EMERGING ELITE ECONOMIES:

A DIACHRONIC PERSPECTIVE OF OBSIDIAN DISTRIBUTION

IN THE BELIZE RIVER VALLEY

THESIS

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ABSTRACT

EMERGING ELITE ECONOMIES: A DIACHRONIC PERSPECTIVE OF OBSIDIAN DISTRIBUTION IN THE BELIZE RIVER VALLEY

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Trade and exchange networks in ancient Mesoamerica were composed of dynamic, interlaced systems defined by a variety of relationships among people from many regions. While the precise nature of these systems remains elusive, new and refined techniques of trace element analysis has allowed for obsidian to be sourced to its place of origin with near 100% certainty. The diversity and density of obsidian recovered from Formative period ritual, burial, and construction contexts at the emerging centers of

Blackman Eddy and Cahal Pech indicate that interactive spheres of trade and exchange of this commodity were well-established at this early date. The obsidian source data reinforces the notion that particular sources were episodically exploited through time. Factors such as emerging social complexity, accumulation of wealth, implementation of authority, and competition will be explored in light of the development of inter-regional trade and exchange networks. With the data acquired from past and recent excavations, and examination of obsidian source data, it is possible to reconstruct obsidian distribution which can be used to examine ancient ritual economies of these early groups in the Belize Valley during the Formative period.

CHAPTER 1

INTRODUCTION TO THE STUDY

The Middle to Late Formative Period (1000 B.C. to A.D. 300) in Mesoamerica marks a time of growing interaction between many groups and communities. In the Maya Lowlands, this temporal frame is characterized by the participation in intricate inter-regional networks of trade and exchange, settlement expansion and population integration, and emerging social complexity evident in the initiation of monumental architecture construction programs and installation of iconographic programs. The most remarkable examples of Formative Period occupations have been found at several sites in the Maya Lowlands; specifically in northern Belize (e.g., Cerros, Colha), the Petén (e.g., Uaxactún, Nakbe, El Mirador, Tikal, Cival), and in the Belize River Valley (e.g., Blackman Eddy, Cahal Pech, Pacbitun). However, this temporal frame remains poorly understood because many Formative Period occupations have been concealed by the massive monumental construction programs raised by the Classic Period Maya (A.D. 300 to A.D. 1000).

In the Belize Valley, most recent investigations of Formative Period occupations have been conducted at the sites of Blackman Eddy — in part, due to salvage efforts

(Garber 2004) — and Cahal Pech (Awe 1992; Garber 2005, 2006; Healy and Awe 1995). As Formative Period deposits are exposed through excavations, details of the dynamic and complex social, religious, economic, and political activities become clearer, and the presence of external complex relationships and long-distance interactions becomes apparent. By defining the elements of Formative occupations as reflected in material culture — specifically through identifying construction sequences, architectural elaborations, and ritual behaviors — the importance of long-distance trade and exchange networks, that resulted in the distribution of exotic items related to "wealth," is unquestionable. Subsequently, the apparent complexity and organization required for developing and maintaining inter-regional networks have also been linked to emerging social complexity (Adams 1977; Andrews 1983, 1990; Hirth 1984; Price 1978; Rathje 1971), and possibly contribute to the spread of, what was to become, a pan-Mesoamerican iconography of authority during the Middle and Late Formative Period (Coe 1977; Freidel 1979; Grove and Gillespie 1992b; Helms 1992; Hirth 1984; Reilly 1991; Ringle 1999).

Obsidian, jade, and marine shell — as well as exotic bird feathers and other perishable items now deteriorated — were among the items traded or exchanged in relatively small amounts during the Middle Formative Period, and increasing in quantity over time. Consequently, technology, iconography, and ideology were also shared through the transfer of goods and commodities. Obsidian, in particular, persisted as a highly valued material as is evident in archaeological contexts, iconography, and ethnohistorical and ethnographic records compiled from a long list of cultures in the distant and recent past in Mesoamerica. Its physical qualities allow for conchoidal fracturing, thus permitting the production of merely flawless and elegant prismatic blades, made possible through a pressure blade flaking technique. Beyond aesthetics, these prismatic obsidian blades are extremely efficient cutting and slicing tools — although less commonly used in households for such tasks due to limited availability in most cases — and were traditionally used in bloodletting rituals and auto-sacrificial ceremonies as a vehicle to communicate with the supernaturals and aid in transformation (Heyden 1988; Saunders 1994, 2001; Schele and Miller 1986).

The importance of the ideology embodied in obsidian throughout Mesoamerica cultures, in both spatial and temporal realms, can be interpreted and defined by its geologically localized occurrence in [volcanic] mountains. Mountains were commonly viewed as sacred places of creation — the *Yax hal witz* or first true mountain of maize — the domiciles of the ancestors and supernatural beings, and also directly linked to production of rain-clouds and rain, therefore being directly tied to fertility (Freidel et al. 1993; Reilly 1996; Saunders 2001; Schele 1995). In fact, Reilly (1996) traces the thematic context of the Lazy-S motif — directly linked to bloodletting and clouds in Classic Maya sculpture — to Middle Formative bas-relief sculpture found in the "cleft" between the twin mountains at the site of Chalcatzingo, in Morelos, Mexico. Further, a bas-relief carving of a figure named El Rey (also known as Monument 1), portrayed with rain drops, clouds, cloud scrolls, sprouting plants, and quetzal birds, is located beside the principal rain runoff channel of Cerro Chalcatzingo and is considered to be the provider of rain (Taube 1995:99). In addition, this creation/fertility narrative, originating in the natural realm, is reinforced and replicated in the physical realm through bloodletting rituals, abundant re-creations of the sacred mountain theme, and reproduction of the cosmos. These sacred themes were further emulated through directionality in architecture and monuments that represent an ideology of authority manifested in political and religious power (Ashmore 1991, 1992; Ashmore and Sabloff 2002; Stone 1992). Subsequently, by association, obsidian was naturally, symbolically, and cosmologically imbued with the intrinsic power of the sacred mountain and thereby, through its use as an apparatus in bloodletting, provided a direct link to the ancestors, the supernatural realm, and fertility.

In early Middle Formative Period contexts, obsidian and other exotic items are often found in association with ritual events such as feasting, dedication, and termination of public structures, as well as interred with the dead, and less often found in domestic contexts. Later in the Middle Formative Period, social hierarchical differences become evident archaeologically by the amount of labor and material invested in construction efforts, coupled with the appearance of public iconographic displays of supernatural and political power, and a more discreet use of exotic items in private and public ritual. Increasing social differentiation and complexity appears to be linked to increasing circumscription, in the Formative Period, of these goods that were used to define authority and rulership during the Maya Classic Period (Freidel 1992; Freidel and Schele 1988a; Helms 1992).

Exchange and trade of non-essential items through well-established networks were well underway by the Early Middle Formative Period (ca. 1000/900 B.C.). Moderate quantities of exotic items have been recovered at the emerging centers of Blackman Eddy and Cahal Pech (Awe 1992; Brown 2003; Garber et al. 2004a; Healy et al. 2004a; Lee and Awe 1995), and at other flourishing Formative Period communities in the Maya Lowlands, such as El Mirador and Nakbe (Hansen 1998), Uaxactun (Ricketson and Ricketson 1937), Cerros (Freidel 1979), and Cuello (Hammond 1991, 1998; Hammond et al. 1990, 1991). Obsidian, in particular, was quarried from several distant volcanic mountain locales and arrived in the Maya Lowlands as a result of extensive "spheres" of inter-regional trade and exchange. Recently, refined procedures of chemical analyses (e.g., neutron activation analysis, X-ray fluorescence) have made possible the association of obsidian artifacts to their places of origins. The precise sources of obsidian can be detected through these procedures because the geological chemical compositions of obsidian vary from source to source; therefore identifying the unique chemical "fingerprint" of a particular obsidian artifact can be used to link the piece to its geologically isolated place of origin. Through refined sourcing techniques and the building of a substantial database, obsidian from the primary, as well as obscure sources in Mesoamerica, can now be sourced with near 100% certainty (Asaro et al. 1978; Cobean et al. 1991; Glascock et al. 1994, 1998, 1999).

Through previous provenience analyses, three major obsidian sources originating in the Guatemalan highlands — El Chayal, San Martin Jilotepeque (also referred to as Río Pixcaya in the literature), and Ixtepeque — appear to have been the primary sources supplying obsidian in the Maya Lowlands, and were acquired through complex networks transporting goods to distances sometimes exceeding 500 km (Dreiss 1989; Nelson 1985). Obsidian from other sources in Mexico, Honduras, and Nicaragua, has also been identified in the Lowlands, although in relatively lower frequencies. Beyond the identification of the sources, it has also become apparent through these studies that spatial and temporal variation exists in the distribution of particular obsidian sources throughout the Lowlands (Awe et al. 1996; Dreiss and Brown 1989; Hammond 1991; McKillop 1989) and elsewhere in Mesoamerica (Cobean et al. 1991; Fowler et al. 1989; Rice 1984, 1985; Sheets et al. 1990).

The focus of this study is to conduct a diachronic and synchronic investigation of obsidian distribution spanning the Formative Period into the Early Classic at the sites of Blackman Eddy and Cahal Pech, located in the Belize RiverValley. Recent source data of 52 obsidian samples recovered from well-defined Formative Period construction sequences and associated ritual deposits from these sites will be used to identify and examine trends in particular source distribution. The source data will also be used to evaluate possible trade relationships that may have existed between the two sites.

Social, economic, cultural, geographical, and political factors no doubt had affects on trade and exchange relations in the Belize Valley and in ancient Mesoamerica as a whole. Subsequently, the temporal framework under which this study will be conducted will allow for investigation of social, economic, cultural, and political elements relating to the gradual emergence of ritual economies during the Formative Period. Previous source data from the Lowlands and examination of systemic and descriptive models of trade and exchange will also aid in this analysis.

Subsequent chapters in this thesis will address various perspectives and models regarding early trade and exchange networks. In addition, aspects of sociocomplexity will also be addressed in light of the development of intricate inter-regional systems. Chapter 2 is an outline of the particular research queries and the methodology employed to address the particular research issues. Chapter 3 is an overview of observed regional trends, cosmology, iconography, and ethnicity aspects associated with Formative period

Mesoamerica, specifically the Maya Lowlands. Discussion of each temporal interval defined for the Formative period follows, and the chapter concludes with an archaeological background for both Blackman Eddy and Cahal Pech. Prior to a summary of current models regarding procurement and distribution of obsidian in the Maya lowlands in chapter 4, the trade and exchange networks of Mesoamerica are discussed in light of emerging social complexity. The results of provenience analysis from Blackman Eddy and Cahal Pech obsidian data are presented in chapter 5, and are accompanied by detailed descriptions of temporal affiliation, associated construction sequences and ritual deposits. Previous obsidian source data is used for comparison. Finally, chapter 6 is a discussion and synthesis of this study.

CHAPTER 2

RESEARCH QUESTIONS AND METHODOLOGY

The wealth of data made available through source analyses — using refined chemical sourcing techniques such as instrumental neutron activation analysis and x-ray fluorescence — has indeed broadened the arenas of trade and exchange studies and has provided answers to the age old question: *where did it come from?* As noted in the previous chapter, elemental source analyses (through instrumental neutron activation analysis [INAA] and x-ray fluorescence) have established that the major obsidian sources found in the Maya Lowlands originated from three primary sources in the Guatemalan highlands: San Martín Jilotepeque, El Chayal, and Ixtepeque (Asaro et al. 1978; Nelson 1985; Sidrys et al. 1976; Stross et al. 1983). Furthermore, the growing set of provenience data have added additional avenues for intra-site and inter-site distribution studies (Awe and Healy 1996; Awe et al. 1996; Dreiss 1989; Dreiss and Brown 1989; Guderjan et al. 1988, 1989; McKillop 1989; Olson 1994), contextual analyses (Fowler et al. 1989; Hammond et al. 1984; Hurtado de Mendoza 1989; Moholy-Nagy 1989; Rice 1984; Sheets 1975), and typological analyses (Awe and Healy 1994; Clark 1987; Lewenstein 1981; 1989; Moholy-Nagy et al. 1984).

Through various investigations and applications of analytical approaches, it has become clear the inherent complexities of inter-regional exchange systems. Moreover, the inherent complexities are illuminated when the logistical mechanisms of transport, complex networks of relationships established through trade and exchange, and factors of socio-political, economic, and religious organization are taken into consideration (Fowler et al. 1989). Nevertheless, source data, coupled with data produced by these various types of analyses, have facilitated in the examination of prehistoric trade within an expanded spatial and temporal frame, and have made it possible to refine, re-examine, and test proposed trade models. These analyses have also aided in the establishment of a general diachronic and synchronic framework from which to examine and compare trends in inter-regional obsidian procurement and distribution over time. Consequently, the work presented here is built upon certain elements of previously proposed models, and the data presented in this study are also an extension of and a contribution to previous distribution, contextual, and diachronic analyses of obsidian trade and exchange.

As noted in chapter 1, the purpose of this study is to conduct a diachronic and synchronic analysis of obsidian distribution at the sites of Blackman Eddy and Cahal Pech, in the Belize River Valley, using neutron activation analysis to chemically source a substantial number of samples of obsidian recovered from well-defined ritual, burial, and architectural deposits from recent excavations. The specific temporal focus of this study is restricted to occupations and associated obsidian data dating from the Terminal Early Formative Period to Late Formative Period (Brown 2003; Garber et al. 2004a, 2004b, 2005; Garber 2006). Chemically "fingerprinting" obsidians from Middle and Late Formative Period contexts at Blackman Eddy and Cahal Pech will allow for an examination of the degree of participation in inter-regional exchange at the community level, accumulation of "wealth" accompanying the emergence of hierarchical social differences, the potential for reconstruction of trade and exchange routes traversing through the Belize RiverValley, and an investigation of any local variations in procurement and distribution between these two major centers during this lesser-known era in Mesoamerican prehistory. In addition, by comparing the Blackman Eddy and Cahal Pech data to the available sourcing data from other communities in the Belize Valley, and from other sites in the Lowlands, similarities or inconsistencies in previously observed trends can be examined.

RESEARCH QUESTIONS

The specific research questions that will be addressed in this study are:

1. What are the main sources of obsidian recovered from Blackman Eddy and Cahal Pech?
2. Are there any major shifts over time evident in the distribution of particular obsidian sources at Blackman Eddy and Cahal Pech, or does the use of one particular source dominate the assemblage throughout the selected temporal frame?
3. Are the sources utilized at Blackman Eddy comparable with the obsidian assemblage at Cahal Pech? If not, what mechanisms may account for the differences?

4. Do the obsidian procurement and distribution patterns from Blackman Eddy and Cahal Pech mimic the spatial and temporal trends observed thus far in the Belize Valley and in the Lowlands as a whole? And what factors may influence variation from the normal trends observed in the sourcing data?

5. What can the information posed in the above questions tell us about the relationship between participation in inter-regional trade and exchange and increased social complexity? What are the possible benefits of participation in these inter-regional networks to the establishment of the public and civic ceremonial centers at Blackman Eddy and Cahal Pech, in the Belize River Valley region? And, is this relationship between participation in spheres of trade and exchange and emerging social complexity visible at other emerging Lowland centers during the Formative period?

METHODOLOGY

To address the research questions posed above, fifty-two obsidian samples recovered from well-defined ritual and associated architectural deposits spanning occupation from the terminal Early Formative Period through the terminal Late Formative Period (1100B.C. to A.D. 300) were submitted to Dr. Michael Glascock at the University of Missouri Research Reactor (MURR) Archeometry Laboratory, in Columbia, Missouri, for source analysis using instrumental neutron activation analysis (INAA). Details of the INAA process have been discussed in detail elsewhere (see Asaro et al. 1978; Cobean et al. 1991; Glascock et al. 1994, 1998, 1999; Vogt et al. 1989). A non-random method of sample selection was employed. Samples were selected by the following established set of criteria: 1) the sample has to be larger than 1 g for the sourcing procedure; 2) the obsidian must have reliable contextual information and associated temporal affiliation; 3) the sample must be associated with Formative Period occupations; and 4) if possible, the total sample set must contain samples from each Formative Period temporal interval (i.e., construction phases/ritual deposits defined by radiocarbon dates and associated ceramic phases). While the main focus is on observing any major shifts in particular obsidian sources within the temporal sequences spanning entire Formative Period sequence, a few samples from Early Classic Period (at Blackman Eddy) were selected for comparison to see if the assemblage followed the established trend of a Late Formative/Early Classic Period shift to El Chayal obsidian. The Cahal Pech assemblage, from the most recent excavations, did not contain obsidian exclusively from the Early Classic Period therefore no samples could be selected to represent this temporal frame.

Nineteen (45 %) of the 42 samples from Blackman Eddy were recovered from ritual deposits while the remaining 23 (55 %) were recovered from well-defined construction sequences. The 42 samples represent 21% of the total obsidian recovered from Structure B1 at Blackman Eddy. Overall, a total of 37 obsidian artifacts (88 percent) are from the 4 Formative period intervals, while the remaining 5 obsidians (12 percent) represent the transition from the Late Formative to the Early Classic period and the Early Classic period exclusively. The sourcing data from Blackman Eddy represents the largest single dataset of sourced obsidian from one locale in the Belize Valley; prior to this study, no obsidian from Blackman Eddy has been chemically sourced. These data will not only substantially increase the dataset for the Belize River Valley, but may also illuminate any minor intricacies not visible in smaller sampling arenas.

Due to the small overall size of the Cahal Pech obsidian assemblage, only 10 samples were selected; however, this sample set represents 30% of the total obsidian recovered from the 2004 and 2005 field seasons. The ten samples from Cahal Pech were also selected in accordance with the established criteria above; 1 complete blade (10%) from a burial context was submitted, 2 blade fragments and 2 flakes (40%) were from ritual contexts, while the remaining 5 samples (3 blade fragments and 2 flakes) (50 %) were recovered from well-defined Formative Period construction sequences. In addition, previous sourcing data from Cahal Pech (Awe et al. 1996) will also be examined.

The sourcing data, accompanied by temporal and contextual information, will allow for the establishment and examination of local diachronic and synchronic patterns of obsidian procurement and distribution during the lesser known Formative Period in the Lowlands. Once the samples are sourced, the data will be used collaboratively with ceramic, architectural, and iconographic data from Blackman Eddy and Cahal Pech, as well as with data from other documented sites in the Lowlands, to identify and reconstruct the ritual economies using statistical temporal and spatial frequencies of obsidian quantities. Moreover, these sites are unique overall in the context of the quality and quantity of well-defined Formative Period occupations, but are also unique in the degree of diversity that exists between these two contemporaneous communities located less than 20 km from one another. Additionally, the strategic locations of Blackman Eddy and Cahal Pech along major river systems no doubt allowed for easier access to goods that entered the valley via established riverine trade routes and may have allowed for these communities to participate in these inter-regional transactions and to possibly serve as minor redistribution nodes. This notion is reinforced archaeologically by the relative abundance of exotic items recovered from Middle Formative deposits. Further, the continual accumulation of "wealth" during the Middle Formative is evident in the amount of labor invested in architecture and in the establishment of a public and civic ceremonial precinct by this early date. Participation in inter-regional spheres of interaction is also evident in artifactual representations of pan-Mesoamerican iconographic elements which may have been used to some degree to constitute authority and consolidate rural populations by way of a common worldview in the growing Belize River Valley region. The results of this study will contribute to a broader understanding of changes in social, economic, cultural, and political structure over this extensive period of time by investigating consistencies and fluctuations of materials transported through trade and exchange networks in this region. The next chapter will discuss Formative Period cultural developments in the Lowlands and evidence for inter-regional interaction in each associated temporal phase.

CHAPTER 3

FORMATIVE PERIOD CULTURAL AND ARCHAEOLOGICAL BACKGROUND IN THE LOWLANDS

By comparison, archaeological investigations of Formative Period occupations in the Maya area are dwarfed by the amount of archaeological excavation that has been conducted at the Classic Period Maya centers. This is due, in part, to the elaborate construction programs of the Classic Maya which have concealed earlier buildings within consecutive layers of architectural modifications over hundreds of years during the Classic Period. In addition, this unbalanced aspect of research also reflects somewhat of a Classic Period-centrism of aligning investigations toward the most grandiose and elaborate of Classic Period manifestations at the largest centers. Consequently, our perspective of early Formative peoples, their lives, and their accomplishments in the Maya region may be somewhat skewed. However, through a blend of academic curiosity and favorable circumstances, discovery and investigation of Formative Period occupations have resulted in a relative wealth of data reflecting various levels of interaction, early settlement, emergence of social differentiation, and early forms of religious manifestations resonated by architecture, portable art, and evidence of ritual (see Awe 1992; Cheetham 1995, 1996; Estrada-Belli et al. 2003; Garber et al. 1998, 2004a, 2004b, 2005; Hammond 1977, 1983, 1986, 1991; Hammond and Gerhardt 1990; Hammond et al. 1991; Lee and Awe 1995; Pendergast 1981; Powis and Hohmann 1995). The first part of this chapter is devoted to summarizing regional trends, ethnicity, and iconography and worldview in the Formative Period Maya Lowlands. The next section of this chapter discusses in more detail the specific chronological sequence which is subdivided into temporal intervals — the Terminal Early Formative (ca. 1100–1000 B.C.), the Early Middle Formative (1000–700 B.C.), the Late Middle Formative (700–350 B.C.), and the Late Formative (350 B.C.–A.D. 300) Periods — defined by settlement patterns, material culture, and iconography. The latter part of the chapter will focus on the archaeological background and recent research conducted at Blackman Eddy and Cahal Pech, in the Belize Valley.

Regional Trends

The Middle and Late Formative Period (1000 B.C. to 300 A.D.) in Mesoamerica encompasses an expansive temporal sequence characterized by the shift from early farming villages to more complex communities defined by hierarchical social distinctions and emerging elitism. This sequence is further identified by participation in low levels of long-distance trade and production of regionally distinct pottery to the development of more complex villages and centers defined by elaborate public architecture, associated ritual and ceremonialism, new technology and iconography, and intricate inter-regional networks of trade and exchange. The social and cultural lifeways during this time are defined by population integration, increased labor and material investment in the construction of public buildings, increased direct or indirect interaction through well-developed and maintained trade and exchange networks, the emergence of social hierarchical distinctions, and early forms of divine kingship. Emerging elitism resulted in hierarchical social divisions and the consequential attainment of authority which was validated by the construction of elaborate public buildings, the proliferation of ritual and ceremony, and the incorporation and distribution of a recognizable religious symbol set (Clark 1997; Freidel 1992; Houston and Stuart 1996:306; Ringle 1999; Schele and Miller 1986). Notable examples of these shifts to increased complexity, outside of the Lowlands, were materialized in great magnitude at the Olmec sites of San Lorenzo Tenochtítlan beginning in the Early Formative Period, and later in the Middle Formative Period at La Venta, and at Chalcatzingo in the Basin of Mexico (Weaver 1993). Many communities in the Maya region witnessed subsequent transformations on a smaller scale in the Middle Formative Period, but it was not until the Late Formative Period that construction programs of great magnitude were administered at the sites of El Mirador in the Petén and Kaminaljuyu in the Guatemalan highlands (Figure 3.1).

The early sequence of the Formative Period and its associated manifestations are represented by only a handful of well-documented sites in the Maya region and at a few others solely by the presence of ceramics. Contextually, a great deal of data has been gathered from primary deposits — from sites in northern Belize, the Pasión region, and the Belize River Valley — which has enabled for the reconstruction of initial settlement and early social and cultural developments on a regional-specific scale as well as for broader spatial and temporal comparison to neighboring regions. On the contrary, evidence of Late Formative Period occupations are rather numerous in the Lowlands, as has been observed through archaeological excavations, and most sites appear to have been settled at least by the Late Middle Formative Period.

Ethnicity

The diversity in early ceramics, the appearance of "Olmec-like" stylistic motifs — now considered to be more of a pan-Mesoamerican iconographic phenomenon — and evidence of conflict have sparked interesting debate regarding the ethnicity of earliest settlers and/or possible migrations in the Maya region and exactly how to distinguish clues of ethnicity in the archaeological record. The use of the term *Maya* has been applied to discuss this entire region and is largely based on the initial observance of Late Classic Period Maya centers at the beginning of studies in this region. Thus the use of the term *Preclassic* implies that the earliest groups in this region were indeed ethnic Maya. There is evidence, which will be addressed briefly, that suggest some of these early groups were of non-Maya origin. Consequently, the term *Formative* is used, as opposed to the term *Preclassic*, to describe the early cultures in this region.

Debates over ethnicity have resulted in pervasive arguments using ceramic data, art styles, hieroglyphic writing, and linguistic analysis to exploring the possibilities of Mixe-Zoque origins or in-situ Maya development (see E.W. Andrews V 1990; Ball 1976; Ball and Taschek 2003; Brown and Garber 2003; Clark et al. 1998; Coe 1977; Dahlin et al. 1987; Demarest and Sharer 1982; Freidel 1979; Justeson et al. 1983; Lowe 1977; Sedat 1992; Sharer and Gifford 1970). An expression of ethnicity may be found in ceramic data from the early Formative and early Middle Formative Periods that show regional and local diversity at certain sites in utilitarian ceramic assemblages exhibiting stylistic similarities to ceramics from culturally distinct distant locales in the highlands, the Olmec heartland, and southeastern Mesoamerica (Ball and Taschek 2003). Trade and exchange of utilitarian ceramics is typically uncommon because these ceramics are a part of the common household assemblage and are often produced locally, and therefore can often provide links to certain cultural and ethnic identities. For example, the utilitarian wares of the Kanocha phase ceramics (ca. 1100 B.C.) from Formative Period occupations at Blackman Eddy (Garber et al. 2004a:27) are similar in style and form to contemporary ceramics in Honduras. The Chotepe phase ceramics from the site of Puerto Escondido in Honduras (see Joyce and Henderson 2001) are the closest stylistic parallel to the Kanocha dull-slipped ware at Blackman Eddy. The stylistic aspects of the Kanocha dull-slipped ware and Chotepe pottery are similar in the use of differential firing techniques that produce fire clouding on cream or white shipped vessels, and also by the incised and carved motifs appearing on flat-bottom flaring bowls.

The distribution of the incised iconographic elements found on Kanocha and Cunil phase ceramics — specifically the kan cross and avian-serpent motifs (Figure 3.2) — indicate that the groups in the Belize Valley participated in the widespread pan-Mesoamerican Middle Formative symbol system shared among many groups in several regions of Mesoamerica (Garber et al. 2004a:32). The exact origins of this symbol set remain elusive and interestingly, these motifs are absent from the early Swasey and Bolay phase ceramics of northern Belize (Kosakowsky and Pring 1998), and are not present in later Jenney Creek, Kanluk (Cahal Pech's Jenney Creek), or Mamom ceramic complexes (Garber et al. 2004a:32). The absence of these motifs suggests a spatial and temporal restriction in the distribution which may represent exclusive relationships between groups, possibly ethnic ties, or favorable geographic location of these communities along specific trade routes (see Zeitlin 1994).

Iconography and a Constructed Cosmology

An elaborate symbol set defining a worldview and associated cosmology spread throughout Mesoamerica during the Formative Period. In the Maya area, at the dawn of the Middle Formative, we begin not only to see evidence for inter-regional imports of exotic materials, but also a distribution of motifs communicating a "Pan-Mesoamerican" belief system. These motifs were first painted and inscribed on pottery and portable objects, and later manifested geographically in town layout, architecture, ritual deposits, and burials. Motifs appearing on Cunil and Kanocha ceramics, such as the kan cross, the hand-paw-wing (i.e., avian serpent imagery), the flaming eyebrow (akin to the Olmec dragon), and trefoil imagery (see Figure 3.2) indicate participation in this symbol exchange at an early date (ca. 1100 B.C.) (Garber et al. 2004:36; Healy et al. 2004a:114). These motifs are viewed as abstract symbols for communicating complex themes of creation, death, transformation, and rebirth in a multi-layered universe, and are further symbolically represented by blood, fish, and maize imagery, and materialized by use of color, numbers, cardinal directions, and raw materials (Garber et al. 2004b; Ringle 1999; Stross 1994). For example, the color red is associated with the East, black with West, white with North, and yellow and green with South. The cardinal directions are further aligned with the vertical planes and horizontal axes forming the levels of multi-layered universe, often depicted as the "worldtree" or axis mundi. North and "up" represent the thirteen levels of celestial realm, South and "down" represent the primordial sea and nine levels of the underworld; East and West form the cyclical path of the sun and moon and signify of the travels of the supernaturals, ancestors, and divine rulers to the conquer the lords of the underworld and emerge in the East with the rising sun. The materialization of these concepts are found in ritual deposits of jade and greenstone, the color linked to "south," and shell (directly akin to water) associated with structures in southern precincts of a center or below structures and floating in the primordial sea. Also, West associated with black, ironically the color of many of the obsidian blades used in bloodletting, which signifies the death of the sun as it sets. East is associated with red, the color of blood, and signifies the rebirth of the sun and victory over the lords of the underworld (which reside in the south). This theme of "blood equals transformation/rebirth" is one of the central themes represented graphically in sculpture throughout Classic Period art (Schele and Miller 1986), and likely a celebrated and re-enacted cyclical event tied to the maize cycle. The "Three Stone Place" of creation at the base of the first true mountain of maize is another common theme illustrated symbolically and iconographically (specific examples will be discussed in Chapter 5). These themes are empowered by a cosmology constructed around myth and reinforced in the natural world, not only replicated physically in architecture and sculpture, but likely re-enacted and celebrated through ritual and the restoration and renewal of buildings and plazas.

This early imagery and symbolism tied to themes of creation, death, transformation, and rebirth has been linked to later groups through ethnohistoric and ethnographic accounts as well as by surviving texts, such as the Popol Vuh. Stross (1994:13) notes, "Mayan and other Mesoamerican traditions allege that humans of the present era have been created from maize and autosacrificial blood, whereas previous eras saw ancestral humans transformed into fish during a great flood. Thus, maize, and before that fish, are both human ancestors." This is narrated in the personages of the Hero Twins, in the Quiché Maya sacred book of creation, the Popul Vuh, and reiterates the transformational channel between humans and maize and humans and fish. For example, while the boys visit the underworld, they are replaced by maize in the middle world, and after their bones are ground and thrown into the river by the lords of the Underworld, they transform into catfish before reappearing as young men (Tedlock 1985). Another narrative of death, transformation, and rebirth that is transmitted iconographically and symbolically, as early as the Terminal Early Formative/Early Middle Formative Period, is of the twins planting their father's decapitated head in the ground which sprouts and grows into a maize plant (Tedlock 1985). This narrative has been symbolically translated in tableaux within a Jenney Creek (also coined Kanluk by Awe 1992) phase cache/burial consisting of a skull and jade beads placed inside a large red bowl (type variety pending) located below a series of Classic Period plaza floors in the central axis of Plaza B at Cahal Pech (Garber 2006).

The Transitional Terminal Early Formative Period to the Early Middle Formative Period (ca. 1100/1000 B.C.)

The Terminal Early Formative Period marks the earliest documented sedentary occupation in the Lowlands thus far and places the beginnings of village life at ca. 1100/1000. Evidence for occupations dating to the era has thus far only been found in the Belize River Valley. These early occupations are characterized by circular and apsidal posthole patterning atop bedrock, associated bedrock features and artifacts, and in the discovery of the Cunil ceramic complex at Cahal Pech and the Kanocha complex at Blackman Eddy (Awe 1992; Garber et al. 2004a, 2005). Of special note, "the iconography and general quality of the Kanocha [and Cunil] phase ceramics represent a well-developed technology, not the first attempt at producing ceramics," which triggers curiosity regarding the origins of these early groups settling in the Belize Valley (Garber

2004:28). Cunil and Kanocha ceramics were also found in association with non-local exotics, such as jade and obsidian, which once again reiterates a developing early Middle Formative Period trend of long-distance inter-regional interaction. These ceramic phases and associated deposits will be discussed in detail (in the archaeological background sections for each site) following the temporal summaries of the lowland Formative Period.

The Early Middle Formative Period (1000–700 B.C.)

Although geographically and quantitatively limited, early Middle Formative Period occupations are represented by an inventory of relatively well-defined ceramic complexes, modest private and public architecture, simple farming and supplemental subsistence resource acquisition, inter-regional interaction, and demonstration of small-scale ritual and ceremonialism. In lieu of the entire list of the characteristics noted above, evidence for early Middle Formative Period occupation at some sites (e.g., in the Petén region) has been identified solely by the presence of early ceramic complexes. Nevertheless, a more complete chronological inventory has been built through intensive investigation and ideal archaeological circumstances from sites in the Pasión region, northern Belize, and the Belize River Valley.

Sites in the northeastern Petén, where primary contextual information is lacking, evidence for early Middle Formative Period occupation is defined solely by the presence of the Eb ceramic complex (700–500 B.C.) found at Tikal (D. Rice 1976). However, in the Yaxha-Sacnab basin, a related ceramic complex, called Ah Pam, was discovered in construction fill and associated midden deposits at the site of Yaxha Hill (D. Rice 1976: 436). Both the Eb and Ah Pam complexes are divided into early and late facets corresponding to early and late Middle Formative occupation sequences; however, the Ah Pam facet definitions are defended by primary stratigraphic evidence (Rice 1979) and not solely by ceramic seriation as in the case of the Eb ceramic complex.

Data for early Middle Formative Period occupation in the Pasión region presents a more complete picture than data from the Petén, as evidenced at Seibal and Altar de Sacrificios (Andrews 1971; Willey 1977). The earliest pottery, coined the Xe complex at Altar de Sacrificios and Real Xe complex at Seibal, were recovered from the lowest stratigraphic levels within early architecture and midden deposits at both sites, and in conjunction with radiocarbon dates, suggest that these sites were initially occupied from 900 to 600 B.C. (Sabloff 1975; Willey 1973). The earliest forms of architecture, as suggested by Willey (1977:386), consisted of pole-and-thatch houses clustered around small plazas which composed small village communities. Additionally, early forms of ceremonialism and ritual are indicated by an "Olmec-like" cache of jade celts and a bloodletter from Seibal, and by the recovery of a sandstone altar at Altar de Sacrificios (Willey 1977:138). Moreover, the jade items found in the ritual cache at Seibal, plus the presence of obsidian in these stratigraphic levels, affirm the involvement in long-distance trade and exchange networks at this early date.

To date, northern Belize has the largest number of sites with evidence for early Middle Formative Period occupations, specifically the remarkable examples recovered from investigations at Cuello and Colha (Hammond 1977, 1991; Hammond and Gerhardt 1990; Hammond et al. 1979, 1991, 1995). This large number of early components, Awe (1992:29) suggests, is probably a reflection of concentrated archaeological research "rather than an actual pre-eminent concentration of early Middle Formative Period settlements." During this time, the people of Cuello lived in apsidal-shaped houses with lime-plaster and thatch supported by a skeleton of wood poles atop low limestone and tamped marl platforms. Clusters of these domiciles were arranged around small public areas or plazas (Hammond and Gerhardt 1990:464). Burials with simple grave goods are found beneath household floors (Hammond 1998). Once again, presence of highland obsidian, as well as granite from the Maya mountains, indicate the community's participation in inter-regional trade and exchange (Hammond 1986). Similar elements of early Middle Formative Period occupation from sites in the immediate area such as Santa Rita, Nohmul, and Kichpanha (Chase and Chase 1987; Hammond 1983, 1986; Reese and Valdez 1987) have also been recovered and have greatly enhanced our understanding of the Middle Formative Period regional culture-scape as a whole.

Analysis of the Swasey ceramic complex and associated radiocarbon dates suggests that sedentary village life began at the site of Cuello approximately 900 B.C. (Kosakowsky 1987). Swasey phase ceramics and associated carbon were recovered from deep stratified structural deposits at the base of a Late Formative Period platform. Initially, controversy surrounded Swasey phase ceramics when preliminary analysis of radiocarbon data suggested the earliest phase of occupation at Cuello began roughly 4,000 years ago (ca. 2000 B.C.) (Hammond 1977, 1984; Hammond et al. 1979). Consequently, considerable debate ensued promptly after the dates were released over the definition of the Swasey phase ceramic complex because: (1) the possibility of a ceramic and cultural tradition whose complexity far transcends any other cultural manifestation in Mesoamerica at 2500 to 2000 B.C. was unlikely, (2) the 1000-year duration of the complex and lack of intrinsic changes observed in other Mesoamerican ceramic complexes through this time, and (3) other Swasey-like ceramics from nearby sites did not adhere to the Swasey temporal designations at Cuello. Calibrated radiocarbon dates from the nearby sites of Colha (Hester et al. 1982; Potter et al. 1984) and Santa Rita (Chase and Chase 1987), for instance, date the Colha Swasey-like Bolay complex and similar pottery from Santa Rita to the Middle Formative Period (ca. 1000-600 B.C.). Subsequently, through several years of debate, refining the chronological sequence through ceramic analysis (Kosakowsky 1987) led to the subdivision of Swasey into the Swasey and the Bladen complexes. With the use of ceramic analysis and additional calibrated radiocarbon dates, the Swasey phase ceramic complex has been redefined as an Early Middle Formative Period development (beginning ca. 900 B.C.) and is comparable to other early pottery in the Maya area (Andrews 1990; Andrews and Hammond 1990; Kosakowsky and Pring 1998).

Beginning with Willey's investigations in the 1950's (Willey et al. 1965), the Belize River Valley has become one of the most intensively studied regions in the Maya Lowlands, although intense examination of Formative Period occupations represents a post-1990's phenomenon. Settlement studies and test excavation of "house mounds" were conducted at many Belize Valley sites by Willey and his colleagues (Willey et al. 1965); the most intensive excavation occurred at the site of Barton Ramie (Figure 3.3) where evidence of the first inhabitants in a long history of occupation at the site was discovered. The primary pottery types used by these early peoples were Jocote Orange-brown and Savana Orange wares and were defined by Gifford (1976:61) as an early facet of the Jenney Creek Ceramic Complex, which he assigned to a pre-Late Middle Formative Period (ca. 900–600 B.C.; pre-Mamom) component. Within the last two decades, the appearance of three additional distinct ceramic complexes — Mai ceramics recovered just above bedrock at Pacbitun, Kanocha at Blackman Eddy (Garber et al. 2004) and Cunil at Cahal Pech (Awe 1992) — amplifies the already diverse ceramic representations of the these settlers in the Maya region. The Mai Ceramic Complex is typologically close to the Jenney Creek complex, and associated radiocarbon dates place the ceramics and the beginnings of habitation at Pacbitun near 900 B.C. (Healy 1990:256; Healy et al. 2004b:223), which also coincides with dates for early facet Jenney Creek at Barton Ramie. On the other hand (as previously discussed), Cunil and Kanocha with their associated radiocarbon dates, predate all ceramics discovered thus far in the Belize Valley placing their first appearance conservatively at ca. 1100/1000 B.C. (Garber et al. 2004; Healy 1999; Healy and Awe 1995).

The Late Middle Formative Period (700–350 B.C.)

Conclusive evidence exists for the initial settlement of most sites in the Central Lowlands by the beginning of the late Middle Formative Period (ca. 700 B.C.) (Hammond 1986). Although a degree of regional and local variability is still present, the late Middle Formative Period is characterized by increasing homogeneity evident in the pan-lowland distribution of Mamom ceramics, increased labor and material investment in the raising of public buildings, appearance of social complexity and emerging elitism, larger scale ritual and ceremonialism, evidence of conflict and competition, the spread of "Pan-Mesoamerican" iconographic elements, and increased participation in the established networks of long-distance trade and exchange (Awe 1992; Chase and Garber 2004:7; Sharer 1992:66-70; Stross 1994). These characteristics are thought to reflect patterns of population growth coupled with geographical expansion and increased cultural complexity (Awe 1992:34). Specific examples are found in the increasing densities of settlement in the late Middle Formative Period (Willey et al. 1965), and also by precursory architectural and spatial compositions reflective of later Classic Period plaza arrangements at a smaller scale at central lowland sites such as Cerros (Freidel 1979; Freidel and Schele 1988a; Scarborough and Robertson 1986), Cuello (Hammond 1991; Hammond and Gerhardt 1990; Hammond et al. 1991), Lamanai (Pendergast 1981), Altar de Sacrificios (Willey 1973, 1977), and Nakbe (Hansen 1998:55–62).

The Late Formative Period (350 B.C. – 300 A.D.)

The Late Formative Period is marked by the social, political, and religious complexity evident in the implementation of large-scale construction programs and public displays of authority, as witnessed at the lowland sites of Tikal, Seibal, Uaxactun, Nakbe, Cerros, Colha, and Lamanai, and at an even grander scale at El Mirador (Figure 3.4). Emergent social hierarchies, socio-political power, and the formalization and legitimization of religious and political institutions represented by an observed unity in elite material culture is apparent in the architectural layout of centers that corresponds with the constructed cosmology (Ashmore 1991, 1992; see also the *Iconography and a Constructed Cosmology* section above). This unity is most recognized in the incorporation of iconographic embellishments as public (e.g., stucco façade masks representing the sun god "Kinich Ahau") and private displays (e.g., the San Bartolo murals [see Saturno 2006]) of supernatural and political power, and in the sculptural programs producing stelae and portable art (e.g., the Hauberg stela; and adornments such as the Pomona earflare; and Cerros "bib style" jade pendants). Hierarchical institutions were not only represented by manifestations of public displays of authority, but also exercised a powerful worldview that aided in uniting all realms of social, economic, religious, and political activities and institutions (Freidel 1979, 1992; Freidel and Schele 1988a, 1988b; Noble 1998).

Also apparent during the Late Formative is the increased interaction between the Highlands and the Lowlands, represented by corresponding appearance or increased densities of non-local, and non-essential, materials at many sites. Transshipment nodes begin to appear along the coast, like Wild Cane Cay and Moho Cay (McKillop 1989a, 1996; McKillop et al. 1989) and San Juan on Ambergris Cay (Guderjan et al. 1988, 1989). Possible trading or redistribution centers like Tikal (Nelson 1985:639; Hammond 1972, 1976) and Cerros (Friedel 1979:50) begin to take a more active role in inter-regional trade and exchange networks. Furthermore, smaller centers, advantageously located along established trade routes, may have served as local minor redistribution nodes.

Although these simple temporal summaries do not address many of the intricacies regarding ceramic data, iconography, and settlement studies of the Formative Period cultures, they do highlight general emergent patterns and trends observed over the broad temporal sequence and provide a "sequence of events" to illuminate the relationships of the early patterns to later manifestations. These observations are only made possible by consequence of concentrated research efforts in the past few decades in northern Belize (Hammond 1977, 1983, 1986, 1991; Hammond and Gerhardt 1990; Hammond et al. 1991, 1995; Hester et al. 1982), the Belize River Valley (Cheetham 1995, 1996; Garber 2004, 2005; Garber et al. 1998, 2004; Healy 1990, 1999; Healy and Awe 1995; Healy et al. 2004a, 2004b; Lee and Awe 1995; Powis and Hohmann 1995), the Pasión region

(Willey 1977), and the northeastern Petén (Culbert 1977; Rice 1984; Rice et al. 1985) in which a broader and more detailed perspective regarding early inhabitants in the Lowlands has emerged.

BLACKMAN EDDY

The site of Blackman Eddy is located downstream from the confluence of the Macal and Mopan Rivers in the Belize River Valley and has evidence of extensive occupations from the Terminal Early Formative Period (ca. 1100 B.C.) into the Late Classic Period (ca. A.D. 900) (Garber 2004) (Figure 3.5). Recent excavations conducted at Blackman Eddy have revealed a complex yet well-defined chronological sequence spanning from its Formative Period founding to its collapse during the Late Classic Period. Unauthorized bulldozing activities in the mid-1980's resulted in the bisection of the largest structure at the site, leaving open the danger for structural collapse and a further possibility of more damage occurring to the structure. Hence, these unusual circumstances created an opportunity to examine an entire construction sequence spanning approximately 2,000 years, and especially to examine intact Early Middle Formative Period deposits that are notoriously rare in the Maya Lowlands. In 1994, as requested by the Belize Department of Archaeology, the Texas State University–San Marcos Belize Valley Archaeology Project began intensive excavations and documentation of the construction history of Structure B1, in addition, block and trench excavations were conducted in most of the other structures at the site to record construction sequences and to establish an intra-site chronology (Brown 2003; Garber et al. 2004a, 2004b) (Figure 3.6).

A single horizontal block excavation of an area approximately 150 m² focused in Structures B1 resulted in the identification of twenty distinct construction phases —17 of which date to the Formative Period (Table 2.1) — and associated ritual deposits (Garber et al. 2004a:26). A well-established ceramic chronology and radiocarbon dates (Table 2.2) from these sealed ritual contexts and clear construction episodes from Blackman Eddy have aided in the delineation of four distinct Formative Period temporal units and two Classic Period temporal units: Kanocha phase (1100 B.C. to 900 B.C.); Early Facet Jenney Creek phase (900 B.C. to 700 B.C.); Late Facet Jenney Creek phase (700 B.C. to 300 B.C.); Barton Creek phase (350 B.C. to A.D. 300); Hermitage phase (A.D. 300 to A.D. 600); and Tiger Run phase (A.D. 600 to A.D. 900) (Garber et al. 2004a: 27) (see Chapter 5 for more detailed information about each phase).

CAHAL PECH

The site of Cahal Pech is located approximately 20 km upstream from Blackman Eddy, on a hill overlooking the modern town of San Ignacio, Cayo District, and the Macal River (see Figure 3.7). The Cahal Pech site core consists of 34 structures, many of which likely have Formative Period components (Figure 3.8). Construction programs of the Formative Period to the Classic Period resulted in massive monumental architecture consisting of range structures, temple mounds, courtyards, plazas, and ballcourts spread out over 10 km. Many settlement clusters, also with monumental architecture, surround the site core and are situated along the terraces of the hill and throughout the river valley (Figure 3.9).

Numerous archaeological investigations have been conducted at Cahal Pech in the last half century, but more rigorous research of Formative Period occupations in the site core, as well as in surrounding settlements has occurred within the last 15 years (Awe 1992; Cheetham 1995, 1996; Garber 2006; Garber et al. 2005; Healy and Awe 1995; Healy et al. 2004a; Lee and Awe 1995; Powis and Hohmann 1995). Excavations near Structure B4 in Plaza B revealed extensive Formative Period deposits that are clear subdivisions of four Early and Middle Formative Period architectural sequences. The earliest ceramic material, called Cunil (Awe 1992) dates to the Terminal Early Formative Period (ca. 1100 B.C.). Subsequent years of investigations have aided in refining the ceramic chronology of Cunil material and have enhanced our understanding of these early occupations.

Recent investigations conducted by the Texas State University–San Marcos Belize Valley Archaeological Project (BVAP) have revealed a sequence of occupations under the Classic Period floors in Plaza B, representing Terminal Early Formative Period occupations atop bedrock to a series of Middle Formative Period structures, with associated ritual deposits and features. A substantial amount of exotic items, as well as the relative complexity of the Middle Formative platforms, suggests emerging social differentiation at this early time. The temporal phases are defined by the existing ceramic chronology and associated calibrated radiocarbon dates (Table 3.3). These Formative Period phases are divided into the Cunil phase (1100 B.C. to 900 B.C.), Early Facet Kanluk/Early Facet Jenney Creek phase (900 B.C. to 700 B.C.), Late Facet

Kanluk/LateFacet Jenney Creek phase (700 B.C. to 300 B.C.), and the Xacal phase (350 B.C. to A.D. 300). Chapter 5 will have a more detailed description of individual temporal units and associated cultural manifestations.

DISCUSSION

Archaeological investigations have resulted in a clearer picture of Formative Period occupations and the related developmental sequences contributing to the emergence of social differences during this time. The shift from small agricultural villages to larger public and civic ceremonial precincts defines Formative Period cultural manifestations. Architectural elaboration over time, ritual behaviors, and participation in inter-regional system of goods, ideas, and technology may have allowed for accumulation of wealth. Evidence of increasing wealth and emerging elitism at many sites discussed above, particularly the two that are the focus of this study, is apparent in the increased investment of labor and materials in construction, the quality and quantity of goods left as ritual deposits, and the use of public displays of authority. The forthcoming chapter is a discussion of models regarding emerging social complexity, accumulation of wealth, and participation in inter-regional trade and exchange networks.

Figure 3.1. Formative period sites in the Maya area.

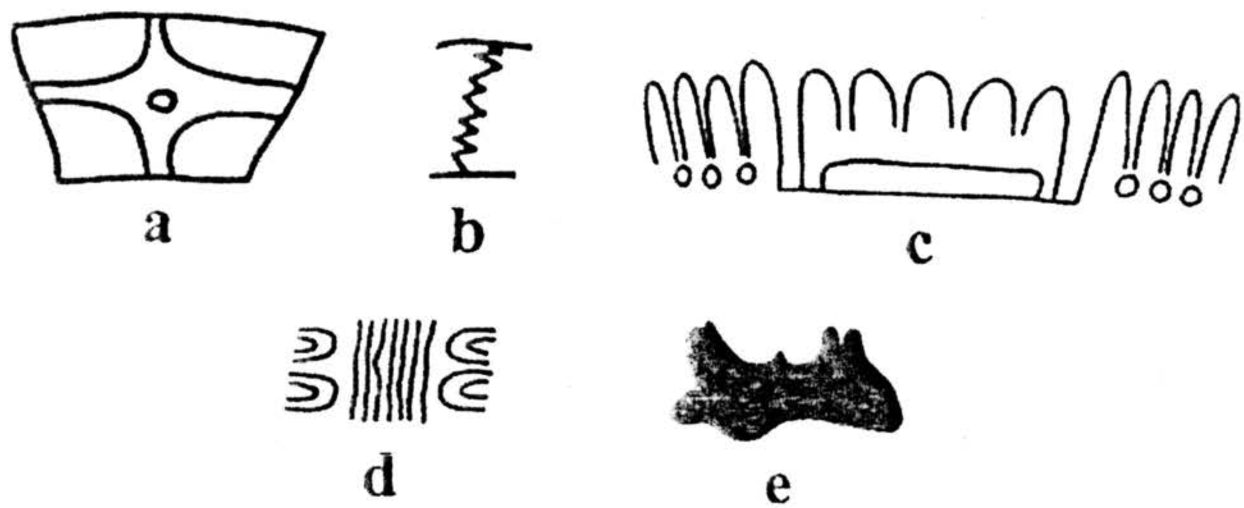

Figure 3.2. Motifs from Cunil and Kanocha ceramics: (a) kan cross; (b) lightning; (c) hand-paw-wing (avian serpent); (d) music bracket; (e) flaming eyebrow (after Healy et al. 2004a:114).

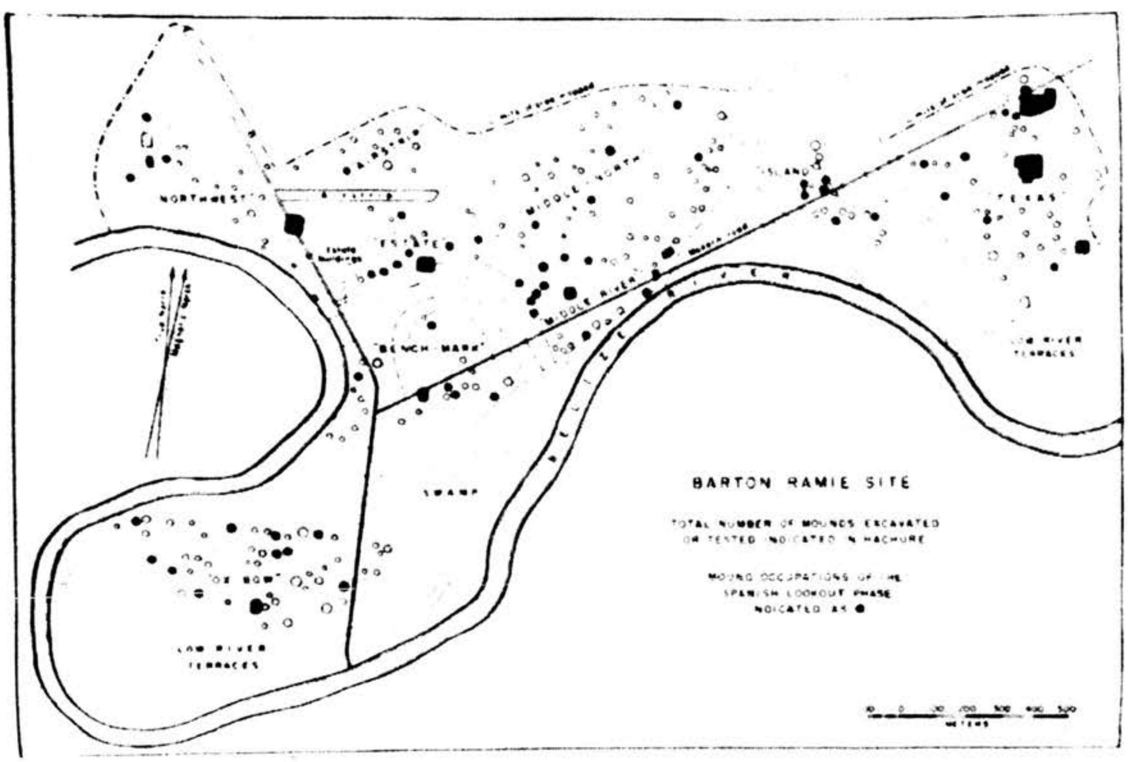

Figure 3.3. Plan of Barton Ramie and structures excavated by Willey (drafted by James F. Garber after Willey et al. 1965:277).

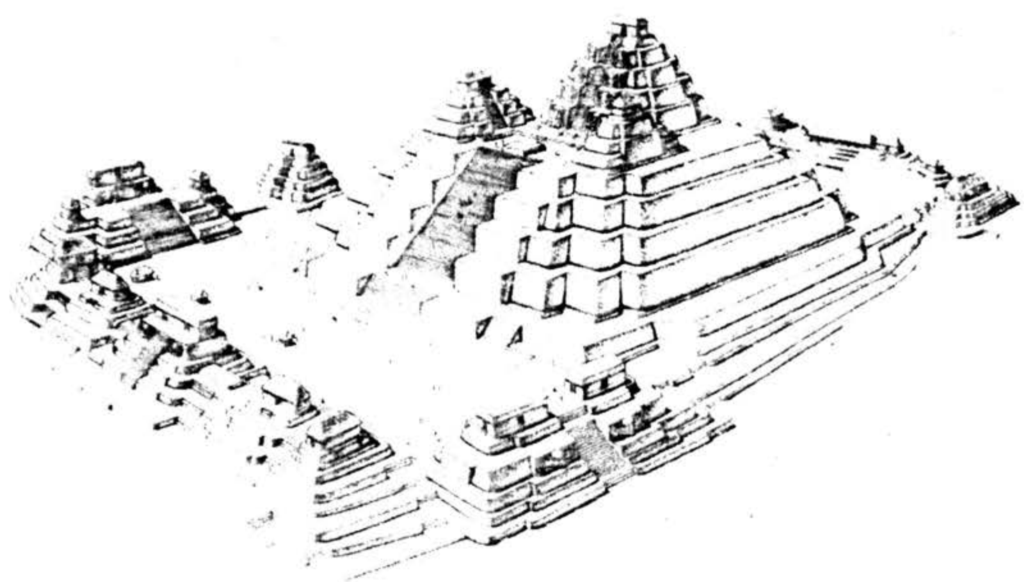

Figure 3.4. Artist's rendering of the El Tigre Group, El Mirador, Guatemala (drawing by Terry Rutledge in Hansen 1998:78).

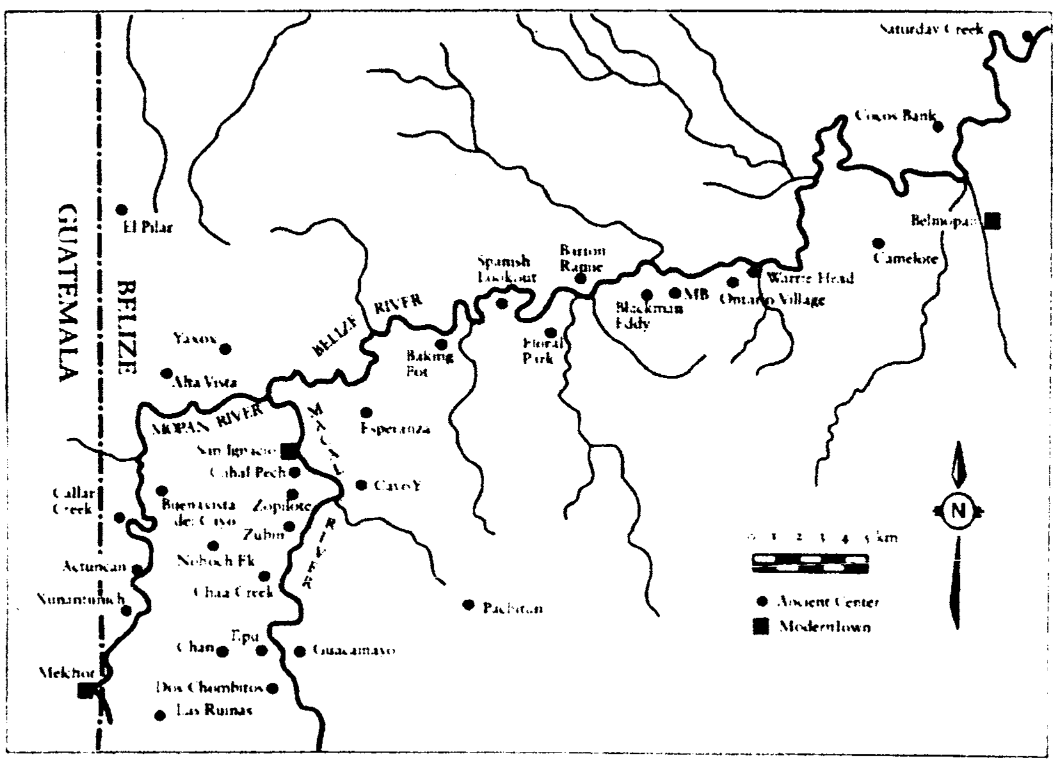

Figure 3.5. Map of the Belize River Valley (from Garber et al. 2005:28).

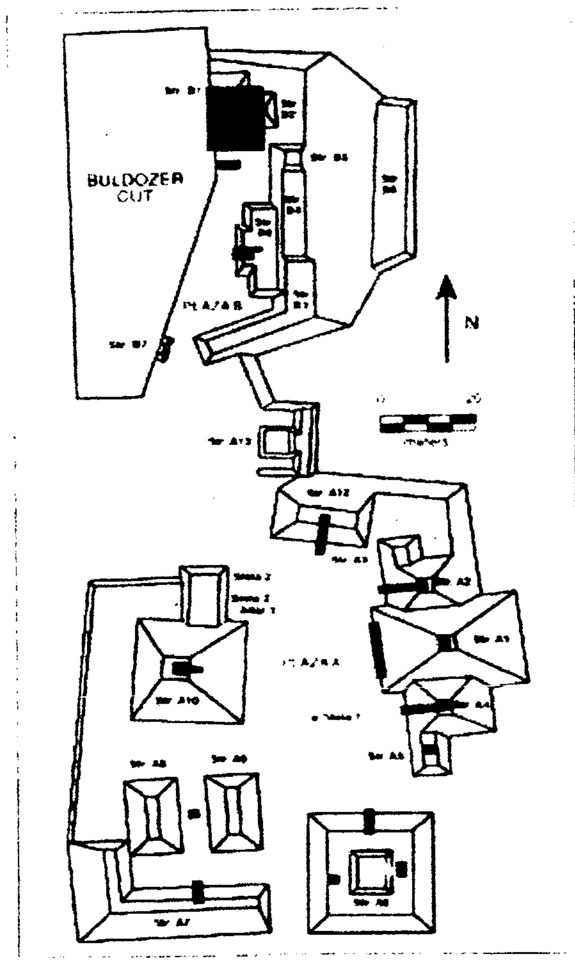

Figure 3.6. Map of Blackman Eddy site core (from Garber et al. 2004b:50).

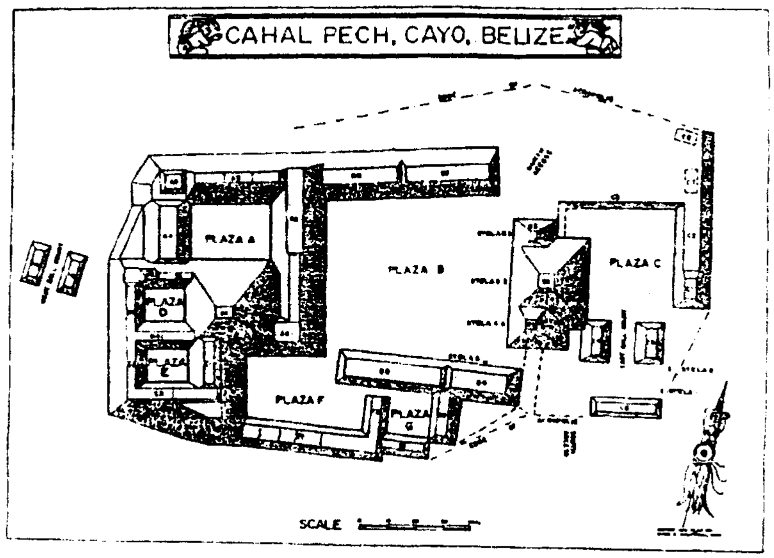

Figure 3.7. Map of Cahal Pech site core (from Awe 1992).

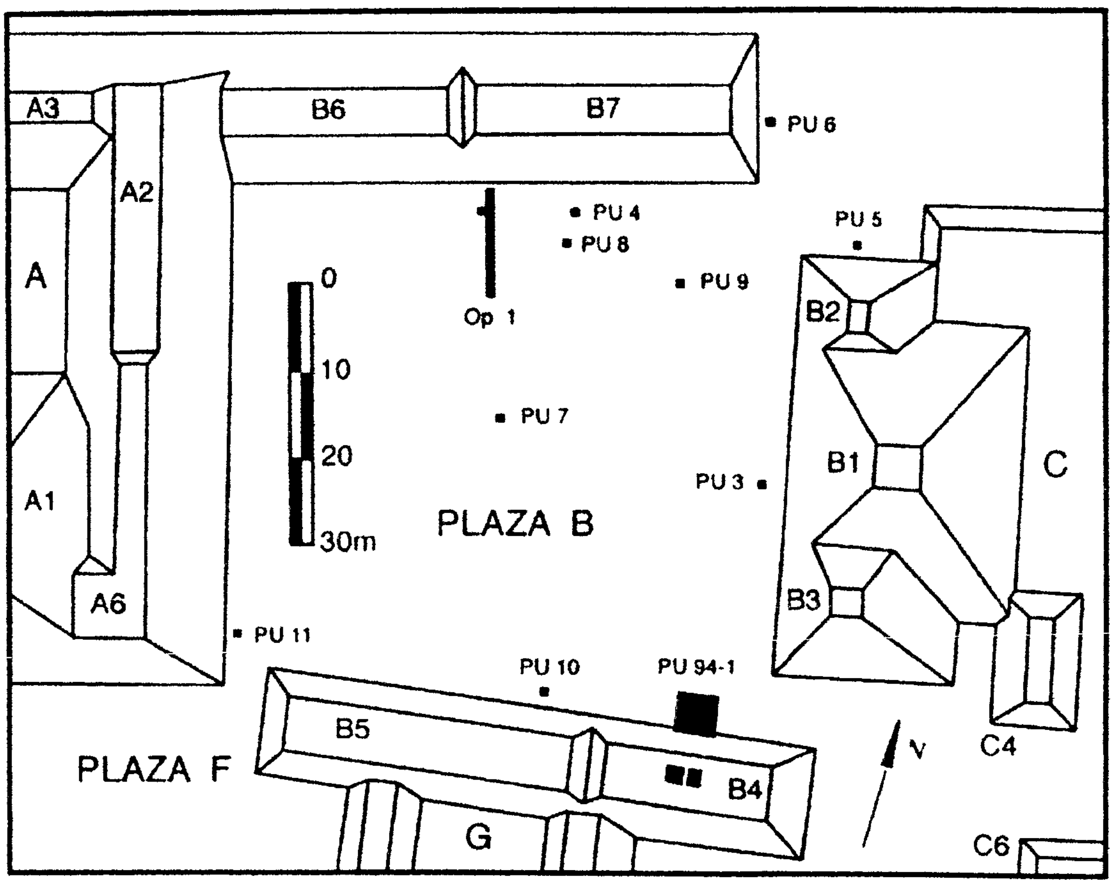

Figure 3.8. Cahal Pech Plaza B previous investigations; Texas State excavations are represented by Op. 1 (after Healy et al. 2004).

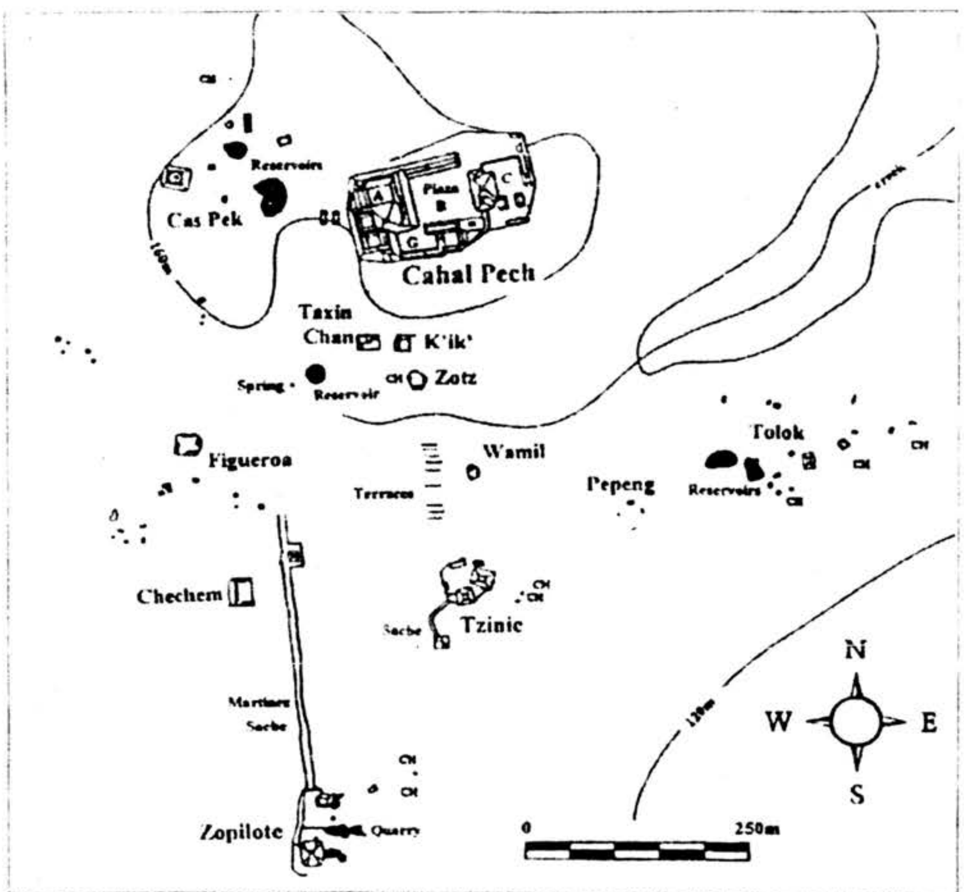

Figure 3.9. Cahal Pech site core and surrounding settlements (from Healy et al. 2004).

Table 3.1. Middle Formative construction sequences of Blackman Eddy Structure B1.

Structure	Period	Ceramic phase	Date
B1-1st	Late Classic	Tiger Run	600 A.D.–900 A.D.
B1-2nd-a	Early Classic	Hermitage	300 A.D.–600 A.D.
B1-2nd-b	Early Classic	Hermitage	300 A.D.–600 A.D.
B1-3rd-a	Late Preclassic	Barton Creek	350 B.C.–300 A.D.
B1-3rd-b	Late Preclassic	Barton Creek	350 B.C.–300 A.D.
B1-3rd-c	Late Preclassic	Barton Creek	350 B.C.–300 A.D.
B1-3rd-d	Late Preclassic	Barton Creek	350 B.C.–300 A.D.
B1-3rd-e	Middle Formative (late)	LJC	700 B.C.–350 B.C.
B1-3rd-f	Middle Formative (late)	LJC	700 B.C.–350 B.C.
B1-3rd-g	Middle Formative (late)	LJC	700 B.C.–350 B.C.
B1-4th	Middle Formative (late)	LJC	700 B.C.–350 B.C.
B1-5th	Middle Formative (early)	EJC	900 B.C.–700 B.C.
B1-6th	Middle Formative (early)	EJC	900 B.C.–700 B.C.
B1-7th	Middle Formative (early)	EJC	900 B.C.–700 B.C.
B1-8th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.
B1-9th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.
B1-10th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.
B1-11th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.
B1-12th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.
B1-13th	Middle Formative (early)	Kanocha	1100 B.C.–900 B.C.

Notes: EJC = Early Jenney Creek; LJC = Late Jenney Creek.

Table 3.2. Radiocarbon dates from Blackman Eddy (from Garber 2004a).

Location	Phase	Beta No.	Radiocarbon age b.p.	Radiocarbon age b.c.	Calibrated 1 sigma b.c.	Calibrated 2 sigma b.c.
BR-F3	Kanocha	122281	2990 ± 60	1040 ± 60	1295-1120	1395 (1215) 1015
BR-F5b	Kanocha	162573	2800 ± 40	850 ± 40	1000-900	1030 (930) 840
BR-F5a	Kanocha	159142	2750 ± 40	800 ± 40	920-830	990 (900) 820
Bedrock	Kanocha	122282	2730 ± 50	780 ± 50	910-820	980 (845) 805
BR-F2	EJC	162571	2420 ± 40	470 ± 40	740-710 and 530-410	760-620 and 590 (420) 400
BR-F1	EJC	162570	2460 ± 40	510 ± 40	760-620 and 590-420	780 (740, 710, 530) 410
BR-F4	EJC	159144	2450 ± 40	500 ± 40	760-650 and 560-420	780 (520) 400
B1-7th	EJC	162572	2340 ± 60	390 ± 60	410-380	740-710 and 530 (400) 360 and 290-230
B1-6th	EJC	159146	2430 ± 40	480 ± 40	750-700 and 540-410	700 (500, 460, 430) 400
B1-5th	EJC	122279	2500 ± 50	550 ± 50	780-515	795 (760, 635, 560) 410
B1-5th	EJC	103956	2440 ± 60	490 ± 60	760-635 and 560-405	785 (505) 390
B1-4th	LJC	103959	2480 ± 50	530 ± 50	775-485 and 465-425	790 (755,685, 540) 405
B1-3rd	LJC	159141	2290 ± 40	340 ± 40	390-370	400 (380) 350 and 300-220
B1-3rd	LJC	159145	2240 ± 40	290 ± 40	380-350 and 310-210	390 (360) 190
B1-3rd	LJC	159147	2190 ± 40	240 ± 40	360-280 and 240-190	380 (340, 320, 210) 160

Notes: All samples are wood charcoal. Dates in parentheses indicate calibration curve intercepts. EJC = early facet Jenney Creek; LJC = late facet Jenney Creek.

Table. 3.3. Chronology of architectural features and caches from Cahal Pech Plaza B.

Feature	*Period*	*Ceramic Phase*	*Date*
Plaza Floor 1	Late Classic	Spanish Lookout/Tiger Run	600 - 900 A.D.
Plaza Floor 2	Late Preclassic - Protoclassic	Mount Hope/Floral Park	100 B.C. - 300 A.D.
Plaza Floor 3	Late Preclassic	Barton Creek	350 B.C. - 300 A.D.
		transitional early and late facet	
Plaza Floor 4	Middle Formative	Kanluk	700 B.C.
		transitional early and late facet	
Burial 1	Middle Formative	Kanluk	700 B.C.
Cache 3	Middle Formative	early facet Kanluk	900 - 700 B.C.
Platform A	Middle Formative	early facet Kanluk to Cunil	1000 - 800 B.C.
Platform B	Middle Formative	early facet Kanluk to Cunil	1000 - 800 B.C.
Cache 1	Middle Formative	early facet Kanluk to Cunil	1000 - 800 B.C.
Cache 2	Middle Formative	early facet Kanluk to Cunil	1000 - 800 B.C.
Platform C	Terminal Early Formative	Cunil	1100 - 900 B.C.
Cache 4	Terminal Early Formative	Cunil	1100 - 900 B.C.
Bedrock Pit	Terminal Early Formative	Cunil	1100 - 900 B.C.

Notes: Platform A and Platform B may date to transitional early facet and late facet Kanluk. Results from further analysis are pending.

CHAPTER 4

MODELS OF SOCIAL COMPLEXITY AND TRADE

Trade and exchange by definition "is the spatial distribution of materials from hand to hand and from social group to social group" (Earle 1982:2). Evidence of trade is recognizable in the archaeological record with the appearance of non-local commodities, and "as a phenomenon [has] definite and measurable effects upon the system in which it functions and with which it develops" (Rathje et al. 1978:147). It is within a constructed and organized system, composed of varying degrees of social, economic, and political complexity, that individuals participate in the transfer of commodities — food products, wealth objects, technology, religious notions — to fulfill some sort of social, biological, economic, religious, and/or political "need."). The terms "trade" and "exchange" in this study are used solely to describe the archaeological *presence* of inter-regional transactions by the appearance of non-local items, and not to define the *nature* of interactions or what types of transactions resulted in the transfer of goods. These definitions are employed because, at this juncture, the nature of interaction and types of transactions between Formative Period communities remain a matter of speculation.

The roles of individuals or groups in these networks are defined by distinct levels of participation, that is, all levels of production, transportation, and consumption. The levels of production, transportation, and consumption are also a reflection of explicit social, cultural, economic, and/or religious relationships between individuals, communities, cities, and states resulting in the establishment of multi-lateral relationships defined by commodity transactions (Renfrew 1975). To illustrate, these multi-lateral relationships are classified according to a typology of transactions in Figure 4.1 (Renfrew and Bahn 2004:376). Furthermore, but not always, the type of transaction carried out between individuals or groups may echo the level of socio-cultural complexity as well as reflect the degree of organization essential to a properly functioning interactive network (e.g., central place redistribution, central place market exchange, colonial enclave, and ports of trade). Archaeologically, the level of participation and precise transaction types involved in acquiring particular goods are measured through the spatial distribution, frequency, context, and type of non-local materials. However, the level of participation in these networks is likely affected by geographical location, alliances, allegiances, and overall wealth and power of the community.

Sharer (1994:60) notes the "Early and Middle Preclassic [Formative] economic networks furnished a web of interaction within which, throughout Mesoamerica, regional civilizations emerged…as societies grew larger and more complex, the ruling elites consolidated their control with new economic, political, and religious institutions." Social complexity, like trade, is defined and measurable archaeologically through artifactual data, architectural inventories, and settlement patterning as well. The degree of complexity defined by material culture, architecture, and settlement helps to define the characteristics of social organization on a spatial and temporal plane, which, in turn, aids in deciphering the role and significance of trade and exchange at a local and regional level (Renfrew 1975:22). However, the nature and dynamism of social, political, religious, and economic mechanisms involved in the emergence of more complex societies during the Formative Period — including those responsible for the development of intricate trade and exchange systems — remain difficult, if not impossible, to detect archaeologically. Consequently, models have been constructed to analyze the known components, and predict the unknown components, that contributed to the emergence of complex society and Mesoamerican interactive networks as well as the relationships between the former and the latter.

Endeavors by scholars to better understand the nature of early trade and exchange in Mesoamerica have resulted in vigorous model-building to identify the structural and operative social, cultural, geographical, and ecological mechanisms involved in the development and maintenance of trade networks (see Dreiss 1989; Hammond 1972, 1978; Renfrew 1975; Santley 1984). Defining these structural and operative mechanisms — for example, community integration, organization, and emergence of hierarchical social structure — responsible for the development of interactive networks has lead to convincing proposals of the emergence of complexity related to resources procurement and interaction through trade in the Formative Period (Andrews 1983; Freidel 1979; Rathje 1971; Tourtellot and Sabloff 1972). In addition, systemic and descriptive models have proven useful to investigate the procurement, production, and distribution of resources (Brown et al. 2004; Renfrew 1977; Rice 1983; Rice et al. 1985; Santone 1997; Shafer and Hester 1991; Sheets 1975a, 1975b; Sheets et al. 1990; Sidrys 1976; Spence 1982), identify and reconstruct ancient trade routes (Adams 1978; Dreiss 1989;

Hammond 1972, 1981; Hammond et al. 1984; Healy et al. 1984; Nelson 1985, 1989), and explore other mechanisms operating at the local community level (i.e., central-place redistribution, central-place market exchange, transshipment points, ports of trade) (Andrews 1990; Aoyama 1994; Ball and Tascheck 1991; Guderjan et al. 1988, 1989; Hantman and Plog 1982; McKillop 1989a, 1989b, 1996; McKillop et al. 1989; Rathje and Sabloff 1973, 1975; Sabloff and Freidel 1975; Sidrys 1979; Zeitlin 1982) (Figure 4.2). These studies have been greatly enhanced and refined by the available source data from neutron activation analyses and X-ray fluorescence procedures (Asaro et al. 1978; Cobean et al. 1971; 1991; Glascock et al. 1999; Shackley 1998; Stross et al. 1983; Vogt et al. 1989). Additionally, the use of ethnographic and ethnohistoric sources (Hammond 1978; Justeson et al. 1983; Lee 1978; Miller 1983; McAnany 1991; Pires-Ferreira and Flannery 1976; Sharer 1983) have also greatly aided in the study of ancient trade and exchange networks.

The plethora of approaches, models, and methodologies "share the explication of the evolutionary significance of exchange in prehistory" (Santley 1984:43) and are central to any analysis and understanding of early interactive networks in the Maya Lowlands and in Mesoamerica as a whole. However, Graham (1987:763) cautions the use of generalized models given the extreme amount of diversity among and within the various cultural and geographical regions. On the other hand, generalized models have been instrumental in providing a basic framework from which to formulate regionally specific models (see Dreiss 1989). In addition, models addressing the nature and dynamism of emerging complex social and cultural systems in the Formative Period Maya Lowlands provide one of the central tenets on which models accounting for the development of early trade and exchange systems lie. In this chapter, issues of social complexity and the resulting models therein will be addressed prior to the presentation and analyses of descriptive and systemic models of trade and exchange.

CONSIDERATIONS OF COMPLEXITY

A shift from small sedentary village farming to the development of nucleated centers with public buildings and monumental architecture, increased social complexity in the emergence of an elite class, and the developments of social, political, religious, and economic institutions occurred in the Maya area during the Middle Formative (1100–350 B.C.), as demonstrated at El Mirador, Nakbe, Tikal, Lamanai, Nohmul, Cerros, Colha, Cuello, Blackman Eddy, Pacbitun, and Cahal Pech (Arnold and Ford 1980; Awe 1992; Ford 1991; Garber et al. 1998, 2004a, 2004b, 2005; Hammond 1983, 1986, 1991; Hammond et al. 1990, 1991, 1995; Hansen 1998; Haviland 1970; Healy 1990, 1999; Healy and Awe 1995; Moholy-Nagy 1997; Pendergast 1981). Evidence of long-distance jade and obsidian trade is found in the earliest temporal contexts at Blackman Eddy, Cahal Pech, Cerros, and Cuello, indicating a form of interactive networking was already established before the later Formative Period social transformations. Consequently, many scholars link social transformations and establishment of hierarchical institutions during the Late Formative directly to trade, that is, the need for certain commodities (i.e., salt, obsidian, basalt, elite paraphernalia) initiated the genesis of an organizational structure (see Andrews 1983; Rathje 1971; Tourtellot and Sabloff 1972; Webb 1975). For example, Andrews (1983:133) argues "the need for salt, or rather the need for an organizational apparatus that could provide it, was undoubtedly a powerful ingredient in the emergence of pristine states in the Maya area." The fostered development of these intricate long-distance trade networks resulted in not only the movement of goods, but also in the transmission of cultural ideas, political ideologies, religion, and technology, which appear to be closely linked to increasing social complexity and the establishment of elite institutions in the Maya region during the Middle Formative Period (Freidel 1979). The later Formative Period social transformations presumably had measurable effects on some of these early networks and likely resulted in reconfigurations of resource-use and/or trade routes through time, as is suggested in the distinctive diachronic patterns of obsidian distribution from the Middle Formative to the Early Classic Period.

Archaeologically, increased complexity is defined and categorized by settlement patterns, by the presence or absence of architectural components (i.e., architectural inventory of civic, ceremonial, private, domestic, and residential buildings), and in the abundance and quality of the various architectural features. Artifactual data are also used to define and categorize social complexity, as they are often measures of differential access to goods and "wealth" and are often viewed as indicators of social status and status differences. The notion of "wealth" is also marked by the presence of exotic items such as jade, obsidian, and marine shell, and further distinguished by the type of consumption viewed in domestic, ceremonial, and burial contexts (A. Chase and D. Chase 1992; D. Chase and A. Chase 1992; Grove and Gillespie 1992a; Hammond 1998). Obsidian, however, is considered somewhat ambiguous in nature because obsidian tools are functional in a utilitarian sense and have been found in household contexts but also functional in the ritual sense as elite paraphernalia to perform bloodletting sacraments and rituals and to demonstrate manipulation of the supernatural and legitimize divine status. Diachronic and synchronic analyses of empirical evidence for obsidian distribution based on the rare occurrence in household contexts during the Formative Period and into the Early Classic suggest that obsidian was considered a wealth item during this temporal frame, but became more accessible during the Late Classic when it is found more frequently in varying contexts and possibly considered less as a "wealth" item (Rice 1987:80).

The most notable example of increased social complexity during the Terminal Early Formative is from San Lorenzo Tenochtítlan in the Olmec heartland, followed by that of La Venta. Increased complexity was materialized through authority and wealth as is evident in the high degree of labor investment associated with the massive architectural and sculpture programs, and portable art, manifesting an intricate cosmology through a sophisticated symbol system (Coe 1989; Cyphers 1999; Diehl and Coe 1995; Lowe 1989; Reilly 1995). Stylistic and thematic elements of this symbol system and manipulation of physical space to construct a spiritual realm have been argued for as exclusively being derived from the Olmec culture. However, numerous contemporaneous examples have been noted in the early architectural layouts (e.g., El Mirador), architectural decoration (e.g., façade masks at Blackman Eddy Structure B1 [Garber et al. 2004b:56], Cerros Structure 5c-2nd [Freidel 1977, 1979:46], Cival [Estrada-Belli et al. 2003], and Uaxactun Structure E–VII–sub), and elite material culture of many emerging centers in the Maya region. These elements reveal a thematic similarity with stylistic variations leaning more toward a "Pan-Mesoamerican" Middle Formative phenomenon, rather than an Olmec phenomenon, associated with the emergence of elite authority and demonstration of divine power (Garber et al. 2004a:31; Flannery and Marcus 2000; Freidel and Schele 1988a, 1988b; Stross 1994). In fact Flannery and Marcus (2000:33) argue that frequent competitive interaction and adaptive autonomy of these early chiefdoms "speed up evolution and eventually make useful technologies and sociopolitical strategies available to all regions."

The processes and operative mechanisms contributing to increasing complexity in the Maya Lowlands during the Formative Period have been a heated debate and have resulted in the formulation of a variety of models. Many of these models offer explanatory propositions for emerging social complexity that deal with effects and functions of a specific stimulus, such as competition (Ball 1977; Rathje 1971; Sanders 1977; Webster 1977) to account for increased complexity in the Late Formative and work as a foundation for the later developments in the Classic Period. These models are, as Freidel (1979:36–40) notes, variations on a *culture area* theme. The *culture area* concept, defined by Linton (1936:383–391), is based on "the assumption of genetic relationships between cultures assigned to each area…develop cultural adaptations to local conditions [and] becom[e] increasingly complete, [complex], and exact, so that its culture will diverge more and more from the cultures of tribes living in different geographic environments." Variations on this theme and speculations regarding stimuli for this seemingly rapid transformation to complex society in the Maya region have resulted in Rathje's (1971) core/buffer zone model, Sanders' (1977) ecological based model, and Webster's (1977) conflict/warfare scenario. Freidel (1979), on the other hand, proposes that the already established networks of communication allowed for the spread of an elite material culture that facilitated the development of regional and local elite institutions. These models are briefly addressed below.

Rathje (1971:276) argues that the lack of vital resources (i.e., salt, obsidian, chert, and hard stone) needed for household survival in the Peten "core" area provided the impetus for certain individuals to organize the importation of these necessary commodities from long-distance locals. Viewed as an adaptive response to local conditions, developing the structure to import these goods, according to Rathje, lead to the emergence of elite organization. Subsequently, the management of this structure and control of distribution of these goods once they reached the core area furnished the elite with the authoritative power over the various "buffer-zone" communities. However, authoritative control by the elite in core areas could not be maneuvered solely by the basis of providing the community with access to common household necessities. Rather, Rathje predicts (1971:280):

> ...the earliest evidence of complex socio-political organization will occur in the resource deficient core area of the Maya Lowlands [as exemplified by the early manifestations at El Mirador and Tikal]...the core area influence will spread into areas vital to the procurement of basic resources — into buffer zones, along trade routes, and into resource areas; and this influence will take the form of wholesale importation of the by-products of complex social organization — cult ideology, cult technology, and manufactured cult commodities from the core area.

Thus, the manifestation of elite authority by way of religious sanctification occurred not only through the management of vital resources but through the transmission of a convincing cult ideology from the core area to the buffer zones, as evidenced by the spread of the northeastern Petén cult complex into the Usumacinta-Pasión drainage, producing buffer communities such as Piedras Negras, Yaxchilan, and Altar de Sacrificios that are along documented trade routes known to have been used during the sixteenth century (Rathje 1971:280).

Sanders (1977:288), also employing the idea of aggregate control over resources as an impetus for socio-political differentiation, proposes a geographically localized model in which early social developments and population nucleation were stimulated by the high proportion of good agricultural land in the northeastern Petén core area. Competition between communities likely ensued over access and control of these lands which fueled the need for an authoritative position to manage the distribution of agricultural lands. Similar to Sanders' ecological conflict model, Webster (1977) argues that conflict in the form of organized warfare, based on empirical evidence of fortifications at the site of Becan during this time, sanctioned a role for an administrative party which led to the development of a hierarchical social organization. Moreover, the elite consolidated this authority by gaining control over the inventory of resources and through an ideological legitimization (Webster 1977:338).

Freidel's (1979) "interaction sphere" model, however, poses a convincing argument in regards to the development of hierarchical institutions at the small major center of Cerros during the Late Formative; a model which can be applied to emerging centers like Blackman Eddy in the Late Middle Formative. In this model, "the interaction sphere paradigm attributes causality in the development of complex, elite social institutions to regional conditions via an information and exchange network among the elites rather than to localized conditions" (Freidel 1979:50). This is marked by a rather elaborate inventory of shared elite material culture of monumental pyramids and plazas

(Ashmore 1991; Garber et al. 1998), and by a shared iconographic program linking symbols to authority visible in architectural decoration (i.e., painted plaster and stucco façade masks) and further transmitted through portable objects (i.e., the "bib and helmet" style pendants of jade and shell, ceramics, and obsidian blades) that began to appear simultaneously throughout the Maya Lowlands during the Middle and Late Formative Period (Freidel 1979:51). These shared emblems manifested through an elite material culture and unity functioned to structure the complex hierarchical institutions (Freidel 1979:49). In addition, Cerros, advantageously located in Chetumal Bay by the mouth of the New River, likely played an active role in these interactive spheres by transporting goods and ideas by canoe to locales along the coastline (Freidel 1979: Figure 2) (see Figure 3.1). Further, the structure of hierarchical institutions was publicly displayed, and authority was enforced through a powerful worldview that served to unite social, economic, religious, and political activities and institutions (Freidel 1979, 1992; Freidel and Schele 1988a, 1988b; Noble 1998).

The models summarized in this section represent a wide array of theoretical possibilities backed with empirical evidence to account for increased social complexity and the emergence of authoritative elite control in the Maya Lowlands. As noted above, Rathje's, Sanders', and Webster's models are variations on the *culture area* theme; however, Rathje is the only one that proposes the impetus for the development of hierarchical organization to an absence (i.e., vital resources) in the local natural environment. Sanders' and Webster's model are centered on conflict and competition as the driving forces spawning the development of hierarchical divisions. These approaches prove useful to address the effects and functions of certain cultural manifestations during the development of social hierarchies and complexity. However, assumptions of "black box" linear evolution of complex societies with local conditions as the catalyst fails to address innovations resulting from direct or indirect transmission of ideas between different "cultures," fails to address migrations of groups in and out of the region, and overall appears somewhat inadequate to address the spatial variability and temporal dynamics during the Formative Period in the Maya Lowlands. Freidel, on the other hand, attributes the development of hierarchical complexity to the transmission of an iconography of authority through networks of interaction that empowered the elite by linking them (and their ancestors) to the cosmos, transformed the physical realm into the cosmic realm, and provided the means (ritual paraphernalia) to express power through ritual and manipulation of supernatural, which consequently beckoned for community participation in many forms, such as sacrifice, to ensure the success of the community as a whole. Furthermore, "public art legitimated privileged access to supernatural forces and powers by marking a leader's exclusive access to revered ancestors, supernatural spirits, or deities" (Clark 1997:212).

Although a great deal of regional and local variability attributable to numerous factors is apparent archaeologically in architectural styles, architectural inventory, and settlement patterning, authority is manifested in thematically similar fashions through art that reinforced ancestry and myth using maize and maize-god imagery, and narratives of transformation, death, and rebirth. Exotic materials acquired through long-distance trade (i.e., jade, obsidian, marine shell, and exotic bird feathers) are considered part of elite material culture and components of ritual paraphernalia that are considered to be imbued with sacred power or *ch'ulel* (Houston and Stuart 1996; Ringle 1999:202) that are used as vehicles to make physical and spiritual connections with the cosmos. Ritual behaviors, in the form of feasting, dedications, and terminations identified archaeologically provides evidence to the sacred nature of these items (D. Chase and A. Chase 1992, 1998; Flannery 1976; Garber et al. 1998) as well as in the role these items play in promoting and maintaining hierarchical institutions.

THE NATURE OF FORMATIVE PERIOD TRADE AND EXCHANGE: PROCUREMENT AND DISTRIBUTION

The defining characteristics of trade and exchange networks that allow for comprehensive model-building, as outlined by Plog (1977:129), are as follows: *content*, ***magnitude*, *diversity*, *size*, *temporal duration*, *directionality*, *symmetry*, *centralization*,** and *complexity*. Although analysis of obsidian data has provided affirmation to questions of content, magnitude (i.e., quantity of goods), diversity (i.e., number of obsidian sources utilized), size (i.e., expanse of territory in which goods were exchanged), temporal duration, and relative directionality (i.e., obsidian was transported from the source to certain locales), other characteristics such as symmetry (i.e., amount of obsidian "flowing" between locales), centralization, and degree of complexity remain rather elusive.

The formulation of a variety of models regarding procurement and distribution of obsidian has undoubtedly shed light on the movement and use of this resource throughout the Lowlands, as well as revealed clues as to the inherent spatial and temporal diversity of access to obsidian on a regional and site level. Although the actual components and mechanisms defining this complex obsidian exchange system as a simple redistributive network or a market exchange system remain ambiguous, it is likely that varying mechanisms functioned at a multiplicity of levels at one time (Graham 1987:763). For example, Andrews (1983:132) argues that "the Maya economy of Late Formative times might be viewed as 'mixed,' in which market-style external trade fed into local redistributive networks." As previously mentioned, models have proven useful to identify corridors of exchange and reconstruct possible ancient trade routes, investigate the procurement and distribution of resources, and explore other mechanisms operating at the local community level (e.g., central-place redistribution, and transshipment points).

A wealth of data has been made available through provenience analyses (i.e., chemical sourcing through neutron activation analyses and X-ray fluorescence) thus establishing that a majority of obsidian found in the Maya Lowlands originated from three main sources in the Guatemalan highlands: San Martín Jilotepeque (also known as Río Pixcaya in the literature), El Chayal, and Ixtepeque (Asaro et al. 1978; Clark 1989; Nelson 1985; Nelson et al. 1977, 1978; Sidrys et al. 1976; Stross et al. 1983). Moreover, through these studies, episodic exploitation of particular obsidian sources in distinct parcels of time and space throughout the ancient Mesoamerican past has been revealed by evidence of fluctuating frequencies and differential distribution of obsidian (Awe and Healy 1996; Dreiss 1989; Dreiss and Brown 1989; McKillop 1989a, 1989b; McKillop and Jackson 1989; McKillop et al. 1989; Rice 1979, 1983; Rice et al. 1985). Beyond these concerns, the dynamic nature of obsidian trade and exchange networks has sparked attempts to delineate evidence of centralized control, the catalytic role of trade in internal organization, differential access to obsidian based on advantageous geographical location, social status, and/or social ties by identifying the synchronic and diachronic patterns of procurement and distribution. The development of descriptive and systemic models of procurement and distribution has provided the necessary framework to explore the issues described above and examine "the interplay among logistical, chronological, functional, and contextual differences at the regional and local levels using larger data sets" (Brown et al. 2004:223). The forthcoming section comprises summaries and analyses regarding proposed trade routes based on modeling of procurement and distribution.

Trade Route Models

Although the precise trade routes used to transport obsidian from the volcanic highlands to destinations in the Lowlands remain a conundrum, scholars have attempted to reconstruct possible routes of distribution modeled around practical geographic corridors, historical political arenas, and ethnohistoric and ethnographic data (Adams 1978; Dreiss 1989; Hammond 1972, 1976, 1978, 1981; Hammond et al. 1984; Healy et al. 1984; Lee 1978; Nelson 1985). Much of the sourced obsidian in the Maya Lowlands does in fact originate from the three Guatemalan sources listed above; however, obsidian from volcanic outcrops in Mexico, namely Pachuca green obsidian, and from obscure Honduran sources has also been documented in the Lowlands, although in less frequencies and often in different contexts than Guatemalan obsidian (Moholy-Nagy 1997:297).

To begin, Hammond hypothesized a series of trade route systems accounting for the transport and distribution of Ixtepeque and El Chayal obsidian (Hammond 1972, 1978, 1981, Hammond et al. 1984) (Figure 4.3). Initially, he proposed that these

Guatemalan obsidians were distributed northeast and northwest from the quarry by porter and canoe to the Lowlands via major river valleys (Hammond 1972). The routes following the Río Motagua, Río Sarstun, Río Grande, Belize River Valley, New River, and Río Hondo basins allowed for the northeasterly transport of obsidian from the Petén region to the Caribbean coast whereas obsidian destined for communities in the Chixoy-Salinas-Usamacinta drainages to the northwest was transported via the Río Negro and Río de la Pasión. Further, he postulated a two-pronged trade system composed of two source-exclusive and competitive routes involved in transporting obsidian from each of the El Chayal and Ixtepeque quarries. El Chayal obsidian was ferried down the Río Chixoy to Altar de Sacrificios, then down the Usamacinta to Piedras Negras and other northern sites, or upstream to Seibal or Tikal via Río de la Pasión (1972:1093). The proposed Ixtepeque obsidian route, modeled primarily from Postclassic distribution, involved transport from the highlands down the Río Motagua to the Caribbean, distribution by sea canoes to the sites scattered along the Belize and Yucatan coasts, and then transported upriver or on overland routes. By examining distribution patterns of obsidians from 23 Classic Period sites, Hammond (1972:1092) tested the foundation of his model and noted that these routes appeared to overlap at or near Tikal suggesting that the two sources of obsidian were being exploited simultaneously in the Classic Period and that a level of competition existed between the sources in the lowland economy.

Hammond's model evolved as sourcing data from Wild Cane Cay, Lubaantun, and several other southern coastal Belize sites were incorporated into his previous trade route hypotheses (1976). For instance, Late Classic contexts from Lubaantun contained El Chayal obsidian, while Wild Cane Cay contained both Ixtepeque and El Chayal obsidian, contrary to Hammond's early predictions of the northwesterly dispersal of El Chayal and northeastern distribution of Ixtepeque. Subsequently, Hammond suggested that because Wild Cane Cay had access to both sources it must have served as a transshipment station to coastal and nearby inland settlements, such as Lubaantun (1976). The exclusive two-prong trade system accounting for the geographical disparity in the distribution of these two obsidians merged at these coastal transshipment points. Moreover, he predicted similar offshore transshipment nodes would be found at the mouths of major river drainages along the Caribbean coast; these stations would serve as distribution nodes for regional centers on the mainland. Hammond's predictions were confirmed by later offshore studies on Ambergris Cay and Moho Cay in which extremely high densities of exotic materials were recovered (Andrews 1990; Guderjan et al. 1988, 1989; Healy et al. 1984; McKillop 1989a, 1996; McKillop et al. 1989).

Further revisions of Hammond's model were stimulated by data from Nohmul, Belize, located in northern Belize along the Río Hondo inland from Chetumal Bay (Hammond et al. 1984). The majority of obsidian from Late Classic and Terminal Classic deposits was from the Ixtepeque source, calling into question two elements of Hammond's earlier models: the temporally limited use of Ixtepeque obsidian to the post-Classic Period and the denial of the possibility of the distribution of goods from the coastal networks to inland destinations. Using these new data, Hammond (1984:818) recognized the establishment of coastal trade and use of Ixtepeque obsidian was of greater antiquity than previously suspected and suggested that coastal networks did, in fact, extend inland by transporting goods via upstream feeder routes along the Río Hondo.

Conversely, Healy et al. (1984) point out the weaknesses in Hammond's propositions. Healy et al. (1984) counter Hammond's trade route proposals by arguing that the two-pronged trade structure is too rigid and simple to account for the inherent complexity within the multifarious distribution patterns represented both spatially and temporally throughout the Lowlands. They note that data from the western Lowlands does not support Hammond's model because all obsidian sources, including Mexican sources, are represented in the sample instead of the predicted exclusive representation of El Chayal obsidian as a product of the two-pronged distribution (Healy et al. 1984: 414). Furthermore, source analysis from Early Classic deposits at Moho Cay show that El Chayal was the primary source of imported obsidian, which refutes Hammond's notion of exclusive inland transport of El Chayal as well as his scheme of overlapping dual obsidian trading spheres at the mouths of river drainages along the coast (Healy et al. 1984). Instead, they propose the most direct routes of transport were used, from both El Chayal and Ixtepeque sources, via the Río Motagua to the coast and transported north to sites in Belize (Healy et al. 1984:416). Through the examination of a growing body of evidence, Healy et al. (1984) suggest that there was no monopoly on the obsidian sources or their routing, rather integrations of obsidian trading dynamics, trade mechanisms, and distribution throughout the Lowlands defined and characterized multiple intricate dynamic trade networks.

Thus far in the history of the development of lowland trade route models, patterns of chronological distribution had not been identified. Nelson (1985), however, provided a chronological framework for the Lowlands based on a large obsidian dataset representing a comprehensive distribution from which to compare datasets (see Awe et al. 1996; Dreiss 1989; Dreiss and Brown 1989; McKillop and Jackson 1989). During his examination of obsidian source data, Nelson (1985) recognized the three primary Guatemalan obsidian sources represented in the Maya Lowlands — San Martín Jilotepeque, El Chayal, and Ixtepeque —were exclusively favored during specific temporal eras. San Martín Jilotepeque obsidian, for example, is dominant in the Middle Formative Period assemblages. The use of El Chayal obsidian increases during the Late Formative and supercedes that of San Martín Jilotepeque obsidian to become the most widely used source throughout the Classic Period. Ixtepeque obsidian emerges as the dominant source at the end of the Terminal Classic and is exploited throughout the Postclassic Period.

Based on the chronological disparities among the three obsidian sources, Nelson (1985:635) proposes that the near-exclusive use of San Martín Jilotepeque obsidian in the Maya Lowlands was a response to the monopoly the Olmec and the Early and Middle Formative groups in coastal Chiapas and Eastern Oaxaca held on El Chayal obsidian. Consequently, with the Middle Formative decline of La Venta and the Olmec monopoly of the El Chayal trade networks and the synchronous rise of Kaminaljuyu as the main custodian and distributor of El Chayal, the use of San Martín Jilotepeque obsidian lessened, being supplanted by a new product managed by a new market monopoly. Despite the new popularity and accessibility of El Chayal in the Lowlands, San Martin Jilotepeque was still being used in significant quantities in the Lowlands at places such as Seibal (Nelson 1985: 638), Tikal (Moholy-Nagy 1989; Moholy-Nagy et al. 1984), and in the Central Peten Lakes Area (Rice 1983; Rice et al. 1985).

With regard to Middle Formative trade routes in particular, Nelson (1985:639) favors the idea of transport from the highland obsidian sources via overland and riverine avenues to the lowland settlements of Seibal, Tikal, El Mirador, Dzibilnocac, and Edzna, with the further distribution to the rural settlements and emerging communities of Cerros, Nohmul, Colha, as well as to the communities in the Belize River Valley. The distribution of San Martín Jilotepeque, El Chayal, and, in smaller quantities, Ixtepeque obsidians in the Late Formative likely followed the same overland/river routes established in the Middle Formative. Additional trade routes along the coastal regions may also have been important as well. As noted before, Freidel (1979) linked the significance of Late Formative long-distance canoe trade to the florescence of Cerros which aided in not only the transport of ocean commodities (i.e., salt, marine shell) inland but also aided in redistributing inland resources (e.g., obsidian) to communities and transshipment nodes along the Caribbean coast. Although Nelson supports Freidel's notions regarding the role of Cerros as a redistribution locus between coastal and inland settlements, he argues that coastal routes were not very important until the Postclassic Period (1985:643). Nelson's analysis of obsidian source data and observations of overall trends of distribution has been instrumental in the study of obsidian trade. However, Nelson's model appears too simplistic to account for the diachronic variability and inconsistencies in obsidian sources at the regional and micro-regional level. His model also may not be able to factor in the effects of the changing cultural environment apparent in increasing social complexity, as well as the possible emergence of minor redistribution nodes.

Engaging elements of many models discussed above, in addition to using Nelson's chronological distribution patterns as a template, Dreiss (1989) fabricated a regionalized obsidian distribution model for sites in Belize. Due to low sample sizes from some of the sites in Belize, it was necessary to construct a regional-focused database in which obsidian data from clustered settlements and/or environmentally similar microregions were amassed to form one of five subregional components representative of approximately thirty lowland and coastal sites. These geographic zones represent sites in the New River and Río Hondo basins, the coastal strip from Chetumal Bay to the Sarstun and Motagua River drainages in the south, the Belize River Valley, the North Coastal Plains, and the Maya Mountains (Dreiss 1989:82).

Essentially, by subdividing obsidian data using this regionalized schematic rather than using an intrasite approach, Dreiss is able not only to examine a much larger sample base, but also to add insight to the inherent regional variability existing in the Belize periphery. Preliminary results of this analysis imply that the sites in the Belize River Valley and those in the Maya Mountains mirror the diachronic patterns of obsidian sources utilized by communities in the Petén (Dreiss 1989:90). Obsidian data from coastal sites point to the transportation of both Ixtepeque and El Chayal by both individual and conjoined coastal routes as early as the Late Preclassic Period. Sites in the New River and Río Hondo basins, including the site of Río Azul in Guatemala, exhibit a strong El Chayal bias in all time Periods while the sites in the Northern Plains, like Colha, are varied possibly due to strategic positioning in local and regional exchange networks or through reflection of a relatively large sample size. Subsequently, through her analysis, Dreiss (1989:81) suggests that: (1) obsidian distribution patterns for sites along the coast are different than inland sites possibly indicating a degree of autonomy from Tikal's sphere of influence, (2) Ixtepeque and El Chayal obsidians were not likely transported by separate routes, but transported by both overland and coastal routes, and (3) coastal obsidian trade networks may have been in operation throughout the entire temporal sequence.

DISCUSSION

A growing body of data for Formative Period Mesoamerica, and for the Maya Lowlands in particular, reflects the emergence of complex society and illustrates the establishment, maintenance, and importance of inter-regional trade networks that resulted in the sharing of commodities, technologies, and ideologies during this time. Descriptive and systemic models have aided in defining the characteristics of these systems and investigating proposed mechanisms employed in obsidian trade and exchange. In addition, these models have been used to analyze the known components and predict the unknown components that contributed to the emergence of complex society and the development and maintenance of these exchange systems as well as investigate the relationships between the former and the latter. In the following chapter, using elements from many of the models discussed in this chapter, I will analyze the sourcing data from Blackman Eddy and Cahal Pech to address the specific research queries outlined in chapter 2 and to construct a diachronic and synchronic view of obsidian distribution in the Belize River Valley.

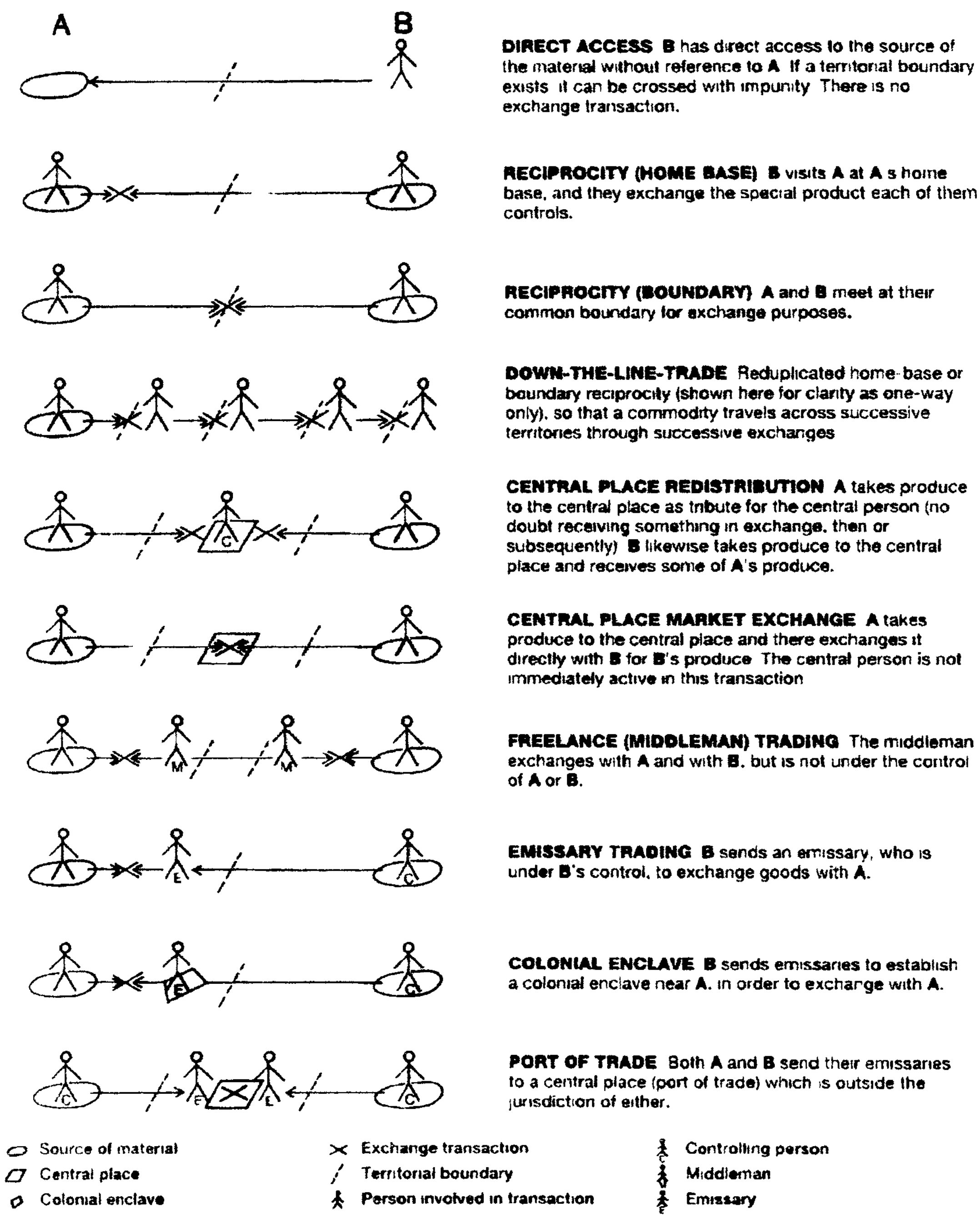

Figure 4.1. Diagram of trade and exchange transactions (from Renfrew and Bahn 2004:376).

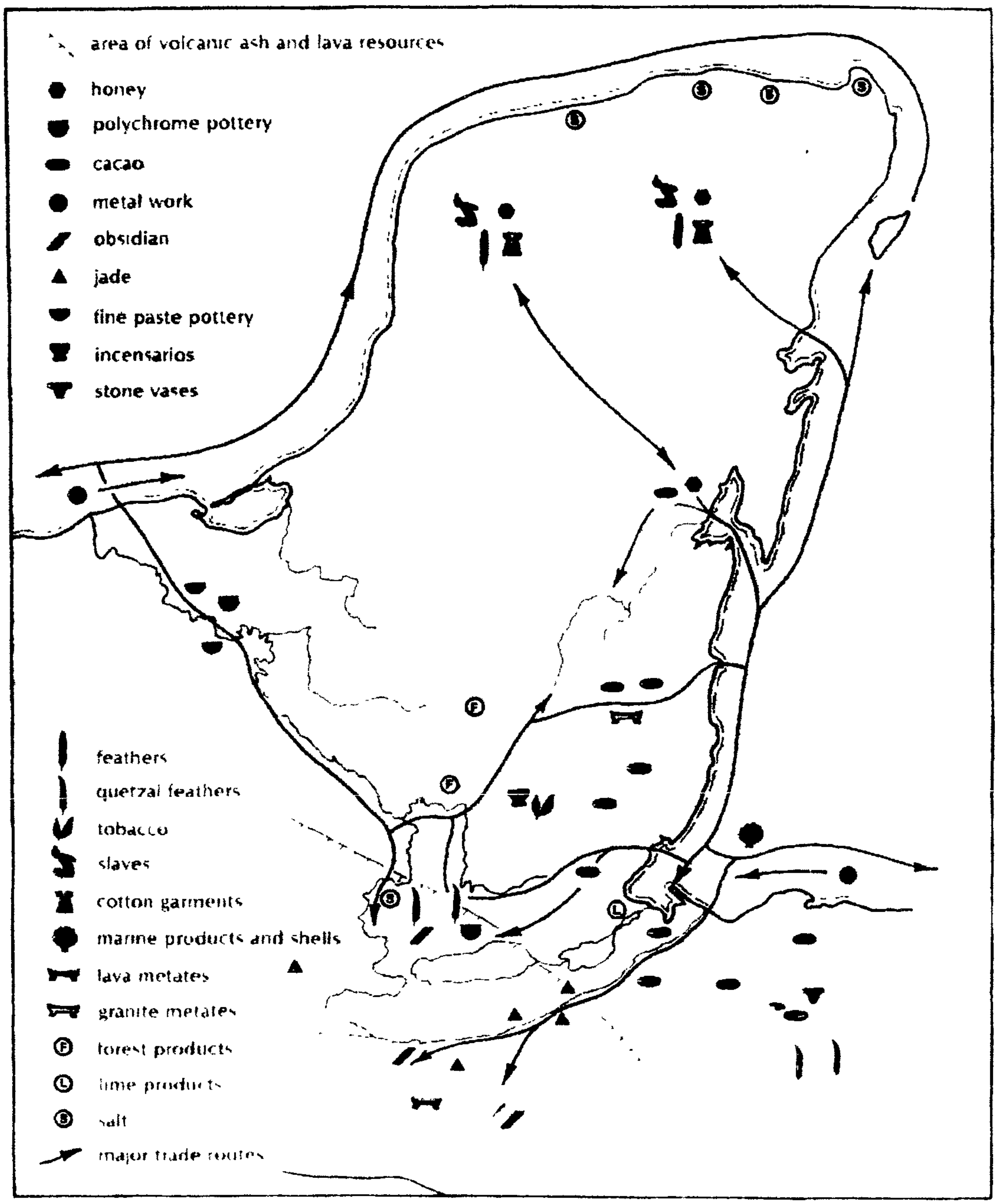

Figure 4.2. Late Classic inter-regional trade routes (from Hammond et al 1984).

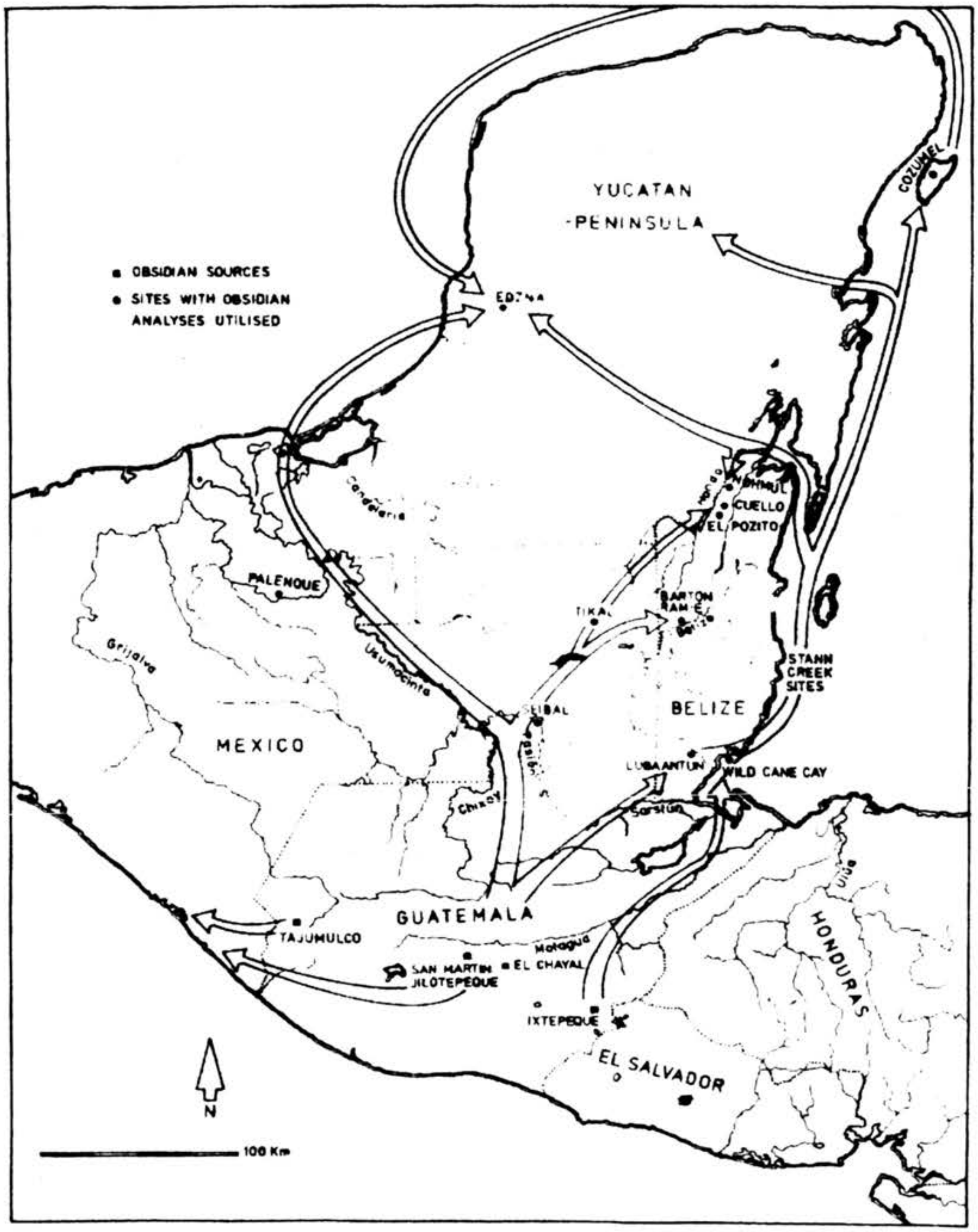

Figure 4.3. Hammond's two-pronged obsidian distribution model (from Hammond 1972).

CHAPTER 5

BLACKMAN EDDY AND CAHAL PECH SOURCE DATA

Chemical sourcing via short-irradiation instrumental neutron activation analysis (INAA), conducted by MURR Archeometry Laboratory, resulted in the positive identification of 51 of the 52 samples submitted for the elemental source analysis (Table 5.1). The one sample from Blackman Eddy, unable to be sourced by the short-irradiation method, was submitted for long-irradiation analysis of which results are still pending, but, upon initial observation, Glascock (2006 personal communication) favors origin from a Honduran or Central Mexican source. The overall number of obsidian samples submitted for sourcing represents a statistically significant portion of the total number of obsidian recovered from both Blackman Eddy and Cahal Pech. Obsidian samples selected for chemical "fingerprinting" from Blackman Eddy represent 21% of the total obsidian recovered from several field seasons of excavation, and the selected samples from Cahal Pech comprise 30% of the total obsidian recovered from the 2004 and 2005 field investigations.

Upon initial observation of the obsidian data, it is obvious that an overwhelming majority of obsidian from Blackman Eddy originated from the San Martín Jilotepeque source (Table 5.2). Interestingly, however, a majority of obsidian from the same temporal sequence at Cahal Pech originated from the El Chayal source, and the Ixtepeque and San Martín Jilotepeque sources are equally represented in lower percentages; the overwhelming majority of El Chayal obsidian at Cahal Pech has also been documented by Awe et al. (1996) (Table 5.3). However, numerous factors beyond errors in sampling may account for dramatic differences exhibited in the sampling data which will be discussed later. Regardless of the differences in the size of the two sample sets — 42 obsidian samples from Blackman Eddy versus 10 from Cahal Pech — these initial data results provoke some interesting notions regarding variability in obsidian procurement and distribution within the "micro-region" of the Belize River Valley.

The source data supplied by the elemental characterization of the obsidian from Blackman Eddy and Cahal Pech, coupled with associated contextual and temporal affiliations, will allow for the an examination and reconstruction of obsidian distribution and procurement at the sites of Blackman Eddy and Cahal Pech in the Belize River Valley. This compilation of data will be used to investigate specific aspects of Formative Period trade in the Belize River Valley from a diachronic and synchronic perspective, such as the level of participation in inter-regional exchange at the community level, the routes of transport responsible for distribution of commodities in the valley, and any local variations in procurement and distribution between these two major centers during this lesser-known Formative era in Mesoamerican prehistory. The new source data, coupled with the available obsidian source data from sites in the Maya Lowlands, will be used to examine similarities or inconsistencies in established trends. Examination of previously proposed trade routes and distribution models (discussed in Chapter 4) in light of the Blackman Eddy and Cahal Pech obsidian data will complete the analysis.

BLACKMAN EDDY OBSIDIAN: TEMPORAL DISTRIBUTION, CONTEXT, AND RAW MATERIAL SOURCE

Of the 283 obsidian artifacts recovered from the site of Blackman Eddy, 217 (76.7%) were recovered from excavations in Structure B1 alone. Fourteen of these obsidian artifacts recovered from Structure B1 were found in disturbed contexts (i.e., bulldozing and looter disturbances), and therefore do not have reliable contextual or temporal affiliation. Consequently, these 14 samples will not be considered in any further analyses of obsidian distribution at Blackman Eddy.

The large number of obsidian found in Structure B1 is not surprising because this structure was a major focal point of a variety of integrative activities over the entire span of occupation — first as a household, then for public ritual and civic gatherings, and finally as the locale for more private elite ritual and ceremony. Furthermore, much more of the structure was excavated compared to other structures at the site. The 203 obsidian artifacts with reliable contextual and temporal information recovered from B1 are divided into 5 classes consisting of: 1) 10 complete obsidian prismatic blades, 2) 173 obsidian blade fragments, 3) 17 obsidian flakes, 4) 1 core fragment, and 5) 2 unidentified fragments (one is a possible biface fragment). Forty-two (21%) of the 203 obsidians were selected for trace element analysis based on an established set of criteria defined by reliable contextual information and associated temporal affiliation as laid out in the methodology section of Chapter 2. While the main temporal focus of this study lies within the span of Formative Period occupational sequences, a few samples for comparative purposes were selected for sourcing from Early Classic Period contexts at Blackman Eddy.

The specific field excavation methods and analysis that were implemented during investigations at Blackman Eddy (see Brown 2003:Chapter 2), coupled with favorable preservation circumstances in most instances, allowed for a good spatial and temporal control and identification of incremental temporal units. Consequently, these temporal units will be used to establish the temporal distribution and discuss associated contexts of the sourced obsidian samples. The sample set is divided into five temporal intervals spanning the Terminal Early Formative to the Early Classic Periods which are defined by isolated sequential construction events, radiocarbon dates, and associated ceramic phases affiliated with occupation at Blackman Eddy (Figure 5.1; see also Table 2.1). Overall, a total of 37 obsidian artifacts (88%) are from the four Formative Period intervals, while the remaining five (12%) represent the transition from the Late Formative to the Early Classic Period and the Early Classic Period exclusively. Additionally, the sample set is further divided into two contextual categories by association with ritual deposits or affiliated construction phase. Nineteen (45%) of the 42 samples were recovered from ritual deposits (i.e., ritual feasting activities and caches), while the remaining 23 (55%) of the samples are from construction events (see Table 5.2).

The chronological groupings and percentages of the 42 obsidian samples submitted for sourcing from Blackman Eddy consist of: five blade fragments (12% of the total sample) from the Early Middle Formative Period, transitional Kanocha to Early Facet Jenney Creek phase (ca. 1000/900 B.C. to 700 B.C.); two complete blades, two blade fragments, and one possible biface fragment (12% of the total sample) from the

Early Middle Formative Period, Early Facet Jenney Creek phase (ca. 700/650 B.C.); four complete blades and 14 blade fragments (42% of the total sample) from the transitional Early Middle Formative Period to the Late Middle Formative Period, transitional Early Facet Jenney Creek/Late Facet Jenney Creek (650 B.C. to 300 B.C.); one complete blade and eight blade fragments (21% of the total sample) from the transitional Late Middle Formative Period to the Late Formative Period, terminal Late Facet Jenney Creek (ca. 300 B.C.); three blade fragments (7% of the total sample) from the transitional Late Formative Period to Early Classic, transitional Barton Creek/Mount Hope to Hermitage (300 B.C. to A.D. 300); and two blade fragments (6% of the total sample) from the Early Classic Hermitage phase (A.D. 300 to A.D. 600) (Table 5.4).

A noticeably larger percentage of obsidian samples was sourced from the transitional early facet/late facet Jenney Creek phase. As a result of continued analysis of the Blackman Eddy data — after the obsidian samples were submitted for sourcing —this temporal interval has been slightly reconfigured and therefore a larger number of the sourced obsidian fell into this temporal frame than previously suspected.

As illustrated in Table 5.2, and following the general trend observed in provenience data from the sites in the Lowlands, 91% of the obsidian from Blackman Eddy Formative Period deposits is derived from the San Martín Jilotepeque source. One sample of each El Chayal, Ixtepeque, and the undetermined obsidian source are present as well, and collectively make up 9% of the Formative Period assemblage. However, no significant spatial or temporal differentiation exists in depositional patterns of San Martín Jilotepeque obsidian and the other less common obsidian sources. A detailed discussion of the sample groupings is offered below.

Transitional Kanocha to Early Facet Jenney Creek Phase (ca. 1000/900 B.C. to 850 B.C.)

The earliest deposits containing obsidian at Blackman Eddy date to the Early Middle Formative Period associated with the transition from Kanocha phase ceramics to the early facet Jenney Creek phase ceramics (ca. 1000/900 B.C. to 700 B.C.). Attesting to participation in the established networks of inter-regional exchange at this early date, other exotics such as greenstone and numerous marine shell are also found among the cultural debris during this early period. A number of obsidian blades fragments — five of which were submitted for sourcing — were found within these early deposits and are associated with either domestic activities, household ritual, or early communal feasting; although the structural affiliation is unclear, the blades are affiliated with reliably dated cultural occupations at Blackman Eddy (see Figure 2.2). All five blades were sourced to San Martín Jilotepeque.

The presence of obsidian blades in these early Middle Formative contexts may signify the earliest use of obsidian blades in the Maya Lowlands to date (Brown, personal communication). Interestingly, no obsidian blades were found in the earliest occupation levels at Cahal Pech; rather, numerous obsidian flakes were present. Based on this observation, Awe and Healy (1994) suggest that a developmental sequence from a flake to a blade industry in the Belize Valley was likely during the Middle Formative (Awe and Healy 1994). Additionally, Clark (1987) argues that spread of obsidian blade technology "appears to have followed the emergence of complex chiefdoms in any given region, suggesting that its spread was not due solely to the technical efficiency of blades" (1987:260). Interestingly, obsidian blades have been recovered from the Early Middle Formative Period deposits when Blackman Eddy appears to have been an emerging egalitarian society focused on "communal" construction efforts and public ritual feasting, rather than a complex chiefdom. However, its strategic location near the navigable Belize River and established trade routes inland from the coast may have allowed access to the technology or the blades themselves, among other goods, thus created favorable circumstances for the inhabitants of Blackman Eddy to accumulate wealth which may have contributed to their emergence as a seat of power in the valley later in the Middle Formative. Conversely, Cahal Pech appears also to be strategically located (only 5 km) from the confluence of the Mopan and Macal Rivers (that form the Belize River), but a majority of the obsidian assemblage consists of flakes rather than blades. This may be a reflection the differences in local redistribution, differential access to technology, or alternatively, the inhabitants of Cahal Pech were involved in other spheres of trade.

The Kanocha phase and early facet Jenney Creek phase deposits at Blackman Eddy overall reflect a developmental sequence beginning with the raising of perishable domiciles to the construction of simple masonry architecture and lime-plaster plaza floors (Figure 5.2). With the increased labor investment evident in these construction efforts, the presence of exotic items, the use of pan-Mesoamerican iconographic emblems, and ritual feasting of a variety of animal foods (and likely a variety of plant foods) indicates the first materializations of a communal identity in the early community at Blackman Eddy during this phase (Brown 2003).

Early Facet Jenney Creek Phase (850 B.C. to 650 B.C.)

The initial rectangular platform constructions, Structure B1-7th and B1-6th, mark the first appearance of public structures and obvious "community" expression, as well as evidence of a substantial increased labor investment. These structures were finely constructed and covered in thick plaster attesting to a much higher degree of labor and material investment and may have functioned as a higher status household or a place for community integration activities and ceremony (Brown 2003:114). In addition, remnants of a circular platform on top of the well-plastered summit of B1-6th were also observed. No postholes were found in association with this structure indicating that there was no attached superstructure which suggests that this platform may have served as a locale for public performance (Brown 2003:115). Extended over a wide area just west of the platforms was associated ritual debris, the remnants of possible feasting events. Numerous freshwater shells, smashed vessels, faunal remains, lithic debris, and small amounts of marine shell and obsidian are among the deposited items and appear to be directly affiliated with the construction and further architectural elaboration of these early community structures. The communal ritual feasting events, visible here at Blackman Eddy, are part of a larger spatial pattern that characterizes much of the ritual behavior during the Middle Formative Period (Brown 2003:116).

A total of five obsidian samples (two complete blades, three blade fragments, and a possible biface fragment) were recovered in the construction fill of these early platforms. All but one of the obsidian samples discussed above are derived from the San Martín Jilotepeque source. The one sample representing the unidentified source in either Honduras or Central Mexico (Glascock 2006 personal communication) is a possible biface fragment found in construction fill also related to the first phases of platform construction during the transition from the Terminal Early Formative Period to the Early Middle Formative Period. Morphologically, the fragment is interesting because it has a series of small negative flaking scars characteristic of the final stages of biface thinning on the ventral side. The dorsal side is characterized by a semi-concave to flat plane that exhibits no evidence of flake removal and it has no finished edge or evidence of use-wear along any edge; the edges are thick and irregular as if it was a mid-section ventral surface fragment belonging to a larger chipped stone implement (Figure 5.3). The morphological characteristics and breakage patterning suggest that this fragment may have been part of a complete chipped stone tool or eccentric that was intentionally, and not naturally, smashed. At Blackman Eddy, evidence of ritual destruction of chipped stone items is found within a ritual deposit placed in a shell-lined basin-shaped depression cut into bedrock (BR-F2) (Brown 2003:116–118; Garber et al. 2004a:37). Destruction of cultural materials for ritual purposes is narrated in the Quiche creation story, the *Popol Vuh* (Tedlock 1985), and is a common practice evidenced by remains of Late Formative Period and Classic Period dedicatory termination ritual events (Garber 1983).

Transitional Early Facet Jenney Creek/Late Facet Jenney Creek Phase (650 B.C. to 300 B.C.)

Four complete blades and 14 blade fragments are associated with the transitional early to late Facet Jenney Creek ceramic phase, which is temporally designated as the transitional period from the early into the late Middle Formative Period. Seven of these obsidian samples (three complete blades and four blade fragments) were recovered from ritual deposits associated with the construction of Structure B1-5th; one complete blade and two blade fragments are affiliated with the construction and dedication of Structure B1-4th. The remaining eight obsidian artifacts were recovered from fill within the platform constructions; four blade fragments are directly affiliated with construction of B1-5th, one was recovered from the fill of an elliptical cut into B1-5th, and the remaining three are associated with the construction of B1-4th. Sixteen of the obsidian samples

(88%) were derived from the San Martín Jilotepeque source. A single El Chayal blade fragment was recovered from the fill in elliptical cut into Structure B1-5th (extending to B1-7th) and a single Ixtepeque blade fragment was recovered from Structure B1-4th construction fill (see Table 5.2).

Rather dramatic social changes, with signals of emerging elitism, occurs at Blackman Eddy during this temporal interval as suggested by increased wealth evident in ritual deposits and associated architecture. The construction of Structures B1-5th and B1-4th signify a more elaborate architectural program with associated symbolic representations and ritual behaviors. This is first documented with the construction of Structure B1-5th, a triadic arrangement of three platforms with a slightly elevated central platform (Figure 5.4), and indicates a higher level of architectural elaboration than previous structures and no doubt entailed a higher degree of labor investment (Brown 2003). Due to the complexity, size, and unrestricted nature of this structural arrangement, coupled with dense and complex dedicatory/termination deposits linked to different ritual events attests to the function of this structure as "a special ceremonial location and as an integrative feature within this community" (Brown 2003:122).

The triadic arrangement of Structure B1-5th also suggests the physical manifestation of a constructed cosmology and worldview in that the number three signifies the "Three Stone Place" of creation at the base of the "first true mountain of maize," or *Yax hal witz* (Brown 2003; Garber et al. 1998, 2004a; see also Chapter 2). Thematically, this representation of the "Three Stone Place" of creation is one of numerous examples documented architecturally and iconographically throughout

Formative Period Mesoamerica (Freidel 1995; Garber et al. 2004b, 2005; Looper 1995; Schele 1995).

Dense widespread deposits of ritual debris are associated with the construction and termination of Structure B1-5th. Three complete blade fragments and four blade fragments were found within a dense ritual deposit composed of marine shell beads, conch shell fragments, unworked jade, a fragment of jadeite, lithic tools and debitage, freshwater shells, ceramic sherds, mano fragments, and fragments of carbon spread over the base of the Structure B1-5th. The pattern of deposition indicates the items were deposited after initial construction but before construction was completed, possibly indicating a communal ritual event that was synchronized with the B1-5th construction effort (Brown 2003:122). Brown further suggests that this ritual deposit appears to reflect a consecration event for the purpose of imbuing the structure with "life," which is symbolically resonated by the ritualized manifestation of the investment of labor and wealth from the community base. A subsequent termination deposit of lithic debitage, freshwater shells, smashed vessels, dense faunal material (of a variety of species; see Brown 2003:125), a possible bloodletter (a polished deer metapodial bone), and carbon were encountered in the "alley" between the central and eastern platforms of B1-5th, and was intentionally sealed under a lens of white marl and a subsequent layer of peach colored marl. The latter deposit shares characteristics with later forms of reverential termination deposits reflecting the conservative pan-Mesoamerican themes of life, death, and rebirth in all physical and symbolic aspects and also suggests a degree of ritual continuity between the Middle and Late Formative Periods (Brown 2003:124).

More elaborate offerings are associated with the construction and termination of Structure B1-4th than were found in association with previous structural sequences. An elaborate deposit of several vessels (one whole and many reconstructable), partial vessels, a jade bead resting upon a broken plate, a deer scapula and jawbone, a broken mano, numerous exotics (including obsidian), and a unique incised clay roller stamp was found sealed under a marl cap and extended over several square meters above and to the east of the alley termination deposit of Structure B1-5th (Brown 2003:126) (Figure 5.5). This deposit has been interpreted as a dedication or consecration feasting event associated with the construction of B1-4th and rests directly on the peach marl capping the alley termination deposit of B1-5th possibly signifying the renewal or rebirth of this structure (Brown 2003; Garber et al. 2004a). Additionally, the more elaborate nature of this deposit suggests increased wealth in a community of emerging elitism (Brown 2003:134).

The trajectory of architectural elaboration at Blackman Eddy continues with the construction of a larger single-tiered rectangular platform with an inset staircase and extended basal platform (B1-4th). In addition, decorative elements such as stucco façade masks were put in place along the basal platform (see Figure 5.4), which marks the earliest documented use of architectural masks in the Lowlands to date (Brown 2003:134; Garber et al. 2004a:42). Ceramic analysis and one associated calibrated radiocarbon date of 790–405 B.C. (2 sigma) support the early to late Middle Formative date of Structure B1-4th and the affiliated façade mask (see Table 2.2). Although highly fragmented, the nose armature of the mask was still in place and rested directly on the low basal platform. Architectural façade masks are common in Late Formative construction programs (as discussed in Chapters 3 and 4) and are interpreted as a mode of communication about social order and links to the supernatural which would have been recognizable throughout the inter-regional interaction spheres during the Late Formative Period (Freidel 1979). Furthermore, it is suggested by numerous scholars that the mask tradition not only expressed a powerful worldview, but also communicated aspects of the social order and legitimized the development of early kingship within society (Freidel and Schele 1988; Garber et al. 2004a, 2004b; Hansen 1992). This discovery of façade masks during the Late Middle Formative at Blackman Eddy may suggest that Late Formative and Classic architectural decoration evolved out of this earlier mask tradition and that "the material symbol system of kingship had antecedents in the Middle [Formative]" (Brown 2003:138).

Terminal Late Facet Jenney Creek Phase (ca. 300 B.C.)

One broken complete blade and eight blade fragments are associated with the Terminal Late Facet Jenney Creek phase temporally designated as the transitional period from the Late Middle Formative to the Late Formative Periods. This grouping of sourced obsidian was recovered from the subsequent construction phases of Structure B1, designated as B1-3rd-g, B1-3rd-f, and B1-3rd e (Figure 5.6). All of the obsidian associated with this phase originated from the San Martín Jilotepeque source.

The construction phases of B1-3rd signify yet another increase in material and labor investment with a shift in architectural style and construction materials (Brown 2003:138; Garber et al. 2004b). The shift in architectural style and materials occurs after Structure B1-4th was burned and desecrated signifying possible evidence of hostile acts or warfare (Brown 2003:157; Brown and Garber 2003; Garber et al. 2004a:42). Six phases of construction (B1-3rd-a through B1-3rd-g), defined by the various architectural elaborations and construction techniques, span the Late Middle Formative to the Late Formative Periods. Subsequently, these six phases of construction doubled the height of the B1-3rd over time and added an outset staircase by the final construction phase of B1-3rd-a (see Figure 5.6). Structures B1-3rd-g, B1-3rd-f, and B1-3rd-e, the earliest subphases of the construction sequence, date to the transition between the Late Middle Formative and Late Formative Periods.

The large platform of Structure B1-3rd-g was constructed of tightly fitted monolithic cut limestone blocks with an inset staircase covered in plaster. Within the construction fill of B1-3rd-g, five of the sourced obsidian blade fragments were recovered. A total of three ritual deposits are affiliated with B1-3rd-g construction and are possibly associated with the dedication of an additional summit platform. Above these deposits was another modest dedication of a carved shell pendant, complete blade (broken into halves), of San Martín Jilotepeque obsidian, deposited within the fill of the platform. This modest dedication was possibly associated with the construction of an additional summit (B1-3rd-f) (Brown 2003:58, 139).

A greater investment of labor is evident in the shift of construction styles with the use of larger cut limestone blocks, the addition of a staircase, layers of plaster, and the increased overall height of the structure (Brown 2003:60). A similar shift in construction techniques is also seen at Nakbe with the first use of monolithic cut limestone blocks during the late Middle Formative (Hansen 1998). Like Structure B1-4th, Structure B1-3rd was also desecrated by burning (Brown 2003:58; Brown and Garber 2003; Garber et al. 2004a).

Beyond the rather intense construction programs initiated during this time at Blackman Eddy other changes occur in the valley and in the Lowlands as a whole such as increase in population and settlement and increase in trade items such as obsidian, marine shell, and greenstone. Consequently, the upper class of Blackman Eddy appears to be accumulating a fair amount of the wealth indicated by the increased quantity of exotics, labor investment in construction efforts, and assertions of a degree of central authority present in architectural elaborations during this time. Garber et al. (2004a:44) note "the picture that emerges for late Jenney Creek phase culture in the valley is one of a precocious society" with Blackman Eddy possibly emerging as a seat of power in the Belize River Valley.

Transitional Barton Creek/Mount Hope to Hermitage Phase (300 B.C. to A.D. 300)

Three blade fragments in the sourced obsidian assemblage represent the transitional Barton Creek/Mount Hope to Hermitage ceramic phases during the Late Formative to Early Classic Periods. All blade fragments were fabricated from El Chayal obsidian indicating a rather abrupt shift from the almost exclusive use of San Martín Jilotepeque during the Middle Formative Period. This shift in obsidian sources appears to be rather widespread throughout the Lowlands as was presented in Chapter 4 and will be further discussed in this chapter.

The later subphases of B1-3rd (B1-3rd-a through B1-3rd-d; see Figure 5.6) construction signal a change in architectural style to more of a pyramidal form as well as indicate change in ritual behavior from a more open communal expression (i.e., ritual deposits scattered on the surfaces of structures) to a more restrictive private form of ritual (i.e., caching in more defined and secluded niches of the structures) (Brown 2003:139).

Several modifications resulted in height increases to Structure B1-3rd again attesting to increased labor and material investment. Surrounding communities in the Belize Valley (e.g., Cahal Pech, Pacbitun, El Pilar, Buenavista del Cayo, and Actuncan) were also implementing construction programs for development of ceremonial precincts during the Middle to Late Formative. Brown (2003:142) interprets the several phases of construction to Structure B1-3rd may indicate the inhabitants of Blackman Eddy might have been struggling to compete for power with these neighbors and validated their authority through architectural height and elaboration. Shifts in architectural style and ritual behavior during this time begin to mirror Classic Period forms of architecture and ritual practice that signify association with the institution of kingship that defines the later Classic Maya civilization (Demarest 1992; Freidel 1977, 1992; Freidel and Schele 1988a; Garber et al. 1998; Grove and Gillespie 1992b; Ringle 1999). These shifts from "communal" identity to more "private" personas further define the emergence of an elite class, increasing status differentiation between members of the community, and attest to increasing social complexity.

By the end of the late Formative Period (ca. 300 A.D.), initial construction of Structure B1-2nd was complete. Structure B1-2nd was composed of two-tiers reaching a height of 3.4m, an addition of a central outset staircase, and stucco façade masks on the lower and upper tiers of the structure (Figure 5.7). Remnants of the upper mask were sufficiently preserved to warrant iconographic interpretation. The central section of the mask represents the head of a long-nosed deity flanked on each side by panels with circular partially preserved decorative ear-flares (Brown 2003; Garber et al. 2004b) (Figure 5.8). The head is resting in an outwardly flaring bowl, shown in profile, and adorned with three large dots. The bowl functions symbolically as a "bloodletting bowl" and is viewed as a portal defining the liminal space between the natural and supernatural worlds (Freidel et al. 1993:213–219; Figure 5.9) while the three dot adornment symbolizes the "Three Stone Place" of creation (Garber et al. 2004b, 2005). This iconographic composition may further reiterate the Popol Vuh story of the severed head of the father of the Hero twins emerging from a blood bowl (Garber et al. 2004b:68). This theme has also been represented symbolically in Burial 1 from Cahal Pech (Garber 2006).

Remnants of red paint were found on the façade mask and on the staircase of Structure B1-2nd-b, suggesting the whole structure was painted red (Brown 2003:142). The color red was commonly used to in architectural decoration during the Classic Period and may be a symbolic extension of "blood" and assertion of lineage affiliation (Schele 1985). Red (blood) is also symbolically linked to the East (as noted in Chapter 3), which may be associated with notions of sacrifice and rebirth as the sun re-emerges in the East from the journey through the underworld. The overall thematic message of birth, sacrifice, death, and rebirth while traveling through the cosmological realms are complete with the added elements of color to the iconographic façade of Stucture B1-2nd. These further elaborations of Structure B1 define an important element of the functioning ceremonial precinct at Blackman Eddy constructed to replicate the cosmological order. In other words, Structure B1 became a sanctified location with adequate staging areas for shamanic performance and re-enactments of the creation story complete with iconographic façade decorations "serving to fuse cosmology and myth into an architectural display of supernatural and political power" (Garber et al. 2004b:54).

As noted above, a significant shift in obsidian procurement also occurs during this time with El Chayal obsidian becoming more popular and subsequently replacing the earlier dominant percentages of San Martín Jilotepeque obsidian at many sites. Ixtepeque obsidian also makes a stronger appearance during the late Formative to Early Classic Periods. This pattern is present at Blackman Eddy. All 3 blade fragments from this temporal frame are El Chayal obsidian which accords with the source trends established through both INAA and X-ray fluorescence elemental source analysis of obsidian from many Late Formative Period and Classic Period occupations at El Mirador, Tikal, Peten Lakes sites, and Edzna (Dreiss 1988; Dreiss and Brown 1989; Fowler et al. 1989; Hammond 1982; Moholy-Nagy et al. 1984; Nelson 1985; Nelson et al. 1978; Rice 1984; Rice et al. 1985). However, this shift is not felt equally throughout the Lowlands as a whole suggesting that a complex set of variables may account for the differences in procurement and distribution. The possible variables accounting for this shift will be discussed later.

Hermitage Phase (A.D. 300 to A.D. 600)

Two blade fragments, of El Chayal obsidian, are associated with Structure B1-2nd-a, and possibly with ritual activity, during the Hermitage ceramic phase of the Early Classic Period. Numerous pieces of obsidian were recovered from the later construction phases of Structure B1. However, due to architectural slump and recent destruction, the exact temporal affiliations could not be determined. Therefore obsidian artifacts from these levels were not submitted for sampling.

Near the latter part of the late Formative Period, and certainly by the Early Classic Period, Blackman Eddy was a fully functional, albeit modestly sized, ceremonial precinct complete with a full inventory of architecture and monumental sculpture. Continuation of the construction program entailed subsequent remodeling of Structure B1-2nd with summit additions and ancillary staircases flanking the main staircase (see Figure 5.7, Structure B1-2nd-a) (Brown 2003; Garber 2004b:54). A large posthole 1.5m in diameter and 3.5 m deep was encountered on the summit behind the upper tier eastern façade mask that has been interpreted as part of a massive scaffolding used in accession ceremonies (Garber et al. 2004b). This is consistent with the views of associating the ruler with the northern (upperworld realm) sector and further on the high plane of a vertical axis (*axis mundi*) placing the ruler in the sky (Ashmore 1991). At the bottom of the posthole a cache of a single obsidian blade and a portion of a Late Formative bucket was deposited.

The continued elaboration of the ceremonial precinct, a possible by-product of continued competition with neighboring centers, resulted in the addition of many of the structures in Plaza A as well as the placement monuments consisting of an altar and three stelae. The carved panel of Stela 1 (Figure 5.10), although somewhat poorly preserved, stylistically resembles early Initial Series inscriptions similar to those from outside the Maya Lowlands indicating influence from adjoining regions (Garber et al. 2004b). Placement of monuments attests to the physical display of power and authority, and for the rulers at Blackman Eddy, this may have been the last attempts at asserting this authority as many other centers were becoming more powerful and erecting massive monumental architecture in the Belize River Valley (Brown 2003:147).

Discussion

The source analysis of a relatively large sample set of 42 obsidian artifacts (21% of the total obsidian) recovered from Blackman Eddy have aided in establishing a diachronic perspective of obsidian distribution at this locale, and greatly expands the limited database of sourced obsidian in the Belize River Valley. It is now apparent that the inhabitants of Blackman Eddy were involved in a network of trade and exchange that allowed access primarily to San Martín Jilotepeque obsidian throughout the Formative Period somewhat abruptly being replaced by El Chayal obsidian as the dominant source during the Late Formative to Early Classic Periods. The exact processes contributing to this shift in obsidian distribution (and possibly procurement) are a matter of speculation at this juncture, but variables accounting for this shift will be discussed later in this chapter. Future sourcing projects are planned which will expand this particular obsidian database allowing for a greater number of obsidian artifacts to be sourced which may shed light on the transition that occurred in obsidian distribution during the Late Formative Period.

CAHAL PECH OBSIDIAN: TEMPORAL DISTRIBUTION, CONTEXT, AND RAW MATERIAL SOURCE

A total of 34 pieces obsidian have been recovered from recent trench excavations in Plaza B at Cahal Pech (Garber 2006; Garber et al. 2005). All samples are from undisturbed contexts and are affiliated with construction sequences or ritual deposits (see Table 3.3). Associated calibrated radiocarbon dates and an established ceramic chronology provide reliable temporal associations for each of the obsidian artifacts. This obsidian assemblage consists of one complete prismatic blade, 17 blade fragments, and 16 pieces of debitage. Ten of these obsidian artifacts were recovered from well-defined Formative

Period deposits sealed under later Classic Period plaza floors while the remaining 24 are associated with Classic Period plaza floor construction episodes.

The Cahal Pech sourced obsidian assemblage consists of: one complete obsidian blade, two blade fragments, and two proximal flakes from the transitional early and late facet Jenney Creek (Kanluk) phase (ca. 900 to 700 B.C.); and three blade fragments, one complete flake, and one proximal flake from the Barton Creek (Xacal) phase of the Late Formative Period (350 B.C. to 350 A.D.) (Table 5.5). While the sample set from Cahal Pech is much smaller than the sample from Blackman Eddy, initial observations of the data can still contribute valuable information about obsidian distribution during the Formative Period. Also, previous sourcing data from Structure B4 at Cahal Pech (Awe et al. 1996) will also be used in this analysis.

All 10 of the obsidian samples were positively sourced to the popular highland Guatemala obsidian sources. The emerging pattern of Formative Period obsidian distribution at Cahal Pech is quite different than the observed pattern at Blackman Eddy. As noted above, 91% of the sourced obsidian at Blackman Eddy dating to the Formative Period is from the San Martín Jilotepeque source while the three other sources (El Chayal, Ixtepeque, and an unknown source) collectively make up 9% of the sample. Conversely, 60% of the obsidian at Cahal Pech in the Formative Period is from the El Chayal source while the San Martín Jilotepeque and Ixtepeque sources are represented by 20% each (see Table 5.3, a). Details regarding temporal affiliation, ceramic chronology, construction sequences, and ritual deposition activities associated with the sourced obsidian samples are discussed below.

Transitional Cunil/Early Facet Jenney Creek (Kanluk) Phase (ca. 1100/1000 B.C. to 900 B.C.)

The appearance of Cunil phase ceramics at Cahal Pech marks the earliest occupation sequence established atop bedrock (Awe 1992). During previous investigations of Structure B-4 (at the southern end of Plaza B; see Figure 3.8), a total of 28 obsidian pieces were recovered from the transitional Cunil to Early Facet Jenney Creek (Kanluk) phase. However, the exact details of artifact types were not available. Based on previous observations, it is likely that a majority of these obsidian artifacts were flakes (Awe 1992; Awe and Healy 1994; Cheetham 1995, 1996; Healy 1999). Seven obsidian artifacts (25% of the total obsidian recovered) from the transitional Cunil to Early Facet Kanluk phase in Structure B-4 were sourced to El Chayal (Awe et al. 1996; see Table 5.3, b).

Transitional Early Facet/Late Facet Jenney Creek (Kanluk) Phase (ca. 700 B.C.)

A total of one complete blade, two blade fragments, and two flakes were recovered from early to late Middle Formative deposits associated with transitional early to late facet Jenney Creek (Kanluk) phase ceramics. All common highland Guatemalan obsidian sources are represented in the sample and consist of: one blade fragment of San Martín Jilotepeque obsidian; the single complete blade, one blade fragment, and one flake of El Chayal obsidian; and one flake representing the Ixtepeque source (see Table 5.3, a). The two blade fragments and two flakes are associated with Floor 4 of Plaza B which was an artifact-laden lens (ranging from 5 to 20 cm in thickness) that extended rather consistently through the entire excavation trench. Among the artifacts recovered were a high density of ceramic sherds, ceramic figurines, incised ceramic spool beads, a "transformation figure" vessel foot, a jadeite disk, drills, numerous marine shell fragments and beads, two pieces of slate, burnishing stones, and a hammerstone. The possibility that this dense artifact zone represents ritual feasting events is likely and detailed analysis is in progress (Garber et al. 2005).

During trench investigations in Plaza B during 2004 (Garber et al. 2005) a portion of a platform construction of dry-laid rubble covered in tamped marl (Platform C) and associated early Facet Jenney Creek (Kanluk) phase material were discovered. To accommodate the later construction of Platform B — also temporally associated with the early facet Jenney Creek (Kanluk) — Platform C was cut and Platform B was built overlapping the earlier platform (Garber et al. 2005:15) (Figure 5.11). The precise north to south dimensions of Platform C are not known due to limited exposure of the trench excavation but the southeastern corner of Platform B was revealed during the 2005 investigations indicating a total length exceeding 15 meters. Excavations in 2004 resulted in the discovery of a cache (Cache 2) located at the junction of the northeastern corner Platform B and Platform A (which is temporally contemporary to Platform B). Cache 2 consisted 3 slate bars, 13 worked greenstone pieces, and a headless figurine. This cache is interpreted by Garber et al. (2005:17) to be a "creation-cosmogram." The cache was placed in the north, which is symbolically aligned with the upperworld realm. Thirteen pieces of greenstone represent the individual 13 levels of the upperworld, and again, the theme of the "Three Stone Place" of creation is manifested symbolically by the inclusion of the 3 slate bars. The interpretation of the headless figurine is pending, but Garber et al. (2005:17) suggest it may represent an ancestor in his role as a *Bacab*, or "ritual assistants positioned at the corners of the world to hold up the sky realm."

During the 2005 field season, another cache/burial was discovered at the southeastern corner of Platform B. A human skull and six polished greenstone beads were found inside a large red bowl, with a somewhat waxy slip (type variety currently under analysis), located directly under a very large limestone slab that formed the exact corner of Platform B. As discussed in Chapter 3, the head-in-bowl composition may symbolically represent the episode in the Popol Vuh of the Hero Twins planting their father's decapitated head which in turn sprouts into a maize plant. The head-in-bowl symbolism manifested here during the early Middle Formative also resonates with later iconographic themes used in architectural displays of supernatural and political power such as the stucco masks decorating the facades of many Late Formative period structures.

A headless body, assumed to belong to the head in the bowl, was found extended with the feet pointing to the north-northwest closely aligned with the axis of Platform B. A simple crypt constructed of upright limestone slabs, one upright slate slab, and capstones housed the body. Interestingly, the body was separated from the head not only by the bowl, but also by a wall of upright slabs. Grave goods consisted of a small groundstone "cone," shell tinklers, and a single obsidian blade of El Chayal obsidian. A few centimeters above the human remains was a "face" fragment from a "potbelly" vessel (Figure 5.12), which is stylistically related to ceramic styles in adjoining regions to the south indicating some form of interaction or possible affiliation with these groups (Garber personal communication). These vessel types are also found in northern Belize as well (Garber personal communication).

Three out of four obsidian artifacts recovered from early to late Middle Formative Period deposits during previous investigations in Structure B-4 at Cahal Pech were submitted for source analysis (Awe et al. 1996). Interestingly, two samples were sourced to San Martín Jilotepeque obsidian (66%), and the other was from the El Chayal source (34%). However, this high density of San Martín Jilotepeque obsidian may be a reflection of the small sample size, or may possibly be a reflection of different sources of obsidian being preferentially used and deposited in different contexts, as noted at Tikal (Moholy-Nagy 1984).

Barton Creek (Xacal) Phase (350 B.C. to A.D. 350)

Three blade fragments and two flakes were recovered from the Xacal/Barton Creek phase which is temporally assigned to the Late Formative. Similar to earlier phases, all common Guatemalan sources are represented. Two of the blade fragments and one flake are of El Chayal obsidian, the other blade fragment is San Martín Jilotepeque obsidian, and one Ixtepeque flake. This phase was associated with Plaza Floor 3 and consisted of remnants of intact plaster and floor fill approximately 15 to 20 cm thick. Artifacts recovered from this level include: lithic tools, polished and unworked greenstone fragments, numerous marine shell fragments and beads, obsidian blades/flakes, and a slate fragment.

Awe et al. (1996) submitted three (50%) of six obsidian artifacts recovered from Late Formative deposits in Structure B-4 for source analysis. Similar to the Middle Formative obsidian assemblage, San Martín Jilotepeque obsidian was represented by two (66%) of the obsidian samples, while the other sample was from the El Chayal source (see Table 5.3).

Discussion

The percentages of obsidian sources represented at Cahal Pech are quite different than that of Blackman Eddy. Sixty percent of the obsidian from Plaza B excavations was sourced to El Chayal, while the two other prominent highland sources (i.e., San Martín Jilotepeque and Ixtepeque) are present at 20 percent each. The obsidian recovered from Plaza B investigations shows similarities to the source percentages of obsidian collected from Structure B-4 excavations (Awe and Healy 1996). The overall prominence of El Chayal obsidian is apparent in both sourcing data sets. Interestingly, Awe and Healy's data exhibits a strong presence of San Martín Jilotepeque obsidian during the Late Formative Period in Structure B, which, as noted earlier, may be skewed due to the small sample size, or may be a reflection of preferential use and discard/deposition of certain obsidian sources in particular places within the site.

OBSERVED TRENDS AND COMPARISONS OF OBSIDIAN SOURCE DATA IN THE MAYA LOWLANDS

A paucity of sourcing data for the lowland Formative Period has made the investigation of early inter-regional trade and exchange networks a difficult task. Awe and Healy (1996:161) note that the smaller quantity of sourced and dated obsidian from the Formative Period in comparison to obsidian data from the Classic Period, may suggest a more limited incipient obsidian trade or limited access to obsidian sources during this early time. However, it may also be a reflection of the inaccessibility of Formative Period deposits as most are buried deeply under Late Classic constructions.

Nevertheless, through full horizontal excavations of Structure B1 at Blackman Eddy, trench excavations in Plaza B at Cahal Pech, and previous excavations in Structure B-4, a noticeable amount of exotic materials (i.e., obsidian, jade/greenstone, and marine shell) have been recovered from deposits spanning the Terminal Early Formative Period to the Late Formative Period indicating a moderate level of participation in the active inter-regional trade and exchange systems of the time. This early evidence for inter-regional interaction in the Belize River Valley also suggests that long-distance trade and exchange spheres were well-established during Formative Mesoamerica, which resulted in the transport of obsidian more than 500 km from the Highlands to the Lowlands.

Blackman Eddy and Cahal Pech, as well as many others sites in the Belize Valley, have been the focus of investigations for a greater part of the last 50 years. Consequently, a well-defined chronology based on radiocarbon dates, associated construction sequences, ritual behaviors, and ceramic data has been established. Elemental sourcing of obsidian from Blackman Eddy and Cahal Pech has allowed for another facet of history in this region to be explored. This sourcing data, and associated contextual and temporal data, have aided in the diachronic and synchronic analysis of obsidian distribution from these two sites located in the Belize River Valley. From the obsidian sourcing data presented above apparent differences exist in the percentages of obsidian present at each site. This may suggest that different mechanisms of obsidian distribution, or *redistribution*, were at play in the Belize River Valley.

The high percentages of San Martín Jilotepeque obsidian found at Blackman Eddy in the Middle to Late Formative Periods is congruous with the general pattern of obsidian distribution throughout the Maya Lowlands at the sites of El Mirador, Peten

Lakes sites, La Libertad, Seibal, Tikal, and Edzna (see Dreiss 1988; Dreiss and Brown 1989; Fowler et al. 1989; Hammond 1982, 1984; Nelson 1985; Nelson et al. 1978; Rice 1984; Rice et al. 1985) (Table 5.6). The shift in distribution from San Martín Jilotepeque obsidian to El Chayal during the Late Formative into the Early Classic is also visible pattern at several of the lowland sites listed above as well as at Blackman Eddy. This shift to the primary use of El Chayal obsidian has been argued as being a result of the reorganization of obsidian networks possibly linked to the emergence of the Kaminaljuyu highlands chiefdom during the Late Formative (Fowler et al. 1989; Hurtado de Mendoza 1989; Michels 1976; Nelson 1985). However, this shift is not felt equally throughout the Lowlands as a whole suggesting a more complex set of variables may account for differential distribution and procurement of obsidian. For example, involvement in different spheres of trade and exchange (not necessarily politically aligned), changing economies and types of transactions, political/social/ religious alliances or allegiances and conflict may account for the differences in procurement and distribution.

A majority (60%) of the Cahal Pech obsidian from the most recent source data, as well as from previous sourcing data (69%; Awe and Healy 1996), is from the El Chayal source which goes against the general trend of obsidian distribution in the Lowlands. A fair representation of obsidian from both San Martín Jilotepeque (20% this study; 31% Awe and Healy 1996 data) and Ixtepeque (20% this study) obsidian is also documented. Similarly, obsidian source analysis of five artifacts (one flake from the Middle Formative, four blade fragments dating to the Late Formative) from the nearby site of Pacbitun, upriver and to the southeast from a tributary to the Macal River (see Figure 3.5), show a similar pattern to the source data from Cahal Pech, with 60% El Chayal and 40%

Ixtepeque obsidian. The dominant percentage of El Chayal at Cahal Pech and also Pacbitun, contrasting with the primary San Martín Jilotepeque presence at Blackman Eddy during the Formative Period, appears to be the result of access to different spheres of trade or involvement in a different redistribution network. The location of Pacbitun — in the hills along a tributary of the Macal River, southeast of Cahal Pech — suggests that goods may have been funneled through Cahal Pech and then redistributed to Pacbitun. Analysis of obsidian source data from northern Belize coupled with obsidian data from other lowland sites suggest that geographical location and political/social/religious affiliations may have resulted in differential distribution of obsidian, as will be discussed below.

Provenience data from the northern Belize sites of Colha and Cuello consist of relatively equal amounts of all three major Guatemalan obsidian sources, as well as a significant percentage of Mexican obsidian from Cuello (see Table 5.6). Sourced obsidian from other northern Belize sites illustrate similar patterns, although the sample sets are much smaller and may not be representative of the complete regional obsidian assemblage. Overall, at least at Colha and Cuello, Dreiss suggests (1989) that access to obsidian from all of these sources during this time may be a reflection of the favorable geographic location in close proximity to established coastal networks. In addition, through examination of trace element data and development of a regionalized distribution model for the Belize periphery, Dreiss' (1989) also suggests that acquisition of obsidian and resulting patterns of distribution were possibly linked to exposure of Tikal's sphere of influence. Furthermore, communities strategically located near established trade routes, such as Blackman Eddy's location near probable riverine routes, may have participated in the network as "minor-redistribution nodes." Blackman Eddy's role as a "minor-redistribution node" may be directly tied to the accumulation of wealth — evidenced archaeologically in both artifactual and architectural data — and may have contributed to its emergence as a "seat of power" during the Middle to Late Formative Period in the valley.

Through analysis of available obsidian source data, patterns of episodic exploitation of particular obsidian sources during the Formative Period into the Early Classic Period have been revealed by fluctuating frequencies and differential distribution of obsidian thus providing a base for a diachronic reconstruction of obsidian trade networks (Awe et al. 1996; Dreiss 1989; Dreiss and Brown 1989; Rice 1984, 1985). The dynamic nature of obsidian trade and exchange networks evident archaeologically and chemically has precipitated curiosity regarding differential access and distribution, the nature of emerging economies, the catalytic role of trade in internal organization, and centralized control of the obsidian sources. Thus far, the available trace element data in the Maya Lowlands has contributed a great deal to the study of inter-regional trade and exchange networks. The source data from Blackman Eddy and Cahal Pech greatly increase the data set of sourced obsidian for the Belize River Valley and for the Lowlands as a whole. However, as some queries were answered in this study, unique patterns of obsidian distribution in the valley have raised more questions regarding the nature and dynamism of Formative period trade and exchange.

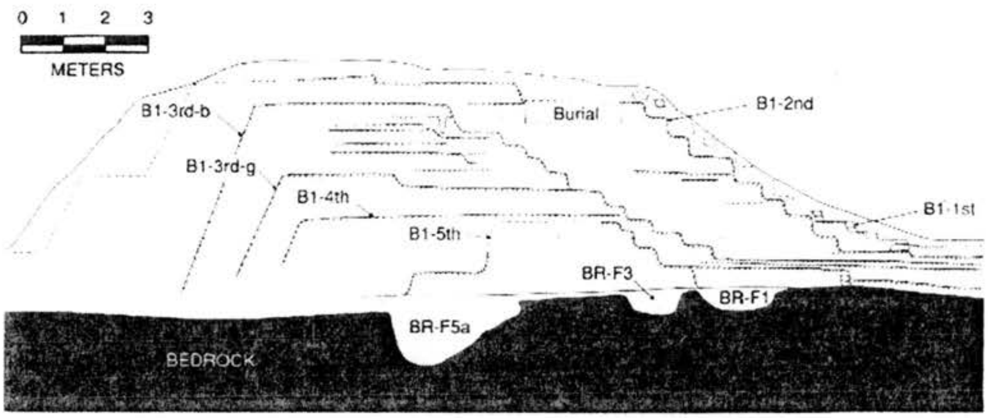

Figure 5.1. Blackman Eddy Structure B1 profile (from Garber 2004a:26).

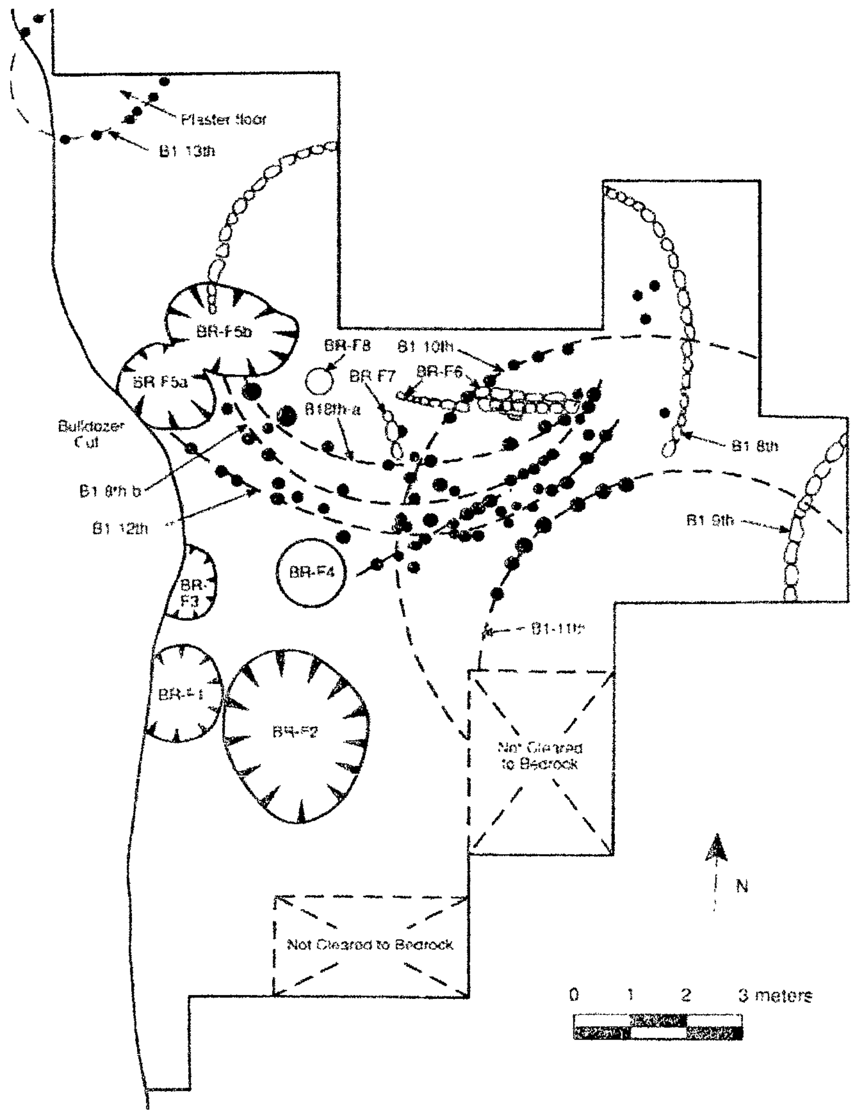

Figure 5.2. Plan map of bedrock beneath Blackman Eddy Structure B1 (from Garber 2004a:34).

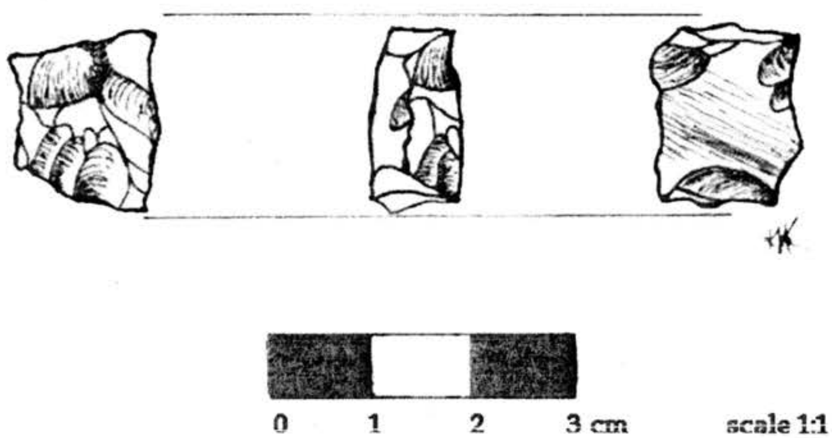

Figure 5.3. Possible biface fragment from an unknown obsidian source, Blackman Eddy (illustrated by the author).

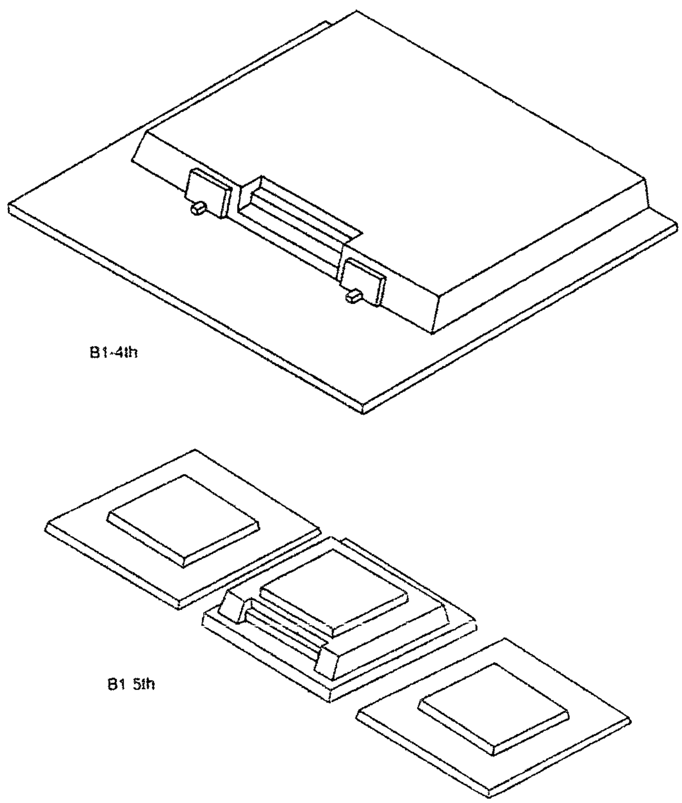

Figure 5.4. Reconstruction of Structures B1-5th and B1-4th, Blackman Eddy (from Garber 2004a:39).

Figure 5.5. Incised clay roller stamp from Blackman Eddy (from Garber et al. 2004a:32).

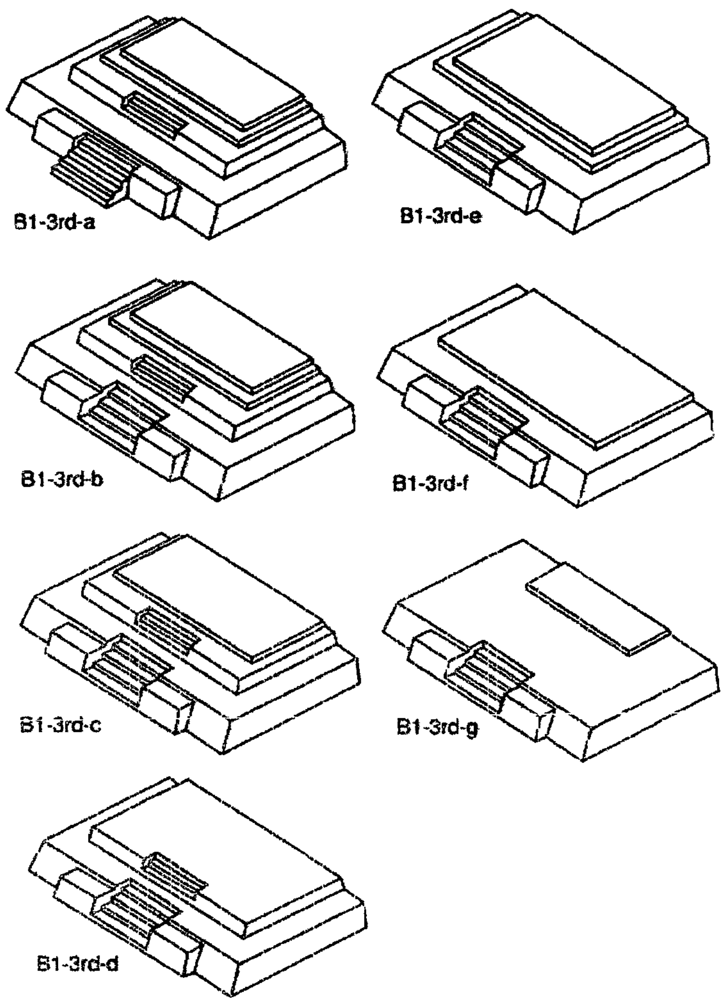

Figure 5.6. Reconstruction of Blackman Eddy Structures B1-3rd-g through B1-3rd-a (from Garber 2004a:43).

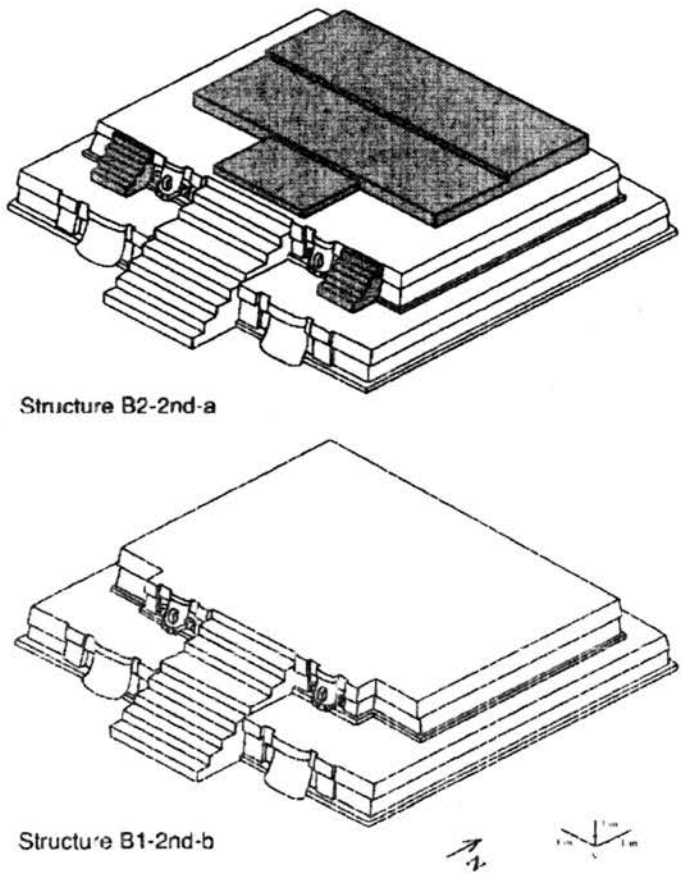

Figure 5.7 Reconstruction of Blackman Eddy Structure B1-2nd (from Garber et al. 2004b:55).

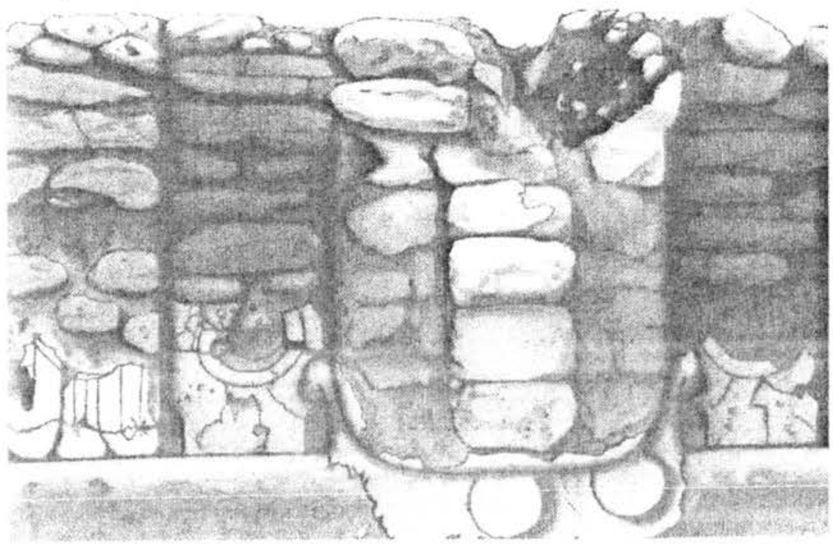

Figure 5.8. Blackman Eddy Structure B1-2nd façade mask (from Garber et al. 2004b:56).

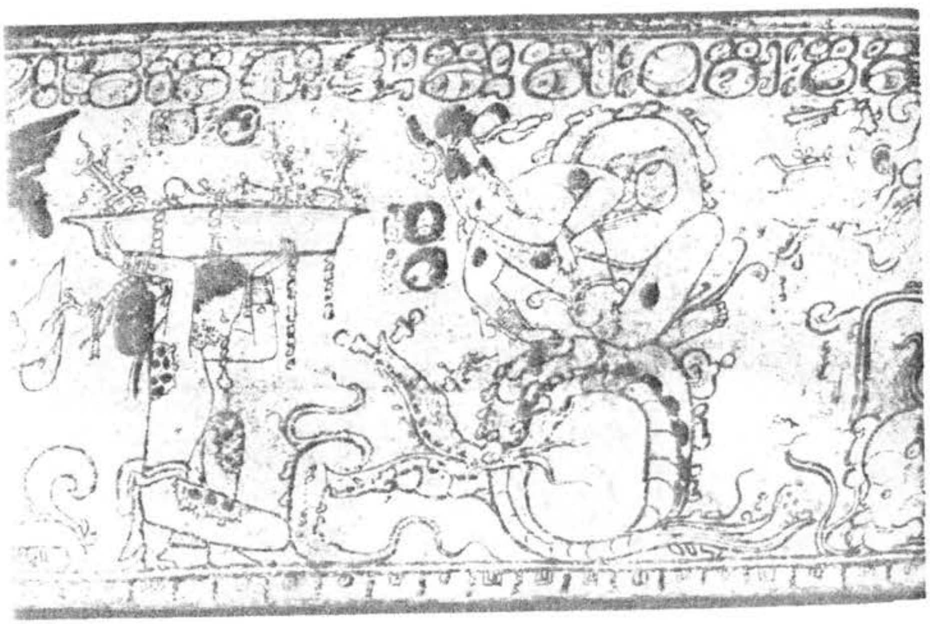

Figure 5.9. Codex style vase, Late Classic, northern Peten. Jaguar Deer holds a "blood bowl" containing blood-letting and possible ancestry paraphernalia.

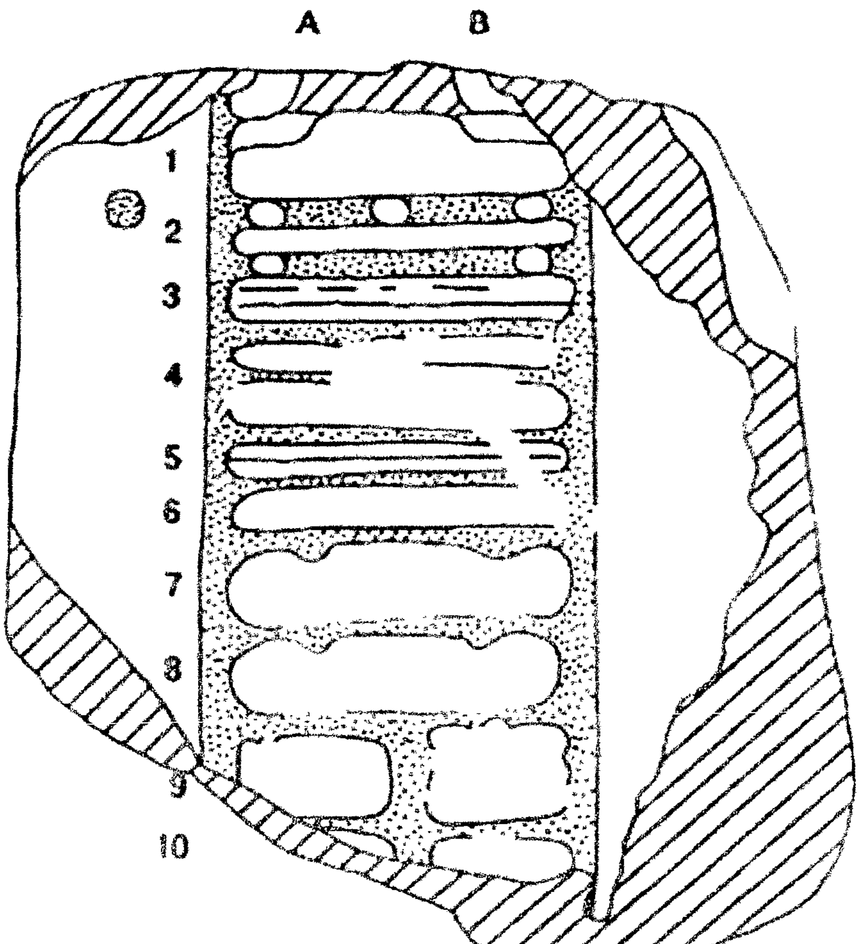

Figure 5.10. Stela 1, Blackman Eddy (from Garber 2004b:63).

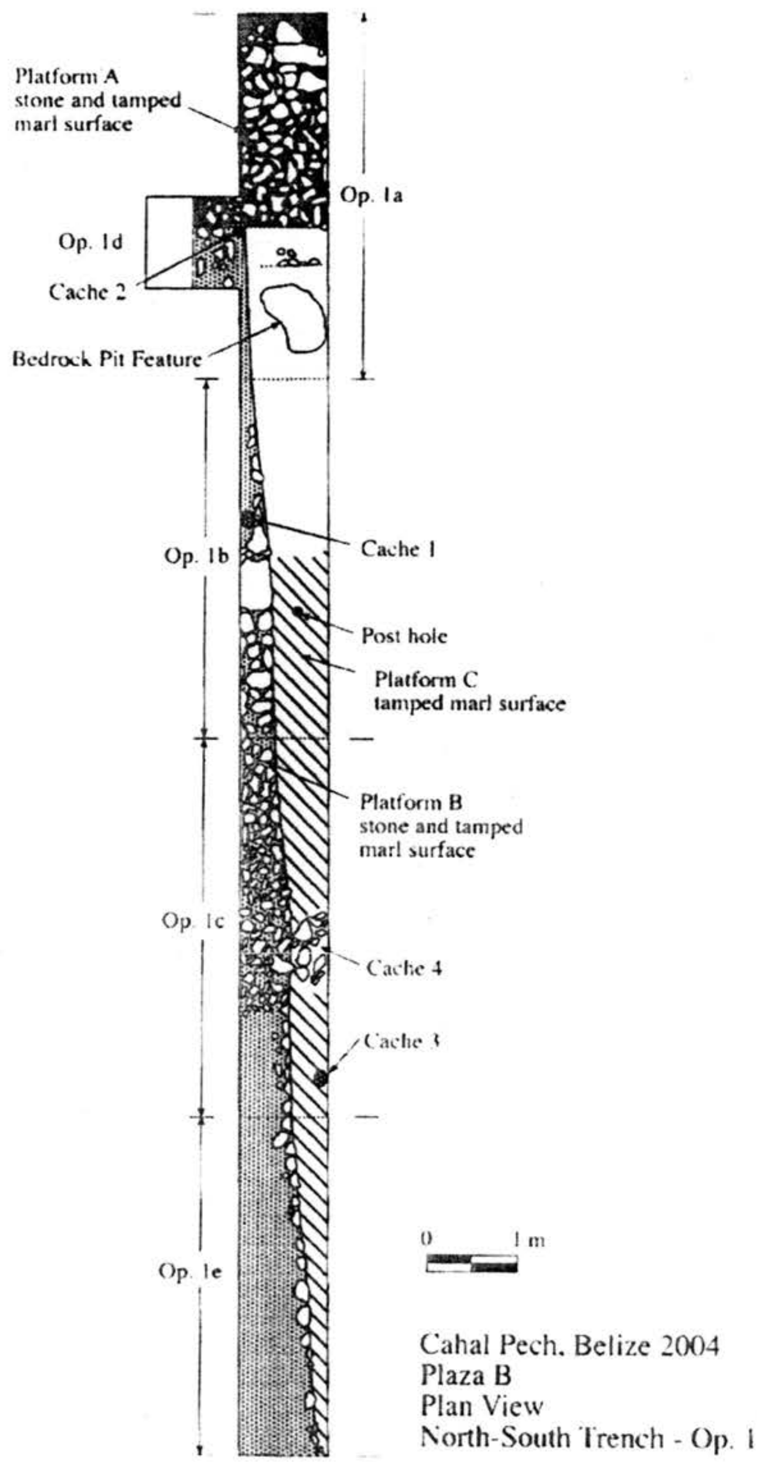

Figure 5.11. Plan view of Op. 1 trench in Plaza B, Cahal Pech.

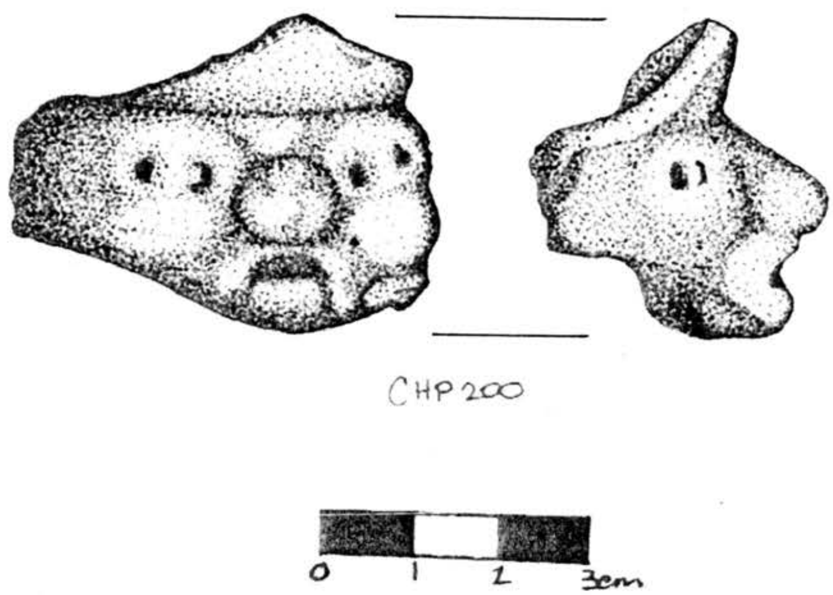

Figure 5.12. Face fragment of a "potbelly" vessel found near Burial 1, Cahal Pech (illustrated by the author).

Table 5.1. Trace element abundances and ratios from Blackman Eddy and Cahal Pech obsidian samples (table courtesy of Dr. Michael Glascock 2006; MURR Archeometry Laboratory).

anid	Al (%)	Ba (ppm)	Cl (ppm)	Dy (ppm)	K (%)	Mn (ppm)	Na (%)	field_id	Site_name	source_name
KMK001	7 06	986	261	1 97	3 31	531	2 84	342	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK002	7 88	1094	325	2 05	3 24	547	2 91	343	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK003	6 92	1014	306	2 25	3 22	541	2 90	345	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK004	7 14	1078	302	2 23	3 17	533	2 84	347	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK005	7 44	1054	293	2 08	3 42	545	2 90	357	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK006	7 15	1036	316	1 32	3 72	544	2 91	358	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK007	6 91	1060	300	1 90	3 14	534	2 84	359	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK008	7 34	1096	280	1 73	3 28	540	2 88	361	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK009	7 05	963	308	2 18	3 21	539	2 87	369	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK010	7 38	1001	280	2 75	3 28	539	2 87	400	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK011	7 24	982	343	1 67	3 17	536	2 87	415	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK012	7 10	947	321	2 12	3 34	449	2 88	422	Blackman Eddy, Belize	Ixtepeque
KMK013	7 04	1075	283	2 13	3 43	530	2 83	438	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK014	6 54	1044	289	1 69	3 38	527	2 80	440	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK015	7 17	1017	259	1 52	3 14	537	2 87	441	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK016	7 34	1024	277	1 71	3 41	537	2 85	453	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK017	7 00	1089	297	1 84	3 43	542	2 89	454	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK018	7 32	1047	259	1 91	3 39	532	2 86	455	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK019	7 68	1098	298	1 62	3 28	544	2 92	456	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK020	7 32	1067	310	2 10	3 29	532	2 85	457	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK021	7 06	1092	333	2 00	3 37	528	2 83	499	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK022	7 07	897	379	2 77	3 80	656	2 73	744	Blackman Eddy, Belize	El Chayal
KMK023	7 10	1012	312	2 08	3 15	527	2 82	785	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK024	7 49	1052	296	1 93	3 44	531	2 76	811	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK025	6 82	1012	301	1 87	3 19	533	2 84	818	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK026	7 26	1011	369	2 28	3 55	538	2 86	858	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK027	6 45	337	351	2 89	3 99	373	2 85	1034	Blackman Eddy, Belize	Not Guatemala, either Honduras or Central Mexico
KMK028	7 20	1072	284	2 31	3 38	532	2 84	1044	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK029	7 13	900	277	1 91	3 26	531	2 83	1045	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK030	7 44	1005	296	2 51	3 14	532	2 85	1178	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK031	7 30	892	290	2 57	3 43	660	3 09	1344	Blackman Eddy, Belize	El Chayal
KMK032	7 04	832	270	2 53	3 28	655	3 09	1428	Blackman Eddy, Belize	El Chayal
KMK033	7 41	759	261	2 62	3 32	646	3 04	1522	Blackman Eddy, Belize	El Chayal
KMK034	6 85	1080	315	2 47	3 32	542	2 87	1561	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK035	7 29	1136	285	2 37	3 30	535	2 86	1617	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK036	7 17	970	294	2 19	3 12	536	2 83	1640	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK037	6 88	1023	276	1 83	3 11	525	2 82	1641	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK038	7 66	996	322	2 01	3 21	535	2 86	1642	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK039	7 43	1019	313	2 03	2 86	532	2 86	1679	Blackman Eddy, Belize	San Martin Jilotepeque-1
KMK050	7 05	1008	354	2 44	3 20	694	3 09	761	Blackman Eddy, Belize	El Chayal
KMK051	7 25	909	369	2 30	3 31	654	3 13	762	Blackman Eddy, Belize	El Chayal
KMK053	6 94	1116	341	1 68	3 38	532	2 90	457	Blackman Eddy, Belize	San Martin Jilotepeque-1

Table 5.2 Blackman Eddy obsidian source data by temporal affiliation and context.

Blackman Eddy Obsidian Samples by Temporal Affiliation and Context					*Number of Obsidian Samples by Source*					
		Context								
Temporal Affiliation	*Ceramic phase*	*ritual*	*domestic/ public*	*Total per context*	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*	*Total per source*	*Total per temporal unit*
Early Middle Formative	Transitional Kanocha to EJC	5		5 (100%)	5				5 (100%) SMJ	5 (12%)
Early Middle Formative	Early Facet Jenney Creek		5	5 (100%)	4			1	4 (80%) SMJ; 1 (20%) UNK	5 (12%)
Transitional EMF to LMF*	Transitional EJC to LJC*	10	8	10 (56%) 8 (44%)	10 6	1	1		16 (88%) SMJ; 1 (5.5%) EC; 1 (5.5%) IXT	18 (42%)
Transitional LMF to Late Formative	Terminal Late Facet Jenney Creek	2	7	2 (22%) 7 (78%)	2 7				9 (100%) SMJ	9 (21%)
Late Formative to Early Classic	Transitional Barton Creek to Hermitage		3	3 (100%)		3			3 (100%) EC	3 (7%)
Early Classic	Hermitage	2		2 (100%)		2			2 (100%) EC	2 (6%)
Totals		19 (45%)	23 (55%)	**42 (100%)**	34 (81%)	6 (15%)	1 (2%)	1 (2%)	**42 (100%)**	**42 (100%)**

*EMF = Early Middle Formative Period; LMF = Late Middle Formative Period

**EJC = Early Facet Jenney Creek; LJC = Late Facet Jenney Creek

Table 5.3 Summary of Cahal Pech obsidian source data: a) obsidian from Plaza B 2004/2005 excavations; b) Structure B-4 obsidian (Awe et al. 1996).

a. Cahal Pech Plaza B Obsidian Samples by Temporal Affiliation and Context — *Number of Obsidian Samples by Source*

Temporal Affiliation	*Ceramic phase*	*Context: ritual/ burial*	*Context: domestic/ public*	*Total per context*	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*	*Total per source*	*Total per temporal unit*
Transitional Early Middle Formative to Late Middle Formative Periods	Transitional Early Facet to Late Facet Jenney Creek	5		5 (100%)	1 (20%)	3(60%)	1(20%)		1(20%) SMJ; 3 (60%) EC; 1 (20%) IXT	5 (50 %)
Late Formative Period	Xacal/Barton Creek		5	5 (100%)	1 (20%)	3 (60%)	1(20%)		1 (20%) SMJ; 3 (60%) EC, 1 (20%) IXT	5 (50%)
Totals		5 (50%)	5 (50%)	**10 (100%)**	2 (20%)	6 (60%)	2 (20%)		**10 (100%)**	**10 (100%)**

b. Cahal Pech Structure B Obsidian Samples by Temporal Affiliation and Context — *Number of Obsidian Samples by Source*

Temporal Affiliation	*Ceramic Phase*	*Total*	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*	*Total per source*	*Total per temporal unit*
Terminal Early Formative Period	Transitional Cunil to Early Facet Jenney Creek	7		7 (100%)			7 (100%) EC	7 (54%)
Transition Early Middle Formative to Late Middle Formative Periods	Transitional Early Facet to Late Facet Jenney Creek	3	2 (66%)	1 (34%)			2 (66%) SMJ, 1 (30%) EC	3 (23%)
Late Formative Period	Xacal/Barton Creek	3	2 (66%)	1 (34%)			2 (66%) SMJ; 1 (30%) EC	3 (23%)
Totals		**13 (100%)**	4 (31%)	9 (69%)			**13 (100%)**	**13 (100%)**

* TEF = Terminal Early Formative; EMF = Early Middle Formative; LMF = Late Middle Formative

Table 5.4. Blackman Eddy obsidian by sample number, context, and source.

Blackman Eddy Sample Nos.	*Artifact Class*	*Context*	*Structural Affiliation*	*Temporal Affiliation*	*Ceramic phases **	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*
KMK050/761	blade fragment	ritual feasting	B1-2nd	Early Classic	Hermitage		x		
KMK051/792	blade fragment	ritual feasting	B1-2nd	Early Classic	Hermitage		x		
KMK031/1344	blade fragment	construction fill	B1-3rd-a/e	Late Formative to Early Classic	Barton Creek to Hermitage		x		
KMK032/1428	blade fragment	construction fill	B1-3rd-a/e	Late Formative to Early Classic	Barton Creek to Hermitage		x		
KMK033/1522	blade fragment	construction fill	B1-3rd-a/e	Late Formative to Early Classic	Barton Creek to Hermitage		x		
KMK001/342	blade fragment	construction fill	B1-3rd-f	Transition LMF to Late Formative	Terminal LFC	x			
KMK004/347	blade fragment	construction fill	B1-3rd-f	Transition LMF to Late Formative	Terminal LFC	x			
KMK003/345	blade fragment	construction fill	B1-3rd-f	Transition LMF to Late Formative	Terminal LFC	x			
KMK005/357	blade	cache 20	B1-3rd-f/g	Transition LMF to Late Formative	Terminal LFC	x			
KMK006/358	blade fragment	cache 20	B1-3rd-g	Transition LMF to Late Formative	Terminal LFC	x			
KMK011/415	blade fragment	construction fill	B1-3rd-g	Transition LMF to Late Formative	Terminal LFC	x			
KMK002/343	blade fragment	construction fill	B1-3rd-g	Transition LMF to Late Formative	Terminal LFC	x			
KMK009/369	blade fragment	construction fill	B1-3rd-g	Transition LMF to Late Formative	Terminal LFC	x			
KMK010/400	blade fragment	construction fill	B1-3rd-g	Transition LMF to Late Formative	Terminal LFC	x			
KMK012/422	blade fragment	construction fill	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC			x	
KMK024/811	blade fragment	construction fill	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK025/818	blade fragment	construction fill	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK013/438	blade fragment	dedication deposit	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK014/440	blade	dedication deposit	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK015/441	blade fragment	dedication deposit	B1-4th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK022/744	blade fragment	elliptical cut	B1-5th to B1-7th	Transitional EMF to LMF	Transitional EFC to LFC		x		
KMK030/1178	blade fragment	construction fill	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK021/499	blade fragment (2)	construction fill	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK008/361	blade fragment	construction fill	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK007/359	blade fragment	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK016/453	blade fragment	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK017/454	blade	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK018/455	blade	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK019/456	blade	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK020/457	blade fragment	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK053/457	blade fragment	termination cache	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK038/1642	blade fragment	construction fill	B1-5th	Transitional EMF to LMF	Transitional EFC to LFC	x			
KMK023/785	blade fragment	floor	B1-6th	Early Middle Formative	Early Facet Jenney Creek	x			
KMK026/858	blade fragment	construction fill	B1-6th to bedrock	Early Middle Formative	Early Facet Jenney Creek	x			

* TEF = Terminal Early Formative; EMF = Early Middle Formative; LMF = Late Middle Formative

**EFC = Early Facet Jenney Creek; LJC = Late Facet Jenney Creek.

Table 5.4. Blackman Eddy obsidian by sample number, context, and source.

Blackman Eddy Sample Nos.	*Artifact Class*	*Context*	*Structural Affiliation*	*Temporal Affiliation*	*Ceramic phases **	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*
KMK027/1034	fragment	construction fill	B1-6th to bedrock	Early Middle Formative	Early Facet Jenney Creek				x
KMK028/1044	blade	construction fill	B1-6th to bedrock	Early Middle Formative	Early Facet Jenney Creek	x			
KMK029/1045	blade	construction fill	B1-6th to bedrock	Early Middle Formative	Early Facet Jenney Creek	x			
KMK036/1640	blade fragment	ritual feasting	not clear	Early Middle Formative	Transitional Kanocha to EJC	x			
KMK037/1641	blade fragment	ritual feasting	not clear	Early Middle Formative	Transitional Kanocha to EJC	x			
KMK034/1561	blade fragment	ritual feasting	not clear	Early Middle Formative	Transitional Kanocha to EJC	x			
KMK035/1617	blade fragment	ritual feasting	not clear	Early Middle Formative	Transitional Kanocha to EJC	x			
KMK039/1679	blade fragment	ritual feasting	not clear	Early Middle Formative	Transitional Kanocha to EJC	x			
				Totals and percentages		34 (81%)	9 (15%)	1 (2%)	1 (2%)

* TEF = Terminal Early Formative; EMF = Early Middle Formative; LMF = Late Middle Formative
**EFC = Early Facet Jenney Creek; LJC = Late Facet Jenney Creek.

Table 5.5. Cahal Pech obsidian by sample number, context, and source.

Cahal Pech Sample Nos.	*Artifact Class*	*Context*	*Temporal Affiliation*	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Unknown*	*Totals per temporal period*
KMK040/106	flake	floor 3	Late Formative			x		
KMK045/106	flake	floor 3	Late Formative		x			
KMK046/107	blade fragment	floor 3	Late Formative		x			
KMK047/108	blade fragment	floor 3	Late Formative		x			
KMK048/113	blade fragment	floor 3	Late Formative	x				5 (50%)
KMK041/20	flake	floor 4 & ritual fill	transition Early Middle Formative to Late Middle Formative		x			
KMK042/21	flake	floor 4 & ritual fill	transition Early Middle Formative to Late Middle Formative			x		
KMK043/22	blade fragment	floor 4 & ritual fill	transition Early Middle Formative to Late Middle Formative		x			
KMK044/23	blade fragment	floor 4 & ritual fill	transition Early Middle Formative to Late Middle Formative	x				
KMK049/191	blade fragment	burial/cache	transition Early Middle Formative to Late Middle Formative		x			5 (50%)
			Totals and percentages	2 (20 %)	6 (60%)	2 (20%)		10 (100%)

Table 5.6. Summary of available obsidian source analysis data from the Maya Lowlands.

Region and sites	*Time period*	*San Martin Jilotepeque*	*El Chayal*	*Ixtepeque*	*Other*	*Total*
Peten						
	Middle Formative	47 (75%)	11 (17%)	3 (5%)	2 (3%)	63 (100%)
Central Peten	Late Formative	22 (65%)	8 (24%)	4 (11%)		34 (100 %)
(Rice et al. 1985)	Early Classic	6 (24%)	18 (72%)		1 (4%)	25 (100%)
El Mirador	Middle Formative	3(100%)				3 (100%)
(Fowler et al. 1989)	Late Formative	4 (24%)	13 (76%)			17 (100%)
La Libertad (Nelson et al. 1978)	Middle Formative	65 (80%)	10 (12%)		6 (8%)	81 (100%)
Peten Lakes sites	Late Formative	69 (71%)	19 (20%)	7 (7%)	2 (2%)	97 (100%)
(Rice 1984)	Early Classic	6 (24%)	18(72%)		1 (4%)	25 (100%)
Seibal	Middle Formative	20 (91%)	2 (9%)			22 (100%)
(Nelson et al. 1978)	Late Formative	18 (86%)	3 (14%)			21 (100%)
	Middle Formative	1 (100%)				1 (100%)
Tikal (Moholy-Nagy et al.	Late Formative	20(47%)	9 (21%)	10 (23%)	4 (9%)	43 (100%)
1984; Nelson et al. 1978)	Early Classic	4 (6%)	41(61%)		22 (33%)	67 (100%)
Belize Valley						
Barton Ramie (Nelson	Middle Formative	1 (100%)				1 (100%)
et al. 1978)	Late Formative	1 (100%)				1 (100%)
Big Falls (Dreiss and Brown 1989)	Late Formative	3 (100%)				3 (100%)
Cahal Pech	Middle Formative	2 (20%)	8 (80%)			10 (100%)
(Awe and Healy 1996)	Late Formative	2 (67%)	1 (33%)			3 (100%)
	Middle Formative		1(100%)			1 (100%)
Pacbitun (Healy 1990)	Late Formative		2 (50%)	2 (50%)		4 (100%)
Vaca Plateau						
Caracol (Dreiss and Brown 1989)	Late Formative		1(33%)	2 (67%)		3 (100%)
Coastal						
Moho Cay (Dreiss 1986; Healy et al. 1984)	Early Classic		13 (81%)	3 (19%)		16 (100%)
Yucatan						
Dzibilnocac (Dreiss and Brown 1989)	Middle Formative	1(100%)				1 (100%)
Edzna (Dreiss and Brown	Middle Formative	12(100%)				12 (100%)
1989)	Late Formative	11 (27%)	28 (68%)	2 (5%)		41 (100%)
Northern Belize						
	Late Formative		16 (100%)			16 (100%)
Cerros (Nelson 1985)	Early Classic		1 (50%)	1 (50%)		2 (100%)
Chan Chen (Nievens et al.	Late Formative		1 (100%)			1 (100%)
1983)	Early Classic		2 (50%)	2 (50%)		4 (100%)
Colha (Brown et al.2004;	Middle Formative	22 (67%)	8 (24%)	3 (9%)		33 (100%)
Dreiss 1988)	Late Formative	26 (27%)	37 (39%)	32 (34%)		94 (100%)
Cuello (Hammond 1982;	Middle Formative	4 (100%)				4 (100%)
Hammond 1991:198)	Late Formative		16 (29%)	26 (47%)	13(24%)	55 (100%)
	Middle Formative	1 (25%)	1 (25%)	2 (50%)		4 (100%)
Kichpanha (Dreiss 1988)	Late Formative		1 (50%)	1 (50%)		2 (100%)
Nohmul (Hammond et al.	Late Formative		2(100%)			2 (100%)
1984)	Early Classic		4 (100%)			4 (100%)
Pulltrouser Swamp	Late Formative	1(33.3%)	1 (33.3%)	1 (33.4%)		3 (100%)
(Dreiss and Brown 1989)	Early Classic		1 (100%)			1 (100%)

Numbers and percentages reflect only sourced obsidian samples and not the total number of obsidian artifacts recovered from each site.

CHAPTER 6

DISCUSSION AND SYNTHESIS

Defining the dynamic nature of Mesoamerican trade and exchange networks responsible for transporting many goods and commodities, including obsidian, has focused on issues regarding social complexity, the catalytic role of trade in internal organization, characteristics of the economy, differential spatial and temporal distribution, and centralized control of the resources. These issues combined with the growing body of obsidian data provided by provenience analyses, has enabled the investigation of an important facet in the study of trade and exchange: determining the origins of goods or that were traded or exchanged.

In the study of Mesoamerican trade and exchange systems source data is particularly useful because of the numerous sources of volcanic glass in Mexico, Guatemala, Honduras, and Nicaragua from which obsidian was quarried and transported to the Maya lowlands. Through refined techniques of elemental sourcing the primary obsidian sources transported to the Lowlands have now been identified as originating from the San Martín Jilotepeque, El Chayal, and Ixtepeque sources. It has become clear, through analysis of obsidian source data, that obsidian trade and exchange can be characterized at the simplest level by the episodic spatial and temporal exploitation of particular obsidian sources (Nelson 1985; Nelson et al. 1978). Additionally, the expanded set of obsidian data has added additional avenues for contextual analyses (Fowler et al. 1989; Hammond et al. 1984; Hurtado de Mendoza 1989; Moholy-Nagy 1989; Rice 1984), typological analyses (Awe and Healy 1994; Clark 1987; Lewenstein 1981; 1989; Moholy-Nagy et al. 1984), and intra-site and inter-site distribution studies (Awe and Healy 1996; Awe et al. 1996; Dreiss 1989; Dreiss and Brown 1989; Guderjan et al. 1988, 1989; McKillop 1989; Olson 1994). These analyses have also made clear the inherent complexities of inter-regional exchange systems when the logistical mechanisms of transport, complex networks of relationships established through trade and exchange, and factors of socio-political, economic, and religious organization are taken into consideration (Fowler et al. 1989). Nevertheless, obsidian data can be used in conjunction with other artifactual, ethnohistoric, and ethnographic data, to test and refine proposed models regarding specific cultural elements tied to trade and exchange (i.e., emerging complexity, reconstruction of trade routes, economic transactions, roles of and relationships between individuals and communities).

The analysis presented in this thesis was built with elements from many of the previous analyses and proposed models (as discussed in detail in chapter 4). It is also a unique study that engaged new data from the lesser-known Formative period frame, recovered from complete and well-defined occupation sequences, to construct a diachronic and synchronic schematic of early obsidian trade and exchange in the Belize River Valley. The new data were employed with previous obsidian data and models of trade to: 1) determine the main sources of obsidian at Blackman Eddy and Cahal Pech; 2) detect shifts or patterns in the procurement of specific obsidian sources evident in the distribution at these two sites; 3) examine the obsidian source data between the two sites for "micro-regional" trends or inconsistencies; 4) compare the sourcing data from Blackman Eddy and Cahal Pech to the spatial and temporal trends observed thus far in the Belize Valley and in the lowlands as a whole, and 5) address possible factors that may have influenced any variation from the observed trends and patterns.

It is apparent from the examination of the new sourcing data that the obsidian distribution patterns are quite different between the Blackman Eddy and Cahal Pech. The Blackman Eddy assemblage resembles the established trends of the primary procurement and distribution of San Martín Jilotepeque obsidian during the Middle Formative period into the Late Formative Period with a shift to El Chayal during the latter part of the Late Formative Period and into the Early Classic Period. Conversely, the Cahal Pech assemblage shows the dominance of El Chayal obsidian as well as a substantial representation from the other two major sources possibly indicating participation in different spheres of inter-regional exchange than the occupants of Blackman Eddy. This notion of nearly overlapping active spheres of exchange accounting for the differences in obsidian distribution within the "micro-region" of the valley is particularly curious given the close proximity of Blackman Eddy to Cahal Pech. It is possible that social, ethnic, or political ties outside of the valley aligned the communities' participation in separate or exclusive networks. Alternatively, the differences in source percentages may be a result of some form of redistribution in the valley. Nonetheless, if major routes of transport followed the Belize River inland from the coast, Blackman Eddy would have been one of the first sites in the valley to have access to these commodities and therefore under these favorable circumstances, could have served as a "minor-redistribution node" to other sites in the Belize Valley. Additionally, the convenient locations of these sites along the major river drainages would have facilitated the access to these exotic goods and commodities entering the valley. Moreover, the access to these commodities would have allowed for the accumulation of "wealth" (e.g., defined as resources equal to surpluses in essential and non-essential goods combined with a community of people and laborers) which was further invested in communal and later elite construction programs.

The relationship between inter-regional trade and exchange in goods and symbols (i.e., pan-Mesoamerican iconographic program), amassing wealth, and the subsequent developmental sequence manifested in architectural programs and later public displays of authority using similar, but more elaborate, thematic elements than used earlier is evident at Blackman Eddy and Cahal Pech. Instead of symbols appearing only on portable materials as they did during the Terminal Early Formative and Early Middle Formative, the symbols began to be incorporated into the architectural façades representing the conservative themes of birth/death/rebirth/fertility during the Late Middle Formative and Late Formative. These transformations associated with increasing social complexity are visible archaeologically at many of the documented lowland sites (e.g., Cerros, Uaxactun, Civál, and El Mirador). Increasing social complexity and associated "adaptations" are also suggestive of the level of participation in the inter-regional exchange of symbols, technology, and goods."

The obsidian data from Blackman Eddy and Cahal Pech has substantially increased the data set for the Belize River Valley and for the Lowlands as a whole. This analysis has offered a perspective of the diachronic and synchronic changes in obsidian distribution. These data have also added a new perspective on the diversity of obsidian distribution within the "micro-region" of the Belize Valley and thus has added a confounding element to the study of trade and exchange within this region. Through future investigations of these early inter-regional networks of trade and exchange and identifying distribution patterns — within geographically distinct micro-regions, such as the Belize River Valley — and further defining mechanisms of social change and complexity that occurred during the Formative period, a clearer picture of the intricate variables accounting for diversity in distribution of goods during the Formative period will eventually emerge.

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