A DIACHRONIC PERSPECTIVE OF MARINE SHELL USE FROM STRUCTURE B1 AT BLACKMAN EDDY, BELIZE

by

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ABSTRACT

A DIACHRONIC PERSPECTIVE OF MARINE SHELL USE FROM STRUCTURE B1 AT BLACKMAN EDDY, BELIZE

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This thesis examines the marine shell artifacts recovered from Structure B1 at the site of Blackman Eddy, Belize. Typological and taxonomic analyses provided useful information on the types of artifacts used and the species utilized at the site. Two categories were identified in this assemblage, 1) worked shell artifacts and 2) shell debitage. An analysis of both worked shell artifacts and shell debitage was important to this study as it provided information about the use and significance of each category in the past. A contextual analysis helped to identify patterns of use and deposition. Examining the contextual designations of all marine shell artifacts recovered provided information about the use life of the artifacts themselves and the value of these artifacts to the ancient inhabitants. Finally, a diachronic perspective was used to examine the results of the typological, taxonomic, and contextual analyses to identify changes in shell use patterns over a 2,000-year period. The examination of the dataset diachronically allowed for the recognition of patterns of continuity and discontinuity within the assemblage.

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CHAPTER 1

INTRODUCTION

Marine shell artifacts have been documented as an important commodity in the Maya Lowlands from the terminal Early Preclassic to the Colonial period. Although this material culture category has been identified as an important long-distance trade item, few systematic studies have been formally conducted on marine shell. Notable exceptions include the work at Cahal Pech, K'axob, and Pacbitun where researchers focused on issues such as production and the use of marine shell as grave offerings. Marine shell research at these, and several other sites, has documented considerable variability in marine shell species and artifact types through time. Contextual data from the Belize River Valley suggests that worked shell artifacts were often placed in special deposits dating as early as the terminal Early Preclassic. Lacking from these studies, however, is an assessment of the deposition and use of marine shell from a diachronic perspective, as well as a detailed analysis of marine shell debitage through time. Recent investigations at the site of Blackman Eddy identified both worked shell artifacts and marine shell debitage in special deposits such as caches, burials, and problematic deposits spanning approximately 2,000 years. These new data have important implications regarding the role of marine shell in ritual activities through time.

More than a decade of research on Structure B1 at the site of Blackman Eddy has provided evidence of an architectural sequence spanning from the terminal Early Preclassic to the Terminal Classic (1200 BC-AD 900). The long cultural history of Structure B1, coupled with the presence of marine shell artifacts associated with all construction phases, has provided an excellent opportunity to identify and evaluate the general trends of marine shell use through time.

1.1 Research Objectives

Three main research objectives guided the analysis of the marine shell from Blackman Eddy. First, a typological and taxonomic analysis of the assemblage was conducted drawing upon previous classification systems used in the Maya Lowlands. This analysis was the first step in the assessment of marine shell use at the site through documentation of the types of artifacts present, as well as the species utilized. An analysis of both worked shell artifacts and debitage was important to this study as it provided information about the use and significance of each category in the past. The second research objective was to complete a contextual analysis of the marine shell objects to identify patterns of use and deposition. Examining the contextual designations of all marine shell artifacts recovered provided information about the use life of the artifacts themselves and the value of these artifacts to the ancient inhabitants. The third research objective was to use a diachronic perspective to examine the results of the typological, taxonomic, and contextual analyses to identify changes in shell use patterns over a 2,000-year period. The examination of the dataset diachronically allowed for the recognition of patterns of continuity and discontinuity within the assemblage.

1.2 Organization of This Thesis

This thesis is organized into six chapters followed by an appendix, and reference section. Chapter One provides the introduction to this study, the organization of this thesis, and a summary of each chapter.

Chapter 2 provides an overview of the environmental setting of the Belize Valley and neighboring regions. This chapter is important as it places the site of Blackman Eddy into geographical and historical context. This chapter begins with a brief overview of the geography and environment of the Maya Lowlands paying close attention to northern and central Belize. This is followed by a discussion of the cultural history of the Maya Lowlands.

Chapter 3 presents previous investigations at Blackman Eddy providing background information on the architectural phases and associated deposits encountered within Structure B1. The chapter begins with a brief discussion of the site, followed by a short synthesis of the architectural phases of Structure B1. The various building phases are discussed chronologically, beginning with the earliest period.

Chapter 4 begins with a brief discussion of the previous marine shell studies conducted in the Maya Lowlands. This brief synthesis provides background on similar studies for comparative purposes and illustrates the importance of the Blackman Eddy dataset. The second half of this chapter presents the descriptions of the taxonomic and typological terminology used during the analysis of the marine shell assemblage from Blackman Eddy. This is followed by a discussion of the methods used in data collection of the marine shell assemblage.

Chapter 5 presents the results of the typological, taxonomic, and contextual analyses of marine shell artifacts recovered from Structure B1. Each section is followed by a brief diachronic discussion.

The final chapter, Chapter 6, discusses several patterns evident from the analysis of the marine shell assemblage. An interpretation of these patterns from a diachronic perspective is presented. Important patterns indentified include the evidence of shell artifact production at the site, as well as the inclusion of shell debitage as an important component in early special deposits. Shifts in the use and deposition of worked shell artifacts also are examined. This is followed by a short summary and conclusion of the research presented in this thesis.

CHAPTER 2

THE ENVIRONMENT AND CULTURAL HISTORY OF THE BELIZE RIVER VALLEY AND NEIGHBORING REGIONS

This chapter provides a brief overview of the geographical and environmental data available for the Belize River Valley and nearby neighboring regions. The hydrography, climate, vegetation, and fauna of these areas also will be addressed. This is followed by a discussion of the cultural history of the Maya Lowlands. Within this section, each period is presented and highlights social developments and architectural advances throughout the lowlands. This chapter serves as a framework, which helps to place the site of Blackman Eddy into historical context.

2.1 Environmental Setting

The Maya Lowlands cover approximately 350,000 square kilometers and encompass all of southeastern Mexico (including the Yucatan Peninsula), Belize, Guatemala, northwestern Honduras, and portions of El Salvador (Hammond and Ashmore 1981:20, Sharer and Traxler 2006:19). This area is environmentally diverse, ranging from low-lying swampy regions to lush tropical rainforests and savanna (Wagner 1964:222-223). Factors such as climate, geology, soil, and vegetation contribute to the variability seen from region to region (Coe 1999:15; Hammond and Ashmore 1981:20, Sharer and Traxler 2006:23),

2.1.1 *Geography*

The lowlands are divided into the northern, central, and southern regions (Sharer and Traxler 2006:45). The country of Belize is located within the central Maya Lowlands. This small country, situated on the southeastern coast of the Yucatan Peninsula, is bordered to the south and west by Guatemala and to the north by the Mexican state of Quintana Roo (Figure 2.1). The entire eastern edge of Belize, approximately 280 kilometers, borders the Caribbean Sea (Hammond 1982:349; Rice 1974:5). A series of cayes and atolls, as well as the world's second-

Figure 2.1 Map of the Maya Lowlands (After Brown 2003).

largest barrier reef is located just off the coastline. The site of Blackman Eddy lies approximately 185 kilometers inland via the Belize River. This small ceremonial center is situated in the Belize River Valley on a high ridge overlooking the alluvial plains of the Belize River system (Willey et al. 1965:23).

2.1.2 *Hydrography*

The most prominent geographical features in Belize are the river systems (Rice 1974:5). The principal river system in central Belize, the Belize River, transects the country in an east-northeasterly direction and empties into the Caribbean Sea. It is about 206 kilometers in length and branches into two main tributaries, the Macal and the Mopan, near the modern day town of San Ignacio in the Cayo District of Western Belize (Rice 1974:11). The Macal drains the central portion of the Maya Mountains in the southwestern region of the Cayo District, while the Mopan flows out of eastern Guatemala, draining much of the southwestern Maya Mountains and the swampy region of southeastern Petén (Rice 1974:50). These rivers have a relatively swift current and are prone to flooding as much as 12-13 meters above normal levels during phases of heavy rainfall (Rice 1974:12; Willey et al. 1965:23). The alluvial plains surrounding these river systems would have provided fertile agricultural land and animal resources for early inhabitants in the Belize River Valley. Many of the ancient centers identified in west-central Belize, including Blackman Eddy, have been located in close proximity to these river systems (Chase and Garber 2004:3).

Northern Belize is characterized as a low-lying swampy region with two principal river systems that drain much of the area into the Chetumal and Corozal bays. These principle systems have many smaller tributaries that drain into them, but unlike those in central Belize, they flow sluggishly in a south-north orientation. The Rio Hondo forms the northern boundary between Mexico and Belize and drains into the Chetumal Bay (Tamayo and West 1964:95). The New River lies to the east of the Rio Hondo and empties into Corozal Bay.

The rivers that transect Belize were likely used as natural transportation routes to supply goods to the inland Maya (Chase and Garber 2004:4). Research at the Moho Caye site shows that it was strategically placed at the mouth of the Belize River and may have participated in the movement of items inland from coastal routes (McKillop 2004:257). In northern Belize, researchers suggest that the Hondo River (D. Chase and A. Chase 1989) along with the New River (Garber 1989) could have facilitated the transport of resources from the coastal regions to the interior Maya communities.

2.1.3 *Climate*

Belize is situated south of the Tropic of Cancer between 18.5° and 17.75° north latitude (Rice 1974:7). The coastal region catches the gentle breeze of the Southeast Trade Winds and is warmed by northerly currents from the Caribbean (Rice 1974:7; Wright et al. 1959). The average annual temperature in Belize is 80° F with a range from 50° F to 95° F (Rice 1974:7; Willey et al. 1965:21). The climate in Belize can be best classified as tropical to subtropical with distinct wet and dry seasons (Gunn, et al. 2002:80; Willey et al. 1965:21). The dry season typically occurs from December to April and the wet season lasts from May to October (Escoto 1964:197-198). The average rainfall amounts for Belize vary from 50 inches in northern Belize to more than 160 inches in the southern part of the country (Willey et al. 1965:21).

2.1.4 *Vegetation and Fauna*

Today, much of the land in the Belize River Valley has been extensively cleared to make room for commercial agricultural development (Willey et al. 1965:23). The limestone hills surrounding the Belize River Valley are dominated by a tropical broadleaf forest, including allspice, cohune palm, copal, mahogany, sapodilla, and ramón trees(Wright et al. 1959). In addition to these species, cacao, cedar, cieba, and the strangler fig species can be found along alluvial terraces (Rice 1974:12-18; Willey et al. 1965:23; Wright et al. 1959). Palm, tree fern, orchid, and various vines species comprise much of the forest undergrowth (Wagner 1964:229).

Much like the vegetation, the fauna of the area is both abundant and diverse (Willey et al. 1965:23). The limestone hills of the Belize River Valley are home to a wide variety of birds and mammals. Common birds found in the region include the chachalaca, curassow, guan, and ocellated turkey (Willey et al. 1965:23). Large mammals, like the jaguar, red brocket deer, and tapir, all roam the area (Nations 2006:48). A variety of smaller mammals, including agouti, armadillo, opossum, peccary, and rabbit also are abundant in the region (Willey et al 1965:23). The alluvial bottoms in and near rivers and streams are home to a variety of fish and reptiles, including catfish, crocodiles, gar, iguanas, and turtles, as well as three varieties of freshwater mollusks, including apple snails, jutes, and pearly mussels (Wright et al. 1959).

2.2 Cultural History of the Maya Lowlands

Archaeologists generally frame lowland Mayas' cultural history into a developmental sequence spanning three periods: the Preclassic (BC 1500-250 AD), Classic (AD 250-900), and Postclassic (AD 900-1500) (Sharer and Traxler 2006). Advances in ceramic and architectural research, as well as breakthroughs in epigraphic analysis have allowed scholars to fine-tune the basic framework developed more than 50 years ago by Armillas (1948). Each of the periods is commonly subdivided into smaller intervals known as the Early Preclassic (1500-1000 BC), Middle Preclassic (900-350 BC), Late Preclassic (BC 350-250 AD), Early Classic (AD 250-550), Late Classic (AD 550-800), Terminal Classic (AD 800-900), and the Postclassic (AD 900-1500).

The development of the central Maya Lowlands' cultural history has greatly benefited from the establishment of well-defined ceramic chronologies and radiocarbon dates. Table 2.1 shows the chronological ceramic sequence for the sites of Uaxactun and Barton Ramie/Blackman Eddy. The Uaxactun chronological ceramic sequence, developed by R.E. Smith (1955), is often used as the standard reference sequence for much of the Maya Lowlands. The Barton Ramie ceramic sequence, developed by Gifford (1976), is the ceramic sequence used for much of the Belize River Valley including the site of Blackman Eddy. The remainder of this section summarizes the cultural developments of the Maya Lowlands, paying particular attention to advances in the Belize River Valley and nearby neighboring regions of northern Belize and Petén.

2.2.1 *Preclassic Period-ca. BC 1500-250 AD*

The transition from the Archaic to the Early Preclassic (2000-1000 BC) period has been defined by the adoption of a fully agricultural economy, the establishment of permanent sedentary villages, and the introduction of ceramic technologies (Clark and Blake 1994; Sharer and Traxler 2006:160). Some of the earliest evidence of ceramic producing communities in the Maya Lowlands comes from western Belize. Evidence from the sites of Blackman Eddy and Cahal Pech in the Belize River Valley suggest that there was a well-defined ceramic technology in place in the lowlands as early as 1100 BC (Awe 1992:226; Garber et al. 2004a:28). Excavations from the site of Blackman Eddy have revealed early apsidal structures, postholes, and associated bedrock features that date to this early period (Brown 2003:46; Garber et al. 2004a:33). This time period is designated the Kanocha phase (1100-900 BC) (Garber et al. 2002, 2004a:27). Awe (1992:133-135) found similar ceramics and architectural features at the site of Cahal Pech, which was designated as the Cunil phase (1100-900 BC). Both the Cunil and Kanocha ceramic phases predate the early facet Jenney Creek phase (850-650 BC), which was the previously the earliest known phase (Willey et al. 1965:27). Recent excavations have also revealed Cunil ceramic material from basal deposits at the nearby site of Xunantunich (LeCount et al. 2002). However, information regarding the sociopolitical landscape of the Belize River Valley, as well as other regions in the Maya Lowlands is still limited. These early deposits are usually deeply buried beneath later, much larger construction episodes making them difficult to expose.

Evidence suggests that ranked societies began emerging during the Middle Preclassic (900-300 BC). Numerous settlements cover most of the Maya Lowlands (Sharer and Traxler 2006:177). The first evidence of monumental architecture appears throughout the Maya Lowlands at this time. This pattern is seen at several sites in the Belize River Valley including Actuncan (McGovern 2004), Blackman Eddy (Brown 2003; Garber et al. 1998, 2004a), and Cahal Pech (Awe 1992). The construction of larger buildings in the Belize Valley demonstrates an increase in labor investment (Garber et al. 2004b:68). The largest monumental architecture from any site, however, is seen at Nakbe in northern Guatemala. Several tall structures, including an 18 m high terraced platform structure, were discovered at the site (Sharer and Traxler 2006:212). Massive stucco mask facades with ideologically charged images were

Table 2.1 Ceramic Sequences for the Sites of Uaxactun and Barton Ramie/Blackman Eddy.

Time	Major Period		Uaxactun		Barton Ramie/Blackman Eddy	
1500	Post Classic	Late			New Town	Late
1400 1300 1200		Middle				
1100 1000 900		Early				Early
800	Classic	Terminal	Tepeu	3	Spanish Lookout	
700		Late		2	Tiger Run	
600				1		
500		Early	Tzakol	3		Hermitage
400				2		
300				1	Floral Park	
200 100 AD BC	Preclassic	Late	Chicanel		Mount Hope	
100 200					Barton Creek	
300 400 500 600		Middle	Mamom		Jenney Creek	Late Facet
700 800 900 1000						Early Facet
1100 1200 1300		Early			Kanocha	

encountered on several of these buildings (Hansen 1992). Middle Preclassic burial data from northern Belize show evidence of social differentiation at this time. The disproportionate numbers of grave goods included in these burials may indicate status differences within the community (Isaza Aizpurúa and McAnany 1999; Robin 1989; Robin and Hammond 1991). Excavations at numerous sites have revealed an increase in the use of exotic goods including greenstone, obsidian, and marine shell during this period. This suggests that long-distance trade was increasingly important in Maya society at this time.

The Late Preclassic (BC 300-250 AD) witnessed a dynamic period of growth and development. Evidence suggests a dramatic population increase and the emergence of an elite social class in much of the southern and central Maya Lowlands (Sharer and Traxler 2006:223). Public architecture becomes more monumental and widespread during the Late Preclassic at many sites throughout Belize, including Actuncan (McGovern 2004), Blackman Eddy (Brown 2003; Garber et al. 1998, 2004a), Cahal Pech (Awe 1992), Cerros (Freidel 1977), Colha (Eaton 1979; Sullivan 1991), Cuello (Hammond 1991), and Lamanai (Pendergast 1981). In north-central Petén, excavations at the site of El Mirador encountered large public architecture so massive that one of its several complexes, the Tigre Complex, alone covered 19,600 sq. meters (Sharer and Traxler 2006). These developments suggest an increase in wealth and organized labor output by leaders in these growing communities. In conjunction with increased architectural development, the use of stucco mask facades becomes more common. Examples of masked facades have been found on Late Preclassic structures from several sites such as Uaxactun (Ricketson and Ricketson 1937) and El Mirador (Hansen 1991) in the Petén, and Cerros (Friedel 1977) Lamanai (Pendergast 1981), and Blackman Eddy (Brown et al. 1999; Garber et al. 2004b:56) in Belize. In addition to architectural advances, evidence suggests that the institution of kingship developed during this period (Friedel et al. 2002). Exotics such as jade continue to be used as prestige items, however. *Spondylus* spp. marine shells make their first appearance as a prestige item in the Maya Lowlands and remains important through the Late Classic.

2.2.2 Classic Period-ca AD 250-900

The Early Classic (AD 250-600) has been characterized by the development of state-level political organization (Braswell 2003:5; Sharer and Traxler 2006:286). Excavations have revealed marked differences between the elite and non-elite in domestic dwellings, material culture, and mortuary practices. Evidence suggests there was increased social interaction between lowland Maya sites and Teotihuacán, a large, powerful site in central Mexico. Influence from Teotihuacán can be seen in murals and monuments, as well as by the appearance of new ceramic forms. The most notable evidence of Teotihuacán's influence has been identified at Tikal, Uaxactun and Copan (Martin and Grube 2000; Sharer 2003a, 2003b).

Other advancements during the Early Classic included the adoption of polychrome decorated ceramic vessels, widespread use of corbel-vaulted archways, and the construction of royal tombs honoring important elite individuals. Stelae monuments also were being erected that recorded dynastic histories, political alliances and interactions, as well as other elite behaviors (Martin and Grube 2000; Schele 1991; Sharer and Traxler 2006).

The site of Tikal, located in the Petén region of Guatemala, was one of the largest and most powerful cities in the lowlands during the Early Classic. To the north, the site of Calakmul quickly emerged to power becoming one of Tikal's greatest rivals. In the Maya Mountains of Belize, the site of Caracol flourished and eventually became one of Calakmul's important allies (Sharer and Traxler 2006:317). By the end of the Early Classic, Teotihuacán appeared to struggle to maintain its power and influence throughout the Maya Lowlands. Evidence suggests that trade contact with these lowland sites began to diminish (Sharer and Traxler 2006:293). Tikal also witnessed intrasite dynastic struggles, as well as a reduction in power and influence throughout the region. In AD 562, Calakmul finally defeated Tikal with the assistance of allied sites (Sharer and Traxler 2006: 369-370).

By the Late Classic (AD 550-800), much of the region witnessed a rapid population increase (Sharer and Traxler 2006). Ceramic vessels from this period were well made with elaborate polychrome decorations. The architecture at many sites was large and ornate including the use of stucco facades and large decorative roof combs. Elites continued building and lavishly furnishing funerary tombs to honor high status individuals. Many scholars consider the Late Classic to be the apogee of Maya civilization (Sharer and Traxler 2006: 377). During this time, it appears that several large sites controlled most of the power and influence over much of the Maya Lowlands. The most powerful and influential of sites was Calakmul reaching its apogee ca. AD 636-686 (Sharer and Traxler 2006:381). Toward the end of the Late Classic, Tikal had a resurgence in power over Calakmul, but Tikal's power was short lived. Other large polities in the lowlands included Yaxchilan in the Usumacinta region, Palenque in the far southwest region of the Maya Lowlands, and Copan in the southeast (Sharer and Traxler 2006:377-497). Important Late Classic centers in Belize included Caracol (A. Chase 2004:329), Buena Vista del Cayo (Ball and Taschek 1991, Taschek and Ball 2004:191), and Xunantunich (Leventhal and Ashmore 2004:178; LeCount et al. 2002). There was an increase in political competition at this time that led to a rise in warfare activities throughout the Maya Lowlands (Harrison 1999:120; Webster 2002:193). The use of defensive mechanisms such as stonewall fortifications suggests a more hostile living environment. Rapid population increase coupled with resource overexploitation and environmental stresses were other important factors that led to the deterioration of major polities as seen in the subsequent period.

Many of the prominent Late Classic sites in the southern and central lowlands witnessed a drastic demise during Terminal Classic (AD 800-900). Architectural modifications and the erection of carved stone monuments ceased in most areas. Many of the problems seen in the Terminal Classic period, including overpopulation and warfare were the product of struggles and stresses that began in the Late Classic (Sharer and Traxler 2006:499). Drought conditions also may have added to the stresses seen during this period (Shaw 2003:157).

The Puuc region, located in the northern Maya Lowlands, however, underwent a period of great fluorescence at this time (Carmean et al. 2004; Schele and Mathews 1998). Evidence from cities such as Uxmal, Sayil, Labna, and Kabah all reveal a distinctive architectural style very different from that seen in the central and southern Lowlands. These differences include the use of freestanding arches and mosaic stone facades, as well as the erection of multistory palaces. In addition to these architectural differences, many of the Puuc sites, such as Uxmal and Yaxuná, had fortifications surrounding them suggesting that warfare activity was common in the area (Kowaliski 1998; Schele and Matthews 1998).

The fluorescence of the Puuc region was short lived. By AD 950, Uxmal witnessed a decline and all monumental construction had ceased (Carmean et al. 2004:432). Other sites followed a similar trajectory and most were abandoned by the 11th century AD (Carmean et al. 2004:42; Tourtellot and Sabloff 1994; Tourtellot et al. 1990). The site of Chichen Itza, however, became an important center during the Terminal Classic. For several decades, Chichen Itza was thought to be a Postclassic center; however, recent evidence suggests that this site was contemporary with Coba and Puuc centers to the south and west (Bey et al. 1997; Cobos 2004)

2.2.3 *Postclassic Period-ca. AD 900-1500*

By the Postclassic (AD 900-1500), the Puuc cities were largely abandoned. However, northern Maya Lowland sites experienced a fluorescence. By AD 1000-1050, Chichen Itza became a dominant political power in the northern Yucatan, although this power was short-lived (Cobos 2004). Significant changes in the political structure of Maya societies were seen during the Postclassic. Evidence suggests that site political organization shifted toward a more centralized governing system (Sharer and Traxler 2006:590-591). Many Postclassic centers were strategically positioned along waterways to control the movement of important items, such as salt (Andrews and Sabloff 1986; A. Chase and Rice 1985; D. Chase 1985; Masson and Mock 2004). In the northern Yucatan, sites like Tulum and Cozumel (Friedel and Sabloff 1989) were key trading centers. Belize also witnessed a period of growth and expansion at several Postclassic sites, like Lamanai (Pendergast 1986), Laguna de On, and Caye Coco (Masson 2002), as well as Santa Rita Corozal (D. Chase 1985).

The walled city of Mayapan became the central power in the Late Postclassic. According to historical accounts, Mayapan overthrew Chichen Itza around AD 1200 and assumed control of long-distance trade in the northern Lowlands (Sharer and Traxler 2006). By the end of the 15th century, prior to the Spanish Conquest, the capital city of Mayapan was abandoned (Sharer and Traxler 2006:603).

CHAPTER 3

PREVIOUS INVESTIGATIONS OF STRUCTURE B1

This chapter provides background on previous investigations of Structure B1 at the site of Blackman Eddy. As previously discussed, excavations of Structure B1 revealed an architectural sequence spanning nearly 2,000 years (Brown 2003:40; Brown and Garber 2003; Garber et al. 2004a:26). Findings from these investigations have been detailed in numerous reports and publications and therefore will be briefly summarized.[1] An overview of the architectural sequence and associated deposits provides important information to place marine shell artifacts in context within Structure B1.

3.1 Site Background

The Blackman Eddy site, located in the Cayo District of western Belize, is situated immediately off the Western Highway on a small ridge overlooking the modern village of Blackman Eddy (Garber et al. 2004b:49). Compared to surrounding sites in the Belize Valley, Blackman Eddy is a relatively small ceremonial center composed of two plazas and a ball court (Figure 3.1). Plaza A, located at the south end of the site core, consists of ten medium-sized public structures and a ball court. In Plaza A, the majority of construction activities occurred during the Late Classic, although excavations have revealed smaller construction efforts dating as early as the Late Preclassic (Brown 2003; Brown and Garber 2000; Garber et al. 2004b:49). Plaza B is located at the north end of the site core and has eight extant structures. Unauthorized bulldozing events in Plaza B unfortunately caused damage to of the western several structures and cut the northern-most mound, Structure B1, in half (Figure 3.2). Due to stability concerns, the Belize government and the Institute of Archaeology granted the Belize Valley Archaeology Project (BVAP) permission to dismantle Structure B1 (Brown 2003:21;

[1] For a detailed discussion of the architecture, features, and associated deposits from Structure B1 at Blackman Eddy, see Brown 2003; Brown and Garber 2000; Garber et al. 2004a; Garber et al. 2004b).

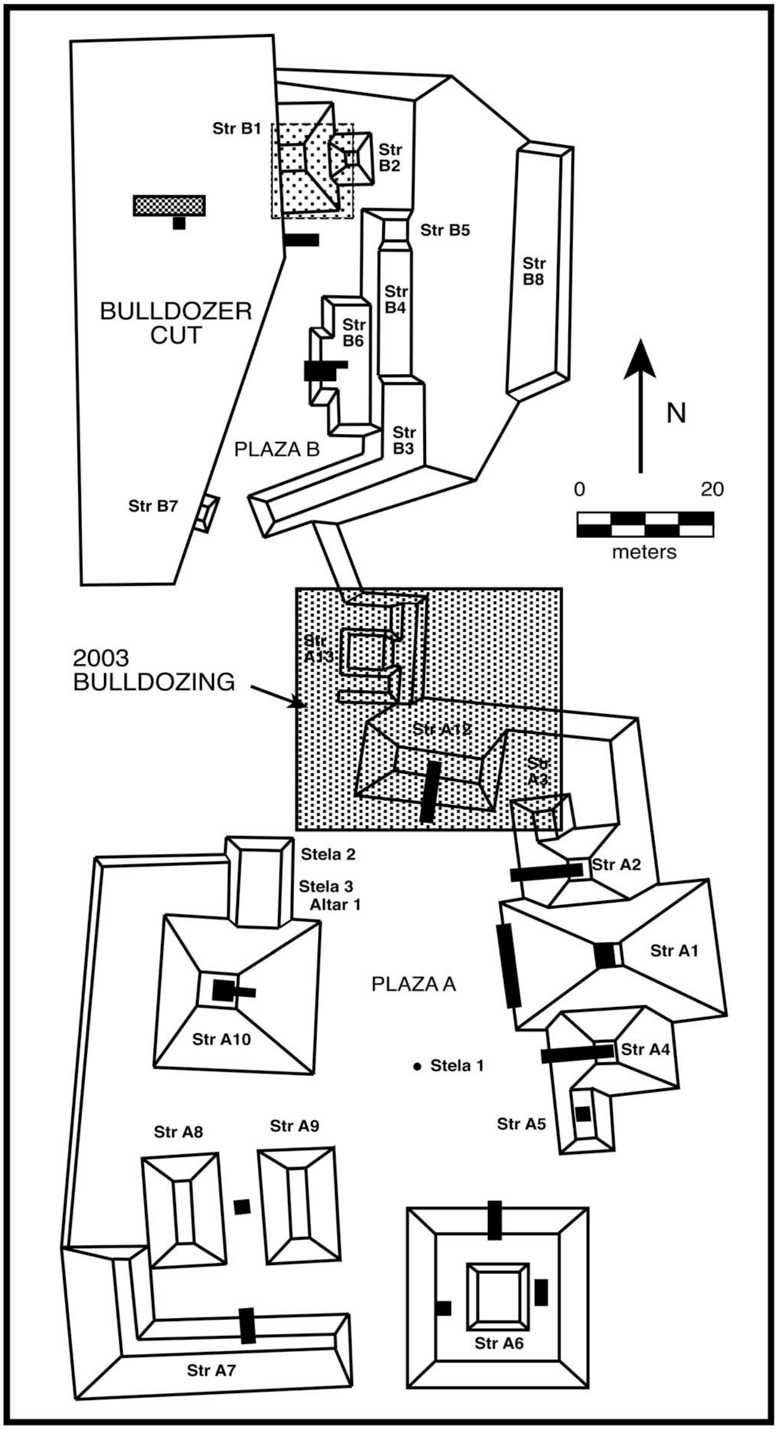


Figure 3.1. Blackman Eddy Site Core.

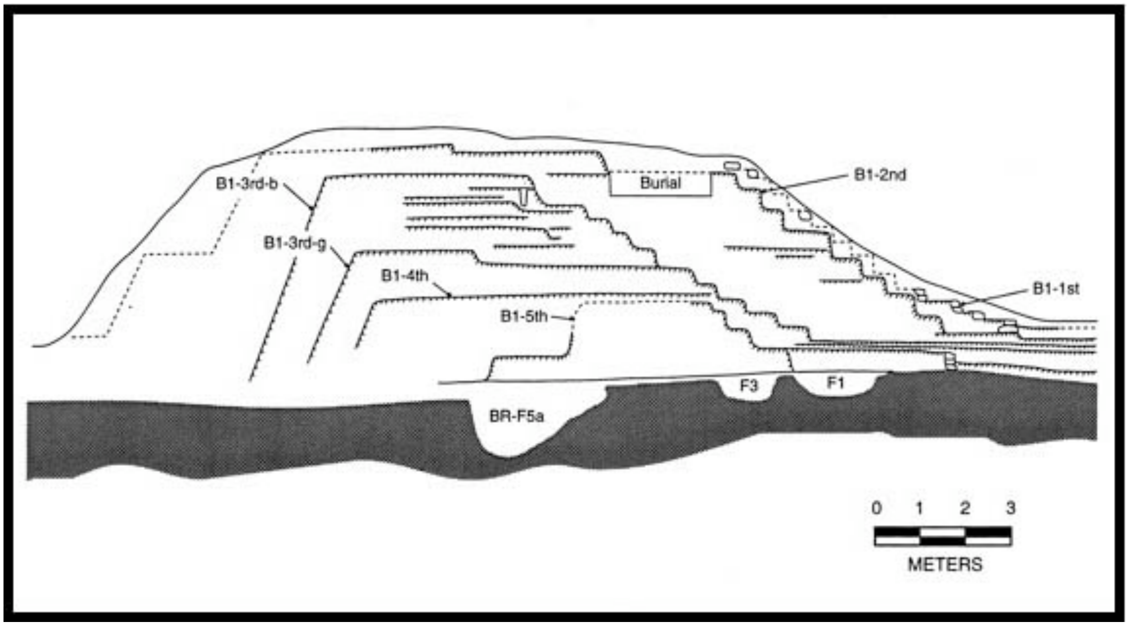


Figure 3.2 Structure B1 Profile.

Garber et al. 2004a:26). As a result, Structure B1 has presented a rare excavation opportunity to investigate its various architectural phases using full vertical and horizontal excavations (Brown 2003:21). A large horizontal block excavation encompassing an area of approximately 150 m^2 on Structure B1 and B2 revealed 20 discrete construction episodes, 17 of them dating to the Preclassic. Initial occupation dates to the terminal Early Preclassic (ca. 1200/1100 BC), a time when inhabitants of the Belize Valley began constructing small perishable pole and thatch structures over bedrock (Brown 2003:46; Garber et al. 2002:44, 2004a). The final occupation at Blackman Eddy dates to the Late Classic, ca. AD 800-900, and reveals the use of large monumental architecture (Brown 2003:14; Garber et al. 2004a:25). Brown (2003:100) has grouped the architecture found with the mound into three categories: 1) domestic, 2) public/integrative, and 3) monumental/restrictive (Brown 2003:100). Marine shell artifacts have been found in association with all construction phases.

3.2 The Architectural Sequence of Structure B1

This section details the construction phases of Structure B1 beginning with the earliest identified buildings at the site. The architectural sequence is discussed chronologically, and highlights the architectural changes and associated deposits through time.

3.2.1 *Terminal Early Preclassic/ Early Middle Preclassic Transition (1200/1100-900 BC)*

The earliest buildings found within the sequence have been interpreted as the remains of domestic dwellings (Brown 2003:46; Garber et al. 2004a:27). Radiocarbon dates associated with these remains suggest occupation began around 1200/1100 BC (Garber et al. 2002; Brown 2003:46). These early dwellings were identified by a series of postholes and several partial,

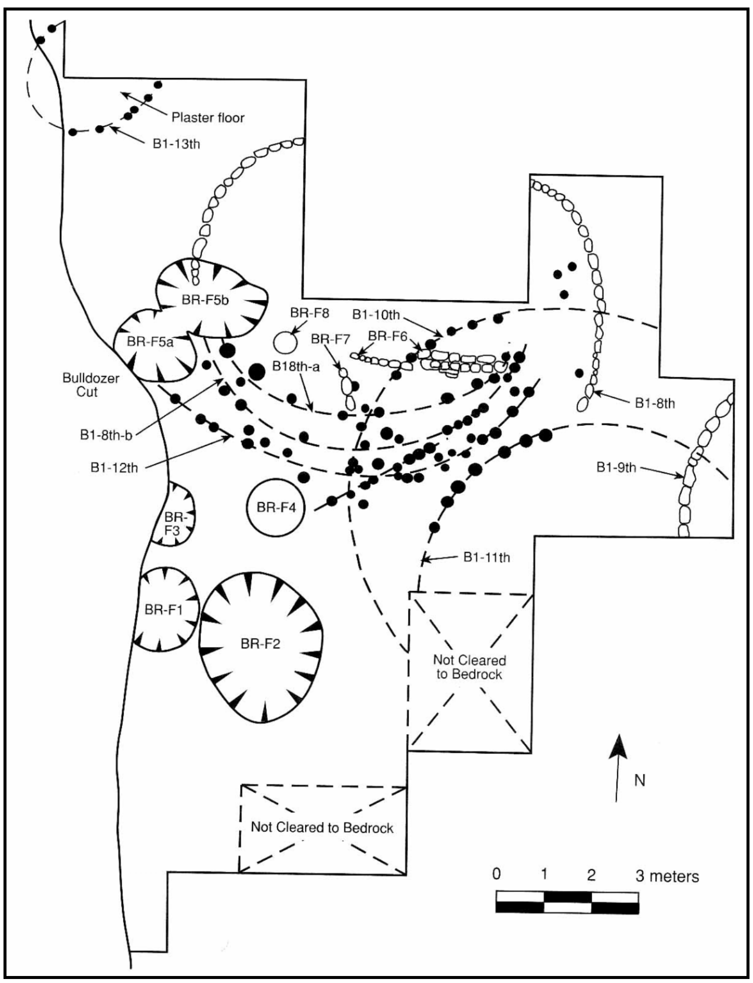


Figure 3.3 Bedrock Construction Phases and Features of Structure B1.

small, limestone walls formed on bedrock (Brown 2003:46; Garber et al.2004a: 33).

Five early buildings, designated Structures B1-12th to B1-8th, were circular or apsidal in shape (Figure 3.3). The remains of these buildings were ephemeral, indicating that the inhabitants leveled the area prior to the construction of later buildings (Brown 2003; Garber et al. 2004a:33). High densities of ceramic, lithic, freshwater shell, and hammerstones were intermixed within the fill above bedrock (Brown 2003; Garber et al. 2004a:33).

Structure B1-13th was located northwest of the domestic dwellings and was very different in form. Although this building was circular in shape, it was only 3 meters in diameter and had a hard plaster floor (Brown 2007). Stratigraphically, this building was the lowermost construction phase encountered at the site and initially thought to be the earliest (Garber et al. 2004a:35). However, a more thorough ceramic analysis coupled with new radiocarbon dates (see Table 3.1) suggest that this building dates to the transition between early and late Middle Preclassic (Brown 2007). Structure B1-13th has been interpreted as a special function building related to the public/integrative architecture of Structure B1-5th (Brown 2007).

A multi-chambered chultun, or underground storage area (BR-F5a/b), was found and associated with the domestic dwellings (Brown 2003; Garber et al. 2002, 2004a). Two radiocarbon dates (Beta-162573 and Beta-159142) were obtained from the base of this feature (See Table 3.1). A high density of artifacts was recovered from the feature, including ceramic fragments, lithic debitage, manos, hammerstones, bone needles, a stone tecomate, and an assortment of marine shell artifacts (Brown 2003:100). The artifacts within this feature are believed to be in secondary context and most likely represent midden material.

Two special deposits associated with the domestic dwellings were encountered. The first deposit was placed into a rectangular-shaped, shallow depression in bedrock. Items in this deposit consisted of several pieces of carved greenstone, ceramic figurine fragments, a uniface, hammerstones, chert flakes, a quartz crystal, incised ceramic sherds, freshwater shells, carbon, and fragments of marine shell debitage (Garber et al. 2002). The second deposit was placed into a small circular depression in bedrock. Artifacts in this depression included pieces of marine shell debitage and a partial Savanna Orange chocolate pot (Brown, personal communication 2007). These deposits are believed to be in primary context and have been interpreted as the earliest evidence of ritual activity at the site.

3.2.2 *Early Middle Preclassic (900-700 BC)*

There was a dramatic increase in the volume of marine shell dating to the Early Middle Preclassic. This increase corresponds to a shift from the use of apsidal structures to low, rectangular platforms (Brown 2003:114). These platforms, Structures B1-6th and 7th, have been interpreted to be public/integrative in function (Brown 2003:114; Brown and Garber 2005; Garber et al. 2004a.) The construction fill of these structures consisted of an artifact rich, wet-laid fill with a dry-laid rubble core (Figure 3.4). Large quantities of marine shell artifacts in various stages of production were recovered from the fill of these buildings (Brown: 2003:108).

A special deposit was encountered in two basin-shaped depressions carved into bedrock to the south of these buildings. This deposit contained layers of approximately 15,000 freshwater shells, intermixed with numerous marine shell artifacts, hammerstones, lithic material, and ceramic fragments of broken water jars (Garber et al. 2004a:37).

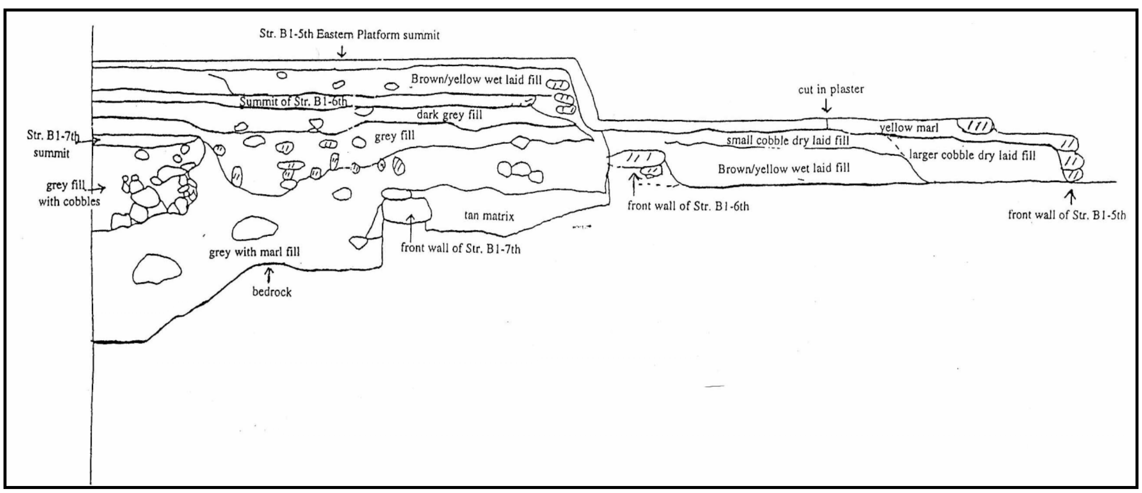


Figure 3.4 Eastern Profile of Structure B1 Showing Str. B1-6th and 7th (Brown 2003:50).

Table 3.1 Radiocarbon Dates from Structure B1 (Garber et al. 2004a)

Location	Phase	Beta #	Radiocarbon age – BP	Radiocarbon age-bc	Calibrated 1 sigma-BC	Calibrated 2 sigma-BC
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	760-620 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	2340 ± 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, 365, 560) 410
B1-5th	EJC	103956	2440 ± 60	490 ± 60	760-635 and 560-405	785 (505) 390
B1-4th	EJC	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 (Early Middle Preclassic); LJC = late facet Jenney Creek(Late Middle Preclassic).

Brown (2003:116) stresses the importance of this special deposit in association with the first public/integrative structure at the site and suggests this may be the beginning of communal ritual activities, such as feasting, a pattern that continues into the Late Middle Preclassic.

3.2.3 Early Middle Preclassic/*Late Middle Preclassic Transition (700-350 BC)*

The construction of Structure B1-5th dates to the transition between the Early Middle Preclassic and Late Middle Preclassic (Figure 3.5). This construction phase appears to have been composed of three related platforms; however, modern bulldozing activity destroyed the entire western half of the complex. Brown (2003:121) suggests that Structure B1-5th may have functioned as a public performance space. The relative complexity of this phase would have required more labor investment.

Excavations revealed four special deposits dating to this time period. One special deposit (C1: 2000) was encountered within the base of the construction of the central platform of Structure B1-5th (Brown et al. 2001:8). Brown (2003:122) suggests that this deposit may reflect a consecration event by the number of intact exotic items placed in this offering.

Two special deposits, located above Structure B1-5th, display patterns similar to later Maya consecration and termination events (Brown 2003:124). The first deposit (C1: 1996) was encountered in the alleyway between the eastern and central platforms of B1-5th. This deposit was first sealed by a layer of white marl followed by a layer of peach marl. In the Classic period, white marl was often used to intentionally seal or cover termination deposits, and this deposit may represent a Preclassic example (Ambrosino et al. 2003; Pagliaro et al. 2003). Artifacts recovered from this deposit included smashed ceramic vessels, freshwater shells, lithic debitage, carbon, worked marine shell, and marine shell debitage. A variety of faunal material was encountered in this deposit including deer, rabbit, dog, fish, and bird species. Brown (2003:126) suggests that this deposit may be the result of ritual feasting activity.

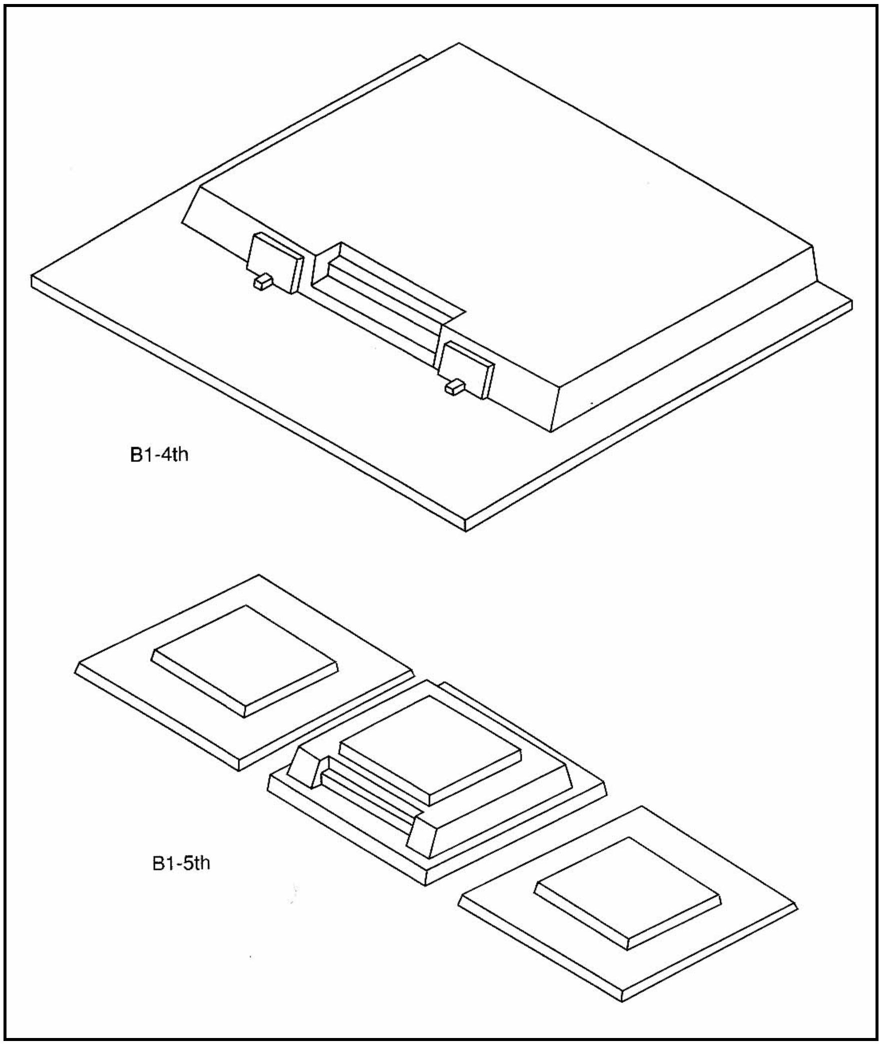


Figure 3.5 Isometric Drawing of Structures B1-5th and B1-4th (Garber et al 2004a:39).

The second deposit (C27) was located above the first, and Brown (2003:126) suggests that this ritual activity appears to be a "consecration or dedication feasting/cache related to the subsequent construction phase, Structure B1-4th." Several whole and partial vessels were recovered as well as fauna lithics and marine shell artifacts. These include a large, heavily pleated marine shell columella fragment and one marine shell bead.

The fourth deposit dating to the Early Middle/Late Middle Preclassic transition was recovered to the north of the central platform of Structure B1-5th and is similar in form and content to the other deposits in Designated Problematic Deposit 4(PD4). This deposit contained eight worked marine shell artifacts and 45 marine shell debitage artifacts. This was the largest concentration of marine shell artifacts recovered from a special deposit at the site. This deposit also contained 10 partial ceramic vessels, several of which were intentionally halved, as well as faunal material freshwater shell and carbon. Brown (2007) suggests that the items in this special deposit represent the remains of a ritual-feasting event associated with the subsequent building phase.

3.2.4 *Late Middle Preclassic (650-350 BC)*

Some of the most prominent architectural changes at Blackman Eddy occurred at the end of the Late Middle Preclassic (Garber et al. 2004a:42). Structure B1-4th (Figure 3.5),

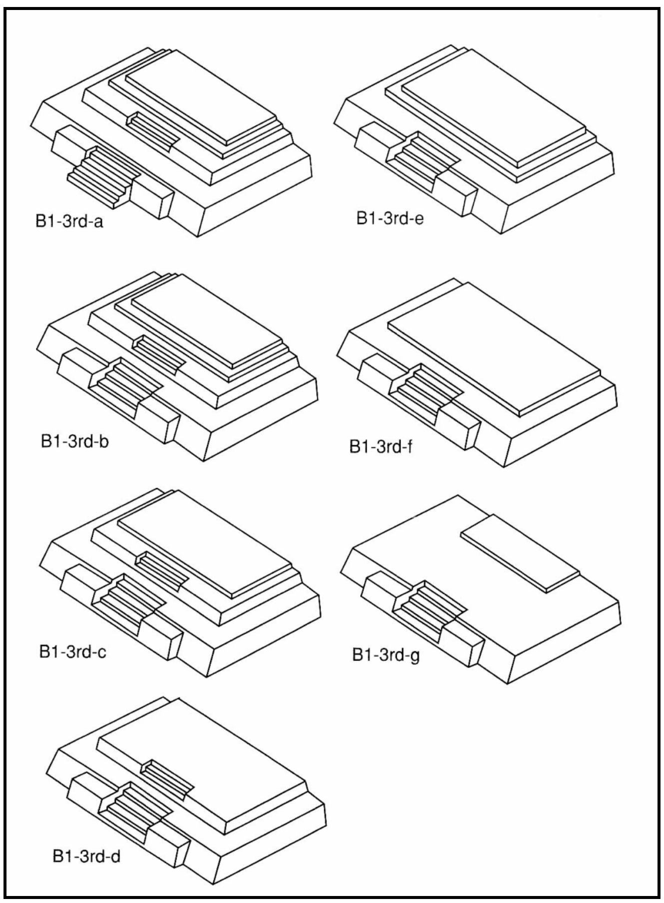


Figure 3.6 Isometric Drawing of Structure B1-3rd (Garber et al. 2004a:43).

constructed directly above Structure B1-5th, shows the earliest signs of sculpted architectural decoration at the site (Brown and Garber 1999:10). This structure was a single-tiered rectangular platform with an inset staircase (Brown 2003:53; Garber et al. 2004a:42).

Structure B1-3rd was built above Structure B1-4th and had six additions to the basal platform (Figure 3.6). Three of these modifications, B1-3rd-e through B1- 3rd-g, date to the Late Middle Preclassic. The remaining modifications, B1-3rd-a through B1-3rd-d, date to the Late Preclassic (350 BC-300 AD). A series of special deposits was found in association with the summit of B1-3rd-g and likely represent one ritual event. Brown (2003:139) suggests that this deposit may represent a modest dedication cache. One of these offerings consisted of a single carved shell pendant and a broken obsidian blade.

3.2.5 *Late Preclassic (350 BC-300 AD)*

The later phases of Structure B1-3rd signal yet another shift in construction techniques at the site (Brown 2003:56). The construction of B1-3rd-d dates to the Late Preclassic and represents a shift in architectural form from public/integrative to monumental/restrictive when the pyramidal form appears for the first time (Brown 2003:58). Dry-laid rubble fill was used to build up this addition. Structure B1-3rd-a represents the final modification of this structure. The structure rose to approximately 3.4 meters above the associated plaza surface, more than doubling the height of the original platform (Brown 2003:64). The most significant modifications occurred to the basal portion of the building, transforming the inset staircase to a larger outset staircase (Brown 2003:68).

3.2.6 *Early Classic (AD 300-600)*

Structure B1-2nd represents the penultimate construction phase within Structure B1. Structure B1-2nd was a two-tiered, south-facing building with an outset staircase reaching a height of approximately 3.4 meters (Garber et al. 1995:7). There were two additions to this pyramid, designated Structure B1-2nd-a and B1-2nd-b. Structure B1-2nd-b dates to the Late Preclassic/Early Preclassic transition, while the addition B1-2nd-a dates to the Early Classic (Figure 3.7). Evidence suggests that this building supported a large, perishable superstructure

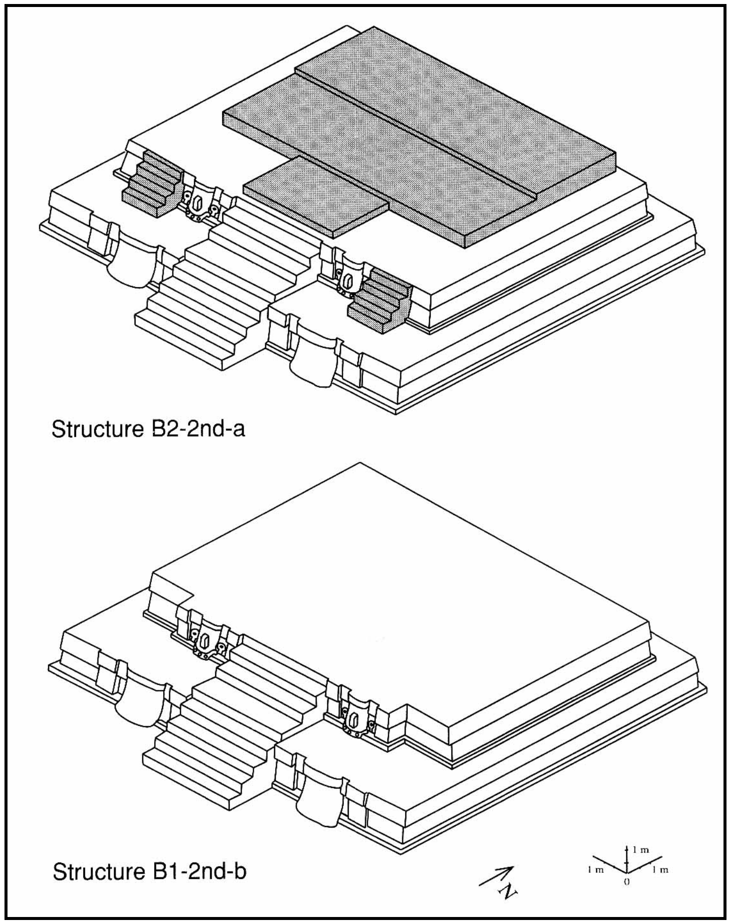


Figure 3.7 Isometric Drawing of Structure B1-2nd (Garber et al. 2004b:55).

(Garber et al. 1995:7). Marine shell artifacts associated with this structure were found in very low quantities.

Three special deposits were associated with Structure B1-2nd. The first deposit was cut into the centerline of the central staircase. Small- to medium-sized river cobbles were interspersed with a heavy concentration of ceramics, lithics, and freshwater shell. A large marine shell debitage fragment also was recovered from this deposit. The function of this special deposit is unknown; however, it appears intentionally placed and is interpreted to be some sort of offering to the building.

A second special deposit was encountered beneath the basal stairs of Structure B1-2nd. A concentration of artifacts was intentionally placed beneath the basal step and is interpreted as an offering. A carved marine shell earflare also was encountered in this deposit.

A large worked marine gastropod pendant was recovered near the step of the uppermost platform of Structure B1-2nd (Hartman et al. 1999:50). A worked bone implement was found inside of this worked shell. This bone artifact may have been suspended inside the pendant and may represent a clapper used to create sound when struck against the sides of the shell. This appears to be a modest offering.

3.2.7 *Late Classic (AD 600-900*)

Evidence suggests that Structure B1-2nd was abandoned and followed by a construction hiatus at this location (Brown 2003). Ritual activities, however, continue to appear associated within Structure B1. Two special deposits were encountered in the alleyway between Structures B1 and B2. Both deposits seem to have been dumped in single episode events. It appears that these deposits were placed in the alleyway after Structure B1-2nd was no longer in use and before Structure B1-1st was built (Brown 2003). These deposits appear to reflect ritual activities, as numerous whole artifacts were present. The first deposit, designated Problematic Deposit 1(PD1), contained one rosette-shaped shell artifact, a marine shell labret, as well as thousands of ceramic sherds, 16 obsidian blades, numerous chert flakes, two chert bifaces, one adze, mano and metate fragments, two figurine fragments, several hammerstones, one spindle whorl, one drilled ceramic disk, three drilled ceramic sherds, and a small carved stone bowl. Several partial vessels have been reconstructed from this deposit (Hartman et al. 1998:77).

A second Late Classic special deposit, designated Problematic Deposit 2(PD2), was encountered below PD1 in the alleyway. Items recovered from this deposit included hundreds of ceramic sherds, two metate fragments, one mano fragment, one celt, numerous obsidian blades, several chert flakes and cores, faunal remains, several pieces of daub, and two worked shell artifacts.

Excavations conducted near the summit of Structure B1-1st revealed a heavily disturbed Late Classic burial with high status grave goods (Garber et al. 1992:9). These grave items included a polychrome cylinder jar, two marine shell adornos, a large jade bead, carved bone implements, and a slate mirror back (Garber et al. 2004b:52). This burial contained one primary interment and three secondary interments. Although the bulldozer cut caused significant damage to the burial, it had several capstones remaining in situ near the central individual's head. It appears that this interment was intrusive into the frontal staircase of the underlying building, Structure B1-2nd, and was most likely placed just prior to the final construction phase of Structure B1 (Garber et al.1992: 10).

CHAPTER 4

METHODOLOGY

4.1 An Overview of Marine Shell Studies in the Maya Lowlands

Prior to the late 1960s, discussions of marine shell artifact assemblages were presented within monographs and site reports. These early publications from such sites as Barton Ramie (Willey et al. 1965), Piedras Negras (Coe 1959), San Jose (Thompson 1939), and Uaxactun (Kidder 1947:61-66; Ricketson and Ricketson 1937) included basic descriptions of marine shell artifacts along with the context and temporal association of the artifacts. Typically, these early studies also included taxonomic classifications and basic functional analysis of various shell artifact types. Early scholars paid special attention to whole and worked shell specimens recovered from excavations; however, little attention was paid to shell debitage and the industry that produced these artifacts.

Research focusing upon marine shell use has been limited in the Maya Lowlands with a few notable exceptions. The foundational study conducted by E. Wyllys Andrews (1969) provided important information on modern and archaeological occurrences of marine and freshwater shell species throughout the Maya Lowlands. Andrews (1969) created a reference collection containing more than 15,000 specimens of 600 species of molluscs. These were collected from over 50 modern research stations along the coast of Belize to Campeche, Mexico (Andrews 1969: 1). Additionally, this volume summarized approximately 15,000 archaeological specimens representing a minimum of 192 species from 18 different sites. Photographs of marine shells s in this volume have provided researchers with good visual representation of these species. Andrews (1969: 41-59) provided a brief overview of suggested uses of marine shell including personal adornment, food sources, votive offerings and trade items. He also addressed temporal trends of marine shell artifacts seen throughout the Maya Lowlands. This important early work provided a foundation for future marine shell studies in the Maya Lowlands. This study, however, focused on whole and modified shell only and did not address any aspects of marine shell debitage.

Following research conducted by Andrews, several important works focusing on material culture were conducted in the Maya Lowlands. Studies of "Small Finds" by Buttles (1992, 2002), Garber (1981, 1989), Moholy-Nagy (1985, 1994), and Taschek (1994) provided detailed descriptions of items manufactured from bone, stone, jade, and marine shell. Material culture analyses from the sites of Cerros (Garber 1981, 1989), Colha (Driess 1994; Buttles 1992, 2002), and Dzibilchaltún (Taschek 1994) have provided valuable information regarding the examination of artifact form, function and context. While not the primary focus of analysis at these sites, marine shell artifacts were integral to understanding past behavior. The small finds studies discussed below are important as they provide clear artifact descriptions for comparative purposes

Driess (1982, 1994) and Buttles (1992, 2002) have provided useful summaries of worked marine shell artifacts at Colha. In various publications, Driess provided typological and taxonomic information on worked marine shell artifacts from Colha, as well as information regarding their contextual and temporal distribution at the site. Buttles further examined the worked shell artifacts from Colha and provided useful temporal and metric data for the worked marine shell artifacts. Although the examination of shell debitage was not part of either Colha study, Buttles does note that shell artifacts were recovered in various stages of production. She suggests, "It is possible that production loci have not been identified Colha, or in the case of disk beads, the beads may have been traded into the site as blanks" (2002:160).

Garber (1981, 1989) examined several types of portable material categories including worked shell artifacts from the site of Cerros to investigate the trends of artifact consumption and disposal. Worked marine shell artifacts were divided into two temporal assemblages: 1) the Late Preclassic, and 2) the Postclassic. A typological, taxonomic and contextual analysis was conducted on the marine shell. Garber (1981:16) stresses, "Context is an indicator of how an artifact functioned in society." He provides a useful analogy to illustrate this point. "Although there are no physical or chemical differences between holy water and ordinary water, to ignore the contextual or social differences between the two would be ignoring the quite distinct manners in which each functions within our own society." He emphasizes the importance of depositional context as an avenue to understanding how these artifacts may have functioned in Maya society. Garber's study provided an excellent example of the importance of contextual analysis and greatly influenced the methods used in the contextual analysis of shell artifacts from Blackman Eddy.

Jennifer Taschek (1994) conducted a study on the artifacts from Dzibilchaltun, Yucatan, Mexico. In this study, she examines materials made of bone, ceramics, polished stone, shell and wood. Her chapter on shell artifacts is well organized, giving both quantitative and qualitative descriptions of the artifact types and paying special attention to contextual and temporal differences of the artifacts within the site. Taschek uses formal attributes and decorative elaboration to discuss variation within the shell artifact class. Many of the designations used for the Dzibilchaltun shell artifact assemblage were also used in the present study.

Hattula Moholy-Nagy (1994) presents an important study of the material culture from the site of Tikal in the Petén. She recognizes two distinct marine shell assemblages at the site of Tikal and suggests that the differences between these assemblages can be attributed to differences between elite and commoner activities. She suggests that the two types of marine shell assemblages seen at Tikal differ primarily by raw material type. These assemblages include: 1) an assemblage associated with elite activity with artifacts manufactured from *Spondylus* sp. and select nacreous marine shells, and 2) an assemblage associated with lesser elite and important commoner activity that consists of artifacts manufactured mainly from *Strombus sp.*, *Oliva* sp. other white marine shell and freshwater mussels (Moholy-Nagy 1994:101; 1995:7). She argues that high-status shell artifacts were recovered from special contexts, including tomb burials, caches, and problematical deposits, while non-elite shell artifacts rarely occurred in special deposits coming mainly from simple burials or general excavations (Moholy-Nagy 1985:148-151). Moholy-Nagy suggests that during the Classic period at Tikal, species selection was more important than the degree of artifact modification of marine shell artifacts recovered from high-status contexts (Moholy-Nagy 1994; 1995). She also suggests that elite control over shell working was firmly in place at Tikal during the Classic as evidenced by the large quantities of *Spondylus* sp. debitage recovered from caches. Elites commissioned the manufacture of shell ornaments for display of wealth, but also required that the shell debitage be returned to them to keep this highly prized shell in limited distribution. Based upon the placement and frequency of both elite and non-elite marine shell artifacts, she suggests that high-status marine shell artifacts were produced by full-time specialists, while the lower status items were made by part-time specialists (Moholy-Nagy 1994:105; 1997:308). Although several alternative interpretations of the data can be suggested, the species distribution by context has implications for different types of production processes. This study provides an important view of Classic period distribution and consumption of marine shell in high-status contexts in the Maya Lowlands. However, this study is limited in scope both temporally and contextually with regards to non-elite marine shell use.

Another interesting study of marine shell artifacts was conducted at the site of K'axob in northern Belize. Isaza Aizpurúa (1997:1) used a diachronic perspective to examine functional and symbolic uses of worked shell artifacts recovered during the Preclassic. She briefly mentions the presence of marine shell debitage at K'axob, but data from this category were not quantified or presented in detail. Isaza Aizpurúa examined worked shell artifacts from a variety of contexts such as caches, burials, middens, and construction fill. The study focused on large frequencies of worked shell artifacts recovered from Middle and Late Preclassic burial contexts (Isaza Aizpurúa 1997, 2004; Isaza Aizpurúa and McAnany 1999). Burial 43 contained over 2,000 marine shell beads. The placement of these beads along the body suggests that they would have been strung together to form necklaces, bracelets, anklets, etc (Isaza Aizpurúa 1997, 2004; Isaza Aizpurúa and McAnany 1999). Several other burials also contained large quantities of worked shell, although the frequencies were substantially less. The researchers from K'axob also note the presence of adolescent burials containing shell artifacts. Isaza Aizpurúa and McAnany (1999) suggest that during the Middle Preclassic, burials containing large quantities of shell beads may be indicators of social differentiation. However, they note a shift during the Late Preclassic where beads decrease in quantity and other items, specifically pendants and tinklers, become important burial offerings. The K'axob burial data are important, as Middle Preclassic burials are limited in the Maya Lowlands. This study illustrates the use of marine shell as a prestige item during the Preclassic.

The material culture studies discussed above focused on understanding the types, frequencies, and uses of worked shell artifacts. Little attention, however, has been given to the whole industry that produced these artifacts. Recent research conducted by Bobbi Hohmann (2002, 2003) at the sites of Pacbitun and Cahal Pech has broadened our knowledge concerning marine shell artifact production during the Middle Preclassic. Her research examined aspects of the organization of production, distribution, and consumption of worked marine shell artifacts. She examined worked shell artifacts in conjunction with shell debitage. Hohmann documented shell ornament production and distribution at both the site and regional level, however, due to the limits of the dataset, detailed information pertaining to the production context and intensity of artifact manufacture was limited (Hohmann 2002:207). Although Hohmann's research was limited to the Middle Preclassic time period, her methodology greatly influenced the study presented in this thesis.

Several methods of analysis have been used in the examination of marine shell assemblages in the Maya Lowlands, including taxonomic, typological, contextual, technological, and functional analyses (Buttles 1992; 2002, 2004; Cobos 1994; Driess 1982, 1994; Ferguson 1995; Garber 1981, 1989; Hohmann 2002; Isaza Aizpurúa 1997; Isaza Aizpurúa and McAnany 1999; Keller 2008; Kidder 1947; Maholy-Nagy 1985, 1994; Taschek 1994). Three types of analysis were conducted for this thesis: 1) taxonomic, 2) typological, and 3) contextual. Background related to these analyses is presented below.

4.2 Taxonomic Classification[2]

Marine shells are classified as mollusks, belonging to the phylum Mollusca. Mollusks all have a soft body, which is generally protected by a hard, calcium-containing shell. Four classes of marine mollusks have external shells; however, only three classes were identified at Blackman Eddy. These classes include: 1) Gastropoda, commonly referred to as gastropods, 2) Pelecypoda,

2 All of the terms used in the anatomical descriptions of marine mollusks, as well as descriptions of shell species, were taken from: Abbott 1954:72-84; Abbott and Dance 1986:7-12; Humfrey 1975:17-25; Morton 1967:20-28; Redher 1981:13-20; and Walls 1979:35). All species images were taken from Abbott 1954, Andrews 1969, and Vokes and Vokes 1983.

referred to as pelecypods or bivalves, and 3) Scaphopoda, referred to as scaphopods or tusk shells. The basic morphology of each shell class will be presented in the sections below.

4.2.1 Gastropoda

Gastropods have an elongated tube that increases in size as it spirals around a central axis, referred to as the columella (Figure 4.1). These shells are characterized by concentric whorls, separated from one another by sutures that spiral outward from the columella. The largest whorl, called the body whorl, contains the body of the invertebrate. The spire is made up of tightly wound whorls located above the body whorl, and the upper most portion of the spire called the apex. The opening of the shell is referred to as the aperture, and the margins of this segment are called the lips. Gastropods exhibit both an inner and an outer lip. In many gastropods, the outer lip thickens once the specimen reaches sexual maturity. Gastropods, such as *Strombus* spp*.,* have spines beginning at the upper edge of the body whorl that extend up the spire to the apex.

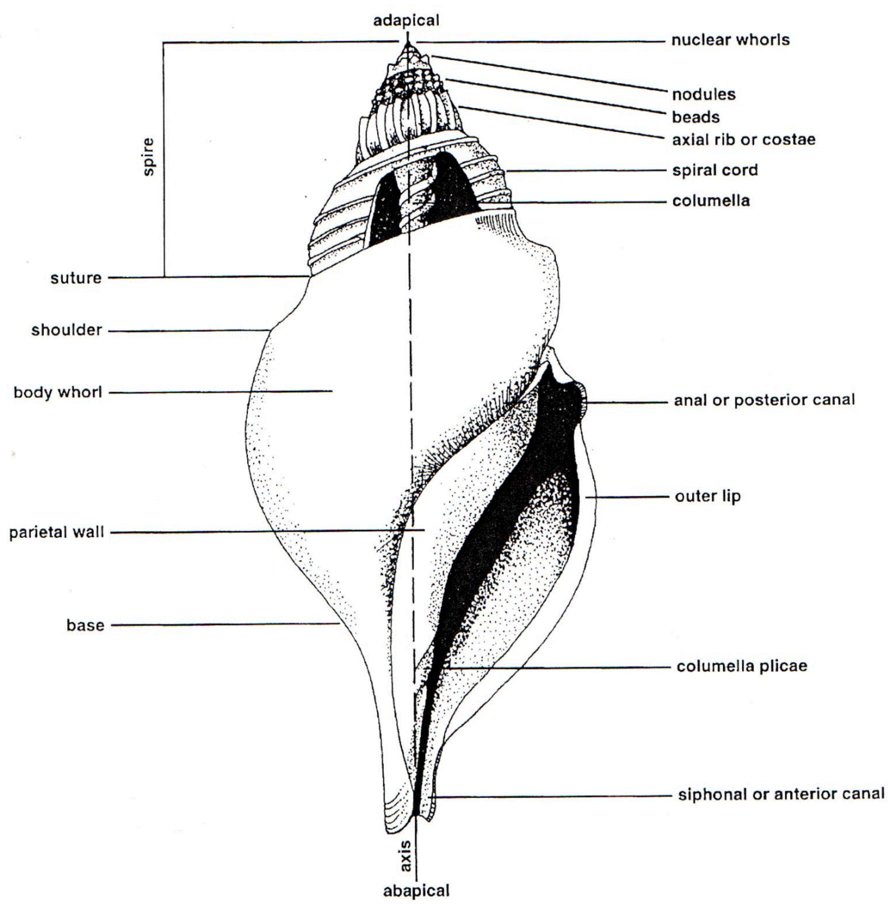
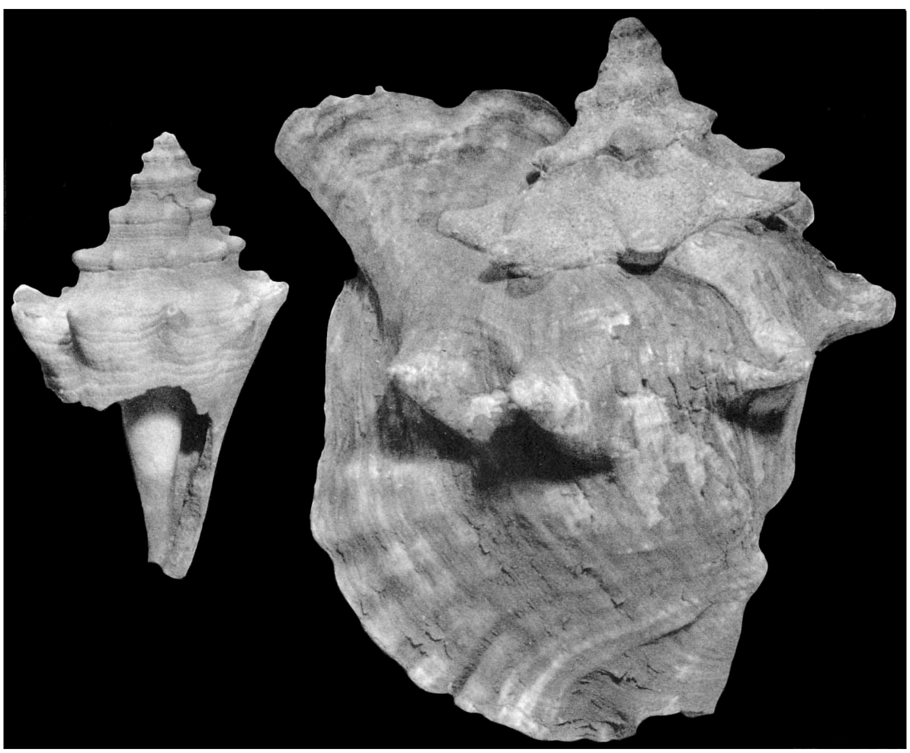


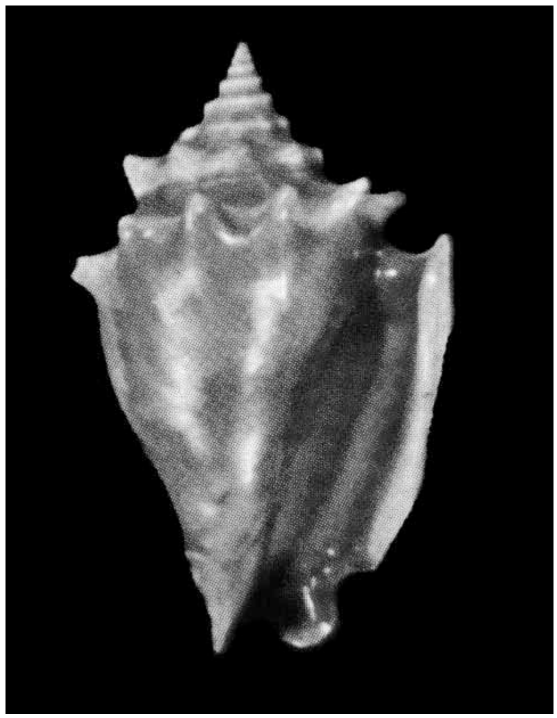
Figure 4.1 Gastropod Terminology (Claassen 1998:Figure 4).

Seven gastropod genera have been identified in the Blackman Eddy assemblage: *Strombus, Melongena*, *Busycon, Conus*, *Pleuroploca*, *Turbinella*, and *Oliva*. The genus *Strombus* belongs to the family Strombidae. The species belonging to this genus are commonly referred to as conchs and comprises the bulk of the marine assemblage from Structure B1 at Blackman Eddy. The two species of *Strombus* identified at Blackman Eddy were *Strombus gigas* Linné 1758 and *Strombus pugilis* Linné 1758. Both species are found in the warm waters of the western Atlantic from southeastern Florida to the West Indies, through the Gulf of Campeche to the Caribbean shores of Central America. *Strombus gigas,* commonly called the Queen or Pink Conch, has a large, heavy yellowish-white shell measuring 18-30 cm in length. This shell exhibits high, strongly angled spire with pointed spines (Figure 4.2). The lower three whorls, including the body whorl, have large, blunt spines. At sexual maturity, the outer lip thickens and becomes broadly flared, oftentimes extending higher than the spire. Adult species of *S. gigas* can be found in the sand or rubble usually among or near eelgrass stands in shallow and intertidal waters 1.5-5 m deep.



4.2 Examples of *Strombus gigas* (Andrews 1969:Plate 4).

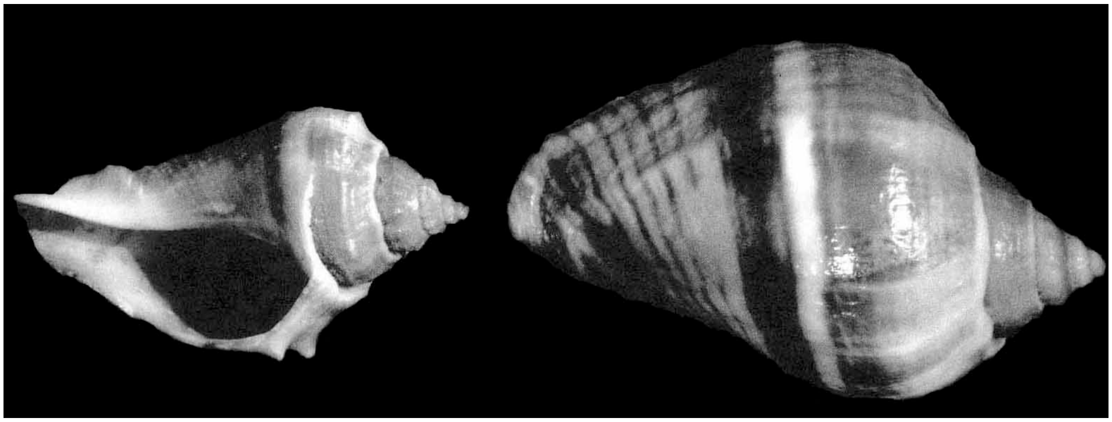
Immature specimens of *S. gigas* display differences from their adult counterparts. They have a high spire and strongly angled whorls with a narrow, pointed base. The outer lip of juvenile specimens is not thickened and flared like the adult examples. These juveniles measure up to 8-10 cm in height and prefer shallow water.



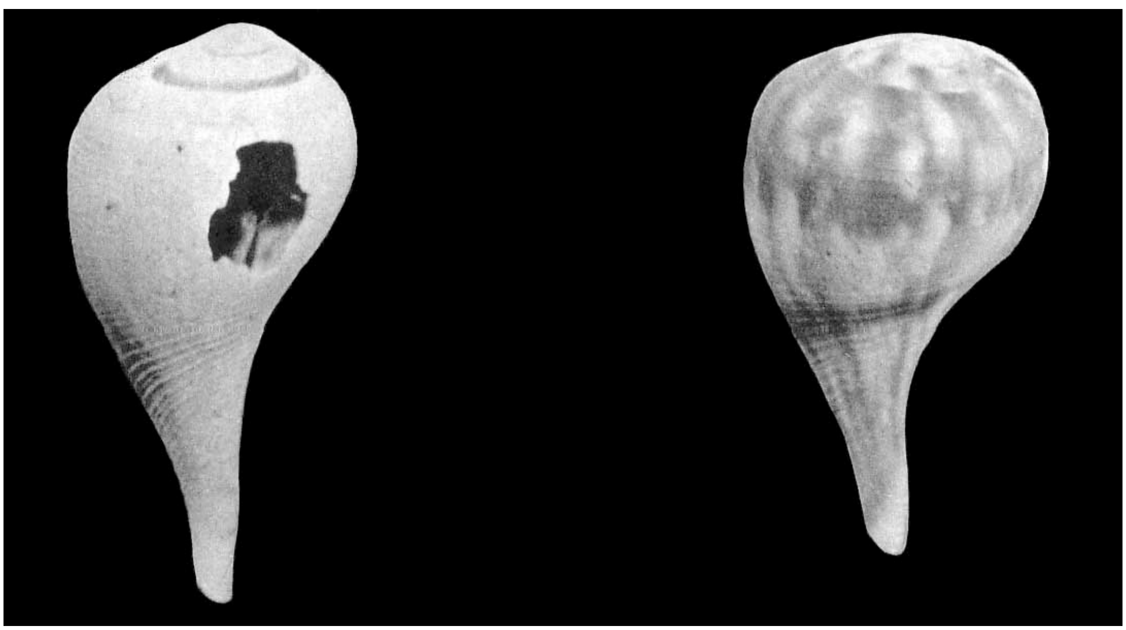
4.3 Example of a *Strombus puligis* (Abbott 1954:Plate 5).

Strombus pugilis, referred to as the West Indian Fighting Conch, is smaller than *S. gigas* measuring only 8-10 cm in height. This gastropod is deep orange in color with a high spire, and pointed spines (Figure 4.3). The outer lip thickens upon sexual maturity, although it is not as broadly flared as *S. gigas.* The habitat of this species is similar to that of *S. gigas*.

Two genera in the family Melongenidae were identified from Structure B1. These include *Melongena* and *Busycon. Melongena melongena* Linné 1758, or West Indian Crown Conch, measures up to 4-19 cm in height, is broadly ovate, and has a large body whorl and short, partly sunken, conical spire. The shells of this species have a distinctive white coloring with purplish-brown bands (Figure 4.4). *M. melongena* prefers mud or muddy sand bottoms of brackish water at the head of bays or lagoons. This species is found in the larger islands of the West Indies to Southern Mexico and to the northern coast of South America near Surinam.

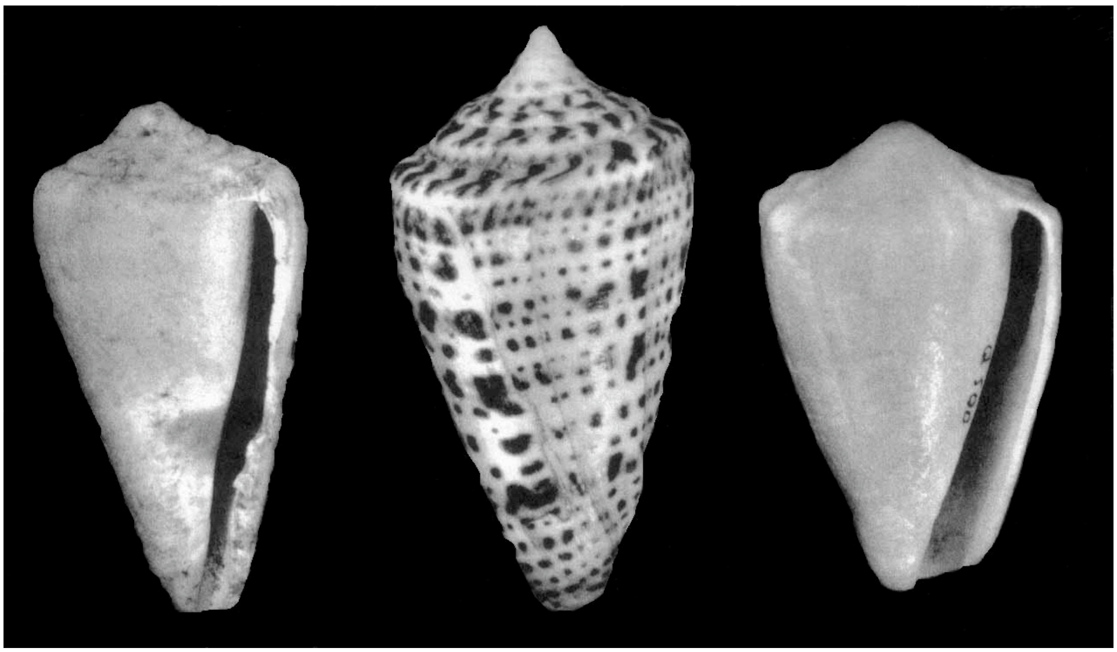


4.4 Examples of *Melongena melongena* (Andrews 1969:Plate 10).



4.5 Examples of *Busycon spiratum* (Andrews 1969:Plate 9).

Busycon spiratum Lamarck 181, or Pear Whelk, was the second genus of the Melongenidae family identified at the site. This gastropod is pear-shaped with a large, low, broadly conical spire that lacks spines (Figure 4.5). This species measures up to 6-14 cm in height and has a large, convex body that narrows near the base. The shells are whitish to yellowish in color with irregular, reddish-brown axial streaks. *B. spiratum* ranges from North Carolina to Florida and the Gulf of Mexico to Yucatan, Mexico. This species prefers a sandy environment in intertidal waters up to 7.5 m deep.



4.6 Examples of *Conus* spp. (Andrews 1969:Plate 4).

The genus *Conus* Linné 1758 belongs to the family Conidae. Cone shells have quite variable shell sizes ranging from 1cm to 10 cm in length. These shells have elongated apertures with nearly parallel lips. The columella is small, usually less than one-third the length of the inner lip. The spire height varies greatly from a low to high spire, and the shoulders can be sharp to slightly rounded (Figure 4.6). *Conus* spp. have color variability ranging from white to orange and red-brown. Axial streaking is a prominent feature found on the body whorl of these shells. These shells prefer a shallow water to intertidal habitat and are commonly found in reef environments. Cone shells inhabit many regions throughout the world, but the Atlantic cones near the study area can be found from the Florida Keys to the West Indies.

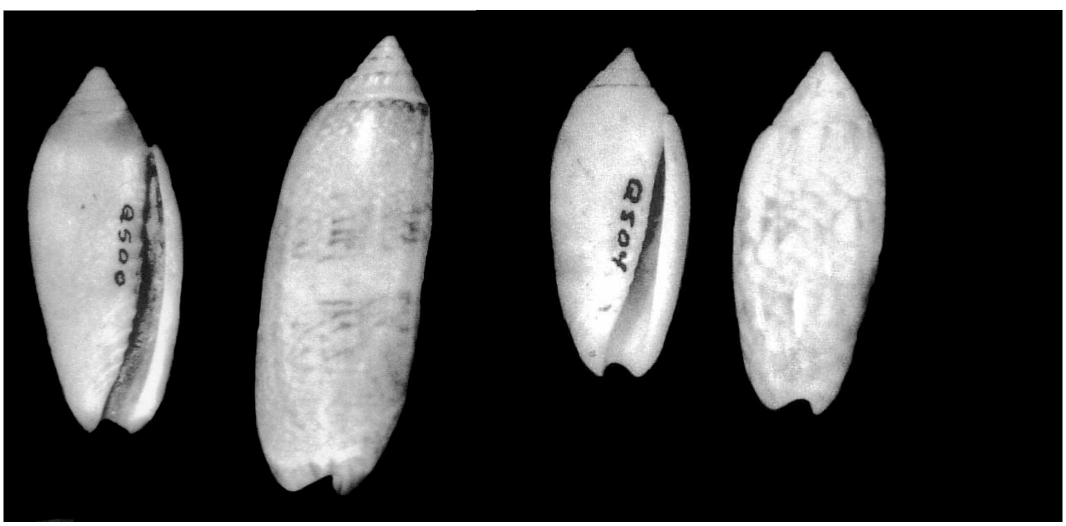
Turbinella angulata Lightfoot 1786, or the West Indian Chank, is a member of the Turbinellidae family. *T. angulata* is broadly spindle-shaped with a large, heavy, cream-white color shell that measures up to 18-36 cm in height. This species often has up to 10 whorls with large, low nodules on the shoulders (Figure 4.7). The spire of this species is moderate height with a

4.7 Example of a half-grown *Turbinella angulata* (Andrews 1969:Plate 11).

4.8 Example of a half-grown *Plueroploca giantea* (Andrews 1969:Plate 11).

bluntly rounded apex. The columella is distinct consisting of several strong, spiral pleats. West Indian Chank prefers shallow waters, sandy bottoms and offshore atolls. This species survives in warm waters from the Bahamas to the West Indies.

One specimen of the Fasciolariidae family, *Pleuroploca gigantea* Kiener 1840, was recovered from the Blackman Eddy assemblage. *P. gigantea*, more commonly referred to as Florida Horse Conch, is one of the largest mollusks in the world, measuring 10-48 cm in height. This species has a heavy, elongated, spindle-shaped shell with a conical spire (Figure 4.8). The shell aperture is oval, and the columella has two distinct strong, spiral ridges near the base. This species prefers sand to muddy sand habitats from low tide levels up to depths of 6 m. The Florida Horse Conch has a range from North Carolina through Florida to Texas, and the Gulf of Mexico to the Yucatán. West Indian Chank and Florida Horse Conch specimens closely resemble one another, and misidentifications are common.



4.9 Examples of *Oliva* spp. *O. reticularis shown* on the right. (Andrews 1969:Plate 12).

The genus *Oliva*, commonly referred to as Olive shells, belongs to the Olividae family. One species of Olive shells has been identified in the Blackman Eddy assemblage: *Oliva reticularis* Lamarck 1810. *O. reticularis*, or the Netted Olive, is a small- to medium-sized gastropod measuring 3-6 cm in height. This species has a thick, glossy, cylindrical shell with a short, pointed, conical spire (Figure 4.9). The body whorl is long, evenly convex, and the aperture is elongated with a smooth, thickened outer lip. *O. reticularis* generally has elaborate surface markings on the body whorl below the suture lines, which often appear as pale purplish or reddish-brown, zigzag, axial streaks. This species ranges from Southeast Florida to the West Indies and Venezuela and prefers sandy habitats in waters 0.6-12 m deep.

4.2.2 Pelecypoda

Pelecypods are flattened mollusks that consist of two symmetrical, uncoiled, circular-oval shell pieces called valves (Figure 4.10). These valves are joined together along the dorsal margin of the shell by an elastic ligament. The valves close efficiently using a hinge-like feature. The upper part of the shell, called the umbo (plural umbones), forms during the initial stage of shell development. The shape of the valve broadens anteriorly and narrows posteriorly near the umbo. Unlike gastropods, the structural variation of pelecypod shells is limited. The greatest amount of variability for this shell type exists in color, shape, and sculpture of the shells. Archaeologically, however, cultural and natural processes can greatly affect color, shape and sculpture of pelecypods making species identification of these specimens difficult.

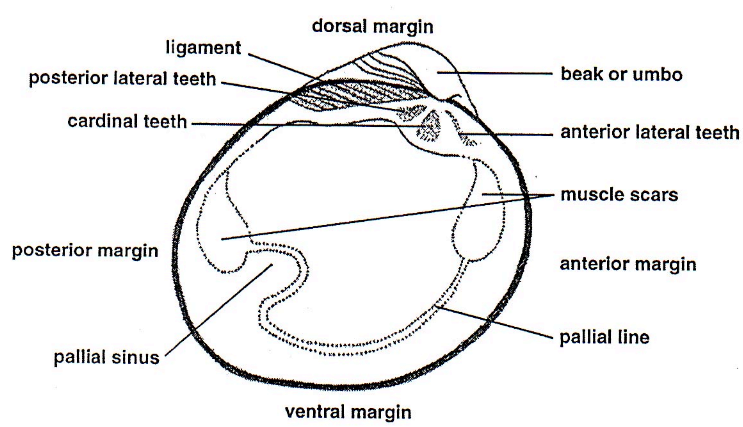
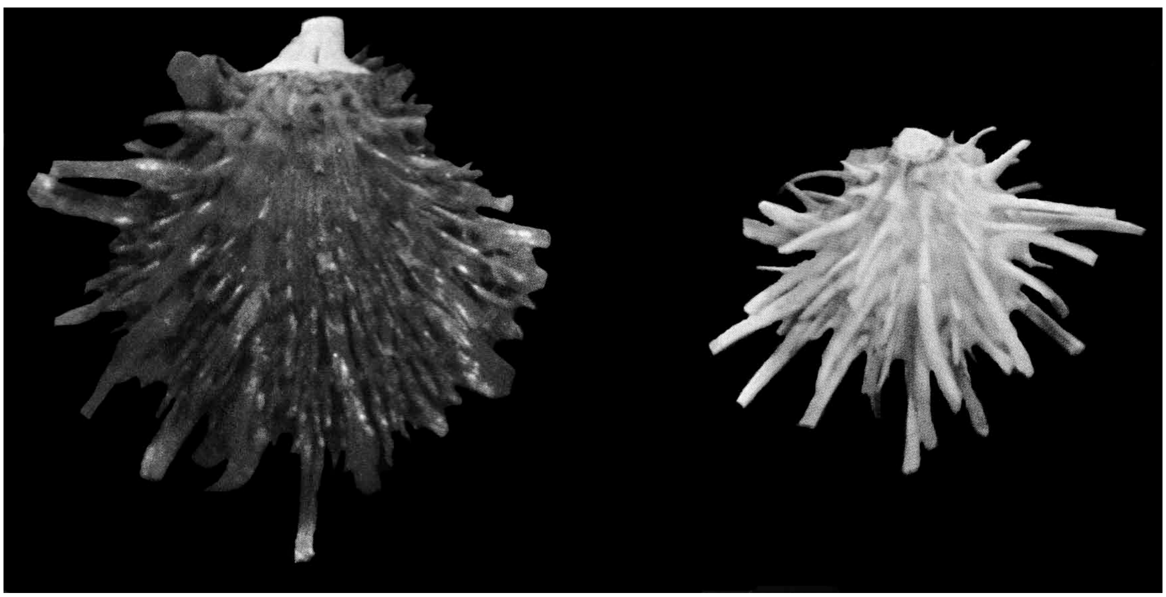


Figure 4.10 Pelecypod Terminology (Claassen 1998: Figure 6).

Spondylus was the only pelecypod genus identified at Blackman Eddy. This specimen belongs to the family Spondylidae, or Spiny Oyster family. *Spondylus* spp. are distinctive shells with a thick body measuring 4-14 cm in length. They have thin spines measuring 3-33 cm in length that grow from the exterior surface of the shell (Figure 4.11). The spines vary in length and tend to grow longer in deeper waters. The shells are moderately convex with circular to broadly ovate bodies. The exterior shell surface ranges in color from white, yellow, red-orange, and purple. The Spiny Oyster family prefers deep, calm waters up to 46 meters deep, but can also be found in shallow water environments. These specimens are found in both the Atlantic and Pacific oceans and have a range from the southern United States to northern South America near Surinam.

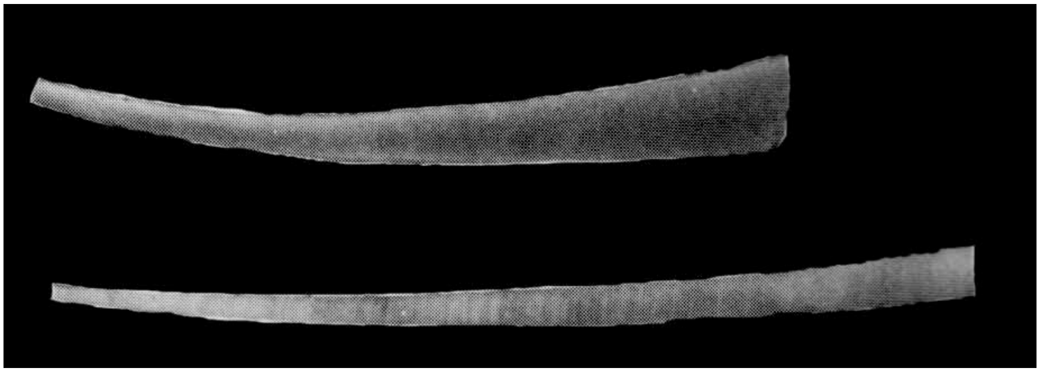


4.11 Examples of *Spondylus* sp. (Abbott 1954:Plate 36).

4.2.3 Scaphopoda

Scaphopods, also called tusk shells, are burrowing mollusks with a long, slender shell. Tusk shells are the least complex type of mollusks. The shells are tubular in shape, oftentimes slightly curved, and exhibit an opening at both ends. One opening is slightly larger than the other and is called the aperture. The smaller opening of the shell is referred to as the apex.

The genus *Dentalium* is the only member of the family Dentaliidae. Only one artifact in this genus was recovered from Blackman Eddy. *Dentalium* spp. have tubular shells ranging 2-6 cm in length. These shells have longitudinal ribs or rings along the shell body and are typically white in



4.12 Examples of *Dentalium* sp. (Vokes and Vokes 1983:Plate 49).

color (Figure 4.12). *Dentalium* spp. live partially buried in the mud or sand in depths ranging from 3-152 m, but are most often found at depths of more than 30 m. The Caribbean species range from North Carolina to the West Indies.

4.3 Typological Classification

In various publications ranging from technical reports to theses and dissertations, researchers have presented typological classifications for marine shell artifacts recovered throughout the Maya Lowlands (Buttles 1992; 2002; Cobos 1994; Driess 1994; Ferguson 1995; Garber 1981, 1989; Hohmann 2002; Isaza Aizpurúa 1997; Kidder 1947; Moholy-Nagy 1994; Taschek 1994; Willy et al. 1965). Researchers focused on artifact form, shape and position of perforations, and surface decoration. The typology presented in this thesis closely follows the typologies presented by Hohmann (2002) and Taschek (1994).

Two broad categories were identified in the marine shell assemblage at Blackman Eddy: 1) worked shell, and 2) shell debitage. This delineation follows Hohmann's (2002) categorical designations for the marine shell artifacts recovered from Pacbitun and Cahal Pech. Within each of these categories, several formal types have been identified and are discussed below.

4.3.1 Worked Shell

Worked shell artifacts are objects that have extensive modification to the original shell form. Modification to these artifacts includes, but is not limited to, cutting, drilling, grinding, abrading, and incising. The types for the worked shell category include: 1) beads, 2) pendants, and 3) adornos. Each of these types is divided into specific subtypes based upon formal variations. Considerable variation is seen within these types throughout the Maya Lowlands.[3] The typology presented below is not meant to be a comprehensive representation of all the forms present in Maya Lowlands; rather it is limited to the forms recovered from Blackman Eddy. Illustrations of many of these types are presented in Chapter 5.

4.3.1.1 Beads

Beads represent the most abundant worked shell artifact type recovered in the Maya Lowlands (Buttles 2002:162, 2004:26; Garber 1989:61; Driess 1994:177; Hohmann 2002:124, Isaza Aizpurúa 1997:62, Kidder 1947:61; Taschek 1994:20; Willey et al. 1965:503). A bead is generally characterized as having a relatively small shape and a central perforation designed for suspension in a series (Taschek 1994:20). Perforations may be uniconically (one side) or biconically (both sides) drilled, and shell thickness may affect the type of drilling selected. A high degree of shape and size variability exists among artifact subtypes. Common bead subtypes found throughout the Maya Lowlands include discoidal, irregular, rectangular, tubular, subspherical, and barrel shaped. Three subtypes were identified in the Blackman Eddy marine shell assemblage: discoidal, irregular, and unspecified.

Discoidal beads are usually defined as having a uniform disk shape with a central perforation; however, the diameter and thickness can vary greatly between artifacts. Discoidal beads have smoothed lateral edges and often exhibit some smoothing and polishing on the bead faces. Species identification is often difficult on this bead form as extensive modification that often eliminates diagnostic shell features is common.

Irregular beads are characterized as having irregular shapes (Hohmann 2002:106). The size and shape of this bead form varies greatly. Irregular beads exhibit different degrees of smoothing along their lateral edges. These beads often appear slightly concavo-convex when viewed in profile. This bead subtype form was commonly manufactured from marine gastropods and many portions of the shell were utilized in the production of these forms (see Figure 5.3).

3 See Buttles 1992; 2002; Cobos 1994; Driess 1994; Ferguson 1995; Garber 1981, 1989; Hohmann 2002; Isaza Aizpurùa 1997; Kidder 1947; Moholy-Nagy 1994; Taschek 1994; and Willy et al. 1965 for descriptions of the different worked shell forms identified throughout the Maya Lowlands.

Species identification is often easier to obtain, since important diagnostic features are more commonly seen on this subtype.

4.3.1.2 Pendants

Pendants are generally characterized by their large size and placement of the perforation on the artifact (Taschek 1994:20). Unlike beads, this artifact type usually has one or more perforations located along the edges of the artifact that allows for vertical suspension. Pendants can be strung in a series, but are generally much larger than beads. The larger size of this artifact type suggests it many have been suspended alone or possibly in conjunction with much smaller elements, like beads. Pendant subtypes represented at Blackman Eddy include carved and cut, modified gastropod shell, modified pelecypod shell and tinklers (see Figure 5.5).

Carved and cut pendants are highly modified artifacts that retain few features of the original shell form. Grooving, incising, and high polish are common attributes of pendants. The shape of this pendant subtype can vary greatly. Due to the extensive modification of this artifact form, species identification is often difficult to obtain.

Gastropod pendants represent a pendant subtype in which the original gastropod form is largely retained. According to Taschek (1994:35), specimen size is the primary factor used to distinguish between perforated gastropod beads and pendants. The perforation is usually located near one end of the gastropod to allow the artifact to hang vertically when suspended. The slight modification to the original shell form allows for species identification in most cases. The common species types used to manufacture gastropod pendants include *Conus* spp., *Melongena* spp., and *Strombus* spp.

Pelecypod pendants are arbitrarily distinguished from pelecypod beads based upon relative size and location of the suspension holes. Pelecypod pendants usually have paired drill holes located near the hinge or ventral margin of the shell, while pelecypod beads will have a single central perforation (Taschek 1994:34). This pendant subtype can exhibit a range of modification including cutting, polishing, and incising present on the dorsal surface and along the edges making species identification difficult.

Tinklers are a common artifact subtype identified in the Maya Lowlands (Andrews 1969;

Coe 1959:57; Driess 1982: 216; Garber 1981:178, 1989; Hohmann 2002:125; Isaza Aizpurúa 1997:79; Isaza Aizpurúa and McAnany 1999:124; Kidder 1947:63-64; Moholy-Nagy 1994:96; Ricketson and Ricketson 1937:201; Willey et al. 1965:508). The term "tinkler" refers to a functional designation based upon the "tinkling" sound these artifacts would have made when strung together. Formal attributes, however, define this artifact form as a pendant. Tinklers are manufactured from small to medium gastropods, usually from *Oliva* sp. gastropods. The spires of these gastropods are removed by transverse cuts at approximately the juncture of the lip and body; however the relative position of this cut can vary (Taschek 1994 :). A series of transverse V-shaped slits are often found cut into the body of the shell. This distinguishes them from gastropod pendants. Perforations are generally located near the ends of the shells, although perforations can be found further down the shell body as well. These artifacts are designed for vertical suspension.

4.3.1.3 Adornos

Adornos are extensively worked artifacts of varying sizes that may or may not have perforations. Taschek (1994:51) refers to this category as an "unsatisfactory but well-established catch all for cut-shell ornaments lacking specific recognized functions." These artifacts can be circular to oval in shape and exhibit well-worked faces and lateral edges. Incising or design motifs are often present on their faces. Adornos have been interpreted as decorative items and may represent facial ornaments, clothing adornments, and mosaic inlay elements. Due to the extensive modification of these artifacts, species identification is usually difficult to obtain. Adorno subtypes represented in the Blackman Eddy marine shell assemblage include notched disks, earflares, inlays, labrets, and rosettes (see Figure 5.7).

4.3.2 Marine Shell Debitage

This category represents marine shell fragments produced as by-products during marine shell artifact manufacture. The shell debitage category consists of fragments that show no further signs of cultural modification beyond the initial stage of shell reduction. Fragments in this category were grouped together according to shell part. Five of the designations are distinctions made for gastropod fragments and include body, columella, lip, shoulder, and spire. Partial shells, pelecypods, scaphopods, and unspecified designations were also included in this category, but were not assigned a specific shell part due to shell morphology and low sample size.

Body fragments are characterized as the portion from the body whorl that does not retain elements of the shoulder or spines of the shell. Columella fragments are described as any shell fragments that retain parts of the central spiral portion of a gastropod. Lip fragments are characterized in this thesis as fragments that retain any elements of the smooth outer lip. This designation also includes fragments of shell located immediately adjacent to the outer lip rim and may have portions of the siphonal canal present. Pieces from the body whorl located near the junction of the body and spire, including segments of the spine, are described as shoulder fragments. These shoulder specimens were useful during taxonomic identification. Spire fragments retain elements of the uppermost portions of the gastropod above the body whorl. Descriptions of these gastropods parts can be found in the previous section on taxonomic classification.

Marine shell fragments with 50 percent or more of the shell present were identified as partial shells. Pelecypod and scaphopod frequencies in the Blackman Eddy assemblage were low. These fragments were placed into groupings based on shell class rather than shell part. Unspecified fragments include specimens that could not be placed into one of the groupings discussed above, either because of artifact preservation or examination availability.

4.4 Contextual Classification

This section presents the approach used during the contextual analysis of the marine shell artifacts from Structure B1 at Blackman Eddy. As previously discussed, Structure B1 has a developmental construction sequence spanning nearly 2,000 years (Brown 2003:40; Brown and Garber 2003; Garber et al. 2004a:26) and marine shell artifacts have been found in association with all phases of this construction sequence. A discussion of provenience and chronological affiliations is presented in Chapter 5. The goal of this analysis is to establish broad provenience categories in order to examine a pattern of shell use and deposition at Blackman Eddy

Two main categories of provenience were identified within Structure B1: 1) construction fill, and 2) special deposits. Special deposits represent intentional deposition of material culture in primary context. Due to the small sample size of marine shell from Blackman Eddy, all ritual-related primary context deposits were grouped together to elicit general patterns related to ritual use of this artifact class. In this thesis, the term "special deposit" is used for the primary context deposits encountered in Structure B1, such as problematical deposits, caches, and burials. Evidence suggests that these deposits were intentionally placed within the architectural sequence and most likely represents ritual behavior.

Two common special deposits found in the Maya Lowlands are dedication caches and termination deposits. The term cache is often used to describe a special deposit in which discrete concentrations of artifacts are intentionally buried or placed in a primary deposit (Schiffer 1987:79). Dedication caches and termination rituals are distinguishable from one another by the condition of material culture and other associated architectural features. Termination rituals often result in deposits of intentionally destroyed material culture and associated architectural remains (Garber 1983:802; Pagliaro et al. 2003). Dedication caching behaviors frequently relate to site construction activities and generally contain complete and intact artifacts (Schiffer 1987:79). These two different primary deposits leave discrete archaeological signatures. Several caches and termination rituals have been identified in Structure B1.

Oftentimes ritual/special deposits do not fit neatly into the categories discussed above and may represent different types of activity in the past. The term problematical deposit was used first at the site of Tikal for such deposits (Coe 1982:49) and has been subsequently used by other researchers (Iglesias 1994; Moholy-Nagy 1994:14, Stanton et al. 2008).

Burials represent another type of special deposit identified in the Maya Lowlands. Becker (1992: 187) defines a burial as primary interment of one or more individuals in a prepared repository. Considerable diversity, ranging from simple crypts to elaborate tombs, exists in these graves. Marine shell artifacts are commonly found in burials throughout the Maya Lowlands, especially during the Preclassic (Isaza Aizpurúa 1997; Isaza Aizpurúa and McAnany 1999 Robin 1989; Robin and Hammond 1991). Analysis of the associated material culture in burials can provide information status and occupation of the deceased.

Cultural material found within construction fill represents the second provenience category examined in this thesis. Unlike the items within special deposits, the artifacts recovered from construction fill are considered to be in secondary context. Two main types of construction fill were identified within the Structure B1 sequence: a wet-laid fill and dry-laid, rubble fill. Wet-laid construction fill, consisting mainly of alluvial clay, typically contained higher percentages of artifacts, including marine shell. The higher frequency of material culture encountered in this type of fill suggests that nearby midden material may have been mixed with riverine clay and used as a sticky construction fill. This type of fill also was used to stabilize the dry-laid fill placed within the core of larger more elaborate buildings within the sequence. The dry-laid rubble fill consisted mainly of small- to medium-sized cobbles and consistently had fewer artifacts.

4.5 Methods for Analysis of Marine Shell from Blackman Eddy

Taxonomic and typological analyses of the assemblage were conducted during the 2005 and 2006 field seasons in Belize. The contextual analysis of the assemblage was conducted in the archaeology laboratory at The University of Texas at Arlington during the spring and summer of 2007. The sections below detail the methods used during these analyses of the marine shell assemblage for Blackman Eddy.

4.5.1 Recovery and General Laboratory Processing

The marine shell assemblage examined in this study comes from excavations conducted at the site of Blackman Eddy by the Belize Valley Archaeological Project (BVAP) from 1990 to 2003. Excavations were conducted over much of the site, but the primary focus of the project concentrated on Structure B1, in Plaza B.

Given the distance of Blackman Eddy to the coast, marine shell artifacts were considered non-local to the area. All non-locally acquired materials like jade, obsidian, groundstone, and marine shell recovered at the site were collected separately and were designated "Small Finds." These artifacts were assigned unique catalog numbers and entered into a master log. Forms were filled out for each small find. The data recorded on these forms included artifact provenience, raw material type, basic descriptive information and artifact measurements, as well as a sketch drawing of each artifact. Many of the artifact illustrations were drawn to scale by the project illustrator.

Following preliminary analysis, all special artifacts were placed in sealed containers according to excavation year and housed in a long-term storage facility in Belize.

A small number of marine shell pieces were recovered from the freshwater shell assemblage at the site. The freshwater assemblage is large, consisting of several hundred thousand specimens. The decision to sort through this large assemblage came after considering the difficulty of identifying highly fragmented marine shell specimens for the untrained observer. The specimens recovered from this assemblage were bagged individually, labeled with the provenience, and added to the marine shell assemblage previously collected as small finds.

4.5.2 Preliminary Evaluation and Establishment of the Marine Shell Database

The initial phase of analysis consisted of a preliminary sorting of all marine shell artifacts to familiarize the author with the assemblage. After the initial sorting, a closer inspection of the material was conducted and any artifacts that were mislabeled or not manufactured from marine shell were removed. Following Hohmann's (2002:104) designations at Pacbitun, the marine shell assemblage at Blackman Eddy was divided into two general categories: 1) worked artifacts, and 2) shell debitage. Worked artifacts consist of objects that show extensive modification to the original shell form. The shell debitage category consists of fragments that show no further signs of modification beyond initial reduction stages. Following this stage of artifact sorting, a database was created and all provenience information and catalog numbers were recorded. It is important to note a minor problem that had to be addressed during this phase of data collection. A considerable volume of marine shell artifacts were recovered in the lower stratigraphic levels of Structure B1. Due to the high density of marine shell found, all marine shell artifacts recovered from the same provenience in these lower levels were collected in one container, processed together in the laboratory, and assigned a single small find number. This method of collection and use of a single Small Find number proved challenging during the analysis phase. The Small Find catalog number could not be used as a unique identifier to keep artifacts separate when entering them into a database. To accommodate this unfortunate method of collection, each small find number assigned to more than one artifact was modified by adding a decimal designation after the number to differentiate them from one another during subsequent analysis. As an example, a group of marine shell artifacts all with the Small Find number 835 would be separated into SF 835.1, 835.2, and so forth. This modification to the small find number system proved to be the fastest, most effective method without having to reassign a new numerical system to the entire collection.

The recording system used for the Blackman Eddy marine shell assemblage is a modified version of the coding system devised by Mark Kenoyer (1983:409-411). Kenoyer conducted extensive research on shell industries of the Indus Valley and has created a recording system that examines significant features seen on marine shell artifacts. The recording system used for the Blackman Eddy dataset records both metric and non-metric variables. Table 4.1 shows a list of the attributes recorded for each artifact in the marine shell assemblage. A complete list of the attributes examined for each shell specimen is presented in Appendix A.

4.5.3 Typological Analysis

The second stage of analysis included the establishment of a recording system for the marine shell assemblage at Blackman Eddy that divided the general shell categories into types and subtypes based upon formal distinctions. Following the establishment of a recording system, metric attributes were recorded for each specimen. These attributes included maximum observed dimensions of length, width, and thickness. Additional measurements, such as artifact diameter and perforation diameter were taken on all circular and drilled artifacts. Digital metric sliding calipers were used to record these measurements in millimeters (mm).

4.5.3.1 Data Collection of Metric Attributes

The debitage category was examined first. The specimens in this category consisted of fragments with highly irregular shapes and edges. Gastropod fragments of body, columella, lip, shoulder, and spire fragments were measured vertically from base to apex to record maximum length of the specimen. Gastropod body fragments without spines or nodules were more difficult to measure. For these specimens, the larger of the two measurements was recorded as the length measurement. The width of each specimen was recorded at the widest portion of the shell. Thickness measurements were recorded at the thickest portions of the shell wall. For specimens with varying degrees of thickness, several measurements were recorded and the varying degrees of thickness were noted. The thickness measurement for columella fragments was usually obtained from the base to the midpoint of the fragment. When measuring lip fragments, the height was measured from the base to the apex. Width was measured at the widest portion of the shell excluding the spines. Thickness was measured on the shell wall where it appeared most consistent. Any large variations in shell wall thickness also were noted.

Each worked shell type was evaluated separately and metric attributes specific to these types were recorded. The maximum perforation diameter was recorded for all drilled artifacts. For artifacts with one or more perforations, the number of perforations was noted and the maximum observed measurement was recorded separately. A maximum artifact diameter measurement was recorded for all circular artifacts. In the case of irregularly-shaped artifacts, length, width, and thickness measurements were recorded. Various other measurements that appeared useful for descriptive purposes also were recorded for any unusually-shaped artifact.

4.5.3.2 Data Collection of Non-Metric Attributes

A series of non-metric attributes was recorded for all shell artifacts in the assemblage. These attributes included relative shell size, descriptions of the external and internal surfaces of the artifact, degree of edge modification, condition of the artifact and evidence of burning. A relative size was recorded for all artifacts. This attribute helped determine the relative size of the shell from which the fragment came and provided useful information during species identification. Descriptions of the internal and external surfaces of each specimen provided important information regarding surface coloration and alteration of the artifact. All artifacts in the debitage category were examined for any modification that may have occurred during shell artifact production. This included any aspects of cutting, sawing, pecking, or chipping. Edge and surface modification of the worked shell artifact also was examined.

4.5.4 Taxonomic Analysis

The third phase in marine shell artifact analysis was to identify the different marine shell species present in the assemblage. To accomplish this goal, the author examined numerous reference texts to become familiar with marine shell morphology and the shell species present along the coastal region of the Yucatan Peninsula. The reference texts used for this study were *American Seashells: The Marine Mollusca of the Atlantic and Pacific Coasts of North America* by

R.T. Abbott, *The Audubon Society Field Guide to North American Seashells* by H.A. Rehder, *The Archaeological Use and Distribution of Mollusca in the Maya Lowlands* by E. Wyllys Andrews, and *Distribution of Shallow Marine Mollusca, Yucatan Peninsula, Mexico* by H.E. Vokes and E.H. Vokes. Following a persual of the reference volumes, several trips by the author were made to the Belize coast and outlying atolls to collect modern specimens. A variety of marine shells from shallow water and along the beaches were collected for a comparison collection. A taxonomic analysis was conducted on the debitage category first. Most of the specimens present in the debitage shell assemblage belonged to the class Gastropoda. Reference texts and the comparison collection were re-examined with a focus on this marine shell class. Shell size, shape, texture, and coloration of the Gastropoda class were examined in detail to gain familiarity with the species types present in the assemblage. Coloration is an important attribute in modern species identification. Caution must be taken when examining coloration on archaeological specimens as certain natural processes can change the color of the artifacts.

Norbert Stanchly of the Institute of Archaeology and Trent University also consulted with the author about the Blackman Eddy shell assemblage. The Institute of Archaeology granted permission in 2006 to export a small sample of marine shell artifacts to The University of Texas at Arlington for further analysis. Dr. Robert McMahon, a marine biologist at the university, graciously offered his expertise in helping to identify difficult fragments in the assemblage.

4.5.5 Contextual Analysis

The final phase of analysis was the most time-consuming. This phase involved examining the contextual information for the marine shell assemblage from Structure B1. Contextual information was gathered by examining daily field logs and notes, lot forms, maps, photographs, and field reports for Structure B1. Additionally, discussions with previous site field directors M. Kathryn Brown and C.J. Hartman were helpful toward understanding the complex stratigraphy encountered within this structure.

Initially, a list of provenience information available for each artifact was made and sorted by the year it was excavated. The type of matrix surrounding the artifact, and any architectural features and deposits associated with the artifacts were recorded. This information was evaluated to assign broad contextual designations to the assemblage. As discussed above, all shell artifacts were grouped into two contextual categories-special deposits or construction fill.

Following the identification of contextual designations, temporal associations were assigned to all shell specimens. These temporal designations were determined by the architectural phase with which the context was associated. The architectural sequence was dated relatively through ceramic analysis and with numerous radiocarbon dates within the stratigraphic sequence (Brown 2003; Garber et al 2004). The chronological designations used for the stratigraphic sequence of Structure B1 are presented in Table 4.2.

Table 4.1 Attributes Used in Analysis of the Blackman Eddy Marine Shell Assemblage

Description	VARIABLE	Notes
Catalog Number	SFN	
Structure	STR	
Operation	OP	
Lot Association	LOT	
Context	CONTX	
Temporal Association	TA	
Structure Association	SA	
Artifact Type	ARTYP	
Species	SPEC	
Relative Shell Size	RELSZE	
Shell Condition	SHCOND	
Interior Shell Surface	INTSUR	
Exterior Shell Surface	EXTSUR	
Length	LGNTH	Maximum recorded (mm)
Width	WDTH	Maximum recorded (mm)
Thickness	THK	Maximum recorded (mm)
	Worked Artifacts Only	
Artifact Diameter	ARTDIAM	Only if circular
Perforation Number	PERFNUM	
Perforation Type	PERFNUM	
Perforation Diameter	PERFDIAM	Maximum recorded (mm)
Edge Modification	EDGMOD	Degree of modification
Surface Decoration	SURFDEC	
Artifact Condition	ARTCOND	Complete, Broken, Unfinished
	Debitage Only	
Shell Part	SHELPRT	
Production Evidence	PRODEVD	Signs of manufacture

Table 4.2 Construction Phases and Chronological Associations for Structure B1

Structure Phase	Structure Type and Function	Period	Date
B1-1st	Monumental/Restricted	Late Classic	AD 600-900
B1-2nd	Monumental/Restricted	Early Classic	AD 300-600
B1-3rd (late phases)	Monumental/Restricted	Late Preclassic	350 BC-300 AD
B1-3rd (early phases)	Rectangular/Public	Late Middle Preclassic	600-350 BC
B1-4th	Rectangular/Public	Early Middle/Late Middle Preclassic Transition	650-350 BC
B1-5th	Rectangular/Public	Early Middle/Late Middle Preclassic Transition	650-350 BC
B1-6th	Rectangular/Public	Early Middle Preclassic	900-700 BC
B1-7th	Rectangular/Public	Early Middle Preclassic	900-700 BC
B1-8th	Apsidal/Domestic	Early Middle Preclassic	900-700 BC
B1-9th	Apsidal/Domestic	Terminal Early/Early Middle Preclassic Transition	1200/1100-900 BC
B1-10th	Apsidal/Domestic	Terminal Early/Early Middle Preclassic Transition	1200/1100-900 BC
B1-11th	Apsidal/Domestic	Terminal Early/Early Middle Preclassic Transition	1200/1100-900 BC
B1-12th	Apsidal/Domestic	Terminal Early/Early Middle Preclassic Transition	1200/1100-900 BC
*B1-13th	Circular/Public	Early Middle/Late Middle Preclassic Transition	650-350 BC

*Stratigraphically, this structure was encountered in the lowermost construction phases of Structure B1 and was originally thought to be the earliest (Garber, Brown, Awe et al. 2004:35). Recent investigations, however, indicate that this is a special function building related to Structures B1-5th (See Brown 2007).

CHAPTER 5

THE MARINE SHELL ASSEMBLAGE FROM STRUCTURE B1

Chapter 5 presents the results of the typological, taxonomic, and contextual analysis of the marine shell artifacts from Structure B1 at Blackman Eddy. This chapter is divided into three sections. The first section presents descriptions and frequencies of the formal artifact types recovered from Structure B1. The second section addresses the types of marine shell resources utilized at Blackman Eddy and focuses on the taxonomic variability identified within the assemblage. This is followed by a discussion of the contextual associations of the marine shell artifacts within Structure B1. Each section is followed by a discussion through time.

5.1 Blackman Eddy Marine Shell Typology

A total of 718 shell artifacts from Structure B1 were evaluated in this study. All marine shell artifacts were placed into one of two broad categories: 1) worked shell, and 2) debitage. As presented in Table 5.1, fragments of shell debitage represent 86.6 percent (n=622) of the assemblage recovered from Structure B1, while worked shell artifacts comprise the remaining 13.4 percent (n=96) of the assemblage. Artifacts belonging to the debitage category were separated according to shell part.

Table 5.1 Frequency of Shell Artifacts from Structure B1

	Frequency	Percent
Worked Shell	96	13.4
Debitage	622	86.6
Total	718	100

5.1.1 Worked Shell Artifact Category

The worked artifact category was divided into three types; beads, pendants, and adornos. Each type was further divided into subtypes based upon distinct characteristics. Presented below are metric data, specimens within each subtype, and relative species information when available.

5.1.1.1 Beads

Beads were the most common worked shell artifact type recovered from Structure B1. This artifact type comprises 76.0 percent (n=73) of the worked shell assemblage. Three bead subtypes were identified within the assemblage: 1) disk shaped, 2) irregular, and 3) unspecified (Table 5.2).

Table 5.2 Distribution of Bead Subtypes from Structure B1

Subtype	Frequency (n)	Percent (%)
Disk	22	30.1
Irregular	43	58.9
Unspecified	8	11.0
Total	73	100.0

Disk-shaped beads represent 30.1 percent (n=22) of the bead assemblage. These artifacts were more uniform in shape along the edges, however, they showed considerable variability in artifact diameter ranging from 6 mm to 43 mm (Figure 5.1). The variation in thickness for this bead subtype range from 1 mm to 6 mm. Disk beads had more modification along the bead edge than irregular beads, making species identification difficult. Analysis suggests that the selection of shell part used during manufacture of this subtype was restricted to gastropod body fragments.

Irregular beads are the most common bead subtype identified in the Blackman Eddy assemblage (Figure 5.2). Of the 73 beads recovered from Structure B1, more than half, 58.9 percent (n=43), were classified as irregular beads. The size and shape of the beads in this subtype varies greatly.

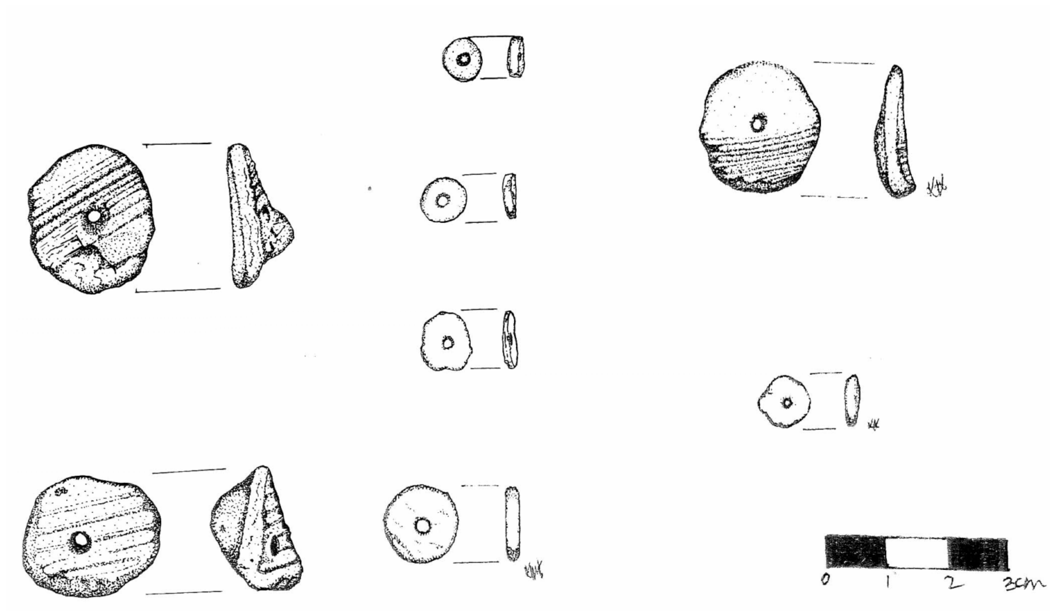


Figure 5.1 Disk Beads from Structure B1.

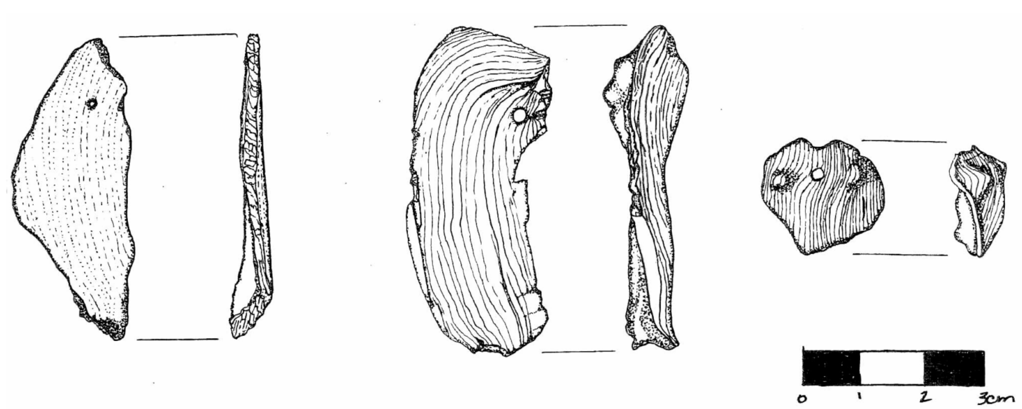


Figure 5.2 Unfinished Irregular Beads from Structure B1.

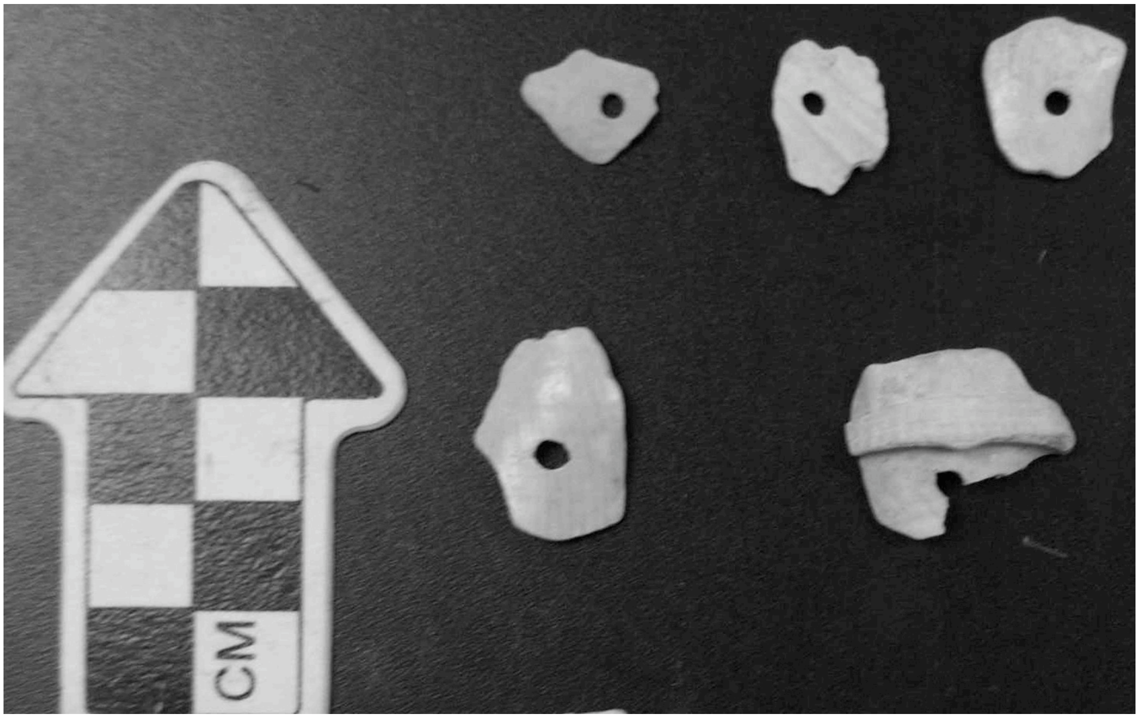


Figure 5.3 Irregular Beads from Structure B1.

Figure 5.2 and 5.3 present examples of the variability of this subtype recovered from Structure B1. The artifact diameter for irregular beads ranged from 7 mm to 57 mm. An examination of the lateral edges of this bead subtype show that 82 percent (n= 37) of irregular beads have smoothed margins, suggesting that these represent finished products. Thickness for this bead subtype range from, 1 mm to 11 mm. Irregular beads with a thickness on the low end of this range are consistent with the thickness recorded for *Strombus* sp. (cf. *puligis*). This demonstrates that little modification was made to the thickness of these artifacts. Irregular beads in the assemblage appear to be manufactured from gastropod fragments with *Strombus* spp. (cf. *S. puligis*) being the preferred species. Many parts of the gastropod were selected for irregular bead manufacture including the body, lip, shoulder, and spire shell portions.

Figure 5.4 Thick-Bodied Irregular Beads

Three large irregular beads recovered from Structure B1 were distinctly different in size and thickness from the other beads present in the assemblage (Figure 5.4). They had an average artifact diameter of 46 mm and thickness of 7 mm. They were manufactured from large, thick-bodied shells. The diagnostic characteristics necessary to give them a species designation were not present, however, size and thickness suggest they were manufactured from larger shell specimens such as *Pleuroploca gigantea,* mature *Strombus gigas, or Turbinella angulata.*

The remaining 11.0 percent (n=8) of the bead assemblage represent beads designated as subtype unspecified. This was due to artifact preservation or artifact availability. Several beads were poorly preserved or broken, which made subtype designation difficult. A small percentage of beads was unavailable for analysis. These were recorded and assigned a Small Find number, however, were either misplaced in the laboratory or were sent to the artifact storage facility at the Institute of Archaeology in Belmopan, Belize.

5.1.1.2 Pendants

The frequency of shell pendants identified within the shell assemblage was substantially lower than that for shell beads, comprising only 16.1 percent (n=16) of the total worked shell assemblage. Pendants show greater variation in both artifact subtype and species type than do the bead types. Pendant subtypes present in the assemblage include carved and cut, modified gastropod shell, modified pelecypod shell, and tinkler artifacts. Table 5.3 presents the distribution of pendant subtypes identified within Structure B1.

Two pendants of the carved and cut subtype were recovered from Structure B1. The first of these pendants was a well-crafted circular piece with a large opening in the center (Figure 5.5d). This artifact was broken vertically through the middle and suspension hole. Assuming symmetry, this artifact would have been circular with an incised groove all the way around the face of the pendant. The diameter of the portion recovered measured 32 mm with an average thickness of 6 mm. Evidence of extensive modification, including smoothing and

Table 5.3 Distribution of Pendant Subtypes from Structure B1

	Frequency(n)	Percent (%)
Carved and Cut	2	12.5
Gastropod	3	18.75
Pelecypod	1	6.25
Tinkler	10	62.5
Total	16	100

polishing, was present on all edges and surfaces of the artifact. Unfortunately, species identification was not possible due to the extensive modification of the artifact. The thickness of the artifact suggests that it was manufactured from a medium- to large-bodied marine gastropod.

The second cut and carved pendant analyzed was teardrop-shaped with highly modified and polished edges and faces (Figure 5.5b). One suspension hole was placed near the smaller end of the artifact. The length of the artifact measured 19 mm with a width near the base of 16 mm. The artifact tapered toward the top near the perforation. This pendant had an average thickness of 2 mm. The high degree of modification made species identification difficult; however, the thickness and curvature of the shell, coupled with the nacreous finish, suggested that it may have been manufactured from a marine pelecypod.

Three gastropod pendants in the assemblage represent the second pendant subtype recovered from Structure B1. One pendant was fashioned from a small *Melongena melongena* gastropod. This small specimen measured 46 mm in length and had an average thickness of 1 mm. This specimen had a punched perforation in the body of the gastropod near the apex. The edges of the perforation were sharp and irregularly shaped suggesting that they may have been damaged during the drilling process.

A second gastropod pendant identified in the shell assemblage was manufactured from a *Conus* sp. shell (Figure 5.5c). This pendant measured 66 mm in length with an average thickness of 2 mm and was modified in a similar fashion to pendants belonging to the tinkler pendant subtype. The spire of this gastropod was removed and the edges near the removal location were well smoothed. A single uniconical perforation was located along the shell base near the siphonal notch. Natural decoration described as tenting in the literature was present along the exterior surface.

The third gastropod pendant recovered from Structure B1 was manufactured from a *Strombus puligis* specimen. This pendant measured 63 mm in length with an average thickness of 3 mm. A single perforation was located at the base of the shell near the stromboid notch to accommodate vertical suspension. The perforation and the upper portion of the pendant were both broken. Analysis indicated that a disk bead had been removed from the body portion of the shell, opposite from the perforation. The hole created from the bead removal would not

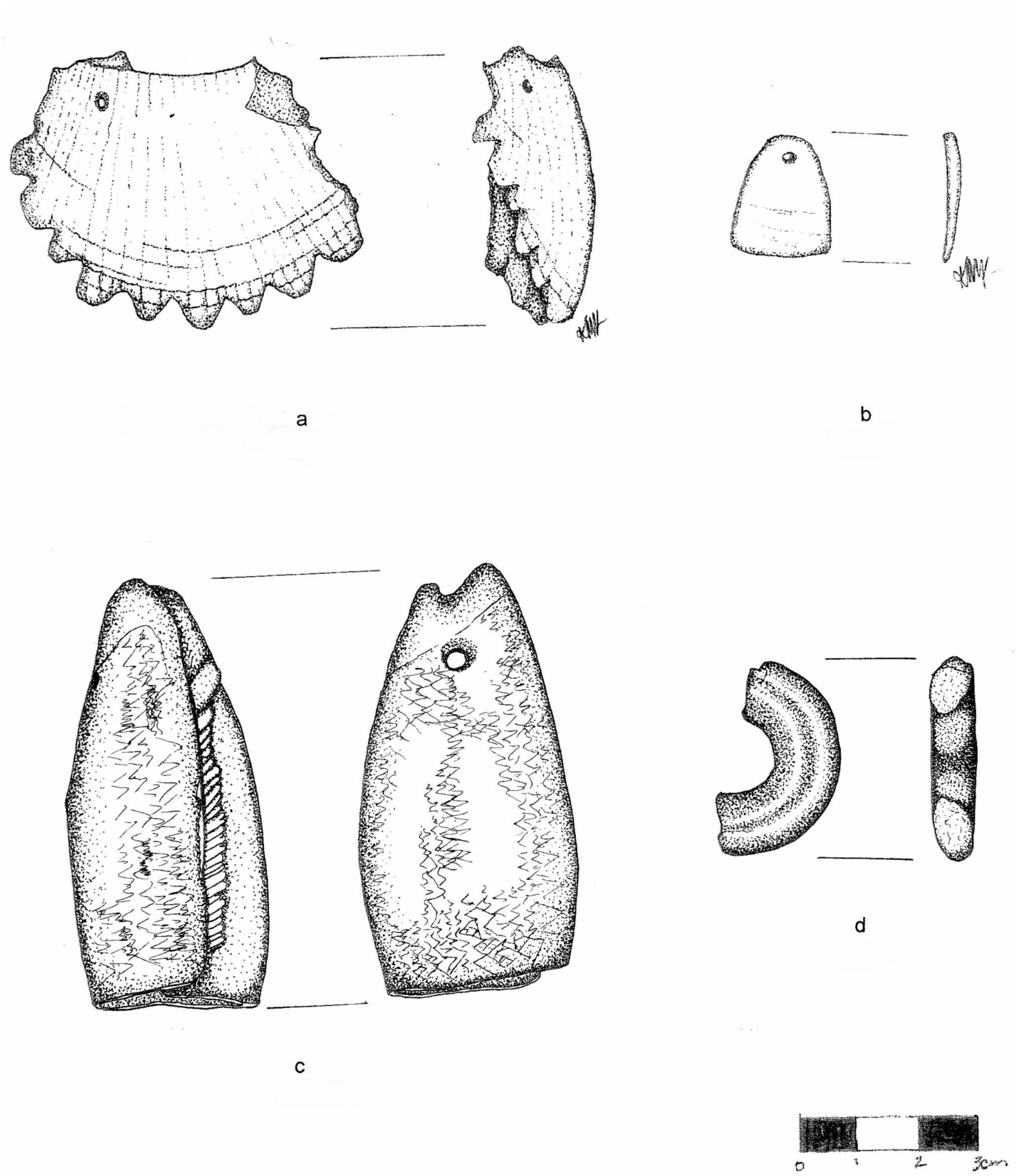


Figure 5.5 Pendant Subtypes from Structure B1: a) Pelecypod, b) Cut and Carved, c) Gastropod, and d) Cut and Carved.

have been visible when the pendant was suspended. A similar artifact was recovered from Structure B4 at the site of Cahal Pech (Awe personal, communication, 2006).

The third pendant subtype found was manufactured from a marine pelecypod (Figure 5.5a). This artifact was carved and incised along the edges; however, it retained much of the pelecypod shape and was therefore given a subtype designation of marine pelecypod pendant. A series of notches was cut into the anterior edge of the valve. Horizontal grooves also were etched onto the pendant's exterior surface. Some of the natural shell scalloping on the exterior surface was retained. A drill hole was present along one upper edge of the shell; however, the other side of this artifact was severely damaged and broken. Given the location of the perforation, and assuming symmetry, a second hole was likely present on the opposite side. This pendant was slightly greater in width than length measuring 61 mm by 47 mm. The average thickness of the artifact was 4 mm. Although much of the pelecypod shape was retained, species identification was difficult due to extensive modification and poor preservation.

The final pendant subtype identified at Blackman Eddy was the tinkler. These artifacts represent the most frequent pendant subtype recovered comprising 62.5 percent (n=10) of the total pendant assemblage (Figure 5.6). Specimens of this subtype ranged in size from 16 mm to 43 mm in length, and had an average thickness of 3 mm. All tinklers from Blackman Eddy were manufactured from *Oliva* spp. gastropods. At least one specimen retained enough morphological characteristics to identify it as being manufactured from an *Oliva reticluaris* gastropod. The tinkler assemblage consisted of four complete, three broken, and three unfinished pendants. All of the broken tinklers exhibited a manufacture failure at or near the perforation for suspension. Unfinished tinklers in the assemblage exhibited spire removal; however, they lacked perforations. One of the specimens appeared to have a partial drill hole near the lip.

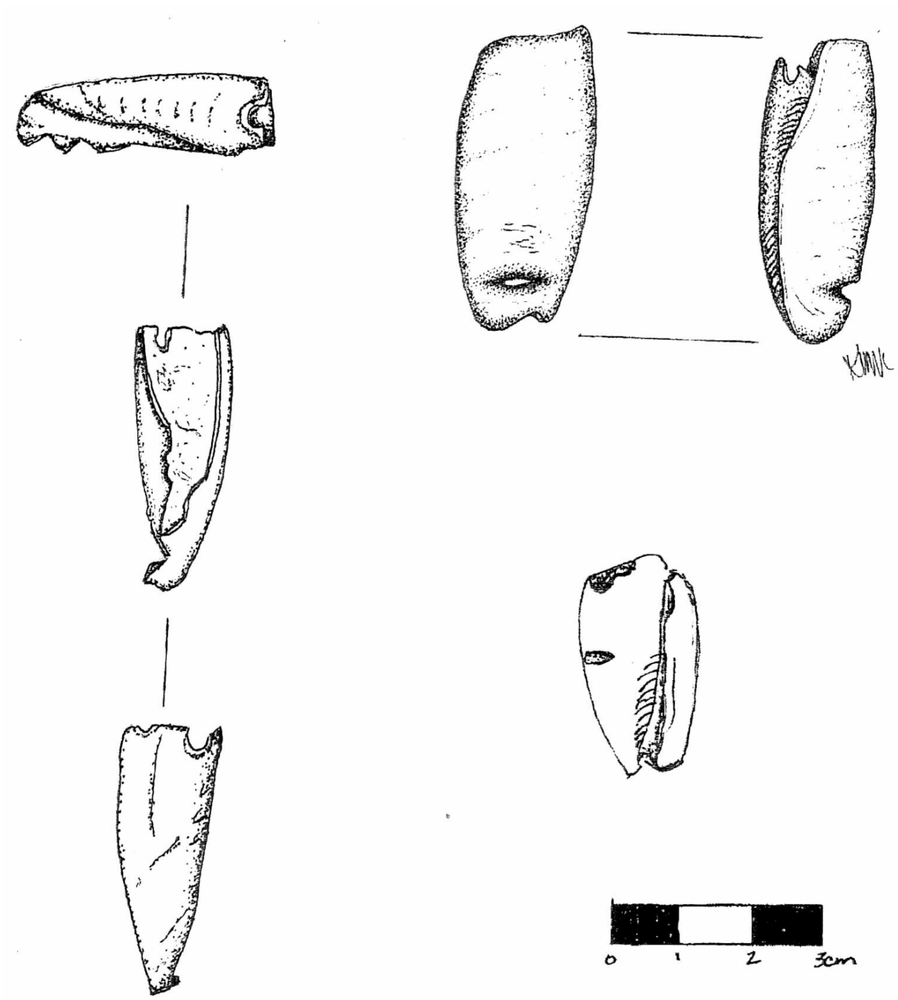


Figure 5.6 Tinkler Pendants from Structure B1.

5.1.1.3 Adornos

The third worked artifact at Blackman Eddy was represented by the adorno type. As mentioned in Chapter 4, this type represents a catch-all designation for cut shell artifacts lacking specific recognized functions (Taschek 1994:51). Because of this, there were several subtypes documented (Table 5.4). The subtypes found at Blackman Eddy include: 1) earflare, 2) inlay, 3) labret, 4) notched disk, and 5) rosette.

A carved earflare in the shape of a flower was identified in the assemblage. This artifact has six petals with an incised line through each petal, as well as a perforation through the center of the flower design (Figure 5.7b). The edges of the perforation opening, as well as the lateral edges, were highly modified and smoothed. This artifact was not available for examination by the author, but examination of photographs, drawings and analysis notes suggest that this earflare was made from a *Strombus* sp. gastropod.

Table 5.4 Distribution of Adorno Subtypes from Structure B1

	Frequency(n)	Percent (%)
Earflare	1	14.2
Inlay	2	28.7
Labret	1	14.2
Notched Disk	2	28.7
Rosette	1	14.2
Total	7	100.0

Two small oval inlays with large central perforations were identified from Blackman Eddy. The central perforations were much larger than those of the beads in the assemblage (Figure 5.7d). These objects were finely worked with a concavo-convex profile.. The concave surface had beveled edges near the perforation. These artifacts likely represent mosaic inlay pieces that had an additional object inlaid into them. The average diameter of these artifacts measured approximately 12 mm with a thickness of 1 mm. All morphological features necessary for species identification were removed.

One labret was present in the worked shell assemblage from Structure B1. This artifact consisted of a circular plug on the proximal end that was connected to a solid cylindrical shank

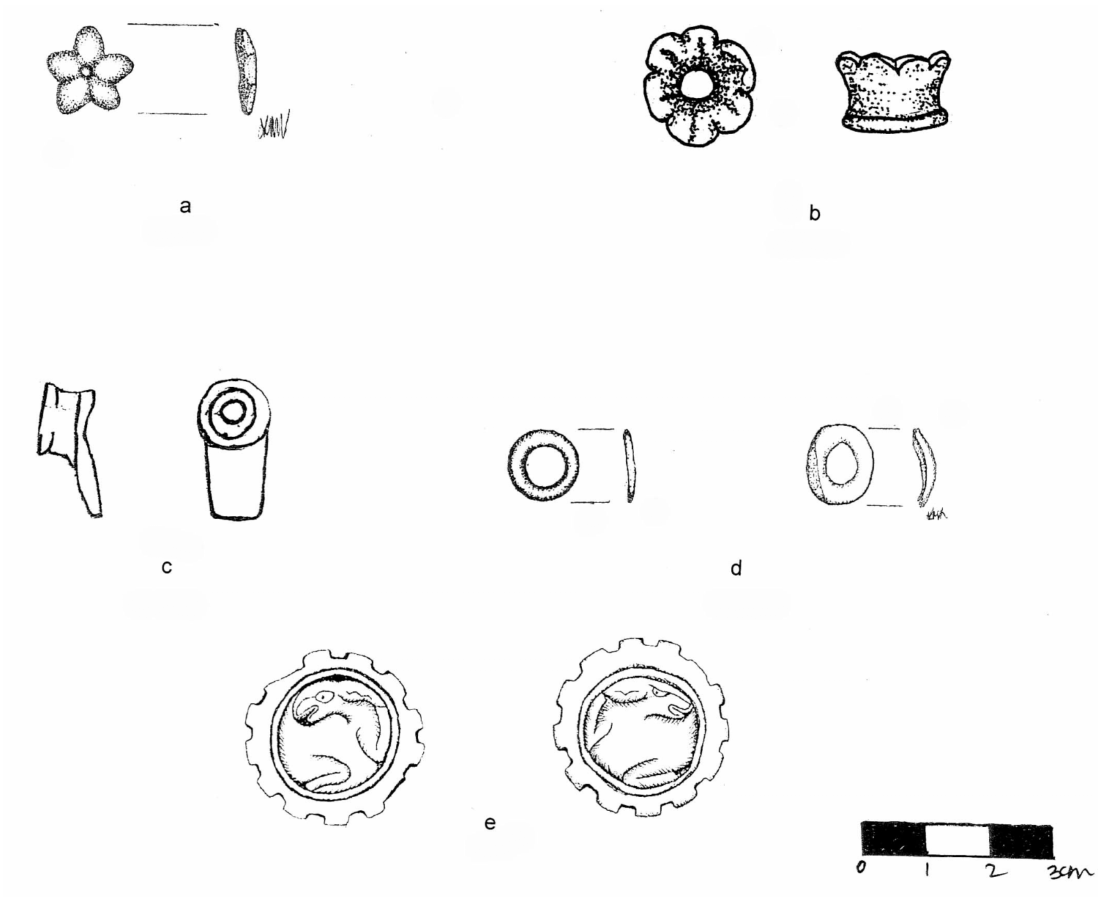


Figure 5.7 Adorno Subtypes from Structure B1: a) Rosette, b) Earflare, c) Labret, d) Inlay, and e) Notched Disk.

with a tapering toe (Figure 5.7c). The plug portion of the artifact had a central depression with an incised circle carved around it. The labret had a drill indentation placed on the top of the plug perpendicular to the larger depression. Both the depression and drilled indentation may have served as insets for inlay decorations. This artifact was not available for examination by the author, but prior documentation suggests that the artifact was manufactured from *Strombus* sp., quite possibly from the columella portion of the shell. A similar marine shell object was identified by Taschek (1994:49) at the site of Dzibilchaltún in the northern Maya Lowlands.

A paired set of carved notched shell disks were recovered from Structure B1 (Figure 5.7e). These artifacts were concavo-convex in profile and lacked any evidence of perforations.

Each disk measured approximately 44 mm in diameter and had 13 notches carved into the edges. The spacing of these notches was fairly uniform creating the appearance of a cogwheel design. In addition to edge modification, these objects had deer motifs incised on the interior natural shell surface. The convexity of the natural shell was incorporated into the artifact design. These artifacts are extensively modified and finely worked making species identification difficult to determine. Notched disks have been identified throughout the Maya Lowlands at the sites of Colha (Buttles 2002; Driess: 1982), and Cerros (Garber 1981). Although the form is similar at these other sites, there is considerable variability within this adorno subtype.

One rosette was recovered from Structure B1. This artifact had a central perforation and was concavo-convex when viewed in profile (Figure 5.7a). The lateral edges of this piece were carved into the shape of flower petals. The face of this artifact was reddish-orange in color and had incised grooves separating each of the petals. These grooves terminated at the edge of the central drilled perforation. Incised radial lines were carved on the exterior face, which created a flower-like design. Additionally, the perpendicular circumference of the artifact was notched at equal intervals. Rosettes showing similar characteristics have been noted elsewhere within the Maya Lowlands (Ferguson 1995; Taschek 1994:52; Willey et al. 1965). Extensive modification to the shell form made species identification difficult, however the bright red-orange color present on the exterior surface suggests that it was manufactured from a *Spondylus* spp. The general morphology of this artifact reflects that of a bead, but it differs in several ways. First, one of the faces of this artifact was decorated suggesting that it may have been meant to be displayed when worn. Secondly, unlike the bead types, the lateral edges of this artifact were modified. The central perforation present on the artifact may have been used to attach the rosette to a costume or clothing.

Table 5.5 presents the worked shell types through time. As shown in this table, beads were the only artifact type identified in the Terminal Early Preclassic and Early Middle Preclassic periods. Pendants appear in the assemblage by the transition between the Early

Middle Preclassic and Late Middle Preclassic, while adornos do not appear until the Early Classic and found in the highest frequencies during the Late Classic.

Table 5.5 Distribution of Worked Shell Types through Time

	Adornos	Beads	Pendants	Total
Late Classic	6	2	3	11
Early Classic	1	0	1	2
Late Preclassic	0	1	0	1
Late Middle Preclassic	0	0	1	1
Early Middle/Late Middle Preclassic	0	21	11	32
Early Middle Preclassic	0	44	0	44
Terminal Early/Early Middle Preclassic	0	2	0	2
Unspecified	0	3	0	3
Total	7	73	16	96

5.2.1 Marine Shell Debitage Category

The marine shell debitage assemblage was significantly larger than the worked shell assemblage with 622 specimens present. The shell debitage category was subdivided into categories according to shell part. More than 97 percent of the identifiable shell debitage assemblage consists of marine gastropod fragments, therefore most of the shell part designations reflect that of gastropods. The part designations include body whorl, columella, lip, shoulder, spire, and unspecified. Partial shells have been included in the shell debitage assemblage since many of these specimens exhibit signs of modification from production activities. Pelecypod and scaphopod fragments also were included in this category, but were not given specific shell part designations due the lack of diagnostic fragments and low sample size. The distribution of fragments identified in the marine shell debitage category is presented in Table 5.6.

Table 5.6 Distribution of Marine Shell Debitage by Shell Part

	Frequency(n)	Percent (%)
Body	148	23.8
Columella	246	39.5
Outer Lip	82	13.2
Shoulder	66	10.6
Spire	48	7.7
Partial Gastropod	6	1.0
Pelecypod Fragment	3	.5
Scaphopod Fragment	1	.2
Unspecified	22	3.5
Total	622	100.0

Columella fragments were the most commonly recovered debitage fragments, representing 39.5 percent (n=246) of the debitage assemblage. Body fragments represented 23.8 percent (n=148) of the assemblage. Smaller percentages of outer lip, shoulder, and spire fragments also were present in the assemblage. The fact that all of the shell parts were present in the assemblage suggests that gastropods were being imported into the site whole and then worked into formal artifacts. One percent (n=6) of the debitage assemblage was represented by partial gastropods with manufacturing evidence present. These partial specimens aided in species identification of many of the other fragmentary pieces in the assemblage. Three pelecypod fragments and one scaphopod fragment were identified from Structure B1. For the remaining 3.5 percent (n=22) of the fragments in the debitage assemblage, shell part was not identified. Figure 5.8 presents examples of marine shell debitage recovered from Structure B1.

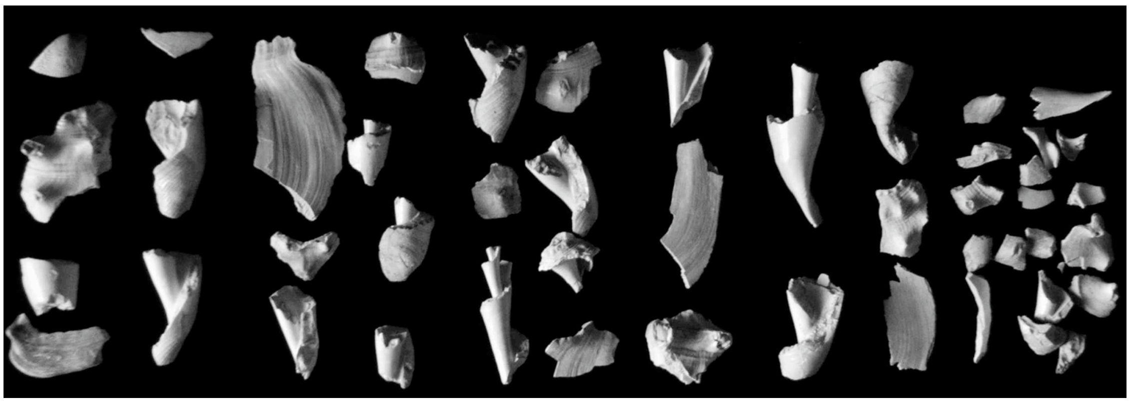


Figure 5.8 Debitage Fragments from Structure B1.

Table 5.7 Distribution of Marine Shell Artifacts from Structure B1 through Time

	Worked Shell		Debitage		Total	
	n	%	n	%	n	%
Late Classic	11	11.5	2	.3	13	1.8
Early Classic	2	2.1	8	1.3	10	1.4
Late Preclassic	1	1.0	2	.3	3	.4
Late Middle Preclassic	1	1.0	3	.5	4	.6
Early Middle/Late Middle Preclassic	32	33.4	165	26.5	197	27.4
Early Middle Preclassic	44	45.8	401	64.5	445	62.0
Terminal Early/ Early Middle Preclassic	2	2.1	40	6.4	42	5.8
Unspecified	3	3.1	1	.2	4	.6
Total	96	100	622	100	718	100

Table 5.7 presents the frequencies of shell artifacts by shell category and temporal designation. As presented in the table, both worked marine shell and debitage were recovered in the greatest frequencies during the Early Middle Preclassic, accounting for 62 percent (n=445) of the total assemblage. The frequencies of marine shell decline during the Early

Middle/Late Middle Preclassic transition representing 27.4 percent (n=197). By the Late Middle Preclassic, the frequencies of both worked shell and shell debitage declines dramatically. This low frequency remains consistent through to the Late Classic. A number of factors may be contributing to the dramatic decrease in the presence of marine shell though time, and will be discussed in Chapter 6.

Table 5.8 shows the frequencies of worked shell to debitage through time. In the transition between the Terminal Early Preclassic and Early Middle Preclassic and into the Early Middle Preclassic, shell debitage was recovered in the highest percentages at 95.2 percent and 90.1 percent respectively. Worked shell increases to 16.2 percent during the transition between the Early Middle Preclassic and Late Middle Preclassic. By the Late Classic, worked shell represents 84.6 of the recovered assemblage. A discussion of the changes in the assemblage from Structure B1 will be addressed in Chapter 6.

Table 5.8 Frequency of Worked Shell to Debitage through Time

	Worked Shell		Debitage		Total Assemblage	
	n	%	n	%	n	%
Late Classic	11	84.6	2	15.4	13	100.0
Early Classic	2	20.0	8	80.0	10	100.0
Late Preclassic	1	33.3	2	66.7	3	100.0
Late Middle Preclassic	1	25.0	3	75.0	4	100.0
Early Middle/Late Middle Preclassic	32	16.2	165	83.8	197	100.0
Early Middle Preclassic	44	9.9	401	90.1	445	100.0
Terminal Early/ Early Middle Preclassic	2	4.8	40	95.2	42	100.0
Unspecified	3	75.0	1	25.0	4	100.0

5.2 Marine Shell Taxa Identified at Blackman Eddy

Taxonomic analysis of the marine shell artifacts from Structure B1 revealed a variety of taxa were utilized at Blackman Eddy. Evidence suggests that at least nine genera and seven species were present in the assemblage. Table 5.8 presents a list of the taxa identified from Structure B1 at Blackman Eddy.

Table 5.9 Marine Shell Taxa Represented at Blackman Eddy

Busycon spiratum
Conus sp.
Dentalium sp.
Melongena melongena
Oliva sp.
Oliva reticularis
Pleuroploca gigantea
Spondylus sp.
Strombus sp.
Strombus gigas
Strombus puligis
Turbinella angulata
Unidentified marine
Unidentified gastropod
Unidentified pelecypod

Taxonomic analysis of the marine shell artifacts recovered from Structure B1 revealed that 87.1 percent of the assemblage could be placed in the genus *Strombus*. Several of the fragments in the assemblage provided good morphological characteristics necessary to make identification possible to the species level. Of the specimens present in the assemblage, 16.3 percent could be identified as *Strombus puligis* (n=26) from worked shell artifacts and (n=91) from shell debitage. Specimens of *Strombus gigas* were present in much smaller frequencies (n=5) representing only 0.7 percent of the assemblage. One immature or juvenile example of *S. gigas* was represented in the assemblage by a spire fragment. As noted in Chapter 4, adult species of S. *gigas* and *S. puligis* have considerable size differences; however, immature species of *S. gigas* are similar in size to the *S. puligis* species. Measurements from diagnostic pieces suggest that most of the specimens represent small to medium gastropods. All of the lip fragments in the assemblage, with an actual outer lip rim present, have a thickened edge indicating they are mature specimens. This characteristic is consistent with adult specimens of *S. puligis.* Adult *S. gigas* specimens have a broad outflaring lip. Analysis of the entire assemblage did not identify any specimens with this characteristic. Immature *S. gigas* do have a thin, sharp lip edge. Many of the lip fragments that were missing the lip rim did indeed have a sharp, thin edge. However, this characteristic could indicate immature *S. gigas* and/or could be the result of either manufacturing activities or preservation issues. As a result, the taxonomic designation given to most of these lips fragments was *Strombus* spp., however it was noted that they were manufactured from a small- to medium-sized shell.

Table 5.10 Distribution of Marine Shell Artifacts by Taxonomic Classification

	Worked	Debitage	Total Percent (%)
Busycon spiratum	0	1	.1
Conus sp.	1	0	.1
Dentalium sp.	0	1	.1
Melongena melongena	1	1	.3
Oliva sp.	9	0	1.3
Oliva reticularis	1	0	.1
Pleuroploca gigantea	1	5	.8
Spondylus sp.	1	0	.1
Strombus sp.	22	479	69.8
Strombus gigas	1	4	.7
Strombus puligis	27	91	16.5
Turbinella angulata	0	4	.6
Unidentified Gastropod	18	19	5.2
Unidentified Pelecypod	4	4	1.1
Unidentified Marine	10	13	3.2
Total	96	622	100.0

Table 5.10 presents the percentages of marine shell taxa identified at Blackman Eddy. As previously discussed, 87 percent (n=625) of the assemblage comprise of *Strombus* spp. gastropods. The remaining varieties of identifiable taxa make up only 3.5 percent (n=25) of the assemblage. Many of these taxa were represented by only one specimen. Due to extensive modification and preservation issues, species identification could not be determined. For 9.5 percent of the shell assemblage these specimens were designated as unidentified marine gastropod (n=37), unidentified marine pelecypod (n=8), or unidentified marine (n=23).

All of the present taxa, with two notable exceptions, were recovered from shallow water to intertidal habitats off the coast of Belize. *Spondylus* spp. and *Dentalium* spp. were the only species in the assemblage found in much deeper waters of the Atlantic Ocean. This is important to note as deeper species require a more difficult procurement strategy than do shallow water species. However, as Hohmann (2002) suggests, the low numbers of these taxa may be indicative of specimens being recovered opportunistically from the shoreline rather than retrieved via diving.

As seen in Table 5.11, like the earliest period, the most commonly identified specimens represented in the Early Middle Preclassic assemblage was *Strombus* spp. with a smaller percentage of *Strombus puligis* being identified. It is important note that while the bulk of the assemblage was designated as *Strombus* spp., the majority of the specimens appear to be from gastropods closely resembling *Strombus puligis* or immature *Strombus* gigas.

The greatest amount of species variation for any one period was identified during the transition between the Early Middle Preclassic and Late Middle Preclassic, however *Strombus* spp. was still identified in the highest frequencies. *Oliva* spp. also appeared in the assemblage at this time. By the Late Middle Preclassic to the Late Classic period, worked shell artifacts recovered were finely worked eliminating characteristics needed for identification and making the study of species variation through time difficult. Unidentified marine gastropod and pelecypod represent the highest frequencies of species identified during these periods, followed by *Strombus* spp. *Conus* spp. and *Spondylus* spp. appear in the assemblage for the first time in very low frequencies.

Table 5.11 Distribution of Species by through Time

	Busycon spiratum	*Conus* sp.	*Dentalium* sp.	*Melongena melongena*	*Oliva* sp.	*Oliva reticularis*	*Pleuroploca gigantea*	*Spondylus* sp.	*Strombus* sp.	*Strombus gigas*	*Strombus puligis*	*Turbinella angulata*	Unidentified Gastropod	Unidentified Pelecypod	Unidentified Marine	Total
Late Classic	0	1	0	0	2	0	0	1	2	1	0	0	3	1	2	13
Early Classic	0	0	0	0	0	0	1	0	3	2	1	0	2	0	1	10
Late Preclassic	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	3
Late Middle Preclassic	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	4
Early Middle/Late Middle Preclassic	0	0	0	1	7	1	2	0	124	1	33	2	19	2	5	197
Early Middle Preclassic	0	0	0	0	0	0	2	0	354	2	64	1	12	4	6	445
Terminal Early/Early Middle Preclassic	1	0	1	1	0	0	1	0	14	0	20	0	0	0	4	42
Unspecified	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	4
Total	1	1	1	2	9	1	6	1	501	5	118	4	37	8	23	718

5.3 Contextual Designations from Structure B1

This section presents the results from the contextual analysis for the marine shell artifacts recovered from Structure B1. As discussed in Chapter 4, two broad contextual types were used to examine the changes in marine shell use through time. The two categories created were: 1) special deposits, and 2) construction fill. As previously discussed, special deposits represent burials, caches, problematical deposits and ritual deposits. Construction fill represents all building materials from all architectural phases within Structure B1. Table 5.9 presents the frequencies of marine shell artifacts recovered from each of these context types.

Table 5.12 Distribution of Marine Shell Artifacts by Context

	Worked Shell(n)	Shell Debitage(n)	Total	Percent (%)
Special Deposits	29	117	146	20.3
Construction Fill	64	504	568	79.1
Unknown	3	1	4	0.6
Total	96	622	718	100.0

As Table 5.12 shows, 20.3 percent (n=146) of the marine shell assemblage from Structure B1 was identified in special deposits while 79.1 percent (n=568) of the assemblage recovered was identified in construction fill. A contextual designation was not assigned to 0.6 percent (n=4) of the shell assemblage due to provenience uncertainties.

Table 5.13 presents the distribution of shell debitage in special deposits and construction fill. The inclusion of shell debitage in special deposits was concentrated to the Middle Preclassic, with the highest frequencies found in the Early Middle Preclassic/ Late Middle Preclassic transition. By the Late Middle Preclassic, a dramatic decrease in the use of shell debitage in special deposits was identified at the site.

Table 5.13 Distribution of Shell Debitage by Context

	Late Classic	Early Classic	Late Preclassic	Late Middle Preclassic	Early Middle/Late Middle Preclassic Transition	Early Middle Preclassic	Terminal Early /Early Middle Preclassic Transition	Total
Special Deposits	0	1	0	1	79	20	16	117
Construction Fill	2	7	2	1	88	380	24	504
Unknown	0	0	0	0	0	1	0	1
Total	2	8	2	2	167	401	40	622

The largest frequencies of shell debitage in construction fill come from the Early Middle Preclassic. By the transition between the Early Middle Preclassic and Late Middle Preclassic, frequencies of shell debitage in special deposits and construction have a near even distribution. Shell debitage identified in construction fill contexts dramatically declines by the Late Middle Preclassic to Late Classic and is only represented by 12 pieces for those combined periods.

Table 5.14 Distribution of Worked Shell by Context

	Late Classic	Early Classic	Late Preclassic	Late Middle Preclassic	Early Middle/Late Middle Preclassic Transition	Early Middle Preclassic	Terminal Early /Early Middle Preclassic Transition	Unspecified	Total
Special Deposits	8	1	1	0	16	2	0	0	28
Construction Fill	5	0	0	1	15	42	2	3	68
Total	13	1	1	1	31	44	2	3	96

The highest frequencies of worked shell artifacts, represented by beads, come from Early Middle Preclassic construction fill contexts (Table 5.14). Worked shell artifacts within special deposits and construction fill in the transition between the Early Middle Preclassic and Late Middle Preclassic have a similar distribution to the debitage category. A dramatic decline in worked shell artifacts is seen by the Late Middle Preclassic to the Late Classic period. Complete pendants and adornos represent the worked shell artifact type in special deposits for these later periods, while beads and broken pendants were only recovered from construction fill contexts.

CHAPTER 6

A DIACHRONIC DISCUSSION OF MARINE SHELL USE AT BLACKMAN EDDY

The main goal of this thesis was to examine the use of marine shell through time by the ancient inhabitants of Blackman Eddy. This goal was accomplished through a detailed analysis of the marine shell assemblage that included a typological, taxonomic, and contextual analysis. This chapter presents a diachronic discussion of marine shell use at Blackman Eddy in light of these analyses. When the data set is examined diachronically, several broad patterns emerge that reflect both continuity and discontinuity in marine shell use at the site.

The earliest occupation at Blackman Eddy has been dated to the transition between the terminal Early Preclassic and Early Middle Preclassic (Garber et al. 2004a). The earliest buildings found within the Structure B1 sequence (Structures B1-8th to B1-12th) were thought to be the remains of domestic dwellings (Brown 2003:100; Brown and Garber 2005:40). These structures appear to have been razed or partially destroyed in antiquity and were identified by the remains of posthole patterns carved into bedrock. There was very little intact fill associated with these early domestic dwellings. Despite this, some marine shell was found associated with these buildings. The shell artifacts included finished beads, unfinished beads, and debitage. One special deposit, a dedicatory cache, contained 12 pieces of debitage and a chocolate pot vessel. A second special deposit containing several pieces of carved greenstone, ceramic figurine fragments, a uniface, hammerstones, chert flakes, a quartz crystal, incised ceramic sherds, freshwater shells, carbon, and four fragments of marine shell debitage also was encountered. These were the earliest offerings found at the site and it is interesting that marine shell debitage was intentionally placed within them. This pattern of using marine shell debitage as well as worked marine shell in special deposits continues throughout the Early Middle Preclassic and Late Middle Preclassic as well. This indicates that the use of shell as raw material was an important component in this offering.

It appears that the early occupants of the site were involved in marine shell production of some nature. The combination of finished and unfinished beads in association with marine shell debitage and worn chert drills provide evidence that early inhabitants were producing shell beads rather than just importing them into the site at this early time period (Cochran 2005). Although the majority of marine shell beads, debitage and chert drills (Yacubic 2006) were recovered from the two public buildings (Structures B1-6th and B1-7th) overlaying these early domestic structures, it appears that these artifacts were scooped up from nearby middens associated with the early domestic dwellings and dumped into the buildings as part of the construction fill. The construction fill from these early public structures consisted mainly of a wet-laid midden-like fill with pockets of dry-laid fill used to buildup the core of these structures. Unlike the dry-laid fill, the wet-laid fill consisted of an artifact-rich matrix consistent with the matrix associated with the domestic structures. Although a production locale was not directly identified, the high percentage of marine shell beads, debitage, and chert drills found within this fill most likely reflects activities of production associated with the earlier domestic structures. Recent work at the sites of Pacbitun and Cahal Pech revealed that the manufacture of marine shell artifacts during the Middle Preclassic was most likely organized at the household or cottage-level industry (Hohmann 2002). Evidence from these sites suggests that marine shell beads were being produced locally. The marine shell assemblages from these sites are quite similar to the early assemblage from Blackman Eddy, suggesting that household production was common in the Belize River Valley during the Middle Preclassic.

The most commonly identified specimens in the Early Middle Preclassic assemblage represented *Strombus* spp., as well. It is important to note that while the bulk of the assemblage was designated as *Strombus* spp., the majority of the specimens appear to closely resemble *Strombus puligis* or immature *Strombus gigas* gastropods. The abundance of these types of shells in the Blackman Eddy assemblage suggests that these specimens may have been preferred since their small size makes them easier to work and transport. Evidence of bead manufacture from large, thick-walled shells, like *Pleuroploca gigantea* adult *Strombus gigas, Turbinella* angulata, was identified in very low frequencies at the site. As discussed in Chapter Four, these shells can grow large and thick, making them bulky and difficult to work. Again, this seems to suggest that while these thick-bodied shells were utilized, they were not preferred. During the Middle Preclassic, the use of small to medium thin-walled *Strombus* spp. gastropods during shell artifact manufacture seems to be a common pattern at several Belize sites, including Cahal Pech (Hohmann 2002), Chan Noohol (Keller 2008) Colha (Driess 1994), Cuello (Hammond 1991) K'axob (Isaza Aizpurua 1997:66) and Pacbitun (Hohmann 2002:116).

The greatest amount of species variation for any one period was identified during the transition between Early Middle Preclassic and Late Middle Preclassic, although the most common species was represented by *Strombus* spp. Several of these new species were being used to manufacture pendants. However, aside from three unfinished pendants recovered in the assemblage it was difficult to determine if pendants and adornos were being produced locally at the site. The majority of the pendants in the assemblage had little modification to their original shell form; therefore, a minimal amount of production evidence would have been apparent, making it difficult to determine if they were modified before or after the shells entered the site.

By the Late Middle Preclassic to the Late Classic, there was a clear reduction in the volume of marine shell debitage recovered from the site. This reduction in debitage coupled with the appearance of more extensively worked artifacts makes it more difficult to examine the types of species being utilized at this time. It does appear, however, that worked artifacts were no longer restricted to *Strombus* spp.

The use of *Spondylus* spp. does not appear in the assemblage at Blackman Eddy until the Late Classic, and was only represented by one specimen. As Freidel et al. (2002: 44) suggest, *Spondylus* shell may have been a symbol of power and prestige used by early kings in the Maya Lowlands. Whole and worked *Spondylus* shells have been identified in elite burial contexts and displayed in Classic period iconography. This shell species has been found at several sites in the Maya Lowlands as early as the Late Preclassic. In the Classic period, large quantities of *Spondylus* spp. identified in elite contexts suggest that this species was readily accessible by the elite at those sites. As addressed in Chapter Four, Moholy-Nagy identified a large special deposit of *Spondylus* sp, debitage during the Early Classic at Tikal. She suggested that this deposit demonstrated elite control over production and use of *Spondylus* material since special deposition of the debitage kept the raw material to limited distribution. If this is the case, then smaller Classic period sites, like Blackman Eddy, with less ability to control the acquisition and distribution of highly prized goods, like *Spondylus,* may have not been able to acquire this highly favored commodity, thus reflecting its limited distribution in the assemblage.

Marine shell in both the worked and debitage forms appears to have some symbolic importance during the Middle Preclassic at Blackman Eddy. As discussed above, both worked (shell beads) and debitage were placed in special deposits during the Early Middle Preclassic and Late Middle Preclassic periods. High densities of shell debitage were found in special deposits that were interpreted to be the remains of communal feasting events. It appears that marine shell, in any form, was an important component within communal rituals and may have symbolically represented water (Cochran 2008). Objects of marine origin were oftentimes placed in offerings dating to the Classic period, as a cosmological reference to the primordial sea (Freidel et al. 1993).

Keller (2008) has also identified the presence of worked marine shell and shell debitage in caches and burials at Chan Noohol, dating to the Middle, Late, and Terminal Preclassic. She suggests that the type of shell items recovered from these special deposits at Chan Noohol may represent “the construction and negotiation of a shared identity, rather than the manipulation of personal identities” (Keller 2008). The worked shell and shell debitage identified within communal ritual feasting events at Blackman Eddy during the Middle Preclassic may represent a similar example of community identity.

By the Late Middle Preclassic to the Late Classic virtually all evidence of marine shell bead production has disappeared in construction fill contexts. Marine shell beads were the predominant worked type during the Middle Preclassic period; however, they were extremely rare in the later periods. In fact, they all but drop out of the record by the Late Middle Preclassic period and are replaced by pendants and adornos. This may reflect a shift in preference of worked shell objects by the occupants of the site, or equally plausibly, bead production was no longer occurring anywhere near the later B1 structures. During the Late Preclassic time period (and into the Classic) the site of Blackman Eddy had transformed tremendously with the addition of monumental architecture and large plazas. The only domestic structures (elite residences) within the site core at this time were located quite a distance away in Plaza A and excavations did not uncover any evidence of shell production. It is also important to note that the material used for construction fill for the later buildings was mainly a dry-laid rubble fill that did not contain much cultural material. Any midden material added to this fill would most likely have been gathered close by and reflected the activities of the buildings. Therefore, the lower densities of marine shell beads and debitage might not reflect a shift in use patterns, but rather a sampling issue. Finally, it is possible that the reduction in the presence of shell beads may be attributed to changes in the acquisition of this long-distance trade item. At Pacbitun, substantially higher volumes of marine shell beads were recovered from Late Middle Preclassic deposits than in the Early Middle Preclassic (Hohmann 2002:188). It appears that production intensification may have been occurring at this site. It could be that by the Late Middle Preclassic, certain sites may have had differential access to marine shell goods explaining the reduction of this material at other sites, like Blackman Eddy. However, further research of Middle Preclassic shell artifact production locales in the region is needed to better address this possibility.

The discontinuity of worked shell types through time is interesting. Pendants do not appear in the Structure B1 assemblage until the transition between the Early Middle Preclassic and Late Middle Preclassic. Their highest frequencies were during this transition period; however, they were found in later periods as well. Tinklers were the most common pendants identified at the site. Iconographic images on carved monuments from the Classic period display tinklers attached to belts and loincloths as important elements of ritual regalia (Jones and Swatterwaithe 1982; Spinden 1957). It is possible that these artifacts may have served a similar function. The remaining pendants in the assemblage consist of two cut and carved pendants, three gastropod pendants, and a pelecypod pendant. As Taschek (1994) mentions, pendants are differentiated from beads by their size and suspension type and can be strung either singularly or in a series. Given the size of the pendants recovered from Structure B1, it is possible that these artifacts represented the central elements when strung either around the neck or elsewhere. These larger elements would have been more prominently displayed than beads and could have played an important role as status symbols for emerging elites to set themselves apart from others within the community.

At K'axob, Izasa Aizupura and McAnany (1999) note a shift from the use of beads to more elaborate shell artifacts (including pendants) in Late Preclassic burials. They suggest that in Middle Preclassic burials, it was the quantity of shell beads as grave offerings that "indicate the varieties of identities of varying status that existed" (Izasa Aizupura and McAnany 1999:125). By the Late Preclassic, however, more elaborate artifacts such as pendants and tinklers replaced shell beads to "diacritically mark positions of status and authority" (Isaza Aizupura and McAnany 1999:125). It is possible that the shift seen from beads to pendants at Blackman Eddy, though represented earlier than at K'axob, may represent a similar scenario.

These data coupled with the findings from Blackman Eddy may demonstrate that the low volumes of more elaborately worked shell compared to shell beads suggests that their procurement, use, and circulation might have not been available to all members in the community.

An interesting pattern emerges when the context of pendants and adornos is examined. Whole pendants were predominately found in special deposits, while broken or unfinished pendants were found primarily in construction fill context. Marine shell adornos, first appearing in the Early Classic with highest frequencies in the Late Classic, were restricted to special deposits. All adornos in the assemblage represent whole artifacts. This artifact type represented the smallest sample recovered, however; they have the greatest variation with respect to artifact subtype. These artifacts have unique, elaborate designs suggesting that considerable time, effort and skill was placed into the creation of these objects. Like pendants, this suggests these artifacts may have been regarded as symbols of power and authority. However, the elaborate characteristics and small sample size of adornos suggest they may have been more powerful symbols of authority or rank than pendants. Adornos were never found together with pendants or beads in Classic period deposits at Blackman Eddy. This may suggest that the acquisition and use of these items may have been restricted to the most elite members of the community.

By the Late Preclassic, there was a change in ritual behavior at the site (Brown 2003). Communal ritual deposits, associated with public structures, are replaced by smaller, discrete deposits placed within pyramidal structures. Unlike in the Middle Preclassic, the discrete nature and seclusion of these special deposits in the later periods suggest that the whole community probably did not participate in these events. The quantities and types of shell artifacts in these deposits reflect this change. Only pendants or adornos, represented by one or two pieces, were being placed in these deposits. This suggests that quality, rather than quantity, may have played an important role. As I mention earlier, this also suggests that more elaborate artifacts might have been linked to certain high-status individuals rather than the community as a whole. Marine shell as a raw material is still important, but artifact form plays a much larger role in ritual activity.

The goal of this study was to evaluate marine shell use at the site of Blackman Eddy through a diachronic perspective. The long cultural history of Structure B1, coupled with the presence of marine shell artifacts associated with all construction phases, provided an excellent opportunity to examine continuity and discontinuity within the shell assemblage over time. The use of typological and taxonomic analyses aided in evaluating shell types in the assemblage and species utilization at the site. A contextual analysis provided important information of both use and deposition of the shell artifacts. Worked shell and shell debitage were examined in this study. Examining these categories together helped to identify several interesting patterns, including evidence for Middle Preclassic shell artifact production, the importance of marine shell, in either finished and/or raw form, in early ritual activity at the site, and changes in artifact types through time. These findings have helped to better our understanding of the use and deposition of marine shell artifacts at Blackman Eddy and can be used as a reference to guide future diachronic shell studies in the Maya Lowlands.

APPENDIX A

ATTRIBUTE CODES FOR THE MARINE SHELL ASSEMBLAGE AT BLACKMAN EDDY

A. CATALOG NUMBER
 Catalog #, 1 to 2000
B. YEAR
  1991-2003
C. STRUCTURE
  B1- Plaza B, Structure 1
D. OPERATION
  Varies, number followed by sub-operation letter
    Example: Operation 15n
E. LOT ASSOCIATION
 Numbered, varies 1-300
F. TEMPORAL ASSOCIATION
 01 TEP/EMP-Terminal Early Preclassic/Early Middle Preclassic transition
  02 EMP- Early Middle Preclassic
  03 EMP/LMP-Early Middle Preclassic/Late Middle Preclassic transition
  04 LMP- Late Middle Preclassic
  05 LP- Late Preclassic
  06 EC- Early Classic
  07 LC- Late Classic
  08 Unspecified
G. CONTEXT
 01 Special Deposit
  01Burial
  02Cache
  03Ritual Deposit
  04Problematic Deposit
 02 Construction Fill
 03 Unspecified
H. ARTIFACT TYPE
 01Worked Shell
  01Bead
   01 Disk.
   02 Irregular
   03 Unspecified
  02 Pendant
   01 Gastropod
   02 Pelecypod
   03 Carved/Incised
   04 Tinkler
  03 Adorno
   01Earflare
   02 Inlay
   03 Labret
   04 Notched Disk
   05 Rosette
  02 Debitage
   01 Outer lip.
   02 Apex fragment.
   03 Spire fragment.

04 Columella fragment.
05 Body whorl
06 Shoulder
07 Partial shell.
08 Pelecypod fragment
09 Scaphopod fragment
10 Unidentified

I. SPECIES
01 Unidentified Marine
02 Unidentified gastropod
03 Unidentified pelecypod
04 *Strombus* gigas
05 *Strombus* puligis
06 *Strombus* sp.
07 *Turbinella angulata*
08 *Pleuroploca gigantea*
09 *Melongena melongena*
10 *Oliva* sp.
11 *Oliva reticularis*
12 *Spondylus* sp
13 *Buyscon* sp.
14 *Dentalium* sp.

J. LENGTH
01 Maximum length: mm

K. WIDTH
01 Maximum width: mm

L. THICKNESS
01 Maximum thickness: mm

M. PERFORATION NUMBER
1
2
3
4

N. PERFORATION TYPE
01 Uniconical
02 Biconical
03 Punched

M. PERFORATION DIAMETER
01Minimum/Maximum: mm

N. RELATIVE SHELL SIZE
01 Small
02 Medium
03 Large
04 Not determined

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BIOGRAPHICAL INFORMATION

Jennifer L Cochran earned a B.A from Texas State University in anthropology with a minor biology in 2001. Her field and laboratory experience are varied, consisting of work in both Texas and Mesoamerica. She also has extensive experience in the recovery and analysis of human remains in both prehistoric and forensic contexts. She has worked seven field seasons (2000-2006) with the Belize Valley Archaeology Project, directed by Dr. James F. Garber, serving as the field director during the last four seasons (2003-2006) with the project. She has conducted research at the sites of Blackman Eddy, Cahal Pech, and Caracol in Belize. In 2004, she served at the field director for the University of Texas at Arlington Beracah Home historic project directed by M. Kathryn Brown. She plans to return to Belize in the future to continue conducting research with Middle Preclassic deposits in the Belize River Valley.