LUCAYAN BEADS FROM SAN SALVADOR, BAHAMAS (ca. A.D. 900-1500)

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A variety of Lucayan shell, stone, and coral beads as well as beadmaking waste was recovered from several sites on San Salvador, Bahamas. Following detailed analysis, comparisons to other beadmaking sites in the Greater Caribbean region indicate that fabrication, material, color preference, and even general forms are similar across great distances from the Maya region to the Greater and Lesser Antilles and the Bahamian Archipelago. In some cases, beads appear to have been made at the household level (Middle Pre-Classic Maya, Post Saladoid Lucayans), although certain stratified societies (later Maya, Classic Taíno) seem to have exerted more control or monopoly over bead manufacturing at various times. The beads were predominately white and red in color. Color symbolism suggests that white (or shiny) beads were more preferred and associated with peace, the "celestial complex," gold and silver, the sun and moon, and elite status. Red seems to have been associated with war, the agricultural complex, blood and fertility, the soil and earth, and lower social status. Appreciation of these Lucayan beads includes their beauty, simplicity, symbolism, and the laborious nature of their fabrication, it taking some two months to produce a single strand of a few hundred beads for a single wearer.

INTRODUCTION

Although several scholars have made collections from areas inhabited by the Lucayans and Taíno of the Bahamas Archipelago, including the modern Bahamas and Turks and Caicos Islands (Figure 1), few of them have so far presented systematic analyses of their findings, including shell, stone, and coral beads. Lisabeth Anne Carlson (1993) is one of the few who has managed to describe this bead industry in such detail that she has essentially left us with a guidebook to perform similar analyses on beads from around the Greater Caribbean region. The recovered beads reveal the Lucayans and the Taíno of the Bahamas Archipelago to be some of the most far-flung oceanic trading peoples in the New World. These peoples were also among the most apt and willing to trade objects of local abundance (e.g., parrots, cotton, javelins) to Europeans for some fairly basic materials such as low-value coins (e.g., Portuguese *ceutis* and Spanish *blancas*) and strings of green and yellow glass beads that were typical items the Spanish traded along the Guinea Coast of Africa, in the Canary Islands, and the newly discovered islands of the "West Indies." The Spanish avarice for gold was exacerbated by local Lucayans wearing small ear and nose rings of gold or *guanín* (a gold/copper alloy) and by the rumor of a Bahamian "king" or chief dressed in gold living on the island of Samoet, now believed to be Acklins Island. But finding little gold and few riches among the Lucayans, who Columbus complained "were poor in everything," the Spanish decided to move their search closer and closer to Samoet and eventually to the island of Colba (Cuba), thought to be Japan and near the legendary city of the Great Khan of Asia. Little did Columbus know that he had embarked upon a mission that would change the face of the globe forever. The Columbian Exchange (Crosby 1972) introduced new peoples, new foods, new languages, new diseases, new animals, and new ways of thinking about the world. It was such a dramatic event that this period–known as "The Age of Exploration"–marks the beginning of the age of modern globalization. Despite Columbus' high aspirations of achieving wealth and fame, we will examine some of the simpler artifacts that have come down to us as one of the legacies of the lost Lucayans.

This article deals with a small, but tangible, group of goods that the Spanish would very likely have traded for with their low-denomination coins, green and yellow glass beads, red caps, red cloth, metal buckles, and hawkbells, all of which so delighted the misnamed "Indians," namely locally produced beads of shell, stone, and coral. These were among some of the most desirable trade goods the Lucayans could themselves give in return for the paltry gifts showered upon them by the Spanish. The categories discussed include shell bead blanks (bead preforms [the names in parentheses are those utilized by Crock and Bartone 1998]), shell disc beads (discoid beads), shell "ghost beads," *Oliva* tinkler beads, cylindrical and tubular beads of shell and stone, and rectangular (barrel-shaped) beads of native coral, items that comprised the personal adornment of the Lucayans of San Salvador. These beads provide insight into the culture, lifeways, aesthetics, social hierarchy, and exchange systems of the pre-Columbian Lucayans and allow us to come to

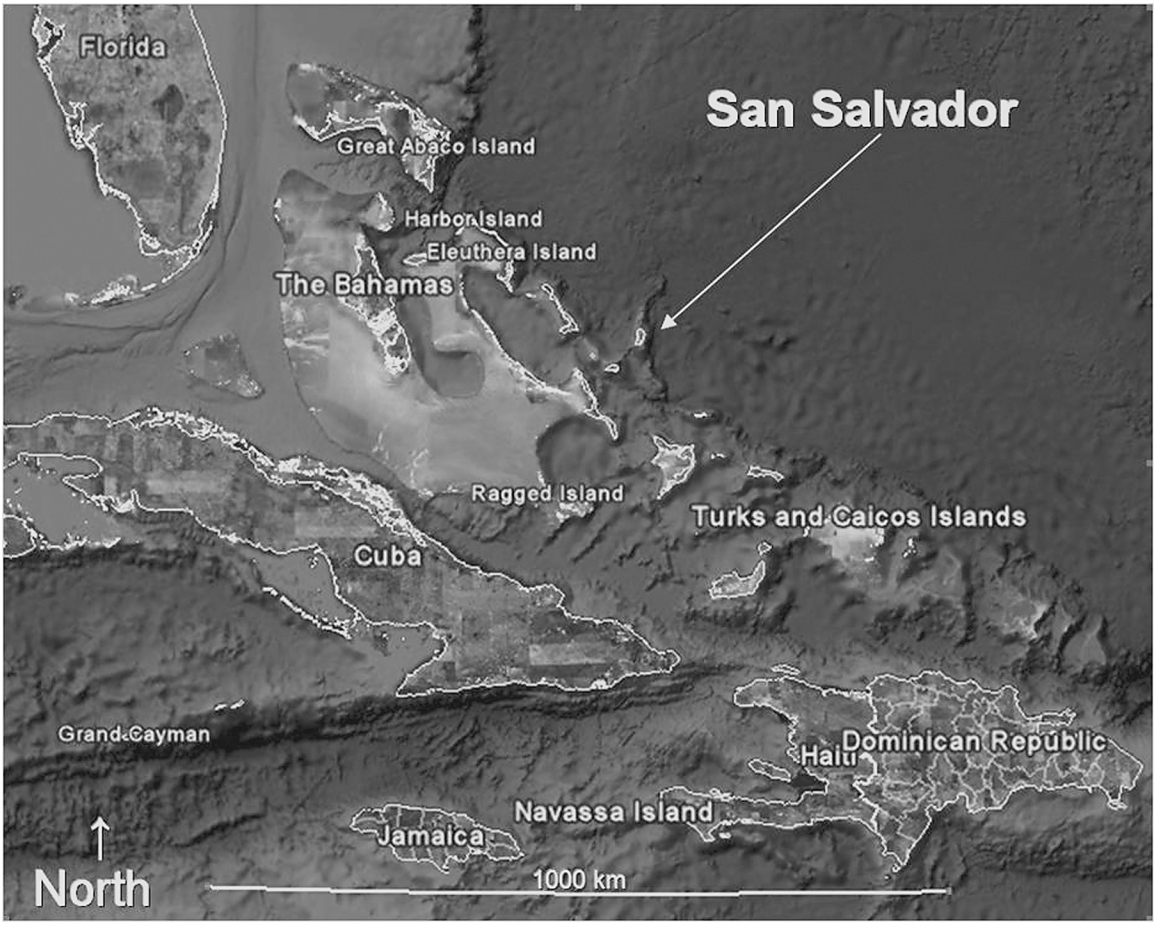

Figure 1. The northern Caribbean region showing the location of San Salvador, Bahamas (J. Blick; GoogleEarth 2010).

know the Lucayans as the long-lost kinsmen of other Native Americans and the first to disappear in the face of the European onslaught (Sauer 1966).

METHODOLOGY

The material described herein represents about eight years of archaeological research on San Salvador and come from the 2003 shovel-testing program at Minnis-Ward (Blick 2003), the 2004 shovel-testing program at the Barker's Point site (Blick 2004), the 2004 5 x 5 m excavation at Minnis-Ward (Blick 2004), the 2005 shovel tests and excavation at North Storr's Lake (Blick and Murphy 2005)(Figure 2), the 2006 4 x 2 m excavation at North Storr's Lake (Blick, Creighton, and Murphy 2006)(Figure 3), the 2009 excavation at Minnis-Ward (Blick et al. 2009)(Plate VB top), and the 2010 excavation at Minnis-Ward (Blick et al. 2010)(Plate VB bottom). Bead provenience is provided below as follows: Site Number/Year-Level or Site Number/Year-Shovel Test Number (e.g., SS-3/04-2 or SS-3/ST3-10).

The recovered beads were typed according to category (blank, circular or disc, "ghost," *Oliva* tinkler, cylindrical and tubular, or rectangular [barrel-shaped]) and then sorted on the basis of raw material (shell, stone, or coral). Beads were sorted into two categories: finished or unfinished (Plate VC top). Finished beads were those that had been through the entire bead manufacturing process (*see* below); unfinished beads were represented by bead blanks. The completeness of the beads was also noted and they were classified as complete ("fully shaped," Crock and Bartone 1998), incomplete (some finishing left to be done), or fragmented (broken).

Measurements were taken using a Helios needlepoint dial caliper with an accuracy of 0.05 mm. Those taken on individual beads included: diameter (of disc or circular beads) and length (longest axis) of squarish, sub-rounded, or "ghost beads;" length (parallel to the perforation in disc or circular beads); thickness (of "ghost" or plate beads parallel to the perforation[s]); width; and drill-hole (bore hole perforation) diameter. If a bead had more than one drill hole, measurements of both were recorded. It was

Figure 2. Screening for artifacts at the North Storr's Lake site (SS-4) in May 2005. This location was a household midden and not a beadmaking locality (photo: J. Blick).

noted if the drill hole was conical or "uniconical" (Carlson 1993; Haviser's [1990:87, Figure 2] Type I bead hole,) or biconical (Haviser's [1990] Type II bead hole). One bead had a diagonal drill hole in which the perforation passed through the body of the bead at an angle (Haviser's [1990] Type V "offset" bead hole). On some beads, horizontal filing or sawing was the means of perforation (e.g., three of the *Oliva* beads). Some of the cylindrical beads were double-drilled and had both longitudinal and transverse perforations. The coral bead was an undrilled blank.

Munsell colors were determined by three persons working together to verify the best color characteristic of each bead. Munsell color names were included so readers would have a better sense of the actual color rather than the numerical Munsell code. It was noted whether or not a bead had been burned or otherwise discolored.

RAW MATERIALS FOR BEAD MANUFACTURE

Raw materials chosen for the manufacture of the recovered beads include *Chama sarda* (red jewel box), *Strombus gigas* (conch), the nacreous *Cittarium pica* (West Indian top shell), *Oliva* sp. (olive shell), *Dentalium* sp. (tusk shell), *Acropora* (coral), and diorite. In this analysis, it is assumed (based on Carlson 1993:13) that any bead exhibiting a pinkish or reddish color is made of *Chama sarda*. If this assumption is correct, then *Chama sarda* beads comprise 32.4% of the bead collection. Pané (1999:9-10) mentions "red conch [sic] shells, which they wear hanging from their ears," or tied to a man's arms or strung around his neck.

A few beads, blanks, and "ghost" beads appear to be made from the silvery nacre of *Cittarium pica* (this identification is based on hours of analyzing artifacts and shells and learning to recognize them by color, texture, and sheen, and validated by Carlson [1993:14]). A light gray "cupped" bead may be *Oliva* as suggested by Carlson (1993:38). It is assumed that the remainder of the "white" beads are manufactured from conch shell based on Carlson (1993), Haviser (1990), Hohmann, Powis, and Healy (2010), and Powis, Healy, and Hohmann (2009). Pané (1999:9) relates that the Taínos of Hispaniola "take another more precious kind [of bead] from the great spiral conch…. That conch they call *cohobo*" (or cobo). The beads themselves are called *cibas* (Pané 1999:10, fn. 40). Nevertheless, we realize that Taíno beads were also made from many other shells including *Charonia* (trumpet shell), *Tellina* (tellin), and *Natica* (moon shell), just to name a few (Carlson 1993:14; Ground 2004; Hoffman 1967, 1970). White beads, if indeed as "precious" to the Taíno as Pané described, make up 56.7% of the San Salvador bead collection, almost double the number of red beads.

Figure 3. The final stages of excavation at the sea-turtle butchery at the North Storr's Lake site in 2006. Twenty-five beads and a piece of a carved shell tooth inlay for a wooden zemi statue were found here. This portion of the site dates to ca. A.D. 900-1550 (photo: Kristi Brantley-Smith).

The coral bead appears to be made of a species of *Acropora* based on the worn corallites on the body of the bead. The stone bead is formed from diorite, or as Fray Pané (1999:10) wrote ca. 1498, some "*cibas* [beads] are made of stones much like marble."

LUCAYAN BEADS AND BEAD BLANKS

The recovered beads were analyzed by J. Blick, R. Kim, and T. Hill over a three-day period using a planned and systematic method. The collection is composed of 292 modified shell artifacts including bead blanks and beads of shell, stone, and coral, although the predominant material is shell (290 or 99.3%), followed distantly by stone (1 or 0.34%), and coral (1 or 0.34%). Most of the beads represented in this collection are white, circular, shell disc (discoid) beads, with five "ghost" beads and blanks (1.7%), four *Oliva* "tinkler" or pendant beads (1.4%), three cylindrical and tubular beads of shell and stone (1.0%), and one rectangular or barrel-shaped coral bead (0.34%).

Shell Bead Blanks (Preforms)

Bead blanks are considered to be the preliminary phase or "preform" stage of shell-bead manufacturing (Haviser 1990:89). All of the bead blanks recovered since 2003 are shell. Of the 32 blanks in the sample, 31 are unfinished (96.8%). Regarding form, 27 (84.5%) are circular discs, 4 are rectangular (squarish) (12.5%), and 1 is amorphous (3.1%). As to completeness, 3 blanks (9.4%) are incomplete (only roughed out), 19 (59.4%) are complete (smoothed and ready for drilling), and 10 (31.3%) are fragmented. Blank diameter/length ranges from 5.20-14.15 mm with a median of 7.95 mm. Blank thickness ranges between 0.90 to 2.75 mm with a median of 1.55 mm. Some blanks with perforations have drill-hole diameters of 0.65-2.10 mm with a median of 0.95 mm. Of the 11 shell bead blanks with complete or partial perforations, 7 have conical perforations (63.6%) while only 4 (36.3%) have biconical perforations. Conical perforations are drilled from only one side, producing a V-shaped hole; biconical perforations are drilled from both sides, producing an hourglass-shaped hole (Carlson 1993; Crock and Bartone 1998; Hoffman 1967).

Two of the blanks are made of conch shell (*Strombus gigas*) (6.3%), 2 are of the West Indian top shell (*Cittarium pica*) (6.3%), and 4 are of the red jewel box (*Chama sarda*) (12.5%). Regarding color, 22 blanks are white (68.8%), 4 are pinkish/reddish (12.5%), 5 are various shades of gray (15.6%), and 1 is very pale brown (3.1%). It is assumed that the white, light gray, gray, and dark gray blanks are made of conch based on ethnographic evidence provided in the ca. 1498 account of Fray Ramón Pané (1999). The gray coloration of an otherwise white shell may have been induced by burning or soil discoloration.

Shell Disc Beads (Discoid or Discoidal Beads)

The 2003-2010 excavations on San Salvador yielded 247 shell disc beads (Plates VC bottom, VD, VIA top). These are primarily circular and range from 2.25 mm to 8.35 mm in diameter, with a median of 4.15 mm. Bead thickness varies from 0.60 mm to 2.15 mm with a median of 1.05 mm and is likely dictated by the thickness of the original shell which may, at least partially, be determined by age and species. Polishing the faces of the beads to some cultural standard may also play a role in the range of thickness. Most (85.0%) of the disc beads are finished, and 89 (73.5%) are complete (fully shaped) while 68 (26.5%) are fragmented.

Drill-hole diameters are remarkably consistent and 95% of them range between 0.85 mm and 0.95 mm with a median of 0.90 mm and a standard deviation of 0.27 mm. This consistency suggests a fine drilling tool, the use of which would have been highly controlled. Carlson (1993), Francis (1988), and Gnivecki (2006, 2009) have suggested the use of pump or bow drills tipped with tiny chert microliths ca. 0.9-1.1 mm in length with tips of similar dimensions. Haviser (1990:87) has suggested that small lithic drills, ca. 1-3 cm in length, worked in a rotary motion would exhibit distinctive rotary use-wear striae. These are not observed on the San Salvador chert microliths. The senior author has doubts about the use of such microdrills in beadmaking on San Salvador and suggests that fine cane reeds used with sand abrasive should further be considered.

Seventy-eight (31.5%) of the shell disc beads have conical perforations while the remaining 169 (68.4%) exhibit biconical perforations. Thus beads with biconical holes outnumber those with conical ones by more than 2 to 1. There are several possible explanations for this: 1) the findings may reflect a slight difference in the technologies being used by individual beadmakers; 2) conical drilling may represent the training phase of an inexperienced beadmaker with limited skills; or 3) biconical drilling may have been performed on sacred, ceremonial, or finer trade objects, whereas conical drilling was relegated to the production of more mundane or local types of beads.

White beads predominate (140 specimens; 56.7%), followed by pinkish/reddish (80 specimens; 32.4%). Light to dark gray beads (27 specimens; 10.9%) probably represent specimens discolored by exposure to dark soil or fire. Forty-four (17.8%) of the disc beads exhibit discoloration possibly caused by burning. Of these, 30 (68.2%) were probably white originally (conch, top shell, etc.), while 14 (31.8%) appear to have been red (*Chama sarda*). Carlson (1993:42) mentions that a small string of beads was found burned in a fire pit at the Governor's Beach site (GT-2), Grand Turk, Turks and Caicos Islands. Carlson (1993) goes on to say that the sacrificial offering of certain ornaments to fire, particularly beads, is a widespread cultural practice found from the Chumash of California, to the Taíno and Lucayans of the Bahamas Archipelago, and even to the African- or Afro-Caribbean-influenced "cremated" glass beads (ca. 1650) found in a cemetery near Santa Elena on Parris Island, South Carolina (South 1983; South, Skowronek, and Johnson 1988).

Shell "Ghost" Beads

Until a standardized name is designated, this bead type is being called a "ghost" bead due to its similarity in appearance to the ghosts that children draw (Plate VIA bottom). The five recovered specimens average 11.55 mm in length, 9.19 mm in width, and 1.39 mm in thickness. The first specimen (Plate VIA bottom, left) (SS-3/04-1) has two conical drill holes or "eyes" 0.60 mm and 0.65 mm in diameter. It is finished, complete (fully shaped), and light gray in color, perhaps the result of burning or soil discoloration. The second bead (Plate VIA bottom, second from left) (SS-3/04-2) is made from the West Indian top shell (*Cittarium pica*) and has two biconical drill holes 1.25 mm and 1.35 mm in diameter. It is finished but fragmented and white in color. The third example (Plate VIA bottom, center) (SS-3/04-2) is an unfinished, fragmented blank with no drill holes. It is white and also made from *Cittarium pica*. The fourth specimen is an unfinished blank (Plate VIA bottom, second from right) (SS-3/04-3) manufactured from a *Diodon* (porcupinefish) oral grinding plate (Dr. William F. Keegan 2010: pers. comm.). It has three biconical drill holes: the two on the obverse side are 1.35 and 1.15 mm in diameter; one of these matches up with the beginning of a 1.65-mm-wide drill hole on the reverse. The bead is unfinished, fragmented, and light gray in color. The fifth and final ghost bead (Plate VIA bottom, right) (SS-3/04-3) is also unfinished, but complete with no drill holes, and appears to be a preform or perhaps a shell-inlay fragment.

"Ghost" beads have also been found in small quantities at the Three Dog site (SS-21) and North Storr's Lake (SS-4) on San Salvador (Shaklee, Fry, and Delvaux 2007; Mary Jane Berman 2010: pers. comm.). The shell ghost beads are similar in form (although smaller in size) to the single- and double-drilled "tabular" beads from Late Classic Mayan deposits at Tikal, Guatemala (Moholy-Nagy 1988) and to the flat plate beads from the Andean region described by Mester (1988:159) who states that "their primary use was as adornments on textiles."

Oliva Tinkler Beads

Oliva "tinkler" beads are composed of the body of the *Oliva* or olive shell. The four recovered specimens average 30.45 mm in length and 15.83 mm in width. Tinkler no. 1 (Plate VIB top, left) is white to yellowish white in color. It is finished and, though fragmented at the lip, still retains evidence of a horizontally filed or sawed suspension hole (Carlson 1993; FitzSimmons 1993; Francis 1988:28; Hoffman 1967). Sawing or filing–which "leaves a deep groove which results in an elliptical opening" (Francis 1988:28)–seems to be a common perforation technique for tinklers. Tinkler no. 2 has broken in the area where it was to be filed or sawed to create a suspension hole (Plate VIB top, second from left). The hole is 11.65 mm long and 6.20 mm wide. This bead may have been broken during the manufacturing process or in the post-depositional environment at the site. White in color, tinkler no. 3 (Plate VIB top, third from left) is a finished specimen but also fragmented as the lower half of the shell has been broken off, perhaps intentionally (FitzSimmons 1993; Powis, Healy, and Hohmann 2009; similar to Haviser's [1990] Type VI "terminal" perforation), to create the hollow "bell-like" noisemaker of the tinkler. Notice, however, that the horizontally filed or sawed suspension hole is clearly visible and measures 3.00 mm in length, very close in size to the perforation on tinkler no. 4. The latter specimen is the only finished, complete tinkler in the collection and is a bright natural white. The horizontal opening is 3.35 mm long. All of the tinklers were filed or sawed near the siphonal canal close to the bottom of the olive shell (*see also* FitzSimmons 1993: Figure 1).

These beads were made to serve as little bells or "tinklers" when worn on the wrists, arms, and ankles (Figure 4). FitzSimmons (1993) asserts that tinklers may also have been worn as necklaces as some Tairona ceramic figurines suggest. Kidder (1932) was the first to call these objects "tinklers." They have been referred to as "tinkler" beads in the Caribbean/Gulf of Mexico region since about 1946: "Oliva tinklers are a widespread Maya lowland and Mesoamerican trait" (Kidder, Jennings, and Shook 1946:148-149). In his report on the excavations at Altar de Sacrificios, Guatemala, Willey (1972:220-223) stated, "Tinklers are little spiral univalves, either of *Oliva* sp. … or *Jenneria pustulata*." The Maya "tinklers" were also perforated: "a portion of the spiral on the bottom [the siphonal canal] was ground or cut away [sawed]"… for stringing in necklaces, bracelets, and anklets. Some of the Mayan varieties were even carved to resemble human skulls and are sometimes referred to as the "death's head" shell bead or "death's head" tinkler. Similar *Oliva* and other tinklers have also been found in the Tairona region of the Caribbean coast of northern Colombia (FitzSimmons 1993: Figure 1). Hoffman (1967:79, Figure 11) and Carlson (1993:16, Figure 2-2b) illustrate *Oliva* pendant beads from San Salvador and Grand Turk, respectively, similar to the ones described here.

Cylindrical and Tubular Beads of Shell and Stone

The three cylindrical and tubular beads of shell and stone are discussed together here based on their morphology rather than their material of manufacture. The first cylindrical bead (SS-3/ST3-10) is made of stone. The bead is finished, complete, and appears to have been manufactured from diorite, white to light gray in color with black speckling. Found in a shovel test during the large-scale shovel-testing program performed at Minnis-Ward in 2003 (Blick 2003), it has such professional manufacturing quality that it resembles a transistor radio component (Plate VIB bottom, left). It is 14.25 mm long and 6.20 mm wide. The bead has been double-drilled longitudinally (Carlson 1993) and the bores measure a consistent 2.60 mm each. The transverse drill holes bisect the stone cylinder nearer one end than the other and are consistently 0.75 mm and 0.70 mm in diameter.

The second bead (SS-3/04-3; Plate VIB bottom, center) is 16.20 mm long and 9.20 mm wide. It is a tubular shell with a natural longitudinal perforation. The openings at the ends are consistently 6.30 mm and 6.65 mm wide. The transverse holes, which act to bisect the tube nearer one end than the other, have been drilled and are 1.35 mm and 1.70 mm in diameter. The bead is finished, complete, white in color, and made from an as yet unidentified shell, perhaps *Vermicularia spirata* (West Indian worm shell) (*see* Sabelli 1979, no. 335).

The third specimen is a possible tubular shell bead (SS-3/04-3, not pictured). It is 7.00 mm long and 3.10 mm wide with what is very likely a natural hole that runs the length of the object. There are no other perforations in the object and it seems to be finished, although it is fragmented. It is bright

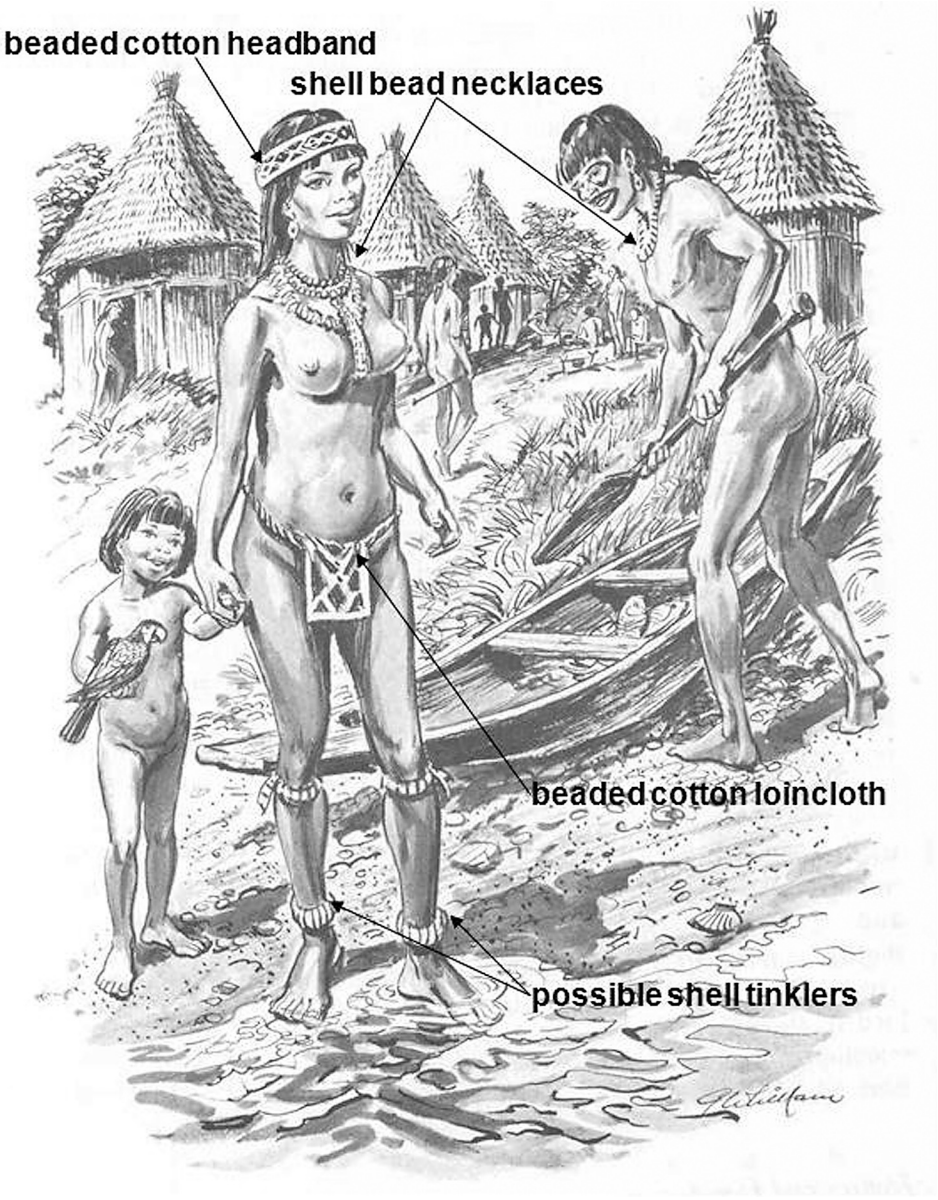

Figure 4. Artist's rendering of a Lucayan domestic scene, illustrating shell beads and bead constructs such as shell-bead necklaces, a beaded cotton loincloth and headband, and possible shell tinkler anklets documented as having been worn by the Lucayans and Taíno (material from "The Story of the Bahamas" by author Paul Albury, copyright © 1975, reprinted by permission of Macmillan Education Limited).

white and appears to be a *Dentalium* shell that may have been worn as part of a chain of beads.

The four-holed or double-drilled beads (with longitudinal holes and transverse drill holes nearer one end than the other) have been reported by Carlson (1993) at the Governor's Beach site (GT-2) on Grand Turk Island. According to Carlson (1993:91), "many stone cylinders were double drilled to hold feathers, creating a feather choker effect." Columbus' priest/ethnographer, Fray Ramón Pané (1999:10), recorded a myth on Hispaniola in which a "woman… gave [a man]… many *cibas* [beads] so that he would wear them tied to his arms, for in those lands the *cibas* are made of stones very much like marble [diorite?], and they wear them tied to their arms and around their necks.…"

Rectangular (Barrel-Shaped or Barrel/Cylinder) Coral Bead

There is some question as to whether this item is a bead as it is unperforated. The object (Plate VIB bottom, right) is rectangular or "barrel-shaped" (or a "barrel/cylinder" bead) (Hammett and Sizemore 1988:132, Figure 7c) and is 20.00 mm long, 11.75 mm wide, and 9.80 mm thick. It appears to be worked (rounded, squared) around the edges to provide its rectangular or barrel-shaped form and may have been shaped in a grooved stone (Carlson 1993). If a bead, this item is unfinished and incomplete. The color is white to yellowish white. It appears to be made of coral, perhaps a species of *Acropora*, such as *Acropora cervicornis* (staghorn coral). This object may be a bead blank that has not yet been perforated. It is similar in form and size to a biconically drilled coral bead (23.00 mm long x 14.00 mm wide) described from the 16th-century Philip Mound, Polk County, Florida by Karklins (1974:4, Figure 2a). Carlson (1993:19) states that "stone beads and especially cylinders are very highly esteemed in the Taíno culture." In any case, this coral bead blank or barrel-shaped bead is a rarity on San Salvador and in the Lucayan Isles, being one among some 57,000 artifacts analyzed in June 2010.

THE LUCAYAN (TAÍNO) BEADMAKING PROCESS

In her comprehensive study of Taíno bead manufacturing based on artifacts from the Governor's Beach site (GT-2) on Grand Turk, Turks and Caicos, Carlson (1993) analyzed some 20,000 pieces of shell beadmaking debris and beads in various states of manufacture from blanks to finished products. The Lucayans of the Bahamas appear to have been manufacturing beads in the same, or similar, manner as the Taíno beadmakers on Grand Turk. Thus Carlson's (1993) analysis is an obvious place to look for a comparison of Taíno and Lucayan beadmaking.

According to Carlson, the primary raw material for beadmaking is the red *Chama sarda* (red jewel box) shell followed by queen conch (*Strombus gigas*). On San Salvador, materials involved in the beadmaking process are primarily conch, as on Curaçao (Haviser 1990), followed by the red jewel box: 56.7% of the finished beads are white (assumed to be predominately conch) and 32.4% are red (assumed to be mostly red jewel box). White chert microliths also appear to be associated with bead manufacturing localities on San Salvador (Blick et al. 2009; Blick et al. 2010; Gnivecki 2006, 2009), so we assume a technological similarity in the beadmaking processes between the Taíno on Grand Turk and the Lucayans of San Salvador. The white chert microliths, or microdrills, appear to have their common source on Hispaniola, an island with demonstrated connections to both Grand Turk and San Salvador (Berman and Gnivecki 1995; Carlson 1993; Keegan 1992; 1997). Microdrills of chert and other materials have been noted in association with shell beadmaking localities from the Mississippian area (Pope 1988; Yerkes 1988) to the Maya region (Hohmann, Powis, and Healy 2010; Powis, Healy, and Hohmann 2009) to coastal Ecuador and Peru (Mester 1988).

According to Carlson (1993), the following stages are involved in the Taíno shell beadmaking process:

1) A conch hammer or conch columella point ("knipper," Keegan 1997) is used to shape a rectangular (squarish) or circular bead blank;

2) The flat sides of the blank are polished in a sand-and-water slurry on a flat abrasive surface using an abrasive tool such as a hand-held abrading stone or a sandstone polisher (Mester 1988);

3) The blank is then perforated using a chert-tipped bow drill (Francis 1988:32; Gnivecki 2006, 2009) or a pump drill with a drill shaft of wood or cane worked in a rotary motion, or perhaps drilled using a fine, sharpened, wooden reed and a sand abrasive;

4) The perforated beads are then strung, ca. 100-300 beads at a time, and rolled (like a rolling pin) back and forth and side-to-side on a flat abrasive surface, using a slurry of sand or pumice and water. This polishes and smooths the outer edges of the beads and produces beads of uniform size. According to Carlson's (1993) analysis, this final stage removes ca. 2 mm of material from the sides of the beads.

Whether performed with a chert-tipped shaft of reed or cane or a "sharpened hollow reed drill filled with a sand abrasive" (Carlson 1993; Roth 1924), the biconical drilling technique predominates at Governor's Beach (80% biconical; 20% conical). A similar predominance of biconical drilling is found in the San Salvador sample of shell disc beads (68.4% biconical; 31.5% conical). This suggests that the Taíno and Lucayan beadmakers either preferred the biconical drilling technique for technological reasons (e.g., the perforation was drilled from both sides to avoid undue stress on the blank that might crack it) or aesthetic concerns (e.g., neat perforations for finely made trade beads).

Beads at Governor's Beach were finished at "cement polishing stations" or "cement blocks" which are man-made surfaces of natural cement formed by mixing seawater and coralline sand (Carlson 1993). The presence of beadmaking debris in and around these polishing stations suggests to

Carlson that beadmakers worked in small groups, perhaps beneath the shade of a shelter for which there is evidence at Governor's Beach (Carlson 1993:49, Figure 2-8). A similar, hard, flat-topped rock surface, thought to be an outcropping of bedrock, was identified at the Minnis-Ward site (Blick et al. 2009; Blick et al. 2010). Such an abrasive surface could certainly have been used as a bead-polishing station.

COMPARISONS TO OTHER SITES IN THE PAN-CARIBBEAN REGION

The Palmetto Grove site (SS-2), San Salvador, Bahamas (Hoffman 1967, 1970) is the nearest source of comparative shell-bead material for the Minnis-Ward and other sites on San Salvador. Based on the recovered ceramics, the site occupation was dated at A.D. 850-1200 by Hoffman. More recent research conducted at the site by Berman and Gnivecki in 1993 focused on the recovery of prehistoric wood and seeds for radiometric dating. Two radiocarbon assays have been reported which place the Palmetto Grove site relatively late in the prehistoric sequence: 570±80 B.P. (cal AD 1410, cal range AD 1280-1460, 2-sigma, Beta-67064) and 380±60 B.P. (cal AD 1483, cal range AD 1430-1654, 2-sigma, Beta-66089) (Berman and Gnivecki 1997).

The 1965 excavations at the Palmetto Grove site produced 57 shell beads and tinklers, most occurring in the 20-30 cm and 30-40 cm levels (Hoffman 1967:109, Table 10, 1970). Included is a "ghost" bead (Hoffman 1967:79, Figure 11). Both conical and biconical drilling techniques were noted in the manufacture of the shell beads: "In some cases it [the bead] is drilled most of the way and then punched out, or the shell is turned around and the hole is drilled from the opposite direction, the latter producing the hour-glass outline" (Hoffman 1967:110). The beads were manufactured from *Oliva*, *Calliostoma*, *Cypraea*, *Chione*, *Codakia*, *Tellina*, Naticidae, and limpet shells. The *Oliva* tinklers had "a groove sawed through one end until it produces a hole" and served as bells or "noise-making beads" which, when strung together, "make tinkling sounds of varying notes" (FitzSimmons 1993; Hoffman 1967:110).

The Governor's Beach site (GT-2) on Grand Turk Island, Turks and Caicos, produced what is probably the largest collection of beads and beadmaking debris from any site in the pan-Caribbean region (Carlson 1993). It dates to ca. A.D. 1100-1200 and yielded some 1,500 whole beads, ca. 430 blanks, ca. 4,000 broken beads (Carlson 1993:28: Table 2-6), ca. 3,400 bead fragments (Carlson 1993:26, Table 2-4), and ca. 13,600 pieces of beadmaking debitage (Carlson 1993:24, Table 2-2). Although a Taíno site with connections to the Greater Antilles (rather than a Lucayan site), Governor's Beach exhibits the same or similar types of white and red shell disc beads, fashioned from *Strombus gigas* (queen conch) and *Chama sarda* (red jewel box), that predominate in the bead material from San Salvador discussed in this article. At Governor's Beach, 37.3% of the intact beads are white, 12.7% are red, and 50% are gray (discolored or burned). In the San Salvador bead collection 56.7% are white, 32.4% are pinkish/reddish, and only 9.7% are gray.

Beads from Governor's Beach have diameters ranging from <4 mm to >9 mm (Carlson 1993), with the majority falling in the 5-6 mm range; the beads from San Salvador are smaller, with a median diameter of 4.15 mm. The thickness of the Grand Turk beads ranges from <1 mm to >1.75 mm, with the majority falling within the 1.00-1.25 mm range (Carlson 1993); the San Salvador beads range between 0.60 mm and 2.15 mm in thickness with a 1.05 mm median. Grand Turk perforations range from <1 mm to >1.75 mm in diameter with the majority falling in the 1.25-1.50 mm range; those of San Salvador beads do not exceed 2.0 mm with a 0.9 mm median.

Carlson (1993) estimates that an average string of beads intended for polishing would have consisted of 100-300 beads and been about 15-45 cm in length. She calculates that an average beadmaker at the Governor's Beach site would have been capable of making about 5 beads per day and perhaps 300 beads in a two-month period. Thus, in a single season (about two months), a group of 10 beadmakers could be capable of producing about 3,000 beads, enough to make 10 300-bead strings about 45 cm in length, based on the thickness of the Governor's Beach beads. Similarly, Francis (1988:33) reports that a single string of Southwestern Puebloan *heishi* beads ca. 43 cm in length typically takes about two months to manufacture.

Clearly, the Governor's Beach beadmakers on Grand Turk were skilled artisans who worked in what appears to have been a mass-production beadmaking camp. The Lucayans of San Salvador seem to have worked as individuals or as single households at multiple sites or at multiple households within a site. We know from the work of Carlson (1993), Claassen (1988), and others that beads were a symbol of social status and were used in trade, for exchange and currency, in ceremonies (weddings, burials, offerings), and simply for personal adornment. Beadmaking debris from Governor's Beach was predominantly red, suggesting many red beads were made and exported from there. Red is a color rich in symbolism associated with warriors and males (Carlson 1993) in the Caribbean, the Amazon, and elsewhere. Carlson (1993:5) makes a convincing case that the beadmakers of Governor's Beach were males, of the high-ranking elite stratum of Taíno society, manufacturers of highly regarded and symbolically charged trade objects that

were transformed by women into "elaborate finished bead constructs" of cotton textile and other woven constructions (Fig. 5; Plate VIC). Carlson (1993:101) proceeds to tout the value of the Governor's Beach beads:

> If the Taino did place value on beads based on size and quality, the examples from GT-2 must have been exceptionally valuable. In all the reports of Caribbean beads, I have never found anything smaller than four millimeters…. The very smallest measures 2.4 millimeters across.… Taino beads were very commonly owned and traded within the elite classes [of Taíno society].

If bead quality is measured by the fineness of the bead, then the Lucayan beadmakers of San Salvador can be said to have made smaller, thinner, and more finely perforated beads than their supposedly more sophisticated Taíno neighbors to the south and west.

Regarding the nature of the color symbolism of the white and red shell beads found at Grand Turk and San Salvador, red is the least common color on both islands. In Ecuador and Peru, red is associated with war, agricultural productivity, female procreative energy, life, blood, and sexuality (Mester 1988). Red is the color associated with the "dark terrestrial complex" and the lower status moiety of Inca society (Mester 1988:162, 164). The white or shiny nacreous color of shell (*Strombus*, the pearl oyster, *Cittarium pica*) is associated with the "shimmering property of reflecting light… that links the pearl oyster with the precious metals and the precious stones, especially quartz crystals" (Mester 1988:157). The white shell or mother-of-pearl nacre is associated with the sun, beauty, moral excellence, and high social status, the highest stratum of Inca society (Mester 1988:160, 161). It is no surprise then that the Taíno referred to themselves as "good and noble" people upon their introduction to Columbus (Anglería 1949). White nacreous shell is associated with the "celestial symbolic complex" of gold and silver, and sun and moon (Mester 1988:161). The Inca name for pearl (and white shiny shells) is *quispe* which means "peace" (Gonzalez Holguin [1608] 1952:6 in Mester 1988:161). The Inca ruler was carried in a white litter, the *quispe rampa*, for peacetime parades of state and royal marriages; he was carried in a red litter, the *pilco rampa*, on his journey to wage war for imperial conquest (Guaman Poma 1980 in Mester 1988).

It is obvious that the colors red and white are complementary opposites: red (war, the agricultural complex, earth, and lower status) versus white (peace, the celestial complex, the sun and the moon, and upper status). This duality of colors and complementary opposites, is magnificently embodied in the emblem of a leader, a Taíno chief's *zemi* (spirit) belt made of white and red shells sewn onto cotton cloth (Plate VIC). Caribbean peoples would have brought their color symbolism with them from mainland South America to the islands of the Lesser and Greater Antilles and Bahamas, so this color system duality would likely apply to Taíno and Lucayan concepts of aesthetics. In fact, Mary Jane Berman (2011) has made a similar argument about shiny, celestial objects in the cosmovision of the Lucayans of the Bahamas. We know that *cohobos* (white beads) were more precious to the Taínos and that white beads were two to three times more common on both Grand Turk (37.3% white vs. 12.7% red) and San Salvador (56.7% white vs. 32.4% red).

Stone beads have been found at the Trants site (MS-G1), Montserrat (Crock and Bartone 1998), which dates to ca. 500 B.C.-A.D. 300 and later (Saladoid Period). Although the beads from Trants are stone, bead terminology and manufacturing technology is similar to that used for shell beads (Carlson 1993; Crock and Bartone 1998; Gnivecki 2006, 2009). The beads are made from a wide variety of imported stone such as amethyst, carnelian, feldspar, jadeite, and white quartz. The presence of these exotic stones on Trants implies an early, widespread, pan-Caribbean trade network that reached to the shores of Central America and northern South America (Crock and Bartone 1998). The similarity of tinkler beads–worn as necklaces, bracelets, anklets, or sewn onto clothing, and used as noisemakers or bells (FitzSimmons 1993)–from San Salvador, Grand Turk, the Maya region, and the north coast of Colombia also points to a widespread usage of this bead form from ca. 900 B.C. to A.D. 1500 across a large region of the Caribbean.

Finally, Powis' work on Mayan beads from the Pacbitun site in Central America provides us with a rather far-flung comparison to Lucayan beads, but it is a pan-Caribbean comparison nonetheless (Hohmann, Powis, and Healy 2010; Powis, Healy, and Hohmann 2009). Pacbitun is a Middle Preclassic (900-300 B.C.) Mayan site in the interior of Belize, about 100 km from the coast. The site produced numerous "modified shell artifacts, including items that would have been attached to clothing or worn as jewelry items" (Hohmann, Powis, and Healy 2010; Powis, Healey and Hohmann 2009:172). Shell objects are made from *Strombus* (conch), *Marginella*, *Oliva*, *Spondylus*, *Dentalium*, and local freshwater snails and mussels (Powis, Healy, and Hohmann 2009:172), materials that are, for the most part, similar to those used by the San Salvador beadmakers. The Mayan shell disc beads range from 5-10 mm in diameter and have ground edges. The size range of the Pacbitun beads is narrower than that of the shell disc beads from San Salvador, although the Pacbitun shell-bead average appears to be larger than the San Salvador average (4.15 mm).

Also present at Pacbitun are Mayan tinkler beads, pendants, and *adornos* (ornaments), along with large quantities of shell beadmaking debris at one particular household, Sub-Structure B-2, which dates to the early Middle Preclassic (Powis, Healy, and Hohmann 2009). Bead production at this household is substantiated by the presence of 5,670 "finished and unfinished shell artifacts, [3,113 pieces of] production debris, and chert tools" (Powis, Healy, and Hohmann 2009:173). The chert tools, some 92 microliths or microdrills, are manufactured from local chert, and are proposed to have been hafted on wooden or bone handles for use in shell beadmaking (Powis, Healy, and Hohmann 2009). The chert microdrills are similar to those purported to be drills by Carlson (1993) and Gnivecki (2006, 2009) on Grand Turk and San Salvador in the Bahamas Archipelago. While beadmaking seems to have been performed at the household level in early Middle Preclassic Pacbitun, by the late Middle Preclassic, bead production may have come to be controlled by a more hierarchical Mayan society, based on the greater uniformity of the later beads (Powis, Healy, and Hohmann 2009). On San Salvador, bead manufacturing seems to have been fairly widespread and performed at multiple households at several sites, and even at multiple households within sites, such as the four to five potential beadmaking households at Minnis-Ward (Blick 2004; Blick et al. 2010). Most of the beads and beadmaking debris at Pacbitun consisted of conch (*Strombus*) shell, as appears to be the case on San Salvador, as well as on Curaçao (Haviser 1990). This dominance of conch as the primary material in Mayan beadmaking at Pacbitun provides some support for our argument that the majority of the white beads found on San Salvador are also likely made of conch shell.

The use of chert microdrills by Mayan beadmakers at Pacbitun also provides support for Carlson's (1993) and Gnivecki's (2006, 2009) conclusions that chert microliths from the Governor's Beach site, Grand Turk, and the Three Dog site, as well as elsewhere, on San Salvador were likely used for drilling shell beads. To the contrary, Berman and Pearsall (2008) and Perry et al. (2007) report starch grains from food processing on similar chert microliths which suggests that they were used in the kitchen and not in the bead workshop. Chert microdrills, if used in the manner described, would "exhibit distinctive rotary use-wear striae" (Haviser 1990:87) which are not apparent on the San Salvador microdrills. This conundrum requires further investigation. Shells were being brought to Pacbitun from the coast 100 km away. That, along with the evidence for exotic shell, stone, and other beads from Grand Turk, San Salvador, and elsewhere, suggests that a widespread trade network crisscrossed the pan-Caribbean region from at least the early Middle Preclassic (ca. 900-300 B.C.), through the Saladoid (ca. 500 B.C.-A.D. 600) and the late prehistoric period (Post-Saladoid, A.D. 600/800-1500), up until the time of the Spanish arrival at San Salvador in 1492.

CONCLUSION

Other than Carlson's (1993) seminal work on Taíno beads at Grand Turk, Turks and Caicos Islands, little has been published on beads of the Bahamas Archipelago. Nor has much been written, or much detail provided, about beads in general in the Greater Caribbean region (FitzSimmons 1993:12; Haviser 1990:85; Powis, Healy, and Hohmann 2009:173). Dr. Perry Gnivecki (2006, 2009) of Miami University of Ohio is one of the few scholars today taking a comprehensive, economic, cultural, and high-tech look at Lucayan shell beads (e.g., he is using a high-power digital camera to take very precise measurements of the diameters and drill holes of shell disc beads recovered from his excavations). Gnivecki's new and precise measurement technique will probably become the standard for bead studies in the very near future.

The present sample of Lucayan beads from San Salvador, Bahamas, is composed of some 292 specimens that were likely used for personal adornment and body decoration (disc beads worn in necklaces, "ghost" beads sewn onto cloth, cylindrical beads adorned with feathers and worn as "chokers," etc.). Clearly, these objects allow us only a partial view of the entire Lucayan suite of bead types and personal adornments. The tinklers were probably worn during public festivities and dances (*areytos* in the Taíno language) for their "musical" properties. The study of beads and similar personal ornaments allows us insight into intimate choices of body decoration as well as such cultural values as beauty, marriageability, and social status.

Lucayan beads resemble the beads made by the culturally-related Taíno beadmakers from Grand Turk (Carlson 1993), other Antillean beads such as those from Montserrat (at least in form if not in material; Crock and Bartone 1998), and Mayan beads reported from Yucatán sites such as Pacbitun, Belize (Hohmann, Powis, and Healy 2010; Powis, Healy, and Hohmann 2009). These similarities suggest an early, widespread, pan-Caribbean trade network and likely a corresponding shared system of cultural values, such as color preference, concepts of form and beauty, and perhaps even a shared (or similar) cosmovision or world view.

It is perhaps for reasons such as those mentioned above that so many people find beads so compelling. They seem to have almost universal, even if sometimes only superficial, appeal to peoples of all times and places. Beads are highly

personal, even intimate objects, worn close to the body, associated with personal adornment, beauty, and status. At the same time, beads are highly charged symbolic objects that outwardly express cultural values, even the very concepts of heaven and earth. Through the study of their beads, we are privileged to gain insight, if only superficially, into the tantalizing cosmovision of the lost Lucayans.

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Plate VB. *Bahamas:* **Top:** The 2009 2x2 m excavation at the Minnis-Ward site (SS-3), San Salvador (photo: J. Blick). **Bottom:** Drawing a soil profile at the site, June 2010 (photo: R. Kim).

Plate VC. *Bahamas:* **Top:** Tyler G. Hill sorting shell artifacts from the 2010 excavation at the Minnis-Ward site (SS-3)(photo: R. Kim). **Bottom:** Shell beads in various stages of manufacture recovered in 2004 from SS-3/04-2 at the Minnis-Ward site (ca. A.D. 985)(photo: J. Blick).

Plate VD. *Bahamas:* **Top:** Several bead blanks and the resultant circular disc beads (SS-3/10-1). Note the unfinished drill hole in blank 2. **Bottom:** A bead blank and a variety of finished shell beads (SS-3/10-5)(photos: R. Kim and T. Hill).

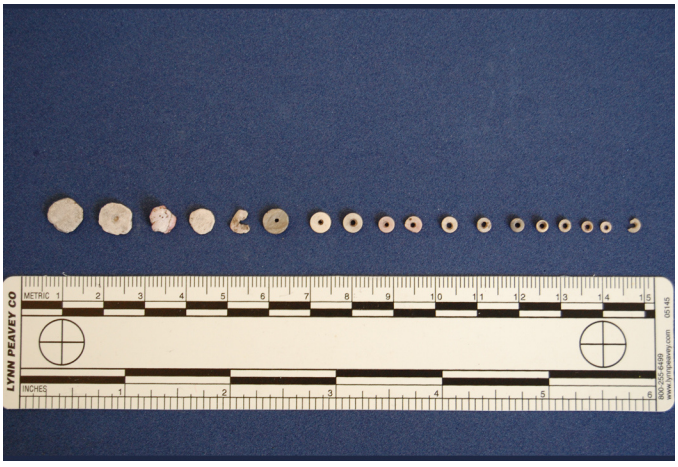

Plate VIA. *Bahamas:* **Top:** A suite of beads from SS-3/10-4 showing the various stages of manufacture. **Bottom:** "Ghost" beads in various stages of manufacture. The fourth bead dates to ca. A.D. 985 (photos: R. Kim and T. Hill).

Plate VIB. *Bahamas:* **Top:** A variety of *Oliva* "tinkler" beads (ca. A.D. 900-1400). **Bottom:** Cylindrical diorite bead (SS-3/ST3-10); naturally perforated worm-shell bead (SS-3/04-3); unfinished rectangular coral bead (SS-3/ST-A9) (photos: R. Kim and T. Hill).

Plate VIC. An early historic Taíno chief's belt with *zemi* figure from the Greater Antilles, ca. 1530. It is made of cotton and decorated with white and red shell beads, likely *Strombus* and *Chama sarda* (Museum für Völkerkunde, Vienna).