Journal of Caribbean Archaeology
Copyright 2015
ISBN 1524-4776

THE IMPRESSIONS OF LONG BAY: BASKETRY IMPRESSED CERAMICS FROM THE LONG BAY SITE, SAN SALVADOR, BAHAMAS

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We know from the first European descriptions (Dunn and Kelley 1989; Lovén 1935), as well as from excavations and artifact analysis (Berman and Hutcheson 2000; Keegan 1997) that the Lucayan Indians of the Bahama and Turks & Caicos Islands utilized many forms of basketry, woven fabric, and spun cordage. Lucayan remains of baskets, fabric and cordage are rare artifacts; thus negative basketry impressions are our only link to the everyday items used by these people. As more Late Lucayan sites are examined, I believe a complex aesthetic culture with depth and diversity on personal and community levels will emerge. The Long Bay site, San Salvador Island, like other Late Lucayan occupation sites, has a number of negative basketry impressed ceramics. This class of artifact is critical to our understanding of Lucayan fiber art, technology, and expertise. This paper will discuss the weave types and materials identified at the Long Bay site, located on San Salvador Island. Comparisons to findings from other sites on San Salvador, and one burial from Eleuthera, will help expand our understanding of Lucayan basketry technology and grammar. While overall homogeneity is seen, some striking inter-site and inter-island differences were noted. I suggest that the weaver's selection of patterns and materials expresses aspects of personal and group identity or boundaries.

Nous savons depuis les premières descriptions européennes (Dunn et Kelley, 1989; Lovén1935), ainsi que des fouilles et de l'analyse d'artefacts (Berman et Hutcheson 2000; Keegan1997) que les Indiens Lucayan du Bahama et des îles Turks et Caicos utilisaient de nombreuses formes de vannerie, tissus, cordages et filets. Parmi les vestiges Lucayan; paniers, tissus, et cordages, sont des objets rares; ainsi, impressions de vannerie eu negatifs, sont notre seul lien avec les objets du quotidien utilisés par ces personnes. Commes les sites se fouille Lucayan sont posterieurs, je crois qu'une culture esthétique complexe avec de la profondeur et de la diversité sur le plan personnel et communautaire verra le jour. Le site de Long Bay (SS-9), l'île de San Salvador, comme d'autres sites d'occupation Lucayan tardive, a un certain nombre de vannerie négatif imprimé céramique. Cette classe d'artefact est essentielle à notre compréhension de l'art Lucayan utilisant des filaments de textile, la technologie et l'expertise. Ce document traite des styles et des matériaux, amure identifiés sur le site de Long Bay, situé sur l'île de San Salvador. Les comparaisons avec les résultats d'autres sites sur San Salvador, et un enterrement de Eleuthera, nous aiderons à élargir et à approfondir notre compréhension de la technologie de la vannerie Lucayan et la grammaire. Alors que l'homogénéité globale est considérée, des différences inter-sites et inter-îles frappantes ont été observées. Je fais l'hypothèse que la sélection de la vannerie s'est exprimé quant au choix des motifs et des matériaux utilisés réfletant son identité et les limites de son groupe.

Aprendemos de las primeras descripciones europeas (Dunn and Kelley 1989; Lovén 1935) tanto como de las excavaciones y análisis de artefactos (Berman and Hutcheson 2000: Keegan 1997) que los Indios Lucayan de las islas de las Bahamas y de los Turks y Caicos utilizaban muchas formas de cestería, de tela tejida y de cordones hilados. Es raro encontrar cestas, tela y cordones entre los restos mortales de los Lucayan por lo que impresiones negativas de cestería componen para nosotros los únicos vínculos a la vida cotidiana de aquella cultura. A medida de que la investigación continue a otros lugares de los Lucayan en Sus Últimos Tiempos, creo que aparecerá una cultura de un estetico complejo con una profundidad y una diversidad de nivel personal y de nivel de comunidad. El lugar Long Bay, Isla de San Salvador, como otros lugares de los Lucayan en Sus Últimos Tiempos, contiene casos de cerámica con impresiones negativas de cestería. Este tipo de artefacto es crítico para nuestro entendimiento del arte de fibra, tecnologia, y pericia. Este documento se tratará de tipos de tejido y de materias

identificados en el lugar de Long Bay ubicado en la Isla de San Salvador. Comparaciones con descubrimientos de otros lugares de San Salvador y con un entierro de Eleuthera extenderán nuestro conocimiento de la tecnologia de la cestería de los Lucayan y su gramatica. Mientras que se ve homogeneidad en general, hay unas diferencias impactantes dentro de unos lugares y entre distintas islas. Sugiero que las selecciones de patrones y de materias muestren factores de identidad personal y de identidad de comunidad o de limites.

Introduction

Negative basketry impressions are the primary means of study for fiber artistry and technology in the prehistoric Bahamas. Fiber and textile remains are rare in the archaeological record except for limited circumstances, such as dry caves or waterlogged locations (Adovasio 1977; Croes 1989; Petersen et al. 1997). Spatial distribution, variation, and technological traditions of basketry and other fiber technologies provide useful information on social and ethnic group affiliations (Adovasio 1974, 1977; Petersen 1996). Impressed Lucayan ceramics can be securely dated from the mid-to-late 11th century until the period of European contact, serving as temporal and cultural markers (Berman and Hutcheson 2000:419). I will present my findings from the negative basketry impressed ceramics from three sites on San Salvador Island (Figure 1), and one burial from the island of Eleuthera, Commonwealth of the Bahamas. First, I will discuss my findings from the Long Bay site (SS9), and then discuss their relationship to those from the Pigeon Creek dune 1 site (SS1), the Palmetto Grove site (SS2), and the New World Museum collection on San Salvador, as well as the Preacher's Cave site on Eleuthera.

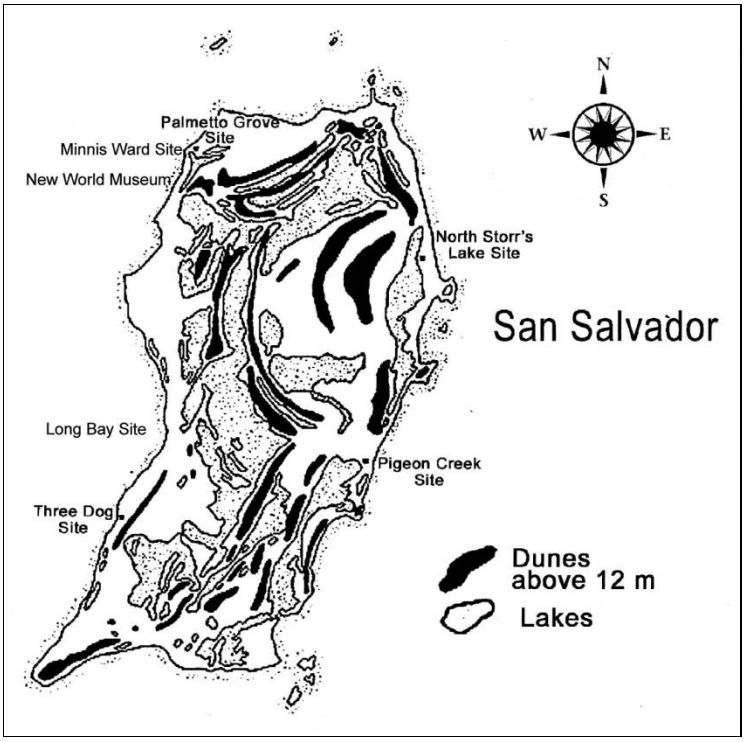

Figure 1. Map of San Salvador, Bahamas, showing the locations of the sites being discussed: Long Bay (SS9), New World Museum, Palmetto Grove (SS2), and Pigeon Creek (SS1).

THE SITES

Long Bay Site

The Long Bay site (SS9) is a Late Lucayan (terminal) occupation site [A.D. 1490-1550 (Bate 2011:216 Table 7.1)] located on the west side of San Salvador, only a short distance from the Long Bay settlement. According to the site's original excavator, Charles A. Hoffman, there may have been "a series of occupation or activity areas of varying intensities on the eastward-facing gradual slope behind the beach ridge of the Bay…a linear north-south distance of some 7 kilometers" (Hoffman 1987b: 98). From 1983 to 1992, Hoffman (1987a, 1987b) excavated the site to determine if there was evidence of Christopher Columbus' first landfall (Bate 2011:4; Blick 2011; Blick 2014; Keegan 1992; Rouse 1948:544). In his estimation there were sufficient period Spanish artifacts found at the same level with native materials to affirm this (Brill et al. 1987; Hoffman 1987a, 1987b; Keegan and Mitchell 1987). Artifacts found at the site, along with local Palmetto ware and non-local Amerindian pottery, included Spanish ceramics, a coin, yellow and green glass beads, bronze buckles, and various other metal objects and fragments (Hoffman 1987a, 1987b). Emma Bate (2011) focused on the ceramic artifacts at the Long Bay site in her Ph.D. dissertation and found examples of all three of the Palmettan Ostionoid ceramic sub-series: Abaco Redware, Crooked Island ware, and Palmetto ware (*sensu* Granberry and Winter 1995).

Palmetto Grove Site

The Palmetto Grove site (SS2) is also a Late Lucayan site (cal. A.D. 1280-1460 intercept 1410, calibrated at 2 σ (Stuiver et al. 1993); [Berman and Gnivecki 1995:429]), located on the northwest coast of San Salvador, situated on the north slope of a low ridge near a small bay (Hoffman 1970:4). This is the first systematically excavated Lucayan site in the Bahamas and is the type-site for Palmettan Ostionoid ceramics or Palmetto ware as Hoffman (1967, 1970) called it. Charles A. Hoffman, Jr. (1967) carried out the excavation in 1965 and 1966 for his Ph.D. dissertation. He felt the site to be a rough circular formation of about 100 m in diameter. His excavations yielded ceramics (Palmetto ware and non-local), shell, coral, stone, and bone tools, ornaments/trinkets, and faunal remains (Hoffman 19676, 1970).

Basketry impressed sherds were described by Hoffman (1967:46, 1970:12), but he did not feel they were a purposeful decoration, and thus did not count them or separate them from the plain ware. I examined the negative basketry impressions at Palmetto Grove, and not only found a variety of weave types and materials that served as the weave elements, but also found the first representation of spun thread woven into fabric in the Bahamas (Hutcheson 2001). Columbus described spun thread and fabric in the diary of his first voyage (Dunn and Kelley 1989; Morrison 1962), but artifact evidence was lacking until this impression was described.

Pigeon Creek Site

The Pigeon Creek site (SS1) is on the southeast coast of San Salvador, on two northeast trending dunes at the head of Pigeon Creek (Rose 1982). This site has two discrete components: Dune 2 is an Early Lucayan period site (Berman and Hutcheson 2000: Table 2; Berman et al. 2013) and Dune 1 dates to the Late Lucayan period (Berman 2011: Table 7.4; Berman and Hutcheson 2000: Table 3; Rose 1987: Note 19), although there may be an Early Lucayan component here, as well (Rose 1982, 1987). Pigeon Creek is one of the largest Lucayan sites in the archipelago, and

the largest on San Salvador, "measuring roughly 12 acres [4 hectares] in area" (Rose 1982:131, 1987:325). This site has the highest percentage of basketry impressed ceramic material of any assemblage, as well as the largest variety and complexity of weave types that I have studied to date (Berman and Hutcheson 2000; Hutcheson 2001, 2008a, 2008b, 2011, 2013). Other artifacts include a shell tool kit; shell, bone and stone tools; shell ornaments and shaped drilled beads; a shell incised "*çemí* mouth, a carved shell insert from a "zemi" or "çemí" (Oliver 2009:3), possibly from a wooden *duho* (seat or stool) or wooden figurine; a limestone hoe, a miniature jadeite petaloid stone axe, jadeite fragments, aragonite fragments, greenstone and basalt fragments, and miniature stone pestles (Berman 2011; Berman and Hutcheson 2000; Rose 1982, 1987); large numbers of deep water, coastal, and reef fish bones (Whyte et. al 2005); large amounts of *Codakia orbicularis* remains (Rose 1982, 1987) and charred wood (fuelwood) and macrobotanical remains (Berman et al. 2013).

New World Museum

An unquantified number of artifacts from many areas of the island are found at the New World Museum. Mrs. Ruth Wolper founded the museum, and for approximately 10 years she collected Lucayan artifacts from all over the island, focusing mainly on the Palmetto Grove and Pigeon Creek sites (Hoffman 1970:4). Unfortunately, very little is known about object provenience. Regardless, I thought it was important to study this collection because it has such a large number of impressed ceramics, many in excellent condition. I was trying to determine if the site of origin could be surmised, but more so, to see if there were undiscovered complex weave patterns. I compared weave type, element details, basketry material data, sherd condition, sherd size, and made comparisons to basketry impressed ceramics from known sites in an attempt to determine the possible site of origin for some of the collection's basketry impressed ceramics with some tentative success (Hutcheson 2011). I determined that it is possible through these comparative means to suggest a site of origin for a number of the sherds in this collection. Additionally, I was gratified by the identification of a second type of fabric construction and a heretofore undescribed lashed selvage technique (Hutcheson 2011).

Preacher's Cave Site

The Preacher's cave site is located on the northern tip of Eleuthera. The cave is known as the landing site of the "Eleutherian Adventurers;" in 1648; they were the first English settlers in the Bahamas, although many of them had previously lived for a time in the English colony of Bermuda (Craton and Saunders 1992). In 1992 the Archaeological and Historical Conservancy and Research Atlantica conducted an investigation of the cave excavating 11 test units which resulted in locating a seventeenth century hearth feature and two European graves, possibly associated with the Eleutherian Adventurers (Carr et al., 1993). Between 2005– 2007, three additional excavations were carried out; the cave yielded a total of four European and seven Lucayan graves (Schaffer et al. 2012:50).

Two of the prehistoric burials are of particular interest to this discussion, due to the preparation of the bodies wrapped in basketry mats. These burials are believed by the authors to be contemporaneous dating to AD 1050- 1300 (Schaffer et al. 2012:52). Burial 3 consisted of a 25-30 year old male with a culturally modified Atlantic trumpet triton (*Charonia variegata*), a cache of 29 sunrise tellin (*Tellina radiata*) shells encased in red ochre, a fish bone scarifier placed behind the shoulders, as well as the semi-articulated scapula, humerus and

cervical vertebrae (C2–C7) of a sea turtle (i.e. Cheloniidae) at his feet (Schaffer et al. 2012:54). This man (burial 3) and woman (burial 1; aged 30-35 years at death) were placed on their sides, facing each other, and were wrapped in twill plaited mats. Ochre was present, perhaps on the mats, or perhaps on the bodies themselves, which is believed to be the cause for the staining (Schaffer et al. 2012:54). Numerous Lucayan sites on Eleuthera possess basketry-impressed ceramics (Granberry and Winter 1975; Sullivan 1974). The mat staining on the Preacher's Cave skeletons was the first time I have examined and described any of the basketry from Eleuthera.

Methods

Elsewhere, I have detailed the process and terminology I use to study negative basketry impressions (Berman and Hutcheson 1997, 2000; Hutcheson 2001, 2008a, 2011, 2013; McWeeney and Hutcheson 2006). In summary, a dental alginate mold is made from the impressed ceramics producing a positive of the basket face. An example of such a mold can be seen in Figure 2. A plaster cast is then made from the mold to represent the sherd. The cast exactly reproduces the sherd surface, and can be used for measurements if the artifact is no longer available. As seen in Figure 3, complex weaves are usually drawn out on graph paper. The pattern may be extrapolated, and an exemplar can be fashioned from this schematic to verify that the design can be woven and that the end result replicates the artifact. This example details the single complex weave from Long Bay, which will be discussed later.

The basketry attributes investigated, following Adovasio (1977) with additional terminology developed to describe attributes that are not apparent in actual basketry, such as "high" and "low" relief in impressions having an undulating surface (Berman and Hutcheson 2000), provide the basis for the weave identification and variation. When possible, vessel types are also noted (Hutcheson 2008a).

Figure 2. Pigeon Creek site sherd (SS1-2037) being unmolded from the alginate showing the basket face. The weave is wicker with bundled grasses for the stationary stripe and an active stripe of *S. palmetto*.

Additional Weave Terminology

With the description of the complex weave found at the Long Bay site, I feel it is necessary to introduce two additional terms. The terms "even twill" and "uneven twill" are adopted from Irene Emery's (1995) textile classification. "Even twills are those in which elements of each set pass over and under equal numbers of the opposite set. This makes the numerical order of both warp-and weft-interlacing the same on the two faces" (Emery 1995:92).

Until the Long Bay site "special" weave was found (see below), all twill plaiting thus far described in the Bahamas are what Emery calls "even twilling" (in this instance, 2/2). We now have what Emery refers to as an "uneven twill," "the basic

interlacing order of an *uneven twill weave* is such that no element passes over the same number of elements it passes under; thus the two faces are always structurally *dissimilar"* (Emery 1995:99, emphasis in original).

Sandra Clements Scholtz (1975) describes the difference: "An example of even twill is a 2/2 twill in which each element, weft and warp, passes over 2, under 2 elements of the opposite set. An uneven twill…[such as a] 3/1 twill [is where] one set of elements will pass over 1, under 3 and the other set of elements will do the opposite…over 3, under 1" (Scholtz 1975:66).

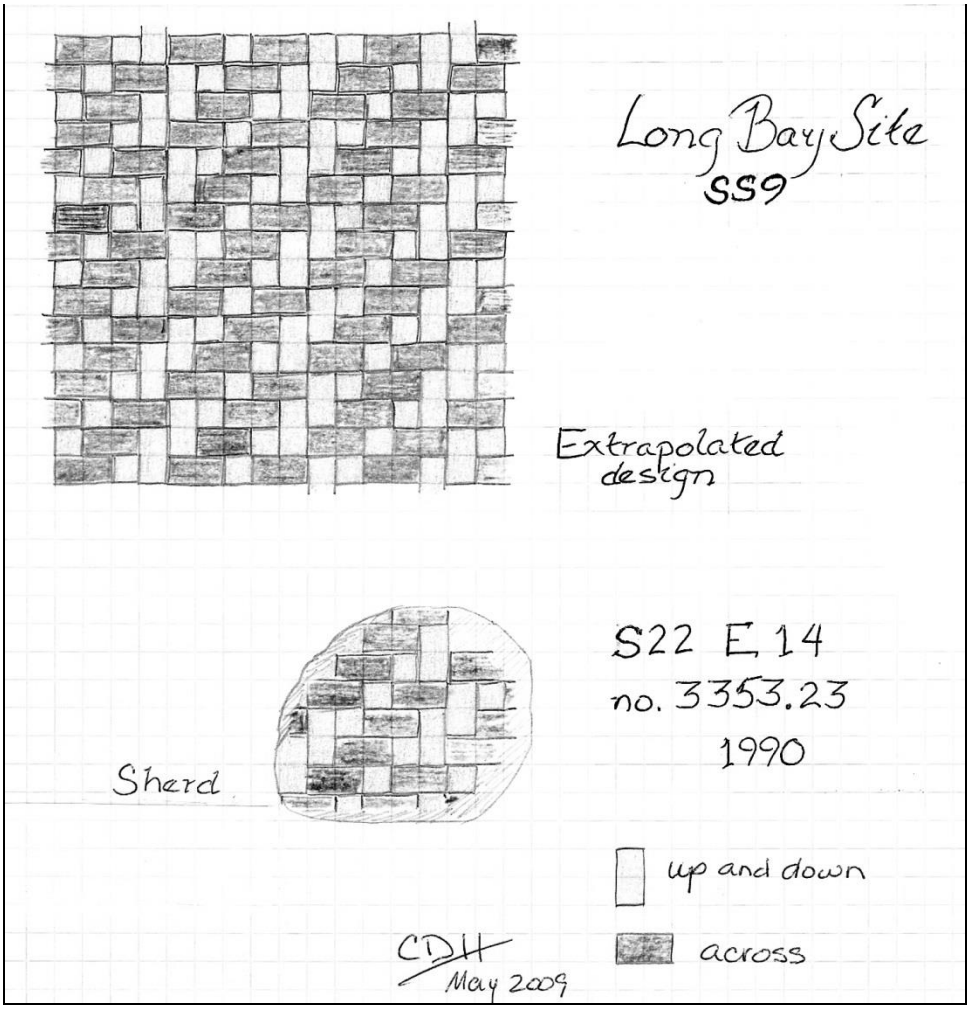

Figure 3. Schematic illustration of the single complex weave from the Long Bay assemblage (S22E14-3353.23). This process occurs with all complex weaves, followed by weaving the pattern with palm fronds or other materials (Illustration © C. D. Hutcheson).

The Long Bay Basketry

Emma Bate (2007, 2011) counted 5,447 ceramic sherds in the Long Bay site assemblage. She identified 327 (6%) as having negative basketry impressions. In 2008 and 2009, I examined these basketry impressed ceramics in order to identify the weaves, as well as element width, possible plant morphology, and sherd type and size. In the basket impressed assemblage, 43 weaves could not be classified because the size of the sherd was too small, the surface

was too eroded to detect clear impressions, or pre- or post- depositional wear rendered the impression unidentifiable. These were excluded from the study.

The basketry from the Long Bay site is well within the parameters for the other Late Lucayan period occupation sites on San Salvador, but with some significant differences. The Long Bay weaving findings are presented in Table 1. The basketry identifications include 2/2 twill plaiting (N=219), which are divided into low relief without shifts (N=179), low relief with shifts (N=16), high relief without shifts (N=22), and high relief with shifts (N=2); 1/1 simple plaiting (N=20), and wicker (N=45). All intentional pattern creating shifts noted in the Long Bay site collection are instances of the ubiquitous "A-Pattern" shift mechanism with its conspicuous pattern visualization [see Berman and Hutcheson (2000) and Hutcheson (2001) for details], with the exception of the only complex weave, which is unique to the Long Bay site. Figure 4 expresses the alterations made in the primary interval of interlacing of two-over-two (2/2) twill plaiting to create the "A-Pattern" shift mechanism.

Table 1. Long Bay Site Basketry Weaves.

Weave Type	No.	El Range	El Mean	% All Sherds	% BI Sherds
Overall (327 sherds)	327	1.8- 17.4	4.2	-	100.0
Simple Plaiting	20	3.42–17.4	8.4	7.04	6.1
Twill Plaiting All Sherds	219	1.8- 8.2	4.0	77.1	66.9
Twill LR w/o shifts	179	1.8-8.2	3.4	63.0	54.7
Twill LR /w shifts	16	2.3-5.9	3.9	5.6	5.0
Twill HR w/o shifts	22	2.5-7.5	4.3	7.8	6.7
Twill HR /w shifts	2	4.6-7.2	5.2	0.7	0.6
Wicker	45	1.8-6.5	3.3	15.8	13.8
Unidentifiable weaves	43	-	-	-	13.1
Selvage Edges[a]	(1)	-	-	-	-

Note: Total sherd count N=5,447, basketry impressed N=327 which is 6 percent of the assemblage (Bate 2007); identified weaves N=284 with N=43 unknown weave types. All measurements are in millimeters.

[a] The selvage edge impression is counted in the twill low relief weave category because it contains two mat body impressions and does not stand alone.

One selvage was identified on a sherd with two overlapping mat impressions, as seen in Figure 5. Both mats are twill low relief. The top mat terminates in a beautifully crafted self-selvage, while the other impression is from the body of a basket or a mat**.**

There are no instances of fabric at the Long Bay site. As with the other sites on San Salvador, there were no examples of coiled ("sewn") or twined basketry (Berman and Hutcheson 2000; Hutcheson 2001, 2011, 2013).

Before element widths are discussed, it should be noted that these widths are measured on fired ceramics, while the impressions were made on wet clay. Thus, measurements do not fully represent the actual dimensions of the raw materials due to shrinkage of the clay during drying and firing – the basketry elements were actually wider than reflected in these measurements, although they remain roughly proportional (Hutcheson 2001:188). Element width variation ranges from 1.18-17.4 mm with the vast majority being between 4-6 mm (71.6%) having a mean of 4.2 mm. Wicker exhibited the narrowest range of element widths for all weaving classes (range 1.18-6.5 mm) with a mean of 3.3 mm. Most wicker elements are between 2.2-2.9 mm (62.2%). Even so, it was not the only class

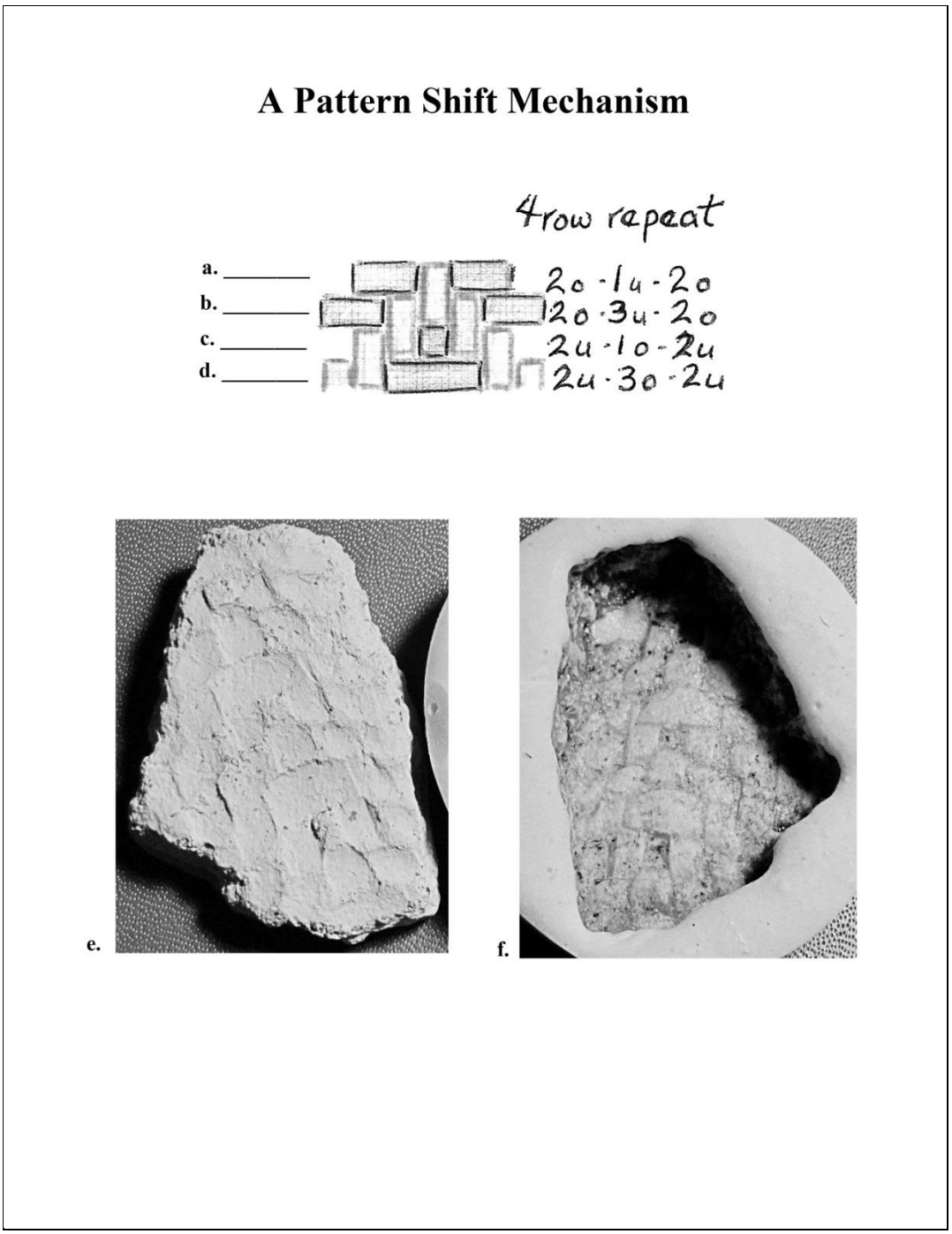

Figure 4. The "A Pattern" shift mechanism is the primary means of creating patterns in the Bahamas to date. The illustration shows the four-row repeat used in this sequence: (a) 2 over / 1 under / 2 over, (b) 2 over / 3 under / 2 over, (c) 2 under / 1 over / 2 under, (d) 2 under / 3 over / 2 under. The weaving from the opposite direction remains the primary 2/2 twill. Photograph (e) is of a Long Bay sherd (SS9-2145) while photograph (f) is of the alginate mold; both clearly show why this nomenclature was adopted, as the shifts create what look like stacks of the capital letter

"A". Photographs and illustrations © C. D. Hutcheson, digital imaging by Anne Sampson, Roanoke, VA (For a more in-depth description, see Berman and Hutcheson 2000).

Figure 5. Long Bay is the only site thus far to have an impression of two mats overlapping in a single sherd. This self-selvage (sherd SS9-3830.3) is the only finished edge in the Long Bay assemblage.

with fine elements. There is a single example in the category of twill plaiting low relief without shifts with elements of 1.8 mm. Twill low relief without shifts also had the largest element size (8.2 mm) for all twill plaiting. The majority of twill plaiting elements ranged between 3.0-5.9 mm (mean 3.4 mm), which constitutes 82 percent of the twill sample. Simple plaiting is the only class with element widths above 8.2 mm. Its range is quite wide, going from 3.4-17.4 mm with a mean of 8.3 mm; 67 percent range between 8-10 mm. Simple plaiting elements were primarily between 8-11mm (83.3%). Within the simple plaiting impressions, there were four ribbed elements measuring between 15.8 and 17.4 mm with a mean of 16.8 mm.

Overall, twill plaiting constitutes 77.1 percent (N=219) of all the weaves in the analysed impressions. Wicker is the next most abundant, while simple plaiting is rarer. As seen in Table 1, twill plaiting low relief without shifts is the most common weave at the Long Bay site, representing 63 percent (N=179) of the weaves observed.

Table 2 provides information on element shape and depth of the impressions. Depth of impression is closely related to the material used in weaving, tightness of the weave, and the force with which the basketry was impressed into the clay. Twill high relief presents a challenge when gathering depth of impression data, due to the undulating sherd surface. For clarity, I take two measurements referred to as "peaks" for the higher indentations and "valleys" for the recessed ones (Hutcheson 2001). The materials used in high relief are certainly a primary cause for this visual variation, and split cane, reeds, bark, or similar thick materials could have been used to produce this effect. Generally, the impressions are less than 1 mm in depth

(86.5%) in all categories of weaving, except for the "valleys" in the high relief examples, which are less than 1 mm only 1.6 percent of the time.

Table 2. Long Bay Site Element Shape and Depth of Impressions.

Element Shape by Number of Sherds

	Flat	Semi-Round	Ribbed	Round	Fibrous
Simple Plaiting	14	2	4		
Twill LR	186	8			1
Twill HR	21	2			1
Wicker	23	13		9	
Total per shape	244	25	4	9	2
Percentage of Total (284)	85.9%	8.8%	1.4%	3.2%	.7%

Depth of Impression by Weave Type

		Range	under 1 mm	over 1 mm
Simple Plaiting		0.29-1.46	14	6
Twill LR		0.19-1.52	176	10
Twill HR	"Peaks"	0.32-0.84	24	
	"Valleys"	0.72-1.73	4	20
Wicker		0.29-1.4	41	4

Note: Twill high relief has an undulating surface; therefore element depth was measured twice to reflect this variation. "Peaks" are the higher impressed areas; "Valleys" are the lower. All measurements are in millimeters.

There is a relationship between the element shape, the depth of impression and the basketry material. Unfortunately, we currently have little solid data on the raw materials that the Lucayans used to manufacture their baskets and mats; therefore, these relationships are poorly understood. At the Long Bay site, flat elements dominate: 244 (85.9%) of the 284 known weaves are made with flat elements, although not all are the same material. Round elements are the next most prevalent with 25 examples (8.8%), mostly in the wicker class. Semi-round elements make up 3.2 percent (N=9) of the sample, again mostly in the wicker class, but they are present in the other weave types. Ribbed elements (N=4) only occur in simple plaiting, and tend to be quite wide. The final element classification constitutes fibrous materials, and can be described as stringy uneven strands loosely held together. Fibrous materials are the least utilized throughout the sites studied, and there are only two examples (0.7%) at Long Bay.

Sherd Condition

Sherd condition is a major factor in the ability to study the negative basketry impressions in the ceramics. The size of the sherd and its physical state are important factors influencing whether basketry impressions can be observed and weaves identified. Many post depositional conditions affect the quality of the artifacts, their preservation, and hence their usefulness in this type of study. As noted, 43 sherds were too small, too worn, had concretions, or were broken in such a way that weave identification could not be performed. Other examples appear quite deteriorated, but, with the aid of the molding process, the data can be recovered. Table 3 shows the sherd size and condition of the basketry impressed Long Bay site ceramics.[1] As indicated, the Long Bay site sherds are

primarily small in size with many of them in poor condition. Additionally, with such small sherds, many 2-4 cm^2, a determination of the type of vessel is not possible.

Table 3. Long Bay Sherd Conditions.

		Size			Condition			Vessel[b]	
	Range	2-10	11-30	31-66[a]	Excellent	Moderate	Poor	Griddles	Bases
1/1 Simple	3-19	13	7		9	5	6	4	13
Twill LR	2-60	144	46	5	44	58	93	74	82
Twill HR	3-66	13	10	1	6	4	14	11	4
Wicker	2-16	41	4		8	14	23	16	19
Totals	2-66	211	67	6	67	81	136	105	118
Percentages		74.3	23.6	2.1	23.6	28.5	47.9	37.0	41.5

Note: Table includes only sherds with identified weaves; N=284. All measurements are in cm^2. [a]66 cm^2 is the largest sherd. [b]Sixty-one vessel types (21.4 percent) were unable to be identified due to size, erosion or spalling. "Bases" include all vessel types except griddles.

Discussion

Table 4 outlines the comparative data from the San Salvador site assemblages. These sites are generally contemporaneous and provisionally have a similar percentage of basketry impressed sherds in a comparable number of ceramic artifacts. At the Pigeon Creek dune 1 site, Rose (1982) indicates a much higher number of "mat marked" ceramics (as he referred to them) (14%) than has been seen at any of the other sites thus far. My examination of the Pigeon Creek dune 1 ceramics included a portion of the sherds from all of the excavations that have been carried out at this site. Marjorie and Peter Pratt excavated the dune 1 site in 1973 and 1974 (Pratt 1974a, 1974b). Richard Rose carried out excavations between 1978 and 1982 with four field seasons averaging one month each (Rose 1982:131, 1987). Mary Jane Berman and Perry L. Gnivecki undertook excavations at Pigeon Creek dune 1 from 1996- 1998 and again in 2010. My study collection for the Pigeon Creek dune 1 site consisted of basketry impressed ceramics from the Pratt excavations, the Rose collection, and also some from the first period of excavations by Berman and Gnivecki, resulting in only 7.8 percent of the ceramics bearing impressions. While it is possible that the Pigeon Creek dune 1 site has nearly double the percentage of impressed sherds found at the other sites evaluated, until the total assemblage has been completely examined, this cannot be determined. At present, the frequency of basketry impressed pottery from the Long Bay (6%), Palmetto Grove (6.8%), and Pigeon Creek (7.8%) sites are roughly comparable.

As the following discussion suggests, there appears to be variability of the weave patterns among the sites. This could, in part, be attributed to a number of variables, among them post depositional processes that affect the viability of the sherds or the visibility of the impressions, sampling strategies, incomplete investigations at some sites, and storage condition issues, to name a few. I suggest, however, that the Lucayans were the source of weave-type variation, that it was produced intentionally, and that it is based on community and cultural beliefs and practices. Adovasio and Pedler (1994:115) indicate that "…no class of artifacts normally available to the archaeologist for analysis possesses a greater number of culturally bound yet still visible attributes than does basketry."

Table 4. San Salvador Site-by-Site Element and Weave Variability

Element Width by Sites Investigated				
Site	No. Sherds	Range	Mean	%BI Impressed
Long Bay Site	327	1.8-17.4	4.2	6
Palmetto Grove Site	205	1.0-13.7	4.0	6.8
Pigeon Creek Site	265	2.0-17.0	6.3	7.8
New World Museum	208	1.4-15.6	4.9	

Note: The very narrow element widths seen at Palmetto Grove and the New World Museum collection are due to the presence of spun thread woven into fabric. All measurements are in millimeters.

Weave Type and Count per Site with Corresponding Element Variation

	1/1 Simple			2/2 Twill LR & HR			Wicker		
Site	No.	Range	Mean	No.	Range	Mean	No.	Range	Mean
Long Bay	20	3.4-17.4	8.3	219	1.8-8.2	3.4	45	1.8-6.6	3.3
Palmetto Grove	9	3.0-13.0	6.8	130	1.0-7.7	4.3	35	1.4-4.2	2.3
Pigeon Creek	68	2.8-17.0	7.0	159	2.5-12.5	5.7	29	2.9-5.5	4.0
New World Museum	18	3.6-15.6	9.1	161	2.0-10.6	4.5	13	1.9-4.8	3.1

Note: All measurements are in millimeters.

The Lucayans made specific choices and expressed them through their basketry and the ceramics they imprinted with the weaves. The ubiquitous twill plaiting is more evenly distributed throughout the sites, as well as being the most amenable to diverse designs. The inhabitants of the Long Bay and Palmetto Grove sites utilized wicker more than those at the Pigeon Creek dune 1 site. The Pigeon Creek dune 1 site had higher amounts of simple plaiting than the other sites, including more with ribbed material (Hutcheson 2001). The data show inter-site variability in the simple plaiting category, with it being nearly absent at the Palmetto Grove site. Wicker is not as common as twill plaiting, though it appears in the archaeological record more frequently than simple plaiting, with the exception of the Pigeon Creek dune 1 site, which yielded 68 examples (Hutcheson 2001).

There is little evidence of shape and/or function of the basketry forms in this type of artifact assemblage (fragments of basketry on fragments of ceramic sherds), but in general, both simple (1/1) and twill (2/2) plaiting are more flexible than wicker. Thus, carrying bags, mats, sieves, and some storage containers would be better suited to plaited weaving, while objects that must be rigid would more likely have been made with a wicker weave. On the whole, the

specific woven patterns in the twill plaited basketry would not affect the form or usage of the items created indicating that the weave designs are more likely personal or group driven rather than essential to the basketry function. That said, "even twill" plaiting is somewhat stronger than "uneven twill" plaiting (LaPlantz 1993:141). *Weaves and Designs*

The dominant Lucayan basketry weave type from all sites investigated thus far is "even twill" plaiting with a primary interval of interlacing of 2-over-2 (2/2) with offset rows, which produce the characteristic diagonal herringbone pattern. There are numerous other possible intervals of interlacing in even twilling utilized throughout the world such as 3/3 and 4/4 (Adovasio 1977:99; Emery 1995; Harvey 1977; Scholtz 1975), as well as the uneven twill weaves of 2/1, 3/1, or 3/2 to name a few (Emery 1995; Scholtz 1975). With four sets of elements the weaver may choose to produce a 2-over-2 even twill or a 3-over-1 uneven twill weave (Emory 1995:99).

There is one weave in the Long Bay site assemblage (S22E14-3353.23) that is striking because of its use of uneven twill in a 2/1 fraction as its primary interval of interlacing, which can be followed in the vertical rows seen in Figure 3 (2-1-2-1-2-1 sequence). The horizontal rows in the schematic illustrate how this sequence creates the patterning. This weave has an offset in a three row repeat:

2-2-1-2-2-2-2-2-1-2
2-1-2-2-2-2-2-1-2-2
1-2-2-2-2-2-1-2-2-2

The Long Bay example is the first weave to be described in the Bahama archipelago that uses an uneven twill (2/1) as the primary interval of interlacing, and it is the only complicated weave noted in this assemblage. While it does not look overly complicated, it is very sophisticated work, and differs significantly from the complex weaves identified at the other sites I have studied (Figure 6). This pattern is sufficiently different from the other identified weaves and tends to lend support to the idea that the weave designs may act as cultural and group identifiers on San Salvador (Berman and Hutcheson 1997, 2000; Hutcheson 2001, 2008b, 2011, 2013). The uniqueness of the weave can be attributed to a number of factors. First, since the weave design differs from others that have been observed, it may have been introduced to San Salvador by way of trade and exchange. We know that the Lucayans were involved in extensive inter-island trade and exchange networks (Berman 2011) and basketry items may have been among the articles that might have circulated (Berman and Hutcheson 1997, 2000; Keegan 1997). Additionally, the unique character could be attributed to function, as it appears to be woven with a species of palm, which would lend itself to many forms and uses. Finally, it may serve as an identifying symbol or signal.

That other patterns and variations of basketry are found throughout the archipelago is represented here by a burial at Preacher's Cave site, Eleuthera (Schaffer et al. 2012). This weave represents another variation not described previously. The presence of ochre, or some other treatment of the plaited materials such as heating or dying, caused the twill weave to stain the bones as the human burial contents decomposed. The staining was most pronounced on the woman (burial 1), where the weave was clearly discernible on the anterior aspect of the clavicle, and less so on the anterior aspect of left zygomatic arch (Schaffer et al. 2012). The markings were obviously the same weave on both bones.[2] I analyzed high resolution photos and found markings of a 2/2 twill plaiting with an unusual weave variation. The basketry had one wide element interlacing with two narrow elements laying side-by-side acting

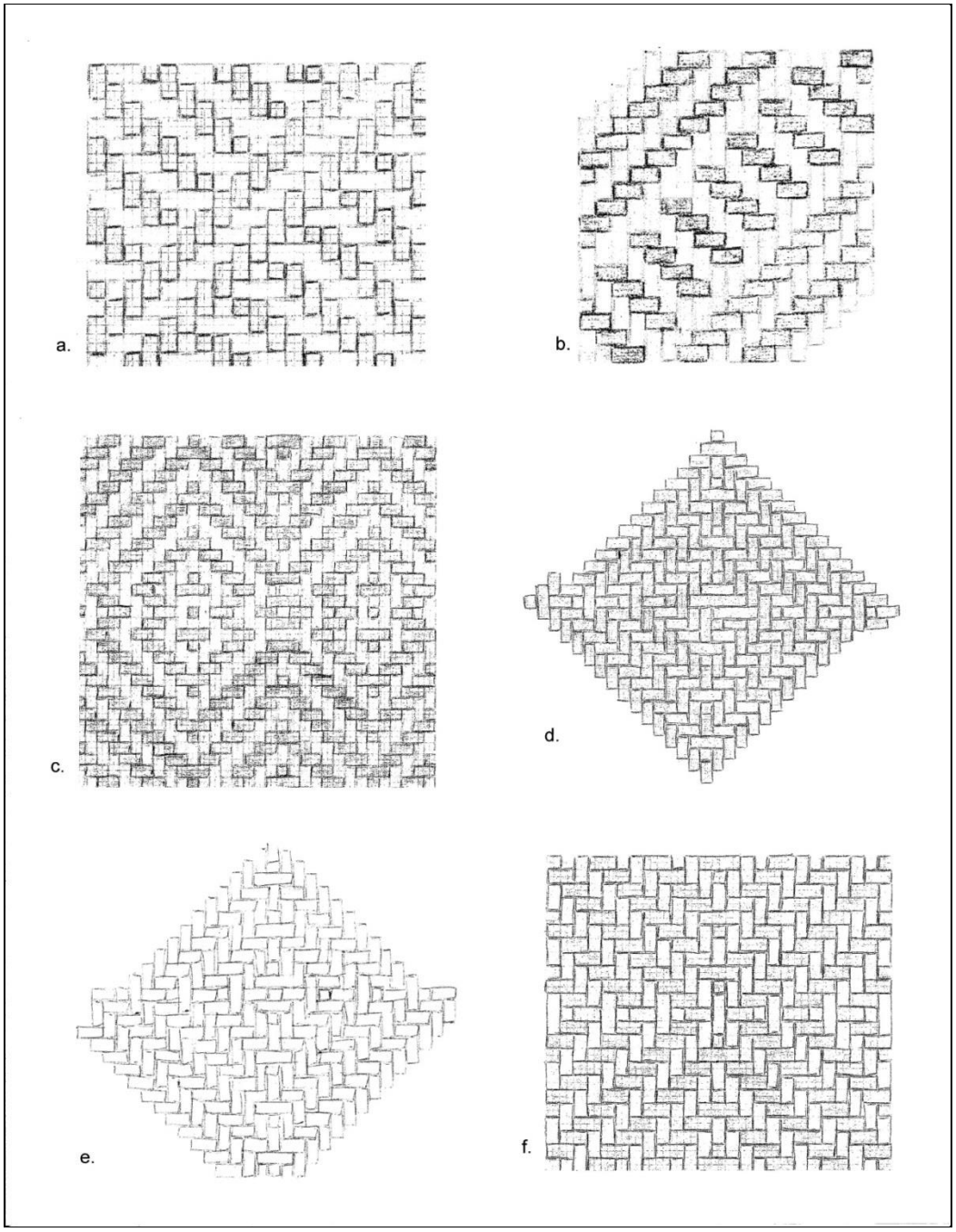

Figure 6. The complex weave patterns from the other sites studied on San Salvador: (a) Pigeon Creek - diagonal divide in the woven field utilizing a variation of the "A Pattern" shift; (b) Pigeon Creek - a border or divided a field; this is not an "A Pattern" shift design; (c) Pigeon Creek - complex design using the "A Pattern" in numerous directions; (d) Pigeon Creek - spiral weave; (e) Pigeon Creek - quartered field creating concentric lozenges; (f) Palmetto Grove - quartered field opposite orientation to concentric lozenges. For full descriptions of these weaves see Berman and Hutcheson 2000, and Hutcheson 2001, 2008b. [Illustrations © C. D. Hutcheson, digital imaging by Anne Sampson, Roanoke, VA.]

as a unit creating an identical width to the single element. Two or more elements acting as a unit does not alter the weave classification as long as this is constant throughout (Emery 1995:93). This simple replacement of two elements for one in the plaited mat is unlike any other basketry impression observed to date on San Salvador or the archipelago.

Schaffer et al. (2012) believe the mortuary treatment and accompanying grave goods may suggest these were high status individuals based upon ethnographic accounts of cacique burials (Colón 1984:106 in Schaffer et al. 2012:59), associations with creation myths, stories of potent zemis (*çemís*), and mythological and magico-religious beliefs (Schaffer et al. 2012:59-61). It is clear to me that the individuals in these graves were well regarded and care was given to them at the time of burial. Basketry played an important role in the lives of the Lucayans, and continued to do so in death.

Spun Fibers and Woven Fabric

The Long Bay site artifacts had no examples of spun fibers or woven fabric. Spun fibers[3] woven into fabric have been identified at two sites. Compact counter twined fabric has been identified from the Palmetto Grove site and twill fabric examples are in the New World Museum collection (Hutcheson 2001, 2011). The absence of textile impressions should not be construed as evidence that the inhabitants of the Long Bay site, or any of the sites that did not yield such finds, did not manufacture or use spun fibers and fabric. Other impressions of textiles surely exist in the archaeological record, but thus far have been limited to these two assemblages. We know that the Lucayans who interacted with Columbus used fabric, netting, cordage, and other spun fibers because he observed them and recorded them in his diary (Dunn and Kelley 1989; Morison 1963; Rose 1987:329; Rouse 1948; Sauer 1966).

The spun materials used in the woven fabric production are being investigated. Native cottons and members of the Agavaceae family (retted fibers) are likely possibilities (Hutcheson 2011; McWeeney and Hutcheson 2006), although other suspected materials include Hibiscus (Malvaceae family; retted bark) and Palmetto (*Sabal palmetto*; retted leaves). Manufacturing and material selection variations are culturally determined, as noted by Adovasio and Pedler (1994:115); thus I expect ultimately to find that several plant materials were spun into thread and woven into textiles.

Many of the plant impressions are extremely clear (Hutcheson 2008a, 2011, 2013), and some of the materials leave tantalizing morphological clues as to their identity (McWeeney and Hutcheson 2006). At the Long Bay site, as at all of the other sites studied, flat elements dominate the basketry-impressed assemblages. Currently, we believe that the Lucayans used various palms including *Sabal palmetto* (Palmetto) and *Cocothrinax argentea* (Silver Thatch palm), whole and split reeds, split canes (likely peeled), grasses, cattails (McWeeney and Hutcheson 2006), sedges (Hutcheson 2011), and other unidentified materials.

Several types of palm appear in the impressions from all of the sites (Hutcheson 2001, 2008a, 2011, 2013; McWeeney and Hutcheson 2006). At the Long Bay site there are four impressions that look very similar to *C. argentea,* the most prevalent palm used in modern Bahamian basketry (Hutcheson 2001:191). There are an additional four impressions with *S. palmetto's* distinctive veining morphology. Palm, thus far, has been primarily seen in twill plaiting throughout the island, but has also been occasionally seen in wicker as the flexible, active element. There are examples

of *S. palmetto* as the active element in wicker from the Pigeon Creek dune 1 site (Berman and Hutcheson 2000), the New World Museum collection (Hutcheson 2011), and the Long Bay site. It is interesting that *S. palmetto* ironically appears to be completely absent in the impressions at the Palmetto Grove site (Hutcheson 2001). Whether this is a function of availability, an artifice of site sampling, or a specific cultural choice is unknown at this moment.

Based on the appearance of the impressions, it seems that the Lucayans on San Salvador, for the most part, selected the same materials to weave their baskets. Whether or not this is simply due to wide availability and proximity, or some culturally compelling reason (mnemonic; spiritual) cannot be known until more information is available about the botanical environment of San Salvador during this period. Kjellmark and Blick (2014) found palm, sedge and grass pollen in a core sample from Triangle Pond near the Minnis-Ward site (SS3) (which is also close to the Palmetto Grove site). Jones (1997) in Berman and Pearsall (2008) also indicates the presence of palm pollen in an early (but undated) layer from a North Storr's Lake. Palms were present throughout Lucayan occupation of San Salvador and played a key role in Lucayan basketry; unfortunately we don't know whether species abundance at particular locales might have played into Lucayan weavers' material selection strategies.

Ribbed elements are only used in simple plaiting, and this is consistent throughout the island. We find considerably more impressions of ribbed elements at the Pigeon Creek dune 1 site than at the Long Bay site or the materials from the New World Museum, but are not present in the Palmetto Grove site assemblage (Hutcheson 2001:190). We have not been able to positively identify this material, as yet, but believe it may be cattail (*Typha latifolia*), a large stemmed member of the Poacea family (grasses), or a member of the sedge (Cyperaceae) family (Hutcheson 2001, 2011; McWeeney and Hutcheson 2006).

The fibrous elements in the two twill examples noted in Table 2 appear to be made of the same unidentified material. They may be climbing or running vines that were processed in some fashion. This same fiber is also seen in several twill impressions at the Pigeon Creek site, but again, absent from the Palmetto Grove site (Hutcheson 2001:191). All of these examples are either loosely woven or tightly woven shifting into a loosely woven section, and I have suggested that they may have been part of a sieve or winnowing basket.

Questions Pertaining to Function-Ceramics

There are seven Long Bay site basketry impressed sherds with heavy charring on the interior surface. The Pigeon Creek dune 1 site also yielded several sherds with similar charring (Berman and Hutcheson 1997; Hutcheson 2001). We know these Pigeon Creek dune 1 site vessels are tall and cylindrical with the charring on the interior lower third and only exhibit wicker impressions, sporadically placed, on the sidewalls from base to rim (Berman and Hutcheson 2000; Hutcheson 2001, 2008a). At the Long Bay site, the sherds are too small to accurately determine the size and shape of the vessels. Wicker, low relief twill, and simple plaiting were impressed into these latter vessels. I have speculated that the vessels at the Pigeon Creek dune 1 site might have been used as braziers, or containers to hold or transport hot coals (Berman and Hutcheson 1997; Hutcheson 2001).

Basil Reid indicates that in Trinidad and Tobago cylinder-shaped vessels that are charred on the interior may have been used for incense burning from the Suazan Troumassoid culture (Saunders 2005 in Reid

2009: 36). This would also be a viable function for the Pigeon Creek dune 1 site and Long Bay site vessels. Why such vessels would have been selected for basketry impressions is unclear. A few possibilities may be construed: if they were used as incense burners, then ritual use can be proposed and the impressions could be imbued with appropriate symbolism. If these vessels were used with hot coals then their purpose may have been to hold live coals overnight, transport coals to start a fire in a new location, or to gift fire to another. In the latter circumstance the impressions may act as a sign of ownership or a "gift" card. It is also possible that such designs were produced for purely aesthetic purposes.

Questions Pertaining to Function-Baskets

The Long Bay site basketry impressed assemblage has 10 tightly woven and eight loosely woven impressions confined to low relief twill without shifts, with one exhibiting both (Figure 7). The Pigeon Creek and Palmetto Grove sites have several impressions exhibiting tight-to-loose weaves (Hutcheson 2001). I believe that some of these smaller individual tightly and loosely woven impressions at the Long Bay site may in fact be part of a single piece of basketry, or a group of similar baskets. The fact that similar weaving is seen at all of the sites investigated suggests that the Lucayans had a specific function for these basketry items. As above, these impressions invoke images of sieves where a tighter weave might be near the rim for stability changing into a loose weave in the body of the basket.

Walter Roth (1929:32 Fig. 29, 34 Fig. 31) illustrates selected "farina sifters" (Figure 8) of various weave patterns with tighter weaving at the outer edges and loose, more open construction in the center. Soraya Serra Collazo (2005:68) describes impressions on La Huecan ceramics, Vieques Island, Puerto Rico, of a tri-axial open weave, with close weaving around the edges, and identifies the basketry type as a sieve.

Some of the very tightly woven examples from the Pigeon Creek site and the New World Museum collection have zigzag or chevron designs in the weave produced by upright and inverse use of the "A-Pattern" shift (Hutcheson 2011). This patterning is unlikely to affect the functionality of the basketry. Examples of similarly tightly woven impressions from the Palmetto Grove and Long Bay sites lack intentional shifts, but could have functioned in a similar manner for comparable tasks.

The tightness of a number of these weaves gives the appearance of being watertight, especially if the baskets were kept wet so the elements remained swollen (Berman and Hutcheson 1997, 2000). The ethno-historic record indicates that the pre-European peoples of the Greater Antilles created watertight baskets, but it is generally believed they were double-walled (Oviedo in Lovén 1935:461-462), which cannot be ascertained with these artifacts.

The evidence suggests that the Lucayans had access to many plant materials for their basketry, fabric and cordage as well as possessed a large weaving repertoire (Berman and Hutcheson 2000; Hutcheson 2001, 2013). Native Americans, in both hemispheres, believe all daily use items and their production, especially basketry, possess cosmological and social significance (Anderson 2005; Guss 1987; Reichel-Dolmatoff 1985; Roth 1929; Wilbert 1975). Christopher Tilley (1999: 57-59) notes: "small-scale societies' technology is inseparable from ideas of spiritual or ancestral involvement in the production process…. The 'economic,' 'social,' 'ritual,' 'magical' and 'political' dimensions of technological processes cannot be meaningfully separated out and put into discrete boxes."

Among the Yekuana, Guss (1989:70) relates how every action of production,

especially basketry, which includes selecting design elements, has social and ritual meaning with material production always tied to and incorporated into the greater cosmic perspective. This was true for the pre-Columbian populations of the Caribbean, as well.

The Lucayans' use of a combination of weaves, natural materials processed in numerous ways, and designs for specific basketry items, suggests a sophisticated basketry technology and aesthetic. The choices made on the individual level most likely carried codes representing family, lineage, community, societal affiliation, and/or cosmological significance.

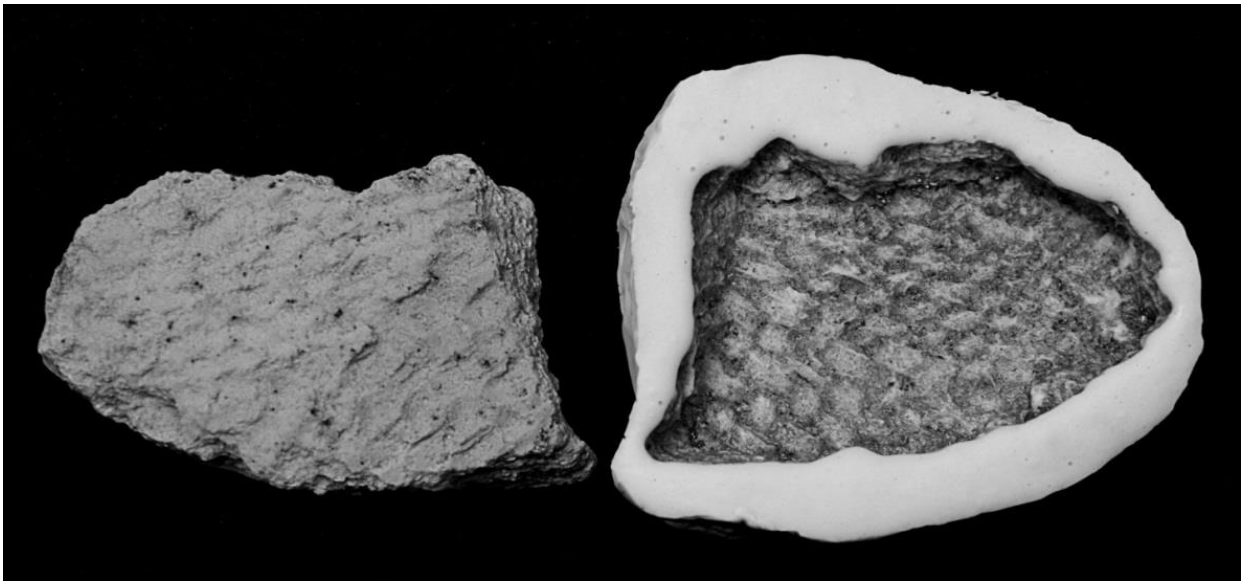

Figure 7. Sherd SS9-0494 from the Long Bay site exhibits both tightly woven and loosely woven basketry-impressions. The weave is 2/2 Twill Low Relief without shifts.

Conclusions

The basketry weaves identified at the sites on San Salvador include simple plaiting, twill plaiting, and wicker. All twill plaiting on the island has a primary interval of interlacing of two-over-two (2/2). The funerary mat from Preachers Cave, Eleuthera, also exhibits 2/2 twill construction. The primary shift mechanism throughout is the "A-Pattern", although the single complex weave from the Long Bay site utilizes the twill fraction of 2-over-1 (2/1). While it is clear that there is a shared basketry grammar and technology during the Late Lucayan period of San Salvador, each community made similar, but not identical, choices most likely based on a collective cultural idea of aesthetic and socially determined traditions (Guss 1989; Oliver 2009; Reichel-Dolmatoff 1985; Roth 1929; Wilbert 1975). There was room in the basketry production for individual or small group / community / family expression, which may have served the purpose of establishing boundaries and identities within their larger group. This may be shown through the selection of two distinctly different complex weaves at the Long Bay and Palmetto Grove sites, and to a lesser degree, the selection and utilization of various materials, such as a lack of *S. palmetto* at the Palmetto Grove site.

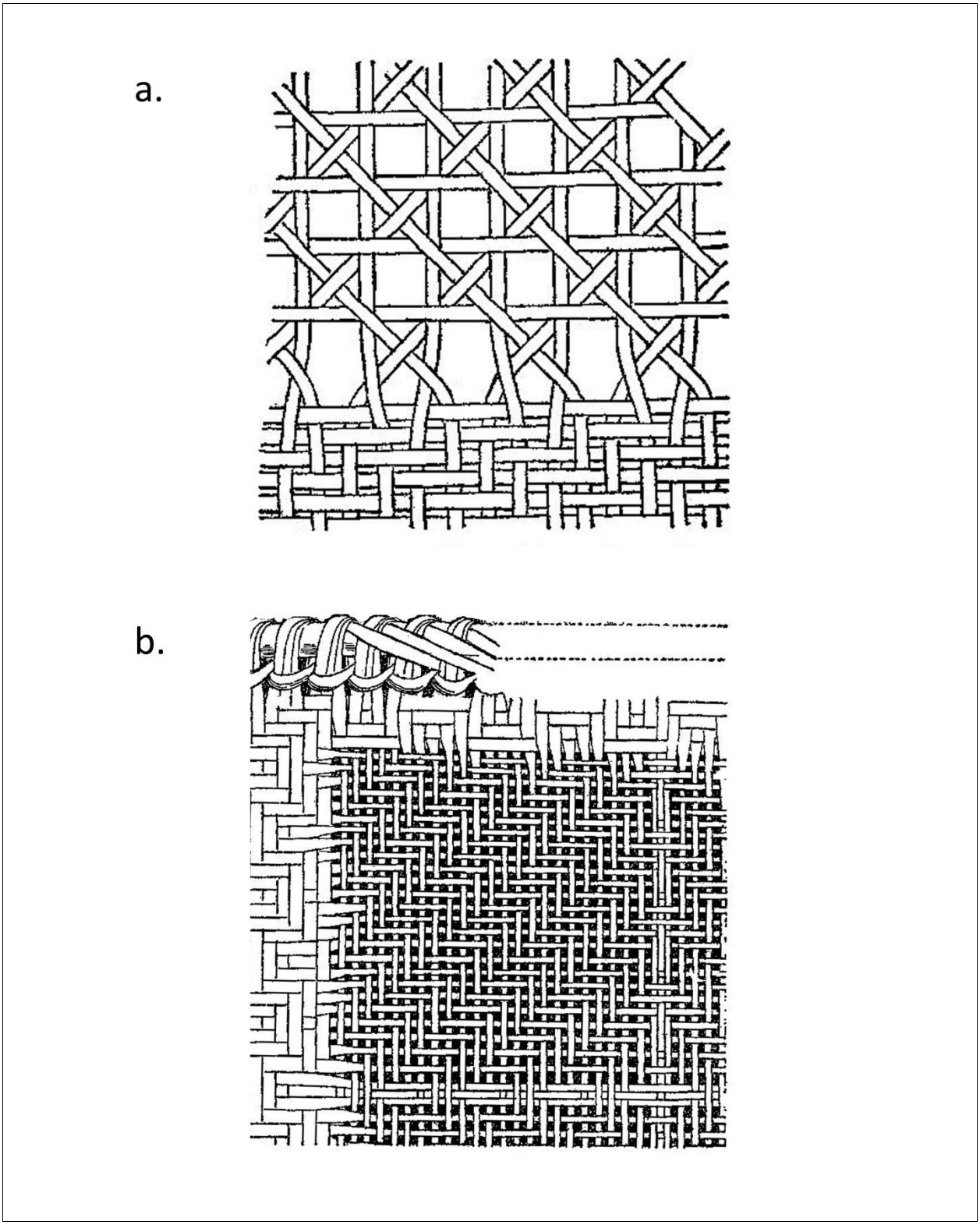

Figure 8. Walter Roth (1929) illustrates sieves in two weaves: (a) Wapishana sifter with crossed quadrilateral pattern (Fig. 29) and (b) Waiwai sifter central portions of the elements trimmed, creating a loose weave with full-sized elements tightly woven terminating in a supportive selvage (Fig. 31).

All Lucayans on San Salvador favored twill plaiting over all other weaves. It is the most versatile of the plaited traditions, yet there is notable variation articulated site-to-site in the use, or lack thereof, of simple plaiting and wicker. There is little element width variation overall, but basket weavers from the Pigeon Creek dune 1 site seemed to prefer slightly wider widths. As stated above, there are some notable differences in the selection of materials, especially palms.

James Gifford noted of ceramics, "out of what may appear to be a mass of variation, regularities, or laws, of cultural process may be discerned, delineated, and described" (Gifford 1960:341). I have tried to find the variation and similarities within the basketry impressions made by the Lucayans. There are patterns now emerging that begin to shed light on the personal and social choices, social group identity, and functional differences as expressed through the basketry of the Late Lucayan period occupants of San Salvador and the archipelago at large.

Notes

1. The sherd condition designations do not denote use wear, but rather the physical condition of the artifact upon examination.

2. 2012 W. C. Schaffer, R. S. Carr, J. S. Day and M. P. Pateman *International Journal of Osteoarchaeology* (22): 45–69 to see photographs of the basketry stained bones, or go to wileyonlinelibrary.com DOI: 10.1002/oa.1180.

3. The gauge of these spun fibers cannot be determined accurately due to the nature of the artifacts: fabric impressed on wet clay, dried and then fired causing shrinkage. This can be calculated if the percentage of shrinkage is known.

Acknowledgments. *I would like to thank Dr. Donald T. Gerace, Chief Executive Officer, and Dr. Tom Rothfus, Executive Director, of the Gerace Research Centre, San Salvador, Bahamas; Michael P. Pateman of the Antiquities, Museum and Monuments Corporation, Nassau; Dr. D. Gail Saunders, former director of the Bahamas Archives; and Emma Bate for inviting me to study the Long Bay impressed ceramics. Additionally, I want to profusely thank Mary Jane Berman and Perry L. Gnivecki for all of their instruction and support from the beginning of my studies on the basketry traditions of the Lucayans. Lastly, thank you to all who have read, edited, and made suggestions for this, and other papers, through the years.*

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