AMERINDIAN CERAMIC REMAINS FROM FOUNTAIN CAVERN, ANGUILLA, WEST INDIES

JAMES B. PETERSEN
Research Associate, Section of Anthropology

DAVID R. WATTERS
Associate Curator, Section of Anthropology

ABSTRACT

Fountain Cavern on the island of Anguilla in the West Indies is a subterranean archaeological site containing prehistoric petroglyphs, artifacts, and faunal remains and, as such, is a rare occurrence in the northern Lesser Antilles. Amerindian ceramics were the predominant artifact category recovered from Fountain Cavern in 1986 during test excavations and limited surface collection. Of 780 specimens, 29 fragmentary ceramic vessels are defined with vessel lot and attribute-based methods, and 234 specimens are assigned to specific vessels. The Fountain Cavern ceramics are distinctive although generally similar to other post-Saladoid ceramics in the West Indies. The likelihood of interisland social interaction is inferred from ceramic temper data. The Fountain Cavern ceramics may be generally related to the Elenan Ostionoid subseries and apparently represent the remains of Amerindian ritual activities after ca. A.D. 600, and more specifically ca. A.D. 900–1200 or later.

INTRODUCTION

Amerindian ceramics are the predominant category of cultural remains recovered during archaeological testing in 1986 at Fountain Cavern, Anguilla, in the northern Lesser Antilles, West Indies. Fountain Cavern is unusual among Lesser Antilles archaeological sites in its subterranean setting and cultural remains. Various petroglyphs, Amerindian ceramics, associated fauna, and other remains are attributable to late prehistoric usage of Fountain Cavern, almost certainly for activities other than habitation. All of the ceramics, possibly excepting one vessel, document post-Saladoid usage of Fountain Cavern after ca. A.D. 600, and possibly more specifically A.D. 900–1200 or later. This report documents a substantial sample of the Amerindian ceramics from Fountain Cavern and complements a more complete report on the 1986 testing (Watters, 1991).

PHYSICAL SETTING

Anguilla occupies a pivotal location in the northeast portion of the Caribbean Sea. It is the most northerly of the relatively large islands in the Lesser Antilles chain, which stretches from Grenada in the south (lat. 12°N) to Sombrero in the north (lat. 18.5°N), and it lies 125 km east of the Virgin Islands, the easternmost group in the Greater Antilles. The closest major island is St. Martin located about 10 km south of Anguilla (Fig. 1).

Anguilla (including Scrub Island) is approximately 30 km (18.6 mi) long, with a maximum width of about 5.9 km (3.7 mi) and an area of about 91 km² (35 mi²) (Fig. 2). Its surficial geology consists almost exclusively of limestone over largely
obscured volcanic rocks. However, a few restricted exposures of altered andesitic tuff and altered basalt occur on the surface of the island. Although the exact maximum elevation is unclear, a discontinuous ridge near the north coast exceeds 61 m (200 ft) above sea level. Soils are relatively thin across Anguilla, consisting of a reddish-brown stony clay *terra rosa* in the uplands and a gray or black, poorly drained rendzina in the low areas. Limestone bedrock protrudes all across the island, but is especially prominent on the east and west headlands. Rainfall is limited and seasonal; relatively few natural sources of fresh water are present on the surface of Anguilla. The natural vegetation has been significantly altered, but likely consisted of evergreen bushland prior to modern disturbances, along with more limited areas of grassland, manchineel, mangrove, strand and rock pavement vegetation (see Watters, 1991, for expanded treatment of Anguilla’s physical setting and natural history).

Anguilla is a narrow, dry, and relatively flat island that epitomizes the “Limestone Caribbees” forming the outer arc of the northern Lesser Antilles. These carbonate islands stand in stark contrast to the rugged, mountainous islands of the volcanic, inner arc of the Lesser Antilles. Volcanic and limestone rocks occur together on a few “composite” islands, such as St. Martin and Antigua. Differences in the prehistoric archaeological record of the volcanic and limestone islands also are evident in terms of available food resources (e.g., Watters and Rouse, 1989) and apparently the onset of occupation (e.g., Watters, 1980:334–336). Limestone and volcanic islands also can be expected to produce different suites of “grit” (rock) and sand temper, as typically employed by Amerindian potters in the Lesser Antilles, and these differences potentially enable the tracing of the movement of...
Fig. 2.—Topography of Anguilla and location of Fountain Cavern (AL1) prehistoric site.
ceramic vessels and/or temper materials between islands (e.g., Donahue et al., 1990).

**Fountain Cavern Archaeology**

**Background**

Fountain Cavern is located in the first national park established by the Government of Anguilla. The park is situated on the north coast of the island at Shoal Bay. Fountain Cavern lies in the southern sector of the park about 250 m inland from the coast.

Between 6 and 16 January 1986, research at Fountain Cavern was undertaken at the request of the Anguilla Archaeological and Historical Society (AAHS) and the Government of Anguilla to assess the archaeological resources within the cavern. The study was necessary because Fountain Cavern is being considered for development as a facility to enhance Anguilla’s tourism.

Prehistoric remains were known from Fountain Cavern prior to the 1986 research. Although the presence of petroglyphs had been previously noted, the site was first recorded formally in 1979 by a research team from the Island Resources Foundation who verified the petroglyphs, reported evidence of other remains including ceramics, and identified 19 archaeological sites on Anguilla. Subsequently, in the 1980s, the newly formed AAHS surface-collected artifacts and recorded 12 petroglyphs at the site (Douglas, 1985, 1986a, 1989). AL1 is the site designation for Fountain Cavern.

**Field Methods**

Field methods involved a general survey of the floor of the cavern, excavation of test pits in selected parts of the cavern, and examination of known petroglyphs. At the request of the AAHS, the majority of the time spent in Fountain Cavern was devoted to excavation of test pits (Watters, 1991).

From an archaeological standpoint the cavern can be divided into two chambers (Fig. 3; see also Gurnee, 1989: plans 3, 4). Chamber 1 includes the area beneath the entrance and the domed ceiling in the front of the cavern and contains almost all of the observed cultural remains. Chamber 2 begins at a raised platform occupying the middle part of the cavern and continues west into its deepest recesses.

Fountain Cavern is entered vertically by way of a steel ladder. Under the entrance is a relatively level area from which the floor of Chamber 1 slopes sharply downward to the southeast, south, and southwest. Pool 1, a freshwater pool, is found along the south wall of Chamber 1. The floor of Chamber 2 is flatter than the steeply sloping floor of Chamber 1.

Extensive spalling from the ceiling and walls has occurred in Fountain Cavern and sediment depths are quite different between the chambers. In Chamber 1, major sediment deposits occur beneath the entrance, on the slope, and against the southeast and south walls. These deposits are composed of large quantities of coarse rock spall and only limited finer sediment. Sediment deposition in Chamber 2 has been negligible.

Three test pits were excavated in Fountain Cavern, two in Chamber 1 and one on the raised platform in Chamber 2. Each test pit was 1 m² and dug to bedrock. All natural and cultural materials were removed from each test pit. Deposits were screened through ½-inch mesh hardware cloth and cultural remains were segregated and bagged by units.
Test pit 1 in the southwest section of Chamber 1 was between the base of the large stalagmite with Petroglyph 12 and the base of a nearby flat-topped stalagmite with Petroglyph 11. Four strata were identified in test pit 1, but Stratum 4 was the principal deposit, extending to about 155 cm below the surface. The matrix included fragmented rocks and broken speleothems around which were cavities containing patchy accumulations of finer sediment. Excavation of test pit 1 was complicated by intrusion of the stalagmite base into the pit. The stalagmite occupied almost 50% of the bottom area of test pit 1 (see Watters, 1991: fig. 11).
Artifacts were found throughout test pit 1, some of which had slid downward through the crevices and holes among the rocks in Stratum 4. Modern coins, bits of plastic, and pieces of glass were found in several lower levels of test pit 1. As discussed below, cultural remains clearly were mixed at different depths and cannot be regarded as having been recovered from reliable stratigraphic contexts.

The second test pit, in Chamber 2 on the raised platform in the middle of the cavern, was excavated to confirm the apparently shallow depth of deposit and the paucity of artifacts in that area. The sediment in test pit 2, composed of bat excrement and decomposing limestone, did not exceed 5 cm above bedrock across most of the test pit. Two pieces of partially buried prehistoric pottery were recovered from the surface.

Test pit 3 was dug on the east side of the relatively level area beneath the entrance to Fountain Cavern. This location was chosen because of its position at the only known entrance to the cavern, its proximity to a number of petroglyphs, and the expected depth of sediment there. Two strata were identified in test pit 3. Stratum 1 overlies bedrock to a depth of about 30 cm. A number of crevices and holes penetrate into the bedrock and a fissure near the northwest corner reaches a depth of about 75 cm. Stratum 2 sediment occurred in these crevices and holes. Artifacts were recovered only from Stratum 1, which yielded both prehistoric and historic objects throughout the test pit. As in test pit 1, the artifacts occurred in a somewhat mixed context.

**Radiocarbon Dating**

Two shell (*Cittarium pica*) samples from test pit 1 were submitted to Beta Analytic, Inc., of Coral Gables, Florida, for radiocarbon dating. The first shell sample (AL1-RC1) yielded a date of 1220 ± 70 B.P. (Beta-15485), the second (AL1-RC2) 1130 ± 80 B.P. (Beta-15486). Conversion to the Christian calendar using the radiocarbon standard of A.D. 1950 indicates a date of A.D. 730 (range with one standard deviation of A.D. 660–800) for the first sample and a date of A.D. 820 (range of A.D. 740–900) for the second sample. The first shell was found at a depth of about 60 cm and the second at 72 cm. A small charcoal sample (AL1-RC3) from a depth of about 100 cm in test pit 1 dated to 1530 ± 140 B.P. (Beta-15824), or A.D. 420 (range of A.D. 280–560). None of these dates have been corrected given various questions about their reliability (see Watters, 1991).

Thermoluminescence dating on two sherds (Alpha-2872, -2873) from test pit 1 was unsuccessful because of “anomalous fading,” which most likely resulted from the presence of volcanic minerals in the sherds (report from Alpha Analytic, Inc., of Coral Gables, Florida).

**Recovered Artifacts**

A total of 2493 artifacts, faunal remains, and miscellaneous materials were recovered from Fountain Cavern during the 1986 fieldwork (Watters, 1991). Of these, 2037 (81.7%) originated in test pits 1, 2, and 3; 121 (4.9%) were collected from the cavern floor; and 335 (13.4%) came from uncertain provenience due to the collapse of some sediments in test pit 1. These materials have been classified as prehistoric ceramics, lithics, and a three-pointed stone; historic and modern ceramics, glass, plastic, and metal; miscellaneous materials including speleothems (cave deposits), unusual rock, botanics, “fossil wood,” organics, calcium carbonate crusts, and wood; and taxa of invertebrate and vertebrate faunas (Watters, 1991: tables 3–12).
Amerindian ceramic sherds dominated the artifact inventory, comprising 944 specimens. Of these, 782 (those with established provenience from excavated contexts and a few surface-collected specimens) were returned to the United States for analysis. Two were sacrificed for thermoluminescence dating and the other 780 specimens are reported here. Excluded from this study are sherds from disturbed contexts and most of the surface sherds collected by Watters in 1986, all of which were left on Anguilla, and an estimated 5000 to 5500 surface sherds (Douglas, 1985:11, 1986a:28) collected by various members of the AAHS prior to Watters' testing at Fountain Cavern.

Analytical Methods

Collaborative analysis of Amerindian ceramics from Fountain Cavern was undertaken in the Section of Anthropology, Carnegie Museum of Natural History, with subsequent examination of these remains at the University of Maine at Farmington. A standard vessel lot analysis was conducted. Vessel lot analysis is a technique previously applied to samples of Amerindian hand-built ceramics from northeastern North America (e.g., Petersen, 1980, 1985; Petersen and Power, 1985). The technique was first applied in the Caribbean region to Afro-Montserratian ceramics from the Harney site slave cemetery (Petersen and Watters, 1988) and is here applied to Caribbean Amerindian ceramics from the first time.

Vessel lot analysis attempts to reconstruct vessels, define the minimum number of individual vessels in a sample, and provide detailed documentary and comparable ceramic data. Such analysis can help correlate natural and archaeological strata, cultural features, and other provenience units of an archaeological site; assignment of ceramic specimens, like actually conjoining sherds, to a particular vessel establishes their common origin and contemporaneity.

Twenty-nine ceramic vessels were defined from a sample of 228 sherds and three fragments (30%) out of an available sample of 704 sherds and 76 fragments from Fountain Cavern (Fig. 4–7). Ceramic sherds minimally preserve both interior and exterior surfaces, whereas fragments preserve one or another or no original surfaces.

The defined vessel lots are described below by various attribute categories, or modes (Rouse, 1939:11–72, 1960, 1977). These ceramic modes (e.g., temper, texture, manufacture, etc.) represent potentially diagnostic attributes that may be discrete in temporal and/or spatial dimensions and therefore are of particular importance in archaeological research (see Tables 1 and 2).

Microscopic analysis of West Indian sherds has been rarely undertaken. This analysis combines microscopic and macroscopic techniques. Petersen first conducted a macroscopic analysis of the entire available ceramic sample trying to match specimens without consideration of associated provenience data. Sherds and fragments not assignable to a specific vessel were excluded from further analysis. Each tentatively defined vessel lot was then subjected to a detailed attribute analysis for each ceramic mode. Each specimen assigned to a specific vessel was carefully re-examined macroscopically and microscopically using a variable power binocular microscope (10×–50×). Geologist Gary Laverdiere at the University of Maine at Farmington later corroborated and refined Petersen’s initial temper identifications. Measurements were taken with needle-nose calipers accurate to 0.05 mm. Color values were recorded using Munsell soil color charts (Table 2).
Fig. 4. — Amerindian ceramics from Fountain Cavern. A. Exterior surface of vessel 2 rim sherd showing burnished finish. B. Exterior surface of vessel 3 rim sherd showing smoothed, somewhat irregular finish, and additive coil forming lip. C. Exterior surface of vessel 5 basal sherd showing smoothed finish, and pedestaled construction. D. Exterior surface of vessel 8 rim sherd showing burnished finish, and coil fracture on lower edge.
Fig. 5. — Amerindian ceramics from Fountain Cavern. A. Interior surface of vessel 24 rim sherd showing slipped and burnished finish on additive coil forming lip, and burnished interior finish. B. Exterior surface of vessel 24 body sherd showing burnished finish. C. Exterior surface of vessel 29 body sherd showing burnished finish.
Fig. 6.—Amerindian ceramics from Fountain Cavern. A. Exterior surface of vessel 3 body sherd showing smoothed finish. B. Exterior surface of vessel 4 body sherd showing slipped and burnished finish. C. Interior surface of vessel 4 body sherd showing burnished finish. D. Exterior surface of vessel
CERAMIC VESSELS

Temper

The temper in the defined vessels is similar and typically includes several distinctive temper constituents (Table 1; Fig. 8). Sharp angular quartz predominated in nearly all of the vessel pastes. The total temper comprises about 30–40% of the paste in 16 vessels (55%), over 40% in ten vessels (35%) and less than 30% in three vessels (10%). These frequencies include the presence of various other angular minerals with the quartz in at least 19 vessels, including feldspar, pyroxene, amphibole, tourmaline, schist, and garnet, among others, collectively subsumed within an “other” category. However, these other minerals are less well represented than the quartz in nearly every case. The quartz and other minerals are predominantly fine-grained in all vessels, less than 1.0 mm in maximum dimension, although lesser amounts of maximal medium (≥1.0 mm, ≤3.0 mm; N = 4 vessels) and coarse (>3.0 mm; N = 10 vessels) temper inclusions also occur. These particles range up to 4.10 mm and 6.20 mm.

In at least seven vessels, the quartz and other constituents seem to be associated with magnetite, which may have been a portion of an aggregate rock type that also included the quartz and some of the other mineral constituents. Only one vessel, 19, exhibits predominant magnetite and “other” temper (30–40%) with a lesser amount of quartz (20–30%). This vessel also has subrounded to rounded temper constituents, implying its origin as a sand. At least four to six other vessels have subrounded constituents, but most of the quartz and “other” constituents seem to have been derived from various crushed rocks and represent “grit” temper; thus the temper was likely derived from a combination of sand and grit in some cases, and more exclusively grit in other cases.

Other temper constituents include grog (crushed sherd), limestone, or possibly some other carbonate material, and muscovite mica. One vessel, 28, also contains 2–5% readily visible, fine to medium-sized garnets. The 25 grog-tempered vessels have mostly fine-sized grog, less than 1.0 mm in all cases, with occasional maximal medium (N = 10 vessels) and coarse (N = 1 vessel) constituents, ranging up to 3.10 mm. Grog constitutes less than 10% of the total paste in most cases (N = 16 vessels), but can comprise up to 10–20% (N = 5 vessels) and 20–30% (N = 4 vessels) of the paste.

Grog temper is not readily visible without magnification in most of the vessels (approximately 21) because it is generally too fine and sparse. The limestone temper was inferred from the occasional presence of a white, angular constituent and angular vesicles in the vessel pastes. The limestone temper has been eroded or leached away in many cases. It clearly does not represent shell temper as known from elsewhere in the Lesser Antilles and the Bahamas (e.g., Bullen and Bullen, 1972:144; Goodwin, 1979:241; Sears and Sullivan, 1978). Evidence that the whitish temper is not kaolin, as documented on St. Kitts (Goodwin, 1979:242), or volcanic tuff, as documented elsewhere (e.g., Petersen and Watters, 1988:178), is provided by its limestone-like eroded condition.

---

5 rim sherd showing smoothed finish. E. Exterior surface of vessel 6 body sherd showing burnished finish, and coil fracture on upper edge. F. Exterior surface of vessel 9 body sherd showing slipped and burnished finish. G. Interior surface of vessel 9 body sherd showing scraped finish and plastic flow. H. Interior surface of vessel 23 body sherd showing smoothed finish.
Fig. 7.—Amerindian ceramics from Fountain Cavern. A. Exterior surface of vessel 1 rim sherd showing carbonate encrustation. B. Interior surface of vessel 8 body sherd showing slipped and burnished finish, and coil fracture on upper edge. C. Exterior surface of vessel 10 body sherd showing smoothed finish, and coil fracture on upper edge. D. Exterior surface of vessel 11 rim sherd showing slipped and
The limestone temper is fine-sized in all cases and constitutes less than 10% of the paste in 15 of the 23 vessels where it is present. The fine-sized particles occur with lesser amounts of maximal medium (N = 14 vessels) and coarse (N = 5 vessels) particles in some vessels, ranging up to 3.8 mm, 4.30 mm, and 6.5 mm. This carbonate temper also occurs in larger amounts, 10–20% (N = 5 vessels), and 20–30% (N = 3 vessels) in some cases.

Muscovite mica, which is always fine-sized (<1.0 mm) and represents less than 10% of the paste, also occurs in at least six vessels. The mica may be an incidental inclusion in the paste, however, either from untempered clay, or derived from some coarser aggregate in conjunction with quartz and/or some other mineral temper.

The sum of these temper types suggests that some, if not most of the 29 defined vessels were not manufactured on Anguilla, or were made there using non-local clays and/or temper sources. In either case, these vessels likely reflect some degree of social interaction between islands in the West Indies, whether between Anguilla and the Lesser Antilles and/or the Greater Antilles. The “other” temper constituents almost certainly originated on one of the volcanic or composite islands, such as St. Kitts or St. Martin, and the quartz and magnetite likely had a similar origin. In particular, vessel 19, one of only two decorated vessels in the sample, exhibits a combination of subrounded or rounded quartz and black mineral sand, which appears nearly identical to temper in ceramics studied in several collections from volcanic islands (Petersen and Watters, 1988). Also, it was the presence of volcanic minerals that caused the failure of thermoluminescence dating in two sherds from Fountain Cavern. Geological studies are necessary to identify potential sources of such temper constituents on volcanic and composite islands.

Although precise temper data from the Lesser Antilles are rare, ceramic tempers from St. Kitts, particularly paste classes 1 and 3 (Goodwin, 1979:238–244) and others from Antigua (Hoffman, 1979), Grenada (Bullen, 1964:48) and St. Vincent (Bullen and Bullen, 1972:130–131, 142; Kirby, 1974:61), are only generally similar to those reported here. However, the sparse evidence on temper and paste is not necessarily comparable among Antillean studies. More detailed data from Martinique (Gauthier, 1974; Mattioni, 1982:6–17; Schvoerer et al., 1985) are likewise difficult to compare with the Fountain Cavern data, but again support the likely origin of at least some of the Fountain Cavern temper on a volcanic island. A recent petrographic thin section analysis of Amerindian ceramic samples from four islands in the northern Lesser Antilles also implies interisland interaction, especially the volcanic temper associations at Rendezvous Bay on Anguilla and Cupecoy Bay on St. Martin (Donahue et al., 1990:251).
Table 1.—*Fountain Cavern* ceramic vessel attributes.

| Vessel designation (Number of specimens) | 1 (1*) | 2 (2) | 3 (15) | 4 (20) | 5 (11) | 6 (7) | 7 (8) | 8 (40) | 9 (75) | 10 (2) |
|----------------------------------------|--------|-------|--------|--------|--------|-------|-------|--------|--------|--------|
| Temper                                 | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Quartz                                 | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Grog                                   | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Limestone                              | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Magnetite                              | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Muscovite mica                         | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Other                                  | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Texture                                | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Fine body                              | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Medium body                            | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Extrusive                              | x?     | x?    | x?     | x?     | x?     | x?    | x?    | x?     | x?     | x?     |
| Not extrusive                          | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Moderate consolidation                 | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Thorough consolidation                 | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Blocky angular fractures               | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Blocky platey fractures                | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Manufacture                            | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Coiled                                 | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Unknown                                | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| **Mean coil size (mm)**                | 11.70  | 12.15 | 10.00  | 9.50   | 12.10  | 11.75 | 9.20  | 10.05  | 10.55  | 12.00  |
|                                         | ×7.40  | ×9.00 | ×8.63  | ×6.98  | ×8.55  | ×9.20 | ×8.45 | ×6.20  | ×7.80  | ×6.85  |
| Surface finish                         | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Smoothed exterior                      | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Burnished exterior                     | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Slipped exterior                       | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Smoothed lip                           | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Burnished lip                          | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Slipped lip                            | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Unknown lip                            | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Smoothed interior                      | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Burnished interior                     | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Slipped interior                       | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |
| Scraped interior                       | x      | x     | x      | x      | x      | x     | x     | x      | x      | x      |

* Additional specimens curated by the Anguilla Archaeological and Historical Society.
| Vessel designation (Number of specimens) | 11 (3) | 12 (2) | 13 (2) | 14 (2) | 15 (2) | 16 (2) | 17 (4) | 18 (4) | 19 (1) | 20 (3) |
|-----------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Temper                                  |        |        |        |        |        |        |        |        |        |        |
| Quartz                                  | x      | x      | x      | x      | x      | x      | x      | x      | x      | x      |
| Grog                                    |        | x      | x      | x      |        |        |        |        |        |        |
| Limestone                               | x      |        |        |        |        |        |        |        |        |        |
| Magnetite                               |        |        |        |        |        |        |        |        | x      |        |
| Muscovite mica                          |        |        |        |        |        |        |        |        |        |        |
| Other                                    |        |        |        |        |        |        |        |        |        |        |
| Texture                                 |        |        |        |        |        |        |        |        |        |        |
| Fine body                               |        | x      | x      | x      | x      | x      | x      | x      | x      |        |
| Medium body                             |        |        |        |        |        |        |        |        |        |        |
| Extrusive                               |        |        |        |        |        |        |        |        |        |        |
| Not extrusive                           | x?     | x?     | x?     | x?     | x?     | x?     | x?     | x?     |        |        |
| Moderate consolidation                  |        |        |        |        |        |        |        |        |        |        |
| Thorough consolidation                  |        |        |        |        |        |        |        |        |        |        |
| Blocky angular fractures                |        |        |        |        |        |        |        |        |        |        |
| Blocky platey fractures                 |        |        |        |        |        |        |        |        |        |        |
| Manufacture                             |        |        |        |        |        |        |        |        |        |        |
| Coiled                                  | x      | x      | x      | x      | x      | x      | x      | x      | x      |        |
| Unknown                                 |        |        |        |        |        |        |        |        |        |        |
| Mean coil size (mm)                     | 9.90   | 12.20  | 10.35  | 7.05   | 11.30  | 11.40  | 12.65  |        |        |        |
|                                          | ×8.75  | ×7.25  | ×8.15  | ×6.35  | ×8.40  | ×8.10  | ×12.10 |        |        |        |
| Surface finish                          |        |        |        |        |        |        |        |        |        |        |
| Smoothed exterior                       |        |        |        |        |        |        |        |        |        |        |
| Burnished exterior                      |        |        |        |        |        |        |        |        |        |        |
| Slipped exterior                        |        |        |        |        |        |        |        |        |        |        |
| Smoothed lip                            |        |        |        |        |        |        |        |        |        |        |
| Burnished lip                           |        |        |        |        |        |        |        |        |        |        |
| Slipped lip                             |        |        |        |        |        |        |        |        |        |        |
| Unknown lip                             |        |        |        |        |        |        |        |        |        |        |
| Smoothed interior                       |        |        |        |        |        |        |        |        |        |        |
| Burnished interior                      |        |        |        |        |        |        |        |        |        |        |
| Slipped interior                        |        |        |        |        |        |        |        |        |        |        |
| Scrapped interior                       |        |        |        |        |        |        |        |        |        |        |
Table 1.—Continued.

| Vessel designation (Number of specimens) | 21 (1) | 22 (1) | 23 (13) | 24 (3) | 25 (1) | 26 (1) | 27 (5) | 28 (1) | 29 (2) |
|-----------------------------------------|-------|-------|---------|-------|-------|-------|-------|-------|-------|
| Temper                                  |       |       |         |       |       |       |       |       |       |
| Quartz                                  | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Grog                                    | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Limestone                               | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Magnetite                               |       |       |         |       |       |       |       |       |       |
| Muscovite mica                          |       |       |         |       |       |       |       |       |       |
| Other                                   | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Texture                                 |       |       |         |       |       |       |       |       |       |
| Fine body                               | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Medium body                             |       |       |         |       |       |       |       |       |       |
| Extrusive                               | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Not extrusive                           | x?    | x?    |         | x?    | x?    | x?    | x?    | x?    | x?    |
| Moderate consolidation                  | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Thorough consolidation                  |       |       |         |       |       |       |       |       |       |
| Blocky angular fractures                | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Blocky platy fractures                  |       |       |         |       |       |       |       |       |       |
| Manufacture                             |       |       |         |       |       |       |       |       |       |
| Coiled                                  | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Unknown                                 | x     | x     |         | x     | x     | x     | x     | x     | x     |
| Mean coil size (mm)                     | 12.20 | 10.70 | 9.30    | 11.00 | 12.15 | 9.80  | x     | x     | x     |
|                                         | 7.80  | 6.75  | 7.80    | 7.70  | 6.70  | 9.15  | x     | x     | x     |
| Surface finish                          |       |       |         |       |       |       |       |       |       |
| Smoothed exterior                       | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Burnished exterior                     |       |       |         |       |       |       |       |       |       |
| Slipped exterior                       | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Smoothed lip                           | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Burnished lip                          | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Slipped lip                            | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Unknown lip                            |       |       |         |       |       |       |       |       |       |
| Smoothed interior                      | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Burnished interior                     | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Slipped interior                       | x     | x     | x       | x     | x     | x     | x     | x     | x     |
| Scraped interior                       |       |       |         |       |       |       |       |       |       |

**Table 1.**—Continued.
Texture

The textural attributes for the 29 vessels include predominant pastes with a fine body (N = 26 vessels), and a few medium-bodied exceptions (N = 3 vessels) (Table 1). Consolidation was thorough to very thorough; only four vessels had moderate or less complete consolidation. Temper is extrusive from the surfaces on 15 vessels, particularly on the lower interior surfaces; the remaining vessels have little or no extrusive temper due to the apparently thorough degree of consolidation. Blocky angular fractures occur on 27 vessels; the other two have blocky platey fractures that reflect structural laminations and less complete consolidation. Structural laminations are present in various other vessels as well (Fig. 8B–D).

Manufacture

The presence of coil fractures confirms that coiling was employed to manufacture 25 of the 29 vessels. Although they are present, the coil fractures are indistinct in most cases (Table 1; Fig. 4D, 5C, 6E, 7B, C). Coiling cannot be verified for the other four vessels because they lack evident coil fractures. Mean coil dimensions for individual vessels were relatively small, ranging from 7.05–12.65 mm in height and 6.35–12.10 mm in thickness. Mean coil height and thickness for the entire sample (N = 23) are 10.83 mm and 8.00 mm, respectively (N = 23 vessels).

Surface Finish

A near even mix of smoothed (N = 13 vessels) and burnished (N = 16 vessels) exterior surfaces reflects a limited range of surface finish attributes (Table 1; Fig. 4–7), as these are closely related techniques (cf. Rye, 1981:89–90). An exterior slip was applied on at least 14 of the burnished vessels and one of the smoothed vessels (Fig. 6B, F, 7D, F, G, K). Slip thickness on six vessels shows a limited range from 0.05 mm to 0.15 mm. On the lip surface, 13 vessels exhibit smoothing and 13 burnishing; the other three vessels lack rim sherds. On interior surfaces, 14 vessels exhibit smoothing, 14 burnishing, and one both smoothing and burnishing. An interior slip was applied on at least seven of the burnished vessels and one of the smoothed vessels (Fig. 5A, 7B, I, L). Interior scraping, which is evident in at least four vessels towards the lower neck and/or body areas (Fig. 6G), may merely reflect incomplete smoothing or burnishing on the lower interior surfaces of some vessels.

Vessel Morphology

Few morphological attributes are available for this fragmentary sample, except for rim and lip attributes (Table 2; Fig. 9, 10). Two vessels exhibit square lips, two have pointed lips, and 22 rounded lips; three vessels lack preserved rims. One, likely two, vessels have incurvate rims, at least 18 vessels exhibit excursive rims, and eight or nine do not preserve enough rim to determine this attribute. At least 12 vessels also have a thickened lip, which was achieved with an additional portion of a coil, or whole coil variably affixed to the uppermost portion of the interior of the rim (Fig. 4B, 5A, 7I, L). This thickened lip form is typical of post-Saladoid ceramics in the northern Lesser Antilles, for example, the Marmora Bay complex, ca. A.D. 900–1200, on Antigua (Hoffman, 1979; Rouse, 1974, 1976: 36).

Two vessels, 1 and 2, seem to have been incurvate cylindrical bowls, at least one of which had a flat bottom (Fig. 9, vessels 1 and 2). Another vessel, not
Table 2.—Fountain Cavern ceramic vessel attributes, Munsell color designation key listed below.

| Vessel designation (Number of specimens) | 1 (1) | 2 (2) | 3 (15) | 4 (20) | 5 (11) | 6 (7) | 7 (8) | 8 (40) | 9 (75) | 10 (2) |
|-----------------------------------------|-------|-------|--------|--------|--------|-------|-------|--------|--------|--------|
| Morphology                              |       |       |        |        |        |       |       |        |        |        |
| Square lip                              | ×      |       | ×      | ×      | ×      | ×     | ×     | ×      | ×      | ×      |
| Rounded lip                             | ×      | ×      | ×      | ×      | ×      | ×     | ×     | ×      | ×      | ×      |
| Pointed lip                             | ×      |       | ×      | ×      | ×      | ×     | ×     | ×      | ×      | ×      |
| Unknown lip                             | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Incurvate rim                           | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Excurvate rim                           | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Unknown rim                             | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Thickened lip                           | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Unthickened lip                         | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Hypothetical bowl                       | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Unknown vessel                          | ×?     | ×?     | ×?     | ×?     | ×?     | ×?    | ×?    | ×?     | ×?     | ×?     |
| Flat base                               | ×      |       | ×      | ×      | ×      | ×     | ×     | ×      | ×      | ×      |
| Pedestaled base                         | ×      |       | ×      | ×      | ×      | ×     | ×     | ×      | ×      | ×      |
| Metrics (mm)                            |       |       |        |        |        |       |       |        |        |        |
| Lip                                     | 7.00  | 8.40- | 6.20  | 6.10  | 7.30- | 5.10  | 4.95- | 4.60   | 6.30   |        |
| 1 cm below lip                          | 10.10 | 9.70  | 6.30  | 6.10  | 7.55  | 5.05  | 5.75  | 9.70   |        |        |
| Neck                                    | 9.70- | 8.70- | 9.65  | 6.70  | 9.15- | 7.60  | 5.05  | 7.05   | 6.30   |        |
| 10.0                                    | 8.20- | 6.60- | 10.05 | 8.50- | 7.60  | 5.35  | 8.05  | 6.80   |        |        |
| Body                                    | 7.45- | 10.00 | 8.05- | 13.15 | 10.05 | 8.50  | 9.55  | 10.05  | 6.85   |        |
| 6.05-                                    | 10.05 | 8.55  | 13.15 | 12.55 | 8.50  | 9.55  | 10.05 | 6.85   |        |        |
| Base                                    | 12.40 | 18.10 | 18.90 | 13.85 | 7.50  | 6.60  | 17*97 | 62     |        |        |
| Oral diameter (cm)                      | 30    | 26    | 34    | 18    | 34    | 73    | 34    | 34     | 129    | 35     |
| Color (see below)                       |       |       |       |       |       |       |       |        |        |        |
| Exterior                                | 34    | 68    | 67    | 74    | 73    | 73    | 34    | 73     | 129    | 35     |
| Interior                                | 68    | 68    | 67    | 67    | 73    | 73    | 34    | 73     | 129    | 35     |
| Core                                    | 39    | 137   | 132   | 132   | 137   | 132   | 137   | 129    | 129    | 127    |
| Firing cloud                            | 132   | 42    | 41    | 70    | 41    | 70    | 41    | 70     | 41     | 70     |
Table 2. —Continued.

| Vessel designation (Number of specimens) | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
|-----------------------------------------|----|----|----|----|----|----|----|----|----|----|
| Firing                                  |    |    |    |    |    |    |    |    |    |    |
| Oxidized environment                    | x  | x  | x  | x  | x  | ?  | x  | x  | x  | x  |
| Reduced environment                     |    |    |    |    |    |    |    |    |    |    |
| Fast cooling                            | x  | x  |    |    |    |    |    |    |    |    |
| Slow cooling                            |    |    | x  | x  |    |    |    |    |    |    |
| Unknown cooling                         |    | x  |    |    |    |    |    |    |    |    |
| Decoration                              |    |    |    |    |    |    |    |    |    |    |
| None observed                           | x  | x  | x  | x  | x  | x  | x  | x  | x  | x  |
| Incision                                |    |    |    |    |    |    |    |    |    |    |
| White-on-red                            |    |    |    |    |    |    |    |    |    |    |
| Unknown                                 |    |    |    |    |    |    |    |    |    |    |

17—red (10 R 4/6); 23—dark red (10 R 3/6); 33—reddish brown (2.5 YR 5/4); 34—red (2.5 YR 5/6); 35—red (2.5 YR 5/8); 38—reddish brown (2.5 YR 4/4); 39—red (2.5 YR 4/6); 41—very dark gray (2.5 YR 3/0); 44—dark red (2.5 YR 3/6); 62—reddish yellow (5 YR 6/6); 64—gray (5 YR 5/1); 67—reddish brown (5 YR 5/4); 68—yellowish red (5 YR 5/6); 70—dark gray (5 YR 4/1); 73—reddish brown (5 YR 4/4); 74—yellowish red (5 YR 4/6); 88—reddish yellow (7.5 YR 7/6); 96—brown (7.5 YR 5/2); 97—brown (7.5 YR 5/4); 100—dark gray (7.5 YR 4/0); 101—brown/dark brown (7.5 YR 4/2); 102—brown/dark brown (7.5 YR 4/4); 104—very dark brown (7.5 YR 3/0); 109—white (10 YR 8/2); 127—grayish brown (10 YR 5/2); 129—yellowish brown (10 YR 5/4); 132—dark gray (10 YR 4/1); 133—dark grayish brown (10 YR 4/2); 137—very dark gray (10 YR 3/1).

* On slipped surface.
Table 2. — Continued.

| Vessel designation (Number of specimens) | 11 (1) | 12 (2) | 13 (2) | 14 (2) | 15 (2) | 16 (2) | 17 (4) | 18 (4) | 19 (1) | 20 (3) |
|----------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Morphology                             |       |       |       |       |       |       |       |       |       |       |
| Square lip                             | x     | x     |       |       | x     |       |       |       |       |       |
| Rounded lip                            | x     | x     |       |       | x     |       |       |       |       |       |
| Pointed lip                            |       |       |       |       |       |       |       |       |       |       |
| Unknown lip                            |       |       |       |       |       |       |       |       |       |       |
| Incurvate rim                          |       |       |       |       |       |       |       | x     | x     | x    |
| Excurvate rim                          |       |       |       |       |       |       | x     | x     | x    | x    |
| Thickened lip                          |       |       |       |       | x     |       |       |       |       |       |
| Unthickened lip                        | x     | x     |       |       | x     |       |       |       |       |       |
| Unknown lip                            |       |       |       |       |       |       |       |       |       |       |
| Hypothetical bowl                      | x     | x     |       |       | x     |       |       |       |       |       |
| Unknown vessel                         |       |       |       |       |       |       |       |       |       |       |
| Flat base                              |       |       |       |       |       |       |       |       |       |       |
| Pedestaled base                        |       |       |       |       |       |       |       |       |       |       |
| Metrics (mm)                           |       |       |       |       |       |       |       |       |       |       |
| Lip                                    | 5.95– | 6.00– | 7.75  | 6.70  | 4.75  | 5.95– | 4.50– | 11.00– | 5.80– |       |
|                                        | 6.75  | 6.55  | 8.30– | 6.60– | 6.50  | 4.55  | 11.25 | 6.25   |       |       |
|                                        | 8.30– | 6.60– | 8.50  | 7.30  | 6.20  | 6.45– | 8.50  | 12.05– | 7.15– |       |
|                                        | 8.70  | 7.25  | 7.05  |       |       |       | 7.55– | 6.10–  |       |       |
| Neck                                   | 7.85– | 6.45  |       |       |       |       | 8.20  | 8.05   |       |       |
|                                        | 9.05  |       |       |       |       |       |       |        |       |       |
| Body                                   | 8.05– | 7.55– | 8.25  |       |       |       |       |        |       |       |
| Base                                   |       |       | 8.20  | 8.05  |       |       |       |        |       |       |
| Oral diameter (cm)                     | 24    | 24    |       |       |       |       |       | 26     |       |       |
| Color (see below)                      |       |       |       |       |       |       |       |        |       |       |
| Exterior                                | 67    | 34    | 34    | 39    | 133   | 133   | 109*/  | 88     | 17*   | 88    |
|                                        |       |       |       |       |       |       | 23*   |        |       |       |
| Interior                               | 38    | 97    | 34    | 39    | 132   | 127   | 97     | 88     | 97    | 73    |
| Core                                   | 127   | 96    | 132   | 41    | 137   | 127   | 104    | 41     | 100   | 67    |
| Firing cloud                           |       |       |       |       |       |       |        |        |       |       |
| Vessel designation (Number of specimens) | Oxidized environment | Reduced environment | Fast cooling | Slow cooling | Unknown cooling | None observed | Incision | White-on-red | Unknown |
|----------------------------------------|-----------------------|---------------------|-------------|-------------|----------------|--------------|---------|--------------|---------|
| 11 (3)                                 |                       |                     |             |             |                |              |         |              |         |
| 12 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 13 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 14 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 15 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 16 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 17 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 18 (4)                                 |                       |                     |             |             | ?              |              |         |              |         |
| 19 (4)                                 |                       |                     |             |             |                |              |         |              |         |
| 20 (2)                                 |                       |                     |             |             |                |              |         |              |         |
| 21 (2)                                 |                       |                     |             |             |                |              |         |              |         |
Table 2.—Continued.

| Vessel designation (Number of specimens) | 21 (1) | 22 (1) | 23 (13) | 24 (3) | 25 (1) | 26 (1) | 27 (5) | 28 (1) | 29 (2) |
|-----------------------------------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|
| Morphology                              |        |        |         |        |        |        |        |        |        |
| Square lip                              |        |        |         |        |        |        |        |        |        |
| Rounded lip                             |        |        |         |        |        |        |        |        |        |
| Pointed lip                             |        |        |         |        |        |        |        |        |        |
| Unknown lip                             |        |        |         |        |        |        |        |        |        |
| Incurvate rim                           |        |        |         |        |        |        |        |        |        |
| Excurvate rim                           |        |        |         |        |        |        |        |        |        |
| Unknown rim                             |        |        |         |        |        |        |        |        |        |
| Thickened lip                           |        |        |         |        |        |        |        |        |        |
| Unthickened lip                         |        |        |         |        |        |        |        |        |        |
| Unknown lip                             |        |        |         |        |        |        |        |        |        |
| Hypothetical bowl                       |        |        |         |        |        |        |        |        |        |
| Unknown vessel                          |        |        |         |        |        |        |        |        |        |
| Flat base                               |        |        |         |        |        |        |        |        |        |
| Pedestaled base                         |        |        |         |        |        |        |        |        |        |
| Metrics (mm)                            |        |        |         |        |        |        |        |        |        |
| Lip                                     | 5.50–  | 6.00–  | 6.55    | 7.25–  | 5.20–  | 5.40–  | 6.25–  | 5.05–  |        |
| 1 cm below lip                          | 5.90   | 6.25   | 11.70–  | 7.75   | 5.55   | 5.60   | 6.80   | 5.40   |        |
| Neck                                    | 6.05   | 9.10   | 11.80   | 10.05– | 8.05   | 7.80   | 7.35   | 6.50   | 6.65   |
| 7.35                                    | 6.75   | 6.70–  | 8.80–   | 5.75–  | 7.00–  | 6.10   | 4.90   | 4.35   | 6.65   |
| 9.60                                    | 7.35   | 7.35   | 6.35    | 7.45   | 6.35–  |        | 6.65–  | 10.00  |        |
| Neck                                    | 14.90  | 7.25   | 7.05–   | 5.90–  | 6.35–  |        |        |        |        |
| 9.90–                                   | 18.95  |        | 14.90   | 7.25   |        |        |        |        |        |
| Body                                    |        |        |         |        |        |        |        |        |        |
| Oral diameter (cm)                      |        |        |         |        |        |        |        |        |        |
| Color (see below)                       |        |        |         |        |        |        |        |        |        |
| Exterior                                | 68     | 44*    | 68      | 39*    | 38*    | 44*    | 68     | 39*    | 39*    |
| Interior                                | 68     | 44*    | 68      | 33     | 102    | 44*    | 101    | 73     | 97     |
| Core                                    | 64     | 73     | 68      | 97     | 129    | 68     | 70     | 132    | 132    |
| Firing cloud                            |        |        |         |        |        |        |        |        |        |
Table 2.—Continued.

| Vessel designation (Number of specimens) | 21 (1) | 22 (1) | 23 (13) | 24 (3) | 25 (1) | 26 (1) | 27 (3) | 28 (1) | 29 (2) |
|-----------------------------------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|
| Firing                                  |        |        |         |        |        |        |        |        |        |
| Oxidized environment                    | ×      | ×      | ×       | ×      | ×      | ×      | ×?     | ×?     | ×      |
| Reduced environment                     |        |        |         |        |        |        |        |        |        |
| Fast cooling                            | ×      |        |         | ×      |        |        | ×?     |        |        |
| Slow cooling                            |        |        |         |        |        |        |        |        | ×?     |
| Unknown cooling                         |        |        |         | ×      |        |        |        |        |        |
| Decoration                              |        |        |         |        |        |        |        |        |        |
| None observed                           | ×      | ×      | ×       | ×      | ×      | ×      | ×      | ×      | ×      |
| Incision                                |        |        |         |        |        |        |        |        |        |
| White-on-red                            |        |        |         |        |        |        |        |        |        |
| Unknown                                 |        |        |         |        |        |        |        |        |        |
Fig. 8.—Amerindian ceramic sherd cross sections on broken edges showing temper constituents and internal laminations. A. Cross section of vessel 1 rim sherd showing quartz, grog, limestone and other temper constituents, and carbonate encrustation on outer surfaces. B. Cross section of vessel 2 rim
included in this study, was reconstructed by the AAHS from about 50 surface-collected sherds in Fountain Cavern. Photographs and a general description provided by the AAHS (Douglas, personal communication, 1991) establish that this vessel is a cylindrical flat-bottomed bowl with a sharply incurvate upper body, namely a "cazuela" (Fig. 11; also figured in Douglas, 1986b:37). Incurvate or "cazuela" vessels seem to be a typical late vessel form in the regional sequence throughout the West Indies, occurring, for example, in the Marmora Bay complex and Caliviny or Troumassoid series developments after ca. A.D. 900 (e.g., Boomert, 1987:22–24; Bullen, 1962, 1964:48–49; Bullen and Bullen, 1972:142; Krieger, 1931: plate 6; Rouse, 1974:174).

Some other vessels may have been cylindrical jars, although many of these vessels more likely were bowls. There is little other evidence of body morphology, however. One other vessel (Fig. 9, vessel 9) has a flat bottom like vessel 2 (Fig. 9) and another vessel, 23, has a pedestaled flat bottom (Fig. 4C, 10, vessel 23). The latter may well have been a bowl. Three other partially restored vessels, again not included in this study, which were assembled from AAHS surface-collected sherds, have been described by Douglas (personal communication, 1991) as two elongate "jugs" and a "double gourd" form.

Amerindian ceramic vessel forms have not been thoroughly reported from the Lesser Antilles, although a variety of complicated forms are known, particularly for the earlier Saladoid ceramics (e.g., Clerc, 1968; Mattioni, 1979, 1982; Mattioni and Nicolas, 1972; Petitjean Roget, H. 1978; Petitjean Roget, J., 1970). The Fountain Cavern vessel lip, rim, and base morphological attributes seem comparable to other ceramics from the Antilles, specifically those occurring later in the regional sequence (e.g., Bullen, 1964: fig. 3; Fewkes, 1922: fig. 63; Goodwin and Walker, 1975: fig. 1; Krieger, 1931: plates 7, 49, 52; Mattioni, 1976: plate 1; Wilson, 1989: table 2). Although these attributes mainly represent "unrestricted, simple" and "unrestricted, inflected" bowl forms, the AAHS "cazuela" vessel represents a "restricted, dependent, composite" bowl form (see Levin, 1980: fig. 2).

One unusual artifact is a vessel sherd (about 24.60 × 22.85 mm) that was apparently cut and possibly ground after breakage and thus represents the only recycled ceramic artifact from Fountain Cavern (Fig. 7M). It exhibits a red slip on both surfaces and may be a "gaming piece." Comparable examples of ceramic disks are known in the West Indies and nearby areas (e.g., Bullen, 1962:23, 32, 1964:20, plate XII.4–5; Bullen and Bullen, 1972: plate VI.e, XVIII.e; Pendergast, 1971:76).

**Metrics**

Minimum and maximum values for various metric categories are presented in Table 2. However, mean values, which are not available in Table 2, are presented here.

sherd showing quartz, grog, limestone, magnetite and other temper constituents, and structural laminations. C. Cross section of vessel 5 rim sherd showing quartz, limestone and mica temper, and structural laminations. D. Cross section of vessel 6 body sherd showing quartz, grog, limestone and other temper constituents, and structural laminations. E. Cross section of vessel 10 body sherd showing quartz, grog, limestone and other temper constituents. F. Cross section of vessel 17 body sherd showing quartz, grog and other temper constituents. G. Cross section of vessel 29 body sherd showing quartz, grog, limestone and other temper constituents.
Fig. 9.—Rim and base profiles for Fountain Cavern ceramic vessels 1–13, as available. Numbers correspond to vessel designations.
Fig. 10.—Rim and base profiles for Fountain Cavern ceramic vessels 14-29, as available. Numbers correspond to vessel designations.
Measurements of lip thickness and of thickness 1 cm below the lip provide the most readily available metric data for the sample given the fragmentary condition of all studied vessels. Mean values of 6.38 mm (N = 26) and 8.13 mm (N = 26) for the lip and 1 cm below the lip, respectively, indicate that most vessels have relatively thin upper rims. Likewise, mean values of 7.59 mm (N = 18) and 8.08 mm (N = 15) for neck and body thickness, respectively, corroborate the overall delicate nature of these vessels. Base thickness (mean = 13.24 mm; N = 4) confirms that vessels were thickest in their lowermost portions. Inferred oral diameter (mean = 25.8 cm; N = 10) establishes that the vessels were not particularly large. The ceramic cut disk is 8.40 mm thick.

Metrics for the four vessels partially restored by the AAHS (Douglas, personal communication, 1991) are as follows. The "cazuela" vessel: basal diameter, 9 cm; maximum body diameter, 30 cm; oral diameter, 20 cm. The two "jugs": basal diameters, 8 cm and 10 cm, and maximum body diameters, 40 and 45 cm, respectively; oral diameter, 20 cm. The "double gourd" form: basal diameter, 8.5 cm; maximum body diameter, 18 cm; oral diameter, 11 cm.

Color and Firing Attributes

The color attributes are the result of firing conditions, the clay source and in some cases, intentional slips and conditions of use, discard, and post-depositional alteration (Table 2).

Exterior colors range from a red (Munsell 10 YR 4/6) and dark red (10 YR 3/6) to white (10 YR 8/2) on slipped and painted surfaces, respectively. The most typical exterior values are red (2.5 YR 4/6) and yellowish red (5 YR 5/6) on slipped and unslipped surfaces, respectively. Interior colors range from reddish brown (2.5 YR 5/4) to dark gray (10 YR 4/1), with a most typical value of reddish brown (5 YR 4/4). The core colors range from red (2.5 YR 4/6) to very dark gray (10 YR 3/1), with a most typical value of reddish brown (10 YR 5/4) to dark gray (10 YR 4/1).

These values and the nature of the gradational change in the core color reflect a predominance of oxidized firing environments (N = 27 vessels, or 93%) and fast cooling (N = 16, or 55.2%) after firing. Seven vessels may have been slow cooled; cooling rate could not be determined for another six vessels. The majority of the vessels seem to contain carbon-rich clay. The sum of these attributes is generally similar to the few other comparable data available from elsewhere in the Antilles (e.g., Kirby, 1974; Petersen and Watters, 1988).

Decoration

A lack of decoration is most characteristic of the Fountain Cavern sample (Table 2). Only two vessels (6.9%), represented by only five sherds (0.6% of the total sample), have exterior decoration. One vessel, 17, was decorated with a white-on-red painted linear geometric motif on a red slipped background (Fig. 7F). The white elements, 4.90–11.25 mm wide, unfortunately are too small and broken to comprise an easily recognizable motif. A simple linear incision, about 1.15 mm wide, bounds one area of the white painted decoration. The other decorated vessel, 19, exhibits a single, deep, U-shaped exterior incision about 9.60 mm below the
lip (Fig. 7G). The incision likely encircled the entire vessel exterior and is about 4.10 mm wide and 2.10 mm deep.

Vessel 17 bears classic white-on-red decoration and as such, may be indicative of Saladoid ceramics, ca. 200 B.C. to A.D. 600. However, white-on-red decoration persisted into the period ca. A.D. 600–900, as in the Mill Reef complex on Antigua. The latter includes linear and curvilinear motifs rather than just the curvilinear motifs characteristic of the earlier Indian Creek complex (Rouse, 1974, 1976). Unfortunately, vessel 17 is too incomplete to afford precise dating. The other relatively thick, broad-lined incised vessel, 19, seems to be attributable to a post-Saladoïd temporal span, ca. A.D. 600–1200 or later, as are most or all of the undecorated vessels (e.g., Boomert, 1987; Bullen, 1962, 1964; Bullen and Bullen, 1972, 1976; Hoffman, 1979; Mattioni, 1979, 1982; Rouse, 1974, 1976; Wilson, 1989).

**Ceramic Distribution**

Although derived from very limited testing in Fountain Cavern, the ceramic sample is rather large in terms of vessel and sherd frequencies. However, this sample is limited when compared with the ceramic sample collected from the surface of Fountain Cavern by the AAHS before and after Watters’ testing in 1986. A recounting of the previously collected ceramics, combined with a lesser number of Amerindian ceramics collected since 1986, increased the total number of prehistoric sherds from 5000–5500 to 6604. Douglas (personal communication, 1991) provided detailed information about the AAHS ceramic sample, from which the following summary is extracted.

All of the 6604 AAHS ceramics came from Chamber 1. Of the 6604 sherds, 10 specimens were found in Pool 1, 145 encrusted specimens (plus one brought by Watters to the U.S.) came from the water-filled cavity beside the pool, 55 came from the floor sloping toward Pool 1 from the level area beneath the entrance (by the ladder), and 6394 originated in close proximity to the large stalagmite (an area roughly equivalent to Watters’ Surface Area A) (Fig. 3). Although a grid was not used by AAHS to collect the ceramics in a systematic manner, their general provenience information clearly establishes that the large majority (96.8%) were concentrated near the stalagmite with Petroglyph 12.

Twenty sherds exhibit some form of decoration on the exterior surface, including seven with white-on-red painting, a spiral-shaped handle with painting, and 12 with modeled decoration. Of the latter 12 specimens, two are adornos, one of which may depict a snake and the other possibly a snail. At least 5934 other specimens exhibit no decoration, while 650 others are too fragmentary or small to ascertain whether or not they were decorated. Thus, a total of as many as 6584 (99.7%) of the AAHS Amerindian ceramic sample may have been undecorated.

Also according to Douglas, of the 6604 sherds, at least 362 are vessel rims and five are griddle rims, 91 represent base sherds, two are adornos, and as many as 6144 are body sherds and fragments. Of the total rim sherds, 286 (79%) are “folded” (thickened) specimens, and of the base sherds all but one are concave to some degree. Four partially restored vessels were discussed above, but many more vessels (Douglas estimated 60–100 vessels) are probably represented in the AAHS collection. The four vessels exhibit a red slip on the exterior and an unmodified interior; the two “jugs” and the “double gourd” form exhibit carbon deposits solely on their lower interior surfaces.
Fountain Cavern can be expected to yield many more ceramics during future archaeological testing. The establishment of vessel lots, using the CMNH sample in particular, permits examination of vertical distribution of the Amerindian ceramics and thus permits assessment of disturbances in Fountain Cavern (Table 3; Fig. 3).

Vessel 1 is based on a single specimen associated with an unstudied sample of 145 encrusted sherds, likely constituting one or more currently unrestored vessels recovered from Surface Area B adjacent to Pool 1 by the AAHS (Watters, 1991). The other 145 encrusted specimens are included in the above summary derived from Douglas' information. Vessels 2–21 originated on the surface and deep within test pit 1, vessels 22–28 in and on the area of test pit 3, and vessel 29 in and on test pit 2. No admixture of vessels occurred between the test pits and surface areas, which is not surprising given the relatively great distance between them (see Fig. 3). However, admixture is obvious within each of the two deeper test pits, 1 and 3. For example, specimens attributable to vessel 9 were recovered on or near the surface and in sectors A, B, and C of test pit 1, in levels 0–10 cm, 5–50 cm, 31–40 cm, 35–50 cm, and 90–100 cm. Likewise, specimens attributable to vessel 23 were found in the 0–10 cm, 11–20 cm, and 21–30 cm levels of test pit 3. These and other examples document considerable admixture in Fountain Cavern, at least in the tested areas. It seems probable that various taphonomic factors, especially human trampling and shifting of rocks, have caused downward movement of cultural remains through the cave deposits. Watters (1991) discusses in detail how the cultural remains, including modern artifacts, have migrated downward through crevices and holes among the rocks in test pit 1. In test pit 3, the deposits may have been more substantially disturbed through various historic activities including the installation of the steel access ladder in the cavern in 1953.

Overview

The ceramic sample from Fountain Cavern is attributable to one or possibly several late prehistoric components; it is quite possibly restricted to a relatively brief time span, at least for most of the vessels. These vessels very likely represent ritual deposits in Fountain Cavern, almost certainly connected with the various petroglyph panels (Douglas, 1985, 1989), the antiquity of which has been variably estimated at ca. A.D. 900–1200, the post-Saladoid period (Dubelaar, 1989; Petitjean Roget, 1989).

The dense concentration of ceramics in test unit 1 and nearby Surface Area A, which were adjacent to the large, somewhat central “Jocahu” stalagmite (#12 in Douglas, 1989), supports this interpretation. The relative scarcity of elaborately modeled or otherwise decorated ceramics might be surprising if the ceramic vessels were brought to the cavern as ritual offerings. However, it is probable that the vessels were indeed typically little decorated, or undecorated and, as such, still may well have been “worthy” ritual objects themselves or they contained “worthy” offerings of some sort. Indeed, in general, post-Saladoid ceramics throughout the northern Lesser Antilles often were left undecorated or “plain.” The fragmented condition of the vessels could be due to several factors, including intentional breakage by the Amerindians, as part of their ceremonies; or by historic visitors, to destroy pagan idols; unintentional breakage by either group; or breakage by natural causes such as rock falls from the cavern roof.

Amerindian ceramics have been previously recovered from varied contexts in other closed sites in the West Indies, particularly in the Greater Antilles, and
Table 3.—Distribution of defined ceramic vessel lots by provenience in Fountain Cavern.

| General provenience    | Code number | Vessel designation |
|------------------------|-------------|--------------------|
|                        |             | 1  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Surface Area A         | D1-1        | 1  |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Surface Area B         | D1-2        | 2  |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Pool 1                 | D1-25       | 1  |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector A, 0-10 | D1-3          | 2  | 8 | 2 | 4 |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector A, 10-20 | D1-4          | 2  | 8 | 2 | 4 |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector A, 20-30 | D1-5          | 4  | 2 | 5 | 5 | 2 |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector A, 30-70 | D1-6          | 1  |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector B, 0-5 | D1-7          | 2  | 2 | 4 |   |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector B, 5-35 | D1-8          | 11 | 4 | 2 | 21| 47| 2 | 3 | 2 | 2 | 2 | 1 |    |    |    |
| Test pit 1, Sector B, 35-50 | D1-9          |    |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Test pit 1, Sector C, 0-5 | D1-10         |    | 3 | 3 | 5 |    |    |    |    |    |    |    |    |    |    |    |
| Test pit 1, Sector C, 5-30 | D1-11         |    | 2 | 5 | 10|    |    |    |    |    |    |    |    |    |    |    |
| Test pit 1, 90-100      | D1-12         |    |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
| Test pit 1, 100-110     | D1-13         |    |   |   |   |   |   |    |    |    |    |    |    |    |    |    |
| Test pit 1, 110-120     | D1-14         |    |   |   |   |   |   | 1  |    |    |    |    |    |    |    |    |
| Test pit 2, 0-10        | D1-19         |    |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
| Test pit 3, Surface     | D1-20         |    |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
| Test pit 3, 0-10        | D1-21         |    |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
| Test pit 3, 10-20       | D1-22         |    |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
| Test pit 3, 20-30       | D1-23         |    |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
| Totals                  |              | 1  | 2 | 15| 20|11 | 7 | 8 | 40| 75| 2 | 3 | 2 | 2 | 2 | 2 |

* CMNH catalogue numbers; D1-15, -16, -17, -18, -24 and -26 did not include ceramic specimens assigned to vessels.
Table 3.—Continued.

| General provenience | Code number | Vessel designation |
|---------------------|-------------|--------------------|
| Surface Area A      | D1-1        | 1                  |
| Surface Area B      | D1-2        | 2                  |
| Pool 1              | D1-25       | 1                  |
| Test pit 1, Sector A, 0–10 | D1-3      | 5                  |
| Test pit 1, Sector A, 10–20 | D1-4    | 16                 |
| Test pit 1, Sector A, 20–30 | D1-5      | 18                 |
| Test pit 1, Sector A, 30–70 | D1-6      | 8                  |
| Test pit 1, Sector B, 0–5  | D1-7       | 9                  |
| Test pit 1, Sector B, 5–35 | D1-8       | 2 1                |
| Test pit 1, Sector B, 35–50 | D1-9        | 1                  |
| Test pit 1, Sector C, 0–5  | D1-10      | 13                 |
| Test pit 1, Sector C, 5–50 | D1-11      | 17                 |
| Test pit 1, 90–100    | D1-12       | 11                 |
| Test pit 1, 100–110   | D1-13       | 4 2                |
| Test pit 1, 110–120   | D1-14       | 4                  |
| Test pit 2, 0–10      | D1-19       | 2 2                |
| Test pit 3, Surface   | D1-20       | 1                  |
| Test pit 3, 0–10      | D1-21       | 4                  |
| Test pit 3, 10–20     | D1-22       | 4 2 4              |
| Test pit 3, 20–30     | D1-23       | 5 1 1 1 1 1 1 1 1 2 234 |

Totals

1991 Petersen and Watters—Fountain Cavern Ceramic Remains 353
nearby areas. Although some of these finds are domestic refuse from subsistence activities, in other cases they clearly represent ceremonial deposits, including funerary urns and containers for ritual offerings (e.g., Brainerd, 1953; Borrell Bentz, 1979; De Booy, 1915; Fewkes, 1922:237–240; Harrington, 1979:271–273; Krieger, 1931:74–79; Loven, 1979:123–125, 129; Pendergast, 1971; Rouse, 1948:508; Veloz Maggiolo, 1972:157–166). These ceramics demonstrate the potentially varied roles for this form of material culture. At Fountain Cavern, ceramic vessels may have served to collect “drip water” used in ritual activities and to transport and present food, beverage or other offerings, and they may have served as funerary vessels, among a range of ceremonial functions. Fountain Cavern was almost certainly not a habitation site, and it contains a notable concentration of petroglyphs. Therefore, a ceremonial function for the ceramics seems to best explain their presence.

Some of the sherds may be the remains of vessels broken during non-ritual activities, such as water collecting from Fountain Cavern, particularly from Pool 1. Historically, Fountain Cavern was a known permanent source of water even in times of severe drought; it may have been known as such to the Amerindians as well, assuming it contained water during prehistoric time.

In any case, all of the vessels (except possibly vessel 17) are attributable to a post-Saladoid component or components, ca. A.D. 600–1200, and quite possibly ca. A.D. 900–1200, or later. These cross dates are based on the correspondence between the Fountain Cavern sample and the incompletely reported Marmora Bay complex on Antigua as well as the unreported Rendezvous Bay (AL2) and Sandy Ground (AL3) sites on Anguilla that are radiocarbon dated generally to after ca. A.D. 500–600. In particular, these entities share common usage of a typical red slip, a near absence of decoration, “folded” or “thickened” rims produced “by adding a cylindrical coil of clay” and minor usage of white-on-red painted and broad-lined incised decoration (e.g., Rouse, 1974:175–176, 1976:36–37; see also Davis, 1988). Rouse (1976:39–40, 1982:50, various) and other scholars have related these and similar ceramics elsewhere in the Lesser Antilles to the Elenoid ceramic series of the Virgin Islands and eastern Puerto Rico, with more distant relationship to the Ostionoid ceramic series of western Puerto Rico and the Dominican Republic and widespread correlates farther west in the Greater Antilles (e.g., Bullen and Bullen, 1976:5; Goodwin and Walker, 1975:86; Lee, 1978; Rouse, 1964:11; Sears and Sullivan, 1978:14; Veloz Maggiolo, 1972:102; Wilson, 1989:430–431). Rouse (1986:143–144) now includes the northern Lesser Antilles post-Saladoid ceramics within his Elenan Ostionoid subseries, first defined in the eastern Greater Antilles.

Some archaeologists question the applicability of the Elenoid series (Elenan Ostionoid subseries) designation over such a broad area and without more detailed definition (e.g., Goodwin, 1979:305; Watters, 1980:274). Post-Saladoid ceramics known from elsewhere in the Antilles share general similarities in morphology and surface finish with the Fountain Cavern specimens, including, for example, Magens Bay ceramics of the Virgin Islands (Bullen, 1962:13, 59–63) and Calivy or Troumassoid or later ceramics of Barbados, Grenada, St. Vincent, the Grenadines, and Martinique (e.g., Boomert, 1987:21–27; Bullen, 1964: Bullen and Bullen, 1972:48–50, 160–167, table 8; Kirby, 1974; Mattioni and Bullen, 1970; Petijean Roget, 1978). One or more likely several widespread ceramic horizon styles can be postulated in the region during the post-Saladoid period on the basis of these similarities. However, these correlations are tentative because the avail-
able ceramic sample from Fountain Cavern does not completely match any other sample previously reported in the Antilles, particularly for the temper attributes. A more expansive treatment of post-Saladoid ceramics from Anguilla is planned once the analysis of samples from two open sites, Rendezvous Bay and Sandy Ground, has been completed.

As Goodwin (1979) has tentatively identified on St. Kitts, it seems likely that local, island-specific, and regional ceramic and broader cultural sequences will ultimately be discernible in the Lesser Antilles. Hence, precise correlation between different manifestations on different islands should not necessarily be expected in spite of apparently widespread horizon styles.

Interisland population interaction, specifically trade and exchange, seems quite likely to be at least one mechanism responsible for the general similarities among post-Saladoid ceramics and, in fact, has been long suggested, if largely unsubstantiated, in regional research (e.g., Boomert, 1987:195; Bullen, 1962:17; Bullen and Bullen, 1972; Daggett, 1980:149–150; Goodwin and Walker, 1975:87, 91; Mattioni, 1979:11; Rouse, 1976:39–40, 1977:9; Sears and Sullivan, 1978:11, 23; Veloz Maggiolo, 1972:108–120). As noted above, temper data for the available Fountain Cavern sample seem to document the presence of one, possibly many, nonlocal, “exotic” tempers, or more likely whole vessels which originated on one or another of the volcanic islands in the West Indies. Given this observation and other evidence of long distance social interaction during the long span of West Indian prehistory, future ceramic studies should be designed to address this significant issue in both local and regional contexts.

Acknowledgments

Members of the AAHS, who assisted in field research, and officials of the Government of Anguilla, who authorized research and export permits, are acknowledged in Watters’ (1991) article. Funding was provided by the Canadian International Development Agency (to the Government of Anguilla), M. Graham Netting Research Fund (CMNH), Charles Cohn Foundation, and Eugene M. Grant. We are indebted to Nik Douglas for providing photographs of the ceramic vessel restored by the AAHS (Fig. 11) and information about the surface-collected ceramics. At CMNH, Stanley W. Lantz photographed most of the ceramics and Sylvia Keller patiently typed manuscript revisions. At the University of Maine at Farmington, Kara Ohlund and Ann Robinson produced and edited the tables, respectively. We gratefully acknowledge the geological expertise of Gary Laverdiere at the University of Maine at Farmington in verifying and refining Petersen’s identifications of tempers.

Literature Cited

Boomert, A. 1987. Notes on Barbados prehistory. The Journal of the Barbados Museum and Historical Society, 38(1):8–43.

Borrell Bentz, P. J. 1979. Buceando tras los Tainos. Boletin del Museo del Hombre Dominicano, 12:137–145.

Brainerd, G. W. 1953. Archeological findings. Pp. 109–119, in Faunal and Archeological Researches in Yucatan Caves (R. T. Hatt, H. I. Fisher, D. A. Langebartel, and G. W. Brainerd), Cranbrook Institute of Science Bulletin 33, Bloomfield Hills, 119 pp.

Bullen, R. P. 1962. Ceramic periods of St. Thomas and St. John Islands, Virgin Islands. William L. Bryant Foundation American Studies Report, 4, 74 pp.

—. 1964. The archaeology of Grenada, West Indies. Contributions of the Florida State Museum Social Sciences, 11, 67 pp.

Bullen, R. P., and A. K. Bullen. 1972. Archaeological investigations on St. Vincent and the Grenadines, West Indies. William L. Bryant Foundation American Studies Report, 8, 170 pp.

—. 1976. Culture areas and climaxes in Antillean prehistory. Pp. 1–10, in Proceedings of the Sixth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles, La Société d'Histoire de la Guadeloupe, 316 pp.

Clerc, E. 1968. Sites Precolumbien de la Grande-Terre de Guadeloupe. Pp. 47–60, in Proceedings
of the Second International Congress for the Study of Pre-Columbian Cultures in the Lesser Antilles, Barbados Museum, St. Ann's Garrison, 146 pp.

Davis, R. E. 1980. The trade process and the implications of trade in the Bahamas. Florida Anthropologist, 33:143-151.

Davis, D. D. 1988. Calibration of the Ceramic period chronology for Antigua, West Indies. Southeastern Archaeology, 7(1):52-60.

De Booy, T. 1915. Pottery in certain caves in eastern Santo Domingo, West Indies. American Anthropologist, 17:69-97.

Donahue, J., D. R. Watters, and S. Millsbaugh. 1990. Thin section petrography of northern Lesser Antilles ceramics. Geoarchaeology, 5:229-254.

Douglas, N. 1985. Anguilla's Fountain Cavern. Anguilla Archaeological and Historical Society, 23 pp.

——. 1986a. Background to the Fountain Cavern discoveries. Pp. 27-30, in Anguilla Archaeological and Historical Society Review, 1981-1985 (N. Douglas, ed.), Anguilla Archaeological and Historical Society, 124 pp.

——. 1986b. Pre-Columbian artifacts donated to the Society: a checklist. Pp. 35-41, in Anguilla Archaeological and Historical Society Review, 1981-1985 (N. Douglas, ed.), Anguilla Archaeological and Historical Society, 124 pp.

——. 1989. The petroglyphs of Fountain Cavern. Pp. 9-14, in A study of Fountain National Park and Fountain Cavern, Anguilla, British West Indies (J. Gurnee, ed.), National Speleological Foundation, Closter, New Jersey, 48 pp.

Dubelaar, C. N. 1989. Petroglyphs and a statue. P. 16, in A study of Fountain National Park and Fountain Cavern, Anguilla, British West Indies (J. Gurnee, ed.), National Speleological Foundation, Closter, New Jersey, 48 pp.

Fewkes, J. W. 1922. A prehistoric island culture area of America. Pp. 35-271, in Thirty-fourth Annual Report of the Bureau of American Ethnology, U.S. Government Printing Office, Washington, D.C., 281 pp.

Gauthier, J. 1974. Etude des pates ceramiques de la Martinique Pre-Colombienne. Pp. 133-139, in Proceedings of the Fifth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles, Antigua Archaeological Society, 178 pp.

Goodwin, R. C. 1979. The prehistoric cultural ecology of St. Kitts, West Indies: a case study of island archaeology. Unpublished Ph.D. dissert., Arizona State University, Tempe, 514 pp.

Goodwin, R. C., and J. B. Walker. 1975. Villa Taina de Boqueron, the Excavation of an Early Taino Site in Puerto Rico. Inter-American University Press, San Juan, 112 pp.

Gurnee, J. (ed.). 1989. A Study of Fountain National Park and Fountain Cavern, Anguilla, British West Indies. National Speleological Foundation, Closter, New Jersey, 48 pp.

Harrington, M. R. 1979. Cuba Before Columbus (2 vols.). AMS Press, New York, 507 pp. [Reprint of 1921 edition published by Museum of the American Indian, Heye Foundation, New York, as Indian Notes and Monographs, 17.]

Hoffman, C. A. 1979. The ceramic typology of the Mill Reef site, Antigua, Leeward Islands. Journal of the Virgin Islands Archaeological Society, 7:35-47.

Kirby, A. E. 1974. The Cayo pottery of St. Vincent: a pre-Calivigny Series. Pp. 61-64, in Proceedings of the Fifth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles, Antigua Archaeological Society, 178 pp.

Krieger, H. W. 1931. Aboriginal Indian pottery of the Dominican Republic. Smithsonian Institution, United States National Museum Bulletin, 156, 165 pp.

Lee, J. W. 1978. Jamaican redware. Journal of the Virgin Islands Archaeological Society, 6:49-53.

Levin, S. 1980. A computer-cataloguing system for Pre-Columbian Antillean ceramics in United States Museums. Pp. 320-330, in Proceedings of the Eighth International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles, Arizona State University, Tempe, 623 pp.

Loven, S. 1979. Origins of the Tainan Culture, West Indies. AMS Press, New York, 696 pp. [Reprint of the 1935 edition published by Elanders Bokfrykery Akiebolag, Göteborg, Sweden.]

Mattioni, M. 1976. Les grandes familles des formes du “Saladoid insulaire” au site de Vive a la Martinique. Pp. 11-13, in Proceedings of the Sixth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles, La Société d'Histoire de la Guadeloupe, 316 pp.

——. 1979. Salvage excavations at the Vive site, Martinique: final report. University of Manitoba Anthropology Papers, 23, 56 pp.

——. 1982. Salvage excavations at the Fond-Brule site, Martinique: final report. University of Manitoba Anthropology Papers, 27, 25 pp.

Mattioni, M., and R. P. Bullen. 1970. A chronological chart for the Lesser Antilles. Pp. 1-3, in...
Petersen, James B. and Watters, David R. 1991. "Amerindian ceramic remains from Fountain Cavern, Anguilla, West Indies." Annals of the Carnegie Museum 60(4), 321–357. https://doi.org/10.5962/p.330472.

View This Item Online: https://www.biodiversitylibrary.org/item/238272
DOI: https://doi.org/10.5962/p.330472
Permalink: https://www.biodiversitylibrary.org/partpdf/330472

Holding Institution
Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Sponsored by
Harvard University, Museum of Comparative Zoology, Ernst Mayr Library

Copyright & Reuse
Copyright Status: In copyright. Digitized with the permission of the rights holder.
Rights Holder: Carnegie Museum of Natural History
License: http://creativecommons.org/licenses/by-nc-sa/4.0/
Rights: http://biodiversitylibrary.org/permissions

This document was created from content at the Biodiversity Heritage Library, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at https://www.biodiversitylibrary.org.