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ARCHAEOLOGY OF FOUNTAIN CAVERN, ANGUILLA, WEST INDIES

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ABSTRACT

Three test pits were excavated as part of an archaeological survey of Fountain Cavern, Anguilla, between 6–16 January 1986, with the assistance of the Anguilla Archaeological and Historical Society. Of 2493 artifacts, miscellaneous materials, and faunal remains recovered, 2037 (81.7%) were excavated from test pits. Archaeological remains were concentrated in Chamber 1, the front of the cavern, near 12 exceptionally well-preserved petroglyphs. Fountain Cavern is interpreted as a subterranean ceremonial center for the prehistoric peoples of Anguilla, making it a rare type site in the northern Lesser Antilles. Ceramics, mostly undecorated, are attributed to utilization of the cavern by post-Saladoid peoples, for ritual and perhaps water procurement activities, after ca. A.D. 600, and more specifically A.D. 900–1200, or later. Certain taphonomic processes, such as downward transport of historic and modern artifacts in test pit 1 where they intermingled with prehistoric artifacts, and active mixing of deposits in test pit 3 as the result of modern construction activities, as well as dubious radiocarbon dates, impose limits on interpretation of the archaeological remains. Nevertheless, the Fountain Cavern archaeological data support the conclusion that this site was an important post-Saladoid ceremonial center, an interpretation that is further supported by ethnohistorical evidence of the significance of caves for prehistoric peoples of the Caribbean islands.

INTRODUCTION

An archaeological survey and test excavation project took place in Fountain Cavern, Anguilla, from 6–16 January 1986, to assess its prehistoric archaeological resources. The research was undertaken at the request and with the cooperation of the Anguilla Archaeological and Historical Society (AAHS) and Government of Anguilla because Fountain Cavern is being considered for development as an interpretive center. Several surveys evaluating various scientific aspects of Fountain Cavern have been summarized in a recent volume (Gurnee, 1989) produced by the National Speleological Foundation.

Reports to AAHS and Government (Watters, 1986, 1987, 1989*a*) included recommendations for integrating archaeological resources in Fountain Cavern with aspects of local natural history in an above-ground visitors center designed to serve as an educational facility for Anguillians and tourists alike.

PHYSICAL SETTING

Anguilla lies on the Anguilla Bank in the eastern sector of the Caribbean Sea and is one of the northernmost islands in the Lesser Antilles, which stretch from Grenada in the south (lat. 12°N) to Sombrero in the north (lat. 18.5°N). Anguilla lies only 125 km east of the Virgin Islands, the easternmost islands in the Greater Antilles in the northern Caribbean (Fig. 1).

The Anguilla Bank is the largest bank in the Lesser Antilles, with an area of about 4660 km² within the 200 m isobath. The islands of Anguilla, St. Bartholomew, and St. Martin are the main emergent features on the bank. St. Martin is situated about 10 km south of Anguilla. Most of the bank is submerged at depths

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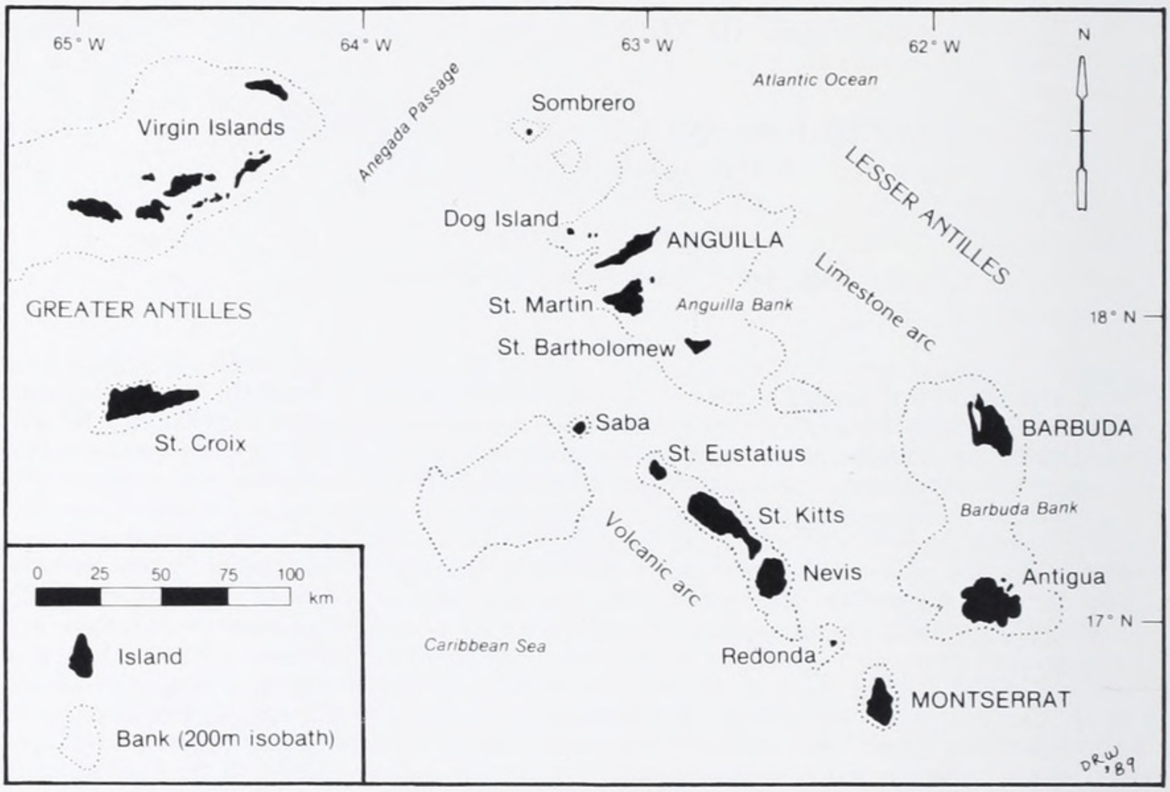


Fig. 1.—Islands and banks of the northeastern Caribbean Sea (eastern Greater Antilles and northern Lesser Antilles).

of 40 m or less (Martin-Kaye, 1969:185). Vaughan (1916:58, fig. 2–4; 1919:303, fig. 11, 19) regarded Anguilla as an example of a "third type" submarine profile, characterized by rocks dipping under the sea at gentle angles and by shores off which are shallow flats. However, deep-water passages isolate the Anguilla Bank from other banks in the region, including the nearby Barbuda Bank (passage depth >200 m) and Saba and St. Eustatius banks (>500 m), while the even deeper Anegada Passage (>2000 m) divides it from the Virgin Islands (excepting St. Croix) of the Greater Antilles (American Geographical Society, 1960).

Anguilla (including nearby Scrub Island) is approximately 30 km (18.6 mi) long. Its maximum width (due E–W) is about 9.3 km (5.8 mi) between Flat Cap Point and Mimi Bay; the maximum width (due N–S) is 6.1 km (3.8 mi) from near Shoal Bay to Forest Point; and the maximum width measured NW–SE, at a right angle to the northeast trending axis of the island, is 5.9 km (3.7 mi) from midway between Blackgarden Bay and Shoal Bay on the north coast to High Cliff on the south coast (Fig. 2). Anguilla has a land area of about 91 km^2 (35 mi^2) and is located between lat. 18°10′ to 18°18′N and long. 62°56′ to 63°10′W (Directorate of Overseas Surveys, 1972, 1973). Being a dry and relatively flat carbonate island, Anguilla exemplifies the low islands in the "Limestone Caribbees" forming the outer arc of the northern Lesser Antilles. The limestone islands differ physiographically from the volcanic islands of the inner arc (Fig. 1), and aspects of the prehistory of these two island arcs also differ (Watters, 1980:334–341).

Anguilla's surficial geology consists almost exclusively of limestone, in what has been termed a "complete carbonate cap" (Adey and Burke, 1977: fig. 2). The term "Anguilla Formation," denoting the island's limestone and marl deposits, was formally proposed by Vaughan (1918:271, 1926:351) based primarily on his study of its fossil corals, although he acknowledged the work of earlier geologists (e.g., Cleve, 1871; Spencer, 1901). The limestone, Lower Miocene in age, is about 75 m (250 ft) thick and lies unconformably over volcanic rocks now regarded as Eocene or Oligocene in age (Christman, 1953:89, 92) and equivalent to St. Martin's Pointe Blanche Formation (cf. Martin-Kaye, 1959:43, 1969:185–186).

Restricted volcanic exposures (Fig. 3) occur on Anguilla, Dog Island some 15 km distant, and its tiny outlier Middle Cay. Initial identifications of igneous rocks on Anguilla at Crocus Bay and Road Bay, respectively as "altered andesitic tuff" (specimen L.I. 99) and "altered basalt" (L.I. 102) (Vaughan, 1926), were verified by Christman (1953:92). Limited information on the igneous rocks of Dog Island and Middle Cay is found in Martin-Kaye (1959:44, 1969:188).

A discontinuous ridge trending northeast parallels the north coast of Anguilla. Goodell (1989:17) indicated the north coast consists of a series of differentially uplifted fault blocks. The island's highest elevation, approximately 200 ft (61 m), is attained on this ridge, midway along the north coast and slightly inland from Crocus Bay. Vertical escarpments some 100 ft (30 m) high mark the north face of the ridge at several places along the coast (Fig. 4A). Sea caves penetrate the base of these escarpments.

The highland or upland topographic area around the ridge contrasts markedly with the central and southern parts of Anguilla. The central part consists of slightly depressed basins, especially near The Valley and Cauls Pond, which in turn are bordered by a low ridge gently descending to sea level along most of the south coast. In the western part of the island where there is no basin, the north coast ridge slopes gradually downward to the south shore. Almost all of the south coast is less than 8 m (<25 ft) above sea level. White-sand pocket beaches (Fig. 4A) are found in most embayments around the island. In western Anguilla, extensive beaches are found along the north and south coasts (Fig. 4B), while smaller beaches occur elsewhere on the north coast at Road Bay, Crocus Bay, and Shoal Bay.

The north, cliffed face of the northeast trending ridge has exposures of highly fossiliferous limestones and marls. Vaughan (1926:351–355) described several geological sections along that coast with a thick argillaceous limestone deposit containing many fossils, mostly of reefal corals and echinoids, underlying a hard cavernous limestone with few or no fossils. Fossiliferous limestone is rare elsewhere in Anguilla. Christman (1953:92) indicated the hard, cavernous limestone is the most widespread; it weathers to a very rough, karst-like surface (Fig. 5). Harris (1965:23) stated that karstic erosion on Anguilla is advanced.

Anguilla's soils have not been studied in detail. Harris (1965:23–24), as part of a broader ecological study of the island, identified two soils, a reddish-brown stony clay *terra rossa* in the uplands and a gray to black, ill-drained rendzina in lower areas. Goodell (1989:18) described the soils as generally thin and lateritic. Soil accumulation is greatest in the basins and solution depressions but it is limited all across the island. Bare limestone pavement protrudes throughout Anguilla and is especially prominent on the east and west headlands.

Rainfall is limited and seasonal. Annual rainfall varies but averages about 1040 mm (Martin-Kaye, 1959:43; Harris, 1965:9; Howard and Kellogg, 1987:106) and is greatest in The Valley in the island's center (Eastern Caribbean Natural Area Management Program, 1980: map 2). May and August through November are

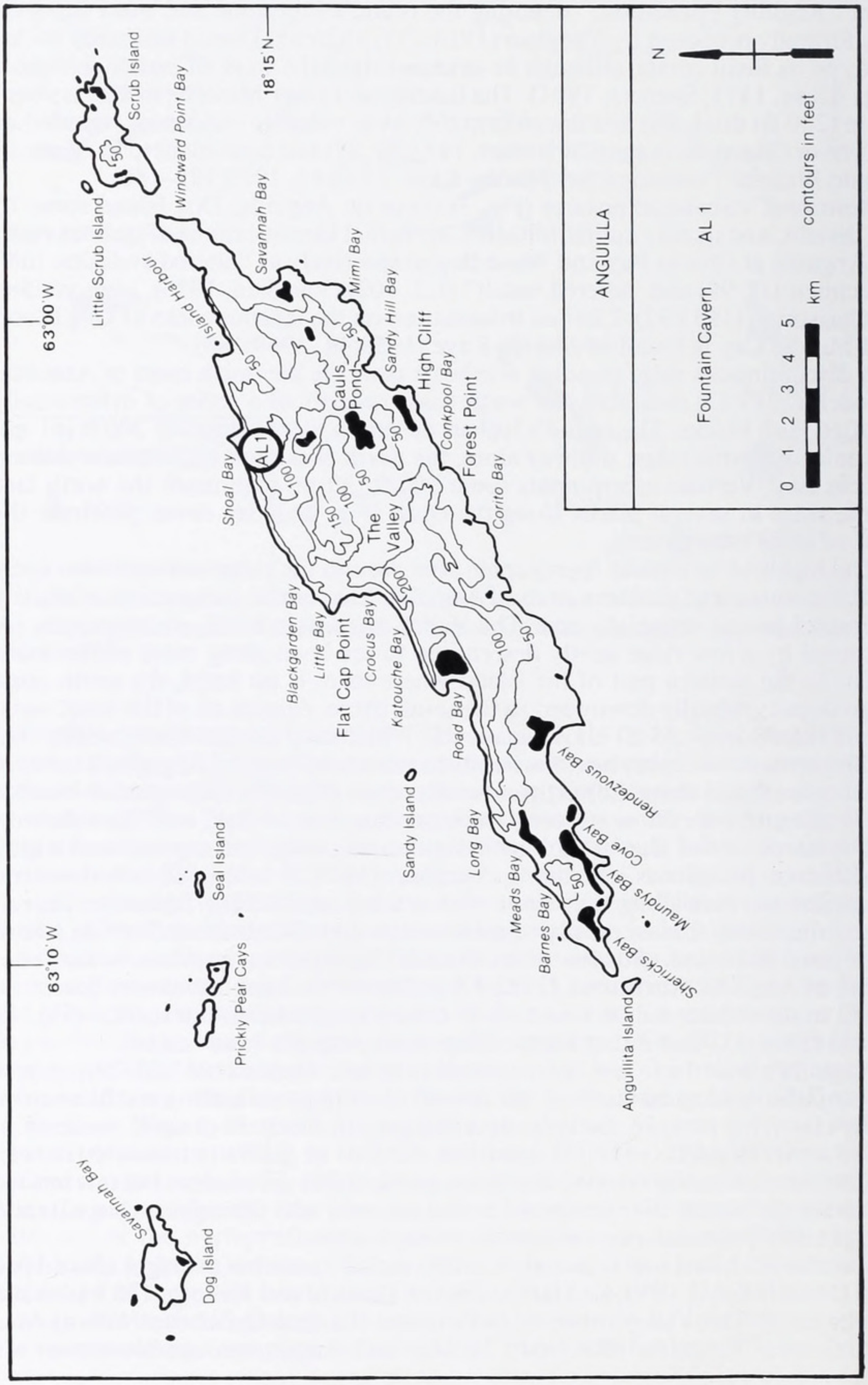


Fig. 2.—Topography of Anguilla and location of Fountain Cavern (AL1) prehistoric site.

Fig. 3.—Outcrops of igneous rock at Savannah Bay beach, Dog Island.

peak precipitation months, a pattern which pertains throughout the northern Lesser Antilles. Rainfall disperses mainly through infiltration into solution fissures and sinkholes. Anguilla has no surface streams.

Anguilla's vegetation recently was studied by Howard and Kellogg (1987). Harris (1965:41–42, 137) classified Anguilla's dominant vegetation as "very degraded evergreen woodland," which he regarded as a subclimax induced by ". . . biotic processes of impoverishment and selection of xerophytic, sclerophyllous species . . ." rather than the island's "natural" vegetation. Beard (1955) concluded that the "evergreen bushland" is the natural vegetation, a point of view also favored by Howard and Kellogg (1987:107, 111). Harris (1965:50–53, fig. 12) also mentioned small areas of grassland, manchineel, and mangrove, as well as strand and rock pavement vegetation.

FOUNTAIN CAVERN

Fountain Cavern (also known as The Fountain) is located in the first national park created by the Government of Anguilla. The park, founded in 1985, is situated at Shoal Bay on Anguilla's north coast (Fig. 2). It encompasses about 1.9 ha (4.75 a) and extends from the shoreline to Fountain Hill. Fountain Cavern lies 250 m inland in the southern part of the park at coordinates (approximate) 906185 on the British West Indies Grid (Directorate of Overseas Surveys, 1972, 1973).

The area around Fountain Hill is credited by Anguillians with more rainfall than many other areas of the island. Various plant communities occur within the national park's boundaries, from the shoreline to the higher elevations inland. G. Douglas (1989) reported 62 plant species within the park's borders.

Fig. 4.—A. Cliffs and pocket beach at Little Bay, north coast of Anguilla. B. Rendezvous Bay beach on Anguilla's south coast, with the mountains of St. Martin visible in the background.

Fig. 5.—Weathered limestone at Island Harbour, northeast coast of Anguilla.

Until 1989, few published reports about Fountain Cavern were available. Wagenaar Hummelinck (1979:165–168) briefly discussed Fountain Cavern and provided two maps (a longitudinal section and ground plan) as well as a photograph of the entrance. Background information on Fountain Cavern and the creation of the national park is found in several articles in the *Anguilla Archaeological and Historical Society Review, 1981–1985* (N. Douglas, 1986*c*). In 1989, summary reports of the archaeology, geology, vegetation, and bats, a proposal for developing the national park, and plan views and profiles of the cavern were published (Gurnee, 1989).

Fountain Cavern occurs in the hard, cavernous limestone on the north slope of the northeast trending ridge at an elevation of about 18 m (60 ft). Goodell (1989:17–18) indicated the cavern is located in a well-indurated Miocene biohermal and biostromal limestone that is cream to buff colored except where weathered to a light gray. It is a vaulted or domed cavern with a maximum length (SW–NE) of about 50 m and width (NW–SE) of approximately 30 m. The cavern entrance is a relatively small hole (ca. 2 × 3 m) in the ceiling, about 10 m above a generally level area. A steel ladder installed in 1953 shares the entrance with long tree roots (*Clusia* sp.) that previously provided the means of access. The cavern is humid and poorly ventilated.

Fountain Cavern is divided into two distinct chambers (Fig. 6). Chamber 1 includes the area under the entrance, the domed ceiling in the front of the cavern, and Pool 1; it reaches a maximum height of about 15 m and has a steeply sloping

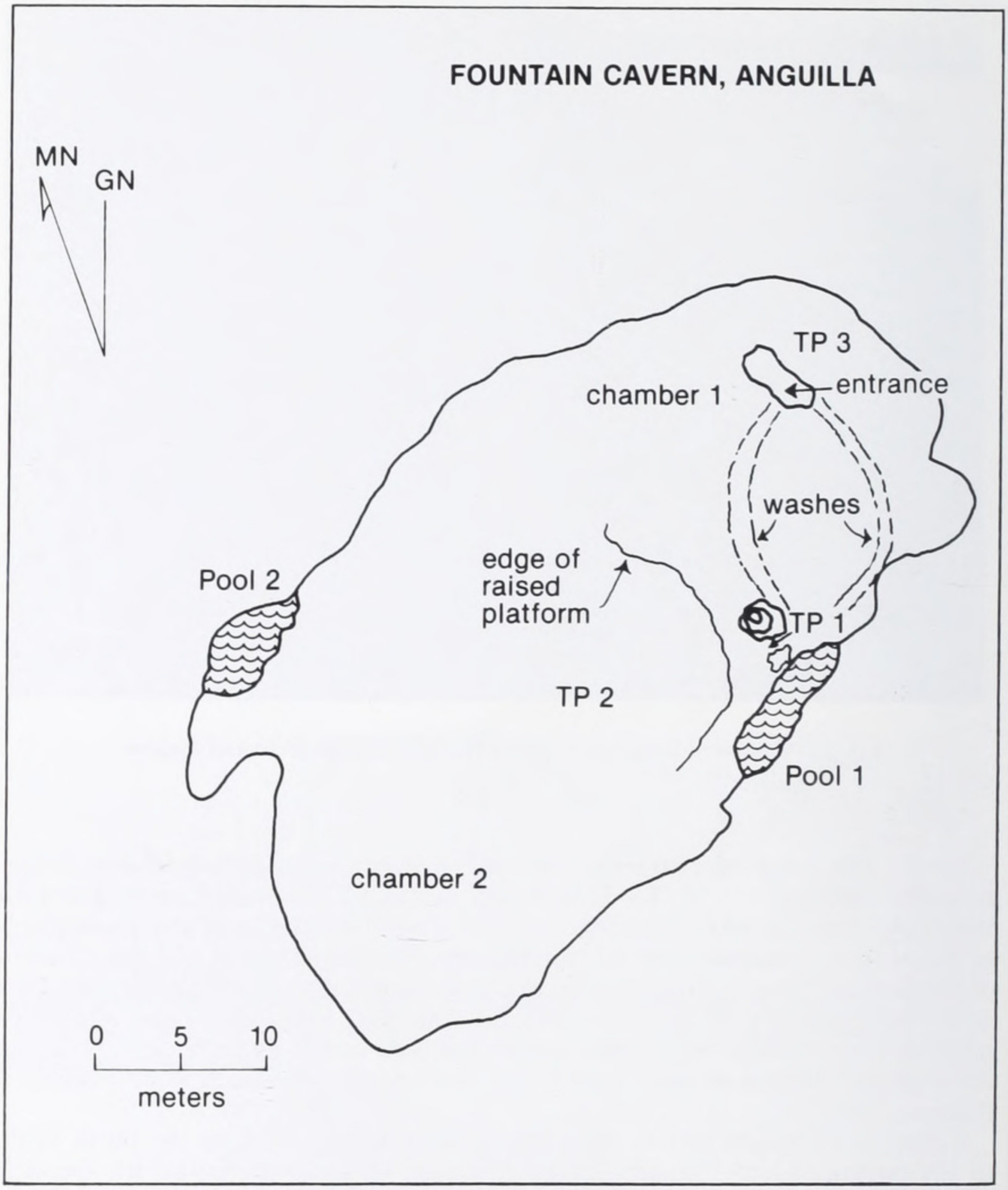


Fig. 6.—Generalized planview of Fountain Cavern showing the positions of chambers and test pits.

floor. Chamber 2 begins at a raised platform in the middle of the cavern and continues westward to its deepest recesses near Pool 2. A low entrance (ca. 4 m high) into Chamber 2 occurs at the edge of the raised platform where the roof dips downward, a constriction resulting from a large limestone roof pendant from which is suspended a large stalactite (Goodell, 1989:18). In Chamber 2, the roof rises only slightly and the floor is fairly flat. Light in Chamber 1, the only part of the cavern where sunlight enters, is subdued. A colony of bats resides in Chamber 2 where almost no light penetrates. One bat species, *Brachyphylla cavernarum* (Antillean cave bat), was captured within Fountain Cavern and another species, *Natalus stramineus* (funnel-eared bat), was taken near the entrance (Genoways, 1989). Very sizeable speleothems (columns and stalagmites) are present on the raised platform, at least three of which remain upright although several others have toppled (Fig. 7A). Water elevation in Pool 1 is 19.4 m, and in Pool 2 is 20.4 m, below the surface benchmark (Goodell, 1989:18). Anguillians have long known of the existence of Fountain Cavern and local legend holds that water always could be obtained from its pools, even during the worst droughts.

Differences other than roof height exist between the two chambers. The floor of Chamber 1 slopes sharply downward to the southeast, south, and southwest from the relatively level area beneath the entrance (Fig. 7B). Goodell (1989:18) described this slope as a debris cone. North of the area beneath the entrance, the floor rises slightly and is covered by large rocks detached from the roof. The floor of Chamber 2 on the raised platform in the middle of the cavern is elevated above most of Chamber 1. The floor remains fairly flat until it reaches the western sector of the cavern where it drops steeply to Pool 2.

Extensive spalling from the roof and walls has occurred in Chamber 1, where many rocks have rolled downslope and come to rest in piles against the south and southeast walls. The piles contain large limestone rocks and chunks of broken speleothems. Goodell (1989:18) indicated the debris accumulated mainly from roof breakdown and ranges from blocks several meters in diameter to much smaller bedding plane slabs and chips to sand and silt. Spall and roof falls in Chamber 2 are scattered across the raised platform rather than being concentrated in piles. The abundance of spall, toppled columns, and broken stalactites indicates that major disturbances, probably earthquakes, have severely wrenched Fountain Cavern in the past. Most stalactites still attached to the ceiling have broken tips.

Sediment depths differ between Chambers 1 and 2. In Chamber 1, major deposits occur beneath the entrance, on the slope, and against the south and southeast walls. Beneath the entrance and on the upper slope the deposits are mainly fine-grained sediment, but at the bottom of the slope and against the walls the deposits are chiefly fragmented rocks. Sediment that accumulated under the entrance has been transported downward along two "washes" bordering the slope (Fig. 6). Gradual downward movement, water runoff from rain falling through the entrance, and treading by people using the washes as trails have contributed to downslope transport of sediment. Sediment deposition in Chamber 2 is negligible and consists mainly of decomposing limestone bedrock covered by bat guano.

Prehistoric archaeological components of Fountain Cavern were known prior to the 1986 research. Petroglyphs were first noted in 1967 by June Flowers from St. Thomas, U.S. Virgin Islands (Dick et al., 1980:35; Douglas, 1986*b*:27). In 1979, a team from the Island Resources Foundation verified the presence of artifacts and petroglyphs in Fountain Cavern (Island Resources Foundation, 1980; Dick et al., 1980). During the 1980s the Anguilla Archaeological and Historical Society collected surface artifacts and recorded 12 petroglyphs at the site (Douglas, 1985, 1986*a*, 1989). AL1 is the site designation for the Fountain Cavern prehistoric site.

Fig. 7.—A. View (looking WSW) of the raised platform and columns in Chamber 2, Fountain Cavern. In the foreground, the large stalagmite with Petroglyph 12 is being measured. B. The sloping floor of Chamber 1 leading to the large stalagmite (with Petroglyph 12) and truncated column (Petroglyph 11) with Pool 1 behind.

METHODOLOGY

The archaeological research in Fountain Cavern involved: a general reconnaissance of the cavern; a survey of the locations of surface artifacts; an examination of petroglyphs; excavation of three test pits; and analysis of recovered artifacts and faunal remains. The research was intended to provide an overview of horizontal distribution of artifacts in the cavern and information about depths of cultural deposits in selected areas, and to determine the temporal and cultural affiliations of artifacts. Spatial data were recorded initially on sketch maps and then transferred to surveyed plans once they became available. The majority of the fieldwork was devoted to test excavations.

Analysis of the artifacts and faunal remains, radiometric dating of shell and carbon samples, preparation of interim reports, and cataloging and photographic documentation of the Fountain Cavern collection have taken place in the United States since 1986. Fountain Cavern's Amerindian ceramics are the focus of a separate report (Petersen and Watters, 1991).

ARCHAEOLOGICAL SURVEY

Archaeological materials on the floor of Fountain Cavern were confined largely to Chamber 1. Surface artifacts were observed in the level area beneath the entrance, in the washes on the slope, along the south wall, and in the vicinity of Pool 1 (Fig. 6).

Chamber 2 produced very few surface artifacts. Given the very shallow depth of sediments on most of the floor in Chamber 2, it is unlikely that any substantial cultural deposits are present; however it is possible that some fissures in Chamber 2 may contain artifacts.

Abundant surface artifacts were observed in two areas of Chamber 1. The first, a relatively flat area termed "Surface Area A," was located at the base of a large stalagmite, atop which is an impressive carving recorded by the AAHS as petroglyph #12 (Douglas, 1985:10, 1986*a*:3, 1989:13). Surface Area A extends from between the stalagmite and a nearby truncated column with petroglyph #11 (immediately adjacent to Pool 1) eastward about 6 m to the western wash on the slope. In this area the AAHS had removed artifacts from piles of loose rocks at the base of the stalagmite and thereafter replaced the rocks to mask the obvious concentration of artifacts in that location (Fig. 8A).

The second area, "Surface Area B," was located along the south wall of the cavern. The eastern wash curves toward the southwest by the south wall and most of Surface Area B was located between the wash and the wall, just east of Pool 1. Artifacts were intermingled with sediment and spall deposits piled against the wall. Artifacts also were recovered in a partially water-filled cavity at the east edge of Pool 1.

Based on the results of the archaeological survey and the previous work undertaken by the AAHS, it was decided to focus initial testing in Chamber 1, to be followed by a check of the shallow sediments in Chamber 2. Actual placement of test pits was determined by the: (1) density of surface artifacts collected by the AAHS; (2) observation of surface artifacts by Watters; (3) depth of the sediments; (4) proximity to washes with evidence of downslope transport; and (5) spatial relationship to petroglyphs.

TEST EXCAVATIONS

Three test pits were excavated in Fountain Cavern, two in Chamber 1 and one on the raised platform in Chamber 2 (Fig. 6). All test pits were 1 × 1 m and

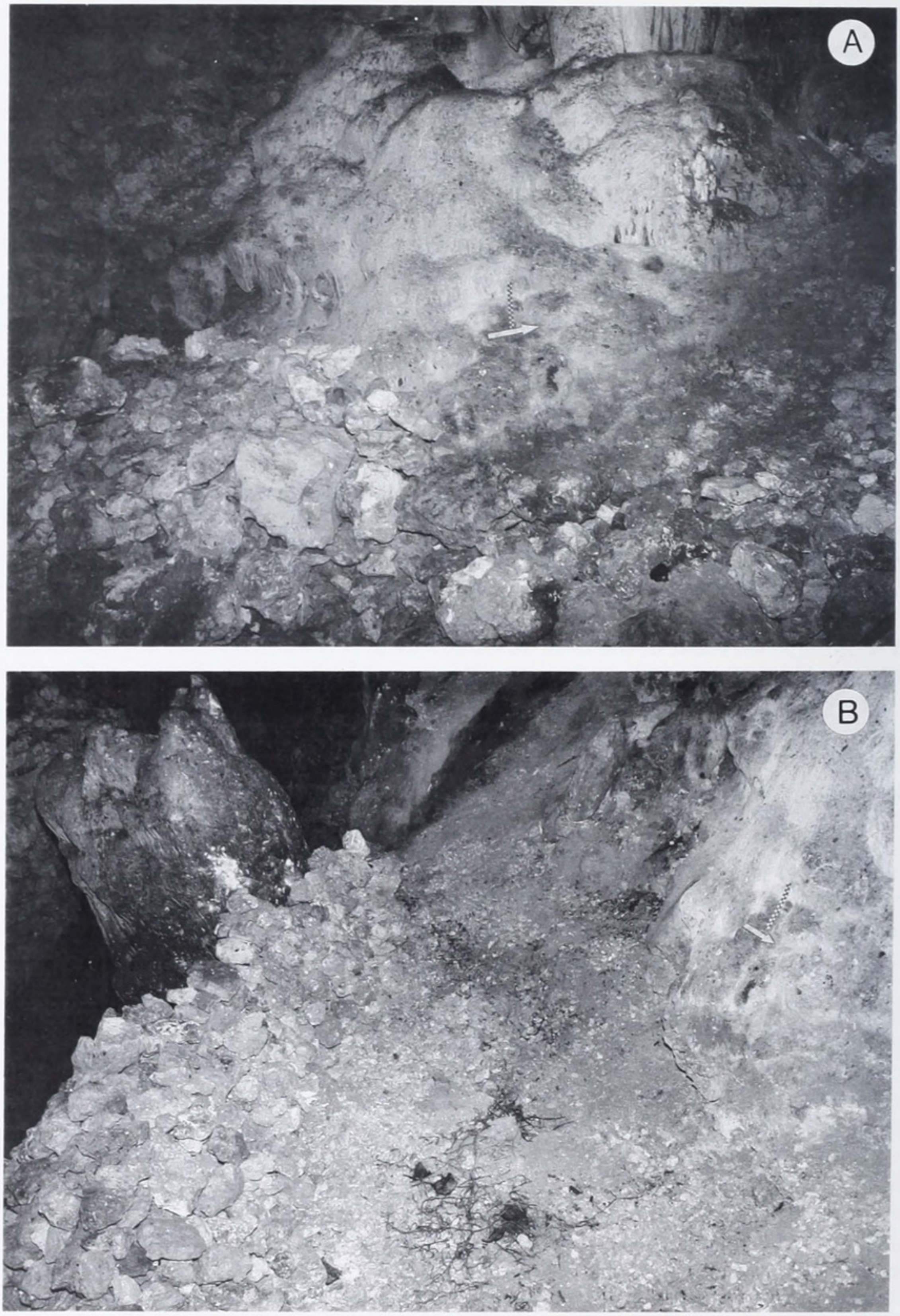


Fig. 8.—A. Loose rocks piled by the AAHS at the base of the large stalagmite to mask the surface artifact concentration (in Surface Area A). B. Test pit 1 was dug between the stalagmite (right) and truncated column (left) behind the loose rocks piled into a retaining wall.

aligned to fit between nearby obstacles. They were dug to bedrock and all natural and cultural materials were removed. Deposits were screened through ⅛-inch mesh; recovered materials were segregated by unit.

Test Pit 1

Test pit 1, in the southwest section of Chamber 1, was positioned at the base of the south side of the large stalagmite with petroglyph #12 carved at the top and on the north side of a nearby truncated stalagmite (with petroglyph #11) adjacent to Pool 1. The 60-cm-high pile of rocks, placed there previously by the AAHS, was removed and the rocks were used to form a retaining wall to stop debris from sliding into Pool 1 (Fig. 8B). Artifacts found among these rocks and on the surface near the stalagmites were assigned to "Surface Area A." The four corners of test pit 1 were laid out on cardinal directions using magnetic north, and the walls were offset (at 045°) to position the test pit between the stalagmites. Walls were designated as northeast, southeast, southwest, and northwest.

When the surface of test pit 1 was exposed after removal of the rocks, a shallow (ca. 5 cm) layer of light yellowish brown (Munsell notation 10 YR 6/4 dry) sediment (Stratum 1) was observed across the test pit (Fig. 9). However, Stratum 1 had a definite reddish cast in the west corner of the test pit, and in the north corner was a slight depression, the remnant of a shallow hole dug into the surface in the past, that extended eastward beyond the confines of the test pit. Test pit 1 initially was horizontally segregated into three sectors: (1) Sector A in the west corner by the reddish sediment; (2) Sector C, the depression, in the north corner; and (3) Sector B, the remainder of the pit (essentially the southeast half). In the upper portion of the test pit each sector was excavated individually, but at a depth of about 50 cm the sector distinction was abandoned because variations in sediment color and texture were no longer discernible.

Stratum 2, in Sector A, was reddish brown (5 YR 4/4), extended horizontally about 50 cm into the test pit, was visible in the southwest and northwest profiles (Fig. 9), and reached a maximum depth below surface of 30 cm. It was immediately adjacent to a reddish flowstone deposit in the southwest wall. Stratum 3, the most limited of the strata, occurred in the southwest wall but only in the southern half of the pit, in Sector C. It reached a maximum depth of about 10 cm adjacent to Stratum 2 but feathered out before reaching the south corner of test pit 1 (Fig. 9). Stratum 3 was patchily distributed rather than being a uniform layer. Its color was yellowish red (5 YR 5/6).

Stratum 4 (brown, 7.5 YR 5/4) directly underlaid Stratum 1 in Sectors B and C, was the principal deposit in test pit 1 (to a depth of about 155 cm), and consisted mostly of spall, primarily fragmented rocks and broken speleothems (Fig. 9). Interspersed in cavities among the rocks were patchy accumulations of finer sediments. The excavation technique involved removing the rocks by hand and then gathering together the limited amounts of fine sediment for screening. Four large rocks occurred in test pit 1 (Fig. 10). Rocks 2 and 3 each protruded into one of the walls and, when removed, caused the walls to slump. Rock 4, wedged across the bottom of test pit 1, had to be left in place because removing it would have collapsed the walls.

Excavation was complicated by intrusion of the stalagmite (with petroglyph #12) into the pit (Fig. 9). As test pit 1 was dug deeper, the stalagmite encroached or protruded farther into the test pit from the northwest profile. By the time test pit 1 "bottomed out," the stalagmite occupied almost 50% of the area, and most

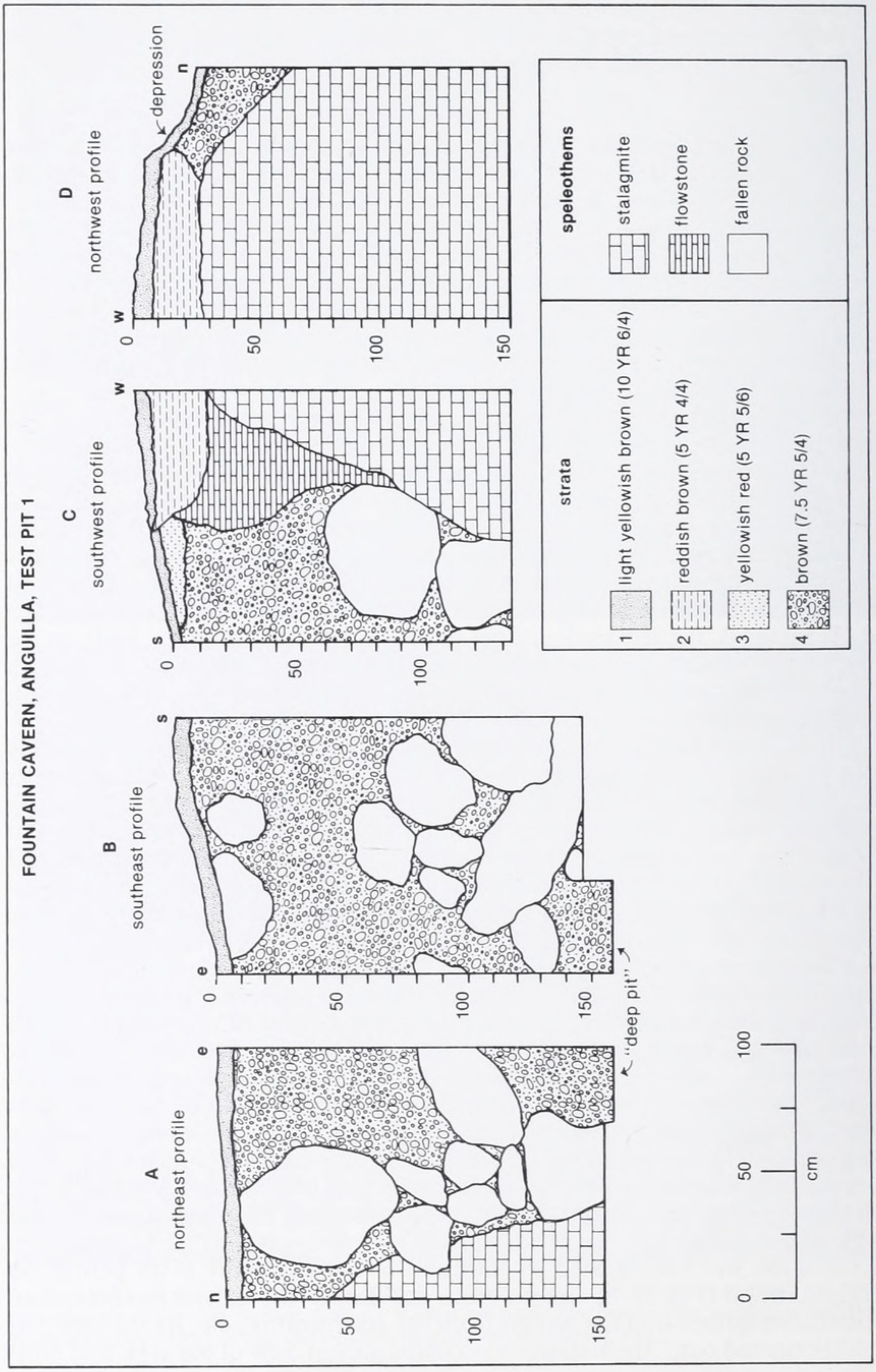


Fig. 9.—Four profiles of test pit 1, Fountain Cavern.

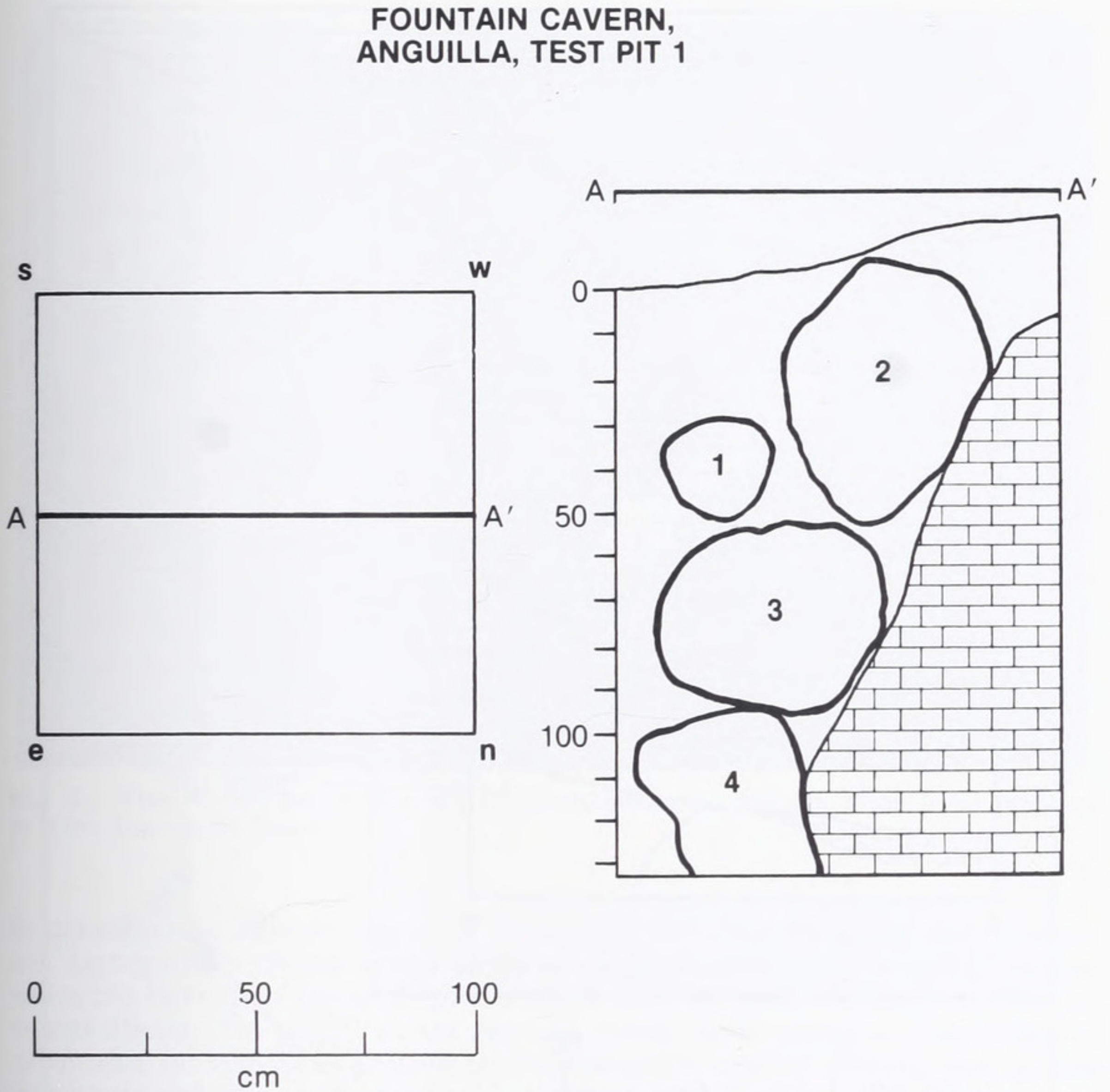


Fig. 10.—Large rocks under line A-A′ bisecting test pit 1. Rock 1 was within the test pit's borders, Rock 2 penetrated the northeast wall, Rock 3 the southwest wall, and Rock 4 (wedged and immovable) both walls.

of the rest of the base was taken up by Rock 4, wedged in the bottom. Only a 20 × 30 cm area (the "deep pit") in the east corner remained accessible for excavation (Fig. 11). When bedrock was reached at about 155 cm (Fig. 12), water seeped into the deep pit from nearby Pool 1.

The intrusion of the stalagmite, the presence of large rocks, and the increasingly narrow and restricted space for digging meant that tight vertical control could not be maintained throughout test pit 1. As a result, the uniform 10-cm excavation units dug in Sector A of the test pit were impossible to maintain when the mass of large rocks was encountered. Between the base of Rock 2 and around most of Rock 3, from about 50 to 90 cm (Fig. 10), vertical control was minimal because as each rock was removed from the test pit, part of the wall in which it was embedded slumped, causing materials from the walls to slide into the test pit. Plastic sheets were placed under the rocks to catch these wall falls, thereby allowing

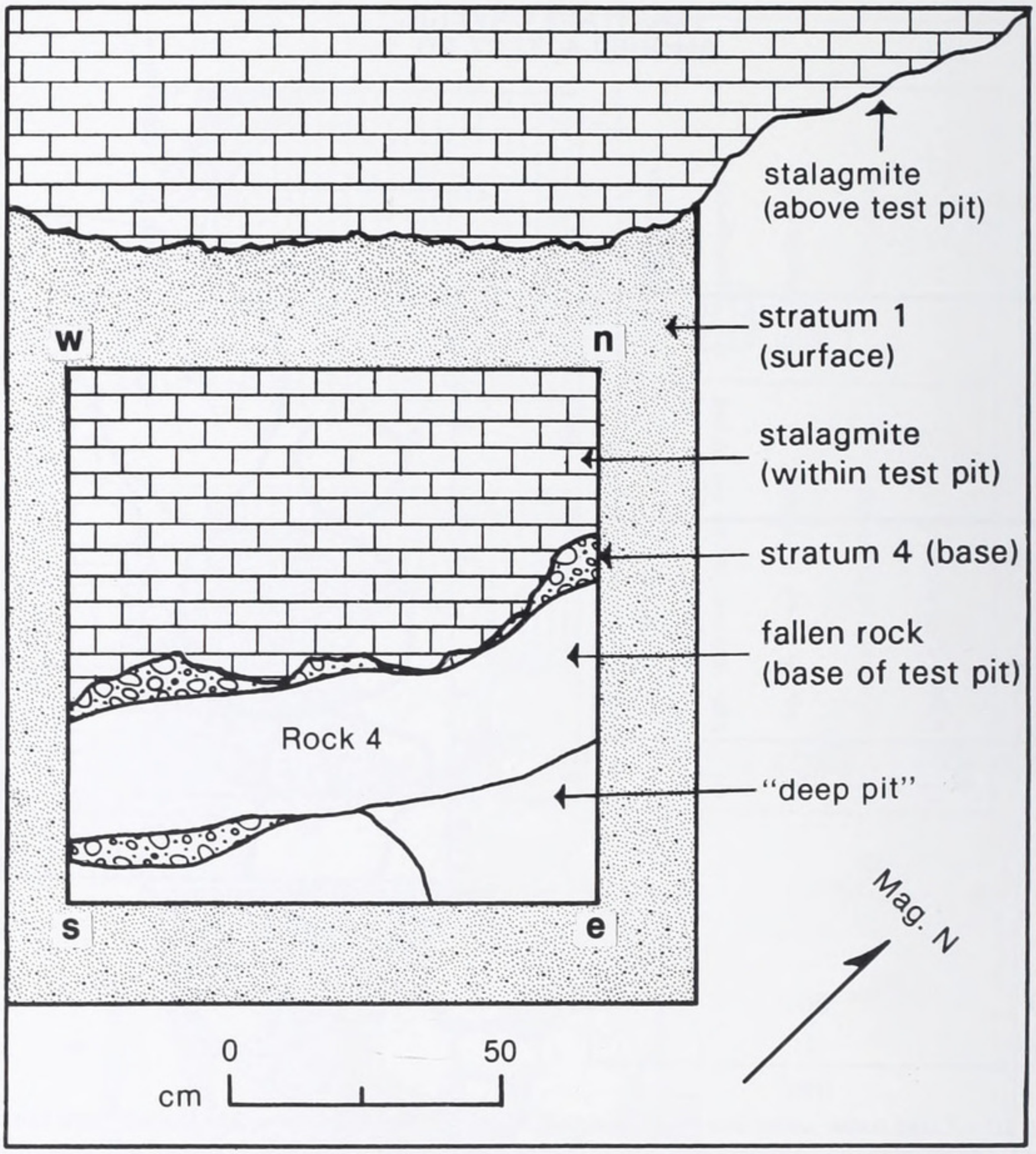


Fig. 11.—Planview of the area around test pit 1 showing the intrusion of the stalagmite from the northwest wall (see also Fig. 9 and 10). The "deep pit" was the bottom of test pit 1.

them to be removed and segregated as "wall debris." Table 1 shows the provenience of excavated units and code numbers applied to each.

Cultural materials were found throughout test pit 1. Yet, artifacts from radically different time periods were intermingled at various depths. Modern artifacts, transported downward through the crevices and holes among rocks in Stratum 4, were juxtaposed with older, prehistoric materials. In one case, in a cavity exposed beneath a rock that was removed at about 50 cm, a prehistoric sherd and a piece of plastic were observed beside one another, along with the still visible striations in the sediment showing where the plastic piece slid into the hole. Trampling and shifting of rocks by people going to Pool 1 most likely caused the downward movement of artifacts; this taphonomic process has probably accelerated in modern times. The mixing of artifacts from different time periods did not result from

Fig. 12.—When the deep pit (ca. 20 × 30 cm) reached bedrock at a depth of 155 cm, it was moistened by water from nearby Pool 1.

humans having actively dug up or turned over the deposits in the past. Instead, the taphonomic process seems to be an agglomerative one, whereby younger materials have been transported downward and essentially "added" to older artifacts already "in place" in the crevices of the lower deposits. The extent of downward movement of artifacts is documented by modern objects, such as glass fragments and coins having quite recent dates, that were recovered deep in test pit 1.

Test Pit 2

The second test pit was excavated in Chamber 2 on the raised platform in the middle of the cavern (Fig. 6). Test pit 2 was excavated to verify the apparently shallow depth of the sediment and to confirm the paucity of subsurface artifacts. The corners of test pit 2 were laid out on cardinal directions using magnetic north, but again the walls were offset (030°) to fit the surroundings. Profiles were labeled as the northeast, southeast, southwest, and northwest.

Sediment in Stratum 1, the only stratum, was light brownish gray (10 YR 6/2) in color and composed of bat guano and decomposed limestone. Across most of the test pit, sediment depth above bedrock did not exceed 5 cm (Fig. 13), although it was slightly deeper (ca. 8 cm) in a small natural depression in the center (Fig. 14A). Stratum 1 was removed as a single excavation unit. Two partially buried prehistoric pottery sherds were found near the northwest wall. One tiny lizard bone (fresh in appearance) was recovered on the surface.

Table 1.—*Unit codes and original provenience.*

Code number	Provenience
D1-1	Surface Area A
D1-2	Surface Area B
D1-3	Test pit 1, Sector A, 0–10 cm
D1-4	Test pit 1, Sector A, 10–20 cm
D1-5	Test pit 1, Sector A, 20–30 cm
D1-6	Test pit 1, Sector A, 30–70 cm
D1-7	Test pit 1, Sector B, 0–5 cm
D1-8	Test pit 1, Sector B, 5–35 cm
D1-9	Test pit 1, Sector B, 35–50 cm (Rock 1)
D1-10	Test pit 1, Sector C, 0–5 cm
D1-11	Test pit 1, Sector C, 5–50 cm (Rocks 2 and 3)
D1-12	Test pit 1, 90–100 cm ("Good Level")
D1-13	Test pit 1, 100–110 cm ("Good Level + 1")
D1-14	Test pit 1, 110–120 cm ("Deep pit #1") (Rock 4)
D1-15	Test pit 1, 120–130 cm ("Deep pit #2") (Rock 4)
D1-16	Test pit 1, 130–140 cm ("Deep pit #3") (Rock 4)
D1-17	Test pit 1, 140–155 cm ("Deep pit #4") (Rock 4)
D1-18	Test pit 1, all debris from slumping walls
D1-19	Test pit 2, 0–8 cm (entire depth)
D1-20	Test pit 3, Surface (roots)
D1-21	Test pit 3, 0–10 cm
D1-22	Test pit 3, 10–20 cm
D1-23	Test pit 3, 20–30 cm
D1-24	Test pit 3, 30–75 cm (bedrock fissures)
D1-25	Pool 1 by Surface Area B (encrusted sherd)
D1-26	Petroglyph rock (chip)

Test Pit 3

Test pit 3 was dug on the east side of the relatively level area beneath the entrance to Fountain Cavern (Fig. 6). It was not directly below the entrance; instead it was situated under an overhang against the east wall of the cavern. The location (Fig. 14B) was chosen because it was near the entrance to the cavern and a panel of petroglyphs.

The walls of test pit 3 were positioned on the cardinal directions (magnetic north) and labeled as north, east, south, and west profiles. Corners of the test pit were designated northeast, southeast, southwest, and northwest. The ground surface sloped slightly, making the north wall of the test pit about 15 cm higher than the south side.

Matted roots and loose rock covered about 5 cm at the top of test pit 3. Immediately below was Stratum 1, a brown (10 YR 5/3) sediment generally uniform in color (Fig. 15) except immediately above bedrock, where it was a slightly darker brown (10 YR 4/3). Stratum 1 contained roots, leaves, and other organic matter. Several larger rocks were embedded in the walls of test pit 3; a thin layer of smaller rocks occurred above the decomposing bedrock. There were, however, many fewer rocks in test pit 3 than in test pit 1. Although Stratum 1 reached bedrock at 25–30 cm below ground level in some parts of the test pit, further excavation revealed that bedrock occurred at different depths elsewhere in test pit 3, with Stratum 1 extending to 40–45 cm in certain areas (Fig. 16). Stratum 1 was removed in 10-cm layers. Below Stratum 1, fissures penetrated deep into bedrock including an especially deep fissure which reached a depth of

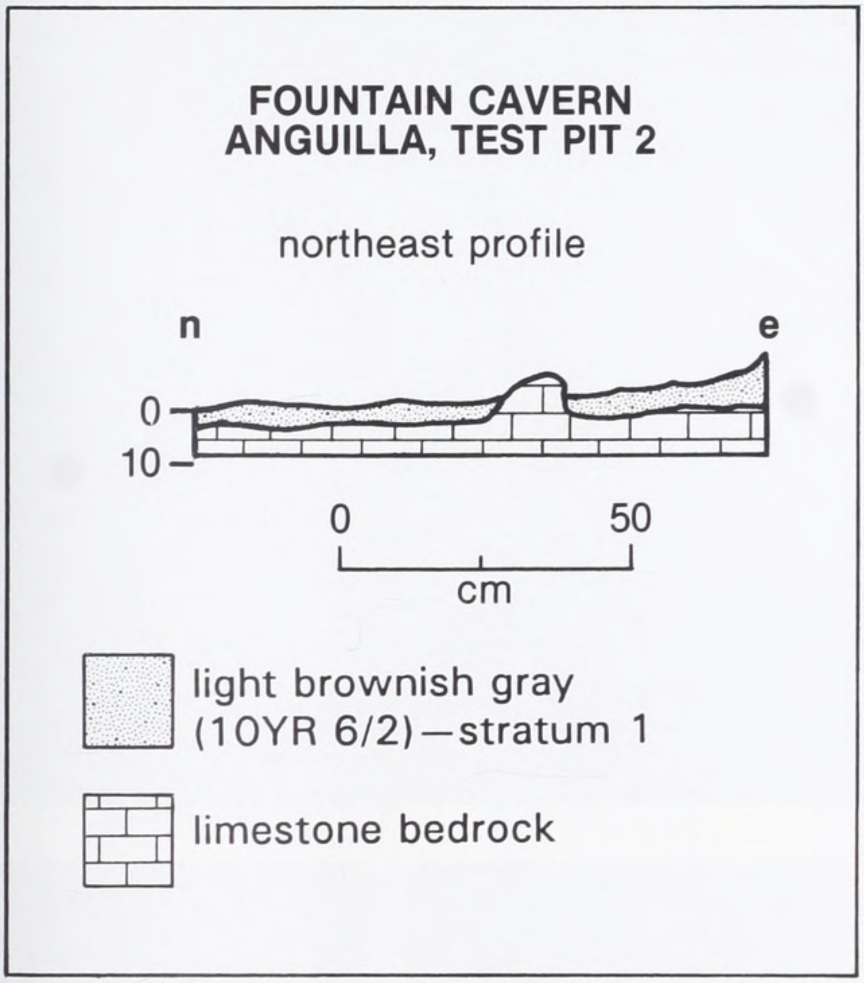


Fig. 13.—Profile of shallow test pit 2, Fountain Cavern.

about 75 cm near the northwest corner (Fig. 16). Stratum 2, consisting of a very fine-grained and very pale brown sediment (ranging from 10 YR 7/3 to 10 YR 8/3), filled these fissures, crevices, and holes.

Artifacts were recovered only from Stratum 1. Prehistoric and historic artifacts were mingled to a depth of about 30 cm; modern objects occurred to 20 cm; these artifacts cannot be regarded as being in primary context. Artifacts and sediments in test pit 3 were mixed during installation of a steel ladder in 1953, when they were dug up, intermingled, and redeposited.

Radiometric Dating

Radiocarbon dating was done by Beta Analytic, Inc., on two shell samples and one charcoal sample removed from test pit 1 on 11 January 1986. Shells selected for analysis were *Cittarium pica,* a species of marine gastropod widely distributed in the Caribbean. Sherds and other artifacts were found near the shell and charcoal samples.

The first shell (sample AL1-RC1) was recovered at a depth of 50 to 55 cm below ground surface, between the stalagmite and base of Rock 2 (Fig. 10) about 22 cm from the north stake and 10 cm in from the northwest profile. Five shells were clustered at this location. It yielded a radiocarbon age of 1220 ± 70 years: A.D. 730 (Beta-15485). (All dates are uncorrected.)

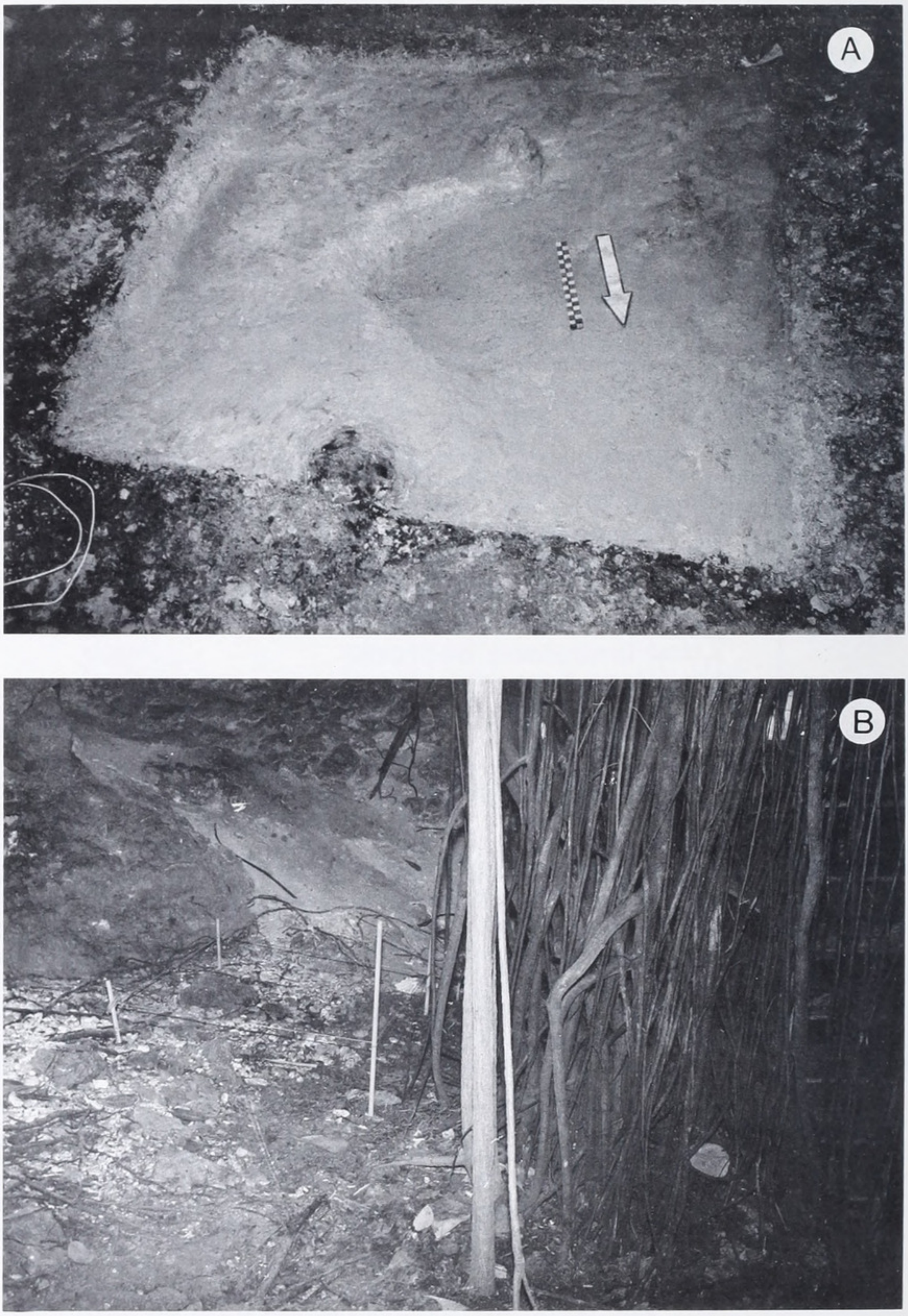


Fig. 14.—A. Completed excavation of test pit 2 showing a small natural depression in the center. B. Location of test pit 3 near the tree roots and ladder beneath the entrance.

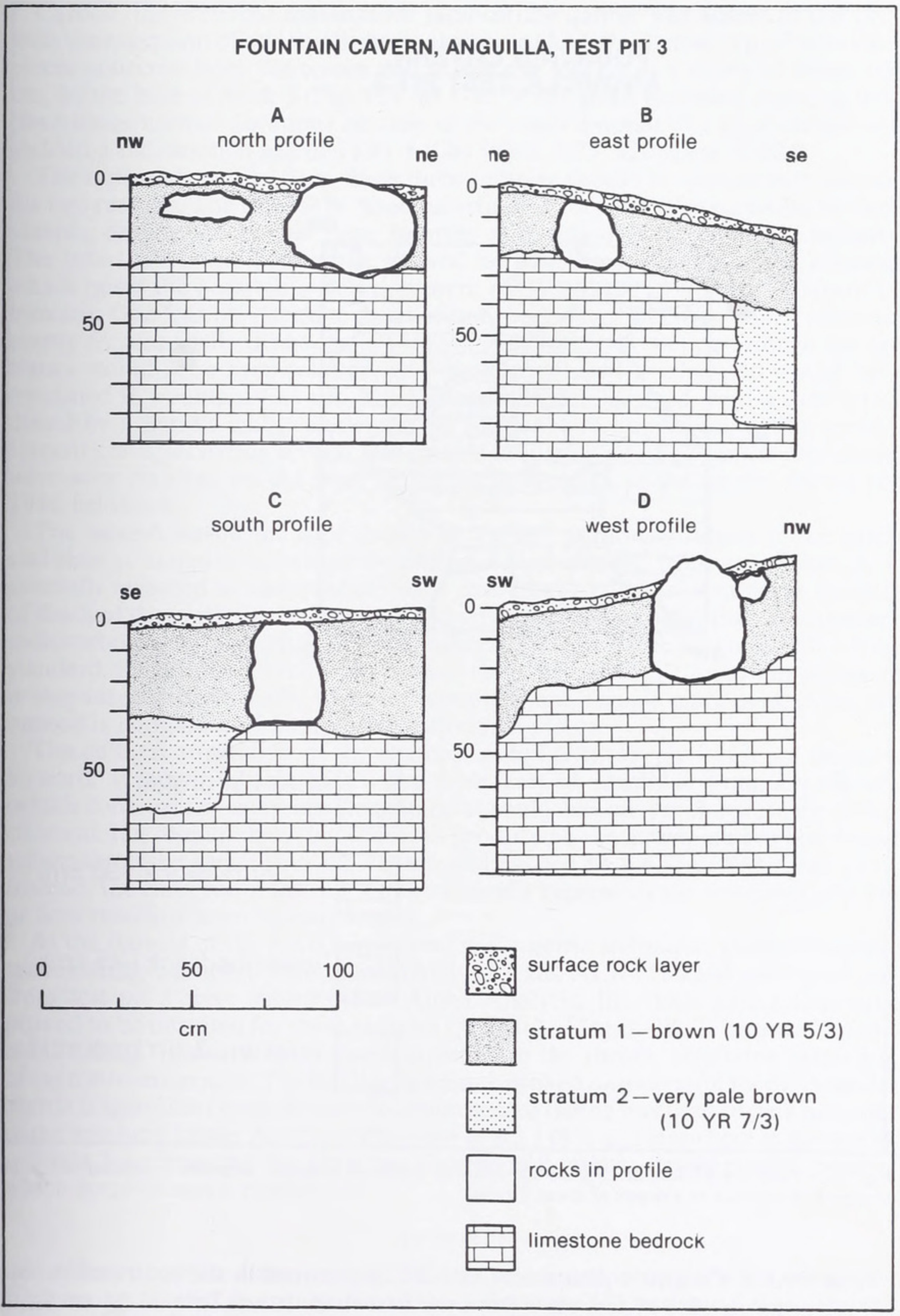


Fig. 15.—Four profiles of test pit 3, Fountain Cavern.

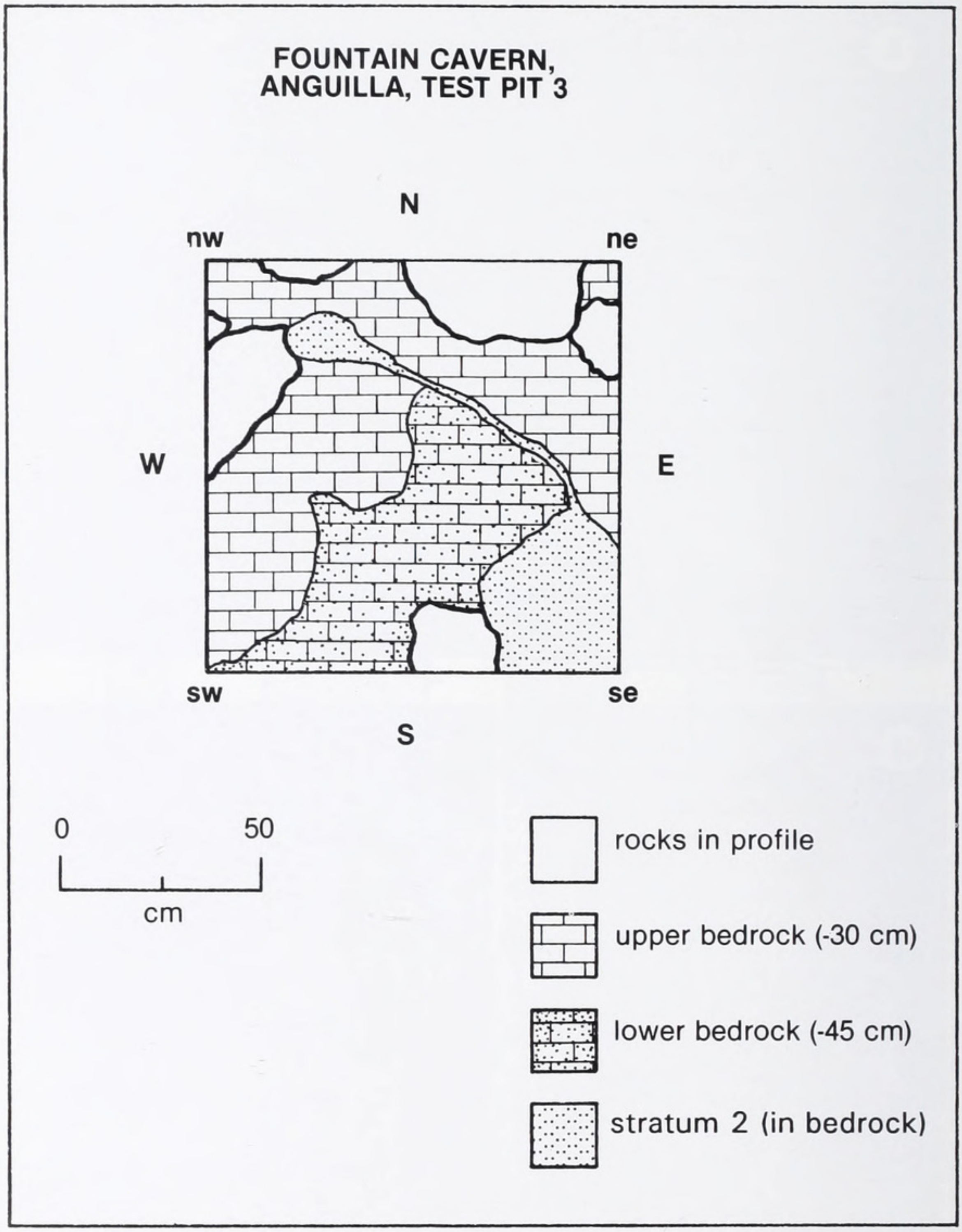


Fig. 16.—Planview of test pit 3 showing different levels of bedrock. Stratum 2 (lacking artifacts) occurred in crevices to a depth of about 75 cm.

The second *Cittarium pica* shell (AL1-RC2) occurred in the southeast profile on the opposite side of test pit 1 from the first shell. It was located 54 cm from the east stake at a depth of 72–75 cm and was the only shell found at that location. The shell yielded a radiocarbon age of 1130 ± 80 years: A.D. 820 (Beta-15486).

Carbon, the preferred material for radiocarbon dating, was absent in test pit 1 with the exception of one small charcoal sample (AL1-RC3) made up of individual pieces collected from the screen and across the test pit at a depth of about 100 cm, by the base of Rock 3 (Fig. 10). AL1-RC3 was given extended counting time (four times normal duration) because of the small amount (0.2 g) of carbon and yielded a radiocarbon age of 1530 ± 140 years: A.D. 420 (Beta-15824).

The radiocarbon ages from these three samples should be viewed with caution for two reasons. The first is the doubtful reliability of cultural association for each sample, despite the fact all three samples were found in proximity to artifacts. The intact *Cittarium pica* shells showed no evidence of alteration by humans, which raises the possibility that they were not deposited in Fountain Cavern by humans. One feasible alternate agent of transport is hermit crabs, which often use empty *C. pica* shells (Randall, 1964:424). A hermit crab falling through the entrance would have been trapped, and the marine shell it inhabited would have remained in Fountain Cavern. Any radiocarbon date derived from a shell introduced by a hermit crab would have no relevance to human use of the cavern. Hermit crabs, including several that carried moderate-sized *Cittarium pica* shells, were seen crawling on the floor beneath the entrance to the cavern during the 1986 fieldwork.

The second reason the ages should be viewed cautiously relates to the kinds and sizes of samples submitted for dating. A date derived from a shell sample is generally regarded as less reliable than a date from a charcoal sample, as the date of death of the mollusk may be two hundred or more years older than the apparent radiocarbon date. The reliability of a radiocarbon age (especially one with a large standard deviation) derived from a small charcoal sample (0.2 g in this instance) is also suspect, particularly when the sample is not a single piece of charcoal but instead is composed of many small individual pieces.

The cultural attribution of the charcoal samples in test pit 1 is more straightforward. It is improbable that a fire from natural causes in Fountain Cavern (which contains few combustible materials) could account for the presence of this charcoal. It is also unlikely that charcoal, produced by an above-ground fire, would subsequently be swept into the cavern and carried to the vicinity of test pit 1. Instead, the charcoal in test pit 1 more logically represents the remnants of a fire or fires resulting from human actions.

At the request of the AAHS, a second radiometric technique, thermoluminescence dating, was tried. Two sherds (AL1-TL1 and AL1-TL2) and associated soil from test pit 1 were submitted to Alpha Analytic, Inc. This dating technique proved to be unsuited for these samples (Alpha-2872 and -2873) because "anomalous fading," induced by volcanic minerals in the sherds, precluded extraction of even minimum ages. The fact the technique proved unsuccessful for the Anguilla sherds is significant because thermoluminescence dating was used to date ceramics in the southern Lesser Antilles (Schvoerer et al., 1985) and elsewhere in the world.

Table 2 summarizes the Fountain Cavern radiometric dating results, none of which inspires much confidence.

ARTIFACTS

Artifacts and miscellaneous materials are segregated into two broad categories: (1) those excavated from test pit 1 (D1-3 through -17), test pit 2 (D1-19), and test pit 3 (D1-20 through -24); and (2) those from the cavern floor surface (D1-1, -2, -25, -26) and from disturbed context in test pit 1 (D1-18, debris from

Table 2.—*Radiometric samples from Fountain Cavern.*

Lab number (Sample number)	Material	Radiocarbon ages*	A.D.	1 Standard deviation
Beta-15485 (AL1-RC1)	shell[a]	1220 ± 70 B.P.	730	660–800
Beta-15486 (AL1-RC2)	shell[a]	1130 ± 80 B.P.	820	740–900
Beta-15824 (AL1-RC3)	carbon[b]	1530 ± 140 B.P.	420	280–560
Alpha-2872 (AL1-TL1)	sherd	unsuited for thermoluminescence dating		
Alpha-2873 (AL1-TL2)	sherd	unsuited for thermoluminescence dating		

* Uncorrected; [a] = *Cittarium pica*; [b] = 0.2 g given extended counting time (4 times normal).

slumped walls) (refer also to Table 1). Excavated artifacts are discussed in three subcategories—prehistoric artifacts, historic and modern artifacts, and miscellaneous material. Individual tables (Tables 3–5) are provided for each excavated subcategory, while surface and disturbed materials are compiled in Table 6. Finally, mollusk remains that were modified into functional objects are treated in the Faunal Remains section.

Prehistoric Artifacts

Excavated prehistoric artifacts include ceramics, lithics, and a three-pointer. They total 779 specimens. Ceramics constitute by far the highest percentage (>98%) of prehistoric artifacts in each test pit (Table 3).

Ceramic

Of a total of 944 prehistoric Amerindian sherds recovered in Fountain Cavern during the 1986 project, 775 (82.1%) were sherds excavated from test pits 1, 2, and 3. Distribution by test pit of the 775 excavated sherds (Table 3) is: test pit 1 (N = 724 or 93.4%), test pit 2 (N = 2 or 0.3%), test pit 3 (N = 49 or 6.3%). All excavated prehistoric sherds were brought to the U.S. for further study but two sherds (one each from D1-4 and D1-8), were sacrificed for the unsuccessful attempt at thermoluminescence dating, leaving 773 excavated sherds for the ceramic analysis. These 773 sherds were combined with seven surface sherds (discussed below, in the section on "Surface and Disturbed Artifacts") to provide a total of 780 prehistoric sherds available for detailed study.

Table 3.—*Excavated prehistoric artifacts at Fountain Cavern, Anguilla.*

Artifact	Test pit 1 (D1-3 to -17)	Test pit 2 (D1-19)	Test pit 3 (D1-20 to -24)	Total
Ceramic	724[a]	2	49	775
Lithic	2	–	1	3
Three-pointer	1	–	–	1
Total ceramic	724 (99.6%)	2 (100.0%)	49 (98.0%)	
Total lithic	2 (0.3%)	– (0.0%)	1 (2.0%)	
Total three-pointer	1 (0.1%)	– (0.0%)	– (0.0%)	
Grand total	727 (100.0%)	2 (100.0%)	50 (100.0%)	779

[a] Two of these sherds were sacrificed for thermoluminescence dating.

A standard vessel lot analysis was conducted using methods derived from prior analyses of North American and Caribbean ceramics (e.g., Petersen, 1980, 1985; Petersen and Power, 1985; Petersen and Watters, 1988). Of the 780 excavated and surface ceramics available for study, 234 (30%) could be assigned to 29 distinct vessels. Data about temper, texture, manufacture, surface finish, vessel morphology, metrics, color and firing attributes, and decoration of these 29 vessels are presented elsewhere (Petersen and Watters, 1991).

Most vessels are spatially segregated in test pits or surface areas (Petersen and Watters, 1991: table 3). Eighteen vessels (3, 5–21) occur solely in test pit 1, seven vessels (22–28) in test pit 3, one vessel (29) in test pit 2, one vessel (1) in Pool 1 (D1-25), and one vessel (2) from Surface Area B (D1-2). Only one vessel (4) occurred in two locations, on the cavern floor (one sherd in Surface Area A) and in nearby test pit 1 (19 sherds).

Although vessels were restricted to individual test pits, in a number of instances sherds from a single vessel were found in different units within a test pit. For example (see Table 1), vessel 5 occurred in five units (D1-3, -4, -5, -10, -11) and vessel 8 occurred in seven units (D1-3, -4, -5, -7, -8, -10, -11) in test pit 1, while vessel 23 was found in three units (D1-21, -22, -23) in test pit 3. Vessel 29, the sole vessel in test pit 2, was represented by only two sherds, both of which were from the same unit (D1-19).

The unit with the most vessels (N = 13) is unit D1-8, located at a depth of 5–35 cm in Sector B of test pit 1, the portion of the test pit where there were no large rocks. D1-8 also had the most sherds (N = 100), although the distribution is biased as 79 sherds are from only three vessels.

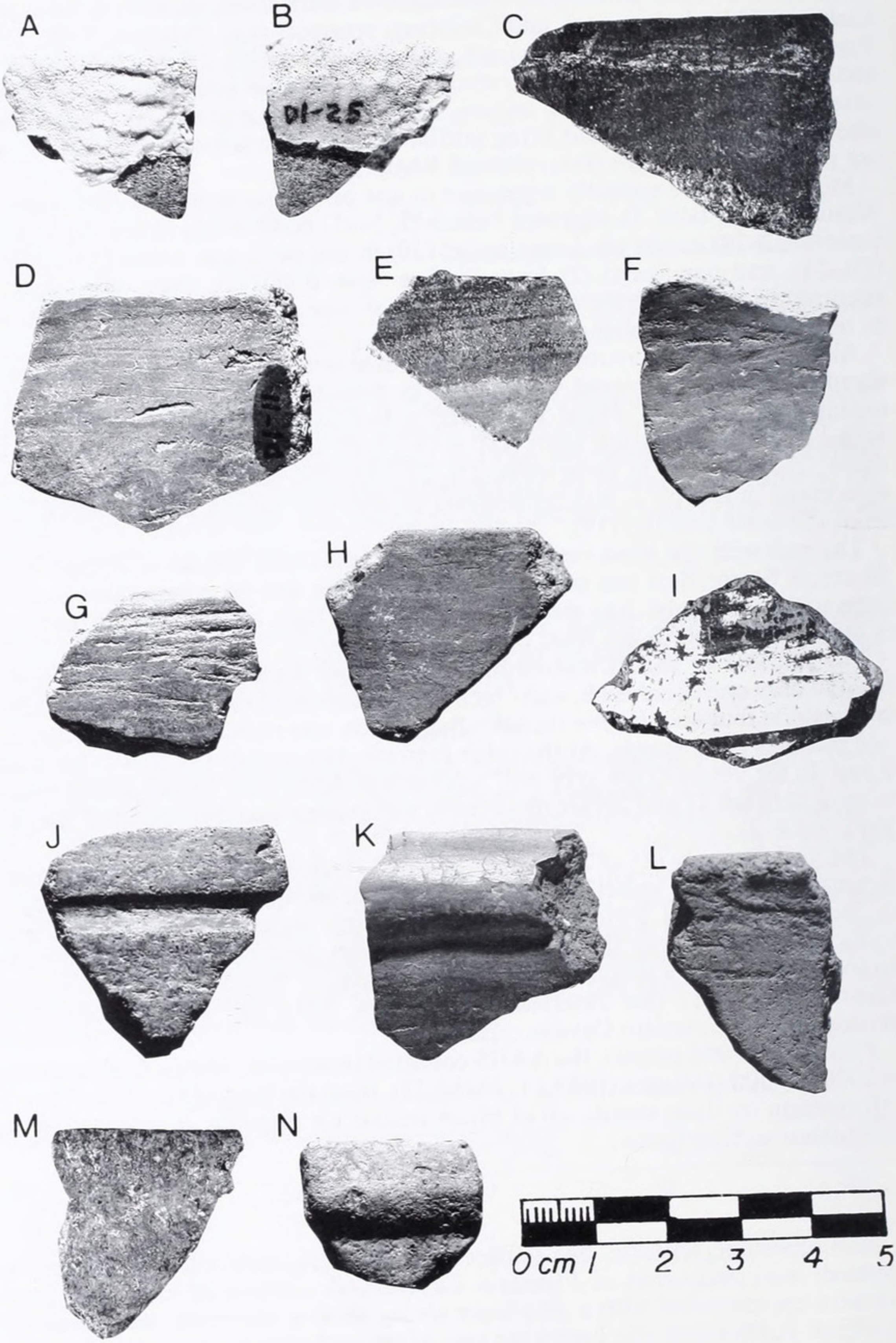
The number of sherds representing each vessel varies widely. Seven vessels include only one sherd each, eight include two sherds, three include three sherds, two include four sherds, one includes five sherds, one includes seven sherds, and one includes eight sherds. At the other extreme, two vessels (75 sherds for vessel 9 and 40 for vessel 8) are very well represented, while four vessels (sherd counts ranging between 11 and 20) are moderately well represented (Petersen and Watters, 1991: table 3).

The vast majority (27 of 29 vessels; 229 of 234 sherds) of the Fountain Cavern ceramics used in the vessel lot analysis exhibit no decoration. They are attributed to the post-Saladoid period. Two vessels exhibit decoration on their exterior surfaces, vessel 17 (four sherds) with white-on-red geometric painting and vessel 19 (one sherd) with a single, deep, U-shaped incision. Sherds from 13 vessels are depicted in Fig. 17 (see Petersen and Watters, 1991: fig. 4–11 for additional photographs of Fountain Cavern ceramics).

Prior to the 1986 project, the AAHS collected prehistoric sherds, first estimated at 5000 to 5500 (Douglas, 1985:11, 1986*b*:28), from the floor of Fountain Cavern. Information on these sherds, all of which remain on Anguilla, is provided in the Discussion section below.

Lithic

Five limestone artifacts, two surface collected (discussed later) and three excavated, were recovered in Fountain Cavern. All surfaces of excavated lithic artifacts are encrusted with a gray layer giving them a uniformly weathered appearance, but beneath that cortex the core of the rock appears gray-green in color. Such limestone reportedly occurs naturally on St. Martin but not on Anguilla.


A
B
D1-25
C
D
D1-11
E
F
G
H
I
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0 cm 1 2 3 4 5

Limestone artifacts from St. Martin (excavated by Jay Haviser) are visually identical to Fountain Cavern lithics in the cortex and core colors.

Haviser (1988:30) described this stone as gray-green chalky chert but later (Haviser, In press) redesignated it radiolarian limestone. In both diagenetic stages and surface erosion it conforms to the weathered appearance and encrusted layer of the Fountain Cavern lithics. Therefore, the five Fountain Cavern lithics are designated as radiolarian limestone. The limestone from which the artifacts were manufactured, especially in its gray-green core color, definitely differs from the limestone and spall observed in the cavern, thus indicating Fountain Cavern was not the source of the radiolarian limestone. St. Martin is the likely source. The three excavated lithic artifacts are in more advanced states of diagenesis (with thicker encrusted layers) than the two surface-collected objects.

Two radiolarian limestone artifacts were recovered from test pit 1 and a third came from test pit 3 (Table 3). All three are broken, conically shaped (Fig. 18A, B), and of similar size. One test pit 1 artifact (D1-3) is bifacially chipped where one end tapers to an angled edge or ridge (not to a point), while the other end is cleanly broken across the long axis. D1-3 is 54.6 mm long, 36.3 mm wide, 30.3 mm thick, and weighs 81.70 g. The second artifact from test pit 1 (D1-6) has a tapered end which was apparently blunted by pounding. No bifacial flaking was detected on this artifact. The break on the opposite end does not entirely cross the long axis; instead a segment of the rock projects beyond the break. D1-6 has a maximum length (to the end of the projection) of 64.3 mm, a length to the rest of the break of 54.5 mm, a width of 35.7 mm, a thickness of 23.4 mm, and a weight of 69.35 g. The object from test pit 3 (D1-22) is the most heavily encrusted of the three excavated artifacts and its surface alteration (resulting in a friable, almost powdery cortex) seems well advanced. Again, the blunted end shows evidence of pounding but no flaking. The opposite end is broken diagonally across the long axis. D1-22 is 54.0 mm long, 30.4 mm wide, 22.1 mm thick, and weighs 49.77 g.

None of these artifacts seem to match either descriptions or functional categories presented by Haviser (1988, In press) for the St. Martin radiolarian limestone tools. The functions of the Fountain Cavern artifacts remain uncertain, although they may have been used for pounding, grinding, pecking, or otherwise forming the petroglyphs within the cavern. The most heavily encrusted artifact (D1-22) came from test pit 3, where rainfall penetrates through the entrance to the cavern, and its more moist deposits very likely enhanced the physical or chemical alteration of the artifact. For test pit 1 artifacts, D1-6, the most deeply buried artifact (between 30 and 70 cm) is the most heavily encrusted specimen, more so than D1-3, found between the surface and 10 cm, which in turn is more encrusted than the two nearby surface finds. Thus, in the drier part of the cavern near test pit 1,

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Fig. 17.—Fountain Cavern prehistoric ceramics. A. Exterior of vessel 1 rim sherd (from cavity near Pool 1) showing the travertine crust. B. Interior of vessel 1 rim sherd. C. Exterior of vessel 5 rim sherd. D. Interior of vessel 8 body sherd. E. Exterior of vessel 9 body sherd. F. Exterior of vessel 10 body sherd. G. Exterior of vessel 11 rim sherd. H. Exterior of vessel 12 rim sherd. I. Exterior of vessel 17 body sherd with white-on-red painting. J. Exterior of vessel 19 rim sherd showing the U-shaped incision. K. Interior of vessel 22 rim sherd. L. Exterior of vessel 23 rim sherd. M. Exterior of vessel 25 rim sherd. N. Interior of vessel 28 rim sherd.

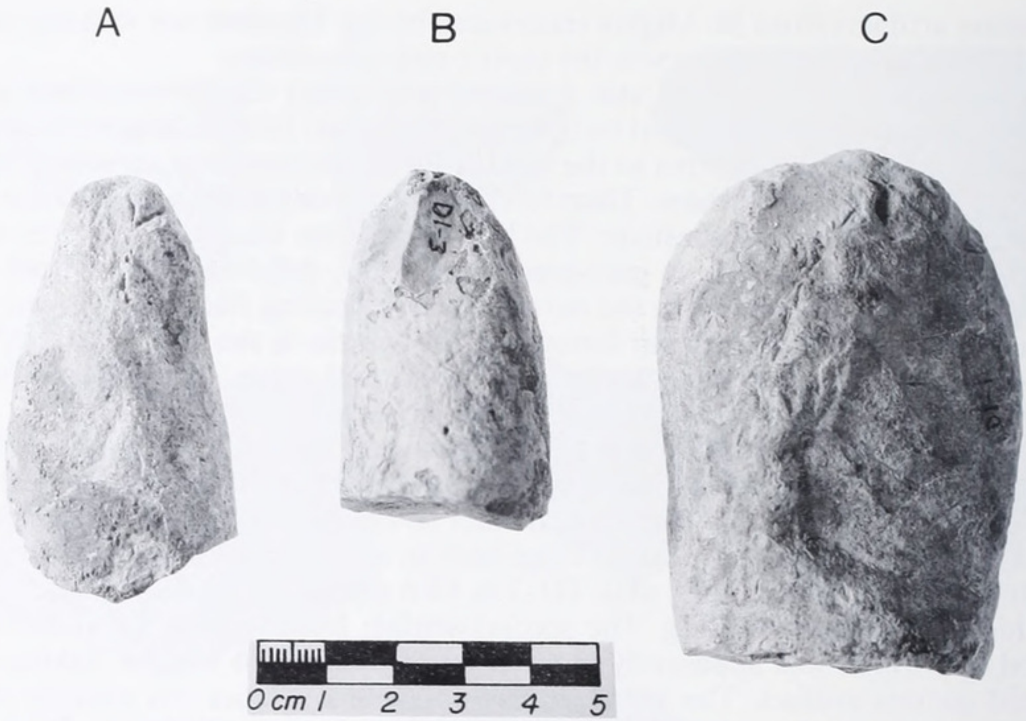

Fig. 18.—Radiolarian limestone tools. A. Blunt-tipped (D1-6) conically-shaped tool excavated from test pit 1. B. Bifacially-chipped (D1-3) conically-shaped tool excavated from test pit 1. C. Bifacial chopper (D1-1) recovered from Surface Area A near test pit 1.

it may be that length of time buried, reflected by depth in the deposit, equates with the degree of diagenesis. The three artifacts have very similar lengths (from tapered tip to the break) at 54.6, 54.5, and 54.0 mm and, being consistently wider than thicker, have elliptical shapes in cross section.

Three-pointer

The final prehistoric artifact is assigned to its own class (Table 3). The three-pointer is made from a marine limestone in which embedded shell fragments are visible. It has the typical triangular shape with the sloping edges joining at the top (Fig. 19). In sideview, the base curves slightly upward to join the lower part of each edge. The base is 37.3 mm long, edges are 33.9 mm and 33.0 mm long, and the height from base to top is 32.3 mm. When the artifact is viewed along an edge, the cross section shows the sides are tapered from the base, the thickest part of the object, to the narrow top, and the base is flattened between the sides. Maximum thickness of the base, measured between the sides across the bottom, is 16.9 mm. Three distinct grooves are incised into the upper part of each edge, between the midway point along the edge and the top (Fig. 19). There are no grooves on the lower portion of an edge. Although they are small, the grooves occur at regular intervals, are consistently U-shaped (not V-shaped) with a slightly rounded bottom, and probably were created by a back and forth "sawing" motion across each edge rather than being cut into the edge as notches. Along one edge the grooves are consistently about 1.1 mm wide and about 1.5 mm deep. Along the other edge, the width varies from 0.9 to 1.7 to 2.4 mm because the wider two grooves encountered natural cavities in the limestone, which in turn caused those two grooves to penetrate deeper. The narrowest groove (0.9 mm) is also the

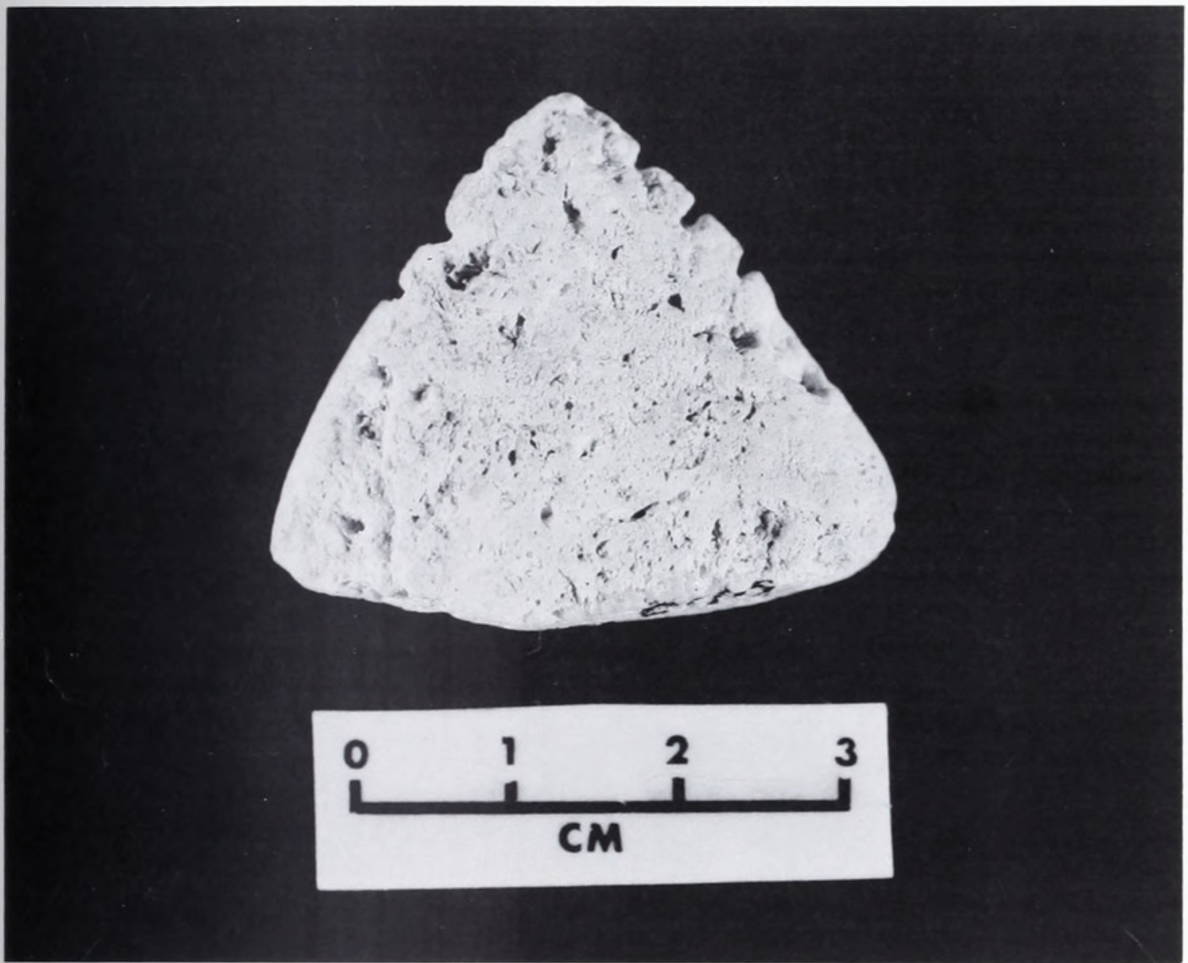

Fig. 19.—Limestone three-pointer ("zemi") showing the set of three grooves incised into each edge.

shallowest. Double sets of grooves have been observed on other Anguillian three-pointers in the care of the AAHS and on three-pointers from Montserrat.

In the West Indies, three-pointers were made of stone, shell, and clay (Rouse, 1986:141). They exhibit considerable variation in size and shape, ranging from small, simple triangular forms, such as the Fountain Cavern specimen, to large, elaborately carved objects incorporating anthropomorphic representations, with the latter being best known from Puerto Rico and the Dominican Republic. Three-pointers are one of several classes of objects subsumed under the term "zemi," and they have long been regarded as objects associated with rituals and ceremonies of "zemiism" (De Hostos, 1923; Fewkes, 1904:178–182, 1907:111–132; Lovén, 1979:578; Rouse, 1986:115, 141). Three-pointer zemis, portrayed as representing ". . . the spirit helpers or supernatural allies of the contact-period chiefs of the Greater Antilles . . ." (Wilson, 1990:19), were highly esteemed objects.

Historic and Modern Artifacts

Excavated historic and modern artifacts from Fountain Cavern are classed as ceramic, glass, plastic, and metal objects. Test pit 1 yielded 43 such artifacts and test pit 3 yielded 46 (Table 4). Fragments of plastic predominated (81.4%) in test pit 1; broken glass (67.4%) did so in test pit 3.

Table 4.—*Excavated historic and modern artifacts at Fountain Cavern, Anguilla.*

Artifact	Test pit 1 (D1-3 to -17)		Test pit 3 (D1-20 to -24)	
	Count	%	Count	%
Ceramic				
Sherds	—	—	3	50.0
Clay pipes	—	—	3	50.0
Total	—	—	6	100.0
Glass				
Old	1	16.7	6	19.4
Clear	1	16.7	15	48.4
Green	1	16.7	4	12.9
Brown	2	33.3	1	3.2
Yellow	—	—	1	3.2
Unspecified	1	16.7	3	9.7
Marble	—	—	1	3.2
Total	6	100.1	31	100.0
Plastic				
White	17	48.6	—	—
Unspecified	13	37.1	—	—
Button	1	2.9	—	—
Flashcube	4	11.4	—	—
Pen cap	—	—	1	100.0
Total	35	100.0	1	100.0
Metal				
Bottle cap	—	—	6	75.0
Pull tab	—	—	1	12.5
Wire	—	—	1	12.5
Coins	2	100.0	—	—
Total	2	100.0	8	100.0
Total ceramics	—	—	6	13.0
Total glass	6	14.0	31	67.4
Total plastic	35	81.4	1	2.2
Total metal	2	4.7	8	17.4
Grand total	43	100.1	46	100.0

Ceramic

Six historic ceramics were recovered at test pit 3. Three are mottled brown stoneware sherds, none of which conjoin although they probably are from the same vessel (Fig. 20). The paste near the interior is cream colored but has a pink cast toward the exterior of each sherd. Sherd thickness ranges from 7.5 to 10.2 mm. One sherd (29.68 g) was recovered from unit D1-22 and two sherds (21.89 and 7.02 g) were recovered from D1-23, the deepest level in test pit 3 located just above bedrock. Such mottled brown sherds are commonly referred to as "Bellarmine" bottles, although that term is inaccurate (Noël Hume, 1969:55). The presence of intermingled historic and prehistoric sherds in the lowest cultural level attests to the disturbed stratigraphy in test pit 3.

The other historic ceramics are pieces of clay (kaolin) tobacco pipes including two bowl fragments and one stem section with the basal part of a bowl. None of these pieces conjoin and there are no maker's marks or other diagnostic impressions. The pipe stem bore diameter is slightly less than $\frac{4}{64}$ in. One bowl fragment

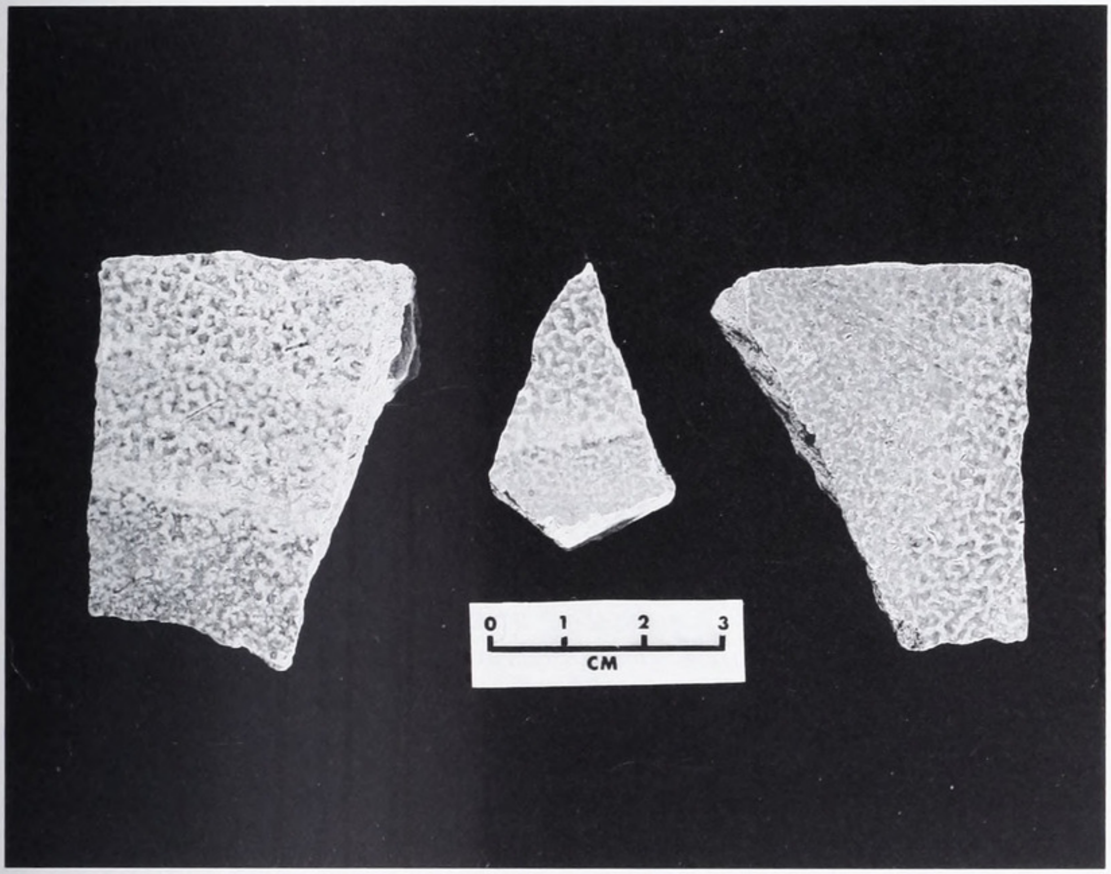

Fig. 20.—Mottled brown stoneware historic sherds from test pit 3. The sherd on the right was recovered in the deepest artifact-bearing level, just above bedrock.

is heavily scorched but the other is minimally charred. All clay pipe fragments came from unit D1-21.

Glass

In Table 4, glass is categorized by color apart from the "old" category, a single broken marble, and the "unspecified" fragments for which color was not recorded. "Old" glass refers to the thick, opaque, dark green to almost black colored bottles of the colonial period that often exhibit patinas and pitted areas because of chemical alteration (Jones, 1986). The rest of the glass fragments are modern in appearance and, apart from the marble, are all bottle parts. In test pit 1, glass fragments were recovered to a depth of 100 cm; in test pit 3 they occurred to 20 cm. Test pit 3 yielded much more glass (N = 31) than test pit 1 (N = 6). Most glass fragments in test pit 3 probably are the remnants of bottles that were dropped or otherwise fell through the entrance and broke on the floor beneath.

Plastic

Bits of plastic were the most abundant modern artifact found in Fountain Cavern. Plastic predominated in the interior of the cavern at test pit 1 (N = 35), where its relative abundance contrasts with its scarcity (N = 1) in test pit 3. The majority were small fragments of plastic containers although one button, a pen cap, and four clear fragments of a photographic flashcube were also recovered. Small pieces of plastic were found as deep as 110 cm in test pit 1. The presence

Table 5.—*Excavated miscellaneous material from Fountain Cavern, Anguilla.*

Material	Test pit 1 (D1-3 to -17)	Test pit 2 (D1-19)	Test pit 3 (D1-20 to -24)	Total
Speleothem	373 (46)[a]	12 (0)[a]	78 (9)[a]	463 (55)[a]
Other material				
Unusual rock	8	–	1	9
Botanical	–	–	1	1
"Fossil wood"	–	–	1	1
Organic	–	–	104	104
Total speleothem	373 (97.9%)	12 (100.0%)	78 (42.2%)	463
Total other material	8 (2.1%)	0 (0.0%)	107 (57.8%)	115
Grand total	381 (100.0%)	12 (100.0%)	185 (100.0%)	578

[a] = Number in parentheses indicates speleothems brought to the U.S. for study.

of flashcube fragments in the dark interior of the cavern is certainly understandable. The plastic container fragments may be remnants of jugs brought to Pool 1 to be filled with water.

Metal

Assorted metal items recovered from test pit 3 included six bottle caps, one beverage container pull tab, and one fragment of rusted wire (Table 4). Two coins were found in test pit 1. One coin, an ECC (Eastern Caribbean Currency) 10-cent piece dated 1981, was recovered near Rock 1 between 35 and 50 cm deep, while another ECC 10-cent coin, dated 1956, was found between 90 and 100 cm. The presence of recent coins at considerable depth in test pit 1 attests to the downward transport of artifacts through crevices among the rocks of Stratum 4.

Miscellaneous Material

The Miscellaneous Material category has two subcategories, "Speleothems" and "Other Material." Excavated Miscellaneous Material is tabulated in Table 5.

Speleothems

The term speleothems refers to massive and crystalline cave deposits, pieces of which were recovered from the floor and test pits in Fountain Cavern. All are composed of calcium carbonate ($CaCO_3$) and most are of a chemical precipitate origin, including fragmented stalagmites, stalactites, flowstone, and dripstone. A few pieces of limestone bedrock are included although they are not actually speleothems. Speleothem fragments probably spalled from the cavern ceiling, walls, and floor during earthquake episodes. They range in size from tiny pieces to the large rocks found in test pit 1 (Fig. 10).

During initial excavation in the uppermost part of test pit 1, all speleothems were collected and examined for evidence of carving or other human modification, as might be expected given the presence of petroglyphs within Fountain Cavern. However, not long after excavation began, the practice of collecting all speleothems was abandoned for three reasons: (1) the quantity of recovered speleothems increased greatly, (2) some were too large (e.g., Rocks 1–4 in test pit 1) to retain, and (3) none displayed cultural modification. Thereafter only selected speleothems from each excavation unit were retained. An effort was made to keep examples of each kind of speleothem from each excavation unit. A second level of selection bias resulted from the decision to limit the number of speleothem specimens that would be brought to the U.S. for further study. The decisions to change collection strategy and to selectively retain specimens were justified on the basis that the pieces occurred naturally and were not really artifacts since none exhibited human modification. Excavated speleothems left on Anguilla (N = 408) are in the care of the AAHS.

Of 463 specimens selectively retained from the Fountain Cavern test pits, 55 (11.9%; 46 from test pit 1, and 9 from test pit 3) were brought to the U.S. for study. Acid (10% HCl) and hardness (Moh's scale of 3) tests and a microscope were used to confirm the presence of calcite, travertine, and limestone in the sample. Medium to coarse crystalline and microcrystalline (micrite) forms were identified as well as a crystal group in one instance; they range from opaque through translucent to transparent. All forms occur naturally in Fountain Cavern.

Some speleothem fragments initially were thought to be culturally modified. These translucent and transparent specimens had flat surfaces (Fig. 21A), abraded surfaces (Fig. 21B), or longitudinal holes (Fig. 22), which resembled respectively purposeful breakage, polishing, or drilling. However, once the specimens were cleaned, it became evident that these features were natural rather than cultural manifestations. Subsequently, it was determined that the flat surfaces are cleavage breaks typical of calcite, the abraded surfaces result from solution etching, and specimens with longitudinal holes are stalactitic forms including a thin-walled variant sometimes called a "soda straw" (Fig. 22). Although these speleothem specimens occur naturally, in form they resemble and could be mistaken for some prehistoric stone artifacts found in West Indies sites, especially beads made from a variety of lithic materials. Calcite crystals (Fig. 23) also were observed in a small cavity exposed just below the surface of a bulldozed track on Anguilla's north coast.

Other Material

"Other Material" includes excavated items not studied in detail and only provisionally classed. None exhibits evidence of human alteration.

Nine red, white, or brown rocks, which may not be natural occurrences in Fountain Cavern or on Anguilla, are classed as "unusual rocks" (Table 5). They were left on Anguilla and have not been studied further.

A single botanical specimen from the lowest level (D1-24) of test pit 3 is an amorphous mass measuring about 2 cm in diameter. The specimen's exterior is a dull brown and its interior consists largely of a translucent, amber-colored material that is probably plant resin, perhaps from the *Clusia* tree at the cavern entrance above the test pit. Without appropriate comparative material, that remains conjectural.

One specimen, a fragment recovered from test pit 3 (D1-22), has been difficult to classify. It has definite cellular structure and seems to be partly mineralized but is lightweight with low density. Initially it was incorrectly identified as stony coral. Further study determined it is porous wood, with incomplete replacement or permineralization by $CaCO_3$. Growth rings are visible in cross section.

A group of soft and friable specimens are labeled simply as "organics" since they have not been identified more accurately. The specimens have powdery surfaces suggestive of weathering and have been attributed to bones, calcareous organic tubes, possibly from worms or clams, or even stalactites by various persons. All specimens were restricted to test pit 3, with the majority (90 of 104

Fig. 21.—Fountain Cavern speleothems. A. Three calcite specimens exhibiting flat cleavage planes and one specimen (lower right) with a small group of crystals. B. Seven translucent and solid crystalline limestone specimens.

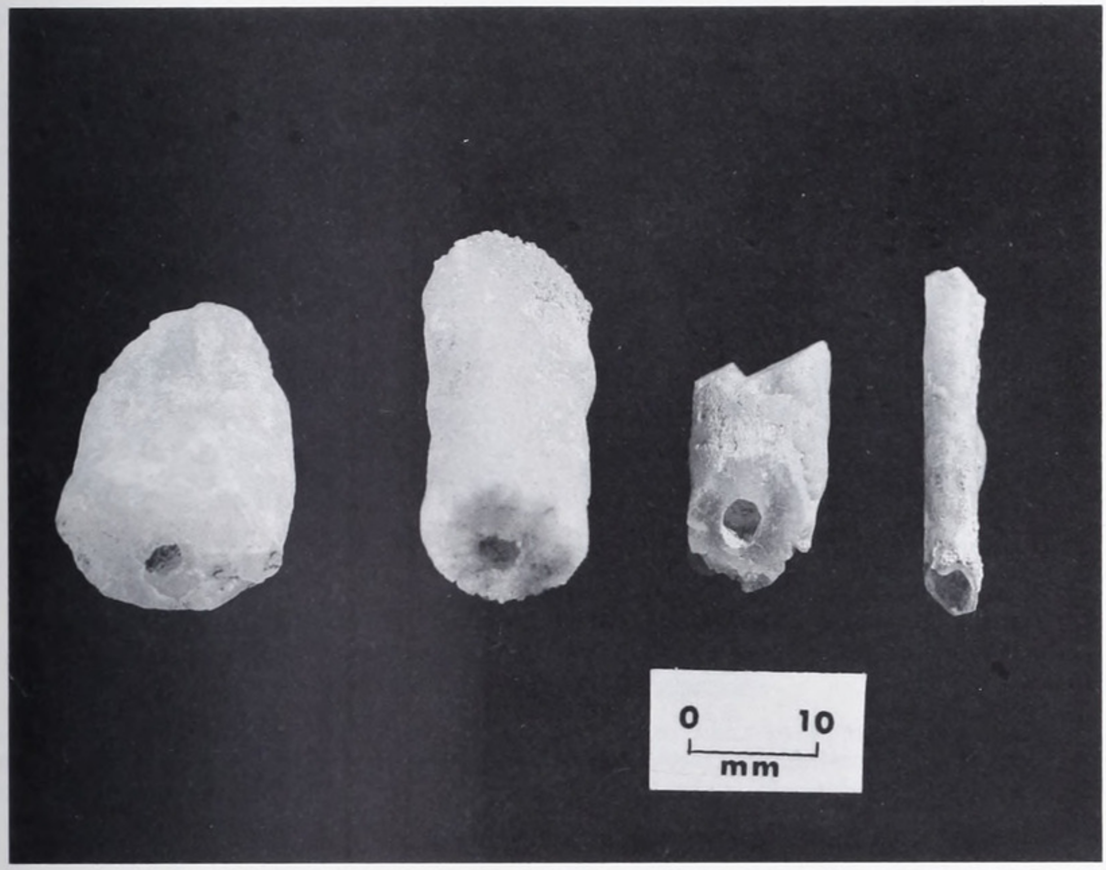

Fig. 22.—Four cylindrical speleothems exhibiting longitudinal holes. These natural specimens resemble and could be confused with unfinished lithic beads. The specimen on the right is typical of "soda straw" stalactites.

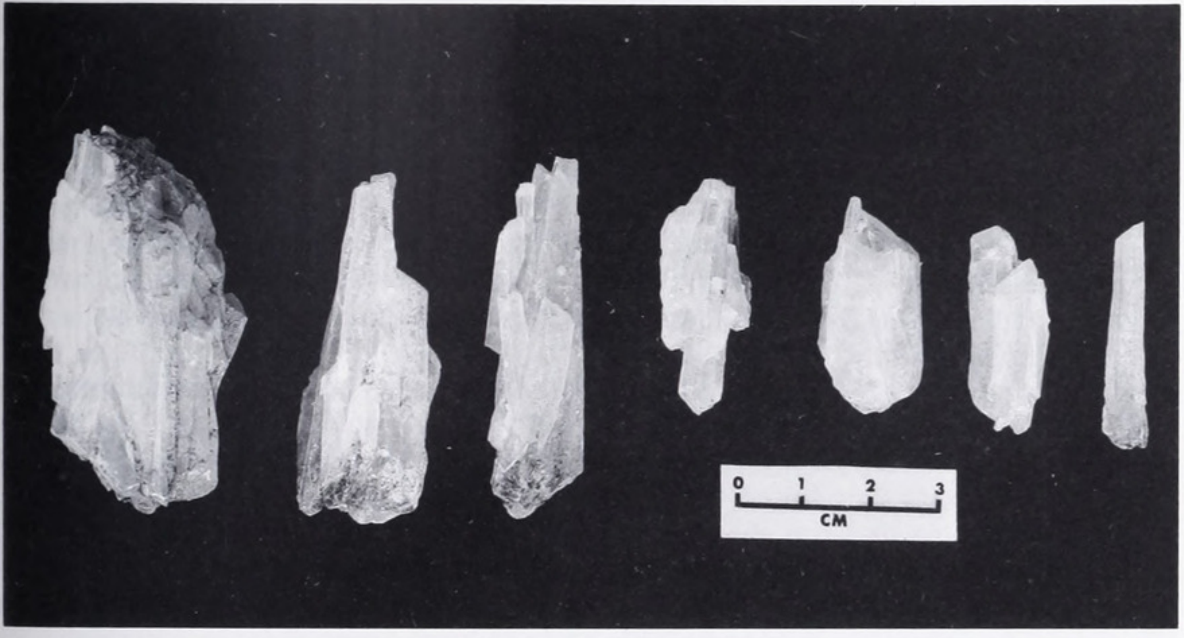

Fig. 23.—Seven calcite specimens found in a non-cave context, a cavity exposed on the surface of a bulldozed road on Anguilla's north coast.

Table 6.—*Surface and disturbed artifacts and miscellaneous material from Fountain Cavern, Anguilla.*

	Surface Area A (D1-1)	Surface Area B (D1-2)	Test pit 1 (slump) (D1-18)	Pool 1 (D1-25)	Petroglyph (D1-26)
Prehistoric					
Sherds	37	20	111	1	–
Lithics	2	–	–	–	–
Historic and modern					
Glass	3	2	3	–	–
Plastic	1	–	8	–	–
Coins	3	–	1	–	–
Miscellaneous					
Speleothem	31 (1)[a]	1 (1)[a]	101 (2)[a]	–	2 (2)[a]
Other material					
Crust[b]	–	–	–	2	–
Unusual rock	3	–	–	–	–
Wood	3	–	–	–	–
Total prehistoric	39	20	111	1	–
Total historic/modern	7	2	12	–	–
Total miscellaneous	37	1	101	2	2
Grand total	83	23	236	3	2

[a] = Number in parentheses indicates speleothems brought to the U.S. for study; [b] = Calcium carbonate (travertine) deposits separated from sherds.

specimens) from D-24, the bedrock fissures where Stratum 2 was present but artifacts were absent. These specimens most likely were deposited before humans began to use Fountain Cavern.

Surface and Disturbed Artifacts and Materials

All artifacts and other materials found on the cavern floor (D1-1, Surface Area A; D1-2, Surface Area B; D1-25, Pool 1; and D1-26, petroglyph rock chip) and in disturbed context in test pit 1 (D1-18, debris from slumped walls) are included in this section and tabulated together (Table 6).

Prehistoric sherds from surface and disturbed contexts total 169 specimens distributed as follows: 37 from D1-1, 20 from D1-2, 111 from D1-18, and one from D1-25. They constitute 17.9% of the 944 sherds recovered at Fountain Cavern. Seven surface sherds (four from D1-1, two from D1-2, one from D1-25) were brought to the U.S.; four were attributable to specific vessels, two of which (vessels 1 and 2) were defined solely from these surface sherds, while one (vessel 4) matched sherds from test pit 1.

An unusual case of post-depositional alteration is displayed by sherds collected by AAHS members during the 1986 project from a water-filled cavity by Pool 1 (D1-25). These sherds exhibit a very distinctive calcium carbonate crust that formed as they lay immersed in the water. Of the 146 sherds found by Pool 1, only a single encrusted rim sherd (Fig. 17A, B) was brought to the U.S. for study. Vessel 1 was defined from that sherd alone. Besides the rim sherd, however, two pieces of crust (Fig. 24), which had separated from other sherds, were brought to the U.S. The crusts are microcrystalline banded travertine. Maximum thickness ranges from 1.3 mm for the rim sherd crust to 5.1 mm and 6.6 mm for the separated crusts. In Table 6, the rim sherd is included in the Prehistoric Artifacts

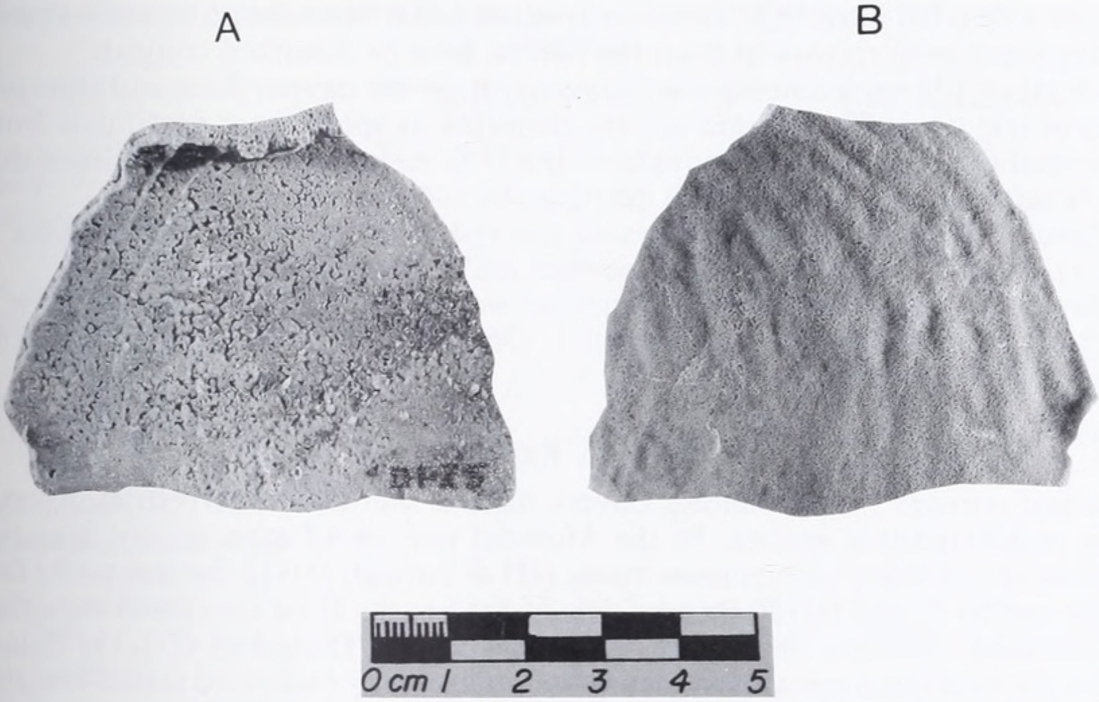

Fig. 24.—Calcium carbonate (travertine) crust deposited on (but now separated from) a rim sherd immersed in Pool 1 (D1-25). A. Interior of crust forming a negative impression of the sherd's exterior surface. B. Crust exterior displaying the wavy depositional pattern. (See also Fig. 17A and B.)

section and the two travertine crusts are tabulated under Miscellaneous Material. The AAHS believes additional vessels are represented among the 145 encrusted sherds remaining on Anguilla.

Two radiolarian limestone artifacts were recovered from Surface Area A (D1-1) near test pit 1. Each artifact has a weathered-appearing cortex, but neither artifact has a cortex as thick as the three limestone artifacts found in test pits 1 and 3. Their cores have the same gray-green color seen in the excavated specimens, but their gray encrusted layers have more brownish hues. The forms of the surface artifacts are decidedly different from the three conically-shaped artifacts recovered from the excavations. The first is the broken end of a celt that was ground to make a curved working edge. The sides of the celt slope inward, to the point where the break occurs, giving the overall impression of a tool that was widest at its base (the working edge) and narrower toward the top. Maximum measurements are a 29.9 mm length from the working edge to the break, a 38.7 mm width of the working edge, a tool thickness of 7.3 mm, and an edge thickness of 2.9 mm; it weighs 9.20 g. The celt is a decidedly thin tool in comparison to other limestone artifacts. The second tool is a large (188.46 g) chopper bifacially chipped on its working edge, both chipped and ground along its sides, and very cleanly broken transversely across its long axis (Fig. 18C). Its measurements are 78.6 mm long, 54.5 mm wide, and 28.6 mm thick. The chopping edge has a maximum thickness of 8.3 mm.

Historic and modern artifacts (Table 6) include eight glass fragments (two brown, three old, three unspecified), nine plastic fragments (all unspecified), and four modern coins. Three coins from Surface Area A (D1-1), adjacent to petroglyph #12 and near test pit 1, are two ECC 25-cent pieces dated 1965 and 1981 and one U.S. 25-cent coin dated 1967; the coin found in slumped wall debris from test pit 1 (D1-18) is an ECC dollar coin dated 1981. No historic ceramic sherds or clay pipes were recovered from the cavern floor or disturbed context.

A total of 135 speleothems was recovered from the cavern floor and slumped walls of test pit 1. These materials are the same as speleothem specimens from excavated context. Six were brought to the U.S. including two small pieces that had broken off the rock on which petroglyphs 1–4 are carved.

Three unusual rocks, two white and one red, were found in Surface Area A (D1-1). They closely resemble the unusual rocks found in the test pits.

Three pieces of wood from tree branches were recovered from Surface Area A on the floor of the cavern near test pit 1. One piece of wood has a charred end indicating it was used as a torch.

Faunal Remains

Faunal remains from Fountain Cavern include marine and terrestrial invertebrate and vertebrate species. In the *Material* portion of each species account, relevant test pits and provenience codes (D1-3 through D1-17 for test pit 1, D1-19 for test pit 2, and D1-20 through D1-24 for test pit 3) for excavated materials are included. Sections on Surface (D1-1, D1-2) and Disturbed (D1-18) faunas follow the excavated remains in each *Material* list. Only excavated faunal remains are used for estimating minimum numbers of individuals (MNI) for each test pit.

Corals

Two coral specimens representing one species were found in Fountain Cavern. These specimens most likely were deposited in Fountain Cavern by humans. The possibility that they naturally eroded from surrounding limestone cannot be discounted, yet the fact that neither specimen displays marked diagenesis argues against any significant antiquity for the specimens. Corals were matched to identified archaeological samples and by reference to Smith (1971) and Kaplan (1982). The sole excavated coral remain is tabulated in Table 7; it does not count toward MNI because of its fragmentary condition.

Class Anthozoa
Order Scleractinia
Acropora cervicornis (Lamarck, 1816)
Staghorn Coral

Material.—**Test pit 3**: D1-22, fragment; MNI = 0. **Surface**: D1-1, fragment.

Remarks.—Both specimens are fragments of the cylindrical branches that are characteristic of this species. The excavated specimen (D1-22) is heavily worn while the surface specimen retains its tubular cups. *Acropora cervicornis* is a shallow-water species usually found to a depth of approximately 10 m and it is often associated with *Acropora palmata,* the Elkhorn coral. Staghorn and Elkhorn corals are recovered with regularity from Caribbean prehistoric sites.

Sea Urchins

The single sea urchin remain was not identifiable beyond the level of class and is not counted toward MNI.

Table 7.—*Excavated corals, sea urchins, crabs, land snails, and fossil mollusks from Fountain Cavern, Anguilla.*

Taxa	Test pit 1 (D1-3 to -17)				Test pit 3 (D1-20 to -24)			
	Count	%	MNI	%	Count	%	MNI	%
Corals								
Acropora cervicornis	—	—	—	—	1	100.0	0	—
Total	—	—	—	—	1	100.0	0	—
Sea urchins								
Echinoidea sp.	—	—	—	—	1	100.0	0	—
Total	—	—	—	—	1	100.0	0	—
Crabs								
Decapoda sp.	7	100.0	1	100.0	8	100.0	1	100.0
Total	7	100.0	1	100.0	8	100.0	1	100.0
Land snails								
Bulimulus guadalupensis	—	—	—	—	105	45.7	45	30.0
cf. *Macroceramus*	—	—	—	—	1	0.4	1	0.7
Choanopoma sp.	—	—	—	—	124	53.9	104	69.3
Total	—	—	—	—	230	100.0	150	100.0
Fossil mollusks								
Orthaulax aguadillensis	—	—	—	—	4	80.0	0	—
Lucina domingensis	—	—	—	—	1	20.0	1	100.0
Total	—	—	—	—	5	100.0	1	100.0
Total corals	—	—	—	—	1	0.4	0	—
Total sea urchins	—	—	—	—	1	0.4	0	—
Total crabs	7	100.0	1	100.0	8	3.3	1	0.7
Total land snails	—	—	—	—	230	93.9	150	98.7
Total fossils	—	—	—	—	5	2.0	1	0.7
Grand total	7	100.0	1	100.0	245	100.0	152	100.1

Class Echinoidea
Echinoidea sp.

Material.—**Test pit 3**: D1-23, spine; MNI = 0.

Remarks.—The specimen consists of the basal section of a single sea urchin spine.

Crabs

A few crab remains were recovered from test pits 1 and 3. Broken segments of legs predominate, although other exoskeleton fragments also are present. An MNI of 1 has been assigned for each test pit on the basis of the presence of legs.

Class Crustacea
Order Decapoda
Decapoda sp.

Material.—**Test pit 1**: D1-8, leg; D1-13, 2 legs; D1-14, leg, 3 fragments; MNI = 1. **Test pit 3**: D1-22, 2 legs; D1-23, 2 legs, 4 fragments; MNI = 1. **Disturbed**: D1-18, 2 fragments.

Remarks.—The fragmentary remains could not be identified below the order Decapoda. Some specimens may represent the remains of one or more taxa of hermit crabs trapped in Fountain Cavern in the past, much like the living hermit crabs inhabiting mollusk shells that were observed crawling on the cavern floor beneath the entrance during the fieldwork.

Mollusks

Mollusks constitute by far the greatest proportion of faunal remains found at Fountain Cavern. However, the faunal assemblage is biased by the extreme representation of land snails. Land snails can be incorporated into archaeological deposits on an "accidental" basis, as a result of their attraction to refuse concentrated at such sites (Watters, 1989*b*:158); thus the land snail fauna has been treated separately from marine mollusks.

Land Snails

Although they are taxonomically distinct, both terrestrial prosobranchs and pulmonates have been included under the category "Land Snails" in this article. They are tabulated in Table 7.

Land snails were recovered only from test pit 3, the test pit located by the roots of the *Clusia* tree extending downward from the cavern's entrance. This part of Fountain Cavern may be the only area capable of sustaining land snail populations. Most land snails came from unit D1-23 at 20–30 cm, the level immediately above bedrock in which few artifacts were recovered. This suggests many land snails were deposited in the sediments before humans made use of the cavern.

Although MNI for land snails is included, such tabulation does not imply that we regard them as being deposited in the sediments as the direct result of human actions. The MNI is based on apertures because they tend to be better preserved than the thin-walled shells. Fragments refer to broken shells lacking complete apertures.

Class Gastropoda
Subclass Pulmonata
Family Bulimulidae
Bulimulus guadalupensis (Bruguière, 1789)

Material.—**Test pit 3**: D1-21, 6 apertures, 4 fragments; D1-22, 14 apertures, 12 fragments; D1-23, 24 apertures, 41 fragments; D1-24, aperture, 3 fragments; MNI = 45.

Remarks.—*Bulimulus guadalupensis* is a highly variable species in form and color and is widely distributed in the Greater and Lesser Antilles. Breure (1974: table 17) recorded *B. guadalupensis* from Anguilla and *B. guadalupensis* and *B. lehmanni* from Dog Island.

Family Urocoptidae
cf. *Macroceramus signatus* (Guilding, 1828)

Material.—**Test pit 3**: D1-23, aperture; MNI = 1.

Remarks.—This specimen was recovered just above bedrock in test pit 3, the same level that yielded numerous *Bulimulus* and *Choanopoma* specimens. As this is an immature specimen with a missing apical whorl and incomplete last whorl, it is referred tentatively to *Macroceramus signatus.* The species was recorded for Anguilla more than a century ago (Bland, 1861:25).

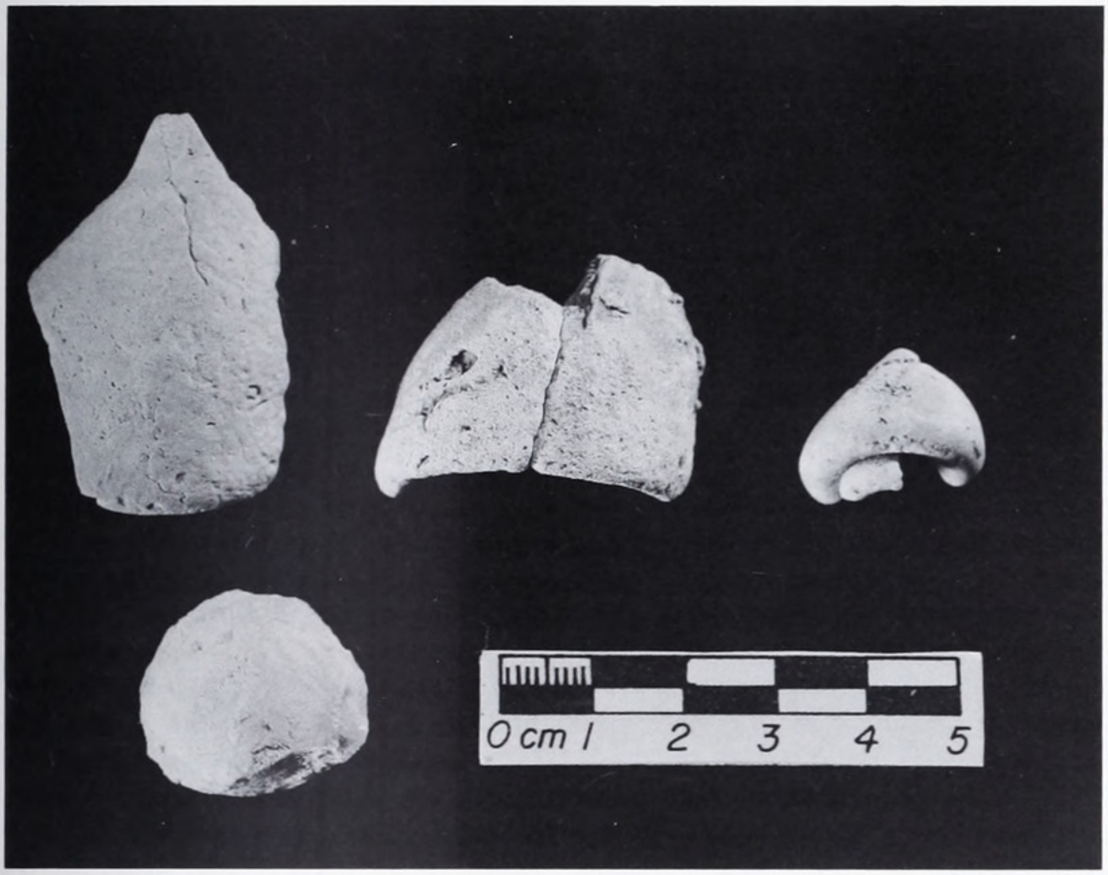

Fig. 25.—Fossil mollusks *Orthaulax aguadillensis* (top row) and *Lucina domingensis* (bottom) from test pit 3.

Subclass Prosobranchia
Family Chondropomidae
Choanopoma sp.

Material.—**Test pit 3**: D1-21, 5 apertures, fragment; D1-22, 15 apertures; D1-23, 76 apertures, 19 fragments; D1-24, 8 apertures; MNI = 104.

Remarks.—The Chondropomidae is an extremely diverse family of Neotropical prosobranchs. *Choanopoma* sp. shells are rugose and thicker and stronger than *Bulimulus guadalupensis,* which accounts for the fact that 69.3% (104 of 124 specimens) of the former retain complete apertures (often as intact specimens) while only 30.0% (45 of 105) of the latter do so (Table 7).

Fossil Mollusks

Five fossil mollusks were found in test pit 3 (Table 7). Although the specimens might have been gathered by humans and deposited by them in test pit 3 along with other faunal remains and artifacts, the fossils also could have been deposited naturally after they eroded from the nearby limestone ceiling or walls.

Family Strombidae
Orthaulax aguadillensis Maury, 1920

Material.—**Test pit 3**: D1-21, cast fragment; D1-22, 2 cast fragments; D1-23, cast fragment; MNI = 0.

Remarks.—The four specimens (Fig. 25) are fragmentary casts of juveniles of

Table 8.—*Excavated marine mollusks from Fountain Cavern, Anguilla.*

Taxa	Test pit 1 (D1-3 to -17)				Test pit 3 (D1-20 to -24)			
	Count	%	MNI	%	Count	%	MNI	%
Gastropoda								
Cittarium pica	222	96.5	17	94.4	74	85.1	10	58.8
Astraea caelata	—	—	—	—	1	1.1	1	5.9
Nerita versicolor	1	0.4	1	5.6	1	1.1	1	5.9
Nerita tessellata	—	—	—	—	3	3.4	3	17.6
Nerita sp.	—	—	—	—	3	3.4	0	—
Tectarius muricatus	—	—	—	—	3	3.4	2	11.8
Serpulorbis sp.	1	0.4	0	—	—	—	—	—
Strombus sp.	4	1.7	0	—	1	1.1	0	—
Cypraea zebra	1	0.4	0	—	—	—	—	—
Oliva sp.	1	0.4	0	—	—	—	—	—
Gastropoda sp.	—	—	—	—	1	1.1	0	—
Total	230	99.8	18	100.0	87	99.7	17	100.0
Polyplacophora								
Acanthopleura granulata	3	100.0	0	—	—	—	—	—
Total	3	100.0	0	—	—	—	—	—
Bivalvia								
Arcinae sp.	—	—	—	—	2	20.0	2	33.3
Lucina pensylvanica	—	—	—	—	5	50.0	3	50.0
Codakia orbicularis	4	100.0	2	100.0	2	20.0	0	—
Chamidae sp.	—	—	—	—	1	10.0	1	16.7
Total	4	100.0	2	100.0	10	100.0	6	100.0
Total gastropods	230	97.0	18	90.0	87	89.7	17	73.9
Total chitons	3	1.3	0	—	—	—	—	—
Total bivalves	4	1.7	2	10.0	10	10.3	6	26.1
Grand total	237	100.0	20	100.0	97	100.0	23	100.0

Orthaulax aguadillensis. Two specimens from D1-22 conjoin. These casts exhibit the characteristic cone-shaped appearance of juvenile *O. aguadillensis,* a common gastropod in late Oligocene to early Miocene (Aquitanian) limestones of the Greater Antilles.

Family Lucinidae

Lucina domingensis (Dall, 1903)

Material.—**Test pit 3**: D1-24, cast; MNI = 1.

Remarks.—This specimen is a complete internal cast (Fig. 25) of *Lucina domingensis,* a common late Oligocene to early Miocene species often associated with *Orthaulax.* It is ancestral to the Recent *Lucina pectinata* (Gmelin, 1791).

Marine Mollusks

Three classes of marine mollusks—gastropods, chitons, and bivalves—were found at Fountain Cavern. Zooarchaeological and Recent collections and malacological sources, including Abbott (1974), Humfrey (1975), and Warmke and Abbott (1975), were used to identify the mollusks. Sequence and nomenclature follow Abbott (1974) except where noted. Marine mollusks are tabulated in Table 8.

Class Gastropoda

With few exceptions, gastropods were identifiable to species despite the fragmented condition of most shells. Whole specimens and broken shells that retained their apices are simply listed as "apices" in the *Material* sections; presence of the apex was the basis of MNI calculations (except for nerites). Fragments are listed separately and were not counted toward MNI.

Family Trochidae
Cittarium pica (Linné, 1758)
West Indian Top-shell

Material.—**Test pit 1**: D1-3, 5 fragments; D1-4, 8 fragments; D1-5, 6 fragments; D1-6, 10 fragments; D1-7, 3 fragments; D1-8, 3 apices, 28 fragments; D1-9, 3 apices, 19 fragments; D1-10, 8 fragments; D1-11, 7 apices, 15 fragments; D1-12, 4 apices, 72 fragments; D1-13, 24 fragments; D1-14, 3 fragments; D1-16, 4 fragments; MNI = 17. **Test pit 3**: D1-20, 3 apices, fragment; D1-21, 2 apices, 24 fragments; D1-22, 5 apices, 21 fragments; D1-23, 17 fragments; D1-24, fragment; MNI = 10. **Surface**: D1-1, 4 apices, fragment. **Disturbed**: D1-18, 4 apices, 100 fragments.

Remarks.—*Cittarium pica* is a monotypic rock-dwelling algae feeder inhabiting primarily the intertidal zone, although larger individuals occur on reefs some distance from shore. It is common in West Indies archaeological sites and constitutes the most abundant taxon in Fountain Cavern (Table 8).

Family Turbinidae
Astraea caelata (Gmelin, 1791)
Carved Star-shell

Material.—**Test pit 3**: D1-21, apex; MNI = 1.

Remarks.—The shell is split in half but one side, complete from apex to aperture, is preserved. The specimen is eroded and most of the spines are worn. *Astraea caelata* inhabits shallow-water rocks.

Family Neritidae
Nerita versicolor Gmelin, 1791
Four-toothed Nerite

Material.—**Test pit 1**: D1-6, aperture; MNI = 1. **Test Pit 3**: D1-22, aperture; MNI = 1.

Nerita tessellata Gmelin, 1791
Tessellate Nerite

Material.—**Test pit 3**: D1-21, aperture; D1-22, aperture; D1-23, aperture; MNI = 3.

Nerita sp.

Material.—**Test pit 3**: D1-22, 2 fragments; D1-23, fragment; MNI = 0.

Remarks.—Nerites are abundant throughout the West Indies on wave-swept rocks facing the open ocean. The limestone cliffs and headlands of Anguilla's north coast, with their numerous crevices and cavities, are ideal habitat for nerites. MNI for nerites is based on presence of the aperture rather than the apex. *Nerita* sp. specimens are fragments of other shell parts and do not count toward MNI. The largest West Indian nerite, *Nerita peloronta,* was absent in the Fountain Cavern materials, which is unusual since it occupies the same habitat as other nerites and commonly occurs in West Indian archaeological sites.

Family Littorinidae
Tectarius muricatus (Linné, 1758)
Beaded Periwinkle

Material.—**Test pit 3**: D1-21, fragment; D1-22, 2 apices; MNI = 2.
Remarks.—Although the Beaded Periwinkle often occurs with nerites on rocky intertidal shores, it also is found above the high-tide line and a considerable distance inland. It is a very common littoral dweller.

Family Vermetidae
Serpulorbis sp.
Worm-shell

Material.—**Test pit 1**: D1-8, fragment; MNI = 0.
Remarks.—The small purplish-brown, coiled specimen may be *Serpulorbis riisei* (Mörch), which Abbott (1974:101) considers possibly synonymous with *S. decussatus* (Gmelin, 1791). The fragment comes from the middle of the shell and does not count toward MNI.

Family Strombidae
Strombus sp.

Material.—**Test pit 1**: D1-6, fragment; D1-8, 2 fragments; D1-9, fragment; MNI = 0. **Test pit 3**: D1-23, fragment; MNI = 0.
Remarks.—All fragments exhibit the lustrous, whitish coloration and denseness that are characteristic of the genus *Strombus.* Two fragments (D1-8 and D1-9) conjoin. Another D1-8 specimen, which consists of a blunt spine with a worn base (Fig. 26A), is similar in appearance to objects that have been argued to be prototypes of three-pointer zemis (Olsen, 1974:36). There are no shell celts among the specimens. None of the conch specimens are used in MNI estimates as they have no apices.

Family Cypraeidae
Cypraea zebra (Linné, 1758)
Measled Cowrie

Material.—**Test pit 1**: D1-13, fragment; MNI = 0.
Remarks.—This specimen, while consisting only of part of the parietal wall and siphonal canal, is of a size that indicates it is an adult *Cypraea zebra.* The species is a moderately common intertidal dweller.

Family Olividae
Oliva sp.

Material.—**Test pit 1**: D1-12, fragment; MNI = 0.
Remarks.—This heavily eroded specimen retains only portions of the parietal wall and outer lip. The apex, columella, and part of the siphonal canal are missing. In general appearance this specimen (Fig. 26B) resembles worked olive shells that are classed as "tinkler" ornaments for necklaces. However, this specimen lacks

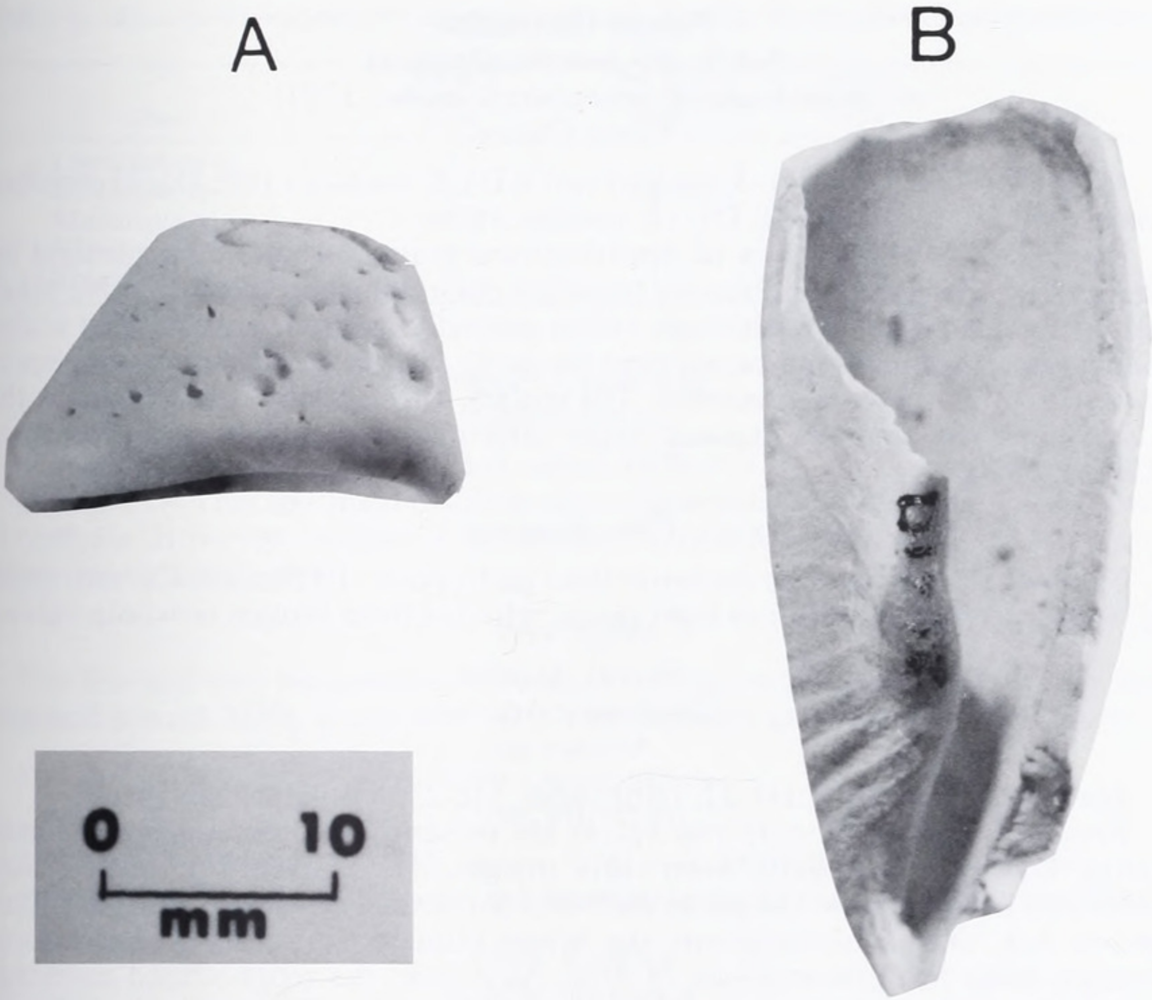

Fig. 26.—Possibly culturally modified shells. A. Heavily worn *Strombus* spine. B. Olive shell resembling a "tinkler" ornament but lacking the usual perforation.

the drilled perforation by which it would be attached to a necklace, that normally characterizes such ornaments. Its size places it within the range of both *Oliva reticularis* and *O. scripta* (termed *O. caribaeenis* by some authors). Olives are nocturnal and carnivorous and inhabit shallow-water sand and mud substrates.

Gastropoda sp.

Material.—**Test pit 3**: D1-22, fragment; MNI = 0.

Remarks.—This fragmentary scrap of shell is undiagnostic and cannot be allocated below the level of class.

Class Polyplacophora

Chiton remains were recovered only from test pit 1. Materials were compared to identified Caribbean chitons found in other archaeological sites. The specimens do not count toward MNI estimates because only median valves, not the singular anterior valve or posterior valve, are present.

Family Chitonidae
Subfamily Acanthopleurinae
Acanthopleura granulata (Gmelin, 1791)
Fuzzy Chiton

Material.—**Test pit 1**: D1-3, median valve; D1-8, median valve; D1-13, median valve; MNI = 0. **Disturbed**: D1-18, median valve.

Remarks.—Median valves of *Acanthopleura granulata* were distinguished by their shape, the presence of blotchy brownish coloration, and the distinctive black splotch on the underside. Although valves generally are eroded, granulated sculpture is observed on all specimens near the girdle margins. Sculpture on one specimen (D1-8) is very well preserved. The species, abundant and widespread in the Caribbean area, inhabits exposed upper intertidal rocks above mean sea level (Glynn, 1970).

Class Bivalvia

Bivalves were much less common than gastropods at Fountain Cavern. MNI is based on presence of left or right beaks, whether from broken or whole valves.

Family Arcidae
Subfamily Arcinae
Arcinae sp.

Material.—**Test pit 3**: D1-21, right valve; D1-23, left valve; MNI = 2.

Remarks.—Although only two valves are present, each represents a different genus. D1-21 has a heavily worn valve margin, but its overall purplish brown color and shape suggest the genus *Barbatia,* more likely *B. cancellaria,* the Red-brown Ark, than *B. domingensis,* the White Miniature Ark. D1-23 has a long, straight hinge line characteristic of *Arca.* As it lacks the zebra-striped markings of *A. zebra,* it more likely is *A. imbricata,* the Mossy Ark. Because both shells are heavily worn, we have chosen to be conservative and retain the subfamily identification. However, both valves count toward MNI. These small shells are juvenile specimens.

Superfamily Lucinacea
Family Lucinidae
Lucina pensylvanica (Linné, 1758)
Pennsylvania Lucina

Material.—**Test pit 3**: D1-21, 3 right valves, 2 left valves; MNI = 3.

Remarks.—Our nomenclature, *Lucina pensylvanica,* for these specimens differs from Abbott (1974:458), who uses *Linga pensylvanica.* The three largest valves are extremely worn and probably were dead specimens collected on the beach.

Codakia orbicularis (Linné, 1758)
Tiger Lucina

Material.—**Test pit 1**: D1-5, left valve; D1-8, right valve, fragment; D1-9, right beak; MNI = 2. **Test pit 3**: D1-21, 2 fragments; MNI = 0. **Surface**: D1-1, right valve. **Disturbed**: D1-18, right valve, fragment.

Remarks.—*Codakia orbicularis* is widespread and abundant throughout the Caribbean. Its range includes much of the tropical western Atlantic where it prefers muddy and sandy substrates in shallow water. *Codakia orbicularis* is a commonplace bivalve in West Indies prehistoric sites.

Table 9.—*Excavated vertebrates from Fountain Cavern, Anguilla. No specimen counts toward MNI.*

Taxa	Test pit 1 (D1-3 to -17) Count	Test pit 2 (D1-19) Count	Test pit 3 (D1-20 to -24) Count	Total
Osteichthyes sp.	1	—	—	1
cf. Teiidae sp.	—	1	—	1
Mammalia sp.	1	—	—	1
Vertebrata sp.	1	—	1	2
Total vertebrates	3	1	1	5

Family Chamidae
Chamidae sp.

Material.—**Test pit 3**: D1-21, left valve; MNI = 1.

Remarks.—This specimen displays some characteristics similar to *Chama macerophylla.* However, because it is small and somewhat worn, we limit our identification to family level.

Vertebrates

The few and very fragmentary vertebrate remains at Fountain Cavern were not counted toward MNI. Excavated vertebrate remains are presented in Table 9.

Class Osteichthyes
Osteichthyes sp.

Material.—**Test pit 1**: D1-13, spine; MNI = 0. **Disturbed**: D1-18, spine.

Remarks.—These undiagnostic fish specimens could not be further identified.

Class Reptilia
Order Squamata
Family cf. Teiidae

Material.—**Test pit 2**: D1-19, metapodial; MNI = 0.

Remarks.—This metapodial, possibly of a ground lizard, was the only faunal remain recovered in test pit 2. Found on the surface and very fresh in appearance, this bone probably is from a recently living lizard and, therefore, has no association with the two prehistoric sherds found in the test pit. It is not counted toward MNI.

Class Aves
Order Charadriiformes
Family Recurvirostridae
Recurvirostridae sp.

Material.—**Disturbed**: D1-18, left distal radius.

Remarks.—This bird bone was recovered from debris that slumped from the sidewall of test pit 1. It is from a member of the stilt family, possibly the Common Stilt, *Himantopus himantopus.*

Class Mammalia
Mammalia sp.

Material.—**Test pit 1**: D1-5, possible right radius fragment; MNI = 0. **Surface**: D1-1, 3 possible right radius fragments.

Remarks.—The three bones were collected previously by the AAHS from the

Table 10.—*Faunal remains from surface and disturbed sectors of Fountain Cavern, Anguilla. No specimen counts toward MNI.*

Taxa	Surface (D1-1)	Disturbed (D1-18)	Total
Anthozoa			
Acropora cervicornis	1	–	1
Decapoda			
Decapoda sp.	–	2	2
Gastropoda			
Cittarium pica	5	104	109
Polyplacophora			
Acanthopleura granulata	–	1	1
Bivalvia			
Codakia orbicularis	1	2	3
Osteichthyes			
Osteichthyes sp.	–	1	1
Aves			
Recurvirostridae sp.	–	1	1
Mammalia			
Mammalia sp.	3	–	3
Total surface/disturbed	10	111	121

surface of the cavern, while the D1-5 fragment was excavated by the author. The bones cross mend and are from the same individual. They seem to be fragments of the radius or, less likely, the ulna. While these limited remains are reminiscent of *Homo sapiens* bones in size and shape, they have hollow medullary areas and thick compact bone layers that are unusual for human bone.

Vertebrata sp.

Material.—**Test pit 1**: D1-8, fragment; MNI = 0. **Test pit 3**: D1-21, fragment; MNI = 0.

Remarks.—These fragmentary scraps of bone are wholly undiagnostic.

Surface and Disturbed Faunal Remains

Faunal remains recovered from Surface Area A (D1-1) and the slumped walls of test pit 1 (D1-18) include coral, crab, marine gastropod, chiton, bivalve, and vertebrate specimens. As these remains were not found in verified archaeological context, their relationship to Amerindian use of Fountain Cavern is equivocal. They are listed in Table 10. All surface and disturbed taxa have counterparts in excavated units with the exception of the single bird bone of the family Recurvirostridae. *Cittarium pica* shells (N = 104) were the most abundant faunal remain from the slumped walls of test pit 1 (D1-18).

Discussion of Faunal Remains

Table 11 presents the counts, MNI, and their percentages for major categories of excavated faunal remains from test pits 1, 2, and 3. Land Snails is the only category excluded from Table 11 because they probably were not deposited by humans in test pit 3, and their extreme representation, 230 of 343 specimens (93.1%) and 150 of 175 individuals (85.7%), in that test pit skews the sample. While it is also unlikely that Amerindians played a role in the deposition of some other faunal categories (e.g., the five fossil shells or Recent lizard bone), we have opted to include them in Table 11 because neither faunal category seriously skews

Table 11.—*Excavated faunal remains by faunal category (excluding land snails).*

Category	TP1 (D1-3 to -17)				TP2 (D1-19)				TP3 (D1-20 to -24)			
	Count	%	MNI	%	Count	%	MNI	%	Count	%	MNI	%
Coral	—	—	—	—	—	—	—	—	1	0.9	0	—
Sea urchin	—	—	—	—	—	—	—	—	1	0.9	0	—
Crab	7	2.8	1	4.8	—	—	—	—	8	7.1	1	4.0
Fossil	—	—	—	—	—	—	—	—	5	4.4	1	4.0
Gastropod	230	93.1	18	85.7	—	—	—	—	87	77.0	17	68.0
Chiton	3	1.2	0	—	—	—	—	—	—	—	—	—
Bivalve	4	1.6	2	9.5	—	—	—	—	10	8.9	6	24.0
Fish	1	0.4	0	—	—	—	—	—	—	—	—	—
Reptile	—	—	—	—	1	100.0	0	—	—	—	—	—
Mammal	1	0.4	0	—	—	—	—	—	—	—	—	—
Vertebrate	1	0.4	0	—	—	—	—	—	1	0.9	0	—
Total faunal	247	99.9	21	100.0	1	100.0	0	—	113	100.1	25	100.0

the data. Finally, one other faunal category that is included, marine gastropods (especially *Cittarium pica*), may involve some whole specimens brought into the cavern by hermit crabs, not by humans. Since intact shells introduced by hermit crabs were not distinguishable from those possibly brought in by humans, all the marine gastropods are tabulated in Table 11.

Of 11 faunal categories included in Table 11, seven occur in test pit 1, one in test pit 2, and seven in test pit 3; only four categories (crab, gastropod, bivalve, unidentified vertebrate) are common to test pits 1 and 3. Test pit 2, with only a single lizard bone, is not considered further.

With regard to counts, test pit 1 (N = 247) has more than twice as many faunal remains as test pit 3 (N = 113). Each test pit has a single faunal category, gastropod (marine), that by count constitutes the bulk of its specimens, with 230 of 247 (93.1%) in test pit 1 and 87 of 113 (77.0%) in test pit 3. All other faunal categories in both test pits have ten or fewer remains (<9.0%) and three categories in each test pit have only one specimen (<1.0%).

In terms of MNI, test pit 3 with 25 exceeds test pit 1 with 21. Again, gastropods predominate, with 17 (68.0%) in test pit 3 and 18 (85.7%) in test pit 1. The gastropod MNIs are similar but percentages of total gastropods are not (18 of 230 or 7.8% for test pit 1; 17 of 87 or 19.5% for test pit 3). Gastropod shells with apices (or apertures in the case of nerites) were found 2.5 times more frequently in test pit 3 than test pit 1. However, Table 8 shows almost all apices in test pit 1 are from *Cittarium pica,* whereas seven apices in test pit 3 are from small gastropods (*Astraea, Nerita,* and *Tectarius*) in addition to ten *C. pica* apices. If only *Cittarium pica* remains are used (Table 8), the MNI as a percentage of total remains changes to 7.7% (17 of 222) for test pit 1 and 13.5% (10 of 74) for test pit 3, which means that *C. pica* apices are found slightly less than two times more frequently in test pit 3. *Cittarium pica* remains are not only more abundant in test pit 1 but also tend to be fragmented and missing more apices. Bivalves also are well represented in test pit 3, with six individuals accounting for 24.0% of total MNI.

The last point about Table 11 concerns the distribution between marine and terrestrial organisms. Even with two categories excluded (fossil marine mollusks and unidentified vertebrates), six of the nine remaining faunal categories are marine (coral, sea urchin, gastropod, chiton, bivalve, fish) and only three are terrestrial (crab, reptile, mammal). Moreover, by count, marine specimens constitute the far greater quantity and percentage (238 of 246 or 96.7% in test pit 1; 99 of 107 or 92.5% of test pit 3), as well as by MNI (20 of 21 or 95.2% for test pit 1; 23 of 24 or 95.8% for test pit 3). Test pit 2, having but a single remain of a recently living lizard, does not constitute a valid sample.

The modern invertebrate and vertebrate faunas of Anguilla are poorly known at this time and thorough faunal studies will be required before definitive statements can be made about possible relationships between modern and past (both paleontological and archaeological) faunas of this island (Watters, 1989*b*). Recent reports are available on Anguilla's gastropods (Coomans, 1958), chitons (Kaas, 1972), land snails (Breure, 1974), bats (Genoways, 1989), tortoise and tree frog (Censky, 1988, 1989), and extinct heptaxodontid rodent *Amblyrhiza inundata* (McFarlane and MacPhee, 1989; cf. Watters, 1989*b*).

Petroglyphs

Fountain Cavern was first recognized as a prehistoric site in 1967 after June Flowers discovered its petroglyphs. A survey by the Island Resources Foundation (1980; Dick et al., 1980) in 1979 recovered the first artifacts and confirmed the cavern's status as a prehistoric site. Reports of that survey neither described nor enumerated the petroglyphs in Fountain Cavern.

Since Fountain Cavern's petroglyphs have been illustrated by Penny Slinger as well as presented in manuscript, checklist, and now published form (Douglas, 1985, 1986*a,* 1989), they are only briefly discussed here. All 12 petroglyphs are in Chamber 1. Nine petroglyphs (reference numbers 1–9 in Douglas's lists) are found in close proximity to the north wall and relatively close to the entrance, the sole source of light in the cavern, and one (#10) occurs on the slope. The majority of these carvings are representations of faces or encircled eyes (Fig. 27). The other two petroglyphs are located in the vicinity of Pool 1 about 15 m south of the others. Petroglyph 11, named by Douglas the "Chief" or "Solar Chieftain" (Fig. 28A), faces Pool 1 from the base of the adjacent truncated column. Petroglyph 12, termed "Jocahu" or the "Creator" by Douglas, is a face carved at the pinnacle of the tall stalagmite (Fig. 28B). It was the base of this stalagmite that encroached into and occupied about 50 percent of the area at the deepest part of test pit 1 (Fig. 11). Petroglyph 12, atop the stalagmite, is almost 6 m above the bottom of test pit 1.

The age of the Fountain Cavern petroglyphs remains uncertain since dates are not available for the rock carvings. Almost all Amerindian ceramics recovered during the 1986 research project are undecorated sherds (see the Artifacts section and Petersen and Watters, 1991) that are attributable to a post-Saladoid occupation of Anguilla, which in turn suggests the petroglyphs most likely date to the post-Saladoid time period as well.

Fountain Cavern's petroglyphs were briefly discussed by Petitjean Roget (1989), who stated they were made around A.D. 900, and Dubelaar (1989), who suggested A.D. 1200, both being dates that are in accord with the post-Saladoid attribution of the Fountain Cavern Amerindian ceramics.

Discussion

AAHS Artifacts

Douglas (1985:11, 1986*b*:28) initially estimated 5000 to 5500 prehistoric sherds were collected from Fountain Cavern before the 1986 excavations. A recounting

Fig. 27.—Petroglyph 6 displaying loop encircled eyes.

of those materials, combined with additional artifacts collected since the 1986 project, increased the total number of artifacts and faunal remains collected by the AAHS from the floor of Fountain Cavern to 6641. Three are lithic tools, 25 are mollusk shells, nine are historic ceramics, and 6604 are prehistoric sherds. These materials, which remain on Anguilla, have not been studied by the author. Douglas (personal communication, 1991) provided information about the AAHS materials, from which the summary below is extracted.

All materials came from Chamber 1. Of the 6604 prehistoric sherds, ten were found in Pool 1, 145 (encrusted sherds discussed previously) in the water-filled cavity beside that pool, 55 on the floor sloping from the level area beneath the entrance (by the ladder and the nine petroglyphs) toward Pool 1, and 6394 in the vicinity of the large stalagmite (an area roughly equivalent to Watters' Surface Area A) (Fig. 6). Although a grid was not used by the AAHS to collect artifacts in a systematic manner, the distribution pattern shows that prehistoric sherds certainly were concentrated near the stalagmite with Petroglyph 12.

Twenty sherds have some form of decoration on the exterior, including seven with white-on-red painting, one that is a painted spiral-shaped handle, and 12 with modelled decoration including two adornos, one of which may depict a snake and one possibly a snail. Of the remaining 6584 sherds, 650 are too fragmentary or small to ascertain whether or not they were decorated. A total of 5934 sherds exhibit no decoration.

Douglas provided additional information about varieties of bases and rims, vessel shapes, and probable numbers of vessels represented, some of which is included by Petersen and Watters (1991).

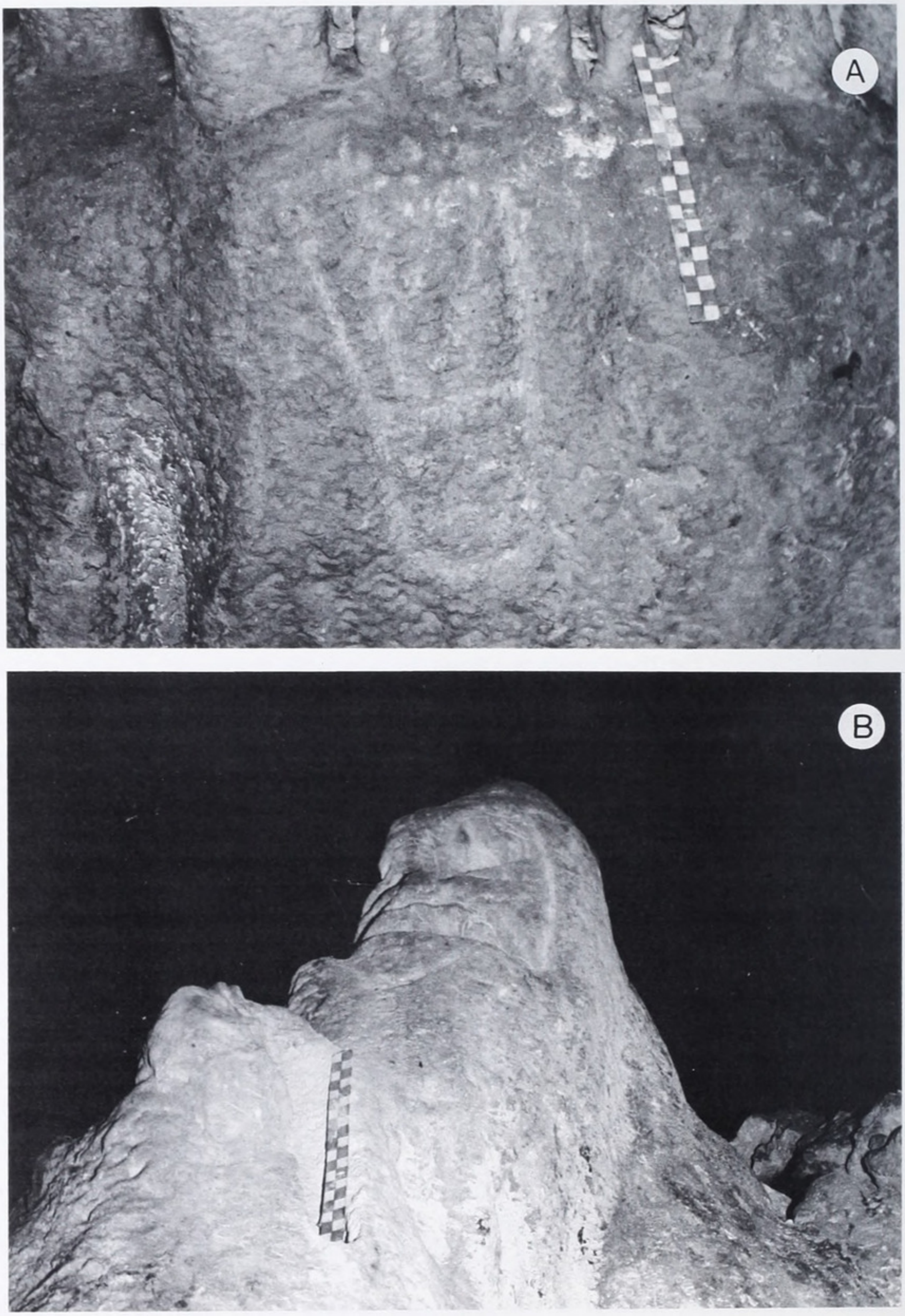

Fig. 28.—A. Petroglyph 11 near the base of the truncated column near Pool 1. B. Petroglyph 12 carved atop the large stalagmite bordering test pit 1.

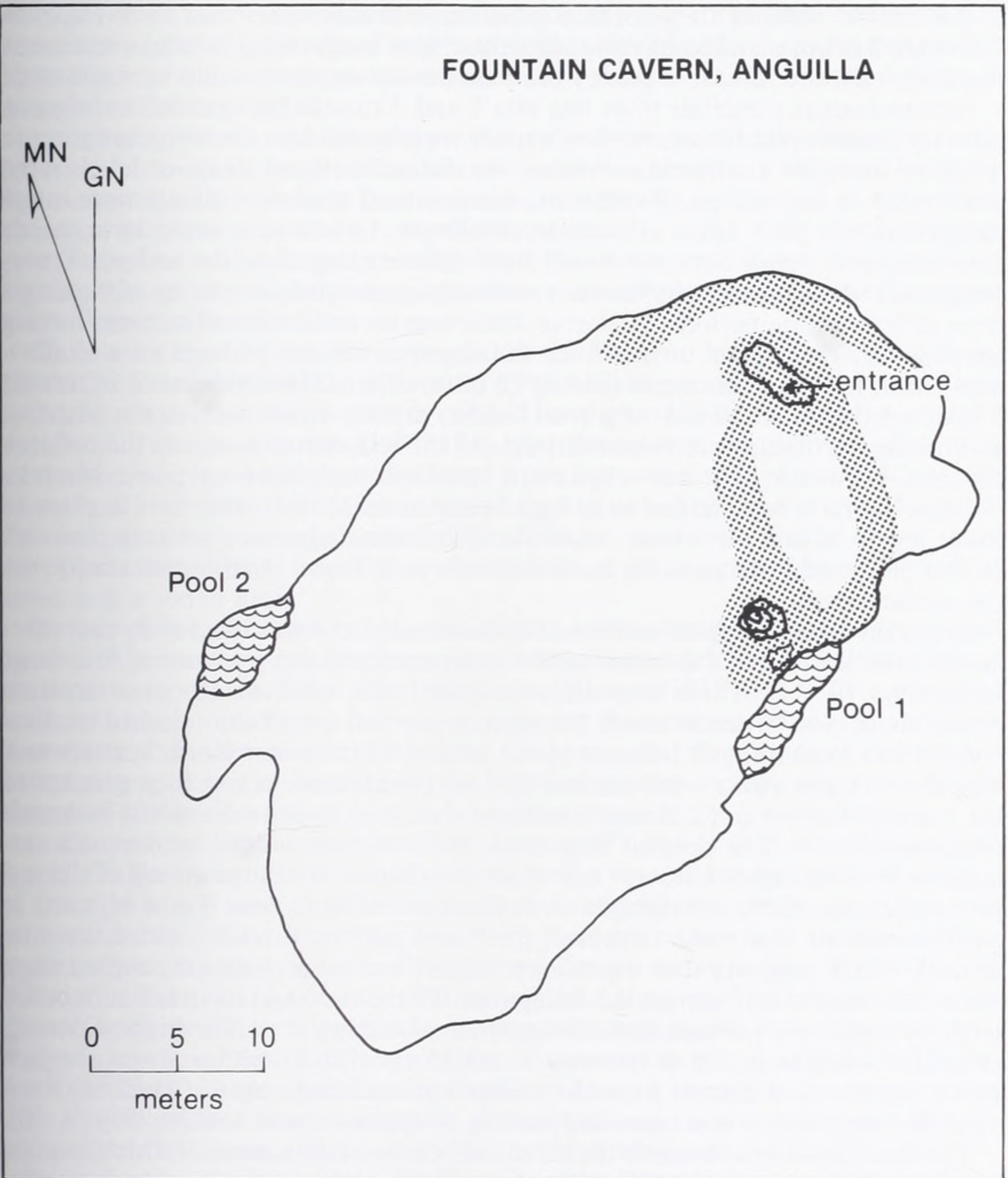

Fig. 29.—High probability areas (stippled) for concentrations of artifacts in Fountain Cavern.

Data Limitations

Although three test pits were excavated in Fountain Cavern during the 1986 project, their combined area (3 m^2) represents a small percentage of the total archaeological deposits. Figure 29 shows the high probability areas for archaeological deposits in Fountain Cavern based on the surface survey, test excavations, and discussion with AAHS members about their earlier surface collecting activities. Certain areas that were not tested and for which information about the depth of the deposits remains unknown, such as the two washes (Fig. 6), should be tested to determine whether they contain prehistoric artifacts. Further excavation in Chamber 2 is not justified in view of its paucity of artifacts and shallow sediment depth, but a more intensive survey of its numerous crevices would be warranted.

Archaeological materials from test pits 1 and 3 cannot be regarded as being in primary context and, therefore, they were not segregated into discrete stratigraphic levels or units for analytical purposes. No distinct cultural strata or levels were discernible in any test pit. Prehistoric, historic, and modern artifacts were intermingled in test pit 1, often at considerable depth. In addition, prehistoric sherds from the same vessel were recovered from different depths in the test pit. Trampling and shifting of rocks by humans probably accelerated the mixing of materials from different time periods. However, there was no indication of humans having purposefully dug up or turned over the deposits, except perhaps in a shallow depression in the north corner (Sector C) of test pit 1. The disturbance in test pit 3 resulted from installation of a steel ladder, during which prehistoric, historic, and modern artifacts were mixed throughout the sediments (except in the bedrock fissures). While test pit 1 was subject to a "passive" taphonomic process, whereby younger artifacts were added to or agglomerated with older materials in place in lower levels, in test pit 3 both the artifacts and the strata were actively churned. In test pit 2, only two partially buried sherds were found in what essentially was the surface level.

In test pit 1, stratigraphic context of cultural materials was affected by two other factors, the intrusion of the base of the stalagmite and the presence of four large rocks (Fig. 10, 11). These impediments meant that uniform 10-cm excavation levels could not be maintained throughout the test pit (Table 1), and vertical control was most difficult between about 50 and 90 cm where Rock 3 interposed. The three largest rocks were stacked against the stalagmite and they penetrated the walls of the test pit, ultimately causing slumping and the disturbed materials from unit D1-18. The deepest large rock, Rock 4, was wedged between the stalagmite base and cavern floor. Only Rock 1 in Sector B (southern half of the test pit) was distant from the stalagmite. Prehistoric artifacts were found adjacent to and beneath all four rocks (although the "deep pit" by Rock 4 yielded few materials), which suggests that the cavern was in use by prehistoric peoples when the rocks came to rest against the stalagmite. The rocks could have fallen or rolled to those positions, perhaps as a consequence of earthquakes. The highest density of artifacts was in Sector B between 5 and 35 cm (D1-8). Sector B was the part of the test pit most distant from the stalagmite, included only the smallest (Rock 1) of the large rocks, and consisted mainly of sediment and cobbles (Fig. 9, 10).

The final limitation involves the three radiocarbon dates, none of which inspires much confidence.

Caves and Petroglyphs

Caves were a recurring element in the mythology of the Taino, the Amerindian group inhabiting most of the Greater Antilles when the Spanish explorers arrived. The significance of caves is known through the work of Ramón Pané, a friar who lived among the Taino for two years in the mid-1490s. Bourne (1906) translated Pané's treatise into English (see Fernández Méndez, 1981:11–32 for a Spanish version). Pané (in Bourne, 1906:319–320) reported a Taino myth in which the larger part of the people (=Taino) to settle the island of Española (=Hispaniola) came forth from a cave named Cacibagiagua led by a man named Guagugiona. Stevens-Arroyo (1988:136–138) interprets this as a Taino hero myth. Pané also recorded the Taino belief that the sun and moon came forth from another cave, which they held in high regard and "painted in their fashion" (in Bourne, 1906: 325). This cave also contained two stone zemis that the Taino visited in times of drought to induce rainfall.

Archaeological research has shown that caves were used as dwellings for habitation only rarely by Amerindian groups in the West Indies. Villages of Ceramic Age Amerindians, who were horticulturalists, typically are located at open sites. Presence of pottery in caves was misinterpreted by some early researchers as evidence of cave-dwelling. Lovén (1979:122), however, refuted that position, arguing that occurrence of pottery remains is not sufficient evidence to document habitation in caves.

Caves were one of three locations used by the Taino to bury their dead (Wilson, 1990:22). Columbus (cited in Bourne, 1906:313) reported that Taino caciques (=chiefs) sometimes were buried in caves. Harrington (1979) recorded many cave burials in Cuba, and Lovén (1979:123–124) argued that caves most often were used as burial places and recorded cases from Jamaica and St. Vincent where the bones had been placed in ceramic burial urns. Lovén (1979:130) argued against differentiating too strongly between Taino burial caves and shrine caves, since the objects of zemiistic worship in caves included the ancestors' bones as well as stone and wooden idols.

Stevens-Arroyo (1988:64, 138) stated that caves, for the Taino, were special places for rites involving hallucinogenic substances and sanctuaries where religious artifacts were reserved for ritual purposes. Lovén (1979:125–130) mentioned artificial niches or platforms for setting images in shrine caves, recovery of artifacts associated with zemiistic rituals in cave-temples, and the presence of petroglyphs and pictographs in various caves in the Greater Antilles. He also cited a historical record of idols being found in a cave on Martinique in the Lesser Antilles.

In Cueva Zemi in eastern Cuba, Harrington (1979:268–273, plates LIX and LX) found a large stalagmite on which was carved a face and indications of a body, in front of which was a blackened earth area about eight feet in diameter with ashes mixed with faunal remains, flint flakes, and plain pottery to a depth of about eight inches. The description of the Cueva Zemi carving closely resembles the Fountain Cavern stalagmite with Petroglyph 12. Lovén (1979:127) referred to the Cueva Zemi specimen as zemiistic sculpture illustrating the transition from petroglyphs to more plastic representation, a characterization paralleled by Dubelaar's (1989:16) contention that the Fountain Cavern specimen is a statue rather than a petroglyph. Anthropomorphic petroglyphs and carved stalagmites also are reported on Hispaniola (Krieger, 1931:21; Veloz Maggiolo, 1972:153, 163).

Petroglyphs sites are widely distributed in the West Indies and are abundant on some islands, such as the Dominican Republic where 72 petroglyph and pictograph sites are recorded (Pagán Perdomo, 1979). Petroglyph sites are not always associated with caves. Lovén (1979:125) argued that since caves occur rarely in the inner, volcanic arc of the Lesser Antilles because the volcanic deposits were not suited for cave development, petroglyphs on these volcanic islands are located on the surface, especially on rocks near streams and rivers. The Layou site on St. Vincent (Kirby, 1970) typifies surface sites. However, caves are prevalent on the limestone islands of the outer arc in the Lesser Antilles, and they provide suitable settings for subterranean petroglyphs. Therefore, although Fountain Cavern, with its abundant subterranean petroglyphs, is regarded as a rare site type in the Lesser Antilles, similar subterranean petroglyph sites occur in cavernous areas of islands in the Greater Antilles. Anguilla's nearest neighboring island, St. Martin, which is a composite island having volcanic and limestone formations, has records of both surface and subterranean petroglyph sites.

Ceremonial Center

The research team from Island Resources Foundation (1980; Dick et al., 1980) deemed Fountain Cavern, because of its petroglyphs and midden deposit, a very important site worthy of further investigation. This task was undertaken in the 1980s by the newly formed Anguilla Archaeological and Historical Society (Douglas, 1986*b*). It was the AAHS that first determined the number of petroglyphs in Fountain Cavern and subsequently recorded and illustrated the 12 carvings (Douglas, 1986*a*). The AAHS also first interpreted Fountain Cavern as a ceremonial center used by prehistoric inhabitants of the island (Douglas, 1985). A ceremonial center attribution is in accord with the quantity and variety of subterranean petroglyphs, and other researchers have agreed with this interpretation. Petitjean Roget (1989) referred to Fountain Cavern as a ritual place, sacred place, magical cavern, and sanctuary, and Dubelaar (1989) referred to its use for religious or magical purposes. The dimly lit interior, poor ventilation, humid condition, and difficulty of access argue against Fountain Cavern having been a place of habitation. Also, some artifacts associated with habitation sites, such as chert flakes used in manioc preparation and shell celts, are absent at Fountain Cavern.

Some findings from the 1986 archaeological project support the hypothesis of some kind of ritual use of Fountain Cavern. First, all archaeological materials (apart from two sherds in test pit 2) were recovered in Chamber 1 (Fig. 6), the sector of the cavern containing the petroglyphs and the only part where daylight enters. All materials surface collected by the AAHS also came from Chamber 1. Thus, areas of Fountain Cavern that lacked petroglyphs generally also lacked artifacts. During the 1986 project, surface-collected prehistoric artifacts were found in Surface Areas A and B and the "washes" leading to test pit 1, all of which are in the general vicinity of Pool 1 (Fig. 6). The AAHS surface-collected materials were similarly concentrated.

Second, test pit 1 yielded by far the greatest density of ceramic remains, including 724 excavated sherds and 111 sherds from slumped walls (Tables 3 and 6). Test pit 1 is positioned between the base of the tall stalagmite (atop which is Petroglyph 12, Douglas' "Jocahu") and the truncated column with Petroglyph 11 ("Solar Chieftain"). The stalagmite (Fig. 7A, 28B) has the most impressive carving in Fountain Cavern; it is reasonable to suggest that this "statue" (Dubelaar, 1989) was central to ritual activity at Fountain Cavern as the Cueva Zemi stalagmite in Cuba was the focus of ritual offerings. The abundant sherds recovered in the test pit at the base of that stalagmite could be the remnants of ceramic vessels presented as ritual offerings to Petroglyph 12. Such vessels may have been placed in crevices below the petroglyph on the stalagmite. Sherds from the only two vessels exhibiting decoration (vessels 17 and 19) are from this test pit. Also, two conically-shaped radiolarian limestone tools, which may have been used to chip, grind, or otherwise create petroglyphs, were found in test pit 1, and the massive chopper came from nearby Surface Area A (Fig. 18).

Third, the artifact that is most suggestive of a ceremonial function, the three-pointer zemi (Fig. 19), came from test pit 1. Archaeological and ethnohistorical evidence has confirmed the ritual significance of such three-pointers among the Taino in the Greater Antilles. Also, the worn and blunt *Strombus* spine (Fig.

26A), a possible prototype three-pointer, and the *Oliva* shell that resembles in some ways a "tinkler" ornament (Fig. 26B) were recovered at the base of the stalagmite.

Support for the ceremonial center hypothesis for Fountain Cavern comes from the concentration of petroglyphs in the only area where daylight penetrates, their co-occurrence in Chamber 1 with the vast majority of the archaeological remains, the surface and excavated artifact densities near the stalagmite "statue" with Petroglyph 12, and the presence of a three-pointer and other artifacts that suggest ritual activity. A correlation also can be made with subterranean petroglyph sites in cavernous areas of the Greater Antilles, especially the Cueva Zemi site on Cuba, where remains of offerings were found. Fountain Cavern may have served as a regional ceremonial center used by Amerindians of Anguilla, as well as those of other islands, in view of the paucity of appropriate subterranean settings on the volcanic islands of the northern Lesser Antilles.

What has not been determined archaeologically are the kinds of rituals, ceremonies, religious practices, or zemiistic worship that took place in Fountain Cavern. Friar Pané's account of the cave on Hispaniola with two stone zemis, which the Taino supplicated for rain in times of drought, suggests one ritual that might have occurred in Fountain Cavern since Anguilla also suffers periodic drought.

Although some findings from the 1986 research can be invoked in support of the ceremonial use hypothesis for Fountain Cavern, that does not preclude the possibility that other activities took place as well, and some artifacts may relate to those activities. For ceramic vessels, two alternative hypotheses are reasonable. First, some sherds may be the remains of ceramic burial urns, a funerary practice reported, although not commonly, from elsewhere in the Antilles. Lovén's (1979: 130) admonition about not too strongly differentiating between burial and shrine caves could pertain here because urn burial can be viewed as another ritual manifestation. The four Mammalia sp. long bones from the cavern floor and test pit 1 might be remnants of disturbed burials, although it is not certain that the bones are human.

Another plausible argument for the presence of some ceramic sherds is that they are the remains of containers used for the collection and transport of water. The existence of permanent freshwater sources in Fountain Cavern was known by the historic occupants of this periodically drought-stricken island. Assuming these pools existed prehistorically, it is reasonable to presume that the Amerindian inhabitants of Anguilla also would have been aware of the freshwater sources. The abundant sherds in test pit 1, located beside Pool 1, could be interpreted as the remnants of ceramic vessels broken during water collecting activities, as it has been suggested that some pieces of plastic found in test pit 1 are the remains of modern water containers. The absence of prehistoric sherds at Pool 2 might contradict a water collecting hypothesis and, therefore, supports a purely ritual function for test pit 1 ceramics, but such an argument really is untenable. Pool 2 is located in the deeper and darker recesses of Fountain Cavern while Pool 1, located closer to the entrance, is a much more easily accessible water source. Also, a lack of prehistoric ceramics at Pool 2 is matched by the absence of modern plastic pieces, which suggests that Pool 2 never has been a favored water collection point.

The ceremonial, urn burial, and water procurement hypotheses all have merit, but the data from surface and excavated sherd distributions and the ritual artifacts more strongly support the conclusion that Fountain Cavern was a ceremonial center for the Amerindians of Anguilla.

Cultural Affiliation

A total of 2493 objects, including artifacts, miscellaneous materials, and faunal remains, were recovered in Fountain Cavern during the 1986 project. Table 12 summarizes these objects by excavation units (test pits 1–3) and surface/disturbed areas. Excavated units yielded far more objects (N = 2037; 81.7%) than surface/disturbed areas (N = 456; 18.3%). All objects in each test pit are regarded as being from a single unit. Test pit 1 has 1398 objects (68.6%), test pit 2 has 15 (0.7%), and test pit 3 has 624 (30.6%) of the 2037 excavated objects.

Three categories stand out, both for excavated and total objects. Prehistoric ceramic sherds (N = 775 excavated, 944 total) are followed in quantity (and percentage) by invertebrates (N = 586 excavated, 702 total) and speleothems (N = 463 excavated, 598 total). Table 12 also shows that prehistoric ceramics constitute extremely high percentages of the excavated prehistoric artifacts (775 of 779; 99.5%) and total prehistoric artifacts (944 of 950; 99.4%). Indeed, the inventory of non-ceramic prehistoric artifacts at Fountain Cavern is exceedingly restricted when compared to the quantity and diversity of such artifacts in open habitation sites.

Prehistoric ceramics provide the data most pertinent to the issue of cultural affiliation. Earlier in this paper, the bulk of excavated ceramics was attributed to the post-Saladoid period, based on detailed ceramic analysis (Petersen and Watters, 1991). Of 780 sherds and fragments available for study, 234 (30%) were assignable to specific vessels. Of the 234 specimens, 229 (97.9%) displayed no decoration. Sherds and fragments not assigned (N = 546) to particular vessels exhibited no decoration (although in some cases their surfaces were too worn to determine whether decoration originally was present). Thus as many as 775 of 780 excavated specimens (99.4%) may have been undecorated. At the vessel level, 27 of 29 (93.1%) vessels defined from excavated sherds had no decoration. For sherds collected by the AAHS (but excluding the 650 fragments), 5934 of 5954 (99.66%) sherds lacked decoration. Thus, undecorated ceramics predominate in all major analytical categories.

The abundance of undecorated sherds in the Fountain Cavern sample is one line of evidence supporting the post-Saladoid attribution. However, other attributes, such as folded or thickened rims, a preponderance of incurvate vessel forms, and minor usage of white-on-red (WOR) painting and broad-lined incision, further support a post-Saladoid cultural affiliation for the Fountain Cavern ceramics (Petersen and Watters, 1991).

Five of 780 (0.6%) sherds in the Fountain Cavern excavated ceramic sample available for study are decorated; they constitute five of 234 (2.1%) specimens assigned to vessels. One relatively thick sherd, the sole vessel 19 sherd, displays a single, deep, U-shaped incision (Fig. 17J). Such broad-line incision is most often attributed to the post-Saladoid period. Eight (0.1%) of the 5954 assignable sherds that were surface collected by the AAHS are painted (7 WOR and one painted handle) and 12 (0.2%) have modelled decoration.

Four excavated sherds exhibit white-on-red (WOR) geometric painting (Fig. 17I), a decorative feature that is generally regarded as characteristic of earlier Cedrosan Saladoid pottery. Indeed, both white-on-red painting and zoned-incised-crosshatch decoration (the latter absent at Fountain Cavern) are regarded as di-

Table 12.—*Summary table of the artifacts, miscellaneous materials and faunal remains from excavated and surface/disturbed contexts at Fountain Cavern, Anguilla.*

Category	Test pit 1 (D1-3 to -17)	Test pit 2 (D1-19)	Test pit 3 (D1-20 to -24)	Total	Surface Area A (D1-1)	Surface Area B (D1-2)	Test pit 1 (slump) (D1-18)	Pool 1 (D1-25)	Petroglyph (D1-26)	Total	Grand total by category
Prehistoric											
Ceramic	724	2	49	775	37	20	111	1	—	169	944
Lithic	2	—	1	3	2	—	—	—	—	2	5
Three-pointer	1	—	—	1	—	—	—	—	—	0	1
Total	727	2	50	779	39	20	111	1	0	171	950
Historic/modern											
Ceramic	—	—	6	6	—	—	—	—	—	0	6
Glass	6	—	31	37	3	2	3	—	—	8	45
Plastic	35	—	1	36	1	—	8	—	—	9	45
Metal	2	—	8	10	3	—	1	—	—	4	14
Total	43	0	46	89	7	2	12	0	0	21	110
Miscellaneous											
Speleothem	373	12	78	463	31	1	101	—	2	135	598
Other material											
Unusual rock	8	—	1	9	3	—	—	—	—	3	12
Botanical	—	—	1	1	—	—	—	—	—	0	1
"Fossil wood"	—	—	1	1	—	—	—	—	—	0	1
Organic	—	—	104	104	—	—	—	—	—	0	104
Crust	—	—	—	0	—	—	—	2	—	2	2
Wood	—	—	—	0	3	—	—	—	—	3	3
Total	381	12	185	578	37	1	101	2	2	143	721
Invertebrates	244	—	342[a]	586	7	—	109	—	—	116	702
Vertebrates	3	1	1	5	3	—	2	—	—	5	10
Total	247	1	343	591	10	0	111	0	0	121	712
Grand total by area	1398	15	624	2037	93	23	335	3	2	456	2493

[a] = Includes 230 land snails.

agnostic of early Caribbean ceramics, dating perhaps as far back as 200–300 B.C. (Rouse, 1989). Some archaeologists have argued the WOR sherds represent an older decorative style that is incongruous with the postulated post-Saladoid use of Fountain Cavern. This led to some speculation concerning use of Fountain Cavern by Saladoid peoples, prior to its use by post-Saladoid populations.

However, one does not have to invoke a Saladoid presence in Fountain Cavern to account for surface and excavated WOR sherds. If the sherds really are earlier Saladoid sherds, they may have been introduced much later into the deposits by post-Saladoid peoples who picked them up elsewhere. In fact, in view of the scarcity of decorated sherds, an argument for incidental inclusion of WOR sherds in the deposits seems more logical. If the sherds are not early Saladoid, they may represent persistence of white-on-red decoration into later Saladoid ceramic styles, as with the Mill Reef style on Antigua, and perhaps into certain post-Saladoid ceramics on a very limited basis. White-on-red painting is not a major decorative feature in either instance.

The term "post-Saladoid" is used throughout this paper in juxtaposition to the term Saladoid, thereby indicating a temporal difference. The Saladoid series (Rouse and Allaire, 1978), more recently the Cedrosan Saladoid subseries (Rouse, 1986: 139), is based on specific ceramic styles, modes, or attributes present during a particular timespan in the West Indies. Ceramics that postdate the Saladoid series in the northern Lesser Antilles are placed in the Elenan Ostionoid ceramic subseries by Rouse (1986:143–144). Elenan Ostionoid styles differ from Cedrosan Saladoid styles and they occur later in time.

In this paper, the term post-Saladoid indicates ceramic forms that differ from and are more recent than Saladoid pottery. However, because the ceramics from Anguilla are not yet assigned to specific styles or subseries, one cannot equate the term post-Saladoid with Rouse's Elenan Ostionoid subseries. Among northern Lesser Antilles archaeologists, Goodwin (1979:305) and Watters (1980:274) have been particularly reluctant to apply the Elenan Ostionoid (formerly Elenoid) designation to post-Saladoid ceramics since their specific attributes are not well defined. One reason they are poorly defined is that the ceramics overwhelmingly are undecorated, so one cannot use decorative motifs (which was one attribute used to define the Cedrosan Saladoid subseries) to define the post-Saladoid ceramics. Definition of specific post-Saladoid ceramic styles will have to rely on other attributes, notably vessel morphology including shape and rim form (Petersen and Watters, 1991) and possibly distinctive temper associations (Donahue et al., 1990).

The distinction between Saladoid and post-Saladoid in the northern Lesser Antilles has other implications. Foremost among these is the issue of when Saladoid ends and when post-Saladoid begins on any given island. By roughly A.D. 600–700, ceramic styles that are attributed to the Cedrosan Saladoid subseries *begin* to disappear from the archaeological record in the northern Lesser Antilles. Yet, certain elements persist for a longer time period on some islands, such as Antigua's Mill Reef style, which was the last Saladoid manifestation on that island. A clearly defined temporal boundary between Saladoid and post-Saladoid has yet to be established for most islands in the northern Lesser Antilles, and the temporal boundary may differ for each island.

Anguilla, because of its location in the northern Lesser Antilles and its proximity to the eastern Greater Antilles, potentially will play an important role in establishing Saladoid and post-Saladoid ceramic styles, temporal boundaries, and spatial distributions on both sides of the Anegada Passage. Unpublished research at two open sites on Anguilla, Rendezvous Bay (AL2) and Sandy Ground (AL3), suggests similarities between post-Saladoid manifestations in these areas.

CONCLUSIONS

Fountain Cavern served as a ceremonial center for the post-Saladoid populations of Anguilla after about A.D. 600, and more specifically A.D. 900–1200, or later. Although the possibility of earlier Saladoid use should not be dismissed, the weight of evidence supports post-Saladoid use of Fountain Cavern. The 12 well-preserved petroglyphs assuredly related to some form of ritual activity. The archaeological materials indicate this was not a habitation site. Post-Saladoid ceramics, the bulk of which are undecorated, most likely were involved in rituals (possibly including urn burial) and also may have been used to procure fresh water. Shattered speleothems indicate that Fountain Cavern has been severely jolted in the past, probably by earthquakes. Active and passive taphonomic processes resulted in the admixture of archaeological deposits from different time periods. Historic and modern artifacts show that Fountain Cavern continued to be used for collecting water, if no longer for rituals, by later inhabitants of this periodically drought-stricken island. The petroglyphs of Fountain Cavern, a rare type site in the northern Lesser Antilles, demand adequate protection.

FUTURE DEVELOPMENT OF FOUNTAIN CAVERN

Fountain Cavern is a very important archaeological resource among the islands of the northern Lesser Antilles because its petroglyphs have suffered little damage from vandalism and are extremely well preserved. Their preservation is due, in large part, to three factors: (1) their discovery occurred only relatively recently and was kept secret (Douglas, 1986*b*); (2) they have been afforded some degree of protection by their inclusion in the Fountain National Park established by the Government of Anguilla; and (3) the Anguilla Archaeological and Historical Society installed a lockable metal grid across the entrance. While the first factor may be considered fortuitous, the other factors indicate genuine concern for protecting these archaeological resources. Concern for the island's archaeological and historical heritage on the part of Anguillians, Government, and the AAHS led to enactment of the "Antiquities Ordinance, 1982" to protect such resources. The findings at Fountain Cavern were instrumental in fostering that ordinance.

Scientists involved in the Fountain Cavern study (see reports in Gurnee, 1989) have cautioned that any plan of development must be devoted to preserving and enhancing the natural and cultural environments in the cavern. Fountain Cavern has the potential to serve two roles simultaneously. An above-ground museum/interpretation center could serve an educational role for informing Anguillians about natural history and Amerindian prehistory of their island. An economic role for Anguilla would be served by promoting visits to the site by tourists. But any development scheme for the site must take into account the high probability areas (Fig. 29) for concentrations of archaeological materials.

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