NPS Form 10-900-b
(March 1992)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form

This form is used for documenting multiple property groups relating to one or several historic contexts. See instructions in *How to Complete the Multiple Property Documentation Form* (National Register Bulletin 16B). Complete each item by entering the requested information. For additional space, use continuation sheets (Form 10-900-a). Use a typewriter, word processor, or computer to complete all items.

__X__ New Submission _____ Amended Submission

A. Name of Multiple Property Listing

Prehistoric Rock Art of Puerto Rico

B. Associated Historic Contexts

(Name each associated historic context, identifying theme, geographical area, and chronological period for each.)

"Prehistoric Ceramic Period Petroglyph and Pictograph Sites of Puerto Rico"

C. Form Prepared by

name/title Michele H. Hayward, Ph.D., Michael A. Cinquino, Ph.D., Mark A. Steinback, M.A.

street & number 2390 Clinton Street telephone 716 821-1650

city or town Buffalo state NY zip code 14227

D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR Part 60 and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation.* (☐ See continuation sheet for additional comments.)

Enid Tortes-Rosa de la Rosa, MSHP — November 28, 2001
Signature and title of certifying official — Date

Puerto Rico State Historic Preservation Office
State or Federal agency and bureau

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper — Date of Action

Table of Contents for Written Narrative

Provide the following information on continuation sheets. Cite the letter and the title before each section of the narrative. Assign page numbers according to the instructions for continuation sheets in *How to Complete the Multiple Property Documentation Form* (National Register Bulletin 16B). Fill in page numbers for each section in the space below.

E. Statement of Historic Context

Introduction

The Puerto Rican prehistoric carved or painted images on rock surfaces present the researcher with a number of opportunities for investigation. Their high degree of execution and stylistic variability within the Caribbean invite interpretive exercises, cross-cultural comparative study, documentation, experimentation, and examination of relationships among cultural systems. Despite the richness and potential of the data set, systematic investigation and formal interest has remained minimal. The present effort aims to nominate to the National Register of Historic Places this unique class of cultural expression along with three examples (see accompanying forms), and by so doing to focus attention on the possibilities for their study.

A description of several island prehistoric rock art characteristics begins Section E, followed by the elaboration of one historic context in which to evaluate or place the images. The development of a series of research issues follows from this data base, as does the requirements for inclusion of future sites within the National Register (Section F). A listing of known rock art sites (Section H) for Puerto Rico and its dependencies (Section G) companioned by a comprehensive bibliography of sources (Section I) completes the Multiple Property Documentation Form.

Puerto Rican Rock Art Characteristics

Definition. Rock art can be divided into four subtypes: geoglyphs, rock sculptures, petroglyphs and pictographs (Dubelaar 1995:1). Geoglyphs represent a restructuring of the earth's surface, usually large-scale, to produce design elements. Examples include the animal-shaped earthen mounds of the Adena-Hopewell culture of North America. No such instances have been noted for Puerto Rico or the rest of the Caribbean. The island does possess rock sculptures in the form of carved zemis or three-pointed objects and free-standing statues. Our interest is restricted to the latter two subtypes found on immovable or relatively stationary rock structures (Rivera Meléndez 1996:2). Petroglyphs consist of images found on rock surfaces produced through pecking, grinding, abrading, scratching or other means (Dubelaar 1995:3; Rivera Meléndez 1996:2, 7). Pictographs consist of images painted on rock surfaces. The image makers commonly used hues of red, white, orange, and black, alone or in combination. The pigments were made from a variety of mineral, vegetable or even animal sources including carbon, kaolin, hematite, the juice of the jagua (*Genipa americana*) and bat guano (Rivera Meléndez 1996:2, 7-9). The images can be found on such rock types as granite, granitic porphyry, quartz diorite, dolomite and limestone (Frassetto 1960:384; Meighan and Trask 1994:15). Of the latter two subtypes, petroglyphs account for the majority of humanly-altered rock surfaces on the island.

Location. Fewkes (1903) organized his discussion of Puerto Rican rock inscriptions according to their physical location: along waterways, in caves or rock-lined enclosures and on stone slabs aligning ball courts or plazas. This scheme remains useful for discussing the

positioning of carved or painted figures. Roe (1991) added a fourth category of location—beach rock.

Puerto Rico possesses over 1,300 waterways ranging from large, permanent rivers to numerous small, seasonal streams. The mountainous interior serves as the source of the rivers and streams, which, after draining the interior and coastal plains, empty into the Atlantic Ocean and Caribbean Sea (Toro-Sugrañes 1982:113-119). Alongside these water courses, both large and small, petroglyphs have been found. The images are frequently carved on large boulders actually in or bordering the waterway, or near other forms of water sources such as waterfalls (Fewkes 1903:443-444). The Ceiba 3 grouping of four petroglyphs is found on a vertical surface of a large boulder within a similar cluster [redacted] The three anthropomorphic and one abstract images [redacted] (Tronolone and Cinquino 1984). The two anthropomorphic petroglyphs of Camp García 3 have also been carved into a large boulder, this time at an inclined angle, along a much less extensive water source. [redacted] (Tronolone et. al. 1984).

Puerto Rico also possesses hundreds of caves, rock shelters or rock-enclosed areas. According to José A. Martínez Oquendo (Inventory of Caves and Caverns, Department of Natural Resources, Puerto Rico), the island has some two thousand caves. Only a minor percentage have been explored and of these not all contain carved or painted figures. The number and location of figures within rock art cave sites is variable and access can be difficult. The Cueva del Indio site [redacted] consists of a number of large boulders accumulated around a deep depression. Open and enclosed spaces form an interconnecting network of cavities, crawl spaces, variously inclined rock faces, and different entrances. Some of these rock surfaces can be reached via an easy entryway at ground level. The 64 anthropomorphic faces and body figures have been carved into five rock surfaces which form the walls of the enclosure at the ground level entrance previously noted (Hayward et al. 1992: 23-24; 34). In contrast the Cueva Lucero [redacted] possesses a rather inaccessible entrance. More than 24 petroglyphs of the Cueva San Miguel, [redacted], are here carved on a large stalagmite formation within the cave. Most consist of various styles of human-like faces.

Ball courts and plazas in the Caribbean constitute level, prepared earthen surfaces. Rectangular, square or oval/ circular shapes are encountered. These courts and plazas can be unlined, partially or completely lined with a varying arrangement of stones, earthen embankments or both (Alegría 1983a; Oliver 1998:9-22, 34-39; Fewkes 1903:454-462, 1907:79-85). For Puerto Rico, Alegría (1983:115-116) lists at least 79 examples of prepared areas distributed among 72 sites. Seven of the sites have more than one, with Caguana [redacted] possessing multiple structures—ten to twelve (Alegría 1983a:66-88, 115; Oliver 1998:6-27; Mason 1941; Barnes 1993). The structures date to the Late Ceramic period beginning around A.D. 600 or Period III, with their maximum period of growth occurring from A.D. 1200-1500 or Period IV (Alegría 1983a:117; Oliver 1998:29, 34; Rouse 1992: 52, 107, 116). The ball courts and plazas are considered to have served

ceremonial and secular functions, such as the playing of a game of ball, public dances and mortuary rituals (Alegría 1983a; Oliver 1998; Rouse 1992; Fewkes 1903:455, 458-459, 461; 1907:80, 83-85).

Alegría (1983:117) reports that petroglyphs are commonly found on the stone slabs aligning ball courts or plazas, adding that stones in eighteen of the sites and in nearby rivers contain carvings. Twenty-two of the twenty-five extant and readily identifiable petroglyphs at the Caguana ball court site are found on large granite boulders aligning the western limit of Plaza A, or the central rectangular marked ground surface (Oliver 1998:9, 11, 121). Initial occupation of Caguana appears to begin around A.D. 700 with a subsequent increase in size and on-going structural modifications to the ball courts and plazas. The climax of site development is estimated to have been circa A.D. 1280, followed by a decline (Oliver 1998:22-27).

The earlier multiple court site of Tibes [redacted] As with Caguana, most of the petroglyphs are found on stone slabs [redacted] Reconstructions of the court's arrangement place up to ten rectangular or squarish courts around the central plaza. Occupation at Tibes is evident from the Early Ceramic Period (A.D. 300), to the end of Period III of the Late Ceramic Era (A.D. 1200). Caguana and Tibes are both considered to have functioned as pre-eminent political and religious ceremonial centers on the island. Tibes is the first such center which is later eclipsed by Caguana (Alegría 1983a:111; Oliver 1998:38-44).

Petroglyphs carved into rock located at the island's ocean limits comprise the least numerous location for this form of rock art. Roe (1991) has reported on a grouping executed horizontally into beach rock in front of the Maisabel site. Similarly, Alemán et al. 1986 have noted one beach petroglyph associated with the site of Ensenada at Rincón on the northwestern coast. Maisabel represents a large, Early to Late Ceramic Period (250 B.C. to A.D. 1500) settlement on the central north coast of Puerto Rico [redacted] Roe's (1991) identification of the images includes: a simple face, a fish, a sun figure, a possible basketryfish trap, another fish, and a fish/human facial composite.

Classification Schemes. Classification schemes for the study of Puerto Rican petroglyphs and pictographs are varied. Frassetto (1960) developed an early framework which recognized four design types. Type I consisted of abstract and geometric forms, such as circles, volutes and series of pits in apparent association. Type II comprised a rather inclusive category of solar designs, zoomorphic representations and various human and animal head forms. Type III represented figures originally termed 'swaddled infant,' but now referred to as 'wrapped ancestor,' 'wrapped figure,' or 'enclosed figure.' The images possess enclosed bodies (i.e., no distinct arms or legs) with prominent- eared heads and readily defined facial features (e.g., eyes, mouth, forehead). Type IV can be defined as petroglyphs executed in the Capá style from four sites: Icacos, Caonillas, Salto Arriba and Capá or Caguana.

Bullen (1973) employed a five-fold division for petroglyphs, ranging from faces to more complicated full body forms, including Frassetto's wrapped figure and Capá types. The following year, Bullen (1974) expanded his classification into seven types intending the scheme to be applicable to Caribbean petroglyphs in general. Type I consisted of abstract geometric designs

(e.g., concentric circles and diamonds, framed crosses). Type 2 represented the Colonarie or Capá style of images which lack any clear reference or meaning. Type 3 comprised simple to more complex faces without bodies. Type 4 referred to 'sun symbols' or circular heads with 'rays' or straight lines emanating from the figure. Type 5 included the wrapped figures with both a face and a largely rectangular-shaped body with internal crossing lines in some sort of pattern. Type 6 is made up of complicated full body images, found in Puerto Rico at Caguana, or what Bullen termed the Utuado-type figures. The last type accounted for stylized representations of uncertain symbolism.

Rivera Meléndez (1996:16-20) devised a scheme with six main classes and eighteen subtypes for his investigation of petroglyphs and pictographs located at various sites in the [redacted] Five types with sixteen subtypes were devoted to categorizing human faces with or without bodies and animal figures. The sixth type with two subtypes was reserved for pictographic representations. Roe (1991), for his study of the petroglyphs at Maisabel, developed a formal framework of analysis involving the definition of individual design elements prior to interpretation. Head, eye, mouth, nose, body, arm, leg and other anthropomorphic body parts were all broken down into various subtypes or modes. For example, head shape included fifteen modes ranging from circular to ovoid to polygonal, to heart-shaped to absent.

The existing classificatory frameworks for Puerto Rican rock art reflect the talents and objectives of the individual researchers. Both general and specific schemes are present and needed. The general ones serve as common points of reference and discussion; the specific frameworks serve to define each site's potentially unique stylistic elements. Our objective in this section is to present an indication of the types of petroglyphic and pictographic images which are known for the island. For this purpose we have organized the presentation around a three-fold breakdown of anthropomorphic, zoomorphic, and abstract figures. Combinations of these three classes are also evident.

Anthropomorphic designs, under this classification, constitute the most frequently occurring type of figures. The images comprise simple to complex faces with or without body elements. Simple human faces range from two circles and a dash or three circles indicating a visage to the features being partially or wholly enclosed. A complex face with can consist of a circular-shaped head, pitted eyes, an enclosed dashed mouth, a semicircular decorated crown or headpiece, and a pointed hairline, among other features.

Attached body elements to faces are varied and can be minimal to elaborate. One of the petroglyphic groupings from the Cueva del Indio site [redacted] barely outlines the upper body torso of an intricately executed crown attached to the head. Intertwined with the principal figure's headgear are a simple face and another elaborately crowned face. Both of these later facial images are without body elements. A more complete body form of two curved lines on opposing sides of a straight line, possibly indicating arms and legs, helps to complete the encircled pitted eyed, ovoid-eared and top-hatted full image. This petroglyph comes from the Piedra Escrita rock boulder group [redacted] A pictograph from the Cueva de Mora site illustrates the wrapped or enclosed body image. The figure possesses a squared- or tabular-eared face with two pitted eyes and an elongated nose and dashed mouth. The body forms a rectangle with multiple internal horizontal

and vertical lines. No arms, legs, feet or hands are evident. In contrast, one of the petroglyphs from Plaza A of the Caguana ceremonial site represents a fully-formed figure. A crowned head with encircled eyes and mouth with a pointed hairline face connects to a torso with internal design elements (e.g., a circle, triangle). Arms and legs with hands and feet are detailed; the arms and hands are upraised.

Zoomorphic representations refer to animalistic or naturalistic forms. Frequently occurring images include bats, turtles, and birds. Turtle and fish examples can be found among the Maisabel grouping of beach rock petroglyphs. Another pictograph from the Cueva de Mora series models a less common zoomorphic design—that of a *Guabá* cave spider.

Verbal indications of the types of abstract designs executed by Caribbean precolumbian peoples have already been exemplified. For Puerto Rico an instance of a carved clockwise spiral is present amid the Quebrada Maracuto river boulder petroglyphic grouping in the [redacted] The Piedra Escrita grouping [redacted] contains similarly designed spirals, as well as an almost completely enclosed or framed simple cross.

Interpretation. Efforts at interpreting Puerto Rican petroglyphs and pictographs can be broken down into three approaches. Following Dubelaar (1995:18) these approaches involve deciphering the pictorial, symbolic and social significance of the rock art images. Pictorial interpretation refers to recognizing what the figure is, as in a face, a leg or a fish. Symbolic interpretation means arriving at what message or information the image was intended to convey. The anthropomorphic faces may represent actual people or perhaps a group's or individual's ancestors; the framed cross might refer to the four cardinal directions. Social interpretation means determining the role the carved and painted images or image-making-process played within the larger cultural context or system. Places of rock art might mark particularly sacred areas, or perhaps ethnic or political boundaries. Examples of the first type of interpretation have been given above. Here we are concerned with the latter two forms of interpretation.

Interpretations specific to Puerto Rican rock art consist primarily of untested statements ranging from low-level simple assertions to well-developed frameworks which relate the rock art to other cultural subsystems. Researchers rely on five data sets, or more frequently their combination, to postulate the function and context of the rock art images. The first data set consists of ethnohistorical accounts of the island natives at the time of Spanish contact. The second set comprises data on the culturally related lowland South American Indian culture, and especially religious systems. The third and fourth sets involve the use of ideas and information drawn from the fields of anthropology and rock art. The last set is a miscellany covering those cases where inspiration or information is drawn from sources other than the ones already mentioned. Interpretive examples cover single or a few images, the same class of figures found in multiple-locations, the entire grouping of images at a single location, and island rock art in general.

To illustrate the variability and nature of interpretive efforts, two case studies are outlined. Roe (1991) begins his analysis of the Maisabel beach petroglyphs with an acknowledgment of the difficulties in ascertaining the symbolic or iconographic meaning of rock art images.

Interpretive problems include a lack of direct dating (see next section), an absence of direct ethnographic evidence (i.e., no living image makers; no ethnohistoric accounts of how or why the images were produced), variant reproductions of the same images by different researchers, lack of specified processes whereby the images are converted into reasonable explanations of them, and the uncritical use of the informational data bases that are available (Roe 1991; Meighan and Trask 1994). Roe attempts to at least partially overcome these problems by utilizing more rigorous rock art reproduction methods, developing a conversion process and specifying which types of information he will employ for explanatory parallelisms.

Generative-grammatical componential analysis is the term applied by Roe to his conversion process. The objective is to break down the images into individual design components, and then recombine the elements into motifs and design layouts which serve as the basic units of analysis. Definition of the design elements proceeds by isolating the shapes or variant forms of expression. For the Maisabel anthropomorphic figures Roe defined the dimensions of head shape, eye form, and eighteen additional body parts. The head shape range has already been referred to, while eye forms represent twenty-two varieties including the pitted and dashed eyes/pupils illustrated thus far. A componential analysis of the design elements for each dimension produces sets of modes (20 in this instance) from the most to least likely selected elements.

This type of analysis provides a statistically manipulable data base for comparative purposes and a means to define stylistic regions. The approach also provides an explicit basis or confirmation of the largely implicit assumption by researchers that rock art images are not randomly formed. Their production follows culturally prescribed rules. It is these rules for recombination, the generative grammar of rock art, that the researcher is attempting to elucidate. Roe's efforts at this exercise include the specifications for which type of material to select (i.e., calcite for cave and beach rock sites or harder granite rocks at river and ball court sites) and the standards of workmanship (i.e., sloppy, variant and careful, invariant). Patterning of the images should be more readily discernible, so that motifs and design layouts can be identified. Motifs such as a solar face or sun figure, simple face, an eared enclosed figure have already been discussed, with multiple-enclosed figure groupings comprising examples of design layouts.

Roe proceeds with his interpretation or decoding of the Maisabel petroglyphs by now being able to characterize individual as well as the entire grouping of images. An aquatic theme is clearly evident with various fish, turtle and crab representations. Anthropomorphic forms are also present from simple faces to enclosed figures. Of particular import to Roe's interpretation is his identification of three of the geometric images as woven basketry fish traps.

A review of relevant ethnohistorical and ethnographic sources yielded enough comparative data to suggest the overall significance of the images. For instance, the contact period Taíno natives are reported to have employed extensive fish weirs at various fresh water and near coastal locations. Native chiefs and later Spanish colonial authorities controlled access to these zones and equipment. Some evidence exists to suggest the use of fish weirs in Puerto Rico extends backwards into the pre-Taíno time period (A.D. 600-1200) when all but one of the petroglyphs at Maisabel are thought to have been engraved. Fish trap petroglyphs have also

been produced by various South American Indian groups where they were employed as territorial markers to claim fishing areas among competing ethnic groups. In Venezuela petroglyphs represent communication devices, conveying information about territoriality among other messages. Roe summarizes his contextual data to suggest that the petroglyphs marked the site's or its ethnic group's "ownership of valuable fishing and marine hunting resources as well as the necessary nature fact aids (local landforms). Moreover, these lithographs [petroglyphs] were designed to communicate that differential access across competitive ethnic boundaries" (Roe 1991: 334).

Roe further hypothesizes that the anthropomorphic figures functioned as supernatural validation of the ownership claim. Whether the images are considered as representing the Sun Deity or as ancestors, their presence implies a continuity with the past population's occupation of the area and use of its resources. Ancestor worship as an important component of at least the immediate precontact (A.D. 1200-1500) Caribbean religious systems is well documented. He, along with others, postulates that the figures represent dead ancestors wrapped in a hammock. The internal lined bodies substitute for the hammock netting.

Roe (Roe et al. 1997) continues and amplifies these themes of ancestor worship and enclosed figures as wrapped dead ancestors in his examination of the Cueva de Mora images (our second case study). Caves constitute the only one of the four categories of location where petroglyphs and pictographs are currently found together. Roe observes that the Cueva de Mora set of carved and painted images exhibit discrete spatial and stylistic patterning. The 27 petroglyphs are positioned low on cave walls and stalagmite/stalactite formations near both entrances to the cavern complex. The 37 pictographs are situated within the two main and one of the auxiliary chambers of the eleven total chamber system. Virtually all of the painted figures have been executed from seven to thirteen meters above the chamber floors on natural ledges and near the ceiling. While the two sets of images share common stylistic elements and pictorial themes, the pictographs are rendered with greater complexity and on a larger scale than the petroglyphs. Roe suggests that the two sets of figures performed separate functions within a common ritual context. The petroglyphs acted as outer guardians and supplicantsto the inner central pictographically rendered shaman intermediaries, ancestral spirits and animal heralds. Three-eared wrapped ancestors are figured along with a *Múcaro*-owl, their messenger, and their descendent(s), indicated by the presence of the human face at the lowest position of the subgrouping.

Roe views the images and their location as recreating, microsmically, the Late Ceramic Age native (A.D. 600-1500) and Contact Period Taíno (1500-1525) cosmology. Archaeological evidence (e.g., presence of ritual items) and ethnohistorical sources (e.g., Taíno origins; association with ancestor cult) suggest that caves served as special ceremonial centers for the shamanistic-based religion during the aforementioned periods. By analogy with extant South American native cosmology, the prehistoric peoples of Puerto Rico would have divided the world into three sections: Sky World, Earth World and a sub-aquatic Underworld. These worlds were connected by some actual earthly feature, for the Taíno, by the Cauta mountain. Caves in mountains also served as connecting and thereby communication points, at least mythically via a shaman, among these worlds. The spatial layout of the Cueva de Mora can then be considered one whereby the entrances with the guardian petroglyphs equate with a lower Earth

World; the inner, higher chambers with the ancestral/ shamanistic/animal familiar pictographs replicate an upper Earth World; the part of the cave above the images represents the Sky World, and the lower, subterranean chambers stand in for the Underworld.

A final note on interpretation. The two case studies should not be viewed as typical of efforts to decipher the iconographic meaning of Puerto Rican rock art. The two studies are among well-constructed examples which attempt to make sense out of the images beyond a mere pictorial identification. More common are lower-order or restricted-in-scope efforts which seek to interpret a few or selected images or those with less extensive use of comparative information and ethnohistoric/ethnographic data bases. An underlying premise that the images function in a religious or ritual context runs through all explanatory attempts.

Dating. The dating of Puerto Rican carved and painted images remains problematic. No direct method of dating the figures has been applied or developed (Meighan and Task 1994:15-16). The association of rock art with a nearby archaeological site and stylistic comparisons to other rock art assemblages comprise the two methods whereby the majority of island images have been dated. For instance, Roe (1991) employs both methods to date the Maisabel beach petroglyphs. Although occupation at the site begins in the Early Ceramic Period by 100 B.C. (ending A.D. 600), the petroglyphs are directly associated with the subsequent expansion of the first and second phase inhabitants of the Late Ceramic Period or A.D. 600-1200. Ceramics dating to these periods were embedded into the same beach rock that the petroglyphs were carved into. Stylistic similarities with other dated rock art assemblages also suggest an equivalent date range. One exception remains—that of a complex face from the third grouping of images at the site. Roe argues that this petroglyph was executed during the Taíno or last phase of the Late Ceramic Period (A.D. 1200-1500). Several factors suggest a later and separate engraving including the exclusive possession of goggled eyes which are also evident on the later and more complex Upper Icacos petroglyphs, and the production of the image with finer and shallower incisions than the other Maisabel petroglyphs.

These indirect methods present certain difficulties. Rock art sites with datable material, primarily ceramics for Puerto Rico, provide the most secure basis for inferring when the images were executed. Multi-component sites with rock art, as in the Maisabel example, confront the researcher with the issue of contemporaneity. The images may have been produced during one or more archaeological phases. Rock art sites without reliable datable material, not an uncommon occurrence, offer the least secure basis for establishing their use period. The occupational phases of nearby settlements are employed as proxies to the rock art sites on the assumption that the inhabitants lived in the settlements, but conducted at least some ceremonies and rituals in special non-habitational locations. Yet, how nearby should nearby be? Did more than one settlement conduct rituals at the same location? Has an associated settlement-to-ritual site been destroyed by historic or modern development? The reliability of stylistic comparisons to other datable image assemblages depends in turn on how secure the dating is for the compared grouping (see Meighan and Trask 1994:15-17 for a discussion of some of these and other dating problems).

Despite these difficulties, researchers early on considered the majority, if not all, of the rock art to have been produced during the Late Ceramic and Contact Periods (A.D. 600 to

1524). (Meighan and Trask 1994:15; Fewkes 1903: 466; Rouse 1992; Frassetto 1960:381, 387-390; Roe 1991:326; Bullen 1974:106; Rivera Meléndez 1996:78-79, 89). Little evidence suggests continued post-contact engraving or painting of images or production before the Late Ceramic Period (see Martínez Torres 1987 for Puerto Rican and Morbán Laucer 1987 for Santo Dominican examples of rock art possibly dating to these periods).

Establishing relative chronologies for Puerto Rican or Caribbean rock art has met with limited success (see Frassetto 1960; Roe and Rivera 1995:446; Meighan and Trask 1994:16-17). A more promising approach to the relative ordering of Puerto Rican rock art has been offered by Roe (Roe and Rivera 1995; Roe et al. 1999). The seriation rests on two component underpinnings—the selection of three rock art assemblages with secure dating and the componential analysis of the assemblages' images. The Maisabel petroglyphs (circa A.D. 800-1000), the petroglyphs from the El Bronce site on the south coast of the island near Ponce (circa A.D. 1100-1200), and the carved rock boulders from the Caguana site near Utuado (circa A.D. 1300-1492) comprise the selected rock art assemblages. Once the relative positioning of the groupings has been established, a componential analysis of the assemblages yields the frequencies of individual design elements or modes and the motifs which can then be seriated in a similar manner as pottery modes and styles.

Diagnostic or common characteristics of Phase A, the earliest, include the predominance of simple round faces, a vertical nose element, the presence of faces with rays normally located below the face, depictions of enclosed simple-faced bodies, and faces with feather headdresses. In Phase B round faces continue, but with additions: concentric eyeballed eyes, horizontal hourglass-shaped eyes, goggled or connected encircled central pupil eyes, rays above and below the face, a nose, and more complex crowns or headgear. The detail, elaboration and size, both of the figure and the rock it is carved into, increase in this phase. The trend towards elaboration of facial and body parts reaches its maximum development by Phase C. The anthropomorphic figures of the Caguana ball court site best exemplify these full-formed and finely-executed images. One of the petroglyphs is considered to represent the Taíno Earth Goddess Atabeyra with her crown, ear plugs, internally complex face and body depiction and attached arms, legs, hands and feet. Such elements as nostrils, lip-lines, a V-shaped hair line and a heart-shaped face are unique to this latest phase.

Ceramic Period Puerto Rican Culture History Overview. The division of Puerto Rico's prehispanic and initial contact periods follows Rouse's 1992 scheme, as modified by Oliver in 1993, by Rouse and Faber Morse in 1995, and by Faber Morse in 1995. In Rouse's scheme, styles refer to a complex of ceramic or other material cultural (i.e., lithic, shell) traits that are characteristic of one or more sites. Series are sets of closely related cultural complexes or styles shared by peoples/cultures of common origin (Rouse 1992:175, 183-184). The scheme is ordered hierarchically, so that individual assemblages or styles can be placed into increasingly general categories (e.g., subseries, series). Vescelius (1980) points out that such schemes are inherently flexible, allowing for additional specific or more encompassing categories.

The areal distributions of Rouse's styles and series do not follow the current pattern of island-specific culture areas. Rouse observed (1982:48) that the Prehispanic ceramic traditions, and by extension the cultures producing the pottery, exhibited more similarity between adjacent

islands than within a given island. Rouse attributed this to the difference in pre- and post-European communication networks. In prehispanic times, communication via the sea and coasts was more likely than over hilly, pedestrian land routes. With the arrival of the Europeans, the development of land-based communication systems (e.g., roads, bridges) was emphasized, thus favoring intra-island cultural relationships. Hence, the prehispanic local cultural areas of Rouse's charts are divided into island passage zones (top portion of the figures).

Puerto Rico's status is variable throughout the pre-Columbian past. During the Early Ceramic Period, the island shared more cultural traits with the Virgin Islands than with other island groupings. During the Late Ceramic Period, Puerto Rico experienced differentiation into two cultural traditions, while maintaining close contacts with the Virgin Islands and eventually establishing similar relationships with the remainder of the greater Antillian islands. This prehispanic areal pattern (Rouse 1986:129, 132) does not extend into the earlier preceramic Lithic age, which instead more closely resembles that of the Postconquest.

Rouse's divisions into series and styles are largely derived from a comparison of the similarities and differences among ceramic complexes. Other non-ceramic material items and cultural traits are also considered for both the ceramic and preceramic periods, with all such considerations organized into a chronological chart or model. Rouse recognizes three broad divisions: the Lithic and Archaic ages, the Ceramic age, and Initial Contact.

The first is represented by possibly the Casimiroid series (4000 B.C.-A.D. 500), but definitely by the Ortoiroid series (4000-200 B.C.) in Puerto Rico and the Virgin Islands. The Ceramic age is represented by two series—the Saladoid (200 B.C. - A.D. 600) and the Ostionoid (A.D. 600 - ca. 1500); Christopher Columbus encountered the Taíno Indians in the area at the end of the 1400s.

The terminology employed for the Ceramic Age discussion is outlined in Table 1 (see next page). When referring to the chronological period the terms *Early Ceramic* and *Late Ceramic* are used for the principal division, while those of the first, second and third phases are applied to the subdivisions.

Table 1. Prehistoric Ceramic Age terminology for the chronological periods, ceramic series/styles and cultures of Puerto Rico

Chronological Period	Ceramic Series/Style	Culture/People
Early Ceramic		
First Phase	Initial/early Cedrosan Saladoid - Hacienda Grande/La Hueca	Early Saladoid
Second Phase	Late Cedrosan Saladoid - Cuevas	Late Saladoid
Late Ceramic		
First Phase	Initial/early Elenan/Ostionan Ostionoid -Monserrate/Early Ostiones	Early Ostionoid
Second Phase	Late Elenan/Ostionan Ostionoid - Santa Elena/Late Ostiones	Late Ostionoid
Third Phase	Chican Ostionoid - Espenanza/ Capa/Boca Chica	Later/latest Ostionoid

When referring to the ceramic series and styles that largely serve to define the periods, the various stylistic names are employed, for example, early Elenan Ostionoid rim sherds. When referring to the peoples or cultures of these periods and ceramic styles, the terms *early* or *late* Saladoid and Ostionoid are used.

The Lithic Age (4000-2000 B.C.). Lithic Age complexes have so far been identified in the Caribbean with the Casimiroid Series, specifically the Casimiran Casimiroid subseries of Cuba, Haiti and the Dominican Republic (4000-2000 B.C.). The subseries or other yet-to-be-defined Lithic Age complex may extend into Puerto Rico and Jamaica. The beginning of the series dates to 4000 B.C., where it is followed in Haiti and the Dominican Republic by the Courian Casimiroid subseries and in Cuba by the Redondan Casimiroid subseries. The appearance of both succeeding subseries around 2000 B.C. also marks the passage of the cultures associated with the subseries into the Archaic Age. The series continued until European contact in western Cuba as evidenced by the non-ceramic ethnohistorical and archaeological Guanahatabey peoples, and until A.D. 500-600 in eastern Cuba, Haiti, and portions of Hispaniola. Central America may be a point of origin for the series and the people associated with it, although the northern coastal area of South America is also a candidate.

The Casimiran subseries is characterized by the presence of flaked lithic tools, primarily simple microblades, struck from large cores of flint and chert, most of which appear to have been used for woodworking. Groundstone and shell tools are absent, although it is likely that tools were also made from perishable material (Oliver 1993:22-24; Rouse 1992:20-21, 51-57, 69).

The Cerrillo site from Puerto Rico might belong to the Casimiran Casimiroid subseries (4500-2000 B.C.) of the Casimiroid series. The site is classified as a lithic quarry, containing some two acres of naturally occurring low-quality chalcedony and chert nodules, prepared cores in a variety of sizes and shapes, plano-convex thumbnail and backed scrapers, micro- and large lamellar flake blades, punches, bifacially worked choppers, and hammerstones. Manufacturing

techniques include direct percussion and anvil methods. Tools or artifacts made from other materials and ceramics are absent (Pike and Pantel 1974; Ortiz 1975). Although the flaked tools and manufacturing techniques suggest a Casimiran origin, specifically the Barrera-Mordán complex from Santo Domingo (pre-2000 B.C.), the site, as well as that of Barrera-Mordán, appears to have been exploited well into the Ceramic age. While Cerrillo's cultural and chronological positioning is unclear, a late Lithic or early Archaic age is indicated for the initial exploitation of the site (Lundberg 1980:134; Oliver 1993:24-25; Pantel 1975; Rouse 1992:54, 67-68; Veloz Maggiolo and Ortega 1976:148-150).

Information concerning other cultural traits for the Lithic age is limited. Kozlowski's excavations of rock shelters along the Seboruco and Levisa rivers in Central Cuba in the early 1970s yielded tool assemblages similar to those of the Hispaniolan and Cerrillo quarry sites. Mussel shells and bones of hutias, lizards, and snakes were recovered (as noted in Rouse 1992:54). Veloz Maggiolo and Ortega (1976:148-150) report faunal remains including shellfish (conch - *Strombus sp.,* chitons - *Chiton,* West Indian top shell - *Cittarium pica*), land mollusks, and fish being recovered from the Santo Dominican site of Mordán. By comparison with settlement and subsistence patterns of the succeeding Archaic period, one can suggest that the Lithic-age economy consisted of hunting and gathering land and marine animals (e.g., shellfish, fish, rodents), supplemented by wild fruits and plants. Settlements were likely to have been small, near the coasts, and short term or seasonally occupied by small groups. Rouse (1992:54) has also suggested that the Lithic Age peoples in the Greater Antilles were organized into small bands.

The Archaic Period (2000 B.C.-A.D. 200). The beginning of the Archaic Period in Puerto Rico and the Virgin Islands is unclear as Rouse's modified models demonstrate. Archaic Age cultures, as represented by the Ortoiroid series, become readily identifiable by 2000 to 1500 B.C. The series continues until ca. A.D. 200, marking the beginning of the Ceramic Age in these islands. The origin of the series is most likely from peoples migrating into the Antilles from Trinidad and the easternmost coast of Venezuela. Characterization of the series has been a slow process, due in part to a lack of sites and diagnostic traits. Rouse (1992:62), following the work of Lundberg (1980, 1991), incorporates a Corosan subseries containing the Coroso complex (1000 B.C.-A.D. 200) from Puerto Rico and the Krum Bay Complex (1500-200 B.C.) from the Virgin Islands (see Hackenberger 1991 for support of a South American origin of the series; Lundberg 1980:131; Oliver 1993:25; Rouse 1992:62, 69; see Veloz Maggiolo and Vega 1982 for an alternative classification of Caribbean preceramic cultures based on technological and ecological factors).

Groundstone, bone and shell artifacts, along with an absence of pottery, characterize Archaic Period assemblages. Diagnostic cultural material items of the Corosan subseries include choppers, hammerstones, shell picks and scrapers, flakes, and especially edge grinders and chipped or partially ground stone celts. Examples of the grinders, choppers, and hammerstones have been made from pebbles, while the flakes have been manufactured from igneous rock. These tools in turn would have been utilized to fashion items such as canoes or cloth from wood, fibers and additional perishable materials. Simple shell and stone beads and pendants have also been recovered (Rouse 1992:50,65-67; Rouse and Alegría 1990:26-27).

The Archaic Period cultures of Puerto Rico and the Virgin Islands, and most likely those of the remaining Caribbean islands, exhibited considerable local variation while participating in a general shared subsistence/settlement pattern. A pattern emphasizing the primary exploitation of easily available marine resources and location of settlements nearby is implied. Subsistence appears to have been based on the hunting, fishing, and gathering of such resources as shellfish (e.g., conch, oyster, mussels, clams), reef fish, birds, turtles, rodents and plant foods (e.g., roots, palm tree products). As for plant foods in particular, Veloz Maggiolo and Ortega (1976) discuss the recovery of seeds and remnants of royal palm and *corozo* (*Acrocomia quisqueyana*) fruits from the site of Tavera in Santo Domingo. Further evidence for the utilization of plant foods was recovered in the form of coral and groundstone metates, groundstone manos, and anvils from several Archaic Period sites on the island. A diet rich in shellfish obtained from shallow marine environments (e.g., beaches, river mouths, mangrove swamps) supplemented by other locally obtainable land resources is thus suggested. The period's sites consist mainly of shell middens along with the use of caves, on or near the coasts. Occupation of the sites was probably by small groups of people for short or recurrent periods (Crock et al. 1995; Drewett 1995; Lundberg 1980:132-133; Oliver 1993:28; Rouse 1992:66-67; Rouse and Alegría 1990:26-27) (see Armstrong 1980 and Haviser 1989 for a presentation of formal models of Caribbean Archaic Period settlement and subsistence patterns).

For the Corosan subseries of Puerto Rico and the Virgin Islands, a number of sites have been recorded and investigated. Rouse and Alegría (1990:26) consider the complex of sites on the island of Puerto Rico to include the María de la Cruz cave on the north coast; Coroso, the type site on the west coast; Papayos, Cayo Cofresí, and Jobos on the south coast; and the Playa Blanca site on the eastern ocean edge of the island. The Krum Bay site complex on St. Thomas constitutes the most thoroughly examined Archaic settlement for the Virgin Islands. The multicomponent Lameshur Bay site on St. John's contains a preceramic and ceramic occupation phase (2720 ± 70 B.P. to 1180 ± 100 B.P.), with the possible Archaic period Betty's Hope site on St. Croix and the Arboretum complex at Magens Bay on St. Thomas completing the list for these islands (Righter 1992; Lundberg 1980:165). Additional preceramic sites are known or under investigation (Lundberg 1980:170;1991:74), including the deep shell and lithic deposits of the Angostura site near Barceloneta on the north coast of Puerto Rico (Ayes Suárez 1990). Occupation at the site may extend from the early Lithic through to the Archaic period (Oliver 1993:25).

The María de la Cruz site is found [redacted]. The archaeological remains at this cave primarily date from the Archaic period with a minor component of Early Ceramic material. The area would have been attractive to both preceramic and ceramic age peoples with the nearby ocean, river, reefs and mangrove swamps providing a variety of birds, fish, and mollusks. Wild fruits and vegetables, along with the small game animals such as the hutia, would have been available upstream or in the surrounding forests. The recovered faunal remains reflect such a pattern of exploitation of diverse and easily gathered foodstuffs (principally aquatic). Bird, crab, fish, hutia, manatee, turtle, hard-shell clams, donax or wedge shells (Donacidae), top shells (Torchidae), conches, razor clams, and scallops, in addition to

wild avocado seeds, and fragments of yellow sapote were among the identified remains. That some of this material was burned suggests it was prepared and eaten within the cave.

The Archaic period lithic material indicates a generalized-use tool kit. Eleven pebble grinders, three pebble choppers, five hammerstones, six sharp-edged flakes, and one shell scraper complete the list of artifacts showing some degree of use. The grinders usually consisted of large, irregular, hard stones with one or more of the edges having been worn flat by rubbing. The choppers showed minimal preparation: only one irregularly broken striking surface. While all five hammerstones were employed as tools, just two were intentionally reshaped. Little preparation could also be noted for the flakes, which were probably used as cutting and scraping implements. The *Cittarium pica* shell scraper was ground on both side edges (Rouse and Alegría 1990:1-23).

The Krum Bay complex or Archaeological District of St. Thomas consists of four separate areas or Archaic-period sites: Krum Bay, Cancel Hill, Grambokola Hill, and Sara Hill. All the sites have been tested at various times and by different researchers, and all have been impacted, the last two having been destroyed (Righter 1992:19-20).

The Krum Bay site, located along the southern shoreline, consists of shell and worked and unworked stone deposits (Bullen 1973c:110). Radiocarbon dates for the site range from as early as 1680 B.C. to 225 ± 160 B.C. (Righter 1992:20). The artifact assemblage includes an abundance of flaked igneous stone; numerous pebble tools with smooth facets used as hammerstones and grinders; crude bifacially worked tools resembling celts or wedges; shell beads and disks; *Strombus columella* or conch tip tools; coral files; polished pebbles; small stone beads; quartz; quantities of red ocher; and the presence of exotic cryptocrystalline stone. Discovery of the latter material supports the hypothesis of inter-island trade and communication during the Archaic period (Lundberg 1991:73-74).

Lundberg (1991:74) has characterized the Krum Bay subsistence pattern as a "narrow-spectrum, selective" one. The majority of the shell remains consist of the Atlantic pearl oyster (*Pinctada imbricata*), quite possibly exploited both for its pearls and nutritive content. *Arca zebra* or turkey wing shells are also present, in addition to vertebrate remains comprising primarily marine fauna (reef fishes and sea turtles). Of the archaeobotanical material recovered from flotation samples, the seeds of *Sterculia* (eaten or ground for a beverage today) and those from the edible fruit of the *Manikara* tree are particularly numerous. Although the site was occupied for a thousand years, the occupation appears to have been non-permanent or recurrent. Location factors likely include the presence of a small sheltered bay close to marine resources, red ocher deposits, or pearl oyster beds.

Gross (1976:233) reports on the history of the excavations at the other two sites of the Krum Bay district. At the Grambokola Hill site, besides shell remains, the recovered artifacts from the midden include "a discoidal hammerstone, half a ground conch shell disc, a prismatic blade of dark red translucent flint . . . and a triangular hammer-grinder" (Gross 1976:233). The Cancel Hill site's artifacts consist of "a number of basalt and quartz flakes, two hammerstones and several conch-tip 'picks'. . . a discoidal hammerstone and two groundstone celt fragments.

The predominant shellfish remains from the excavated sample were those of the Turkey Wing *(Arca zebra),* West Indian Top Shell *(Cittarium pica),* pearl oysters *(Pteriidae),* and Leafy Jewel Box *Chama macerophylla* in nearly equal quantities" (Gross 1976:234). The calibrated radiocarbon dates for the two sites are 1243-788 B.C. and 1265-795 B.C. respectively (Oliver 1993:26).

Archaic-period sites are also known from the island of Vieques, between that of Puerto Rico and those of the Virgin Islands. They include Caño Hondo with a closely comparable artifact assemblage and settlement/subsistence pattern to the Krum Bay complex of sites. The radiocarbon dates indicate an occupation span from 1600 to 1550 B.C. (Figueredo 1976). A burial and "irregularly-shaped flake tools made of chalcedony, groundstone percussors and hammerstones, and shell artifacts similar in type and composition to those in [the] Krum Bay and Coroso complexes" (as noted in Oliver 1993:26), have been reported by Chanlatte Baik and Narganes Storde for the lower levels of the site at La Hueca-Sorcé. The radiocarbon dates vary considerably, but indicate an occupation as early as 2000 B.C. Verdiales 1 (12VPr2-33), known locally as "Puerto Ferro," is also on Vieques Island (Tronolone et al. 1984; Vescelius and Robinson 1980).

While researchers generally consider that the sites from Puerto Rican islands and those of the Virgin Islands present enough cultural and chronological similarities to be grouped together into the same Corosan subseries, the extent of the two component complexes remains in debate. For example, Rouse (1992:65-66) classified the Archaic period remains of Vieques with those of the Krum Bay complex. Earlier (Rouse and Alegría 1990:77-80) he had included the sites within the Coroso complex of Puerto Rico, and Lundberg (1989:171-174; 1991), proposed three complexes—Krum Bay for St. Thomas only, Coroso for Vieques and eastern Puerto Rico, and Cayo Cofresí for part of the eastern and all of western Puerto Rico—within the Corosan subseries. Lundberg (1991:76) stresses that despite any differences, the subseries is marked by strong similarities in artifact assemblages and settlement and subsistence patterns.

The Early Ceramic Period (250 B.C.-A.D. 600). The Saladoid series marks the beginning of the Early Ceramic age in Puerto Rico and the Virgin Islands and the first appearance of settled village life and cultivated foodstuffs. Preceramic groups, as discussed above, may have begun experimenting with agricultural techniques (harvesting of certain roots and plants and encouragement of others) in the Archaic period. The origin of the peoples with this new cultural tradition, who perhaps rapidly displaced the Archaic populations, was again from South America (Oliver 1993:28-29; Righter 1992:24-25; Rouse 1992:71-74, 77-79; see Chanlatte Baik 1983; and Chanlatte Baik and Narganes Storde 1983, 1986 and 1991 for an alternative classification of the Ceramic age).

The Saladoid peoples, in their migration from the South American coast up the Lesser Antillean island chain, may have arrived in the Virgin Islands, Puerto Rico, and the far eastern portion of Santo Domingo as early as 500 B.C. More secure dating places their first appearance around 250 B.C. (Rouse 1992:36, Figure 10; 79-80). The Early Ceramic period in Puerto Rico and the Virgin Islands is represented by five styles. The first phase styles (250 B.C.-A.D. 350/400) are Hacienda Grande and La Hueca for Puerto Rico, and the Prosperity

style for the Virgin Islands. The corresponding styles for the second phase period (350/400 B.C.-A.D. 600) are Cuevas for Puerto Rico and Coral Bay/Longford for the Virgin Islands (Rouse 1992).

A number of diagnostic or chronologically sensitive traits characterize these first phase styles, as well as the presence of inter- and intra-island variability within the Cedrosan Saladoid subseries. For Puerto Rico, Rouse and Alegría (1990:39-49) discuss in detail the ceramic traits from the type site of Hacienda Grande on the north coast of the island. Thin, fine, light tan-colored sherds from straight-sided and sharply angled vessels identify ceramics manufactured during this first phase. Vessel shapes exclusive to the Hacienda Grande style consist of incense burners, jars, and annular bases on bowls. Concave or outward flaring rims predominate over straight/deep and inward/restrictive types, as do squared over rounded rims. Secondary shape features commonly include pronounced carinas (changes in the vessel wall profile), D-shaped handles, flanges, partial flanges and points on rims, and pierced lugs or tabular handles. Among the distinctive decorative techniques is a usually red-colored slip applied to all or parts of the vessel; finely modeled zoo-and anthropomorphic forms on lugs; the presence of Zoned Incised Crosshatching (ZIC) ware or areas outlined with broad, deep lines and then filled in with lightly incised crosshatching normally found on rims, and finely executed white-on-red (WOR) painted designs.

In addition to the type site, Rouse and Alegría (1990:49) note the presence of Hacienda Grande style ceramics at six other sites for Puerto Rico: the El Convento site in Old San Juan, Tecla near Guayanilla on the South Coast, Sorcé on Vieques, Maisabel near Veja Baja on the north coast, Canas near Ponce on the south coast, and Monserrate on the northeast coast.

Outside Puerto Rico, this style is comparable in form, surface decoration, and technology to the Pearls style of Grenada, the Vivé style of Martinique and St. Lucia, the Morel I style of Guadeloupe, the Indian Creek I style of Antigua (Siegel 1992:1:71), and the Prosperity style of St. Croix (Faber Morse 1989:31). Faber Morse (1989:34) also notes similarities between the Prosperity style of St. Croix and that of La Hueca from Vieques (see discussion of La Hueca style below). This view is more strongly echoed by Chanlatte Baik (1981:56) and Rodríguez López and Rivera Calderon (1991:46), who consider the Prosperity site to exhibit a strong, if not dominant, Huecan material cultural presence. The authors present no specific data to support this conclusion beyond asserting that a significant relationship exists.

The Cedrosan Saladoid peoples of Puerto Rico and the Virgin Islands produced not only various kinds of vessels from clay and tempering agents, but other ceramic artifacts as well. Fragments of griddles, used for baking cassava bread made from manbc flour, are commonly recovered cultural material items from all Early Ceramic period sites, and are found in all succeeding Ceramic Age sites in the Caribbean. The griddles are large and circular, with flush or raised rims. They are relatively smooth on top, rough on the bottom, and are usually undecorated (Faber Morse 1989:32; Rouse and Alegría 1990:50). Topias, used to support the griddles, are also commonly distributed, and are cylindrical and squat in shape (Rouse and Alegría 1990:50). They are usually absent from the archaeological record by the end of the Early Ceramic period (Roe 1989:271-272, 299; Rouse 1992:84). The presence of these

artifacts is usually interpreted as evidence for a reliance on cultivated rather than gathered plants.

Other ceramic items include amulets, tubular beads, figurines, and disks. Disks are small circular pieces of fired clay, smoothed on the edges, whose function has not been clearly demonstrated; they are nonetheless frequently termed "gaming pieces" in the literature (Rouse and Alegría 1990:50, 74; Rouse 1992:83). Examination of the wear patterns of three such sherds from the Puerto Rican site of PO-21 (Garrow & Associates 1987) suggests that at least some of these ceramic disks functioned as edge abraders to burnish the surface of vessels. The site dates to the first phase of the Early Ceramic period (A.D. 650 ± 90 corrected).

Saladoid peoples throughout the Caribbean also employed stone, shell, coral, and bone to fashion a number of personal adornment objects and tools. Particularly noteworthy are the examples of finely wrought small groundstone beads, amulets, and pendants. The amulets and pendants are intricately carved and polished, with incised lines, perforations, or punctations used to emphasize the features of frogs or other exotic fauna. Raw materials consist of those locally available and a significant amount of foreign or off-island materials including jasper-chalcedony, crystal quartz, fossilized wood, and greenstones. The presence of such exotic items from distant South America suggests the existence of a Pan-Caribbean trading network in raw and manufactured items (Oliver 1993:32-33; Siegel 1992:100).

The sites of La Hueca-Sorcé on Vieques (Chanlatte Baik 1983; Chanlatte Baik and Narganes Storde 1983), Punta Candelero (Rodríguez López 1991) on the eastern coast of Puerto Rico, and a collection from the island of Monserrate (Harrington 1924) have yielded especially high frequencies of this type of micro-lapidary art. Additional examples of carved semi-precious or gem stones are reported for the sites of Hacienda Grande (Rouse and Alegría 1990:50-51), Morel in Guadeloupe (Durand and Petitjean Roget 1991), Pearls in Grenada (Cody 1991), and Prosperity on St. Croix (Faber Morse 1989:32). Oliver (1993:33) notes that a significant decline in the manufacture of micro-lapidary items by the end of the Early Ceramic period can be observed in the recovered material assemblages.

Bone and shell items made by Cedrosan Saladoid craftsmen occur regularly and are finely made (i.e., intricately carved, polished, incised), but at present appear to be less chronologically sensitive than ceramics. This contrasts with the succeeding Late Ceramic period, when such items are not as well-executed. First phase shell objects reported from Puerto Rico include needles, beads, three-pointers or deity icons, discs, amulets, spoons, gouges, celts, hoes, chisels, and figurines. The same phase and location bone items consist of: projectiles, amulets, awls, spatulas, beads, carved figures, and worked manatee ribs or even human bone (Siegel 1992:100, 106).

Groundstone artifacts continued to be made during the Ceramic age, with an increase in the variety and excellence of the product. Included are celts, adzes, beads, abraders, grinding stones, metates, and hammerstones. While the study of celts and certain other groundstone artifacts (e.g., metates, hammerstones) has yielded few temporally diagnostic attributes, the manufacture of adzes has been established as restricted to the Early Ceramic period. In plan

view, celt and adze shapes are rectangular, teardrop, or petaloid, while plano-convex (adze), bi-convex (celt), or bi-planar shapes are observed in cross section. Use-wear ranges from heavy to apparently none, suggesting that the latter category of celts/adzes served a ceremonial function (Siegel 1992:106, 111).

By comparison, the chipped stone industry of the Ceramic age is less developed. Small cores can be found, with the majority of the material consisting of largely unretouched small flakes (Siegel 1992:111). Walker's (1980) replication experiments and study of the lithic assemblage from St. Kitts demonstrates that bipolar percussion was the primary manufacturing technique. This technique is suited to the production of small flakes, which appears to have been the objective of the Ceramic Age flint knappers. Possible uses for the flakes, as Walker discusses, are suggested by archaeological and ethnographic observations: use as teeth in grater boards for the processing of bitter manioc, and as tools for the production of other wood, shell, bone, and stone tools. Use-wear analysis would be helpful in suggesting and determining the function or functions of these lithics, but few such studies have been done. Chronologically distinctive attributes have not yet been identified for chipped stone artifacts (Siegel 1992:111).

Walker's (1983) continued examination of the St. Kitt's flaked stone artifacts constitutes one example of a use-wear analysis study. His sample consisted of 1,038 flakes, with 323 or 31 percent exhibiting wear patterns suggestive of tool use. The flake tools are from the Sugar Factory Pier site dating to the Ceramic Age, or A.D. 100 to 950. Comparison of experimentally produced use-wear patterns with those of the archaeological lithic assemblage, revealed that the flake tools were employed to cut, saw, plane, drill and grate a variety of materials. Relying on Tropical Forest ethnographic analogs, Walker notes that the tools used for cutting, the most common function within the assemblage, may well have included activities relating to manioc and fish preparation. The manufacture of wood items such as canoes, bows, arrows, and grater boads were likely accomplished with the sawing and planing tools. Lithics utilized as drills accounted for only a minor percentage of the functions. Analysis indicated flakes were also used in shell carving and as grater teeth for manioc boards. Although the flakes probably employed as grater teeth did not comprise a significant portion of the assemblage, Walker reports that they can easily pass through the standard ¼-inch screen frequently employed in archaeological excavations. This may help to explain in part the low frequencies of this artifact class in the sample.

The Saladoid peoples of Puerto Rico also manufactured sharpeners, anvils, netsinkers, and abraders from coral (Siegel 1992:111, 114).

Before reviewing the characteristics of the Cuevas style ceramics, mention should be made of the artifact assemblages from the sites of La Hueca-Sorcé on Vieques, Punta Candelero near Humacao on the east coast of Puerto Rico, and Hope Estate on St. Martin. While other sites with first phase (Hacienda Grande and Prosperity) and later (Cuevas) Saladoid style ceramics consist mainly of plain wares, with a significant to less significant percentage of painted sherds and a minor percentage of the Zoned Incised Crosshatched fragments, this combination is not observed at these two Puerto Rican sites. (See Rodríguez López 1989 for a discussion of 17 sites on Puerto Rico with stratigraphically distinct ZIC sherds or associated with

Hacienda Grande/Cuevas style ceramics.) At both sites two sets of distinct semicircular mound groups are associated with two different and mutually exclusive ceramic assemblages. At the Vieques area, the southern grouping, termed La Hueca, contains only plain ware and ZIC sherds, while the northern grouping, called Sorcé, contains the expected combination of first phase Cedrosan Saladoid ceramic types (Chanlatte Baik and Narganes Storde 1983). At Punta Candelero, the mounds near the coast yielded only plain and ZIC wares, with the second, more inland mound grouping yielding Cuevas style ceramics (Rodríguez López 1991). Although the results are preliminary, at Hope Estate ZIC wares are also reported as being restricted to certain portions of the site (Haviser 1991).

The classification of these first phase Saladoid ceramic assemblages characterized by only plain and ZIC wares is unsettled. Chanlatte Baik first proposed in 1981 that the plain/ZIC ceramic components and associated high frequencies of micro-lapidary art be considered a separate series, the Huecoid. He, along with Narganes Storde (Chanlatte Baik 1983, 1991; Chanlatte Baik and Narganes Storde 1983, 1986), also proposed that the material cultural difference demonstrated that two separate but parallel and partially overlapping migrations of ceramic-producing peoples from South America occurred.

Rouse has vacillated. He (Rouse 1982:48-49) first considered that La Hueca material represented a variant of the Hacienda Grande style and not a separate series or migration of people, since at that time this combination of material cultural items had been described for only one site. With the discovery of the spatially distinct La Hueca components at the Punta Candelero site and, apparently, at Hope Estate, Rouse (1992:86-90,1989) now considers that these assemblages should be classified as a separate ceramic style (Huecan), perhaps at the level of a subseries (Huecan Saladoid), but still within the Saladoid series. Rouse (1989:386) emphasizes that although the Hacienda Grande, La Hueca, and Prosperity styles reflect different cultural adaptations by peoples on different islands (with the question of their origins still in debate), the underlying similarities in material culture and settlement/subsistence strategies unite them into a single grouping.

The varying proportions in ceramic design elements and in the production of micro-lapidary art can also be viewed as one of emphasis. For example, Peter Roe's (1989) analysis of the vessel forms and surface decoration of examples of both plain and decorated Hacienda Grande and La Hueca style ceramics led him to conclude that the differences were minimal enough that the ceramics should be grouped into the Cedrosan Saladoid subseries. They could, however, be considered two separate styles. Roe argues the differences represent the material cultural manifestation of two culturally similar but competing ethnic groups or peoples.

Carini (1991) reached a comparable conclusion to that of Roe regarding the level of differences among the Hacienda Grande, La Hueca and Prosperity style ceramics. He based his assessment on the analysis of the material composition of 93 sherds, employing five methods which included infrared spectroscopy and petrographic microscopy. The sample consisted of Hacienda Grande style ceramics from the sites of Hacienda Grande, Canas, and Maisabel of Puerto Rico and Sorcé on Vieques; La Hueca style ceramics from Punta Candelero on Puerto Rico, Sorcé on Vieques and Hope Estate on St. Martin; Prosperity style ceramics

from the sites of Salt River and Richmond on St. Croix and from the Indian Creek site on Antigua, and sherds from the sites of Cedros and Saladero in Trinidad. Carini's results indicated that all of the sherds' paste characteristics were similar enough to argue for inclusion with the Saladoid series. He did not consider that his results would or would not justify a claim to a separate Huecan subseries.

Lastly, Haviser (1991:655) reserves judgment, preferring to call them simply first phase Early Ceramic assemblages until more information is available.

The Cuevas (Puerto Rico/Eastern Santo Domingo) and Coral Bay/Longford (Virgin Islands) style ceramic assemblages have long been considered in the literature to represent a decline in the execution of design elements, manufacture (less emphasis on embellishments), and basic aesthetic appeal of the pottery compared to the preceding Hacienda Grande, Huecan and Prosperity styles. Indeed, this trend is considered to have continued into the Late Ceramic period. Curet (1995) cautions that such an assertion may not be completely correct or apply to all aspects of ceramic production. For instance, in his analysis of certain technological traits of utilitarian wares from Puerto Rican sites of the Early and Late Ceramic periods, Curet discovered that sherds from both periods were originally fired at similar temperatures. This finding thus contradicts a widely held assumption that Saladoid series pottery, because it is harder, was fired at higher temperatures than post-Saladoid series ceramics.

The manufacture of thin (less than 5 millimeters [mm]), hard and well-made ceramics continues to be found in Cuevas style ceramic assemblages, as does the presence of bowls in the shape of inverted bells. Vessel profiles, however, tend to be rounded, more graceful, and less sharply angled than those of the Hacienda Grande style. Such secondary features as carinas and internally thickened rims follow suit, with these features being less pronounced or more rounded than previously. A decrease in the proportion of decorated sherds, the elimination of ZIC wares, and the presence of less well-executed white-on-red motifs are among the design element changes observed from the first to the second phases of the Early Ceramic period (Rouse and Alegría 1990:39-49, 66-67; Rouse 1952:336-344; Siegel 1992:114). With regard to other artifacts of the second phase of the Early Ceramic period, Siegel (1992:117) noted that the trend in ceramic simplification carries over into the production of other material items, such as stone and shell beads and amulets. While still being produced, the degree of artistic refinement (e.g., engraving, incising) is less than that of the Hacienda Grande style assemblages.

Information on and analysis of Cedrosan Saladoid settlement patterns is limited. Few regional settlement surveys (Rodríguez López 1991 and Curet 1992 for Puerto Rico) or site distribution syntheses using known settlement locational data (Righter 1995 for the Virgin Islands) exist. Intersite patterns do, however, exhibit a change from the preceding Lithic and Archaic ages. Early Cedrosan sites are located on the northern and eastern (leeward) coastal plains, near river mouths and the shoreline, and at the edge of forests. Their locations most likely reflect selection factors involving proximity to available resources such as shellfish, fish, wood products, fruits, and agricultural land. On Puerto Rico, all known sites are found along the flat coastal plain and alluvial valleys. It is not until the later Cedrosan and most especially the

Late Ceramic period that sites begin to appear in the interior mountainous regions. This shift may reflect an increase in population pressure on the more favorable coastal resources, with a concomitant move to areas of less favorable or accessible resources. Nevertheless, the sites remain about the same size, and it is not until this Late Ceramic period that increases in the size and number of settlements are observed throughout Puerto Rico (Oliver 1993:33).

Siegel's (1991) analysis of the physical setting of ten Early Ceramic period settlements from St. Croix and seventeen known first phase Early Ceramic sites on Puerto Rico suggests that a more subtle or eclectic interplay exists between settlement location and subsistence strategies. Sites from both St. Croix and Puerto Rico can be found near the shoreline, coastal plain and interior, implying that groups were exploiting a variety of habitats. Puerto Rican and Virgin Islands early Saladoid settlement patterns, as well as those of other islands, are best viewed as flexible and opportunistic. Positioning settlements with respect to the best or most easily obtainable resources and other sociopolitical factors is a strategy which, given the diversity of environmental zones in the Antillian island chain, is not likely to lead to one consistent pattern. The diversity in settlement patterns, Siegel reports, is mirrored in the diversity of subsistence strategies beginning to be documented for this period. These early Saladoid flexible adaptive strategies, Siegel believes, derive from those of similar South American lowland ones.

Determining intrasite settlement patterns has received little attention within Caribbean research projects. Nonetheless, Oliver (1993:33) considers that a typical pattern for Puerto Rico and adjacent islands might be "a semicircular or horseshoe-shaped series of mounded middens facing a central open space or plaza nearly devoid of refuse and frequently functioning as a cemetery." The sites of La Hueca-Sorcé on Vieques (Chanlatte Baik and Narganes Storde 1983), Punta Candelero on the east coast of Puerto Rico (Rodríguez López 1991), and that of Maisabel on the north coast (Siegel 1992; Siegel and Bernstein 1991), as we have already discussed, exhibit this patterning, as does that of Monserrate with roughly five circular mounds (Roe at al. 1990:339). Oliver (1993:34) adds the site of Ensenada/Rincón on the west coast of Puerto Rico to the list and Salt River on St. Croix can be added as well (de Booy 1919:43).

Both Versteeg (1989, 1990, 1991a) and Siegel (1989) provide further details concerning Early Ceramic period village organization. They also draw, based on this data, inferences regarding the period's sociopolitical organization. The site of Golden Rock on St. Eustatius (Versteeg 1989) in the Lesser Antilles consists of five midden areas arranged in a horseshoe pattern. The excavation by Versteeg of one of the mound groupings revealed the presence of a midden area, three circular houses, and associated burial and ceremonial areas. Two of the houses date from the first phase of the Early Ceramic period (fifth centuryA.D.), measure 7 and 7.5 meters in diameter, and were estimated to have housed between 14 and 20 people. The third house dates from a later phase, measures 19 m in diameter, and was estimated to have housed 45 to 50 individuals. Versteeg considers that the larger structure represents a sizable communal house based on northwest South American ethnographic analogs. These changes in house structures Versteeg interpreted as indicating an increase in sociopolitical organization during the second phase of the Late Ceramic period.

At the Maisabel site, a large rectangular house, in addition to the cemetery area, was located in the center portion of the settlement surrounded by middens. Siegel also employed South American ethnographic analogs to reconstruct the size of the house and to estimate the number of individuals occupying it. His estimate is some 60 people. Siegel applied a similar method to obtain an estimate for the large circular Golden Rock site house, with a result of some 30 individuals, or somewhat less than Versteeg (1989) had thought. Although occupation at Maisabel spans the Early Ceramic through to the later Ceramic periods, the rectangular house structure dates to the Late Ceramic period. Assuming that: 1) the relative increase in house size from the second phase of the Early Ceramic to the first phase of the Late Ceramic period indicates an increase in sociopolitical organization; 2) early Saladoid peoples had clan- or lineage-based sociopolitical organization; 3) Saladoid peoples faced competition from the resident Archaic period populations when they moved into new areas, thus providing an external impetus for an increased sociopolitical organization; and that 4) the central portion, cemetery, and middens of Early Ceramic period settlements are also ceremonial centers for the worship of ancestors, a principal component of the religious systems of many lowland South American groups, Siegel argues that this period's sociopolitical organization can best be characterized as a *complex tribe* (derived from John Hoope's concept of the term).

The complex tribe is a type of organization in which sophisticated community activities are conducted, where individuals have different statuses or ranking is observed, but where no centralized authority is present. Siegel observes that for Caribbean Saladoid societies, the postulated ceremonial centers would indicate communal activities on an order above a simple tribal organization. Ranking is observed in the burials at Maisabel, where some adults and children were either accompanied by grave goods or were afforded more careful post-mortem treatment than others. Lack of centralized authority is indicated by the apparent absence of such archaeologically observable traits as a hierarchically ordered set of settlements and ball courts/ball game paraphernalia. Ball courts are normally associated with paramount chiefs and chiefdom levels of organization in the Caribbean. This form of organization developed into simple and complex chiefdoms in the area under discussion during the Late Ceramic period.

Subsistence patterns, although strongly interrelated with those of settlement, have by contrast received greater attention in the literature. They even served as an initial criterion for differentiating the Early from the Late Ceramic periods. Rainey, in his 1940 publication, referred to the Early Ceramic peoples of Puerto Rico as the Crab culture, since they relied heavily on land resources, especially the land crab. He observed a shift in resource exploitation for the later ceramic age peoples, who now relied more heavily on marine than land resources. Subsequently, this land crab-marine shell dichotomy has been noted by a number of researchers throughout the Caribbean area, with its timing and reliance on particular species varying on a subregional or island level. DeFrance (1989:57) mentions that a number of models have been advanced to understand this shift in dietary patterns: Rainey (1940) proposed a second migration of peoples; Carbone (1980), a paleoenvironmental desiccation theory; Goodwin (1980), population pressure resulting in the need for intensification and diversification; Keegan (as cited in DeFrance 1989:57), diet breadth expansion from reduced cost-benefit ratios, and Jones (as cited in DeFrance 1989:57), increasing population versus reduced food yields.

It should also be noted that most discussions of subsistence patterns have been about vertebrate and non-vertebrate faunal remains. Recovery of cultivated or wild plant foods, seeds, and fruits has not been abundant, unlike the faunal remains. Caribbean archaeologists have had to rely on the relative frequencies of such material cultural items as griddles and grinding stones for indirect indicators of cultivated or wild foodstuffs. It is assumed that from the Early Ceramic period on, peoples increasingly relied upon agricultural products (e.g., manioc, sweet potato), in addition to marine and land resources as major food sources. The proportions of these three categories in the diet remains to be demonstrated and undoubtedly varied by time period and island.

DeFrance's (1989) analysis of faunal remains from the Puerto Rican site of Maisabel illustrates these issues. Her sample consisted of some 25,000 specimens representing a minimum of 4,957 individuals. While invertebrates were more numerous, vertebrate remains accounted for the majority (77 percent) of the total estimated usable meat weight at the site. The terrestrial vertebrate remains that the first phase Saladoid peoples are assumed to have especially exploited are the hutia (*Isolobodon portoricensis)* and land crabs (*Cardisoma* sp. and *Gecarcinus* sp.).

Maisabel is located near soils suitable for agriculture, and close to a number of marine and terrestrial habitats. The results of DeFrance's analysis reveal that even during the first phase of the Early Ceramic period, people were relying on marine resources, in addition to those of the land. The recovered terrestrial remains included: the hutia, the most common mammal in the sample; dove species, along with much lower frequencies of herons, egrets and ducks; the reptiles iguana and pygmy boa, both present in low quantities; and the blue land crab (*Cardisoma guanhumi*). The latter constituted the most important species in the diet, and would have been available in large quantities from nearby mangrove swamps. The crab species were present in the Early Ceramic period samples, but not those of the Late Ceramic period.

The recovered marine species are more varied than those of the land, and therefore demonstrate a wider range of habitats was being utilized. Those habitats consisted of a freshwater river, estuary areas at the mouth of the river, shoreline, and deeper offshore waters. While all were exploited, the relative frequencies of the faunal material suggest that the coast and estuary areas were especially exploited. The majority of the remains included reef or coastal fishes such as parrot fishes, grunts, triggerfishes, and groupers. A large number of smaller fishes, including sardines and herrings, were also present in both the Early and Late Ceramic periods. Tuna and shark remains from deeper waters; sea and freshwater turtle and manatee bones; and marine mollusks (e.g., nerites, top-shells, chitons, conch shells, sea scallops, pectens) from shallow to deeper coastal zones complete the listing.

DeFrance (1989) concludes by noting that a shift from heavy to less reliance on terrestrial resources (especially land crabs) can be observed from the first phase of the Early Ceramic to the Late Ceramic period at Maisabel. This shift is also accompanied by an increasing intensification of a maritime component of the diet that was already in place during the first phase of the Early Ceramic period. Oliver (1993:37) observes a similar pattern for the Ensenada site on the west coast of Puerto Rico. While Rainey's and Carbone's models are no longer

considered valid, the other three also have problems in explaining subsistence strategy shifts on a pan-Caribbean basis, points out DeFrance, if the Maisabel and other site data is considered.

The Late Ceramic Period (A.D. 600 - 1500). The Late Ceramic period in the West Indies can be characterized by increased sociopolitical organization and economic diversity, as well as an increase in the regionalization of ceramic styles (Oliver 1993:36). From the first to the second phase of this period, seven ceramic styles are represented in Puerto Rico—Early Ostiones, Late Ostiones, Monserrate, Santa Elena, Esperanza, Capa and Boca Chica. The corresponding styles for the Virgin Islands are Magens Bay/Salt River 1, 2 and 3 (Rouse 1992; Rouse and Faber Morse 1995; Faber Morse 1995).

Rouse classified the Magens Bay/Salt River 1 and 2 styles of the Virgin Islands and the Santa Elena and Monserrate styles of eastern Puerto Rico into the Elenan Ostionoid subseries. Western Puerto Rican ceramic styles differentiate into the Ostionan Ostionoid subseries, which is grouped with other similar complexes from such areas as the Dominican Republic, Haiti and Jamaica. For the latest phase of the Ostionoid series (A.D. 1200-1500), Rouse has grouped the Boca Chica, Capa, Esperanza, and Magens Bay/Salt River 3 complexes into the Chican Ostionoid subseries, along with comparable ones from the Dominican Republic, Haiti, and eastern Cuba. According to Rouse (1992), the Ostionoid series ceramics, and by extension the other associated cultural traits, represent primarily a local developmental sequence from the preceding Saladoid series.

The Chican Ostionoid pattern developed directly out of the general Ostionoid complex of eastern Hispaniola, and then spread westward across the island with outposts established on the eastern end of Cuba, and eastward into Puerto Rico with similar outposts on St. Croix, in the Virgin Islands, and the northern Leeward Islands (Rouse 1992:107-108). The extent of this influence in the Virgin Islands, however, remains a subject for debate and further investigation (Righter 1992:27).

For the Puerto Rican Ostionoid ceramic style descriptions we rely primarily on Rouse (1952, 1982) and Rouse and Alegría (1990). The initial Elenan Ostionoid style for Puerto Rico is that of Monserrate (A.D. 600-900). Thicker, coarse and lower-fired vessels are produced, with bowls being the predominant form. Softening of the wall profiles continues, accompanied by a significant reduction in the number of secondary shape features, although modeled adorno heads in fanciful shapes and vestigial handles are present. Use of red slip and incising is rare, with red paint and black smudging employed to create simple designs (Rouse and Alegría 1990; Roe et al. 1990; Oliver 1993; Siegel 1992).

The Santa Elena style (A.D. 900-1200) also contains thick-walled vessels, with a tendency toward reddish brown-colored sherds. Simple hemispherical bowls constitute most of the shapes and flat bases on all vessels are common. Diagnostic elements include strongly convex, vertical-sided vessels and the presence of cylindrical rim coils. Modeled adorno effigies are common, as are vestigial ridges or strap handles. The effigies are also accompanied by incision and punctation used to emphasize shape, but they are not as well-executed as those of the Hacienda Grande style. The use of red paint with black smudging continues from the

Monserrate style, but is employed in decreasing frequency. The use of incising is common, with thick and deep lines usually occurring as sets of horizontal and vertical parallel lines, often in combination with vestigial handles (Rouse 1952, 1982).

While the thickness and color characteristics of the preceding Elenan Ostionoid styles carry over to the Esperanza style (A.D. 1200-1500), vessels with rounded bases and incurving shoulders now predominate. Modeled and incised adornos and appliqued features on handles and vessels can be found, with incision again the most common form of decoration. Pairs of parallel lines, either semicircular or straight and inclined alternately in opposite directions are characteristic. They frequently can be found on the incurving vessel shoulders (Rouse 1952).

Many of the same ceramic and non-ceramic artifacts reported for Puerto Rican sites that were produced in the Early Ceramic period continue to be made in the Late Ceramic. In the preceding discussion and listing of these artifacts, they were considered to be less temporally sensitive than ceramic assemblages. This situation is further compounded by the lack of reporting in the literature of stratigraphic information, thus making correlations between the two sets of material cultural items difficult (see also Lundberg et al. 1992:6).

Nonetheless, certain trends or style-specific traits have been established. For example, the production of free-standing figurines and topias is eliminated by the second phase of the Early Ceramic to the first phase of the Late Ceramic period (Rouse and Alegria 1990; Rouse 1992:83-84; Roe 1989:271-272, 299), as is the rectangular adze by the beginning of the Late Ceramic period (Oliver 1993:37). Commonly occurring material cultural items in the Late Ceramic period include petaloid celts, and zemis made from stone, shell, and clay. The Esperanza style assemblages contain larger and more elaborately carved zemis than those of the preceding Early and Late Ceramic phases. Rock art in the form of petroglyphs and pictographs carved on cave walls, large boulders along rivers or on stone slabs aligning ball courts, is also believed to have become a common art form during the Late Ceramic period. Newly introduced items consist of: large, round "stone collars" associated with the playing of the Caribbean rubber ball game; carved stone, wood, and cotton representations of deities; spatulas of wood, bone or shell, which apparently were employed to induce vomiting during purification ceremonies; wooden small tables and platters presumably for ceremonial use; and wooden stools or *duho*, indicative of high status or chiefly individuals. All but the rock art items are characteristic or limited to the later phases of the Late Ceramic period (Rouse 1992:115-123; Oliver 1993:37).

Ostionoid settlement patterns exhibit both similarities and differences with those of the preceding Early Ceramic period. While the earlier pattern of mounded middens arranged in a rough circle around an open central area—with or without a cemetery—continued into the later ceramic age, the number and type of settlements increases. In Puerto Rico, this increase is especially associated with new interior locations (Rouse 1992:94, 109; Oliver 1993:39, 45). The rate of expansion may have slowed by the third phase of the Late Ceramic to Classic Taíno periods (Oliver 1993:45). Consistent factors in site location include proximity to rivers and defensible positions such as hilltops, ridges, or terraces (Oliver 1993:39), presumably for protection from natural elements or other populations. Lesser Antillean Carib incursions into the

Virgin Islands and Puerto Rico are reported by the end of the Late Ceramic age in ethnohistorical sources (Rouse 1992).

Differentiation and the ranking of sites is also evident during the Late Ceramic period. Site types include large and small coastal and inland villages, probable individual homesteads, specialized resource exploitation sites (forests, mangroves), specialized small or local ritual areas represented by cave or riverine rock art sites, and specialized local and regional ceremonial sites as indicated by the presence of single (local) and multiple (regional) ball courts. The ball court in the Caribbean region can be defined as a wholly or partially stone-lined plaza. Villages may have had a single unmarked central plaza, as in the Early Ceramic period, a single marked plaza, or multiple marked plazas/ball courts. The ranking appears to have taken the form of smaller satellite villages, the possible individual homesteads, and the small specialized religious site being subordinate to larger village sites with marked plazas (Oliver 1993:37) (a probable individual house site type may be added to Oliver's typology; a probable local ceremonial center may also be added based on work by Garrow (1995) for the site of La Iglesia de Maragüez-PO 39, Puerto Rico).

Alegría (1983) has made a comprehensive study of the ball courts/plazas of the Caribbean and associated rubber ball game. For Puerto Rico, Alegría (1983:115-118) lists at least 79 such structures distributed among 72 sites. Seven of them have more than one plaza, with Caguana in the mountainous interior possessing eleven. Thirty-nine of the structures are rectangular in shape, and are likely to have been used for the ceremonial game, as opposed to or in addition to, other types of communal religious/social activities (e.g., dances, mortuary rituals, feasts). The ball courts/plazas date to the Late Ceramic period as a whole, with the earliest reported for Puerto Rico being around A.D. 700. The maximum period of growth, however, occurs between A.D. 1000 and 1500, or the period of the archaeological Taíno culture immediately preceding European contact (Alegría 1983a).

Information on village organization and house types for the Late Ceramic period is not abundant. Table 2 summarizes the data concerning various aspects of house types for Puerto Rico. As can be seen from the table, data on household structures are not only limited, but also contradictory. Siegel and Curet's estimates for household size vary for the Maisabel structure, in addition to Curet and Lundberg and Robinson's differing estimates for the dimensions of one of the houses at El Bronce.

Table 2. Characteristics of prehistoric house types, Puerto Rico

Source	Site	Ceramic Style	Dimensions	Shape	Household Size
Siegel 1989	Maisabel	Monserrate/ Santa Elena	52 x 14 m	oblong	60
Curet 1992	Maisabel	Primarily Monserrate	52 x 14 m	oblong	98
Garrow 1995	PO-21	Early Ostionoid	8 x 6 m	oval	—
Curet 1992	El Bronze	Santa Elena	7.6 x 4 m	oblong	6
Curet 1992	El Bronze	Esperanza	5.2 x 5 m	circular	5-6
Lundberg and Robinson 1995	El Bronze	Santa Elena / Esperanza	6 m	circular	
Rivera and Rodriguez 1991	Playa Blanca-5	Esperanza	7.14 x 6.64 m	circular	8
Garrow 1995	PO-39	Santa Elena	10 m	circular	—

Note: The household size estimates were taken from Curet 1992:170, Table 2. Curet did not include the PO-21 and PO-39 sites in his analysis.

Curet's 1992 analysis of ethnohistorical and archaeological information relating to Prehispanic household structure is one of the most comprehensive to date. His reading of the ethnohistorical sources reveals that contact period or Taíno houses in general were circular and conical in shape;made of a frame of posts, reed walls, and straw roof; and appear to have had two doors and no windows. The size of the houses varied, with those of commoners smaller than those of chiefs. The number of occupants also varied, with extended families ranging from 10 to 75 individuals per household.

Inferences as to household structure in the Caribbean have been made on the basis of post mold patterns and the locations of hearths and burials. Curet's reading of the archaeological data, in addition to the above inferences, leads him to suggest that oblong structures preceded circular ones. Specifically, the second phase Early Ceramic/first phase Late Ceramic period houses may have tended to be oblong and large, indicating a communal arrangement of related families.

Oblong, but smaller, nuclear family-sized dwellings begin to be constructed sometime between the first and second phases of the Late Ceramic period. The smaller, nuclear family-sized orientation continues into the third phase. Houses now appear to be round and conform in general to the ethnographic descriptions. The discrepancy between the ethnohistoric and archaeological size estimates, Curet notes, may be due to regional, ethnic, or status

differences. The ethno-historical sources primarily refer to chiefly and non-Puerto Rican households on Hispaniola, Cuba, and the Bahamas. Curet also argues that the changes in size and type of household in the Late Ceramic period are related to the other sociopolitical and subsistence trends of the period such as the development of complex chiefdoms, and agricultural and marine resource intensification.

Ostionoid subsistence patterns, as discussed in the previous subsection, include a shift in emphasis from primary reliance on land resources, especially land crabs, to primary reliance on marine resources. This shift has been abundantly documented for Puerto Rican, as well as Virgin Island sites, with the timing of change being variable (Lundberg et al. 1992:8). Another component of the pattern is the intensification of agricultural practices, such as planting in small mounds (equivalent to raised fields) and the possible use of simple irrigation systems (Moscoso 1986:280).

Intensification of the sociopolitical system, in especially the Greater Antilles, is another hallmark of the Late Ceramic period. We presented Siegel's (1989) model of a complex tribe for the Early Ceramic period system. While ranking and stratification appear to be absent (e.g., lack of a clear-cut settlement hierarchy, lack of artifacts/structures known to be associated with chiefly rank by the last phase of the Late Ceramic period), status differences were nonetheless indicated by burial goods and post-mortem treatment. Communal activities, such as mortuary and other religious practices, are signified archaeologically by the arrangement of mounded middens serving a ceremonial and domestic refuse function surrounding an open, central area, which often functions as a cemetery. Siegel (1991:235) next argues that this system in a Caribbean context, "provided an organizing framework for the following period of rapid centralization." The end result of the trend in political consolidation was the complex Classic Taíno chiefdoms of Puerto Rico and Hispaniola encountered by the Europeans. The chiefdoms likely consisted of a hierarchically-ordered system with primary, secondary, and possibly tertiary centers of authority.

Projecting certain aspects of the Classic Taíno religious system backward in time, Siegel (1991) sees the beginnings of this process of centralization in the manipulation of ritual and ceremony by higher-status individuals in the Early Ceramic period. During the Late Ceramic period, the increasing power of political leaders is presumed in part to be based on the continued participation in ancestor cult ceremonies, on the possession of ritual objects (e.g., large, carved zemis), on the organization of the ball game, and on the construction of the ball courts/plazas. The factors for political consolidation, Siegel considers, begin outside Saladoid/Ostionoid society with the presence of other perceived or actually hostile groups. These groups would have been Archaic age populations during the Early Ceramic period, and other local and off-island groups, such as the Caribs of the Lesser Antilles, during the Late Ceramic period. The factors continue with the Saladoid/ Ostionoid peoples' response to these threats consisting of incorporation into larger villages, and the concomitant need for increased social and political integrative mechanisms. Siegel asserts that the model remains hypothetical and needs to be tested.

The Contact Period (A.D. 1500-1524). The Chican Ostionoid cultures of period IVa are the direct ancestors of the Taíno peoples of period Ivb. Rouse (1992) divides the Taíno cultures into the Classic Taínos of Puerto Rico (including Vieques and St. Croix) and Hispaniola; the Western Taínos of Cuba, Jamaica and the Bahamas; and the Eastern Taínos of the remaining Virgin and northern Lesser Antillean islands. Rouse considers that the Taínos of Puerto Rico and Hispaniola represented the highest level of societal organization. The other two areas, although interacting with this central core, were less organized. Lundberg et al. (1992:10-11) counter that the Virgin Islands need not necessarily be considered a transitional or Sub-Taíno zone. Enough similarities in ceramic styles and settlement and subsistence systems may demonstrate the area's more complete integration into the Taíno interaction sphere, at least until the very late Island Carib intrusions from the Lesser Antilles.

The population of Puerto Rico at the time of contact has been estimated from 30,000 to 600,000, with modern scholars tending to accept lower population estimates for the island. They are also debating other aspects of Taíno culture, particularly the socio-political units into which these peoples were grouped (Anderson Córdova 1980; Sauer 1966).

The Classic Taíno sociopolitical system consisted of an elementary class structure organized into hierarchical chiefdoms (Rouse 1986:114-115). Chroniclers reported that the people were divided into two classes—nitaíno and naboria—which they considered represented nobles and commoners. The expectation by the Spanish of additional class divisions, such as slaves, was not borne out. Their settlements were permanent, with "an average of one thousand to two thousand people and ranged in size from a single building to twenty to fifty houses" (Rouse 1992:9). Occupation of the structures or houses was by extended families.

The dwellings were made of wood and thatch, and had dirt floors with no internal partitions. Houses were commonly round and conical-roofed, although rectangular structures were noted by the Colonial period. Sleeping within the houses was normally done in a hammock, or for high status individuals on wooden platforms. Among the other material cultural items found within the dwellings were baskets, presumably personal adornments and tools. Houses were irregularly arranged around a central plaza or *batey*. The chief or *cacique* would occupy the largest and best-constructed house located on the plaza (Rouse 1992:9).

Chiefdom political organization took the form of a chief presiding over the affairs of a single village, then a district chief overseeing a grouping of the individual villages. These district chiefdoms were in turn interconnected to regional ones, each of which would be presided over by the most important district chiefs. Village chiefs, who could be either male or female, were responsible for a number of functions including organizing daily activities, regulating the distribution of surplus goods, handling political relations with other villages, and serving as religious functionaries. District and regional chiefs had the power, however qualified, to appropriate food and military service (Rouse 1992:9,16).

While full-time craft specialization appears not to have been practiced, the Taíno artisans nonetheless produced a wide range of finely-made objects such as small beaten gold plates

which were used to inlay wooden objects and applied to clothing and ornaments, carved wooden stools, and stone ball court collars (Rouse 1992:9,11).

Subsistence was based primarily on agriculture. The gathering of wild fruits and vegetables and the hunting of fish, turtles, hutias, and other small game animals supplemented their source of vegetable nutrients. Horticultural practices included the clearing of presumably rotating forest plots, in addition to more intensive practices of maintaining mounded-earth fields. The fields, called *conuco*, contained mounds measuring three feet high and approximately nine feet in circumference in rows. This procedure lowered the hazard of erosion, and increased drainage thereby extending the storage period for the root crops grown in the mounds. While agriculture was mainly rainfall dependent, irrigation systems may have been in existence (reported for Hispaniola) (Rouse 1992:12).

Cassava, the primary food crop, grew well in a number of prehispanic environmental settings. Its growing season was virtually year round and could be stored in the ground for up to three years. Cassava was planted with a digging stick and made into flour for baking bread on a clay griddle. Another important cultigen was the sweet potato, supplemented by corn, squashes, beans, peppers, fruits and peanuts. Non-food cultigens included cotton andtobacco (Rouse 1992:12-13).

Zemism characterizes the Taíno religious system. Zemis represented the spirits of gods, people's ancestors and natural features such as trees and rocks. One of the two supreme gods, Yúcahu, presided over the growing of cassava and the products of the ocean, while the other, his mother Atabey, oversaw the fruits from fresh waters and human fertility. Zemis were commonly made of stone, shell and bone, with the term also applying to the actual artifact. Spiritual power was thought to reside in the zemis, with individuals owning a number of them. They were kept in special places within the houses, with chiefs even constructing separate structures or temples for their safe-keeping. People obtained zemis through inheritance, as gifts or in trade. Purification rituals were undertaken before communicating with the spirits, and food offerings were made to appease the zemis. These rituals could be performed by an individual or the entire village. Religious practitioners included the chiefs, priests and shamans (Rouse 1992:13-15).

The village plazas hosted social/religious ceremonies, including public dances, with singing and musical accompaniment; the annual homage to the chief's zemis; and rituals before and after battles. The Taíno ball game was also played in village plazas, in addition to specialized ball courts and ball court areas. A ball court, as opposed to the village plaza, was normally rectangular in shape and lined on one or more sides with earthen embankments, stone slabs or both. Spectators took their positions along the sides, with high status individuals sitting on stools. The actual game was played with male or female teams of from ten to thirty players, with the objective of keeping a rubber ball in play. This appears to have a frequent social activity, complete with betting, within and among villages. Religious and political aspects of the game are also likely. The most elaborate ball courts in Puerto Rico are found on the presumed chiefdom boundaries, indicating the game may have been played between different political units (Rouse 1992:15-16). Further, the center of the island contains the largest ball court

complex in the Caribbean, with 14 ball courts, the largest measuring 198 m by 114 m (Alegría 1983a:66-88; Mason 1941). Later examination determined that only 10 of the 14 areas were actually ball courts (Barnes 1993). A second complex is located on the south coast, the Centro Ceremonial Indígena de Tibes in Ponce (Alegría 1983a).

Trade between islands was common. Daily visits across the Mona Passage between the western Puerto Rican and eastern Hispaniolan residents are reported. Trips were undertaken in canoes, hollowed out of logs, which could hold up to 150 people. Chiefs owned the largest canoes, which were carved, painted and stored in special boathouses. Travel on land was by foot, or, in the case of Chiefs, on litters (Rouse 1992:16-17).

Research Issues

1 *Documentation Methodology.* The rock art that one sees needs to be duplicated as accurately as possible to form a reliable and comparative database. Reproduction methods include the use of color, black and white and infrared photography as well as photogrammetry; graphic artist representations; to scale drawings, verbal descriptions ad digital imaging. More than one technique is normaly needed to faithfully document the carved and painted images. Some methods are more appropriate for the particular physical characteristics of a site, or more likely to produce an exact copy than others. For instance, standard photographic methods can be employed for rock art located in caves or in the middle of rivers, but photogrametry may not be feasible due to the camera or camera's location requirements. Tracings at a scale of 1:1 may produce the most accurate renderings of rock art, but can be destructive, especially of pictographs that are ill-bonded to the rock surface (see Leondorf 2001). Examination of documentation methods forms part of the on-going study of rock art, where Puerto Rican sites can serve:

- to develop new techniques
- to refine existing methodologies
- to help eliminate non-efective or destructive procedures
- to test the relative results of competing techniques.

2 *Chronology.* Direct dating methods for Puerto Rican rock art have either not been developed, or existing ones, such as cation-ratio dating and accelerated mass spectrometry (AMS) of pictograph pigments have not been applied (see Rowe 2001 and Dorn 2001). Indirect methods involving assigning dates to the images based on close physical proximity of dateable habitational sites or other rock art sites similar in design execution can be problematical. Even direct dating results must be accepted with caution and ideally evaluated with other sources of chronological data. Any site whichwould offer the particular set of environmental or chemical properties necessary for a chronological determination would be especially significant. Accurate, datable reproduced images form the twin supports for further manipulation and interpretation. Specifically, datable island rock art locations can:

- determine the earliest to the latest island occurrences of the images
- establish local, regional and island-wide sequences
- provide a chronological framework for relating rock art to additional island patterns of settlement, socio-political organization and the religious/ideational system.
- provide a chronological framework for cross-cultural comparisons

3 *Locational Representation.* The distribution of known sites in Section H, while imperfect, nonetheless suggests that images have been carved or painted on a large number of rock faces throughout the island. Som 536 locations can be found in caves, mountain regions, ball courts, plazas, along large and small waterways and at the edge of the surrounding sea. The majority of municipios possess at least one site, with their lack in the remainder most probably due to the absence of significant archaeological studies or modern development. An underlyoing asumption of archeaeological investigation considers that the materials and their contexts which are extant represent products of human patterned

behavior. Rock art is unlikely to be an exception. The nature of that patterning in island rock art distribution is presently unclear. Examination of this issue couldinvolve:

- conducting surveys in those areas for which rock art sites have not been reported
- determining the relationship among images or design elements and locational factors. For instance, are certain figures or elements employed only in a cave setting or only along major rivers?
- recognizing images produced by individuals or groups of individuals (e.g., artistic specialists, shamans)
- identifying designs related to social or political boundary definition
- identifying images produced by hierarchically related social or political groups
- investigating the relationship between the physical location of a rock art site and celestial factors.

4 *Art.* Puerto Rican petroglyphs and pictographs might not necessarily reflect artistic expression as presently understood. Rock art may have been produced for primarily other reasons including social and political boundary definition and identification. Nonetheless, the images can be considered as another class of cultural item, like ceramics or lithics. When viewed in this context, a number of avenues of investigation are possible involving:

- establishing the physical methods of production
- identifying the types of rocks and types of surfaces selected for rock art production
- identifying the types and origins of pigments employed in executing pictographs
- developing statistical techniques to quantify and to identify patterning in the rock art attributes
- defining local, regional, and island-wide stylistic boundaries based on the rock art characteristics
- developing internal critiques of the degree of execution based on the number, variability and other characteristics of the images
- conducting cross-cultural studies

5 *Rock Art and Settlement Systems.* Rock art appears to be been produced during at least the Late Ceramic Period from A.D. 600 to 1500. Three archaeological subperiods have been defined, raising the issue of the relationship of rock art sites to the first, second and third phases of the Late Ceramic. Investigations into this issue might involve:

- determining the ratio of rock art sites to habitation sites throughtime; does one habitation site use one or more rock art sites?
- determining if certain settlement types such as villages execute their images in one or more class of rock art site
- examining if rock art sites are used continuously or discontinuously

6 *Rock Art and the Socio-Political Systems.* Researchers have recently been examining the relationship between such cultural material items as ball courts, stone collars and zemis, settlement patterns and island socio-political systems. Changes in the characteristics of these items are considered to mirror or be related to the increasing complexity of the social system and political organization. The role the production of petroglyphs and pictographs plays in this cultural milieu has received little attention. This research

question vcan be investigated by:

- linking attribute changes in settlement types, their archaeological correlates and rock art attributes
- development o fresearch strategies to test new hypotheses concerning the relationship of rock art and socio-political systems
- examining the role the individual or individuals play in the production of the rock art. Are they full-time specialists? Would they receive special treatment during life or in death?

7 *Rock Art and the Religious System.* Rock art is thought to be closely linked with the religious/ideational system. The majority of the designs represent human-like facial and body images, followed by zoomorphic and geometric/abstract designs. Interpretations of the carved and painted designs relate them to such aspects of the religious system as ancestor worship, cosmology beliefs and deity representations. The nature of these explanations remain largely low-level and untested. Avenues for further study involve:

- exploring appropriate ethnographic comparative sources
- generating interpretative frameworks based on explicitly stated methods of inference
- conducting inter-site comparative studies
- conducting cross-cultural studies
- establishing local versus supralocal religious expression
- relating changes in rock art to changes in the religious system

F. Associated Property Types/Registration Requirements

This Multiple Property Documentation Form has been prepared to further the protection, and to stimulate the investigation of, Puerto Rican rock art. The developed Historic Context, *Prehistoric Ceramic Period Petroglyphs and Pictographs of Puerto Rico*, provides a working interpretive framework for individual sites to be nominated to the National Register of Historic Places. Three petroglyph locations are being submitted for eligibility determinations with this Multiple Property form—Quebrada Maracuto, Municipio of Carolina, La Piedra Escrita, Municipio of Jayuya, and Cueva del Indio, Municipio of Las Piedras. These sites meet, and future ones should meet, the following stipulations for Register inclusion under Criteria C (high artistic value) and D (advancement of prehistoric understanding).

1 The property must contain one or more petroglyphs or pictographs. A low number of images should not necessarily exclude the site from consideration, since unique design elements or a high degree of execution may be present.

2 The site must have the potential to address one or more of the research issues developed in this multiple property form.

3 The site must possess integrity. Since the petroglyphs and pictographs have been executed on largely immovable rock surfaces, the overwhelming majority likely occupies their original location. The condition of the images is therefore likely to be the primary concern in assessing integrity, which should be determined with a site visit.

G. Geographical Data

The Commonwealth of Puerto Rico and dependencies.

H. Summary of Identification and Evaluation Methods

Introduction

This listing of Puerto Rican Rock Art sites represents reordered information from Dubelaar et al. (1999), which contains the names and locations of some 500 sites with rock art on the island. Additional sources have been employed to supplement this data base.

The enumeration of the sites takes the form of a table with six columns: the municipio division arranged alphabetically, the name of the site., site type, class of rock art, comments and National Register of Historic Places status. The name column begins with an italicized name, or formal Puerto Rico State Historic Preservation Office code, as in PR AD 09 [Puerto Rico State Code (PR), the municipio designation (AD = Adjuntas), the xth site in the municipio listing (09), or a non-name/code description. The name, code or description is followed by the barrio or submunicipio division, the sector or subbarrio division and local road location (PR 10 kilometer marking) if known. Further location particulars may also be given to distinguish one sitefrom another.

The site type refers to a four-part general geographical classification of cave/rock shelter/mountain, waterway, coastal/beach, and ball court/plaza while the class of rock art column distinguishes between sites with petroglyphs, pictographs or both forms of images. The *not verified* term is employed when it is unclear or unknown from the published sources consulted which of the forms is represented.

References to the number and form (e.g., anthropomorphic, zoomorphic) of the carved or painted designs at the sites can be found under the comment heading. The Dubelaar et al. 1999 citation is used to reference remarks from this publication regardless of the original source. The remaining citations represent information obtained posterior to, or data employed to supplement the Dubelaar et al. publication.

Four categories under the National Register Status category are provided: Listed or previously determined National Register eligible sites; Eligible or sites for which a National Register Nomination form has been completed; Initial Investigation or sites for which at least some background data has been collected and for which no National Register Nomination Form has been completed; and Investigation Required or sites for which very little or no background data has been collected and for which no National Register Nomination form has been completed.

Translations of Spanish words or phrases into English from Dubelaar et al 1999 have been provided by Dr. Michele H. Hayward.

Pages H 38 – H 69 contain restricted information and are not included in this document.

eligible	6
initial investigation	20
investigation required	505
Total	536

I. Bibliographic References

(Note: bibliographic entries conform to the *American Antiquity* Style Guide of 1992, 57(4):749-770.)

Alegría, Ricardo E.

1941 Petroglifos Indígenas. *Revista La Torre* 2(55):6. Universidad de Puerto Rico, Reciento de Río Piedras, Puerto Rico.

1967 *El Centro Ceremonial Indígena de Utuado.* Instituto de Cultura Puertorriqueña. San Juan, Puerto Rico.

1976 Las primeras noticias sobre lugares de interés arqueológico en Puerto Rico. *Revista del Instituto de Cultura Puertorriqueña* 19 (70):30-33. San Juan, Puerto Rico.

1978 *Apuntes en Torno a la Mitología de los Indios Taínos de las Antillas Menores y Sus Orígenes Suramericanos.* Centro de Estudios Avanzados de Puerto Rico y el Caribe, San Juan, Puerto Rico and Museo del Hombre Dominicano, Santo Domingo.

1981 *El Uso de la Incrustación en la Escultura de los Indios Antillanos.* Centro de Estudios Avanzados de Puerto Rico y el Caribe, San Juan Puerto Rico.

1983a *Ball Courts and Ceremonial Plazas in the West Indies.* Publications in Anthropology, vol 79. Yale University Press, New Haven, Connecticut

1993b *Indice Analítico de las Actas de los Congressos de la Asociación de Arqueología del Caribe 1963-1994.* Centro de Estudios Avanzados de Puerto Rico y el Caribe. San Juan, Puerto Rico.

Alegría, Ricardo E.; Juan González y Mela Pons Alegría

1975 Pictografías Indígenas de Puerto Rico. Manuscript on file, Sociedad Guaynía de Arqueología e Histórica, Ponce, Puerto Rico.

Aléman Crespo, Harry E.; Eduardo Questell Rodríguez y Edgar J. Maíz López

1986 *Informe de Evaluación Cultural (Fases 1A-1B), Construcción Balneario Público, Bo. Ensenada, Rincón, Puerto Rico.* Prepared for Municipio de Rincón. Antonio Hernández Virella, Ingeniero Consultor. Required by Oficina Estatal de Preservación Histórica (SHPO #09-13-85-10), San Juan, Puerto Rico.

Alvarado Zayas, Pedro

1991 *Relocalización P.R.-10 desde la Interseccion con el Desvío de Utuado hasta la P.R.-135, Utuado-Adjuntas, Puerto Rico.* Prepared for Autoridad de Carreteras. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1992 *Reemplazo Puente No. 278, Barrio Limaní, Adjuntas, Puerto Rico.* Prepared for Autoridad de Carreteras. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1999a *El Arte Rupestre en Puerto Rico Draft.* División de Arqueología, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

1999b Estudio y Documentación del Arte Ruprestre en Puerto Rico. In *Trabajos de Investigación Arqueológica en Puerto Rico: Tercer Encuentro de Investigadores,* edited by J. A. Rivera Fontán, pp. 97-102. Publicación Ocasional de la División de Arqueología, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

Bibliographic References continued

Anderson Córdova, Karen

1980 Ethnohistory and History of Puerto Rico. In *A Cultural Resources Reconnaissance of Five Projects in Puerto Rico*, Appendix B. The Environmental Compliance Section, U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama. Report on file Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico; and Mobile District, USACE.

Arana, Annie

1978 Antropólogos descubren valiosas pictografías. Un llamado para preservar legados indígenas. *El Mundo* Sección C. 10 Febrero. San Juan, Puerto Rico.

Armstrong, Douglas V.

1980 Shellfish Gatherers of St. Kitts: A Study of Archaic Subsistence and Settlement Patterns. *Proceedings of the Eighth International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 8:152-167. Arizona State University, Anthropological Research Papers No. 22.

Ayes Suárez, Carlos M.

1985 Para graduarse de cialeño, hay que subir a las Archillas. *Arqueología* 1(1)::2-7. Manatí, Puerto Rico.

1986 Contraportada: Petroglifo, Cueva de las Golondrinas, Ciales. *Arqueología* 2 (1). Manatí, Puerto Rico.

1987 La cueva de la Campana y la cueva de las Golondrinas. *Cayure* 3:17-19. Centro Cultural Carmen Rivera de Alvarado, Vega Baja, Puerto Rico.

1988a *Estudio Arqueológico Fase 1A y 1B. Proyecto AC: 220002. Barceloneta Factor (Sección III).* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988b *Estudio Arqueológico Fase 2. Garrochales 2 y 3. Barceloneta A Factor (Sección III).* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988c *Estudio Arqueológico Fase 1-A. Proyecto Pesas, Ciales.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989a Tras las huellas del Dr. Agustín Stahl Estamn: Isla de Roque. *Horizontes* January-March:12-13. Veja Alta, Puerto Rico.

1989b Dos nuevas localidades petroglíficas del Barrio Garrochales de Arecibo. *Horizontes* August-October: 12-13. Veja Alta, Puerto Rico.

1989c *Las Abejas: A Ceremonial Ball Court from the "Santa Elena" Phase of the Taino Culture. Type Phase 2 Study. Asomante, Aibonito, Puerto Rico.* Ayes: Investigaciones Arqueológicas e Históricas. Vega Baja, Puerto Rico.

1990 *Angostura: Un campamento arcaico temprano del valle de Mantauabón, Barrio Florida Afuera.* Ayes: Investigaciones Arquelógicas e Históricas. Barceloneta, Puerto Rico.

1991a *Investigaciones Arqueológicas e Históricas. Trabajo de salvamento en las localidades petroglíficas Garrochales 2 y Garrochales 3, Arecibo, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991b *Evaluación Arqueológica Fase 1-A. Parque Los Almendros, Aguadilla, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, PuertoRico.

Bibliographic References continued

1991c *Investigaciones Arqueológicas e Históricas. Nuevo Acceso entre San Lorenzo y la PR-30 cercano a Gurabo. Estudio Arqueológico, Fase 1-A.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991d *Investigaciones Arqueológicas e Históricas. Proyecto Desarrollo Solares, Finca Las Acerolas. Barrio Almirante Norte, Vega Baja.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1992 *Investigaciones Arqueológicas e Históricas. Proyecto Barceloneta Shopping Center. Barrio Florida Afuera.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1993a Los petroglifos de Maisabel. *Sebuco* 1(1):1-3. Organo Oficial de la Sociedad de Investigaciones Arqueológicas e Históricas Sebuco, Inc. Nueva epoca.

1993b La cueva de Mataplátano. *Sebuco* 1(2):1-3. Organo Oficial de la Sociedad de Investigaciones Arqueológicas e Históricas Sebuco, Inc. Nueva época.

Barnes, Mark R.

1993 Caguana Site. National Park Service, National Historic Landmark Nomination Form. Manuscript on file, National Park Service, Southeast Regional Office, Atlanta, Georgia, and Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

1999 Ball Court/Plaza Sites of Puerto Rico and the U.S. Virgin Islands. National Park Service, National Register of Historic Places, Multiple Property Documentation Form. Manuscript on file, National Park Service, Southeast Regional Office, Atlanta, Georgia, and Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

Barnés Español, Eugenio

1985 La distribución geográfica, difusión del estilo artístico, zonas sociopolíticas y el concepto mágico-religioso de los petroglifos en Puerto Rico e islas adyacentes. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 11:Abstracts:1. San Juan, Puerto Rico.

1991 *Informe de Evaluación Arqueológica. Fase 1A-1B. Proyecto: Mejoras al Sistema de Acueductos, Barrios Espino y Quebrada Arenas, San Lorenzo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Betancourt, Angel

1983 Investigación Arqueológica en la Cueva del Caballo (parte I). *Revista de la Sociedad para el Estudio de la Arqueológica* 1(1):4-5. Carolina, Puerto Rico.

Blasini, Antonio

1985 *El Aguila y el Jaguar. Autoradiografía de una civilización.* Hato Rey, Puerto Rico.

Bliss, Peggy Ann

1991 Jayuya as paradise. *The San Juan Star Sunday Magazine* 28 July:6-9. San Juan, Puerto Rico.

Bullen, Ripley P.

1973a Petroglyphs of the Virgin Islands and Puerto Rico. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 4:13-16. Castries, St. Lucia.

Bibliographic References continued

1973b Further comments on Antillean petroglyphs. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 4:65-67. Castries, St. Lucia

1973c Krum Bay, A Preceramic Workshop on St. Thomas. *Proceedings of the Fourth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* 8:110-114. St. Lucia.

1974 Certain petroglyphs of the Antilles. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 5:94-109. St. Johns, Antigua.

1978 Petroglyphs of the Antilles. In *Cultural Continuity in Mesoamerica*, edited by David L. Browman, pp. 365-385. The Hague and Paris.

Carbone, Victor A.

1980 Puerto Rico Prehistory: An Outline. In *A Cultural Resources Reconnaissance of Five Projects in Puerto Rico,* Appendix A. Environmental Compliance Section, U.S. Army Corps of Engineers, Mobile District, Alabama. Report on file, Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico; and Mobile District COE office.

Carini, Stephen P.

1991 *Compositional Analysis of West Indian Saladoid Ceramics and their Relevance to Puerto Rican History.* Ph.D. dissertation, University of Connecticut. University Microfilms, Ann Arbor.

Chanlatte Baik, Luis A.

1981 *La Hueca y Sorcé (Vieques, Puerto Rico): Primeras Migraciones*

1983 *Vieques-Puerto Rico: Asiento de una Nueva Cultura Aborigen Antillana.* Impresora Corporán, Santo Domingo.

Chanlatte Baik, Luis A. and Yvonne M. Narganes Storde

1983 *Catálogo Arqueología de Vieques: Exposición del 13 de Marzo al 22 de Abril de 1983.* Museo de Anthropología, Historia y Arte. Universidad de Puerto Rico, Río Piedras.

1986 *Proceso y Desarrollo de los Primeros Pobladores de Puerto Rico y las Antillas. Agroalfareras Antillanas-Nuevo Esquema para los Procesos Culturales de la Arqueología.* Privately Printed, Santo Domingo.

1991 Doble Estratigrafia Agro-II (Saladoide). *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 2, 13:667-681. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Coastal Resources and Wildlife Planning Division/Planning Area, Department of Natural Resources

1981 Cueva de Los Indios, Loiza. National Park Service, National Register of Historic Places Nomination Form. Manuscript on file, Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

Cody, Annie K.

1991 From the Site of Pearls, Grenada: Exotic Lithics and Radiocarbon Dates. In *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 2, 13:589-604. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Bibliographic References continued

Coll y Toste, Cayetano

1979 *Prehistória de Puerto Rico.* 5th Edition, San Juan, Puerto Rico.

1918 Las pictografías de Puerto Rico. *Boletín Histórico de Puerto Rico* 5:7-17. San Juan, Puerto Rico.

Collazo, Nelson Rafael

1983 Petroglifos indígenas. *Revista Cultural "Hequetí"* 5:2-8. San Juan, Puerto Rico.

1990 *Petroglifos Indígenas de Puerto Rico.* 5th edition. San Juan, Puerto Rico.

1993 *Enigmas y Revelaciones de los Petroglifos.* 2nd edition. San Juan, Puerto Rico.

Commonwealth of Puerto Rico [Forest Reserve Master Plan]

1950-1990 *Mona Island Forest Reserve.* Department of Natural Resources, Puerto Rico.

Consultorías Arqueológicas Nativas

1989a *Cultural Resources Survey, Stages 1A-1B. Improvements to the water supply system to Villa Taina and Minillas Arriba, Sectors of Cerro Gordo and Minillas Wards, Municipio Bayamón.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989b *Evaluación Arqueológica, Fase 1A. Mejoras al Sistema de Acueductos de la Región de Aguadilla.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Council for the Protection of Terrestrial Archeological Patrimony

1992 Inventario de Recursos Arqueológicos (Draft). Institute of Puerto Rican Culture, Council for the Protection of Terrestrial Archeological Patrimony, San Juan, Puerto Rico.

Crespo, Harry E. Alemán

1987 *Informe de Evaluación Arqueológica (Fases 1A-1B). Proyecto Club Med Punta Ballena, Guánica, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1990 *Informe de Investigación Arqueológica (Fase 1). Proyecto remodelación del Parque de Pelota, Aguas Buenas.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 *Informe de Investigación Arqueológica (Fase IA-1B). Proyecto de Desarrollo Residental.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Crock, John G., James B. Petersen, and Nick Douglas

1995 Preceramic Anguilla: A view from the Whitehea's Bluff Site. *Proceedings of the Fifteenth International Congress for Caribbean Archaeology* 15:283-292. San Juan, Puerto Rico.

Crusoe, Donald L., and Stephen A. Deutschle

1974 *Mona Island: an Archaeological Reconnaissance.* Southeast Archaeological Center, National Park Service. Tallahassee, Florida.

Cultural and Environmental Consultants

1988 *Proyecto Urb. Industrial, Alturas de Adjuntas. Compañía de Fomento Industrial, Adjuntas, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Bibliographic References continued

Curet, Luis Antonio

1992 The Development of Chiefdoms in the Greater Antilles: A Regional Study of the Maunabo, Puerto Rico. Ph.D. dissertation, Department of Anthropology, Arizona State University. University Microfilms, Ann Arbor.

1995 Technological Changes in Prehistoric Ceramics from Puerto Rico: An Exploratory Study. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis.

Daubón Vidal, Antonio

1981 *Stage 1A. Cultural Resources Survey. Wastewater Treatment Plant and Interceptor Sewer. Cayuco, Utuado.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1983 *Río Grande de Loiza Archaeological Survey.* Prepared by Sociedad Espeleo-Arqueológica de Puerto Rico. Prepared for the Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

1986a *Stage 1B. Cultural Resources Survey. Villalba-Juana Díaz Trunk Sewer.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1986b *Stage 1A-1B. Cultural Resources Survey. Diagnostic and Treatment Center, Yabucoa.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1987 *Stage 1A-1B. Cultural Resources Survey. Montaña Intercepting Sewer, Montaña Ward, Aguadilla.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988 *Fase 1A. Estudio Recursos Culturales. Vistas del Río. Barrio Hato, San Lorenzo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 *Fases 1A-1B. Estudio Recursos Culturales. Proyecto: Conector P.R. 690, Barrio Cerro Gordo, Vega Alta.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1993 *Fases 1A-1B. Estudio Recursos Culturales. Proyecto Centro Comercial Monterrey, Barrio Espinosa, Vega Alta.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Dávila Dávila, Ovidio

1972 *Los Petroglifos de la Cueva Piedra Marcada en Las Piedras, Puerto Rico.* Manuscript on file, Universidad de Puerto Rico, Departamento de Antropología. Río Piedras, Puerto Rico.

1975 *Los Pictoglifos de la Cueva de Punta Maldonado, Loíza, Puerto Rico.* Manuscript in the Centro de Estudios Puertorriqueñas, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

1976a Apuntes sobre el arte rupestre prehispánico de Puerto Rico. *Cuadernos Prehispánicos* 4:61-67. Valladolid, Spain.

1976b Morovis: el Altamira Jibaro. *El Nuevo Día* 29 Mayo. Also in *El Mapa* 1 (1):7-11. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1977a *Las Pictografías de Cueva Maldita.* Sociedad de Investigaciones Arqueológicas e Históricas "Sebuco". Veja Baja, Puerto Rico.

Bibliographic References continued

1977b Apuntes sobre el arte rupestre prehispánico de Puerto Rico. *Boletín Las Artes Populares* 3:10-13. Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

1977c El arte aborigen de Puerto Rico: petroglifos y pictografías. *Revista Caribe* 1:7-14.

1978 Donde vivían los Indios de Barceloneta? *El Mapa* 1(5). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979a Los petroglifos del Cibuco en Corozal. *Promoción Cultural* 2(6):6. Instituto de Cultura Puertoriqueña, San Juan, Puerto Rico.

1979b Excavaciones arqueológicas en Manatí. *Revista del Instituto de Cultura Puertorriqueña* 85:8-16. San Juan, Puerto Rico.

1979c Indios en Morovis antes de Cristo. Cueva de los Gemelos, Barrio Barahona. *El Mapa* 2 (7). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979d *La Cueva John Alden Mason del Barrio Angeles de Utuado.* Prabe, Asociación Puertorriqueña pro Educación Bilingue, San Juan, Puerto Rico.

1979e Yamanatuabon. Capital indígena del Norte de Puerto Rico. Una de las Plazas Ceremoniales. Barrio Tierras Nuevas, Manatí. *El Mapa* 2 (9-10). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1981a *Cuevas Los Gemelos (Las Cavachuelas). Un yacimiento precerámico de Morovis, Puerto Rico.* Unpublished Master's thesis, Centro de Estudios Avancazdos de Puerto Rico y el Caribe, San Juan, Puerto Rico

1981b *Album Histórico y Cultural de Barceloneta.* Manatí, Puerto Rico.

1985a La arqueología de las cuevas de Puerto Rico. *Revista del Instituto de Cultura Puertorriqueña* 24 (89): 24-27. San Juan, Puerto Rico.

1985b Exposición de motivos. In *Resolución del Senado de Puerto Rico 106, 21 de Marzo.* San Juan, Puerto Rico.

1988a *Importancia Arqueológica de la Cueva del Indio, Arecibo, Puerto Rico.* Manuscript on file, Department of Natural Resources, Commonwealth of Puerto Rico, Office of Scientific Research. San Juan, Puerto Rico.

1988b Valor arqueológico de la Isla de Mona. *Nuestras Cosas* 1(1). Departamento de Recursos Naturales, San Juan, Puerto Rico.

1996 Las pinturas taínas de Cueva de Espinar. *El Nuevo Día* 13 Octubre: 4-7,13. San Juan, Puerto Rico.

1998 El Desarrollo Histórico-Cultural del Poblamiento Prehispánico de la Isla de Mona. Tomo I y II. Unpublished Ph.D. dissertation, Facultad de Filosofía y Letras, Universidad de Valladolid, Valladolid, España.

de Booy, Theodoor

1919 Archaeology of the Virgin Islands. *Indian Notes and Monograms* 1(1):1-100. Museum of the American Indian, Heye Foundation, New York.

Bibliographic References continued

deFrance, Susan D.

1989 Saladoid and Ostionoid Subsistence Adaptations: Zooarchaeological Data from a Coastal Occupation on Puerto Rico. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 57-78. BAR International Series 506, British Archaeological Reports, Oxford.

De Hostos, Adolfo

1941 *Anthropological Papers, Based Principally on Studies of the Prehistoric Archaeology and Ethnology of the Greater Antilles.* Manuscript on file, Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

Departamento de Instrucción Pública

1974 Cuevas vivas y cuevas muertas. *Escuela* 24 (4):11. San Juan, Puerto Rico.

1982 Cueva en el Barrio de Piñones. *Escuela* 32 (4). Frontispicio. San Juan, Puerto Rico.

Díaz González, Marlén

1987 Informe sobre cueva 'La Catedral,' Barrio Bayaney, Municipio de Hatillo. Manuscript on file at the University of Delaware, Department of Anthropology.

1990 *Proyecto Recuperación Arqueológica. Arte Rupestre de la Cueva de la Catedral, Barrio Bayaney, Hatillo, Puerto Rico.* Unpublished Master's thesis, Centro de Estudios Avanzados de Puerto Rico y El Caribe. San Juan, Puerto Rico.

1993a Arte rupestre de la Cueva de El Lucero, Juana Díaz, Puerto Rico. Paper presented at the Primero Simposio de Arqueología Puertorriqueña, Vega Baja, Puerto Rico, 11 April 1993.

1993b El arte rupestre en Puerto Rico. *Periódico Claridad* 34, 20-26 August:19. San Juan, Puerto Rico.

Dictamen preliminar sobre varios petroglifos excavados por el Padre José María Nazario y Cancel

1981 *Boletín de la Academia Puertorriqueña de la Historia* 7 (25):163-176. San Juan, Puerto Rico.

Dorn, Ronald I.

2001 Chronometric Techniques: Engravings. In *Handbook of Rock Art Research*, edited by David S. Whitley, pp. 167-189. Altamira Press, New York.

Drewett, Peter L.

1995 Heywoods: Reconstructing a Preceramic and Later Landscape on Barbados. *Proceedings of the Fifteenth International Congress for Caribbean Archaeology* 15:273-282. San Juan, Puerto Rico.

Dubelaar, Cornelis N.

1983 A comparison between petroglyphs of the Antilles and of North Eastern South America. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 10:421-435. Fort de France, Martinique.

1986 *South American and Caribbean Petroglyphs.* Koninklijk Instituut voor Taal-, Land- en Volkenkunde, Caribbean Series 3. Leiden, The Netherlands.

Bibliographic References continued

1991 *Bibliography of South American and Antillean Petroglyphs.* Foundation for Scientific Research in the Caribbean Region. Publication 129. Amsterdam, The Netherlands. The Archaeological Museum of Aruba. Publication 5. Oranjestad, Aruba.

1994a Prehistoric rock art in Puerto Rico. *Latin American Indian Literatures Journal* 10 (1):78-82. Pennsylvania State University, McKeesport, Pennsylvania.

1994b Investigación del arte rupestre en Puerto Rico. *Boletín de la Sociedad de Investigación del Arte Rupestre de Bolivia (SIARB)* 8:17-19. La Paz, Bolivia.

1994c Prehistorische rotskunst in Puerto Rico. In *De Horen en zijn Echo.* Verzameling essays opgedragen aan Dr. Henny E. Coomans, pp:126-130. Stichting Libri Antilliani. Zoologisch Museum, Amsterdam, The Netherlands.

1995 *The Petroglyphs of the Lesser Antilles, the Virgin Islands and Trinidad.* Foundation for Scientific Research in the Caribbean Region, Amsterdam, The Netherlands.

1995 Rock Art in Puerto Rico: a Survey. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 16:399-443. Basse Terre, Guadeloupe.

Dubelaar, Cornelis N., Michele H. Hayward, and Michael A. Cinquino

1999 *Puerto Rican Rock Art: A Resource Guide.* Prepared by Panamerican Consultants, Inc. Prepared for the Puerto Rico State Historic Preservation Office. San Juan, Puerto Rico.

Dumont, D. Enrique

1876 *Investigaciones acerca de las Antigüedades de la Isla de Puerto Rico (Borinquen).* Havana, Cuba.

Durand, Jean-Francois, and Henri Petitjean Roget

1991 A propos d'un collier funeraire, Morel, Guadeloupe, les Huecoids sont-ils un mythe. *Proceedings of the Twelfth International Congress for Caribbean Archaeology* 12:53-72. International Association for Caribbean Archaeology, Martinique.

Eichholz, Duane W.

1975 A potential archaeo-astronomical horizon at Las Flores, Puerto Rico. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 6:314. Pointe-á-Pitre, Guadeloupe.

1993 Rock art from Juana Díaz, Puerto Rico. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 15:559-569. San Juan, Puerto Rico.

1997 Rock Art and Astronomy at Las Flores, Puerto Rico. Paper presented at the 17th Congress of the International Association of Caribbean Archaeology, Nassau, Bahamas.

El Mundo

1971 Isla de Mona, un tesoro arqueológico. Suplemento Dominical 25 April:8-10. San Juan, Puerto Rico.

1979 Centro Cultural Añasco adopta petroglifo como símbolo. 15 Mayo:14A. San Juan, Puerto Rico.

El Nuevo Día

1991 Ofrecen charlas sobre arqueología. 21 Marzo:123. San Juan, Puerto Rico.

Bibliographic References continued

El Parque Ceremonial
1979 *El Mapa*:2(7). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

El Reportero
1982 Arqueología. Sabado, 22 Mayo. Suplemento Comerío S-10. San Juan, Puerto Rico.

Faber Morse, Birgit
1989 Saladoid Remains and Adaptive Strategies in St. Croix, Virgin Islands. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 29-42. BAR International Series 506, British Archaeological Reports, Oxford.
1995 The Sequence of Occupations at the Salt River Site, St. Croix. *Proceedings of the Fifteenth International Congress for Caribbean Archaeology* 15:471-484. San Juan, Puerto Rico.

Fewkes, J. Walter
1902 Das vorkolumbische Portoriko I. *Globus.* Illustrirte Zeitung für Länder- und Völkerkunde 82 (18-19): 292-294. Braunschweig, Germany.
1903 Prehistoric Porto Rican pictographs. *American Anthropologist* (n.s.) 5(3):441-467. Washington, DC.
1904 *An Archaeological Trip to the West Indies.* Smithsonian Miscellaneous Collections, vol 45:132-133, Washington, D.C.
1907 *The Aborigines of Porto Rico and Neighboring Islands.* 25th Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution for 1903-1904. Washington, D.C.

Figueredo, Alfredo E.
1976 Caño Hondo, un Residuario Preceramico en la Isla de Vieques. *Proceedings of the Sixth International Congress for the Study of the Lesser Antilles* 6:247-252. University of Florida, Gainesville.

Figueroa Lugo, Jesús S.
1987 *Petroglifos de la Cordillera Central de Puerto Rico.* Ponce, Puerto Rico.
1989 *Evaluación Arqueológica, Fase 1A y 1B. Residencial Las Violetas. Barrio Cacao Baja, Patillas.* Prepared by Cultural and Environmental Consultants, Inc., Ponce, Puerto Rico. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.
1970-1990 *Estudio de los Recursos Culturales. Urb. Susua Alto, Barrio Susua, Yauco.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Frassetto, Monica Flaherty
1960 A preliminary report on petroglyphs in Puerto Rico. *American Antiquity* 25(3):381-391. Menasha, Wisconsin.

Fresko, David
1981 Review of two rock art sites in Puerto Rico. 6th Annual ARARA Symposium, Bottle Hollow, Utah, May 26-28, 1979. *American Indian Rock Art.* Annual Monograph vol 6:66-79. The American Rock Art Research Association. El Toro, California.

Bibliographic References continued

García Goyco, Osvaldo

1984 *Influencias Mayas y Aztecas en los Taínos de las Antillas Mayores. Del juego de pelota al arte y la mitología.* Ediciones Xilbalbay, San Juan, Puerto Rico.

1988a *Survey de Recursos Culturales, Fase 1A-1B. Proyecto Carolina, Puerto Rico. Sanitary and Water System for Villa Caridad, Villa Justicia and Villa Esperanza I and II.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988b *Survey de Recursos Culturales, Fase 1A, 1B. Proyecto: Improvements to the Utuado Water Supply System.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988c Survey de Recursos Culturales Fase 1A, 1B. Proyecto: Escuela Superior Urbana, Vega Baja. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Garrow & Associates, Inc.

1987 Data Recovery Excavations at Site PO-21, Cerrillos River Valley, Puerto Rico. Garrow & Associates, Inc., Atlanta. Prepared for Jacksonville District Corps of Engineers.

Garrow, Patrick H.

1995 La Iglesia de Maragüez: A Local Prehistoric Ceremonial Center in the Cerrillos River Valley, Ponce, Puerto Rico. Paper presented at the 60th Annual Meeting for American Archaeology, Minneapolis.

Garrow, P., C. McNutt, Jr., G. Weaver, and J. Oliver

1995 *Iglesia de Maraguez (PO-39): Investigation of a Local Ceremonial Center in the Cerrillos River Valley, Ponce, Puerto Rico.* Prepared by Garrow and Associates, Inc., Atlanta, Georgia. On file at the Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

Gómez Acevedo, Labor, and Manuel Ballesteros Gaibros

1978 *Culturas Indígenas de Puerto Rico.* Editorial Cultural, Río Piedras, Puerto Rico.

1980 *Vida y Cultura Precolombinas de Puerto Rico.* Editorial Cultural, Río Piedras, Puerto Rico.

González Colón, Juan

1978 Centro Ceremonial Indígena - Barrio Tibes - Ponce, Puerto Rico. National Park Service, National Register of Historic Places Nomination form. Manuscript on file, Puerto Rican State Historic Preservation Office, San Juan, Puerto Rico.

1984 *Tibes. Un Centro Ceremonial Indígena.* Unpublished Master's thesis, Centro de Estudios Avanzados de Puerto Rico y El Caribe. San Juan, Puerto Rico.

1987 Pictografías indígenas en Puerto Rico. *VIII Simposio Internacional de Arte Rupestre Americano, Santo Domingo* 8:133-145. Museo del Hombre Dominicano, Dominican Republic.

1991a *Evaluación Arqueológica (Fases 1A-1B). Proyecto Escuela Intermedia de Barahona. Morovis, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991b *Evaluación Arqueológica, Fase 1A. Zona Industrial. Compañía de Fomento Industrial. Barceloneta, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Bibliographic References continued

1991c *Evaluación Arqueológica (Fases 1A-1B). Zona industrial. Barceloneta, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1970-1990 *Las Pictografías Indígenas de la Cueva de los Roche.* Sociedad Guaynía de Arqueología e História Inc. Ponce, Puerto Rico.

González Colón, Juan, and Hector Moya

1991 *Evaluación Arqueológica (Fases 1A-1B). Urbanización Industrial. Municipio de Aibonito.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1992 *Evaluación Arqueológica (Fases 1A-1B). Las Margaritas Apartments. Aibonito, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Goodwin, R. Christopher

1980 Demographic Change and the Crab-Shell Dichotomy. *Proceedings of the Eighth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* 8:45-68. Tempe, Arizona.

Gross, Jeffrey M.

1976 The Archaic Period of the Virgin Islands: New Investigations. *Proceedings of the Sixth International Congress for the Study of the Lesser Antilles* 6:232-238. University of Florida, Gainesville.

Gurnee, Russell, and Jeanne Gurnee

1974 *Discovery at the Río Camuy.* New York, New York.

1987 Río Camuy Cave Park, Puerto Rico, open to the public. *NSS News* May: 1-11. National Speleological Society, Closter, New Jersey.

Hackenberger, Steven

1991 Archaeological Test Excavation of Buccament Valley Rockshelter, St. Vincent: Pre-ceramic Stone Tools in the Windward Islands, and the Early Peopling of the Eastern Caribbean. *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 1, 13:86-91. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Haeberlin, H.K.

1917 Some archaeological work in Porto Rico. *American Anthropologist* (n.s.) 19:214-238.

Harrington, Mark R.

1924 A West Indian Gen Center. *Museum of the American Indian Heye Foundation Indian Notes* 1(4):184-189.

Haviser, Jay B.

1989 A Comparison of Amerindian Insular Adaptive Strategies on Curaçao. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 3-28. BAR International Series 506, British Archaeological Reports, Oxford.

1991 Preliminary Results from Test Excavations at the Hope Estate Site (SM-026), St. Martin. *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 2, 13:647-666. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Bibliographic References continued

Hayward, Michele H.

1991 *Propuesta para nominar una serie de yacimientos de arte rupestre al registro nacional de lugares históricos.* Manuscript on file, the Centro de Investigaciones Arqueológicas, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

Hayward, Michele H., Marisol J. Meléndez Maíz, and Marlene Ramos Vélez

1992a *Informe Preliminar. 1 Documentación de Tres Sitios de Arte Rupestre: Piedra Escrita, Jayuyua; Cueva del Indio, Las Piedras; Quebrada Maracuta, Carolina.* Centro de Investigaciones Arqueológicas, Instituto de Cultura Puertorriqueña. San Juan, Puerto Rico.

1992b Poster presentation of the results of the Proyecto Arte Ruprestre Pre-Colombino (Precolumbian Rock Art Project). Presented at the 57th Annual Meeting of the Society for American Archaeology, Pittsburgh.

1992c Resultos preliminares de proyecto de arte rupestre. Municipios de Jayuya, Las Piedras y Carolina. Paper presented at the X□ Simposio Internacional, Asociación de Literaturas Indígenas Latinoamericanas (LAILA/AILA). San Juan, Puerto Rico.

1992d *Informe Final. Documentación del Sitio LM-4 de Arte Rupestre: Río Guacio, Las Marias.* Centro de Investigaciones Arqueológicas, Instituto de Cultura Puertorriqueña. San Juan, Puerto Rico.

Hayward, Michele H., and Michael A. Cinquino

1999 *Proposal to Prepare a Multiple Nomination with Three Individual Rock Art Sites in Puerto Rico to the National Register of Historic Places.* Prepared by Panamerican Consultants, Inc., Buffalo, New York. Prepared for the Puerto Rican State Historic Presentation Office, San Juan, Puerto Rico.

2000 Puerto Rican Rock Art Sites: Their Characteristics and Their Research Potential. Paper presented at the 57th Annual Meeting of the Southeast Archaeological Conference, Macon, Georgia.

2001a Three Puerto Rican Rock Art Sites. *Eastern States Rock Art Research Association Newsletter (ESRARA)* 5(4):1,3.

2001b Puerto Rican Rock Art: Towards a Comprehensive Interpretive Framework. Paper presented at the 66th Annual Meeting of the Society for American Archaeology, New Orleans.

Informe preliminar de unos petroglifos excavados en Guayanilla, Puerto Rico, por el Padre José María Nazario y Cancel en 1880.

1980 *Boletín de la Academia Puertorriqueña de la História* 6(24):259-276. San Juan, Puerto Rico.

Isla de Caja de Muertos

1986 *Boletín Informativo del Departamento de Recursos Naturales*, June. Puerto de Tierra, Puerto Rico.

King, Byron W.

1977 Report from Puerto Rico. *La Pintura* 4(2). American Rock Art Research Association Newsletter. Whittier, California.

Bibliographic References continued

Krug, L.
1876 Indianische Alterthümer in Porto Rico. *Zeitschrift für Ethnologie* 8:428-435. Berlin, Germany.

La Montaña
1982 Denuncian saqueo arqueológico. 1(4):13-26. Utuado, Puerto Rico.

Lee, Georgia
1991 *Rock Art and Cultural Resource Management.* Wormwood Press. Calabasas, California.

Loendorf, Larry
2001 Rock Art Recording. In *Handbook of Rock Art Research*, edited by David S. Whitley, pp. 55-79. Altamira Press, New York.

Los petroglifos de Guayanilla excavados por el presbítero José María Nazario de Figueroa y Cancel
1981 *Boletín de la Academia Puertorriqueña* 7(26):11-27. San Juan, Puerto Rico.

Lothrop, Samuel Kirkland
1934 Archaeological Sites in Puerto Rico. Manuscript on file, Department of Anthropology, The American Museum of Natural History. New York.

Lovén, Sven
1935 *Origins of the Tainan Culture, West Indies.* Göteborg, Sweden.

Lundberg, Emily R.
1980 Old and New Problems in the Study of Antillean Aceramic Traditions. *Proceedings of the Eighth International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 8:131-138. Arizona State University, Anthropological Research Papers No. 22.
1989 *Preceramic Procurement Patterns at Krum Bay, Virgin Islands.* Ph.D. dissertation, University of Illinois at Urbana-Champaign. University Microfilms, Ann Arbor.
1991 Interrelationships among Preceramic Complexes of Puerto Rico and the Virgin Islands. *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 1, 13:73-85. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Lundberg, Emily R., Elizabeth C. Righter, and Margaret D. Cesar
1992 The Late Ceramic Age in the Northern Virgin Islands. Paper presented at the 57th Annual Meeting for American Archaeology, Pittsburgh.

Lundberg, Emily R. and Linda Sickler Robinson
1995 Settlement Investigations at El Bronce, A Pre-Columbian Village in the Cerrillos Drainage, Puerto Rico. Paper presented at the 60th Annual Meeting of the Society for American Archaeology, Minneapolis.

Maldonado, Angel
1982a Destruyen la Piedra del Indio. *La Montaña* 1(4):3. Utuado, Puerto Rico.
1982b Devuelven tesoro arqueológico a Caguana. *La Montaña* 1(16):3. Utuado, Puerto Rico.

Mallery, Garrick
1972 *Picture-Writing of the American Indians.* Vol1:136-137: Puerto Rico. Dover Publications, New York, New York.

Bibliographic References continued

Martín, Jorge

1984 Arqueología enigmática. Descifran el códice Taíno. *Enigma* 1(1):8-12. Río Piedras, Puerto Rico.

Martínez, Héctor Luis

1989 Descubren yacimiento indígena. *Todo*:18(843). Newspaper of the town and municipality of Bayamón. Bayamón, Puerto Rico.

Martínez de Hernandez, Tomasita

1985 *Culturas Precolombinas de Puerto Rico: Los Igneri, los Taínos, los Caribes.* Bibliografía Selectiva. Universidad de Puerto Rico, Recinto Universitario de Mayaguez, Mayaguez, Puerto Rico.

Martínez Torres, Roberto

1974 Morovis histórico. Barahona: los ojos de la piedra. *Revista Cultural Yucayeke* 1(3). Barahona, Morovis, Puerto Rico.

1978a Las pictografias de la Cueva de las Palomas. *El Mapa*:1(3). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1978b Arte rupestre en Ciales. *El Mapa*.1(4):7-9. Boletin de la Agrupación Paleontológica y Arqueológica Moroveña. Barrahona, Morovis, Puerto Rico.

1978c Visitaron los extraterrestres a nuestros Indios? *El Mapa* 1(5). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979a Las pinturas de la Cueva Maldita. *El Mapa*. 2(6):11-13. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979b La Cueva del Indio de Barahona. *El Mapa* 2(9-10):10-12. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979c Arte rupestre en Florida (reportaje fotográfico). *El Mapa* 2 (11-12):4-7. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979d Visitaron los extraterrestres a nuestros Indios? (Conclusion). *El Mapa* 2(6):9-10. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979e Indios en Morovis antes de Cristo. *El Mapa* 2(7):2-5. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1980 Arte rupestre en Vega Alta (reportaje fotográfico). *El Mapa* 3(13-15):3-6. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1981a *Pinturas indígenas de Borinquen.* Ediciones El Mapa, Morovis, Puerto Rico.

1981b Florida indígena. *El Junco* 1(1):4-5. Revista del Centro Cultural Yanes. Florida, Puerto Rico.

1982a Artistas indígenas de Pajonal. *El Junco* 2(3):10-11. Revista del Centro Cultural Yanes. Florida, Puerto Rico.

1982b Escrito en piedra: huellas indígenas en Corozal. *Periódico Claridad* Año 23, 13-19 August:9. San Juan, Puerto Rico.

1983 Huellas indígenas en Manatí. *Revista Manatuabon* 3(1):6-7. Boletín del Centro Cultural de Manatí. San Juan, Puerto Rico.

Bibliographic References continued

1987 La pintura rupestre en Puerto Rico. *VIII Simposio Internacional de Arte Rupestre Americano, Santo Domingo* 8:117-131. Museo del Hombre Dominicano, Santo Domingo, Dominican Republic.

1988 La pared escrita de Unibón. *Archivo Histórico de Morovis* 2(6):180-191. Sociedad de Investigaciones Arqueológicas e Históricas de Morovis. Barahona, Morovis, Puerto Rico.

1989 Huellas profundas. *Revista Alomar* Año 9, July-September. Asociación de Maestros Retirados de Vega Baja.

1992 El enigma de los rostros barbados en el arte rupestre indígena de Puerto Rico. *Contornos Caribeños* 1(1):38-41. Centro de Estudios Avanzados de Puerto Rico y el Caribe. San Juan, Puerto Rico.

1994a *El Yacimiento Arcaico de La Tembladera en Morovis, Puerto Rico*. Unpublished Master's thesis, Centro de Estudios Avanzados de Puerto Rico y El Caribe, San Juan, Puerto Rico.

1994b Nuestros primeros artistas. *Revista Catey* 1(1):3-6. Morovis, Puerto Rico.

1994c Expediciones de 1976. *Revista Catey* 1(1):7-10. Morovis, Puerto Rico.

1994d El mural de los Caballitos. *Revista Catey* 1(1):11-14. Morovis, Puerto Rico.

1994e Las primeras huellas humanas. *Revista Catey* 1(1): 15-16. Morovis, Puerto Rico.

1994f Pinturas de osos en Morovis? *Revista Catey* 1(1): 16-19. Morovis, Puerto Rico.

1994g Nuestra hipótesis. *Revista Catey* 1(1):19-21. Morovis, Puerto Rico.

1994h El Parque de las Cavernas de Cabachuelas. *Revista Catey* 1(1):22-23. Morovis, Puerto Rico.

Mason, J. Alden

1915 Excavation of a new archaeological site in Porto Rico. *19th International Congress of Americanists* 19:220-223. Washington, D.C.

1939 Painted cave petroglyphs in Porto Rico. *27th International Congress of Americanists, Lima, Peru.*

1941 A large Archaeological Site at Capá, Utuado, with Notes on other Porto Rico Sites visited in 1914-1915. In *Scientific Survey of Porto Rico and the Virgin Islands* 18 (2):150-304. The New York Academy of Sciences, New York, New York.

Meighan, Clement, and Lance K. Trask

1994 Rock art at Roosevelt Roads, Puerto Rico. Manuscript on file at the Cultural Resources Office, U.S. Naval Station, Roosevelt Roads, Ceiba, Puerto Rico.

Meléndez, Hector Rivera

1979 Expedición arqueológica exploratoria. *Revista Orocoveña* 2 (7):12-15.

Meléndez Maíz, Marisol J., and Marlene Ramos Vélez

1990 *Evaluación Arqueológica Fase 1A-1B. Finca Alto de Breña, Sector Cerro Gordo, Barrio Sabana, Vega Alta.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Melgarejo, Juan de

1969 Memoria y descripción de la Isla de Puerto Rico mandata a hacer por S.M. el Rey Don Felipe II en el año 1582. In *Crónicas de Puerto Rico: Desde la Conquista hasta nuestras dias* (1493-1955). Editorial Universidad de Puerto Rico.

Bibliographic References continued

Méndez Bonilla, Juan F.

1987 *Evaluación Arqueológica. Anteproyecto de Construcción para Tres Estructuras ...* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989 *Informe de la Evaluación de Recursos Culturales, Fases 1A y 1B. Proyecto Mansiones de Lago Alto, Trujillo Alto.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1990a *Evaluación Recursos Culturales. Fase IA-1B. Proyecto:Valles de Carolina. Barrio Cacao, Carolina.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1990b *Informe de Evaluación de Recursos Culturales, Fases 1A-1B. Proyecto de Construcción Carretera Desvío Este de Ciales ... desde la Carretera PR-145 ... Ciales.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991a *Informe de Recursos Culturales, Fases 1A-1B. Proyecto: Escuela Libre de Música, Arecibo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991b *Informe de Evaluación de Recursos Culturales, Fase IA del proyecto Bella Vista en el Municipio de Aibonito, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Molina Feal, Daniel, and Liza Colón

1988 *Informe de la Evaluación de Recursos Culturales, Fases 1A y 1B. Escuela Isidro Vicens, Barrio Quebrada Honda, San Lorenzo.* Prepared by Archaeology & Museums, San Juan. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Morales Colón, Edwin

1979a Arte rupestre en Corozal. *El Mapa* 2(6):6-9. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

1979b Unibón: un altar indígena? *El Mapa* 2(7). Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

Morbán Laucer, Fernando

1986 El arte rupestre en las Antillas. *Anuario* 10:77-105. Academia de Ciencias de la República Dominicana, Santo Domingo, Dominican Republic.

1987 El arte rupestre de la Sierra del Bahoruco Republica Dominicana. *VIII International Symposium of American Rock Art*, pp. 95-104. Museo del Hombre Dominicano. Santo Domingo, Dominican Republic.

Moscoso, Francisco

1986 *Tribu y Clases en el Caribe Antiquo.* Universidad Central del Este, San Pedro de Macorís, Dominican Republic.

Muñoz, José

1989a *Informe de Investigación de Recursos Culturales (Fase 1A-1B). Proyecto: Centro Vacacional de Añasco.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989b *Informe de Investigación de Recursos Culturales (Fase 1A-1B). Proyecto: Construcción Urb Alturas de Librada.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Bibliographic References continued

1989c *Informe de Investigación de Recursos Culturales (Fase 1A-1B). Proyecto: Construcción e Desvío Norte del PR 111, San Sebastian.* On file Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Murphy-Larronde, Suzanne

1994 (title unknown). *El Nuevo Día* 2 January. San Juan, Puerto Rico.

Nuestra portada. Indios Mayas en Barceloneta

1980 *El Mapa* 3 (13-15):1. Boletín de la Agrupación Paleontológica y Arqueológica Moroveña. Barahona, Morovis, Puerto Rico.

Oficina de Estudios Ambientales

1970-1990 *Evaluación Arqueológica, Fase IA-IB. Mejoras al Sistema de Acueductos del Barrio La Gloria, Trujillo Alto.* Autoridad de Acueductos y Alcantarillados, San Juan, Puerto Rico. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Oliver, José R.

1973a La cueva 'El Convento' (informe preliminar). *Boletín Informativo* 1(5):5-6. Fundación Arqueológica, Antropológica e Histórica de Puerto Rico. Santurce, Puerto Rico.

1973b Petroglifos en 'La Mina'. *Boletín Informativo* 1(6):1-2. Fundación Arqueológica, Antropológica e Histórica de Puerto Rico. Santurce, Puerto Rico.

1974 Communication on newly found petroglyphs at La Mina, Porto Rico. *Bulletin de Liaison de Recherche Archéologique.* Musée Départemental de la Martinique. Fort-de-France, Martinique.

1992 The Caguana Ceremonial Center: a cosmic journey through Taíno spatial and iconographic symbolism. Paper presented at the X□ Symposio Internacional, Asociación de Literaturas Indígenas Latinoamericanas (LAILA/AILA), San Juan, Puerto Rico.

1993 Chapter 3: Cultural Overview. In *Iglesia de Maraguez (PO-39): Investigation of a Local Ceremonial Center in the Cerrillos River Valley, Ponce, Puerto Rico;* prepared by P. Garrow, C. McNutt, Jr., G. Weaver, and J. Oliver, pp. 14-50. Garrow and Associates, Inc., Atlanta. Prepared for U.S. Army Corps of Engineers, Jacksonville.

1998 *El Centro Ceremonial de Caguana, Puerto Rico.* BAR International Series 727. British Archaeological Reports, Oxford.

Oliver, José R., Juan Rivera Fontán, and Lee A. Newsom

1999 Arqueología de Barrio Caguana, Puerto Rico. Resultdos Preliminarea de Las Temporadas 1996-1997. En *Trabajos de Investigación Arqueológica en Puerto Rico: Tercer Encuentro de Investigadores*, edited by J. A. Rivera Fontán, pp. 7-26. Publicación Ocasional de la División de Arqueología, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

Olsen, Fred

1971 Petroglyphs of the Caribbean Islands and Arawak Deities. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 4:35-46. St. Lucia.

1974 *On the Trail of the Arawaks.* Norman, Oklahoma.

Bibliographic References continued

1979 The Arawaks - their art, religion and science. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 8:3-15. St. Kitts.

Orama Exclusa, Jorge

1984 Denuncian destrucción de yacimiento indígena. *El Reportero* 16 November:4. San Juan, Puerto Rico.

Orduña Barrero, Carlos de

1991 Mona. Breve crónica de un paraíso. *El Nuevo Día* Revista Domingo 23 June:4-10. San Juan, Puerto Rico.

1993 Kawana, el mundo mágico de Borinquen. *El Nuevo Día* Revista Domingo 1 August:4-9. San Juan, Puerto Rico.

Ortiz, José

1975 Excavations at the Preceramic Cerrillo Site, Southwest Puerto Rico. *Proceedings of the Sixth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* 6:269-271. Pointe a Pitre, Guadelupe.

Ortiz-Aguilú, Juan José

1975 Aboriginal Antillean Pictographs: A New Discovery. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* Abstracts:315. Pointe a Pietre, Guadeloupe.

Ortiz Graham, Edín

1981 Encuentran importantes piezas arqueológicas en Río de Caguas. *El Mundo* 8 July. San Juan, Puerto Rico.

Ortiz Montañez, Hernán

1991 *Evaluación Arqueológica, Fase 1A-1B. "Vista de San Juan." Barrio Minillas, Sector La Pra, Bayamón.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Pané, Fray Ramón

1974 *Relación acerca de las antiqüedades de los indios.* Translated by José Juan Arrom. Siglo XXI, México.

Pantel, Agamemnon Gus

1973 North coast survey. *Boletin Informativo* 1(5):5-6. Fundación Arqueológica, Antropológica e Histórica de Puerto Rico. Santurce, Puerto Rico.

1975 Progress Report and Analysis, Barrera-Mordán Complex, Azua, Dominican Republic. *Proceedings of the Sixth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* 6:253-257. Pointe a Pitre, Guadelupe.

1980 Cueva La Mora, Comerío. National Park Service, National Register of Historic Places Nomination Form. Manuscript on file, Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico.

Pérez-Marchand, Liliane

1977 Petroglifos indígenas de Puerto Rico. *Boletin Artes Populares.* 2(3):12-13. Instituto de Cultura Puertorriqueña. San Juan, Puerto Rico.

Bibliographic References continued

Pérez Merced, Carlos A.
1996 Los Petroglifos de la Colección del Instituto de Cultura Puertorriqueña. Unpublished Master's thesis, Centro de Estudios Avanzados de Puerto Rico y el Caribe, San Juan, Puerto Rico.

Petitjean Roget, Henri
1975 *Contribution á l'Etude de la Prehistoire des Petites Antilles.* Fort-de-France, Martinique.
1975 Note sur quelques petroglyphes des Antilles. *Proceedings of the International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 6:215-220. Pointe-á-Pitre, Guadeloupe.

Pierluissi de Rodríguez, Aura
1980 El enigma de los petroglifos. *Maquetaurie Guayaba* 1(1):7. Jayuya, Puerto Rico.
1984 *Jayuya. Capital Indígena de Boriquén.* Centro Cultural Jayuyano. Jayuya, Puerto Rico.

Pike, Dorothy W. and Agamemmon Gus Pantel
1974 First Flint Worksite found in Puerto Rico. *Proceedings of the Fifth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* 5:140-142. Antigua.

Pinart, Alphone L.
1890a Pétroglyphes de _isthme Américain, de l'Amérique Centrale, des Grandes et des Petites Antilles. *Proceedings of the 8th International Congress of Americanists* 8:532-533. Paris.
1890b *Notes sur les Pétroglyphes et Antiquités des Grandes et Petites Antilles* Manuscript. Paris, France.
1890c Notas sobre los petroglifos y antigüedades de las Antillas Mayores y Menores. Introducción y notas de Ricardo E. Alegría. Traducción de Manuel Cárdenas. *Revista del Museo de Antropología, História y Arte de la Universidad de Puerto Rico,* no. 1, Julio-Diciembre 1979 (1):71-88. San Juan, Puerto Rico.

Ponce de León II, Juan, and Antonio de Santa Clara
1914 Memoria y Descripción de la Isla de Puerto Rico (1582). *Boletín Histórico de Puerto Rico* 1:75-94. San Juan, Puerto Rico.

Pons Alegría, Mela
1980 Taíno Indian art. *Archaeology* 33 (4):8-15. The Archaeological Institute of America, New York, New York.

Priego, Joaquin R.
1977 *Cultura Taíno.* (3rd edition) Santo Domingo, Dominican Republic.

Pujols Soto, Cesar E.
1992 *Informe Petroglifos: Las Piedras, Carolina y Jayuya, Instituto de Cultura.* Oficina Ingenería de Suelos, Autoridad de Carreteras y Transportación, San Juan, Puerto Rico. On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Questell Rodríguez, Eduardo
1983 Tibes: Indian cultural heritage in Puerto Rico. *Qué Pasa* 35(5):6-9. Tourism Company of Puerto Rico. San Juan, Puerto Rico.

Bibliographic References continued

Questell Rodríguez, Eduardo, and Carlos Figueroa Sellas
1991 *Informe de Evaluación Cultural, Fase 1A. Proyecto: Parque Pasivo La Playita, Morovis, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Rainey, F.G.
1940 Porto Rican Archaeology. In *Scientific Survey of Porto Rico and the Virgin Islands* 18 (1). The New York Academy of Sciences, New York, New York.

Ramos Vélez, Marlene
1989 *Evaluación Arqueológica, Fases 1A-1B. Mejores al Sistema de Acueductos, Aibonito.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.
1992 *Evaluación Arqueológica, Fase 1A-1B. Proyecto Construcción Incinerador de Desperdicios.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Ramírez, Guillermo
1977 El Arte Popular en Puerto Rico. *Boletín Artes Populares* 3:5-8. Instituto de Cultura Puertorriqueño. San Juan, Puerto Rico.

Retrato del famoso petroglifo de la Cueva de los Tamarindos
1989 *Ecos de Plazuela* 1(2),July-September: frontispiece. Centro Cultural de Barceloneta. Barceloneta, Puerto Rico.

Reyes Casanova, Otto O.
1964 *Motivos indígenas de Puerto Rico.* Equipo de Mejoramiento Ambiental. Junta de Planificación de Puerto Rico. San Juan, Puerto Rico.

Reyes, Ramón Dorta
1978 *Relación de los petroglifos que se encuentran en el Museo de Antropología, Historia y Arte de la Universidad de Puerto Rico.* Universidad de Puerto Rico, Recinto Universitario Río Piedras, Río Piedras, Puerto Rico.

Righter, Elizabeth
1992 *Statewide Comprehensive Historic Preservation Plan: Prehistoric Context* (draft). Submitted to the Southeast Regional Office of the National Park Service, Atlanta. Division for Archaeology and Historic Preservation, St. Thomas, U.S. Virgin Islands.
1995 A Critical Look at Prehistoric Settlement Pattern Distribution in the U.S. Virgin Islands. *Proceedings of the XVIth International Congress for Caribbean Archaeology*, Part 1, 16:52-64. Conseil Régional de la Guadeloupe, Basse Terre.

Rivera, Luis; Jeffery Walker, and Agamemnon Gus Pantel
1985 Icacos River Petroglyph Site. National Park Service, National Register of Historic Places Nomination Form. Manuscript on file, Puerto Rican State Historic Preservation Office, San Juan, Puerto Rico.

Rivera, Roque Uriel
1989 *Informe de Evaluación Cultural, Fases 1A-1B. Proyecto Urbanización Residental, Barrio Villalba Abajo, Villalba.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Bibliographic References continued

Rivera Calderon, Virginia

1991 *Evaluación Arqueológica, Fase 1A-1B. Proyecto: Mejoras al Sistema de Acueducto Planta de Filtración hasta Tanque Urbana Fajardo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Rivera Calderón, Virginia, and Miguel Rodríguez López

1991 The Playa Blanca 5 Site: A Late Prehistoric Ceramic Site in Eastern Puerto Rico (A Preliminary Report). *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 2, 13:541-558. Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

Rivera Fontán, Juan A., and Daniel Silva Pagán

1997 Proyecto arqueológico Bo. Quemado, Mayagüez (Batey Delfín del Yagüez). In *Ocho Trabajos de Investigación Arqueológica en Puerto Rico*: *Segundo Encuentro de Investigadores*, edited by J. A. Rivera Fontán, pp. 53-64. Publicación Ocasional de la División de Arqueología, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

Rivera Meléndez, José

1990 Estudio sobre el arte rupestre en Cuevas de Bina, Cayey. La voz del Pueblo Ciora, P.R., 30 de junio año II edicion 153.

1992a Estudio sobre arte rupestre en Cuevas de Binas, Cayey, Puerto Rico. Paper presented at the Sexto Encuentro de Investigadores APAA-USC, 27 de Junio.

1992b Estudio del arte rupestre de Cueva El Seto, Barrio Pasto Viejo, Cayey, Puerto Rico. Paper presented at the X□ Simposio de la Asociación Literaturas Indígenas Latino-Americanas (LAILA/AILA). San Juan, Puerto Rico.

1993 Reevaluación del estudio sobre el arte rupestre realizado por Alphonse Pinart en el Siglo XIX en Cayey, Puerto Rico: datos en torno al arte rupestre de la Cueva Las Planadas (refugio rocoso La Iglesia). *Proceedings of the Congress of the International Association for Caribbean Archaeology*,15:595-605. San Juan, Puerto Rico.

1995 *Apuntes para el estudio de la Prehistoria de Cayey.* Unpublished Master's thesis, Centro de Estudios Avanzados de Puerto Rico y el Caribe, San Juan, Puerto Rico.

1996 *Apuntes para el estudio de la Prehistoria de Cayey.* M.A. Thesis. Centro de Estudios Avanzados de Puerto Rico y el Caribe, Viejo. San Juan.

1999 Las Pictografías de la Cueva el Seto, Barrio Pasto Viejo, Cayey, Puerto Rico. Paper presented at the 18th Congress of the International Association for Caribbean Archaeology, Grenada, July 11-17.

Rivera Meléndez, José and Lydia Ortiz

1995 Investigación sobre el arte rupestre en dos cuevas en el interior de la Isla - Cayey, Puerto Rico. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 16:462-476. Basse-Terre, Guadeloupe.

Bibliographic References continued

Robinson, Linda Sickler

1983-1985 The stone row at El Bronce archaeological site, Puerto Rico. In *Archaeological Data Recovery at El Bronce, Puerto Rico,* edited by Linda Sickler Robinson, Emily R. Lundberg and Jeffery B. Walker, Phase 1, 1983:51-55; Phase 2, 1985: Appendix 1:11-15 and Figures 2-9, 11. Submitted to the U.S. Army Corps of Engineers, Jacksonville District. Copies available from the Puerto Rican State Historic Preservation Office, San Juan, Puerto Rico.

Rodríguez, Jorge

1988 Petroglifos, huellas de los primeros Criollos. *El Mundo* 21 January:27-29. San Juan, Puerto Rico.

1990 La arqueología en primer plano. *El Mundo* 14 February:11-15. San Juan, Puerto Rico.

Rodríguez Alvárez, Angel

1989 A preliminary petroglyph survey along the Blanco River, Puerto Rico. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 13(2):898-926. Curaçao, Netherlands Antilles.

1993 A classificatory scheme for the Puerto Rico petroglyphs. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 14:624-636. Barbados.

1995 A survey of the petroglyph collection in the Instituto de Cultura Puertorriqueña, San Juan. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 15:625- 631. San Juan, Puerto Rico.

Rodríguez Gracia, Luis

1970-1990 Nuevas Pictografías en Puerto Rico. La Cueva de las Guavás y la Cueva de Atabeira. Manuscript on file, Sociedad Guaynía de Arqueología e Historia Inc. Ponce, Puerto Rico.

Rodríguez López, Miguel

1981 *Estudio y Evaluación Recursos Culturales Proyectos Embalses Río Mameyes y Río Espiritu Santo. Informes Fase 1A y 1B.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1984 Estudio Arqueológico del Valle del Río Cagüitas, Caguas, Puerto Rico. Manuscript on file, Museo de la Universidad del Turabo, Caguas, Puerto Rico.

1985a Arqueología del Río Loíza. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 11:287-294. San Juan, Puerto Rico.

1985b *Estudio Arqueológico (Stage 1-A). Sanitary Sewer System for Pollos.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989 The Zoned Incised Crosshatch (ZIC) Ware of Early Precolumbian Ceramic Age Sites in Puerto Rico and Vieques Island. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 249-266. BAR International Series 506, British Archaeological Reports, Oxford.

1990 *Estudio Arqueológico Fases 1A-1B. Proyecto Expansión Universidad del Turabo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 Arqueología de Punta Candelero, Puerto Rico. *Proceedings of the XIIIth International Congress for Caribbean Archaeology*, Part 2, 13: 605-627. Curaçao, Netherlands Antilles.

Bibliographic References continued

Rodríguez López, Miguel, and Virginia Rivera Calderon

1983a La Plaza Indígena de Sabana Arriba: un nuevo yacimiento arqueológico en la región este-central montañosa de Puerto Rico. *Revista de la Sociedad para el Estudio de la Arqueología* 1(2):1-6. Carolina, Puerto Rico.

1983b Informe de dos petroglifos en el Río Grande de Loíza. *Revista de la Sociedad para el Estudio de la Arqueología* 1(2):7-8. Carolina, Puerto Rico.

1991 Puerto Rico and the Caribbean Pre-Saladoid "Crosshatch Connection." *Proceedings of the Twelfth International Congress for Caribbean Archaeology, Cayenne, French Guiana* 12:45-51. Martinique.

Rodríguez Miranda, Marisol

1989 *Informe de Investigación Arqueológica, Fase 1A. Comunidad Factor, Arecibo, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1999 Arte Rupestre del Cibuco. En *Trabajos de Investigación Arqueológica en Puerto Rico: Tercer Encuentro de Investigadores*, edited by J. A. Rivera Fontán, pp. 37-46. Publicación Ocasional de la División de Arqueología, Instituto de Cultura Puertorriqueña, San Juan, Puerto Rico.

Roe, Peter G.

1989 A Grammatical Analysis of Cedrosan Saladoid Vessel Form Categories and Surface Decoration: Aesthetic and Technical Styles in Early Antillean Ceramics. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 267-382. BAR International Series 506, British Archaeological Reports, Oxford.

1991 The petroglyphs of Maisabel: a study in methodology. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 12:317-370. Cayenne, French Guayana.

1993 Advances in the Study of Lowland South American and Caribbean Rock Art. Paper presented at the 58th Annual Meeting of the Society for American Archaeology. St. Louis.

1993 Cross-media isomorphisms in Taíno ceramics and petroglyphs. *Proceedings of the Congress of the International Association for Caribbean Archaeology* 14:637-671. Barbados.

2001 Rivers of Stone, Rivers within Stone: Rock Art in ancient Puerto Rico. Paper presented at the 66th Annual Meeting of the Society for American Archaeology. New Orleans.

Roe, Peter G., Agamemnon Gus Pantel, and Margaret B. Hamilton

1990 Monserrate Restudied: The 1978 Centro Field Season at Luquillo Beach: Excavation Overview, Lithics and Physical Anthropological Remains. *Proceedings of the Eleventh Congress of the International Association for Caribbean Archaeology* 11:338-369. San Juan, Puerto Rico.

Roe, Peter G., and José Rivera Meléndez

1996 Recent advances in recording, dating and interpreting Puerto Rican petroglyphs. *Proceedings of the Sixteenth Congress of the International Association for Caribbean Archaeology* 16:444-461. Basse Terre, Guadeloupe

Bibliographic References continued

Roe, Peter G., José Rivera Meléndez, and Peter DeScioli
1997 The Cueva de Mora (Comerío, PR) Pictographs: A Documentary Project. Paper presented at the 17th Congress of the International Association for Caribbean Archaeology, Nassau, Bahamas, July 21-27, 1997.

Roe, Peter G., James Byerly, and Nicole Cornell
1999 The Cueva de la Momia (Comerio, PR) Petroglyphs: A Case Study in Field Technology. Paper presented at the 18th Congress of the International Association for Caribbean Archaeology, Grenada, July 11-17, 1999.

Rosa, Luis M. de la
1987 Prehistoria y protohistoria. In *Veja Baja. Su Historia y su Cultura,* pp. 19-35. Gobierno Municipal de Veja Baja, Puerto Rico.

Rosario, Rubén del; Esther Melón de Díaz y Edgar Martínez Masdeu
1976 *Breve Enciclopedia de la Cultura Puertorriqueña.* San Juan, Puerto Rico.

Rouse, Irving
1938 Field Notes. Manuscript on file, Peabody Museum of Natural History, Yale University, New Haven, Conneticut.
1949 Petroglyphs. In *Handbook of South American Indians* 5:493-502.
1952 Porto Rican Prehistory: Excavations in the Interior, South and East: Chronological Implications. In *Scientific Survey of Porto Rico and the Virgin Islands* 18 (4). New York Academy of Sciences, New York, New York.
1952 Porto Rican Prehistory: Introduction; Excavations in the West and North. *Scientific Survey of Porto Rico and the Virgin Islands,* vol. 18, Part 3. The New York Academy of Sciences, New York.
1982 Ceramic and Religious Development in the Greater Antilles. *Journal of New World Archaeology* 5(2):45-52.
1986 *Migrations in Prehistory: Inferring Population Movement from Cultural Remains.* Yale University Press, New Haven and London.
1989 Peoples and Cultures of the Saladoid Frontier in the Greater Antilles. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 383-403. BAR International Series 506, British Archaeological Reports, Oxford.
1992 *The Taínos: Rise and Decline of the People who Greeted Columbus.* Yale University Press, New Haven and London.

Rowe, Marvin W.
2001 Dating by AMS Radiocarbon Analysis. In *Handbook of Rock Art Research*, edited by David S. Whitley, pp. 139-166. Altamira Press, New York.

Santaliz, Coqui
1991 Asi es Puerto Rico. *Revista Imagen* September:41. San Juan, Puerto Rico.
1993 Asi es Puerto Rico. Centro Ceremonial Caguana. La magia de un legado Taíno. *Revista Imagen* November:206-211. San Juan, Puerto Rico.

Santos, Rossana
1988 *Estudio de Recursos Culturales, Fase 1A & 1B. Proyecto Fajardo-Ceiba.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Bibliographic References continued

1989 *Archaeological Assessment. Stages 1A & 1B.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 *Evaluación Arqueológica, Fase 1A-1B. Mejoras al Sistema de acueductos de los barrios Calabazas y Guacio, San Sebastián.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Sauer, Carl O.

1966 *The Early Spanish Main.* University of California Press, Berkeley.

Schlafer Roman, Ethel Victoria

1988 *Evaluación Arqueológica. Urb. Villa Pinares, Barrio Río Abajo, Vega Baja.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1988 *Evaluación Arqueológica. Relocalización P.R. 167, Comerío.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 *Investigación Arqueológica, Fases 1A-1B. Municipio de Vega Alta. Conector PR 6678 desde la Carretera PR 676 hasta la Carretera PR 677.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1992 *Evaluación Arqueológica. Borinquen Memorial Park 11. Caguas, Puerto Rico.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Schlafer Roman, Ethel Victoria, and Marisol Rodríguez Miranda

1986 *San Sebastián Waste Water Treatment Plant, Stage 1A.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1989 *Archaeological Assessment, Stage 1B. Caguas-Aguas Buenas.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Sepúlveda, Ing. Cándido, and Dr. Rafael Millán

1983 *Informe de Evaluación Cultural, Fase 1A-1B. Proyecto Urb. Loma Linda y Remanente, Barrios Pueblo y Juan González, Adjuntas.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Siegel, Peter E.

1989 Site Structure, Demography, and Social Complexity in the Early Ceramic Age of the Caribbean. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 193-245. BAR International Series 506, British Archaeological Reports, Oxford.

1991 Political Evolution in the Caribbean. *Proceedings of the Thirteenth International Congress for Caribbean Archaeology*, Part 1, 13:232-250. Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles, No. 9.

1992 *Ideology, Power, and Social Complexity in Prehistoric Puerto Rico.* Ph.D. dissertation, State University of New York at Binghamton. University Microfilms, Ann Arbor.

Siegel, Peter E. and David J. Bernstein

1991 Sampling for Site Structure and Spatial Organization in the Saladoid: A Case Study. *Proceedings of the International Association for Caribbean Archaeology* 12:87-107. Martinique.

Somville, Jean A.

1984 *La Guadeloupe. La Route des Fleurs.* Editions Caribéennes, Paris.

Bibliographic References continued

Stahl, Agustin
1900s *Pictografías Indo-Borincanas del Litoral.* San Juan, Puerto Rico.

Sued Badillo, Jalil
1972 Los grabados rupestres en Puerto Rico. *Boletín Informativo* 1(1): 5-7. Fundación Arqueológica, Antropológica e Histórica de Puerto Rico. Santurce, Puerto Rico.
1977 *Bibliografía Antropológica para el Estudio de los Pueblos Indígenas en el Caribe.* Fundación García-Arévalo. Santo Domingo, Dominican Republic.
1983 *Guayama:Notas para su Historia.* San Juan, Puerto Rico.
Tío, Aurelio
1981 Arqueología prehistórica: los petroglifos de Guayanilla en torno a una polémica critica. *Boletín de la Academia Puertorriqueña de la Historia* 7(26):187-199. San Juan, Puerto Rico.

Todo
1987 El enigma de los petroglifos (26 February). Newspaper of the Town and Municipality of Bayamón. Bayamón, Puerto Rico

Toro Sugrañes, José A.
1982 *Nuevo Atlas de Puerto Rico.* Editorial Edil, Inc., Río Piedras, Puerto Rico.

Trinidad Castillo, William
1990s *Petroglifos Indígenas del Este de Puerto Rico.* Privately Printed by the Author.

Tronolone, Carmine A., and Michael A. Cinquino
1985a Ceiba 3. Ensenada Honda Petroglyph 1: Northern Group, Ceiba. National Park Service, National Register of Historic Places Nomination Form. Manuscript on file, Puerto Rican State Historic Preservation Office, San Juan, Puerto Rico.
1985b Ceiba 4. Ensenada Honda Petroglyph 2: Southern Group, Ceiba. National Park Service, National Register of Historic Places Nomination Form. Manuscript on file, Puerto Rican State Historic Preservation Office, San Juan, Puerto Rico.

Tronolone, Carmine A., and Michael A. Cinquino, incorporating research by Gary S. Vescelius
1984 *Preliminary Cultural Resource Reconnaissance Survey of United States Naval Station, Roosevelt Roads, Ceiba, Puerto Rico.* Prepared by Ecology and Environment, Inc., Buffalo, New York. Prepared for the Department of the Navy, Headquarters, U.S. Atlantic Fleet, Norfolk Naval Station, Norfolk, Virginia.

Tronolone, Carmine A., Michael A. Cinquino, Charles E. Vandrei, and Gary S. Vescelius
1984 *Cultural Resource Reconnaissance Survey for the Vieques Naval Reservation.* Prepared by Ecology and Environment, Inc., Buffalo, New York. Prepared for the Department of the Navy, Headquarters, U.S. Atlantic Fleet, Norfolk Naval Station, Norfolk, Virginia.

Underhill, Connie
1976 Polychrome cave art in Vega Baja. *San Juan Star Sunday Magazine* 1 February. San Juan, Puerto Rico.

Vargas, Pedro Juan
1969 Descubre cueva con inscripciones de la época colonización española. *El Mundo* 19 November. San Juan, Puerto Rico.

Bibliographic References continued

Vega, Jesus

1992 *Mitigación Arqueológica, Fase III. Nueva Escuela Superior, Ciales.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Vélez, Jaime G.

1988 *Estudios Arqueológicos, Fase 1A, Fase 1B. Proyecto Propuesto Desarrollo de Solares, Barrio Puerto Nuevo, Vega Baja.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1990 *Estudio Arqueológico, Fase 1-A. Proyecto Segunda Unidad Santa Olaya, Barrio Santa Olaya.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

1991 *Estudio Arqueológico Fase 1-A. Proyecto Estacionamiento Municipal Norte Arecibo.* On file at the Institute of Puerto Rican Culture, San Juan, Puerto Rico.

Veloz Maggiolo, Marcio, and Bernardo Vega

1982 The Antillean Preceramic: A New Approximation. *Journal of New World Archaeology* 5(2):33-44.

Veloz Maggiolo, Marcio, and Elipidio Ortega

1976 The Preceramic of the Dominican Republic: Some New Finds and their Possible Relationships. *Proceedings of the First Puerto Rican Symposium on Archaeology*, edited by Linda Sickler Robinson, pp. 147-201. Fundación Arqueologica, Antropologica, e Historica de Puerto Rico, San Juan, Puerto Rico.

Versteeg, A. H.

1989 The Internal Organization of a Pioneer Settlement in the Lesser Antilles: the Saladoid Golden Rock Site on St. Eustatius, Netherlands Antilles. In *Early Ceramic Population Lifeways and Adaptive Strategies in the Caribbean*, edited by Peter E. Siegel, pp. 171-192. BAR International Series 506, British Archaeological Reports, Oxford.

1990 Investigations of the Golden Rock Site GR-1, St. Eustatius. *Proceedings of the Eleventh Congress of the International Association for Caribbean Archaeology* 11:370-374. San Juan, Puerto Rico.

1991 Saladoid Houses and Functional Areas Around Them: The Golden Rock Site on St. Eustatius, Netherlands Antilles. *Proceedings of the Twelfth Congress of the International Association for Caribbean Archaeology* 12:35-44. Martinique.

Vescelius, Gary S.

1980 A Cultural Taxonomy for West Indian Taxonomy. *Journal of the Virgin Islands Archaeological Society* 10:38-41.

Vescelius, Gary S. and Linda Robinson

1980 Verdialis 1 (12VPr2-33), Barrio Puerto Ferro, Vieques, Puerto Rico (Eastern Maneuver Area, U.S. Naval Reservation, Vieques, PR), National Register of Historic Places Inventory Form, on file with Historic Preservation Office, San Juan, PR; and the National Register, National Park Service, Washington, D.C.

Walker, Jeffery B.

1980 Analysis and Replication of Lithic Artifacts from the Sugar Factory Pier Site, St. Kitts. *Proceedings of the Eighth International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 8:69-79. Arizona State University, Anthropological Research Papers No. 22.

1983a Stylistic Analysis of Río Blanco Petroglyph Site. Manuscript on file, Centro de Esudios Advancados de Puerto Rico y El Caribe, San Juan, Puerto Rico..

1983b *Final Report of the Cultural Resources Survey of Area 1, adjacent to the Icacos River in the Caribbean National Forest.* Manuscript on file, U.S. Forest Service, Río Piedras, Puerto Rico.

1983c Use-Wear Analysis of Caribbean Flaked Stone Tools. *Proceedings of the Ninth International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles* 9:239-247. Centre de Recherches Caraïbes, Université de Montréal.

Willey, Gordon R.

1971 *An Introduction to American Archaeology*, Vol 2. Hall, Englewood Cliffs, New Jersey.

Primary Location of Additional Documentation.

Puerto Rico State Historic Preservation Office, San Juan, Puerto Rico—correspondence and materials related to the nomination of rock art sites.

Institute of Puerto Rican Culture, Division of Archaeology and the Council for the Protection of Terrestrial Archaeological Patrimony—correspondence and materials related to the nomination of rock art sites.; original field documents and materials related to the documentation of four rock art sites: La Quebrada Maracuto, Municipio of Carolina; La Piedra Escrita, Municipio of Jayuya; Cueva del Indio, Municipio of Las Piedras; Site LM-4, Municipio of Las Marias.