The Tutu Archaeological Village Site

A multidisciplinary case study in human adaptation

Edited by Elizabeth Righter

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Excavations at the Tutu site represent a dramatic chapter in the annals of Caribbean archaeology. The site was discovered in 1990 during initial site clearing for a shopping mall in St Thomas, US Virgin Islands. Investigations were conducted in response to the imminent destruction of the site for development. Under severe time constraints, the site was excavated under the direction of Elizabeth Righter with the assistance of a team of professional archaeologists and volunteers. Utilizing resources and funds donated by the local community and grants from the nineteenth Legislature of the Virgin Islands Government and the American National Foundation for the Humanities (NFH), the project employed a multidisciplinary sampling strategy designed to recover material for analysis by experts in fields such as physical anthropology, archaeology, palaeobotany, zooarchaeology, bioarchaeology, palaeopathology and photo imaging.

This volume reports the results of applied analytical techniques that stand at the cutting edge of technological methods for palaeoenvironmental reconstruction; interpretation of human remains, and understanding of human social, cultural and economic adaptive strategies during 1,200 years of site occupation. These innovative and comprehensive investigations lay a solid foundation for future comparative studies of prehistoric Caribbean human populations and cultures.

At the time of the Tutu investigations, **Elizabeth Righter** was Senior Archaeologist in the Division for Archaeology and Historic Preservation (DAHP) of the Department of Planning and Natural Resources (DPNR) of the Virgin Islands Government. After three years as a consultant to that office, also known as the State Office of Historic Preservation or SHPO, Righter now is writing up the results of her many years of research in the Caribbean Islands and is President of her own archaeological consulting firm in Bradenton, Florida.

Interpreting the remains of the past
Editor: Mary K. Sandford

Volume 1

Stories From the Skeleton
Behavioural reconstruction in human osteology
Robert Jurmain

Volume 2

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Dedication

This book is dedicated *In Memoriam* to volunteers, Margaret Caesar, Phillip Caesar, Jim Cohen, Tom Lawrence, Tom Linnio, Fred Gjessing and Cameron Scobie; and to three people who made this project happen: Claudette Lewis, Alan Smith, and my teacher and guide, my father, Bukk Carleton II.

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Since 1973, **Emily R. Lundberg** has primarily concentrated on prehistoric archaeology and cultural resources management in the US Virgin Islands and Puerto Rico. Her dissertation for the PhD received from the University of Illinois in 1989 dealt with the pre-ceramic occupation of St Thomas. Her current projects concern ceramic-age research, undertaken as an independent consultant.

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Dolores Piperno is currently the Director of the Center for Tropical Paleoecology and Archaeology at the Smithsonian Tropical Research in Panama, where she has worked as a staff scientist since 1988. She carries out research with plant microfossils (phytoliths, pollen, and starch grains) to study past human ecology, paleoenvironmental changes, and agricultural origins and dispersals in the lowland Neotropical forest.

Elizabeth Righter received her BA and Master's degrees in Anthropology from Harvard University and completed studies toward her PhD at the University of Hawaii in Honolulu and Bryn Mawr College in Pennsylvania. Between 1982 and 1997, she was Senior State Archaeologist in the Virgin Islands State Office of Historic Preservation (SHPO). In this role, she directed archaeological excavations and data recovery at the Tutu Archaeological Village site, which involved supervision of more than 30 professional archaeologists and 200 lay volunteers in the field, fund raising to support this cooperative government-private sector venture, and subsequent follow-up laboratory work and report writing. Presently, as an independent archaeological consultant, she is conducting research on Guana Island in the British Virgin Islands, and writing up the results of her many years of Caribbean field research.

Mary K. Sandford is Associate Dean of the College of Arts and Sciences and Professor of Anthropology at the University of North Carolina at Greensboro. She received her Masters and Doctoral degrees in anthropology at the University of Colorado. Her research focuses on skeletal biology, paleopathology and paleonutrition. She is the editor of *Investigations of Ancient Human Tissue: Chemical Analyses in Anthropology* (1993, Gordon & Breach).

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Elizabeth S. Wing, a retired professor, is now Curator at the Florida Museum of Natural History in Gainesville, Florida, where she is responsible for their program in Environmental Archaeology, including collections of plant and animal remains from archaeological sites, comparative collections for the identification and interpretation of archaeological remains, and soils from archaeological deposits. The regional focus of this program is the southeastern United States, the West Indian Islands, the circum-Caribbean mainland and northwestern South America. Her research involves the study of animal remains from West Indian sites and integration of these studies with studies of archaeological plant remains.

Introduction to the series

This series provides a forum for presenting innovative ideas and methods relative to our understanding of the human past. The concept developed during preparation of my edited work, *Investigations of Ancient Human Tissue: Chemical Analyses in Anthropology* (Sandford, 1993a). While researching and writing that volume, I became acutely aware of the need for comprehensive and timely works focused on topics within the intersection of archaeology and physical anthropology.

That book examined the promise and pitfalls of using elemental and isotopic analyses in understanding past diets, nutritional patterns and disorders. Such topics, and the manner in which we elected to address them, influenced the scope and goals of the present series in several fundamental ways. The inauguration of these analytical techniques in anthropology signaled intensification of multidisciplinary approaches. These techniques made their debut in anthropology during the 1970s and the decade itself was one of fervor and optimism, as students seized upon such new technologies in hopes of gaining a better and more accurate understanding of the human past.

The enthusiasm that marked the introduction of trace element analysis in anthropology was tempered by recognition of the vast complications surrounding its use. Moreover, as with any method adopted from another discipline, most anthropologists simply lacked the training necessary for using the techniques or interpreting data. Remembering this as we prepared *Investigations of Ancient Human Tissue* some two decades later, we endeavored to contextualize our case studies with basic information on both theory and method, striving to make these techniques more accessible and understandable to a larger number of our colleagues.

The need for work with the requisite breadth to explore the reaches of a multidisciplinary perspective, or the depth to probe the intricacies of a specialized technique, is even more compelling now. Indeed, what seemed to be quite extraordinary a mere twenty years ago has been far outpaced by innovations and discoveries of today. Scientific visualization and digital technology have revolutionized our ability visually to assess and quantify the objects of our investigations, while providing us with the means, through virtual technology, to share our latest findings with colleagues around the world. Advances in biotechnology have expanded the bounds of our imagination; the ability to extract DNA from tissue may help us resolve issues emanating from such concerns as the history of disease to the origins of humankind. As we begin the new millennium, it is staggering to contemplate the matters we will be discussing, debating and endeavoring to understand in another twenty years. In providing a forum for cutting-edge ideas and techniques, it is my hope that this series will serve both to chronicle and propel our understanding of the human past.

Mary K. Sandford

Foreword

Antillean archaeology poses interesting questions relevant to general theories about human and environmental history. Did the archipelagic setting shape the trajectory of human history or at least point humans in particular directions? Were the islands more prone to immigration than were continental regions? Did Antillean communities maintain long-term relationships with communities on the mainland? How did island cultural evolution compare to that of the mainland? Did the islands' environmental circumscription speed up the rise of complex societies and processes of conquest in prehistory, or did their isolation buffer them? Alternatively, did indigenous human settlement in the Caribbean islands influence local environmental history? Did humans extinguish many species in the islands? Could the low rainfall of some areas have been caused by extensive deforestation in either prehistoric or historic times? Is such human influence a factor in the distribution of fauna, usually attributed to purely environmental factors?

Approaching such questions effectively through research requires the collection of specific types of data. First of all, we need good control of the passage of time to chart changes in relationships between different entities and factors. For any period, we need concrete evidence of the sizes and organization of human sites and the functions of structures and activity areas. To assess regional interaction through time, abundant excavated artifacts and raw materials are needed for analyzing styles of art, manufacturing methods, and sources of materials. To inquire about environmental effects on humans, we need to know the state of the environment at particular times and places, for it would be unwarranted to assume it has always been the same in the Caribbean. To evaluate economic change and human impacts on the environment, we need evidence of changes in technology, population, and resource use through time as well.

Few indeed are research sites in the Antilles and northern South America that provide this kind of interdisciplinary information. Such sites can be counted on the fingers of one hand: two sites in Puerto Rico, Maisabel investigated by Peter Siegel and his colleagues, and Caguana investigated by Oliver and his colleagues; the Hope Estate complex on St Martin investigated by Hofman and his colleagues; Golden Rock on St Eustatius investigated by Versteeg and his team; and the Tanki Flip site in Aruba, also investigated by Versteeg and his colleagues. Maybe we archaeologists have specialized too much. Perhaps National Science Foundation (NSF)- and National Endowment for the Humanities (NEH)-funded research has become so streamlined, trendy, and success-oriented that it cuts out collection of comprehensive data that could falsify hypotheses and lead in new theoretical directions. Those of us interested in settlement patterns may have relied overmuch on surface collections – impossible to date without stratigraphic excavations and often unrevealing of occupations deep beneath the surface. Others of us interested in cultural studies often neglect to collect systematic bioarchaeological and geoarchaeological evidence, making it difficult to study the interaction between cultural and ecological spheres. Studies of ecological

adaptation, for their part, often have been one-sided in favor of hunting and fishing, leaving out the all-important plants that furnished habitats for both humans and animals and most of the food base.

In this context, the Tutu site project, directed by Elizabeth Righter, is a landmark in both holistic archaeology and tropical archaeology. The Tutu project is an outstanding example of how problem-oriented data collection and rescue archaeology can provide as much or even more data of theoretical relevance than narrower "pure" research projects. The Tutu project also is a model in collaboration among researchers, government agencies, the private business sector, and the community. At each stage of the research, interaction of the interests, needs, and contributions of the different players had a synergistic effect, achieving an extended research schedule, expanded research agenda, and significant public education benefits.

Working under the gun of development, Righter's research team meticulously cleared, plotted, sampled, and excavated structures, burials, and activity areas over a wide area of the site. After careful re-scraping and cleaning of features that had been revealed by earth moving for mall construction, they excavated the midden areas and features by hand, sampled intensively, and recorded the results in detail. The archaeologists at Tutu intensively collected both animal and plant remains, and among plant remains, both macro and micro specimens. Furthermore, they also analyzed the isotopic, elemental, and pathological evidence from human skeletons, providing an excellent critical background for the interpretation of the food traces and environmental evidence. Like the earlier studies, the Tutu project illustrates the fallacy of the assumption that prehistoric biological remains are not preserved in humid tropical sites.

Few other sites in either the Antilles or eastern South America have produced the comprehensive, definitive, interdisciplinary site information contained in this volume on Tutu. In this book are detailed descriptions of the methods and findings of the research at Tutu. The many excellent illustrations record detailed plans and profiles of structures and micro-stratigraphy, chart and illustrate the abundant samples of artifacts and biological remains, and list radiometric date series from structures, features, and human skeletons of the different periods.

Due to the intensive fine screening and flotation carried out, the research produced a huge sample of fauna and flora. Considering the rich information that these remains provide, it is surprising that many researchers still eschew screens or only use coarse quarter-inch screening, since, without small screen mesh, excavations essentially throw away most of the subsistence and environmental evidence (Wing & Brown, 1979). Most of the fauna at Tutu were shellfish and fish, with more marine fauna than land fauna through time, a sequence long recognized by archaeologists in the Antilles. The fauna are mostly small species, only rarely over 2,700 grams.

Many other sites have produced more finds of larger species than of small species, not because these were more important in subsistence, but merely because coarse-grained sampling methods skewed the sample in their favor. Contrary to optimal foraging theory, at Tutu, the choice of species changed little through time as population grew and resource use intensified. The Tutu archaeologists found the harvesting levels of reef species quite stable over time, but the harvesting of marine resources seems to have increased as local human populations grew. Across the board, the size of individuals is smaller later in the sequence, due to the prey population effects of more intensive harvesting. There is little evidence of animal husbandry, although the first migrants brought in hutias and an insectivore. As in riverine Amazonia, the maritime tropical people preferred to rely on collecting and hunting as long as there were sufficient resources.

In the plant food system, arrowroots turned out to be important, as well as squashes, palm fruits, and other tree crops. Unlike the situation at some late prehistoric mainland sites in the middle Orinoco (van der Merwe, Roosevelt & Vogel, 1981), and upper Amazon (Piperno & Pearsall, 1998; Roosevelt, 1989a, 1999, n.d.), the evidence for maize at Tutu is sparse and

suggests that the plant was probably not an important part of the food plant inventory. Manioc's relative importance also is uncertain. Maize's apparent absence from Saladoid deposits at Tutu may mean that the first Saladoid migrants left the mainland before maize cultivation was widespread. Taken altogether, the results of the Tutu bioarchaeological analyses suggest that subsistence was a broad-based horticultural system of root and seed cultivation, tree-fruit harvesting or possibly tree-fruit cultivation, and fishing and hunting, similar in structure to the most common system today in Amazonia (Roosevelt, 1994).

The environmental information from the Tutu archaeological deposit sheds light on the nature of human–ecological relationships through time. Despite the general openness of the St Thomas landscape and today's frequently arid conditions, the result of centuries of timbering, agriculture, ranching, and urbanization, phytoliths at Tutu reflect a predominance of closed, moisture-loving forest vegetation during prehistory. In contrast, grasses and weeds were present in much lower percentages in the archaeological samples than they are in modern, anthropogenic savanna woodlands subject to intensive cutting and annual burning (Lovett & Wasser, 1993; Bonnefille, 1995). However, among the common forest taxa identified in the Tutu site are useful trees of rainforest disturbance successions: several palms and the legumes, Acacia, and Cassia. Thus, people cut the local forest but allowed it to regenerate and protected the useful species of succession, as in managed forest fallow systems in Amazonia today (Balee, 1989). The analysts suggest that disturbance and utilization of the vegetation in the immediate site area became more intensive through prehistoric time, an occurrence not unexpected for a growing community.

To judge from the condition of the many skeletons excavated from the site, the quality of life of Tutu people seems to have been good overall. There are relatively few marks of chronic, severe physiological stress in the skeletons of the young, the group expected to be the most vulnerable to effects of diet and disease problems. Although the evidence for stress increases somewhat through time, health status remains favorable, compared to other archaeological populations. Marks of mechanical premortem trauma are uncommon, especially the pathologies that osteologists associate with interpersonal violence (Cohen, 1989).

In addition to the rich bioarchaeological materials recovered from Tutu, cultural objects are abundant and elaborate. Diverse objects were made of a range of materials: pottery, rock, shell, and wood. As in other tropical areas, the nature of discarded materials reveals that pottery and some lapidary objects were made locally (Roosevelt, 1989a). The abundance of fine pottery art at Tutu gave the researchers an excellent opportunity to create a detailed cultural sequence by analyzing the distribution of modal ceramic attributes by radiocarbon-dated micro-stratigraphic units. As they point out, this is the only Lesser Antillean site where fine chronological control of pottery change has been possible. This method of analysis, pioneered by Irving Rouse, allowed the archaeologists to divide the Cedrosan Saladoid deposit into 3 successive Saladoid assemblages. I had a comparable experience with Rouse's method in ceramic analyses carried out at Orinoco sites (Roosevelt, 1997); and, having worked at prehistoric pottery sites both in the Orinoco and Lower Amazon, I was fascinated to see the repeated echoes of continental cultures in this Antillean site. For me, the Saladoid assemblages at Tutu were remarkably similar to those of the Ronquin Sombra phase and its early Corozal I descendant, and the late Ostionoid seemed like pottery of the Arauquinoid series (Roosevelt, 1980, 1997). As in the Orinoco sites, at Tutu there was a shift from well-smoothed, regular vessel contours, sharply defined and angled rims, and the tidy, sinuous grooving found in the Saladoid assemblages to the irregular vessel contours, direct, rounded rims, and sloppy but sharp and intricate incision, punctation, and appliqué of the late Ostionoid. Such parallel stylistic changes suggest continuing social interaction and stylistic communication between islands and mainland peoples, but what the pottery changes mean in terms of social, aesthetic, and demographic processes is difficult to say.

The patterns of similarity between Tutu and other Antillean sites and sites in mainland regions show that there existed a widespread, long-term shared sphere of cultural interaction, despite local differences in subsistence and social trajectories. Does Tutu offer any evidence of site unit intrusions that might indicate conquest? Basic pottery manufacturing methods seem stable, as if the area was continuously occupied by a population acculturated to the same manufacturing customs. However, the calibrated radiocarbon sequence does reveal a hiatus in occupation of the site, as well as a discontinuity in culture. One example of this is the suspension of elaborate modeled, incised, and painted pottery decoration during the last Saladoid assemblage and a gap in radiocarbon dates between it and the late Ostionoid assemblage. A period distinguished by pottery lacking elaborate decoration common during almost a thousand years of earlier development also occurs in parts of Marajo Island soon after AD 1100 (Roosevelt, 1991). Some archaeologists believe that there could have been an environmental disaster, but an alternative theory is that widespread social disruption occurred as ancient communities began to move toward more centralized and stratified organization.

What evidence does the Tutu research offer about how the community was organized and how it changed through time? Of the structures identified at Tutu, some of the larger residential structures look like Amazonian malocas, rounded communal dwellings with several related families in each residence. In some areas of Amazonia, as with the Shipibo at Lake Yarinacocha, malocas were discontinued under Western influence in favor of square or rectangular nuclear family structures. Even so, however, the individual family structures were often built in clusters, housing extended families. The multifamily residential group, however it was housed, seems a stable, long-term pattern in the eastern tropical lowlands. At Tutu, the continuity in general house pattern does not mean there is no change through time in the function of these groups. For example, the researchers point out that later buildings have intriguing structural details in common with ethnohistoric records of Taíno dwellings, such as the door structure.

Interestingly, although there are indications of social differentiation during both periods of occupation, the archaeologists found no compelling structural and artifactual evidence for the existence of coercive central authority at Tutu. Righter feels that "we cannot assume that the site was outside the influence of some overall central authority during the late occupation. Although there are signs of continuity at the village, I do not think that it was totally independent of what was going on in the rest of the Tutu sphere of sociopolitical influence, given the burial patterns and house types, and the presence of Taíno-like zemis and ball belt fragments in the Ostionoid deposits at the site." The structures and skeletons of Tutu did not show evidence of either epidemic interpersonal violence or significant interpersonal differences in faunal consumption. Probably, the site community had little of the type of socioeconomic differentiation characteristic of discrete class organization, although some individuals may have achieved unique roles, commemorated in the different burial treatment. With time, residences at Tutu appear to have become more substantial and permanent, as also happens in lower Amazon prehistory (Roosevelt, 1993). In addition, in the later period some houses are larger and richer in objects. Perhaps larger co-residential groups were more differentiated. Alternatively, with more members, they could have had more hands to labor and build up possessions or gain gifts through the influence of greater numbers.

Would the growing community have eventually fissioned if not integrated by a central agency? Maybe not. Like some residential communities on Marajo Island, Tutu held together for periods of hundreds of years despite the lack of central authority. The literature on heterarchy suggests the need to investigate the non-centralized, non-hierarchical methods of long-term community integration (Arnold, 1996; Ehrenreich, Crumley, & Levy, 1995) that could have been responsible for this stability.

Many particular cultural features of the site are difficult to interpret with present knowledge. Some disposal customs are opaque. Some shallow human burials were usually covered with a cap of mounded soil, a pattern also found in late prehistoric burials at Corozal, Venezuela (Roosevelt, 1997). Perhaps the locations of burials were marked by the mounds, but the mounds could also have obscured burial pit locations. As in some early cultures of the coast of Peru, during the late occupation at Tutu, children's burials have more offerings than adult burials (Roosevelt, 1999). Does this mean children were especially valued or were they feared as potent sources of malign spirits needing appeasement? What was the meaning of the turtle burials, which also occur in other Antillean sites and in late prehistoric sites at Santarem in the Lower Amazon, Brazil (Roosevelt, 1994)? Such practices of the ancient neotropical communities were part of an elaborate tapestry of regional culture. Elucidating the nature and rationale of this great indigenous American tradition constitutes a compelling challenge to future generations of tropical anthropologists.

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Preface

The Tutu Archaeological Village site was discovered on 20 September 1990 by Mr Tom Linnio, who, as an environmental officer of the Virgin Islands Department of Planning and Natural Resources (DPNR), was making a routine inspection of a land parcel being cleared for construction of a shopping mall. The mall site had been stripped of topsoil which was being stored in large mounds for sale prior to construction. During his inspection, Mr Linnio observed two partially exposed human skeletons and a wide scatter of prehistoric artifacts that extended over an area of approximately 2.20 hectares. Immediately recognizing the research potential of the site, Mr Linnio reported the find to this author, Ms Elizabeth Righter, former Senior State Archaeologist for the US Virgin Islands.

Because of its relatively flat terrain and treeless expanse of open land, the site offered an unprecedented opportunity to study the remains of an entire prehistoric village and to document house types, village structure and related sociocultural patterns. This type of research had never before been conducted in the Virgin Islands. However, the site was in imminent danger of complete destruction.

The shopping mall was to be constructed on private property, which was not part of the local Coastal Zone Management (CZM) area; there was no federal funding and ostensibly no requirement for federal permits that would have triggered compliance with Section 106 of the National Historic Preservation Act of 1966 (P.L. 89–665, as amended). In 1990, there was no local antiquities act to protect either unmarked human burials or significant archaeological resources threatened by local government actions and commercial development outside the coastal zone. The developer, therefore, was not required under any territorial or federal statute to consider the impacts of his project on cultural resources, and he could not be required to fund an archaeological survey and evaluation of the site. For similar reasons, the developer could not be required by law to put the site, or portions of it, into preservation. The political climate favored mall development, and the developer verbally promised many amenities that would benefit the community.

As Senior State Archaeologist, the author approached the then Commissioner of the DPNR and State Historic Preservation Officer (SHPO), Mr Alan Smith, requesting his assistance. After the Commissioner had evaluated the significance of the site and the options for recovery of its important scientific information, it was agreed that the Office of Historic Preservation of the Virgin Islands, known as the DAHP, would undertake responsibility for data recovery. The Commissioner agreed to negotiate with the developer and granted the author permission to work at the Tutu site full time until construction of the mall began. Endorsement of the investigation by the government was the first step in a delicate set of political maneuvers that eventually led to increasing support for the archaeological excavation of the Tutu site. Nevertheless, at the time that the Commissioner gave the project his blessing, there were no staff, funds, or equipment with which to carry out the Department's intentions. The only contribution to the data recovery was Ms Righter's time and labor.

Mall developers agreed to provide access to the property until construction began and to assist with fund raising. They also donated an unoccupied building for use by volunteer archaeologists from off-island. The developers, while expressing support for the research, had little understanding of the painstaking nature of archaeology and assumed that the archaeologists would be "out of their hair" in a very short time. An impossible deadline of three months until construction start-up was imposed.

Undaunted, the author enlisted the assistance of Dr Emily Lundberg, Research Associate for the project. Without benefit of a field station, trees, or other shelter, the first two weeks of research were carried out in the pouring rain with small supplies carried in backpacks. No storage space was available on the site, and larger equipment was left out at night buried in tall grass. A sign indicating that scientific work was in progress was propped up at the entrance to the site. This was the only protection afforded the site; and, throughout the entire course of the research, when the site was left unattended, it was never vandalized or disturbed in any manner.

Land surveyors, Travis Gray and Humphrey Ongondo, of John Campbell Design Group, St John, volunteered to lay out the framework for a grid of 5 m^2 units over the entire site and to provide future Autocad mapping of exposed features and other aspects of the site. Utilizing tapes and a transit, this author and Emily Lundberg subdivided the grid into smaller units. Chris Shearman and Associates contributed supplies for water screens and Doug White and Tom Linnio each contributed to establishing a water screening system at the site. Because of the presence of a deep well on the property and electrically pumped water, it was possible to set up a continuously operating water screening and flotation system. Shortly thereafter, a systematic surface collection was conducted, assisted by weekend volunteers from community groups such as the St Thomas Historical Trust, the Environmental Association of St Thomas (EAST), the Rotary Clubs of St Thomas, the Boy Scouts and the Girl Scouts. Other local citizens also volunteered hours or days of their time (see Acknowledgments).

Citizens, concerned about the imminent loss of the site to shopping mall construction, formed an *ad hoc* committee of prominent businessmen to support the project. The resultant partnership was an outstanding example of private sector–government cooperation. The St Thomas Historical Trust, with the assistance of its president, Douglas White, and his staff, set up a separate nonprofit financial account to accept and monitor contributed funds; and Christopher Green, Architect, and his assistant, Gail Choate, undertook the enormous task of fund raising. Within a matter of weeks, a field tent had been donated and erected by the Virgin Islands National Guard. Soon thereafter a 30-foot-long ocean shipping container was donated by Antilles School, for use as a makeshift field laboratory and secure on-site storage area. With encouragement of the developer, and prodding by one of its employees, Joyce Craig, the local telephone company, VITELCO, donated USD 10,000 to the project. This breakthrough enabled the DPNR to enter into an agreement with archaeologists from the Southeast Regional Office (SEAC) of the National Park Service (NPS) to send a crew to assist the author and Dr Lundberg and other volunteers at the site.

Although the original deadline for completion of data recovery at the Tutu site had been three months, when the December 1990 deadline arrived, the developer was not ready to proceed with construction. An extension was granted and plans were made for work through April 1991.

The first prehistoric house posts and a human burial were excavated by the NPS team in December of 1990. These findings received a great amount of local publicity; and, at that point, a full-scale project was launched.

The *Daily News*, a Pulitzer Prize-winning Gannett publication, donated three full-page advertisements that were utilized by the Tutu project to raise funds, thank contributors and advertise upcoming fund-raising events. Several very successful events took place under the energetic supervision of Denise Michelini, Bill Groggin and others. As the number of visitors to the site

increased, daily tours were offered for a small fee. Tour guides were volunteers who devoted many long hot hours to trekking across the site in the hot sun, and explaining the procedures to an awed public. Films were produced by Channel 8 and by the Public Service Channel, Channel 12. The site received a visit from then Governor Farrelly and from the cast of the Hollywood movie, *Dances with Wolves*. Dr Douglas Ubelaker of the Smithsonian Institution visited the site and gave of his professional time and expertise to excavate a number of human burials and train volunteers. He later reported on the experience in his 1996 book, *Bones*. Dr Ricardo Alegría, the father of Puerto Rican archaeology, also made a visit to the site.

The Tutu project received generous funding and contributed supplies of all kinds. In order to help stretch the funding, two major resort hotels, Point Pleasant Resort and Stouffer Grand Resort Hotel, donated elegant rooms for the use of off-island professional archaeologists and qualified volunteers. Restaurants donated meals for hungry archaeologists, while car-rental agencies such as Seabreeze Car Rental, Independent Car Rental and Dan Bayard Motors donated vehicles which were used to transport supplies and to pick up archaeologists at the airport and deliver them to their hotels. Armed with contributed amenities, the project was able to attract professional archaeologists and physical anthropologists from the United States, Puerto Rico and Europe, who agreed to work six long days a week for their plane fare, a meal allowance and accommodation in a luxury hotel. In order to familiarize volunteers with the project and to obtain a consistent level of work at the site, volunteers whose transportation and living costs were supported by the project were required to be on site for at least two weeks.

Reflecting the interdisciplinary approach of the project, at the outset, recognized experts in Caribbean archaeology, zooarchaeology, paleopathology and paleobotany were contacted and their assistance with materials analysis was enlisted. Their advice was also sought as to the appropriate methods for sample collection. This precaution insured the recovery of samples that were uncontaminated and suitable for statistical analysis, and also established standards for recovery of a wide range of samples that would be comparable to similarly collected samples at other sites. Materials recovered from the field each day were registered, and artifacts needing special care were attended to in the field trailer. Recovered samples and artifacts were then moved to an improvised field laboratory in a vacant building donated by the developer. After the fieldwork ended, the author, with the assistance of Tom Linnio and Robert Pederson, personally moved the entire collection to an air-conditioned laboratory at the (DAHP). For the next five years, a cadre of dedicated volunteers, under leadership of Monique Purguy and Ann Heartburg, worked one day a week in the DAHP laboratory and another group worked one night a week at the author's home, where, under her supervision, every ceramic sherd from the collection was washed, numbered, catalogued and photographed.

In order to obtain financial contributions, it was necessary to demonstrate the presence of important archaeological material, and explaining the more esoteric aspects of method and theory to the developer and the public was a daily challenge.

Because of fluctuating funds, investigations did not always continue at full pace. Sometimes only the author and one or two assistants were at the site; and, at other times, a group of 12 or more volunteers and archaeologists would be present for several weeks. A small corps of local volunteers worked almost every day, supported by others who volunteered when they could.

In total, after a series of three- to four-month deadlines, the fieldwork for the project extended to 11 November 1991. Before the project ended, volunteers assisting with data collection and analysis had included 30 professional archaeologists, 5 physical anthropologists, 10 graduate students, 3 land surveyors, numerous other anthropologists and scientists in other fields, and more than 500 members of the community (see Acknowledgments). Ultimately the percentage of the site investigated and the amount of information retrieved are far greater than would have been

required by federal historic preservation legislation for mitigative data recovery. In 1991, the remainder of the site was obliterated by earth moving that completely restructured the terrain of the shopping mall site. In 1992 the Tutu Archaeological Village project won an American Express Historic Preservation Award.

The project is committed to materials analyses and publication of the research, two important aspects of responsible archaeology. Unlike many Virgin Islands projects, whose materials still sit on shelves awaiting analysis, the project was extremely fortunate in the generosity of the community, assistance from other archaeologists and volunteers, and a gift of USD 50,000 from the Virgin Islands government which provided funding for the materials analyses. Subsequently the author applied for and was granted an Interpretive Research Award of USD 47,500 from the NEH in Washington, DC (Grant No. RK–20224–95). These funds provided for additional analyses and supported the preparation of the current volume.

Elizabeth Righter

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From its inception, the Tutu Archaeological Village project was a community project: a cooperative government–private sector venture that relied entirely upon contributed funding and technical support, and hands-on assistance from volunteers from a wide range of disciplines and all walks of life. Contributions were diverse and ranged from scientific expertise to bubble wrap. Each person involved in the project provided an essential piece of the complex fabric which resulted in the collection and reporting of scientific data. Heartfelt thanks to all of you and to anyone whose name may have been inadvertently omitted.

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Introduction

Elizabeth Righter

Archaeological evidence indicates that the Tutu Archaeological Village site was initially occupied shortly after the beginning of the Christian era and abandoned sometime around the time of Christopher Columbus' arrival in the New World. Two major periods of site occupation took place: one between cal. AD 65 and cal. AD 900 and the other between cal. AD 1150 and AD 1500. Although earlier dates were obtained they could not be associated confidently with other evidence of site occupation. On the later end of the time scale 2-sigma date ranges extend to cal. AD 1635, but the lack of fifteenth-century European trade goods in any of the recovered material suggests that either the inhabitants of the Tutu site were not present at the time of European contact or they abandoned the site very shortly thereafter.

The Tutu site is the first Ceramic Ages prehistoric settlement in the Virgin Islands to be investigated in a holistic manner. The challenge of documenting and interpreting the complex interplay between the natural environment and human subsistence, culture, sociopolitical organization, and spiritualism underlies the theoretical and methodological approach to the Tutu site. In order to expose and record the full range of archaeological evidence, both midden and non-midden areas were investigated and interpreted. In consultation with leading experts in a number of related fields, charcoal and other samples were carefully excavated from stratified midden deposits and subjected to state-of-the art analyses. This approach permitted interpretation of the relationship of site elements, in chronologically controlled contexts. Analysis of the paleopathology of human remains from the site is one of the most extensive and comprehensive for the Caribbean islands; and these studies combined with results of paleobotanical, faunal, trace element, stable isotope and other analyses provide significant information pertaining to health and diet as well as to patterns of subsistence and natural resource exploitation. Large expanses of non-midden areas were exposed to reveal patterns of post holes, structures and burials in relationship to each other, and to a central open area or plaza, and other features.

The results of the project demonstrate the wealth of information contained in both midden and non-midden areas of a settlement, challenge our survey methodologies and suggest increased use of remote sensing techniques. The results also challenge existing federal historic preservation legislation which limits consideration of archaeological resources to impact zones. The use of interdisciplinary analysis, so often set aside in the Virgin Islands for lack of funds, also set a precedent for future research, re-emphasizing the complex nature of prehistoric settlement sites and the interrelated nature of the archaeological data that they contain.

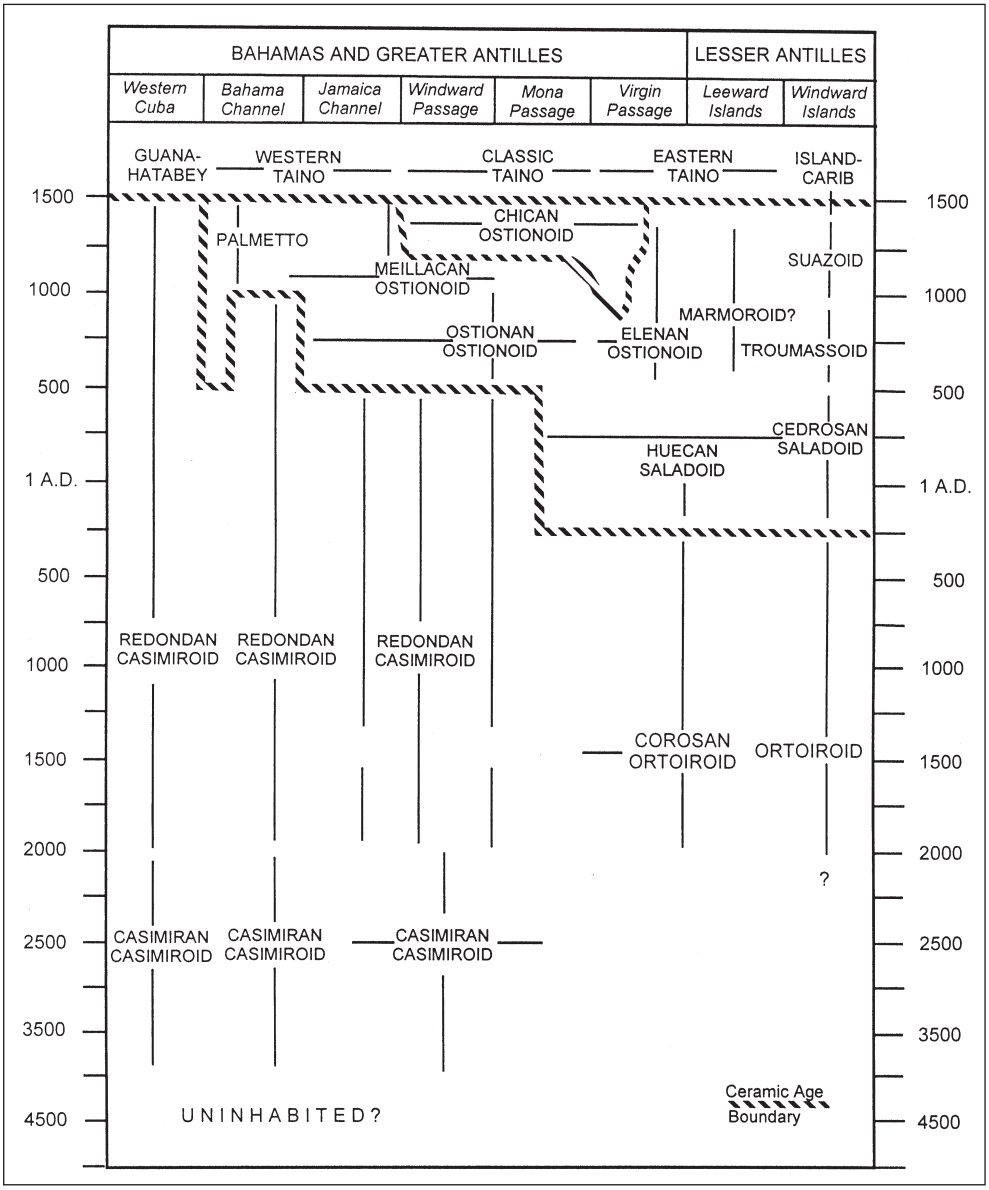

Figure I.1 Cultural chronology of the Bahamas, Greater Antilles and Lesser Antilles: ceramic series and subseries (Rouse, 1992, with modifications by Oliver, 1993: 28, Figure 6; redrawn by PCI). Reprinted with permission from Hayward *et al.* (1997).

As the first of its kind in the US Virgin Islands, the Tutu project is one among a growing number of Caribbean island projects which are contributing new information to an evolving theoretical model (see Curet, 1992; Curet & Oliver, 1998; Hofman & Hoogland, 2000; Oliver, 1998; Siegel, 1992, 1996; Versteeg &Rostain, 1997; Versteeg & Schinkel, 1992). As this data base grows, so does our ability to document the diversity of adaptation among island populations, make meaningful

inter-island comparisons and trace movements and interactions between these groups within a chronological framework. These data also document social, political and cultural change.

The major purposes of the current volume are to:

1 present the methodological and theoretical basis of the project;
2 describe field methods and present the findings of the field research;
3 present results of interdisciplinary analyses of a wide variety of carefully collected samples from the site;
4 compare these results and determine the degree to which they support and supplement each other;
5 interpret the archaeological evidence to identify changing patterns of human adaptation at the Tutu site;
6 compare findings at the Tutu site with those of other sites; and
7 make a significant contribution to the data base for the Caribbean islands.

Cultural chronology

Most authors contributing to this volume place the cultural components of the Tutu site within the existing cultural chronology developed for the Caribbean islands and widely used among Caribbean archaeologists (Figures I.1, I.2). This chronology, ordered in terms of *space–time* units (cultural chronology) and *time–form* units (cultural taxonomy), was largely developed by Irving Rouse in the course of over six decades of archaeological work in the Antilles and Venezuela (Cruxent & Rouse, 1958, 1961; Rouse, 1937, 1939, 1952; 1954; 1960; 1962, 1965, 1972; 1982, 1986, 1992; Rouse & Faber Morse, 1995; 1999). The Caribbean cultural chronology has been modified, continuously updated and refined to accommodate new archaeological finds, and to render more clearly the implied broad cultural processes of diffusion, migration, local independent development and regional interaction (Oliver, 1992, 1995; Oliver & Righter, 1998). Ceramic series and subseries, and time periods referenced in this volume, are defined and described in Rouse, 1992.

The Virgin Islands data base

The first serious archaeological investigations in the Virgin Islands were conducted by Theodoor deBooy (1919) at Salt River, St Croix and Magens Bay, St Thomas on behalf of the Museum of the American Indian, Heye Foundation. DeBooy's analysis of fauna from Magens Bay, an enlightened technique for his day, resulted in identification of two extinct species, *Isolobodon portoricensis* (a hutia) and *Nesotrachis deBooyi* (a rail), that were food resources for the prehistoric inhabitants of the site (Miller, 1918). See Chapter 4 for a comparison between recently excavated fauna of the Magens Bay site (Elliott, 1990) and the Tutu site.

The deBooy investigations were followed by those of Gudmund Hatt, who, with deJosselin deJong, conducted extensive investigations at the same two sites, as well as at the Hull Bay and Krum Bay sites on St Thomas, the Coral Bay site on St John and several other sites in the Virgin Islands (Hatt, 1924; Lundberg, 1989). Hatt's investigations at Salt River, St Croix, uncovered human remains, mounds of cultural refuse and a ball and dance court demarcated by nine upright stones, of which four were carved with figures. These investigations have been extensively reviewed by Faber Morse (1990, 1991, 1995).

During the 1960s, Bullen & Sleight (1963; Bullen, 1962; Sleight, 1962) investigated a number of sites on St Thomas and St John. On St Thomas, their excavations at Magens Bay followed

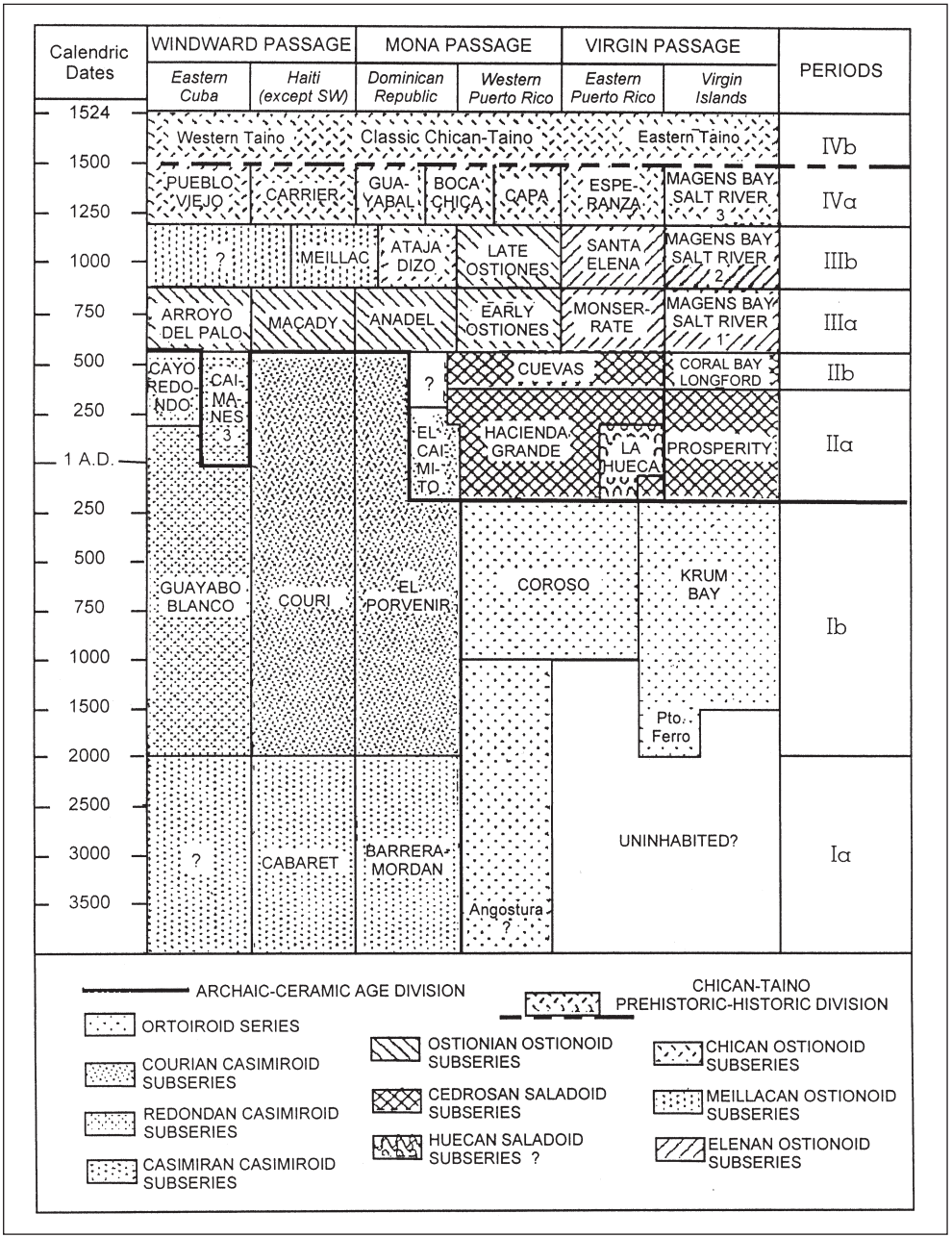

Figure I.2 Cultural chronology of the Greater Antilles: ceramic styles and subseries (Rouse, 1992; with modifications by Oliver, 1993: 17, Figure 5; Rouse & Faber Morse, 1995; Faber Morse, 1995; redrawn by PCI). Reprinted with permission from Hayward *et al.* (1997).

those of Kreiger (1938) and, at the archaic Krum Bay site, radiocarbon dates were obtained for several levels of the site (Bullen, 1973). Sleight's survey of St John sites remains an invaluable contribution to the Virgin Islands' archaeological record.

In 1973, the Government of the US Virgin Islands established an Office of Archaeological Services (OAS) whose responsibilities were archaeological research and education. Under this program, a number of sites were tested and several were nominated to the National Register of Historic Places. In 1976, a federally funded office of historic preservation, the (DAHP, equivalent to) the State Historic Preservation Office or SHPO, was established. Its mission was protection and preservation of cultural resources in compliance with the federal historic preservation program.

Between 1980 and 1982, under contract to the DAHP, Johnston compiled the Virgin Islands Inventory of Historic Places; and, between 1982 and 1997, as full-time archaeologist to the DAHP, Righter conducted research at a number of sites in the Virgin Islands, including the Tutu site. After establishment of the DAHP, however, the majority of research consisted of archaeological surveys, and limited data recovery conducted by a variety of contracting firms in compliance with historic preservation legislation. During this time National Park Service archaeologists also conducted research on all three islands, and off-island archaeologists were encouraged to conduct research projects. As a result, a number of privately funded research projects currently are underway on St John and St Thomas. In 1998, 15 years after its initial presentation to the Virgin Islands legislature, the Virgin Islands Antiquities and Cultural Properties Act was passed.

Overview of Virgin Islands prehistoric sites

As of 1997, the Virgin Islands Inventory of Historic Places listed a total of 210 prehistoric sites: 56 on St Thomas (Figure I.3); 118 on St Croix, and 36 on St John (Johnston, 1981, 1982; Righter & Lazelle, 1997). The Tutu site is the 54th prehistoric site to be identified on the island of St Thomas in the US Virgin Islands (Reg. No: 12VAm 3-54). Apart from this project, and limited data recovery required in compliance with historic preservation regulations, most Virgin Islands prehistoric sites have not been comprehensively investigated.

On St Croix, 26 single and multi-component sites contain ceramics of the Cedrosan Saladoid series. Most of these sites are situated directly on the north, west and south coasts of St Croix; however, the St George's site is situated more than 1 km inland from the south shore; and, on the north coast of St Croix, a complex of sites with Saladoid components is located in a large valley upriver from the Salt River estuary.

Four Saladoid sites have been recorded on St John and four on St Thomas (Righter, 1990, 1992, 1995).

Sites containing Ostionoid series ceramics also are found on all three islands. On St Croix, the majority of Ostionoid sites have been found on the north and south shores; however, the Fairplain site, one of the most extensive on St Croix, is located at the juncture of tributaries of Bethlehem Gut, slightly inland from the south shore (Righter, 1995). The late Ostionoid/Contact Period component of the Salt River site on St Croix is best known for its association with a visit by Christopher Columbus and his caravelle during Columbus' second voyage to the New World in 1493 (Morrison, 1942).

On St John, a series of Ostionoid settlement sites, each apparently representing a different phase, is situated along the northwest coast; and, despite generally rougher offshore waters and drier weather conditions, a variety of prehistoric sites also is known for the south shore of St John (Righter, 1992). Petroglyphs are present at Reef Bay and on Congo Cay in Pillsbury Sound, off of St John.

On St Thomas, the largest Ostionoid sites are located on the west end (Botany Bay) and on the north shore (Magens Bay and Hull Bay) of the island (Johnston, 1981). A few poorly known post-Saladoid sites also are present on Water Island and on Rotto Cay, a small island off the south shore in Mangrove Lagoon. The Tutu site, which contains both Saladoid and late Ostionoid components, is the only known major inland prehistoric settlement on St Thomas.

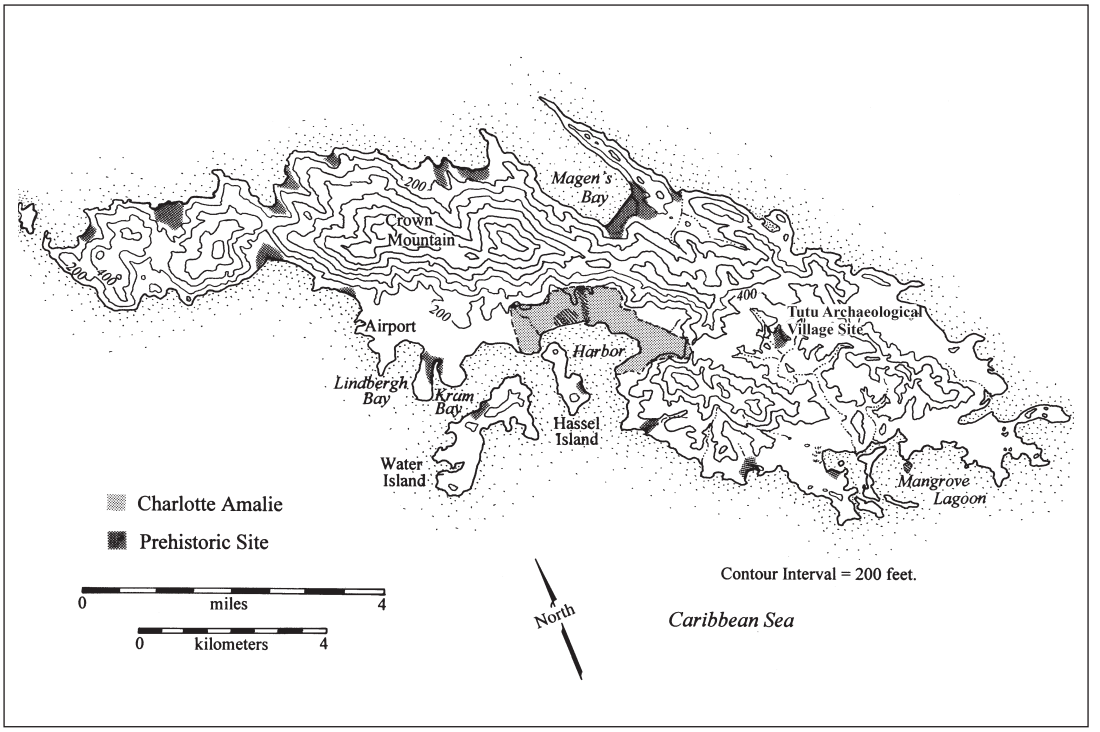

Figure I.3 Major prehistoric sites of St Thomas, USVI (graphic by Julie Smith).

THE CURRENT VOLUME AND ITS CONTENTS

Chapter 1 of this volume describes the background of the project, research rationale and field methods. It also describes samples collected and provides an overview of findings. As such, it is a site report abridged to accommodate the subsequent analytical chapters which are the essence of the volume.

By their nature, in the Caribbean especially, surviving archaeological remains represent only a small percentage of the cultural activity that took place at a site. Organic materials, often the largest part of the material culture, are subject to decay. Therefore, both the practical aspects of human life, such as subsistence and house forms, and the non-material aspects, such as spiritual beliefs and social organization, must be carefully interpreted from the archaeological evidence left behind (Righter, 1997). For example, evidence of plant cultivation or harvesting may be found in microscopic plant phytoliths recovered from soil samples collected in midden contexts (Chapter 3); or evidence of overfishing and stress on food resources can be observed in faunal remains (Chapter 4). Sometimes it is necessary to compare analytical results from a number of related fields to address a question fully. For example, results of analytical studies in Chapters 4, 7, 8, 9, and 10 may be compared to understand the combination of factors that affected the diet and health of the Tutu inhabitants. Accordingly, the central section of the volume is a series of records prepared by individual analysts who report the results of their application of the most up-to-date techniques to a wide variety of recovered samples.

This information is integrated with site specifics and compared to findings at other comprehensively investigated Caribbean sites. The final chapter compares results of the field investigations and materials analyses to focus on interpretation of the site as a whole. This interdisciplinary

approach is intended to contribute an important building block in the development of a comparative prehistoric data base for the Caribbean Islands.

It is always desirable that collected samples from an archaeological site be of a quality and significance to permit continuing research, especially as new questions arise and new analytical tools become available to the field of archaeology. The analytical results presented in this volume are but a beginning. The ceramic collection and the botanical remains from the site will be subjected to additional refined analyses in the future; and it is anticipated that the collection of prehistoric Caribbean human remains from Tutu will provide material for future specialized studies as our analytical tools continue to sharpen. Among anticipated near-future studies are examination of phytoliths extracted from abdominal soils of human burials; in-depth analysis of lithic remains; and mitochondrial DNA analysis to examine inter- and intra-population relationships during the two major occupational periods at the Tutu site.