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The Netherlands

Pre-Columbian social organisation and interaction interpreted through the study of settlement patterns

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Citation
Waal, M. de. (2006, May 29). *Pre-Columbian social organisation and interaction interpreted through the study of settlement patterns*. Leiden. Retrieved from https://hdl.handle.net/1887/4402

Version:	Not Applicable (or Unknown)
License:	Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden
Downloaded from:	https://hdl.handle.net/1887/4402

Note: To cite this publication please use the final published version (if applicable).

This book appeared as a Ph.D. thesis, Leiden University, May 29 2006

ISBN-10: 90-9020669-8
ISBN-13: 978-90-9020669-1

Cover design: Medy Oberendorff, Leiden University
Cover photographs: Maaike S. de Waal
Cover map: Michiel Kappers, In Terris Site Technieken (Amsterdam, The Netherlands)

Printed by Digital Printing Partners Utrecht BV (Houten, The Netherlands)

PRE-COLUMBIAN SOCIAL ORGANISATION AND INTERACTION INTERPRETED THROUGH THE STUDY OF SETTLEMENT PATTERNS

AN ARCHAEOLOGICAL CASE-STUDY OF THE POINTE DES CHÂTEAUX, LA DÉSIRADE AND LES ÎLES DE LA PETITE TERRE MICRO-REGION, GUADELOUPE, F.W.I.

Proefschrift
ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van de Rector Magnificus Dr. D.D. Breimer,
hoogleraar in de faculteit der Wiskunde en
Natuurwetenschappen en die der Geneeskunde,
volgens besluit van het College voor Promoties
te verdedigen op maandag 29 mei 2006
klokke 15.15 uur

door

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geboren te Eindhoven in 1972

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This edition was financially supported by the *J.E. Jurriaanse Stichting* and by the Foundation for Anthropology and Prehistory in the Netherlands.

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PREFACE AND ACKNOWLEDGEMENTS

The present thesis results from a PhD study that I carried out between 1997 and 2003 at Leiden University (The Netherlands). It was part of a research-project focusing on pre-Columbian interaction on the Lesser Antilles, that further comprised archaeological investigations by dr. Corinne Hofman and Sebastiaan Knippenberg. They studied pre-Columbian interaction on the basis of pottery style distributions and the exchange of flint, St. Martin greenstone and calci-rudite '*zemi*-stone' on the northern Lesser Antilles respectively. I designed my part of the project to focus on pre-Columbian social organisation and interaction in a smaller part of the Caribbean by creating a detailed site inventory through surface surveys and test excavations and by investigating the resulting site patterns and systems. The research area includes the Pointe des Châteaux peninsula, La Désirade and Les Îles de la Petite Terre (Guadeloupe, French West Indies). The project may be considered a follow-up of small-scale archaeological investigations I had been doing at Anse Petite Rivière on La Désirade in 1994 and 1995, which resulted in my 1996 MA thesis and a great personal passion for the island of La Désirade. It also matches the archaeological investigations (1994-2000) carried out at Anse à la Gourde by André Delpuech (*Direction Régionale des Affaires Culturelles* of Guadeloupe), dr. Corinne Hofman and dr. Menno Hoogland (Leiden University). Last but not least, the project was designed to make a contribution to the *Carte Archéologique* (regional site inventory) project of the archaeological service of the *Direction Régionale des Affaires Culturelles* (DRAC) of Guadeloupe.

This study would never have been possible without the help of many people and institutions, to whom I would like to express my deepest gratitude here. First of all, it was financed by the Faculty of Archaeology of Leiden University, and supervised by Prof. dr. Leendert Louwe Kooijmans, dr. Corinne Hofman, and dr. Menno Hoogland. The required fieldwork, financed by grants from the French Ministry of Culture, was supported by the directors of the archaeological service of the DRAC of Guadeloupe, André Delpuech (1992-1999) and dr. Antoine Chancerel (1999-present). The Prins Bernard Foundation, the Dutch Foundation for Scientific Research (NWO), and the Leiden University Foundation (LUF) financed my participation in archaeological meetings in the Netherlands, the Caribbean and the United States.

Very special thanks go to the 1998-2000 fieldwork participants Florine Asselbergs, Marc Dorst, Michiel Kappers, Kirsten Leijnse, Jochem Lesparre, Esther Mietes, Axel Müller, Mark Nokkert, Frank Stevens, Menno Van der Heiden and Wilmar Visschers. I am very well aware that without their enormous efforts, professional work, enthusiasm and humour, literally fighting their way through areas with vegetation that seemed impenetrable and ignoring mancenilla tree accidents and attacks by jacks, bulls and dogs, the fieldwork would never have been possible. I am very grateful as well for the great help offered by scientific staff and students working at the 1997-2000 excavations at Anse à la Gourde.

All land-owners kindly permitted survey or subsurface testing procedures on their land: Mrs. Galli on Pointe des Châteaux, and on La Désirade Mrs. Patrice St. Auret, Mr. Berno Berchel, Mr. René Berchel, Mr. Jean De l'Orme, Mr. Lalanne, Mrs. Maston, Mr. and Mrs. Robert, Mr. Etienne Speno and the *Office National des Forêts* (ONF). On La Désirade, help provided by Michel Manubens, Mr. and Mrs. Guy Villeneuve, Pegguy Villeneuve and his friend Claude, Jacques Zamia, the crew of the Colibri, Mrs. Alexis, Mr. Calvados-Luce of the pharmacy, the warden of the airport, and the gendarmes made the fieldwork something to remember. Mr. Robin, former mayor of La Désirade, and Mr. Maston, director of the land registry office, arranged us with the special authorisations required for the fieldwork on the La Désirade airport and on the uninhabited islands of Petite Terre. I also would like to thank André and Claude Delpuech and Thomas and Chrystelle Romon for their incredibly warm hospitality on Guadeloupe.

Sebastiaan Knippenberg provided a description of the lithics recovered and Mark Nokkert studied the vertebrate faunal remains, which was made possible by a NWO grant. Dennis Nieweg offered his expert opinion on the most undeterminable shell fragments. A team of geologists, headed by dr. Simon Troelstra (*Vrije Universiteit*, Amsterdam), provided an important part of the environmental data presented in chapter 3. Jochem Lesparre and Wilmar Visschers (Faculty of Geodesy, Delft University of Technology) provided the co-ordinates for the test unit locations. I am greatly indebted to Alistair Bright for checking the English text of this volume and to Harry de Waal for correcting the French summary and all the French reports I had to write since 1994.

Artefact drawings were made by Florine Asselbergs, Jan Boudestein, Marc Dorst, Erick van Driel, Chris van Gestel, Alex Geurts, Rozemarijn Kneepkens, Frank Stevens and myself. The drawings were elaborated by Erick Van Driel (Leiden University) and Rozemarijn Kneepkens

(figures A2.12a-c, A2.16c, A3.9a-d, A3.35 bottom right, A4.2a-d, A4.4a-h). Medy Oberendorff (Leiden University) designed the cover, created the maps and elaborated the drawings of the test unit sections. Jan Pauptit (Leiden University) took the photographs. I owe many thanks to Wietse Balster for his great help in creating the lay-out of this volume.

I would like to thank Leendert, Corinne and Menno as well as Benoît, Claudia, Esther, Laura, Sabine, Sebastiaan, Simone, Wynne and Yvonne for their great support. Most of all, I'd like to express my gratitude to Jochem, my parents and Anke for all their love and support during the long time it took me to finish this project. It is to them and to Ingmar that I would like to dedicate this work.

Maaike, Leiden 2006

1. PRE-COLUMBIAN SOCIAL ORGANISATION AND INTERACTION IN THE LESSER ANTILLES: AN INTRODUCTION

The study of pre-Columbian social organisation and interaction in the Caribbean has largely centred upon the Greater Antilles, and only quite recently has attention started to focus on the Lesser Antilles. The past decade witnessed a notable increase in studies on pre-Columbian social organisation, concentrating in particular on the later pre-Columbian period in the northern Lesser Antilles (e.g. Crock 2000; Crock and Petersen 2004; Hofman 1993; Hoogland 1996; Hofman and Hoogland 2004; Knippenberg 2004). The present study aims to contribute to the understanding of pre-Columbian social organisation and interaction in a small region within the Lesser Antilles, namely the Eastern Guadeloupe micro-region.

1.1 EARLIER RESEARCH

1.1.1 Introduction

Caribbean archaeology has long focused almost exclusively on the construction of a regional chronological framework based on the study of pottery styles. This work was started by professor Irving Rouse in the early 1930s and many Caribbean archaeologists contributed to the constant refining of this framework (section 4.2.1). Mirroring trends in American and European archaeology, albeit slightly delayed, a gradual shift has occurred from this largely cultural-historical approach, that fitted well into prevailing scientific archaeological approaches of the first decades of the 20th century, to ecologically oriented studies. The latter, largely focussing on adaptation of pre-Columbian societies to prehistoric insular environments and on economic exploitation of these environments, became increasingly numerous from the 1970s onwards. Study of other aspects, such as socio-political organisation and ceremonial use and perception of the environment, has been becoming increasingly important, and it is deemed that when combined with more economically based studies, these aspects provide valuable insights into pre-Columbian social organisation and interaction.

As mentioned above, studies of pre-Columbian social organisation in the Caribbean have long been focused on the Greater Antilles. This is because of the relative wealth of Spanish ethnohistoric documents, dating from the first contacts between Amerindians and Europeans and describing different aspects of complexly organised pre-Columbian societies of the chiefdom type in the Greater Antilles. These societies were grouped in *cacicazgos* headed by a *cacique*. The complex character of these societies has been underscored by archaeological evidence, including the emergence of a site hierarchy and regional centres in the form of ball-court sites (e.g. Curet 1992; Siegel 1992; Torres 2001). Several attempts have been made to explain this emergence by hypothesising population growth (see for example those listed in Wilson 1997:52), but Curet (1992) noted through carrying capacity studies in the Valley of Maunabo on Puerto Rico that this could not account for the growing complexity observed. Thus no evidence was found that environmental circumscription, stimulating population pressure in case of demographic increase, played an essential role in the process of increasing complexity. According to Siegel (1992), monopolisation and intensification of ritual and cosmology played a pivotal role in developing complexity.

Much less attention has been paid to the social organisation of pre-Columbian societies inhabiting the Lesser Antilles. Information is lacking for the later pre-Columbian period in particular. It has generally been assumed that the region-wide homogeneity of Saladoid style ceramics (section 4.2.3), typical for the earlier period, indicates a tightly organised society, fostering close contacts over long distances within the Caribbean. However, though sharing many similarities, Saladoid ceramic assemblages throughout the region are more heterogeneous than has generally been thought (Hofman and Hoogland 2004). The end of this Early Ceramic Age is characterised by the development of more localised style zones (Hofman 1993). These styles have often been labelled post-Saladoid (section 4.2.4). Ethnohistorical sources, that may shed some light on relevant social processes, are less abundant for the Lesser Antilles when compared to those on the Greater Antilles and they postdate by more than a century the earliest contact period (section 1.4.7). French historical documents, dating from this later period, do not describe societies to be as complex as they were in the Greater Antilles but as small and egalitarian instead (Breton 1978[1647]; Moreau 1990). The nature of the archaeological record itself, which does not lend itself to easy correlations with certain stages of social complexity, did not provide a stimulus for the study of socio-political organisation within this area either, when compared to the Greater Antillean record.

1.1.2 Social organisation

As for pre-Columbian social organisation in the Lesser

Antilles, the general impression that arises when regarding archaeological evidence for the Early Ceramic Age, is that of communities dispersed over the islands, living in rather large villages, maintaining regular and close contact with each other by means of communal activities. The relatively swift and successful spread from the South-American mainland over several Caribbean islands and the long maintained uniformity in pottery style that all these communities share indicates the existence of long distance contact networks (Hofman and Hoogland 2004; Keegan *et al.* 1998; Watters 1997). These networks probably played an important role in the region-wide spread of semi-precious stone artefacts, which is typical for this period, as well. The evident degree of complexity has led Hoogland (1996:9) and Siegel (1989) to label those societies 'complex tribes'.[1] The absence of evidence for settlement hierarchy based on settlement sizes or for burial stratification suggests an egalitarian society without hereditary personal status differences (Curet 1992). So-called local 'big-men' may have played a role of some regional importance, however, in the initiation and maintenance of the long-distance contact-networks and therefore achieved leadership should not be ruled out (Boomert 2000). Siegel (1989:202) and Petersen (1996) also emphasise the existence of status variation and the absence of centralised authority.

The Late Ceramic Age in the Caribbean is characterised by divergent pottery styles (section 4.2.4). Part of the current archaeological discussion centres on the question whether Lesser Antillean communities surpassed the tribal level and were developing chiefdom societies instead during this period. Archaeological investigations at Kelbey's Ridge (Saba) and Anse à la Gourde (Guadeloupe) did not provide evidence for hereditary status variation, which may be considered typical for chiefdom societies (Hofman *et al.* 2001[c]; Hofman and Hoogland 2004). Site differentiation, however, does increase during this period, mirroring developments in a society experiencing growing social and political complexity (Hofman and Hoogland 2004). Others, however, are convinced of the existence of Lesser Antillean chiefdoms during the early period of the Late Ceramic Age. The presence of large residential sites on Anguilla and smaller special activity sites on St. Martin and Dog Island and the existence of an exchange network involving lithics in the Anguilla - St. Martin interaction sphere led Haviser (1991) and Crock (2000) to surmise the existence of a multi-island chiefdom in this region in which Anguilla occupied a central position. Based on a hierarchical site pattern on Late Ceramic Anguilla and the presence of special 'elite-related' artefacts, Petersen and Crock (1999) suggested that the social and political level of pre-Columbian social organisation was more hierarchical than is usually suggested on the basis of ethnohistorical accounts.

Knowledge of the socio-political organisation during the latest part of the pre-Columbian period, relatively well documented in the Greater Antilles thanks to Spanish ethnohistorical accounts, remains scarce for the Lesser Antilles. This period is characterised by a sizeable decrease in the number of sites and by influences from other regions or contacts with other regions. The discovery of the Chican Ostionoid site of Kelbey's Ridge 2 on Saba led Hofman (1993) and Hoogland (1996) to suggest that Saba was incorporated within the interaction sphere of one of the Greater Antillean *cacicazgos*. The Morne Cybèle site on La Désirade, dated to this latest period, yields pottery, decorated by a style not implemented elsewhere (Hofman 1993, 1995; Hofman and Hoogland 2004), that suggests influences from the South-American mainland, and a shell mask that appears to reflect Greater Antillean style influences (section 5.5.1).

Several Caribbean archaeologists have tried to obtain an insight into pre-Columbian social organisation by investigating settlement patterns (e.g. Goodwin 1979; Keegan 1985; Watters 1980). Site inventories have been made since 1907 onwards through non-systematic archaeological reconnaissance studies that were usually biased (section 2.1.3). Unfortunately, these incomplete inventories are widely used to investigate existing or new ideas on pre-Columbian landscape use. The attempts to make systematic site inventories in the Lesser Antilles are more limited, notwithstanding the fact that some very positive exceptions exist for other parts of the region (e.g. Antczak 1998 for the islands off the Venezuelan coast; Curet 1992 for parts of Puerto Rico). This is an obvious result of the time and resources constraints with which every archaeologist is familiar. Moreover, not all of the Antilles are equally suited to making efficient inventories through surface surveys, the problematic sedimentation histories and typically dense, impenetrable vegetation of those areas being the most significant problems.

1.1.3 Inter-insular relationships

Pre-Columbian interaction, a subject that is intertwined with social organisation to an important degree, has been studied from different perspectives, even though most are related to economic or socio-political exchange. One of the most eye-catching features in Caribbean archaeology, namely the region-wide occurrence of homogeneous pottery styles during a considerable time-span within the pre-Columbian period, is only one of the indications for pre-Columbian Amerindian interaction. The existence of contacts between inhabitants of different islands or direct access to non-local sources of raw materials has been well demonstrated in the Caribbean. Region-wide distributions of

semi-precious stones, valued for the manufacture of beads and pendants, have indicated the existence of long distance contacts between the South-American mainland and many of the Lesser Antilles (Boomert 1987[a]; Cody 1991). It has been made clear in earlier studies (e.g. Boomert 2000:3) that water passages separating the islands should be considered communication routes instead of barriers in view of the excellent sea-faring capacities of the Amerindian inhabitants of the Antilles. This created favourable conditions for inter-island contacts.

Contacts over shorter distances have been reported on the basis of distributions of non-local lithics, including chert, flint, calci-rudite *zemi*-stone and semi-precious stone material (Cody 1991; Crock 2000; Knippenberg 2001[a-b], 2006; Watters 1997). Haviser (1991) suggested an interaction sphere including the islands of Anguilla and St. Martin. The presence of volcanic inclusions in ceramics from limestone islands such as Anguilla and Barbuda indicates that temper materials, clays or possibly complete pots were transported from, presumably nearby, volcanic islands (Crock 2000; Donahue *et al.* 1990; Fuess 2000; Watters 1997). The procurement of certain artefacts or raw materials, such as shell, that are not distinctly 'exotic' can unfortunately not be demonstrated. It may be expected, however, that in some instances shell was obtained non-locally as well, as Serrand (1999) demonstrated based on the presence at Hope Estate on St. Martin of ornamental artefacts made of fresh-water *Unionoida* shell, which originated either from the Greater Antilles or the South American mainland. Micro-regional interaction spheres were demonstrated as well on the basis of similarities between the ceramic assemblages of the sites of The Bottom on Saba and Sandy Hill on Anguilla (Hofman 1993).

Although the presence of long-distance as well as short-distance contacts has been demonstrated, the nature of these contacts and of the underlying socio-political organisation is more difficult to determine. In many cases, it is not clear whether pre-Columbian inhabitants of sites had direct access to raw material occurrences on other islands that could be exploited during specially organised trips, or whether exchange of raw materials or finished artefacts was taking place between inhabitants of different islands. The presence of St. Martin lithics in Anguilla site assemblages, for example, has been explained by possible direct procurement, while it has been suggested that ceramics and other lithics were probably obtained through exchange (Crock 2000).

Ethnographic studies contribute to a better understanding of the nature of exchange, which is difficult to grasp, as it is usually not merely related to economic 'everyday' activities or to social storage acting as a buffer against periodic food scarcity (*sensu* Halstead and O'Shea 1982; O'Shea 1981). It involves complex socio-political and possibly ceremonial relations as well. This latter aspect emphasises the existence and reinforcement of inter-personal or inter-community contacts that are considered important for the functioning of society. These contacts need to be re-established from time to time during specially organised group meetings and exchanges of women and goods (e.g. Mauss 1950; Rappaport 1984[1968]; Sahlins 1965). This aspect is important enough, for example, for the Yanomamö to artificially maintain a differentiated product manufacture between villages (Chagnon 1983:149-150).[2] Such meetings often involve other important activities as well such as economic exchange of objects or raw materials that are not locally available. Alongside the long-distance ceremonial Kula system in Melanesia, for example, exchange of utilitarian goods, as well as customs, songs, art motifs and general cultural influences, takes place (Malinowski 1953).[3] Another important feature is the meeting of potential marriage partners, vital in small insular environments. The exchange of 'special' highly valued artefacts and the ability to maintain exchange relationships may also play a significant role in the emergence and consolidation of social stratification in societies. O'Shea (1981:167) warns, however, that the economic aspect of exchange should not be overshadowed or even neglected as a result of the great emphasis that is put on its social and ceremonial aspects nowadays.

1.2 RESEARCH PROBLEM

As can be concluded from the section above, several studies have been carried out with the aim of investigating pre-Columbian social organisation and interaction in the Caribbean. Although research at site or island level occurs, most studies aim at a regional approach and use an archaeological database based almost exclusively on relatively large and well investigated settlement sites. This produces rather vague patterns of relatively large regions that blur the view of local or micro-regional processes, and that tend to result in an overrepresentation of large settlements. This partly stems from the traditional nature of Caribbean archaeological research, focusing largely on the identification and investigation of large settlement sites with long periods of occupation instead of the creation and use of detailed and systematically compiled site inventories. Very little attention has been paid to site function differentiation and to pre-Columbian use of other types of sites related to activities other than permanent settlement. It is thought that without a detailed insight into processes related to pre-Columbian social organisation and interaction on a

micro-regional scale, it remains impossible to accurately understand these processes on a larger, regional scale. Detailed and systematically made site inventories, specially created to answer specific research questions and covering a complete micro-region, are required to obtain a more accurate understanding of social organisation relating to local and micro-regional inter-site and inter-island contacts. Such studies, however, are virtually non-existent, bar those of Crock (2000), Curet (1992), Hoogland (1996) and Keegan (1985).[4]

The present project, which is part of a Leiden University research-project focusing on pre-Columbian interaction on the Lesser Antilles (see preface), was designed to make a contribution to this micro-regional approach. It focused on the central research question: what information can be obtained on pre-Columbian socio-political, economic and ceremonial organisation and interaction through the intensive and systematic study of a micro-region? Obviously, the wish to understand regional patterns surpasses the possibility of creating and using fine-grained archaeological data. It should be specified here that the study aims to combat the traditional bias on large settlement sites by including other types of sites present within the research area as well. The study area selected includes the easternmost part of Guadeloupe, consisting of Pointe des Châteaux, La Désirade and Les Îles de la Petite Terre (section 1.4.2 and fig. 1.1).

1.3 RESEARCH OBJECTIVES

As a starting-point for this study, it was deemed that pre-Columbian social organisation in a micro-regional perspective would be best understood through the analysis of site patterns, providing dynamic overviews through time, and site hierarchy. The latter refers to the localisation and understanding of sites that may have played a central role in these patterns as well as the characterisation of smaller, peripheral sites.

The objectives of the project, formulated to answer the central research question presented above, were four-fold. The first objective relates to the natural environment, both past and present. The physical landscape of the research area during pre-Columbian times provides information on conditions for Amerindian settlement and use, exploitation and perception of the environment. In addition, recent environmental data provide useful information on site survival and fieldwork conditions in general. A team of geologists from the *Vrije Universiteit* of Amsterdam was asked to collect information on processes that may have influenced the local physical environment. Geological fieldwork was carried out in 1999 and 2000 and focused on the effects and rate of coastal erosion, the rate and impact of formation and movement of dunes, and the stability, extent and location of salinas in time (Troelstra and Beets 2001[a-b]).

Secondly, it is obvious that the study requires a reliable and detailed archaeological database. This has been provided through (micro-)regional surveys. To understand different facets of socio-political, economic and ceremonial organisation, the archaeological record should include a systematically collected site sample that can be used for the presentation of a detailed long-term settlement history and diachronic archaeological site patterns for the research area.

In the third place, archaeological data collected, including site information (site location choice, subsistence and artefacts) and site patterns, were studied to obtain information on local or micro-regional socio-political, economic and ceremonial organisation and interaction, and use and perception of the landscape in different pre-Columbian periods. It is assumed that stylistic analysis of ceramic assemblages as well as provenance studies on lithic artefact inventories of the sites provide information on interaction in micro-regional areas (*cf*. Hofman 1993; Knippenberg 2006.). The investigation of the site hierarchy is a point of interest here, as it may be expected that the hierarchy of the site pattern reflects the hierarchy of the society involved.

Fourth, and finally, as the research area represents a marginal area when compared to the large and ecologically diverse island of Guadeloupe, the information collected has been compared to archaeological data from Guadeloupe, particularly from Grande-Terre, and other Lesser Antillean islands. It is possible that site patterns as identified in the study area may be considered representative for the larger region surrounding it but they may reflect local adaptations as well. The project may provide information on relations between main sites and more marginal sites within the micro-region that can be used to launch ideas for larger areas on Guadeloupe.

Two basic assumptions needed to be made at the start of the project. The first and most important assumption was that pre-Colombian activities within the research area would be reflected to some extent by distributions of archaeological material on the surface. The second assumption was that surface surveys of the research area would adequately locate concentrations within these distributions, reflecting the areas where repeated or concentrated actions took place in the past.

1.4 RESEARCH STRATEGY, METHODOLOGY AND DEFINITIONS: THE EAST-GUADELOUPE PROJECT

1.4.1 Introduction

The East-Guadeloupe project was inspired by studies on landscape archaeology (e.g. Alcock 1993; Attema 1996[a-b]; Barker 1991; Barret *et al.* 1991; Cherry *et al.* 1991; Rossignol and Wandsnider 1992; Tilley 1994; Ucko and Layton 1999, among many others). Central in the landscape approach is the concept of landscape itself. Although palaeoecologists may choose to restrict the term landscape to the physical and biological environment, landscape may also be considered a social product or a cultural image. This implies that the way of living and understanding the world is not only dependent on time, place, historical conditions and personal conditions such as gender, age, and social and economic position (Bender 1993:2), but also that landscapes relate to human activity and transformation by humans of the natural environment. A landscape can be seen as an ancestral map (Tilley 1994:37) or "an enduring record of – and testimony to – the lives and works of past generations who have dwelled within it" (Ingold 1993:153, cited in Attema 1996[b]).[5] In this sense, a landscape reflects a cognitive or symbolic ordering of space (Attema 1996[b]:5) and important and enduring aspects shaping such orderings include landscape myth and memory (Schama 1995:15). Still, a landscape is seen here to primarily consist of the physical environment, including mountains, water sources and streams, the sea, vegetation and so on, with man-made arrangements as an additional characteristic. The meaning of such arrangements is only then visible in the archaeological record if activities took place in the past that left traces that are still perceptible today.

Ideally, the outside or 'etic' view, focusing on tangible features of the environment such as ecology and natural resources, should be combined with the inside or 'emic' perspective which is steered by the cognitive and symbolic meanings of the landscape. The problem, however, is that non-local archaeologists see the landscape in a very different light than the recent Creole inhabitants of the area, let alone the Amerindian inhabitants. Therefore, unfortunately, the archaeologist's perspective will remain that of an outsider, or, as Thomas (1993:24) puts it, that which will be represented is "a picture of past landscapes which the inhabitant would hardly recognise".

Archaeological landscapes, or, as in Rossignols (1992:4) definition, distributions of archaeological artefacts and features relative to elements of the landscape, may both invoke and reflect diachronic statuses and changes in socio-political, economic and ceremonial aspects ruling human life. The archaeological landscape may be considered the material reflection of actions and activities related to these aspects.

Recurrent aspects in landscape studies are the concepts of space and place. Tilley (1994) distinguishes between different kinds of space, which create a socially produced medium for human action. Space is an abstract and subjective construct in the sense that "what space is depends on who is experiencing it and how" (Tilley 1994:11, 15). Places, in the words of Cosgrove (1989:104), are "physical locations imbued with human meaning". They have biographies, narratives recalling their formation, use and transformation, stressing links between people and specific features of the landscape (Tilley 1994:33). As Agnew and Duncan (1989:2) correctly stress, three aspects of place should be considered complementary instead of competing dimensions. These are the spatial distribution of social and economic activities, settings for everyday social interaction, and "identification with a place engendered by living in it". These three dimensions are indispensable for an understanding of regional organisation and interaction but the third dimension of space, related to human perception of the landscape, which is not only based on personal experience by sense organs but also on collective memory, is obviously difficult to study archaeologically. As a consequence it is underrepresented in Caribbean archaeological studies.

A systematic investigation of the entire research area, and its socio-political, economic as well as ceremonial 'landscapes', is considered the best means to answer the research question formulated in section 1.3. The present study will not provide much detail on starting-points, history or methodologies of landscape studies in general, as sound overviews have been presented elsewhere (see references listed above) and as most focus on European cases. Instead, it isolates some aspects, relevant to the basic aspects of research strategy and methodology of the project. The aim of investigating complete landscapes naturally has an important impact on the area that can be investigated, the archaeological database to be used as well as the fieldwork methods required to provide a reliable regional database. These will be shortly introduced in the following sections.

1.4.2 Selection of the study area

Due to the character of this study (section 1.4.1) a regional approach was required. However, as it also demanded detailed archaeological fieldwork and as the time frame and resources of the project were limited, a strictly bounded area had to be selected. Out of many suitable possibilities a choice was made based on a series of practical arguments, resulting in the selection of the Eastern Guadeloupe micro-region. This area consists of the Pointe des Châteaux peninsula,

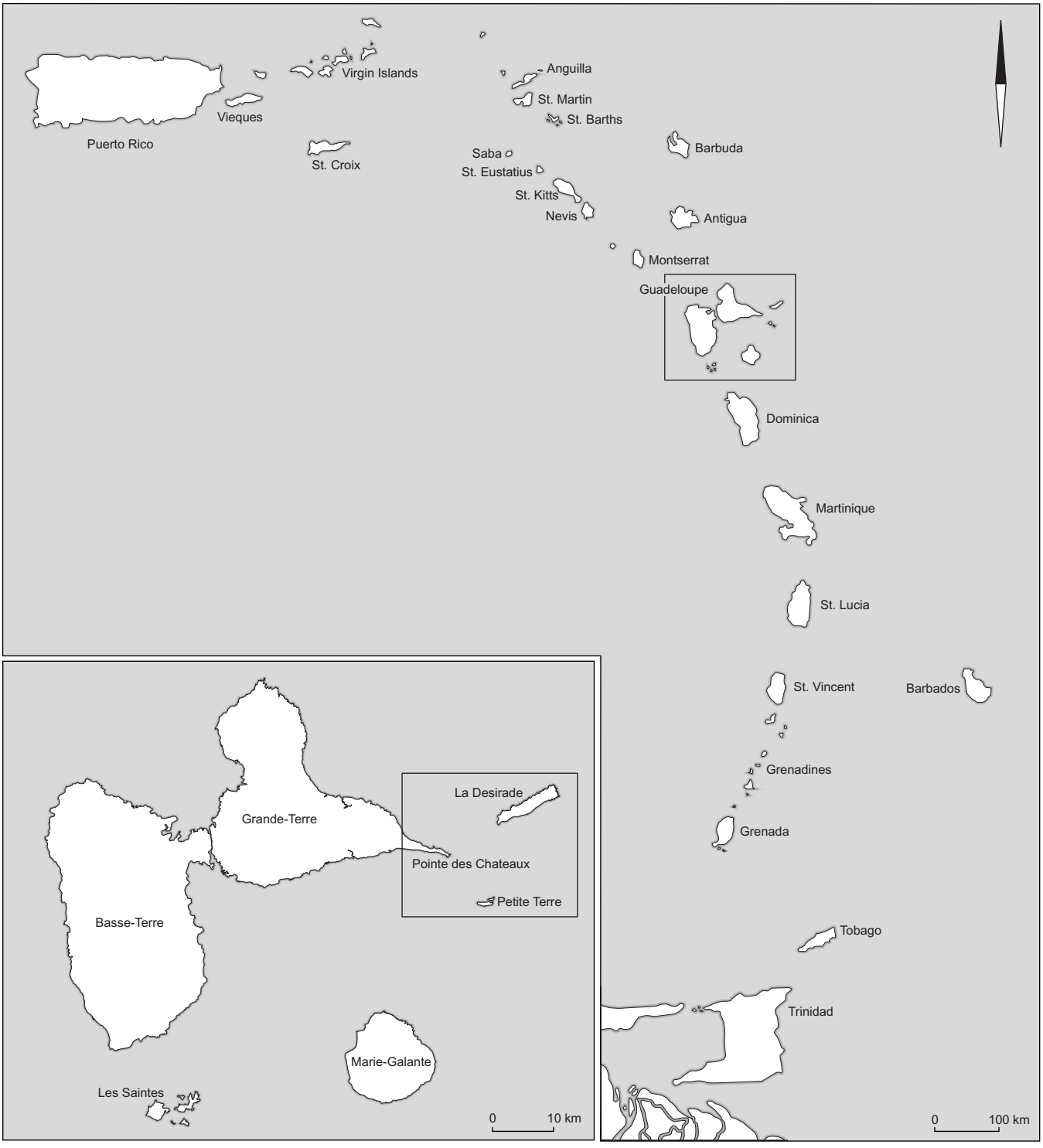


Fig. 1.1. Map of the Eastern Caribbean and the location of the research area (detail).

which is the easternmost tip of Guadeloupe, and the islands of La Désirade and Les Îles de la Petite Terre, as the small islands of Terre de Haut and Terre de Bas are called officially (fig. 1.1). They will be referred to as Petite Terre, as is common practice on Guadeloupe. In the present study, Eastern Guadeloupe does not refer to Grande-Terre but to the study-area instead.

Investigations at Anse à la Gourde, carried out by teams from Leiden University since 1995 on a yearly basis, had already demonstrated the great archaeological potential of this area (Hofman *et al.* 2001[a]). Some other large settlements, such as Les Sables (Bodu 1985[b]) and Anse Petite Rivière (De Waal 1996[a-b]) on La Désirade, had already been investigated as well. The presence of such large settlement sites suggests that a larger range of site types, more or less related to home ranges of the settlements, areas exploited on a daily basis, can be expected in their surroundings. Intensive study of the Eastern Guadeloupe micro-region would thus provide information on Eastern Guadeloupe settlement systems.

This specific micro-region was selected with the full support of André Delpuech, at that time the director of the archaeological service of the *Direction Régionale des Affaires Culturelles* (DRAC) of Guadeloupe. He wished to include this area, where very little systematic archaeological fieldwork had been carried out until then, into the *Carte Archéologique* project of the DRAC (section 2.1.4).

The selection of the Eastern Guadeloupe area was also considered attractive for other reasons. It was expected that the project would contribute to a better understanding of the pre-Columbian occupation history of Guadeloupe as a whole. Guadeloupe holds a key logistical position, being the largest island of the Lesser Antilles. Guadeloupe ceramic assemblages showing influences from both the northern as well as the southern Lesser Antilles suggest the island was strategically situated between the Leeward Islands and the Windward Islands (Allaire 1992). In addition, the short distances between the different parts of the study area as well as the marine shallow flats within this triangle must have facilitated transportation and communication, encouraging micro-regional interaction. Moreover, the parts of the study area are not isolated, but situated very near to Guadeloupe, Marie-Galante and Antigua, and close interaction can be supposed to have taken place. Finally, the present-day situation of the study area is favourable for the fieldwork required. It provides an environmental situation that allows surface surveys, needed for the site inventory, and it also has favourable administrative and social conditions, regarding acceptance of and authorisations for the project by local landowners, facilitating the fieldwork.

1.4.3 Fieldwork methods

1.4.3.1 Introduction

The study of human activity across an entire landscape requires a detailed archaeological database containing information on the past use of this landscape. It demands a method that provides an efficient and accurate inventory of the archaeological sites present and that furthermore allows an analysis of the long-term trends in site patterns within the selected study area. The method selected for the present study involves surface surveys. The physical characteristics of the research area allow this method of investigation, as the relatively flat and accessible area is characterised by modest sedimentation. In addition, it is rather small and therefore provides possibilities for easy orientation on topographic features related to the coastline. Finally, the vegetation slows down, but does not preclude surface observation, although dense acacia and mancenilla forest make working in some areas far from appealing. The leaves of both kinds of vegetation, however, are tiny and they can easily be removed from the surface.

Surveys are a reliable means of attaining region-wide and diachronic archaeological information. Although surface surveys generally provide data with a low chronological resolution and only little information on individual sites, in terms of site structure, they are well suited to the study of general and long-term processes or trends in human activity in a micro-region or a region (section 1.4.4). Other limitations of the method of surface surveying certainly exist as well. These are related to observation and have been outlined in section 5.2.1. It has been chosen, however, not to neglect possible disadvantages of surface surveys as a method but rather to investigate the potential impact of personal, environmental or methodological aspects of the fieldwork on the reliability of the archaeological site inventory that needs to be made.

1.4.3.2 Surface concentrations, sites and off-site or non-site material

In spite of some early criticism postulated by Thomas (1975) and Foley (1981) who questioned the utility of the focus on sites, the latter turning to off-site archaeology, the concept of site is widely accepted and has remained central to archaeological investigations. Sites have been described simply as places where archaeologists find concentrations of artefacts (Dewar and McBride 1992:231) or as "locations of concentrated residues of human activity" (Benes and Zvelebil 1999:74). More than a decade later, however, a growing number of archaeologists began to reject the site concept considering it an ambiguously defined, inadequate conceptual and analytic unit and advocated the use of

smaller-scale observational units, such as artefacts (Dunnell 1992). The main criticism of others, such as Rossignol and Wandsnider (1992), centres on the idea that sites are simply not the best unit for the investigation of land use. Zvelebil *et al.* (1992:193) argue that the concept of site should be replaced by the concept of 'the archaeological landscape'. It has been argued that in some regions it is profitable for specific time periods to study distributions of archaeological material directly related to the landscape without distinguishing between on-site and off-site archaeological material. Instead, the distribution of archaeological material at the surface, reflecting variations in densities and concentrations all over the landscape should be studied, without trying to distinguish more or less bounded activity areas. Others, including Binford (1992) and Dewar and McBride (1992), defend the use of the concept of site since they consider it a useful tool for understanding regional organisation, perceiving sites as unambiguous consequences of real archaeological and behavioural events in the past. Binford (1992:52) stresses that the focus is and needs to be on the explanation of patterning, and that the choice for site and non-site approaches merely involves a question of scale. Following Binford's line of reasoning the emphasis in the East-Guadeloupe project is on sites, and embracing the site concept automatically implies that off-site material is recognised as well.

The decision to focus on sites was based on the fact that, as this study is merely a first reconnaissance of the research area, it does not seem logical to start concentrating on details within the material distributions at the surface. In addition, the study asks for information on longer-term processes, and their resulting accumulations of material, surface concentrations or sites, in order to reconstruct regional patterns. Furthermore, archaeological material in the research area appeared to surface in rather distinct concentrations instead of revealing itself in continuous carpets. Among the most important reasons for choosing a site-based approach, however, is the limited possibility for studies of off-site or non-site archaeological material in the research area. It is usually impossible to provide chronological assignments for non-ceramic off-site material and ceramic off-site material, which tends to be rather weathered and fragmented, is very difficult to study as well. This is mainly a result of the traditional Caribbean archaeological studies, heavily focusing on the refinement of the regional chronological framework, based on and therefore slightly emphasising the analysis of ceramic morphology and decorations on ceramics. This greatly complicates the study of fragmentary or weathered ceramics and those from the latest part of the pre-Columbian period in particular, since only a minor percentage is decorated. A method based on a regional framework of technological pottery analyses is needed to improve possibilities for non-site or off-site studies. Such methods have been successfully applied in Mediterranean surveys (e.g. Van de Velde 2001:31-32) but in Caribbean archaeology they are still in a pioneer phase. Although several technological studies have been carried out on Caribbean ceramic assemblages (e.g. Arts 1999; Bloo 1997; Donahue *et al.* 1990; Dorst 2000; Fuess 2000; Hofman 1993, 1999; Hofman and Jacobs 2000/2001; Van As and Jacobs 1992), the outcomes of these studies present site-specific situations. Island-wide or even regional patterns cannot yet be discerned. Daan Isendoorn (Leiden University) has recently started a PhD study on this topic.

Sections 1.4.4 and 2.2.3 describe the identification and documentation of surface concentrations, sites and off-site material in the field. It is acknowledged that archaeological sites are artificial 'constructs' or interpretations made by archaeologists, representing one or more concentrations of archaeological material at the surface. It should be mentioned here that site is not used as a synonym for settlement, which, incorrectly and confusingly, often occurs. For the present project, fixed numbers or densities of finds are not used as a main criterion to distinguish between surface concentrations and isolated finds. It is virtually impossible to establish sherd number and density thresholds, as the study is diachronic in character and surface distributions may be expected to vary depending on period or site function, and may also be subject to multiple post-depositional processes (see Fentress 2000:49). As Plog *et al.* (1978:387) warned "rigid application of density-based definitions may thus result in the systematic exclusion from analysis of significant components of the archaeological record".

Surface concentrations are defined here, more or less artificially, as distributions consisting of archaeological material resulting from repeated actions. These may be expected to have a diameter of at least 5 m. Surface concentrations should be spatially bounded, in other words, they should be clearly delimited by significant areas without archaeological material at the surface. Each of these concentrations may be an archaeological site, but it is possible, however, that some sites consist of more than one surface concentration. This artificial definition of concentrations evidently involves a certain risk of subjectivity. Fentress (2000:48) warns, for example, that in such situations it may not be verifiable "whether a concentration was omitted from the record because the field walking team wanted lunch, or included because they hadn't found a site all day". Concentrations were not, however, characterised on single occasions, as they were revisited. During the field walking stage of the research program, when

material was encountered at the surface, only the dimensions of the surface distribution were established and the find spot was mapped on aerial photographs. It took at least a second visit to create descriptions and complete documentation of the concentrations recorded.

The prerequisite, proposed by Plog *et al.* (1978:389), that archaeological sites should be potentially interpretable, and thus yield "materials of sufficiently great quality and quantity […] for at least attempting and usually sustaining inferences about the behavior occurring at the locus" was not used as a starting-point for the present project. By restricting the investigation to searching for interpretable concentrations, it appears that only known and clearly recognisable patterns are being recorded. Small or low-density surface concentrations may very well contain important information on past human behaviour (Schiffer *et al.* 1978:14), and these would then probably be neglected.

Distributions consisting of archaeological material related to, presumably, single, individual actions are considered isolated finds, or off-site material. One might consider, for instance, the accidental loss or discard after breaking of artefacts such as shell or stone axes or ceramic vessels. Such finds appear to be less important and merely of complementary value for the patterns and overviews this study focuses on and that are provided by the study of archaeological sites). It is imaginable, though, that in some instances the result of a single action has a more profound impact on organisation or experience of the landscape, for example when deliberate or ceremonial depositions are involved. Such depositions can be considered sites.

1.4.3.3 Site survey

Taking a site-based study as a starting-point, a systematic and intensive transect survey, combined with a small-scale test excavation program, was designed to create a regional archaeological database. The aims of the fieldwork are to locate the archaeological sites within the study area and to provide as detailed site characterisations as possible. The resulting database should not only fit the purposes of the project but it should easily suit future archaeological research programs with other objectives as well. Finally, it should contribute to the archaeological inventory of the *Carte Archéologique* project of the DRAC. One basic fieldwork design, which has been described in detail in section 2.2, has been made although this had to be adapted to local circumstances from time to time.

At the start of the project, a full-coverage survey was envisioned, aimed at providing as complete an overview as possible of site and off-site material. Although off-site material was systematically collected and mapped during the surveys, it could not be presented in detail due to time constraints. As soon as investigation methods have been improved (see above), off-site material may be used in order to complement ideas on landscape use as brought forward by site information but these data must await publication elsewhere. This is true for colonial and sub-recent data as well.

As a final remark, it should be mentioned here that the fieldwork and the resulting investigations are considered 'micro-regional', as the study area represents merely a very small part of Guadeloupe, let alone of the Caribbean. Surveyors, however, especially those working in the Mediterranean, consider it to be regional instead, as the area, when regarding the high level of intensity and systematic of the fieldwork, is large (Van de Velde personal communication 2002). The term micro-regional has however been maintained deliberately in order to contrast the present study with Caribbean studies that are focused on large regional overviews based on less intensive micro-regional data.

1.4.4 Archaeological site inventory

1.4.4.1 Introduction: site parameters

During the fieldwork, sites (concentrations of archaeological material fulfilling the requirements described above) were located and characterisations were provided to obtain a reliable archaeological site inventory for the study area. Site descriptions made during fieldwork consist of an administrative part, which is mainly useful for the DRAC site registration system as it has information on informants and the owner of the terrain. It also lists whether earlier research has been carried out and where resulting archaeological collections are stored. In addition, it provides data for the present study. These include site dimensions, a characterisation of the distribution of surface material, co-ordinates, degree of conservation, and, if possible, an estimated thickness of the archaeological deposits, terrain descriptions and the presence of and the distance to site location variables). Apart from site descriptions, samples of surface material were collected, and some sites were furnished with geological and archaeological information from test units. Data collected on all sites in the research area is presented in the site catalogues in appendices 2-4.

The inventory of archaeological sites in the research area provided by the fieldwork described above will include different types of sites that need to be distinguished in order to allow a presentation of diachronic site patterns in the research area. This may be done using site parameters providing general site characterisations. These include site location, site dimensions and site area, and site function, duration of use or occupation and chronological assignment.

The following descriptions only provide information on how site parameters have been defined for the present project. Section 5.3.1 describes the ways in which the site parameters have been used during this project.

1.4.4.2 Site location

Assuming that pre-Columbian Amerindians were not limited in the choice of suitable locations for activities of all kind and that they would select locations fulfilling practical and symbolic needs, the study of site locations provides information on possible site function and on use and perception of the landscape. Location variables that may have been important for pre-Columbian site selection were distinguished and recorded for each site. It should be remarked here that the location variables selected mainly include factors related to physical factors of the landscape. These are associated with subsistence, extraction or exploitation of natural resources and other environmental factors such as the presence of flat areas that may allow habitation, accessibility by sea through the presence of canoe landing spots, and viewpoints and strategic locations that may be considered important for defence and observation. In this sense the study of site location selection may be considered to be physically deterministic, while it is widely recognised that landscape perception and symbolism and social memory both play an additional but important role in choice of site location as well (Tilley 1994:1). It is hoped and expected that so-called 'illogical' site locations may provide information on social or political site location factors or on pre-Columbian perception of the landscape. Personally objective observations on site locations, such as 'impressiveness', 'accentuation' and 'special features' have been taken into account as well in the site descriptions, but they have not been listed in the location variables overview.

The presence or absence of location variables has been scored for the immediate surroundings of the sites of Pointe des Châteaux, La Désirade and Petite Terre. These include fresh water occurrences and flat terrain, large enough to house a small number of residential structures. In addition, the presence of accessible bays with canoe landing-spots, coastal reefs, soils suitable for small-scale horticulture, lithic raw materials, view points to other islands, parts of islands or possible sea routes, strategic elevated spots, salinas and mangrove areas has been investigated. The presence of clay sources has not been investigated. Decalcification clay deposits, however, are present within the complete study area, and it is deemed that access to these sources was not restricted. It is likely, that not all location variables were equally important for pre-Columbian inhabitants of the area, but as relative importance could not be quantified, so-called 'weighted' analyses could not be provided. It is simply assumed that the more site location variables present, the more attractive the site location.

The boundaries of the immediate surroundings of sites were artificially set at 250 m as this is an average distance between many of the sites and the coastal reefs in front of them, which are usually considered an important location variable for pre-Columbian settlement as they offer profitable subsistence situations. Most of the location variables, however, are in closer reach. For several sites, location variables are not present in the immediate surroundings of sites but they are still within reasonable reach as a result of the limited dimensions of the research area. Site location analyses, however, will focus specifically on features present in the immediate surroundings of the sites, in the hope that they will provide information on selection of the specific spot and possibly on site functions.

The absence of location variables, of course, merely indicates that the surveys did not demonstrate the presence of certain features. This does not necessarily imply that they did not exist in pre-Columbian times. This is particularly true for the presence of fresh water, salinas, mangrove areas and soils suitable for small-scale horticulture. The latter two, together with coastal reefs, are important as they foster attractive nutrient situations. As for the soils, it should be remarked here that pedological maps, and therefore detailed classifications of local soils, are not available for the research area. For the site location analyses, a rough distinction has been used that merely identifies soils suitable for small-scale horticulture or not suitable for cultivation at all. In general, the greatest part of the research area is rather fertile, except for the sandy beach areas. The overall dryness of the area appears to be a more important limiting factor. Very steep hills were considered less attractive as well.

The stability of the salinas in the research area is not known either. The site of Anse à la Gourde, for example, is not situated near a salina nowadays, but it may have been located south of one in the past (section 3.2.3). Even though many pre-Columbian sites in the Caribbean are located quite close to salinas, it is not quite clear what they were used for. In almost all salinas the salinity rate is too high for flora and fauna, although salinas, but in particular the surrounding vegetation, attract birds.

The presence of fresh water, one of the most limiting factors for human settlement, is difficult to investigate. Watters (1980:283) reported this for his Barbuda and Montserrat surveys as well. Many fresh water occurrences consist of fresh water lenses, presently invisible at the surface, that may have been exploited through digging, possibly using potstacks (section 3.2.5). Fresh water sources and streams are more easily detected.

Features such as flatness of terrains, offering favourable locations for habitation, accessible bays with canoe landing-spots, dependent on passages through the reefs, allowing easy transport and communication over sea, lithic raw materials for the manufacture of tools, viewpoints and strategic locations, are assumed to have remained more or less unaltered. Strategic locations consist of protruding elevations that may have an observational or defensive function in overlooking other islands, parts of islands or possible sea routes. It is also possible, however, that a strategically located site is very well hidden.

Occupation of sites may affect the attractiveness of a location positively and negatively. The creation of horticultural plots in dense vegetation, for example, may cause an increase in the presence of terrestrial fauna, although hunting over long periods of time will cause their depletion. The use of site locations, however, usually decreases the attractiveness for subsequent years, being related to gradual depletion and pollution of the immediate area (Dewar and McBride 1992:232).

Location variables were mapped during the fieldwork and distances between sites and features surrounding them were recorded on site description forms (appendix 1). These will be presented in a summarised form in chapter 5.

1.4.4.3 Site dimensions and site area

For all the sites, north-south and east-west dimensions are recorded in meters and their surface areas in m^2. This is done in order to indicate the largest distributions of surface material for the sites for the benefit of the DRAC administration. It will allow efficient site management and protection, but more importantly, it may provide an additional means to evaluate functional assignments and site hierarchies, as site areas are expected to depend on the longevity and intensity of use of the sites.

Site dimensions are estimated in the field by investigating the transitions in presence or absence of archaeological surface material, mapping maximum areas where archaeological material was found. It is expected that several sites appear to be larger on the surface than they actually were. Mapped areas may include activity areas or off-site material next to the site as well, as long as 'empty' areas do not separate them from the main site. In addition, it is possible that lateral ploughing has gradually dispersed surface material over larger surfaces. On the other hand, natural or cultural post-depositional processes may have destroyed parts of sites, diminishing their areas at the surface. For several sites it will remain uncertain how accurately the surface material reflects the sub-surface situation. One of the risks will be the effacing of different activity areas and different chronological components of sites discovered. These may go unnoticed when surface studies or small-scale sub-surface investigations are carried out.

1.4.4.4 Site type or site function

The most complicated aspect of the creation of the East-Guadeloupe site inventory relates to the functional assignment of the sites. This is usually the case in situations where most of the site data have been obtained through surveys, providing small samples of archaeological material and hardly any information on site structure. It is wondered to what extent the present study can benefit from information on pre-Columbian site types presented in other archaeological studies in the Caribbean where more extensive research had been carried out.

Boomert (1996:27; 2000:12-13) distinguished three major site categories on the basis of presumed function and general archaeological character. These include settlement sites, characterised by midden deposits and occasionally by burials, so-called ephemeral camp or bivouac sites, characterised by pottery deposits and possibly other artefacts but without reasonable numbers of food remains, and individual finds, sites that provided only very few ceramic fragments or lithic artefacts. The latter are thought to represent special activity sites. Apart from these major categories are petroglyph sites that Boomert linked to as yet unidentified ceremonial activities. Keegan (1985:196-218; 1992[a]:72) defined longest linear dimensions of sites and used size differences, viewed as reflecting the number of site occupants, in order to distinguish shelters (10-19 m) and three types of permanent settlement, including households (20-89 m), hamlets (90-199 m), and villages (>200 m). It is not right by nature, however, to determine site types on the basis of dimensions of surface distributions of archaeological material alone, without taking the composition of the specific archaeological assemblage into account (Fokkens 1991:23). In several cases, it may even be problematic to distinguish whether one or more assemblages may be represented at the surface**.** In addition, as the study of site dimensions is highly complicated as a result of differential depositional and post-depositional processes, functional assignments on the basis of site dimensions alone were considered inappropriate for the East-Guadeloupe surveys.

Information on contemporary settlement patterns on the South-American mainland indicate that patterns are more fluid than presented in traditional archaeological schemes in which permanent habitation sites, campsites and special activity sites are usually clearly distinguished and labelled. Inhabitants of villages, characterised by long stretching layouts, not only occupy household habitation structures, but several other structures as well, for example areas aimed

at the preparation of food. In addition, they usually appear to have garden houses that are situated at rather large distances from the village and that are used for stays of some days to several weeks (Duin personal communication 2000, for the Wayana in French Guyana). If recognised in archaeological patterns at all, it remains to be questioned whether valuable suggestions can be brought forward on use, intensity and duration of use of such sites and on the spatial and functional behaviour that is represented by these patterns. Moreover, it remains to be questioned whether it is possible at all to interpret archaeological sites by "direct analogy to the camps, stations and locations that are the components of ethnographically described subsistence/settlement systems" (Dewar and McBride 1992:229). According to Rossignol and Wandsnider (1992:61) "attempts to fit settlement systems into ideal or templated settlement types", as derived from ethnographic analogies, seriously hinder accurate archaeological interpretations of human activity in the past. Binford (1992:50), largely agreeing with this argument, however, warns that archaeologists should not just conclude that the archaeological record is distorted and claims that "it is our task to investigate this record and to understand it in all its variation". For the present study, an attempt was made not to force data into a scheme, in which they do not really fit, and not to impose unambiguous functional assignments on indistinct sites.

In spite of the fact that functional assignments for some of the sites may appear to be quite obvious during the fieldwork, it is expected they may be better evaluated after the fieldwork has been finished. Only then are relevant data on site function, including site location, composition of archaeological assemblage, site dimensions, and duration of occupation fully available. Definitions and conditions of the different site functions observed will be presented in section 5.3.

1.4.4.5 Duration of use or occupation

Estimates of duration of use or occupation are thought to be important in the assignment of site functions, in the understanding of site patterns and the analysis of local site hierarchies. Two aspects are important, namely the repetition of occupation phases and the duration of each of these phases. Of course, the most accurate way to create such estimates is the study of absolute dates on extended series of well-chosen, representative samples for each period of use or occupation of archaeological sites. As a result of the large number of sites discovered, this was impossible for this project and absolute dates were available for a few sites only.

Duration of use or occupation can also be estimated using evaluations of the thickness of archaeological layers found at sites for each occupation period, resulting, of course, in relative approximations at best. These can only be made when the complete fieldwork documentation is available as well as reports on the analyses of all archaeological material collected. It is thought, though, that the small scale of fieldwork that has been carried out on behalf of the present study will hinder such estimates significantly. But even for intensively excavated sites, this usually remains problematic. At Anse à la Gourde on Pointe des Châteaux, for example, it turned out to be impossible to discern short occupation phases within the large chronological units distinguished at this site, let alone to estimate the duration of each of these occupation phases (Hofman personal communication 2003). The problem is that what is actually dated are rough 'components', *i.e*. pre-ceramic, Early Ceramic or Late Ceramic phases, instead of distinct occupations. Rossignol and Wandsnider (1992:163) define components as "temporally discrete archaeological deposits" and occupations as "temporally discrete cultural episodes of deposition". Estimating duration of occupation using 'household vessel assemblages' (Espenshade 2000) was of course completely unfeasible for the present project as a result of sampling limitations.

Mixed deposits, for example in multi-component sites, may complicate chronological assignments and estimates of duration or use. Multi-component sites are represented by two or more of the phases mentioned above. Single-component sites are attributed to only one of those phases. Unfortunately, single-component cannot be used as a synonym for single occupation. It is accepted that this project cannot discern small and discrete occupation phases, and it should make do merely with rough chronological assignments largely based on pottery characteristics for the different components of the sites. It is simply not expected that the fieldwork allows more detailed distinctions related to different occupations within one of the phases.

It is deemed that it should be possible to discern temporary use or permanent use of sites based on thickness and characteristics of the archaeological layers and in particular on characteristics of faunal and ceramic assemblages. Temporary sites are expected to have a special, non-settlement, function that may be reflected by the composition of the archaeological assemblage. Seasonal specialisation may be recognised in faunal assemblages based on the presence of migratory birds, and the stages of development of animals caught. It is often assumed that temporary use of sites may also be reflected by a small variety of vessel shapes in ceramic assemblages, as limited use or limited duration of use does not require having all types of vessels around (Hofman personal communication 1998).

1.4.4.6 Chronological assignment and temporal resolution

As mentioned above, only a limited number of ^{14}C dates are available. Among these are dates that had been provided for some sites that had already been investigated before the start of the fieldwork. These include Anse à la Gourde on Pointe des Châteaux and Morne Cybèle-1 and Morne Cybèle-2 on La Désirade. Most of these dates have been obtained from *Cittarium pica* samples that were analysed at the Groningen Laboratory for Isotopic Research in the Netherlands (Hofman and Hoogland 1994; Hofman *et al.* 2001[b]). ^{14}C dates were also available for the site of Anse Petite Rivière on La Désirade (De Waal 1996[a-b]). These were also obtained from *Cittarium pica* samples that were analysed at the Groningen Laboratory for Isotopic Research and the resulting BP dates have been calibrated with the Groningen calibration program CAL 15 using the calibration curve for marine shell (Stuiver and Braziunas 1993).

As absolute dates are rare, general chronological assignments will have to be made, based on stylistic and technological aspects of the ceramics encountered. It should be remarked, however, that merely small samples are expected. This, of course, seriously limits the accuracy of the dates and possibilities for investigating site contemporaneity.

The traditional Caribbean archaeological approach aims at assigning archaeological assemblages to the regional cultural-chronological framework that is based on the distinction of so-called series and subseries based on morphology and decoration of ceramics (chapter 4). A growing number of Caribbean archaeologists is feeling confronted with problems related to a strict use of this framework (e.g. Keegan 1999, 2000; Knippenberg 2006; Petersen *et al.* 2004). They no longer consider classification of ceramic assemblages of the study area in series and subseries as an aim in itself. As Keegan (1999, 2000) points out, the attempt to classify pre-Columbian societies into well-separated cultures, leads to an emphasis on pottery designs while similarities and differences in other aspects of culture run the risk of getting less attention. In addition, he argues that for example Cedrosan Saladoid pottery can be viewed as a social phenomenon, occurring within regional alliances, instead of simply representing a 'people and culture'. Another comment is related to the static character of the framework, accepting only one culture in a region at a certain period in time, which does not cope very well, for example, with persisting or coexisting cultural traditions (Knippenberg 2006; Petersen *et al.* 2004).

In addition, it is possible that pottery samples collected during the East-Guadeloupe surveys cannot be assigned to different series or subseries as a result of the fact that for many sites only surface collections may be expected. These generally provide small samples of heavily weathered and fragmented ceramics, often without any diagnostic traits. It is hoped that sites can be at least roughly assigned to chronological periods. These include the pre-ceramic period (>500 BC), Early Ceramic early phase (400 BC - AD 400), Early Ceramic late phase (AD 400-600/850), Late Ceramic early phase (AD 600/850-1200/1300), and Late Ceramic late phase (AD 1200/1300-1493). In order to improve legibility, letters A and B have been used to replace early phase and late phase respectively. AD 1493 marks the discovery of Guadeloupe and its annexes by Columbus and therefore this date is taken to represent the end of the pre-Columbian period and the start of the colonial period, even though the actual colonisation of this area only occurred some 150 years later. The different pottery styles that have been distinguished within these chronological periods, and that form the backbone of Rouses regional cultural-chronological framework have been described in chapter 4.

It is possible that for some of the pottery collections, stylistic affiliations can be suggested on the basis of comparisons with ceramic assemblages from other sites in the region. These will be mentioned to complement the chronological assignment and to allow easier comparative affiliations to be made, that can be related to the regional cultural-chronological framework, with assemblages from other archaeological sites. However, it is equally possible that some of the sites do not provide pottery or diagnostic pottery and that therefore no chronological assignments can be provided at all.

It has already been mentioned that surface surveys provide data with a low chronological resolution and are therefore better suited to the detection of long-term processes. Dewar and McBride (1992:230), among others, pointed out that, although archaeologists are aware that distributions of archaeological materials across a landscape reflect use through many years and even generations, the duration and pace of processes to which artefacts collected from the surface testify usually remain poorly understood. Attema (1996[b]:8) has emphasised that this low chronological resolution results in a series of chronological distribution maps creating a static succession of restricted periods, instead of laterally sliding processes, with different duration and pace. Although it is obvious that settlements and settlement patterns are continually changing, through processes which may take place so slowly that they remain invisible even to their inhabitants (Tringham 1972:xxiv), insight into medium-term dynamics cannot be expected and at best a long-term time perspective can be achieved.

1.4.5 Eastern Guadeloupe pre-Columbian site patterns

The following phase in the research includes the construction of diachronic site patterns on the basis of the archaeological site inventory created, providing a long-term settlement history of the research area. It should be made clear at this point that many archaeologists and anthropologists use the term site pattern for what is described in this study as site structure, or they use both terms confusedly to indicate site layout (e.g. Bright 2003; Rivière 1995). In addition, as Rossignol and Wandsnider (1992:61) point out, site systems are sometimes confused with site patterns during analysis and interpretation. In order to avoid confusion, a clear distinction will be applied in this study. Site structure has been used as a synonym for the layout of individual sites, site pattern refers to the distribution of sites across the landscape within a given region and period and site systems describe sets of organisation and structuring principles that created and influenced these site patterns. Site systems thus provide information on organisation of the landscape in different aspects, namely socio-political, economic and ceremonial. Information on site structure must be completely based on the work done by other archaeologists, as the present project was not designed to obtain data of this kind.

Information on site patterns may be obtained by mapping all different types of sites in the research area in chronologically discrete units, focusing on a diachronic sketching of statuses, changes and developments in numbers, types, dimensions and locations of the sites and characteristics of their archaeological assemblages. Dewar and McBride (1992:231) define site distributions as joint products of human activity in the past and archaeological research activity through time, and characteristics of the physical environment affecting conservation and visibility of sites. Filtering biases related to research and environmental factors thus provides information on past human activity. It has already been outlined above that archaeological data in many cases do not allow direct analogies to functional components of ethnographically recorded site patterns. Rouse (1972), being well aware of the limitations of such analogies, stated that ethnographers and geographers study full settlement patterns, while archaeologists only study remnant settlement patterns. The archaeological site patterns are subjected to many other processes than the ethnographically recorded patterns that typically can be related to one specific moment in time. Archaeological site patterns are products of taphonomic processes, and processes causing inter-site and intra-assemblage variability in annual subsistence cycles, and causing year-to-year variability in positioning and content of archaeological assemblages of sites with different functions. It remains to be questioned whether these "medium-term processes affecting the temporal continuity and spatial congruence of occupation sequences" that are so obvious in ethnographic patterns can be sufficiently distinguished in archaeological studies, affecting the number and distribution of archaeological components in an area (Dewar and McBride 1992:230, 237).

No GIS (Geographical Information System) techniques were used during the project. Although the possibilities for predictive modelling in GIS, predicting site locations on the basis of environmental data gained from the data set from the survey-region, are considered to be too limited and questionable, other applications could have been of much use. The influences of site formation and deformation processes could have been successfully quantified using GIS, for example. Nevertheless, opportunities and personal abilities to do so were too limited in the course of this project. The data that are needed to construct valuable layers that can be used are too limited in quality and quantity. For example, no soil data are available. Moreover, the research area is rather small and homogeneous, which implies that differences in soils, geology and climate are rather insignificant and that data have to be very detailed in order to be able to elucidate small differences.

It should be remarked here as well that the study does not involve the identification of ideal site distributions that may be compared at a later stage with the actually observed distributions as has been suggested by Keegan (1985). It was felt that the lack of detailed micro-regional archaeological studies on the Lesser Antilles that existed at the start of the project did not allow a presentation of such ideal distributions.

1.4.6 Eastern Guadeloupe pre-Columbian social organisation and interaction

1.4.6.1 Introduction

The diachronic site patterns will provide an insight into dynamics of occupation and use of the landscape in pre-Columbian times and the different aspects of pre-Columbian social organisation will be investigated taking the site patterns and the individual site descriptions as a starting-point. Interaction, which is closely linked to these aspects of organisation, will be treated separately.

The central issue to be investigated comprises three aspects. In the first place, an attempt should be made to understand how the individual sites function in the landscape. Then, attention should be devoted to functions of the sites in relation to each other and their positions within a regional hierarchy. This leads inevitably to the question whether sites played a central role locally or maybe even regionally.

Statistical analyses of site data, such as multi-

variate analyses, hierarchical clustering, multi-dimensional scaling, cluster analyses, nearest neighbour analysis or k-means analysis, have often been used to identify clusters of more or less contemporaneous sites, and to make inter-site comparisons based on archaeological and environmental data. The small samples and the low quality of the survey data expected did not allow application of such methods. The methods used to obtain information on the different aspects of pre-Columbian social organisation will be described in the ensuing sections.

Last but not least, it should be remarked that an attempt has been made to consider the organising principles for the site patterns from two different views. One is a scientific geographical and archaeological view, based on the physical and practical characteristics of sites and site locations. The other examines which places 'feel' or 'look' special and therefore may have played an important role in the landscape in the past. This latter view has been referred to as "contextual and relativist" by Sherrat (1996:141).

1.4.6.2 Socio-political organisation

Central aspects in the study of socio-political organisation are mechanisms that structure social relations between individuals and settlements, including centralised political authority and institutional social status differentiation. Usually a scale of increasing complexity is presented, ranging from egalitarian tribal society, with village autonomy and consensual decision-making, to chieftaincy, which is defined as a situational hierarchy emerging from time to time in non-hierarchical tribal societies related to hierarchically differentiated decisions and actions of a temporary, achieved-status leader. The final level to be reached, when successors within a leader lineage hereditarily succeed to retain permanent regional hegemony, is that of chiefdom society, which is characterised by regional village centralisation (Redmond 1998). The internal organisation of groups or indications for complexity are usually investigated by studying site structure, individual burials reflecting status differences, collective works and communal actions, relationships with neighbours, evidence for intensification of food production, and existence of craft specialists. Most of these aspects cannot be studied during the present project, although information on site layout and burial areas could be deduced from other archaeological projects.[6] The description of social and political organisation focuses in the first place on site pattern dynamics. Habitation sites may provide data on different stages of settlement of the area, on functioning and growth of settlements, while other sites provide information on the use of the environment. In addition, it may be possible to discern so-called 'central' sites that appear to have played some role of local significance and their effects on more ephemeral sites within the research area and beyond.

The study of hierarchical positions of sites within the research area is based on inter-site comparisons regarding site function, site location, site dimensions, duration of use or occupation and the presence of high-status artefacts. As for site function, a decreasing scale of local or regional importance may be expected for the range from permanent settlement sites, via temporary habitation sites, to special activity sites. Ceremonial sites take a special position. These may be central in a socio-political sense but need not necessarily be so. Problematic in estimating the local importance of site functions is the lack of monuments, and great public central structures, which in other regions, such as the Greater Antilles, parts of Meso-America or prehistoric Europe, are easily recognisable indicators of regional stratification.

Analyses of centrality of site locations within the landscape, and possibilities offered by those locations provide information on site hierarchies as well. These run the risk, however, of overemphasising economic and environmental characteristics of the present physical environment, overshadowing less evident socio-political considerations that may have been important as well. The identification of 'optimum setting locations' (Petersen and Crock 1999) to explain the occurrence of high status artefacts in Anguillan site assemblages and the apparently related site hierarchy, may be seen in this light.[7] Their emphasis is on an economic use of the landscape while possible demands of protection or symbolic needs seem de-emphasised. The problem is that it is virtually impossible to identify which site locations were considered optimum at the time. Ideas of which locations are ideal may have changed throughout the different pre-Columbian periods, apart from the fact that locations themselves may have changed.

Site dimensions can be indicative of numbers of inhabitants and duration or intensity of use or occupation and thus reflect the relative socio-political importance of a site. Curet (1992:267) lists methods for estimating numbers of village inhabitants, including analyses of human skeletal remains, artefact assemblages, food remains, site area, house floor areas and household size calculations, and the use of ethnographic analogies from groups on the South American mainland. One could follow ethnographically based estimates by Myers (1973, cited in Boomert 2000), counting 1 person per 200 m^2, and by Roosevelt (1980), counting 75 persons per hectare.[8] Although analyses of house floor areas generally provide more reliable population estimates when compared to analyses of total site dimensions (Curet 1998:371), survey results, on which the present study is based, only allow population estimates based on site areas, and yet this is a problematic exercise. Apart from difficulties

related to estimating site areas on the basis of survey data (section 5.2.1), it should not be forgotten that population size is not the only factor influencing site area. Other factors, such as duration and intensity of occupation, intra-site mobility of households, spatial organisation of activities inside the settlement, architecture of residential structures, levels of culture and technology, and natural and cultural post-depositional processes influence site areas as well (Curet 1992:268, 1998:363; Hoogland 1996:214). As Curet (1992:269) correctly stresses, the information obtained refers to the maximum number of people that could have lived in the settlement, ignoring the possibility that sites may have been inhabited during several shorter, successive phases. In addition, post-depositional processes such as ploughing and erosion spread surface material over larger areas. Using site areas tends to result in an overestimation of settlement inhabitants. Curet (1992:270) attempted to correct this overestimation by arbitrarily subtracting 10% from the total site area. Finally, using ethnographic information is problematic as well, as a lot of variation appears to exist in population numbers of settlements that would be otherwise comparable. In addition, refuse areas and other activity areas are usually not included in diameters represented in ethnographical reports, while this information is strongly present archaeologically (Curet 1992), and data from multi-family roundhouses or smaller and more mobile residential structures related to nuclear family use tend to be lumped together (Curet 1998:366). Population density is hardly ever constant as it varies across sites of the same culture and even within a settlement (Curet 1998:362-363).

As for duration of use or occupation, which is difficult to estimate, the assumption is reflected that the longer a site has been used, the more stable and the more important it may have been.

Analysis of the site assemblages, and the presence of so-called high-status artefacts, may provide indications for the existence of hierarchical positions. The small-scale of the study, however, resulting in very small and differently sized samples of archaeological material, implies that absence of high-status artefacts does not automatically indicate that they cannot be found at a site. High-status artefacts might include rare objects, whether made from non-local materials or displaying rare decorations or even styles. The time and skill required to make the objects should be taken into account as well.

Site hierarchies may provide information on territories occupied by major sites.[9] As the project, however, does not provide detailed information on chronological assignment or on duration of occupation or use, there is a lack of information on contemporaneity of the sites. Only very rough temporal distinctions may be expected, blurring information on which sites were functioning more or less at the same time or which sites can be considered successors of others. Analysis is limited to what Davis (2000:81) called "the palimpsest of settlement represented by the site distributions".

Other relevant aspects that all merit attention, such as kinship, ethnicity, power, and aspects related to socio-political interaction, such as marriage ties, warfare and alliances, can be isolated, but these cannot be investigated on the basis of the archaeological information provided by the East-Guadeloupe project. These may only be deduced from ethnohistorical or ethnographical sources, although other archaeological studies in the Caribbean may be consulted as well (e.g. Boomert 2000; Curet 1998).

1.4.6.3 Economic organisation

The study of economic organisation focuses on use and exploitation of natural resources in the direct or more remote environs of the pre-Columbian sites in the research area. Information on subsistence was obtained through the study of faunal (Grouard 2001; Nokkert in appendix 5) and shell food remains, and subsistence related artefacts, such as griddles or grinding stones. For a limited number of sites isotope analyses are available as well (Stokes 1998). Archaeobotanical studies could not be undertaken. Samples of faunal remains were available for analysis for merely a very limited number of habitation sites. For several sites only surface collections had been made, in which faunal remains are usually absent. At some other sites faunal remains appear to have been hardly present at all, as not all habitation sites are characterised by midden areas, that provide unique conservation factors for delicate faunal remains (*cf*. Nokkert, in appendix 5). It should be remarked here as well that shellfish was not only used for human consumption, but as raw material for the production of shell artefacts or for other purposes as well. Shells may have been used as containers, hearth bases, net sinkers, ceremonial paraphernalia and curiosities (Antczak 1998:142-143) or as bait. In addition, shell remains may also belong to the natural sedimentary matrix and be intrusive as well, being transported by animals attracted to refuse heaps in settlements, including land hermit crabs, producing a typical shine inside the shell, or birds. It is deemed, however, that only very small amounts of these non-consumptive items will be found, hardly altering the image of pre-Columbian shellfish consumption. In addition, although small shell species are often regarded as marginal as they fulfil only a small part of the protein need in a diet, they can be valued for being especially tasty, or for having special properties, *i.e*. medicinal or aphrodisiac (Antczak 1998:182).

In the second place, information on the use of non-

subsistence resources may be provided by study of raw materials used for the manufacture of artefacts, including clay, temper materials, stone, shell, coral and bone. Perishable materials have not survived in the archaeological record but indirect information can sometimes be gained, such as basketry imprints on pottery. These have been found, for example, on the bases of some of the Anse à la Gourde griddles (Hofman 2001). In addition, it should be investigated which of these materials are non-local, providing evidence of interaction, and which were locally available in the immediate surroundings of habitation sites, using site location variables and a larger geographic or environmental overview. As the islands are small, site location variables are probably not exclusive. Inhabitants from sites all over the island may have exploited locally available sources provided that access was non-restricted.

1.4.6.4 Ceremonial organisation

One of the most complicated aspects of pre-Columbian Amerindian life to investigate involves the ceremonial organisation. What can be retraced are ceremonial places or artefacts, the archaeological remnants of the related actions, which are generally referred to as rituals (Bell 1992:19). Information on conceptual aspects such as ideology, symbols and myths cannot be expected.

Rituals have a communicative function and may be meant to structure contacts between world and supra world and to provide the profane daily world with meaning. The term ritual is not only used with reference to communal activities. Ritual activities relate to individual needs and aspirations as well. What counts is their effect on the spatial context of the landscape and on relations between humans and between humans and the landscape.

Information on ceremonial traditions and religious beliefs of the pre-Columbian inhabitants of the Caribbean (e.g. Rodríguez 1997) may be used to provide a general framework in which the data from the East-Guadeloupe project may be fitted. For a good understanding of pre-Columbian ideology on the Lesser Antilles, an insight into South American religious beliefs and practices is to be recommended.[10] Boomert (2000:445) refers to the present-day Amerindian belief system as animistic, entailing a strong belief in the existence of positive as well as destructive spirits of nature and spirits of the dead. It operates at the community level and village shamans, who may be considered ceremonial specialists, have a central role in ritual activities. Complex ordering principles structure the world and human society. Ethnohistoric and ethnographic evidence from the South-American mainland and the Caribbean demonstrates that the layout of houses and even complete villages often reflects cosmological ordering principles related to time, space and the organisation of the universe (Boomert 2000:446; Siegel 1997:108).

Many aspects of the South-American belief system, reflecting the conceptual world of the homeland area of Early Ceramic settlers on the islands, are thought to have been included in the iconography on Early Ceramic pottery, which was only slowly adapted to reflect the new insular environments. Use of symbols and decorative patterns reflecting elements from the South-American mainland over long periods of time are indicative for the existence of intense long-distance contacts and for continued worshipping of elements from the ancestral culture. Representations of anthropomorphic and zoomorphic creatures are characteristic, several being naturalistic in character, first depicting fauna from the mainland, while later, animals endemic to the islands became increasingly important. Roe (1997:124), for example, considers frogs, generally associated with water, fertility and the underworld (Boomert (2000:470), to be island substitutes for caimans from the mainland.

Many other representations appear to be fantastic human or animal beings, which, according to Rodríguez (1997:84) may be considered indicative for the existence of a complex supernatural and mythical world. Boomert (2000:461) points out that transformations between humans and animals are considered to be quite common and therefore combinations of anthropomorphic and zoomorphic elements may occur as well. The abundance of these *adornos* demonstrate according to Boomert (2000:462) "the high value placed by the Early Ceramic Indians on communication with the spirit world in order to ensure health, fertility, social order and group survival".

Another aspect that originated from the mainland is the use of hallucinogenic powders or leaves, or the burning of herbs, which enabled users, in most cases ritual specialists, to communicate with supernatural beings. Use of hallucinogens on the islands is indicated by the presence of incense burners, nostril bowls and snuff-inhalers in archaeological assemblages. Ritual specialists among the Taíno, called *behiques*, have been reported to use shell, bone or wooden *spatulae* in their religious activities to induce vomiting. Large idols of wood, cotton and stone, or associated stone, bone or shell inlays, and large three-pointer stones, intensively decorated by incised designs depicting animals or supra-natural beings, were used as well. Idols, crania or bones of ancestors as well as three-pointer stones were called *zemis* and they were visible symbols of political and religious power related to *caciques* and *behiques* (Rodríguez 1997:87; Siegel 1997:106). The basis for the cosmological system called *zemiism* can be found in the veneration of deified ancestors (Siegel 1997:106). According to Pané (1999[1496]:21) "all

the majority of the peoples of the Island of Hispaniola have many *zemis* of various sorts. Some contain the bones of their father and mother and relatives and ancestors; they are made of stone or wood. And they have many of both kinds, some that speak, and others that cause the things they eat to grow, and others that make it rain, and others that make the winds blow". Each *zemí* "fulfilled a special purpose, had its own name, myth of origin, personality, and supernatural competence" (Boomert 2000:451). In the Lesser Antilles, the worship and use of another type of *zemi* was common during the Early Ceramic Age. This type consists of small, generally between 3 to 7 cm long, usually undecorated, three-pointed objects, made from shell, stone or coral. Many of them have concave bases. These three-pointed *zemis* are thought to mediate between worldly people and the beings from the supra-natural world, *Yucahú(guamá)*, the manioc-spirit, in particular. In some cases, they appear to have been buried in fields to ensure good crops (McGinnis 1997:92). Bases of some *zemi* specimens show remains of resin-like materials, leading Boomert (2000:488-490) to suggest that they used to be attached to staffs of perishable material and possibly served as digging sticks. Walker (1997:90) suggested that three-pointer *zemis* represent spiritual links between *caciques* and their real and mythical ancestors. It is not known from what moment on three-pointer *zemis* came to be used. In addition, the first three-pointer *zemis* were apparently made of *Strombus gigas* shell, using the natural cone-shaped protuberances of the top of the shell, while stone and coral *zemis* occurred later in time (Boomert 2000:486).

Up till now, archaeological studies have provided limited information on Lesser Antillean pre-Columbian ceremonial life and related rituals, but the information available provides important clues to the understanding of the special meaning of areas, sites and artefacts discovered in the research area.

Regarding ceremonial use of areas or micro-regions, studies on, for example, the Basse-Terre petroglyph area on Guadeloupe should not be neglected. This area in southern Basse-Terre is considered a 'spirited' or 'ritual' landscape, containing large numbers of petroglyph sites, usually on large volcanic boulders close to fresh water sources or streams (Ruig 2001, 2003). It was long thought that petroglyph sites were restricted to this area but the recent discovery of an abri decorated with petroglyphs near Anse Patate on Grande-Terre (Stouvenot and Richard 2003) sheds a different light on this situation, although the site awaits further analysis. It is quite far from this bounded 'ritual' area on Basse-Terre and situated in a completely dissimilar, dry context. It is not clear what purpose the petroglyph sites, which vary from individual representations of human figures, faces and scroll-like motifs to tableau-like depictions with multiple rock carvings served, although ceremonial functions in communal ritual actions are usually suggested. Wild (2003) suggested that petroglyphs represent faces of dead ancestral deities and that the use of petroglyph sites was directly linked to ancestor veneration. Although petroglyph sites cannot be dated, excavations at some petroglyph sites in the southern Basse-Terre region have demonstrated that activities took place at the sites at least during the Early Ceramic B. Within the research area no petroglyph sites have been discovered up till now and it remains to be questioned whether the regional significance of the Basse-Terre petroglyph area extended to a larger region, not only including nearby communities but also local groups living in Eastern Guadeloupe.

At the site level, indications for ritual or non-daily life practices have been reported for cave sites. The significance that caves held in pre-Columbian ceremonial life has long been recognised. Ethnohistoric accounts tell of the special role of caves in Taíno mythology, being the place of origin of human beings and of the Sun and the Moon (Pané 1999[1496]:5, 17). Similar beliefs can be found on the South American mainland (Boomert 2000:457). Caves are often regarded as entries to the underworld and may therefore be important places in shamanic activities (Boomert 2000:446, 449). Paintings and petroglyphs often adorn ceremonial caves. Examples can be found in the caves of Morne Rita on Marie-Galante (Slozinski and Slozinski 1983) and Big Spring (Crock and Petersen 1999; Petersen *et al.* 2003) and Fountain Cavern (Watters 1991) on Anguilla. The latter site contains at least a dozen petroglyphs and a stalagmite, which has been carved and which depicts *Yucahú*, the manioc-spirit, close to a freshwater well. Two other, undecorated, cave sites in Anguilla, Airport Cave and Tangelwood Cave, yielded human skeletal remains (Crock and Petersen 1999, 2004). L'Abri Patate on Grande-Terre has been decorated with 14 anthropomorphic figures on calcareous stalagmites and stalactites but no ceremonial function has been suggested for this site (Stouvenot and Richard 2003).

In addition, ceremonial evidence can be found in the form of mortuary rituals and the existence of large burial areas at some habitation sites (e.g. Hofman and Hoogland 2004). Mortuary ritual, according to Roymans and Kortlang (1999:35), "is embedded in the wider system of ideas and values of a society. It is part of an all-embracing ritual cycle of life and death, in which groups give their view on the social order and the wider cosmos". As for the mortuary behaviour, a distinction should be made between funerary rituals, relating to rites of passage that structure the transition between life and death of an individual, and ancestor rituals, which "draw the symbolic presence of ancestors into the world of the living" (Barrett 1991:121). These two types

of mortuary ritual are mutually dependent. Ancestor rituals probably structured the living environment, in the sense of a social and ceremonial ordering but of a practical or physical ordering as well. Benes and Zvelebil (1999:86) suggest that cemeteries acted as territorial markers in a similar way as megalithic tombs are expected to have functioned in prehistoric landscapes in Europe. As such, they acted not only as burial sites for the ancestors, but also as "focal points and centres for ritual activities, places in which social memories became encoded" (Tilley 1993:50). Ancestor veneration can be indicative and sometimes may even be a condition for a certain level of social as well as territorial organisation. A prerequisite is that they must be recognisable as burial zones, being marked visually or attaining a reputation through oral tradition. Large cemeteries, reflecting ancestor burial places, with long periods of use and stable locations, reflect collective identities of local groups (Roymans and Kortlang 1999:40). Human burials provide evidence for the existence of intricate funeral rites that, according to Rodríguez 1997:82), reflect ancestor cult. Although burials containing the remains of only a few individuals have been found all over the Lesser Antilles, the occurrence of large burial areas is restricted to a very limited number of sites and very few intensive cemetery investigations have been carried out. It is not clear whether this is a result of typical Caribbean research biases, focusing on the investigation of small site areas. It seems most likely, however, that large burial areas are really rare on the Lesser Antilles, reflecting the special statuses of the settlements where they do occur.

Artefact assemblages of sites may provide clues for ceremonial or ritual activities as well. There is always a risk of overemphasising, in the sense that 'remarkable' or 'special' finds, in other words, those that in our view do not appear to have a strictly functional use related to daily life activities, will be readily and maybe automatically regarded as ceremonial. For several artefact types, however, including three-pointed *zemis*, *spatulae*, masks, incense burners or snuff-inhalers, a ceremonial use has been reported that has been affirmed by ethnohistorical accounts (Allaire 1990). Other artefacts that have been interpreted as ritual paraphernalia, associated with activities carried out by ritual specialists, include gourd rattles, figurines, and ceremonial axes (Boomert 2000:478). Body stamps, used to adorn the body with decorative patterns of vegetable pigments, are considered to belong to this group as well, as bodily decoration is thought to be associated with communal activities or rituals.

An attempt will be made to cover these three levels, relating to artefact assemblages and site and (micro)regional evidence during this project. Even though the small scale of the project hinders the acquirement of information on site layout and of sufficiently large samples of archaeological material, sites and objects with a special ceremonial significance can be identified. A distinction will be made between strictly ceremonial sites, such as ceremonial places, offerings or depositions, and habitation sites with ceremonial functions. Diachronic patterns of sites with strictly or partly ceremonial functions all over the research area may provide information on what can be called the ceremonial landscape. On a more abstract level, an attempt is made to understand why the sites had such special functions and how they functioned locally and in a wider region, *i.e.* what evidence do they provide of ceremonial organisation and ceremonial interaction. A complicated aspect of those patterns is related to their meaning, in other words, what information do they communicate and at to whom is the 'meaning' of ceremonial markers or of a ceremonial landscape conveyed? Are they exclusively recognisable and valuable to specially trained people, such as ceremonial or ritual specialists, and are they therefore structuring the upper world? Or are they understood by all members of a society and do they structure patterns of everyday life? In Allison's (1999:277) words "It is not difficult to sense that a link is missing between the archaeologists' perceived physical reality, their organising and explaining of a landscape of sites, and the significance of these places". The outsider's view may simply be too restricted and too different from the insider's view and the East-Guadeloupe project is therefore not expected to contribute to this level of analysis.

1.4.6.5 Micro-regional and regional interaction

Interaction, being defined as contacts between persons, inhabitants of different settlements or even different islands, may be linked to socio-political, economic or ceremonial activities. It may relate to alliances or the quest for marriage partners or to shared insights into how societies should be organised and even to warfare. Economic interaction is concerned with the procurement of locally unavailable raw materials or artefacts and shared technological insights and ceremonial exchange may relate to shared cosmological beliefs and the exchange of ritual objects. Interaction can merely be observed archaeologically when evidence of 'foreign' influences is present within the archaeological assemblages of sites. These may relate to 'ideas', style characteristics of artefacts discovered and the origin of raw materials used for subsistence, and for tools and ornaments. Categories of material that are best suited to such investigation include lithic artefacts and ceramics. Shell, coral and faunal remains are expected to be too widely available, even though the occurrence of non-local shell at the Hope Estate site on

St. Martin demonstrated interaction (Serrand 1999).

The limited time frame of the project precludes technological pottery analyses as a result of which no information on exchange of clays, tempering materials or complete pots is expected. Analysis of pottery styles, or of style characteristics of other artefacts, provides information on pre-Columbian inter-site interaction at a micro-regional or regional level. The occurrance of stylistic similarities in ceramic assemblages of different sites has been reported to reflect shared communal ideas on decoration, morphology, and the representation of cultural identities (Hofman 1993).[11] A problem, however, is that pottery decoration cannot be expected to adequately reflect meaningful social units intrinsically (Keegan 2000:138). Although Rouse's subseries and styles identify cultural units, it may be necessary to distinguish smaller socio-political units, such as local groups (Haviser 1991; Hofman 1993; Hoogland 1996; Keegan 2000).

Exchange or direct procurement of so-called exotic, *i.e*. non-local, lithic artefacts or raw materials used for the production of lithic tools or ornaments, is easier to demonstrate. Presence or absence of raw materials can usually be rather straightforwardly indicated, thus it is rather easy to establish whether materials are local or not. Local in this sense would mean available on the island. As the body of evidence on natural occurrences of raw materials is constantly growing (see Knippenberg 2006), it is expected that many possible source areas of the non-local materials collected during the project can be pinpointed. The fact that, according to Knippenberg (2006), lithic artefact production in the north-eastern Caribbean, and possibly beyond that, is based on relatively standard raw material choices for specific types of artefacts, even if alternatives are at hand, increases the possibilities for study of exchange of lithic artefacts. The lithic artefacts collected during this project have been analysed and included in a study on regional exchange by Knippenberg (2006), which yields information on the origins of the raw materials used.

It is hoped that through the present study three levels of interaction can be identified. The lowest level, which is the least visible archaeologically, includes relations between settlements in the Eastern Guadeloupe micro-region and special activity sites, situated relatively nearby, covering areas that can be easily travelled in one day, and aimed at daily exploitation of subsistence and non-subsistence resources. It is assumed that such sites would be within at most 10 km distance from the villages (*cf*. Jarman *et al*. 1972).

The second level consists of micro-regional networks that are formed between settlements in the Eastern Guadeloupe micro-region and that may involve socio-political, economic and ceremonial relationships. These contacts may exist between settlements situated rather close to each other (for example, between villages situated on La Désirade), but also between settlements that are further away (for example, between villages situated on La Désirade and Guadeloupe). It is thought that such contacts would have taken place on a more or less regular basis. Very strong similarities in pottery style are evidence of such close contacts. Although it is difficult to pinpoint the frequency of contact, it is thought that this level forms an intermediate contact level between the daily relations mentioned above and the incidental contacts of regional networks. This level also includes relations between villages and temporary campsites or special activity sites that are located further away, at more than 10 km distance from the settlements and that involve trips that require more than one day's travel. Use of these sites is aimed at the exploitation of non-subsistence resources such as lithic raw materials, which are not needed on a daily basis.

The highest level, then, concerns villages in the Eastern Guadeloupe micro-region forming extensive regional contact or exchange networks with other villages in the wider Eastern Caribbean region. These contacts take place incidentally and require a considerable effort in organising and sustaining long-distance trips and contacts. This is visible by the sharing of general style characteristics of the pottery, instead of sharing very strong stylistic similarities in ceramic assemblages. Within this larger region, non-subsistence resources are occasionally exploited and obtained through direct access or exchange. Regional networks involve socio-political, economic and ceremonial relationships as well.

As mentioned above, although the existence of interaction is relatively easily determined, it is far more difficult to understand the mechanisms behind it. Different forms of interaction relate to different types of organisation, ranging from direct access, via reciprocity and through down-the-line trade to central place redistribution or market exchange.

1.4.7 Ethnohistorical and ethnographical analogies

Without doubt, Caribbean archaeologists are fortunate to have numerous ethnohistorical and ethnographical sources. They often consult these to enliven the archaeological information, which is sometimes, but undeservedly, regarded as being rather static, with colourful accounts on pre-Columbian inhabitants of the Antilles or on more or less contemporaneous Amerindian inhabitants of the South-American mainland. On the other hand, this creates a delicate situation in the sense that they should well think about which sources to select and how to use them. It may

be clear that ethnohistorical and ethnographical information will not provide direct analogies, but it may be well worth investigating how they can be used as sources of inspiration for regions and periods for which no written accounts are available (see Hodder 1982).

As was made clear in the title, this work concentrates on archaeological information, trusting that this by itself may present a dynamic picture of pre-Columbian social organisation and interaction within the study area. The choice for an archaeological emphasis was strengthened by the limited timeframe of the study, not allowing extensive digressions into other disciplines that require proper instruction and training. However, as ethnohistorical as well as ethnographic documentary evidence does exist that may broaden the insights into the central research question of this project, it seems unwise to completely ignore it. Thus, although the collection of ethnographical and ethnohistorical information is not an aim in itself; it is merely used to complement archaeological information presented.

Ethnohistorical sources, consisting of colonial travel accounts, chronicles and scientific works, are less abundant for the Lesser Antilles when compared to the Greater Antilles, for which early sixteenth century ethnohistorical accounts do exist. Important ethnohistorical sources for the study area include seventeenth century French accounts, unfortunately dating from more than a century after the earliest contact period. Among these are the accounts of *Anonyme de Carpentras* (Moreau 1990[1618-1620]), Bouton (1640), Breton (1978[1647]; 1892[1665]; 1900[1666]), De la Borde (1674), De Rochefort (1665[1658]), Du Puis (1972[1652]), Du Tertre (1973[1667]) and Labat (1931[1742]).

Before using their information, however, several aspects should be regarded in order to be able to evaluate the reliability and value of the sources. An important aspect greatly influencing the types of descriptions provided and the attitude and value judgement towards the Amerindian inhabitants of the islands relates to the different personal backgrounds, intentions and motivations of the authors. Another aspect, that was already mentioned before, touches upon the fact that the sources were written well over a century after European domination within the region began (section 4.3), during which time a considerable number of socio-political and demographic changes had already taken place. This implies that the documents need to be carefully consulted and evaluated against the background of the document's context.

Comparing the different accounts, there is an apparent uniformity in descriptions of Amerindian culture and in their chapter divisions. This suggests that authors felt inspired by each other and that they even may have been copying descriptions. It is generally accepted that the accounts of Father Breton may be regarded as an important primary source while De Rochefort, Du Tertre, De la Borde and Labat based their works largely on Breton's information, often without mentioning his work. They also added some new information. Du Puis and De Rochefort based their descriptions mainly on the accounts of Breton and Du Tertre. Information from the accounts and dictionaries of Breton will be considered most reliable. Breton, writing reports that were meant to inform the congregation in Rome on the activities of Dominican clergymen on the Antilles, was the only one who lived on the Antilles for 20 years, mostly among the Amerindian inhabitants of the islands. In addition, he learned their language.

As for ethnography, it was decided to only include some of the suggestions that colleagues, who are better instructed in this field of study, have been bringing up. It should be noted that ethnographical information usually represents modern indigenous groups that may have changed significantly in comparison with their pre-Columbian ancestors as a result of European influence, depopulation, increased environmental stress and notable changes in socio-political organisation of the groups involved (Posey 1994:271). Ethnographical information in this study can mostly be found in the endnotes.

Last but not least, some attention should be paid to the very unfortunate fact that only little information is available on names of groups living in the Lesser Antilles in the region of interest, as a result of their swift extinction following European contact. Ethnohistorical accounts provide rather unreliable and highly confusing information on this subject, which makes the use of names such as Taíno, Carib or Igneri, for cultural or ethnic labelling highly doubtful (see Hofman 1993:217-232; Petersen *et al.* 2004). Archaeologists working in the area have often used names of large language families to indicate smaller social groups, referring for instance to 'the Arawak' of the Lesser Antilles. Names of pottery styles from Rouse's chronological and cultural classification scheme (chapter 4) have been used in a similar manner as well, resulting in names such as 'the Huecans' or the 'Saladoid people'.

As there is too little information on what the people living in the research area in pre-Columbian times called themselves, throughout this study they have generally been referred to as the pre-Columbian inhabitants of the research area. Indigenous Amerindian people, however, have negative associations with the term 'pre-Columbian', in the sense that it refers to Columbus and it severely obscures the diversity and richness inherent in cultural and social identities. It is well acknowledged that names are important for understanding ethnicity, self-recognition,

and cultural and social identity, which are factors that do not necessarily correlate with archaeological cultures. These are essential for the understanding of any society, as they relate to the communal memory. The term pre-Columbian is used in the absence of accurate names or terms of self-identification and it is certainly not intended to provoke or to trivialise problems related to this. The term is considered a chronological marker. The study focuses on the habitation of the research area up to AD 1493, which denotes the arrival of Columbus.

1.5 CONCLUSIONS AND EXPECTATIONS ON THE SUITABILITY OF THE DATA

The East-Guadeloupe project is expected to make a contribution to our understanding of social organisation and interaction of pre-Columbian Amerindians who once lived on Pointe des Châteaux, La Désirade and Petite Terre. This will be done through intensive archaeological fieldwork, which has been adapted to the research questions and to the local conditions. The study of the resulting archaeological data, focusing on the investigation of site distributions and site patterns and on the characterisation of the material culture assemblages from these sites, is expected to result in an analysis of pre-Columbian organisation and interaction in the research area. If relevant, the data may be supplemented with ethnohistorical and ethnographical information in order to provide information that is less visible archaeologically. To answer the questions related to the physical landscape a geological study has been formulated. In addition, the results of the investigations can be used to extract information on settlement systems for areas immediately outside the selected micro-region, such as Grande-Terre on Guadeloupe, where systematic and intensive surveys are lacking. Grande-Terre, which environmentally forms a rather homogenous region together with the research area, is known to harbour a number of regularly spaced coastal settlements (DRAC archives), but the more or less direct surroundings or the home ranges of the sites have not been investigated.[12] Information on the presence of different types of sites, with locations other than coastal, is thus absent, as is information on the use of the environments of the sites or on inter-site interaction. Data from the research area will be used to bring forward suggestions on how the incomplete view of the Grande-Terre settlement system can be improved.

Some problems can be expected, however, when using the site inventory and the archaeological material collected during the surveys for the study of pre-Columbian social organisation. The first problems encountered during the project are related to local environmental conditions and to the fieldwork conducted and the possible biases inherent to the survey methods and the additional small-scale test units (section 5.2.1). These may be enforced by the intensity and the method of surveying, the use and characteristics of archaeological surface material, survey capacities of individual survey crew participants, environmental factors and natural and cultural post-depositional processes. Section 5.2.1 describes causes and effects of those variables in detail, and more importantly, attention is focused on how their effects have been dealt with during the present project. It was thought that the effect of those variables on the accuracy of the recovery of archaeological sites can largely be predicted and their impact turned out to be rather small. The site inventory is deemed to be rather representative. One of the basic premises of the project is that central sites will not be missed while systematically and intensively surveying the region, on the basis of their dimensions and their surface material. The effect of biases on site characterisations as a result of methods of investigation is expected to be much larger, and more importantly, the impact cannot be quantified and thus it cannot be accurately corrected. Site characterisations had to be based on small samples of archaeological material and environmental situations, strategies and sample sizes are not comparable for all sites. For many sites, at which no test units could be excavated, only surface collections were available. These were kept rather small, so as not to destroy the appearance of the sites on the surface. For the surface collections a bias is expected towards a more intensive collection of decorated ceramics. Sub-surface testing had to be limited to small and randomly selected test units, providing severe constraints on the quantity of archaeological material excavated as well as problems in estimating how accurate the collected data reflect the actual situations at the site. Intra-site distributions cannot be studied and it is of course an easy criticism to remark that site characterisations can be improved to an important degree by extending the scale of research. Sampling problems such as those related to faunal material have been described by Nokkert (appendix 5). It is felt that these problems, related to site characterisation, could not be accurately solved.

It is, however, assumed that the survey data collected for the East-Guadeloupe project are compatible for the investigation of pre-Columbian socio-political, economic and ceremonial organisation and interaction, as they do provide information on rough diachronic patterns of distributions of archaeological material over the landscape. A very important problem that cannot be satisfactorily dealt with includes the impossibility of studying contemporaneity of the sites. It is obvious that, as Shennan (1985:105) once remarked, “it is only possible to work in terms of those

chronological distinctions which variation in the material collected allows us to make". It was clear from the outset that within the present project sites could be assigned to pre-ceramic, Early Ceramic and Late Ceramic Ages at best, without expecting information on finer time-frames. Evidence of short-term variation cannot be expected. This, of course, invokes restrictions in establishing the co-existence of individual sites. Another problem involves the study of site surface areas and their relationships to settlement hierarchies, especially in the case of multi-component sites.

The choice for studying some islands or parts of islands in so much detail obviously has strong implications for the scale of the project and gives rise to some problems in the applicability of the data that are inherent to regional survey projects. One can continue regarding the survey data with scepticism and decide not to use these for the construction of rough regional overviews. One may also take a more positive attitude by using the large body of data that has been brought forward by the project and which may provide valuable insights into archaeological site distributions. These will hopefully be refined, complemented and corrected by future research, involving larger-scale site-specific archaeological research.

1.6 OUTLINE OF THE PRESENT STUDY

The present study comprises six chapters. After having formulated the research problem and the methodological framework for this study in the present chapter, fieldwork procedures and artefact analysis methods have been presented in chapter 2. Chapter 3 outlines the actual physical setting of the study, complemented with information on the pre-Columbian situation where possible, necessary to understand local conditions for fieldwork and site survival as well as the conditions for pre-Columbian use and perception of the landscape. In order to improve the understanding of chronological assignments of sites in the research area, a short cultural background, focusing on pottery styles, is provided in chapter 4. Chapter 5 presents fieldwork results. Chapter 6 describes diachronic pre-Columbian site patterns, social organisation and interaction for the research area, based on the site catalogues that were created during the East-Guadeloupe project.

Appendix 1 provides an introduction to the site catalogues and presents the fieldwork forms used. Appendices 2-4 include extensive site catalogues that were made during the present project, providing detailed information on site location and preservation, test units and stratigraphy, archaeological materials excavated and chronological assignment for all pre-Columbian sites in the research area. Appendix 5, written by Mark Nokkert in 2001, reports his analyses of faunal remains excavated during the project.

Page 431 presents a general legend for the maps as well as the names of the sites in the Eastern Guadeloupe micro-region.

NOTES

1 After Hoopes, 1988, *The complex tribe in prehistory: sociopolitical organization in the archaeological record*. Paper presented at the 53rd Annual Meeting of the Society for American Archaeology.

2 See also Weiner (1988) for Papua New Guinea.

3 The Kula is a highly complex exchange system operating in a closed circuit consisting of local groups inhabiting a wide ring of islands, wherein red shell necklaces are moving in one direction and white shell bracelets in the opposite direction, invoking constant exchange of items (Malinowski 1953:81; see also Weiner 1988).

4 Crock (2000) and Hoogland (1996) selected large settlement sites for their studies on site hierarchy on Anguilla and Saba but they also provided detailed site inventories for these islands.

5 Ingold, T., 1993, The Temporality of the Landscape. In: *World Archaeology 25 (2)*:152-174.

6 See Bright (2003) for a comprehensive discussion of this subject.

7 "The 'optimum-settings' are defined as: (1) situated on sandy beach sediments, (2) close to salt ponds or other non-ocean water, (3) close in elevation to the sea, and (4) close to suitable farmland. In contrast, the 'non-optimum-settings' are: (1) situated on rocky and non-beach sediments, (2) not situated close to salt ponds, (3) not close to the sea in terms of elevation, and (4) more distant from farmland" (Petersen and Crock 1999:126).

8 Myers, T.P., 1973, Towards the reconstruction of prehistoric community patterns in the Amazon Basin. In: Lathrap, D. and J. Douglas (eds.), *Variation in anthropology*:233-252. Illinois Archaeological Survey, Urbana.

9 Following Jarman *et al.* (1972:62), territory is used "in an economic sense, to refer to the area exploitable from a particular site, and no reference is intended to the concept of territory as a defended entity. Territories exploited from archaeological

sites will vary according to a number of factors, among which the most obvious are the nature of the economy, the means of transport available, the population pressure, and the character of the terrain".

10 The reader is referred to Boomert (2000) for an overview of Early Ceramic cosmology and ritual.

11 The reader is referred to Hofman (1993:198-203) for an overview on the use of the concept of style in archaeology through time and on different meanings of style.

12 DRAC archives were last consulted July 29, 1999. A large number of sites in the DRAC inventory have only been listed as pre-Columbian, without indicating a more precise chronological assignment, and only few have been investigated in detail.

2. SURVEY METHODS AND ANALYSES OF ARCHAEOLOGICAL MATERIALS

2.1 INTRODUCTION

2.1.1 The archaeology of regions

Since the late 1980s, interest in regional archaeological research has been increasing.[1] This can be attributed to two factors. The first is related to an increased awareness among archaeologists of the importance of and need for the management and the protection of the archaeological cultural heritage of the regions in which they work and a subsequent need to map entire areas. The second is related to the growing interest in studies of prehistoric social and political organisation, exchange and interaction. The interest in such studies, focusing on patterns of human behaviour, can only be satisfied through the study of entire social or political landscapes (Kowalewski 1990:33).

An efficient way of investigating the archaeology of regions, without causing too much damage to the archaeological record, is through regional survey. The importance of regional surveys has increased considerably over the past twenty years. Surveying is no longer seen as a technique to merely locate sites, in order to determine where to carry out intensive excavations at a later stage. It has now developed into an independent field of study. Without neglecting the rich archaeological data that intensive archaeological research through excavation yield, regional or micro-regional surveys may be needed for the archaeological study of patterns, reflecting spatial distributions of human activities in the past. If tightly constructed around relevant research questions, they may provide an adequate database for regional archaeological projects with limited resources. The East-Guadeloupe project is an example of such a project.

In order to present a substantive framework for the fieldwork executed on behalf of this project, the first part of this chapter seeks to provide an overview of regional surveying techniques in general, and an insight into the current state of affairs in the Caribbean and the study area in particular. The chapter subsequently focuses on the fieldwork carried out during the East-Guadeloupe project. It describes the strategies and methods of the field walking and sub-surface testing procedures. Then, the analyses of the pre-Columbian archaeological material provided by the surface and sub-surface procedures will be addressed.

2.1.2 Regional surveys

The most accurate way of investigating the archaeology of a region is to study it completely. Of course, logistical factors never allow such an approach. In addition, such an approach inevitably destroys the archaeological record for future generations. A good alternative to get a swift insight into the regional archaeological record is to carry out a systematic regional survey, which will allow accurate generalisations regarding *surface* distributions of archaeological material.

Although some authors advocate 'complete' surveys or surveys that are as detailed as possible in order to make such generalisations (e.g. Fish and Kowalewski 1990; Kamermans 1993; Shennan 1985), others (e.g. Van de Velde 2001) consider complete surveys to be an impossible ideal.[2] They question the reliability of archaeological surveys, since sites may have been eroded or covered by sediment. In addition, it is not very likely that all terrains are accessible and there is no chance of finding 'all' archaeological objects. However, there should be no misunderstanding about what is meant by full-coverage surveys. Fish and Kowalewski (1990:268) warn, "recovering 100% of anything, and verifying the claim, is impossible in archaeology". For them, full-coverage surveys do not prescribe survey intensity; the only prerequisite is that the observation density should be uniform (Fish and Kowalewski 1990:2). Survey intensity, or the detail and the scale of spatial observation, is determined by the research objectives, the characteristics of the archaeological data required, the characteristics of the terrain, and the projects' possibilities in terms of financial and human resources. Therefore, full-coverage surveys may be characterised by 5 m survey intervals, but they may also be as wide as 75 m, as long as they systematically cover the complete survey area. Parsons (1990) correctly points out that what is meant by 'full-coverage' and 'intensive survey' will vary from project to project.

Even within Fish and Kowalewski's definition, full-coverage surveys can be carried out in only a few projects. The possibility of doing so depends heavily on the characteristics of the survey area, including the dimensions, the accessibility of the terrain, and the soil cover. If the soil is covered by sediment, it may be necessary to execute a sub-surface survey by means of auger testing or the excavation of small test-pits within a grid. Sub-surface testing, however, is time-consuming and may limit the intensity of a survey considerably. The characteristics of the artefacts on the surface, such as their dimensions and the material of which they are made, may also greatly influence the speed, efficiency and accuracy of their identification on the surface. And finally, the capacity of the survey crew, including the number of participants and their

training, the available material in the field such as measuring equipment, and the time frame, is relevant to the dimensions of a region that can be covered completely by a survey.

These factors obviously restrict the possibilities for full-coverage surveys. Therefore, it is wise to select controllable sampling designs, whether they are random with a purposive or a systematic stratification, or systematic with an unaligned design, or random with a systematic stratification; these are thought to produce representative data with a predictive value (Flannery 1976:132). Van de Velde (1997) warns that few people are aware that transect walking, which is the most popular systematic survey technique, is selective by nature and therefore a sample.

2.1.3 Caribbean archaeological surveys

From 1907 until recently, archaeological reconnaissance studies have been frequently reported in Caribbean archaeology (e.g. Allaire 1974; Bodu 1985[c]; Boomert 1984, 1996; Branch 1907; Crock 1995; De Josselin de Jong 1947; Evans 1968; Sutty 1990).[3] Such studies concentrate on the identification of archaeological sites already known to professional or amateur archaeologists. From a regional perspective, they are unsystematic and they often result only in the affirmation of existing knowledge. The problem with such studies is that the incomplete inventories they provide are often widely used for the formulation and affirmation of ideas concerning pre-Columbian Amerindian site location and environmental adaptation (Gassies and Rousseau 1995[b]:36; Johnston and Lundberg 1985). Fish and Kowalewski (1990:263-264) note that reconnaissance surveys often fail to specify the areas examined, that they tend to contain a bias toward larger and more spectacular sites, and that they often seem to neglect remote or less accessible terrain. This situation may be also considered exemplary for the archaeological research on Guadeloupe in general (Gassies and Rousseau 1995[b]:36).

Systematic archaeological surveys with well-defined survey areas and survey strategies have generally been rather scarce in the Caribbean. An important impulse to improving this unfortunate situation was provided by Goodwin (1979). He created a multistage sampling design in order to provide an archaeological study of geographical distributions of Early Ceramic habitation sites on the island of St. Kitts. He applied an environmentally stratified survey procedure (Goodwin 1979:126). Randomly chosen quadrates, which represented one per cent of each stratum, were systematically surveyed. This first phase demonstrated that archaeological sites were related to fresh water sources and no sites were found above the 1000 feet contour boundary. Therefore, a second, purposive, survey stage was carried out, aimed at the study of transects bordering rivers or river drainages, up to this elevation. Although this method allowed Goodwin to define a hypothetical diachronic sequence of settlements for prehistoric St. Kitts, he had to conclude that the fieldwork did not allow generalisations on population growth, and that it was especially difficult to estimate component sizes of multi-component sites (Goodwin 1979:322).

Another regional survey was carried out by Watters (1980), contributing to the study of relationships between environmental variables and pre-Columbian site locations on the islands of Barbuda and Montserrat. Watters applied a simple random survey design, based on the survey of east-west oriented cross-island transects. As the number of sites discovered was very limited, sites that had previously been discovered outside the transects had to be included in the study in order to create a reasonably large database. This obviously imposed some limitations on the representativity, generalisability, and predictability of the data (Watters 1980:186). The results of the project were further strongly influenced by the inaccessible nature of the terrain and the depth of the soil, making it impossible to adequately survey the interior parts of Montserrat.

From the early 1980s onwards, further regional survey projects were carried out. Survey designs were largely based on the results of the studies by Goodwin and Watters by concentrating on the coastal areas of Caribbean islands. For some studies inland areas were surveyed as well. Among the most impressive are Keegan's (1985) investigations on the Bahamas and the surveys of 72 islands located off the central and western Venezuelan coast (Antczak 1998). Wilson (1989, 1991) carried out a complete survey of the coastal region of Nevis and the drainage guts as far as the inland topography seemed to permit settlement. Areas where settlement was less likely were randomly surveyed. Curet (1992), studying the development of chiefdoms in the Valley of Maunabo on Puerto Rico, investigated both the mountainous inland part and the coastal area of this region. Within the mountainous area, he surveyed a sample of three flat areas, based on earlier Puerto Rican studies that reported sites to be located on relatively flat terraces close to the junction of streams (Curet 1992:131). Other survey projects have been reported for Carriacou (Kaye *et al.* 2003), St. Vincent (Callaghan and Moravetz personal communication 2001), Barbados and Tortola (Drewett 1991, 1995[b]), St. Lucia (Keegan *et al.* 2002), St. Eustatius, Saba and St. Martin (Haviser 1985[a-b], 1988), among others. Systematic regional studies on Puerto Rico profit from the large amounts of archaeological data provided by contract archaeology projects that have been carried out on this island since the 1970s (e.g. Elliott 1987; Rodríguez 1990; Tronolone *et al.* 1990). On the other hand, several failings have been reported, the lack of problem-oriented research being the one most often criticised in academic studies (e.g. Curet 1992:38-39).

2.1.4 Archaeological fieldwork in the research area

Until the start of the East-Guadeloupe project, the number and the influence of contract archaeology projects on Guadeloupe were quite limited, except for archaeological projects at the pre-Columbian sites of Anse Ste. Marguerite (Rousseau *et al.* 1995) and Morel (Hamburg 2000[a]; Hofman *et al.* 2000). The near absence of such projects is remarkable since Guadeloupe, as a French department, takes part in the European 1992 Malta convention. Implementation of this convention elsewhere has led to the surveying of large areas for their archaeological potential, prior to building activities, and to subsequent excavations if needed. Considering the numerous construction activities on Guadeloupe and its annexes, possibilities for salvage archaeological research should be more prominent. However, until very recently, the traditional organisation of archaeological fieldwork on Guadeloupe appeared to have been hardly altered at all. Fortunately, the number of archaeological salvage operations being carried out on Guadeloupe has been increasing since 2001 (Chancerel 2001:4-6, 2002:4-5).

Archaeological research on Guadeloupe has traditionally focused on the small-scale study of large, principally coastal sites on the islands of Basse-Terre, Grande-Terre and Marie-Galante. Less fieldwork was conducted on the smaller Guadeloupe annexes of Les Saintes, La Désirade and Petite Terre. In 1993, a scientific and financial co-operation was signed between the archaeological service of the *Direction Régionale des Affaires Culturelles* (DRAC) of Guadeloupe and the Faculty of Archaeology of Leiden University.[4] Since then, larger-scale projects have been carried out on the larger islands, and some pioneering projects were carried out on the smaller annexes. This co-operation program existed until 2000.

A strong impulse to systematic archaeological fieldwork on Guadeloupe was provided by the French Ministry of Culture. It instructed the archaeological services of every DRAC in France and its overseas territories to work towards the completion of their *Carte Archéologique* or archaeological heritage inventory (Gassies and Rousseau 1995[a-b]). This instruction, enhancing possibilities for archaeological heritage management as well as scientific research, is well served by survey in general, and by systematic surveys in particular. For the *Carte Archéologique* project, more or less systematic regional surveys were conducted. These were carried out on a small coastal strip and some adjacent river drainages on the Leeward side of Basse-Terre (Gassies 1995[b], 1996[a], 1996[c]), in the mangrove area in the northwestern part of Grande-Terre (Rist personal communication 2000), and on Marie-Galante (Chenorkian *et al.* 1998; Gassies 1995[a], 1996[b]). Prior to 1998, no systematic regional surveys had been conducted at Pointe des Châteaux, La Désirade and Petite Terre.

At Pointe des Châteaux, archaeological fieldwork in the area selected for the present study has been limited to the large-scale excavations that have been conducted on a yearly basis at the site of Anse à la Gourde between 1995 and 2000. Before 1994, several excavation proposals were drafted; in 1973 by Père Barbotin and Edgar Clerc, in 1975 by Pierre Verin and in 1977 by Louis Allaire. Unfortunately, no reports from these campaigns are available, and it is as yet uncertain whether the latter two campaigns were carried out at all. The investigations of Pierre Bodu, carried out in 1984 and 1985, have been documented in more detail, but Anse à la Gourde has only been thoroughly investigated since 1994 (Bloo 1997; Bright 2003; Duin 1998; Grouard 2001; Hofman *et al.* 2001[a]; Kappers 1996; Kelly 2003; Knippenberg 2001[b]; Kraan 1998; Lammers-Keyzers in prep.; Nieweg 2000; Pater and Teekens 2004; Roetman 2003; Timmermans 2003; Viallon 2001[a-b]).[5] Besides these studies, no systematic archaeological research was carried out on the easternmost tip of Pointe des Châteaux. Nevertheless, the sites of Grande Saline and Petites Salines had already been reported in the DRAC archives.

At La Désirade and Petite Terre, the Fathers Pinchon and Guilbert, together with other local inhabitants, had been collecting archaeological surface finds from the early 1950s onwards. They also carried out small-scale and non-documented excavations, at, for example, the sites of Anse Petite Rivière and Voûte à Pin on La Désirade. Father Maurice Barbotin (1991) and Edgar Clerc, the latter being the founder of the Guadeloupe Historical Society and director of Antiquities since 1972, were the first in the 1950s to document their archaeological investigations of La Désirade and Petite Terre. Unfortunately, most of their documentation has been lost over the course of time. Nicholson (1975) reported a short archaeological visit to the Site du Phare at Petite Terre. Henri Petitjean-Roget (1983), director of Antiquities between 1984 and 1992 and curator of the departmental Schoelcher and Edgar Clerc Museums on Guadeloupe, visited some archaeological sites on La Désirade and Petite Terre. Under his supervision, Pierre Bodu started a reconnaissance survey of 17 pre-Columbian sites on these islands in 1984. Site descriptions and surface collections were made and test excavations were carried out at the sites of Anse Petite Rivière, Morne Cybèle-1 and Les Sables (Bodu 1984, 1985[a-c]).[6] The collections made by Pinchon, Guilbert and Bodu have been stored in the depot of the archaeological Edgar Clerc Museum in Le Moule (Guadeloupe).

Since 1994, archaeological teams from Leiden University have been investigating archaeological sites on La Désirade. Test excavations have been carried out at Morne Cybèle-1 and Morne Cybèle-2 (Hofman 1995; Hofman and Hoogland 1994) and Anse Petite Rivière (De Waal 1996[a-b]). Archaeological research at Petite Terre was not undertaken until recently, because local circumstances greatly hindered archaeological

research and overnight stays on these islands. At Terre de Bas, five pre-Columbian sites had been reported at the start of the surveys (Bodu 1985[c], Nicholson 1975).[7]

2.1.5 Conclusions

Despite the recently increased interest in regional studies and the subsequent need to carry out systematic surveys, archaeological fieldwork within the research area has been mainly limited to the study of isolated sites and to haphazard surveys. Apart from investigations at Anse à la Gourde, archaeological research at Pointe des Châteaux and on La Désirade and Petite Terre has been small-scale, non-systematic and, in most cases, poorly documented. In addition, few of the resulting archaeological collections, including those from Anse à la Gourde (Hofman *et al.* 2001[a]), Pointe Doublé and Morne Baie Mahault (Bodu 1984), Morne Cybèle-1 and Morne Cybèle-2 (Hofman 1995) and Anse Petite Rivière (De Waal 1996[a-b]), have been studied.

Caribbean surveys in general have been largely based on the studies by Goodwin (1979) and Watters (1980). They concentrate almost exclusively on coastal and riverine areas for the discovery of archaeological sites and survey designs are largely similar. However, there are factors to be considered that cause an overrepresentation of archaeological sites in coastal areas. These factors will be addressed in the following section.

2.2 FIELD METHODOLOGY OF THE EAST-GUADELOUPE PROJECT (1998-2000)

2.2.1 Introduction

The archaeological site inventory of the study area at the start of the project was considered to be far from reliable. This belief came about through awareness of several factors that result in a biased representation of site types, locations and periods. The first among these is that amateur archaeologists and many of their professional colleagues have tended to focus their interest on large settlement sites, preferably those which yield decorated artefacts. Secondly, in many cases, the coastal locations of known sites appear to reflect activity areas of both professional and amateur archaeologists instead of actual site distribution patterns. Coastal sites are usually more easily reached and observed than inland sites, and often they are uncovered as a result of construction activities related to urban or tourist development, illegal sand exploitation, or coastal erosion. Unfortunately, this also means that these sites are easily and frequently subject to illegal excavation. Thirdly, surface material of some sites will be more difficult to detect by means of a surface survey than that of others. This is particularly true for pre-Ceramic or a-ceramic sites. These often lack diagnostic material and, if present at all, flint flakes or other lithics are usually more difficult to observe on the surface than ceramics. The most important reason, however, for the absence of accurate site distributions within the study area is the lack of systematic and intensive surveys. However, such surveys are the only means of providing representative information on archaeological site patterns, as needed for the present study.

Three survey campaigns were designed to provide this information and to create a reliable archaeological database. In addition, relevant unpublished archaeological collections from sites in the research area were studied. The survey campaigns were made possible as the archaeological service of the DRAC of Guadeloupe supported financial demands to the French Ministry of Culture (De Waal 1997, 1998[b], 1999[g]) and allowed the fieldwork to take place. The first 10-week campaign aimed at the survey of Pointe des Châteaux and an orientation visit to Petite Terre, during which Terre de Haut was surveyed. Two surveyors, aided by two students from the Anse à la Gourde field school, carried out this fieldwork in 1998. Six surveyors conducted the second 10-week campaign on La Désirade and Petite Terre in 1999. The final campaign was carried out by five surveyors and consisted of a six week measuring project of test unit locations at Pointe des Châteaux and on La Désirade and Petite Terre. During this last campaign, additional archaeological fieldwork was carried out as well, including auger testing at the Pointe des Châteaux beaches, the survey of a 1.5 km block west of the site of Anse à la Gourde and the survey of the southern coastal plain of La Désirade. The following sections will address the strategies and methods of these fieldwork campaigns.

2.2.2 Survey strategies

As outlined above, earlier research in the study area has not provided the reliable data required for the research questions as formulated in section 1.3, since it focused on the study of isolated sites, and it was influenced by research biases. The 1998-2000 fieldwork campaigns were supposed to fill this gap of data, and an attempt was made to design a less biased survey strategy. This was expressed in the fieldwork objectives. In the first place, the surveys should provide a reliable pre-Columbian site inventory. This should include all types, functions, locations and periods of sites. At the very least, they should procure a representative sample inventory that would allow generalisations both on the presence and absence of sites in certain areas. Secondly, detailed site descriptions should be obtained, to better understand spatial artefact distributions, geological and archaeological stratigraphies, site functions, and chronological assignments. Finally, it should be possible to estimate the efficiency and

accuracy of the inventory.

2.2.3 Survey methods

The fieldwork methodology of the East-Guadeloupe project has been described in detail in the field manuals (De Waal 1998[a], 1999[a]) and in the final fieldwork report for the DRAC (De Waal 2002[a-c]). The following text is merely a summary. While the field manuals discuss the fieldwork for the different islands separately, this summary presents it as whole and only highlights some relevant differences. It proved to be quite difficult to design one single survey strategy since survey methods had to be adjusted to suit the particular physical characteristics of the different parts of the study area.

The following section is organised according to the main distinction that was made during the fieldwork: field walking procedures, subsurface testing and test unit positioning. Private archaeological collections of local inhabitants of La Désirade were also studied. Unfortunately, these were not of great use for the inventories, since information on find locations and archaeological context could not be recorded in most cases.

2.2.3.1 Field walking procedures

The first part of the fieldwork included an intensive field walking program. Surface surveys were deemed possible as sedimentation appears to have been very limited throughout most of the study area. The field walking program consisted of parallel transects, separated by 10 or 20 m intervals (fig. 2.1).[8] Some locations where the survey results did not meet the expectations at all, however, were walked again using

Fig. 2.1. Surveying the eastern part of La Désirade.

transects separated by 5 m intervals. This was done, for example, for Anse Tarare on Pointe des Châteaux. None of the revisited locations revealed sites. Transects were 1 m wide since this is the maximum area that can be overseen at a moderate walking speed. Parallel transects were chosen as the basic survey technique, in order to reduce orientation problems and logistical problems in the field (*cf.* Plog 1976:139; Plog *et al.* 1978:401; Watters 1980:171; Watters and Scaglion 1980:341), which are among the most limiting factors of Caribbean surveys (e.g. Haviser 1985[a]:67). It was easy for survey participants to find and to document transect starting points, since the coastal topography provided useful orientation. Transect starting positions were chosen in the field. In addition, transect surveying is usually considered useful at early project stages when little information is available on the range of archaeological material types, relative density and degree of clustering within a region (Schiffer *et al.* 1978:12; *cf.* Watters and Scaglion 1980:339).

The efficiency of the transect intervals was tested by a so-called 'zigzag' survey technique, randomly checking the interval surfaces in order to see if concentrations of archaeological material had been missed. Steep slopes, where *in-situ* material could not be expected, were not included in the study. To avoid observational bias towards favourable locations, the transects were compass-oriented north-south covering the coastal as well as the inland areas, and thus different topographic features and different geological and vegetation zones. Moreover, when present in the transects, natural or anthropogenic sections were studied for the presence of artefacts. Gullies and ravines were examined for the presence of fresh-water sources and for the presence of large boulders with pre-Columbian petroglyphs. Transect surfaces were cleared, if necessary, with machetes in order to optimise observation. Due to time constraints, survey areas could not be walked again to improve observation under different conditions. The sandy beaches at Pointe des Châteaux and on La Désirade and Petite Terre, however, were surveyed several times and in different weather conditions. No new sites were discovered.

In the initial phase of the project, each transect was described on a transect survey form summarising administrative information, information on factors influencing

Fig. 2.2. Surveyed areas and possibly eroded coastal zones on Pointe des Châteaux.

the observation capacity of crew members, and environmental information that influenced presence and visibility of material on the surface and accessibility of terrain (appendix 1). On La Désirade, these detailed, but time-consuming descriptions were replaced by short descriptions of the survey zones.

For all discovered concentrations of archaeological material, surface collections of diagnostic material were made in the field. If present in the surface concentration, decorated sherds, fragments of rims, bases, griddles, appendages and other ceramic objects, and lithic, shell and coral artefacts were collected. If not, an arbitrary sample of non-diagnostic material was obtained. It is obvious that chronological assignments, which had to be based on ceramic evidence, were mainly determined using surface material, of which generally rather small samples had been collected. The samples include material from all over the concentration, thus collected outside transects as well. In addition, off-site material found in transects was collected. Although such samples do involve selection biases and loss of provenience information (Plog *et al.* 1978:406; Van de Velde 2001:27), they may be useful for attaining rough and general site characterisations. Rims of vessels and griddles and decorated pottery fragments, which are the fragments most susceptible to collection biases, often provide useful functional and chronological indications. It is true, however, that percentages of decoration of the pottery samples, that are generally rather small, may turn out to be rather high as a result of these biases. The collection of surface material

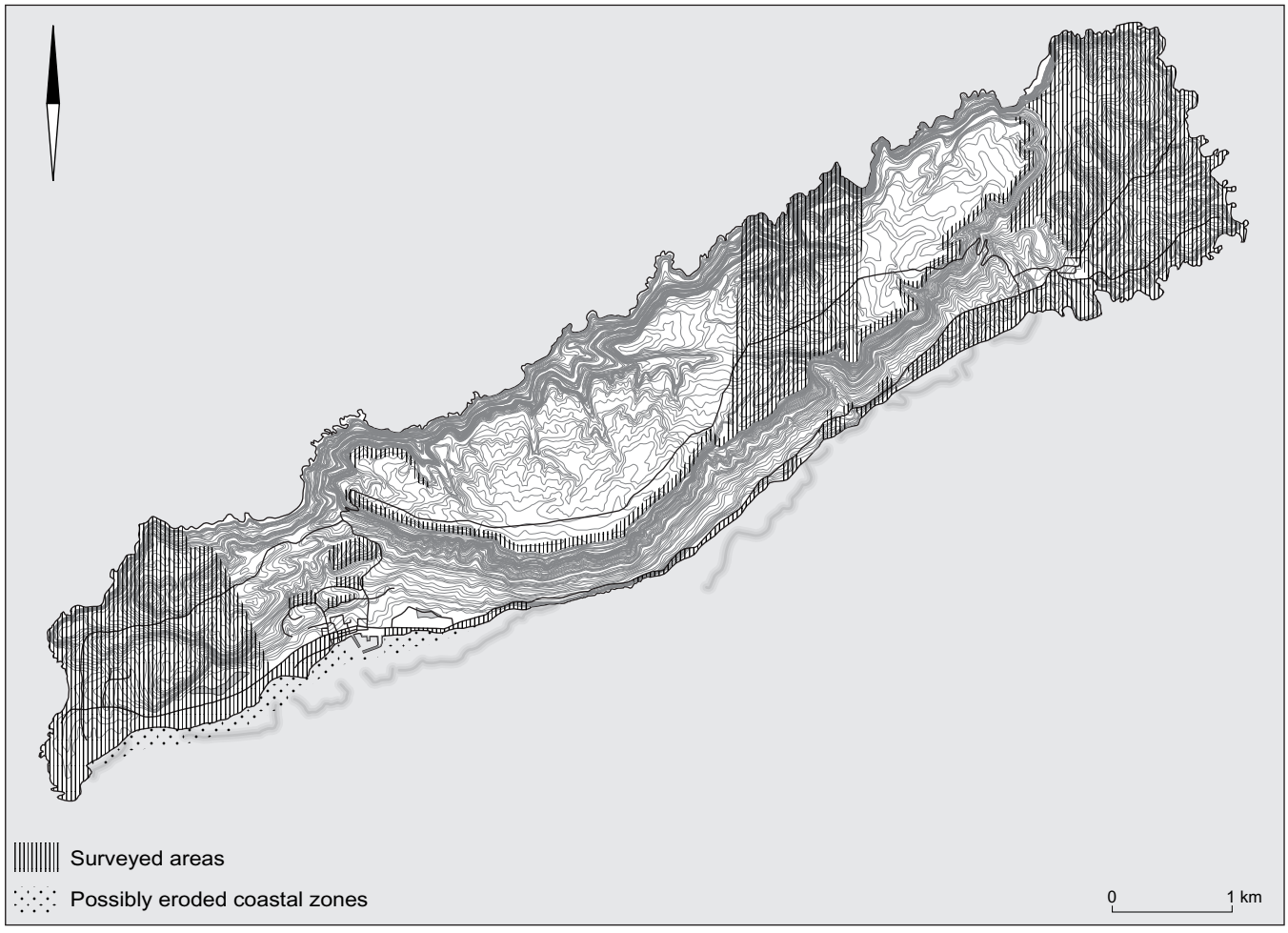


Fig. 2.3. Surveyed areas and possibly eroded coastal zones on La Désirade.

was necessary, although it causes damage to the visibility of and the spatial distributions within surface concentrations (Plog *et al.* 1978:405), as a result of the unfamiliarity of part of the survey crew with the local ceramics.[9] Collection of the material provided the opportunity of studying it in a standardised way by one person and reanalysing it at a later stage. One of the premisses in collecting site samples was that archaeological material left at site surfaces would be sufficient to allow relocation and characterisation of the sites in the future. It should not be forgotten, however, that surface distributions appear to change regularly (section 5.2.1). Isolated finds, or off-site material, and surface concentrations of archaeological material were mapped on aerial photographs that had been enlarged to 1:5000 scale.[10] As a result of limited possibilities for topographic measuring in the field, transects could not be divided into collection units based on a grid, which would have facilitated generalisation of field data at a later stage.

The focus of the survey was on the recovery of archaeological sites. Although it cannot be denied that site definitions are often rather vague interpretations, possibilities for a regional non-site study were considered to be too limited within the study area, as a result of the characteristics of the surface material (section 1.4.3). Off-site data were used as merely complementary to the site data collected. As a result of this site-focus, problems related to the transformation from walkers' counts to densities, as tackled by Van de Velde (2001:25), are negligible.

Standard descriptions were made of the archaeological sites, which may consist of one or more surface concentrations (SC). Site description forms (appendix 1) provide information on informants, the current owner of the terrain and earlier research and archaeological collections. Secondly, they include data on site dimensions, reflecting the spatial distribution of pre-Columbian archaeological material over the surface, co-ordinates, status, and thickness of the archaeological deposits.[11] Then, terrain descriptions and a sketch of the local situation were provided. The surface material and its distribution were characterised and site location variables, as introduced in section 1.4.4, were reported. Finally, it was decided whether sub-surface tests were to be made. It should be remarked here that for only a few sites, the study of surface distributions provided an impression of the functional areas within sites. In most cases, only the refuse or midden areas could be identified, if present. In some cases, the location of dwelling areas of settlements could be hypothesised, but areas used for cultivation, burial practices or other special activities could not be properly identified on the basis of only surface data and small-scale sub-surface information. According to Barker (1991:5) essential features of sites, such as shape, size and chronological information of artefact concentrations remain reflected at the surface in a quite stable manner. Data from other regions suggest, however, that the amount of archaeological material at the surface may vary enormously over time, even during a single field season (e.g. Bintliff and Snodgrass 1988:509). For the study area, no quantitative data are available on this topic. However, repeated surface observations at the À l'Escalier site on La Désirade, carried out in 1997 and 1999, suggest that the density of surface material at this site is constantly changing.

The area selected for study at Pointe des Châteaux could be completely surveyed in the above-described manner, using 10 m intervals, as a result of the limited dimensions of the area (fig. 2.2). This detailed investigation served as a pilot study for the fieldwork on the larger island of La Désirade (De Waal 1999[b]). As results from the 10 m intervals at Pointe des Châteaux did not justify continuation of this time-consuming approach, intervals were set at 20 m on La Désirade.

On La Désirade, which could not be surveyed completely, four survey zones were defined, including the plateaus in the eastern part of the island, the central plateau, the hills at the western part of the island, and the southern coastal plain (fig. 2.3). The eastern plateaus and the western hills were completely surveyed, as was the southern coastal plain. On the latter, however, various parts were disturbed and others could not be studied as a result of present habitation. The central plateau was the most difficult and time-consuming to survey, since its vegetation entailed problems in accessibility, orientation, and observation. Moreover, as a result of individual and unofficial land claims by many of the inhabitants of La Désirade (section 4.5), it proved to be very complicated and time-consuming to get fieldwork permissions. On the plateau, a 1 km wide sample block was systematically surveyed, extending both to the west and to the east of the site of Morne Cybèle-1, which is without doubt one of the most intriguing sites of the island. In addition, a 60 m wide area running along the whole southern border of the plateau was surveyed, in order to find out if Morne Cybèle-1 was the only site situated there. An attempt to survey the northern border of the plateau had to be abandoned due to its impenetrable vegetation.

The survey of Petite Terre was greatly hindered by the impenetrable vegetation, consisting for an important part of dense acacia forests and mancenilla trees that easily cause serious burning scars after contact with bare skin and eyes, and the local research conditions. Although Terre de Haut was completely surveyed at 10 m intervals during a two-day orientation visit in 1998, the vegetation on Terre de Bas made it impossible to completely survey this area intensively and systematically. It was decided to focus on the sites that had been reported earlier at Terre de Bas (e.g. Bodu 1985[c],

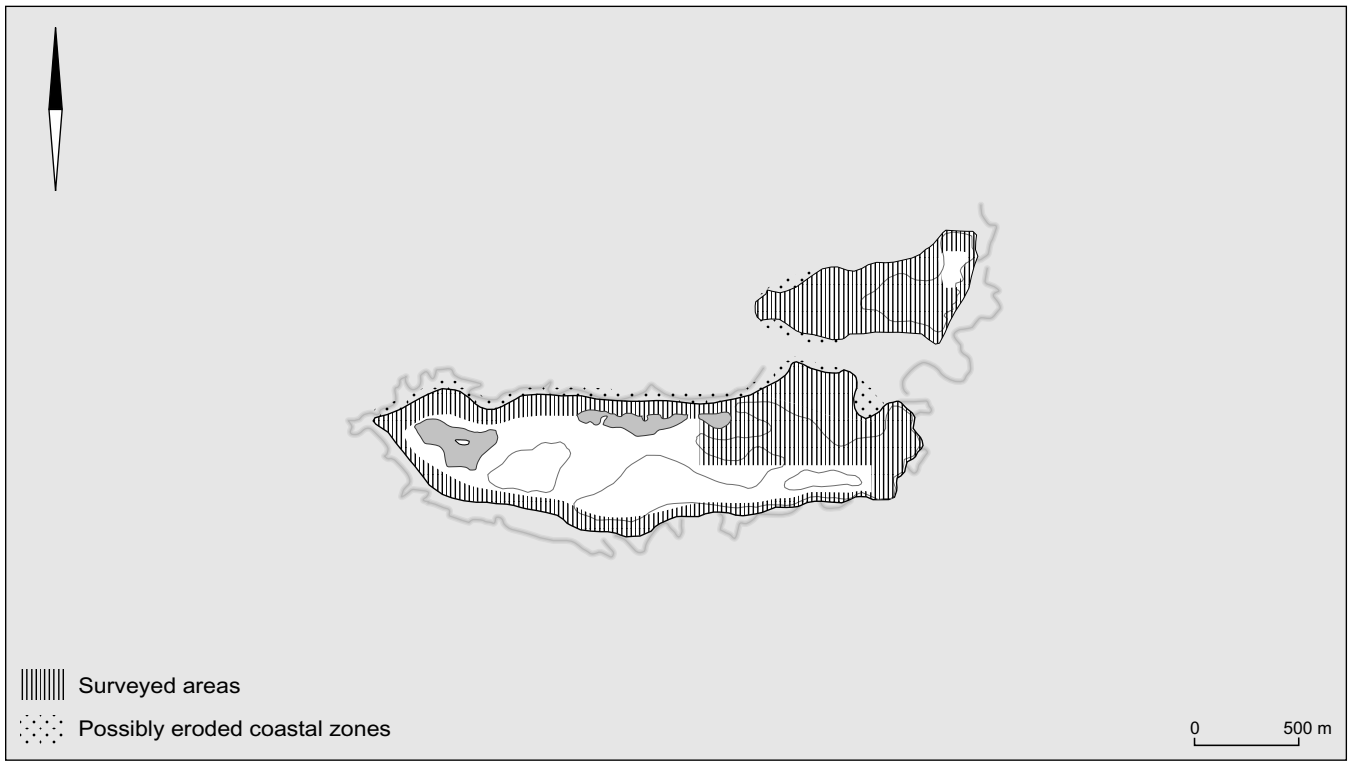


Fig. 2.4. Surveyed areas and possibly eroded coastal zones on Petite Terre.

Nicholson 1975), but since surroundings and access routes of the individual sites were intensively surveyed, a selective but important part of the island was still studied (fig. 2.4).

2.2.3.2 Sub-surface testing

Since it is known that the surface often reflects the sub-surface situation poorly (e.g. Versteeg *et al.* 1993), several sites were selected for additional sub-surface testing. Being the most time-consuming part of the fieldwork this had to be kept to a minimum. Only those sites were selected that gave reason to believe that their archaeological deposit was vertically stratified and not just limited to the surface (0-5 cm), and in particular those sites which were expected to be multi-component. Moreover, a sample of all types of sites at various locations in the study area was to be tested.

The excavation of 1 m^2 test units, or series of them, was aimed at the collection of information on geological and archaeological stratigraphies and on site formation and deformation processes as well as collection of a sample of preferably diagnostic archaeological material that could help to provide a chronological and cultural context. In addition to this material, *Cittarium pica* samples for ^{14}C dating were collected if available, although as yet, with few exceptions, no financial opportunity has presented itself to have them analysed. Therefore, chronological assignments had to be almost exclusively based on ceramic evidence.

Test unit locations were decided based on personal observation of surface survey information and they were randomly chosen in areas with relatively dense archaeological deposits, without covering the site with a grid system. The locations, all with a north-south orientation, were measured by GPS (Global Positioning System) and infrared theodolite. Test units were excavated as is common practice in Caribbean archaeology (Watters 1980:254; Hofman *et al.* 2001[a]; Hoogland 1996). They were excavated in 10 cm arbitrary levels, while taking geological and archaeological layers into account, until the bedrock was reached (fig. 2.5). Archaeological material from these levels was hand-sorted from 2/5 inch dry sieve residues, and archaeological and geological information was documented on test-unit records (appendix 1). However, for

Fig. 2.5. Sub-surface testing at the Aéroport site, La Désirade.

the two 1 m^2 test units excavated at Pointe Gros Rempart and for the two 1 m^2 test units excavated at Pointe Séraphine, 20 x 20 cm samples from the north-west corner were sieved over 2 mm screens. In addition, at a few sites where units displayed unusual features or densities of faunal material, samples for archaeozoological analysis were wet-sieved over 1 mm and 2 mm screens. This has been done for 5 litre samples from levels 6 and 7 of unit 1, and from levels 5 and 6 of unit 2 at the À l'Escalier site at La Désirade. The hearth-feature 001 of level 7 of unit 2 at the Site du Phare at Petite Terre, and features 001 and 002 at the Petites Salines site at Pointe des Châteaux were sampled in a similar way (site catalogues, appendices 2-4).

Additional subsurface information was provided through auger testing, particularly at individual sites. At Pointe des Châteaux, all the sandy beaches on the northern coast of the study area could be tested in 2000 as well. One series of tests, separated by 20 m intervals was placed in the middle of the beach between the dunes and the tide-line using a 10 cm diameter riverside auger. First a small unit was excavated for each test, measuring 50 x 50 cm at least, to prevent collapsing of the hole. Then, auger tests were done until groundwater levels or the bedrock were reached, or until depths between 1.70 and 1.90 m were reached where further testing proved impossible. The auger testing campaign of Petite Terre's beaches, planned for 2000 as well, could not be authorised by the *Office National des Forêts* (ONF) within the available timeframe.

2.2.3.3 GPS positioning of test unit locations

The location of each test unit was measured using two Leica SR261 GPS-receivers and two Leica CR344 field manuals (fig. 2.6) and a Sokkia SET 4B infrared theodolite. If not hindered by local vegetation, the northwest corners of the units were measured. As a result of the dimensions of the research area, the relative scarcity of IGN reference points and the unfamiliarity of the archaeological survey crews with GPS co-ordinate system transformation, this turned

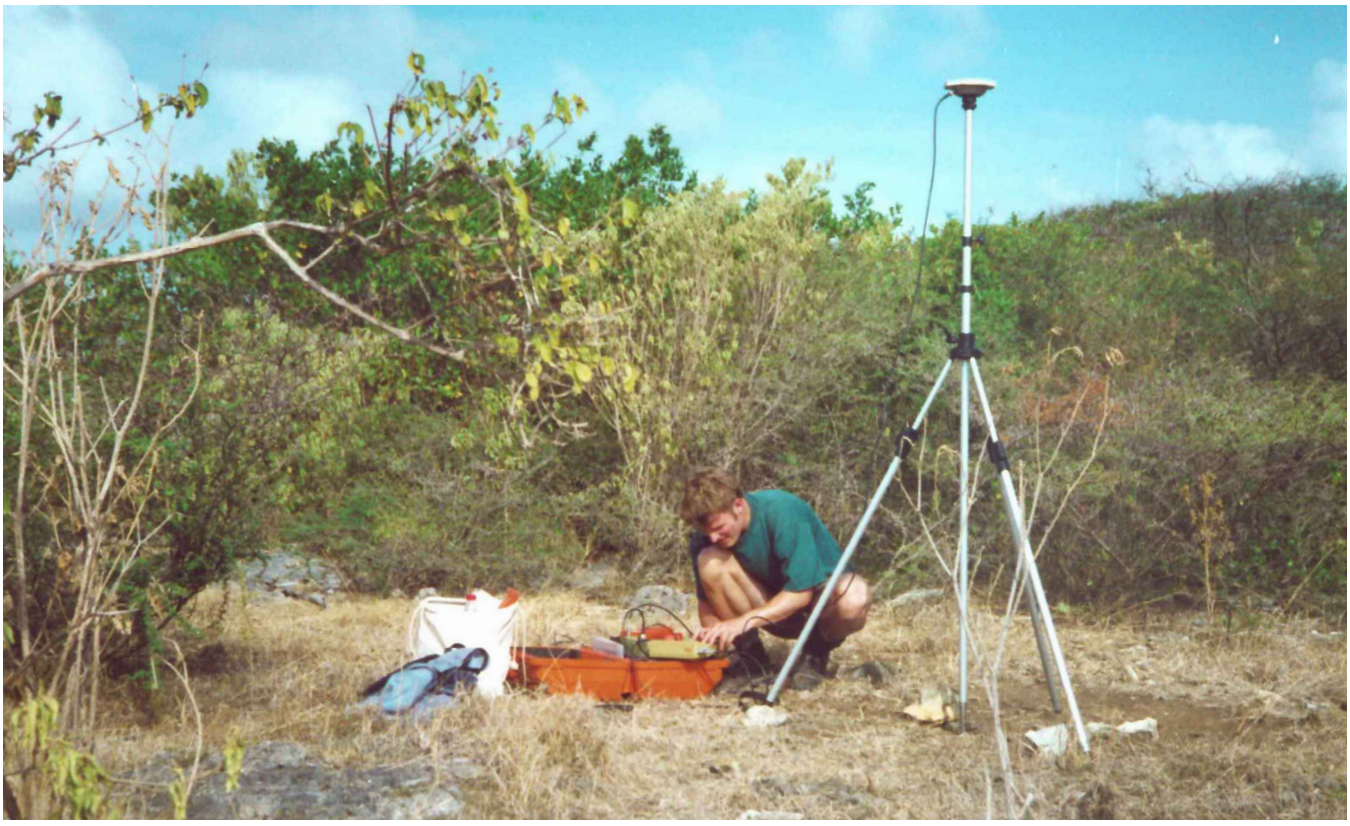


Fig. 2.6. Performing GPS measurements at the Nord Morne Zambi site, Pointe des Châteaux.

out to be one of the major obstacles during fieldwork. In 2000, two students from the Department of Geodesy of the Delft University of Technology (the Netherlands) were asked for assistance. They developed one single design and planning for the measuring campaigns for both Pointe des Châteaux and La Désirade; another design had to be made for Petite Terre since the islands are more remote and only one IGN reference point is available there. This is the Petite Terre lighthouse where GPS and theodolite cannot be positioned. On Pointe des Châteaux and La Désirade, local IGN reference points were used to measure base lines to a GPS reference station that had a fixed location during the fieldwork. As soon as the position of the reference station had been fixed, base lines were measured to the points from which the units could be measured. For Petite Terre, base lines towards three points were measured from La Désirade (Visschers and Lesparre 2000). Petite Terre is situated at approximately 12 km from the reference point on La Désirade, while the maximum acceptable base-line distance is 15 km for the GPS equipment used (Polman and Salzmann 1996). Starting from those three points at Petite Terre, short local base lines were measured from which the co-ordinates of the test units could be positioned. For sites with more than two units, two reference points were measured by GPS and the others by infrared theodolite (Visschers and Lesparre 2000). Unfortunately, due to logistical factors, it turned out to be impossible to use the electronic field manual of the theodolite, which resulted in manual registration, and thus a great loss of valuable time.

The co-ordinate system that is used on Guadeloupe is the Guadeloupe - Ste. Anne system, which uses UTM projection (north, zone 20) and the International-Hayford 1909 ellipsoid. For the heights, two other, independent systems are in use: at Pointe des Châteaux the 1988 IGN system (Guadeloupe) and on La Désirade the 1992 LD IGN system (Guadeloupe/La Désirade). In addition to these systems, the WGS84 system has been used, which is the system in which GPS measurements take place (Visschers

and Lesparre 2000).

In order to combine GPS and theodolite data, transformation parameters were created in Ski, which is Leica GPS software, by using the co-ordinates of points that are known in the IGN local system as well as WGS84. For Pointe des Châteaux a total of 11 sets of co-ordinates in both systems could be used and for La Désirade 12 sets were available. Preliminary co-ordinates were determined for the reference stations and for the points where the mobile station of the GPS had been measuring. After error detection, using Ski and Microsoft Excel, the results were calculated in a least squares adjustment using Scan 3, which is Delft Department of Geodesy software. Scan 3 produced 3-D co-ordinates of the IGN points, the reference points, the points where the mobile GPS station had been measuring and the test unit corners. The accuracy of the unit co-ordinates turned out to be good and sufficiently accurate to guarantee GPS relocation of the units in the future. The standard deviation for Easting and Northing was 2.5 cm at Pointe des Châteaux and La Désirade and 4.5 cm at Petite Terre, while the mean deviation for the orthometric height – which is the height relative to sealevel as it would be measured by levelling – was 20 cm at Pointe des Châteaux and on La Désirade and 21 cm on Petite Terre. This standard deviation is high as a result of the poorly known geoid, transformation between orthometric and ellipsoidal GPS heights. The relative accuracy of orthometric heights, compared to nearby points on a single site, is nearly the same as that of the ellipsoidal heights; 3.5 cm for Pointe des Châteaux and La Désirade and 6.5 cm for Petite Terre (Visschers and Lesparre 2000:41).

2.3 ANALYSIS OF THE ARCHAEOLOGICAL MATERIALS COLLECTED

2.3.1 Introduction

Artefact analysis includes all phases from collecting the finds to the analysis of the various material categories. The archaeological material collected during surface surveying and sub-surface testing was cleaned on Guadeloupe, and the different material categories were separated. Before storage in the Edgar Clerc Museum, the material was sent to Leiden University for analysis. However, part of the 1999 material from La Désirade and Petite Terre could be directly investigated and stored on Guadeloupe. It included all shell food remains and coral fragments from the test-units. The data from the analyses were processed in Microsoft Access 97 and used for the site descriptions presented in the site catalogues (appendices 2-4). The methods of analysis of pottery, stone, shell and coral artefacts, and shell and vertebrate food remains are presented below.

Earlier reports on the collections from Anse à la Gourde (e.g. Hofman *et al.* 2001[a]) at Pointe des Châteaux and from Morne Cybèle-1 and Morne Cybèle-2 (Hofman 1995) and Petite Rivière (De Waal 1996[b]) on La Désirade were also used in the present study. These collections had previously been analysed at Leiden University according to the same procedures as described in the ensuing sections.

In addition to this material, collections from earlier archaeological research in the study area were studied at Leiden University. These collections, accrued between the 1950s and the 1990s, had been stored in the depot of the Edgar Clerc Museum. There were few if any fieldwork reports or material descriptions concerning the majority of these collections. The main focus in the study of these collections was on the ceramics in the hope of attaining additional information on functions and chronological assignments of the sites already reported at the start of the East-Guadeloupe project. However, some of the faunal samples were studied as well (appendix 5). While the archaeological context of the ceramics could be tracked to some extent, the other archaeological find categories, including shell, stone and coral artefacts, appeared to have been haphazardly collected and documented. This turned out to be particularly true for shellfish subsistence remains, which were largely absent from the collections. Therefore, they have not been included in the descriptions in the site catalogues.

2.3.2 Analysis of the surface finds

Surface finds collected during the survey consisted of pre-Columbian ceramics and artefacts of shell, stone and coral, as well as colonial artefacts. The analysis of these materials aimed at providing chronological assignments and at quantification in number and weight primarily. Per surface collection, the different artefact categories were counted, weighed and their occurrences were plotted on the aerial photographs to obtain a general insight in surface distributions. This was also done for off-site material. As mentioned before, the off-site material has only been used as a complement to the site data. Since a detailed study of this material turned out to be impossible within the project's timeframe, the off-site data await further study and presentation.

The pottery, being the most abundant and most diagnostic category in the surface collections, was studied for its stylistical or morphological characteristics. Of course, possibilities to do so were limited due to heavy fragmentation and weathering of the material. However, in many cases it turned out to be possible to assign ceramics to Early Ceramic or Late Ceramic Ages. Chronological assignments of the shell, stone and coral artefacts could not be specified in more detail than being pre-Columbian or not. Raw materials and functions

of these artefacts were studied as well. As for the colonial artefacts, mainly ceramics, no efforts were made for further chronological or functional analysis, as this was beyond the scope of this study.

2.3.3 Analysis of the archaeological material from the test units

The excavated pre-Columbian materials include ceramics, lithic, shell and coral artefacts, coral fragments without evidence of modification, shell food remains, faunal remains, and human skeletal remains. No botanical samples were taken, since no deposits were encountered with a sufficiently good conservation. Charcoal was found in too limited amounts to allow ^{14}C or macro-botanical analyses. Incidental colonial material also occurred, but this was only quantified in number and weight and it has not been presented in this study. Charcoal fragments as well as colonial material have been preserved and stored in the depot of the Edgar Clerc Museum.

The pottery analysis carried out in the present study can be characterised as an analysis of stylistic and morphological features of the pottery as proposed by Hofman (1993). No detailed technological or functional information was obtained, and quantitative analyses could not be executed due to the incomplete nature of the sample. In order to standardise the recording of the various stylistic and morphological characteristics of the pottery, a description form was used. This was based on the form Hofman (1993) designed for the study of Saban pottery assemblages, which has been used since 1993 for all analyses of Caribbean ceramics carried out at Leiden University.

The pottery description form registers the counts of the various ceramic categories represented and the morphological description of rim sherds larger than 5 cm. It also records the number and weight of sherds of rims, bodies, bases, griddles, and appendages and registers the number of sherds larger than 5 cm. The sherds finished with a red, beige or black slip or paint are counted, as well as those representing different decoration modes. Special attention is also paid to the number of different base shapes and griddle rim shapes (fig. 2.7) represented, and the number of different appendages or other pottery items in the sample. The rims larger than 5 cm are studied and numerical codes are used to record their characteristics. These include vessel shape and wall profile (fig. 2.8), lip shape and rim profile (fig. 2.9), wall thickness, orifice diameter and percentage of the rim present, decoration,

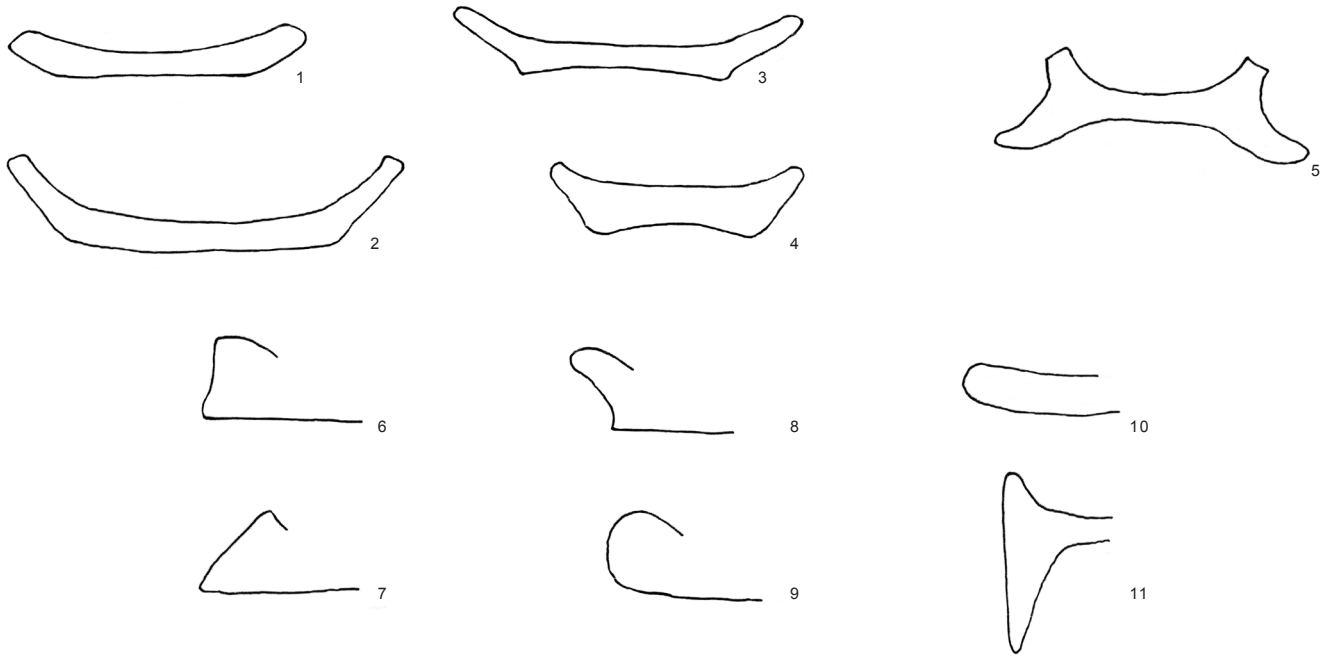


Fig. 2.7. Base shapes (1: flat; 2: convex; 3: concave; 4: concave high; 5: pedestal or annular) and griddle rim shapes (6: straight; 7: triangular; 8: overhanging; 9: rounded; 10: unthickened; 11: legged); (after Hofman 1993).

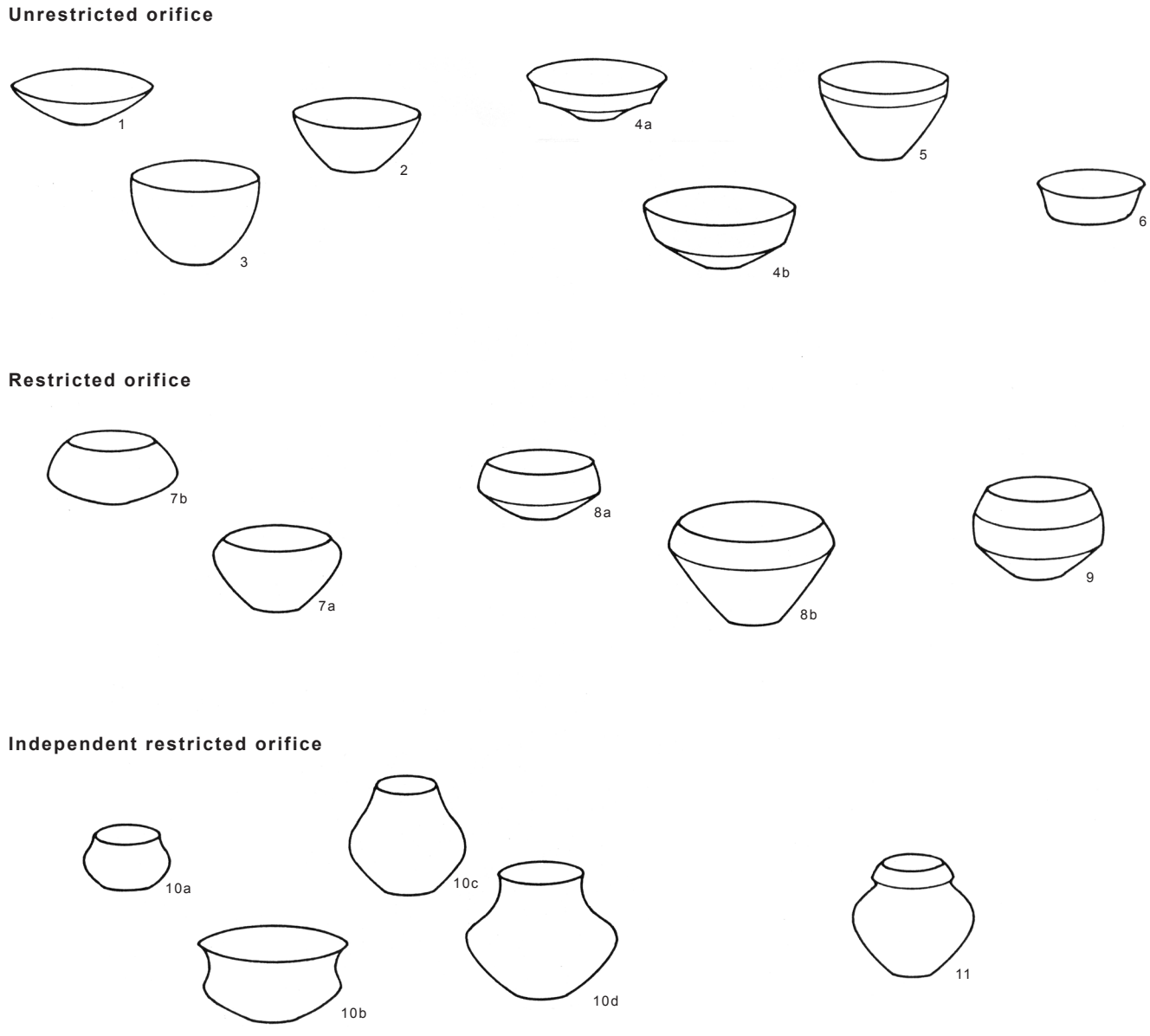


Fig. 2.8. Vessel shape categories (1: dish with unrestricted simple contour; 2: bowl with unrestricted simple contour; 3: jar with unrestricted simple contour; 4a-b: dish or bowl with unrestricted composite contour; 5: jar with unrestricted composite contour; 6: bowl with unrestricted inflected contour; 7 a-b: bowl with restricted simple contour; 8a: bowl with restricted composite contour; 8b: jar with restricted composite contour; 9: bowl with restricted complex contour; 10a-d: bowl or jar with independent restricted inflected contour; 11: Bowl or jar with independent restricted complex contour); (after Hofman 1993).

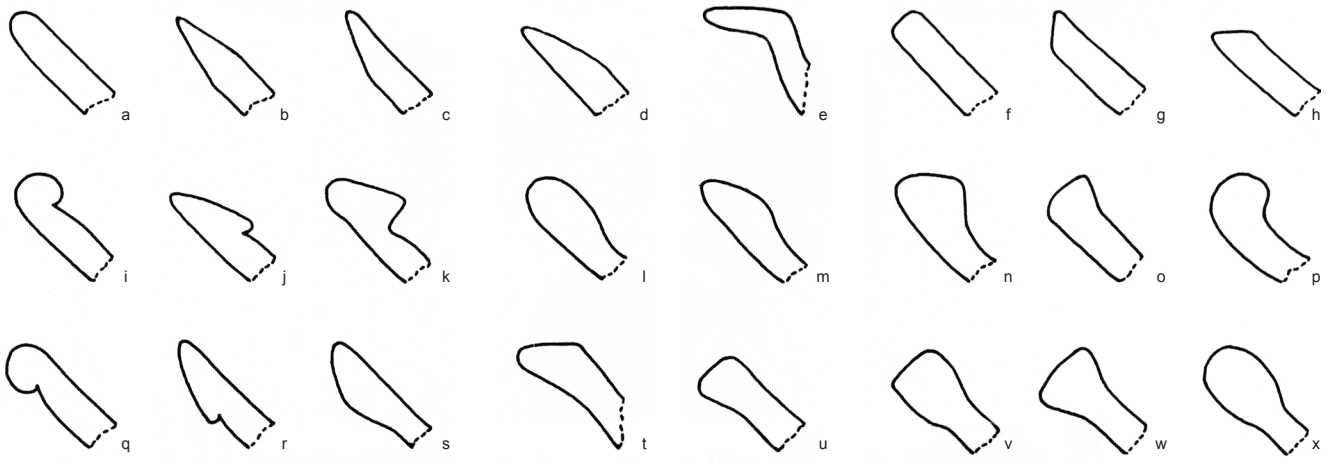


Fig. 2.9. Lip shapes (a-d: rounded; e: flanged; f: flattened; g-h: bevelled; i-p: inward thickened; q-u: outward thickened; v-x: double thickened); (after Hofman 1993).

Munsell chart colours, firing atmosphere, surface finishing, and the presence of red slip. These characteristics are used to describe the pottery assemblages and to assign them a place within the regional chronological framework.

Knippenberg (Leiden University) provided short descriptions of the stone artefacts, recording artefact type, macroscopic identification of the rock type and provenance of the raw material. For the study of shell and coral artefacts, the use of simple description forms proved useful in the registration of various artefact functions and raw materials. These forms register find numbers, raw materials, dimensions and weight, and functions, as well as remarks on production technology for each artefact. Use-wear analysis has not been carried out. The outcomes of the analyses may provide information on procurement strategies and the various technological stages in the process used to produce stone, shell or coral artefacts.

Remains of the shellfish consumed and other faunal remains are studied to obtain information on shellfish gathering, fishing and hunting strategies, the exploitation of different ecological zones for food resources and on diet components of the pre-Columbian inhabitants of the research area. Seasonal information could not be obtained. Shell food remains recovered during the project were classified by means of a description form that was drawn up by Brokke (1996) and refined by Nieweg (2000). This form lists the most common shellfish species in the Caribbean. The form registers number and weight of complete shells, shells that had been opened to extract the animal, individuals, and of the fragments per species. Complete shells include complete gastropods for bivalves, with two matching valves, without apparent damage to the shell and chitons of which anterior and posterior valves can be counted together with six intermediate valves. Opened shells include gastropods with meat extraction holes and bivalves with only one complete valve. Individuals are counted on the basis of the presence of the umbilicus or anterior side for gastropods, the umbo with teeth or bivalves and one posterior or anterior valve or six intermediate valves for chitons (Nieweg 2000:10-11). In addition, total weights per species are listed. The descriptions of shell food remains in the site catalogues (appendices 2-4) list MNI (minimum number of individuals) counts and weights, weights of fragments, whether burnt or not, and the total weights of the main consumed shell species for each site. MNI estimates are based on the sum of complete shells, opened complete shells and individuals. The mollusc reference collection of Leiden University was consulted in order to standardise species identifications.

Faunal remains were studied by Nokkert (appendix 5) using reference collections from the Natural History Museum in London and a private reference collection for the ascription of the remains with element and taxon, with subsequent calculations of the number and weight of the fragments and MNI calculations per taxon. Although interesting results were thus obtained, the size of the screen mesh used, 2/5 inch, was probably unsuitable for obtaining very reliable samples of faunal material.[12] Small-sized vertebrates and invertebrates with remains smaller than the mesh size used may have been underrepresented. Changes in the average sizes of the animals

over time, which can be a result of human overexploitation, could therefore, for instance, not be studied (Grouard 2001; Wing personal communication 1999). The collection of finely screened samples, however, would have imposed serious logistical problems during the survey, as it would have required wet sieving procedures on site, which is impossible at the majority of the sites, or transportation of bulky non-sieved material to the field laboratories. The survey was designed to provide a general regional overview and herein a regional but relative comparison of differences and similarities of the faunal assemblages obtained from sites with different functions and from sites located in different zones. Despite the above-mentioned sample problems, these aims could largely be accomplished with the gathered animal remains.

A small amount of heavily fragmented human skeletal remains was found as well. These were also analysed by Nokkert, using reference collections from the Natural History Museum in London.

2.4 CONCLUSIONS

The East-Guadeloupe surveys were designed to swiftly provide a detailed and systematic archaeological site record for a small region. As a result of encountered environmental constraints, related to impenetrable vegetation in most cases, and archaeological diversity, representing different kinds of sites in varying settings including caves, beach areas or elevated plateaus, it turned out to be quite complex to develop one single best survey strategy. Standardisation was not very easy since the survey methods described in section 2.2.3 had to be adapted to the local situations in many cases.

Surface finds provided only a very general insight in regional surface distributions. Diagnostic material was largely absent, which hindered detailed chronological or functional information. This is a problem especially for Late Ceramic assemblages since decorated sherds are scarce. Test unit material was in most cases more informative. However, for some sites that were characterised by a thin layer of heavily fragmented and non-diagnostic sherds this still remained a problem. Since this problem is encountered in most survey studies in the Caribbean (*cf*. Watters 1980:209), the need is felt to carry out larger-scale excavations at such sites, in order to understand better what they actually represent.

Notwithstanding the above mentioned constraints, the East-Guadeloupe regional surveys resulted not only in the creation of a useful regional archaeological database for the present study (site catalogues, in appendices 2-4), but they have also contributed to an important degree to the *Carte Archéologique* inventory project for the department of Guadeloupe.

NOTES

1 In this study, a region is considered to be any area larger than the one immediately surrounding one single archaeological site. Within this definition, a region may include several islands, an island, or part of an island.

2 Complete surveys have also been termed 'full-coverage', 'total' or '100%' surveys (e.g. Fish and Kowalewski 1990; Shennan 1985).

3 The present overview is limited to regional or micro-regional surveys aimed at the recovery of pre-Columbian archaeological material. Site level surveys have not been included.

4 The regional archaeological service was created in 1992 as a part of the DRAC of Guadeloupe and André Delpuech (1992-1999) and dr. Antoine Chancerel (1999-present) were appointed as regional archaeological curators.

5 The French archaeologist Bodu worked on Guadeloupe in fulfilment of his military service in 1984 and 1985.

6 These include the sites of Anse Petite Rivière, À l'Escalier, Morne Cybèle 1-3, Grotte le Baigneux, Les Sables, Pointe Mansénillier, Léproserie, Pointe Doublé, Morne Baie Mahault, Le Cocoyer, Grotte de Grande Anse, Voûte à Pin, Anse des Galets, Tropique, and Pointe à Godard (*cf*. site catalogue in appendix 3).

7 These include the sites of Site du Phare, Baleine du Sud, Trou Canard, Mouton de Bas, and Est de Mouton de Bas (*cf*. site catalogue in appendix 4).

8 Although transect is generally used to label a rectangular block, in which walking and observation of several lines takes place (*cf*. Flannery 1976:138), in this study a transect is a line that is actually a 1 m wide continuous observation and sampling unit.

9 All survey participants, however, were trained in surface collecting of ceramics and lithics. The latter is particularly important since lithic artefacts are more easily missed in surface surveys than ceramics.

10 The originals are IGN (*Institut Géographique National*) photographs of Pointe des Châteaux (1989): 1:8000; La Désirade (1993): 1:30,000; Petite Terre (1948): 1:20,000.

11 Co-ordinates for site registration in the DRAC inventory were

taken from the 1:25,000 IGN map ‘St. François, La Désirade, îles de Petite Terre’.

12 As remarked earlier, some 1 mm and 2 mm samples have been collected as well.

3. THE PHYSICAL LANDSCAPE

3.1 INTRODUCTION

The objectives behind describing the physical landscape of the research area are two-fold. On the one hand, an attempt is made to describe the present natural situation of the area, in order to outline the context in which the fieldwork took place and to evaluate conditions for site survival. On the other hand, an attempt is made to give an idea of how the environment may have looked in pre-Columbian times, in order to be able to evaluate conditions for Amerindian settlement and exploitation of the environment.

In order to be able to fully appreciate the local conditions encountered by pre-Columbian inhabitants of the area, detailed paleoenvironmental information should be presented. Information is needed that focuses on environmental changes that are thought to have taken place since the start of the pre-Columbian period. It is important to know to what extent the landscape has changed during the last millennia compared to the present-day situation to attain an understanding of changes in the presence of natural resources, the accessibility of the shore and the preservation of archaeological sites, caused by erosion, sea level changes, and tectonic movements.

Only since very recently have such studies been carried out in the Caribbean, focusing to a significant degree on coastal dynamics (e.g. Delpuech 2004; Delpuech *et al.* 1999; Keegan 1992[b]; Watters *et al.* 1992) or on paleoclimate (e.g. Curtis and Hodell 1993). Region-wide studies on island

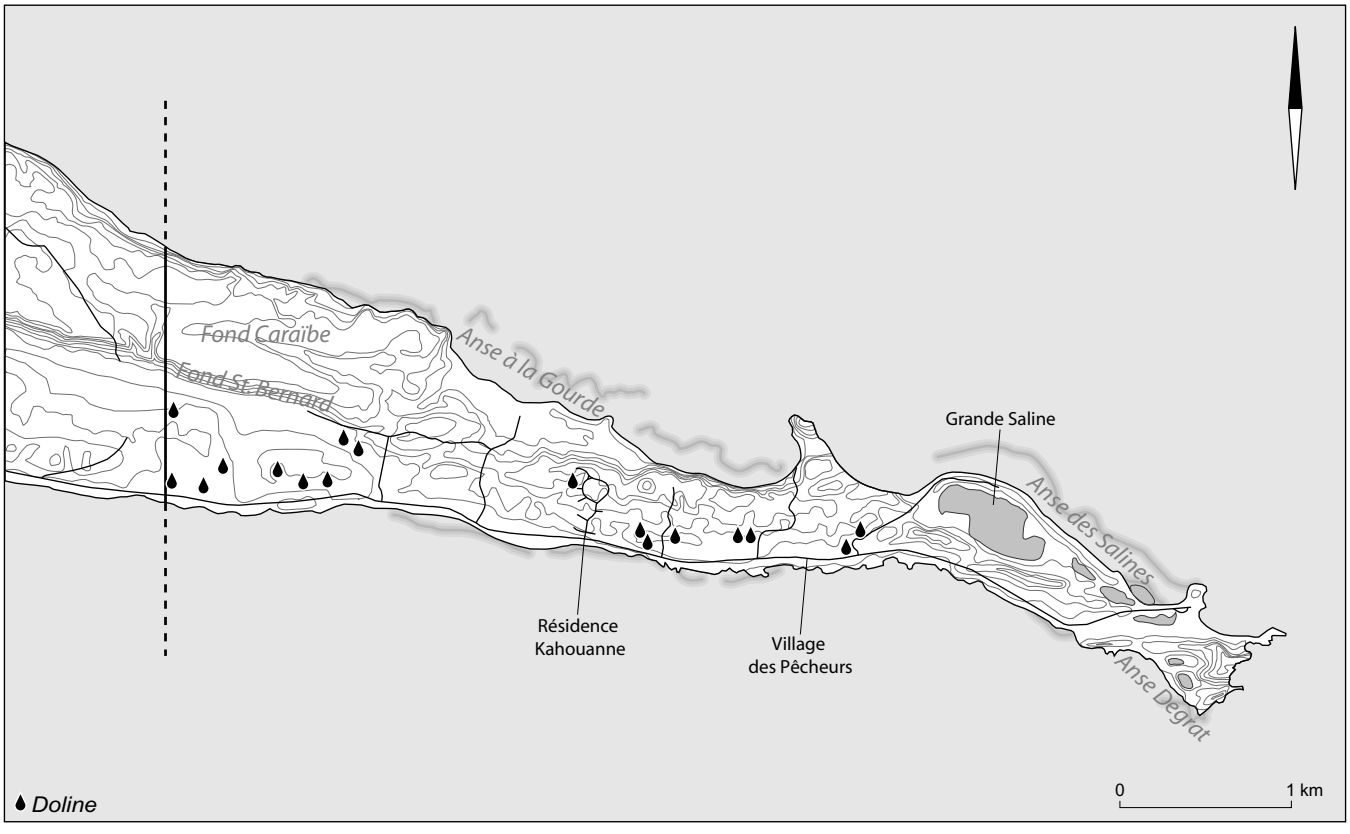


Fig. 3.1. The Pointe des Châteaux study area.

vegetation and related Amerindian plant use within pre-Columbian times are not yet available although a promising start has been made by Newsom (1993).

Fortunately, for the eastern part of Guadeloupe, field studies, related to the Anse à la Gourde excavations and the present project, could be carried out by a team of geologists from the *Vrije Universiteit* of Amsterdam in 1999 and 2000 (Troelstra and Beets 2001[a-b]). The section on coastal dynamics is largely based on their observations, and the description of other aspects of the physical environment greatly profited from their fieldwork as well. For most topics in this chapter, descriptions of the present-day natural environment prevail, since information regarding the past situation is less complete. These are complemented by data that have been collected from other parts of the Caribbean as well.

3.1.1 The Lesser Antilles

The research area includes the Pointe des Châteaux peninsula, which is the easternmost part of Guadeloupe, and the islands of La Désirade and Petite Terre. These are among the least known parts of the eastern Caribbean (fig. 1.1). The Caribbean islands extend in an arc from the South-American mainland, separating the Caribbean Sea from the Atlantic Ocean. Most of the islands are within view of each other. They are divided in the Lesser Antilles and the Greater Antilles. The Lesser Antilles include the Windward Islands, extending from the island of Trinidad to Guadeloupe, and the Leeward Islands, ranging from Montserrat and Antigua to the Virgin Islands.[1] The Greater Antilles, located in the northwestern part of the Caribbean Sea, are connected to the South-American mainland by the Lesser Antillean chain.

North of Dominica, the volcanic chain of islands splits in a volcanic inner-arc, extending from south to north from the Basse-Terre part of Guadeloupe to Saba, and a calcareous outer-arc, ranging from Marie-Galante in the south to Sombrero in the north.[2] The volcanic islands were formed as a result of tectonic movements of the Caribbean plate, forcing itself over the Atlantic plate around 45 million years ago. This caused radial cracks through which the plastic interior, which formed the volcanoes, could escape (Fox and Heezen 1975:444-445). This process also created the volcanic bases of the outer-arc islands that were later covered by marine sediments (Fox and Heezen 1975:444; Uchupi 1975:28).

Guadeloupe comprises the volcanic island of Basse-Terre (950 km^2), dominated by its 1.5 km high volcano and its tropical rainforest, and the relatively dry and flat, calcareous island Grande-Terre (590 km^2). A small salt-water stream, *La Rivière Salée*, separates Basse-Terre and Grande-Terre. The other islands of the Guadeloupe archipelago, including the islands of Les Saintes, Marie-Galante, Petite Terre and La Désirade, are situated at very close distance. Administratively, St. Barthélemy and the French part of St. Martin also belong to the French overseas department (*Département d'Outre-Mer*) Guadeloupe.

3.1.2 Pointe des Châteaux

The Pointe des Châteaux peninsula is the easternmost tip of Grande-Terre and administratively it belongs to the municipality of St. François. Pointe des Châteaux is approximately 9 km long and its width varies between 50 m in its eastern part and 2.5 km in its western part. The study area, however, is smaller, covering almost 7 km from east to west (fig. 3.1).

3.1.3 La Désirade

La Désirade is situated 12 km east of the Pointe des Châteaux peninsula. The island is an 11 km long and 2 km wide calcareous table mountain that has a volcanic substratum. It is dominated by its 6.5 km long uninhabited limestone plateau, which is locally called *La Montagne* (Barrabé 1954:614; Lasserre 1961:885). The north coast of the island is rather difficult to reach from the sea, as a result of its extremely steep cliffs and the strong and unpredictable sea currents. The south part of the island is characterised by a gentler slope between the plateau and the southern coastal plain that extends along the entire southern coastline. This coastal plain is sheltered from the wind and the reefs that border the coastline protect it from strong sea-currents (fig. 3.2).

3.1.4 Petite Terre

The islands of Petite Terre, Terre de Haut in the north and Terre de Bas in the south, administratively belong to the municipality of La Désirade.[3] They are situated at approximately 12 km south of La Désirade and at 7.5 km south-east of Pointe des Châteaux. Terre de Bas measures 2.5 km by 600 m, and Terre de Haut measures 1.1 km by 200-300 m (fig. 3.3).

Nowadays, the islands of Petite Terre are state property. The so-called *50 pas géométriques*, representing a coastal zone of approximately 80 m wide, are managed by the ONF. The remainder of the islands has been controlled by the *Conservatoire de l'Espace Littoral et des Rivages Lacustres* (CELRL) and by the *Direction Départementale de l'Équipement* (DDE), ever since it was expropriated from its Desiradien owners in 1994. In this year, the *Direction Régional de l'Environnement* (DIREN) declared the islands of Petite Terre to be a nature reserve (Barré *et al.*1997:6; Conservatoire du Littoral 1997:6).

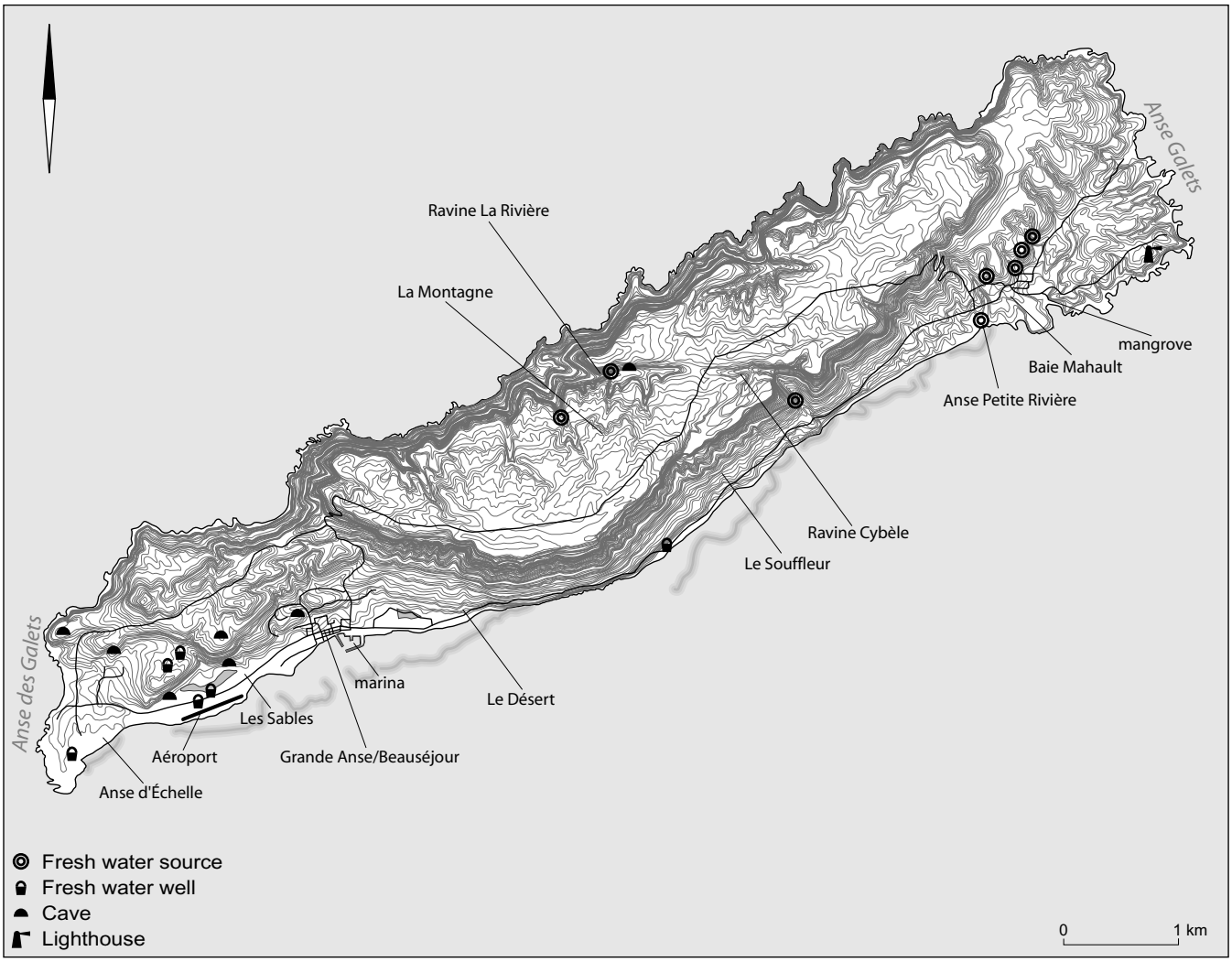


Fig. 3.2. La Désirade.

Fig. 3.3. Terre de Haut and Terre de Bas, Petite Terre.

3.2 NATURAL SETTING

3.2.1 Geology and geomorphology

Pointe des Châteaux, La Désirade and Petite Terre are calcareous islands, belonging to one platform (Butterlin 1956:274; Westercamp and Tazieff 1980:123). As a result, they are rather similar in appearance, particularly Pointe des Châteaux and Petite Terre. Nowadays, they are characterised by calcareous plateaus bordered by uplifted reefs, salinas, dunes and sandy beaches protected by reef barriers. Today, mangrove areas are largely absent in this area. The coasts in the research area offer many locations where canoes can land and navigation around the islands is relatively easy for people accustomed to the local situation. The influence of volcanic eruptions is thought to be modest, especially when compared to the volcanic Basse-Terre part of Guadeloupe. This was probably true for the pre-Columbian period as well.

Pointe des Châteaux (fig. 3.1 and 3.4) is situated on the calcareous St. François plateau, which is intersected in its western part by a large, flat-bottomed valley. Local relief is modest. Today, the northern coast consists for more than 50% of beaches, with a mean width of 18 m, behind which dunes are situated. Those dunes have been built-up from eroded material from the reef barrier through high-energy storm floods and wind-action (Troelstra and Beets 2001[b]). The southern coast consists of uplifted reefs and beaches, which have a mean width of 4.8 m, and there are no dunes. Abundant coral and gastropod fragments on these beaches demonstrate the presence of gaps in the reef barrier caused by tropical storms and hurricanes (Troelstra and Beets 2001[b]). Beach-rock formation processes, resulting in the lithification of sediment particles, are common along the northern coast. Beach-rock formation is typical for tropical beaches where calcium carbonate touches salt and fresh water interfaces (Troelstra and Beets 2001[b]). Beach-rock formation processes take place rather fast, evidenced by the existence of beach-rock with very recent inclusions, such as beer bottle caps. Pre-Columbian pottery sherds are often

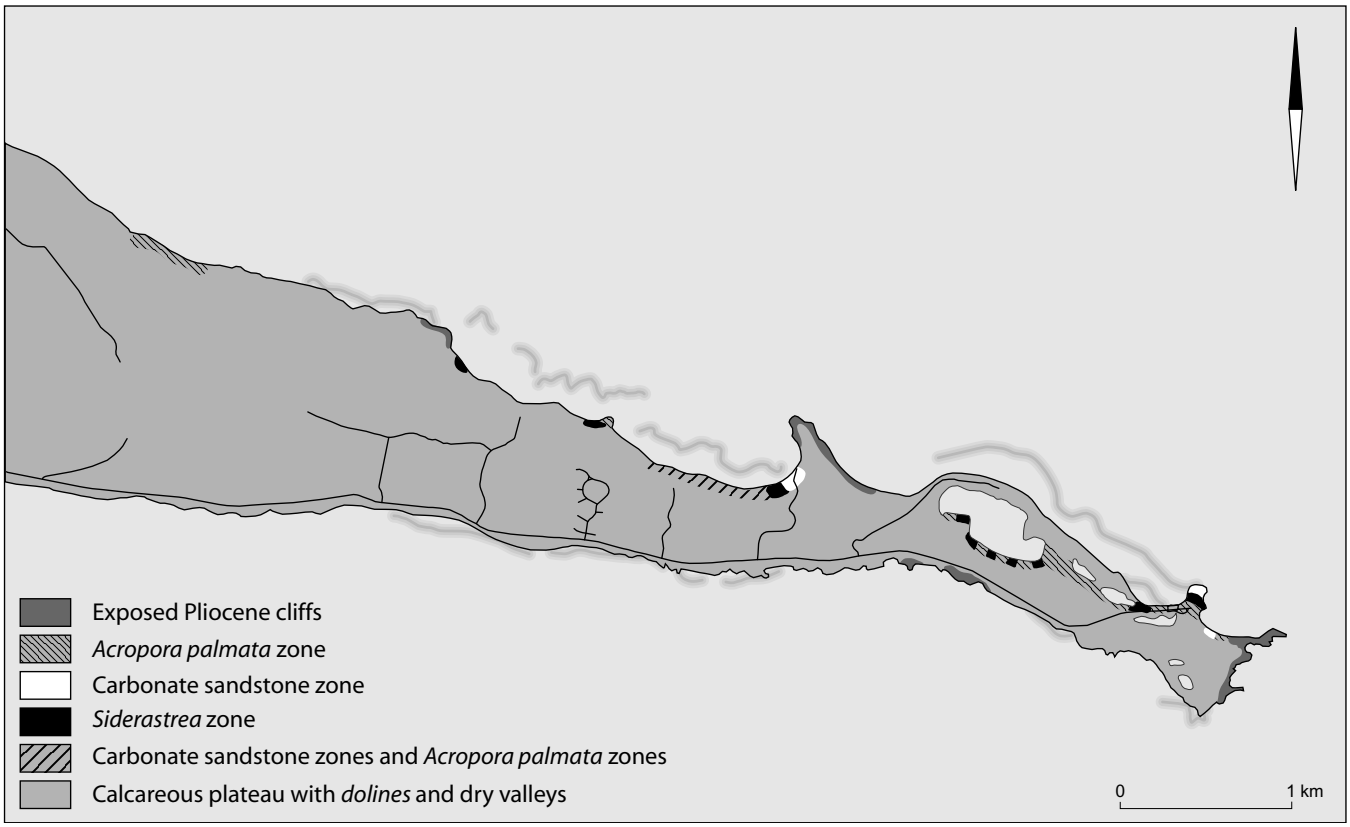


Fig. 3.4. Geological map of Pointe des Châteaux (after Troelstra and Beets 2001[b]).

embedded as well. Beach-rock formation poses a significant threat to the preservation of archaeological sites, although in some instances it stimulates their survival by decreasing the effects of erosion. At Morel on Grande-Terre, for example, pre-Columbian burials have been conserved in bedrock concretions that would have been eroded if not protected by this hard coating. Furthermore, Pointe des Châteaux is characterised nowadays by the presence of *dolines*, small rounded and flat bottomed natural water basins (Lasserre 1961:52), which are typical for karst regions, and, in the easternmost part, by its seven salinas.[4] Most of these contain water throughout the year, even during the dry season. Four types of salinas can be identified at Pointe des Châteaux. The Grande Saline is an enclosed, permanently filled salina. It is characterised by the presence of algae and its extremely high salinity (Troelstra and Beets 2001[b]). It remains unclear whether this salina existed in pre-Columbian times or not (Troelstra personal communication 2002). The Grande Saline is fed by marine transgressions from the Atlantic through the beach and dunes. The two small salinas at the south-eastern part of Pointe des Châteaux, near Anse Degrat, are enclosed salinas located along a tectonic fault. Wind and wave action gradually deposit sedimentary material, which will eventually result in a complete in-filling and subsequent coverage by vegetation. The easternmost salina on the north coast is semi-enclosed; it has an open connection to the sea. Another salina, situated south-east from this semi-enclosed one, is presently mainly fed by rainfall as evidenced by the presence of abundant fresh water calcareous algae in the recent setting. However, the water is brackish and not suitable for human consumption (Troelstra and Beets 2001[b]).

La Désirade (fig. 3.2, 3.5 and 3.6) is characterised by its well-exposed volcanic basement, consisting of lava with greenschist, interbedded chert and radiolarite (Barrabé 1954; Donnely 1975:672-674; Fink 1972:275; Uchupi 1975:28). This basement eroded into a platform on which a

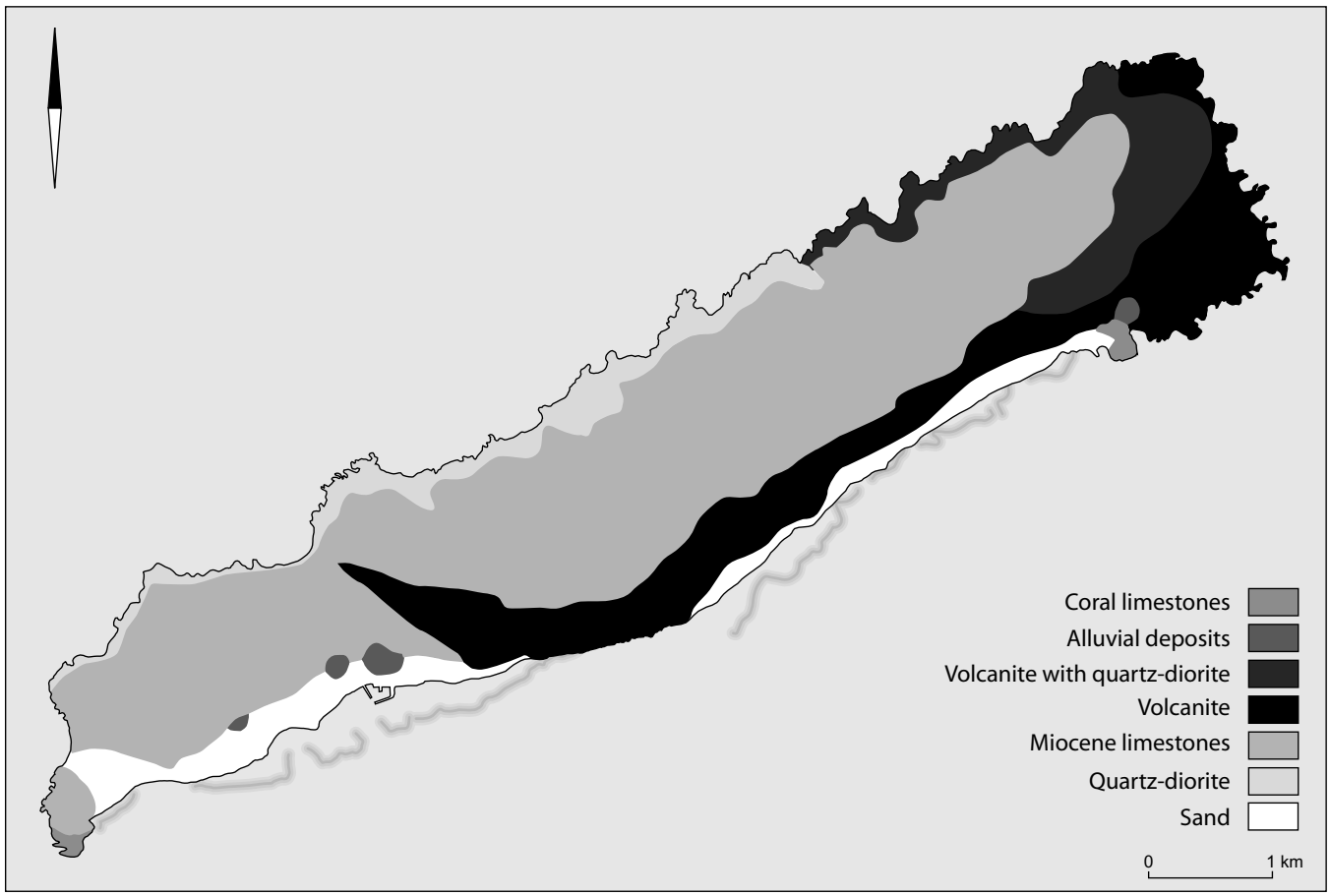


Fig. 3.5. Geological map of La Désirade (after Weyl 1966:259).

50-70 m cap of limestone was deposited. The upper part of this cap consists of nodular massive limestone, whereas the lower 35 m come close to marl and contain coral fragments (Troelstra and Beets 2001[b]). Tectonic movements lifted the platform to more than 200 m high, folded the limestone and created cracks that resulted in the Rivière and Cybèle ravines and the plateau's western border.[5] A thick limestone cornice borders the plateau (Barrabé 1942:150; Butterlin 1956:278; Lasserre 1961:887; Mitchell 1953; Weyl 1966:259-261). At the plateau, karst processes created small basins that are filled with shallow decalcification clay deposits and that conserve rainwater (Lasserre 1961:887). A characteristic feature of La Désirade is the presence of caves used by inhabitants of the island in pre-Columbian as well as in recent times. The western part of the plateau is bordered by limestone hills reaching 150 m in height and in the east by a series of plateaus, at 35 m, 75 m and 95 m, consisting of limestone that covers accumulations of volcanic boulders in limestone and coral cement (Barrabé 1954:618; Lasserre 1961:887). Whereas the northern and eastern part of the island consist of volcanic material, the southern coastal plain has a limestone covering and consists of elevated reefs on conglomerates of water-worn pebbles (Lasserre 1961:84; Westercamp and Tazieff 1980:125). Near Anse Galets, in the north-eastern part of La Désirade, the volcanic basement is covered by calcareous sandstone, with numerous *Cittarium pica* fossils in its upper part. Near Baie Mahault, the volcanic basement is covered by a conglomerate in the deeper parts and by *Siderastrea siderastrea* fossils in the higher parts. The carbonate sequence on top of the volcanic base appears to consist of calcareous packstone, often containing shell fragments, massive coral boundstones and coral conglomerates. The Pliocene reefs

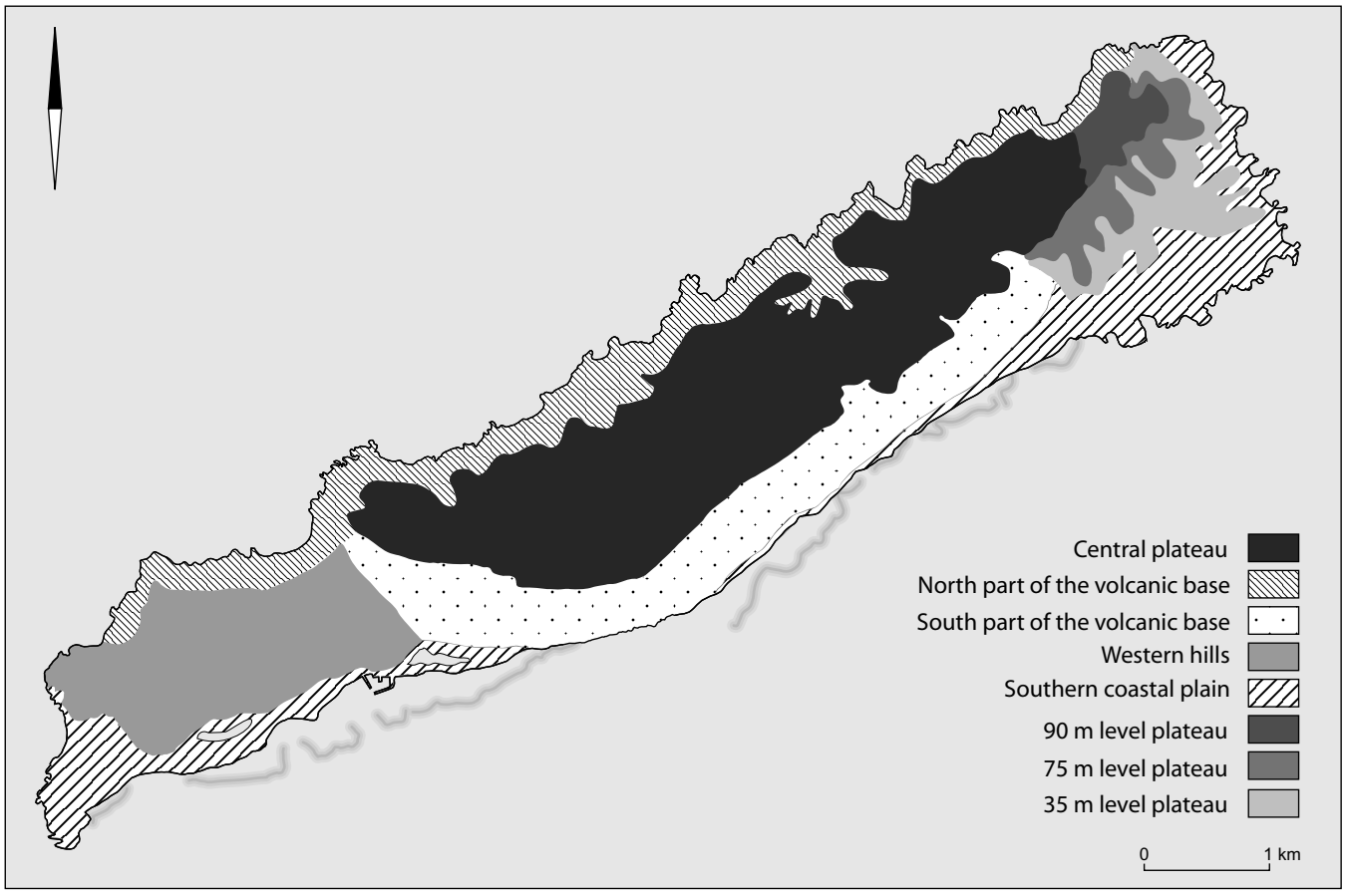


Fig. 3.6. Geomorphological map of La Désirade (after Lasserre 1961:886).

near Les Galets in the south-western part of La Désirade are covered by a reef sequence containing typical Eemien corals, which in turn is covered by a volcanic conglomerate (Troelstra and Beets 2001[b]). The unusual composition of La Désirade, being partially volcanic and partially limestone, provides a unique possibility for the exploitation of raw materials for the production of stone tools in the largely limestone study area that is devoid of suitable rocks.

The islands of Petite Terre (fig. 3.7) are flat west-east oriented islands that originally consisted of one elevated coral plateau. They show a general inclination in west/north-western direction, which is the result of the same tectonic processes as those at Grande-Terre (DIREN Guadeloupe 1994:6). A 150 m wide channel, which is 7 m deep at most and which is enclosed on the eastern side by an impressive reef barrier, separates the islands. The islands are almost completely enclosed by coral reefs (DIREN Guadeloupe 1994:6). Abrasion of these reefs by sea action has created sandy zones that dominate the beaches in the low northern and western parts of Terre de Bas. These are easily influenced by wind and sea action, thus creating dynamic dune formations bordering a depression that nowadays contains salinas (Conservatoire du Littoral 1997:8; DIREN 1994:6). At high sea, for example during hurricanes, the easternmost of these salinas is in open connection to the sea. Therefore, it is always filled with water, whereas the two others are periodically dry (Rousteau 1995:8). The more elevated south and east coasts of Terre de Bas are rocky with limestone outcrops, as is most of Terre de Haut.

3.2.2 Erosion and sedimentation

The local relief, occasional heavy rains, high winds and

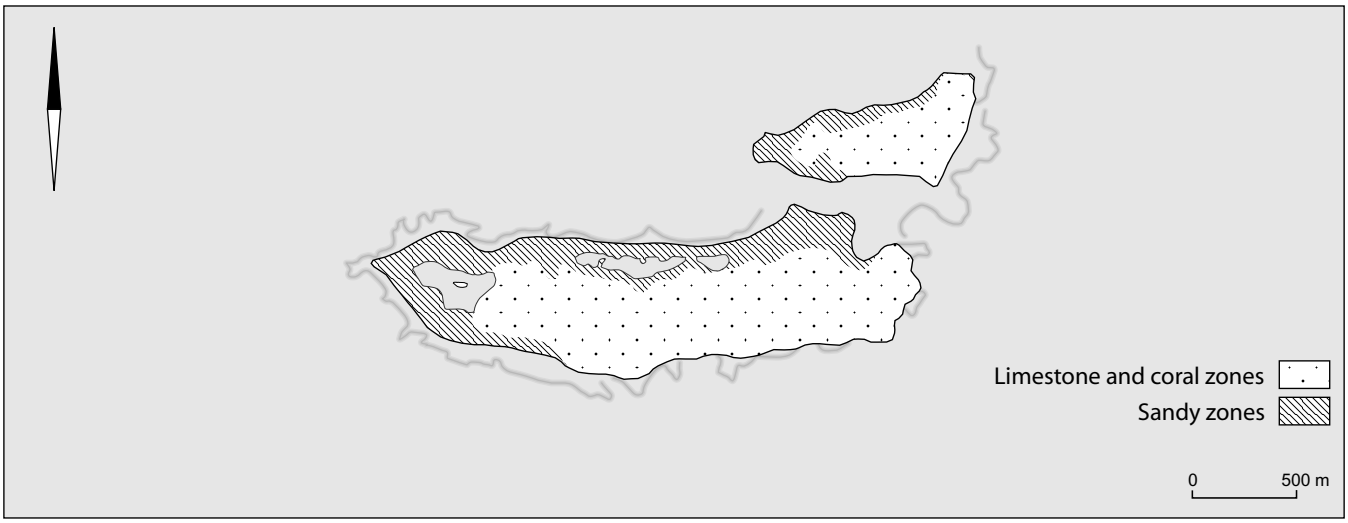


Fig. 3.7. Geological map of Petite Terre (after Conservatoire du Littoral 1997:Carte A.II.4).

the lack of substantive vegetation within the study area encourage erosion and sedimentation processes. These are reinforced by human factors, of which removal of vegetation from slopes, overgrazing by goats, farming of dry land, and shifting cultivation practices which, with short recovery periods, may destroy the vegetation and the soil structure, are the most important.

At present, and this is probably true for the pre-Columbian period as well, Pointe des Châteaux does not appear to be greatly influenced by landslides, soil creep or mudflows. Rockfalls, however, do occur, but only at the extreme edges of elevated cliff coasts. Modest but continuous superficial slope erosion, aeolic erosion in flat areas, and resulting sedimentation appear to be of more significance, at Fond St. Bernard in particular. However, this has minor effects on the displacement of sediment.

La Désirade's relief and its presently modest vegetation cover encourage slope erosion and aeolic erosion to a greater degree. This process particularly affects the thin layer of loose soil, which covers the limestone bedrock at the borders of the plateau. Eroded sediments are deposited on the western, eastern and southern slopes, where soil creep at the surface moves them further down. The thin sedimentation layer on the southern coastal plain demonstrates the slow nature of this process. Faster displacement of sediments occurs on the western hills and the eastern plateaus, through gullying, which is caused by excessive runoff of water during the wet season. Landslides or mudflows do not appear to be significant processes. Rockfalls occur only at the edges of ravines and the steep northern coast.

At Petite Terre, slope erosion and aeolic erosion in the present as well as in the past appear to be modest as a result of the flat character and the dense vegetation of the islands. The only significant impact of erosion may be found in the area north-west from the lighthouse on Terre de Bas, where sediments may be moving downwards to the beach in the northeast.

3.2.3 Coastal dynamics

Coastal dynamics drastically altered important parts of the research area. Wave action, of which the effects are largely dependent on wind action, accounts for the most dramatic coastal changes. The resulting degree of coastal erosion is mostly dependent on whether or not waves are broken on a reef system. The effects of coastal erosion are modest in parts of the study area that are protected by fringing reef systems. Coastal areas with reef-passages or which lack reef protection, however, are heavily subjected to coastal erosion. Wave action in reef areas is also responsible for the fine sand deposits that, influenced by wind processes, may play a part in coastal dune formation processes. Tropical storms and hurricanes greatly accelerate these processes. It is clear that areas with salinas and sand beaches are the least stable and most vulnerable to erosion and covering by pioneer dunes. The effects of erosion of sandy beaches through wave action are reduced by the presence of beach-

rock formation processes, which consolidate the sand, but this does not actually stop erosion. At Anse à la Gourde even hard beach-rock erodes very fast (Troelstra and Beets 2001[b]). Archaeological sites are greatly damaged by such processes. Coastlines consisting of conglomerates and fossil coral reefs have eroded to a lesser extent, being only affected by caving in of the coast and by rock falls as a result of strong wave action.

The *Vrije Universiteit* geological team, besides its work of investigating climatic change, tried to estimate the rate and impact of coastal dynamics in the research area, by mapping elevated reefs at Pointe des Châteaux and coring salinas at Pointe des Châteaux and La Désirade (Troelstra and Beets 2001[a-b]). The team found peat, dated 4473 BP, at 195-200 cm depth in the La Désirade salina cores, and algae, dated 2544 BP, at 126-130 cm depth in the Grande Saline at Pointe des Châteaux. Furthermore, they collected organic material deposits, dated 1760 BP, immediately underneath Anse à la Gourde beach-rock. On the basis of these finds they conclude that around 4473 BP sea level was 2 m below the present level, while around 2544 BP, sea level was approximately 130 cm lower than it is now.[6] Around 1760 BP, the sea level equalled the present one (Troelstra personal communication 2002).

According to Feller *et al.* (1992), sea level for the Grand Cul-de-Sac Marin, to the west of Grande-Terre, rose approximately 3.4 m per 1000 years between 7000 and 4000 BP. Between 4000 BP and AD 1000 it rose 0.8 m per 1000 years. After the year AD 1000 it rapidly rose 1.8 m.[7] This largely coincides with sea levels estimated for Barbuda and the Bahamian archipelago. At Barbuda it was estimated that for the period of initial Ceramic Age occupation, around 300 BC, the sea level was very close to its present state (Watters *et al.* 1992:15). But for the period of 3700 to 3800 years ago, it is suggested that it would have been 5 m lower than today (Watters *et al.* 1992:47). For the Bahamian archipelago, sea level changes are reported to be insignificant for the period AD 700 to 1500 (Keegan 1992[b]:5). Rise of sea level greatly changed the stability of the coast. Troelstra and Beets (2001[b]) suggest that the first development of salinas and dunes at Pointe des Châteaux probably started about 5000 years ago, while a stabilisation in sea level occurred until approximately 1000 years ago.

At Pointe des Châteaux, the northern coast with its salinas and sand beaches presently is, as it probably was in the past, most vulnerable to coastal changes. These changes have been described for Anse à la Gourde (Delpuech *et al.* 1999; Hofman *et al.* 1999[a]; Troelstra and Beets 2001[a-b]). According to Troelstra and Beets (2001[b]) originally there was a wide coastal plain with semi-enclosed salinas at the location of this site, separated from the sea by beach and dune formations, instead of the present beach and dune formations. Delpuech *et al.* (1999) suggested that before AD 600 the sea level was 1 to 2 m lower, and that the actual bay was a salina that was invaded by the sea as a result of the rise of sea level between AD 600 and 1000. This also resulted in the development of a mangrove area.[8] Recent data from Anse à la Gourde, however, (see above) demonstrate that in this period sea level approximately equalled the present sea level, but a gradual displacement of the local system, as described by Delpuech *et al.*, did take place. Troelstra (personal communication 2002) proposes that destruction of the coastal dunes affected this process. After AD 1000, only a reef barrier remained and a sandy beach, together with the present coastal dunes, appeared on the southern shore of the former salina. Hofman *et al.* (1999[a]) hypothesised that during the Early Ceramic B occupation of Anse à la Gourde, between AD 500 and 700, the coastline was probably located between 50 to 100 m more northward.[9] The present situation at the Grande Saline is rather similar, which suggests a comparable process through time. This, however, may be a little slower since the Anse à la Gourde beach is presently undergoing dramatic erosion, as a result of a passage in the coral reef barrier that is located in front of the site. In 2000, a significant change could be noted compared to the situation in 1999. Large parts of the beach and beach-rock had been eroded and the sea almost reached the Anse à la Gourde site (Troelstra and Beets 2001[b]). The beach in front of the Grande Saline appears to be better protected by the reef barrier and by wash-over deposits. The situation near the salina that is in open connection with the sea is disastrous as large parts of the beach and the dunes are rapidly disappearing. The surrounding areas are being threatened by marine breakthroughs as well. They continue to be protected by the dunes that result from sedimentation of eroded reef particles. The moment that those reefs or parts of the reefs are destroyed, dune formation will stop at those locations, while dune erosion, which is rapid, will continue.

At La Désirade, the situation in 2000 has been compared to 1983 aerial photographs and coastal erosion was found to be rapid. It ranges between 1 to 21 m and for some parts of the island it even involves 34 m for this short period of time (Troelstra and Beets 2001[b]); (fig. 3.8). Recent human action dramatically affects the beaches as well. This includes the creation of the island's marina in the capital Grande Anse, for which a large beach has been completely dug out (APEPAD nd:28), and bulldozing activities at the airport and at the beach of Anse Petite Rivière.[10] Although the beaches appear to be relatively well protected by the coral reef barriers that extend all along the southern coastal plain, they do rapidly erode. In the Les Galets area, in the south-eastern part of La Désirade, this is evidenced by the

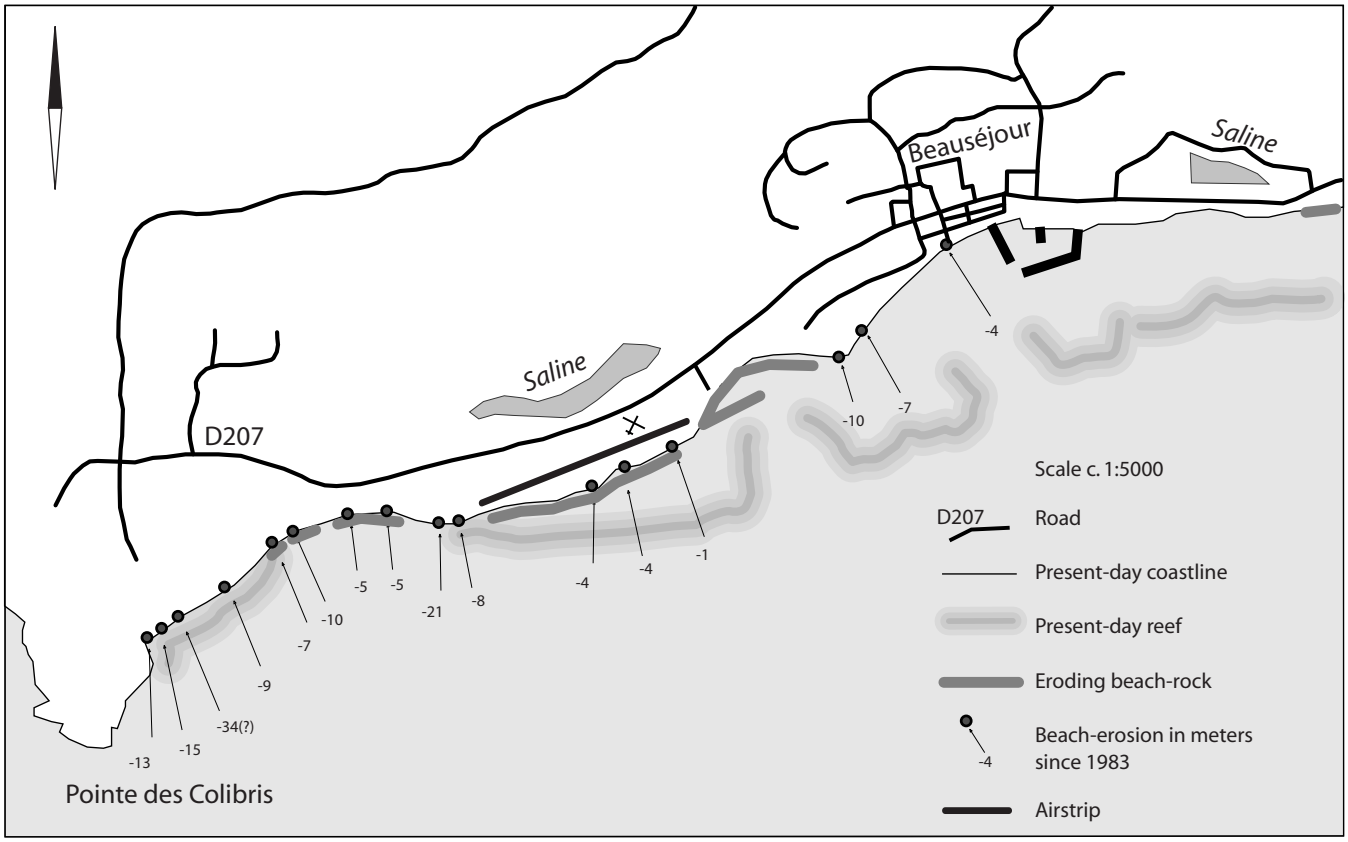


Fig. 3.8. Coastal erosion at south-western La Désirade (after Troelstra and Beets 2001[b]).

near complete disappearance of the Anse d'Échelle beach cemetery that was used for victims of the 1865-1866 cholera epidemic. The bulldozing of this area in order to destroy what was left of the cemetery and to flatten the terrain to allow construction works did not enhance protection either. The small beach strip south of the airport, which is only a few meters wide, completely disappeared after some weeks of heavy tropical storms (personal observation 2002). The coast south of the easternmost salina presently appears to be badly protected as well. Although a small channel running from the sea normally feeds this salina, the dune fringe is so narrow at this point that breakthroughs easily occur. Another obvious coastal development was noted at the west of the marina. A layer of fine clay was found at the waterside, which must have been deposited when there was stagnant water, allowing the finest sediment particles to settle (personal observation 2000).

On Petite Terre, the northern and the western coast of Terre de Bas are presently unstable, a situation that is probably representative for the pre-Columbian period as well. Large parts of the beach and the dunes are rapidly eroding. This is evidenced by steep, almost vertically eroded, slopes of the dunes (personal observation 1997-2000). Although a lot of the sandy coast disappears, an important part is displaced inland as well. The dunes on Petite Terre are relatively young and characterised by pioneer vegetation, and they appear to be moving a lot. The salinas are gradually being filled up with sand; a process that is clearly visible at the easternmost of the three principal salinas of Terre de Bas (Rousteau 1995:8).

3.2.4 Climate

For the Guadeloupe archipelago, three seasons can be distinguished nowadays. From January to April, it is dry and rather fresh with a moderate northeastern wind. In May and June, the season is tropical with moderate rainfall and with

strong eastern winds and the rainy period, between July and December, is extremely warm and humid, with subsiding trade winds (Bouchet 1992:3). One of the most important impacts on the natural environment is the almost annual passage of tropical storms and hurricanes during this season. They may cause tidal waves, heavy rains, and on Basse-Terre, mud streams and land slides.

The research area is situated in the driest and warmest part of Guadeloupe. Only 959 to 1014 mm of rain has been measured on a yearly basis between 1951 and 1993 for Petite Terre and La Désirade respectively (Conservatoire du Littoral 1997:7). The annual average temperature is above 27° C and stable during the year, while the relative humidity of the air is high, with an average of 81% (Bouchet 1992:3-6; Lasserre 1961:143-210; 1961[b]:767-806).

Information on seasonality, precipitation, insolation, temperature, humidity and winds in pre-Columbian times is important since climatic change is closely associated with the rate of coastal erosion, rate and impact of dune generating and eroding processes, and stability of the salinas. Even small-scale changes may cause changes in the balance between evaporation and precipitation, salinity variations, currents and wave activity and hurricane frequencies. These, in turn, may influence fresh water supplies, water level in the salinas, tolerance of food resources such as gastropods and coastal erosion processes. Increased hurricane intensity also strongly limits human occupation. Therefore, the *Vrije Universiteit* team placed a special emphasis on the recovery of high-resolution sediment cores deposited during the last 5000 years (Troelstra and Beets 2001[a-b]). Troelstra and Beets (2001[b]) present data of stable isotope analyses on carbonate shells of land snails from the site of Anse à la Gourde indicating that before AD 900 the climate was variable with rapid dry and wet sequences.[11] Between AD 900 and 1300 conditions changed from dry to distinctly wet and the period between AD 1300 and 1600 was characterised by a development towards dryer conditions. They conclude that dry periods centre around AD 950 and AD 1400 and wet periods around AD 750 and AD 1300. Curtis and Hodell (1993:135) suggest on the basis of isotopic, trace element and pollen analysis for samples from Lake Miragoane (Haiti) that the period from 7000 to 4000 years BP was relatively humid. From approximately 4000 to 2500 years BP the climate became drier, while from approximately 2500 to 1500 years BP it was exceptionally dry, until around 1000 BP, when wetter conditions briefly returned. Since then, a general return to drier conditions was witnessed. Such climatic changes surely influenced the soils, vegetation and water supplies of the study area, but unfortunately it is not known to what extent.

3.2.5 Hydrography

Surprisingly, considering the importance of fresh water in arid regions, the information on the possibilities for fresh water procurement within the research area is limited. This may be caused by the fact that most fresh water occurrences are not visible from the surface at present. Many of these are fresh water lenses, or aquifers, situated between chalky layers in the subsurface, or floating on saline groundwater as a result of their lower density. This phenomenon, fed by rainfall, has also been reported for other flat limestone islands, for example Barbuda (Watters 1980:64). According to Antczak (1998:109) Los Aves fishermen still excavate pits in the dunes to obtain brackish but drinkable water. Some of these pits provide water throughout the year. The presence of colonial and more recent wells at Pointe des Châteaux and on La Désirade and Petite Terre demonstrates the use of such lenses. In pre-Columbian times, the lenses could be exploited through digging as well. This should be done with care since lenses are often underlain by salty water. Careless exploitation causes the salty water to pollute the aquifer. Potstacks, made from bottomless vessels (Harris and Hinds 1995; Hinds and Harris 1995), may have been used in this process. Potstacks have been found on eroded coastlines at several Caribbean islands, such as Barbados (Hinds *et al.* 1997), Mustique and St. Vincent (Hinds and Harris 1995) and an Early Ceramic B potstack was discovered at Morel on Guadeloupe (Arts personal communication 2002). The direct collection and conservation of rainwater in ceramic vessels, causing serious limitations to the quality and quantity of fresh water, was probably of less importance.

Fresh water sources and streams are absent nowadays in the Pointe des Châteaux research area. In the pre-Columbian period, fresh water was probably collected from aquifers although it may have been collected from *dolines* as well (section 3.2.1; fig. 3.1).

At La Désirade, permanent fresh water sources exist under the cornice of the plateau and near the coasts (fig. 3.2). Those of Baie Mahault and the Cybèle and Rivière ravines are still in use (Lasserre 1961:890-891; Petit 1989:3). Several sources are known to have been used and to have supported the needs of La Désirade's 1600 inhabitants far into the 1960s (Lasserre 1961:900; Petit 1989). As a result of transportation through limestone, the water is calcareous and rich in minerals. Nowadays, only the water from the Baie Mahault sources is potable. The other sources do not have sufficient bacteriological quality (Petit 1989:11), although they were probably better in the past when there was less environmental pollution.

Since fresh water sources and water streams are now absent on Petite Terre, it is deemed that aquifers must have been exploited in pre-Columbian times. The presence

of a well, nowadays providing brackish water, near the lighthouse indicates that this was done until quite recently (fig. 3.3). In addition, on the limestone plateaus of the central parts of the islands of Petite Terre waterholes have eroded that contain rainwater (Rousteau 1995:9).

The pre-Columbian population of the research area must have had sufficient access to fresh water, although a considerable effort may have been involved in its procurement. There is no reason to assume that the above-mentioned sources did not exist in pre-Columbian times. If environmental conditions indeed were less arid in the pre-Columbian period (section 3.2.4), the situation was more favourable. However, Troelstra (personal communication 2002) warns that salt water, as indicated by geophysical studies, must have been present in the subsoil during dry periods in the pre-Columbian period as well, suggesting that the procurement of fresh water was probably always problematic in this region.

3.2.6 Pedology and agricultural potential

Nowadays, soils within the study area are poorly developed, the majority consisting of well-drained soils composed of coarse, loose sand, with or without humus component.[12] In some areas, on the southern coastal plain at La Désirade for example, soils are compact and clayish, which implies that they retain water without releasing it to plant roots easily.

The agricultural potential of the soils, however, is sufficiently promising. The area nowadays makes a poor impression in this respect, since hardly any cultivation takes place, except for the valley in the western part of the Pointe des Châteaux study area. In the past, however, the greatest parts of Pointe des Châteaux and Petite Terre were in use for large-scale cultivation of cotton and for small-scale horticultural practices. On La Désirade, slash-and-burn agriculture on the central plateau was common practice until the late 1960s (Bariteau 1968:21-22) and is still carried out now and then. The thin layer of decalcification clays, mixed with calcareous nodules, allows good yields (Lasserre 1961:906). On the southern coastal plain small fields are cultivated for household use only.

Extensive slash-and-burn horticulture, common to agricultural Amerindian societies, is possible in all of the study area as well, except of course in the sandy beach areas. This was probably also the case during pre-Columbian times, as it is likely that local circumstances were then less arid and that soils received more protection from a denser vegetation cover.

3.2.7 Vegetation and fauna

To obtain an insight into local vegetation in pre-Columbian times, the *Vrije Universiteit* team also conducted an investigation aimed at the recovery and analysis of pollen. Unfortunately, the preservation potential of the salinas at Pointe des Châteaux and La Désirade, where samples were taken, proved to be unsuitable for pollen. Only a few samples contained minimal amounts of badly preserved pollen. The peats in the La Désirade salina cores, however, point to considerable mangrove growth in the period before 4400 BP (Troelstra personal communication 2002). Present-day vegetation is described below.

Nowadays, the study area is covered by a coastal vegetation and a dry, thorny 'inland' vegetation, that is adapted to dry and sunny conditions, sea winds, and sandy and calcareous soils. The widespread occurrence of this thorny vegetation, while to some extent natural, is probably the result of long-term human intervention in the landscape (Rousteau 1995:9).[13]

At Pointe des Châteaux, a coastal zone mainly consisting of small trees and sea grape borders an area characterised by acacia and other types of low, dense and thorny shrub.

La Désirade's plateau and the hills in the western part of the island are presently also densely covered by thorny shrub. The sparse vegetation on the southern coastal plain consists of small-leafed thorny brushwood, acacia in particular, and cactaceous and herbaceous species. The sandy beaches along the south coast are covered by lianas and sea-grape (Bouchet 1992:11-12). The eastern part of the island is characterised by dense mancenilla growth and by a very small mangrove area near Baie Mahault. The ravines along the northern coast, however, are characterised by lush vegetation, consisting of large fruit-bearing trees and large trees that are potentially suitable for the manufacture of dug-out canoes (personal observation 2000).

Although very small, the islands of Petite Terre nowadays exhibit a relatively significant biological diversity as a result of the appearance of varied environments such as salinas, sandy beaches, rocky coastal zones and varied vegetation zones (Conservatoire du Littoral 1997:15). Beaches and coastal formations on sandy grounds are covered by 1 to 2 m high sea-grape. The dominant vegetation formation consists of low, impenetrable and very dense shrub of 1 to 1.5 m in height (Barré *et al.* 1997:7, 8 and map 2) and the western parts of the islands are densely covered by poisonous mancenilla trees (Conservatoire du Littoral:1997). The salinas are bordered by a small mangrove zone, then by a small zone of dense shrub of 3 to 4 m in height, and finally by 5 to 10 m high trees. Most remarkable is the presence of *Gaïac* trees, which are almost extinct on the Lesser Antilles and thus heavily protected. Since *Gaïac* is a hard quality wood, pre-Columbian Amerindians often used it for the manufacture of high-status artefacts.

It is generally assumed that in pre-Columbian times, vegetation within the research area was somewhat more abundant, as a result of less arid conditions. Large trees may have been present but they were probably intensively used for the building of houses and dugout canoes. The vegetation has been further threatened by large habitations and cultivated areas (e.g. sugar cane, indigo and cotton plantations), charcoal production, and the introduction of grazing domesticated animals, like sheep and goats, in colonial times.

At present, Petite Terre is characterised by an abundant and diverse terrestrial fauna, including iguanas (*Iguana delicatissima*), turtles (*Chelonia mydas*, *Eretmochelys imbricata* and *Lepidochelys* sp.), land crabs and rats (*Rattus rattus*). Very few insects have been reported for these islands (DIREN 1994:15). The central channel, today overexploited, has until recently been very rich in sea urchins, *Strombus gigas* and coral species such as *Diploria* sp. and *Acropora* sp. Along and near the bordering reefs parrot fish (*Sparisoma* sp.) and barracuda (*Sphyraena barracuda*) can be caught in abundance, although fishermen that frequent the area recently reported a general decline of fish populations. Sharks are usually found in the deeper areas south of the islands, and whales may pass the islands between March and May (DIREN 1994:17-20). The areas around the Petite Terre salinas are reputed to attract a lot of terrestrial sedentary birds and migrating birds (Barré *et al.* 1997:19, 24). This has also been reported for Pointe des Châteaux (Office National des Forêts nd:15).

Nowadays, La Désirade, because of its larger surface, has a richer terrestrial fauna compared to Petite Terre and Pointe des Châteaux. Agoutis in particular are abundant (personal observation 1999-2000). The south-eastern part of the island abounds in iguana. In addition, the ravines, thanks to their dense and rich vegetation, attract many birds (Lasserre 1961:904). The islands' environments have been reported to be well-stocked with fish (Lasserre 1961:915), crustaceans, marine molluscs and turtles.[14] Turtles regularly come on land to lay their eggs, for example at the Anse Petite Rivière beach.

Steadman *et al.* (1984[a]) demonstrated for Antigua that several vertebrate species were lost over the past 3500 years. These include reptiles, such as lizards and snakes, birds, and mammals, such as bats, rice rat, and manatee. They attribute this to human-caused environmental degradation that precipitated extinction in the pre-Columbian period already. Ethnohistorical accounts report species that have now become rare or extinct on Guadeloupe (Grouard 2001:70). These include pink flamingo (*Phoenicorpterus ruber*), pigeon and turtledove (*Columbidae*), parrot (*Psittacidae*), iguana (*Iguana delicatissima*), acouchi (*Myoproctaa acouchi*), sluggard (*Bradipus tridactylus*), manatee (*Trichechus manatus*), monk seal (*Monachus tropicalis*), and sea turtle (*Cheloniidae*). Although present-day situations probably reflect fairly well the fauna as they might have been on Petite Terre, at Pointe des Châteaux and on La Désirade during the pre-Columbian period, biodiversity was probably richer in the past.

3.3 CONCLUSIONS AND EXPECTATIONS FOR THE EAST-GUADELOUPE PROJECT

This chapter provided data needed to understand fieldwork conditions, site distributions and the general natural framework for pre-Columbian settlement within the research area. It made clear that local relief and vegetation in the research area are not very attractive but they do not hinder systematic surface surveys being carried out. Sedimentation is quite modest and mud streams or landslides, covering archaeological sites, are highly unexpected locally. However, conditions for the survival of coastal sites or parts of these sites seem to be less favourable as a result of coastal erosion. Other sites are partially destroyed by beach-rock formation processes. In addition, dune formations at the northern coasts of Terre de Bas and of Pointe des Châteaux may cover archaeological deposits, since these dunes are relatively young and characterised by pioneer vegetation. At the Anse à la Gourde site, evidence has been found that dunes gradually shifted over parts of the habitation area. Therefore, the Pointe des Châteaux beaches have been auger tested in order to investigate the presence of archaeological material underneath beach sand deposits (section 2.2.3).

Inland sites will be better preserved although they may have been damaged by human action, and, if situated at the borders of La Désirade's plateau, by erosion. At Morne Cybèle-1, for example, archaeological material is only conserved in natural depressions in the bedrock (Hofman and Hoogland 1994). This situation, however, does not appear to be exemplary for the border of the plateau, as at comparable site locations at Les Éoléens and Morne Souffleur large amounts of surface material were present. The Morne Cybèle situation may have been brought about by extensive excavation in the past.

Local conditions were probably favourable for pre-Columbian settlement and exploitation. The area is characterised by a lot of terrain suitable to habitation, small-scale horticulture and food gathering, and by small bays protected by coral reef barriers. They can be entered by canoe although it is difficult to pass the reefs. Marine food resources are easily and widely available.[15] The

richest marine biotopes that can be distinguished in the Caribbean are represented: coral reef areas, sea-grass beds and mangrove, while other biotopes such as sandy beaches, rocky coasts, and estuaries are nearby as well. In combination, these harbour a wide variety of mammals, birds, amphibians, reptiles, crustaceans, echinoderms, fish and shellfish (Grouard 2001:46). Terrestrial fauna appears to be only moderately abundant and diverse. Fresh water would have been available, although collection would have demanded some effort. This is also true for various shell species and coral species, lithics and *Gaïac* wood, which may have served raw material demands for tools and ornaments. It is not clear where wood used for dug-out canoes and houses was obtained, but giant postholes found at the site of Anse à la Gourde (Bright 2003; Duin 1998; Hofman *et al.* 2004) demonstrate that areas with large trees must have been exploited. Nowadays, large trees are only present in the La Désirade ravines. A less positive aspect of the natural environment is the almost annual passage of hurricanes. Considering the damage, chaos and panic they cause even nowadays, the situation in pre-Columbian times may have been more dramatic. It is possible that caves at La Désirade, of which the largest were reported in the La Rivière ravine and in the western hills, were used for shelter during such events (APEPAD 1995).

Considering the natural features of the area, certain areas appear to be more suited to pre-Columbian habitation or use than others. Most attractive appear to be flat coastal areas where fresh water can be found and where bays with coral reefs are close by. At Pointe des Châteaux these are expected at Anse à la Gourde, Anse Kahouanne, the Village des Pêcheurs, Anse Degrat and at Anse des Salines. On La Désirade, suitable areas are situated on the southern coastal plain and on Petite Terre at all the coastal areas. It is important to find out if archaeological sites are actually located at such attractive locations, but it is equally important to know whether sites are located in unexpected and maybe less favourable places. It is deemed important for the fieldwork to investigate all aspects of landscape use, an idea that is reflected in the survey design. What is needed ultimately is a combination of environmental and archaeological information. But before getting to this point, it should be outlined what could be expected with respect to the cultural setting of the research area.

NOTES

1 Guadeloupe is sometimes referred to as one of the Leeward Islands as well.

2 Sombrero is located to the north-east of Anguilla.

3 The islands of Petite Terre have been named after their positions related to the prevailing eastern trade winds. Terre de Haut has a windward location and Terre de Bas is a leeward island (Lasserre 1961:18, note 2).

4 Diameters of the Pointe des Châteaux *dolines* range between 2 and 5 m.

5 In its western part the plateau reaches 276 m in height, and in its eastern part it reaches 175 m.

6 This largely coincides with results from Curaçao, a stable tectonic area, where the sea level was found to be some 2 m below the present level for the period around approximately 4500 BP (Troelstra personal communication 2002).

7 The Cul-de-Sac situation is probably slightly different from the La Désirade situation, which can be explained by decline of the Cul-de Sac area and compaction of local peat (Troelstra personal communication 2002).

8 The shell material collected from Anse à la Gourde, however, does not support the idea of the existence of a mangrove area (Nieweg 2000:126).

9 At Morel, on the northern coast of Grande-Terre, the coastline has retreated 30 meters over the last 50 years (Delpuech *et al.* 1999, 2001). The Morel site appears to be more vulnerable to hurricane action and strong sea currents than other areas on Guadeloupe. Dramatic changes for other vulnerable parts of Guadeloupe, such as the Culs-de-Sac marins, have been presented by Delpuech *et al.* (2001).

10 The Grande Anse beach has actually disappeared (for the situation before construction of the marina, the reader is referred to Lasserre 1961: Plate LXXIII).

11 The carbon isotope variation is largely dependent on land snail diet.

12 No pedological maps exist for La Désirade and Petite Terre and no detailed soil information is available for Pointe des Châteaux.

13 This has also been suggested for St. Martin (Newsom and Molengraaff 1999:230).

14 To this day, for example, the Souffleur area at La Désirade is renowned for the enormous amounts of *Strombus gigas* that are being exploited (personal observation 1999-2000).

15 Nowadays, Anse à la Gourde at Pointe des Châteaux is still known for its large *Cittarium pica* populations.

4. CULTURAL CHRONOLOGICAL FRAMEWORK

4.1 INTRODUCTION

The present chapter provides a short, general overview of the cultural chronological framework for the research area and its surroundings. The description largely follows the cultural chronological framework presented by Rouse in 1992, and it has been adapted to incorporate the refinements that were recently made to this framework (section 1.4.4); (Petersen *et al.* 2004). This is needed to understand what features have been used in this study to assign archaeological assemblages to specific pre-Columbian periods. Colonial and recent information is provided in order to be able to estimate the impact of cover or destruction of archaeological sites by later use of parts of the research area.

4.2 PRE-COLUMBIAN CULTURAL SETTING

4.2.1 Introduction

The ensuing overview covers the pre-ceramic, Early Ceramic and Late Ceramic Ages (fig. 4.1). The description of the pre-ceramic period is mainly based on Rouse (1992). The largest part of the overview deals with the Ceramic Age in the Caribbean.

The overview has been based on the chronological framework for cultural developments in the Caribbean that was initiated by Professor Irving Rouse of Yale University in the early 1930s. Rouse, working from a cultural-historical point of view, considered groups of pottery to delimit material cultures and people behind cultures and the study of their cultural development was based on the study of the development of style. A pottery style, complex or phase is defined as the entire repertoire of a people built into its pottery during one single cultural period. A style may be characterised by a specific material, shape, decoration or ware and technology. These characteristics have been widely used to define areas, periods, peoples and cultures (Hofman 1993:26; Rouse 1964). A series of styles, named after the type-site with the suffix -oid, is a resemblance of styles within one line of development. Local variations are called subseries, named after the type-site with the suffix -an (Hofman 1993:26; Rouse 1964, 1986, 1989, 1992; Vescelius 1980). Rouse explains the pottery developments and their dispersions through the region by migrations of Ceramic people from the South-American Orinoco region, through the Lesser Antilles to the Greater Antilles (Rouse 1986, 1992).

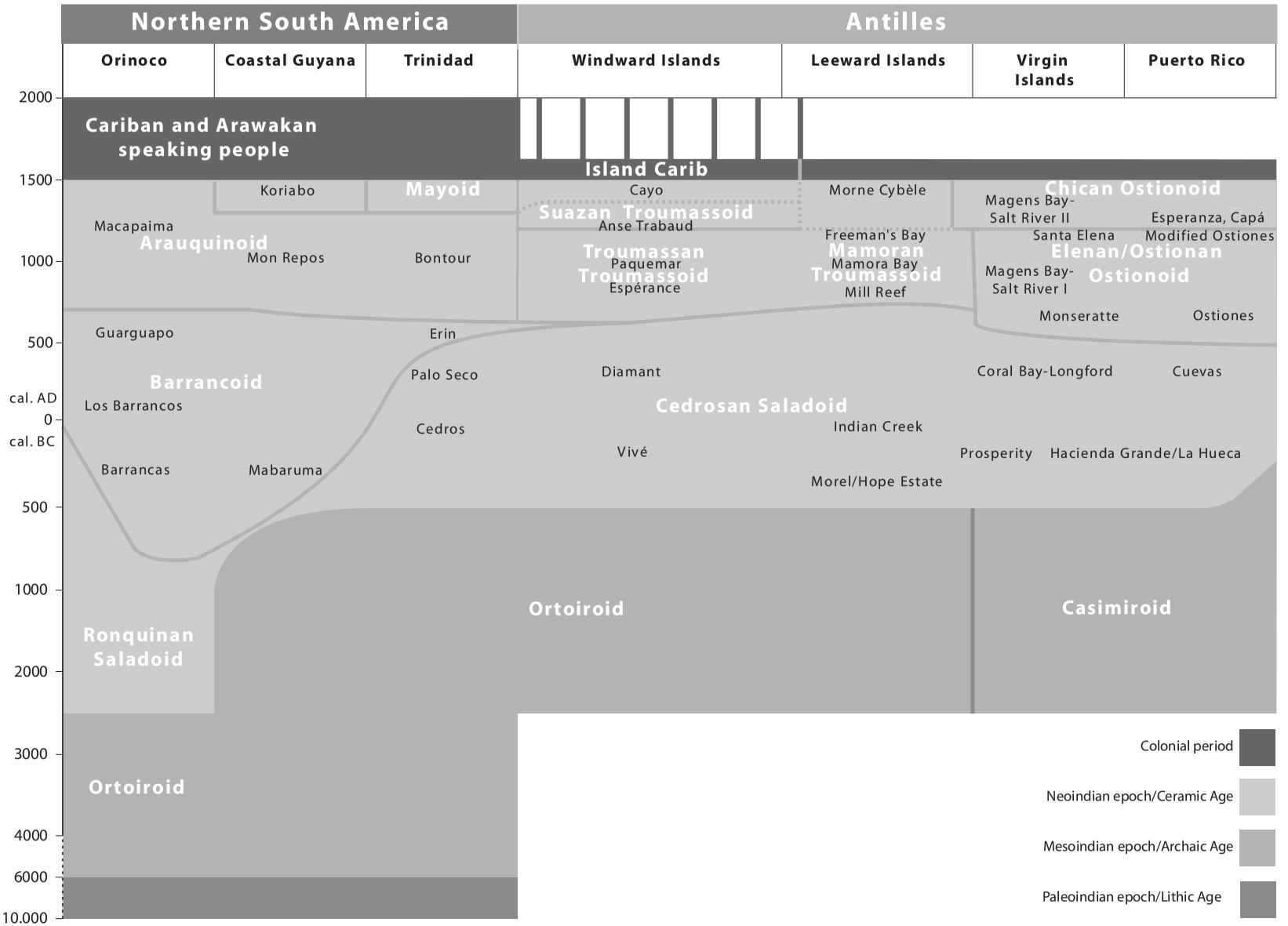
Rouse's framework has been widely adopted regionally and as it has been used and refined ever since it was first introduced it did and still does provide a valuable and very detailed regional reference for ceramic assemblages. It is therefore expected that reference to Rouse's chronological framework will ensure that the presentation of East-Guadeloupe complexes, roughly assigned to the pre-ceramic period, or to Early and Late Ceramic Ages with early and late phases, is accessible to all Caribbean archaeologists familiar with this framework.

4.2.2 Pre-ceramic period

Rouse (1992:49) divides the pre-ceramic period into two ages: the Lithic, or Paleo-Indian, age starting around 4000 BC and the Archaic, or Meso-Indian, beginning around 2000 BC. The pre-ceramic period largely coincides with Rouse's Period I. Flaked stone assemblages characterise the first and grinded artefacts of stone, bone, and shell characterise the latter. Two series are identified: Casimiroid and Ortoiroid. The Casimiroid series, approximately dated between 4000-400 BC, also known as Barreroid or Mordanoid, originated in Middle America. Three subseries can be distinguished: Lithic age Casimiran, Courian, which succeeded it in Hispaniola during the Archaic age, and Redondan, which replaced it in Cuba (Rouse 1992:51). Since Casimiroid has only been found on Cuba and Hispaniola, it is not considered relevant for further description within this study.

The Ortoiroid series, approximately dated between 2000-400 BC, also called Banwaroid, is named after the Ortoire culture in Trinidad.[1] Several variations can be distinguished: Ortoire on Trinidad, Boutbois on Martinique and Jolly Beach on Antigua, as well as the Corosan subseries, on Puerto Rico and the Virgin Islands. However, Rouse (1992:62) remarks that it is difficult to delineate subseries as site assemblages are generally small and consist mainly of non-diagnostic artefacts. It is thought that the Ortoiroid migrated from South America into the Lesser Antilles and Puerto Rico around 2000 BC (Rouse 1992:51). Boomert (2000:78) suggests, however, that this may have started as early as 5000 to 4000 cal. BC as well. The overall characteristic is provided by the presence of edge grinders, and partially ground celts of stone and shell, although the latter do not occur in Coroso assemblages. Evidence for flint flaking has only been found in Antigua and Puerto Rico (Rouse 1992:67).

On the Windward Islands, only few pre-ceramic sites have been reported. One pre-ceramic site was excavated


Northern South America
Antilles
Orinoco
Coastal Guyana
Trinidad
Windward Islands
Leeward Islands
Virgin Islands
Puerto Rico
2000
1500
1000
500
cal. AD
0
cal. BC
500
1000
2000
3000
4000
6000
10.000
Cariban and Arawakan speaking people
Island Carib
Koriabo
Mayoid
Cayo
Morne Cybèle
Chican Ostionoid
Magens Bay-Salt River II
Esperanza, Capá
Macapaima
Arauquinoid
Anse Trabaud
Suazan Troumassoid
Freeman's Bay
Santa Elena
Modified Ostiones
Mon Repos
Bontour
Troumassan Troumassoid
Paquemar
Espérance
Mamoran Troumassoid
Mamora Bay
Mill Reef
Elenan/Ostionan Ostionoid
Magens Bay-Salt River I
Monseratte
Ostiones
Guarguapo
Erin
Barrancoid
Palo Seco
Diamant
Coral Bay-Longford
Cuevas
Los Barrancos
Cedrosan Saladoid
Cedros
Indian Creek
Vivé
Prosperity
Hacienda Grande/La Hueca
Barrancas
Mabaruma
Morel/Hope Estate
Ortoiroid
Casimiroid
Ronquinan Saladoid
Ortoiroid
Colonial period
Neoindian epoch/Ceramic Age
Mesoindian epoch/Archaic Age
Paleoindian epoch/Lithic Age

at St. Vincent (Hackenberger 1991), at Barbados, a pre-ceramic component was identified in the Suazoid Heywoods site (Drewett 1995[a]; Drewett *et al.* 1993) and two pre-ceramic sites have been found in the interior of Martinique, Boutbois and Le Godinot (Allaire and Mattioni 1983). The sites on Martinique have been attributed to the Boutbois complex. Edge grinders, pebbles with grinding facets in their edges, are characteristic. Hammer stones, *metates* and irregularly shaped flakes also occur (Rouse 1992:63-64). According to Boomert (2000:78), the inland locations and the absence of food remains may suggest that the sites were used as special activity sites. On Trinidad, Ortoire sites are found along beaches and inland swamps (Rouse 1992:63). They are characterised by bone barbs and bipointed projectile points. Simple *manos*, metates, choppers, hammer stones, net sinker pebbles and mortars also occur (Rouse 1992:63). There is little pre-ceramic evidence from Guadeloupe and La Désirade. Clerc (1976) reported several isolated finds on Guadeloupe of probably pre-ceramic ground stone artefacts. In addition, a small concentration of local lithic material and typical Long Island blades has been reported for an inland area west of Capesterre-Belle-Eau (Basse-Terre). Although this site has not been investigated yet, it is probably pre-ceramic as well (Delpuech personal communication 1999). Richard (1995) mentions a possibly pre-ceramic component at the coastal site of Pointe des Pies at Pointe des Châteaux (Guadeloupe). This site is situated near the marina in St. François, a location that used to be a mangrove area. The bottom layer of this Saladoid site is characterised by an abundant lithic industry. No associated ceramics were found. On the basis of one single ^{14}C date on shell, producing a date of 2830 ± 50 BP, the hypothesis was launched that this occupation layer was pre-ceramic. Unfortunately, the site is almost completely destroyed nowadays, hindering the collection of more ^{14}C dates. At La Désirade, two pre-Columbian sites have been interpreted as being workshops where local lithics were obtained and worked. Both sites, the site of Pointe Doublé and Morne Baie Mahault, are on a rocky slope very close to the sea. They have been interpreted as being pre-ceramic since no ceramics were found and they have been presented in the permanent exhibition of the Edgar Clerc Museum as such. However, since no ^{14}C dates have been collected this is still open to discussion (*cf.* site catalogues in appendices 2-4; section 5.5.2).

More pre-ceramic sites have been reported from the Leeward Islands, and from Antigua in particular, where more than 50 a-ceramic sites have been identified. Most a-ceramic sites from Antigua can be attributed to the Jolly Beach culture (Nodine 1990). The Antiguan a-ceramic sites provide a wealth of information on the organisation of pre-ceramic occupation on this island. Most pre-ceramic sites on Antigua are located along the northern coast and in a low-lying limestone plain setting, close to flint sources and shallow offshore waters, offering rich and easily obtainable marine resources (Davis 2000:82). Although exceptions do exist, such as inland Norman Estate on St. Martin (Knippenberg 1999) and Plum Piece on Saba (Hofman and Hoogland 2003), most Lesser Antillean pre-ceramic sites have coastal locations, close to shallow waters and reefs, and most of them are rather small. Antigua site areas, predominantly habitation sites, measure between 150 m^2 and 4000 m^2 (Davis 2000:92). It has been suggested that the sites were used by small and mobile groups of hunter-gatherers (Keegan 1985; Petersen *et al.* 2004; Rouse 1992:66; Watters 1980). Pre-ceramic inhabitants of Antigua relied on a wide variety of terrestrial plants, shellfish, fish, and smaller numbers of reptiles and birds. For the Antigua sites, the complete absence of crabs in the diet is striking, as is the absence of the locally available but apparently not collected *Cittarium pica* (Davis 2000:89-91). Archaeological assemblages are further characterised by narrow blades and celts made out of *Strombus gigas* lips, and a wide repertoire of stone tools. Casimiroid-like flakes of pebbles are characteristic, while simple ground-stone artefacts are found as well (Rouse 1992:65). Casimiroid-like flakes of pebbles are characteristic, while simple ground-stone artefacts are found as well (Rouse 1992:65). Antigua flint artefacts have been reported as north as Anguilla (Crock *et al.* 1995). It is likely that flint was directly procured instead of exchanged. Blade production is a rare but typical feature, in particular on islands where flint is easily available, although flake industry is important as well (Knippenberg 1995).

There is a little a-ceramic evidence from Barbuda (Watters *et al.* 1992), Nevis (Wilson 1989, 1991), St. Kitts (Armstrong 1980), St. Eustatius (Delvoye 1994), Saba (Hofman and Hoogland 2003; Roobol and Smith 1980:169), St. Martin (Bonnissent 2001; Bonnissent *et al.* 2001; Knippenberg 1999) and Anguilla (Crock *et al.* 1995; Haviser 1991).

Several Archaic sites have also been reported from the Virgin Islands and eastern Puerto Rico. These have been assigned to the Corosan subseries, which is further divided into two (Rouse 1992) or three complexes (Lundberg 1991). According to Rouse (1992:65-66), edge grinders are diagnostic while simple beads and stone, bone and shell pendants also occur. Simple used but non-worked choppers,

Fig. 4.1. Chronological chart of the pre-ceramic and Ceramic ages (Petersen *et al*. 2004: fig. 1).

hammer stones, grinding stones, igneous rock flakes, shell picks and scrapers have also been found.

4.2.3 Early Ceramic Age

4.2.3.1 Saladoid series

The first ceramic people to arrive in the Antilles made pottery belonging to the Saladoid series. The Saladoid series is named after the Saladero site on the lower Orinoco in Venezuela (Rouse 1992). The Saladero style evolved from the Ronquinan Saladoid, which had developed in the middle Orinoco near the town of Parmana in the second millennium BC (Roosevelt 1980:193-196). Ronquinan pottery is characterised by bell-shaped bowls with red or white-on-red painted geometric designs, curvilinear incised lines, wedge-shaped lugs, modelled-incised *adornos* on lugs, strap handles and vessel walls, and painted crosshatching (Rouse 1992:75). During the first millennium BC, the people producing Ronquinan Saladoid pottery are thought to have moved into the Guyanas, where a Cedrosan Saladoid subseries developed (Rouse 1986, 1992). The Cedrosan Saladoid and Huecan Saladoid subseries, local variations on the Saladoid series, are the earliest pottery traditions on the islands. They are typical for the Early Ceramic Age, which may be equated with Rouse's Period II.

4.2.3.2 Huecan Saladoid subseries

The Huecan Saladoid subseries has been named after the La Hueca site on Vieques. Huecan Saladoid ceramics have been documented for Grenada, Union Island (Grenadines), St. Vincent, Martinique (Petitjean Roget 1981), St. Martin (Hofman 1999), Puerto Rico (Rodríguez 1991; Rouse and Alegría 1990) and Montserrat (Watters and Petersen 1999). Dates range from 400 BC-AD 400, roughly coinciding with Early Ceramic A.

On Guadeloupe, Huecan Saladoid ceramics have been discovered on the coasts of Grande-Terre, located close to reefs and shallow water areas. These include Morel (Arts 1999; Clerc 1964, 1968, 1970; Hamburg 2000[a]; Hofman *et al.* 1999[b], 2000); (fig. 4.2), Anse Patate and Anse Ste. Marguerite (Hofman *et al.* 1999[b]). Quite recently, however, the inland site of Place du Christ/Cathédrale was discovered in Basse-Terre (Romon and Gabriel 2001; Romon *et al.* 2002). The Folle Anse and Talisseronde sites on Marie-Galante also provided Huecan Saladoid material (Arts 1999; Barbotin 1991; Hofman *et al.* 1999[b]). Curvilinear incision, whether or not filled in by zoned-punctation or zoned incised crosshatching or zic, as well as incised nubbins and small zoomorphic *adornos* characteristically decorate Huecan Saladoid ceramics. Rounded griddles are predominant. White-on-red painting, one of the diagnostic traits of Cedrosan Saladoid pottery, is absent (Chanlatte Baik 1981, 1983; Rouse 1992; Hofman 1993:29-31, 1999). Apart from ceramics, Huecan Saladoid sites usually yield shell, coral or stone three-pointers and worked ornaments and stone or shell tools. At the Morel site, burials of humans and dogs have been found as well (Hamburg 2000[a]; Hofman *et al.* 2000).

Untill halfway through the 1990s, Huecan Saladoid ceramics were seen as belonging to people who migrated from the South-American mainland towards the Lesser Antilles around 400 BC. Recently, some scholars started to question if Huecan Saladoid should still be considered to represent a separate subseries, resulting from such separate and earlier Saladoid migration or whether it reflects a variant of early Cedrosan Saladoid (Oliver 1999). Based on geographic distribution and stratigraphic contexts, they argued that Huecan Saladoid represents a special, for example ceremonial, component of the Cedrosan Saladoid series (e.g. Hofman and Jacobs 2000/2001). According to Reed and Petersen (1999:257-258), Huecan Saladoid and Cedrosan Saladoid ceramics of the Trants site on Montserrat differ only in the details of decoration and vessel form and significant overlaps occur. They conclude that one single cultural group manufactured the Trants ceramics. However, for some other sites, technologically the ceramics are seen as two well-defined wares, as has been reported for Morel (Hofman and Jacobs 2000/2001).

Early Ceramic A settlement patterns are dispersed and typically consist of large, permanent and independent habitation sites, with rather large site territories, that were continuously occupied for centuries, resulting in thick accumulations of archaeological material. Trants on Montserrat, for example, represents a ring-shaped village consisting of large houses, occupied by extended families, around an 'empty' area that has been interpreted as a central *plaza*. It was occupied by 200 to 300 people for 800 years (Watters 1994). Huecan Saladoid ceramics and beads and pendants of non-local semi-precious stone are characteristic for Early Ceramic A site assemblages. The latter demonstrate the existence of long-distance contact networks and, if manufacture and possession of these lithic valuables was restricted as Cody (1991:210) suggested, indicating a certain level of group organisation with a certain, at least temporary, centralisation of power. Although organisation is further described as egalitarian, the procurement of wood and subsequent construction of large residential structures and canoes require co-operative efforts as well and reinforce this idea (Keegan 2000:144). No evidence for personal status differentiation was encountered, differences in grave goods are suggested to be related to differences in gender, age or

Fig. 4.2. Huecan Saladoid pottery from the Morel site on Grande Terre, Guadeloupe (drawings by Erick van Driel, courtesy of Corinne Hofman).

achieved social positions (Hofman and Hoogland 2004).

Subsistence was focused on a mixed economy of root crop horticulture, hunting of land animals, fishing, and mollusc collecting (Keegan 2000:142). Birds, fruits, and wild tubers and seeds probably supplemented this diet. Stable-isotope analyses indicated that the diet was focused on terrestrial sources of protein, such as hutia, iguana, land crabs and freshwater fish (Stokes 1995).

Although Early Ceramic A technology has been described as "simple and available to everyone" (Keegan 2000:143), Huecan Saladoid ceramics are renowned for their high level of craftsmanship and technology and the elaborate decorations. The manufacture of amulets and beads of exotic lithics was very sophisticated as well, notably of stone pendants representing large predator birds (Watters 1997). The depiction of these animals endemic to the South American mainland indicates strong ties between the islands and the mainland. Evidence for the manufacture of artefacts from wood, stone, bone, and shell, and for weaving has been found as well (Righter 1997). This latter technology was probably largely related to household production, although Keegan (2000:143) pointed out that it is likely that the skills of some individuals were renowned.

Evidence for ritual is limited, although it is reckoned that central *plazas* in villages may have been used for community rituals. The small size and wide distribution of ritual objects, for example of three-pointed *zemis*, suggests that ceremonial activities were of an individual character instead of collective (Keegan 2000:144-145). Pottery used for narcotics and incense, usually applied for non-profane purposes, were found as well.

A large style-zone can be established on the basis of the rather uniform style of the pottery, running all the way north to Puerto Rico (Hofman and Hoogland 2004). Keegan (2000:154) suggested on the basis of the swift and large-scale distribution over the Antilles that a number of distinct local groups were involved. Local groups are relatively small and egalitarian societies, living in semi-independent villages, connected to each other by socio-political alliances and economic and ceremonial contacts, with small personal status differentiation and occasional and context dependent leadership (Earle 1987 cited in Hofman and Hoogland 2004).[2] The strong stylistic similarities that existed for such a long time between Early Ceramic A complexes all over the Antilles are suggestive of a common ancestry and of intensive and frequent interaction between local groups, both with each other and with the mainland. It is possible that the uniformity of style helped to support alliances all over the Antillean islands, as Keegan (2000:139) for example suggested, but it might also be true that regional uniformity was maintained by the existence of these alliances. It is generally accepted that this uniformity points to the existence of long-distance contact networks. It has been suggested that the high percentage and uniformity of decorations in Saladoid pottery complexes might have served purposes of ceremonial communication or stressing group identity and ethnic affiliation (Hofman 1993:207). Keegan (2000:139) even speaks of a "sort of pottery *lingua franca* [that] would have acted to reinforce social ties between islands and over long distances" (Keegan 2000:139). The maintenance of social ties may have been an important factor in the successful and relatively fast colonisation of the Antilles by small local groups that took place in the Early Ceramic Age. Anyway, the homogeneity in style is to be explained as the direct outcome of close interaction between local groups inhabiting the different islands during this period.

Although the pottery from this period represents a highly uniform ceramic tradition all over the Antilles, regional variation and local styles can still be identified in the finish of the ceramics (Hofman and Hoogland 2004). Within the larger framework of a homogeneous Saladoid tradition, more personal styles of individual potters resulted in a distinctiveness of vessels, while a general uniformity in vessel shapes and designs was maintained (Keegan 2000:143). These differences could well be related to varying expressions of group identity or different settlement functions (Hofman 1993:205).

4.2.3.3 Cedrosan Saladoid subseries

Cedrosan Saladoid pottery has been named after the Cedros site on Trinidad.[3] It has been found from Trinidad to the Virgin Islands, on Puerto Rico and the eastern part of Hispaniola (Hofman 1993; Rouse 1989, 1992). Dates in the Antilles range between AD 400-600/850, which is generally considered Early Ceramic B. Cedrosan Saladoid pottery is typically decorated by white-on-red and polychrome painting and zic. Characteristic vessels are bell-shaped bowls with plain or flanged rims, often with D-shaped handles. Most of the pottery is painted (Rouse 1992:80). Some authors (e.g. Keegan 2000:139) suggested that the highly uniform Cedrosan Saladoid pottery acted to support social alliances all over the Antilles. Cedrosan artefacts also include clay griddles and large hollow figurines, and worked shell, bone and stone tools and ornaments.

Cedrosan Saladoid may be divided in three phases, including Early Cedrosan Saladoid, largely coinciding with Rouse's Period IIa, Cedrosan Saladoid with Barrancoid influences and Late Cedrosan Saladoid, which may be equated with Rouse's Period IIb (Hofman 1993; Petersen *et al.* 2004; Rouse 1992). Mattioni and Bullen (1970) distinguished an Insular, Modified and Terminal Saladoid instead.

Characteristic for Early Cedrosan Saladoid, roughly dated between 400 BC-AD 300/400, is the combination of plain pottery, painted white-on-red and, less common, zic ware. Zic decoration only occurs on hemispherical bowls. Other decorations include curvilinear and linear incisions, modelled animal or human heads on tabular lugs and nubbins. Vessels are bell-shaped, boat-shaped or kidney-shaped, often with D-shaped handles, while bottles and jars and hemispherical bowls also occur (Petersen *et al.* 2004; Rouse 1952, 1986:141, 1992:81; Rouse and Alegría 1990). Early Cedrosan Saladoid pottery is ubiquitous on the Lesser Antilles and Puerto Rico. On Guadeloupe it has been found at the Morel site (Clerc 1964).

In the period AD 300-500, the Cedrosan Saladoid on the Windward Islands undergoes influences from the Barrancoid series, which developed on the lower part of the Orinoco from 1500 BC onwards (Hofman 1993:33). McKusick (1960) has labelled this phase Troumassée A and Boomert (2000) suggested that pottery with Barrancoid influences should be grouped into the Palo Secan subseries, which was first identified at the Palo Seco site on Trinidad. Cedrosan Saladoid with Barrancoid influences is generally heavier, thicker and softer and it is decorated by zoned painting, curvilinear incisions and various hollow-backed modelled-incised anthropomorphic and zoomorphic *adornos* (Rouse 1989). Rouse (1992:85) attributes this influence to Barrancoid trade, spreading designs to the Windward Islands from Trinidad and Tobago, which may have served as trade ports, although interaction may have taken place at the mouth of the Orinoco as well (Rouse 1989:387). Hofman (1993:33), however, remarks that other mechanisms, such as reciprocal exchange and marriage ties, may account for this dispersal. It is remarkable that this type of pottery is not commonly found north of Guadeloupe and it appears to be absent on the Greater Antilles (Petersen *et al.* 2004). Cedrosan Saladoid with Barrancoid influences has been found on Barbados (Drewett 1991), the Grenadines, Grenada, St. Vincent, Dominica and at the Morel site on Guadeloupe (Rouse 1992). It has been reported for St. Lucia (McKusick 1960), Martinique (Allaire 1977) and for the site of Les Sables on La Désirade (Bodu 1985[b]) as well.

Late Cedrosan Saladoid, which is approximately placed around AD 300/400-600/800, is characterised on the Greater Antilles by an overall decline in pottery technology and complexity of decoration. This is evidenced by changes from white-on-red painting in elaborated curvilinear designs to straight parallel lines and to completely red slipped surfaces (Hofman 1993:34). On the Leeward Islands, Late Cedrosan Saladoid pottery occurs around AD 400-600/850. For the Anse des Pères site on St. Martin radiocarbon dates extend even to cal. AD 959 (Hamburg 1999:83) and for Golden Rock on St. Eustatius similarly late dates have been suggested (Versteeg and Schinkel 1992). The pottery displays an increase in complexity of white-on-red painting and polychrome painting (Hofman 1993:32-34) and new forms such as flanged rim bowls and incense burners appeared (Rouse 1992). Late Cedrosan Saladoid has been found on Antigua (Murphy 1999), St. Kitts (Goodwin 1979), St. Eustatius (Versteeg and Schinkel 1992), Saba (Hofman 1993), St. Martin (Hamburg 1999; Hofman 1999) and Anguilla (Crock 2000). Late Cedrosan Saladoid sites reported for Guadeloupe include the coastal sites of Morel (Clerc 1964, 1968, 1970), Anse à la Gourde (Hofman *et al.* 2001[a]); (fig. 4.3), Pointe des Pies (Richard 1995), l'Embouchure de la Rivière de Baillif (Gassies 1996[d]) and Anse Ste. Marguerite (Rousseau *et al.* 1995). Other coastal sites with Cedrosan Saladoid assemblages have been found at Grand-Bourg (D'Anna 1999), Anse à l'Eau (Boomsma and Isendoorn 2001), Cocoyer St. Charles (Boomsma and Isendoorn 2001), Folle Anse (Chenorkian *et al.* 1998), Morne Rita (Slozinski and Slozinski 1983), Pavillon and Taliseronde (DRAC archives) on Marie-Galante and Anse Petite Rivière (De Waal 1996[b]) on La Désirade.

Similarly to the preceding phase, the Early Ceramic B is characterised by a mixed economy based on cultivating root crops, catching molluscs and terrestrial and marine fauna, and collecting fruits, wild tubers and seeds. Stable-isotope analysis indicates that marine sources of protein became more important, when compared to the Early Ceramic A when diet was typically focused on terrestrial sources of protein (Stokes 1995). This may be the result of increasing scarcity of terrestrial fauna (Keegan 2000:142). If no habitation preceded the Early Ceramic B occupation of the research area, it may be expected that the inhabitants arrived in a pristine area that possibly had not been exploited before. If pre-ceramic occupation had taken place, the environment had already been given some time to regenerate. Steadman (1995) reported that pre-ceramic groups inhabiting other islands had a significant impact on the local ecology.

4.2.4 Late Ceramic Age on the Lesser Antilles

4.2.4.1 Post-Saladoid series

Around AD 600/850 the Cedrosan Saladoid subseries comes to an end and divergent local developments start to take place on the Antilles. This period may be generally referred to as the Late Ceramic Age, which includes Rouse's Periods III and IV. The Late Ceramic Age can be divided in an early phase around AD 600/850-1200/1300, and a late phase that is generally placed at approximately AD 1200/1300-1493. The early phase equates to Rouse's Periods IIIa (AD 600-900)

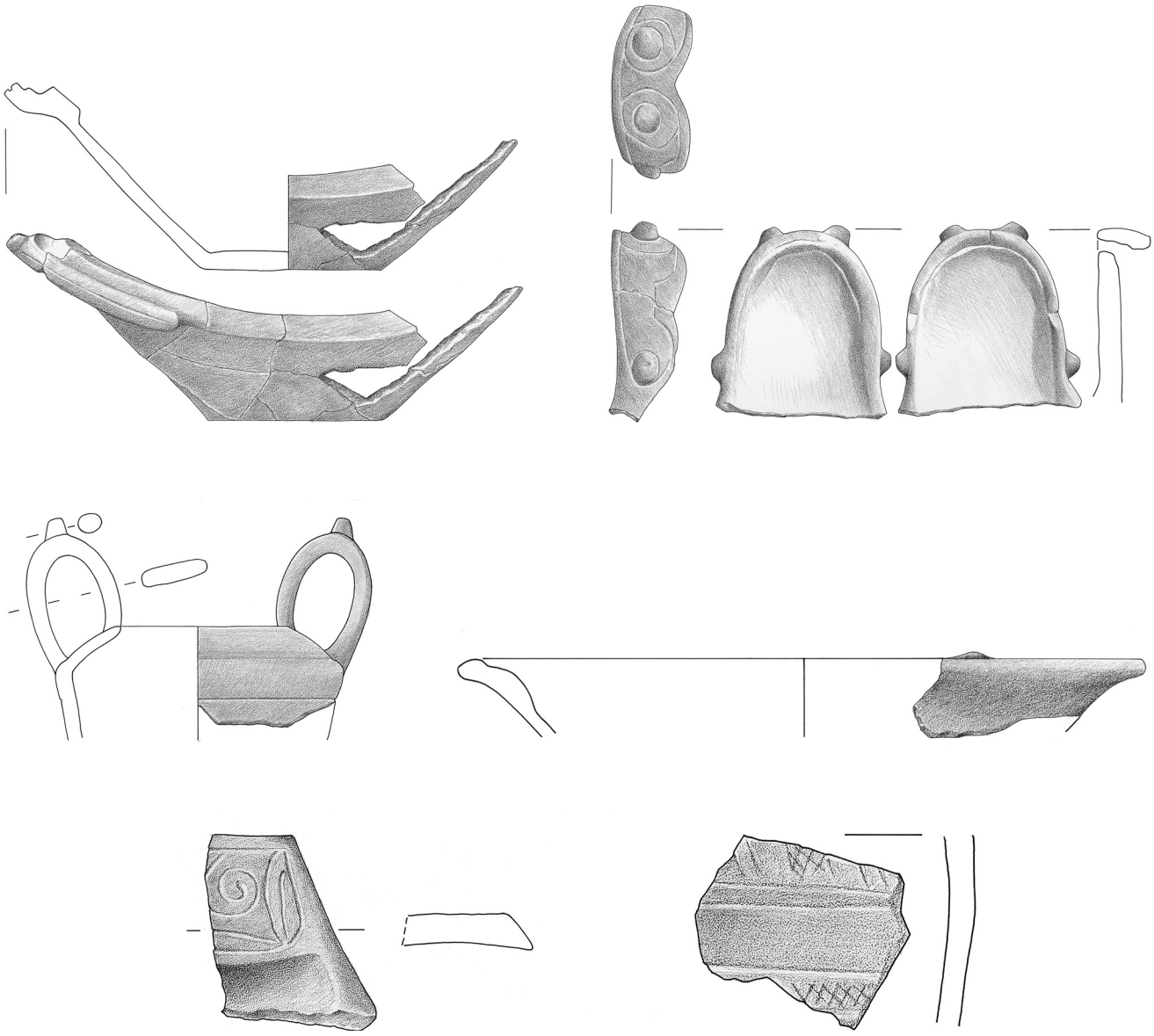


Fig. 4.3. Cedrosan Saladoid pottery from the Anse à la Gourde site on Grande Terre, Guadeloupe (drawings by Erick van Driel, courtesy of Corinne Hofman).

and IIIb (AD 900-1200). Contact networks had apparently changed through time and had become more localised, which is evidenced by the development of different micro-regions and micro-style areas (Hofman and Hoogland 2004). Rouse (1992:71) suggests that at this time the Cedrosan Saladoid subseries had possibly spread too widely which hindered interaction and encouraged the rise of different local variations. The Late Ceramic Age on the Greater Antilles is dominated by the Ostionoid series. This series is divided in space and time into four subseries, namely Ostionan, Elenan, Meillacan and Chican Ostionoid. Post-Saladoid series on the Lesser Antilles are described below.

4.2.4.2 Late Ceramic developments on the Leeward Islands

Late Ceramic developments on the Leeward Islands have long been attributed to Elenoid or Elenan Ostionoid subseries. The Elenan Ostionoid subseries (AD 600-1200) is named after the Santa Elena site on Puerto Rico. It developed in the Vieques Sound area on eastern Puerto Rico and the Virgin Islands. Its Montserrate style (AD 600-900) is characterised by painted polychrome zones in negative geometric designs. The Santa Elena style (AD 900-1200) consists of painted plates and griddles and thick, coarse pottery decorated by zoomorphic and anthropomorphic modelling and parallel-incised lines (Rouse 1952:344-346). Elenan Ostionoid influences extended from central Puerto Rico through the Virgin and Leeward Islands to Guadeloupe (Rouse 1986, 1992). Hofman (1993) demonstrated the existence of strong Chican Ostionoid influences on Leeward Island complexes from AD 1300 onwards. The Chican Ostionoid subseries (AD 1000-1500) is named after the Boca Chica site on the Dominican Republic. Its three main styles include elaborate, carefully finished and highly polished Boca Chica pottery, the simpler Capá pottery and Esperanza pottery. Boca Chica pottery has unique vessel necks and it is complexly decorated with modelled-incised designs including zoomorphic and anthropomorphic heads and linear incisions combined with dots. Capá decoration includes lugs, knobbed ridges and modelled and incised designs. Esperanza pottery is decorated with incised parallel lines forming angles and semi-circles ending in dots or arches. Modelling is less common and consists of simple heads and geometric figures (Hofman 1993:40-41). Chican Ostionoid pottery has been found on the Dominican Republic, Hispaniola, Puerto Rico, the Virgin Islands, Haiti and eastern Cuba (Hofman 1993:40) and Chican influences reach all the way south to Antigua (Rouse 1992:72, 135).

Rouse *et al.* (1995) proposed to include the Leeward Island complexes within an enlarged Troumassoid series divided into a Mamoran subseries in the Leeward Islands and Troumassan and Suazan subseries in the Windward Islands. It should be noted that archaeologically Guadeloupe appears to take an intermediary position between the Windward Islands and the Leeward Islands (Rouse 1992:71).

Mamoran Troumassoid, approximately dated between AD 500/600-1500 and named after the Mamora Bay site on Antigua, is abundant all over the Leeward Islands as far south as Guadeloupe (Rouse 1992). The subseries comprises the Mill Reef, Mamora Bay and Freeman Bay styles. The Mill Reef style, between AD 500/600-800/1000, consists of pottery with straight parallel painted white-on-red designs, two parallel incised lines on the inside of inward thickened rims, with vestigial handles and the first appearance of scratched surfaces (Rouse 1992). Although legged griddles were found in the Mill Reef complex on Antigua, these were not encountered further north (Hofman 1993).

The Mamora Bay style, occurring between AD 800-1200, is characterised by pottery with red slipped surfaces replacing bicolour and polychrome painting, broad lined curvilinear or parallel linear designs on the outside wall of shallow vessels, scratched surfaces, folded or thickened rims, and rare lugs and no handles (Rouse 1992). The pottery is less well finished and less frequently decorated (Hofman 1993). Troumassoid influences have been reported up to Saba (Hofman 1993) and Baie aux Prunes on St. Martin (Bonnissent 2003).

The Freeman's Bay style, between AD 1200-1500, consists of pottery with deeper and narrower, more irregular and U-shaped lines, scratched surfaces and dimpled bases (Rouse *et al.* 1995).

4.2.4.3 Late Ceramic developments on the Windward Islands

On the Windward Islands, the Troumassoid series makes its first appearance around AD 500/600. Some scholars consider this to be a local development from the former Cedrosan Saladoid subseries, based on similarities in red, black and white painted decorations and wedge-shaped lugs (Rouse 1986:149, 1992). Troumassoid pottery is thick, coarse and soft. It has inward thickened rims, legged, pedestal or annular bases, legged griddles and triangular griddle rims, scratched surfaces, polychrome painting with white, red and black or red and black combined with curvilinear incisions and modelled-incised designs on lugs. Troumassoid vessel shapes comprise boat-shaped, kidney-shaped, bottomless, double, hemispherical, inverted bell shaped bowls, cylindrical pot-stands, jars and effigy-bowls (Hofman 1993:39). Clay spindle whorls make their first appearance, explained by an increasing production of cotton (Allaire 1991; Rouse 1992:129). The Troumassoid series, approximately dated between AD 500/600-1000, is named after the Troumassée site on St. Lucia. The first to define the series was McKusick (1960). Rouse (1992) identified McKusick's Troumassée B phase, with a median date of AD 730, as the Troumassoid series on the Windward Islands. McKusick's dates were based on samples from the Grande Anse, Troumassée and Giraudy sites on St. Lucia (Rouse and Allaire 1978:462). Bullen and Bullen (1972) identified similar ceramics on the Caliviny site on Grenada and they therefore called this phase 'Calivinoid'. Troumassoid pottery has a wide distribution all over the southern Lesser Antilles up to Guadeloupe. Bullen and Bullen (1966) identified 'Caliviny' traits as far north as St. Martin, in the Cupecoy Bay complex (Haviser 1987[b]),

and St. Croix (Bullen and Bullen 1974).

The Suazan Troumassoid subseries, formerly known as the Suazoid series, can be roughly placed between AD 1000-1500. It is named after the Savanne Suazey site on Grenada (Bullen 1964). The early part of the Suazan Troumassoid subseries (AD 1000-1200) is characterised by thick, coarse and soft pottery, predominantly consisting of simple unrestricted or restricted bowls and necked jars, often with red slipped surfaces. Decoration is rare, although broad, shallow incisions on red slip do occur as well as, albeit less frequently modelled-incised zoomorphic *adornos*. Scratched surfaces, inward thickened rims, legged, pedestal or annular bases and legged griddles and triangular griddle rims are typical (Petersen *et al.* 2004).

Late Suazan Troumassoid on St. Lucia had previously been named Micoid by McKusick (1960), who distinguished two styles, Choc and Fannis. Information on Suazan Troumassoid is limited, although debates considering its origins do take place. According to Bullen and Bullen (1976:7-8) and McKusick (1960), a Suazoid series resulted from a population movement from South-America, marking an abrupt break with the preceding Saladoid series (Bullen 1970). Several other investigators (Allaire 1977, 1984; Davis and Goodwin 1990; Haag 1965:244; Rouse 1986:151, 1992:131) are convinced that Suazan Troumassoid developed as a Suazoid series locally from its Saladoid predecessor. Their ideas are based on similarities in iconography. According to Rouse (1992:130-131) it can be considered as the climax of a continuous period of local development. Great similarities with Troumassoid pottery led Boomert (1987[b]:24-26) to conclude that so-called Suazoid ceramics are a development within the Troumassoid series.

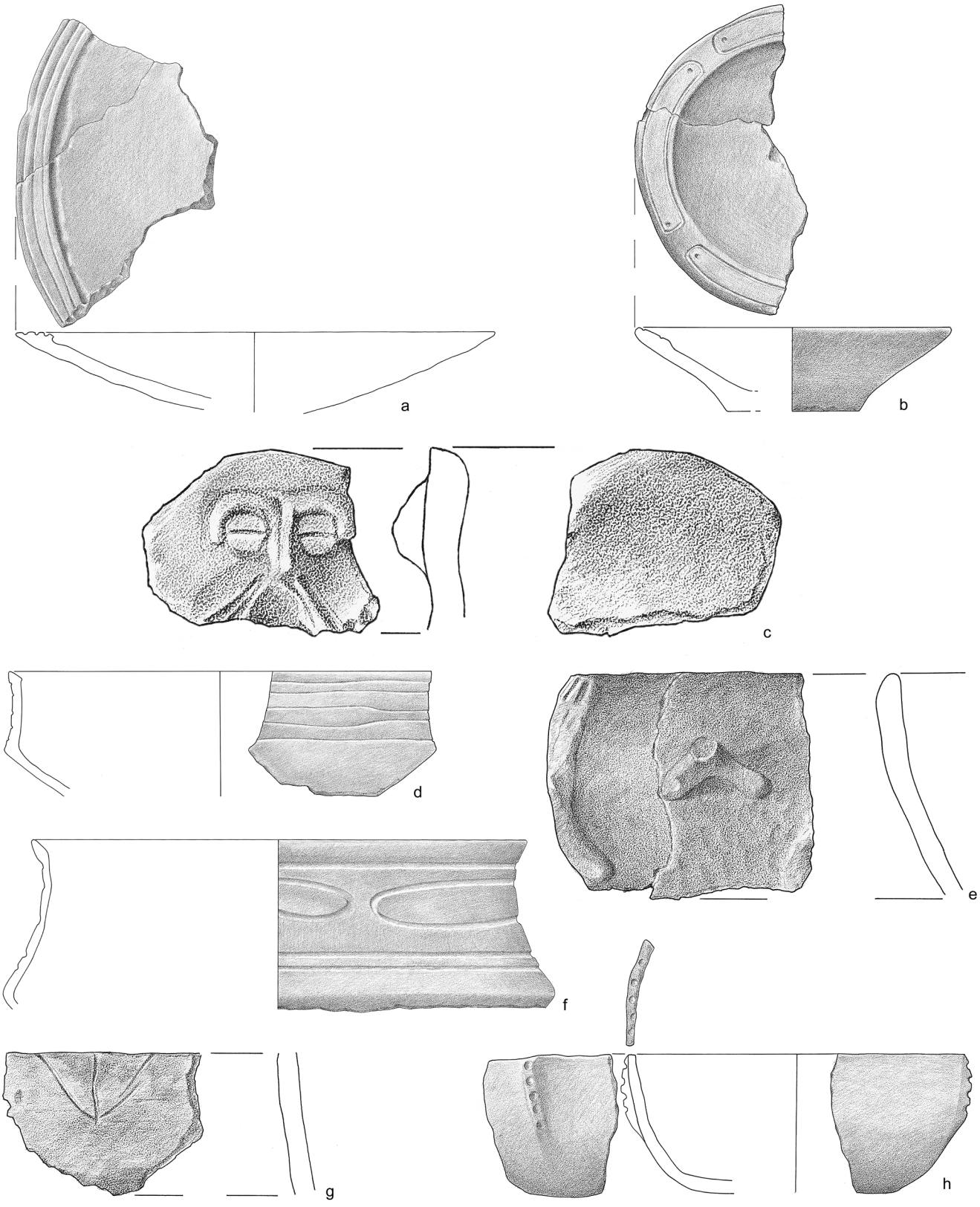
Suazan Troumassoid pottery is among the least finished and crudest pottery of the Antilles (Hofman 1993:42). It is characterised by scratched surfaces or finger-indented rims, linear or areal painting, simple parallel incisions, circles, scrolls, anthropomorphic *adornos* and figurines, clay pestles and legged vessels and griddles (Allaire 1977; Hofman 1993; McKusick 1960). There are local forms of lugs, including pegs and heads with flat faces, *appliqué* noses and eyebrows, punctated or slashed mouths, nostrils and eyes and pierced ears. Other types of ceramic artefacts include pot-stands, spindle whorls, stamps, figurines and pierced cylinders known as loom weights (Allaire 1977).

Late Suazan Troumassoid ceramics are most abundant from Tobago to Guadeloupe. Several coastal sites with Troumassan or Suazan Troumassoid assemblages have been reported for Guadeloupe, such as the sites of Anse à l'Eau (Boomsma and Isendoorn 2001), Pointe de la Couronne Conchou, Morel IV and Gros Cap (Allaire 1992; Bullen and Bullen 1973), Pointe Helleux and Pointe Canot (Hofman *et al.* 2004) and Anse à la Gourde (Hofman *et al.* 2001[a]); (fig. 4.4). In addition, the sites of Folle Anse (Allaire 1992) and Cocoyer St. Charles (Boomsma and Isendoorn 2001) on Marie-Galante, Grande Anse on Terre de Bas (Les Saintes) and Morne Cybèle-2 (Hofman 1995) and Anse Petite Rivière (De Waal 1996[b]) at La Désirade display similar archaeological materials as well.

The latest part of the pre-Columbian period is characterised by ceramic complexes that show similarities to Guyana-styles. The Cayo complex, roughly dated between AD 1250-1500, developed in the southern Windward Islands of Tobago, St. Vincent (Kirby 1974), the Grenadines and Dominica (Allaire and Duval 1995; Boomert 1986). Recently, Richard (2002; 2003) reported Cayo style pottery from the Plage de Roseau site (Capesterre Belle-Eau, Guadeloupe), but the ceramics await further analysis. The Cayo complex is named after the Cayo River on the northeast coast of St. Vincent. Cayo pottery is characterised by incisions on a flat rim, cone shaped collar and body, perforated small *adornos*, multi-convex vessels with anthropomorphic faces and caraipe temper (Hofman 1993:42).[4] According to Allaire and Duval (1995:255), Cayo should be considered to be independent from Troumassan or Suazan associations. Boomert (1986:56; 1995; 2004), associating Cayo with the Island Carib population, representing an offshoot of the Koriabo complex of coastal Guyana brought to the islands through migration, war and intermarriage, is convinced that it gradually replaced Suazoid series on the Windward Islands.

The Morne Cybèle complex was identified at the site of Morne Cybèle-1 at La Désirade. This site had been discovered and excavated in 1984 on the island of La Désirade by Pierre Bodu (1985[a]). It was restudied (Hofman *et al.* 2004) and dated to cal. AD 1440-1460. Morne Cybèle pottery is very different from Cayo pottery, although some stylistic similarities should not be overlooked (Hofman 1993:42). The pottery implies a later and local Antillean development (Hofman 1995:7-10), although influences from the South American mainland have been suggested as well (Hofman *et al.* 2004). It is decorated in most cases by geometric, anthropomorphic and zoomorphic *adornos* embellished by punctation. Morne Cybèle-like ceramics

Fig. 4.4. Post-Saladoid pottery from the Anse à la Gourde site on Grande Terre, Guadeloupe (Hofman *et al*. 2004: fig. 7).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have also been excavated at Anse à la Gourde on Pointe des Châteaux (Hofman 2001).

During this latest pre-Columbian period, ritual objects in Chican Ostionoid/Classic Taíno style occur as far as the Windward Islands. They probably date between AD 1200-1450. Included are large three-pointers, snuff tubes, *duhos*, and human face masks or *guaízas* (Allaire 1990). According to Allaire (1990), most of these objects are locally made imitations. Such objects have been reported from Guadeloupe as well. At the site of Anse à la Gourde, large three-pointers have been found and shell *guaízas* have been discovered at the sites of Anse du Coq on Marie-Galante (Hoogland and Hofman 1999) and Morne Cybèle-1 on La Désirade (Hofman 1995). Although these might represent human faces, deities or dead ancestors may have been depicted as well (García Arévalo 1997:114). As decorated headbands embellish most shell masks found in the Antilles, it might be suggested that they represent high-status individuals at least. Richard (2002:53; 2003) has reported a worked manatee-bone for the Plage de Roseau site (Capesterre Belle-Eau, Guadeloupe). He tentatively interpreted this frog-shaped small bowl as a Taíno ritual object.

As mentioned in section 1.4.7, the use of the term Taíno does not appear to be very suitable for ethnic or cultural labelling as a result of cultural confusion and biases in interpretation that are inflicted by ethnohistoric reports. Petersen *et al.* (2004) stress, however, that "Taíno is sometimes used as an archaeological category that refers to a supra-cultural entity at a level well above an individual culture. From this perspective, therefore, Taíno is beyond a single culture and it includes several distinctive but related socio-cultural polities and even traditions". If possible, it is more preferable to identify smaller cultural units or traditions by assigning artefacts to more strictly defined styles.

4.3 COLONIAL OCCUPATION OF GUADELOUPE

The colonial history of the research area has been influenced by the fact that this area was not considered of any economic importance. It was only in the seventeenth and eighteenth centuries that the small annexes of Guadeloupe were reported as just 'arid rocks'.[5] Still, sugar industry, plantations of indigo and cotton and slavery have largely dominated the colonial history of Grande-Terre and of Pointe des Châteaux. The greatest part of Pointe des Châteaux was used for the cultivation of cotton. The Amerindian population was rapidly decimated within the first twenty years of colonisation and many Amerindians left Basse-Terre for Grande-Terre, les Saintes, Marie-Galante and Dominica in particular (Lasserre 1961:270). According to Abenon (1992:59), in 1664 only 15 Caribs were counted among the 11,437 inhabitants of Guadeloupe.[6] Carib territories, registered on a 1732 map of Grande-Terre (Lafleur 1992:234), were created in the Le Moule area, near Anse des Corps, in the Anse Bertrand area, near La Pointe de la Grande-Vigie, and at Pointe des Châteaux in an area that is called Fond Caraïbe today.[7] A small Carib habitation was located south of Anse à la Gourde.[8] In the *Fond Caraïbe* area, the native inhabitants of Guadeloupe lived until the end of the nineteenth century or the beginning of the twentieth century, when the last of them dissolved into the rest of the islands population (Lafleur 1992:234). The Carib territory that was founded on Dominica at the same time still exists.

As for La Désirade some authors (e.g. Lasserre 1961:884) claim that Christopher Columbus discovered the island on his second journey in November 1493 and named the island 'Désirada', 'the desired one'. In the journals of Columbus, however, the discovery of La Désirade is never mentioned (Jane 1930), and among historians the name giving of La Désirade remains disputed (Yacou 1993:78).[9] It is only in the seventeenth century historic account by Father Breton that Petite Terre and La Désirade occur in the description of the islands surrounding Guadeloupe.[10] Other references, although very basic, can be found in the French-Carib and Carib-French dictionaries of Father Breton (1892[1665], 1900[1666]). In these dictionaries, the islands of Les Saintes (*Caároucaéra*) and Marie-Galante (*Aïchi*) are described for the economic importance to the Amerindian inhabitants of Guadeloupe (*Caloucaéra*); (Breton 1892:211, 280, 409-410; 1900:116, 352). Petite Terre (*Cayóhori*) and La Désirade (*Oualíri*) are only mentioned once.[11] The attention of the European newcomers was mainly focused on the island of Guadeloupe (Jane 1930:319). Therefore, the *Les Archives Nationales de La Guadeloupe* (Basse-Terre) do not contain a lot of documentation on Amerindian and colonial occupation of more marginal areas such as Pointe des Châteaux, La Désirade and Petite Terre.

Colonial documentation does not take place prior to 1648, when La Désirade was annexed by the *Compagnie des Isles de l'Amérique* and subjected to the government of Guadeloupe. At that moment, no Amerindian or European inhabitants were reported for La Désirade.[12] In 1649, La Guadeloupe, La Désirade, Marie-Galante and Les Saintes became property of M. Boisseret, brother-in-law of governor Houël. The islands were bought by the *Compagnie Française des Indes Occidentales* in 1664, and in 1674 they were united in the royal territories. From this moment on,

La Désirade played only a modest role as a Guadeloupe annex. The only importance of the island in colonial times was its use as exile for lepers between 1728 and 1958, and for *mauvais sujets* of France between 1763 and 1767 (Lasserre 1961:891-894). According to Abenon (1992:62), however, the latter was an enormous failure and only a very limited number of people was actually sent to La Désirade, the island being too small.[13] The important restriction factor in colonial occupation was set in the difficulties incurred for agriculture and the unsuitability for sugar plantations because of the poor soils. The soils, however, suit the demands for cotton cultivation and cotton plantations have been in use from the end of the sixteenth century until very recently. The production of cotton has never been a success, however. The 1790 census mentioned 47 *cotonneries* and the absence of sugar and indigo plantations were reported to be evident (Lasserre 1961:note 266). At the start of the fieldwork, only one rather recent *cotonnerie* was registered as an archaeological site in the DRAC inventory.

The islands of Petite Terre are uninhabited nowadays, but in the eighteenth century they were used intensively for growing cotton (Lassere 1961[b]:916). From 1826 onwards, the islands were property of the Thionville family from La Désirade. In 1858, 28 persons lived on the islands (Conservatoire du Littoral 1997:13) and by the 1940s seven families. Despite the apparent lack of fresh water, the Petite Terre gardens produced sufficient cotton, peas, pumpkins, melons, manioc, sweet potatoes, ignames and maize to sell part of these products on La Désirade. In addition, the Petite Terre inhabitants preserved their fish with salt from the local salinas, they kept sheep, goats and pigs and they caught lots of turtles that came to land to lay their eggs. Sufficient amounts of fresh water were collected in the cistern near the lighthouse. The last inhabitants of the islands were the lighthouse-keeper and his wife. They left the islands in 1972 or 1974, as soon as the lighthouse was equipped with an automatic light (Barré *et al.* 1997:8; Conservatoire du Littoral 1997:13; DIREN 1994:8).

4.4 RECENT SETTING

Pointe des Châteaux is part of the community of St. François. Tourists frequently visit its beaches and in the weekends of Easter and other short holidays, inhabitants of other areas in Guadeloupe tend to camp on the Pointe des Châteaux beaches. They cause considerable distortions to the archaeological deposits in the dunes. More serious threats to the archaeological record, in the Anse à la Gourde area in particular, are caused by illegal habitation of the area and by illegal excavation. Two other habitation areas are located in the Kahouanne area, and in the Village des Pêcheurs at the southern coast.

Pointe des Châteaux is hardly cultivated at all. The only part where substantial water melon cultivation takes place is west of Anse à la Gourde, in the valley south of the Fond Caraïbe area. Most inhabitants of the Village des Pêcheurs work in other parts of Grande-Terre, as do the house owners at Anse à la Gourde. The latter also live in other parts of Guadeloupe. They only come over for weekends and holidays. The Kahouanne residence has hardly any inhabitants at the moment, as a result of rising criminality in the area.

Today, La Désirade's 1600 inhabitants live in six small villages situated in the southern part of the island, along the *Route Départementale* 207. These are from west to east, Les Galets, Les Sables, the capital Le Bourg or Grande Anse, Le Désert, Le Souffleur and Baie Mahault. Except for one person, the central plateau is uninhabited, as are the western hills and the eastern plateaus. Many *Désiradiens* work on Guadeloupe. Tourism does not play an important role in the local economy, since the island is one of the least developed and the least visited of the Guadeloupe archipelago. On La Désirade, fishing, small-scale horticulture and breeding are important sources for household use. On the sandy soils of the west end, the southern coastal plain and on the more clayey soils at the hills and the plateau, millet, maize, beans, manioc, cucumbers, and sweet potatoes are cultivated. Hardly any cultivation takes place on the eastern plateaus.[14] The soil is fertilised with seaweed, manure or ashes (Bouchet 1992:14). Although several parts of La Désirade, the central plateau in particular, assure good yields, the general opinion is that the local soils are too poor to be cultivated at all. Crops are mainly imported from Guadeloupe.

The environmental conditions of the islands of Petite Terre are importantly and negatively affected as a result of booming tourism. Apart from families from St. François and La Désirade, coming over for the weekend in order to fish, an estimated number of 12,000 tourists a year were brought to the islands by commercial boat companies (Lancelot 1995; cited in Barré *et al.* 1997:9). The commercial boat companies are tolerated as long as they keep an eye on the islands. Since the islands were declared to be a nature reserve in 1994 only little has changed. It is now officially forbidden to camp on the islands, to light fires and to leave garbage behind, but as efficient supervision appears to be too complicated, people still do.

4.5 CONCLUSIONS AND EXPECTATIONS FOR THE EAST-GUADELOUPE PROJECT

It is thought that the pre-Columbian chronological framework presented helps to increase the accessibility of the presentation of pottery assemblages and chronological assignments of sites in this study. In addition, on the basis of the aforementioned some expectations can be raised on the pre-Columbian archaeology of the research area. As for the pre-ceramic period, Ortoiroid sites could be expected, considering the situation on surrounding islands, such as Antigua. The Ortoiroid have been reported to be oriented towards the sea, both in their exploitation of marine resources and their choice of site locations (Rouse 1992:66). Inland Ortoiroid sites on Martinique have been interpreted in this respect as special activity areas of not yet discovered coastal sites (Rouse 1992:63). Ortoiroid sites to be expected within the study area are probably small, transient coastal campsites, where edge grinders, partially ground stone and shell celts can be found and where flaked flint will be rare or even absent. Subsistence remains will reflect a marine orientation. Dates of such sites could range approximately between 2000-400 BC. Unfortunately, such sites are difficult to recognise archaeologically on the basis of surface material. This is partly a result of their limited dimensions and the absence of pottery, which usually increases the visibility of the site at the surface. Partly this may simply be the result of the fact that the sites are located in coastal areas that will have undergone important changes during the last 4000 years. For later sites, this period is simply much shorter. It is thought that this accounts for the modest number of pre-ceramic sites that is presently known on Guadeloupe. However, this can also be a reflection of the absence of flint resources that probably made the island of Antigua so attractive to pre-ceramic exploitation and occupation. If present at all, pre-ceramic sites in the research area will not be numerous.

This is also true for sites with Huecan Saladoid components. Except for the Morel site, only two other sites with incidental finds of Huecan Saladoid material are known on Guadeloupe and only one on Marie-Galante. Region wide they are rather rare as well. Many Huecan Saladoid sites, which can be roughly dated between 400 BC-AD 400, are coastal sites, although sites located some distance inland, such as the Hope Estate site on St. Martin, do occur as well.

Sites with Cedrosan Saladoid components, with rough dates between 200 BC-AD 600/850, are more numerous on the Antilles. Based on suggestions on population growth brought forward by Boomert (2000:278), it is therefore expected that more Late Cedrosan sites will be found within the study area than Early Cedrosan sites. Cedrosan Saladoid sites are characteristically located directly on the shore as well as some distance inland (Boomert 2000:273, 278) on locations that are protected by coral reefs and where marine resources could easily be exploited. These locations can be situated both along Leeward as well as Windward coasts. Most Cedrosan Saladoid habitation sites represent relatively large villages that appear to have been used for centuries, resulting in deep occupation layers. Such sites have been reported for the study area as well, including the site of Anse à la Gourde at Pointe des Châteaux and the sites of Les Sables and Anse Petite Rivière on La Désirade. Saladoid subsistence is characterised as a mixed economy of root crop horticulture, hunting of land animals, fishing and mollusc collecting. Stable-isotope analyses suggest that during the first part of the Early Ceramic Age subsistence focused on terrestrial sources of protein, such as land crabs, hutia, and fresh water fish. Later, marine protein sources became more important (Stokes 1995).

In Late Ceramic times, settlements still reflected both coastal as well as inland locations and settlement patterns became more complex (Haviser 1997; Hofman and Hoogland 2004). On Puerto Rico, for example, a site-hierarchy developed involving a pattern of nuclear villages with dispersed settlements (Curet 1992). In the Late Ceramic Age, site numbers and sizes dramatically increase (e.g. Wilson 1989) and subsistence focused on marine protein, including fish and molluscs (Rouse 1992:94). For the research area, several sites yielding mostly Troumassan and Suazan Troumassoid material are thus expected, although Mamoran Troumassoid and Ostionoid features probably also occur. Of special importance are the objects in Morne Cybèle style, roughly dated between AD 1440-1460, and in Chican Ostionoid/ Classic Taíno style, approximately dated between AD 1200-1450.

Regarding the colonial history of the research area, it can be concluded that large sections will be superficially disturbed as a result of intensive cotton cultivation. Disturbance as a result of habitation occurs in more limited areas, but causes a more radical destruction of the archaeological record. At Pointe des Châteaux little colonial habitation occurred, as on Petite Terre, where habitation was concentrated near the lighthouse. The Petite Terre case demonstrates that it is very well possible for some small families to permanently inhabit the islands. On La Désirade habitation was mainly concentrated in the Les Galets, Grande Anse and Baie Mahault areas. Remains of the old *Léproserie* can be found west of Baie Mahault and, more surprisingly, in the northeastern part of the central plateau, near the archaeological site of

Cocoyer. Although ethnohistorical sources are vague about the presence of Amerindian people on the islands in the early colonial period, and although they do not provide exact descriptions of Amerindian settlement locations, Amerindian sites dating from the European contact period are expected as well within the study area.

The recent setting brings to light several factors that influence the study of the archaeological record. In general, the effects of constructions are dramatic, at La Désirade's southern coastal plain in particular. At Pointe des Châteaux, habitation is mainly limited to the western part of the research area, and on Petite Terre habitation no longer occurs. Agricultural activity in the area is very limited, small-scaled, except for the western part of the Pointe des Châteaux study area, and it causes only very superficial damage. Illegal excavations cause considerable damage. These occur in Pointe des Châteaux at the sites of Anse à la Gourde and Grande Saline, and on La Désirade at the sites of Voûte à Pin and Anse Petite Rivière among others. Tourists in the area have not influenced the archaeological record to a great extent until now. The area is not the most touristically attractive part of Guadeloupe and no hotels or other special facilities have been constructed here. Although Petite Terre suffers weekly from boatloads of tourists, the damage appears to be limited to the natural environs and not immediately to the archaeological sites themselves. Last but not least, the cadastral situation on La Désirade makes archaeological studies on the island considerably difficult. Ownership conflicts exist on significant stretches of the island, namely the entire central plateau. Officially, the municipality owns the plateau but many families are allowed to use land if they need it. The families, who have worked certain land plots for generations, actually claim this land but the municipality does not register this. Therefore, it is very complicated to find out whom to ask permission to survey land plots and who to register as the owner of the sites' terrain.

NOTES

1 See Boomert (2000) for a detailed overview of Archaic cultural patterns and subsistence strategies on Trinidad and Tobago.

2 Earle, T., 1987, Chiefdoms in Archaeological and Ethnohistorical Perspective. In: *Annual Review of Anthropology 16*:279-308.

3 See Boomert (2000) for detailed descriptions of the Cedros complex of Trinidad.

4 Caraipe temper is dried, charcoaled and crushed bark of the *Licania apetala* or Kwepi tree (Boomert 1986).

5 "Je crois que cette île [La Désirade] est la plus miserable des Antilles, et celle où la terre est la moins capable de production" (Chevallier de Bourlamaque, 1763, *Mémoire abrégé ou réflexions sur l'état actuel de la Guadeloupe et des changements que l'on estime devoir faire dans ce gouvernement pour le bien de l'Etat et la Colonie*. Archives Nationales, Basse-Terre).

6 Lafleur (1992:233) suspects such figures to have been largely manipulated, related to political wishes and trends.

7 The Anse des Corps territory probably rapidly lost its function as it is hardly mentioned in historical documents.

8 *Carte Générale de la Guadeloupe par les ingénieurs du Roy*, 1764-1768. Copy of the 'Archives Départementales de la Guadeloupe'.

9 The discovery is neither mentioned by Hernando Colombus or by Chanca (Yacou 1993:78). They claim that Dominica was the first island to be encountered arriving at the Antilles during the second voyage. One of the other passengers, Juan de Rojas, claimed that in the early morning of the 3rth of Novembre, an island was encountered that was baptised Désirada (Pleitos Colombinos t. VIII; Rollo del proceso sobre la Apelación de la Sentencia de Duenas, 1534-1536; Escuela de Estudios Hispanoamericanos, Sevilla, 1964, p.402; cited in Yacou 1993:78).

10 "Il y a autour de la Guadeloupe nombre de petites îles fort agréables. Les Saintes sont les plus belles, où les sauvages mesme ont encore quelques jardins à cotton. Les habitants de la Guadeloupe y vont varer et tourner la tortue. Marie-Galande et La Désirade n'en sont pas loin ny la Petite Terre esquelles nous allons aussy dans la saison pour tourner les tortues" (Breton 1978[1647]:32).

11 "*Oualíriche-éntina*, i'ay passé par la Désirade" (Breton 1900[1666]:274). *Oualíri* was translated as "Les nieves, les Anglais y sont' (Breton 1892[1665]:416). Nevis was translated as *hueléme* (Breton 1900:259). Dr. B.J. Hoff (personal communication 1996) assumes that Breton made a mistake and that *Oualíri* actually refers to La Désirade. Petite Terre is referred to as "Islet entre la pointe de la grande terre & la desirade" (Breton 1900[1666]:379).

12 A century later, however, the island was mentioned to be "peuplée seulement de quelques Caraïbes" (Archives Nationales, Colonies, Guadeloupe, F3 223, no. 493, 28 March 1748: "sur la maladie de la lèpre").

13 In July 1765 only 55 *mauvais sujets* were on La Désirade

(Lasserre 1961:279).

14 On La Désirade, the central plateau serves as collective property. Those in need of land are allowed to create and to use small slash-and-burn fields.

5. SURVEY RESULTS

5.1 INTRODUCTION

This chapter presents the survey results and comments on the efficiency and accuracy of the fieldwork, taking into account the biases related to the fieldwork method, environmental circumstances and natural and cultural post-depositional processes. These biases are important as they influence the contents of the site catalogues on which the presentation of pre-Columbian site patterns in chapter 6 will be based. Subsequently, the identification of different site types is described. Finally, the archaeological sites of Pointe des Châteaux, La Désirade and Petite Terre are summarily presented.

Although archaeological sites on Guadeloupe are generally labelled with both their, usually topographical, names and DRAC registration numbers, it has been decided to use site names only. DRAC registration numbers have been listed in the site catalogues (appendices 2-4). The reader is also referred to the site catalogues for detailed site descriptions and a presentation of the collected archaeological material.

5.2 EFFICIENCY AND ACCURACY OF THE FIELDWORK

5.2.1 Possible biases related to the surface surveys

The surveys provided a detailed regional site inventory. Site patterns can certainly be observed. The survey results cannot be regarded, however, without estimating how they represent the actual archaeological record or even the actual pre-Columbian situation. Notwithstanding the use of an intensive systematic survey technique as the one applied during the East-Guadeloupe project, it is obvious that several factors may affect the observation and collection of site and off-site material and thus entail a biased site record. These are related to the intensity and the method of surface observation, the use of surface material, the characteristics of the archaeological material, personal observation of the survey crews, environmental factors and natural and cultural post-depositional processes.

Some authors attempted to provide a quantification of biasing effects related to archaeological surveys. For example, Shennan (1985) demonstrated that for surveys in East Hampshire (United Kingdom) 40% of find density variations could be explained by environmental variables, 18% by distorting variables and only 3% by personal observation factors. Inter walker variation hardly appeared to influence find densities observed by Shennan. These outcomes are supported by the results of the Agro Pontino study in Italy (Verhoeven 1991). Van de Velde (2001:28), however, warns that both the Shennan and the Verhoeven studies are seriously defective since they excluded sampling units without finds from their calculations, thus biasing quantification of the effects of external factors on archaeological finds. In addition, during the workshop 'GIS techniques for regional archaeology' organised by the RPC (Regional Pathways to Complexity) project in Groningen, the Netherlands (April 15 2000) it was argued that inter walker differences do form an important factor biasing the outcomes of surface surveys. It was suggested that walker effects could be reduced by eliminating the extent of subjective decisions the survey participants have to make by moving towards total collection of artefacts from the surface.

5.2.1.1 Intensity of surface observation

Transect interval distances inevitably cause survey biases as sites with diameters smaller than the transect intervals may have been missed. At Pointe des Châteaux and on Terre de Haut intervals were set at 10 m; the smallest sites of importance to this study were thought to measure 10 x 10 m at least (Bodu 1985[c]). Smaller concentrations can provide information on the relative use and importance of different environmental zones, but their functions and dating are usually hard to establish. They were hardly found anyway. Regular interval inspection during field walking confirmed this tenet. The results of the 1998 fieldwork at Pointe des Châteaux and on Terre de Haut suggested that hardly any site of importance to the study would be missed by using 20 m intervals. Intervals were thus enlarged in 1999 for the La Désirade and Terre de Bas surveys. Moreover, since no single zone was completely excluded from the survey, the site inventory is expected to represent at least a sample of all types of site locations and functions. It may be important to note that transect intervals determine the observation of off-site material as well. Merely a 10% sample of off-site material is expected in areas where 10 m intervals and 1 m wide transects have been used.

Site information may be absent from the archaeological record as parts of La Désirade and Terre de Bas could not be completely surveyed (section 2.2.3; fig. 2.2 and 2.3). By generalising data from the areas that could be surveyed on La Désirade it can be hypothesised that the non-surveyed areas would yield indistinct sites in particular. It is possible that

habitation sites are present in the non-surveyed areas on Terre de Bas, but since most of these areas have been investigated in a non-systematic manner it appears unlikely that large sites are missing in the archaeological record.

5.2.1.2 Method of surface observation and use and characteristics of archaeological surface material

The simple fact that observations are limited to the surface generates some biases as well. The study of the surface material itself is rather complex anyway as it usually lacks context and it is often eroded. Moreover, chronological and cultural assignments are limited to diagnostic (read: decorated) artefacts, which are not necessarily present in the surface record. This situation severely hinders local off-site or non-site archaeological studies but for site surveys it is difficult as well since for many of the sites only surface collections could be made. An attempt was made to overcome this problem by studying general pottery characteristics, such as style, morphology, and finishing. This provides rough chronological assignments to Early Ceramic or Late Ceramic Ages, allowing only very basic chronological overviews with limited time-depth. Many of the other artefact categories, such as lithic, shell or coral artefacts, could not be dated at all when lacking a clear archaeological context. This is the reason why six of the La Désirade sites could not be dated.

The characteristics of the archaeological record itself also largely influence the outcomes of surface surveys. Different site locations, site types and material categories of archaeological material may influence visibility at the surface. Pottery, for example, is relatively easy to detect while untrained eyes probably face problems in identifying lithic artefacts on the surface.

5.2.1.3 Personal observation of the survey crews

Walker effects include personal interest and training, and personal reactions to variations in visibility related to the time of survey, cloud cover or position and intensity of the sun, and humidity of the terrain. An attempt was made to reduce walker effects to a minimum by having a trained field walking crew, familiar with ceramic, lithic and shell artefacts. As for survey time or cloud cover, the position and strength of the sun clearly hinder accurate observation between 12.00 and 16.00 p.m. During these hours no field walking was done and finds were washed and labelled instead. Around 17.00 p.m. floodlight slowed down surface observations, but no evidence was found that the quality of observations was hindered as well. The fact that humidity improves the visibility of ceramics and flint at the surface was used to study and re-study areas where sites had been expected at the start of the project but where no archaeological material was found. This did not, however, result in the discovery of archaeological material. Since these areas were intensively rewalked and no survey biases were signalled for these areas, they are considered to have been actually archaeologically 'empty' and to accurately reflect pre-Columbian site location choices. Despite the warning by Bintliff and Snodgrass (1988:509) that their surveys demonstrated sites to "appear and disappear in one locality from season to season" other areas in Eastern Guadeloupe were not revisited as a result of time constraints.

5.2.1.4 Environmental factors

Environmental factors notoriously biasing survey results include vegetation, accessibility, ground cover type and ground cover percentage. Vegetation negatively influences surface observations as it complicates the accessibility of terrain. This is particularly true for areas that are densely covered by acacia or mancenilla trees, which characterises important parts of the research area. It should be remarked, however, that surface visibility within acacia areas is remarkably good. In addition, dense acacia cover forces surveyors to slow down and to concentrate on small areas, "lying full-length on the ground and inspecting small areas by eye" (*cf.* Bintliff *et al.* 1999:158). If not related to traversing problems, vegetation did not further influence observation, since all transect surfaces were cleaned. Accessibility problems related to other factors than vegetation, such as angry bulls, dogs, or landowners could be solved in most cases.

As for the effects of ground cover type and ground cover percentage on the visibility of archaeological surface material, Van de Velde (2001) suggested to correct the outcomes of transect surveys by estimating the visibility of the surface. This turned out to be impossible for the East-Guadeloupe project since no useful generalisations could be made using known and controllable surveys. Yet, an attempt was made to estimate the impact of survey and environmental biases using descriptions of transects and survey zones that had been made in the field (De Waal 1998[b]:12-13). However, the most important means to delimit the influence of external factors, was to simply clear the transect surfaces using machetes and thus to enhance uniform observation. This was relatively easy since local circumstances are not favourable to the growth of dense grass patches. In most cases, clearing the surfaces meant removing a thin leaf cover. This was deemed preferable over compensating for possibly biased results and thus risking broad generalisations of the surface record.

5.2.1.5 Natural post-depositional processes

The impact of natural post-depositional processes is probably one of the most uncontrollable yet important factors influencing presence and visibility of surface material. These consist of processes of erosion and sedimentation, and coastal dynamics, including sea level changes and

coastal erosion. As outlined in section 3.2.2, sedimentation and erosion appear to be quite modest in the research area, except for the borders of the La Désirade central plateau and its slopes, which are gradually eroding. Site coverage as a result of mud streams, slope wash and deposits from volcanic activities is thought to be non-existent or at least limited. Coverage of archaeological layers by geological deposits may be expected on sandy beaches with dynamic dune formations. On Pointe des Châteaux, series of auger tests separated by 20 m intervals were carried out on all the beaches of the northern coast in order to check the presence of hidden concentrations of archaeological material but no archaeological material was identified. Coastal dynamics, including changes in sea level, coastal erosion, the presence and stability of the salinas and the formation and stability of dune formations, have more dramatic effects on preservation and visibility of sites. Low-lying sandy beach areas, characterising great parts of the study area, are particularly vulnerable to these processes.

At Pointe des Châteaux, these include parts of low-lying coastal areas at Anse à la Gourde, the bay east of Pointe à la Gourde, the western part of Anse à Plume, the salina that is in open connection to the sea, and Anse des Châteaux (fig. 2.1). Anse à la Gourde, the western part of Anse à Plume and the open salina harbour archaeological sites that are thought to have been larger than what remains of them today. On La Désirade, low-lying coastal areas at Anse d'Échelle, the beach south of the airport, Les Sables, and Pointe à Godard have probably eroded (fig. 2.2). Archaeological sites found at the airport and at Les Sables are thought to have been larger than they appear to be nowadays. The Pointe à Godard site, reported by Bodu in 1984, has been almost completely destroyed by coastal erosion. At Anse d'Échelle, no pre-Columbian sites were found. It is not clear if this is a result of the almost complete destruction of the beach. On Petite Terre, the northern and the western coasts of Terre de Bas are swiftly eroding. The impact of this process is well-visible at the Est de Mouton de Bas site, on the northern coast of Terre de Bas (fig. 2.3). In four years, the coastline appears to have retreated at least 2.5-3 m (personal observations 1997-2000). Coastal erosion of the southern beaches at Terre de Haut is known to have resulted in the almost complete destruction of the Pointe Sablé site.

In spite of the efforts of the Amsterdam geological team to provide an insight into the local coastal dynamics (section 3.2.3), it turned out to be difficult to give accurate estimates of destroyed areas and of the number of sites that may be missing in the archaeological record; the impact of coastal dynamics largely depends on prevailing winds and on the degree to which locations are protected by fringing reef systems (Troelstra personal communication 2002).

In spite of the fact that coastal erosion is dramatic in certain parts of the study area, the site inventory is considered to be more or less representative of the actual archaeological record. In view of the large sizes that are generally reported for Early Ceramic sites it is not plausible that sites from this phase have been destroyed completely. Parts of the sites are thought to have survived at least. The sites of Morel and Anse à la Gourde, where extensive coastal erosion has been reported and the sea has eroded significant parts of Early Ceramic occupation phases, illustrate this situation (Delpuech *et al.* 2001); (section 3.2.3). In the research area, however, no Early Ceramic A sites were found. It appears even more unlikely that coastal dynamics destroyed Late Ceramic sites since these have been exposed to the same forces of nature for a considerably shorter period of time than the Early Ceramic sites. The situation for the pre-ceramic period was probably less favourable for site conservation. Small coastal sites dating from this period will have been eroded.

5.2.1.6 Cultural post-depositional processes

Cultural post-depositional processes have badly damaged the archaeological record as well. This process may have already started during the pre-Columbian period. Superposition of younger archaeological deposits may cover older age sites or other sites with deep deposits and the different components of multi-component sites are hardly ever equally represented at the surface. It is known that tropical lowland groups on the South-American mainland clear garden plots of so-called fertile black-soils that result from old settlements and their trash and ash debris. They thus inflict considerable damage on the surface and sub-surface record (Hoogland personal communication 2000). At merely one site, the Late Ceramic A Petites Salines site, was an older archaeological layer discovered. All the other tested sites consisted of one single archaeological component. These observations contrast with those by Versteeg *et al.* (1993:158), but they are in accordance with observations by Bradford (2001) for sites on the Windward Islands.

The recent construction of houses and roads has severely disturbed the archaeological record in particular. Bulldozing activities at the airport on La Désirade and at Anse Petite Rivière destroyed important parts of archaeological sites. In addition, the construction of the marina on La Désirade led to the complete destruction of the Grande Anse beach. The original location was easily accessible from the sea and had great exploitation potential – factors that must have made the location attractive for pre-Columbian settlement – and it is well possible that it was inhabited during pre-Columbian times. Some non-diagnostic isolated pre-Columbian ceramics and lithic artefacts were discovered near the marina, but unfortunately, this location can no

longer be investigated as a result of its dramatic alteration and destruction.

In addition, at Pointe des Châteaux and on La Désirade and Petite Terre intensive cotton cultivation took place in the eighteenth and the early nineteenth century. Notwithstanding the fact that cotton cultivation entails only shallow perturbation of the soil, it compounds the negative effects of erosion and trampling processes on the archaeological record. It is deemed that even though intra-site distributions have been negatively influenced, the chance that complete sites have been destroyed remains limited. Non-stable and presumably non-representative site dimensions and surface distributions of archaeological material were found at the À l'Escalier site. Bodu described the surface concentration of this site to be large and dense in 1984, but during a visit in 1997 hardly any archaeological material was found. In 1999 and 2000, a small concentration of surface material was identified on the surface again. Some other sites, including Les Sables, Tropique and Site du Phare, had smaller surface distributions in 1999 when compared to Bodu's 1984 and 1985 observations. This probably reflects differential conservation situations through time, related to ploughing.

No indications were found in the research area for the addition or removal of soil to increase local soil fertility. Agricultural activities also disturbed archaeological contexts but, since they consist of extensive horticulture, their influences have remained limited and their effects can largely be estimated. They can be observed on the surface and in the sections of the test units.

5.2.2 Biases related to small-scale sub-surface testing

Sub-surface testing was the most time consuming part of the fieldwork and was therefore carried out on a very small scale only. This entailed unavoidable biases. First, sub-surface testing consisted of the excavation of small test units at only a limited number of sites. Secondly, the excavation of small test units involves certain biases, since (at some of the sites) they provide relatively limited samples of archaeological material. In addition, test unit locations were more or less randomly selected, and therefore it is not clear how representative these are of the sites. Surface surveys and small randomly situated units provide only, literally, superficial and small-scale insights, especially regarding site structure and intra-site distributions and it is difficult to generalise the data collected. However, the surveys did at least provide general site characterisations. Finally, almost all test unit material has been dry screened using 2/5 inch mesh screens, biasing sampling methods of faunal remains in particular (*cf*. Nokkert in appendix 5).

Apart from the excavation of test units, auger test series were carried out at the northern beaches at Pointe des Châteaux in order to investigate the presence or absence of archaeological material. The picture provided by the auger tests is far from complete since only one east-west running series of auger tests could be completed across the Pointe des Châteaux beaches, situated halfway between the shoreline and the dunes. The dunes themselves, and halfway positions inland from the dunes could not be tested in the project's time frame. In addition, the maximum depth that was reached was limited to approximately 200 cm below surface and therefore does not provide information for deeper levels.

At some of the sites, including Est Petite Saline Orientale, Est Pointe Tarare and Nord Morne Zambi and Pointe Séraphine, only small amounts of archaeological material were collected from the test units while a lot of surface material had been found. For the À l'Escalier site, the situation is the other way around. It is not exactly clear how to interpret these situations. It may be true that dense surface concentrations represent well-preserved sites with abundant sub-surface material. On the other hand, it may be equally true that archaeological layers have been eroded, exposing larger quantities of material at the surface than can be found in the test units. Both explanations may be valid and they can be tested only in cases where obvious perturbations have taken place.

For many other sites in the research area, excavated test-units demonstrated that the surface information reflected the sub-surface situation rather well, even though several sites appear to have been superficially eroded at least. At Pointe Séraphine and Pointe Gros Rempart the quantities of surface material were greater than what was found in the test units as well, but this probably had a different reason. The dense, but thin and widely dispersed deposits of material at these sites are considered to be the result of the fact that the sites were used only incidentally. At the Cocoyer site, the quantity of material excavated was very disappointing. The surface distribution, which is much denser in other parts of the site, suggests that the test unit location was just an unlucky choice.

5.3 SITE IDENTIFICATION

This section contains information on site parameters that have been used for the identification of different types of sites. These parameters include site location, site dimensions and site area, site function, duration of use or occupation and chronological assignment (section 1.4.4).

5.3.1 Site parameters

5.3.1.1 Site location

Regarding site location, rough distinctions have been made between coastal and inland sites. No real inland locations

exist, however, as a result of the limited dimensions of the various parts of the study area. This is true for Pointe des Châteaux and Petite Terre in particular, their maximum width being 1 km. Although several of the sites, when plotted on a map, appear to be close to the coast, some are situated at elevations that are difficult to reach and these were therefore considered inland. This distinction between coastal and inland sites was emphasised, as inland sites would have been missed in traditional surveys, focusing on coastal areas. Still, notwithstanding the fact that as a result of the homogeneity of the area no great ecological differences occur between coastal and inland locations, it is deemed that these entail different selection criteria. On La Désirade, for example, the eastern plateaus and the central plateau are difficult to reach from the coast but they offer special opportunities related to defence or observation.

For the immediate surroundings of all sites, artificially set at 250 m distance from the sites at maximum, presence or absence of certain location variables has been scored (section 1.4.4). These include fresh water sources or streams, flat terrain, accessible bays with canoe landing-spots, coastal reefs, soils suitable for small-scale horticulture, lithic raw materials, views of other islands, parts of islands or possible sea routes, strategic elevated spots, salinas and mangrove areas (table 5.1).

5.3.1.2 Site dimensions and site area

Areas representing spatially bounded distributions of surface material have been recorded. Unfortunately, as a result of logistical limitations, it turned out to be impossible to map fixed numbers of artefacts per square meter. The grab-samples made during the survey were too small and unsystematic to allow insights into intra-site variation. This complicated the understanding of site layouts, a situation which was made even more difficult since the composition of the surface material at some of the sites appeared to change from time to time (section 5.2.1). Several sites have probably been documented as being larger than they actually were as a result of site recording methods as well as post-depositional processes (section 1.4.4).

The problem related to the obscuring of different chronological components of sites turned out to be smaller than feared at the beginning of the project since only three multi-component sites were found. It is true, however, that for all three sites, dimensions of the earliest occupations could not be distinguished. The surface material at Petites Salines, for example, only represented Late Ceramic A occupation, while evidence for Early Ceramic B occupation was found in one of the test units. The other four test units, excavated west, east and south of this unit, did not provide any evidence for this earlier occupation, nor did auger tests at the beach north of it. At this moment there is absolutely no information available on the extensions of the Early Ceramic B site. Only more intensive sub-surface investigations can provide this information. But even at sites where such detailed studies have been carried out, such as Anse à la Gourde, it proved to be difficult to estimate the dimensions of the different occupations. This was mainly the result of the local coastal processes (Hofman *et al.* 2001[a]). Early Ceramic B occupation at the third multi-component site, Anse Petite Rivière, is represented by a handful of sherds only, of which the exact context is not known since they stem from old, undocumented excavations. The dimensions of the site during this period remain unidentified as well. Although dimensions of the eldest components could not be investigated, the simple fact that sites have been occupied during different periods and that people deliberately selected a certain location over a long time frame, indicates the relative importance of the sites.

5.3.1.3 Site type or site function

As expected, the functional assignment of sites turned out to be the most complicated aspect, although this was not only attributable to the small samples, as had been foreseen at the start of the surveys. Initially, it had been thought that information on site types was to be drawn from other, more extensive, archaeological studies in the Caribbean. This turned out to be more complicated than envisioned because motivation for functional assignments often remains obscure in Caribbean publications. Antczak (1998), Boomert (1996, 2000), Haviser (1987[a]) and Hoogland (1996) are positive exceptions to this rule. More importantly, the systematic and intensive nature of the East-Guadeloupe surveys resulted in the discovery of 'marginal' and under-exposed sites, characterised by shallow and dispersed distributions of fragmented and weathered ceramics at the surface, that were not reported in detail before (De Waal 1999[b], 2002[a-c]). At some of the sites lithic artefacts and shell and coral fragments were found as well. The limited quantities of pottery and the heavy fragmentation of the sherds did not allow estimates of numbers and shapes of vessels represented by the samples collected from the sites. This is unfortunate since such estimates would have helped improve the understanding of the functioning of these sites. The indistinct sites may have been used as temporary habitation sites, campsites or special activity sites that may have been related to habitation sites. While it is tempting to label indistinct sites with unambiguous functions in order to facilitate site pattern descriptions, it has been decided not to do so since archaeological evidence is rather limited. The term 'indistinct' has been used instead of 'unknown' or 'unidentified', since information on site functions is not completely lacking. It is not clear, however,

Site name	F	L	Period	Site area	Depth	1	2	3	4	5	6	7	8	9	10	N	Cer	Grid	Lith	Sh.A	Cor	Sh.F	Faun	Hum
Anse à la Gourde	H	C	ECB-LCB	45,000	10, 150, ?	?	+	+	+	+	-	+	+	?	-	8	++	++	++	++	++	++	++	++
Site 7	H	I	LCA	17,000	10	+	+	-	-	+	-	+	+	-	-	5	+	+	+	-	+	+	+	-
Montagne Petites Salines	H	I	ECB	15,500	40	+	+	+	+	+	-	+	-	+	-	7	++	++	+	-	+	+	+	-
Est Pointe Tarare	H	I	LCA	13,700	10	+	+	-	-	+	-	+	+	-	-	5	+	+	+	-	+	+	-	-
Grande Saline	H	C	LCA	12,200	60	-	+	+	+	-	-	+	-	+	-	5	++	++	++	-	++	++	+	-
Village des Pêcheurs	H	C	ECB	10,000	20	+	+	+	+	+	-	+	-	-	-	6	+	+	-	-	+	+	-	-
Est Petite Saline Orientale	H	C	LCA	7700	<5	+	+	+	+	+	-	+	-	+	-	7	+	-	-	-	+	+	-	-
Nord Morne Zambi	H	C	LCA	5400	30	-	+	+	-	+	-	+	+	+	-	6	+	+	+	-	+	+	-	-
Petites Salines	H	C	ECB-LCA	5200	20, 90	-	+	+	+	+	-	+	-	+	-	6	++	++	+	-	++	++	+	-
Fond Caraïbe	H	I	LCA	2400	Unident.	-	-	-	-	+	-	-	+	-	-	2	+	+	+	-	-	+	-	-
Degrat	H	C	LCA	1200	30	-	+	+	+	+	-	+	+	+	-	7	+	+	+	-	+	+	+	-
Ouest Pointe Tarare	Ih	I	LCA	11,000	Unident.	+	+	-	+	+	-	+	+	-	-	6	+	+	+	-	-	+	-	-
Pointe à Cabrits 1	Ih	I	LCA	10,000	Unident.	-	+	+	+	+	-	-	+	?	-	6	+	-	-	-	-	+	-	-
Pointe à Cabrits 2	Ih	I	LCA	2500	Unident.	-	+	+	+	+	-	+	+	?	-	7	+	+	+	-	-	+	-	-
Site 1	Ih	C	LCA	2200	30	+	+	+	-	+	-	+	-	-	-	5	+	-	-	-	+	+	-	-
Ouest Morne Zambi	Ih	I	ECB	1800	20	+	+	+	-	+	-	-	-	+	-	5	+	+	+	-	+	+	-	-
Ouest Résid. Kahouanne	Ih	I	LCA	1600	20	+	+	-	-	+	-	+	+	-	-	5	+	+	-	-	-	-	-	-
Fond St. Bernard	Is	I	LCA	1000	Unident.	-	+	-	-	+	-	-	+	-	-	3	+	-	-	-	-	+	-	-
Site 9	Is	I	LCA	600	<5	+	+	+	-	+	-	-	-	-	-	4	+	-	-	-	-	-	-	-
Site 10	Is	I	LCA	400	<5	+	+	+	-	+	-	-	-	-	-	4	+	-	-	-	-	-	-	-
Ouest Anse à Plume	So	I	LCA	400	<5	-	+	+	-	+	-	+	+	-	-	5	+	-	-	-	+	+	-	-
Anse Petite Rivière	H	C	ECB-LCA	50,400	Unident., 35	+	+	+	+	+	-	-	-	-	-	5	++	++	++	++	++	++	++	+
Aéroport	H	C	LCA	28,200	100	-	+	+	+	+	-	+	-	+	-	6	++	++	++	+	++	++	+	-
Les Sables	H	C	ECB	19,000	70	-	+	+	+	+	-	+	+	+	-	7	++	++	++	+	-	+	+	-
Pointe à Godard	H	C	LCA	15,200	Unident.	-	+	+	+	+	-	+	-	+	-	6	+	+	+	+	-	+	-	-
Anse des Galets	H	C	LCA	14,800	30	-	-	+	-	+	-	-	+	-	-	3	+	+	++	-	+	+	+	-
Grand Abaque 1	H	I	LCA	10,000	30	-	+	-	-	+	-	-	-	-	-	2	+	++	++	+	-	+	-	-
Pointe Colibri	H	C	LCA	9700	30	+	+	+	+	+	-	+	-	-	-	6	+	++	++	-	++	+	-	-
Cocoyer	H	P	LCA	9400	10	-	+	-	-	+	-	-	+	-	-	3	+	++	+	+	-	-	-	-
Morne Souffleur	H	P	LCB	2800	20	-	+	-	-	+	-	+	+	-	-	4	+	+	++	+	++	++	+	-
À l'Escalier	H	C	LCA	1700	80	+	+	+	+	+	-	-	-	-	-	5	++	++	++	++	++	++	++	+
Morne Cybèle-1	H	P	LCB	700	30	-	+	-	-	+	-	+	+	-	-	4	++	++	+	+	-	++	-	-
Pied de la Montagne	Ih	I	Unident.	39,000	50	+	+	-	-	+	-	+	+	-	-	5	+	-	+	+	+	+	+	-
Ravine à Moko	Ih	P	LCA	16,800	Unident.	-	+	-	-	+	-	-	+	-	-	3	+	+	+	-	-	-	-	-
Morne à Marthe	Ih	I	LCA	14,100	<5	-	+	-	-	+	-	+	+	-	-	4	+	+	+	-	-	-	-	-

Tropique	Ih	P	LCA	7800	Unident.	-	+	-	-	+	-	+	-	-	-	3	+	-	++	+	-	+	-	-
Les Éoléens	Ih	P	LCA	5500	Unident.	-	+	-	-	+	-	+	+	-	-	4	+	+	+	-	-	+	-	-
Au Vent	Ih	I	LCA	2700	<5	-	-	-	-	+	+	-	-	-	-	2	+	-	+	-	-	+	-	-
Ravine César	Ih	P	LCA	400	Unident.	-	-	-	-	+	-	-	-	-	-	1	+	-	+	-	-	+	-	-
Morne Cybèle-2	Ih	P	LCA	300	20	-	+	-	-	+	-	+	+	-	-	4	+	-	+	-	-	+	-	-
Chemin de la Montagne	Is	P	LCA	19,300	<5	-	+	-	-	+	-	-	-	-	-	2	+	-	+	-	-	-	-	-
Site 19	Is	I	LCA	13,100	<5	-	+	-	-	+	-	-	-	-	-	2	+	-	+	-	-	-	-	-
Grande Ravine	Is	I	LCA	6800	Unident.	+	-	-	-	+	-	-	-	-	-	2	+	-	+	-	-	-	-	-
Trou Madame	Is	P	LCA	6300	<5	-	+	-	-	+	-	-	-	+	-	3	+	-	-	-	-	-	-	-
La Ramée	Is	I	LCA	4500	<5	-	+	+	-	+	-	-	-	-	-	3	+	-	-	-	-	-	-	-
Site 29	Is	I	LCA	2700	Unident.	-	+	+	+	+	-	-	+	+	-	6	+	-	-	-	-	-	-	-
Site 8	Is	I	LCA	2400	<5	+	+	-	-	+	-	+	-	-	-	4	+	-	+	-	-	-	-	-
Site 28	Is	I	LCA	1800	<5	-	+	-	-	+	-	-	-	-	-	2	+	-	-	-	-	-	-	-
Site 5	Is	I	LCA	1200	<5	-	-	-	-	+	-	-	-	-	-	1	+	-	-	-	-	-	-	-
Site 17	Is	C	LCA	1000	Unident.	+	+	+	+	+	-	-	-	-	-	5	+	-	-	-	-	-	-	-
Grand Abaque 2	Is	I	LCA	900	Unident.	-	+	-	-	+	-	-	-	-	-	2	+	-	+	-	-	-	-	-
Site 4	Is	I	LCA	800	<5	-	-	+	-	+	+	-	-	-	+	4	+	-	+	+	-	-	-	-
Chemin du Latanier	Is	I	LCA	600	<5	-	+	-	-	+	-	-	+	-	-	3	+	-	-	-	-	-	-	-
Grotte le Baigneux (cave)	Is	I	Unident.	30	Unident.	-	+	-	-	+	-	-	-	-	-	2	-	-	+	+	+	+	-	-
Voûte à Pin	CF	P	LCA	70	40	+	+	-	-	-	-	-	+	-	-	3	+	+	+	-	+	+	+	+
Chemin de M. De l' Orme	CF	P	LCA	<1	12	-	-	-	-	+	-	-	-	-	-	1	+	-	+	-	-	-	-	-
Pointe Séraphine	LW	C	Unident.	11,200	20	-	-	-	-	-	+	+	-	-	-	2	-	-	++	+	-	-	-	-
Pointe Doublé	LW	C	Unident.	9900	Unident.	-	-	-	-	-	+	+	-	-	-	2	-	-	++	+	-	+	-	-
Morne de Baie Mahault	LW	C	Unident.	4500	Unident.	-	-	+	+	-	+	+	-	-	+	5	-	-	++	-	-	+	-	-
Pointe Gros Rempart	LW	C	Unident.	3600	20	-	+	+	+	+	-	+	-	-	+	6	+	-	++	+	++	+	-	-
Parc à Jojo	Cs	I	LCA	100	Unident.	-	+	-	-	+	-	-	+	+	-	4	+	-	-	-	-	-	-	-
Grotte de Grande Anse	Cs	I	LCA	6-20	Unident.	-	+	-	-	+	-	-	-	-	-	2	+	-	+	-	-	-	-	-
Morne Frégule	Cs	I	LCA	Unident.	Unident.	-	+	+	-	+	-	+	+	-	-	5	+	-	-	+	-	-	-	-
Grotte de Morne Blanc	Cs	I	LCA	Unident.	Unident.	-	-	-	-	+	-	-	-	-	-	1	+	-	-	-	-	-	-	-
Site du Phare	H	C	LCA	25,100	70	+	+	+	+	+	-	+	-	+	-	7	++	++	++	+	++	++	+	-
Baleine du Sud	H	I	LCA	9500	70	-	+	+	+	+	-	+	-	-	-	5	+	+	-	-	++	++	+	-
Est de Mouton de Bas	H	I	LCA	8200	70	-	+	+	+	+	-	+	-	+	-	6	++	++	++	+	++	++	++	-
Pointe Sablé	H	I	LCA	8400	60-80	-	+	+	+	+	-	+	-	-	-	5	++	++	++	-	+	+	++	-
Trou Canard	H	I	LCA	Unident.	Unident.	-	+	+	+	+	-	-	-	-	-	4	+	+	-	-	-	-	-	-
Mouton de Bas	Ih	I	LCA	12,800	Unident.	-	+	+	+	+	-	-	-	+	-	5	+	+	-	-	-	+	-	-
Est de Trou Canard	Ih	C	LCA	4900	Unident.	-	+	+	+	+	-	+	-	-	-	5	+	-	-	-	-	+	-	-

how the available information should be interpreted unambiguously. Few references to similar sites where more extensive research had taken place could be found that could help further analysis.

Analysis of find material and site locations suggested that three types of indistinct sites should be distinguished. The first type is characterised by very small quantities of material that are indicative for the local preparation of food, such as griddle fragments and shell food remains. This suggests that people stayed at these specific spots a while, at least long enough to consider it necessary to prepare food on the spot instead of bringing it in a prepared form. This is not evident for short stays since cassava-griddles are less easily transported than cassava-bread, which can be kept for long periods. The surface distributions further consist of small numbers of lithic artefacts and at some of the sites shell and coral artefacts were found as well. The archaeological material of some of the sites is considered settlement refuse, but the density of material is very limited. It appears to be likely that some of the sites were temporary habitation sites used by a small group of people. Regarding the superficial and dispersed distributions of archaeological material, it is not very likely that these sites played a role of regional significance. Temporary habitation sites do provide, however, valuable information on local social, economic and political organisation.

The second type lacks evidence of local food preparation. These sites are characterised by small surface distributions consisting of heavily fragmented and weathered ceramics, without griddle fragments. Some of these sites may be related to pre-Columbian subsistence. These may include areas marked by repeated actions related to food procurement, such as horticultural activities, fishing, catching terrestrial fauna, collecting wild plants or collecting water, or related to the exploitation of non-subsistence resources, such as wood, calabashes, feathers, fibres and pigments. As they are inland sites near soils suitable for small-scale horticulture and situated close to fresh water sources, it may be suggested that they were related to gardening activities. Pottery found at the sites may have been used for carrying water, crops or food for consumption during a day's work in the fields.

The third type of indistinct sites includes cave sites with indistinct functions. These have only been found on La Désirade. These sites are all situated inland at special places within the landscape, such as at high elevations overlooking parts of the southern coastal plain of the island. The cave site category does not specifically relate to site function but to a site type that allows various different functions, including habitation, shelter, ceremonial use, or other, unidentified, special activities and combined functions. Until quite recently, inhabitants of La Désirade went to seek shelter in caves for hurricanes. The cave sites with indistinct functions were probably used for a similar purpose, though they can also have offered shelter to other environmental or possibly human threats as well. This interpretation is considered plausible since most of the cave sites are close to pre-Columbian habitation sites so that they can be reached rather quickly in times of need, except for Grotte de Grande Anse. This site, however, is near the Grande Anse harbour, the probable location of a large pre-Columbian site regrettably destroyed during the construction of the marina. No evidence could be found for habitation or ceremonial use of these caves.

For other sites rather distinct functions could be suggested. These include habitation sites, lithic workshops, ceremonial sites and a strategic outpost. Habitation sites may comprise the remains of one house or a cluster of houses that were

Table 5.1 (preceding two pages). Site information per site type for Pointe des Châteaux, La Désirade and Petite Terre. The table successively lists site name, site function (F), location (L), period of use, approximate surface area (m^2), and maximum depth of the separate archaeological deposits (cm). Site functions include habitation site (H), strategic outpost (So), indistinct site, probably temporary habitation (Ih), indistinct site, probably special activity (Is), lithic workshop (LW), site with ceremonial function (CF), and cave site, probably used as shelter (Cs). Site locations are coastal (C), inland (I) or on the plateau (P). Periods of use cover Early Ceramic late phase (ECB), Late Ceramic early phase (LCA) and Late Ceramic late phase (LCB). Subsequently, presence (+), absence (-) or possible presence (?) of fresh water (1), flat terrain (2), accessible bays with canoe landing-spots (3), reefs (4), soils suitable for small-scale horticulture (5), lithic raw materials (6), view points (7), strategic elevated spots (8), salinas (9) and mangrove (10) has been scored, as has the total number of site location variables (N). Finally, the table lists incidental presence (+), frequent presence (++) or absence (-) of various categories of archaeological material, including ceramics (cer), griddles (grid), lithic artefacts (lith), shell artefacts (Sh.A), coral artefacts (Cor), shell food remains (Sh.F), faunal remains (Faun) and human skeletal remains (Hum).

occupied on a permanent basis. Duration of occupation ranges from very short periods to many generations, influencing the thickness of sub-surface deposits. Although the sites primarily have a settlement function, ceremonial or other special activities probably took place as well. Habitation sites may be characterised by rather large site areas, locations favourable for habitation and large quantities of habitation refuse, which generally includes pottery, shell food and faunal remains, and lithic, shell and coral artefacts. In some instances, human skeletal remains do occur as well. Pottery samples may be characterised by a variety of vessel shapes, of which simple, rather large open vessels with thick walls, that may have functioned for storage or cooking, will be predominant. Griddle fragments, spindle whorls and pot-stands may be present as well. Intensity and duration of occupation, as well as preservation of the settlement, determine the amount and diversity of different archaeological materials. Surface material distributions are generally dense and concentrations and empty areas, relating to activity areas, may be visible at the surface. Off-site material, mostly consisting of ceramics or lithic or shell tools, is usually found near habitation sites.

Lithic workshops consist of sites where lithic raw materials were worked into semi-manufactured objects or finished artefacts. The sites yield lithic artefacts in different stages of production, refuse material resulting from the production process and coral and lithic tools used during the manufacturing process. The sites usually lack habitation refuse. Lithic workshops are generally situated on or very close to sources of the raw materials worked, thereby reducing the expected amounts of off-site material. Dimensions of the site area and thickness of sub-surface deposits depend on the intensity and duration of use.

Sites have been labelled ceremonial sites when their main use appears to have been aimed at ritual or ceremonial practices. These are expected to be rather small sites, located at impressive or 'special' spots in the landscape, intensifying their special character. Archaeological material probably consists of pottery with special forms or decorations, human skeletal remains, as well as lithic, shell or coral objects that are not directly aimed at daily use, such as *spatulae* or three-pointed *zemis*. Duration of use can range from one single ritual activity to repeated activities, the character of which influences the thickness of the sub-surface deposits. The use of the sites, however, is considered special and restricted, thereby resulting in small, shallow deposits and the total absence of off-site material.

Strategic outposts are probably relatively close to habitation sites. They may represent sites that had a local or regional importance in defence or communication. The main characteristic is the site location, providing a commanding view over other islands, parts of islands or possible sea routes. Strategic outposts are thought to be small sites, used for short periods by only a few people, maybe even one person. This will result in very small and shallow archaeological deposits. Off-site material is probably absent.

5.3.1.4 Duration of use or occupation

Duration of occupation could only be investigated at Anse à la Gourde. Long-term and intensive archaeological investigations demonstrated that this site had been occupied between approximately AD 500 and 1350 (Hofman *et al.* 2001[a-b]). It is possible, however, that habitation was less continuous than it now appears in the archaeological record, but it is expected that occupation at Anse à la Gourde was, if not continuous, probably only occasionally interrupted for a short period and swiftly recommenced (Bright 2003:51). Relatively short, successive phases could not be distinguished at any of the sites.

Moreover, it was impossible to excavate test units at all pre-Columbian sites. Several of these sites provided a limited amount of archaeological material suggesting that these sites were used for a short period or for activities that do not result in dense deposits. Some of the sites may have been slightly eroded as a result of local conservation or perturbation factors but it is thought that this is not the only factor accounting for the shallowness of the deposits. Depositional behaviour appears to have been more important, involving, for example, refuse discarding over extended areas, precluding the development of dense midden deposits. In addition, at some cliff sites refuse material may also have been thrown in the sea.

Information on seasonal use of sites could not be obtained due to the small samples of faunal remains.

5.3.1.5 Chronological assignment and temporal resolution

At the start of the project, ^{14}C dates were available for Anse à la Gourde, Morne Cybèle-1, Morne Cybèle-2 (Hofman and Hoogland 1994; Hofman *et al.* 2001[a]) and Anse Petite Rivière (De Waal 1996[b]). For À l'Escalier and Aéroport, ^{14}C dates were obtained from *Cittarium pica* samples that were analysed in the Groningen Laboratory for Isotopic Research in the Netherlands. The resulting BP dates have been calibrated using CALIB 4.2 by Stuiver *et al.* using the marine shell calibration curve.[1] For the other sites, rough chronological assignments were made on the basis of stylistic and technological aspects of the ceramics (section 1.4.4). Sites could be labelled Early Ceramic B, Late Ceramic A, and Late Ceramic B. The chronology of six sites remains unidentified since no (diagnostic) pottery could be collected. The three multi-component sites represent Early Ceramic B

and Late Ceramic A occupations. A very small Late Ceramic B component has been reported for the multi-component site of Anse à la Gourde as well (Hofman *et al.* 2001[a]). Multi-component sites were counted as single sites during the surveys, but in site pattern analyses occupation periods have been presented separately.

5.3.2 Off-site material

A large amount of off-site material has been collected and mapped during the 1998-2000 surveys. Off-site material reflects the use of activity areas around sites, areas on the islands that were used for horticultural practices, harvesting areas, fresh water sources, lithic raw materials or other exploitation of natural resources. Paths of movement through the landscape, *i.e*. trails that were often frequented may become visible in the archaeological record as well (Lindblom 1991). This has been reported, for example, for pre-Columbian Saba (Hoogland personal communication 2000). Therefore, the study of off-site material may be useful in the understanding of pre-Columbian use of the landscape. Unfortunately, as mentioned earlier (section 2.2.3), the project's timeframe did not allow detailed analysis and study of the non-site data collected. In some instances, the presence of off-site material could be used as complementary information to the site data collected.

5.4 ARCHAEOLOGICAL SITES ON POINTE DES CHÂTEAUX

Pointe des Châteaux has a dense site distribution consisting of 21 sites (fig. 5.1; appendix 2; table 5.1).[2] These include 11 habitation sites, that yield typical habitation refuse and generally have attractive site locations in the sense that they are generally well accessible from the sea and have good exploitation potential and observation facilities. In addition, a strategic outpost – dominating the northern coast of the peninsula – and nine indistinct sites, of which some have evidence of local food preparation, were found. Most of the sites, 16 in total, were dated Late Ceramic A, three others could be assigned to the Early Ceramic B and two sites are multi-component. No pre-ceramic sites were found (De Waal 1999[b], 2001, 2002[a-c]). Few sites are well-preserved, as a result of erosion or cultural post-depositional processes.

5.4.1 Habitation sites

The Pointe des Châteaux site inventory consists of 11 habitation sites (table 5.1). Two of these can be dated Early Ceramic B, two others are multi-component and the remaining seven are Late Ceramic A. The sites have a settlement function primarily, but ceremonial or other special activities may have been carried out as well. The substantial burial area and the abundant and delicately worked ceramics, lithic, shell and coral artefacts excavated at Anse à la Gourde, for example, suggest that this site played a role of local, and possibly regional, importance. The long occupation of the site, ranging from the end of Early Ceramic B (AD 500-700) until the start of Late Ceramic B (median date AD 1350), demonstrates the importance of the site as well (Hofman *et al.* 2001[a]). Early Ceramic B and Late Ceramic A Anse à la Gourde yielded ritual paraphernalia such as *zemis*, inlays, *spatulae*, body-stamps, shark-shaped and frog-shaped pendants and anthropomorphic and zoomorphic *adornos*, depicting caiman, lizard, duck, frog, parrot and pelican. *Zemis* were also collected from the Degrat site and at Nord Morne Zambi an *adorno* representing a manatee was found (fig.A2.25a), an animal that is associated with the underworld (Boomert 2000:474).

The habitation sites are large, ranging between 1200 m^2 and 45,000 m^2. Although Caribbean archaeological studies usually emphasise coastal habitation sites, inland sites are remarkably large. Their surface material distributions, however, are usually less dense than those of coastal sites, and their sub-surface deposits appear to be more shallow as well. Depths of archaeological deposits range between less than 5 cm to 150 cm. Many of the sites are rather shallow. This may be the result of conservation factors, as most of the sites have been damaged by coastal erosion, cultivation and constructions, and of biases linked to the selection of the test unit locations but it may be indicative of relatively short occupation periods as well.

As mentioned before, the survey method did not allow analyses of intra-site distributions or site layout, but attention during the fieldwork was probably mainly directed at (parts of) refuse areas. The sites yield typical habitation refuse, including pottery, shell food remains and faunal remains, and lithic, shell and coral artefacts. At Anse à la Gourde, human skeletal remains have been found as well. Of course, the composition of the archaeological assemblages varies from site to site since these depend not only on intensity, duration and significance of occupation, but also on site preservation. Pottery samples can be roughly characterised by a variety of vessel shapes, among which simple, rather large and thick open functional vessels are predominant. Decoration is not abundant. Griddle fragments, spindle whorls and pot-stands are present on several of the sites as well. Apart from Anse à la Gourde and Petites Salines, the Pointe des Châteaux habitation sites yielded hardly any faunal remains (Nokkert in appendix 5). This can be explained by preservation factors, the small scale of the investigation or simply through the absence of the material. The large mesh sizes of the screens used are not thought to

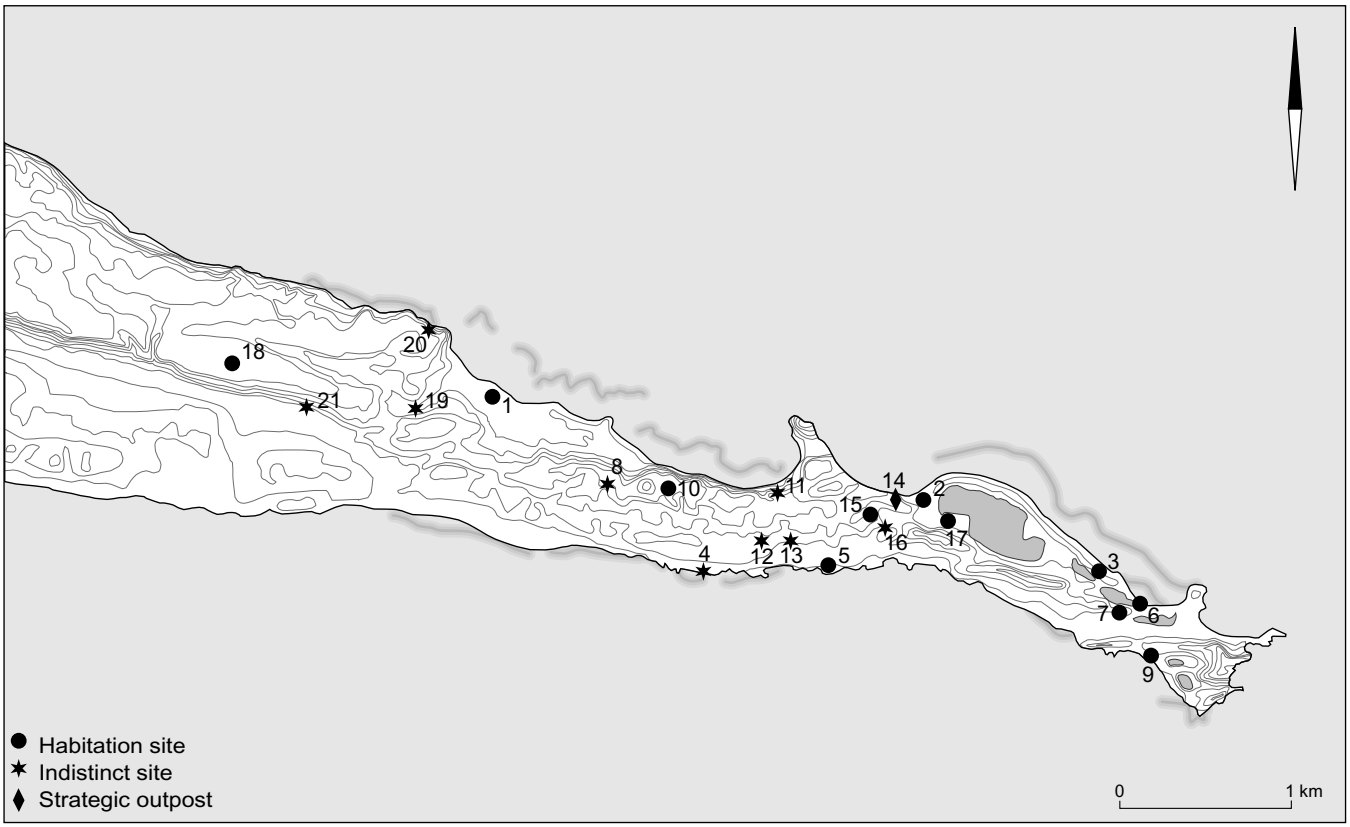

Fig. 5.1. Archaeological sites on Pointe des Châteaux.

have contributed to this absence, since it is expected that faunal remains, no matter how small, would not have gone unnoticed entirely while excavating. Almost all the sites have ceramic off-site material.

Seven habitation sites are coastal, while four others have inland locations. The sites typically have attractive locations, characterised by a large number of location variables relating to exploitation potential, access and observation. The largest habitation site, Anse à la Gourde, has the most attractive site location in this sense, also when compared to La Désirade and Petite Terre habitation sites, even though the other sites follow close behind. Almost all habitation sites are on flat terrain and near soils suitable for small-scale horticulture, and provide clear views of their surroundings. Some of the sites are close to reefs, salinas, strategic points or fresh water sources. The Fond Caraïbe site, which is one of the smallest habitation sites, occupies the least favourable location.

5.4.2 Special activity sites: strategic outpost

None of the sites could be assigned distinct economical functions, related to pre-Columbian subsistence and use of the landscape or distinct ceremonial functions. A function as a strategic outpost has been suggested for the Late Ceramic A Ouest Anse à Plume site on the basis of its remarkable site location on a small flat terrain situated on a protruding plateau on the northern coast. The site provides a commanding view of La Désirade, Marie-Galante, Pointe des Châteaux, Anse à Plume, the Grande Saline and the archaeological sites near the Grande Saline. The site, which appears to be the result of periodic short-term use, is characterised by a small (25 x 22 m) and probably shallow distribution of archaeological material, consisting of pottery, coral and shellfish remains. Hardly any off-site material was found.

5.4.3 Sites with indistinct functions

The nine indistinct sites include one Early Ceramic B site

and eight Late Ceramic A sites. Some of these sites had been listed as small habitation areas in a preliminary presentation of the Pointe des Châteaux fieldwork (De Waal 1999[b]), but it now appears that these functional assignments may require revision.

The sites consist of small distributions of fragmented and weathered ceramics that appear to be largely limited to the surface. The sites may represent short periodic visits but also activities by a small group of people. Although the sites may have played an as yet unknown role on the local level, their regional importance appears to have been limited. The sites appear to be largely destroyed, which explains the shallowness of the archaeological layers. Hardly any off-site material was found, except near Ouest Pointe Tarare and Ouest Morne Zambi. The indistinct sites, of which areas range between 400 m^2 and 11,000 m^2, are generally smaller than habitation sites on Pointe des Châteaux.

The indistinct sites have only slightly less attractive site locations when compared to the habitation sites. Eight sites are inland sites, while the ninth is coastal. Most indistinct sites are on flat areas near soils suitable for small-scale horticulture and fresh water sources and possible canoe landing-spots. Some are close to strategic locations, viewpoints and reefs.

Six indistinct sites, where indications for local food preparation were found, have been tentatively labelled temporary habitation sites that were probably used by a small group of people. Site areas are between 1600 m^2 and 11,000 m^2. The sites have quite attractive locations, being situated on flat areas near soils suitable for small-scale horticulture. Many of them are situated close to fresh water sources, the coast, viewpoints, strategic locations and reefs. The three other indistinct sites lack evidence of local food preparation, are slightly smaller with site areas ranging between 400 m^2 and 1000 m^2, and they have less attractive locations. They may have been related to gardening activities.

5.5 ARCHAEOLOGICAL SITES ON LA DÉSIRADE

The La Désirade site inventory consists of 43 sites (fig. 5.2; appendix 3; table 5.1), namely 11 habitation sites, four lithic workshops, two ceremonial sites and 26 indistinct sites. One ceremonial site and five indistinct sites are situated in caves. A total of 33 sites was assigned to the Late Ceramic A. One Early Ceramic B site, two Late Ceramic B sites, and one multi-component site were found as well. For six sites the period of use could not be identified. These include four lithic workshop sites that can probably be assigned to the Ceramic Age (Knippenberg personal communication 2002). No pre-ceramic sites were found (De Waal 1999[f], 2000, 2001, 2002[a-c]).

5.5.1 Habitation sites

The 11 habitation sites include one Early Ceramic B site, while seven are Late Ceramic A, two others are Late Ceramic B and one is multi-component. Most of the sites are quite large and, with site areas ranging between 700 m^2 and 50,400 m^2, they are larger than the Pointe des Châteaux habitation sites. Surface material distributions are usually rather dense but some of the sites appear to have shallow archaeological deposits. Similarly to the Pointe des Châteaux habitation sites, archaeological deposits are 10-100 cm thick.

No insights were obtained on site structure, although refuse areas were probably most prominently represented by distributions of archaeological material at the surface. At Cocoyer, however, a concentration of griddle fragments was found in the eastern part of the site, probably representing a special activity area at the site. At Anse Petite Rivière, the 1984 and 1995 investigations provided some information on where refuse areas, living areas and a burial area were most likely situated (De Waal 1996[b]).

All habitation sites, except for the almost completely destroyed site of Pointe à Godard, yield typical habitation refuse, including pottery, shell food remains and faunal remains, lithic, shell and coral artefacts and, at Anse Petite Rivière and À l'Escalier, human skeletal remains were found as well. Very small amounts of faunal remains were found, which may be the result of research or preservation biases, but which may reflect the actual situation as well. These reflect a mix of everyday activities (Nokkert in appendix 5). Pottery samples can be roughly characterised by a variety of vessel shapes, among which simple, rather large and thick open functional vessels are predominant. Decoration is not abundant, except at the Early Ceramic B site of Les Sables. Griddle fragments, spindle whorls, pot-stands and an occasional body-stamp were found as well. Ceramic off-site material has been found near all the sites.

Apart from a settlement function, some habitation sites served ceremonial or other special activity functions as well. At the Late Ceramic A settlement of À l'Escalier, for example, preforms of *spatulae* and a *zemi*, an anthropomorphic head carved in beach-rock which may have been used as a *zemi* (fig. A3.5), one ceramic pelican-head modelling (fig. A3.3a), and polished shell discs and a shell inlay were collected (fig. A3.6). It seems unlikely that this latter object belongs to a garment decorated by shell ornaments, as it is extremely fragile and it would only be conserved if kept on a firm base. It may have functioned as an eyepiece for a statue or figurine made of clay, wood or other perishable materials. Wooden statues, decorated by

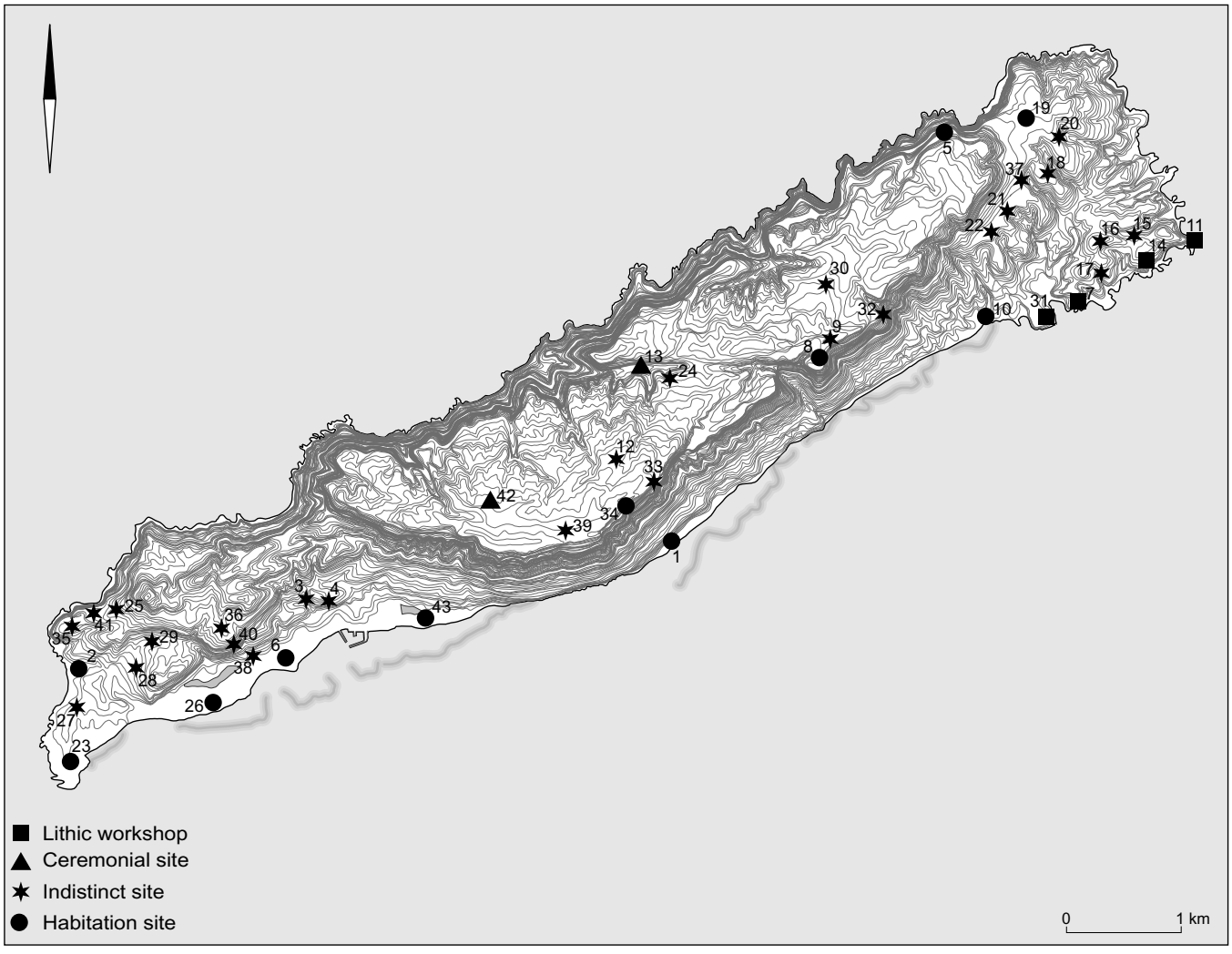

Fig. 5.2. Archaeological sites on La Désirade.

similar shell inlays, are known from the Greater Antilles, and these are usually labelled Taíno style (see for example Dacal Moure and Rivero de la Calle 1996: colour plate 7). It is possible, however, that on the Lesser Antilles statues were made in a local style. Although one small human skull fragment was found in the À l'Escalier midden area, there is no evidence for the existence of a burial area. Late Ceramic A occupation at Anse Petite Rivière yielded some stone and coral three-pointed *zemis* (fig. A3.17), anthropomorphic and zoomorphic *adornos* (fig. A3.15) and body-stamps (fig. A3.13). In addition, three burials were found, of which one individual had been buried with a ceramic vessel. Notwithstanding the fact that local informants reported that at least 15 pre-Columbian individuals had been removed from the site during construction works in 1983 before the area could be properly investigated by archaeologists, the existence of a larger burial area, could not be demonstrated (De Waal 1996[b]). At Early Ceramic B Les Sables, some anthropomorphic *adornos*, seemingly adorned with headdresses, and bird *adornos*, were collected (fig. A3.9).

Site locations are generally rather attractive. Most habitation sites are located on a flat terrain near soils that are suitable for small-scale horticulture and close to a reef and canoe landing-spots. Remarkably, the close proximity of

fresh water could only be reported for three coastal sites. No fresh water sources could be found in the near surroundings of the three sites located on the central plateau and the inland site. For Morne Cybèle-1 and Morne Souffleur, fresh water can be obtained near Souffleur and in the Cybèle ravine, but it is virtually impossible to climb the slope towards the sites from these sources. It takes more than half an hour and quite some effort to climb the slope from the southern coastal plain towards the site, even when using both hands and not carrying water. The peculiar site locations were probably considered attractive features.

Morne Cybèle-1 and Morne Souffleur, which are among the smallest habitation sites on La Désirade, are the most remarkable habitation sites on La Désirade, when regarding site location, archaeological material and chronological assignment. Unfortunately, both sites have been largely destroyed. The sites have spectacular locations on the southern border of the plateau at elevations of approximately 250 m above sea level. The site locations are strategic locations that can be defended easily and they provide commanding views of significant parts of La Désirade and its surroundings. They appear to emphasise the significance of the sites as well and are most impressive when viewed from the southern coastal plain and particularly in the morning when the first rays of sun accentuate the site locations. The protruding plateau, the steep slope towards the sites, and its eye-catching white limestone cornice, exceptional features in the landscape, were probably visually more dominant than the sites themselves. Tilley (1994:99) described a similar phenomenon, claiming that in some instances rock outcrops on which monuments are situated "are far more visually impressive than the monuments themselves". Being dominant focal points in the landscape, they function as landmarks and orientation points and in this manner they indicate and emphasise the location of the site, even when looked upon from a large distance. This makes them special places and consolidates their significance.

The archaeological layers at the sites are rather shallow, approximately 20 cm deep at most, and most of the material is found in bedrock cavities. Although this shallowness can be the result of erosion, it is not thought that the sites were used for a very long time. The archaeological material consists of pottery (fig. A3.35-A3.36; see also Hofman *et al*. 2004: fig. 16), including anthropomorphic *adornos*, clay discs, spindle-whorl fragments and griddle fragments, of an extraordinary style, that has been labelled Morne Cybèle, for which influences from the South-American mainland have been suggested (Hofman 1993, 1995). In addition, both sites yielded a *guaiza*, or shell mask, carved out of *Strombus* sp. (fig. A3.38; see also Hofman *et al*. 2004: fig. 17). Similar shell masks, referred to as Taíno style, have been found in the region, for example at the Anse du Coq site on Marie-Galante (Hoogland and Hofman 1999) and at the Rendezvous Bay and Sandy Hill sites on Anguilla (Crock 2000; Crock and Petersen 1999). Punctated headbands not only embellish the Morne Souffleur mask but the anthropomorphic *adorno* (fig. A3.35) collected from the same site as well, suggesting high-status individuals (or deities or dead ancestors) being represented. The style of the shell mask from the Morne Cybèle-1 site is slightly different. Allaire (1990) referred to these kinds of objects as ritual objects in Chican Ostionoid/Classic Taíno style.

The function of the masks is unknown. The Morne Cybèle-1 mask has been drilled in its upper part and the wearing out of the hole suggests that it was used as a pendant. The Morne Souffleur item has drilled holes in the back of the shell, from which the inner spiral had been completely removed, in order to allow the object to be attached to a stick, or to be worn on a belt. In this latter manner it might have functioned as a special container as well. The mask found at Sandy Hill, Anguilla, has two perforations, which allow a similar use (Crock and Petersen 1999:75). Dacal Moure and Rivero de la Calle (1996:43), citing Las Casas, report that one of the *caciques* on Hispaniola had offered Columbus a belt decorated by a golden human face mask, and that other ethnohistoric accounts describe similar practices that possibly involve shell masks.[3] According to García Arévalo (1997:114) masks were used as protective charms. Roe (1997:153) considers masks to be cacical pendants, for which human frontal bones, decorated by incision and worn on Taíno ceremonial belts might have been prototypes. Following this line of reasoning shell masks might have *zemi*-like functions and it was probably this symbolic reference that made them valuable or high-prestige items.

It is not clear why the La Désirade masks had been deposited. Loss seems unlikely as great efforts would have been made to relocate these highly esteemed objects and they would probably have been found when intensively looked for. It is also possible that these valuable objects needed to be hidden for some reason and no one ever came back to recollect them. Deposition of the objects might also have been part of a specific ritual action, for example related to special offerings. No other objects that are related to ceremonial activities were found. Masks might also lose their ceremonial significance after a certain period of use and may then easily be discarded. The last two possibilities appear most likely.

Regarding the unique archaeological material, including the shell masks and the peculiar style of the very fine ceramics, the high percentage of decoration, and the impressive and easily defensible site locations, the sites may have played a role of special significance (De Waal

2002[a], 2003; Hofman and Hoogland 2004). They appear to have been important at least for La Désirade, but possibly for surrounding areas as well, during the latest part of the pre-Columbian period. ^{14}C analysis of a *Cittarium pica* sample collected from Morne Cybèle-1 provided a date of cal. AD 1440-1480 (Hofman 1995). Although no dates were established for Morne Souffleur, similarities in style of the archaeological material suggest that it was probably occupied roughly in the same period as Morne Cybèle-1. This late date is remarkable since sites with similarly late dates have not been found in the research area, and they are rare on other Lesser Antillean islands.

5.5.2 Lithic workshops

The widespread presence of raw materials suitable for the production of stone tools on the south-eastern part of La Désirade is an interesting feature as these materials cannot be obtained on Petite Terre, Pointe des Châteaux or Grande-Terre. Small amounts of lithic off-site material have been found all over the south-eastern part of La Désirade, indicating that this area was incidentally used for the exploitation of local raw materials for the production of lithic artefacts. Concentrated and repeated activity took place at four lithic ateliers, with site areas ranging between 3600 m^2 and 11,200 m^2, situated at the coast.

Simple, mostly *ad-hoc*, artefacts of local raw materials were made there. Archaeological material is largely restricted to the surface and generally comprises lithic artefacts such as pebbles, flakes, flake cores, hammer-stones and shatter pieces of local igneous rock, local chert and possible Long Island flint. Some weathered shell fragments, including *Cittarium pica* and *Strombus gigas*, and coral fragments were observed as well and *Strombus gigas* axes were collected from some of the sites. No settlement refuse was found. Few finished tools were found in the site assemblages but the unsystematic character and the low densities of the worked material indicate that the sites were not used as pre-working sites (Knippenberg personal communication 2003).

The shallow concentrations of lithic material suggest that the sites were not in use very long. Bodu (1984) remarked that the limited quantity of lithic artefacts at Pointe Doublé could be the result of several hours' work by a group, or even by an individual, over a period of several days. People living at different sites on La Désirade in pre-Columbian times probably used the sites on a very small scale from time to time. Chronological assignments have not been made, but the sites are probably ceramic (Knippenberg personal communication 2002).

According to Bodu (1984), the sites of Morne de Baie Mahault and Pointe Doublé produced lithic artefacts for the Anse Petite Rivière site but these were not available for analysis. The worked lithic materials that naturally occur at the sites can be easily exploited and used for the manufacture of a large number of simple stone tools. The red and dark gray chert that has been worked at Pointe Gros Rempart, however, does not surface at this site and it is not clear why reduction took place at this very spot. Pointe Gros Rempart may have been selected as a temporary base to work material that can be collected close-by. It is not likely that Pointe Gros Rempart functioned as an outpost to exert control on the exploitation of La Désirade lithics. The archaeological material found at the site, as well as the limited importance of the La Désirade lithic material, evident from the modest spread over the research area, suggest that the material was not highly valued. The quantity of available raw material was apparently more important than the quality. The material does not equal the qualities of flint, reducing the regional importance to an important degree. Very small amounts of red chert have been found at other sites on La Désirade itself and on other parts of the research area. Two flakes of La Désirade red chert have been reported for the Morel site on Grande-Terre as well (Knippenberg 2006).

5.5.3 Ceremonial sites

Two ceremonial sites were identified on La Désirade on the basis of the special archaeological material encountered and the peculiar characteristics of the site locations: the Late Ceramic A sites of Chemin de M. De l'Orme and Voûte à Pin on La Désirade.

Chemin de M. De l'Orme consists of a deliberate deposition of a small vessel, which functioned as a container for a small stone axe and adze of St. Martin chert (fig. A3.39); (De Waal 2003). The vessel is decorated with an elaborate but rather imprecisely made pelican motif all over. Members of the 1999 survey crew found it outside the survey area, in the middle of a dirt track on the central plateau. Before deposition of the vessel, a small hole had been dug in the bedrock to provide a snug fit and protection for the vessel. The deposition is in an unattractive area with no strategic importance, on a hilly terrain that is difficult to reach and far from the villages and the coast. The vessel has been placed in an 'empty' area, judging from the distributions of archaeological material in the surroundings of the site: hardly any off-site material was discovered.

The function of the deposition is not clear. Close investigation of its surroundings did not provide evidence for the deposition to be a votive offering as part of a habitation structure or a burial. Petitjean-Roget (personal communication 2003) suggested on the basis of analogies from the South American mainland that the vessel functioned

as an offering to spirits related to agricultural fields, made in order to ensure fertility of the soil and good crops. It appears unlikely, however, that the vessel was deposited in an agricultural field, as it is not on flat terrain or close to water. Corrosion of the outer surfaces hindered use-wear analysis of the lithic artefacts. The tools were probably never used and their significance in this deposition is most likely linked to the exotic origin of the material. The deposition appears to reflect a single deposition action, but it remains unknown to what extent the site played a more extensive role of longer ritual or ceremonial importance. It is equally unknown whether the deposition is the result of an individual or a collective action (De Waal 2003). The symbolism of the pelican decoration and the presence of the two axes provide some insight into the meaning of the deposition. Moravetz (1999:188-189) suggests that pelican representations may have been symbolic of the spirit world. According to Crock (2000:227-228) it is very likely that for marine oriented people, pelicans symbolised an abundance of marine resources as their presence is related to the presence of fish, and that pelican bowls therefore had a great symbolic significance. The use of pelican bowls was probably limited to ceremonial contexts only and people handling the vessels had a special status. Crock, however, discussed pelican head *appliqués*, instead of vessels embellished all-over by pelican decoration representing the complete body of the animal, which probably had an even greater symbolic significance.

In depositions, relationships between objects deposited, people involved as well as the location where it takes place are relevant and provide meaning to the action (Fontijn 2003:33-35). According to Fontijn (2003:271) "selective deposition reflects a structured cultural understanding of the land, in which different places and zones had different and possibly even conflicting meanings". Being different from structuring elements that may be visible in the landscape, such as settlements, burial areas or monuments, the persistence of significance of depositions may be largely dependent on the collective memory. The exact meaning of the pelican-vessel deposition remains unidentified, although it appears to have functioned as a votive offering, in honour of ancestors, spirits or deities.

Voûte à Pin is a cave site, situated on the steep west slope some 15 m above the Rivière ravine, which is the major ravine intersecting the central plateau. The site is seriously disturbed. The cave consists of two main chambers, measuring 6 x 5 m and 8 x 6 m and it has an entrance, measuring 2 x 1.5 m, and a small 50 x 50 cm window-like opening. No petroglyphs were encountered at Voûte à Pin. The site is well hidden and one can easily imagine hostile situations when this is an advantage. A natural spring can be found close to Voûte à Pin. Canoes cannot land in the vicinity of the site but a landing spot on the northern coast, at a distance of 700 m from the site, can easily be reached through the ravine. The site location is impressive, particularly when approaching the site by walking through the deep Rivière ravine. The site is quite far from any of the known pre-Columbian habitation sites on La Désirade. Pottery, including griddle fragments, some lithic artefacts, a coral artefact, shell food remains and very small amounts of crab remains and human skeletal remains were collected. No off-site material has been found. The impressive location and special features of the site, and the presence of human remains, suggest that the site was not used for everyday activities.[4] The griddle fragments and food remains indicate that people spent at least enough time to prepare meals, whether they served for the living or the dead.

Although only very small amounts of human skeletal remains have been found, it is tentatively suggested that the site was used as a burial site. It is not known whether this involved one or more burials and what other rituals may have been associated with this practice at the site. It is possible that the site was used for communal activity. It is remarkable that people were buried in the cave taking into account that settlement sites such as Anse à la Gourde and Anse Petite Rivière had their own burial areas. It is not known why people were buried at Voûte à Pin instead of in these communal burial areas. The small amounts of human skeletal remains at Voûte à Pin do not suggest a change of burial location from village cemeteries to caves. Instead, it can be suggested that only some individuals, people with a special status, or only some bones, were buried here, away from the communal burial areas in the settlements. Although children that died before they received their names were on some occasions buried at special locations outside the settlement (Kraan 1998:11), it is thought that the Voûte à Pin human remains belong to adults. The presence of human skeletal, or 'ancestral', remains seems to point to ancestor veneration cults or to consulting and worshipping the spirit world. Usually crania or long bones are worshipped as *zemis* for this purpose (Hoogland 1996). The Voûte à Pin sample, however, only consists of fragments of a radius, an ulna and several other, much smaller, bones.

As Keegan (1985:214) suggested, the prominence of caves in pre-Columbian Amerindian mythology implies that they were significant locations for ritual activities. Voûte à Pin may have played a role of, at least local, significance.[5] Regional significance cannot be advanced on the basis of the present evidence, however.

5.5.4 Sites with indistinct functions

A total of 26 sites have been listed as indistinct sites with

functions. One of these is a cave site. All the sites were dated Late Ceramic A, except for two undated sites. The sites are characterised by shallow and dispersed distributions of fragmented and weathered ceramics. In some cases lithic artefacts and shell and coral fragments occur as well. Ceramic off-site material was found near almost all the sites. The sites are damaged as a result of building activities, erosion and cultivation. This may explain the thin archaeological layers of the sites to some extent, although it appears more likely that the sites are shallow since they only represent short periodic visits or incidental activities by a small group of people, therefore reducing the regional importance of the sites. They may have played a role at the local level, however. Excluding the cave sites, site areas are between 300 m^2 and 39,000 m^2. The indistinct sites are larger than the Pointe des Châteaux indistinct sites but smaller than the La Désirade habitation sites. Most indistinct sites, 18 in total, are located inland, seven sites are on the central plateau and only one site is coastal. The indistinct sites have less attractive locations than the habitation sites, since they are further removed from fresh water sources, reefs, canoe landing-spots and salinas. All are situated near good soils and most are on flat terrain.

Eight indistinct sites, with site areas between 300 m^2 and 39,000 m^2, provided evidence for local food preparation. The limited density of settlement refuse at some of the sites suggests that they functioned as temporary habitation areas or campsites. The sites can swiftly be reached from the habitation sites. Long stay-overs, related to special activities carried out on the spot or in the immediate surroundings, such as the exploitation of non-subsistence resources or activities related to food procurement, would therefore not have been necessary for inhabitants of the settlements on La Désirade. Site location variables are slightly less attractive than those of the habitation sites, since most of the sites are inland and only one of the sites is close to a fresh water source.

A total of 14 indistinct sites, lacking evidence of food preparation on the spot, may have been used for gardening activities. These sites have areas between 600 m^2 and 19,300 m^2. Being predominantly situated inland, they have less attractive locations, near soils suitable for small-scale horticulture and mostly on flat terrain, but only few are close to fresh water. Most of these sites may have been related to gardening activities. The Grotte le Baigneux site, however, was probably used for activities related to the exploitation, preworking or finishing of non-subsistence resources, as the site only yielded lithic, coral and shell artefacts, including a hammer-stone, a grinding-stone, and axes.

Four indistinct sites are small cave sites. The sites are inland, generally at high elevations overlooking parts of the southern coastal plain of the island. These locations do not appear to have been attractive for habitation. It has been suggested that the cave sites may have been used for shelter from hurricanes or other natural or possibly human threats (section 5.3.1).

5.6 ARCHAEOLOGICAL SITES ON PETITE TERRE

The Petite Terre site inventory contains seven single-component Late Ceramic A sites (fig. 5.3; appendix 4; table 5.1), five of which had already been reported by Bodu (1985[c]). The total comprises five habitation sites and two indistinct sites (De Waal 1999[f], 2000, 2001, 2002[a-c]).

5.6.1 Habitation sites

The Petite Terre habitation sites are large, with site areas between 8200 m^2 and 25,100 m^2, and 60-80 cm thick archaeological deposits. The sites are relatively deep when compared to some of the habitation sites on Pointe des Châteaux and La Désirade.

According to Bodu (1985[c]) the Petite Terre sites should be interpreted as temporary camps that were used for short stops on the way from Marie-Galante to La Désirade and vice-versa. This idea is probably linked to the often-voiced assumption that Petite Terre was too small to be settled permanently and too dry to support human occupation. However, archaeological material and site dimensions suggest that the sites could very well have functioned as permanent habitation sites. Thick accumulations of material have been found over large areas, and faunal and ceramic assemblages appear to suggest permanent use. The idea that Petite Terre is too small to allow permanent habitation appears to be guided by recent perceptions of preferred living conditions. The islands of Petite Terre are very attractive for habitation: horticulture is possible for almost all areas and they are surrounded by easily accessible, large stretches of shallow water. They have an extremely high potential for exploitation of marine resources, providing ideal natural conditions for marine turtle life, reef fish and molluscs. This situation can be compared to the shallow water Saba-bank (Hoogland 1996) and the Anguilla-bank (Crock 2000) that is reported to have been attractive for pre-Columbian habitants of the nearby region. On Petite Terre, turtles nowadays preferably lay their eggs on the northern coast of Terre de Haut, and the westernmost tip and at the southern coast of Terre de Bas (Diren 1994: map in appendix 24). The Est de Trou Canard site and the Baleine du Sud site are situated rather close to these areas. In addition, the islands appear to have harboured an abundance of fur seals. Breton (1892[1665]:113) translates *Cayóoli* as “Islet entre la desirade & la pointe de la grande terre appellée premierement

Fig. 5.3. Archaeological sites on Petite Terre.

la petite terre du depuis l'islet aux ours marins, enfin l'islet d'hoüel". In addition, regular contacts with inhabitants of La Désirade, Marie-Galante and Grande-Terre would have greatly enhanced the pre-Columbian living environment on Petite Terre.

The sites have attractive locations, being situated on flat areas, near canoe landing-spots, reefs and good soils. Just one source of fresh water, however, could be recorded near the lighthouse, which is in the immediate surroundings of Site du Phare.

No intra-site distributions or site layouts were identified, though at Baleine du Sud, Site du Phare and Est de Mouton de Bas, small concentrations were identified at the surface. These are interpreted as different patches of one extended midden area. The sites have small amounts of ceramic and shell off-site material, less than usually encountered around habitation sites. All the sites, except for Trou Canard, yield typical habitation refuse, including pottery, shell food remains and lithic, shell and coral artefacts. Samples of faunal material, reflecting a mix of everyday activities, could be collected at most sites as well (Nokkert in appendix 5). Pottery samples can be roughly characterised by a large variety in vessel shape, although simple open, often red slipped, vessels predominate. Samples from some of the sites show a rather large variety in rim shape, surface colour, firing technique and surface finishing. Decoration is not abundant. Fragments of griddles, pot-stands and spindle whorls were found as well. Finds of a shell *spatula* (Est de Mouton de Bas; fig. A4.10), a human face bowl (Pointe Sablée; fig. A4.14) and a bird *adorno*, a figurine leg fragment and a *zemi* (Site du Phare; fig. A4.4-A4.5) suggest that ceremonial or other special activities also took place.

5.6.2 Sites with indistinct functions

Two sites on Terre de Bas, measuring 4900 m^2 and 12,800 m^2 and, have been listed as indistinct sites. The locations of the sites, being situated on flat areas, close to the coast, reefs, and good soils, are more attractive than those of indistinct sites on La Désirade and Pointe des Châteaux. The sites are

characterised by small amounts of fragmented and weathered ceramics, representing simple, open vessel forms, and shell fragments on the surface and they appear to be shallow. Mouton de Bas yielded fragments of rather thick and large vessels and two griddle fragments; a spindle whorl preform was collected from Est de Trou Canard. Small amounts of ceramic off-site material were found.

The function of the Petite Terre sites appears to be even more indistinct than the function of roughly similar sites on Pointe des Châteaux and La Désirade. The islands are so small and homogeneous that it appears very unlikely that inhabitants of the Petite Terre settlements used temporary habitation sites or campsites. It appears to be more likely that the indistinct sites at Terre de Bas are satellite sites of habitation sites on Pointe des Châteaux or La Désirade. People were probably attracted to the abundance of marine resources. According to Breton (1978[1647]:32), cited in chapter 4, pre-Columbian inhabitants of Guadeloupe went to Petite Terre to catch sea-turtles. It is not clear whether use of the indistinct sites was contemporaneous with occupation of the Petite Terre settlements, but if it was, people using these sites must have been in close contact with the inhabitants of Terre de Bas, who depended on these resources as well.

5.7 CONCLUDING REMARK

This chapter has demonstrated that the East-Guadeloupe surveys have successfully provided a reliable inventory of pre-Columbian sites in the selected micro-region. Large samples of different geological and ecological zones have been investigated, and a large number of pre-Columbian sites, with various functions, locations and chronological assignments, have been discovered. The detailed Eastern Guadeloupe site catalogues (appendices 2-4) may be considered a direct result of the systematic and intensive survey design used.

The surveys demonstrated shortcomings in the understanding of marginal site types, labelled indistinct sites in this study, characterised by modest distributions of fragmented ceramics largely limited to the surface. Although hardly ever documented in earlier studies in the Caribbean they represent an important part of the Eastern Guadeloupe site inventory (De Waal 1999[b], 2002[a-c]) and it is thought that they must be present in other areas and on other islands too.[6]

NOTES

1 Stuiver, M., P.J. Reimer and R. Reimer, Electronic program, http://www.depts.washington.edu/qil/calib/, accessed October 2002.

2 The 2000 fieldwork campaign enlarged the existing 1998 site inventory, which has been presented before (De Waal 1999[b,d-e]), by adding four sites that were found in the area west of Anse à la Gourde.

3 Casas, Fray B. de las (1951), *Historia de las Indias*. *Vol.1*:271-272. Fondo de Cultura Económica, Mexico City [Originally written 1520/1561, first published in 1875/1876].

4 Apparently, Fathers Guilbert and Pinchon collected remarkably well-finished and decorated ceramics from Voûte à Pin (Bodu 1985[c]). Unfortunately, these ceramics were not available for analysis.

5 Older inhabitants of La Désirade still consider Voûte à Pin to be a ritual place.

6 Similar sites have been reported for the Los Roques archipelago, and no functional explanations could be proposed for these sites either (Antczak 1998).

6. SETTLEMENT PATTERNS, SOCIAL ORGANISATION AND INTERACTION IN A DIACHRONIC PERSPECTIVE

6.1 INTRODUCTION

Reviewing the site data that have been presented in chapter 5 and appendices 2-4 for Pointe des Châteaux, La Désirade and Petite Terre separately, micro-regional overviews are created for each pre-Columbian occupation period. These overviews include descriptions of settlement patterns, settlement structures, settlement territories and hierarchies, and inter-settlement contacts. They largely follow a diachronic schema encompassing the four main phases of the Ceramic Age and the social developments characterising each of these phases as recently proposed by Hofman and Hoogland (2004).

6.2 HYPOTHETICAL PIONEER PHASES (PRE-CERAMIC PERIOD AND EARLY CERAMIC A: 2000 BC - 400 AD)

The pre-ceramic period and the Early Ceramic A have been hypothetically labelled pioneer phases for Eastern Guadeloupe as no evidence for habitation prior to the Early Ceramic B was found. Pre-ceramic and Early Ceramic A sites have been found in other parts of Guadeloupe, however (fig. 6.1; sections 4.2.2 and 4.2.3).

Pre-ceramic sites are not expected to have gone completely unnoticed during fieldwork. One re-used pre-ceramic artefact was found at the Early Ceramic B site of Les Sables, but this artefact is a Long Island flint blade fragment, which was possibly collected on Long Island together with other flint raw materials or artefacts, during a later period.

Although pre-ceramic sites are quite rare on the Windward Islands as well, the almost complete absence of pre-ceramic sites on the large and ecologically diverse island of Guadeloupe is striking. More pre-ceramic sites have been reported for the Leeward Islands, for Antigua in particular. This cannot only be explained by the island's unique flint sources but also by its tectonic history. Part of the island has been uplifted and this is almost exactly the area where the densest concentration of pre-ceramic sites has been found. Guadeloupe does not have natural flint occurrences, but as the island is located quite close to Antigua, it can be expected that pre-Columbian inhabitants of nearby Guadeloupe could easily obtain flint as well. In addition, raw material – albeit of low quality – for the production of lithic artefacts was and still is readily available at La Désirade. This material – chert – is of sufficient quality for an expedient flake technology but it is not suitable for blade production. Moreover, the ecologically rich environments related to the salinas and the large and shallow reefs on Pointe des Châteaux and Petite Terre will have been attractive for pre-ceramic groups. These areas, contrary to Antigua, are not uplifting but submerging instead. Most pre-ceramic sites on surrounding islands have a marine orientation, not only in the exploitation of marine resources but in the choice of site locations as well.[1] Although the option that there simply were no pre-ceramic sites in the micro-region should be considered, pre-ceramic sites, once present in coastal areas, may nowadays have been eroded or covered (Delpuech *et al.* 2001; De Waal 1999[b]; *cf.* section 3.2.3).

No evidence is available for Early Ceramic A habitation in the Eastern Guadeloupe micro-region either. This is surprising since some Early Ceramic A settlements, yielding Huecan Saladoid ceramics, have been reported for other parts of Guadeloupe and it is not likely that Early Ceramic settlements, for which large dimensions have usually been reported, would have eroded completely. In view of the intensity of the surface surveys (*cf.* section 2.2.3) it is practically impossible that large surface scatters of archaeological material dating to the period before AD 400 went unnoticed in the field. It is possible, however, that Early Ceramic A settlements have been covered by later sediments, just like pre-ceramic sites.

There is evidence that people who lived at the Early Ceramic A settlement of Morel (Grande-Terre) exploited red chert sources on La Désirade (Knippenberg 2006). They were using the La Désirade lithic workshops (fig. 5.2) during an early period for which no habitation evidence has yet been found on this island.

6.3 BEGINNING OF OCCUPATION AND ESTABLISHMENT OF LOCAL CONTACT NETWORKS (EARLY CERAMIC B: AD 400-600/850)

6.3.1 Introduction

Seven Early Ceramic B sites have been discovered in the Eastern Guadeloupe micro-region, comprising six habitation sites and one indistinct site (fig. 6.2; table 5.1). Most of these sites are on Pointe des Châteaux. The surface areas of the single-component sites are large, ranging between 1 and 2

hectares.[2] Only one indistinct site that possibly functioned as a temporary habitation site has been discovered on Pointe des Châteaux. This inland site is much smaller than the habitation sites. Some of the undated La Désirade lithic workshops (fig. 5.2) were probably used during the Early Ceramic B period as well, since La Désirade red chert was found at Les Sables and Anse à la Gourde.

6.3.2 Settlement pattern

The beginning of Early Ceramic B habitation in the Eastern Guadeloupe micro-region was coeval with a population increase on several other Caribbean islands with Early Ceramic A habitation, including Grande-Terre, and the settling of previously uninhabited islands. There is archaeological evidence for occupation at Pointe des Châteaux and on La Désirade, but no indications were found for temporary stays or longer-term habitation on the islands of Petite Terre.

Habitation was concentrated in large permanently inhabited villages. This is consistent with other Early Ceramic B settlements in the Lesser Antilles (e.g. Versteeg and Schinkel 1992; Watters 1994). Thick occupation layers – another typical feature of Early Ceramic B settlements – were observed only at Les Sables (table 5.1). Habitation at Les Sables appears to have been more substantial than the Pointe des Châteaux settlements, which were probably inhabited by smaller groups of people for relatively short

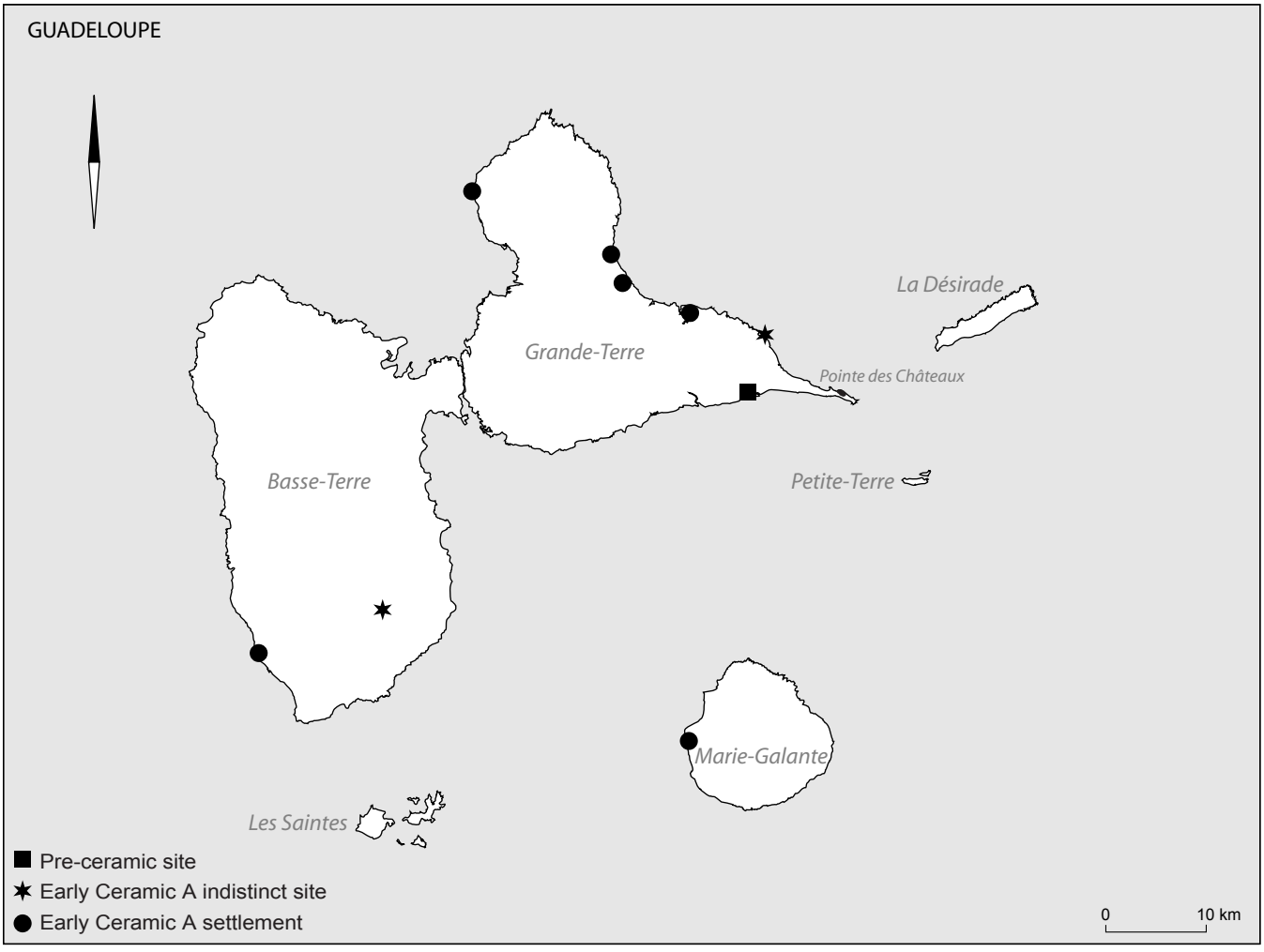

Fig. 6.1. Pre-ceramic and Early Ceramic A sites on Guadeloupe and its nearest neighbouring islands.

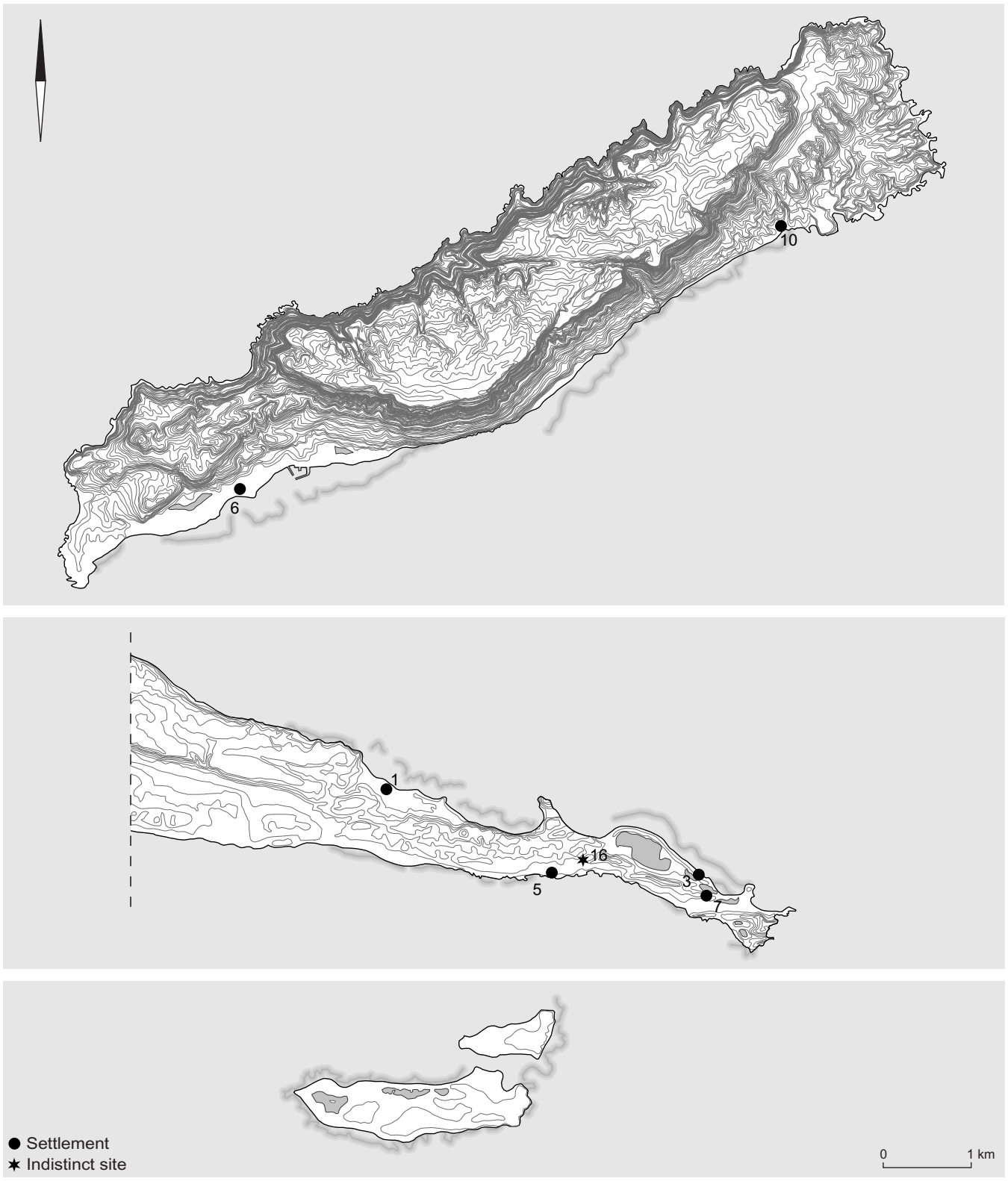

Fig. 6.2. Early Ceramic B sites in the Eastern Guadeloupe micro-region.

periods. The large dimensions of the Pointe des Châteaux settlements may be explained by the accumulation of refuse from subsequent small camps resulting in sheet trash, or low-density scatters of refuse material.[3]

It is unlikely that the villages in the Eastern Guadeloupe micro-region were occupied concurrently, when one regards the relatively short periods during which they were inhabited. The earliest occupation in the Eastern Guadeloupe micro-region has been documented at Petites Salines, followed by settlements at Montagne des Petites Salines and Les Sables, which, in turn, were succeeded by occupations at Anse à la Gourde, Village des Pêcheurs and Anse Petite Rivière. The thick sterile beach sand layer that separates Early Ceramic B and Late Ceramic A settlement refuse at Petites Salines suggests that this settlement was uninhabited for some time. Petites Salines possibly represents an older phase of a settlement that shifted inland to nearby Montagne des Petites Salines. Petites Salines was inhabited again during the Late Ceramic A.

Les Sables reflects most intensive occupation. The other settlements were occupied by smaller groups of people or for shorter periods, suggesting that there was some shift of settlements over the landscape. This is not true for Anse à la Gourde, which was inhabited from AD 500 until the latest part of the pre-Columbian period. The environs of this village apparently supported such a long period of occupation and its inhabitants tended to stay in one location or only moved very small distances. The mobility of this settlement ostensibly was low.

No special ceremonial sites have been identified and the discovery of only one indistinct site, possibly a temporary habitation site, and a very small quantity of off-site material suggest that most ceremonial, socio-political and economic activities were centred in or near the settlements. The settlements and their direct environs were clearly the focus of daily-life activities. The only village where indications of ceremonial activities were actually found is Anse à la Gourde, thanks to extensive excavation. The most striking feature at this settlement is a large burial area (Hoogland and Panhuysen 2001; Kraan 1998; Roetman 2003; Timmermans 2003). Use of this burial area started during the Early Ceramic B, and had its heyday in the Late Ceramic A. Ritual paraphernalia, such as three-pointed *zemis*, inlays, *spatulae* and shark-shaped and frog-shaped pendants, were found at Anse à la Gourde as well.

One site on Pointe des Châteaux may have functioned as a temporary habitation site or a campsite. The site was probably not related to one of the Pointe des Châteaux settlements. It was very close to Village des Pêcheurs, and it could also be easily reached within the hour from the other settlements on the peninsula. Considering the wealth of subsistence resources and the limited dimensions of the area, however, it is not likely that long stay-overs in the fields or at special activity sites were needed. Most subsistence resources were present in the near surroundings of the villages. Most likely, inhabitants of villages outside the Pointe des Châteaux peninsula, probably from an ecologically different zone and attracted by the presence of the rich subsistence resources around the salinas, used the site. Only a short distance separated the temporary habitation site from Village des Pêcheurs. The former would have interfered in the territory of the latter, if the sites were contemporaneous, thus access to settlement territories was probably not restricted. This suggests certain mobility, but as only one temporary habitation site was encountered, the scale at which this occurred was probably quite modest. It is not clear whether inhabitants of villages in the Eastern Guadeloupe micro-region used similar sites in order to exploit more remote areas. It is possible, however, that special activity sites, used by inhabitants of the Eastern Guadeloupe villages, e.g. for harvesting *Strombus gigas* or *Cittarium pica,* were located at the coasts and destroyed by erosion.

The Eastern Guadeloupe settlement pattern is similar to settlement patterns on Grande-Terre as a whole, Basse-Terre, Marie-Galante and Les Saintes, which also consist of large, regularly spaced coastal villages (fig. 6.3). The spacing between the settlements on these islands, however, is greater when compared to Eastern Guadeloupe, and no indistinct or special activity sites have been recorded. Both facts can be explained by a lower intensity of surface observations. Incidentally, non-residential sites have been found in other parts of the Guadeloupe archipelago, including a special activity site near Chute du Carbet and several petroglyph sites in the petroglyph area on Basse-Terre, and the ceremonial site of Morne Rita on Marie-Galante (Slozinski and Slozinski 1983).

6.3.3 Settlement structure

Very little can be said regarding settlement structures since even at the intensively excavated Anse à la Gourde settlement, only a very small part of the Early Ceramic B settlement has been preserved due to severe coastal erosion. This includes some posthole configurations, from which no structures have been deduced, a small number of burials, charcoal patches and a crab midden (Hofman *et al.* 2001[a]:49).

On a regional scale, Golden Rock on St. Eustatius is the best-documented village providing data on Early Ceramic B settlement structure in the Lesser Antilles. At Golden Rock, the remains of six roundhouses have been

found with diameters ranging from 7 to 19 m dating to AD 600-900. Smaller structures have been interpreted as special activity huts and storage or drying racks. The village layout consists of a central area with dwellings, refuse dumps, adult burials, and an area that may have been used for food processing activities, protected by windbreaks. The settlement comprised some children's burials, ceremonial caches, a rectangular structure that possibly functioned as a men's house, and a central *plaza*. The different functional areas appear to have largely remained unchanged throughout the period of occupation of the village, and this, together with the fact that houses were probably being rebuilt on the same spot, has been taken as evidence of strong settlement continuity. Five occupation phases have been identified. Assuming that these lasted 25-50 years each, and assuming that occupation was continuous, this would amount to a total occupation span of 125-250 years. Each occupation phase had one single dwelling, although one phase had two houses. The number of inhabitants of the large structures was estimated by calculating 3 m^2 or 6 m^2 per person, and by counting the number of triangular family compartments, assuming a four-person family per compartment. Estimates of the number of inhabitants increase from 12 to 24 for the earliest phase to 35/36 to 71 for the last phase (Schinkel

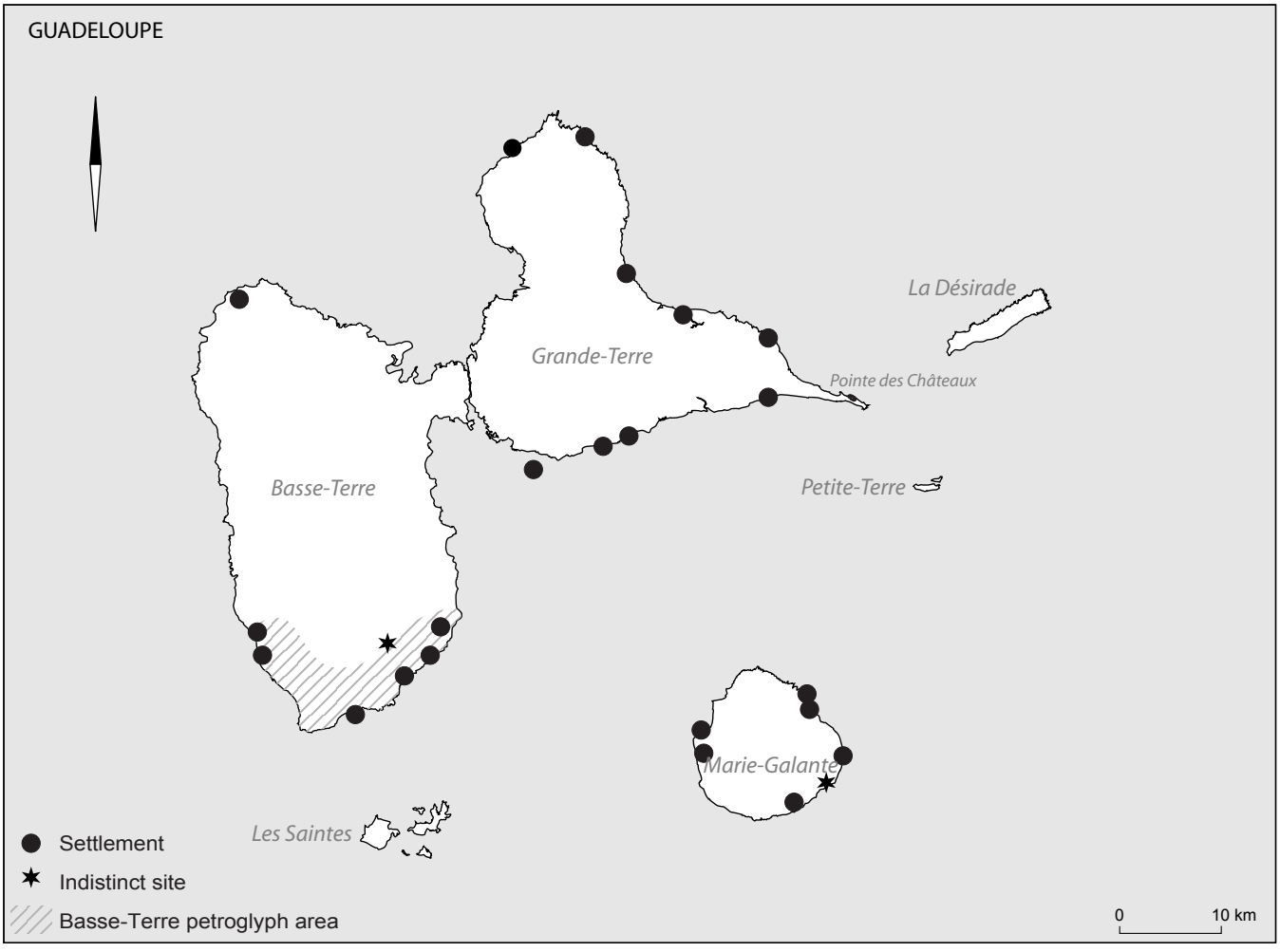

Fig. 6.3. Early Ceramic B sites on Guadeloupe and its nearest neighbouring islands (for sites in the Eastern Guadeloupe micro-region see fig. 6.2).

1992).

Golden Rock is representative for Early Ceramic B settlements in general considering its large dimensions and its dense refuse deposits, as well as its strong continuity in habitation. Some aspects, however, are less ubiquitous. As Bright (2003:48) pointed out, large roundhouses, as found at Golden Rock, were not necessarily the representative house type, as round, oval, and incidentally rectangular structures of varying dimensions are more common throughout the Caribbean.

Although far from reliable, an attempt has been made to estimate maximum numbers of inhabitants that could have possibly lived in the villages in the Eastern Guadeloupe micro-region, following ethnographically based guidelines by Myers and Roosevelt, presented in section 1.4.6. These numbers range roughly between 45 or 70 persons for Village des Pêcheurs, the smallest settlement, to 86 or 128 persons for Les Sables (table 6.1). These estimates are based on the maximum surface areas of the sites and thus should be considered as rough estimates. They appear to be far too high when compared to the Golden Rock estimates.

6.3.4 Settlement territories and hierarchies

The villages were dispersed and evenly distributed, separated by rather large distances, along the coasts of Pointe des Châteaux and La Désirade (fig. 6.2). This was probably due to the wide availability of attractive areas – with easy access from the sea, as well as good exploitation potential and observation facilities – for habitation within the micro-region; clustering of settlements due to limited occurrences of natural resources did not occur. The regular distances between the settlements resulted in equally spaced territories. It has been suggested above that people from villages outside the Eastern Guadeloupe micro-region exploited resources within this micro-region and that access to settlement territories was probably not restricted (section 6.3.2).

Inhabitants of the La Désirade settlements could have considered the complete island as their territory as the villages of Les Sables and Anse Petite Rivière were not inhabited at the same time. The Pointe des Châteaux villages were located approximately 2 km from each other. The inhabitants of Petites Salines, and later Montagne des Petites Salines, were the only people to use and exploit the Pointe des Châteaux peninsula, due to a lack of contemporaneous settlements. It is possible that settlement territories were limited to approximately a 1 km radius, as habitation of Anse à la Gourde and Village des Pêcheurs may have been more or less contemporaneous.

Most villages had attractive coastal locations (fig. 6.4). They were on flat areas close to fresh water sources, easily accessible bays, reefs, salinas and good soils, and most settlements provided overviews on their surroundings. Rich subsistence and non-subsistence resources close-by allowed villages to be independent. The inhabitants probably centred on exploitation areas quite close to the settlements. They practised a mixed and broad-spectrum economy. Faunal exploitation is broad, focusing on a wide range of species. They cultivated root crops and tubers on the flat coastal areas near the villages. In addition, they collected shellfish, crustaceans and sea urchins in the shallow littoral zones (in sea-grass beds but mostly on rocky shores) and caught fish on reefs and more sporadically in offshore-pelagic zones. In inland zones surrounding the villages, wild tubers, seeds and fruits could be collected and small terrestrial mammals such as rice rat and agouti, as well as land crab, could be hunted and caught. Fresh water could be obtained close to most villages. Clays and temper materials for the manufacture of pottery and limestone rock and shell, and coral for the fabrication of other artefacts were widely available in the

Site	Site area	Site area - 10%	N inhabitants following Myers (1973)	N inhabitants following Roosevelt (1980)
Village des Pêcheurs	10,100	9090	46	68
Montagne des Petites Salines	15,500	13,950	70	105
Anse à la Gourde	Unidentified	Unidentified	Unidentified	Unidentified
Petites Salines	Unidentified	Unidentified	Unidentified	Unidentified
Les Sables	19,000	17,100	86	128
Anse Petite Rivière	Unidentified	Unidentified	Unidentified	Unidentified

Table 6.1. Estimated numbers of inhabitants of the Early Ceramic B settlements in the Eastern Guadeloupe micro-region.

near surroundings of the settlements, as were firewood, cotton, calabash, and fibres.[4] Volcanic rock, suitable for the manufacture of lithic artefacts, was available at La Désirade and was worked in lithic workshops in the eastern part of this island. The inhabitants of Anse à la Gourde and Les Sables probably used these workshops for the manufacture of simple tools from volcanic rock, but they exploited local limestone rocks as well. They also obtained artefacts from more distant sources, such as Long Island (flint), Antigua (chert), and St. Martin (chert). Non-local flint was obviously preferred over the more easily available La Désirade red chert.

The observation that villages were situated in ecologically diverse, attractive settings concurs with that made by Petersen and Crock (1999), reporting that all Late Saladoid settlements on Anguilla were located in 'optimum settings'. Murphy (2004) deemed fresh water and fertile soils to be the most attractive location variables for Early Ceramic groups on Antigua, although they preferred to settle inland, in contrast to the people living in the Eastern Guadeloupe micro-region. The attraction of salinas, near which all Eastern Guadeloupe settlements in this period were situated may have been related to various factors. No artefact or field evidence has been found that salt was gathered or processed. Antczak (1998:132), however, suggested for one of the Los Roques settlements that perishable materials were probably used for the collection and storage of salt and this may be true for the East-Guadeloupe settlements as well. Although

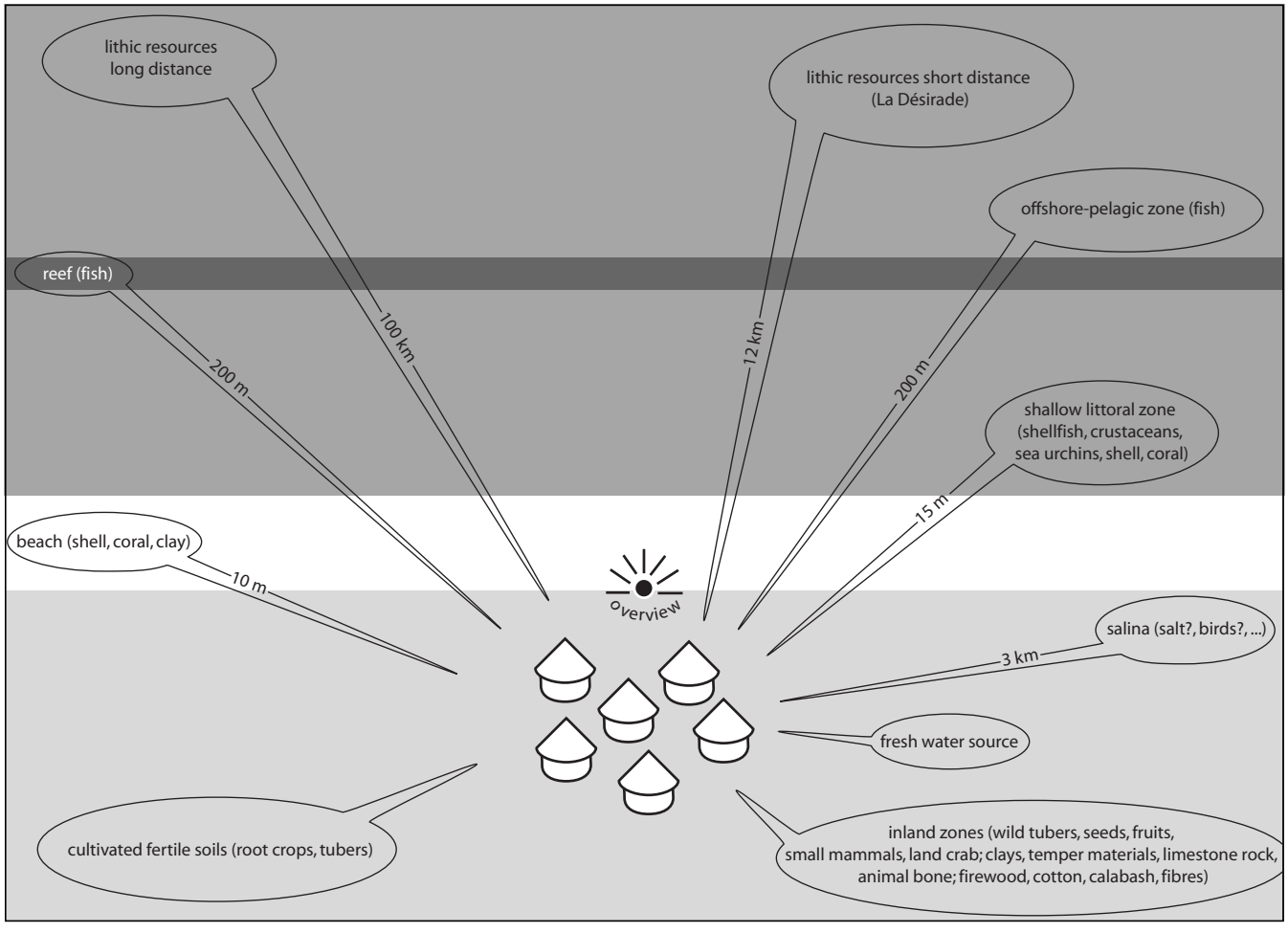

Fig. 6.4. Schematic representation of the Anse à la Gourde site location and (subsistence) resources.

Breton (1978[1647]:63) reported that the Amerindians he encountered on Guadeloupe did not use salt to spice their meals, it is possible that salt was used for conserving meat or fish. He, moreover, reported (1978[1647]:34-35) that the salinas on Grande-Terre sheltered large numbers and many species of birds, which made them attractive areas for exploitation. The Eastern Guadeloupe inhabitants actually did catch birds (appendices 2-5).

No evidence has been found for the existence of any settlement hierarchy, although it is clear that Anse à la Gourde and Les Sables were the most prominent villages. All villages had ecologically diverse locations and mutual differences were small. Regarding the location variables listed in section 1.4.4, Anse à la Gourde occupied the best location followed by Montagne des Petites Salines and Les Sables (table 5.1). Petites Salines, probably the first settlement on Pointe des Châteaux, and Village des Pêcheurs occupied next best locations. High-status artefacts, such as ceremonial paraphernalia, and non-local lithic artefacts have been collected from Anse à la Gourde and Les Sables. The latter settlement has the largest extent and the thickest archaeological layer (table 5.1).

There is no archaeological evidence for internal group organisation or for personal status variation in the Eastern Guadeloupe micro-region during the Early Ceramic B period.

6.3.5 Micro-regional and regional interaction

6.3.5.1 Introduction

Close contacts between inhabitants of different villages and different islands needed to be carefully maintained, for demographic reasons alone, *i.e.* the need for finding marriage partners outside the village. It is, however, difficult to demonstrate and to identify the existence of such contacts in material remains from neighbouring and contemporary villages that are rather similar to each other.

Regarding possible contemporaneity of settlements in the Eastern Guadeloupe micro-region (section 6.3.2), it is postulated that the inhabitants of Petites Salines could have had contact only with villages outside Eastern Guadeloupe, as a result of the absence of contemporary settlements nearby. In a later stage, contacts between inhabitants of Montagne des Petites Salines and Les Sables may have existed on the mere basis of contemporaneity. Interaction might also have taken place between Anse à la Gourde, Village des Pêcheurs and Anse Petite Rivière. Inhabitants of the Eastern Guadeloupe villages were probably in contact with occupants of settlements outside this micro-region as well.

In addition, if the temporary habitation site was contemporaneous with one or more of the Pointe des Châteaux settlements, then its occupants, who were probably from outside the Eastern Guadeloupe micro-region, must have communicated with inhabitants of the Pointe des Châteaux villages concerned.

6.3.5.2 Style zones

Early Ceramic B ceramics from villages in the Eastern Guadeloupe micro-region all bear, to a smaller or larger extent, style elements of the Saladoid series (section 4.2.3). Petites Salines pottery (fig. A2.6-A2.7) has some resemblance to Early Cedrosan Saladoid assemblages from all over the Antilles (fig. 6.5). Ceramics with Barrancoid influences – yielding typical knobbed handles and outward bent rims (fig. A2.15) and anthropomorphic and zoomorphic *adornos* (fig. A3.9) – were present at the settlements of Montagne des Petites Salines and Les Sables. Pottery with Barrancoid influences was also found at Morel on Grande-Terre. Barrancoid influences demonstrate the existence of connections with the South-American mainland (Keegan 2000:144) or at least the southern Lesser Antilles (fig. 6.5). According to Boomert (2000:249), these connections were probably more related to trade contacts, intermarriage and casual visits, than to raids and war. Ceramics found at Anse à la Gourde (fig. 4.3) and Village des Pêcheurs (fig. A2.12) are Late Cedrosan Saladoid, similar to those found at several settlements on Guadeloupe and on other Lesser Antillean islands, from St. Vincent and St. Lucia up north to Saba (Hofman personal communication 2005); (fig. 6.5).

Although regional pottery style similarities related to general morphologic and decorative traits can be distinguished, no micro-style areas could be defined on the basis of close similarities in shapes of vessels, bases and griddles, lip shape, wall thickness, orifice diameter, decoration, firing atmosphere, surface colour and surface finishing of ceramic assemblages from various Eastern Guadeloupe villages. The site assemblages have peculiar characteristics of their own. No close similarities were found either between pottery assemblages from settlements in the micro-region and those from settlements at greater distances like Morel (Hamburg 2000[b]), Anse à l'Eau and Cocoyer St. Charles (Boomsma and Isendoorn 2001).

6.3.5.3 Procurement and distribution of non-local raw materials and finished products

Non-local rock that was obtained outside the Eastern Guadeloupe micro-region has only been identified at Anse à la Gourde and Les Sables (fig. 6.6). Inhabitants of Anse à la Gourde obtained jasper from Martinique, red ochre from St. Martin, flint from Antigua and possibly calcite and plutonic

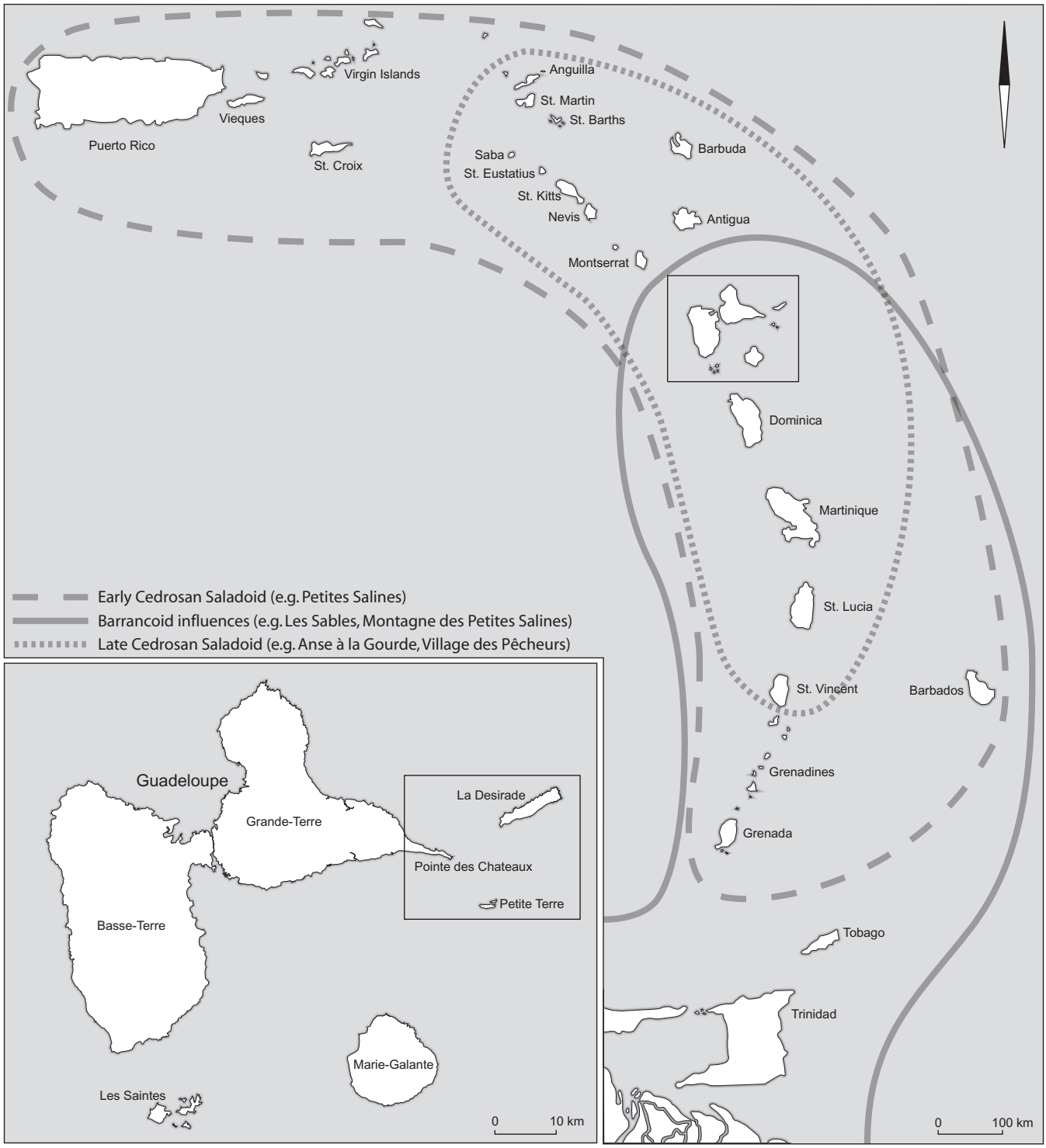

Fig. 6.5. Early Ceramic B style zones.

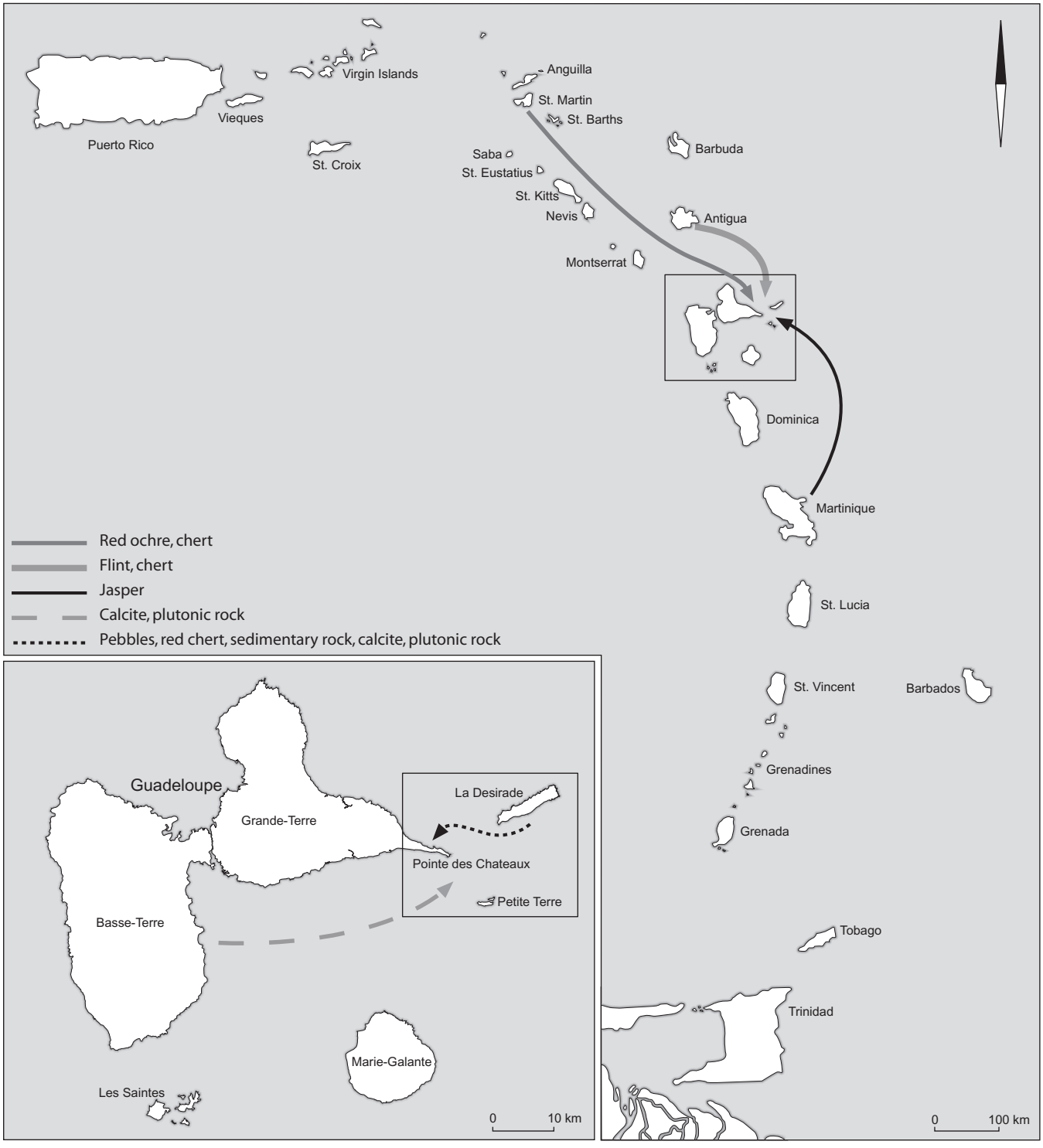

Fig. 6.6. Early Ceramic B long distance and short distance (detail) procurement of non-local materials and finished products.

rock from Basse-Terre. Antigua flint was preferred over La Désirade red chert, notwithstanding the fact that chert could be easily obtained during visits aimed at the procurement of La Désirade water-worn pebbles, that were found in great quantities at Anse à la Gourde. People who lived at Les Sables procured flint from Long Island and chert from Antigua and St. Martin.

Unmodified Long Island flint nodules were exchanged or directly procured throughout a region stretching from Martinique to Puerto Rico and they were locally used for the production of flake tools. Local groups from the northern coast of Grand-Terre, including the Eastern Guadeloupe micro-region, to the region south of St. Martin probably directly procured flint during specially organised trips to the Long Island source. People who lived outside this zone were dependent on down-the-line exchange with intermediate communities (Knippenberg 2006).

Green chert axes and adzes on the contrary were distributed in a different system. These items were manufactured in limited numbers at settlements close to the source on St. Martin and transported as finished items, probably through down-the-line exchange. Production sites with direct access to the sources of raw material were located at least 350 km from the Eastern Guadeloupe micro-region. They include Hope Estate on St. Martin (De Waal 1999[c]; Haviser 1988), Golden Rock on St. Eustatius (Versteeg and Schinkel 1992), Sugar Factory Pier on St. Kitts and Sandy Ground and Rendezvous Bay on Anguilla (Crock 2000). The area included in the green chert exchange system largely coincides with that of Long Island flint. Within the East-Guadeloupe micro-region, inhabitants of Anse à la Gourde and Les Sables probably obtained finished green chert tools directly from people who lived at the production sites (Knippenberg 2001[b]; 2006).

Most lithic artefacts in Eastern Guadeloupe, however, were manufactured from rock types that were available within the micro-region (fig. 6.6). Grande-Terre limestone and La Désirade igneous rock were widely used for the manufacture of grinding-stones and the inhabitants of Anse à la Gourde exploited red chert, sedimentary rock, calcite and plutonic rock from La Désirade. They also collected use-modified or non-modified water-worn pebbles from La Désirade, as did the inhabitants of Montagne des Petites Salines, and those of settlements outside the Eastern Guadeloupe micro-region, such as Anse à l'Eau on Grande-Terre.

6.4 CONSOLIDATION AND INTENSIFICATION OF OCCUPATION AND CHANGING CONTACT NETWORKS (LATE CERAMIC A: AD 600/850-1200/1300)

6.4.1 Introduction

During the Late Ceramic A, the open spaces in the Eastern Guadeloupe micro-region were gradually filled up by settlements and their territories. The number of sites on Pointe des Châteaux and La Désirade increased and the formerly uninhabited islands of Petite Terre were now being settled and exploited as well. This could be a result of Pointe des Châteaux and La Désirade beginning to be too densely occupied, creating a desire for new areas to be explored. This pattern fits the general picture for the wider Caribbean in this period, when new islands were settled by growing populations (Petersen *et al.* 2004). Murphy (2004), for example, also noted that small arid offshore islands near Antigua were beginning to be exploited, probably on a seasonal basis. In total, 59 sites have been found in the Eastern Guadeloupe micro-region, including 22 habitation sites, two ceremonial sites, one strategic outpost and 34 indistinct sites (fig 6.7; table 5.1). The undated lithic workshops on La Désirade (fig. 5.2) were probably used during this period as well.

6.4.2 Settlement pattern

Occupation of the micro-region was consolidated and intensified during the Late Ceramic A. The number of settlements increased, especially after AD 1000. People continued to live in large permanent villages, which were slightly smaller, however, than the Early Ceramic B settlements (table 5.1).[5] This has also been reported for Antigua (Murphy 2004) and Montserrat (Watters and Petersen 1992). The number of sites with thick occupation layers increased; the villages of Anse à la Gourde, Petites Salines, À l'Escalier, Aéroport and the Petite Terre settlements are most representative of this (table 5.1). They may have been occupied longer or more substantially than the Early Ceramic B settlements, but it is also possible that the latter were simply more prone to destruction by post-depositional processes. Many other sites, however, have rather shallow occupation layers and were probably inhabited for relatively short periods.

Almost all villages were established after AD 1000, but Degrat (AD 700/800-1200), Grande Saline (AD 800-1000), Grand Abaque 1 and Pointe Colibri (both AD 800-1200) were settled before this date. The relative spacing of the villages suggests that Nord Morne Zambi (AD 1000-1200) probably succeeded Grande Saline, likely as a result of coastal processes. People apparently

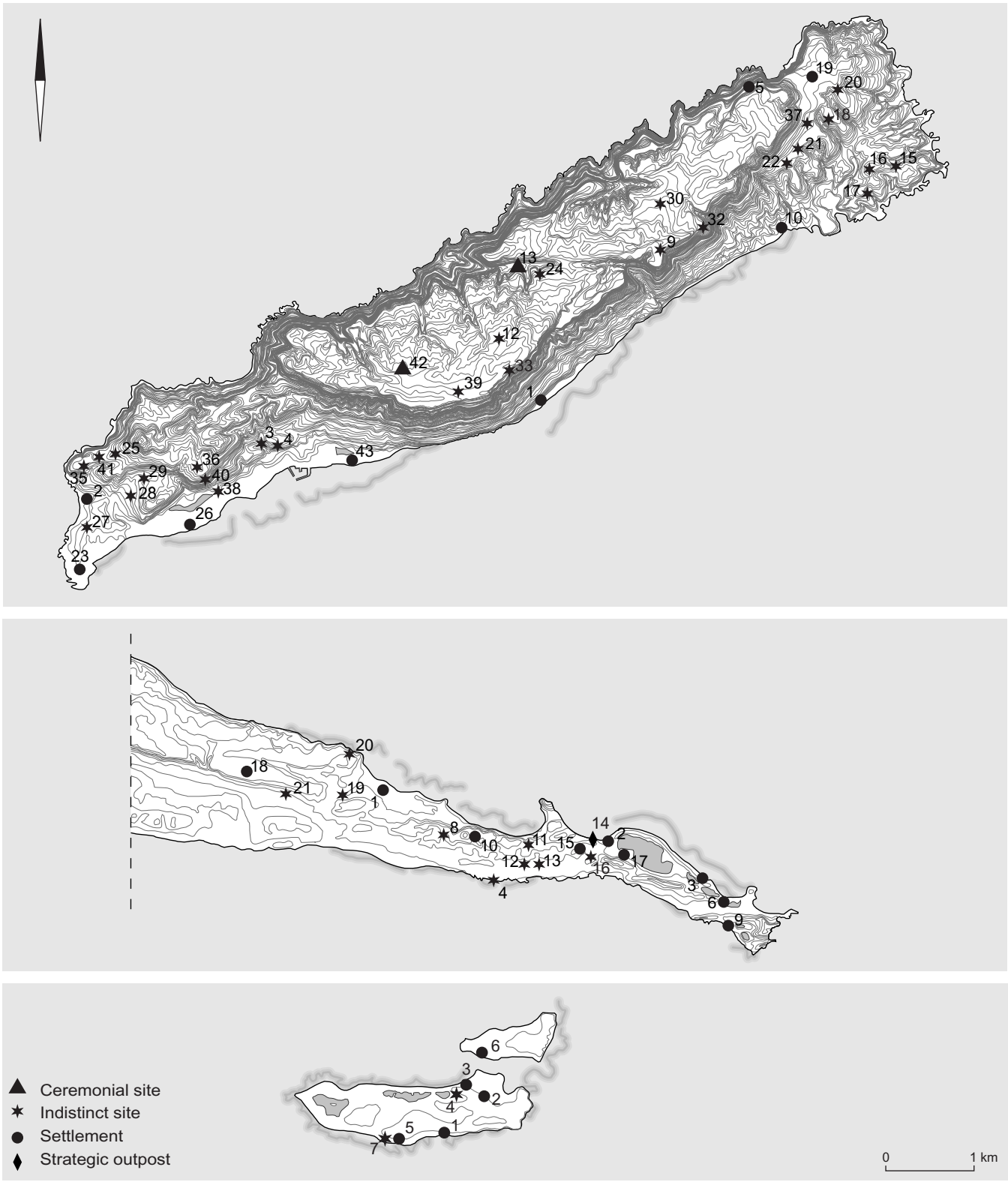

Fig. 6.7. Late Ceramic A sites in the Eastern Guadeloupe micro-region.

decided to move their settlement inland. It is also possible that habitation at Est de Mouton de Bas shifted to Site du Phare for the same reason. There was certainly settlement mobility then, though some of the larger settlements tended to be occupied for rather long periods at one and the same location. Contemporaneity between the settlements has not been established, except for Anse à la Gourde and Anse Petite Rivière.

The increased number of villages led to a denser settlement pattern than the pattern of the preceding period. A similar development has been reported for other islands as well, for example for Barbados (Drewett 1995[a]), Antigua, Montserrat and Barbuda (Watters 1980), Nevis (Wilson 1989), St. Martin (Haviser 1988), and Anguilla (Crock 1995). It has generally been explained by population growth (e.g. Crock and Petersen 1999, 2004; Curet *et al.* 2004; Haviser 1991; Keegan 1985; Murphy 1999; Petersen *et al.* 2004; Siegel 2004; Watters and Petersen 1992; Wilson 1989, 1991). An organisational shift in society and associated settlement pattern might, however, cause a similar increase as well (De Waal 1999[b]; Drewett 2004; Siegel 1992; Wilson 1989, 1991). It is possible that several settlements were inhabited more briefly, entailing higher settlement mobility when compared to the Early Ceramic B. The Guyana situation described by Rivière (1995) comes to mind. There, settlements are usually shortly inhabited – ten years at maximum – abandoned for a large variety of personal, ceremonial, environmental and practical reasons, and moved relatively short distances. Villages thus move from time to time. It is also possible – if the population did indeed increase – that large villages such as Anse à la Gourde grew towards a certain level of occupation density and that people chose to split up and found new, smaller, economically independent settlements. The foundation of small settlements is an effective way of filling up open spaces within the landscape.

The second development, as compared to the Early Ceramic B, is the increase in site type diversity. This has also been reported for other parts of the Caribbean (e.g. Siegel 1992 for Puerto Rico). A strategic outpost, a large number of possible temporary habitation sites and special activity sites, and some ceremonial sites have been found in the selected micro-region, indicating that settlements no longer functioned as centres where all ceremonial, socio-political and economic activities were carried out. Larger parts of the landscape gained importance in this respect. Pre-Columbian inhabitants used strategic outposts on elevated parts of the landscape, such as Ouest Anse à Plume, for observation and control of their environment. Apparently, in contrast with the Early Ceramic B, people chose to do so. It may be postulated that strategic or observation posts were used by inhabitants of villages close-by, in this case Est Pointe Tarare.

The landscape was used more intensively: people established temporary camps and carried out activities related to the exploitation of natural resources outside the villages. The increased amount of off-site material provides evidence of this intensification as well. It has been suggested (section 5.6.2) that the temporary habitation sites or campsites on Petite Terre were used by inhabitants of villages on Pointe des Châteaux and La Désirade, who were attracted by rich marine resources. As suggested in section 6.3.2, it is possible that temporary habitation sites on Pointe des Châteaux and La Désirade were used by inhabitants of villages outside the micro-region but they may also be a result of a rapidly growing population, encouraging people to leave the main settlements. The Pointe des Châteaux temporary habitation sites were close to the villages and possibly encroached upon their territories. The La Désirade temporary habitation sites are on the central plateau and the eastern plateaus, at a larger distance from the villages but they can still be reached easily within a few hours. Special activity sites on Pointe des Châteaux and La Désirade were probably used for gardening activities by inhabitants of nearby settlements.

During the Late Ceramic A inhabitants of certain villages began to use caves near settlements for protection against hurricanes or other natural or possibly human threats (section 5.3.1).

Rituals were still carried out at settlements, as attested to by the presence of *zemis, spatulae*, *adornos*, inlays and body-stamps. The Anse à la Gourde burial area increased in size and importance. It probably assumed a central ceremonial function. The complex and elaborate burial rituals, the wide range of modes of body treatment and burial positions of the primary and secondary burials, some of which contained more than one individual, suggest the performance of complex ancestor rituals. There is further evidence in the deliberate removal of long bones or skulls from some of the buried individuals long after their bodies had decomposed. Ethnohistoric accounts provide a possible explanation for this practice, describing how ancestor remains were treasured, worshipped and consulted as *zemis*.[6] Ancestor veneration has been reported to strongly emphasise and legitimise expanding personal power of chieftains (Redmond 1998:9).

À l'Escalier assumed a special importance as well, as it yielded not only a *zemi* and *spatulae* preforms but also an anthropomorphic head carved out of beach-rock (fig. A3.5). This object possibly had a *zemi*-like function. In addition, a shell inlay was found, which probably functioned as an eyepiece for a statue or figurine (fig. A3.6). Wooden statues, decorated by similar shell inlays, are known from the Greater Antilles, and are usually labelled Taíno style

(see for example Dacal Moure and Rivero de la Calle 1996: colour plate 7). It is possible that such statues were locally made on the Lesser Antilles as well.

Ritual activities were not only carried out in the villages, but also at special ceremonial or ritual sites conspicuously located throughout the landscape. Ritual activity being clearly less restricted to the villages may be considered a third development when compared to the preceding Early Ceramic B period. Two ceremonial sites have been discovered: Chemin de M. De l'Orme and Voûte à Pin (section 5.5.3). The ceremonial depot at Chemin de M. De l'Orme (fig. A3.39) indicates that incidental votive offerings were made outside the settlements. Voûte à Pin, on the other hand, seems to indicate that ancestor veneration rituals were carried out, probably on a more frequent basis, outside the villages. Both sites are located on the central plateau of La Désirade, at considerable distance from the villages (De Waal 2003). It is difficult to grasp the significance of this plateau but the shape of La Désirade was probably recognised as a remarkable feature by pre-Columbian inhabitants of the island and of neighbouring islands. It is the only island in the area that is a high table-mountain, surrounded as it is by flat limestone islands and, more remotely, by mountainous volcanic islands. The presence of the huge plateau, intimidating and looming, can be intensively felt on the southern coastal plain of La

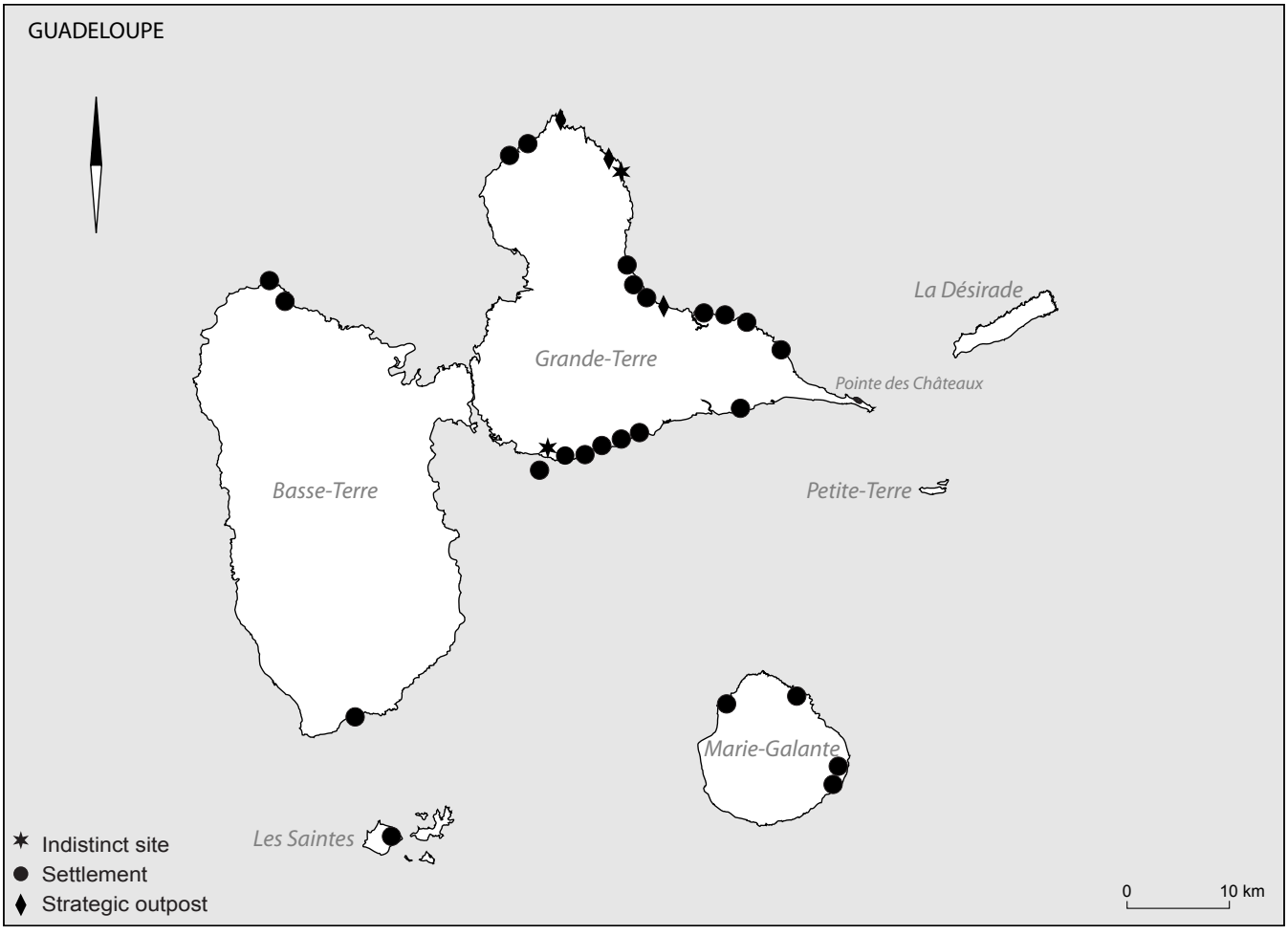

Fig. 6.8. Late Ceramic A sites on Guadeloupe and its nearest neighbouring islands (for sites in the Eastern Guadeloupe micro-region see fig. 6.7).

Désirade, where most settlements are situated. When seen from Grande-Terre, for example from Anse à la Gourde, La Désirade rises vertically from the sea. From another perspective, such as from Petite Terre and Marie-Galante, La Désirade resembles a giant alligator and the resemblance was probably not overlooked by people inhabiting the region. Alligators are native to the South-American mainland and they were represented in Early Ceramic B ceramic iconography, for example from Anse à la Gourde. The ceremonial sites themselves were most likely not visible in the landscape due to their unmarked, non-monumental nature. However, it is possible that the exceptional locations of the sites, in combination with oral tradition, which may have recounted the biographies of these places, emphasised their significance for pre-Columbian communities in the Eastern Guadeloupe micro-region.

The settlement pattern of Grande-Terre as a whole mirrors the developments documented above for Eastern Guadeloupe (fig. 6.8): when compared to the Early Ceramic B period the number of settlements increased, as did site type diversity and the occurrence of settlements in locations that were not occupied before. There were, for example, some strategic outposts in elevated areas on the north-eastern coast as well as some indistinct sites on the north-eastern and southern coasts of Grande-Terre. Striking differences between the Eastern Guadeloupe settlement pattern and those of Grande-Terre, Basse-Terre, Marie-Galante and Les Saintes, are the absence of inland sites – most settlements were located along the coasts – and the low number of temporary habitation sites and special activity sites on these latter islands. The lower intensity of archaeological investigation on these islands when compared to that of the Eastern Guadeloupe micro-region largely explains these differences.

6.4.3 Settlement structure

Information on settlement structure is only available for Anse à la Gourde. This village comprised distinct functional zones, including an oval-shaped refuse midden that partly enclosed a cleared or 'empty' area (tentatively labelled *plaza* or central ceremonial space) and a habitation area (Hofman *et al.* 2001[a,c]). The oval shape of the midden probably arose by a process described by Boomert (2000:293), in which refuse areas shift in circular trajectories over a settlement. Although Caribbean archaeologists tend to identify circular village plans, even on the basis of incomplete settlement layouts, a variety of settlement forms occurred, of which the ethnographically reported ring-village is only one (Heckenberger and Petersen 1995). People in the Lesser Antilles may have lived in linear settlements stretching along rivers or shorelines, single-dwelling villages or settlements with seemingly randomly placed structures, as people still do on the South-American mainland (Bright 2003:44-45). Anse à la Gourde represents the third settlement type. Its habitation area was characterised by burials and by a few small residential structures, including round and oval houses (5 to 8 m in diameter), and a small rectangular house. Residential structures were built and rebuilt in a limited area over a long period of time (Bright 2003), reflecting the strong continuity of this settlement. Based on approximations of habitation areas of the dwellings, it has been postulated that residential structures housed 2 to 22 inhabitants (Bright 2003:53). It is very difficult to make an educated guess as to the number of inhabitants of the Eastern Guadeloupe settlements. In accordance with ethnographic guidelines (section 1.4.6), most villages would have been inhabited by approximately 40-50 persons. The largest settlements would have been inhabited by about 200-300 people on average, while the smallest would have been occupied by around 10 inhabitants (table 6.2). It must be stressed that these numbers reflect educated estimates rather than real calculations.

6.4.4 Settlement territories and hierarchies

Late Ceramic A inhabitants continued to live in evenly distributed settlements throughout the micro-region (fig. 6.7). The increase in the numbers of settlement resulted in shorter inter-settlement distances and smaller territories as compared to the preceding period. The landscape was getting structured. Attractive habitation areas – easily accessible from the sea, with good exploitation potential and observation facilities – were still widely available and there was no need to cluster in specific parts of the micro-region. Most settlements probably had territories of roughly similar size, resulting in a balanced use of subsistence resources in the direct environs of the villages. Socio-political and ceremonial contacts probably extended beyond the borders of these territories.

Most settlements continued to be situated in attractive coastal areas (table 5.1). Several villages were on flat terrain, providing overviews of the surroundings, and were close to good soils, canoe landing-spots, and coastal reefs. Fond Caraïbe, Cocoyer and Grand Abaque 1 were located inland. Although greater efforts may have been required to obtain fresh water and marine resources, these locations were apparently not considered unattractive. Inhabitants of Pointe des Châteaux and La Désirade possibly settled these areas for reasons relating to defensibility or spiritual connotations instead of merely economic factors. In addition, the villages apparently could rely on sufficient subsistence and non-subsistence resources. Evidence for Late Ceramic occupation of inland and plateau settings has been found on Barbuda (Watters and Petersen 1992) and

Anguilla (Petersen and Crock 1999:125) as well. Crock and Petersen (1999) suggest that population pressure may have prompted settlement of inland locations, but they propose that defensibility and proximity to fertile soils were also important factors in location choices. Fertile soils were certainly present in the near surroundings of Fond Caraïbe, Cocoyer and Grand Abaque 1. Keegan (1985:193-194) put inland settlement locations in the Bahamas down to the occurrence of rare resources such as salt, but this does not appear to hold true for inland settlements in Eastern Guadeloupe.

Inhabitants of the Eastern Guadeloupe micro-region carried on practising a similar mixed and broad-spectrum economy and they continued to exploit the zones near their villages, as people had done during the preceding period (fig. 6.4; section 6.3.4). For the Late Ceramic A, however, there is also evidence that they caught birds, and reptiles, such as iguana, and people inhabiting the Petite Terre settlements caught quite a number of sea turtles. The long Petite Terre beaches still attract sea turtles, who lay their eggs there. In addition, in contrast to the Early Ceramic B, few villages were close to fresh water. This was also reported for Antigua (Murphy 1999:72). The inhabitants of the Eastern Guadeloupe micro-region obtained non-local materials and artefacts from Barbados or the Grenadines (sandstone), Basse-Terre and Montserrat (igneous rock), Antigua (flint), the Greater Antilles or the South American mainland (metamorphic rock), and probably St. Martin (green chert artefacts). Although the inhabitants of La Désirade worked local rock, they apparently did not use the local lithic workshops intensively.

Site	Site area	Site area - 10%	N inhabitants following Myers (1973)	N inhabitants following Roosevelt (1980)
Anse à la Gourde	45,000	40,500	203	304
Petites Salines	5200	4680	23	35
Grande Saline	12,200	10,980	55	82
Est Petite Saline Orientale	7700	6930	35	52
Degrat	1200	1080	5	8
Site 7	17,000	15,300	77	115
Est Pointe Tarare	13,700	12,330	62	93
Nord Morne Zambi	5400	4860	24	37
Fond Caraïbe	2400	2160	11	16
Anse Petite Rivière	50,400	45,360	227	340
À l'Escalier	1700	1530	8	12
Anse des Galets	14,800	13,320	67	100
Cocoyer	9400	8460	42	64
Grand Abaque 1	10,000	9000	45	68
Pointe Colibri	9700	8730	44	66
Aéroport	28,200	25,380	127	190
Pointe à Godard	15200	13,680	68	103
Baleine du Sud	9500	8550	43	64
Site du Phare	25,100	22,590	113	169
Est de Mouton de Bas	8200	7380	37	55
Trou Canard	Unidentified	Unidentified	Unidentified	Unidentified
Pointe Sablé	8400	7560	38	57

Table 6.2. Estimated numbers of inhabitants of the Late Ceramic A settlements in the Eastern Guadeloupe micro-region.

A settlement hierarchy began to develop. Anse à la Gourde evolved into a central settlement. It occupied the best location (table 5.1) and the largest territory on Pointe des Châteaux, and it was probably the largest and most lengthily inhabited village in Eastern Guadeloupe. The village also yielded the largest quantities of potential high-status artefacts and it appears to have played a central role in long-distance exchange systems. It is possible that the reputation of villages with long-term occupation, such as Anse à la Gourde, played a certain role in local oral tradition. This might have made villages to be recognised as centres, possibly holding claims on the surrounding land, and to be respected in a wider (micro-)region. The same may be true for villages with burial grounds with supra-local significance, whether or not visually emphasised in the landscape.

Contradictorily to what one might expect of a micro-regional centre, almost all burials at Anse à la Gourde were associated with residential structures. This indicates that some individuals and their family relations became more important in the socio-political village organisation than others, pointing to a more complex society compared to the preceding period when a communal burial ground was used (Hofman and Hoogland 2004). In addition, variation in mortuary practices and a more individualised treatment of the deceased took place, which can be considered indicative for social differentiation. Grave goods, however, do not reflect personal status differences (Hofman and Hoogland 2004). It has been suggested that changes in burial practices indicate that common group ideology shifted to an emphasis on individual households and that incipient social stratification developed (Curet and Oliver 1998; Hofman and Hoogland 2004; Righter 2001). This shift may result in changes in settlement structure as well, multiple structure settlements replacing single-dwelling villages, but this development has not been witnessed in Eastern Guadeloupe.

Crock and Petersen (2004) have postulated that during the Late Ceramic A Anguilla's settlement hierarchy reflected an independent multi-island chiefdom polity instead of a system of incipient social stratification. They based this idea on the presence of high-status objects occurring in 'optimum settings', and the important role of Anguillan settlements in the exchange of ceramics and green chert tools and calci-rudite *zemis*. The Anguillan villages have been assumed to be at the highest level of the inter-island settlement hierarchy on the basis of their dimensions which far exceed those of settlements in other Lesser Antillean islands (Crock 2000). The largest settlements of the Eastern Guadeloupe micro-region, Anse Petite Rivière and Anse à la Gourde, have surface areas comparable to middle-range dimensions of Anguillan villages. Crock (personal communication with Hofman, 2004) has suggested that Anse à la Gourde may have played a central role within a similar chiefdom polity as the one on Anguilla. However, organisation and maintenance of long-distance contacts, involving exchange of high status objects, does not necessarily require or produce situations of hereditary status variation or institutionalised social stratification, which are essential aspects of chiefdom societies, nor did burial evidence at Anse à la Gourde demonstrate the existence of status differences. A system of incipient social stratification seems more plausible for Eastern-Guadeloupe.

6.4.5 Micro-regional and regional interaction

6.4.5.1 Introduction

Intensive contacts continued to exist between people living in different villages or on different islands during the Late Ceramic A period. Before analysing the existence of style zones and the procurement and distributions of non-local materials and products, it is useful to determine which settlements in the Eastern-Guadeloupe micro-region could have been in contact with each other, based on possible contemporaneity of settlements (section 6.4.2). Inhabitants of the earliest villages dating to this period, including Degrat, Grande Saline, Grand Abaque 1 and Pointe Colibri, might have had contact with each other. During the later part of the Late Ceramic A, people living in the other settlements in the micro-region, which were roughly dated AD 1000-1200, probably had contact with each other as well. In addition, the occupants of temporary habitation sites on Pointe des Châteaux and La Désirade would have been in communication with inhabitants of the more permanent villages in this area. The Petite Terre temporary habitation sites may have been occupied by people living on Pointe des Châteaux or La Désirade, who were attracted by the abundant marine resources of the islands.

Apart from these micro-regional contacts, some settlements participated in contact networks that included more distant villages as well.

6.4.5.2 Style zones

Stylistically, Late Ceramic A pottery from Guadeloupe is intermediate between that of the southern and northern Lesser Antilles (fig. 6.9). Pottery complexes from Grande-Terre, La Désirade and Petite Terre share Mamoran Troumassoid affiliations, pointing to contacts with the northern Lesser Antilles, as well as early Suazan Troumassoid affiliations, indicating influences from the southern islands (section 4.2.4; fig. 6.9).

Diversity in pottery styles increased and micro-style areas came into existence. Contact networks had become more localised when compared to the Early Ceramic B.

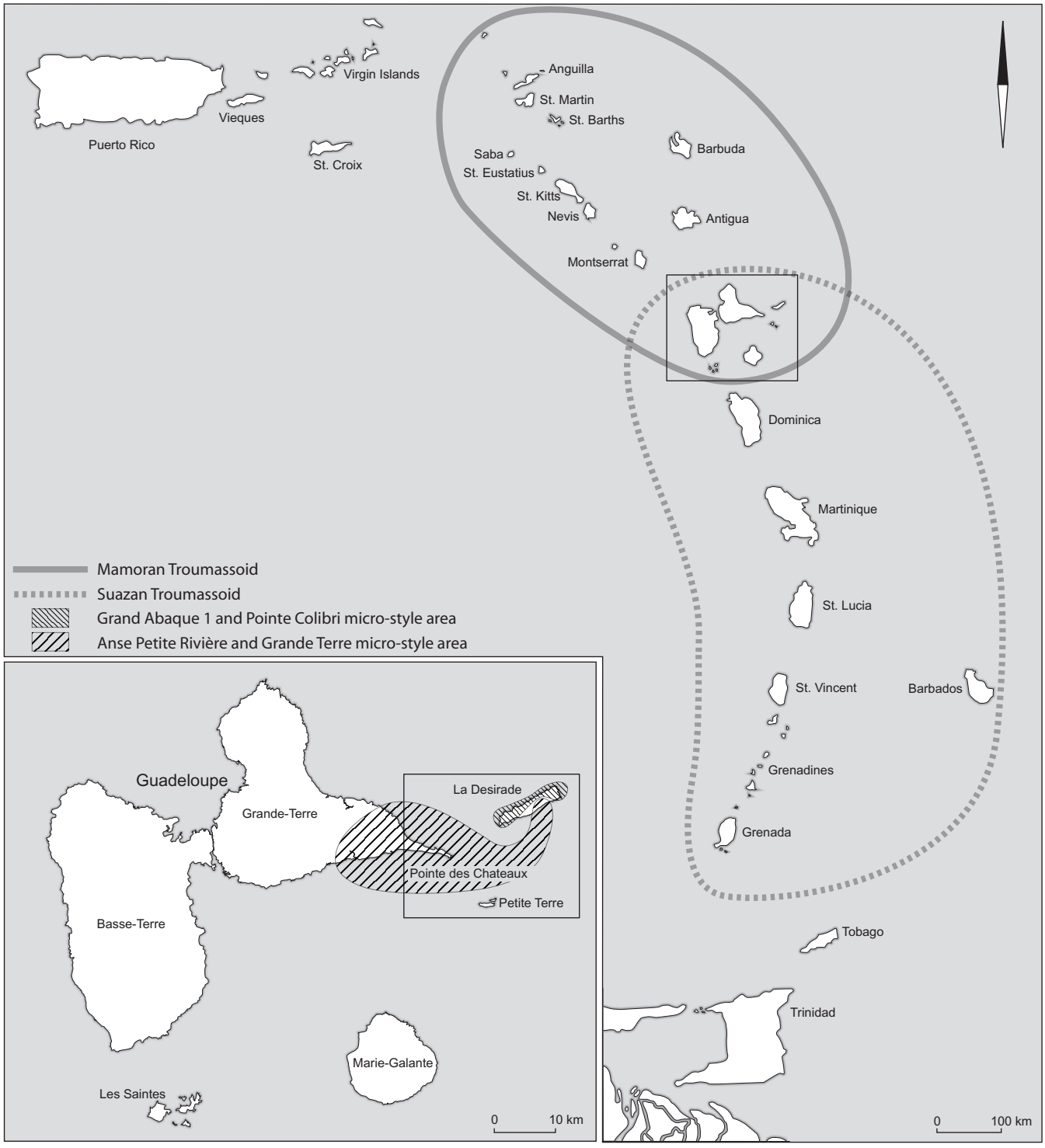

Fig. 6.9. Late Ceramic A style zones and micro-style areas (detail).

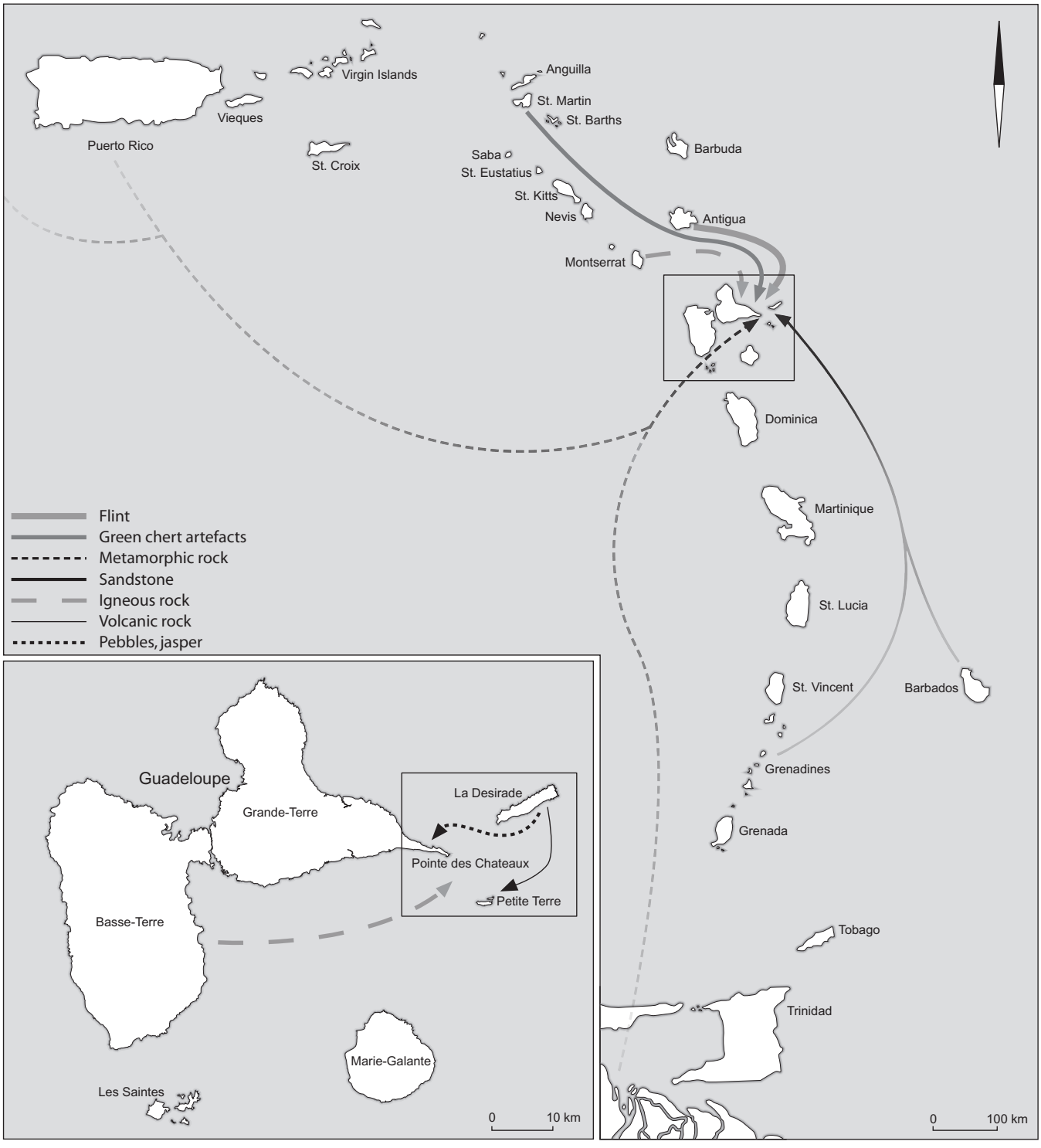

Fig. 6.10. Late Ceramic A long distance and short distance (detail) procurement of non-local materials and finished products.

Increasing population, distributed over the landscape in dense settlement patterns, as well as successful adaptation to the island environment had made it possible for local groups to be involved in contact networks over shorter distances; the intensity of interaction within micro-regions increased.

Close stylistic similarities have been observed between the pottery from Grand Abaque 1 and Pointe Colibri, relating to shapes of vessels, bases and griddles, surface colour and finishing and firing conditions, and red slip and decoration (appendix 3). This suggests that inhabitants of the two settlements maintained regular contacts with each other (fig. 6.9).

Strong stylistic similarities have been found between Late Ceramic A pottery from Anse à la Gourde (Pater and Teekens 2004) and Anse Petite Rivière (appendix 3), that were not shared with other settlements. Close and frequent contacts certainly existed between Anse à la Gourde and Anse Petite Rivière; some vessels might even have been manufactured by one and the same potter. In addition, Mamoran Troumassoid/Suazan Troumassoid ceramic assemblages from other settlements on Grande-Terre (Pointe Helleux, Pointe Canot and Pointe de la Couronne Conchou) are very similar to those of Anse à la Gourde and Anse Petite Rivière.[7] The ceramics from these settlements had similar vessel forms and red-slipped surfaces, and if decorated at all, shallow broad-line incised patterns were predominant (Hofman *et al.* 2004; appendix 3). These settlements on Grande-Terre and La Désirade clearly participated in a micro-regional contact network (fig. 6.9).

6.4.5.3 Procurement and distribution of non-local raw materials and finished products

Inhabitants of a larger number of settlements obtained non-local rock from outside the Eastern Guadeloupe micro-region compared to the preceding period and more settlements seem to have been involved in exchange or direct procurement networks (fig. 6.10). People living at Anse à la Gourde probably played a central role in procurement and distribution of non-local lithic raw materials, profiting from the increasing importance of their village and from the larger history of participating in exchange networks. Their long distance contact networks (fig. 6.10) encompassed Basse-Terre and Montserrat (igneous rock), Antigua (flint), the Greater Antilles or the South American mainland (metamorphic rock) and Barbados or the Grenadines (sandstone); (Knippenberg 2006).

The distribution pattern of finished green chert artefacts remained largely the same as it was during the Early Ceramic B period (section 6.3.5). These were rather common in the Anguilla-Guadeloupe region and inhabitants of Anse à la Gourde, À l'Escalier and Site Du Phare participated in this network.

Trips over shorter distances continued to be undertaken by inhabitants of the villages at Pointe des Châteaux and Petite Terre, in order to collect pebbles, jasper and volcanic rock on La Désirade (fig. 6.10). They used locally available calcareous rock, sedimentary rock and beach-rock incidentally. The lithic workshops at La Désirade seem to have been most intensively used by inhabitants of this island. Inhabitants of the villages at Pointe des Châteaux and Petite Terre clearly preferred Antigua flint to La Désirade red chert. Inhabitants of La Désirade villages also used larger amounts of other locally available volcanic and limestone rock when compared to the Early Ceramic B period (fig. 6.10).

6.5 ABANDONMENT OF THE MICRO-REGION AND INCORPORATION OF LOCAL GROUPS INTO LARGER SOCIO-POLITICAL UNITS (LATE CERAMIC B: AD 1200/1300-1493)

6.5.1 Introduction

People left the Eastern Guadeloupe micro-region during the Late Ceramic B: the number of settlements decreased dramatically, even when seen in the light of the shorter duration of this period. Only three villages remained on La Désirade and Pointe des Châteaux (fig 6.11; table 5.1). Petite Terre was abandoned again. The lithic workshops at La Désirade (fig. 5.2) probably continued to be used.

6.5.2 Settlement pattern

The micro-region became desolate during the Late Ceramic B period (fig 6.11). A small part of Anse à la Gourde remained occupied and two new settlements appeared in formerly uninhabited locations, situated on the southern edge of the central plateau of La Désirade (Morne Cybèle-1 and Morne Souffleur). Petite Terre and the other settlements on Pointe des Châteaux and La Désirade were abandoned. The Late Ceramic B settlement sites are small compared to those of the preceding periods and the relatively thin refuse layers suggest that the villages were inhabited by small groups of people or for rather short periods (table 5.1).[8] The settlements were inhabited at the very end of the pre-Columbian period: Morne Cybèle-1 has been radiocarbon-dated cal. AD 1440-1480 and Morne Souffleur was probably inhabited around the same time. Late Ceramic B Anse à la Gourde provided a median date of AD 1350.

The lower number of villages suggests that settlement mobility was low. A similar decrease has also been witnessed

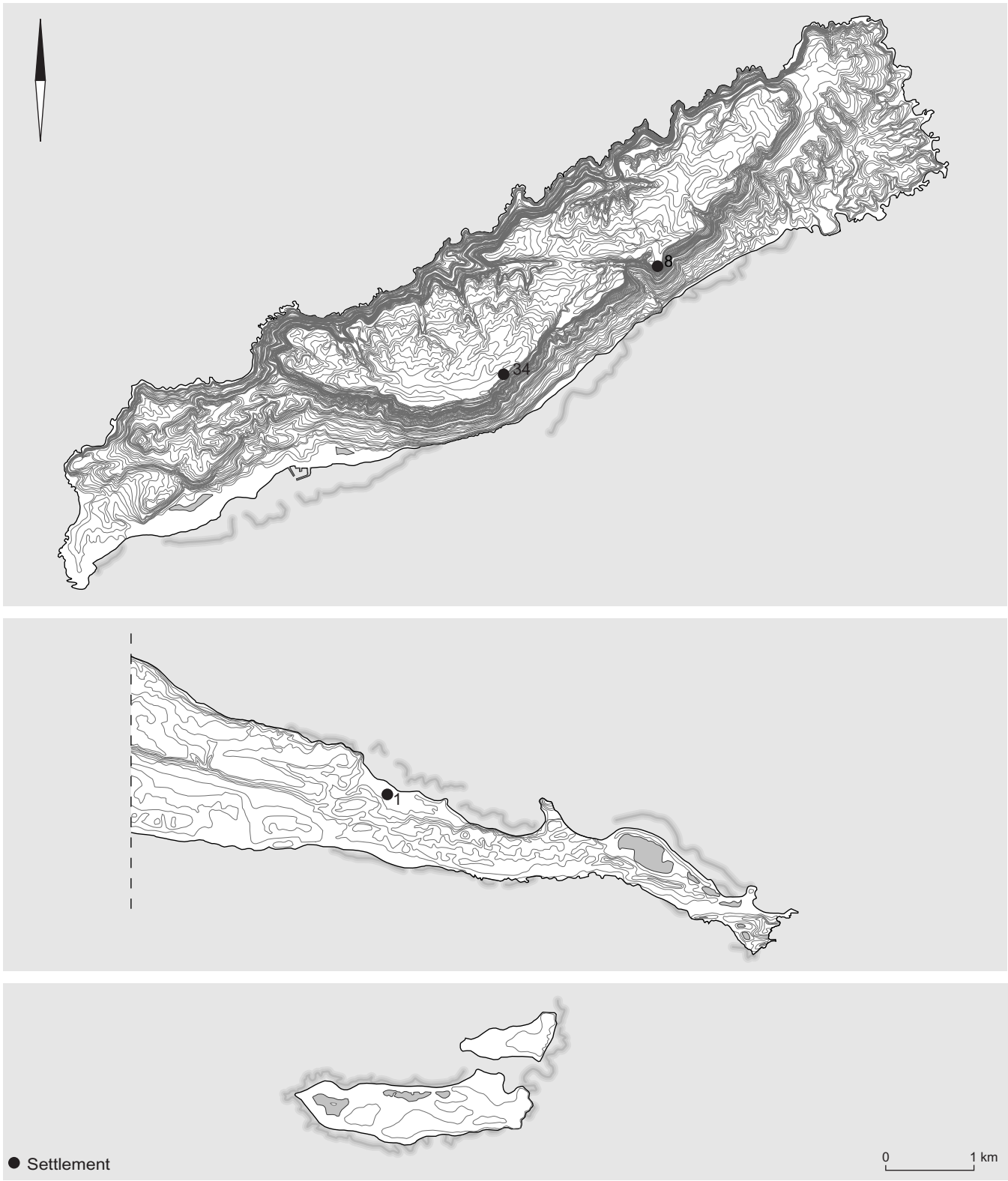

Fig. 6.11. Late Ceramic B sites in the Eastern Guadeloupe micro-region.

outside the Eastern Guadeloupe micro-region. Except for the Plage de Roseau settlement near Capesterre Belle-Eau (Richard 2002, 2003), no Late Ceramic B settlements have been discovered on Guadeloupe (fig. 6.12). This is remarkable as Columbus observed several small Amerindian settlements along the coast of Guadeloupe (Jane 1930) and in 1511 and 1512 Amerindians on Guadeloupe were reported to be so numerous as to dare to attack the Spanish on Puerto Rico (Yacou 1993). Only a few Late Ceramic B settlements have been found on other Lesser Antillean islands as well. Kelbey's Ridge 2 on Saba (Hoogland 1996) and Sandy Ground, Sandy Hill and Shoal Bay East on Anguilla (Crock 2000; Crock and Petersen 1999) are among the very few. In addition, Curet *et al.* (2004) and Siegel (2004) have reported a similarly significant decrease of number of settlement for the Loíza and Maunabo valleys on Puerto Rico.[9] Apparently, population decline started well before the conquest of the region by Europeans, but the factors leading to this process of Late Ceramic B depopulation of the Lesser Antilles are poorly understood. The most important factor was probably a political one. It relates to the influence of developing *cacicazgos* on the Greater Antilles, which stretched at least as far as the Virgin Islands (Righter 2001), Saba (Hoogland and Hofman 1999, 2004) and Anguilla (Crock 2000). The presence of so-called ritual objects in Chican Ostionoid/ Classic Taíno style on Guadeloupe and Martinique suggests that this influence extended even further southwards (Allaire 1990; Hoogland and Hofman 2004). Curet *et al.* (2004) proposed for Puerto Rico that larger political centres attracted people because of the greater social opportunities they offered and that this caused emigration of local groups in the Lesser Antilles. It is imaginable that, for example as a result of the population increase – and possibly of a concommitant decline in the availability of food resources – that took place during the Late Ceramic A, people started to feel socio-politically dissatisfied and were therefore attracted to the complex societies on the Greater Antilles.

Another new development is the reduction in site type diversity; the landscape was less intensively used (fig. 6.11).[10] People inhabiting the La Désirade settlements did not need strategic outposts since they located their villages strategically. No temporary camps or special activity sites were established. Special locations for carrying out ceremonial activities were absent as well and the Late Ceramic A trend of ceremonial behaviour taking place in larger areas of the landscape outside the settlements apparently came to an end. Ritual and economic activities were once again incorporated within the settlements, as they were during the Early Ceramic B. However, the Late Ceramic A preference for carrying out ceremonial activities in eye-catching locations on the central plateau of La Désirade continues. The presence at both Morne Cybèle-1 and Morne Souffleur of a human face mask that probably had *zemi*-like functions suggests that ceremonial activities were conducted there. The unique pottery style and the high percentage of decoration, together with the impressive site locations, reinforces this idea (section 5.5.1). There is no evidence of ceremonial activities at Anse à la Gourde and it is not clear whether its burial area, that was so prominently present during the Late Ceramic A, was still being used.

As Late Ceramic B settlements are reputedly rare in the Lesser Antilles, it is not surprising that only one other settlement, the coastal village of Plage de Roseau on Basse-Terre, has been recorded on Guadeloupe and its nearest neighbouring islands (fig. 6.12). It remains to be questioned, however, to what degree this inventory would be either supplemented or confirmed upon archaeological investigation of elevated inland locations, which were obviously popular during this period. The Eastern Guadeloupe situation corresponds well with settlement patterns on Guadeloupe and its nearest neighbouring islands and on other islands of the Lesser Antilles: the number of settlements decreased dramatically when compared to the Late Ceramic A, as did site type diversity. There are no temporary habitation or special activity sites. In addition, there seems to be a preference for formerly uninhabited, defensible locations on elevations (*cf*. Kelbey's Ridge 2 on Saba; Hoogland 1996). This suggests that the socio-political situation demanded secure settlement locations. This may have been true for Eastern Guadeloupe as well. Although no archaeological evidence has been found for conflicts or hostile situations, it is imaginable that the simple fact that people left the Eastern Guadeloupe micro-region, as a result of the attraction of *cacicazgos* on the Greater Antilles, made for an increasingly tense social situation in Eastern Guadeloupe. According to Breton (1978[1647]) Amerindians on Guadeloupe preferred to live in areas that were not easily accessible in order to avoid surprise attacks by their enemies, who raided them frequently (see also Hofman *et al.* 2004). Raids could have occurred more easily and frequently as allied groups were more distant. The lower availability of marriage partners close-by may have compounded this situation and may have caused raids to be carried out for the single purpose of abducting young men and women.

The fact that ceremonial activities and other special activities were once again concentrated in the settlements may be attributable to such weakened sense of safety. People possibly tried to limit to leave the settlement and the security of the group to a minimum. The fact that ceremonial activities were carried out is not surprising, as these tend to become more important as local situations become more hostile.

It is not clear whether this situation concerned internal hostilities between groups living on the Lesser Antilles or whether groups on the Mainland or the Greater Antilles were involved.

6.5.3 Settlement structure

There is no information on Late Ceramic B settlement structure in the Eastern Guadeloupe micro-region. Kelbey's Ridge 2 on Saba, measuring 2000 m^2, may serve as an example. Four to five households, each inhabiting a house compound adjacent to a *plaza*, probably occupied this settlement, for 30 to 50 years. Compounds consisted of a cooking hut and small round and oval residential structures with diameters of 6 to 8 m and surface areas of 57 to 80 m^2. The houses, with estimated lifespans of 10 to 15 years, were possibly inhabited by extended families consisting of 11 to 15 persons (Hoogland 1996). It is an educated guess – for lack of real calculations – that similar numbers of people may have inhabited Morne Souffleur (13-19 inhabitants; table 6.3).[11]

6.5.4 Settlement territories and hierarchies

Late Ceramic B settlements are situated at great distances from each other and probably had large territories (fig. 6.11). Anse à la Gourde is still situated in an 'optimum setting' (*sensu* Petersen and Crock 1999); (table 5.1). Morne

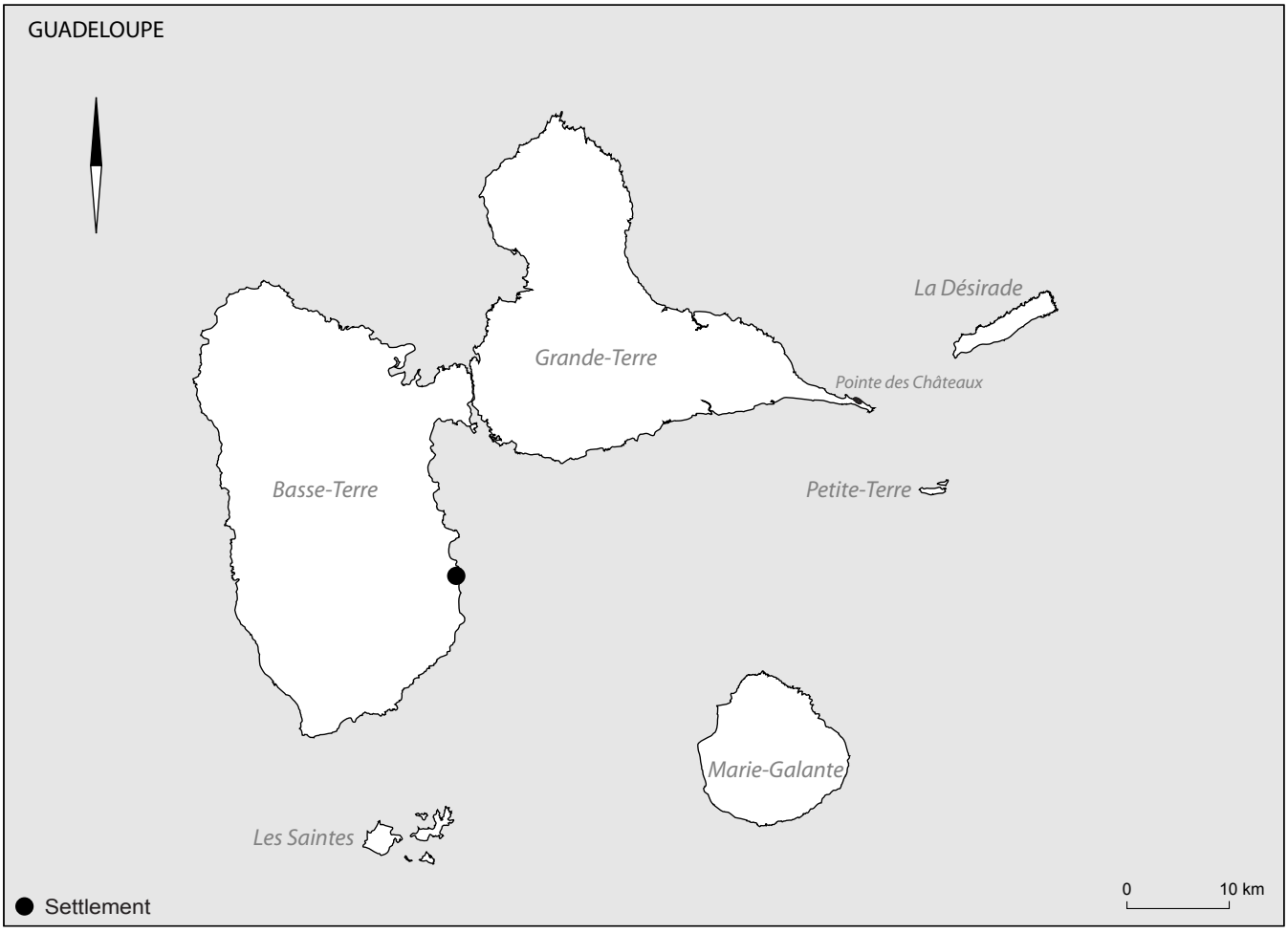

Fig. 6.12. Late Ceramic B sites on Guadeloupe and its nearest neighbouring islands (for sites in the Eastern Guadeloupe micro-region see fig. 6.11).

Cybèle-1 and Morne Souffleur occupy impressive and well-defensible locations on La Désirade's central plateau. The inhabitants of these settlements faced considerable challenges in obtaining fresh water and exploiting marine resources (table 5.1). Since there are no other contemporary habitations, they were free to choose village locations and they apparently deliberately selected settings well suited to observation and defence purposes or with spiritual appeal.

Although there is hardly any evidence of subsistence practices, it appears that inhabitants of the micro-region still practised a mixed economy of root crop horticulture, hunting of land animals, fishing, catching birds and collecting molluscs, fruits, wild tubers and seeds. Contrasting to preceding periods, inhabitants of the La Désirade settlements now exploited resources at quite some distance from their villages. Although they could continue cultivating root crops and tubers near their settlements, the procurement of fish, shellfish (mainly *Cittarium pica* and *Strombus* sp.) and coral required trips to the sea over at least an hour walk. Wild tubers, seeds and fruits could be collected on the plateau, in the surroundings of the settlements, where mammals could be caught as well. The villages were not close to fresh water (table 5.1). Most raw materials for lithic artefacts were locally available on La Désirade, and the lithic workshops were probably used, but non-local red chert and St. Martin chert and flint were also obtained.

Anse à la Gourde had the most attractive setting (table 5.1), was inhabited longer than any other village in Eastern Guadeloupe and it continued to play a role in regional exchange systems. Although the La Désirade settlements lacked these characteristics, both yielded a remarkable shell mask, which is considered a high-status artefact, usually related to activities of a ritual specialist or local leader. Petersen and Crock (1999) suggest that such objects occur in what they called 'optimum settings'. In their definition, the La Désirade settlements can hardly be considered to be in 'optimum settings' however. It has already been mentioned above (section 6.5.2) that the well-defensible settlement locations were probably chosen for safety reasons. The impressiveness of the eye-catching settlement locations probably greatly enhanced the practical advantages – related to observation and control – they offered. The La Désirade settlements probably mainly had a local significance, limited to the groups inhabiting the settlements. They restricted their activities to the settlements as much as they could, probably for safety reasons. The micro-regional and regional significance of the settlements was probably their mere presence, which indicates that the region was not completely deserted and that there were still people who managed to survive and to live their lives as they had been doing since the first occupation of Eastern Guadeloupe.

6.5.5 Micro-regional and regional interaction

6.5.5.1 Style zones

Late Ceramic B pottery from the micro-region is affiliated to the late Suazan Troumassoid subseries (section 4.2.4; fig. 6.13), but influences from the Venezuelan mainland have been suggested as well (Allaire 1996; Hofman *et al.* 2004). The diversity in pottery styles, which had emerged during the Late Ceramic A, ended (fig. 6.13).

Because of lower population densities, inhabitants of Eastern Guadeloupe had to sustain contact networks that extended over larger areas when compared to the Late Ceramic A. It is hypothesised that these contacts intensified, as a very small number of villages, dispersed over a very large region, had to arrange mutual marriage partners and political alliances. A small micro-style area and related short but intensive contact lines continued to exist on La Désirade (fig. 6.13). Strong stylistic similarities have been observed between pottery from Morne Cybèle-1 (Hofman *et al.* 2004) and that of Morne Souffleur (appendix 3), in terms of shapes of vessels, griddle bases and rims, colour and decoration (mainly punctation), and firing and surface finishing techniques. Anse à la Gourde pottery is slightly

Site	Site area	Site area - 10%	N inhabitants following Myers (1973)	N inhabitants following Roosevelt (1980)
Morne Cybèle-1	700	630	3	5
Morne Souffleur	2800	2520	13	19
Anse à la Gourde	Unidentified	Unidentified	Unidentified	Unidentified

Table 6.3. Estimated numbers of inhabitants of the Late Ceramic B settlements in the Eastern Guadeloupe micro-region.

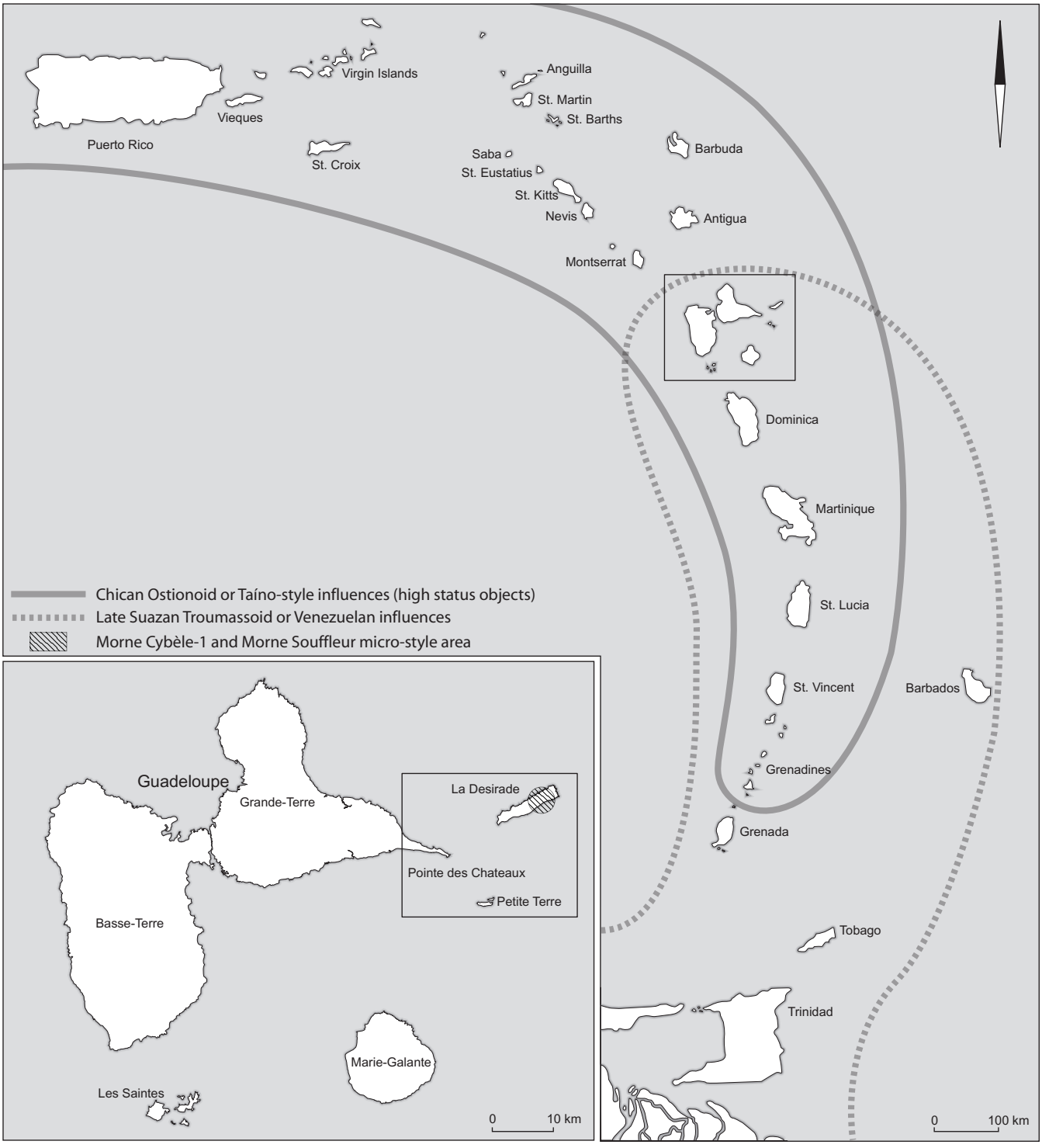

Fig. 6.13. Late Ceramic B style zones and the Morne Souffleur and Morne Cybèle-1 micro-style area (detail).

different from Morne Cybèle-1 and Morne Souffleur ceramic complexes (Hofman *et al*. 2001[a]:172). There was probably no interaction between this village, dated slightly earlier, and the La Désirade settlements. Vessel shapes and decoration modes of the pottery from the possibly contemporaneous Plage de Roseau settlement on Basse-Terre (Richard 2002:52-54) differ from those of Morne Cybèle-1, Morne Souffleur and Anse à la Gourde. Inhabitants of this settlement apparently did not participate in the same network either. Late Ceramic B pottery from settlements in the northern Lesser Antilles is affiliated with the Chican Ostoinoid subseries, and is thus completely different from the La Désirade ceramic complexes.[12]

The La Désirade settlements as well as the Plage de Roseau village on Basse-Terre yielded Chican Ostionoid or Taíno-style high-status objects. Both La Désirade settlements yielded a shell mask (fig. A3.38; Hofman *et al*. 2004: fig. 17) and the Plage de Roseau village yielded a frog-shaped bowl from manatee-bone (Richard 2002:52-54). Shell masks have been found from the Greater Antilles to as far south as the Grenadines (fig. 6.13).[13] It is remarkable that the styles are very different, even though some general characteristics can be distinguished, including decorated headbands and emphasised eyes. This indicates that contacts between the La Désirade settlements and villages on the northern Lesser Antilles or even on the Greater Antilles actually may have existed (fig. 6.13). Local groups were apparently incorporated in a so-called Taíno-related interaction sphere expanding eastwards from the Greater Antilles, as were inhabitants of Anguilla (Crock and Petersen 2004) and Saba (Hofman and Hoogland 2004; Hoogland and Hofman 1999). According to Allaire (1990), this network may have been based on esoteric interaction or on socio-political or economic expansion of one of the Greater Antillean *cacicazgos* (Hoogland and Hofman 1999). The La Désirade masks might represent increased reach of Greater Antillean influence spheres, compared to Anguilla for example, which had been in relatively close contact with Greater Antillean societies from an earlier stage onwards.

6.5.5.2 Procurement and distribution of non-local raw materials and finished products

Short distance trips were still organised by inhabitants of Anse à la Gourde, aimed at the procurement of La Désirade pebbles, magmatic rock, and red chert. The lithic workshops at La Désirade were probably still used for exploitation of the latter (fig. 6.14). Considering the growing quantity of Antigua flint (Knippenberg 2001[b]:189, 217-219), however, this material was still preferred over La Désirade red chert.

The inhabitants of Anse à la Gourde and Morne Souffleur obtained non-local rock from outside the micro-region as well. Access to Antigua flint and finished green chert tools continued and the micro-region thus remained part of the Guadeloupe-Anguilla exchange network (fig. 6.14).

6.6 SUMMARISING REMARKS

6.6.1 Introduction

The present study has focussed on pre-Columbian social organisation and interaction by investigating settlement patterns in a micro-region consisting of Pointe des Châteaux, La Désirade and the islands of Petite Terre. Special features of the project are the scale and the intensity of the regional investigation carried out: it concentrated on a very small region and the required data have been collected through systematic and highly intensive surveys, covering coastal as well as inland areas. The surveys have provided a detailed regional site inventory. The resulting archaeological database, representing different site types, locations and periods, is considered to be representative for the selected micro-region, although it does have its limitations (section 5.2). A quick comparison between settlement patterns in the Eastern Guadeloupe micro-region and those on Guadeloupe and its nearest neighbouring islands (sections 6.3.2, 6.4.2 and 6.5.2) demonstrates that the settlement patterns observed in the micro-region are most likely representative for a larger region.

The fieldwork greatly contributed to the *Carte Archéologique* site inventory project for Guadeloupe (section 2.1.4), as a large number of sites, including habitation sites, lithic workshops, ceremonial sites, a strategic outpost, and indistinct sites have been discovered. It exhibits shortcomings in particular in the understanding of indistinct sites. It has been postulated in this study that these sites may have been used as temporary habitation sites, sites related to gardening activities, and cave sites used for shelter.

One of the merits of the East-Guadeloupe project is that it documents the complexity of pre-Columbian settlement patterns. It did not only focus on large villages. Diversified settlement patterns have been observed instead, and dynamic diachronic changes were distinguished.

6.6.2 A pre-Columbian settlement history of the Eastern Guadeloupe micro-region

The first occupation of the Eastern Guadeloupe micro-region took place during the Early Ceramic B period. People inhabited Pointe des Châteaux and La Désirade in large permanent coastal settlements. The areas surrounding their villages obviously fulfilled their subsistence and

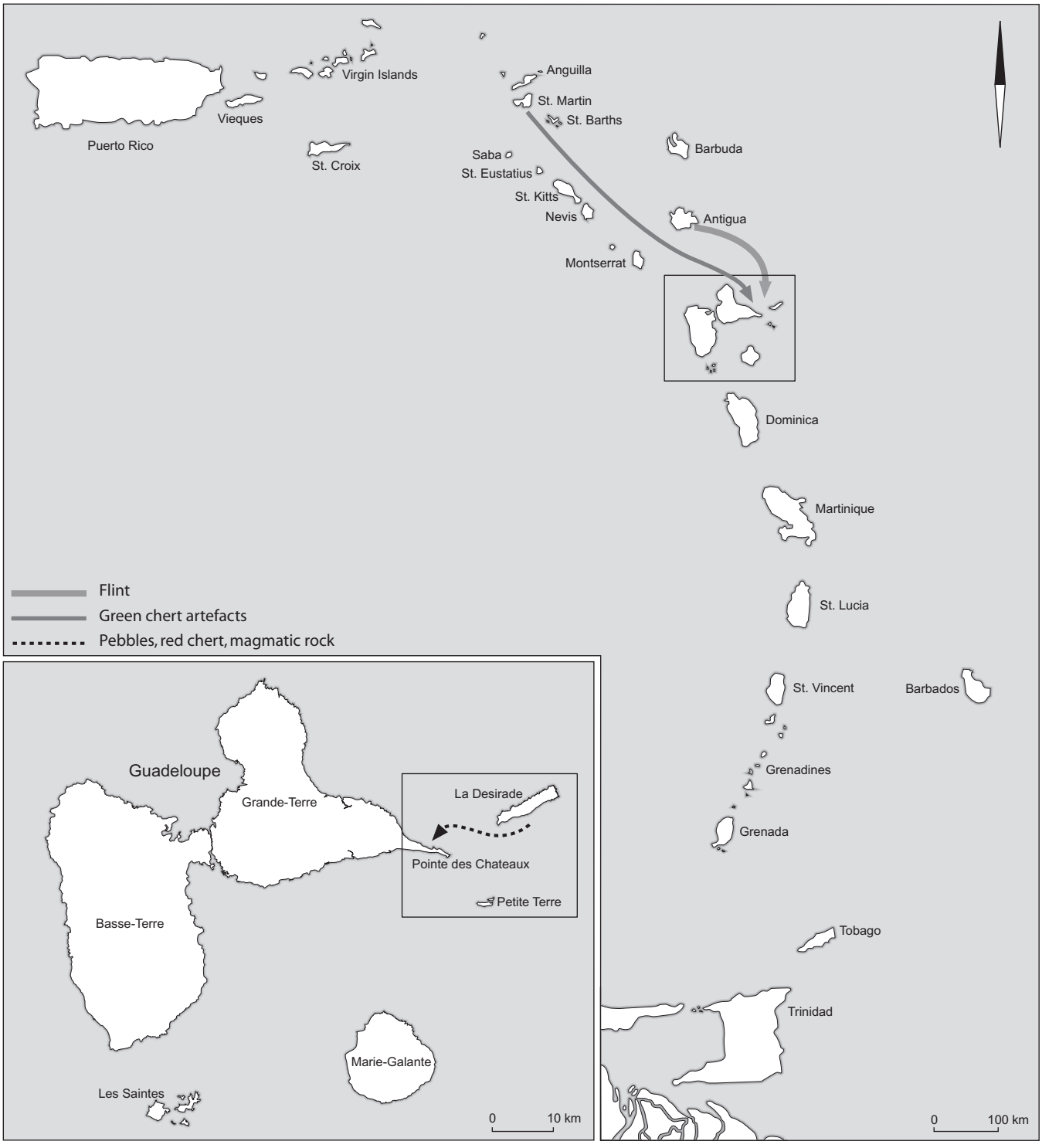

Fig. 6.14. Late Ceramic B long distance and short distance (detail) procurement of non-local materials and finished products.

non-subsistence needs. They used these villages for most socio-political, economic and ceremonial activities; they apparently did not establish special places away from the settlements. It is possible that Anse à la Gourde and Les Sables were more prominent in this respect when compared to the other villages.

Inhabitants of the Early Ceramic B villages had pottery that is highly comparable in style with that used by inhabitants all over the Antilles, and they apparently maintained long-distance contact networks stretching as far as their South-American homeland. The inhabitants of Anse à la Gourde and Les Sables obtained rocks from Martinique, Basse-Terre and Antigua for the manufacture of lithic artefacts and they procured finished green chert tools directly from the inhabitants of production sites on St. Martin.

The number of villages increased during the Late Ceramic A, especially after AD 1000. Occupation of the micro-region, which was still concentrated in large permanent villages, was consolidated and intensified. It is possible that the population grew, but settlements may also have been inhabited for shorter periods and they possibly moved from time to time. Inhabitants of villages of increasing size may also have decided to split up and found new, smaller, economically independent settlements, effectively filling up the open spaces in the landscape. Although most settlements were still situated along the coast, some La Désirade villages were located inland and proximity of fresh water sources was rarer when compared to the Early Ceramic B. People continued to practise a mixed economy of root crop horticulture, hunting of land animals, fishing, catching birds and collecting molluscs, fruits, wild tubers and seeds, and they still exploited zones near the settlements. Greater parts of the landscape were used for ceremonial, socio-political and economic activities, which were more restricted to the settlements themselves during the preceding phase. Anse à la Gourde evolved into a central settlement. This village, and particularly its burial area, probably had a central ceremonial function in the micro-region. Ceremonial activities were also carried out at Voûte à Pin and Chemin de M. De l'Orme, situated at remarkable locations on the central plateau on La Désirade and at quite some distance from the villages. At Anse à la Gourde, burials associated with residential structures, variation in mortuary practices and a more individualised treatment of the deceased suggest that social differentiation began to play a role and that incipient social stratification developed.

Long distance contacts with the northern and southern Lesser Antilles continued to exist, although they appear to have been less frequent than during the Early Ceramic B. Local groups were clearly involved in frequent and intensive short distance contacts as well, stimulated by an increased population that had successfully adapted to the island environment. Access to and participation in exchange networks appeared to have been less restricted. The inhabitants of Anse à la Gourde played a central role in these networks, that stretched as far as the South American mainland and the Greater Antilles, incorporating Barbados, the Grenadines, Basse-Terre (Guadeloupe), Montserrat, and Antigua. Together with the Anse à la Gourde residents, inhabitants of À l'Escalier and Site Du Phare also participated in contact networks in which finished green chert artefacts circulated. In addition, trips over shorter distances (to La Désirade) were still undertaken as well.

From c. AD 1200 onward, the pre-Columbian landscape of the Eastern Guadeloupe micro-region became desolate and was less intensively used: only three small villages were inhabited during the latest part of the pre-Columbian period. This Late Ceramic B depopulation was probably an effect of the influence of developing *cacicazgos* on the Greater Antilles, attracting people from the Lesser Antilles because of the greater social opportunities. The Late Ceramic A population increase – and possibly a related decline in the availability of food resources – may have provoked socio-political dissatisfaction and made people susceptible to the attractions offered by complex social societies on the Greater Antilles.

The inhabitants of Morne Cybèle-1 and Morne Souffleur established their villages in impressive and well-defensible locations on the La Désirade plateau. They therefore had to cover the equivalent of at least an hour's walk in order to exploit coastal resources, which they continued using.

Ritual and economic activities were once again restricted to the settlements, particularly to Morne Cybèle-1 and Morne Souffleur. It is not clear whether Anse à la Gourde still had the central function that it had assumed during the Late Ceramic A.

Interaction networks necessarily covered larger areas, to the south and the north, but local contact networks continued to exist and short distance trips, for example aimed at the procurement of La Désirade rock, were still organised.

6.6.3 Final remark

The intensive and systematic investigation of the Eastern Guadeloupe micro-region was an efficient means to make a contribution to our understanding of social organisation and interaction of the pre-Columbian Amerindians who once inhabited Pointe des Châteaux, La Désirade and Petite Terre. This understanding clearly demands the diachronic

study of site patterns complementary to the more traditional study of individual coastal habitation sites. The systematic survey of the micro-region provided site inventories that surpass in potential the research questions formulated for the present study. These inventories can be used without the interpretations imposed upon them during the present research as the raw data, as presented in appendices 2-4, are available to everyone willing to study any aspect of pre-Columbian life in Eastern Guadeloupe.

NOTES

1 Inland pre-ceramic sites, such as Norman Estate on St. Martin (Knippenberg 1999) and Plum Piece on Saba (Hofman and Hoogland 2003) are discovered only incidentally.

2 Site areas of the Early Ceramic B occupations in multi-component sites could not be estimated (section 5.2).

3 After Haury, E.W., 1976, *The Hohokam: desert farmers and craftsmen*. University of Arizona Press, Tucson (cited in Hoogland 1996:160).

4 On La Désirade, compact decalcification clay deposits occur in eroded cavities on the central plateau and fine but very fat clays can be collected from the waterside west of the marina and the borders of the salinas (personal observations 1999-2000). Isendoorn (personal communication 2005) discovered a clay deposit in the eastern part of La Désirade. On Pointe des Châteaux fine and fat clays can be collected from deposits underneath beach-rock formations on the northern coast and Bloo (1997:126-131) and Isendoorn (personal communication 2005) collected clay samples from shallow karst depressions in the vicinity of Anse à la Gourde and Anse Tarare.

5 Settlement dimensions range between 1200 m^2 and 50,400 m^2.

6 "[…] Fouïllant la terre où ils sçavent qu'il ya a quelqu'un d'enterré, il en tirent des os, ou du poil du trespassé, le mettent dans une calebace qu'ils bouchent de cotton, et les diable leur parle par ces os ou cheveux et se disent être l'âme du deffunt. Voire avec ces os, ils font diverses sortes de charmes pour se venger de leur ennemys" (Breton 1978[1647]:58).

7 Dates provided for Pointe Helleux include cal. AD 1230-1326, cal. AD 1028-1179 or AD 1188-1208 and Pointe Canot and Pointe de la Couronne Conchou have been tentatively dated AD 900-1200 based on the presence of Mamoran/Suazan Troumassoid pottery traits (Hofman *et al.* 2004).

8 The exact lay-out and dimensions of Late Ceramic B Anse à la Gourde have not been identified (Pater and Teekens 2004:309).

9 Interestingly, the number of sites in the Manatí Valley on Puerto Rico increased at the same time (Siegel 2004).

10 Attested to by a decrease in the amount of off-site material.

11 The estimated number of inhabitants of Morne Cybèle-1 (3-5 inhabitants) is probably not accurate as a result of site destruction (table 6.3).

12 This has been observed at Sandy Ground, Sandy Hill and Shoal Bay East on Anguilla (Crock 2000; Crock and Petersen 1999) and Kelbey's Ridge 2 on Saba (Hofman 1993).

13 Apart from on La Désirade, shell masks have also been found on Cuba (Dacal Moure and Rivero de la Calle 1996), Puerto Rico (Alegría 1978), the Dominican Republic (Bercht *et al*. 1997), St. Croix, Anguilla and Antigua (Crock 2000; Crock and Petersen 1999), Marie-Galante and the Grenadines (Sutty 1991).

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APPENDIX 1. SITE CATALOGUE INTRODUCTION AND FIELDWORK FORMS

1.1 INTRODUCTION

The Pointe des Châteaux site catalogue (appendix 2) contains data that have been collected during systematic intensive surface surveys. These were carried out in 1998 and 2000 by teams from the Faculty of Archaeology of Leiden University (De Waal 1998[b], 2002[a-c]). In addition to these data, reports on the 1995-2000 field campaigns at Anse à la Gourde (97125-003) have been used. Numbers listed with the site names are administrative numbers attributed to each site per municipality by the archaeological service of the DRAC of Guadeloupe. The sites have been listed following the order of these DRAC numbers. The SC-numbers that have been registered refer to the numbers assigned to surface concentrations identified during the Leiden University 1998 and 1999 surveys.

The catalogue for La Désirade (appendix 3) includes sites that were revealed by reconnaissance studies by Bodu (1984, 1985[a-c]) and by the 1999 Leiden University surveys (De Waal 1999[g]). Information on Morne Cybèle (97110-012) and Anse Petite Rivière (97110-013), excavated by Bodu in 1984 and 1985 and subject to later investigations (De Waal 1996[a-b]; Hofman 1995; Hofman and Hoogland 1994) has been used as well. The colonial Léproserie site (97110-019), yielding one Early Ceramic B sherd amidst the building material, and Pointe Mansénillier (97110-015), consisting of one flint flake, have not been included in the present overview. Pointe Mansénillier (97110-015) was revisited in 1997 by a Leiden University team but no archaeological material was discovered. Information on survey sampling and strategies from the Bodu fieldwork campaigns has been lost.

On Petite Terre (appendix 4), six pre-Columbian sites had been reported through reconnaissance studies by Bodu (1985[c]) and Nicholson (1975). Leiden University teams (1998-2000) carried out surface surveys and test-pit programs (De Waal 1999[g]). Est de Trou Canard (97110-052) was found during the 1999 surveys.

Information on location, dimensions, co-ordinates, terrain and owner is listed for all the sites. For the sites described during the 1998-2000 fieldwork campaigns, site dimensions refer to the maximum extent of surface material. This at least enables a relative comparison of site sizes. The *Office National des Forêts* (ONF) or the municipalities of St. François or La Désirade own site terrain if not specified otherwise. Site co-ordinates are taken from the 1:25,000 IGN map 'St. François, La Désirade, îles de Petite Terre'. Sketches of surface material distributions were drawn on 1:5000 aerial photographs. In addition, information is provided on surface material, site preservation, co-ordinates of test units and stratigraphy. Test-unit co-ordinates are local co-ordinates in the Guadeloupe - Ste. Anne system revealing Easting and Northing related to the International Hayford ellipsoid in a UTM projection (zone 20) and the orthometrical height in meters, computed from WGS84 measurements (Visschers and Lesparre 2000). Subsequently, the archaeological materials (pottery, lithic, shell and coral artefacts, shellfish remains, faunal remains, and human skeletal remains) found at the sites are described. The amounts of archaeological materials have been presented for the surface and the different layers of all test units separately elsewhere (De Waal 2002[c]).

If not specified otherwise, the lithics were analysed by Knippenberg (personal communication 2001-2002), summarising rock types and lithic artefact types for each site, and the faunal remains and the human skeletal remains were analysed by Nokkert (appendix 5). Natural rock fragments have been listed in the description of the lithics, as they have been collected and stored. They cannot be considered artefacts and are therefore not represented in the tables. Finally, the chronological assignment is presented. For most sites no ^{14}C dates are available and rough chronological assignments were made on the basis of stylistic aspects of ceramics encountered. Often, these merely consist of small samples. The site catalogues do not list information on site functions as these are considered to be interpretations. Site functions are presented in chapter 5.

1.2 FIELDWORK FORMS

1.2.1 Transect survey form; Pointe des Châteaux (1998)

Date	...../...../1998	Percentage		Vegetation	
Reporter		Transect area		Soil cover percentage	
Sector (S)		Time		Soil cover type	
Transect number (T)	PC98/S../T..	Cloud cover		Erosion	
Walking direction	North or South	Humidity		Slope	
Distance		Visibility		Soil type	

Archaeological finds	Ceramic	Shell	Stone	Coral	Animal	Colonial
Find numbers						
Photo record						
Remarks						

- Distance relates to the interval between the present transect and the previous one
- Percentage of transect surveyed: 1) 0%; 2) <25%; 3) 26-50%; 4) 51-75%; 5) 76-100%
- Area of the transect that was covered in m^2
- Time: 1) 6-10 am; 2) 10-12 am; 3) 12 am-3 pm; 4) 3-7 pm; 5) other
- Cloud cover: 1) clear; 2) somewhat cloudy; 3) very cloudy; 4) rain; 5) other
- Humidity (soil): 1) wet; 2) damp; 3) dry; 4) other
- Visibility conditions (take ploughing and/or dust conditions into account): 0) no visibility (0%); 1) bad (>0-25%); 2) moderately bad (>25-50%); 3) moderately good (>50-75%); 4) good (>75-100%)
- Vegetation (ONF): 1) zone A: shrubby pioneer vegetation (xerophile); 2) zone B: coastal strip of mancenillier and sea-grape; 3) zone C: thorny brushwood with acacias; 4) zone D: cactaceous savannas; 5) zone E: coastal grass-land; 6) cultivated; 7) other; 8) unknown
- Ground cover percentage: 0) absent; 1) >0-25%; 2) 26-50%; 3) 51-75%; 4) 76-100%
- Ground cover type: 0) absent; 1) leaves; 2) vegetation; 3) constructions; 4) other; 5) unknown
- Erosion: 0) absent; 1) soil added; 2) soil removed; 3) other; 4) unknown
- Slope: 0) no slope present; 1) 1-5%; 2) 6-10%; 3) 11-15%; 4) 16-20%; 5) 21-25%; 6) >25%
- Soil type: 1) loose or compact sand/clay/loam/peat; 2) sand/clay or loam in a sandy, clayish, loamy, peaty, gravel matrix; 3) other; 4) unidentified

1.2.2 Test unit record; La Désirade survey (1999)

Date	...../...../1999	SC number	DESI99/SC.....	Samples	C14; Soil; Other
Reporter		Test-pit number	DESI99/SC...../TP.....	Find nr.	DESI99/SC...../TP...../.....
Sector		Co-ordinates			
Site name		Sieving	.....inch wet/dry screen Other	Photos	

Finds	Pottery	Stone	Shell	Coral	Bone	Crab	Colonial	Other
Weight								
Number								

Feature.....	Description	
Feature.....	Description	
Feature.....	Description	
Feature.....	Description	
Feature.....	Description	

- Remarks (information on circumstances, disturbances, context; suggestions for further research):

- Scale drawing (1:10) of most informative section (preferably the northern section) with information on geological and archaeological stratigraphy, munsell colours and soil description (soil type, structure, and compactness):

1.2.3 Site description form; La Désirade survey (1999)

Date	...../...../1999	Co-ordinates	
Reporter		Length (N-S); Width (W-E)	
Sector		Thickness	Thickness of archaeological deposit (cm)
Site name		Status	Badly, moderately or well conserved
Site number	DESI99/S...../SC.....	Samples	
Site area		Site function	

Photo record				
Remarks				

Related transects	DESI99/S..... /T.....	Related test-units	DESI99/SC...../TP.....
	DESI99/S...../T.....		DESI99/SC...../TP.....
	DESI99/S...../T.....		DESI99/SC...../TP.....

Earlier research		Informants	
Collections	Private or public collections?	Current owner	
Recent land-use		Earlier land-use	

Soil type		Distance coast (m)		Distance other feature (m)		Find fragmentation	
Soil texture		Distance reef (m)		Vegetation		Settlement debris	Yes/No/?
Soil drainage		Distance salina (m)		Groundcover %		Shell sp. on surface	
Distance strategic location (m)		Distance mangrove (m)		Groundcover type		Surface distribution	
Distance drainage channel (m)		Distance fresh water (m)		Flat terrain	Yes/No/?	Find distribution	.....finds/m^2

Sketch of local situation (1:5000 aerial photographs)
Strategic or remarkable spots (or other islands) that are visible from site:

Remarks:

- Soil type: 1) loose or compact sand/clay/loam/peat; 2) sand/clay or loam in a sandy, clayish, loamy, peaty, gravel matrix; 3) other; 4) unidentified
- Soil texture/dominant particle size: 1) coarse (sand); 2) medium (silt/loam); 3) fine (clay); 4) other
- Soil drainage: 1) poor; 2) moderate; 3) good
- Find fragmentation: 1) modest; 2) moderate; 3) heavy
- Surface distribution: 1) even; 2) patchy; 3) concentrations; 4) other

APPENDIX 2. POINTE DES CHÂTEAUX SITE CATALOGUE

2.1 ANSE À LA GOURDE (97125-003)

2.1.1 Site location and preservation

The site of Anse à la Gourde (x: 691,000; y: 1798,850) is situated in the dunes of Anse à la Gourde bay and extends inland. The dimensions of the site are approximately 300 m along the coast by 150 m towards the south (fig. 5.1). Part of the site is situated in the dune area that is nowadays used for recreation. The inland part of the site used to be covered by dense impenetrable acacia vegetation, but it was cleared during the 1995-2000 excavations. The soil consists of loose, coarse, well-drained beach sand in the dune area, whereas the inland part is characterised by compact heavy clay. Père Barbotin and Edgar Clerc in 1972, Pierre Verin in 1975, Louis Allaire in 1977, Pierre Bodu in 1984, Gérard Richard in 1990 and Henri Petitjean-Roget in 1991 were already interested in the site. Between 1995 and 2000, large-scale archaeological investigations have been carried out, supervised by André Delpuech, then director of the archaeological service of the DRAC, and by dr. Corinne Hofman and dr. Menno Hoogland (Leiden University). The site is being threatened by illegal excavation, sand removal, and illegal house construction, but the worst damage has been inflicted by marine erosion, which erases great parts of the site every year (Troelstra and Beets 2001[a-b]).

2.1.2 Test units and stratigraphy

Eight 10 x 10 m units, 13 units measuring 2 x 2 m, two 2 x 3 m units, three 5 x 5 m units, one 1 x 1 m unit, 27 units measuring 1.2 x 2.4 m and 105 small shovel tests, measuring 50 x 50 cm, were excavated. In addition, a 72 m long trench was excavated, which was enlarged by an additional 6 x 7 m unit. A smaller trench was made for geological studies (Hofman *et al.* 2001[a]:28-30). Layout of the site and stratigraphy of the different parts of the site have been described by Hofman *et al.* (2001[a]:30-63).

2.1.3 Archaeological materials

Anse à la Gourde turned out to be an archaeologically rich site. The excavation of large units allowed the study of features and structures (Duin 1998). The features include 79 burials that demonstrate the existence of complex burial rites (Hoogland and Panhuysen 2001; Kraan 1998). Abundant and delicately worked artefacts were recovered, including ceramics (Hofman 2001), lithic artefacts (Knippenberg 2001[b]; Viallon 2001[a-b]), and shell (Lammers-Keysers in prep.) and coral objects (Kelly 2003). In addition, large amounts of shellfish remains (Nieweg 2000) and faunal remains (Grouard 2001) were collected.

2.1.4 Chronological assignment

Anse à la Gourde was occupied from the end of the Early Ceramic B well into the Late Ceramic B. Recovered pottery has been referred to as Cedrosan Saladoid (cal. AD 500-700) and Troumassoid I, II and III styles (cal. AD 950-1350); (Hofman *et al.* 2001[b]).

2.2 GRANDE SALINE (97125-010; SC22)

2.2.1 Site location and preservation

The site of Grande Saline (x: 693,800; y: 1798,250) is situated in the dunes north of the Grande Saline and extends southwards, well into the salina (fig. 5.1). Site dimensions are approximately 160 m from west to east and 85 m from north to south. Coastal vegetation, mostly sea grape, covers 11-20 percent of the soil, which consists of loose, coarse, well-drained beach sand. Surface visibility is very good. The terrain is actually used for recreation. Although the site was already known, no site description was available prior to 1998 (De Waal 1999[d-e]). Surface material consists of pottery, *Cittarium pica*, coral and lithics, and a lot of it is actually in the salina. Ceramic off-site material was found west and south-east of the Grande Saline, in the area leading towards Petites Salines (97125-011) and Montagne des Petites Salines (97125-016). Coastal erosion and illegal excavations have seriously damaged the site, and the impact of the Grande Saline on the preservation of the site is unknown.

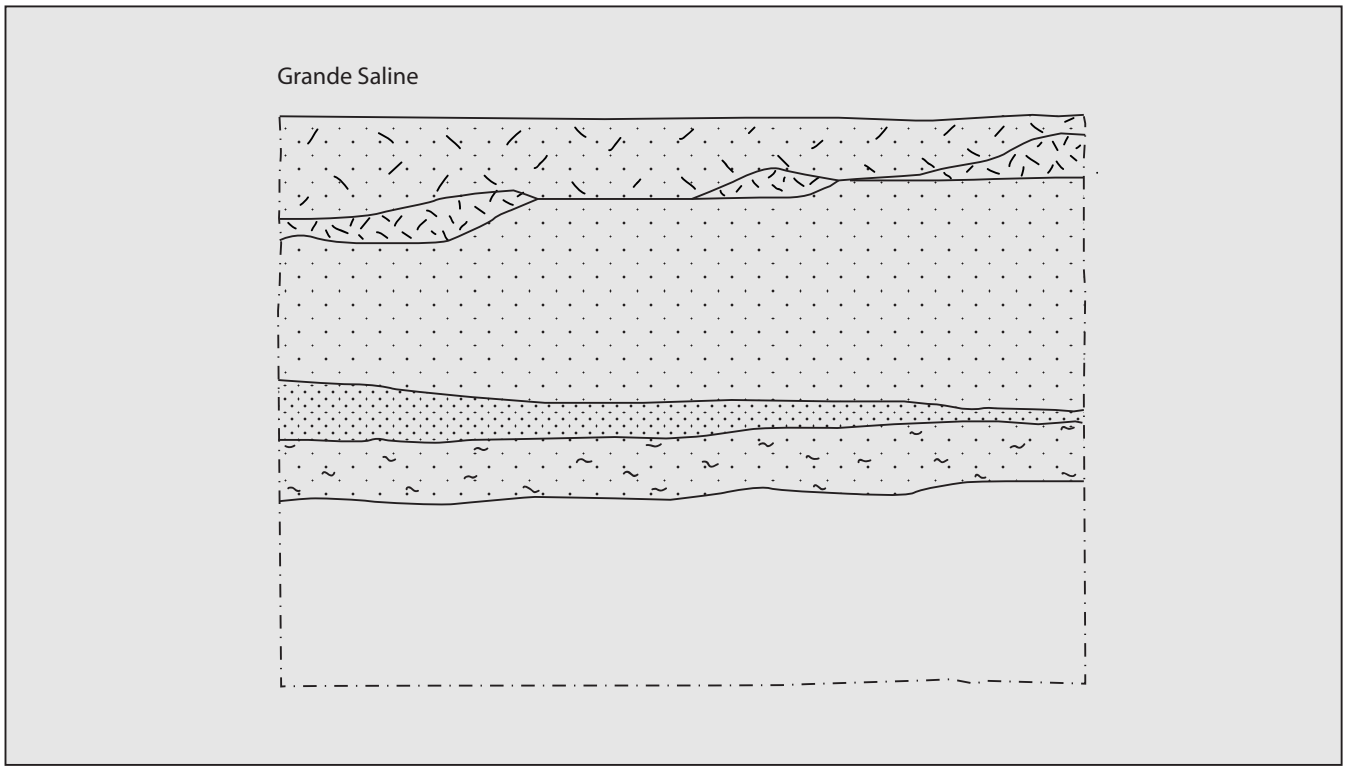
2.2.2 Test units and stratigraphy

One 2 x 2 m unit, situated in a concentration of archaeological material in the dunes, has been excavated. It demonstrated that the site has been seriously damaged by illegal excavation and by natural perturbation processes (fig. A2.1). The northwest corner of unit 1 was located at 693868.813; 1798260.801; 1.59 (Guadeloupe - Ste. Anne system) or 16°15′16.6866″; -61°11′23.6133″; -40.72 (WGS84).

2.2.3 Archaeological materials

2.2.3.1 Pottery

A total of 630 sherds was collected in 1998, mostly body



0 to 5-25 cm: Loose, coarse, dark grey brown (10YR;4/2) beach sand with a humus component and a lot of pottery and shell, some coral and hardly any faunal remains.

5-15 cm, 7-20 cm and 18-31 cm: Features consisting of loose, coarse pale brown (10YR;6/3) and brown (10YR;5/3) sand.

15-31 to 65-73 cm: Loose, coarse, yellow (10YR;7/6) sand with a very small amount of archaeological material, consisting of pottery, shell, some lithics and very few faunal remains.

65-73 to 75-80 cm: Brick-hard, extremely compact, lumpy, coarse, light yellowish brown (10YR;6/4) sand with a very small amount of archaeological material, consisting of pottery, shell, some lithics and very few faunal remains.

75-80 to 91-95 cm: Less compact, more humid, coarse, pale yellow (2.5YR;7/4) sand with almost no archaeological material, consisting mostly of shell.

> 91-95 cm: Loose, coarse, pale yellow (2.5YR;8/4) sand without archaeological material. Almost no archaeological material was found between 100-120 cm depth and no material at all was found between 120-140 cm depth. At 1.40 m depth, excavation had to be stopped as the ground water level was reached. Bedrock was not reached.

Fig. A2.1. Grande Saline, unit 1 (2 x 2 m), east section.

sherds (75.7%), weighing 9421 g (table A2.1). The appendages/other category, including handles (fig. A2.2) and a griddle leg, represents 1.1% of the sample. A total of 58 sherds has red slipped surfaces (9.2%) and incision and nubbins decorate six sherds (1%). Most of the bases are flat (fig. A2.3) or concave. Straight or triangular rims characterise the griddle fragments (tables A2.2-A2.5).

The morphological description of the pottery has been based on the analysis of 32 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (59.3%) and bowls with restricted simple contours (18.8%); (table A2.6; fig. A2.4). The dominant rim shape is rounded (78.1%). Wall thicknesses range between 6-8 mm (40.7%) and 9-11 mm (53.1%) and orifice diameters range between 21-30 cm (31.3%), 31-40 cm (25.0%) and 41-50 cm (18.7%), while 15.6% remains unidentified.[1] Surface colours are predominantly reddish brown (43.8%) and dark brown/very dark brown (37.5%). Firing techniques include incomplete or relatively good oxidation (37.5%), complete reduction (31.2%), as well as incomplete oxidation (25.0%). Surface finishing is mainly characterised by burnishing (59.4%) and smoothing (12.5%). For 18.8% the surface finishing could not be identified (tables A2.7-A2.12).[2] Temper materials include finely crushed shell and fine sand, although some sherds have coarse surfaces and coarse sand temper.

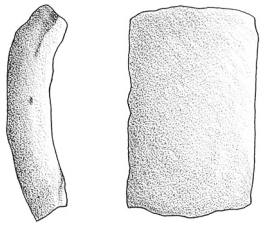


Fig. A2.2. Handle from Grande Saline (surface, scale 1:2).

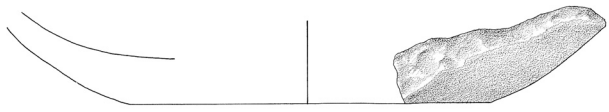


Fig. A2.3. Flat base from Grande Saline (unit 1, level 3, scale 1:3).

	Number	Number %	Weight	Weight %
Rim	104	16.5	1688	17.9
Body	477	75.7	6640	70.5
Base	36	5.7	874	9.2
Griddle	6	1.0	155	1.7
Appendage/other	7	1.1	64	0.7
Total	630	100.0	9421	100.0

Table A2.1. Number, percentages and weight (g) of sherds from Grande Saline.

	Number	Number %
Handle	6	85.7
Griddle leg	1	14.3
Total	7	100.0

Table A2.2. Number and percentages of sherds within appendages/other categories from Grande Saline.

	Number	Number %
Incision	4	66.7
Nubbins	2	33.3
Total	6	100.0

Table A2.3. Number and percentages of sherds with particular Grande Saline decoration modes.

	Number	Number %
Flat	15	41.7
Convex	2	5.6
Concave	12	33.3
Unidentified	7	19.4
Total	36	100.0

Table A2.4. Number and percentages of sherds within base shape categories from Grande Saline.

	Number	Number %
Straight	3	50.0
Triangular	3	50.0
Total	6	100.0

Table A2.5. Number and percentages of sherds within griddle shape categories from Grande Saline.

	Number	Number %
Jar with unrestricted simple contour	5	15.6
Bowl with unrestricted simple contour	10	31.2
Dish with unrestricted simple contour	4	12.5
Bowl with restricted simple contour	6	18.8
Bowl with unrestricted composite contour	2	6.3
Jar with restricted composite contour	3	9.4
Bowl with unrestricted inflected contour	1	3.1
Jar with independent restricted inflected contour	1	3.1
Total	32	100.0

Table A2.6. Number and percentages of sherds within vessel shape categories from Grande Saline.

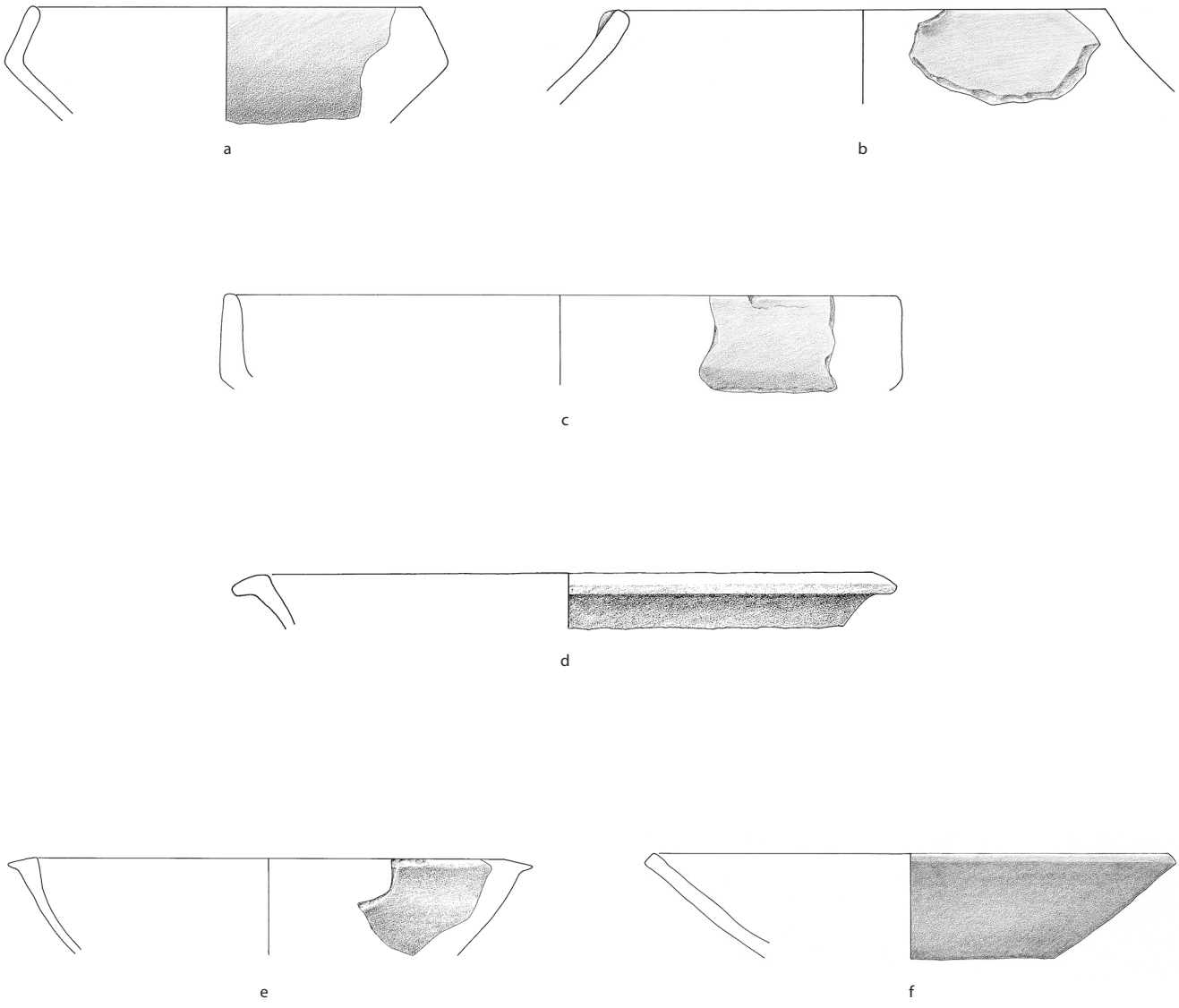


Fig. A2.4. Vessel shapes, scale 1:3 (a: unit 1, level 4, feature 004; b: surface; c: unit 1, level 6; d: surface) and scale 1:4 (e: surface; f: unit 1, level 1).

	Number	Number %
Rounded	25	78.1
Inward thickened	2	6.3
Outward thickened	3	9.4
Inwardly bevelled	1	3.1
Flanged	1	3.1
Total	32	100.0

Table A2.7. Number and percentages of sherds within rim shape categories from Grande Saline.

	Number	Number %
1-5 mm	1	3.1
6-8 mm	13	40.7
9-11 mm	17	53.1
12-15 mm	1	3.1
Total	32	100.0

Table A2.8. Number and percentages of sherds within Grande Saline wall thickness categories.

	Number	Number %
21-30 cm	10	31.3
31-40 cm	8	25.0
41-50 cm	6	18.7
51-60 cm	3	9.4
Unidentified	5	15.6
Total	32	100.0

Table A2.9. Number and percentages of sherds within Grande Saline orifice diameter categories.

	Number	Number %
Dark gray-black	1	3.1
Light brown/brown	3	9.4
Dark brown/very dark brown	12	37.5
Reddish-gray/dark reddish-gray	1	3.1
Reddish brown	14	43.8
Red	1	3.1
Total	32	100.0

Table A2.10. Number and percentages of sherds within Grande Saline exterior surface colour categories.

	Number	Number %
Complete reduction	10	31.2
Incomplete oxidation	8	25.0
Complete oxidation	2	6.3
Incomplete or relatively good oxidation	12	37.5
Total	32	100.0

Table A2.11. Number and percentages of sherds within Grande Saline firing colour categories.

	Number	Number %
Crude	1	3.1
Scratched	1	3.1
Smoothed	4	12.5
Lightly burnished	6	18.8
Highly burnished	13	40.6
Polished	1	3.1
Unidentified	6	18.8
Total	32	100.0

Table A2.12. Number and percentages of sherds within Grande Saline exterior surface finishing categories.

	Flake	Pebble	*Metate*	Core	Total
Long Island flint	13				13 68.4
La Désirade igneous rock		4			4 21.00
Limestone				1	1 5.3
Sandstone			1		1 5.3
Total	13 68.4	4 21.00	1 5.3	1 5.3	19 100.0

Table A2.13. Number and percentages of Grande Saline rock types and lithic artefact types.

2.2.3.2 Lithic artefacts

The 19 lithic artefacts collected mainly consist of Long Island flint artefacts (table A2.13). They further include four pebbles, one fragment of a possible *metate* or passive grinding tool and one irregularly shaped burnt limestone core. The latter exhibits a scar. The *metate* fragment has one flat face and is made of greenish sandstone. The pebbles are possibly La Désirade igneous rock. Among them, used

	Rasp fragment	Polishing tool	Grinding tool fragment	Unidentified	Total
Acropora cerv.	2			1	3
	15.4			7.7	23.1
Acropora palm.			2	1	3
			15.4	7.7	23.1
Porites porites		1		2	3
		7.7		15.4	23.1
Montastrea cav.				3	3
				23.1	23.1
Siderastrea sid.				1	1
				7.7	7.7
Total	2	1	2	8	13
	15.4	7.7	15.4	61.6	100.0

Table A2.14. Number and percentages of Grande Saline coral species and artefact types.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	17	21	291	312
	3.9	0.4	1.8	1.4
Strombus gigas	8	347	3253	3600
	1.8	6.3	20.1	16.6
Cittarium pica	103	4519	12,440	16,959
	23.7	81.8	76.7	78.0
Nerita sp.	156	150	45	195
	36.0	2.7	0.3	0.9
Other[3]	150	489	193	682
	34.6	8.8	1.1	3.1
Total	434	5526	16,222	21,748
	100.0	100.0	100.0	100.0

Table A2.15. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species at Grande Saline.

material has been identified, with possible intentional retouch, and differential patination has been found, which indicates that flaking occurred in some instances after patination had already taken place.

2.2.3.3 Coral artefacts

A total of 13 coral artefacts was found, including two unidentified artefacts of *Porites porites*, one with ground sides and one without use wear, two *Acropora cervicornis* rasp fragments, of which one has been lightly used and one heavily used, and two unidentified objects of *Montastrea cavernosa* without use wear.[4] One lightly used and one heavily used fragment of *Acropora palmata* grinding tools, one lightly used unidentified artefact of *Siderastrea siderea* and one heavily used *Porites porites* polishing tool were found as well.[5] In addition, three fragments, of *Acropora palmata*, *Acropora cervicornis* and *Montastrea cavernosa,* were found without any sign of modification or use (table A2.14).

2.2.3.4 Shellfish remains

The main shellfish remains consisted of *Acanthopleura*

granulata, Cittarium pica, Nerita sp. and *Strombus gigas* (table A2.15). Other shell species represented in very low numbers and weights at the site included *Arca zebra*, *Astraea* sp., *Chama sinuosa*, *Charonia variegata*, *Chiton tuberculatus*, *Codakia orbicularis, Conus mus*, *Cyphoma gibbosum*, *Cypraecassis testiculus*, *Fissurella nimbosa*, *Hipponix antiquatus*, *Nodilittorina tuberculata*, *Purpura patula*, *Spondylus americanus*, *Tegula excavata*, *Tellina* sp., *Thais deltoidea*, *Tonna maculosa* and *Vermetus* sp.[6] All shell remains could be identified.

2.2.3.5 Animal remains

A very small sample of faunal remains could be collected (total MNI 6; total weight 33 g). MNI counts (excluding the intrusive species) show that the faunal sample has only a terrestrial component, including land hermit crab, great land crab, black land crab and land crab (Nokkert in appendix 5).

2.2.4 Chronological assignment

The pottery suggests that the site was probably occupied during the early part of the Late Ceramic A, probably around AD 800-1000. Characteristic is the use of red slip and the inward thickened rims, although the latter are not very numerous.

2.3 PETITES SALINES (97125-011; SC21)

2.3.1 Site location and preservation

The site of Petites Salines (x: 694,575; y: 1797,875) is situated in the Anse des Salines dunes on the northern coast (fig. 5.1). This terrain is presently used for recreation. Site dimensions are 85 m from west to east and 80 m from north to south. A sandy road, running from the Grande Saline towards the easternmost salina, divides the site in two parts. The northern part is characterised by a dense distribution of archaeological material consisting mainly of fragments of pottery, *Cittarium pica*, *Strombus gigas* and coral. The southern part has a small surface distribution. Some concentrations could be identified, in which test units were excavated. Off-site material, which reflects special activity areas belonging to the site, was found near the small eastern salina. Other off-site material has been found, in the area leading to the Montagne des Petites Salines site (97125-016) in particular. Coastal vegetation, mostly sea-grape, covers 11-20 percent of the part of the site situated in the dunes, and the soil consists of loose, very coarse beach sand. Surface visibility is extremely good. Towards the salina, thorny vegetation covers the terrain and the soil consists of more compact, moderately structured well-drained very clayey sand with a humus component. It appears to have been covered by salina sediments from time to time. Although the location of the Petites Salines site had already been registered in the DRAC inventory, no site description had been made prior to the 1998 surveys. Parts of the site have probably been washed away through coastal erosion. Visitors to the site mentioned small-scale illegal excavation that may have partially destroyed the site but no evidence was found to support this.

2.3.2 Test units and stratigraphy

Five test units, distributed all over the terrain, were excavated in the surface concentrations. Units 1 (fig. A2.5), 3, 4 and 5 were situated in the dunes and unit 2 in the interior of the terrain, near the salina. In order to prevent the sections collapsing, the first two levels of units 1, 2 and 4 measured 2 x 2 m. A 1 m^2 unit was made in the middle of this 2 x 2 m unit until a depth of 1.80-2.00 m was reached. In units 1 and 4, a 50 x 50 cm unit was excavated in the middle of the 1 m^2 unit. Excavation of unit 4 ended at a depth of 2.00-2.20 m after having dug more than a meter of sterile sediment and bedrock was not reached as the sections collapsed. The third unit was enlarged in its eastern part by unit 5 in order to have a larger section and to facilitate excavation. Excavation of these units was halted at 2.00 m depth after digging more than a meter of sterile sediment. The northwest corner of unit 1 was located at 694556.674; 1797845.134; 2.49 (Guadeloupe - Ste. Anne system)[7] or 16°15′2.9674″; -61°11′0.5746″;-39.82 (WGS84). The northwest corner of unit 2 was located at 694539.967; 1797825.835; 0.87 (Guadeloupe - Ste. Anne system) or 16°15′2.3445″; -61°11′1.1429″; -41.45 (WGS84). The northwest corner of unit 3 and 5 was located at 694534.416; 1797853.379; 2.22 (Guadeloupe - Ste. Anne system) or 16°15′3.2421″; -61°11′1.3216″; -40.10 (WGS84). The northwest corner of unit 4 was located at 694576.419; 1797830.111; 2.32 (Guadeloupe - Ste. Anne system) or 16°15′2.4731″; -61°10′59.9142″; -40.00 (WGS84).

2.3.3 Archaeological materials

2.3.3.1 Pottery

A total of 809 sherds was collected, weighing 17,280 g (table A2.16). The total number of Early Ceramic sherds is 193 and most of these are body sherds (76.7%). It should be remarked that Early Ceramic B rims (mean weight 87.5 g) are much bigger than Late Ceramic A rims (mean weight 41.5 g). The appendages/other category, including one handle, represents 0.6% of the sample. One sherd (0.5%) has red slipped surfaces and eight sherds (4.1 %) are decorated, one by incision (12.5%) and seven by nubbins (87.5%); (fig. A2.6). Most of the bases are convex (42.1%) and one

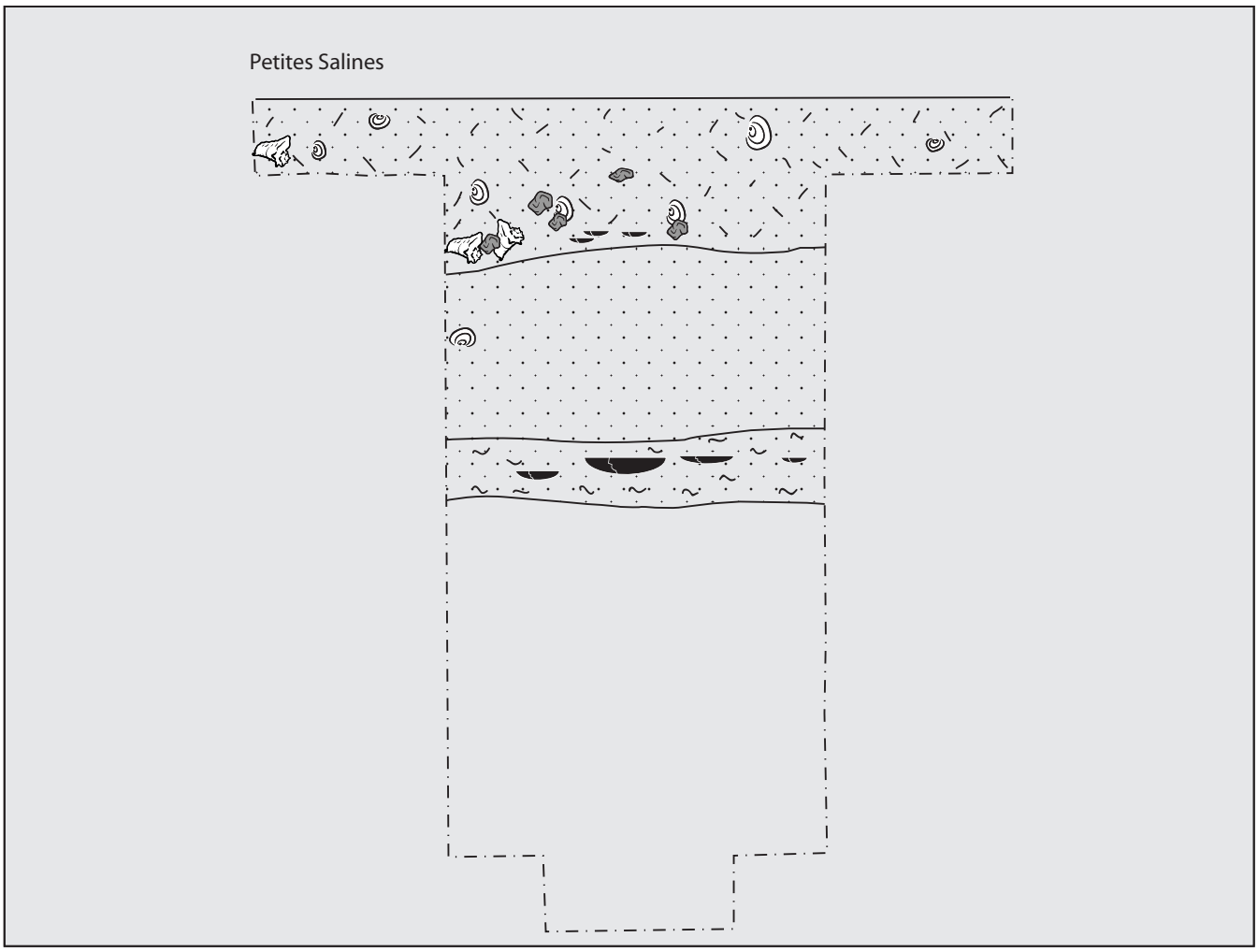


Fig. A2.5. Petites Salines, unit 1 (2 x 2 m), south section.

triangular griddle rim could be identified (table A2.17).

The morphological description of the Early Ceramic B pottery has been based on the analysis of 19 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars with unrestricted simple contours (63.2%), bowls with unrestricted composite contours (15.8%) and bowls with unrestricted inflected contours (15.8%); (table A2.18; fig. A2.7). Dominant rim shapes are rounded (73.3%) and flanged (15.7%). Most of the walls are 6-8 mm thick (73.6%) and orifice diameters range between 21-30 cm (52.6%) and 31-40 cm (31.6%), while 10.5% remains unidentified. Surface colours are predominantly reddish brown (73.7%) and dark brown/very dark brown (21.0%). The main firing technique is incomplete or relatively good oxidation (89.4%). Surface finishing is predominantly characterised by smoothing (47.4%) and light burnishing (15.7%). The surface finishing of many sherds could not be identified (36.9%) as a result of thick salty chalk deposits

	Number	Number %	Weight	Weight %
Rim	23	11.9	2012	38.9
Body	148	76.7	2586	49.9
Base	19	9.8	539	10.4
Griddle	2	1.0	33	0.6
Appendage/other	1	0.6	10	0.2
Total	193	100.0	5180	100.0

Table A2.16. Number, percentages and weight (g) of sherds from Early Ceramic B Petites Salines.

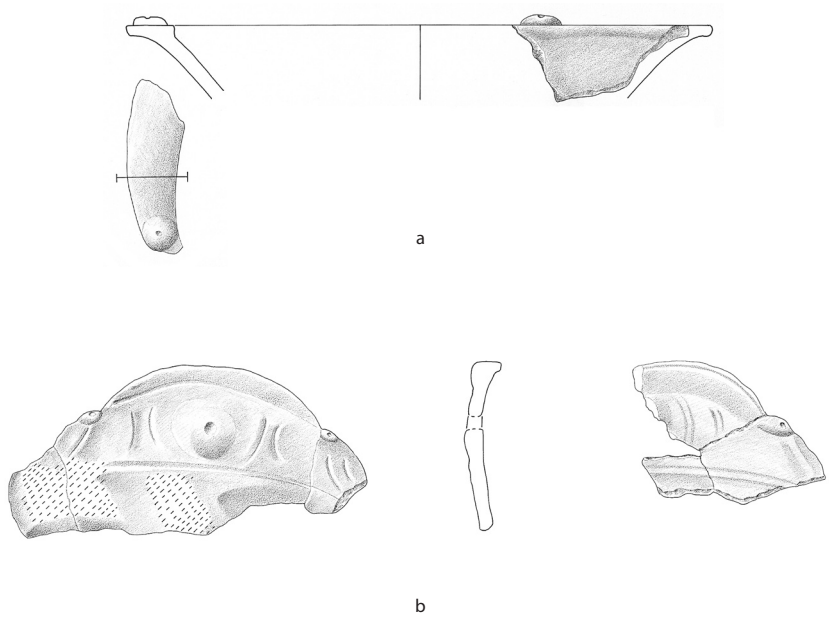


Fig. A2.6. Decorated sherds from Early Ceramic B Petites Salines (a: nubbins; b: nubbins and incisions).

	Number	Number %
Flat	1	5.3
Convex	8	42.1
Concave	2	10.5
Unidentified	8	42.1
Total	19	100.0

Table A2.17. Number and percentages of sherds within base shape categories from Early Ceramic B Petites Salines.

	Number	Number %
Jar with unrestricted simple contour	12	63.2
Bowl with unrestricted composite contour	3	15.8
Bowl with unrestricted inflected contour	3	15.8
Unidentified	1	5.2
Total	19	100.0

Table A2.18. Number and percentages of sherds within vessel shape categories from Early Ceramic B Petites Salines.

	Number	Number %
Rounded	14	73.7
Outward thickened	1	5.3
Flanged	3	15.7
Unidentified	1	5.3
Total	19	100.0

Table A2.19. Number and percentages of sherds within rim shape categories from Early Ceramic B Petites Salines.

	Number	Number %
1-5 mm	1	5.3
6-8 mm	14	73.6
9-11 mm	2	10.5
12-15 mm	1	5.3
Unidentified	1	5.3
Total	19	100.0

Table A2.20. Number and percentages of sherds within wall thickness categories from Early Ceramic B Petites Salines.

on the pottery, caused by the wet and salty conditions in the Early Ceramic B layer (tables A2.19-A2.24). Temper materials include finely crushed shell and fine sand.

The total number of Late Ceramic A sherds is 616 and most of these are body sherds (76.8%); (table A2.25). The appendages/other category represents 1.8% of the sample. This includes handles, spindle whorl preforms, large and heavy griddle legs and ceramic discs (fig. A2.8). A total of 23 sherds (3.7%) has red slipped surfaces and two sherds (0.3%) are decorated by nubbins. Most of the bases are flat (51.4%) and legged griddles are dominant (38.1%); (tables A2.26-A2.28).

The morphological description of the Late Ceramic A pottery has been based on the analysis of 45 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, dishes and bowls with unrestricted simple contours (55.6%), bowls with unrestricted composite contours (17.7%) and bowls with unrestricted inflected contours (15.6%); (table A2.29; fig. A2.9). Dominant rim shapes are rounded (69.0%) and flattened (11.1%). Wall-thickness ranges between 1-5 mm (73.6%), 9-11 mm (31.1%) and 6-8 mm (17.8) and orifice diameters range between 11-20 cm (11.1%), 31-40 cm (35.6%) and 41-50 cm (26.7%), while 8.9% remains unidentified. Surface colours are predominantly reddish brown (44.5%) and dark brown/very dark brown (22.3%). The main firing technique is incomplete or relatively good oxidation (77.9%). Surface

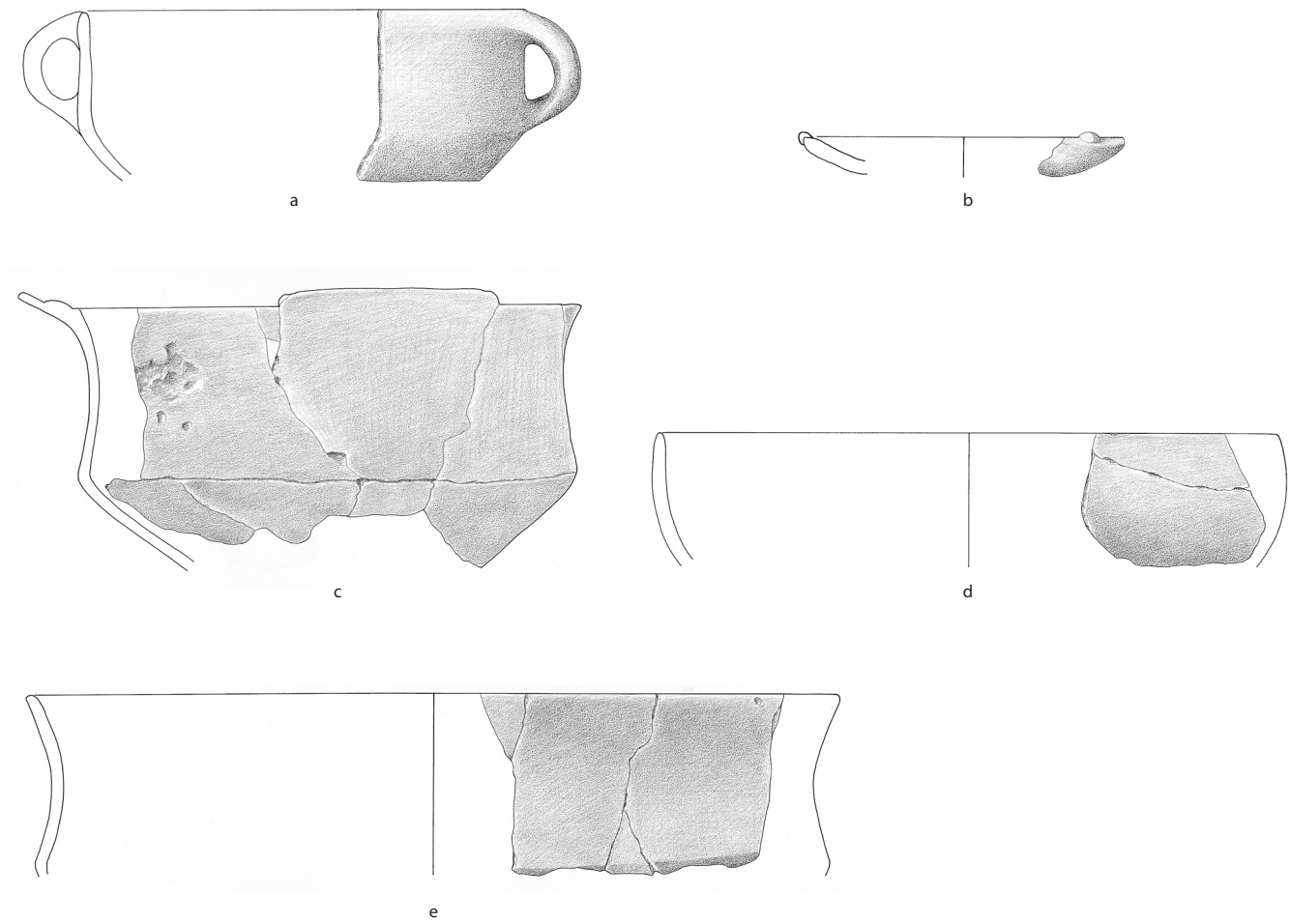


Fig. A2.7. Vessel shapes from Early Ceramic B Petites Salines, scale 1:3 (a: unit 1, level 11; b: unit 1, level 8) and scale 1:4 (c: unit 1, level 11; d-e: dump).

	Number	Number %
21-30 cm	10	52.6
31-40 cm	6	31.6
41-50 cm	1	5.3
Unidentified	2	10.5
Total	19	100.0

Table A2.21. Number and percentages of sherds within orifice diameter categories from Early Ceramic B Petites Salines.

	Number	Number %
Dark brown/very dark brown	4	21.0
Reddish brown	14	73.7
Unidentified	1	5.3
Total	19	100.0

Table A2.22. Number and percentages of sherds within exterior surface colour categories from Early Ceramic B Petites Salines.

	Number	Number %
Incomplete oxidation or reduction	1	5.3
Incomplete or relatively good oxidation	17	89.4
Unidentified	1	5.3
Total	19	100.0

Table A2.23. Number and percentages of sherds within firing colour categories from Early Ceramic B Petites Salines.

	Number	Number %
Smoothed	9	47.4
Lightly burnished	3	15.7
Unidentified	7	36.9
Total	19	100.0

Table A2.24. Number and percentages of sherds within exterior surface finishing categories from Early Ceramic B Petites Salines.

	Number	Number %	Weight	Weight %
Rim	77	12.5	3197	26.4
Body	473	76.8	6978	57.7
Base	35	5.7	985	8.1
Griddle	20	3.2	471	3.9
Appendage/other	11	1.8	469	3.9
Total	616	100.0	12,100	100.0

Table A2.25. Number, percentages and weight (g) of sherds from Late Ceramic A Petites Salines.

	Number	Number %
Handle	5	45.4
Spindle whorls	2	18.2
Griddle leg	2	18.2
Ceramic disc	2	18.2
Total	11	100.0

Table A2.26. Number and percentages of sherds within appendages/other categories from Late Ceramic A Petites Salines.

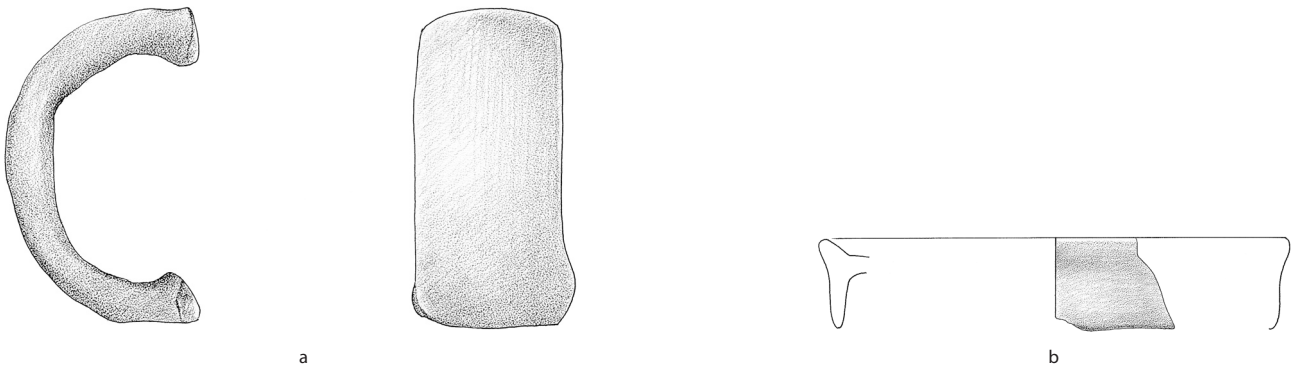


Fig. A2.8. Handle (unit 4, level 7, scale 1:2) and legged griddle (unit 1, level 1, scale 1:3) from Late Ceramic A Petites Salines.

	Number	Number %
Flat	18	51.4
Convex	1	2.9
Concave	2	5.7
Unidentified	14	40.0
Total	35	100.0

Table A2.27. Number and percentages of sherds within base shape categories from Late Ceramic A Petites Salines.

	Number	Number %
Triangular	3	14.3
Legged	8	38.1
Unidentified	10	47.6
Total	21	100.0

Table A2.28. Number and percentages of sherds within griddle shape categories from Late Ceramic A Petites Salines.

	Number	Number %
Jar with unrestricted simple contour	12	26.7
Bowl with unrestricted simple contour	6	13.3
Dish with unrestricted simple contour	7	15.6
Bowl with restricted simple contour	4	8.9
Bowl with unrestricted composite contour	8	17.7
Jar with restricted composite contour	1	2.2
Bowl with unrestricted inflected contour	7	15.6
Total	45	100.0

Table A2.29. Number and percentages of sherds within vessel shape categories from Late Ceramic A Petites Salines.

	Number	Number %
Rounded	31	69.0
Flattened	5	11.1
Inward thickened	2	4.4
Outward thickened	4	8.9
Flanged	2	4.4
Unidentified	1	2.2
Total	45	100.0

Table A2.30. Number and percentages of sherds within rim shape categories from Late Ceramic A Petites Salines.

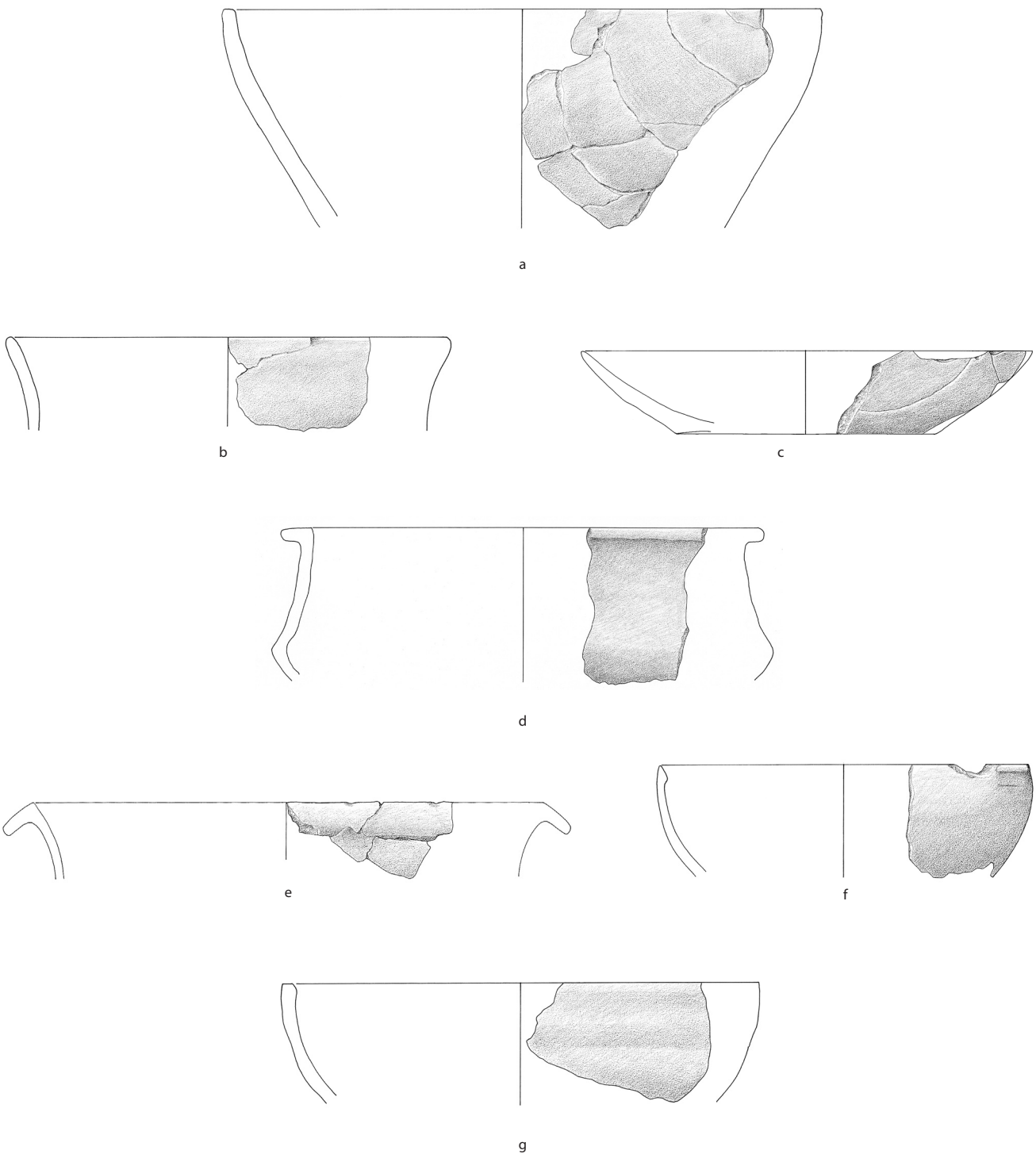


Fig. A2.9. Vessel shapes from Late Ceramic A Petites Salines, scale 1:4 (a: unit 1, level 1; b: dump; c: unit 3, level 4; d: unit 5, level 5; e: dump) and scale 1:3 (f-g: unit 1, level 2).

	Number	Number %
1-5 mm	22	48.9
6-8 mm	8	17.8
9-11 mm	14	31.1
12-15 mm	1	2.2
Total	45	100.0

Table A2.31. Number and percentages of sherds within wall thickness categories from Late Ceramic A Petites Salines.

	Number	Number %
11-20 cm	5	11.1
21-30 cm	4	8.9
31-40 cm	16	35.6
41-50 cm	12	26.7
51-60 cm	1	2.2
60-70 cm	3	6.6
Unidentified	4	8.9
Total	45	100.0

Table A2.32. Number and percentages of sherds within orifice diameter categories from Late Ceramic A Petites Salines.

	Number	Number %
Dark gray-black	2	4.4
Dark grayish-brown	1	2.2
Light brown-yellow	2	4.4
Light brown/brown	4	8.9
Dark brown/very dark brown	10	22.3
Reddish-gray/dark reddish-gray	4	8.9
Reddish brown	20	44.5
Red	2	4.4
Total	45	100.0

Table A2.33. Number and percentages of sherds within exterior surface colour categories from Late Ceramic A Petites Salines.

finishing is predominantly characterised by burnishing (68.9%). The surface finishing of many sherds could not be identified (22.2%) as the pottery is heavily weathered (tables A2.30-A2.35). Temper materials include finely crushed shell and fine sand.

2.3.3.2 Lithic artefacts

Very few lithic artefacts were found, and none were from the Early Ceramic B layer in unit 1. These include two rhyolite-like pebbles, two Long Island flint flakes and one polyhedral core-artefact. Two of these are heavily patinated. Several burnt limestone fragments that appear to be non-worked and which are probably natural were found as well (table A2.36).

2.3.3.3 Coral artefacts

Most coral artefacts were found in the upper level of unit 1 and none were from the Early Ceramic B layer in this unit. These include several *Acropora cervicornis* objects, among which are 16 rasp fragments, of which one was moderately used and most of the others were lightly used, and one unidentified object without any evidence of use. In addition, *Porites porites* objects were collected, including one heavily used grinder, four unidentified fragments with ground sides and one hammering implement with ground sides. Three fragments of *Acropora palmata* grinders, of which two were moderately used and one was lightly used, five unidentified *Montastrea cavernosa* fragments and five unidentified *Siderastrea siderastrea* fragments were found as well (table A2.37).

2.3.3.4 Shellfish remains

A very small number of shell remains were found in the Early Ceramic B layer in unit 1, representing 884 g, among which were *Acanthopleura granulata, Chama sinuosa*, *Cittarium pica*, *Codakia orbicularis, Nerita* sp. and *Nodilittorina tuberculata* (table A2.38).

The main Late Ceramic A shellfish remains consisted of *Acanthopleura granulata, Astraea* sp., *Cittarium pica, Nerita* sp. and *Strombus gigas* (table A2.39). Other shell species represented in very low numbers and weights included *Acmaea antillarum*, *Anadara notabilis*, *Bulla striata*, *Chama* sp., *Charonia variegata*, *Chiton* sp., *Codakia orbicularis, Conus mus*, *Cymatium femorale*, *Cypraea zebra*,

	Number	Number %
Complete reduction	6	13.3
Incomplete oxidation or reduction	2	4.4
Incomplete oxidation	1	2.2
Complete oxidation	1	2.2
Incomplete or relatively good oxidation	35	77.9
Total	45	100.0

Table A2.34. Number and percentages of sherds within firing colour categories from Late Ceramic A Petites Salines.

	Number	Number %
Crude	1	2.2
Smoothed	3	6.7
Lightly burnished	14	31.1
Highly burnished	17	37.8
Unidentified	10	22.2
Total	45	100.0

Table A2.35. Number and percentages of sherds within exterior surface finishing categories from Late Ceramic A Petites Salines.

Cypraecassis testiculus, *Diodar viridula*, *Fissurella* sp., *Hipponix antiquatus*, *Murex (phyll.) pomum*, *Nodilittorina tuberculata*, *Purpura patula*, *Spondylus americanus*, *Tegula excavata*, *Tellina* sp., *Thais* sp., and *Vasum capitellum*. All shell remains could be identified.

2.3.3.5 Animal remains

Animal remains from the Petites Salines sites were collected from a 2/5 inch (total MNI 30, total weight 183 g) and a 2 mm sample (total MNI 19, total weight 9 g) from two natural features. Unfortunately the faunal material from both the Early Ceramic B layers was combined with the Late Ceramic A layers in the species list of the site sample, and as yet it has been impossible to isolate the Early Ceramic B fragments from the complete sample studied.

MNI counts (excluding the intrusive species) show that the Petites Salines 2/5 inch faunal sample consists of crab (93.2%), fish, (3.3%) and bird (3.3%). It has a terrestrial component (79.9%) that consists of unidentified bird, land hermit crab, great land crab, black land crab, land crab and crab. Without land hermit crab included the terrestrial component still makes up 49.9% of the total sample. The majority of invertebrate remains has been explained by small sample size or by unrecognized recent intrusive fragments. Inshore species (16.6%) are represented by red rock urchin, common spider crab and coral crab and reef herbivores/omnivores, in this case parrotfish, represent 3,3% of the sample. MNI counts of the negligible 2 mm sample, demonstrate the presence of land hermit crab mainly (Nokkert in appendix 5).

2.3.4 Chronological assignment

Early Ceramic B and Late Ceramic A pottery has been found.

	Flake	Core	Pebble	Total
Long Island flint	2	1		3
				60.0
Rhyolite			2	2
				40.0
Total	2	1	2	5
	40.0	20.0	40.0	100.0

Table A2.36. Number and percentages of rock types and lithic artefact types found at Petites Salines.

	Rasp fragment	Hammering impl.	Grinding tool fragm.	Unidentified	Total
Acropora cervicornis	16			1	17
	44.4			2.8	47.2
Acropora palmata			3		3
			8.3		8.3
Porites porites		1	1	4	6
		2.8	2.8	11.1	16.7
Montastrea cavernosa				5	5
				13.9	13.9
Siderastrea siderastrea				5	5
				13.9	13.9
Total	16	1	4	15	36
	44.4	2.8	11.1	41.7	100.0

Table A2.37. Number and percentages of coral species and artefact types collected at Petites Salines.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	1	4	14	18
	10.0	0.6	5.2	2.0
Cittarium pica	6	596	246	842
	60.0	96.8	91.8	95.3
Codakia orbicularis	1	14	0	14
	10.0	2.3	0.0	1.6
Other	2	2	8	10
	20.0	0.3	3.0	1.1
Total	10	616	268	884
	100.0	100.0	100.0	100.0

Table A2.38. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at the Early Ceramic B layer at Petites Salines.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	65	123	678	801
	7.2	0.8	2.8	2.1
Strombus gigas	12	3219	5067	8286
	1.3	21.6	21.3	21.4
Cittarium pica	209	9645	17,372	27,017
	23.2	64.7	72.9	69.7
Nerita sp.	408	421	165	586
	45.2	2.8	0.7	1.5
Astraea sp.	47	642	164	806
	5.2	4.3	0.7	2.1
Other	161	866	398	1264
	17.9	5.8	1.6	3.2
Total	902	14,916	23,844	38,760
	100.0	100.0	100.0	100.0

Table A2.39. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at the Late Ceramic A layers at Petites Salines.

2.4 SITE 1 (97125-013; SC01)

2.4.1 Site location and preservation

Site 1 (x: 692,350; y: 1797,750) was discovered on a protruding plateau on the southern coast of Pointe des Châteaux, bordered by steep cliffs, during the 1998 surveys (fig. 5.1). Site dimensions are 100 m from east to west and 30 m from north to south. The archaeological material, mainly consisting of heavily fragmented pottery, has a thin and even distribution all over the surface. Almost no off-site material was found. Thorny and very dense bush covers 11-20 percent of the soil, which consists of moderately textured well-drained clayey sand. Surface visibility is moderate. No real archaeological layer could be identified, the distribution of artefacts being too superficial. The test units hardly yielded any archaeological material at all. This is due to erosion. In addition, the surface material is heavily fragmented, which may be indicative of perturbation of the site, for example through cattle grazing, for which the site

is presently used. The northern section of test unit 1 shows a small ditch probably indicating human action. Illegal excavation seems improbable.

2.4.2 Test units and stratigraphy

Three test units of 1 m^2 were excavated on the west-east axis of the site. The first unit was started as a 1 m^2 unit, but excavation continued as a 50 x 50 cm unit from 30 cm depth onwards, as the layers were very compact and sterile (fig. A2.10). The northwest corner of unit 1 was located at 692280.222; 1797724.336; 6.83 (Guadeloupe - Ste. Anne system) or 16°14′59.6911″; -61°12′17.2658″; -35.33 (WGS84). The northwest corner of unit 2 was located at 692270.348; 1797724.676; 6.63 (Guadeloupe - Ste. Anne system) or 16°14′59.7050″; -61°12′17.5982″; -35.53 (WGS84). The northwest corner of unit 3 was located at

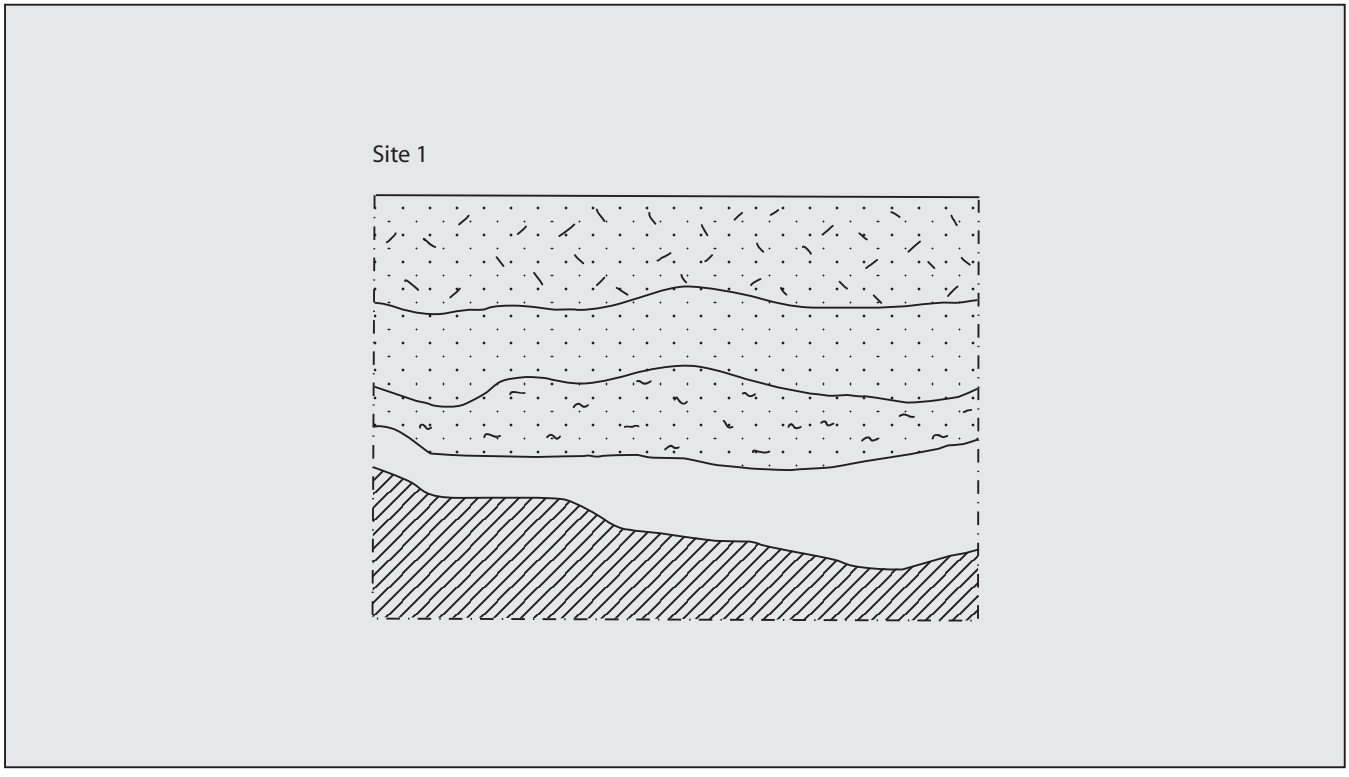


Fig. A2.10. Site 1, unit 1 (1 m^2), north section.

692308.720; 1797719.767; 6.30 (Guadeloupe - Ste. Anne system) or 16°14′59.5344″; -61°12′16.3075″; -35.86 (WGS84).

2.4.3 Archaeological materials

2.4.3.1 Pottery

As two rims smaller than 5 cm and 13 non-diagnostic body sherds were collected, no quantitative or morphological description can be provided. One sherd (6.7%) has red slipped surfaces. The ceramics are coarse and heavy, heavily fragmented and tempered with crushed shell.

2.4.3.2 Coral artefacts

Two unidentified *Siderastrea siderastrea* fragments were collected.

2.4.3.3 Shellfish remains

The main shellfish remains consisted of *Cittarium pica* and *Strombus gigas* (table A2.40). Other shell species represented in very low numbers and weights at the site included *Astraea* sp., *Nodilittorina tuberculata*, *Purpura patula*, *Tellina radiata*, and *Tonna maculosa*. All shell could be identified.

2.4.4 Chronological assignment

The site yielded Late Ceramic A pottery, probably dated not later than AD 1200.

2.5 VILLAGE DES PÊCHEURS (97125-014; SC02)

2.5.1 Site location and preservation

The Village des Pêcheurs site (x: 692,900; y: 1797,750) was discovered on the southern coast of Pointe des Châteaux during the 1998 surveys (fig. 5.1). Site dimensions are 180 m from east to west and 70 m from north to south,

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	3	150	116	266
	50.0	96.2	17.8	33.0
Strombus gigas	0	0	528	528
	0.0	0.0	81.1	65.5
Nerita sp.	2	5	3	8
	33.3	3.2	0.5	1.0
Other	1	1	4	4
	16.7	0.6	0.6	0.5
Total	6	156	651	806
	100.0	100.0	100.0	100.0

Table A2.40. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from Site 1.

	Number	Number %	Weight	Weight %
Rim	37	14.1	310	19.6
Body	218	83.2	1166	73.7
Base	1	0.4	8	0.5
Griddle	0	0.0	0	0.0
Appendage/other	6	2.3	98	6.2
Total	262	100.0	1582	100.0

Table A2.41. Number, percentages and weight (g) of sherds from Village des Pêcheurs.

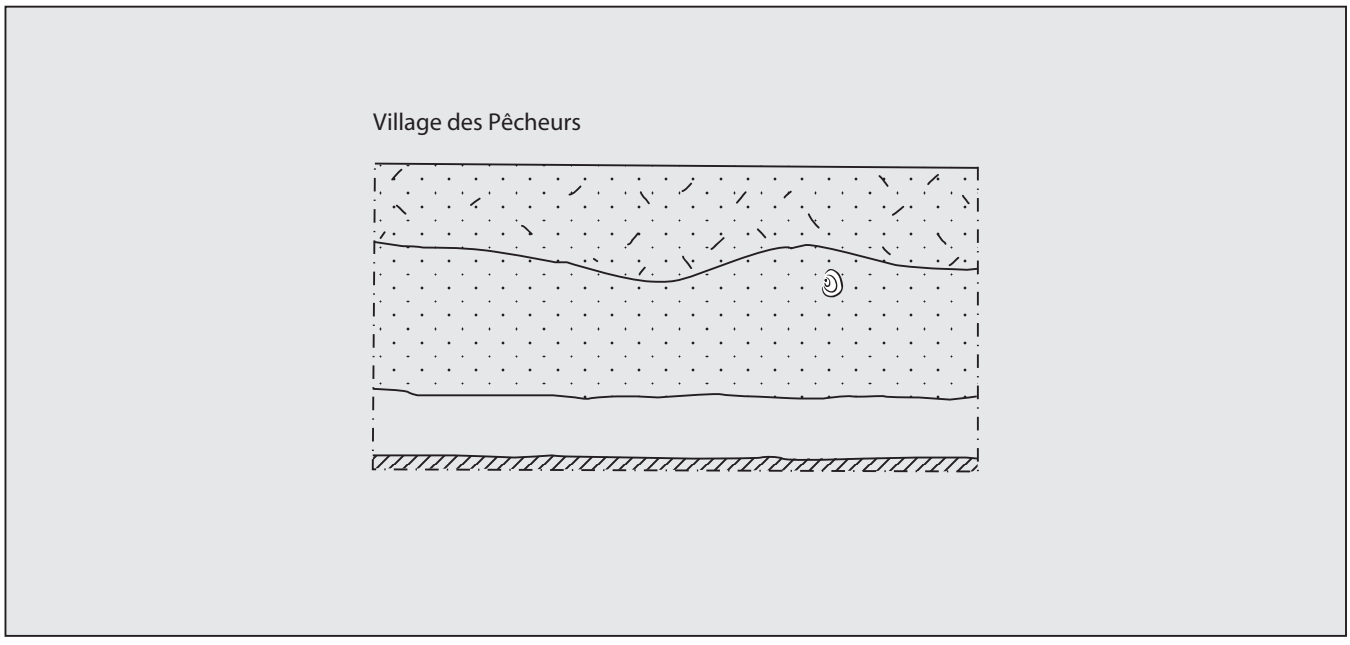


Fig. A2.11. Village des Pêcheurs, unit 1 (1 m^2), north section.

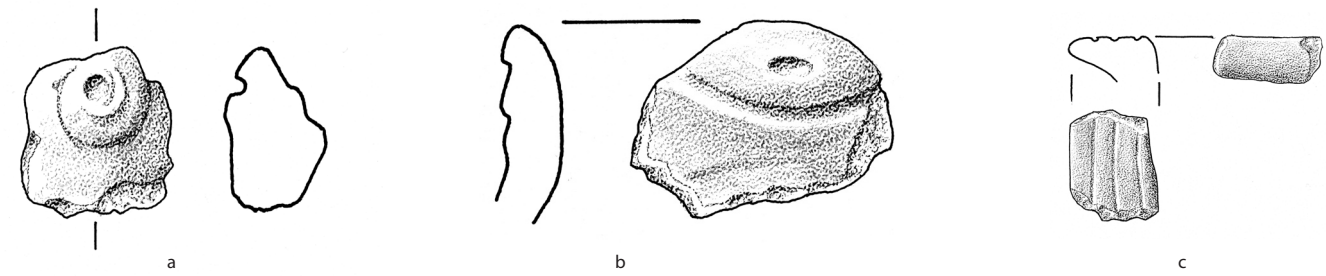


Fig. A2.12. Sherds decorated by nubbins and incision from the surface of Villages des Pêcheurs (a-b: scale 1:1; c: scale 1:2).

	Number	Number %
6-8 mm	1	20.0
9-11 mm	4	80.0
Total	5	100.0

Table A2.42. Number and percentages of sherds within Village des Pêcheurs wall thickness categories.

	Number	Number %
21-30 cm	1	20.0
31-40 cm	1	20.0
Unidentified	3	60.0
Total	5	100.0

Table A2.43. Number and percentages of sherds within Village des Pêcheurs orifice diameter categories.

	Number	Number %
Light brown-yellow	1	20.0
Dark brown/very dark brown	1	20.0
Reddish brown	1	20.0
Red	2	40.0
Total	5	100.0

Table A2.44. Number and percentages of sherds within Village des Pêcheurs exterior surface colour categories.

	Number	Number %
Complete reduction	2	40.0
Incomplete or relatively good oxidation	3	60.0
Total	5	100.0

Table A2.45. Number and percentages of sherds within Village des Pêcheurs firing colour categories.

	Number	Number %
Highly burnished	3	60.0
Polished	1	20.0
Unidentified	1	20.0
Total	5	100.0

Table A2.46. Number and percentages of sherds within Village des Pêcheurs exterior surface finishing categories.

extending from the *Route Départementale* southwards to the sea. The site was probably larger but its northern part has been completely destroyed by the road and the houses of the village. A very small part of the site, situated west of the fish-auction, is actually preserved. Surface material is heavily fragmented as a result of recent perturbation. It consists of small fragments of pottery, *Cittarium pica*, *Strombus gigas*, *Codakia* sp., coral and lithics. Small concentrations of archaeological material that are probably the result of local perturbation could be identified west of the fish-auction and in the gardens east of it. Almost no off-site material was found. Grass and thorny bush cover approximately 11-30 percent of the soil, which consists of moderately structured, well-drained, loose sand. Surface visibility is moderate.

2.5.2 Test units and stratigraphy

One 1 m^2 unit was excavated north west of the fish auction (fig. A2.11). The northwest corner was located at 692884.557; 1797763.690; 7.93 (Guadeloupe - Ste. Anne system) or 16°15′0.7987″; -61°11′56.9043″; -34.27 (WGS84).

2.5.3 Archaeological materials

2.5.3.1 Pottery

A total of 262 sherds was collected, mostly body sherds (83.2%), weighing 1582 g (table A2.41). The appendages/other category, including two lugs and four unidentified appendages, represents 2.3% of the sample. A total of 103 sherds has red slipped surfaces (39.3%) and eight sherds (3.1%) are decorated, six by incision, one by nubbins and one small lug was decorated by geometric modelling with incision (fig. A2.12). One flat base fragment was found. Griddles are lacking from the sample.

The morphological description of the pottery has been based on the analysis of five rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars and bowls with unrestricted simple contours (80.0%) and bowls with restricted simple contours (20.0%). The dominant rim shape is rounded (60.0%), although outward thickened (20.0%) and flanged (20.0%) rims occur as well. Most of the walls are 9-11 mm (80.0%) thick and orifice diameters range between 21-40 cm, although most of the diameters (60.0%) could not be identified. Surface colours are red (40.0%), reddish brown (20.0%), light brown-yellow (20.0%) and dark brown/very dark brown (20.0%). Firing techniques include incomplete or relatively good oxidation (60.0%) and complete reduction (40.0%). Surface finishing is predominantly characterised by high burnishing (60.0%) and polishing (20.0%). For 20.0% the surface finishing could not be identified (tables A2.42-A2.46).

2.5.3.2 Coral artefacts

One fragment of a heavily used *Porites porites* grinder was found.

2.5.3.3 Shellfish remains

A very limited number of shellfish remains was found, mainly consisting of *Cittarium pica* and *Strombus gigas* (table A2.47). Other shell species represented in very lower numbers and weights at the site included *Acanthopleura granulata*, *Chiton marmoratus*, *Codakia orbicularis*, and *Cypraecassis testiculus*. All shell could be identified.

2.5.4 Chronological assignment

The site yielded Early Ceramic B pottery although some sherds appear to be early Late Ceramic A. The use of nubbins and flaring rims decorated by incision show similarities to Mill Reef style pottery.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	3	5	477	482
	42.9	4.8	36.8	34.4
Strombus gigas	0	0	816	816
	0.0	0.0	63.0	58.3
Other	4	100	2	102
	57.1	95.2	0.2	7.3
Total	7	105	1295	1400
	100.0	100.0	100.0	100.0

Table A2.47. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Village des Pêcheurs.

2.6 EST PETITE SALINE ORIENTALE (97125-015; SC03)

2.6.1 Site location and preservation

The site of Est Petite Saline Orientale (x: 695,000; y: 1797,500) was discovered during the 1998 surveys. It is situated between the small eastern salina and the *Route Départementale*, at approximately 250 m south-east of the Pointe des Châteaux parking spot (fig. 5.1). The site extends from the hill next to the road well into the water of the salina that is in open connection to the sea. Site dimensions are 165 m from west to east and 20-30 m from north to south. The surface material, consisting of fragments of pottery,

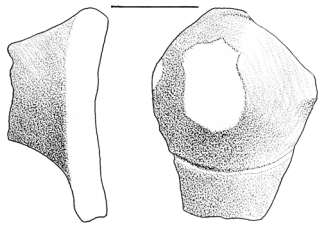


Fig. A2.13. Handle from the surface of Est Petite Saline Orientale (scale 1:2).

	Number	Number %	Weight	Weight %
Rim	9	10.8	108	11.2
Body	69	83.2	716	74.4
Base	1	1.2	20	2.1
Griddle	0	0.0	0	0.0
Appendage/other	4	4.8	118	12.3
Total	83	100.0	962	100.0

Table A2.48. Number, percentages and weight (g) of sherds from Est Petite Saline Orientale.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	0	0	82	82
	0.0	0.0	42.3	29.7
Strombus gigas	0	0	110	110
	0.0	0.0	56.7	39.9
Astraea tuber	1	18	0	18
	33.3	22.0	0.0	6.5
Chama sarda	0	0	2	2
	0.0	0.0	1.0	0.7
Codakia orbicularis	1	16	0	16
	33.3	19.5	0.0	5.8
Cypraecassis testiculus	1	48	0	48
	33.3	58.5	0.0	17.4
Total	3	82	194	276
	100.0	100.0	100.0	100.0

Table A2.49. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all shell species collected at Est Petite Saline Orientale.

Cittarium pica, *Codakia* sp., *Strombus gigas* and *Chama sarda*, has an even, small and superficial distribution over the site. Most of it was found in the salina that is in open connection to the sea and near the hill, which is situated in the southern part of the site. No material was found on top of this hill. Salina water and salt seriously damaged pottery surfaces. Ceramic and shell off-site material was found south-east of the site. The soil, which consists of loose, coarse, well-drained beach sand is not covered by vegetation. Dense thorny vegetation covers 21-30 percent of the more compact soil with humus on the hill. Surface visibility is good all over the site. A significant part of the site has been destroyed as a result of coastal erosion and it is difficult to estimate how much of the site has been preserved. The *Route Départementale* probably destroyed another part of the site. South of this road, a small amount of pottery was found that is thought to belong to the site.

2.6.2 Test units and stratigraphy

Due to time-constraints, a series of auger tests was carried out instead of test units. The tests on the beach went down to depths varying between 180 and 200 cm and were characterised by one homogeneous geological layer consisting of loose, coarse light gray (2.5YR;7/2) beach sand. Tests done on the hill revealed a homogeneous layer of compact, brown (7.5YR;4/3) sand with a humus component to a depth of 30 cm below the surface, after which bedrock was reached. No archaeological material was found in the auger tests.

2.6.3 Archaeological materials

2.6.3.1 Pottery

A total of 83 sherds was collected, mostly body sherds (83.2%), weighing 962 g (table A2.48). The appendages/ other category, including three handles (fig. A2.13) and one griddle leg, represents 4.8% of the sample. Six sherds have red slipped surfaces (7.2%) and two sherds (2.4%) are decorated with incision. One flat base and no griddle fragments were collected. The rather thin pottery, the form of the handle and the occurrence of red slip combined with incision suggest an early Late Ceramic A date for the pottery.

The morphological description of the pottery has been based on the analysis of three rims larger than 5 cm. These include a jar and a bowl with an unrestricted simple contour and a bowl with a restricted simple contour. All three fragments have rounded rim shapes. Two walls are 6-8 mm thick and the other is between 1-5 mm, and orifice diameter ranges between 11-30. Surface colours are dark gray-black for two sherds and reddish brown for the other. Firing techniques include complete reduction for two sherds and incomplete or relatively good oxidation for the other and surface finishing could not be identified for any of the rims.

2.6.3.2 Coral artefacts

One heavily weathered *Acropora cervicornis* rasp fragment was collected.

2.6.3.3 Shellfish remains

Very few shellfish remains were collected. These included *Astraea tuber*, *Chama sarda*, *Cittarium pica*, *Codakia orbicularis*, *Cypraecassis testiculus* and *Strombus gigas* (table A2.49).

2.6.4 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

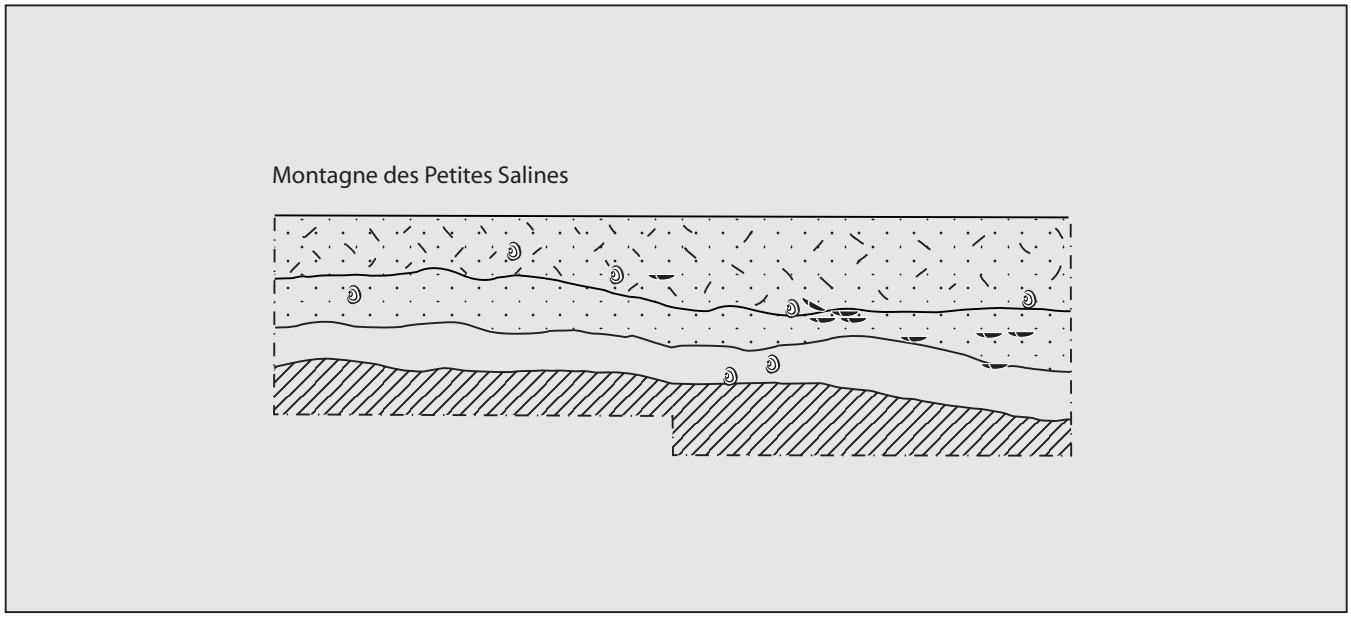
2.7 MONTAGNE DES PETITES SALINES (97125-016; SC04)

2.7.1 Site location and preservation

The site of Montagne des Petites Salines (x: 694,550; y: 1797,600) was discovered on a plateau near Petites Salines hill, south of two small salinas, during the 1998 surveys (fig. 5.1). Mrs. Galli (Tropicour, Pointe des Châteaux) owns this terrain. Site dimensions are 175 m from north to south and 150 m from west to east. Archaeological material on the surface, consisting of fragments of pottery, *Cittarium pica* and *Strombus gigas*, is evenly distributed, although some concentrations could be distinguished. The distribution becomes denser towards the salinas. A number of very small surface concentrations were identified that are separated from the site by several tens of meters without artefacts. These concentrations also consist of fragments of pottery, *Cittarium pica* and *Strombus gigas* and have been interpreted as special activity areas related to the site. Other ceramic off-site material was found as well, to the north-west of the site in particular, in the area leading to the Petites Salines site (97125-011). Hardly any off-site material was found south of the site. Extremely thorny and dense vegetation, which made it almost impossible to traverse the terrain, covers the soil, which consists of loose, coarse, well-drained sand with a humus component. Surface visibility is bad for most of the site. The site has been superficially disturbed by cultivation and by ancient habitation of the terrain.[8] Recent cattle grazing causes trampling, which mainly results in fragmentation of the material.

2.7.2 Test units and stratigraphy

Seven 1 m^2 test units were excavated, on the approximate west-east axis and north-south axis of the site in areas with dense surface deposits. For unit 3 it was decided at a depth of 45 cm to continue digging only a 50 x 50 cm unit, as layers became too compact and sterile. Unit 4, providing diagnostic archaeological material, was enlarged in its western part by the addition of unit 5 (fig. A2.14). The northwest corner of unit 1 was located at 694526.197; 1797573.912; 10.44 (Guadeloupe - Ste. Anne system) or 16°14′54.1538″; -61°11′1.6818″; -31.84 (WGS84). The northwest corner of unit 2 was located at 694556.588; 1797599.825; 6.23 (Guadeloupe - Ste. Anne system) or 16°14′54.9880″; -61°11′0.6508″; -36.06 (WGS84). The northwest corner of unit 3 was located at 694611.164; 1797611.812; 3.01 (Guadeloupe - Ste. Anne system) or 16°14′55.3621″; -61°10′58.8094″; -39.29 (WGS84). The northwest corner of unit 4 and 5 was located at 694499.216; 1797588.504; 12.15 (Guadeloupe - Ste. Anne system) or 16°14′54.6363″; -61°11′2.5860″; -30.13 (WGS84). Unit 6



0 to 17-25 cm: Loose, coarse, very dark grayish brown (10YR;3/2) sand with a humus component and a lot of archaeological material, including pottery, shell, and some lithic and coral artefacts.

17-25 to 27-39 cm: More compact, fine, very dark grayish brown (10YR;4/2) clayey sand with less archaeological material, including pottery and shell.

27-39 to 36-51 cm: Very compact, finely structured brown (10YR;4/3) clayey sand with a very small amount of archaeological material. From 32 cm depth onwards, the sand becomes reddish and fewer ceramics and shell fragments are found. From 40 cm onwards, no archaeological material is found.

At a depth of 36-51 cm calcareous bedrock was reached.

Pottery

Cittarium pica

Fig. A2.14. Montagne des Petites Salines, units 4 and 5 (2 x 1 m), north section.

could not be relocated for topographic measuring, as most of it had been 2 cm deep. The northwest corner of unit 7 was located at 694538.687; 1797574.763; 9.54 (Guadeloupe - Ste. Anne system) or 16°14′54.1779″; -61°11′1.2610″; -32.75 (WGS84).

2.7.3 Archaeological materials

2.7.3.1 Pottery

A total of 750 sherds was collected, mostly body sherds (77.5%), weighing 10218 g (table A2.50). The appendages/ other category, consisting of 15 handle fragments, represents 2.0% of the sample. A total of 122 sherds has red slipped surfaces (16.3%) and incision, geometric modelling, finger indentation and nubbins decorate eight sherds (1.1%); (table A2.51). Bases are usually flat (88.9%), while 11.1% remains unidentified, and although most of the griddle-rim forms could not be identified (80%), a straight (10%) and a legged (10%) fragment were found. The pottery found at the site displays Barrancoid influences, visible for example in the handles decorated by geometric modelling in the form of knobs (fig. A2.15) and the outward bent rims.

The morphological description of the pottery has been based on the analysis of 44 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars and bowls with unrestricted simple contours (54.5%) and jars with independent restricted inflected contours (11.4%) and 11.4% could not be identified (table A2.52; fig. A2.16). Dominant rim shapes are rounded (54.5%), outward thickened (20.5%) and flanged (13.6%). Wall-thickness is mostly 6-8 mm (54.5%) and 9-11 mm (34.1%). Most orifice diameters are between 31-40 cm (22.7%), 21-30 cm (20.5%) or 11-20 cm (11.4%). However, 36.4% could not be identified. Surface colours are predominantly dark brown/

	Number	Number %	Weight	Weight %
Rim	99	13.2	2184	21.4
Body	581	77.5	6844	67.0
Base	45	6.0	664	6.5
Griddle	10	1.3	132	1.3
Appendage/other	15	2.0	394	3.8
Total	750	100.0	10,218	100.0

Table A2.50. Number, percentages and weight (g) of sherds from Montagne des Petites Salines.

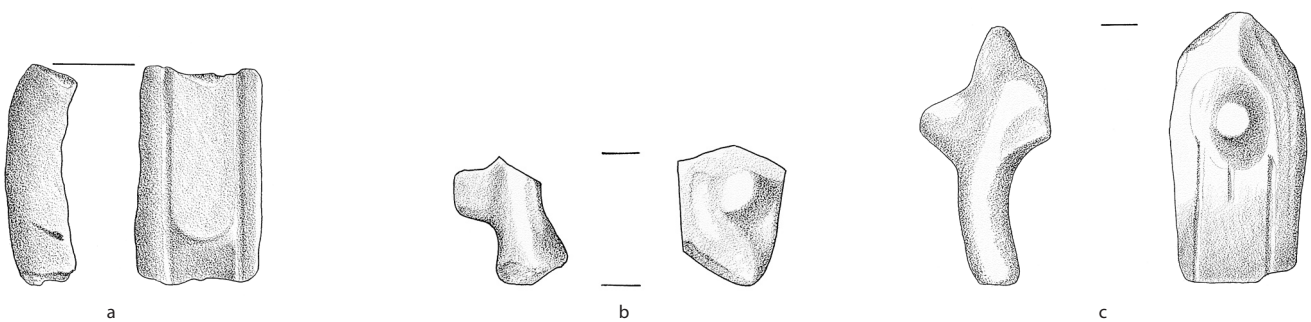


Fig. A2.15. Handles decorated by incision and knobs from Montagne des Petites Salines, scale 1:2 (a: unit 4, level 2; b: unit 5, level 1; c: unit 4, level 1).

	Number	Number %
Incision	2	25.0
Modelling (geometric)	4	50.0
Finger indentation	1	12.5
Nubbins	1	12.5
Total	8	100.0

Table A2.51. Number and percentages of sherds with particular Montagne des Petites Salines decoration modes.

	Number	Number %
Jar with unrestricted simple contour	10	22.7
Bowl with unrestricted simple contour	14	31.8
Dish with unrestricted simple contour	3	6.8
Bowl with restricted simple contour	3	6.8
Bowl with unrestricted composite contour	1	2.3
Jar with restricted composite contour	2	4.5
Bowl with unrestricted inflected contour	1	2.3
Jar with independent restricted inflected contour	5	11.4
Unidentified	5	11.4
Total	44	100.0

Table A2.52. Number and percentages of sherds within vessel shape categories from Montagne des Petites Salines.

	Number	Number %
Rounded	24	54.5
Flattened	1	2.3
Outward thickened	9	20.5
Flanged	6	13.6
Unidentified	4	9.1
Total	44	100.0

Table A2.53. Number and percentages of sherds within rim shape categories from Montagne des Petites Salines.

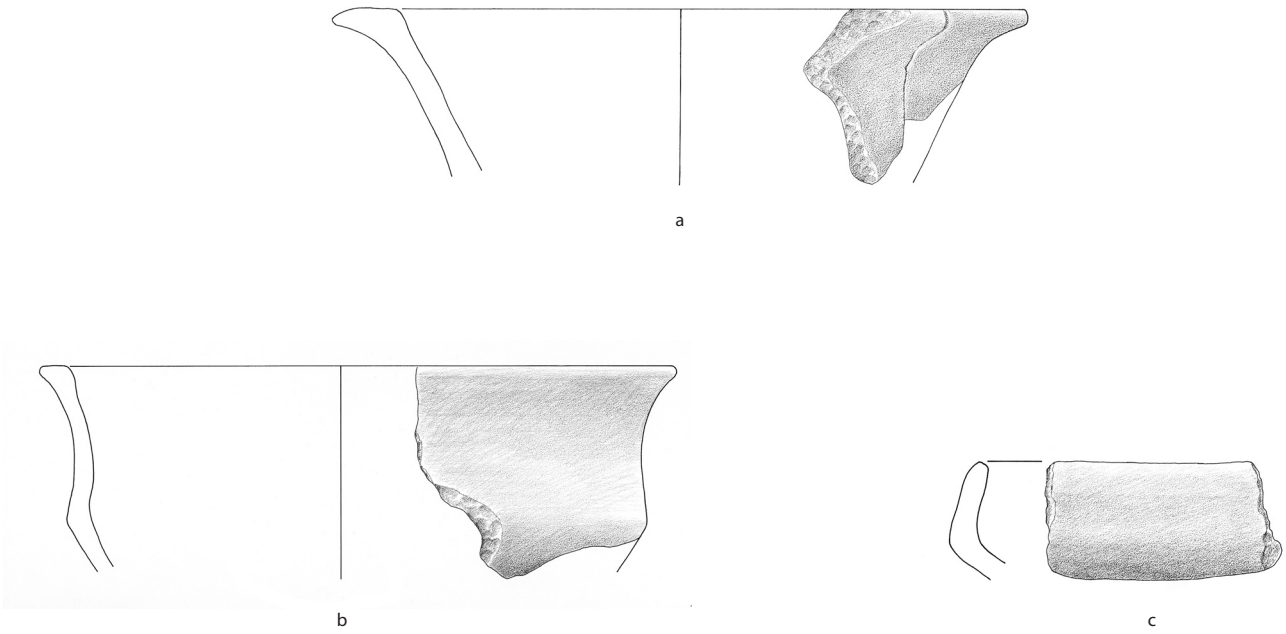


Fig. A2.16. Vessels from Montagne des Petites Salines (a: unit 5, level 1, scale 1:3; b: unit 5, level 1, scale 1:4; c: unit 4, level 2, scale 1:3).

	Number	Number %
1-5 mm	1	2.3
6-8 mm	24	54.5
9-11 mm	15	34.1
Unidentified	4	9.1
Total	44	100.0

Table A2.54. Number and percentages of sherds within Montagne des Petites Salines wall thickness categories.

	Number	Number %
11-20 cm	5	11.4
21-30 cm	9	20.5
31-40 cm	10	22.7
41-50 cm	2	4.5
51-60 cm	2	4.5
Unidentified	16	36.4
Total	44	100.0

Table A2.55. Number and percentages of sherds within Montagne des Petites Salines orifice diameter categories.

very dark brown (40.9%), reddish brown (31.8%) and red (15.9%). The main firing technique is incomplete or relatively good oxidation (84.1%). Two fragments were irregularly fired. Surface finishing is predominantly characterised by burnishing (54.5%) and for 40.9% this could not be identified, as a lot of the pottery has a weathered surface (tables A2.53-A2.58). Most of the ceramics were tempered with finely crushed shell and quartz and sand, although coarse-grained crushed stone has been used as well.

2.7.3.2 Lithic artefacts

The lithic material is very poor. It consists of four unidentified rock pebbles that are probably from La Désirade, one flake of an unidentified green fine-grained material and one natural piece of limestone.

2.7.3.3 Coral artefacts

One heavily used and broken axe of an unidentified coral species was found (fig. A2.17).

2.7.3.4 Shellfish remains

The main shellfish remains consisted of *Acanthopleura granulata, Astraea* sp., *Chama* sp., *Cittarium pica, Nerita* sp., and *Strombus gigas* (table A2.59). Other shell species represented in very low numbers and weights at the site included *Arca zebra*, *Charonia variegata*, *Chiton marmoratus*, *Conus mus*, *Cypraecassis testiculus*, *Fissurella*

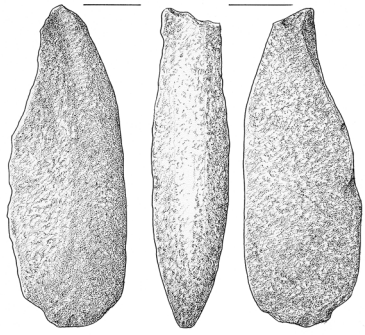


Fig. A2.17. Coral axe from Montagne des Petites Salines (unit 4, level 1, scale 1:3).

	Number	Number %
Light brown-yellow	1	2.3
Dark brown/very dark brown	18	40.9
Reddish brown	14	31.8
Red	7	15.9
Unidentified	4	9.1
Total	44	100.0

Table A2.56. Number and percentages of sherds within Montagne des Petites Salines exterior surface colour categories.

	Number	Number %
Complete reduction	2	4.5
Incomplete oxidation or reduction	1	2.3
Incomplete or relatively good oxidation	37	84.1
Unidentified	4	9.1
Total	44	100.0

Table A2.57. Number and percentages of sherds within Montagne des Petites Salines firing colour categories.

nimbosa, *Leucozonia nassa*, *Murex brevifrons*, *Nodilittorina tuberculata*, *Purpura patula*, *Spondylus americanus*, *Tegula excavata*, *Tellina* sp., *Thais deltoidea*, and *Tonna maculosa*. All shell could be identified.

2.7.3.5 Animal remains

Montagne des Petites Salines yielded negligible amounts of faunal material (total MNI 3, total weight 6 g), consisting mainly of land hermit crab and very little other crab (Nokkert in appendix 5).

2.7.4 Chronological assignment

The site yielded Early Ceramic B pottery. It displays Barrancoid-style influences, visible for example in the handles decorated by geometric modelling in the form of knobs and the outward bent rims.

	Number	Number %
Scratched	1	2.3
Smoothed	1	2.3
Lightly burnished	8	18.2
Highly burnished	16	36.3
Unidentified	18	40.9
Total	44	100.0

Table A2.58. Number and percentages of sherds within Montagne des Petites Salines exterior surface finishing categories.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	20	27	200	227
	8.1	1.1	3.8	2.9
Strombus gigas	1	72	94	166
	0.4	3.0	1.8	2.2
Cittarium pica	59	1450	4791	6241
	23.9	60.2	90.2	80.8
Nerita sp.	48	21	26	47
	19.4	0.9	0.5	0.6
Astraea sp.	11	94	106	200
	4.5	3.9	1.9	2.6
Chama sp.	16	516	34	550
	6.5	21.4	0.6	7.1
Other	92	228	63	291
	37.2	9.5	1.2	3.8
Total	247	2408	5314	7722
	100.0	100.0	100.0	100.0

Table A2.59. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Montagne des Petites Salines.

2.8 OUEST RÉSIDENCE KAHOUANNE (97125-017; SC05)

2.8.1 Site location and preservation

The site of Ouest Résidence Kahouanne (x: 691,500; y: 1798,350) was discovered on a plateau on the northern coast of Pointe des Châteaux during the 1998 surveys (fig. 5.1). Site dimensions are 60 m from west to east and 30 m from north to south. There is a small amount of archaeological material on the surface, consisting exclusively of heavily fragmented ceramics that are evenly distributed over the site. Two small concentrations were identified. The first is part of the site itself and the second is separated from the site by ten meters devoid of artefacts. Almost no other off-site material was found. Dry thorny vegetation covers 0-10 percent of the soil, which consists of loose, moderately structured, well-drained sand with a humus component. The terrain is not difficult to traverse and surface visibility is good. Although the terrain was not in use at the time of survey, small-scale horticultural activities appear to take place from time to time. This situation is made worse by erosion of the terrain.

2.8.2 Test units and stratigraphy

Three units of 50 x 50 cm were excavated at the west-east axis of the site (fig. A2.18). The northwest corner of unit 1 was located at 691536.224; 1798339.124; 23.86 (Guadeloupe - Ste. Anne system) or 16°15′19.9014″; -61°12′42.1379″; -18.32 (WGS84). The northwest corner of unit 2 was located at 691517.259; 1798325.946; 24.22 (Guadeloupe - Ste.

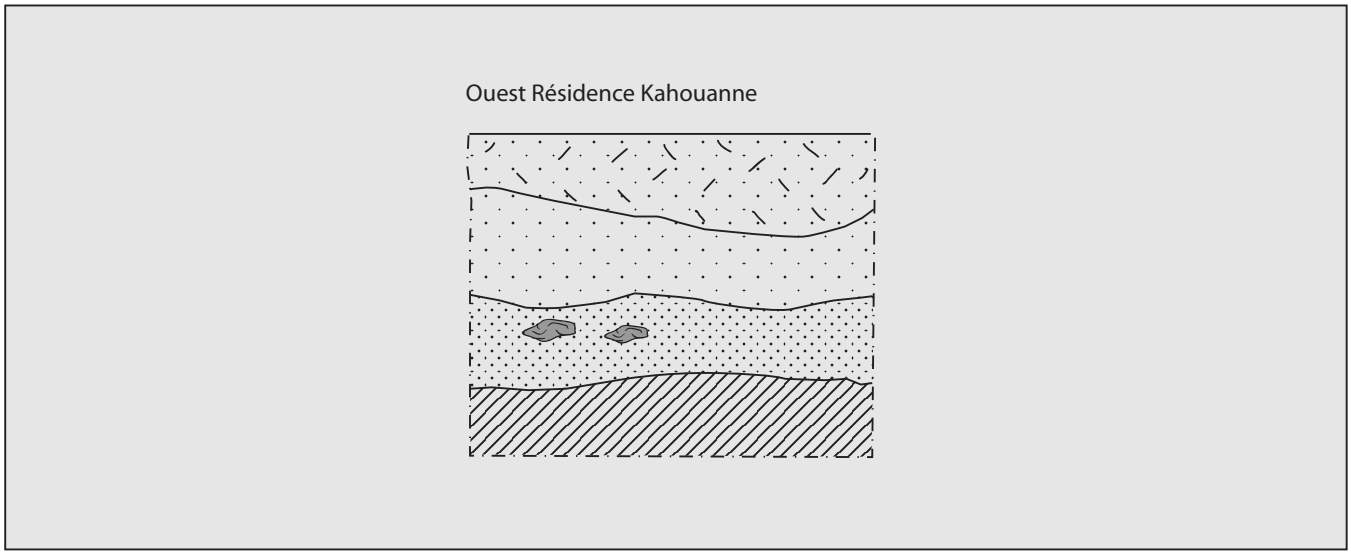


Fig. A2.18. Ouest Résidence Kahouanne, unit 1 (50 x 50 cm), north section.

Anne system) or 16°15′19.4781″; -61°12′42.7804″; -17.95 (WGS84). The northwest corner of unit 3 was located at 691598.663; 1798333.992; 24.06 (Guadeloupe - Ste. Anne system) or 16°15′19.7167″; -61°12′40.0368″; -18.12 (WGS84).

2.8.3 Archaeological materials

2.8.3.1 Pottery

A total of 90 sherds was collected, mostly body sherds (74.4%), weighing 652 g (table A2.60). The appendages/other category, including five handles and one griddle leg, represents 6.7% of the sample. A total of 14 sherds has red slipped surfaces (15.6%) and one sherd (1.1%) is decorated by incision. One flat and one convex base and one straight griddle rim were found as well.

The morphological description of the pottery could be based on the analysis of four rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include three bowls with unrestricted simple contours and one bowl with a restricted simple contour and that all four rims are rounded. Wall thicknesses range between 1-5 mm for three rims and between 6-8 mm for the other, and orifice diameters range between 11-20 cm for one sherd and between 31-40 cm for the three others. Surface colours of three rims are red and the other is dark brown/very dark brown. Firing techniques include complete reduction for one sherd and complete oxidation for the three others. Surface finishing includes light burnishing, smoothing and for two sherds the finishing remains unidentified. Temper materials include fine sand and crushed shell.

2.8.4 Chronological assignment

The site yielded Late Ceramic A pottery with Mamoran Troumassoid style affiliations, characterised by broad incision and typical handles.

2.9 DEGRAT (97125-018; SC06)

2.9.1 Site location and preservation

The Degrat site (x: 695,000; y: 1797,200) was discovered on the cliff at Anse Degrat at the south coast of Pointe des Châteaux during the 1998 surveys (fig. 5.1). Site dimensions are 27 m from west to east and 40 m from south to north. The archaeological material on the surface consists of a rather dense and even distribution of ceramic sherds and fragments of *Cittarium pica*, *Astraea tuber* and *Spondylus americanus*. Several large ceramic fragments were found along the edge of the cliff. Almost no off-site material was found. Dense thorny vegetation and grass cover 31-40 percent of the soil, which consists of loose, moderately structured, well-drained sand with a humus component. It is difficult to traverse the terrain, which is not used, and surface visibility is very bad. The site seems to be slightly disturbed as a result of erosion of the plateau and the cliffs. More seriously, a deeply eroded sandy road runs across the site.

2.9.2 Test units and stratigraphy

Five 1 m^2 units were excavated on the south-north axis of the site, demonstrating the existence of an archaeological layer between 0-30 cm below the surface. Unit 3 was excavated as an extension of the east part of unit 1 (fig. A2.19). The northwest corner of unit 1 and 3 was located at 695021.335; 1797207.637; 5.93 (Guadeloupe - Ste. Anne system) or 16°14′42.0964″; -61°10′45.1189″; -36.35 (WGS84). The southwest corner of unit 2 was located at 695015.796; 1797202.082; 4.66 (Guadeloupe - Ste. Anne system) or 16°14′41.9173″; -61°10′45.3071″; -37.62 (WGS84). The northwest corner of unit 4 was located at 695023.276; 1797216.805; 7.37 (Guadeloupe - Ste. Anne system) or 16°14′42.3941″; -61°10′45.0508″; -34.92 (WGS84). The northeast corner of unit 5 was located at 695037.717;

	Number	Number %	Weight	Weight %
Rim	14	15.6	206	31.6
Body	67	74.4	350	53.7
Base	2	2.2	18	2.8
Griddle	1	1.1	12	1.8
Appendage/other	6	6.7	66	10.1
Total	90	100.0	652	100.0

Table A2.60. Number, percentages and weight (g) of sherds from Ouest Résidence Kahouanne.

1797232.142; 10.51 (Guadeloupe - Ste. Anne system) or 16°14′42.8888″; -61°10′44.5599″; -31.78 (WGS84).

2.9.3 Archaeological materials

2.9.3.1 Pottery

A total of 215 sherds was collected, mostly body sherds (81.8%), weighing 2976 g (table A2.61). A large percentage (7.0%) of the sample is taken by the appendages/other category. This includes 12 handle fragments, a griddle leg, a lug and an unidentified appendage (fig. A2.20). Part of the pottery collection has red slipped surfaces (13.9%), another part is beige (5.6%); (table A2.62). Most of the bases are flat (55.6%) or concave (44.4%), while the griddles are straight (25%) legged (50%) or unidentified (25%).

The morphological description of the pottery has been based on the analysis of three rims larger than 5 cm. These are all from bowls with unrestricted simple contours and two rims are flanged and the other is rounded. Wall thicknesses range between 6-8 mm for one rim and between 9-11 mm for the two others, and orifice diameters range between 31-40 cm, 41-50 cm and 51-60 cm. Surface colours of two rims are reddish brown and the other is dark brown/very dark brown. The firing technique found is incomplete or relatively good oxidation. Two rims have lightly burnished outer surfaces and the finishing of the other remains unidentified. Temper materials include finely crushed shell and quartz and fine sand.

2.9.3.2 Lithic artefacts

Two small lithic artefacts were found. One consists of an Antigua flint shatter piece with patina all over the surfaces and a small amount of cortex and the other is a non-modified water-worn pebble of unidentified volcanic rock.

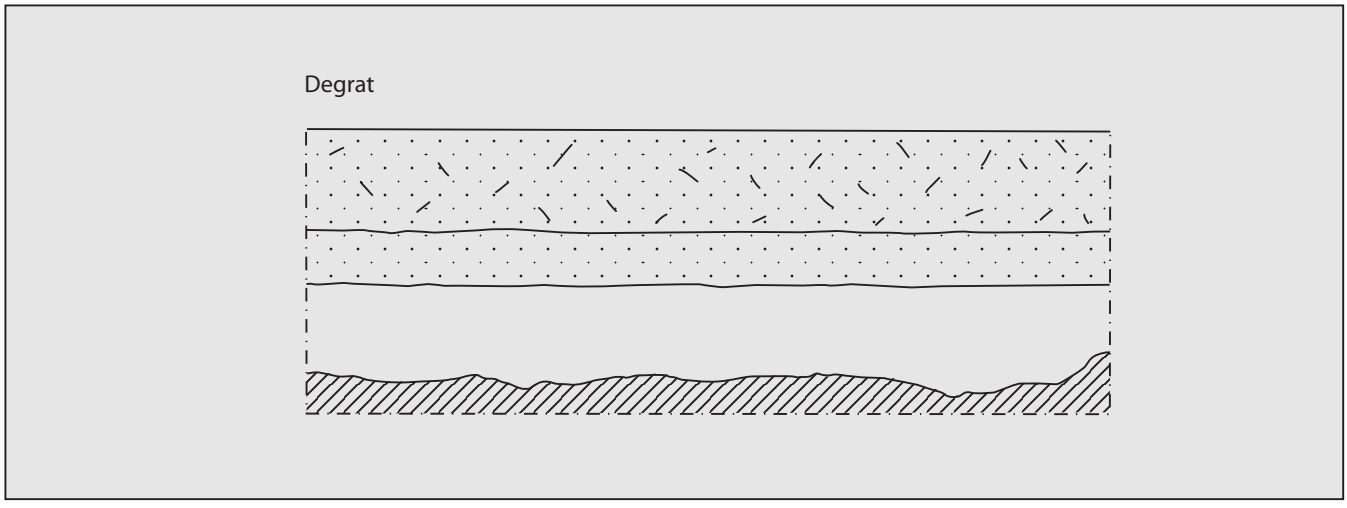


Fig. A2.19. Degrat, units 1 and 3 (2 x 1 m), east section.

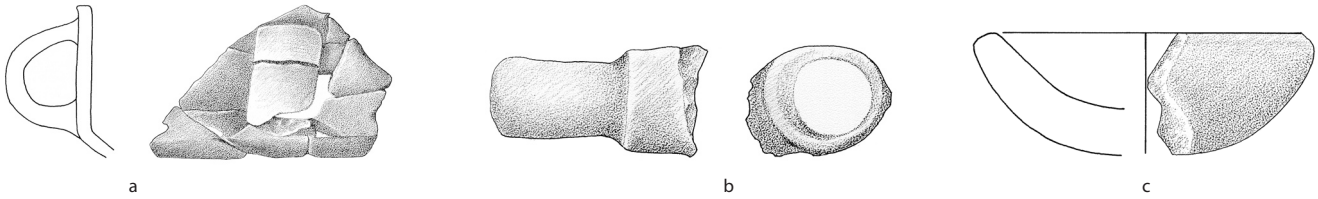


Fig. A2.20. Handles (a: unit 1, level 2, scale 1:3; b: unit 2, level 2, scale 1:2) and small vessel (c: surface, scale 1:2) from Degrat.

	Number	Number %	Weight	Weight %
Rim	11	5.1	189	6.4
Body	176	81.8	1707	57.4
Base	9	4.2	203	6.8
Griddle	4	1.9	78	2.6
Appendage/other	15	7.0	799	26.8
Total	215	100.0	2976	100.0

Table A2.61. Number, percentages and weight (g) of sherds from Degrat.

	Number	Number %
Sherds with red slipped surfaces	30	13.9
Sherds with beige slipped surfaces	12	5.6
Sherds with slipped surfaces	42	19.5

Table A2.62. Number and percentages (related to the total sample) of sherds with slipped surfaces from Degrat.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	1	2	30	32
	4.5	1.0	3.2	2.8
Strombus gigas	0	0	110	110
	0.0	0.0	11.8	9.7
Cittarium pica	8	122	778	900
	36.4	61.0	83.5	79.5
Other	13	76	14	90
	59.1	38.0	1.5	8.0
Total	22	200	932	1132
	100.0	100.0	100.0	100.0

Table A2.63. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Degrat.

2.9.3.3 Coral artefacts

A heavily weathered mortar of *Acropora* sp., one possible *zemi* top of *Acropora palmata* and one fragment of a moderately used *Acropora cervicornis* rasp were collected.

2.9.3.4 Shellfish remains

Few shellfish remains were found at the Degrat site. Most of them consisted of *Cittarium pica, Strombus gigas* and *Acanthopleura granulata* (table A2.63). Other shell species represented in very low numbers and weights at the site included *Arca zebra*, *Astraea* sp., *Codakia orbicularis*, *Nerita* sp., *Nodilittorina tuberculata*, *Spondylus americanus*, *Tegula excavata*, *Tellina excavata*, and *Thais deltoidea*. All shell could be identified.

2.9.3.5 Animal remains

The 2/5 inch sample (MNI 1, 1 g) of Degrat consists of land hermit crab remains exclusively (Nokkert in appendix 5).

2.9.4 Chronological assignment

The site yielded early Late Ceramic A pottery, probably dating around AD 700/800-1200. The handles, use of red slip and the late lugs suggest a Troumassoid-like style assignment.

2.10 SITE 7 (97125-019; SC07, SC10, SC11)

2.10.1 Site location and preservation

Site 7 (x: 692,050; y: 1798,125) was discovered on the north coast of Pointe des Châteaux overlooking Anse Tarare, during the 1998 surveys (fig. 5.1). Site dimensions are approximately 200 m from west to east and 100 m from north to south. The site is characterised by an even and small distribution of surface material in which three concentrations can be identified, measuring 152 x 26 m (SC07), 25 x 15 m,

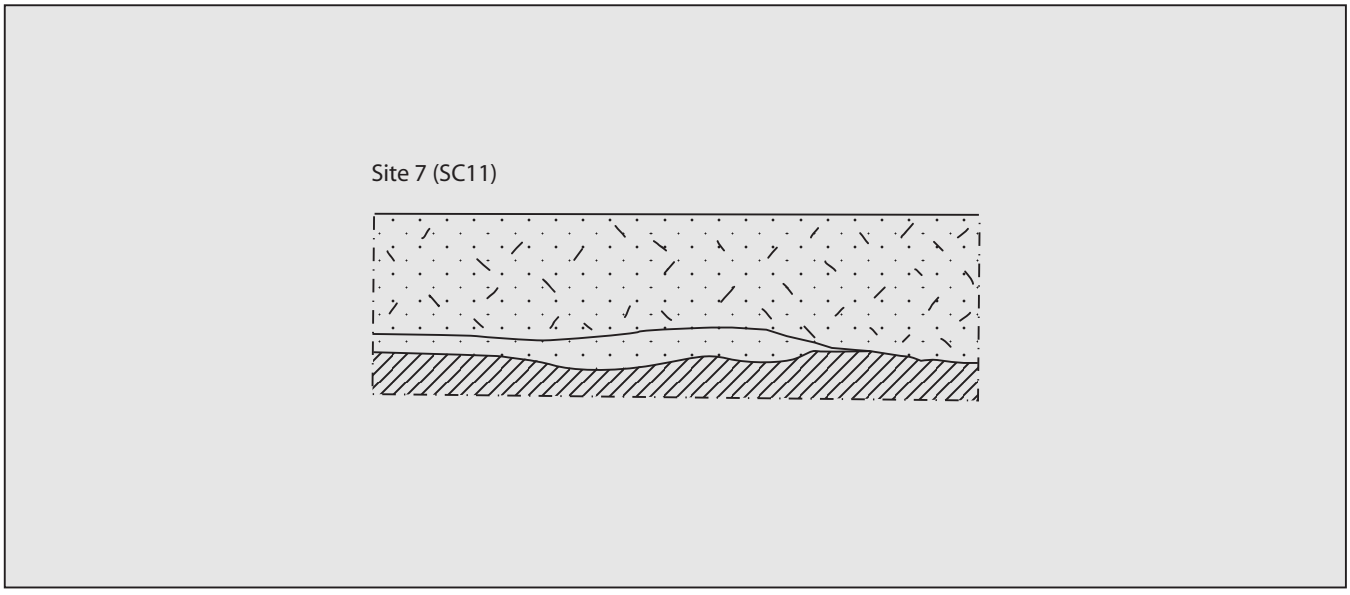


Fig. A2.21. Site 7 (SC11), unit 1 (1 m^2), north section.

(SC10) and 15 x 30 m (SC11). The archaeological material consists of fragments of pottery and *Astraea caelata*, *Chama sinuosa*, *Cittarium pica*, *Nerita versicolor*, *Phyllonotus pomum* and *Strombus gigas,* and lithic and coral artefacts. Some ceramic off-site material was found south of the site. The soil at the terrain, which is flat and rocky, consists of loose, moderately structured well-drained sand with a humus component. Vegetation lightly covers the site and surface visibility is very good. The site does not appear to be very well preserved. This is due to erosion of the plateau and by past agricultural activity. The terrain is not in use at the moment.

2.10.2 Test units and stratigraphy

Two 1 m^2 test units were excavated. One was located in SC10 and another in SC11 (fig. A2.21). The archaeological layer appeared to be limited to the upper 10 cm. The northwest corner of unit 1, SC10, was located at 692123.448; 1798093.471; 18.00 (Guadeloupe - Ste. Anne system) or 16°15′11.7434″; -61°12′22.4360″; -24.18 (WGS84). The northwest corner of unit 1, SC11, was located at 692050.748; 1798132.578; 21.66 (Guadeloupe - Ste. Anne system) or 16°15′13.0362″; -61°12′24.8726″; -20.52 (WGS84).

2.10.3 Archaeological materials

2.10.3.1 Pottery

A total of 181 sherds was collected, mostly body sherds (88.9%), weighing 1194 g (table A2.64). No fragments belonging to the appendages/other category were found. Three sherds have red slipped surfaces (1.7%) and one sherd (0.6%) is decorated by broad and shallow incision. One convex base and fragments of straight (33.3%) and legged griddles (66.7%) were found.

The morphological description of the pottery was based on the analysis of two rims larger than 5 cm. These demonstrate the presence of a jar and a bowl with unrestricted simple contours. Rim shapes are rounded and outward thickened. However, many rims smaller than 5 cm are inward thickened. Wall thicknesses are between 6-8 mm and 9-11 mm and orifice diameters were estimated at 21-30 cm or remain unidentified. Surface colours of both rims are reddish brown, firing techniques include complete oxidation and complete reduction and surface finishing

	Number	Number %	Weight	Weight %
Rim	16	8.8	140	11.7
Body	161	88.9	960	80.4
Base	1	0.6	14	1.2
Griddle	3	1.7	80	6.7
Appendage/other	0	0.0	0	0.0
Total	181	100.0	1194	100.0

Table A2.64. Number, percentages and weight (g) of sherds from Site 7.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	13	626	332	958
	68.4	54.3	98.2	64.3
Other	6	527	6	533
	31.6	45.7	1.8	35.7
Total	19	1153	338	1491
	100.0	100.0	100.0	100.0

Table A2.65. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Site 7.

consists of light and high burnishing. Temper materials include finely crushed shell and fine sand. Weathering and fragmentation of the pottery is moderate or high.

2.10.3.2 Lithic artefacts
Two stone artefacts were found on the surface of the site. They include a pebble of a remarkable sandstone-like material and a possible hammer-stone fragment from a fine-grained chert-like material with inclusions.

2.10.3.3 Coral artefacts
One fragment of a moderately used *Acropora cervicornis* rasp and one moderately used *Siderastrea siderastrea* grinder were found on the surface of the site. In addition, one unidentified fragment of *Montastrea cavernosa* was found.

2.10.3.4 Shellfish remains
Very few shellfish remains were found at this site. Most of them consisted of *Cittarium pica* (table A2.65). Other shell species represented in very low numbers and weights at the site included *Astraea caelata*, *Chama sinuosa*, *Nerita* sp., *Phyllonotus pomum*, and *Strombus gigas*. All shell could be identified.

2.10.3.5 Animal remains
The 2/5 inch sample (MNI 1, 2 g) of Site 7 consists of land crab exclusively (Nokkert in appendix 5).

2.10.4 Chronological assignment
The site yielded Late Ceramic A pottery. The material has been assigned to the Mamoran Troumassoid style, on the basis of broad incisions and the inward thickened rims.

2.11 OUEST POINTE TARARE (97125-020; SC12)

2.11.1 Site location and preservation
The site of Ouest Pointe Tarare (x: 692,400; y: 1798,130) was discovered on an elevated plateau overlooking the sea, west of Pointe Tarare during the 1998 surveys (fig. 5.1). Site dimensions are 170 m from west to east and 50 m from north to south. The distribution of archaeological material is rather dense and even. It consists mainly of fragments of pottery and shell, including *Chama sarda*, *Cittarium pica* and *Strombus gigas*, and lithic artefacts. The north part of the site has the densest surface material. Ceramic and shell off-site material has been found up to 250 m south of this distribution. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Thorny vegetation, which severely hinders travel across the terrain and visibility of the surface, covers 31-40 percent of the soil, which consists of loose, moderately structured and well-drained sand. The site appears to be heavily disturbed as a result of erosion of the plateau and cultivation in the past. The terrain is not used nowadays, except for cattle grazing.

2.11.2 Archaeological materials

2.11.2.1 Pottery
A total of 65 sherds was collected, mostly body sherds (69.2%), weighing 438 g (table A2.66). The appendages/other category represents 6.2% of the sample. It includes two handles, one lug and one unidentified appendage. A total of 14 sherds has red slipped surfaces (21.5%) and one sherd, a very small and tiny lug, is decorated by incision (1.5%). Two flat bases and three unidentified griddle fragments were

	Number	Number %	Weight	Weight %
Rim	11	16.9	94	21.5
Body	45	69.2	238	54.3
Base	2	3.1	16	3.7
Griddle	3	4.6	36	8.2
Appendage/other	4	6.2	54	12.3
Total	65	100.0	438	100.0

Table A2.66. Number, percentages and weight (g) of sherds from Ouest Pointe Tarare.

collected.

The morphological description of the pottery was based on the analysis of two rims larger than 5 cm. These are both of bowls with unrestricted simple contours and inward thickened and flanged rims. Wall thicknesses of both rims are between 6-8 mm and orifice diameters are 21-30 cm or unidentified. Surface colours are gray and reddish brown, firing techniques include incomplete or relatively good oxidation and complete reduction, and surface finishing includes light burnishing and unidentified finishing. The overall finishing of the sherds is rather crude. Temper materials include crushed shell and small stones. The sherds are heavily weathered and fragmented.

2.11.2.2 Lithic artefacts

Two artefacts of volcanic rock were collected. One is an axe fragment of dark basalt with very small voids. Flakes and blades have been removed from the edge, possibly to regrind it. The end part of the butt-part is flat. The other artefact is possibly a hammer-stone of unidentified volcanic rock.

2.11.2.3 Shellfish remains

A very small amount of shell, including *Chama sarda, Cittarium pica* and *Strombus gigas*, was collected (table A2.67).

2.11.3 Chronological assignment

The site yielded Late Ceramic A pottery, dating approximately to AD 800-1200. Troumassan Troumassoid style affiliations have been suggested for the material on the basis of the red slip and the inward thickened rims.

2.12 SITE 9 (97125-021; SC13)

2.12.1 Site location and preservation

Site 9 (x: 692,700; y: 1797,870) was discovered inland of the peninsula during the 1998 surveys (fig. 5.1). Site dimensions are 40 m west to the east and 15 m south to the north. The site is characterised by a very small distribution of heavily fragmented and weathered ceramics. Fragments of shell, coral or worked stone have not been found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Almost no off-site material was found. Thorny vegetation covers 11-20 percent of the soil, which consists of loose, moderately structured and well-drained sand. Surface visibility is good. Most of the site has actually been destroyed. Although the terrain is not used now, cultivation appears to have taken place in the past. Moreover, the terrain looks artificially flat, which indicates the use of a bulldozer.

2.12.2 Archaeological materials

A very limited amount of archaeological material was collected. This consists of nine heavily fragmented and weathered body sherds, weighing 32 g, of which 33.3% have red slipped surfaces. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.12.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	1	82	2	84
	100.0	100.0	0.4	14.2
Strombus gigas	0	0	506	506
	0.0	0.0	99.2	85.5
Chama sarda	0	0	2	2
	0.0	0.0	0.4	0.3
Total	1	82	510	592
	100.0	100.0	100.0	100.0

Table A2.67. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all shell species collected at Ouest Pointe Tarare.

2.13 SITE 10 (97125-022; SC14)

2.13.1 Site location and preservation

Site 10 (x: 692,820; y: 1797,975) was discovered near Site 9 in the interior of the peninsula during the 1998 surveys (fig. 5.1). Site dimensions are 20 m from west to east and 30 m from south to north. The site is similar to Site 9. It is characterised by a small distribution of heavily fragmented and weathered pottery. No fragments of shell, coral or worked stone were found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Almost no off-site material was found. Thorny vegetation covers 11-20 percent of the soil, which consists of loose, coarse and well-drained sand. Surface visibility is good. Most of the site has been destroyed, as a result of past cultivation, recent house constructions and the sandy road that borders the site in its southern part. The owners, the local Devarieux family, used a bulldozer to flatten the terrain.

2.13.2 Archaeological materials

A very limited amount of archaeological material was collected. This consists exclusively of 18 heavily fragmented and weathered body sherds and one rounded rim sherd, weighing 80 g. Red slipped surfaces do occur (21.1%). No other archaeological materials were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.13.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.14 OUEST ANSE À PLUME (97125-023; SC15)

2.14.1 Site location and preservation

The Ouest Anse à Plume site (x: 693,475; y: 1798,175) was discovered on an elevated plateau overlooking Anse à Plume during the 1998 surveys (fig. 5.1). Site dimensions are 25 m from north to south and 22 m from west to east. The northern part of the site is bordered by steep cliffs and the southern part by a small dirt track that leads from Pointe Tarare to the Grande Saline. The site is characterised by a very small and even distribution of ceramic fragments. Few fragments of *Cittarium pica* and *Nerita* sp. and one coral artefact were found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Hardly any off-site material was found. Some isolated finds of ceramics and shells were made to the east of the site, in the direction of the Est Pointe Tarare site (97125-024). Dry vegetation covers 0-10 percent of the soil, which consists of loose, coarse, well-drained sand. Surface visibility is very good. The terrain is not used at the moment and the site appears to be eroded. Bedrock surfaces almost everywhere and the archaeological material is mainly found in the cavities in the calcareous plateau.

2.14.2 Archaeological materials

2.14.2.1 Pottery

A total of 22 heavily fragmented and weathered sherds was collected, mostly body sherds, weighing 146 g (table A2.68). One flat base was found. No fragments belonging to griddles or to the appendage/other category were collected. Some of the sherds have red slipped surfaces (13.6%) and none were decorated.

	Number	Number %	Weight	Weight %
Rim	1	4.5	16	11.0
Body	20	91.0	118	80.8
Base	1	4.5	12	8.2
Griddle	0	0.0	0	0.0
Appendage/other	0	0.0	0	0.0
Total	22	100.0	146	100.0

Table A2.68. Number, percentages and weight (g) of sherds from Ouest Anse à Plume.

One rim larger than 5 cm was found. This was part of a small bowl with unrestricted simple contour with a rounded rim, a wall thickness of 14 mm and an orifice diameter of 7 cm. The outer surface is reddish brown and highly burnished. The firing technique is complete reduction and crushed shell was used as temper material.

2.14.2.2 Coral artefacts

One moderately used *Acropora cervicornis* rasp fragment was collected.

2.14.2.3 Shellfish remains

Few shellfish remains, consisting of 8 g of *Cittarium pica* and 426 g of *Strombus gigas,* were found on the surface.

2.14.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.15 EST POINTE TARARE (97125-024; SC16, SC18)

2.15.1 Site location and preservation

The Est Pointe Tarare site (x: 693,200; y: 1798,175) was discovered at a strategic location on the northern coast of Pointe des Châteaux, between Pointe Tarare and the sandy road leading to the Grande Saline, during the 1998 surveys (fig. 5.1). Part of the site is on the north part of the plateau (SC16) and another part extends towards the interior southern part (SC18). The dimensions of SC16 are 120 m from west to east and 60 m from north to south and SC18 measures 24 m from west to east and 20 m from north to south. Ten meters with a less dense distribution of archaeological material separate these concentrations. The archaeological material, mainly consisting of heavily fragmented ceramics, is rather dense and evenly distributed. Limited amounts of ceramic off-site material were found to the east of the site in the direction of the Ouest Anse à Plume site (97125-023). Thorny vegetation, which makes it very difficult to traverse the terrain, covers 11-20 percent of the soil, which consists of loose, moderately structured, well-drained sand with a humus component. Surface visibility is good. The preservation of the site is not very good as a result of erosion, which affects the northern part of the site, and of cultivation, which appears to have affected the southern part. Although the terrain is now used for cattle grazing, according to the Pointe des Châteaux inhabitants it was used for plantations in the past.

2.15.2 Test units and stratigraphy

Two 1 m^2 units were excavated in SC16 (fig. A2.22) and one 1 m^2 unit and one 50 x 50 cm unit in SC18. The first unit in SC16 was started as a 1 m^2 unit but at a depth of 40 cm, the layers being sterile and extremely compact, it was continued as a 50 x 50 cm unit in the north-eastern part of the unit. The northwest corner of unit 1, SC16, was located at 693293.797; 1798172.613; 22.56 (Guadeloupe - Ste. Anne system) or 16°15′13.9832″; -61°11′43.0024″; -19.71 (WGS84). The northwest corner of unit 2, SC16, was located 693245.400; 1798129.373; 19.01 (Guadeloupe - Ste. Anne system) or 16°15′12.5906″; -61°11′44.6450″; -23.25 (WGS84). The northwest corner of unit 1, SC18, was located at 693301.458; 1798062.880; 16.62 (Guadeloupe - Ste. Anne system) or 16°15′10.4115″; -61°11′42.7770″; -25.64 (WGS84). The northwest corner of unit 2, SC18, was located at 693316.564; 1798070.571; 16.68 (Guadeloupe - Ste. Anne system) or 16°15′10.6574″; -61°11′42.2661″; -25.58 (WGS84).

	Number	Number %	Weight	Weight %
Rim	8	2.9	44	3.6
Body	254	92.0	964	79.1
Base	13	4.7	168	13.8
Griddle	1	0.4	42	3.5
Appendage/other	0	0.0	0	0.0
Total	276	100.0	1218	100.0

Table A2.69. Number, percentages and weight (g) of sherds from Est Pointe Tarare.

2.15.3 Archaeological materials

2.15.3.1 Pottery

A total of 276 sherds was collected, mostly body sherds (92.0%), weighing 1218 g (table A2.69). No fragments belonging to the appendages/other category were found. Seven sherds have red slipped surfaces (2.5%). Bases are flat (38.5%), concave (7.7%) or unidentified (53.8%), while one triangular griddle rim was found as well. Some of the base fragments seem to be part of one single base but they could not be fitted. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

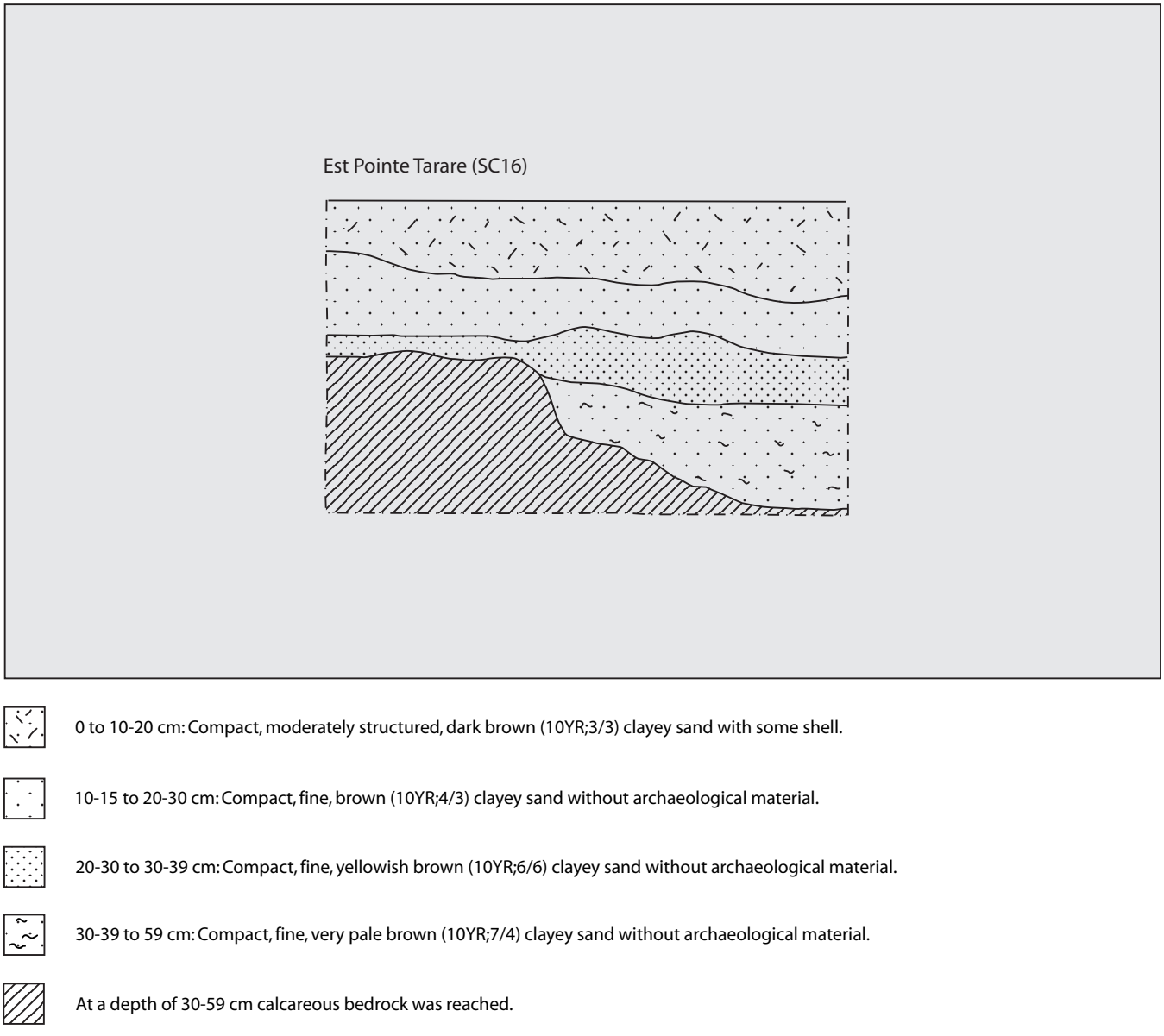


Fig. A2.22. Est Pointe Tarare (SC16), unit 2 (1 m^2), north section.

However, a superficial study of the collection demonstrates that fragmentation is very high but that the sherds are not too badly weathered. Six rounded rims smaller than 5 cm were found. Surface finishing consists of light and high burnishing and temper materials include fine sand, very small stones and finely crushed shell.

2.15.3.2 Lithic artefacts
Two stone artefacts were found. These include a burnt, sandstone fragment from a *metate*-like tool with two abraded faces, one flat and one concave, and a flat, rounded coral limestone artefact with sharp edges, probably created through use.

2.15.3.3 Coral artefacts
One *Siderastrea siderastrea* polishing tool was collected.

2.15.3.4 Shellfish remains
The main shellfish remains consisted of *Acanthopleura granulata*, *Chama sinuosa*, *Cittarium pica*, and *Strombus gigas* (table A2.70). Other shell species represented in very low numbers and weights at the site included *Astraea caelata*, *Cypraecassis testiculus*, *Nerita* sp., *Nodilittorina tuberculata*, *Purpura patula*, *Tellina radiata*, and *Thais deltoidea*. All shell could be identified.

2.15.4 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

2.16 OUEST MORNE ZAMBI (97125-025; SC17)

2.16.1 Site location and preservation
The Ouest Morne Zambi site (x: 693,500; y: 1798,000) was discovered to the west of Morne Zambi, quite close to the strategic Ouest Anse à Plume site (97125-023) and the Nord Morne Zambi site (97125-026), during the 1998 surveys (fig. 5.1). Site dimensions are 70 m from west to east and 44 m from north to south. The site is characterised by a small surface distribution, consisting mainly of fragments of pottery and shell, including *Charonia variegata*, *Cittarium pica* and *Nerita* sp. The site is separated in two parts by the dirt track leading to the Grande Saline. The northern part of the site has a denser surface distribution than the southern part. Small concentrations were found quite near to the site that are probably activity areas related to the site. Ceramic off-site material was found east of the site near the Grande Saline. Thorny vegetation, which greatly hinders travel across the terrain, covers 11-20 percent of the soil, which consists of loose, moderately structured, well-drained sand with a lot of humus. Surface visibility is good. Although the dirt track causes major damage to the site, the preservation of the other parts is quite good.

2.16.2 Test units and stratigraphy
Two 1 m^2 units were excavated (fig. A2.23). The northwest corner of unit 1 was located at 693522.811; 1798012.586; 8.56 (Guadeloupe - Ste. Anne system) or 16°15′8.7120″;

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	7	18	42	60
	18.4	1.6	9.2	3.8
Strombus gigas	1	112	91	203
	2.6	9.8	19.8	12.7
Cittarium pica	10	587	317	904
	26.4	51.4	69.1	56.4
Chama sinuosa	6	394	0	394
	15.8	34.5	0.0	24.6
Other	14	32	9	41
	36.8	2.7	1.9	2.5
Total	38	1143	459	1602
	100.0	100.0	100.0	100.0

Table A2.70. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Est Pointe Tarare.

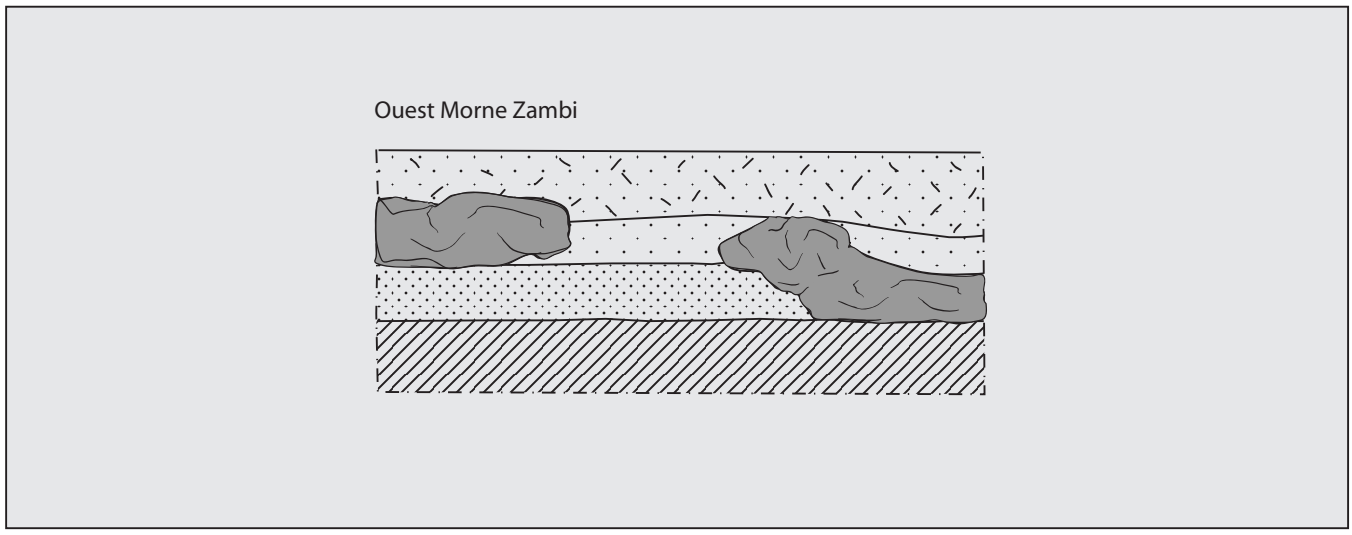


Fig. A2.23. Ouest Morne Zambi, unit 2 (1 m^2), north section.

	Number	Number %	Weight	Weight %
Rim	31	8.6	480	16.5
Body	319	89.1	2356	81.1
Base	2	0.6	24	0.8
Griddle	2	0.6	16	0.6
Appendage/other	4	1.1	28	1.0
Total	358	100.0	2904	100.0

Table A2.71. Number, percentages and weight (g) of sherds from Ouest Morne Zambi.

-61°11′35.3383″; -33.71 (WGS84). The northwest corner of unit 2 was located at 693525.545; 1798018.359; 8.29 (Guadeloupe - Ste. Anne system) or 16°15′8.8990″; -61°11′35.2445″; -33.98 (WGS84).

2.16.3 Archaeological materials

2.16.3.1 Pottery
A total of 358 sherds was collected, mostly body sherds (89.1%), weighing 2904 g (table A2.71). The appendages/ other category represents 1.1% of the sample. It includes one handle, one lug, one miniature griddle leg and one unidentified appendage. A total of 36 sherds has red slipped surfaces (10.1%) and no decorated sherds were collected. Two flat bases and two unidentified griddle fragments were found as well. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no detailed morphological and technological description could be provided for the ceramics of this site. However, some remarks can be made on the basis of superficial study of the collection. Find fragmentation and weathering of surface material is heavy, as a result of superficial site disturbance, while find fragmentation and weathering of test unit material is moderate. A total of 41 rounded rims, smaller than 5 cm, was found, together with one flattened rim and two flanged rims. Surface finishing consists of burnishing, but many fragments remain unidentified as a result of weathering. Temper materials include mostly fine sand, some crushed shell and in rare cases very small stones.

2.16.3.2 Lithic artefacts
Two lithic artefacts were collected. These include one non-modified water-worn pebble of volcanic rock and one shapeless core-artefact of limestone/chalk. In addition, two natural fragments of limestone/chalk rock and sandstone were collected as well. The origins of the raw materials have not been identified.

2.16.3.3 Coral artefacts
One fragment of a heavily used *Acropora palmata* grinding tool was found.

2.16.3.4 Shellfish remains
A very limited number of shellfish remains was found, consisting exclusively of small amounts of *Astraea caelata, Charonia variegata, Cittarium pica, Nerita* sp., and *Thais deltoidea* (table A2.72). All shell could be identified.

2.16.4 Chronological assignment
The site yielded Early Ceramic B pottery.

2.17 NORD MORNE ZAMBI (97125-026; SC20)

2.17.1 Site location and preservation
The Nord Morne Zambi site (x: 693,800; y: 1798,025) was discovered north of Morne Zambi, on a flat terrain that borders the Grande Saline, during the 1998 surveys (fig. 5.1).

	MNI count	MNI weight	Fragment weight	Total weight
Astraea caelata	1	1	1	2
	25.0	16.7	2.3	4.1
Charonia variegata	0	0	2	2
	0.0	0.0	4.7	4.1
Cittarium pica pica	0	0	40	40
	0.0	0.0	93.0	81.6
Nerita sp.	2	4	0	4
	50.0	66.6	0.0	8.2
Thais deltoidea	1	1	0	1
	25.0	16.7	0.0	2.0
Total	4	6	43	49
	100.0	100.0	100.0	100.0

Table A2.72. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all shell species collected at Ouest Morne Zambi.

Site dimensions are 80 m from west to east and 70 m from north to south. The site is characterised by a small surface distribution, consisting of ceramic fragments and shell and lithic and coral artefacts. Test units were excavated in the denser parts of this distribution. Small amounts of ceramic off-site material were found to the east and south-west of the site. Thorny vegetation, which greatly hinders travel across the terrain, covers 11-20 percent of the soil, which consists of loose, moderately structured, well-drained clayey sand with a lot of humus. Surface visibility is good. The westernmost part of the site appears to have been covered by sediments from the Grande Saline from time to time. The preservation of the site appears to be quite good. Sedimentary processes from the salina and Morne Zambi and cattle grazing, for which the site is presently used, lightly and superficially disturbed the site.

2.17.2 Test units and stratigraphy

Four 1 m^2 test units have been excavated in the denser parts of the surface distribution (fig. A2.24). The test units are distributed all over the terrain. The northwest corner of unit 1 was located at 693785.612; 1798022.717; 0.37 (Guadeloupe - Ste. Anne system) or 16°15′8.9661″; -61°11′26.4858″; -41.92 (WGS84). The northwest corner of unit 2 was located at 693829.118; 1798026.736; 1.83 (Guadeloupe - Ste. Anne system) or 16°15′9.0843″; -61°11′25.0196″;

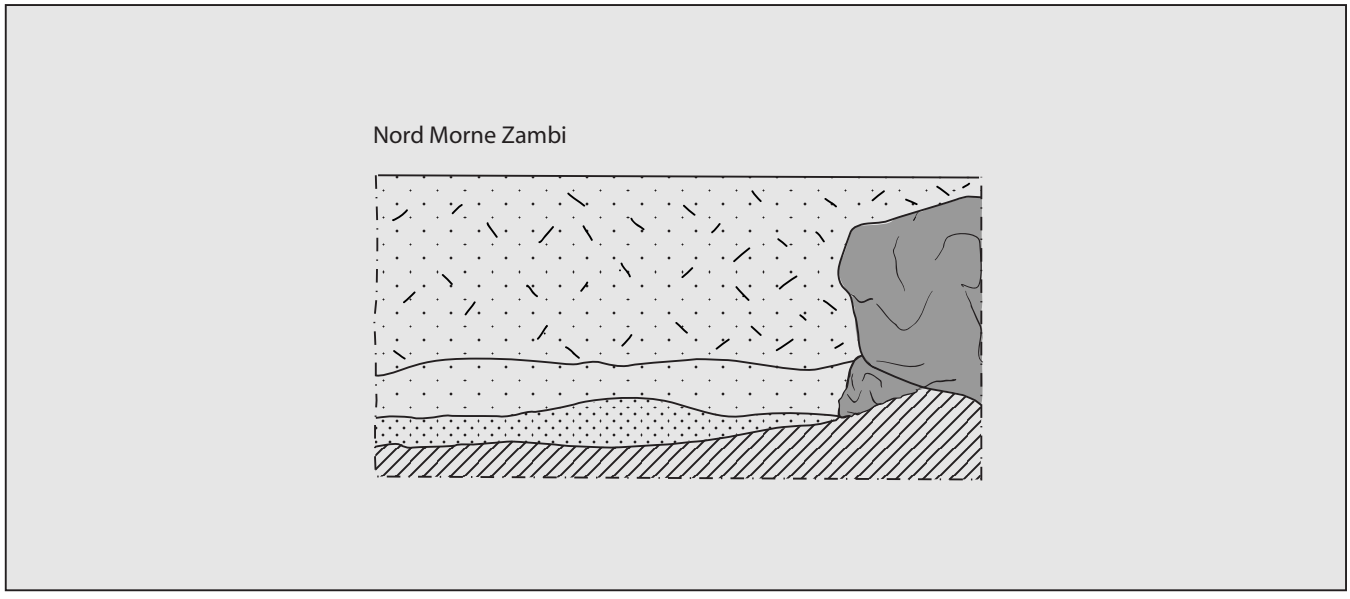


Fig. A2.24. Nord Morne Zambi, unit 1 (1 m^2), north section.

-40.46 (WGS84). The northwest corner of unit 3 was located at 693827.296; 1797991.518; 1.48 (Guadeloupe - Ste. Anne system) or 16°15′7.9392″; -61°11′25.0915″; -40.81 (WGS84). The northwest corner of unit 4 was located at 693850.003; 1798014.107; 1.91 (Guadeloupe - Ste. Anne system) or 16°15′8.6675″; -61°11′24.3201″; -40.38 (WGS84).

2.17.3 Archaeological materials

2.17.3.1 Pottery

A total of 608 sherds was collected, mostly body sherds (77.1%), weighing 5867 g (table A2.73). Weathering and fragmentation of the sherds is moderate to heavy. The appendages/other category represents 0.6% of the sample. It includes two lugs, an *adorno* and an *appliqué* (fig. A2.25). A total of 42 sherds has slipped surfaces (6.9%) and eight sherds (1.3%) are decorated by incision and a zoomorphic modelled incised *appliqué*. Two sherds have a beige slip and the others are red. Most of the bases are flat (40.0%) or concave (36.7%) but the shape of many fragments could not be identified (23.3%). One straight griddle rim was collected as well.

The morphological description of the pottery has been based on the analysis of 14 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (78.6%) and bowls with unrestricted composite contours (14.3%); (table A2.74; fig. A2.26). The dominant rim shape is rounded (78.7%) although flattened, outward thickened and flanged rims occur as well. Most of the wall thicknesses (85.7%) are between 9-11 mm and orifice diameters are between 41-50 cm (50%), 31-40 cm (21.5%), although fragments of very large vessels (51-80 cm) have been found as well. For 14.3% of the sample, the diameter cannot be estimated. Surface colours are reddish brown (92.9%) and dark brown/very dark brown (7.1%). The dominant firing techniques are complete oxidation (35.7%), incomplete or relatively good oxidation (35.7%). Surface finishing is predominantly characterised by burnishing (71.4%), but scratching (14.3%) and smoothing (14.3%) occur as well (tables A2.75-A2.79). Some of the pottery is rather crude and heavy, although finely made ceramics occur in the same collection. Temper

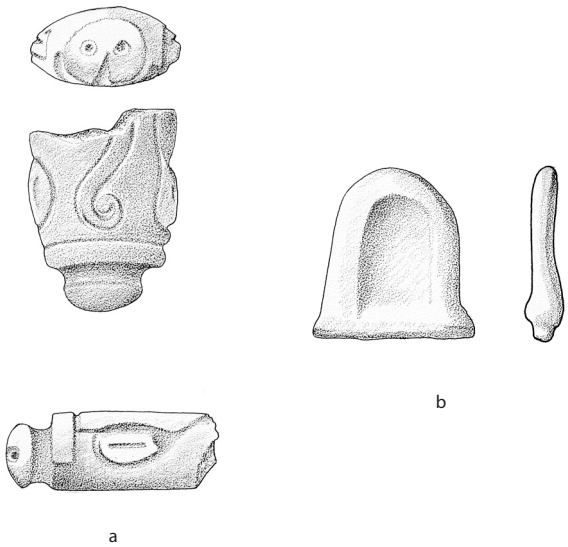


Fig. A2.25. Zoomorphic *adorno* (a; surface, scale 1:2) and lug (b: unit 1, level 2, scale 1:2) from Nord de Morne Zambi.

	Number	Number %	Weight	Weight %
Rim	74	12.2	972	16.6
Body	469	77.1	3186	54.3
Base	60	9.9	1633	27.8
Griddle	1	0.2	2	< 0.1
Appendage/other	4	0.6	74	1.3
Total	608	100.0	5867	100.0

Table A2.73. Number, percentages and weight (g) of sherds from Nord Morne Zambi.

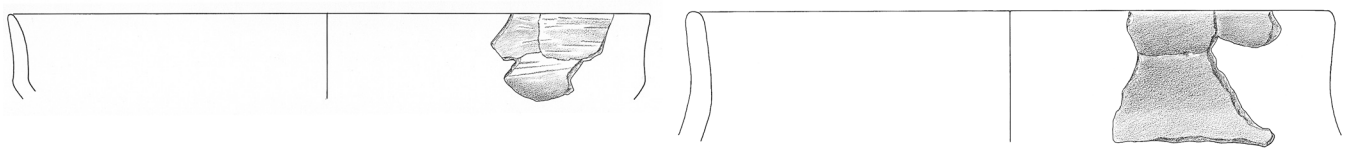


Fig. A2.26. Ceramic vessels from unit 2, level 1 (scale 1:4) from Nord de Morne Zambi.

	Number	Number %
Jar with unrestricted simple contour	5	35.7
Bowl with unrestricted simple contour	2	14.3
Dish with unrestricted simple contour	4	28.6
Bowl with unrestricted composite contour	2	14.3
Bowl with unrestricted inflected contour	1	7.1
Total	14	100.0

Table A2.74. Number and percentages of sherds within vessel shape categories from Nord Morne Zambi.

	Number	Number %
Rounded	11	78.7
Flattened	1	7.1
Outward thickened	1	7.1
Flanged	1	7.1
Total	14	100.0

Table A2.75. Number and percentages of sherds within rim shape categories from Nord Morne Zambi.

	Number	Number %
6-8 mm	2	14.3
9-11 mm	12	85.7
Total	14	100.0

Table A2.76. Number and percentages of sherds within Nord Morne Zambi wall thickness categories.

materials include crushed shell, stone and pottery and fine sand.

2.17.3.2 Lithic artefacts
Four patinated lithic artefacts were collected. These consist of three Long Island and one Blackman's Point flint flakes. In addition, some natural but burnt limestone pieces were collected as well. Two non-burnt exceptions exhibit a scar and a sharp edge respectively but these are probably natural.

2.17.3.3 Coral artefacts
Seven coral artefacts were collected (table A2.80). These include two fragments of heavily used *Acropora palmata* grinding tools and one heavily used *Porites porites* grinder. In addition, several unidentified objects were found. These consist of two *Siderastrea siderastrea* objects (one lightly used and one without use wear), one heavily used *Diploria labyrinthiformis* object and one *Montastrea cavernosa* fragment without use wear.

	Number	Number %
31-40 cm	3	21.5
41-50 cm	7	50.0
51-60 cm	1	7.1
70-80 cm	1	7.1
Unidentified	2	14.3
Total	14	100.0

Table A2.77. Number and percentages of sherds within Nord Morne Zambi orifice diameter categories.

	Number	Number %
Complete reduction	1	7.15
Incomplete oxidation	2	14.3
Complete oxidation	5	35.7
Incomplete or relatively good oxidation	5	35.7
Unidentified	1	7.15
Total	14	100.0

Table A2.78. Number and percentages of sherds within Nord Morne Zambi firing colour categories.

	Number	Number %
Scratched	2	14.3
Smoothed	2	14.3
Lightly burnished	2	14.3
Highly burnished	8	57.1
Total	14	100.0

Table A2.79. Number and percentages of sherds within Nord Morne Zambi exterior surface finishing categories.

2.17.3.4 Shellfish remains

The main shellfish remains consisted of *Acanthopleura granulata*, *Cittarium pica*, and *Strombus gigas* (table A2.81). Other shell species represented in very low numbers and weights at the site included *Arca zebra*, *Astraea caelata*, *Chama* sp., *Charonia variegata*, *Chiton marmoratus*, *Codakia orbicularis*, *Nerita* sp., *Nodilittorina tuberculata*, *Tegula excavata*, and *Thais deltoidea*. All shell could be identified.

2.17.4 Chronological assignment

The site yielded Late Ceramic A pottery, dating around AD 1000-1200. Early Ceramic B-like shapes such as lugs and *appliqués* still occur and comparisons to the Mill Reef style can be made.

2.18 FOND CARAÏBE (97125-053; SC104)

2.18.1 Site location and preservation

The Fond Caraïbe site (x: 689,375; y: 1799,125) was discovered on top of and on the slopes of a hill in the cultivated fields in the *Fond Caraïbe* area during the 2000

	Grinding tool fragment	Unidentified	Total
Acropora palmata	2		2
	28.6		28.6
Diploria labyrinthiformis		1	1
		14.3	14.3
Siderastrea siderastrea		2	2
		28.6	28.6
Porites porites	1		1
	14.3		14.3
Montastrea cavernosa		1	1
		14.3	14.3
Total	3	4	7
	42.9	57.2	100.0

Table A2.80. Number and percentages of coral species and artefact types collected at Nord Morne Zambi.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	9	16	70	86
	19.6	6.5	9.7	8.9
Strombus gigas	3	114	240	354
	6.5	46.5	33.2	36.5
Cittarium pica	4	48	376	424
	8.7	19.6	51.9	43.8
Other	30	67	38	105
	65.2	27.4	5.2	10.8
Total	46	245	724	969
	100.0	100.0	100.0	100.0

Table A2.81. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Nord Morne Zambi.

surveys (fig. 5.1). Site dimensions are 40 m from west to east and 60 m from north to south. The site is characterised by a small distribution of fragments of weathered pottery and shell, including *Cittarium pica, Strombus gigas* and *Codakia orbicularis* and lithic artefacts and coral fragments. Almost no off-site material was found. Although an archaeological layer is expected, the aims and time constrictions of the 2000 fieldwork did not allow test units to be excavated. Surface collections, consisting of a very small amount of pottery and four lithic artefacts, were made. The soil, which consists of compact, moderately structured, sandy clay, is not covered by any vegetation at all. Therefore, surface visibility is extremely good, especially as the area is regularly ploughed. This, however, also results in the superficial disturbance of the site, encouraged by slope erosion.

2.18.2 Archaeological materials

The material described includes the 2000 surface collection. Four hypabyssal rock artefacts were collected. These include two pebbles without traces of use or modification, one flake core pebble and one flake, removed from a pebble. In addition, 58 sherds were collected, weighing 497 g. These include 13 rims, 41 body sherds, one flat base, a fragment of a rounded and a legged griddle and one pot-stand fragment. No red slipped surfaces have been collected and one sherd (1.7%) is decorated by incision. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.18.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.19 POINTE À CABRITS 1 (97125-058; SC101)

2.19.1 Site location and preservation

The Pointe à Cabrits 1 site (x: 690,750; y: 1798,750) was discovered to the west of the site of Anse à la Gourde during the 2000 surveys (fig. 5.1). Site dimensions are 100 m from west to east and 100 m from north to south. The site is characterised by a very small surface distribution of archaeological material consisting of heavily fragmented and eroded ceramics, fragments of *Cittarium pica*, *Strombus gigas*, *Nerita* sp., *Chiton* sp. and fragments of non-worked coral. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Hardly any off-site material was found. Very dense and thorny vegetation covers the soil, which consists of compact, moderately structured sandy clay. Although this seriously limits passage across the terrain, the visibility of the surface material was good. The site appears to be seriously damaged as a result of cultivation in the past.

2.19.2 Archaeological materials

Surface collections were made at the site, consisting exclusively of a very small amount of pottery. Although present on the surface of the site, no other archaeological materials have been collected. A total of 14 sherds was collected, weighing 76 g, and these include one rim and 13 body sherds. No sherds with slipped or decorated surfaces were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.19.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.20 POINTE À CABRITS 2 (97125-059; SC102)

2.20.1 Site location and preservation

The Pointe à Cabrits 2 site (x: 690,700; y: 1798,875) was discovered to the west of Anse à la Gourde, north of the Pointe à Cabrits 1 site, during the 2000 surveys (fig. 5.1). The site extends from halfway up the southern slope into the valley and halfway up the northern slope. Site dimensions are 40-50 m from west to east and 50 m from north to south. The site is characterised by a very small distribution of archaeological material on the surface consisting of fragmented and weathered ceramics, fragments of *Cittarium pica*, *Strombus gigas* and lithic artefacts and coral fragments. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A surface collection was made, consisting of a small amount of pottery (193 g) and three lithic artefacts. Hardly any off-site material was found. Dense and thorny vegetation covers the soil, which consists of compact, moderately structured sandy clay. Although this seriously limits travel across the terrain, the visibility of the surface material was good. The site appears to be superficially touched by erosion of the terrain.

2.20.2 Archaeological materials

The material described includes the 2000 surface collection, consisting of three unidentified artefacts of hypabyssal rock

and 25 sherds, weighing 193 g. These include two rims, 18 body sherds, two flat bases and three straight griddle rims. No fragments belonging to the appendages/other category were found. One sherd has red slipped surfaces (4.0%) and one sherd (4.0%) is decorated by incision. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.20.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.21 FOND ST. BERNARD (97125-060; SC103)

2.21.1 Site location and preservation

The Fond St. Bernard site (x: 689,625; y: 1798,625) was discovered on the slope that extends from the valley north of Chassaing towards Fond Caraïbe during the 2000 surveys (fig. 5.1). The owner of the terrain is Mr. Bastareau, who lives near *l'ancien moulin* on Pointe des Châteaux. Site dimensions are 40 m from west to east and 25 m from north to south. The site is characterised by a small surface distribution of archaeological material consisting of fragmented ceramics and fragments of *Cittarium pica*. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A surface collection consisting of a small amount of pottery (69 g) was made. Almost no off-site material was found. The soil, which consists of compact, moderately structured sandy clay, is not covered by vegetation at all. Therefore, surface visibility is very good. The site has been seriously damaged as a result of cultivation of the terrain.

2.21.2 Archaeological materials

Ten sherds were collected, weighing 69 g, including eight body sherds and 2 rim fragments. No sherds with slipped or decorated surfaces were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

2.21.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

2.22 POINTE TARARE (97125-027)

2.22.1 Site location and preservation

During the 1998 survey of Pointe Tarare (x: 693,500; y: 1798,000), four undatable lithic artefacts were found and some very tiny shell fragments. In order to test if this location actually is an archaeological site, which was not clear on the basis of the surface material, it was decided to excavate some test units. After excavation, we had to conclude that the units did not yield enough evidence to register Pointe Tarare as an archaeological site. Except for rare shell fragments, no archaeological material was found at all. However, the location would have been very attractive for habitation. The flat terrain provides an excellent overview of an important part of the northern coast and a canoe-landing beach and reefs are very close. Grass and rare sea-grape cover the soil, consisting of very compact, very fine, clay. Surface visibility is very good.

2.22.2 Test units and stratigraphy

Three test units were excavated. The first level of the units was excavated as a 1 m^2 unit, but as the soil was extremely compact and the layers were sterile, it was decided to continue digging 50 x 50 cm units in the north-western corners (fig. A2.27). The units did not yield any archaeological material at all, except for some shell, which is not archaeological by nature. The lithic artefacts that were discovered on the surface have been interpreted as isolated finds. The northwest corner of unit 1was located at 693013.177; 1798411.308; 6.61 (Guadeloupe - Ste. Anne system) or 16°15′21.8280″; -61°11′52.3813″; -35.67 (WGS84). The northwest corner of unit 2 was located at 693033.951; 1798415.747; 6.71 (Guadeloupe - Ste. Anne system) or 16°15′21.9665″; -61°11′51.6804″; -35.56 (WGS84). The northwest corner of unit 3 was located at 693064.926; 1798409.572; 6.74 (Guadeloupe - Ste. Anne system) or 16°15′21.7567″; -61°11′50.6392″; -35.54 (WGS84).

2.22.3 Archaeological materials

2.22.3.1 Lithic artefacts

Three small Long Island flint artefacts without cortex were collected. These include one unmodified, non-patinated broken flake with unifacial use retouch made by direct freehand hard hammer percussion, one unmodified flake fragment with unifacial use retouch and patina all over the fragment, and one double platformed blade core with patina all over made by a bipolar flaking technique. One small fragment of a water-worn pebble of hypabyssal rock, with a possible La Désirade origin, was found on the surface as

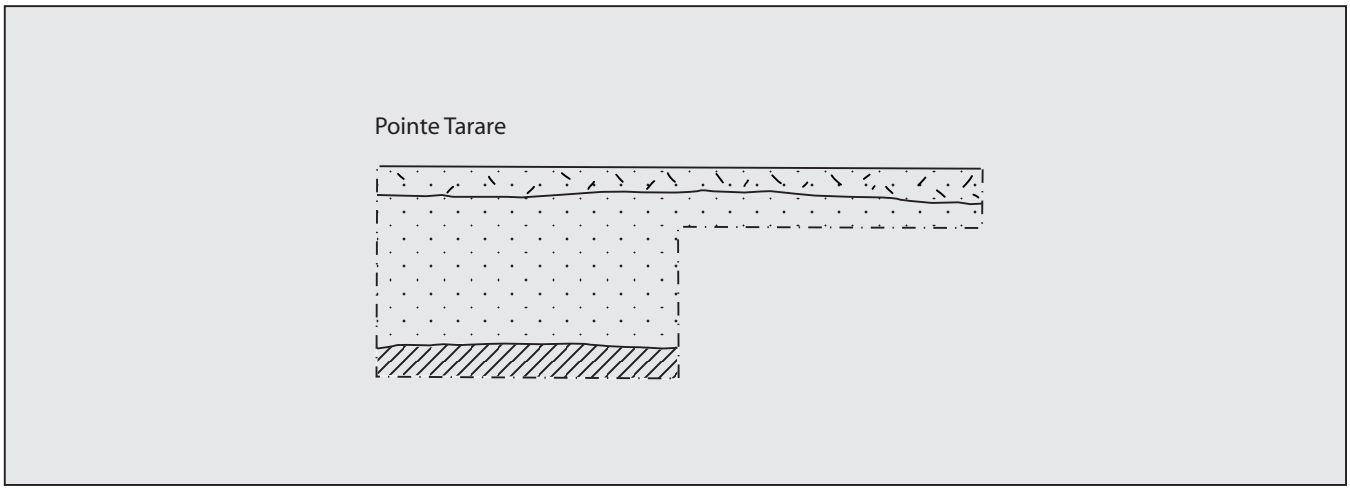


Fig. A2.27. Pointe Tarare, unit 2 (1 m^2), north section.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	1	22	16	38
	10.0	33.9	4.5	9.1
Cittarium pica	4	34	324	358
	40.0	52.3	91.5	85.4
Other	5	9	14	23
	50.0	13.8	4.0	5.5
Total	10	65	354	419
	100.0	100.0	100.0	100.0

Table A2.82. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Pointe Tarare.

well. It has a little polishing.

2.22.3.2 Shellfish remains
The main shellfish remains consisted of *Strombus gigas* and *Cittarium pica* (table A2.82). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata*, *Astraea caelata*, *Nerita* sp., *Nodilittorina tuberculata*, and *Purpura patula*. All shell could be identified.

NOTES

1 Orifice diameter could not be identified in cases of small rims, irregularly formed rims or boat-shaped vessels.

2 Surface finishing could not be identified for heavily weathered sherds and sherds that have unremovable chalk cover.

3 The shell species category 'other' represents all species that made minor contributions to the total counts.

4 Coral rasps are active grinding/abrading tools.

5 If not specified otherwise, grinding tools refer to passive grinding/abrading tools.

6 Obviously, not all shell species represented here have been used for consumption.

7 These are the co-ordinates of the north-west corner of the 1 m^2 unit.

8 The area was also inhabited during the colonial period and remains of two houses were found during the survey.

APPENDIX 3. LA DÉSIRADE SITE CATALOGUE

3.1 À L'ESCALIER (97110-001; SC23)

3.1.1 Site location and preservation

The À l'Escalier site (x: 709,400; y: 1804,600) is situated in a cultivated terrain very close to the beach on the southern coastal plain of La Désirade (fig. 5.2). Bodu surveyed the site in 1985 but Père Barbotin and Edgar Clerc already knew of its existence. The site was restudied in 1999. Bodu described the site as a pre-Columbian coastal habitation site, measuring approximately 100 m^2. Site dimensions were estimated to be 40 m from north to south and 60 m west to east in 1999. Although in 1997 hardly any archaeological material was visible on the surface, Bodu described a very dense surface concentration in 1984 and during the 1999 survey an important concentration could be identified again. The archaeological surface material consists of heavily fragmented ceramics, lithic and coral artefacts and shellfish remains, including *Cittarium pica* and *Strombus gigas*. Almost no off-site material was found. Cultivated plants and the house of Mr. Robin, the owner of the terrain, cover 41-60 percent of the soil, which consists of loose, coarse, well-drained sand. Surface visibility is very good. Unfortunately, only a very small part of the site actually appears to have been preserved and the upper levels (0-30 cm) of this part, which is situated in the owners garden, are perturbed as a result of cultivation of the terrain. Lower-lying layers are very well preserved.

3.1.2 Test units and stratigraphy

Two 2 x 2 m units (fig. A3.1) were excavated in the owners garden where the densest distribution had been observed. Although a lot of archaeological material was found throughout all the levels up to 80 cm depth, the densest concentration of material was found between 30-60 cm depth. Auger tests have been made in the four corners and the centres of the units as sterile layers of beach sand were being excavated from 80 cm depth onwards. In unit 1, this was done at a depth of 95 cm and in unit 2 at a depth of 80 cm. Groundwater was reached in unit 1 at 220 cm depth and in unit 2 at 160 cm depth. Bedrock has not been reached. Unfortunately, not all the archaeological material from levels 7 and 8 could be separately excavated and collected due to severe and unforeseen time constraints. This was the result of the sudden withdrawal of permission by the owner, who expected that excavation dust would hinder laundry activities. The southeast corner of unit 1was located at 709278.089; 1804592.065; 1.75 (Guadeloupe - Ste. Anne system) or 16°18′38.0076″; -61°2′42.7077″; -41.79 (WGS84). The southeast corner of unit 2 was located at 709276.035; 1804596.744; 1.88 (Guadeloupe - Ste. Anne system) or 16°18′38.1604″; -61°2′42.7754″; -41.67 (WGS84).

3.1.3 Archaeological materials

The material described includes the 1985 and 1999 surface collections and the material from the 1999 test units.

3.1.3.1 Pottery

The pottery collection includes the 1985 surface collection made by Bodu and the 1999 surface collections and material from the test units. The Bodu surface collection consists of 316 sherds, mostly body sherds (64.2%), weighing 13,874 g

	Number	Number %	Weight	Weight %
Rim	75	23.8	3180	22.9
Body	203	64.2	7573	54.6
Base	13	4.1	776	5.6
Griddle	14	4.4	1240	8.9
Appendage/other	11	3.5	1105	8.0
Total	316	100.0	13,874	100.0

Table A3.1. Number, percentages and weight (g) of sherds from the 1985 À l'Escalier collection.

(table A3.1). The appendages/other category represents 3.5% of the sample. It includes a handle, lugs, a pot-stand and griddle legs (fig. A3.2). A total of 77 sherds has red slipped surfaces (24.4%) and 17 sherds (5.4%) are decorated by incision, geometric modelling combined with incision on red slip, zoomorphic modelling, finger indentation and nubbins (fig. A3.3). Most of the bases are flat or concave, while the griddles are straight, legged or unidentified (tables A3.2-A3.5).

The morphological description of the pottery has been based on the analysis of 66 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes

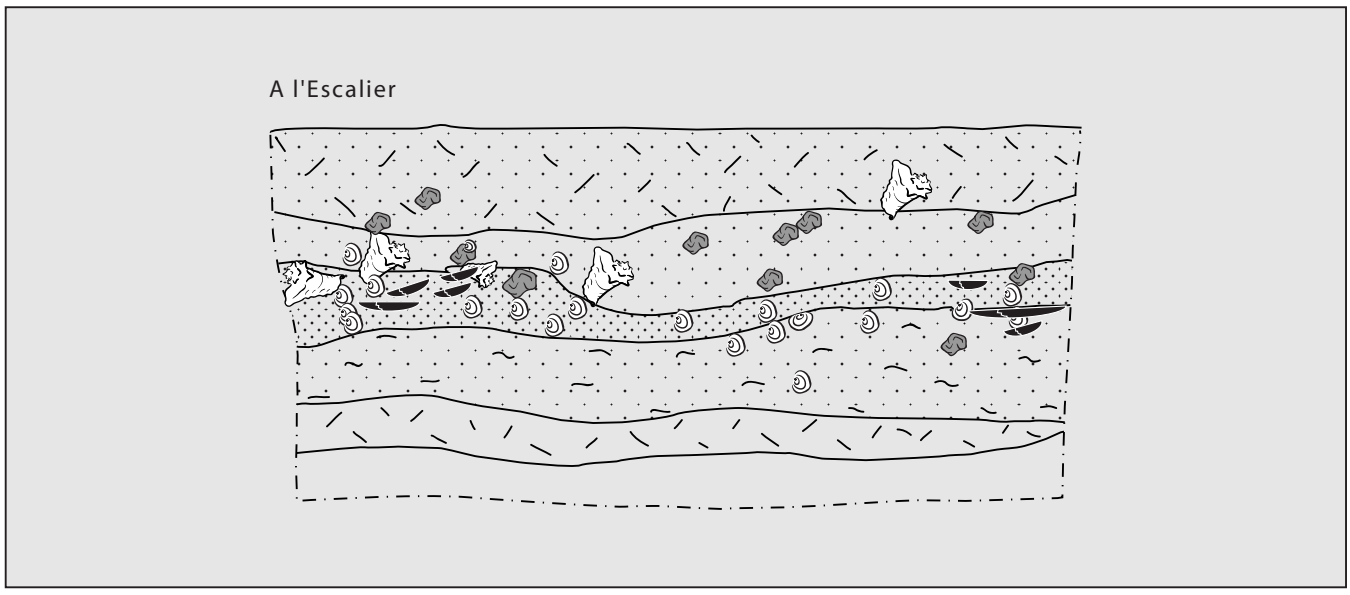


Fig. A3.1. À l'Escalier, unit 2 (2 x 2 m), east section.

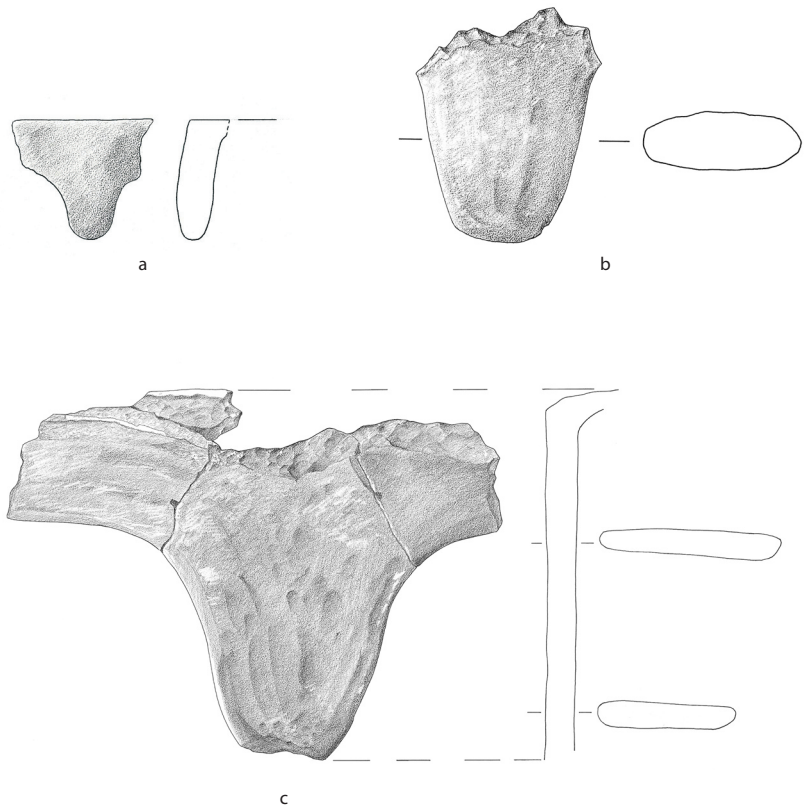


Fig. A3.2. À l'Escalier griddle legs (a: surface, scale 1:2; b: unit 2, level 5, scale 1:3; c: unit 2, level 4, scale 1:4).

	Number	Number %
Handle	1	9.1
Lug	5	45.5
Pot-stand	1	9.1
Griddle leg	4	36.3
Total	11	100.0

Table A3.2. Number and percentages of sherds within appendages/other categories from the 1985 À l'Escalier collection.

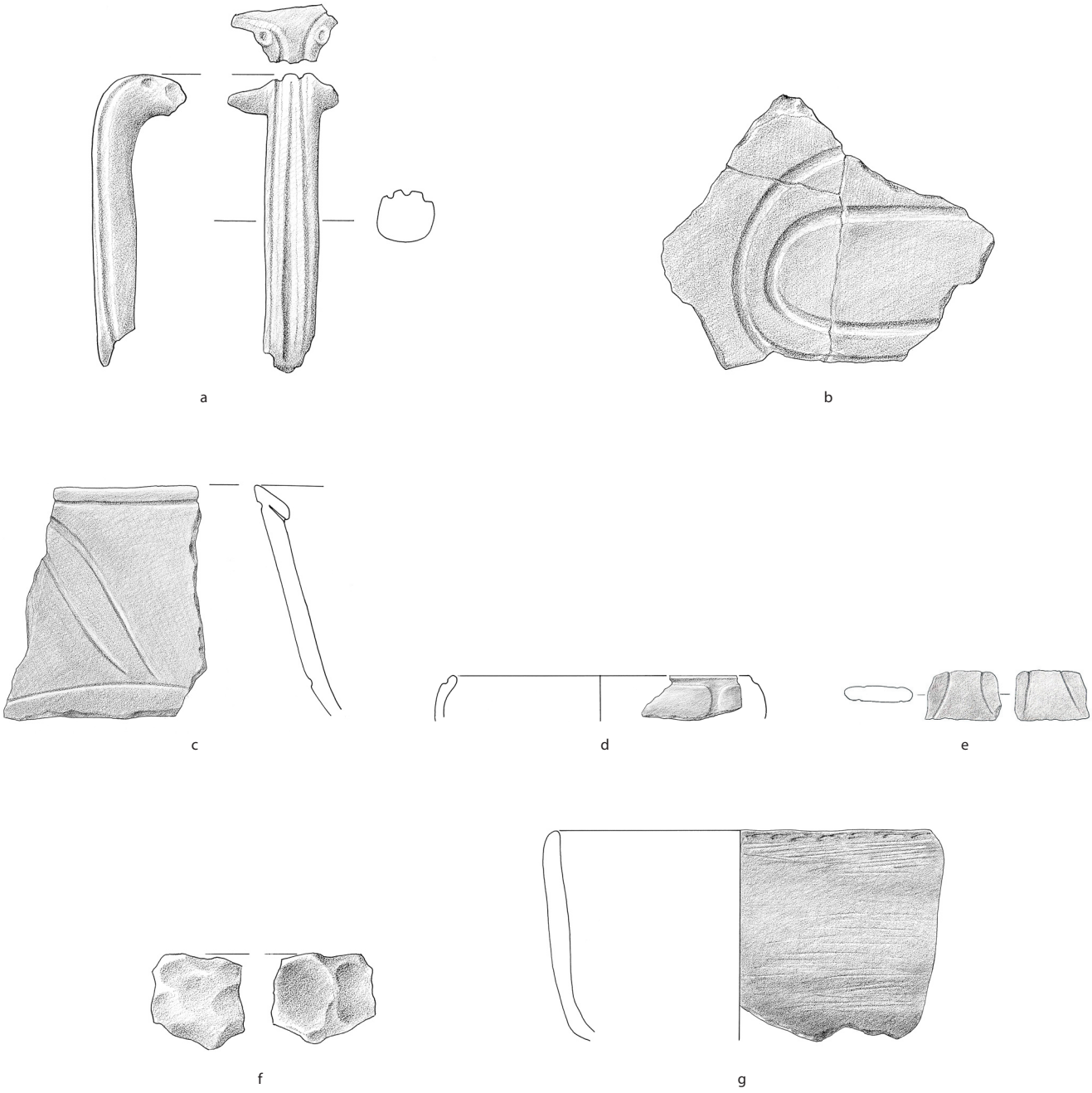


Fig. A3.3. Sherds from À l'Escalier, decorated by zoomorphic modelling (a: unit 2, level 5, scale 1:2), incision (b: unit 2, level 3, scale 1:2; c-d: unit 2, level 5, scale 1:3; e: surface, 1:3), modelling (f: unit 2, level 6, scale 1:3) and by finger indentation (g: unit 1, level 6, scale 1:3).

	Number	Number %
Incision	13	76.4
Modelling (geometric)	1	5.9
Modelled incised *appliqué* (anthropomorphic)	1	5.9
Finger indentation	1	5.9
Nubbins	1	5.9
Total	17	100.0

Table A3.3. Number and percentages of sherds with particular decoration modes in the 1985 À l'Escalier collection.

	Number	Number %
Flat	8	61.5
Concave	3	23.1
Pedestal/annular	1	7.7
Unidentified	1	7.7
Total	13	100.0

Table A3.4. Number and percentages of sherds within base shape categories from the 1985 À l'Escalier collection.

	Number	Number %
Straight	3	21.4
Overhanging	1	7.2
Legged	3	21.4
Unidentified	7	50.0
Total	14	100.0

Table A3.5. Number and percentages of sherds within griddle shape categories from the 1985 À l'Escalier collection.

	Number	Number %
Jar with unrestricted simple contour	7	10.6
Bowl with unrestricted simple contour	30	45.5
Dish with unrestricted simple contour	18	27.3
Bowl with restricted simple contour	8	12.1
Bowl with unrestricted composite contour	2	3.0
Unidentified	1	1.5
Total	66	100.0

Table A3.6. Number and percentages of sherds within vessel shape categories from the 1985 À l'Escalier collection.

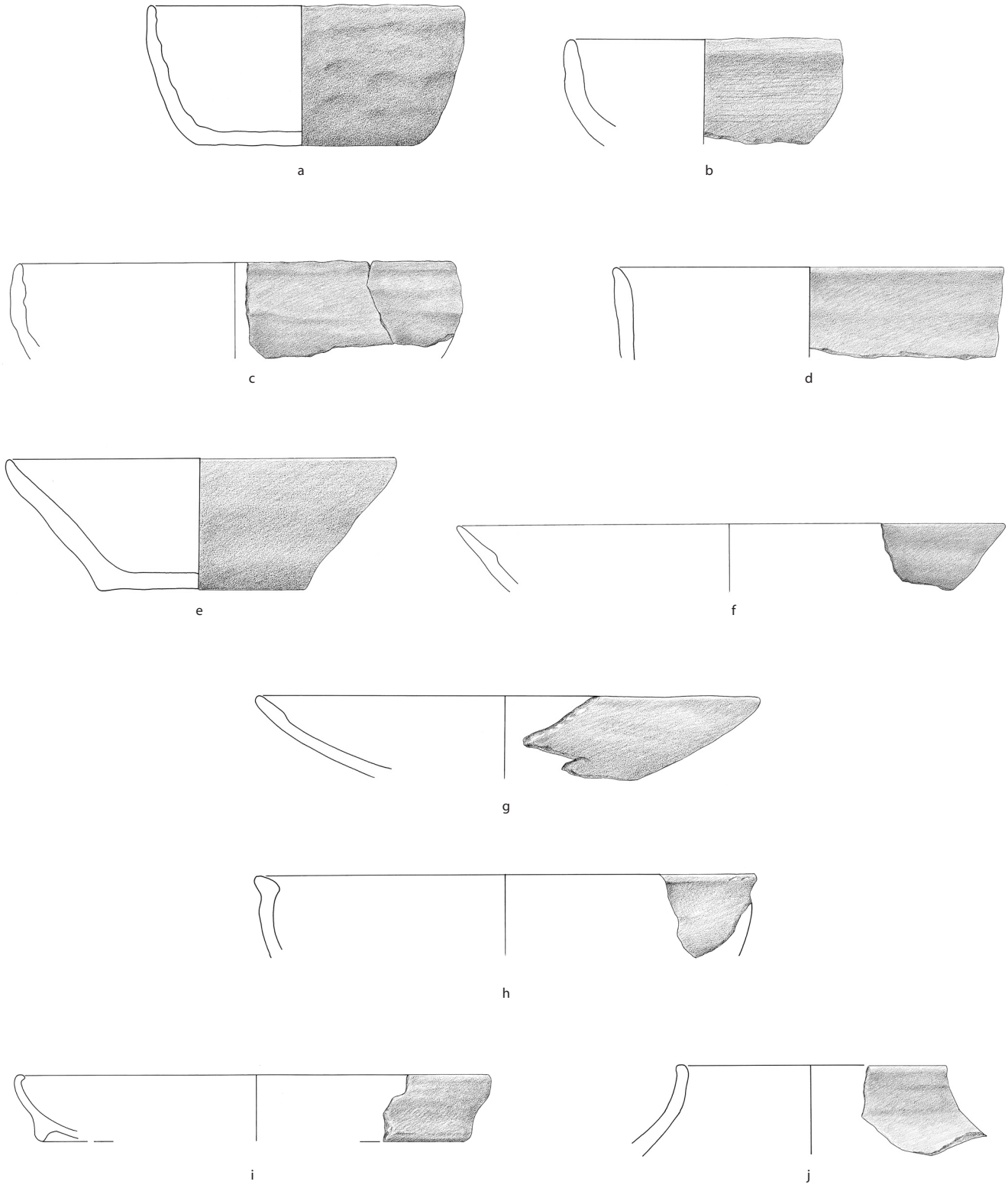


Fig. A3.4. À l'Escalier vessel shapes, scale 1:3 (a: unit 1, level 5; b: unit 2, level 3; c: unit 1, level 6) and scale 1:4 (d: unit 2, level 5; e: unit 1, level 5; f: unit 1, level 6; g: unit 1, level 6; h: unit 2, level 1; i: surface; j: unit 1, level 6).

	Number	Number %
Rounded	45	68.2
Flattened	3	4.5
Inward thickened	17	25.8
Outwardly bevelled	1	1.5
Total	66	100.0

Table A3.7. Number and percentages of sherds within rim shape categories from the 1985 À l'Escalier collection.

	Number	Number %
6-8 mm	22	33.3
9-11 mm	37	56.1
12-16 mm	7	10.6
Total	66	100.0

Table A3.8. Number and percentages of sherds within wall thickness categories from the 1985 À l'Escalier collection.

	Number	Number %
11-20 cm	13	19.7
21-30 cm	19	28.8
31-40 cm	2	3.0
41-50 cm	1	1.5
Unidentified	31	47.0
Total	66	100.0

Table A3.9. Number and percentages of sherds within orifice diameter categories from the 1985 À l'Escalier collection.

	Number	Number %
Dark gray-black	1	1.5
Dark brown/very dark brown	25	37.9
Reddish brown	32	48.5
Red	8	12.1
Total	66	100.0

Table A3.10. Number and percentages of sherds within exterior surface colour categories from the 1985 À l'Escalier collection.

include jars, bowls and dishes with unrestricted simple contours (83.4%) and bowls with restricted simple contours (12.1%); (table A3.6; fig. A3.4). Dominant rim shapes are rounded (68.2%) and inward thickened (25.8%). Wall thicknesses range between 6-8 mm (33.3%), 9-11 mm (56.1%) and 12-16 mm (10.6%) and orifice diameters range mainly between 11-20 cm (19.7%) and 21-30 cm (28.8%), while 47.0% remains unidentified. Surface colours are predominantly reddish brown (48.5%), dark brown/very dark brown (37.9%) and red (12.1%). The dominant firing technique is incomplete or relatively good oxidation (86.4%). Surface finishing is predominantly characterised by burnishing (74.4%) and for 10.6% the surface finishing could not be identified (tables A3.7-A3.12).

The pottery collection in 1999 consisted of 2978 sherds, mostly body sherds (72.9%), weighing 77,159 g (table A3.13). The appendages/other category represents 0.6% of the sample. It includes lugs, pot-stands, spindle whorl preforms made of body sherds that have not yet been drilled, griddle legs and unidentified appendages (table A3.14). Two complete vessels were found as well (<0.1%). A total of 752 sherds has red slipped surfaces (25.3%) and 36 sherds (1.2%) are decorated, most of the sherds by broad and shallow incision on red slip although two sherds have been decorated by small and narrow incision, of which one is a lug. Geometric modelling and pelican-head zoomorphic modelling, occurs as well (table A3.15). One sherd from the 1999 collection has orange/beige slipped surfaces. Most of the bases are flat (table A3.16) and most of the griddles are straight or legged, but for both categories the shape of most of the fragments could not be identified (table A3.17).

The morphological description of the 1999 pottery collection has been based on the analysis of 187 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (78.6%); (table A3.18). Dominant rim shapes are rounded (71.1%) and inward thickened (16.6%); (table A3.19). Most wall thicknesses are between 6-8 mm (34.2%), 9-11 mm (49.7%) and 12-16 mm (12.9%) and orifice diameters range mainly between 11-20 cm (18.2%), 21-30 cm (28.9%), 31-40 cm (13.4%), while 30.4% remains unidentified (tables A3.20-A3.21). Surface colours are predominantly reddish brown (33.7%), red (17.6%), dark gray-black (11.8%) and 10.7% could not be identified (table A3.22). Firing techniques include incomplete or relatively

	Number	Number %
Complete reduction	6	9.0
Incomplete oxidation or reduction	3	4.6
Incomplete or relatively good oxidation	57	86.4
Total	66	100.0

Table A3.11. Number and percentages of sherds within firing colour categories from the 1985 À l'Escalier collection.

	Number	Number %
Scratched	2	3.0
Smoothed	4	6.1
Lightly burnished	28	42.4
Highly burnished	21	31.8
Polished	4	6.1
Unidentified	7	10.6
Total	66	100.0

Table A3.12. Number and percentages of sherds within exterior surface finishing categories from the 1985 À l'Escalier collection.

	Number	Number %	Weight	Weight %
Rim	440	14.8	15,477	20.1
Body	2172	72.9	41,956	54.4
Base	151	5.1	7802	10.1
Griddle	197	6.6	8952	11.6
Appendage/other	18	0.6	2972	3.8
Total	2978	100.0	77,159	100.0

Table A3.13. Number, percentages and weight (g) of sherds from the 1999 À l'Escalier collection.

	Number	Number %
Lug	5	27.8
Pot-stand	3	16.7
Spindle whorls	3	16.7
Griddle leg	5	27.8
Unidentified appendage	2	11.0
Total	18	100.0

Table A3.14. Number and percentages of sherds within appendages/other categories from the 1999 À l'Escalier collection.

	Number	Number %
Incision	34	94.4
Modelling (geometric)	1	2.8
Modelled incised *appliqué* (zoomorphic)	1	2.8
Total	36	100.0

Table A3.15. Number and percentages of sherds with particular decoration modes in the 1999 À l'Escalier collection.

	Number	Number %
Flat	87	57.6
Convex	9	5.9
Concave	4	2.7
Pedestal/annular	5	3.3
Rounded	1	0.7
Unidentified	45	29.8
Total	151	100.0

Table A3.16. Number and percentages of sherds within base shape categories from the 1999 À l'Escalier collection.

	Number	Number %
Straight	21	10.7
Triangular	5	2.6
Overhanging	6	3.0
Rounded	3	1.5
Unthickened	4	2.0
Legged	30	15.2
Unidentified	128	65.0
Total	197	100.0

Table A3.17. Number and percentages of sherds within griddle shape categories from the 1999 À l'Escalier collection.

	Number	Number %
Jar with unrestricted simple contour	46	24.6
Bowl with unrestricted simple contour	65	34.7
Dish with unrestricted simple contour	36	19.3
Bowl with restricted simple contour	10	5.4
Bowl with unrestricted composite contour	6	3.2
Bowl with unrestricted inflected contour	11	5.9
Bowl with independent restricted inflected contour	1	0.5
Unidentified	12	6.4
Total	187	100.0

Table A3.18. Number and percentages of sherds within vessel shape categories from the 1999 À l'Escalier collection.

	Number	Number %
Rounded	133	71.1
Flattened	9	4.8
Inward thickened	31	16.6
Outward thickened	4	2.1
Unidentified	10	5.4
Total	187	100.0

Table A3.19. Number and percentages of sherds within rim shape categories from the 1999 À l'Escalier collection.

	Number	Number %
1-5 mm	6	3.2
6-8 mm	64	34.2
9-11 mm	93	49.7
12-16 mm	24	12.9
Total	187	100.0

Table A3.20. Number and percentages of sherds within wall thickness categories from the 1999 À l'Escalier collection.

	Number	Number %
1-10 cm	3	1.6
11-20 cm	34	18.2
21-30 cm	54	28.9
31-40 cm	25	13.4
41-50 cm	9	4.8
51-60 cm	5	2.7
Unidentified	57	30.4
Total	187	100.0

Table A3.21. Number and percentages of sherds within orifice diameter categories from the 1999 À l'Escalier collection.

	Number	Number %
Light gray	4	2.2
Gray	4	2.2
Pinkish gray	6	3.2
Dark gray-black	22	11.8
Brown-gray/gray-brown	1	0.5
Light brown-yellow	3	1.6
Light brown-gray	8	4.2
Dark brown/very dark brown	7	3.7
Reddish-gray/dark reddish-gray	16	8.6
Reddish brown	63	33.7
Red	33	17.6
Unidentified	20	10.7
Total	187	100.0

Table A3.22. Number and percentages of sherds within exterior surface colour categories from the 1999 À l'Escalier collection.

	Number	Number %
Complete reduction	25	13.4
Incomplete oxidation or reduction	22	11.8
Incomplete or relatively good oxidation	132	70.6
Unidentified	8	4.2
Total	187	100.0

Table A3.23. Number and percentages of sherds within firing colour categories from the 1999 À l'Escalier collection.

	Number	Number %
Crude	1	0.5
Scratched	1	0.5
Smoothed	5	2.8
Lightly burnished	21	11.2
Highly burnished	110	58.8
Polished	11	5.9
Unidentified	38	20.3
Total	187	100.0

Table A3.24. Number and percentages of sherds within exterior surface finishing categories from the 1999 À l'Escalier collection.

good oxidation (70.6%), complete reduction (13.4%), as well as incomplete oxidation or reduction (11.8%); (table A3.23). Surface finishing is predominantly characterised by burnishing (70.0%) and for 20.3% the surface finishing could not be identified (table A3.24). The ceramics found in level 4 of unit 2 are covered in particular by a heavy chalky layer.

The 1985 and 1999 pottery samples are quite comparable, although some differences occur as a result of typical biases related to surface collections. This is visible in the fact that the 1985 collection includes a higher percentage of rims and fragments belonging to the appendages/other category (although the types of appendages/other are quite similar) and decorated sherds. The percentages for slipped sherds are almost equal for the 1985 and 1999 collections. Decoration techniques are similar, although nubbins and finger indentation were only found in the 1985 sample. Percentages of flat bases are comparable for both collections, but in 1985 much more concave bases were collected while in 1999 a much larger percentage remains unidentified. Convex and rounded bases, although not very numerous, have been found in the 1999 sample. Percentages for unidentified griddles are comparably high for both collections. The 1985 collection has a slightly larger percentage of legged griddles. Overhanging, rounded and unthickened griddles were only found in the 1999 collection. Vessel shapes, rim shapes, wall thickness, orifice diameter, firing technique and surface finishing are quite comparable as well, although larger variations occur for the 1999 sample. The variety of surface colours, in particular, is much larger in the 1999 sample. Bowls with unrestricted inflected contours and bowls with independent restricted inflected contours, 1-5 mm wall thickness category, 1-10 cm and 50-60 cm orifice diameter categories, crude outer surfaces are absent from the 1985 sample. The latter, however, has slightly more scratched and smoothed outer surfaces.

3.1.3.2 Lithic artefacts

Bodu collected one possible polishing stone of unidentified layered fine-grained rock and one flake of an igneous rock pebble from the surface of the site in 1985.

Many more lithic artefacts were discovered in the 1999 test units (tables A3.25-A3.26). Most of them are igneous rock pieces. These include 62 pebbles (two flaked), 13 pebble fragments, one unidentified core-artefact fragment, 19 flakes (five from pebbles) and one pebble with an abraded side (passive grinding/abrading stone). They further consist of one pebble fragment with a slightly concave abraded face (passive grinding/abrading stone), five pebble fragments used as active abrading tools, one hammer-stone pebble and one hammer-stone pebble fragment with pits on one end, and one fragment, with an abraded face, which functioned either as a passive or an active grinding/abrading stone. A total of 52 unidentified and probably natural fragments has been collected as well but these are not considered artefacts. Flint flakes (six from Antigua, two from Long Island and one light-brown unidentified), one calcite crystal, one plutonic rock fragment with a flat abraded face (passive or active

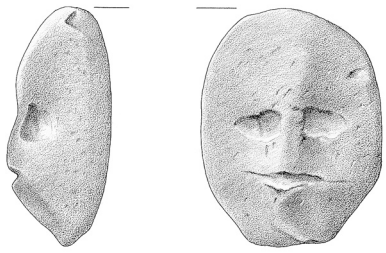


Fig. A3.5. Anthropomorphic head from À l'Escalier carved in beach-rock (unit 1, level 6, scale 1:3).

	Total
Igneous rock	105 86.8
Antigua flint (not Long Island)	4 3.3
Antigua flint (possibly Long Island)	2 1.7
Long Island flint	2 1.7
Unidentified flint	1 0.8
Calcite	1 0.8
Plutonic rock	1 0.8
St. Martin chert	1 0.8
Non-local white chert	1 0.8
Limestone	2 1.7
Beach-rock	1 0.8
Total	121 100.0

Table A3.25. Number and percentages of rock types found at À l'Escalier in 1999.

	Total
Pebble	60 49.6
Flaked pebble	2 1.7
Pebble fragment	14 11.5
Fragment of unidentified core artefact	2 1.7
Flake	29 23.9
Passive grinding-stone	2 1.7
Active abrading stone	6 4.9
Passive or active grinding/abrading stone	2 1.7
Hammer-stone	2 1.7
Adze	1 0.8
Carved anthropomorphic head	1 0.8
Total	121 100.0

Table A3.26. Number and percentages of lithic artefact types found at À l'Escalier in 1999.

grinding/abrading stone), one St. Martin chert adze fragment and one non-local white chert flake (possibly from Antigua) were found. Some limestone pieces were found, including one pebble fragment, one pebble with slight abrasion on one face (possible active grinding/abrading tool) and two natural fragments, together with two natural fragments of unidentified greenish rock with large minerals. The most beautiful lithic artefact is a 9 cm long anthropomorphic head (fig. A3.5) that has been carved out of beach-rock.

3.1.3.3 Shell artefacts

Ten shell artefacts were discovered in 1999 (table A3.27). Almost all the artefacts are of *Strombus gigas* and, despite their worked edges, many of them have indistinct functions. They include an axe preform, two possible *spatula* preforms (one broken), one possible *zemi* preform and two unidentified artefacts. In addition, two small polished discs (one possible earplug), an *Isognomon alatus* or *Pteria colymbus* inlay with an irregular perforation and one broken *Chama* sp. artefact with a perforation, possibly a bead, were found (fig. A3.6).

3.1.3.4 Coral artefacts

Many coral artefacts were collected in 1999 (table A3.28). These include 127 lightly or heavily used *Acropora cervicornis* rasp fragments, except for seven with a ground tip and two without use wear, and 45 heavily used *Acropora palmata* active or passive grinding tool fragments, except for one without use wear. One grinding tool fragment and six unidentified objects with worked edges from an unidentified coral species were found as well.

3.1.3.5 Shellfish remains

The main shellfish remains consisted of *Cittarium pica, Strombus gigas* and *Nerita* sp. (table A3.29). Other shell species represented in low numbers and weights at the site included *Acanthopleura granulata, Acmaea leucopleura*, *Ampulladoria* sp., *Arca zebra*, *Astraea* sp., *Bulimulus guadalupensis*, *Cerithium litteratum*, *Chama sarda*, *Charonia variegata*, *Chiton tuberculatus*, *Codakia orbicularis*, *Columbella mercatoria, Conus* sp., *Cymatium femorale*, *Cypraea* sp., *Fissurella nodosa*, *Hipponix antiquatus*, *Lima scabra, Linga pensylvanica*, *Lucina* sp., *Murex* sp., *Nodilittorina tuberculata*, *Pisiano pusio*, *Polia aritula*, *Polinices lacteus*, *Purpura patula*, *Tectarius muricatus*, *Tellina* sp., *Thais* sp., *Tonna maculosa*, and *Turbo* sp.[1]

Fig. A3.6. Two polished discs, an *Isognomon alatus* or *Pteria colymbus* inlay (c. 3 cm long) and a broken *Chama* sp. bead from À l'Escalier.

	Axe preform	Possible *spatula* preform	Possible bead	Inlay	Disc	Possible *zemi* preform	Unident.	Total
Strombus gigas	1 10.0	2 20.0			2 20.0	1 10.0	2 20.0	8 80.0
Isognomon alatus/ Pteria colymbus				1 10.0				1 10.0
Chama sp.			1 10.0					1 10.0
Total	1 10.0	2 20.0	1 10.0	1 10.0	2 20.0	1 10.0	2 20.0	10 100.0

Table A3.27. Number and percentages of shell species and artefact types from the 1999 À l'Escalier collection.

	Rasp fragment	Grinding tool fragment	Unidentified	Total
Acropora cervicornis	127			127
	70.9			70.9
Acropora palmata		45		45
		25.1		25.1
Unidentified		1	6	7
		0.6	3.4	4.0
Total	127	46	6	179
	70.9	25.7	3.4	100.0

Table A3.28. Number and percentages of coral species and artefact types from the 1999 À l'Escalier collection.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	275	57,494	13,265	70,759
	8.6	31.0	19.1	27.8
Cittarium pica	2129	122,603	53,760	176,363
	66.9	66.2	77.5	69.3
Nerita sp.	286	254	14	268
	9.0	0.1	< 0.1	0.1
Other	489	4840	2231	7096
	15.4	2.6	3.2	2.8
Unidentified	4	7	67	74
	0.1	< 0.1	0.1	< 0.1
Total	3183	185,198	69,337	254,560
	100.0	100.0	100.0	100.0

Table A3.29. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 À l'Escalier collection.

3.1.3.6 Animal remains

The faunal material studied from À l'Escalier is from a 2/5 inch sample (total MNI 220, total weight 1763 g) and a 1 mm sample (total MNI 127, total weight 384 g). MNI counts (excluding the intrusive species) of the 2/5 inch samples of the À l'Escalier (97110-001) site indicate that the sample consists of fish (50.8%), crab (40%), mammal (2.7%), reptile (2.3%), bird (1.8%) and sea urchin (1%). Most of the faunal remains represent terrestrial species (38.6%), including agouti, unidentified bird, iguana, land hermit crab, great land crab, black land crab and land crab. However, this high percentage is mainly derived from the high contribution of land hermit crab, of which it remains disputed whether it served dietary purposes. Without land hermit crab included the terrestrial component makes up 17.2% of the sample. Reef herbivores/omnivores (30.4%), including parrotfish, surgeonfish and triggerfish, are also important in the diet. Reef carnivores (16.2%), include shark, blackbar soldierfish, squirrelfish, grouper, big eye, jack, snapper, grunt and wrasse, and inshore species (11.1%) include sea turtle, needlefish, porgy, boxfish, porcupinefish, red rock urchin, common spider crab and coral crab. Very few remains are from offshore-pelagic species (0.5%), in this case barracuda. Unknown habitats (1.8%) are represented by unidentified fish and unidentified crab species (Nokkert in appendix 5).

MNI counts of the 1 mm samples from the À l'Escalier site suggest that the sample consists of fish (54.5%), crab (33.9%), sea urchin (3.9%), mammal (3.2%), reptile (2.4%) and bird (1.6%). Many faunal remains are

of terrestrial species (38.8%), including rice rat, agouti, unidentified bird, iguana, unidentified reptile, land hermit crab, great land crab, land crab and unidentified crab. Without including land hermit crab the terrestrial component makes up 24.6% of the sample. Reef herbivores/omnivores (22.8%) include parrotfish, surgeonfish and triggerfish. Reef carnivores (17.4%) include shark, squirrelfish, grouper, big eye, jack, snapper, grunt, Spanish hogfish and wrasse. Inshore species (17.4%) include sea turtle, herring, needlefish, porgy, goatfish, boxfish, red rock urchin, common spider crab and coral crab. Of the offshore-pelagic habitat species (1.6%) barracuda has been identified. Unknown habitat (1.6%) are represented by unidentified fish (Nokkert in appendix 5).

Comparison between the samples demonstrates that the samples produce a rather uniform image. Terrestrial species represent the same percentages (although when excluding land hermit crab from the sample, the 2/5 inch sample has a smaller terrestrial component), and the same species. The 1 mm sample has rice rat remains (1.6% of the total MNI in this sample) that are absent from the 2/5 inch sample. Reef herbivores/omnivores contribution is slightly smaller in the 1 mm sample but represents the same species. Reef carnivores are rather similar in both samples. The 1 mm sample has a slightly larger contribution by inshore and offshore-pelagic species, although the species represented are similar. Classes represented are rather similar as well, although sea urchin makes up a larger component in the 1 mm sample than it did in the 2/5 inch sample.

3.1.3.7 Human skeletal material

One small heavily weathered human skull fragment was excavated, which may be the result of displacement and redeposition of an eroded burial (Nokkert personal communication 2001).

3.1.4 Chronological assignment

Three unmodified *Cittarium pica* shell samples were obtained from the 1999 test units, from levels 5 (40-50 cm below the surface), 6 (50-60 cm below the surface) and 7 + 8 (60-80 cm below the surface) in test unit 2. They were sent to the Laboratory for Isotopic Research in Groningen (The Netherlands). The BP dates have been calibrated using CALIB 4.2 by M. Stuiver, P.J. Reimer and R. Reimer using the calibration curve for marine shell.[2] Calibrated radiocarbon dates with a 68.3% confidence level suggest that the site was at least occupied between cal. AD 1188-1243, between cal. AD 1091-1166, and between cal. AD 1049-1112 and at a 95.4% confidence level calibrated dates range between cal. AD 1165-1271, cal. AD 1062-1195 and cal. AD 1036-1155 (table A3.30).

On the basis of the pottery, site occupation was estimated around AD 1000. The pottery, which is cruder than the Anse à la Gourde ceramics or those from Anse Petite Rivière, is Late Ceramic A (Early Suazan Troumassoid style). It possibly reflects a local development.[3] Influences from both the southern as well as the northern islands are represented in the ceramic sample. Southern, *i.e.* Suazan Troumassoid style influences are visible on the griddles, of which a few are legged, while the inward thickened rims demonstrate Mamoran Troumassoid style influences known from the northern Lesser Antilles. No rim modifications have been found and incisions are not extraordinarily broad.

3.2 ANSE DES GALETS (97110-002; SC11)

3.2.1 Site location and preservation

The Anse des Galets site (x: 703,900; y: 1803,400) was documented and surveyed by Pierre Bodu (1985[c]) using information of the La Désirade gendarmes and the site was restudied in 1999. It is situated at the edge of the ravine south of Pointe Frégule (fig. 5.2). Site dimensions are 200 m from east to west and 50-75 m from north to south. The archaeological material on the surface consists of a modest and even distribution of heavily fragmented ceramics and

Sample ID	Provenance (unit, level)	Material	BP date	Cal. AD 2σ (95.4%)	Cal. AD 1σ (68.3%)
GrN-26814	Unit 2, level 5	*Cittarium pica*	1205 ± 25	1165-1271	1188-1243
GrN-26815	Unit 2, level 6	*Cittarium pica*	1275 ± 25	1062-1195	1091-1166
GrN-26816	Unit 2, level 7+8	*Cittarium pica*	1315 ± 25	1036-1155	1049-1112

Table A3.30. À l'Escalier radiocarbon dates.

shell, including *Cittarium pica*, *Strombus gigas* and *Charonia variegata*. Some ceramic off-site material was found south of the site. Rather large trees, mainly *flamboyant* trees, with little undergrowth, cover 10-30 percent of the soil, which consists of loose, fine, well-drained loamy sand. Surface visibility is very good. The site, which is on a sloping terrain, owned by Mrs. Maston (Les Galets), near the coast, has been destroyed almost completely as a result of slope erosion and bulldozer-activities. The quantity and quality of surface material described by Bodu was not matched at all by the 1999 surface collections and the test unit demonstrated that most of the archaeological layer has actually disappeared.

3.2.2 Test units and stratigraphy

One 2 x 2 m unit was excavated in the central part of the site (fig. A3.7). It showed that the archaeological layer had almost completely disappeared and very small fragments without a clear context were found. The northwest corner of unit 1 was located at 703844.716; 1803652.929; 21.08 (Guadeloupe - Ste. Anne system) or 16°18′9.1321″; -61°5′46.0048″; -22.13 (WGS84).

3.2.3 Archaeological materials

The archaeological material described includes the 1985 and 1999 surface collections as well as material from the 1999 test unit.

3.2.3.1 Pottery

The 1985 and 1999 collections turned out to be quite comparable. Bodu collected 106 sherds in 1985, mostly body sherds (89.6%), weighing 1116 g (table A3.31). The collection contains hardly any diagnostic material at all. No fragments belonging to the appendages/other category were found. Eight sherds have red slipped surfaces (7.6%)

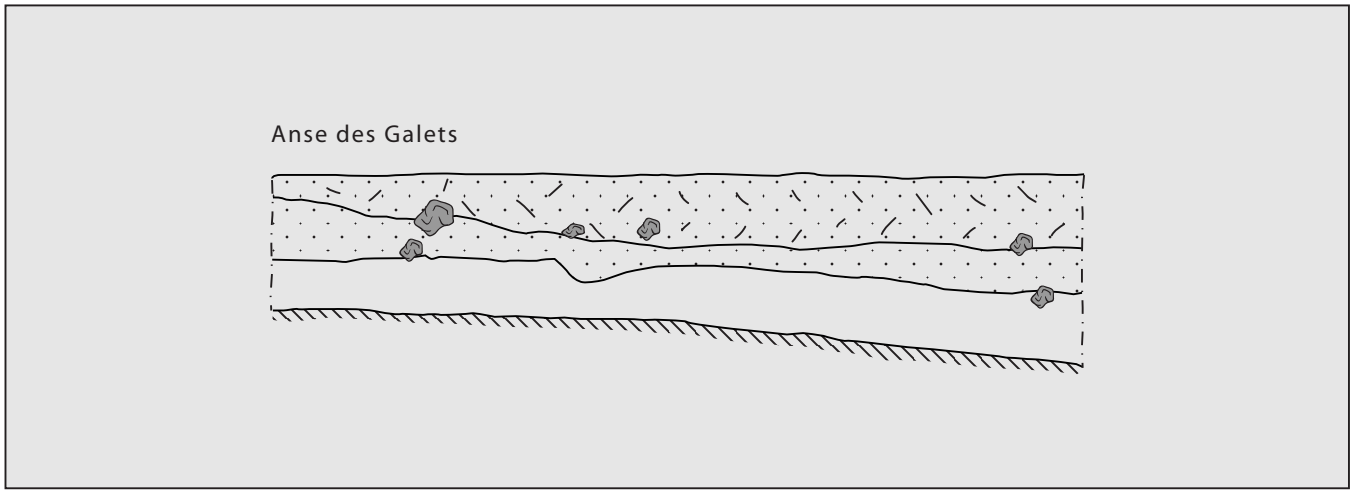


Fig. A3.7. Anse des Galets, unit 1 (2 x 2 m), north section.

and three sherds (2.8%) are decorated by incision. Griddle fragments are straight (33.3%) or unidentified (66.7%). As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided.

In 1999, 19 heavily weathered sherds could be collected, mostly body sherds (84.2%), weighing 159 g (table A3.32). No fragments belonging to the appendages/other category were found. Six sherds have red slipped surfaces (31.6%) and one sherd (5.3%) was decorated by a narrow double incision on red slip. Griddles are straight and legged. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided.

3.2.3.2 Lithic artefacts

Bodu collected 14 lithic artefacts from the surface of the site in 1985 (table A3.33). These include one local red chert shatter piece and one possible St. Martin chert fragment. Igneous rock artefacts consist of one pebble fragment used as a hammer-stone, two pebbles, six pebble fragments, one flaked pebble fragment, one flake and one unidentified fragment.

In 1999, one lithic artefact was collected. This is an edge-bit of a coarse igneous rock axe. Both sides show pecking traces and the pits on the broken face suggest that it has been re-used as a hammer-stone. A total of 217 local igneous rock pebbles was found as well, but these probably have a natural occurrence at the site, which is not called Anse des Galets for nothing!

3.2.3.3 Coral artefacts

One unidentified artefact of an unidentified coral species was found.

3.2.3.4 Shellfish remains

The main shellfish remains, collected in 1999, consisted of *Strombus gigas* and *Cittarium pica* (table A3.34). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata*, *Astraea* sp., *Bulimulus guadalupensis*, *Diadora dysoni*, and *Nerita* sp.[4]

	Number	Number %	Weight	Weight %
Rim	8	7.6	98	8.8
Body	95	89.6	916	82.1
Base	0	0.0	0	0.0
Griddle	3	2.8	102	9.1
Appendage/other	0	0.0	0	0.0
Total	106	100.0	1116	100.0

Table A3.31. Number, percentages and weight (g) of sherds from the 1985 Anse des Galets collection.

	Number	Number %	Weight	Weight %
Rim	1	5.3	14	8.8
Body	16	84.2	90	56.6
Base	0	0.0	0	0.0
Griddle	2	10.5	55	34.6
Appendage/other	0	0.0	0	0.0
Total	19	100.0	159	100.0

Table A3.32. Number, percentages and weight (g) of sherds from the 1999 Anse des Galets collection.

3.2.3.5 Animal remains
The 2/5 inch sample (MNI 2, 3 g) of Anse des Galets consists of black land crab and other crab remains (Nokkert in appendix 5).

3.2.4 Chronological assignment
The site yielded Late Ceramic A pottery, dated around AD 1000-1200.

3.3 GROTTE DE GRANDE ANSE (97110-006; SC33)

3.3.1 Site location and preservation
Bodu surveyed the Grotte de Grande Anse site (x: 706,000; y: 1803,900) in 1984 on the basis of information provided by Jacques Zamia, and it was restudied in 1999. The site is located in the capital of La Désirade, in a very small cave, on the slope of a hill, with its entrance facing south (fig. 5.2). Bodu reported a 20 m^2 site area, but as construction works next to the site caused the collapsing of part of it, the dimensions of the cave were estimated at 1.5 m from north to south and 4 m from west to east during the 1999 survey. Although some ceramic fragments were found, the archaeological deposit appears to be very superficial and almost no off-site material was found. No surface collection was made in 1999. The soil in and just outside the cave consists of loose, coarse, moderately well-drained sand with stones. Vegetation surrounding the site includes cultivated plants, such as banana-trees. Groundcover percentage by vegetation and constructions outside the cave is high,

	Shatter piece	Hammer stone	Pebble	Pebble fragment	Flaked pebble fragment	Flake	Unidentified	Total
Local red chert	1 7.1							1 7.1
Local igneous rock		1 7.1	2 14.3	6 43.0	1 7.1	1 7.1	1 7.1	12 85.8
St. Martin chert							1 7.1	1 7.1
Total	1 7.1	1 7.1	2 14.3	6 43.0	1 7.1	1 7.1	2 14.3	14 100.0

Table A3.33. Number and percentages of rock types and lithic artefact types collected at the Anse des Galets surface in 1985.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	0 0.0	0 0.0	62 11.8	62 5.4
Cittarium pica	11 12.1	564 89.7	410 77.9	974 84.3
Other	80 87.9	65 10.3	50 9.5	115 9.9
Unidentified	0 0.0	0 0.0	4 0.8	4 0.4
Total	91 100.0	629 100.0	526 100.0	1155 100.0

Table A3.34. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Anse des Galets collection.

81-100 percent, and surface visibility is not very good. Bodu already reported the site, which has been in use as hen house for a long time, to be heavily disturbed. Nowadays, the site is almost completely destroyed as a result of the construction of a house and the road on top of the cave. Mrs. L. Nilor, owner of the site, lives there. No test units were excavated.

3.3.2 Archaeological materials

The material described was collected by Bodu in 1985. It includes some pottery and one lithic artefact, which is a fine-grained local volcanic rock pebble fragment with localised areas with pits on both faces. It may have been used as hammering or anvil stone. Merely 10 sherds were collected, weighing 190 g, including two rims smaller than 5 cm and eight body sherds. No fragments belonging to the appendages/other category were found. One sherd (0.1%) had a red slipped surface and no sherds were decorated. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided for the ceramics of this site.

3.3.3 Chronological assignment

The pottery found at the site is Late Ceramic A (unidentified style).

3.4 GROTTE LE BAIGNEUX (97110-007; SC34)

3.4.1 Site location and preservation

Although Bodu reported the Grotte le Baigneux site (x: 706,100; y: 1803,900) in 1984 on the basis of information received from the owner, Mr. M. Baigneux (Grande Anse), who found two volcanic stone axes (one of which is an eared axe) and one *Strombus gigas* axe, it was not surveyed prior to 1999. The site, which is a cave site, is situated on a steep slope running from the plateau to the southern coastal plain (fig. 5.2). Site dimensions are 6.5 m from south-west to north-east and 6 m from north-west to north-east. A very

	Pebble	Pebble fragment	Flaked piece	Hammer-stone	Grinding-stone	Core artefact	Total
Local igneous rock	1 14.3	2 28.5	1 14.3	1 14.3	1 14.3	1 14.3	7 100.0
Total	1 14.3	2 28.5	1 14.3	1 14.3	1 14.3	1 14.3	7 100.0

Table A3.35. Number and percentages of rock types and lithic artefact types collected at the Grotte le Baigneux surface in 1999.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	1 25.0	60 49.2	0 0.0	60 49.2
Cittarium pica	1 25.0	36 29.5	0 0.0	36 29.5
Codakia orbicularis	1 25.0	12 9.8	0 0.0	12 9.8
Purpura patula	1 25.0	14 11.5	0 0.0	14 11.5
Total	4 100.0	122 100.0	0 0.0	122 100.0

Table A3.36. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all the shell species from the 1999 Grotte le Baigneux collection.

small amount of pre-Columbian archaeological material was found within the cave, consisting almost exclusively of some lithic and coral artefacts. Some fragments of *Cittarium pica* and *Strombus gigas* were observed as well. Almost no off-site material was found. Thorny brushwood with acacia covers 21-40 percent of the soil surrounding the site, which consists of coarse, moderately well drained sand with many stones. Surface visibility is good. No test units were excavated as the site, which is presently used for goat pasturing, is badly disturbed.

3.4.2 Archaeological materials

Although reported by Bodu, the axes collected by Mr. Baigneux were not available for study and they have not been included in this description. The material described consists of the 1999 surface collection.

3.4.2.1 Lithic artefacts

The lithic artefacts include seven igneous rock pieces (table A3.35). Inside the cave, two artefacts were collected. One is a pebble fragment with an area of localised pits that possibly functioned as hammer-stone. The other is a pebble fragment with one slightly abraded smooth face, which was possibly used as active or passive abrading/grinding-stone. Near the entrance of the cave, one pebble fragment with pits on one end, one incomplete possibly flaked piece, two pebbles without use wear and one unidentified fragment of a core-artefact were collected as well.

3.4.2.2 Coral artefacts

One heavily used *Acropora palmata* passive grinding tool fragment was collected in 1999.

3.4.2.3 Shellfish remains

The amount of shell collected in 1999 is very limited. It includes *Strombus gigas*, *Cittarium pica*, *Codakia orbicularis* and *Purpura patula* (table A3.36). All shell could be identified.

3.4.3 Chronological assignment

As no pottery was collected, no chronological assignment could be made for the site.

3.5 COCOYER (97110-008; SC15, SC15A, SC15B)

3.5.1 Site location and preservation

The Cocoyer site (x: 711,625; y: 1808,000) was reported and surveyed by Bodu in 1985 and restudied in 1999. It is situated very close to a steep slope at the north-eastern part of the central plateau of La Désirade (fig. 5.2). Site dimensions are 120 m from east to west and 100 m from north to south. High dense grass covers 61-80 percent of the soil, which consists of compact, fine, moderately well drained sandy clay. Surface visibility is very bad. The find distribution on the surface is rather patchy and consists of moderately fragmented ceramics and large amounts of *Cittarium pica* and *Strombus gigas*. A lot of griddle fragments were found in the eastern part of the site during a revisit of the site in July 2000. Approximately 20 m north of the Cocoyer site, another small concentration (SC15a) of archaeological material was discovered, consisting exclusively of heavily fragmented and heavily eroded pottery sherds and *Cittarium pica* fragments. It is situated strategically on a flat terrain right next to the edge of the north cliff. The dimensions of this concentration are 10 m from east to west and 10 m from north to south. The concentration appears to be disturbed as a result of erosion. Approximately 30 m south of the Cocoyer site, another patchy surface concentration consisting of sherds and fragments of *Cittarium pica* and *Charonia variegata* was discovered (SC15b). It is situated on a flat terrain near a strategic location and it measures 40 m east to west and 40 m north to south. This concentration is badly disturbed as a result of cultivation in the past. It is deemed that these concentrations are special activity areas that belong to the Cocoyer site. A very limited amount of ceramic off-site material was found north-east of the site. The site appears to have been partly destroyed as a result of erosion of the terrain, which is claimed by Mr. René Berchel (Baie Mahault), and of cultivation of parts of it. Bodu reported that the site was so heavily disturbed that excavations were not necessary. During the 1999 and 2000 campaigns, the site did not appear too seriously disturbed and more extensive excavation is recommended as a result of the interesting site location.

3.5.2 Test units and stratigraphy

One single 1 m^2 unit was excavated in a small concentration of surface material (fig. A3.8). However, it is possible that the location was not well chosen, as at this spot the archaeological layer appeared to have been almost completely eroded. The sub-surface situation may be better for other parts of the site. The northwest corner of unit 1 was located at 711647.491; 1807994.245; 172.88 (Guadeloupe - Ste. Anne system) or 16°20′27.9218″; -61°1′21.7936″; 129.09 (WGS84).

3.5.3 Archaeological materials

The material described includes the 1984, 1999 and 2000 surface collections as well as material from the 1999 test unit.

3.5.3.1 Pottery

The pottery sample consists of material collected by Bodu in 1984 and material collected in 1999 and 2000. The Bodu sample includes 142 heavily fragmented and weathered sherds, mostly body sherds (85.9%), weighing 1688 g (table A3.37). No fragments belonging to the appendage/other category, nor sherds with red slipped or decorated surfaces were found. Three unidentified base fragments were found, together with a rounded and unthickened griddle fragment.

The morphological description of the pottery collected by Bodu was based on the analysis of two rims larger than 5 cm. These belong to a jar and a bowl with unrestricted simple contours and both of the rims are rounded. Wall thicknesses range between 9-11 mm and one orifice diameter is between 11-20 cm while the other could not be identified. Both of the rims are reddish brown and the firing technique for both of them consists of incomplete or relatively good oxidation. One rim appears to have been irregularly fired. Surface finishing of both rims is unidentified.

The pottery collected in 1999 and 2000 includes 56 heavily weathered sherds, mostly from rims (41.1%) and body sherds (42.9%), weighing 652 g (table A3.38). One fragment (1.7%), a griddle leg, belonging to the appendages/other category was found. A total of 11 sherds has red slipped surfaces (19.6%) and three sherds (5.4%) are decorated by incision and punctation (table A3.39). Griddle rims are triangular (25%), legged (50%) or unidentified (25%).

The morphological description of the pottery collected in 1999 and 2000 was also based on the analysis of just two rims larger than 5 cm. These are both from bowls with unrestricted simple contours. Rim shapes are rounded and inward thickened. Wall thicknesses range between 6-8 mm and one orifice diameter is between 11-20 cm and one is unidentified. Surface colours are dark brown/very dark brown, incomplete or relatively good oxidation is the firing technique and surface finishing is unidentified.

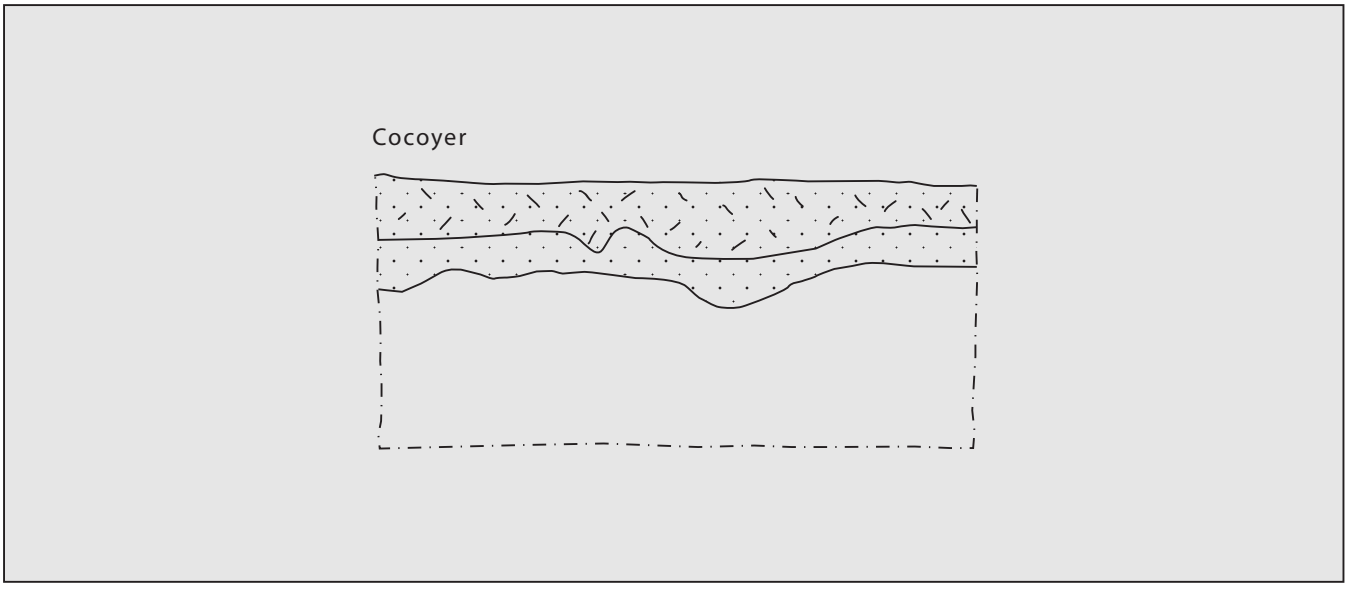


Fig. A3.8. Cocoyer, unit 1 (1 m^2), west section.

The 1984 and 1999-2000 collections are rather similar, although the first is larger and contains fewer rims and fewer griddle fragments (and different griddle rim shapes) but more base fragments. Remarkably, red slipped or decorated surfaces were not found, although these do occur in the 1999/2000 sample. Rims larger than 5 cm from both collections are very similar, although the 1984 rims are thinner and the surface colours are different.

3.5.3.2 Lithic artefacts

Five local volcanic rock artefacts were collected during the 1999 and 2000 surveys. These include two rock pebble hammer-stone fragments with possible traces of hammering activities, two pebble fragments, possibly used as passive abrading/grinding-stones (*metates*) and one flake core.

3.5.3.3 Shell artefacts

One nicely finished *Strombus gigas* axe fragment was collected in 2000.

3.5.4 Chronological assignment

The site yielded Late Ceramic A pottery, dated around AD 1000-1200.

	Number	Number %	Weight	Weight %
Rim	15	10.6	184	10.9
Body	122	85.9	1340	79.4
Base	3	2.1	118	7.0
Griddle	2	1.4	46	2.7
Appendage/other	0	0.0	0	0.0
Total	142	100.0	1688	100.0

Table A3.37. Number, percentages and weight (g) of sherds from the 1984 Cocoyer collection.

	Number	Number %	Weight	Weight %
Rim	23	41.1	174	26.7
Body	24	42.9	164	25.2
Base	0	0.0	0	0.0
Griddle	8	14.3	260	39.9
Appendage/other	1	1.7	54	8.2
Total	56	100.0	652	100.0

Table A3.38. Number, percentages and weight (g) of sherds collected at Cocoyer in 1999 and 2000.

	Number	Number %
Incision	2	66.7
Punctation	1	33.3
Total	3	100.0

Table A3.39. Number and percentages of sherds with particular decoration modes collected at Cocoyer in 1999 and 2000.

3.6 LES SABLES (97110-010; SC24)

3.6.1 Site location and preservation

The Les Sables site (x: 705,350; y: 1803,550) was discovered and excavated by Bodu in 1984 and restudied in 1999. The site is situated somewhat inland behind the Les Sables beach (fig. 5.2). Although Bodu estimated the site surface at 350 m^2 in 1984, site dimensions were estimated at 150 m from north to south and 150 m from west to east in 1999. The site terrain has several owners, among whom Mr. Jacques Loquet and the owner of the *Chez Addy* shop at Les Sables. Houses, cultivated plants, coastal grassland and a coastal strip of sea grape cover 41-60 percent of the soil, which consists of loose, medium structured, moderately well drained sand. Surface visibility is very good, particularly in the garden plots. The surface concentration consists of an even distribution of moderately fragmented ceramics and shell, such as *Cittarium pica*, *Strombus gigas*, *Codakia orbicularis*, *Chiton* sp. and *Nerita* sp. Shell artefacts occur in surface collections of local inhabitants. These include several *Strombus gigas* axes and adzes and some large shell beads were found as well. These finds have not been included in the present site description. No concentrations could be identified in the surface distribution. However, the south part of the site appears to have the densest concentration of material, while towards the north of the site, the material becomes less abundant. A lot of ceramic and shell off-site material was found. Most of it is in the area between the Aéroport site (97110-033) and the Les Sables site and north-west of the site in particular. Parts of the site have been seriously destroyed by coastal erosion in the southern part of the site and by the construction of houses and of the *Route Départementale* in the northern part. Cultivation of garden plots and collection of artefacts from the surface further endangers the preservation of the site.

3.6.2 Test units and stratigraphy

Bodu excavated one 4 m^2 unit (A1) and two 1 m^2 units (A2 and A3). Unit A2 contained a hearth feature, with charcoal, and burned *Cittarium pica* and other faunal remains, crab in particular.

Unit A1 (After Bodu 1985[b]):

0 to 20 cm: Loose, grayish brown sand, which had probably been perturbed by crab activity and cultivation. This layer contained abundant archaeological material, including pottery and lithic artefacts.

20 cm to 40 cm: More compact grayish brown sand, containing more and larger sherds, lithic artefacts and faunal remains.

40 cm to 50 cm: Lower part of the more compact grayish brown sandy layer, containing less pottery.

50 cm to 60 cm: Lowest part of the more compact grayish brown sandy layer, without archaeological material.

>60 cm depth: Sterile beach sand, without archaeological material. Bedrock was not reached.

3.6.3 Archaeological materials

The material described here includes material collected in 1985. The lithic artefacts include two pieces that were collected during the 1999 survey.

3.6.3.1 Pottery

A total of 2292 sherds was collected, mostly body sherds (69.9%), weighing 48376 g (table A3.40). The appendages/other category represents 5.8% of the sample. This includes a lot of handles, lugs and unidentified appendages and some pot-stands, griddle legs, *adornos* (fig. A3.9), *appliqués* and spouts (table A3.41). A total of 473 sherds has slipped surfaces (20.6%), of which six are black, two are beige and all the other fragments are red slipped, and 160 sherds have decorated surfaces (7.0%). Most of the sherds are decorated by incision (68.8%), of which one is on a base fragment, but white-on-red and polychrome painting, zoned-incised crosshatching, geometric modelling, zoomorphic and anthropomorphic modelled incised *appliqués*, punctation and nubbins occur as well (fig. A3.10). One polychrome sherd has also been decorated by incision. Polychrome painting is characterised by red with beige and white, white on gray, white on light grayish-brown, red and beige and red and orange painted surfaces. Several handles are decorated by geometric modelling (in some cases combined with lugs), modelled-incised-anthropomorphic decorations, nubbins and lugs (table A3.42). Four fragments of boat-shaped vessels were found (0.2%). Most of the bases are flat or concave and convex, pedestal/annular and unidentified bases occur as well (table A3.43). Most of the griddles remain unidentified, but straight, unthickened, overhanging, rounded and triangular griddle rims were found as well (table A3.44).

The morphological description of the pottery has been based on the analysis of 172 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (67.5%) and bowls with restricted simple contours (10.5%), while 7.6% could not be identified (table A3.45; fig. A3.11). Dominant rim shapes are rounded (34.9%), outward thickened (33.7%), and flanged (14.5%); (table A3.46). Wall thicknesses range between 6-8 mm (47.7%) and 9-11 mm (40.7%), although some very thin (1-5 mm) and thick (12-15 mm) pottery occurs as well (table A3.47).

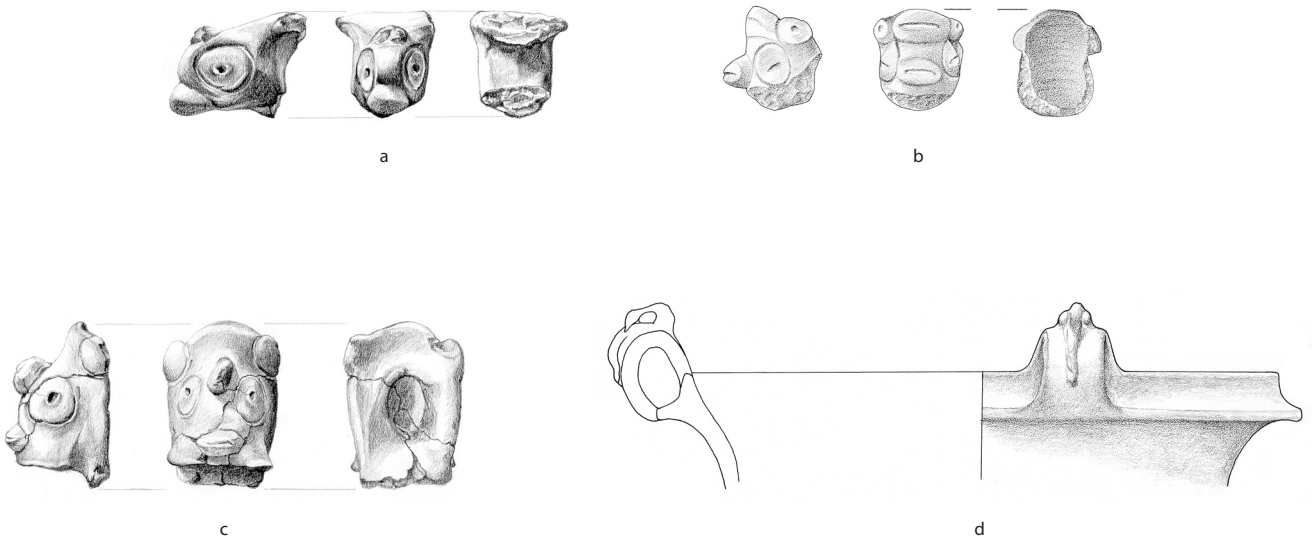


Fig. A3.9. Zoomorphic *adornos* from Les Sables, scale 1:3 (a-c: surface; d: unit A1, 20-40 cm).

	Number	Number %	Weight	Weight %
Rim	385	16.8	10,169	21.0
Body	1602	69.9	26,247	54.3
Base	68	3.0	2377	4.9
Griddle	104	4.5	4807	9.9
Appendage/other	133	5.8	4776	9.9
Total	2292	100.0	48,376	100.0

Table A3.40. Number, percentages and weight (g) of sherds from the 1985 Les Sables collection.

	Number	Number %
Handle	56	42.1
Lug	26	19.5
Pot-stand	3	2.3
Griddle leg	6	4.5
Adorno	6	4.5
Appliqué	1	0.8
Spout	2	1.5
Unidentified appendage	33	24.8
Total	133	100.0

Table A3.41. Number and percentages of sherds within appendages/other categories from the 1985 Les Sables collection.

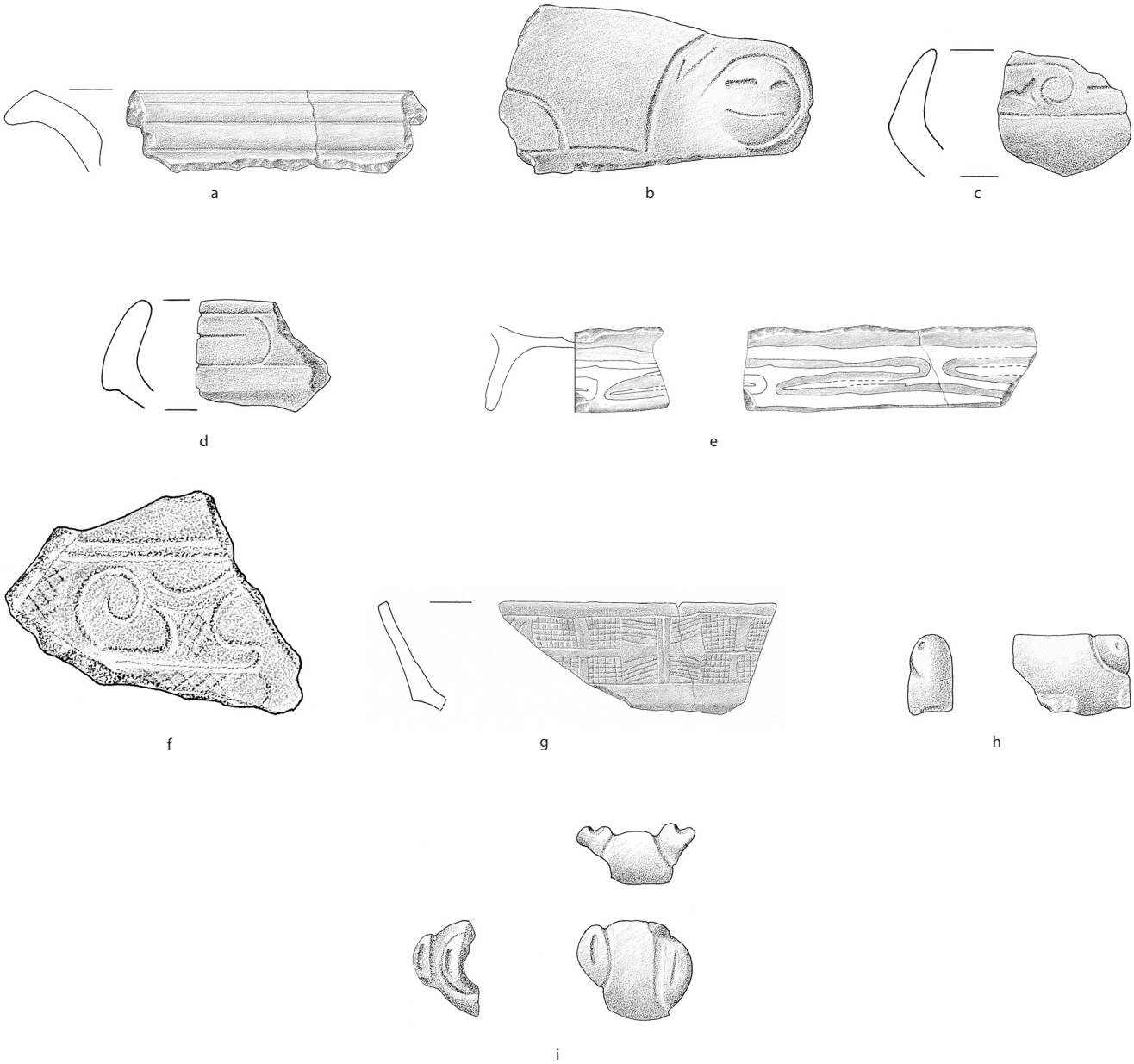


Fig. A3.10. Ceramics from Les Sables decorated by incision (a: surface, scale 1:3; b: unit A3, 0-20 cm, scale 1:2; c-d: surface, scale 1:2), red on white painting (e: unit A1, 20-40, scale 1:4), zoned-incised-crosshatching (f: surface, scale 1:1; g: unit A1, level 20-40, scale 1:3) and by nubbins (h: unit A1, 20-40 cm, scale 1:2; i: surface, scale 1:2).

	Number	Number %
White-on-red painting	9	5.6
Polychrome painting	15	9.4
Zoned-incised crosshatching	4	2.5
Incision	110	68.8
Modelling (geometric)	5	3.1
Modelled incised *appliqué* (zoomorphic)	5	3.1
Modelled incised *appliqué* (anthropomorphic)	4	2.5
Punctation	1	0.6
Nubbins	7	4.4
Total	160	100.0

Table A3.42. Number and percentages of sherds with particular decoration modes from the 1985 Les Sables collection.

	Number	Number %
Flat	34	50.0
Convex	1	1.5
Concave	19	27.9
Pedestal/annular	6	8.8
Unidentified	8	11.8
Total	68	100.0

Table A3.43. Number and percentages of sherds within base shape categories from the 1985 Les Sables collection.

	Number	Number %
Straight	16	15.4
Triangular	2	1.9
Overhanging	6	5.8
Rounded	4	3.8
Unthickened	8	7.7
Unidentified	68	65.4
Total	104	100.0

Table A3.44. Number and percentages of sherds within griddle shape categories from the 1985 Les Sables collection.

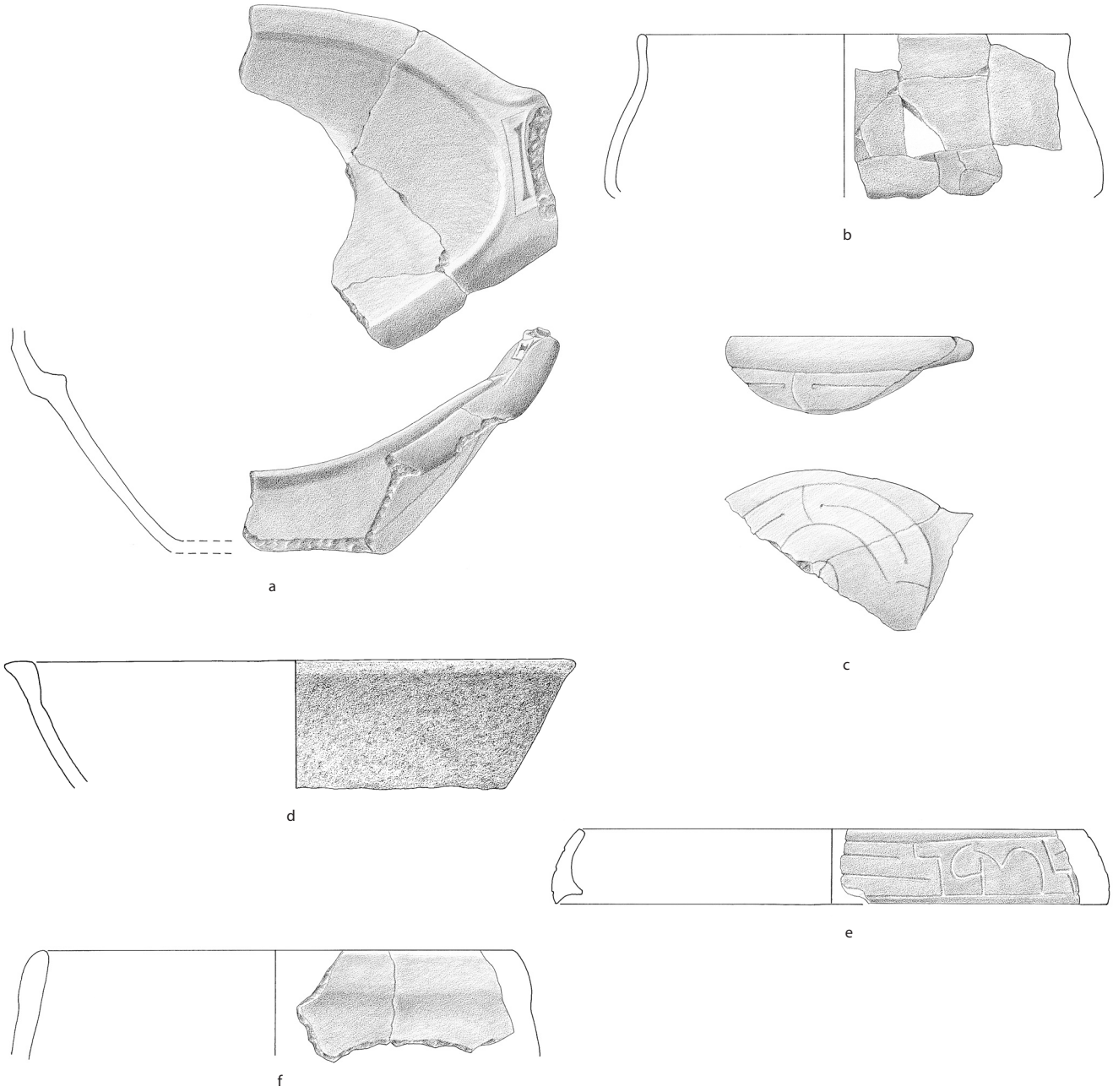


Fig. A3.11. Les Sables vessel shapes, scale 1:3 (a-d: unit A1, 20-40 cm; e: unit A1, 0-20 cm; f: surface).

	Number	Number %
Jar with unrestricted simple contour	39	22.7
Bowl with unrestricted simple contour	45	26.2
Dish with unrestricted simple contour	32	18.6
Bowl with restricted simple contour	18	10.5
Bowl with unrestricted composite contour	5	2.9
Jar with restricted composite contour	3	1.7
Bowl with unrestricted inflected contour	4	2.3
Jar with independent restricted inflected contour	7	4.1
Bowl with independent restricted inflected contour	3	1.7
Bowl with independent restricted complex contour	3	1.7
Unidentified	13	7.6
Total	172	100.0

Table A3.45. Number and percentages of sherds within vessel shape categories from the 1985 Les Sables collection.

	Number	Number %
Rounded	60	34.9
Flattened	6	3.5
Inward thickened	10	5.8
Outward thickened	58	33.7
Double thickened	7	4.1
Inwardly bevelled	1	0.6
Outwardly bevelled	1	0.6
Flanged	25	14.5
Unidentified	4	2.3
Total	172	100.0

Table A3.46. Number and percentages of sherds within rim shape categories from the 1985 Les Sables collection.

	Number	Number %
1-5 mm	3	1.7
6-8 mm	82	47.7
9-11 mm	70	40.7
12-15 mm	17	9.9
Total	172	100.0

Table A3.47. Number and percentages of sherds within wall thickness categories from the 1985 Les Sables collection.

	Number	Number %
1-10 cm	3	1.7
11-20 cm	29	16.9
21-30 cm	52	30.2
31-40 cm	23	13.4
41-50 cm	11	6.4
51-60 cm	3	1.7
Unidentified	51	29.7
Total	172	100.0

Table A3.48. Number and percentages of sherds within orifice diameter categories from the 1985 Les Sables collection.

	Number	Number %
Gray	1	0.6
Dark gray-black	5	2.9
Dark grayish-brown	1	0.6
Light brown-yellow	5	2.9
Light brown/brown	1	0.6
Dark brown/very dark brown	19	11.0
Reddish-gray/dark reddish-gray	6	3.5
Reddish brown	74	43.0
Red	50	29.1
Unidentified	10	5.8
Total	172	100.0

Table A3.49. Number and percentages of sherds within exterior surface colour categories from the 1985 Les Sables collection.

	Number	Number %
Complete reduction	10	5.8
Incomplete oxidation or reduction	19	11.0
Incomplete oxidation	2	1.2
Complete oxidation	10	5.8
Incomplete or relatively good oxidation	129	75.0
Unidentified	2	1.2
Total	172	100.0

Table A3.50. Number and percentages of sherds within firing colour categories from the 1985 Les Sables collection.

	Number	Number %
Smoothed	5	2.9
Lightly burnished	20	11.6
Highly burnished	67	39.0
Polished	43	25.0
Unidentified	37	21.5
Total	172	100.0

Table A3.51. Number and percentages of sherds within exterior surface finishing categories from the 1985 Les Sables collection.

A large range of orifice diameters has been identified. Most of them are between 21-30 cm (30.2%), 11-20 cm (16.9%) and 31-40 cm (13.4%); (table A3.48). Small and very large vessels occur in minor percentages, and a great part of the sample (29.7%) could not be identified. Surface colours are predominantly reddish brown (43.0%), red (29.1%) and dark brown/very dark brown (11.0%); (table A3.49). Firing techniques include mainly incomplete or relatively good oxidation (75.0%), of which one rim was irregularly fired, and incomplete oxidation or reduction (11.0%); (table A3.50). Surface finishing is predominantly characterised by burnishing (50.6%) and polishing (25.0%) and 21.5% could not be identified (table A3.51).

3.6.3.2 Lithic artefacts

Bodu collected several local igneous rock artefacts from the surface of the Les Sables site in 1985 (tables A3.52-A3.53). These consist of one round pitted hammer-stone with use-wear all over, showing negatives and which may have been used as a core as well and one fragment of a passive grinding/abrading stone, with one very concave face. A pebble and a fragment with one face with traces of abrasion, which may have been used as an active or a passive grinding/abrading stone, and one possible upper part of an axe were found as well. Both sides show traces of non-pronounced pitting and both faces are relatively smooth and appear to be slightly polished. Bodu also collected one Long Island flint flake, one patinated Long Island flint blade fragment with use retouch on one edge. The latter is probably a pre-ceramic artefact that has been re-used; it has one edge that is not patinated which probably resulted from use at the Les Sables site.

The 1985 test units yielded a lot of igneous rock artefacts, including pebbles or pebble fragments used as polishing stones (eight), active grinding/abrading stones (one), passive grinding/abrading stones (seven) and hammer-stones (three) and five pebble fragments without use-wear, five pebble flakes, four fragments and 25 pebbles. Flakes and shatter pieces are Long Island flint (three, one of which exhibits use retouch), possibly local dark green/dark gray bedded chert (one), red chert (one), slightly translucent Antigua chert (one), unidentified white flint/chert (one) and St. Martin chert (one pebble with negatives at both ends). The latter looks like an old axe fragment that has been re-used, possibly as a hammer-stone, as one of the ends looks blunt. One possible limestone fragment, with a clearly abraded face and which was probably used as a passive grinding/abrading stone, one unidentified pebble, with strange veins and inclusions, and two unidentified rock fragments, and one very small, possibly re-used, edge flake of fine-grained unidentified green-stone, were collected as well.

During the 1999 surface survey of the Les Sables site, one unidentified piece of local igneous rock without clear traces of use and one fragment of a local igneous rock active abrading stone were collected. The latter has been shaped into a flat rectangular piece, and both faces exhibit traces of use and shaping.

3.6.3.3 Animal remains

MNI counts show that, excluding the intrusive species, the Les Sables hand-collected sample (total MNI 32, total weight 583 g) includes crab (40.7%), fish (34.3%), reptiles (15.6%), mammal (3.1%) and bird (3.1%). The sample has a terrestrial component (46.9%) that consists of great land crab, land crab, unidentified mammal and unidentified bird remains. Several reef carnivores (18.7%) have been found, such as squirrelfish, grouper, jack and snapper, as well as inshore species (18.7%) including sea turtle and porcupinefish. Reef herbivores/omnivores (6.2%) are represented by parrotfish

	Total
Local igneous rock	63 80.7
Long Island flint	5 6.4
Possibly local dark green/gray bedded chert	1 1.3
Local red chert	1 1.3
Possible Antigua chert	1 1.3
Unidentified white flint/chert	1 1.3
St. Martin chert	1 1.3
Limestone	1 1.3
Unidentified	4 5.1
Total	78 100.0

Table A3.52. Number and percentages of rock types from the 1985 Les Sables collection.

	Total
Hammer-stone (or fragment)	5 6.4
Pebble	27 34.5
Pebble fragment	5 6.4
Possible upper part of axe	1 1.3
Flake	12 15.4
Blade	1 1.3
Polishing stone	8 10.3
Passive grinding-stone (or fragment)	10 12.8
Active grinding-stone	1 1.3
Shatter piece	2 2.6
Unidentified fragment	6 7.7
Total	78 100.0

Table A3.53. Number and percentages of lithic artefact types from the 1985 Les Sables collection.

and tuna/mackerel represents offshore-pelagic fish (6.3%). Great land crab remains represent the greatest part of the terrestrial remains and most of the inshore remains are turtle fragments. The large number of turtle fragments (almost half of the sample in weight) can be explained through collection biases resulting from the emphasis on larger fragments when hand-collecting (Nokkert in appendix 5).

3.6.4 Chronological assignment

The site yielded Early Ceramic B pottery. Although two sherds decorated with very fine Huecan-Saladoid style zoned-incised-crosshatching were found, the style of most of the pottery collected is modified Saladoid, which tentatively dates the site around AD 300-500. Even some later influences were found, for example in a pelican-head zoomorphic decoration.

3.7 MORNE DE BAIE MAHAULT (97110-011; SC32)

3.7.1 Site location and preservation

The Morne de Baie Mahault site (x: 712,900; y: 1806,700) was discovered and surveyed by Bodu in 1984 and restudied in 1999. It is situated on a small hill, near the small harbour of Baie Mahault, which provides an easy landing place for canoes. The road leading to the lighthouse borders the site in the north and the southern part of the site ends on a small rocky platform near the coast (fig. 5.2). Site dimensions are 125 m from east to west and 50 m from north to south. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Bodu found stone

artefacts atop of the hill and on the slight slopes that lead to the road in the north and to the sea in the south. In 1999, the surface distribution appeared to be patchy, including lithic artefacts such as pebbles, flakes, flake cores, hammer-stones and shatter pieces of local igneous rock, local chert and possible Long Island flint. Some weathered shell fragments, including *Cittarium pica* and *Strombus gigas*, and coral fragments were observed as well but they were not collected. The biggest part of the site is on a slightly sloping terrain (1-5%). Limited amounts of lithic off-site material have been found all over the southern coast, leading from the Morne Baie Mahault site (97110-011) towards the Pointe Doublé site (97110-014) at the easternmost part of the island. Coastal grassland covers 0-20 percent of the soil, which consists of loose, fine, well-drained clayey sand. Surface visibility is very good. The site appears to be slightly affected by erosion, as it is situated atop and on the sides of a small hill that is virtually unprotected by vegetation.

3.7.2 Archaeological materials

The material described consists of the 1984 and 1999 lithic artefact surface collections.

In 1985, 175 artefacts were found. These have been analysed by Bodu (1984) and include eight percussion instruments, 37 cores, 11 refuse fragments, 108 flakes, six tools and five other artefacts, such as non-worked pebbles (that do not naturally occur at the site), grinding-stones and an amethyst bead. Raw materials used include locally available volcanic rocks, radiolite being most commonly used, although an Antigua origin for one of the flakes is suggested. According to Bodu, the tools have been manufactured through very primitive direct hard percussion, in a non-organised production process. The quality of the raw material is not very good either. Very few of the artefacts show any evidence of retouch and production characteristics are comparable to the Pointe Doublé site, although the Morne de Baie Mahault site is slightly richer. Bodu suggests that the sites have been exploited to a similar degree.

The 1999 surface collection includes igneous rock pieces such as one flake, one pebble with pits at one end and the top of both sides and two hammer-stone pebbles with pits on the sides, of which one has a scar from flake removal (table A3.54). One flake and three shatter pieces of dark gray/black chert of a probable local origin were collected. This chert has not been identified at other sites on Guadeloupe, although it does occur frequently on La Désirade sites. Red chert fragments, including five flakes, one shatter piece and one flake core, and one possible Long Island flint flake used as a core were found as well. It should be remarked that only one large igneous rock class has been identified, which includes a large variety of rock types. Finer analysis requires specialist thin section research. The variety that was found appears to correspond to igneous rock varieties that are naturally available on La Désirade.

3.7.3 Chronological assignment

The chronological assignment for the site is largely unidentified, as neither ceramics nor ^{14}C samples could be collected for analysis. Bodu suggested that the inhabitants of the Anse Petite Rivière site exploited Morne de Baie Mahault. It is safer to assume that the site has been exploited on a very small scale from time to time by people living at different sites on La Désirade, and maybe even on Guadeloupe, in pre-Columbian times. For the lithic exploitation sites in general,

	Pebble	Flake	Flake core	Hammer-stone	Shatter piece	Total
Local igneous rock	1 6.3	1 6.3		2 12.4		4 25.0
Possible Long Island flint		1 6.3				1 6.3
Local dark gray-black chert		1 6.3			3 18.7	4 25.0
Local red chert		5 31.1	1 6.3		1 6.3	7 43.7
Total	1 6.3	8 50.0	1 6.3	2 12.4	4 25.0	16 100.0

Table A3.54. Number and percentages of rock types and lithic artefact types collected at the Morne de Baie Mahault surface in 1999.

it can be remarked that no real blades have been found. This suggests that the sites are ceramic, as no pre-ceramic sites have been revealed with similar material. However, the possibility cannot be excluded that this exploitation started already in the pre-ceramic period. Pre-ceramic sites have not been discovered at all in the research area. In the archaeological Edgar Clerc Museum, however, this site is actually presented as a pre-ceramic site, on the basis of the lack of pottery on the surface.

3.8 MORNE CYBÈLE-1 (97110-012; SC16)

3.8.1 Site location and preservation

The Morne Cybèle-1 site (x: 710,500; y: 1806,100) is situated on a heavily eroded gently sloping terrain, west of an antenna installation on the southern border of the plateau (fig. 5.2). Local inhabitants already knew the site before it was surveyed and excavated by Bodu (1985[c]) and by Hofman and Hoogland (1994). The site has not been restudied in 1999, as very little of it has been preserved and sufficient reports exist. According to Bodu the site measured approximately 200-300 m^2; in 1999 site dimensions were estimated at 35 m east-west and 25 m north-south. Bodu reported that pre-Columbian material extended from the border of the plateau to 20 m inland. An important concentration of material was found in a 4 x 1 m cavity in the southern part of the site, situated 3 m from the border of the plateau. An area with cavities in the western part of the site yielded a lot of archaeological material as well. According to Bodu the distribution of archaeological material does not reflect actual activity areas or special places, but loss and erosion of artefacts instead, and therefore spatial analysis of the site was not possible. Today, archaeological material, which consists almost exclusively of very small pottery fragments, is found only in bedrock cavities. Ceramic off-site material has been found directly north-west of the site, in the area leading to the sandy road on the plateau. Hardly any vegetation at all covers the soil, which consists of loose dark brown sand. At the borders of the site is dense shrub present. Surface visibility is very good. Most of the Morne Cybèle-1 site appears to have been destroyed. This can be attributed to the construction of the antenna installation, which also resulted in the discovery of the site, and Bodu excavated most of what was left (Hofman and Hoogland 1994). The site, which was cultivated in the past, according to Bodu, is threatened nowadays by its shallowness, by erosion and by goat trampling. Local inhabitants have been making surface collections, and some of these have been donated to the archaeological Edgar Clerc Museum.

3.8.2 Test units and stratigraphy

Bodu excavated 18 4 x 4 m units in 1984 and 1985. Hofman and Hoogland (1994) excavated one 1 m^2 test unit and a 50 x 50 cm unit. The two latter units revealed one layer of loose dark brown (7.5YR;3/3 or 3/2) sand with a very small quantity of ceramics and shell. Bedrock was reached at 30 cm depth.

3.8.3 Archaeological materials

It is not clear to what extent the surface material was indicative for the sub-surface situation in 1984 and 1985. In 1994, however, the surface material suggested richer sub-surface deposits. The pottery collected at the surface and excavated in 1984, 1985 and 1994 was analysed by Hofman and Hoogland (1994). Lithic artefacts were collected and analysed by Bodu.

3.8.3.1 Pottery

A total of 2347 sherds of Morne Cybèle style ceramics, made of finely tempered clays, was found (24,000 g). Part of the sample is decorated (3.5%), mostly by modelling although punctation and incision occur as well. Several *adornos* were found, representing animals, humans and part of human bodies. Six clay discs were discovered, as were two fragments of spindle-whorls. A total of 62 base fragments was discovered as well as 32 griddle fragments (1.3%). Vessel shapes include simple bowls. Lip shapes are often rounded and several have been decorated. Wall thicknesses range between 4-12 mm, with an average of 6.7 mm and vessel diameters range between 6-42 cm, with an average of 23.7 cm. Surfaces are lightly or highly burnished and hardly ever polished (Hofman 1995).

3.8.3.2 Lithic artefacts

Bodu reported a very small number of lithic artefacts, including polishing stone fragments, pebbles and local radiolite and andesite flakes and cores, of which the raw materials can be found at the eastern part of the island.

3.8.3.3 Shell artefacts

Père Guilbert discovered a *Strombus gigas* 'mask' on the surface of the site. This object, which represents a flat human face with a decorated headband, has been stored in the permanent exhibit of the archaeological Edgar Clerc Museum. The mask has been referred to as Taíno style (e.g. Bodu 1985[a]); (see section 4.2.4 for comments). Although other shell masks have been found in the region, for example on the Anse du Coq site on Marie-Galante (Hoogland and Hofman 1999) on the Rendezvous Bay and Sandy Hill sites on Anguilla (Crock 2000; Crock and Petersen 1999), the decoration of the Morne Cybèle-1 mask is unique

(*cf*. section 5.5.1). The artefact has been drilled and it can be used as a large pendant.

3.8.3.4 Shellfish remains

The excavations of 1984, 1985 and 1994 yielded approximately 900 shells. These included more than 800 *Cittarium pica*, eight *Strombus gigas*, and 70 other species, including *Charonia variegata* and *Cypraea* sp. According to Bodu it is possible that as a result of the problematic access to the site, *Strombus gigas* was exploited near the coast and that the meat was transported to the site. *Cittarium pica*, however, was transported to the site.

3.8.4 Chronological assignment

The site was used during the Late Ceramic B. Calibrated radiocarbon dates, from a *Cittarium pica* sample, with a 95.4% confidence level suggest that the site was used around AD 1440-1480. The pottery has been referred to as Morne Cybèle style (Hofman 1995[a]).

3.9 MORNE CYBÈLE-2 (97110-012; SC17)

3.9.1 Site location and preservation

The Morne Cybèle-2 site (x: 710,500; y: 1806,100) is located to the east of and very close to the Morne Cybèle-1 site (fig. 5.2).[5] The site was discovered in 1983 by Bodu (1985[c]) who excavated it in 1984, followed by Hofman and Hoogland (1994). The site was not restudied in 1999, as very little of it has been preserved and sufficient reports exist. According to Bodu the site area measures approximately 150 m^2, but in 1999 site dimensions were estimated at approximately 20 m east-west and 20 m north-south. Most of the material was found in bedrock cavities. Ceramic off-site material has been found directly north-west of the site, in the area leading to the sandy road on the plateau. Shrub lightly covers the soil, which consists of loose dark brown sand. Surface visibility is good. Building activities and erosion seriously destroyed the site.

3.9.2 Test units and stratigraphy

Hofman and Hoogland (1994) excavated one 1 m^2 test unit and two 50 x 50 cm units. The units revealed one layer of loose dark brown (7.5YR; 3/2) sand. Bedrock is reached at depths ranging from 11 to 18 cm. The 1 m^2 unit yielded archaeological material including ceramics and shell in 10-20 cm deep natural bedrock depressions. The other units did not yield any archaeological material at all (Hofman and Hoogland 1994).

3.9.3 Archaeological materials

It is not clear to what extent the surface material was indicative for the sub-surface situation in 1984 and 1985. In 1994, however, the surface material appeared to be quite indicative for the sub-surface deposits. The material described includes the surface collection as well as material from the test units of the 1994 fieldwork and it consists of pottery and shellfish remains. A total of 43 Late Ceramic A (Suazan Troumassoid style) sherds was collected, amounting to 1190 g. No base fragments and no griddle fragments were collected. Decoration includes broad shallow incision. Simple vessel shapes and unmodified lip shapes are dominant in the sample. Diameters range between 20 and 42 cm and wall thicknesses range between 8 and 14 mm. Surfaces are poorly finished and some are scratched (Hofman and Hoogland 1994). Bodu found 300 g of shell, and 2180 g of shells were collected in 1994. These include *Cittarium pica*, *Purpura patula, Chiton* sp. and *Nerita* sp. Bodu found one stone bead as well.

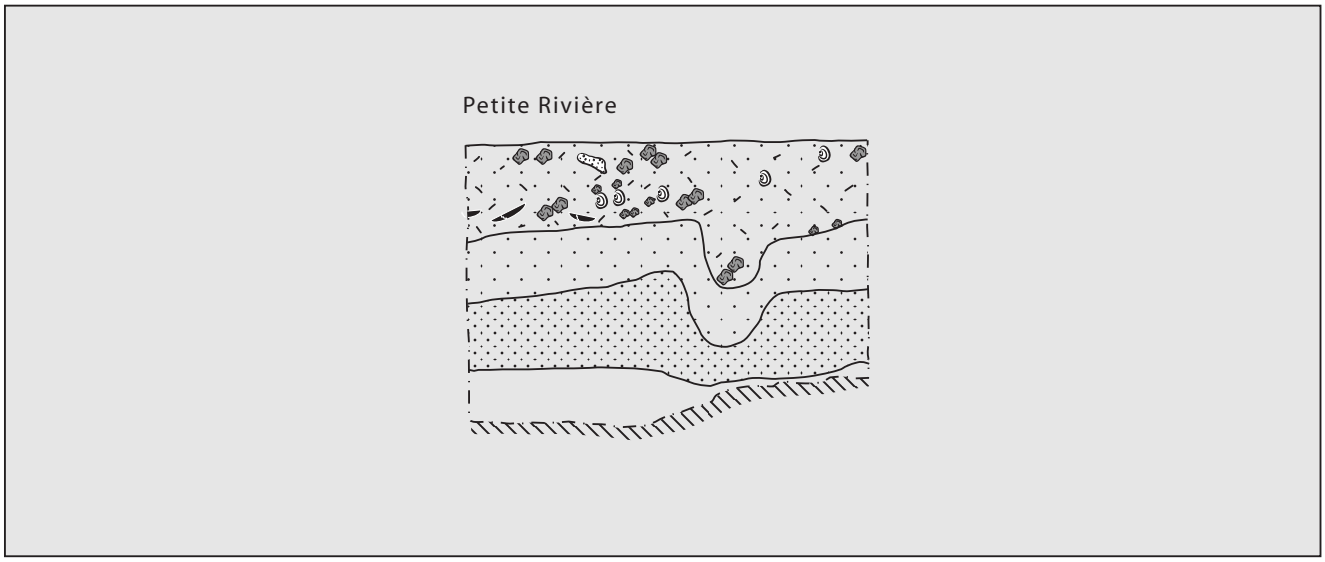
3.9.4 Chronological assignment

The pottery collected at the site is Late Ceramic A and it was labelled Suazan Troumassoid style. A *Cittarium pica* sample from unit 3 (GrN-20876) yielded a date of cal. AD 1230-1326 (Hofman and Hoogland 1994).

3.10 ANSE PETITE RIVIÈRE (97110-013; SC25)

3.10.1 Site location and preservation

The Anse Petite Rivière site (x: 711,800; y: 1806,500) is situated on the southern coastal plain near the Petite Rivière bay in Baie Mahault (fig. 5.2). It was discovered by Barbotin and Clerc in 1950, visited by Petitjean-Roget (1983) and excavated by Bodu in 1984 and De Waal (1996[a-b]) in 1995. The site was not restudied in 1999, as sufficient documentation exists. At the northern end, the Route Départementale borders the site and at the southern end the beach and the sea enclose it. Site dimensions are approximately 400 m from west to east and 160 m from north to south. The site is characterised by an extended concentration of ceramics and shell and lithic, shell and coral artefacts. Very limited amounts of ceramic off-site material have been found. Low grass and some shrub areas cover the soil that consists of compact, heavy reddish-brown clay. Surface visibility is very good for most parts of the site. Significant parts of the site, such as the refuse area and the burial area, have been almost completely destroyed by bulldozing activities that preceded the construction of the two restaurants that are nowadays situated on the Petite Rivière beach. Agricultural



0 to 10-20 cm: Compact dry, dark reddish brown (5YR;3/2) clay with a lot of archaeological material.

10-20 to 15-25 cm: Very compact, dark reddish brown (2.5YR;3/3) clay with a small artefact concentration.

15-25 to 30 cm: Very compact, weak red (2.5YR;4/2) clay without archaeological material.

30 to 35 cm: Very compact, weak red (2.5YR;4/2) clay with chalk nodules from the bedrock, without archaeological material.

> 35 cm: Compact, pinkish grey (5YR;8/2), chalky bedrock.

Pottery

Rock

Cittarium pica

Coral

Fig. A3.12. Anse Petite Rivière, unit 1 (50 x 50 cm), south section.

activities and the construction of houses have been causing damage to the northern part of the site, which is owned by the local Lalanne family. The southern 80 m, which has the densest surface distribution, is state property. Erosion and illegal collection of artefacts further threaten what is left of the site (De Waal 1996[b]).

3.10.2 Test units and stratigraphy

Bodu excavated 11 units measuring 2 x 2 m in the densest midden area of the site in 1984 (1985[c]). Except for photographs, these units have not been documented in detail. In 1995, a Leiden University team excavated 13 units measuring 50 x 50 cm (De Waal 1996[b]); (fig. A3.12).

3.10.3 Archaeological materials

The archaeological material collected at Anse Petite Rivière includes surface collections as well as material from the 1984 and 1995 test units. These were analysed and presented by De Waal (1996[b]). The surface material appeared to be quite indicative for the sub-surface situation, as for quantities and

different categories of material excavated. In 1996, however, the surface situation was less representative than in 1984, as a result of ongoing perturbation of the site.

3.10.3.1 Pottery

A total of 8940 sherds was analysed, mostly body sherds (74.1%), together amounting to a weight of 220,210 g (table A3.55). The appendages/other category represents 1.0% of the sample. This includes handles, lugs, pot-stands, spindle whorls, griddle legs, a spout, a body stamp, an *appliqué*, clay discs and unidentified appendages (table A3.56; fig. A3.13). Part of the pottery (1.4%) has been decorated by polychrome painting, zone-incised-crosshatching, incision, geometric modelling, zoomorphic and anthropomorphic modelled incised decoration, punctation, finger indentation and side lugs (table A3.57; fig. A3.14-A3.15). Most of the base shapes are flat or unidentified (table A3.58), and the griddle shapes are mostly straight, triangular or unidentified (table A3.59).

The morphological description of the pottery has been based on the analysis of 735 rims larger than 5 cm (De Waal 1996[b]:66-101). These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (70.3%); (table A3.60; fig. A3.16). Dominant rim shapes are rounded (64.9%) and inward thickened (14.8%); (table A3.61). Wall thicknesses range mainly between 6-8 mm (40.5%) and 9-11 mm (39.2%) and most orifice diameters range between 21-30 cm (27.6%), 31-40 cm (19.5%), 1-10 cm (16.1%), 11-20 cm (14.3%) and 41-50 cm (12.9%); (tables A3.62-A3.63). Surface colours are predominantly red (29.2%), reddish brown (27.1%) and dark brown/very dark brown (17.1%); (table A3.64). Firing

	Number	Number %	Weight	Weight %
Rim	1368	15.2	48,457	22.0
Body	6623	74.1	124,004	56.3
Base	435	4.9	22,636	10.3
Griddle	429	4.8	19,842	9.0
Appendage/other	85	1.0	5271	2.4
Total	8940	100.0	220,210	100.0

Table A3.55. Number, percentages and weight (g) of sherds from Anse Petite Rivière.

	Number	Number %
Handle	7	8.2
Lug	20	23.5
Pot-stand	30	35.3
Spindle whorl	4	4.7
Griddle leg	4	4.7
Spout	1	1.2
Body stamp	1	1.2
Appliqué	1	1.2
Clay disc	11	12.9
Unident. appendage	6	7.1
Total	85	100.0

Table A3.56. Number and percentages of sherds within appendages/other categories from Anse Petite Rivière.

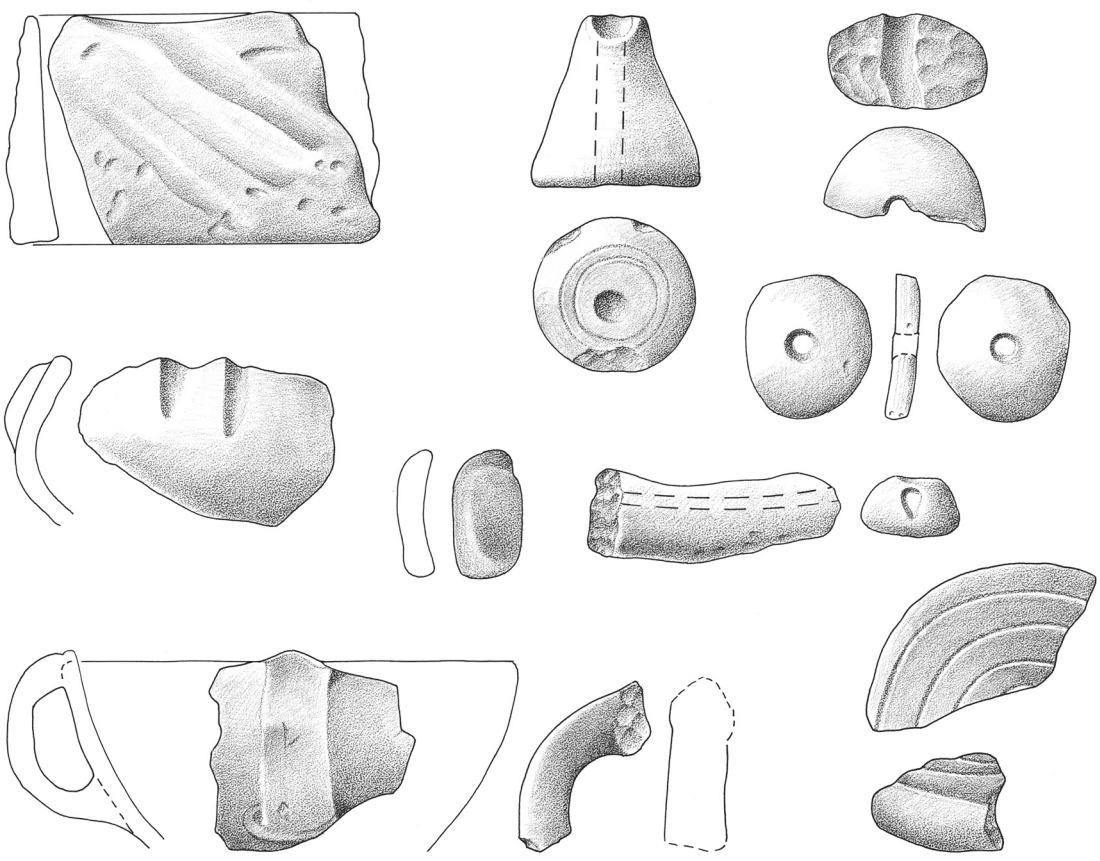


Fig. A3.13. Ceramic pot-stand, spindle whorls, *appliqué*, clay disc, spout, handles and body stamp from Anse Petite Rivière (scale 1:3).

	Number	Number %
Polychrome painting	17	13.3
Zoned-incised crosshatching	1	0.8
Incision	95	74.2
Modelling (geometric)	6	4.6
Modelled incised *appliqué* (anthropomorphic)	1	0.8
Modelled incised *appliqué* (zoomorphic)	3	2.3
Punctation	2	1.6
Finger indentation	1	0.8
Site lug	2	1.6
Total	128	100.0

Table A3.57. Number and percentages of sherds with particular Anse Petite Rivière decoration modes.

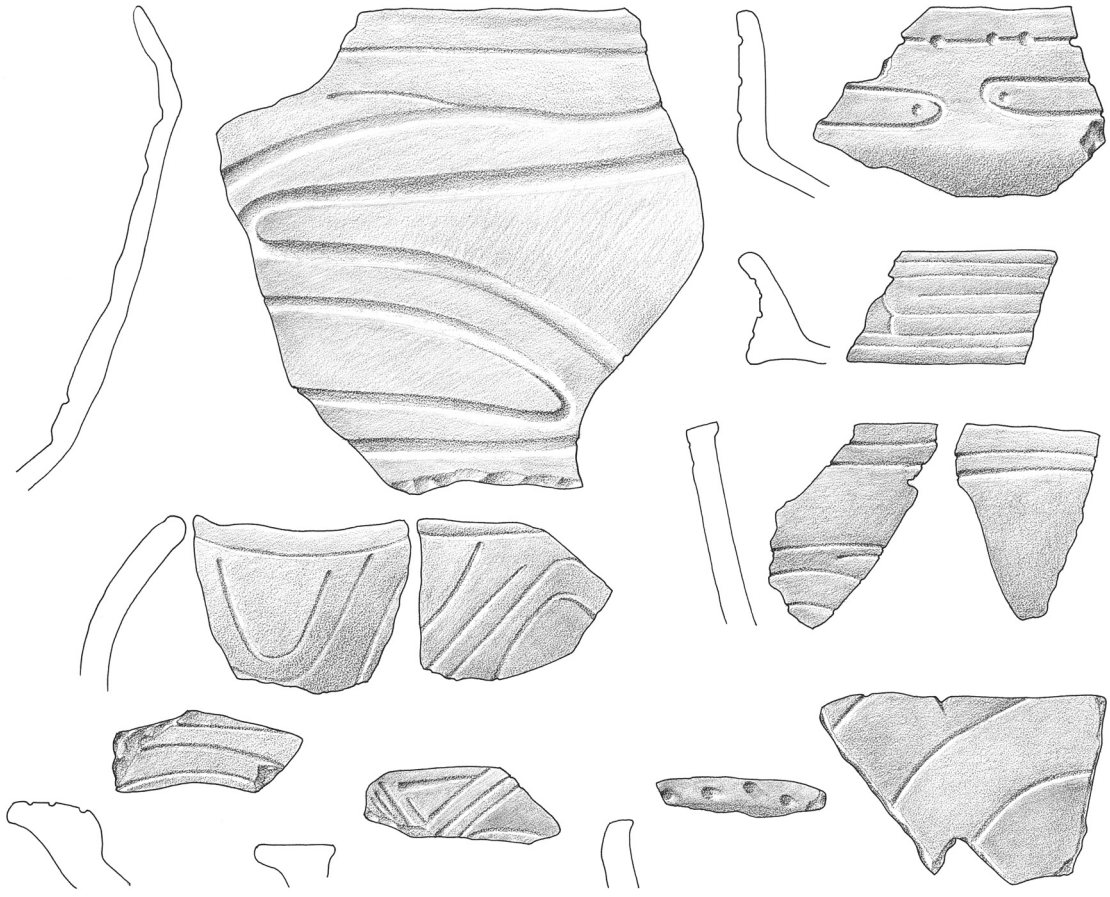


Fig. A3.14. Anse Petite Rivière pottery decorated by broad shallow incision, narrow incision and punctation (scale 1:4; top left scale 1:6).

	Number	Number %
Flat	300	69.0
Convex	14	3.2
Concave	10	2.3
Concave high	7	1.6
Pedestal/annular	2	0.5
Unidentified	102	23.4
Total	435	100.0

Table A3.58. Number and percentages of sherds within base shape categories Anse Petite Rivière.

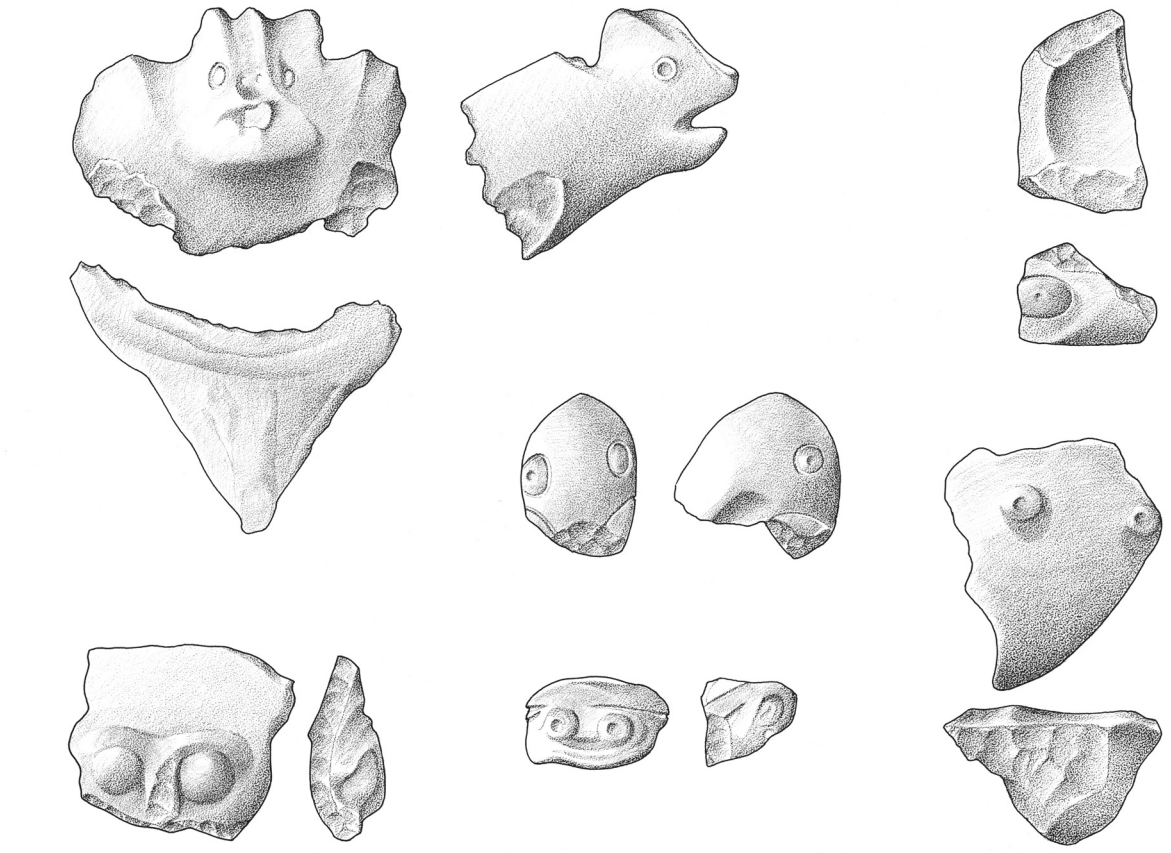


Fig. A3.15. Ceramic zoomorphic and anthropomorphic representations from Anse Petite Rivière (scale 1:4; top left scale 1:6).

	Number	Number %
Straight	69	16.1
Triangular	74	17.3
Overhanging	10	2.3
Rounded	4	0.9
Unthickened	2	0.5
Legged	25	5.8
Unidentified	245	57.1
Total	429	100.0

Table A3.59. Number and percentages of sherds within griddle shape categories from Anse Petite Rivière.

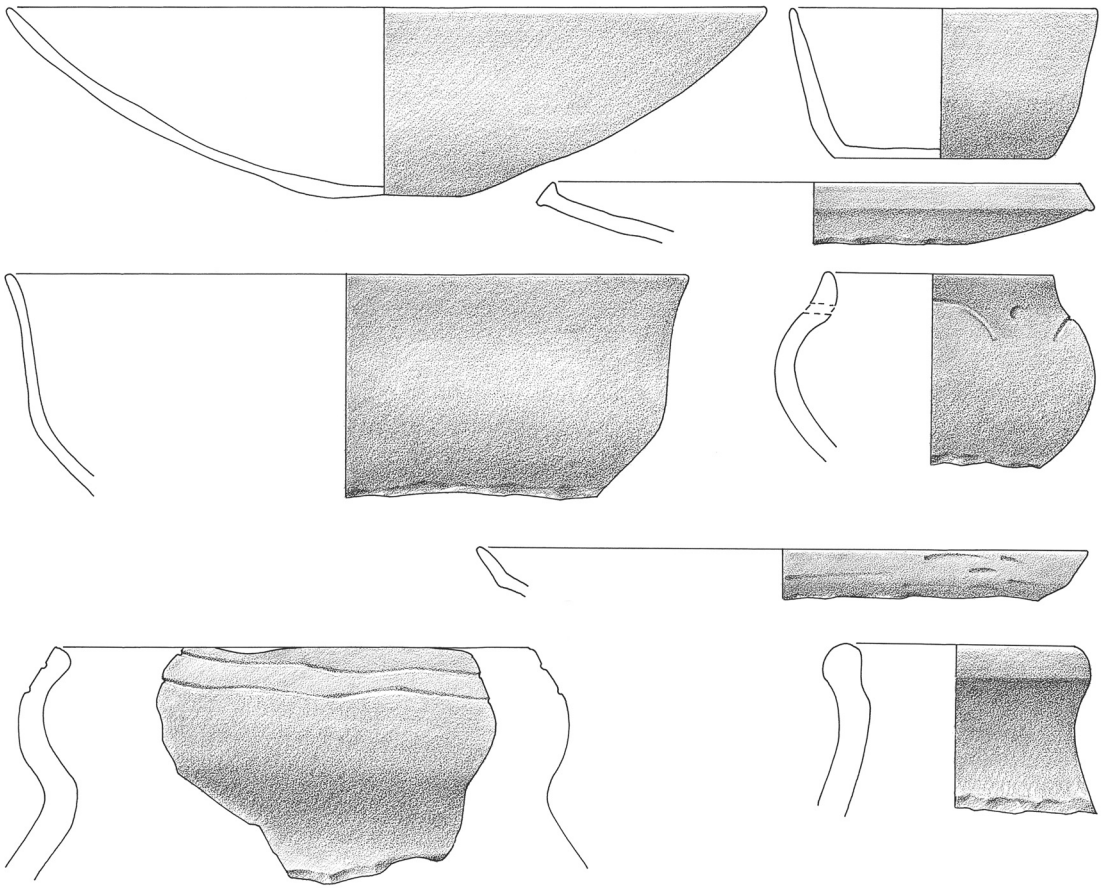


Fig. A3.16. Anse Petite Rivière vessel shapes (scale 1:6; second, third and fifth on the right scale 1:4).

	Number	Number %
Jar with unrestricted simple contour	121	16.5
Bowl with unrestricted simple contour	265	36.1
Dish with unrestricted simple contour	130	17.7
Bowl with restricted simple contour	78	10.6
Dish or bowl with unrestricted composite contour	38	5.2
Jar with unrestricted composite contour	5	0.7
Bowl with unrestricted inflected contour	14	1.9
Bowl or jar with restricted composite contour	5	0.7
Bowl/jar, independent restricted inflected contour	2	0.2
Unidentified	77	10.4
Total	735	100.0

Table A3.60. Number and percentages of sherds within vessel shape categories from Anse Petite Rivière.

	Number	Number %
Rounded	477	64.9
Flattened	44	6.0
Inward thickened	109	14.8
Outward thickened	43	5.9
Double thickened	8	1.1
Bevelled	4	0.5
Unidentified	50	6.8
Total	735	100.0

Table A3.61. Number and percentages of sherds within rim shape categories from Anse Petite Rivière.

	Number	Number %
1-5 mm	19	2.6
6-8 mm	298	40.5
9-11 mm	288	39.2
12-15 mm	55	7.5
Unidentified	75	10.2
Total	735	100.0

Table A3.62. Number and percentages of sherds within Anse Petite Rivière wall thickness categories.

	Number	Number %
1-10 cm	118	16.1
11-20 cm	105	14.3
21-30 cm	203	27.6
31-40 cm	143	19.5
41-50 cm	95	12.9
51-60 cm	27	3.7
61-70 cm	2	0.2
Unidentified	42	5.7
Total	735	100.0

Table A3.63. Number and percentages of sherds within Anse Petite Rivière orifice diameter categories.

	Number	Number %
Gray	47	6.4
Dark gray-black	12	1.6
Brown grey/grey brown	4	0.5
Dark grayish brown	16	2.2
Light brown/brown	29	4.0
Dark brown/very dark brown	126	17.1
Reddish-gray/dark reddish-gray	40	5.4
Reddish brown	199	27.1
Red	214	29.2
Unidentified	48	6.5
Total	735	100.0

Table A3.64. Number and percentages of sherds within Anse Petite Rivière exterior surface colour categories.

	Number	Number %
Complete reduction	84	11.4
Incomplete oxidation or reduction	29	4.0
Incomplete oxidation	3	0.4
Incomplete or relatively good oxidation	572	77.8
Unidentified	47	6.4
Total	735	100.0

Table A3.65. Number and percentages of sherds within Anse Petite Rivière firing colour categories.

	Number	Number %
Crude	6	0.8
Smoothed	78	10.6
Lightly burnished	97	13.2
Highly burnished	287	39.1
Polished	51	6.9
Scratched	69	9.4
Unidentified	147	20.0
Total	735	100.0

Table A3.66. Number and percentages of sherds within Anse Petite Rivière exterior surface finishing categories.

techniques include mainly incomplete or relatively good oxidation (77.8%) and complete reduction (11.4%); (table A3.65). Surface finishing is predominantly characterised by burnishing (52.3%), smoothing (10.6%) and scratching (9.4%); (table A3.66).

3.10.3.2 Lithic artefacts

A total of 70 lithic artefacts was collected (tables A3.67-A3.68). These include, among others, 22 water-worn pebbles (31.4%), nine grinding-stones (12.9%), six pebbles (8.5%), 17 flakes (24.3%), two beads (2.9%), two *zemis* (2.9%) and five unidentified artefacts. Several artefacts were made of basalt (32.9%), flint (27.1%), sandstone (15.7%), while other raw materials were incidentally encountered (De Waal 1996[b]:102-115); (fig. A3.17).

3.10.3.3 Shell artefacts

Anse Petite Rivière shell artefacts include several *Strombus gigas* artefacts, among which 13 axes, two scrapers, one pointed object, four beads, one *zemi* and 12 unidentified objects. A *Cittarium pica* fish hook, three *Cypraea* sp. scrapers, one scraper of unidentified shell and an unidentified *Cypraea* sp. object were found as well (De Waal 1996[b]:125-133); (tables A3.69-A3.70; fig. A3.18).

3.10.3.4 Coral artefacts

Anse Petite Rivière coral artefacts include 37 *Acropora cervicornis* rasp fragments, 52 *Acropora palmata* grinding-stone fragments, three polishing tools and two unidentified artefacts of *Porites porites*, five grinding-stones and one unidentified piece of *Siderastrea siderastrea* and one

	Total
Limestone	2 2.9
Pumice	1 1.4
Basalt	23 32.9
Flint	19 27.1
Sandstone	11 15.7
Diorite	3 4.3
Radiolite	2 2.9
Quartz	1 1.4
Granite	1 1.4
Quartzite	1 1.4
Unidentified	6 8.6
Total	70 100.0

Table A3.67. Number and percentages of Anse Petite Rivière rock types.

	Total
Water-worn pebble	22 31.4
Grinding stone	9 12.9
Pebble	6 8.5
Rubbing stone	1 1.4
Polishing stone	2 2.9
Preform	2 2.9
Flake	17 24.3
Flaked core	1 1.4
Flake tool	1 1.4
Bead	2 2.9
Zemi	2 2.9
Unidentified	5 7.1
Total	70 100.0

Table A3.68. Number and percentages of Anse Petite Rivière lithic artefact types.

Meandrina meandrites grinding object (De Waal 1996[b]:133-143); (table A3.71; fig. A3.19).

3.10.3.5 Shellfish remains

As for total weight counts, shellfish remains consist predominantly of *Cittarium pica* (70.7%) and *Strombus gigas* (17.8%). MNI counts are dominated by *Chiton* sp. (23.9%), *Cittarium pica* (18.9%), *Tegula* sp. (14.1%), *Nerita* sp. (13.5%) and for 11.9% by *Nodilittorina tuberculata* (De Waal 1996[b]:116-125); (table A3.72).

3.10.3.6 Animal remains

Grouard (2001) has studied 35048 faunal remains. Total MNI counts include 790 individuals, among them were fish (69.62%), crustaceans (19.24%), reptiles (3.29%), birds (3.29%), mammals (2.78%) and echinoderms (1.77%). Regarding the MNI counts, the exploited habitats include coral reefs (62%), deep channels (18%), shorelines (9%), terrestrial areas covered by vegetation (6%), bird habitats (4%), and mangrove (1%). The different ecosystems are represented in a balanced way, although the coral reef was slightly more exploited. The sample reflects a generalised subsistence economy and a diversity of catch techniques (Grouard 2001:252-255). The Anse Petite Rivière assemblage shows a large diversity in bird species and a specialisation in fishing and marine reptiles. The subsistence economy appears to be generalised (Grouard 2001:291, 299, 302).

Some worked turtle bone has been found in the

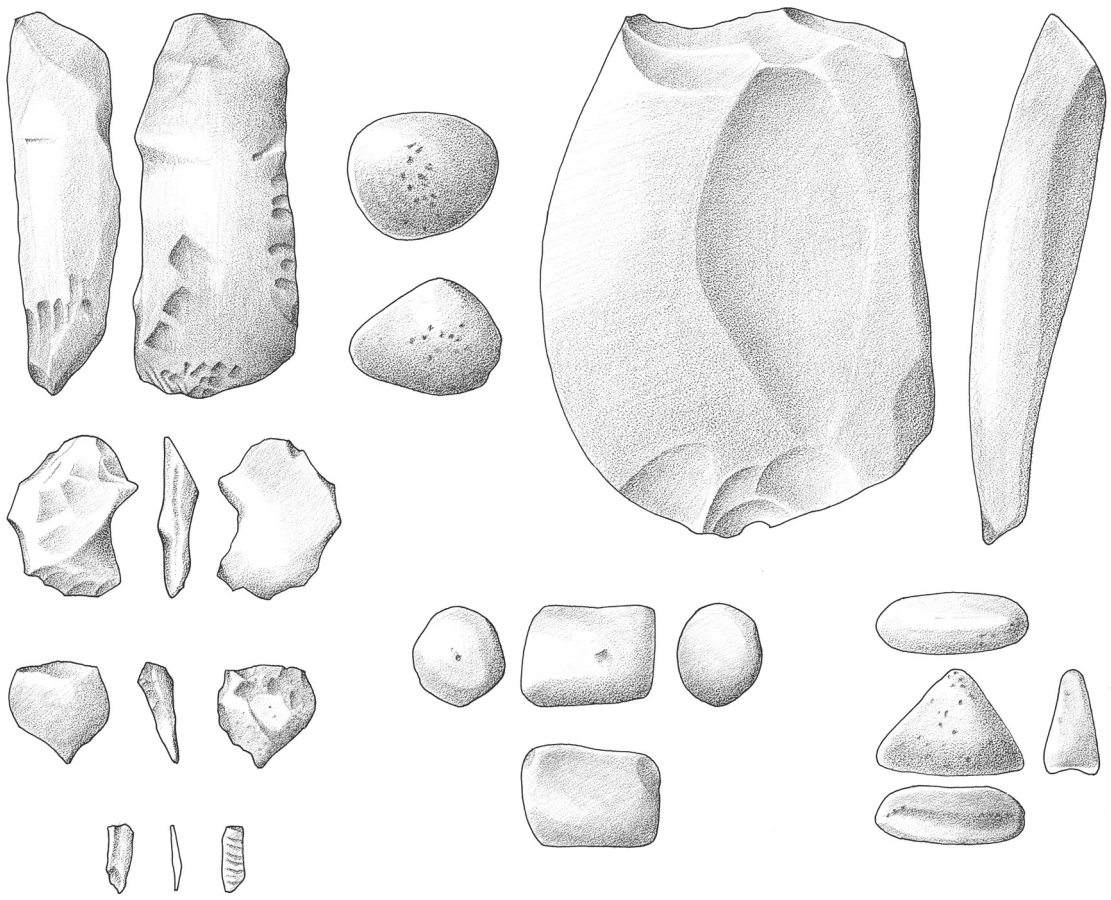


Fig. A3.17. Anse Petite Rivière lithic artefacts, including a quartzite axe preform (scale 1:4), a basalt pebble with hammering use-wear (scale 1:4), a basalt grinding stone (scale 1:6), three flint flakes (scale 1:1), a quartzite bead preform (scale 1:2) and a limestone *zemi* (scale 1:4).

	Total
Strombus gigas	33 84.6
Cittarium pica	1 2.6
Cypraea zebra	3 7.6
Cypraea cinera	1 2.6
Unidentified	1 2.6
Total	39 100.0

Table A3.69. Number and percentages of Anse Petite Rivière shell artefact raw materials.

	Total
Scraper	6 15.4
Axe	13 33.3
Pointed tool	1 2.6
Fish hook	1 2.6
Bead	4 10.2
Zemi	1 2.6
Unidentified	13 33.3
Total	39 100.0

Table A3.70. Number and percentages of Anse Petite Rivière shell artefact types.

	Rasp fragment	Grinding tool fragment	Polishing tool	Unidentified	Total
Acropora cervicornis	37 36.6				37 36.6
Acropora palmata		52 51.4			52 51.4
Porites sp.			3 3.0	2 2.0	5 5.0
Siderastrea siderastrea		5 5.0		1 1.0	6 6.0
Meandrina meandrites		1 1.0			1 1.0
Total	37 36.6	58 57.4	3 3.0	3 3.0	101 100.0

Table A3.71. Number and percentages of Anse Petite Rivière coral species and artefact types.

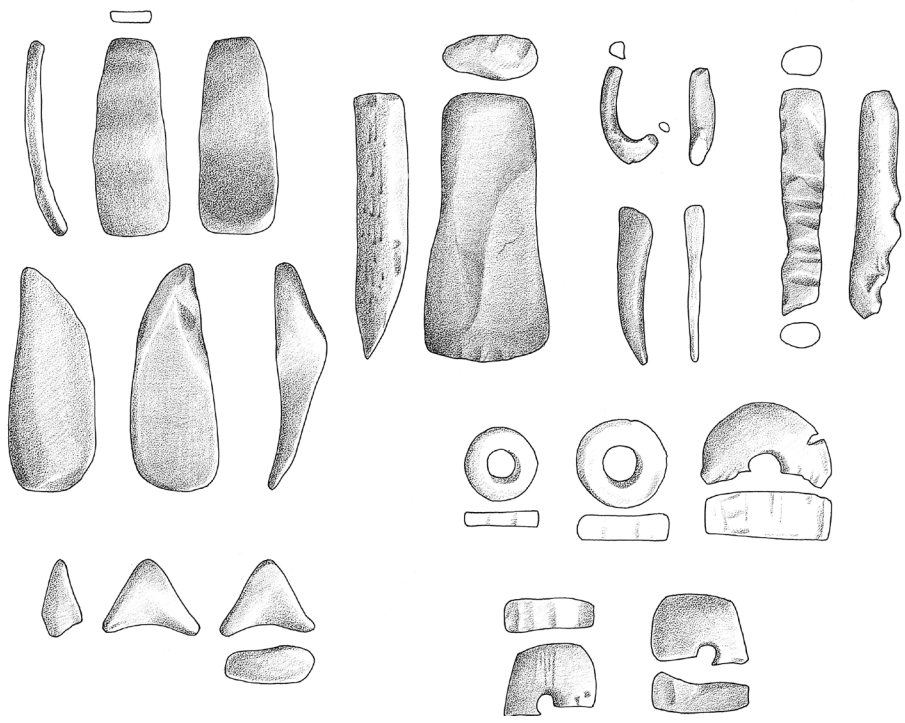


Fig. A3.18. Anse Petite Rivière shell artefacts from St*rombus gigas*, including two scrapers (scale 1:3), a *zemi* (scale 1:2), an adze (scale 1:4), a pointed tool (scale 1:2), an unidentified artefact (scale 1:4), four beads (scale 1:1) and a *Cittarium pica* fishhook (scale 1:2).

	MNI count	Total weight
Strombus gigas	16	6001
	1.5	17.8
Acanthopleura granulata	202	2002
	19.1	6.0
Cittarium pica	200	23,810
	18.9	70.7
Nerita sp.	143	142
	13.5	0.5
Nodilittorina tuberculata	126	32
	11.9	0.1
Tegula sp.	149	448
	14.1	1.3
Other	222	1230
	21.0	3.6
Total	1058	33,665
	100.0	100.0

Table A3.72. MNI counts, total weight (g) and percentages of the Anse Petite Rivière main shell species.

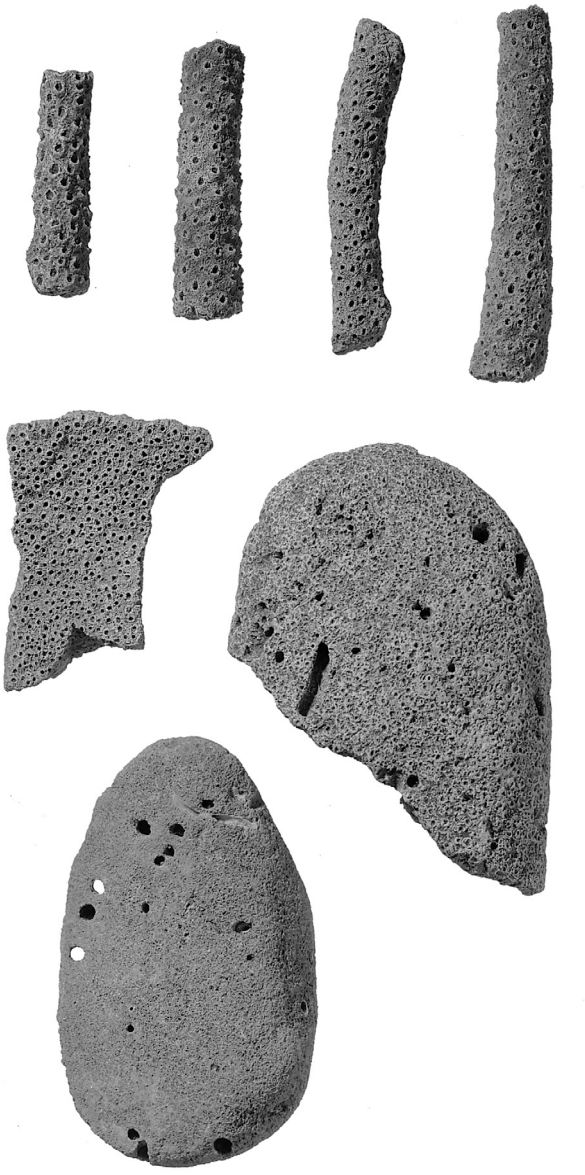


Fig. A3.19. Anse Petite Rivière coral artefacts, including *Acropora cervicornis* rasps and *Acropora palmata* grinding tools (scale 1:2).

Fig. A3.20. Dental pathology of an older woman buried at Anse Petite Rivière.

form of plates with flattened edges (Grouard 2001:298).

3.10.3.7 Human skeletal remains

Although the most important part of the Anse Petite Rivière burial area was completely destroyed just prior to the 1984 excavations, fragments belonging to three human burials that had been found in the midden area were collected at the archaeological depot on Guadeloupe and analysed by Steffen Baetsen in 1995. Burial 1 contained pelvic elements of two individuals, which could both be designated as male. This designation was confirmed by the analysis of the cranium, which also pointed to a male. The age at death of one of the two individuals was estimated around 40 to 50 years. No pathological features were found. Burial 1a contained the skeletal remains of a man, whose age at death was approximately 26 to 46 years. The presence of an *os wormianum* was the only pathological feature found in this burial. The *sutura lambdoidea*, at the back of the cranium, is followed by a double row of extra sutures, filled in with bone. This is not an anomaly but a congenital variation. Burial 1b contained a limited quantity of skeletal material, which had belonged to a rather small, older woman, whose age at death could not be estimated. She had suffered from a severe form of dental pathology (fig. A3.20). Results of these analyses are presented in more detail in De Waal (1996[b]:153-160).

3.10.4 Chronological assignment

The Anse Petite Rivière site can be largely attributed to the Late Ceramic A, although some isolated Early Ceramic B sherds have been encountered as well. Groningen radiocarbon dates (95.4%) for *Cittarium pica* samples of this site range between cal. AD 554 and 662, cal. AD 998 and 1160 and cal. AD 1302 and 1412. These dates coincide well with the ceramics that have been found at the site (De Waal 1996[b]:63).

3.11 POINTE DOUBLÉ (97110-014; SC26)

3.11.1 Site location and preservation

Bodu discovered and surveyed the Pointe Doublé site (x: 713,800; y: 1807,250), which is situated on the south-eastern tip of La Désirade, in 1984 (fig. 5.2). In 1999, the site was resurveyed. Site dimensions are 100 m north to south and 150 m west to east. The site is on a very rocky and relatively steep slope towards the sea. Coastal grassland covers 0-20 percent of the soil, which consists of rather compact, well-drained clayey sand. Surface visibility is very good. The surface distribution is thin and even and is characterised by flint and red chert flakes, hammer-stones and shell fragments including *Cittarium pica* and *Strombus gigas*. Not a single ceramic fragment has been found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Bodu remarked that the material he collected during his survey appeared to be part of a small concentration next to a large rock situated in the middle of the site. He suggested that this rock provided protection against the wind while working at the site, and it may also have been useful as an anvil during the debitage of the local raw material. The site is very close to the Pointe Séraphine site, which is rather similar. A small amount of lithic off-site material has been found west of the site, in the area leading towards the Pointe Séraphine site (97110-021). The site appears to be very superficial and therefore easily affected by erosion, but is still moderately well preserved.

3.11.2 Archaeological materials

The material described is from surface collections made in 1984 and 1999. It consists mainly of lithic artefacts and one shell artefact was found as well. This is a worked *Strombus gigas* pointed object that may be a fragment of an axe. Although Bodu collected shell fragments and one parrotfish jaw from the surface, these were not available for analysis and have thus not been included in the description below.

Bodu (1984) has provided a description of the 149 stone artefacts he collected. These include two hammering implements, used for flake removal from a core by hard direct percussion, 30 cores (22 are small) used for *ad-hoc*, random production of small flakes, 102 small flakes that are possible grater board teeth for manioc processing, and ten irregularly formed tools, without debitage marks. The mediocre raw material, the direct hard percussion technique, the absence of organised debitage, the deliberate production of small fragments and the disposal of a large quantity of raw material suggest that the site was used for the manufacture of simple tools for groups living nearby. The debitage was determined not by the quality but by the quantity of available raw material. Five artefacts have undergone a real transformation from flakes to actual tools. Production

	Total
Local igneous rock	11 42.3
Light gray chert	1 3.9
Light red/light gray chert	3 11.5
Local red chert	9 34.6
White chert	2 7.7
Total	26 100.0

Table A3.73. Number and percentages of rock types collected at the Pointe Doublé surface in 1999.

	Total
Pebble fragment	7 26.9
Flaked pebble	3 11.5
Flake	8 30.9
Flake core	3 11.5
Hammer-stone	2 7.7
Shatter piece	3 11.5
Total	26 100.0

Table A3.74. Number and percentages of lithic artefact types collected at the Pointe Doublé surface in 1999.

characteristics are very comparable to those of the Morne de Baie Mahault site (97110-011).

In 1999, very few clear lithic artefacts were collected (tables A3.63-A3.74). These include two flaked pebbles, one pebble hammer-stone with pits and scar negatives at both ends, one pebble flake, six pebble fragments, one flaked pebble hammer-stone with pits at one side and one possibly natural unidentified fragment of igneous rock. Seven flakes, one flake core and a flaked pebble of local red chert, two flake cores and a shatter piece of light red/gray chert, a shatter piece and a broken natural piece of white chert, one light gray chert shatter piece and a natural chalcedony piece were collected as well. In addition, natural pieces of red chert were found.

3.11.3 Chronological assignment

The chronological assignment for the site is largely absent, as neither ceramics nor ^{14}C samples could be collected for analysis. Bodu suggested that the inhabitants of the Anse Petite Rivière site exploited Pointe Doublé. It is safer to assume that the site has been exploited on a very small scale from time to time by people living at different sites on La Désirade, and maybe even on Guadeloupe, in pre-Columbian times. No real blades have been found. This suggests that the sites are ceramic, as no pre-ceramic sites have been revealed with similar material (Knippenberg personal communication 2001). Pre-ceramic sites have not been discovered in the research area. In the archaeological Edgar Clerc Museum, however, this site is presented as a pre-ceramic site on the basis of the lack of pottery on the surface.

3.12 TROPIQUE (97110-016; SC13)

3.12.1 Site location and preservation

The Tropique site (x: 708,700; y: 1805,300) was surveyed by Bodu in 1984 (1985[c]) on the basis of information provided by Père Guilbert and it was restudied in 1999. It is located on the highest part of the plateau around a pool on a rather flat terrain (fig. 5.2). The site is located some 100 m from a large drainage channel on the central plateau. Bodu described a site area of approximately 400 m^2 but site dimensions were estimated at 185 m north-south and 50 m east-west in 1999.

	Number	Number %	Weight	Weight %
Rim	10	4.4	68	4.0
Body	212	92.6	1525	89.4
Base	0	0.0	0	0.0
Griddle	0	0.0	0	0.0
Appendage/other	7	3.0	112	6.6
Total	229	100.0	1705	100.0

Table A3.75. Number, percentages and weight (g) of sherds from the 1984 Tropique collection.

	Pebble	Pebble fragment	Active or passive grinding-stone	Active grinding-stone	Flake	Unidentified	Total
Local igneous rock	2 18.2	5 45.4	1 9.1	1 9.1		1 9.1	10 90.9
Local red chert					1 9.1		1 9.1
Total	2 18.2	5 45.4	1 9.1	1 9.1	1 9.1	1 9.1	11 100.0

Table A3.76. Number and percentages of rock types and lithic artefact types from the 1984 Tropique surface collection.

The surface distribution is patchy and three concentrations could be identified in 1999. The surface material consists almost exclusively of ceramics. Some fragments of *Cittarium pica* were found as well, but these may have been transported to the site by soldier crabs. On the highest part of the site several worked stones were found while to the north-west and north-east of this area ceramic sherds were found on gentle slopes. Some ceramic off-site material has been found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Dense, thorny bush and leaves cover 21-40 percent of the soil, which consists of a loose medium structured, well-drained mixture of sand, gravel and stone in a loamy matrix. Surface visibility is bad and passage across the terrain is troublesome. Bodu described the site to be partially destroyed by erosion and by a sandy road. In 1999, the site appeared to be heavily disturbed as part of the terrain is cultivated.

3.12.2 Archaeological materials

The material described consists of surface collections made in 1984 and 1999, including 1729 g of pottery. The lithic artefacts are from the 1984 and 1999 surface collections. Bodu collected three shell artefacts in 1984.

3.12.2.1 Pottery

Bodu collected 229 sherds in 1984, mostly body sherds (92.6%), weighing 1705 g (table A3.75). The appendages/ other category, including seven handle fragments, represents 3.0% of the sample. No red slipped, decorated sherds, bases nor griddles were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found in the 1984 collection, no morphological and technological description could be provided for this sample.

In 1999, two rims and three body fragments were collected, weighing 24 g. No fragments belonging to the appendages/ other category, red slipped, decorated sherds, bases or griddles were found. The morphological description of the pottery could be based on the analysis of one rim larger than 5 cm. This belongs to a jar with an unrestricted simple contour with a rounded rim, a wall thickness between 6-8 mm and an orifice diameter between 21-30 cm. The outer surface colour is reddish brown, the firing technique consists of incomplete or relatively good oxidation and the outer surface is finished by high burnishing.

3.12.2.2 Lithic artefacts

Bodu collected several igneous rock artefacts from the surface in 1984, including a large pebble fragment with pitted areas and abrasion on both faces, one pebble fragment with abrasion on one face (possible active or passive grinding-stone), one fragment with a slightly concave abraded face, one pebble fragment with possible abrasion on one face (possible active grinding-stone), one pebble with possible abrasion on the side edges, one complete pebble with possible active abrasion on one end, three pebble fragments without use wear and one unidentified fragment. One flake core of local red chert was found as well (table A3.76).

The 1999 surface collection consists of five local igneous rock artefacts, including one pebble without use wear, a pebble fragment, one pebble fragment with hammering traces (possible hammer-stone), a large pebble fragment with indistinct abrasion on both faces (passive grinding-stone) and one pebble fragment with abrasion on both faces (active or passive grinding activities).

3.12.2.3 Shell artefacts

Bodu collected one axe and two unidentified objects of *Strombus gigas* from the surface of the site in 1984.

3.12.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.13 VOÛTE À PIN (97110-018; SC12)

3.13.1 Site location and preservation

The Voûte à Pin site (x: 708,975; y: 1806,025) was discovered by Pères Guilbert and Pinchon and it was partially destroyed by their excavations. Bodu (1985[c]) surveyed the site in 1984 and it was restudied in 1999. The site towers above the riverbed, as it is situated at the base of a steep west slope, some 15 m above the Rivière ravine (fig. 5.2). The site is situated 15 minutes' walk from the northern coast, although this route is not very accessible. The site is easily reached from the plateau though. Voûte à Pin is a cave site, which consists of two main chambers, measuring 6 x 5 m and 8 x 6 m respectively. The cave has two entrances, measuring 2 x 1.5 m, and a small 50 x 50 cm window-like opening. The archaeological material on the surface consists of heavily fragmented ceramics and some human skeletal material was collected at the surface in the back of the cave. The northern cavern contained hardly any archaeological material on the surface and most of the material was collected at the southern cavern. Almost no material was found outside the cave and no off-site material has been found. The soil in the cave consists of loose, coarse sand, covered by bat guano.

Surface visibility is very good. Vegetation surrounding the cave consists of dense trees and shrubby vegetation. The terrain near the cave is claimed by Mr. Etienne Speno (Baie Mahault). The site, and the southern cavern in particular, is seriously damaged as a result of illegal excavation. The archaeological layer has been almost completely destroyed. The northern cavern appears to be less perturbed. Moreover, the site has been known for a long time to the inhabitants of La Désirade and regular visits to the cave may contribute to its perturbation. Some older inhabitants regard the site to be a ritual place and it is even indicated on the IGN topographical map. Others are convinced that buccaneer treasures were hidden in La Désirade caves in colonial times, and the widespread idea that gold is to be found in caves is not very helpful to site preservation either.

3.13.2 Test units and stratigraphy

Two 1 m^2 units were excavated in the largest room of the cave (fig. A3.21). They demonstrated that the archaeological layer had been completely destroyed as a result of prior, non-documented excavations.

3.13.3 Archaeological materials

The material described includes material from the 1984 and 1999 surface collections and material from the 1999 test units. Very small amounts of archaeological material could be collected. The 1984 collection consists of pottery and one lithic artefact, and the 1999 collection includes pottery, shellfish remains, faunal remains, human skeletal remains, lithic artefacts and one coral artefact. The sub-surface material is quite comparable to what was found

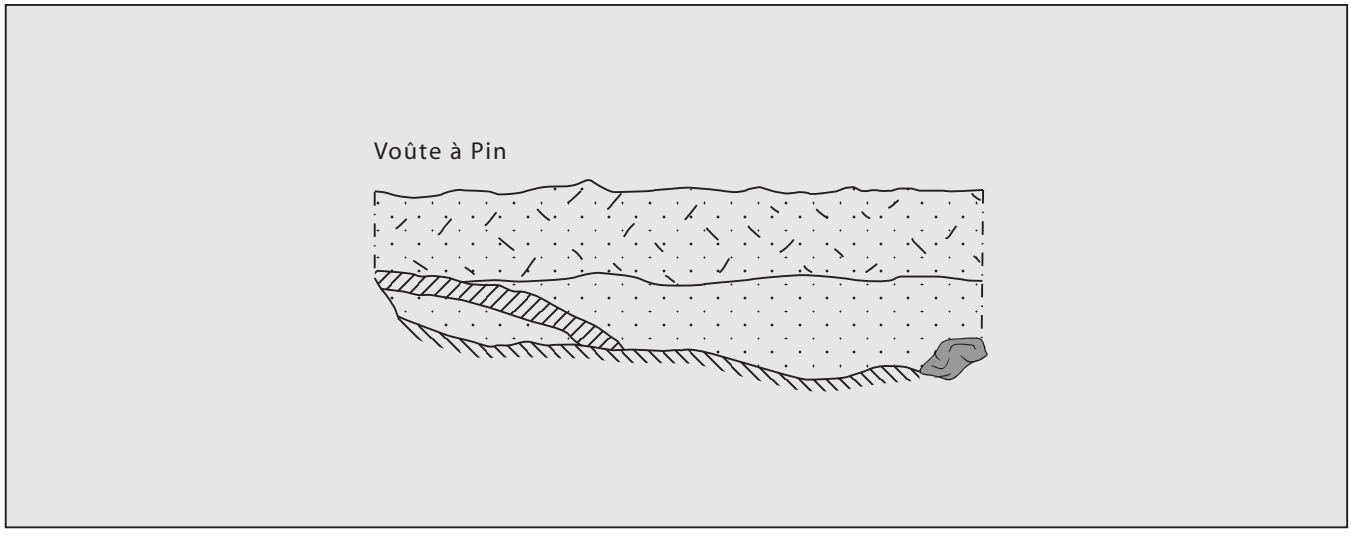


Fig. A3.21. Voûte à Pin, unit 2 (1 m^2), north section.

on the surface in the cave. Both surface and sub-surface information indicates that excavations in the past seriously destroyed the site.

3.13.3.1 Pottery

Bodu collected four remarkably well finished body sherds in 1984, weighing 132 g, without decorations or red slipped surfaces. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found in the 1984 collection, no morphological and technological description could be provided for this sample. Bodu remarks that the ceramics that were collected by Pères Guilbert and Pinchon in particular appear to have been of an extremely high quality. Unfortunately, it is unknown where these fragments have been stored and they were not available for analysis.

In 1999, 44 sherds were collected, mostly body sherds (45.5%), weighing 1240 g (table A3.77). No fragments belonging to the appendages/other category were found. Eight sherds have red slipped surfaces (18.2%) and none of the sherds are decorated. All eight base fragments are flat and all six griddle fragments are unidentified.

The morphological description of the 1999 pottery collection has been based on the analysis of six rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (83.4%); (table A3.78). The dominant rim

	Number	Number %	Weight	Weight %
Rim	10	22.7	447	36.0
Body	20	45.5	328	26.5
Base	8	18.2	251	20.2
Griddle	6	13.6	214	17.3
Appendage/other	0	0.0	0	0.0
Total	44	100.0	1240	100.0

Table A3.77. Number, percentages and weight (g) of sherds from the 1999 Voûte à Pin collection.

	Number	Number %
Jar with unrestricted simple contour	1	16.7
Bowl with unrestricted simple contour	3	50.0
Dish with unrestricted simple contour	1	16.7
Bowl with unrestricted composite contour	1	16.7
Total	6	100.0

Table A3.78. Number and percentages of sherds within vessel shape categories from the 1999 Voûte à Pin collection.

	Number	Number %
Rounded	5	83.3
Inward thickened	1	16.7
Total	6	100.0

Table A3.79. Number and percentages of sherds within rim shape categories from the 1999 Voûte à Pin collection.

	Number	Number %
6-8 mm	4	66.7
9-11 mm	2	33.3
Total	6	100.0

Table A3.80. Number and percentages of sherds within wall thickness categories from the 1999 Voûte à Pin collection.

	Number	Number %
11-20 cm	2	33.3
21-30 cm	2	33.3
31-40 cm	1	16.7
Unidentified	1	16.7
Total	6	100.0

Table A3.81. Number and percentages of sherds within orifice diameter categories from the 1999 Voûte à Pin collection.

	Number	Number %
Reddish-gray/dark reddish-gray	1	16.7
Reddish brown	3	50.0
Red	2	33.3
Total	6	100.0

Table A3.82. Number and percentages of sherds within exterior surface colour categories from the 1999 Voûte à Pin collection.

	Number	Number %
Complete reduction	1	16.7
Incomplete or relatively good oxidation	5	83.3
Total	6	100.0

Table A3.83. Number and percentages of sherds within firing colour categories from the 1999 Voûte à Pin collection.

	Number	Number %
Lightly burnished	2	33.3
Highly burnished	1	16.7
Polished	3	50.0
Total	6	100.0

Table A3.84. Number and percentages of sherds within exterior surface finishing categories from the 1999 Voûte à Pin collection.

shape is rounded (83.3%); (table A3.79). Wall thicknesses are mainly 6-8 mm (66.7%) and orifice diameters range between 11-20 cm (33.3%), 21-30 cm (33.3%) and 31-40 cm (16.7%) and 16.7% remains unidentified (tables A3.80-A3.81). Most of the outer surfaces are reddish brown (50%) or red (33.3%), the dominant firing technique is incomplete or relatively good oxidation (83.3%) and the outer surfaces are burnished (50%) or polished (50%); (tables A3.82-A3.84).

3.13.3.2 Lithic artefacts

Bodu collected one igneous rock pebble with very smooth faces, one of which had been used for active grinding/abrading activities, from the surface of the site in 1984.

The 1999 surface collection included igneous rock pieces such as one fragment, which looks like a passive abrading stone with one face with an abraded area, one pebble, one fragment, and one pebble with flake removals, one face with abrasion, which could have functioned as a passive grinding/abrading stone. One red chert shatter piece and one limestone rock fragment, which could be a flake, with one edge part which has been abraded although its usage remains indistinct, were found as well (table A3.85).

3.13.3.3 Coral artefacts

One heavily used *Acropora palmata* active grinding tool fragment was collected in 1999.

3.13.3.4 Shellfish remains

A very limited amount of shell was found in 1999, *Cittarium pica* being most abundant (table A3.86). Other shell species, including *Acanthopleura granulata*, *Astraea* sp., *Bulimulus guadalupensis*, *Pleurodonte* sp., *Purpura patula*, *Sleurodonta nux*, and *Strombus gigas*, were found to a far lesser extent.

3.13.3.5 Animal remains

A very small sample of faunal remains was collected (total

	Pebble	Fragment	Passive grinding-stone	Possible flake	Shatter	Total
Local igneous rock	1	1	2			4
	16.7	16.7	33.2			66.6
Local red chert					1	1
					16.7	16.7
Limestone				1		1
				16.7		16.7
Total	1	1	2	1	1	6
	16.7	16.7	33.2	16.7	16.7	100.0

Table A3.85. Number and percentages of rock types and lithic artefact types from the 1999 Voûte à Pin surface collection.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	15	330	64	394
	42.9	57.7	85.3	60.9
Other	20	242	8	250
	57.1	42.3	10.7	38.6
Unidentified	0	0	3	3
	0.0	0.0	4.0	0.5
Total	35	572	75	647
	100.0	100.0	100.0	100.0

Table A3.86. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Voûte à Pin collection.

MNI 5, total weight 13 g). MNI counts, excluding intrusive species, show that the 2/5 inch sample has a terrestrial component (83.2%) consisting of land hermit crab, mountain crab and land crab. Without land hermit crab included the terrestrial component makes up 49.9% of the total sample (Nokkert in appendix 5).

3.13.3.6 Human skeletal remains

Some human skeletal remains were found, including four fragments consisting of a proximal part of the first phalanx of a right foot, and fragments of a right clavicle, a rib, a sacrum and nine unidentified fragments (12 g in total). In the back of the northern cavern two fragments of a left radius, one fragment of a left ulna and five unidentified fragments were found on the surface (26 g in total). Unfortunately, because of the fragmentation and bad conservation of the material it provides a very limited amount of information (Nokkert personal communication 2001).

3.13.4 Chronological assignment

The site yielded early Late Ceramic A pottery, which can be dated to approximately AD 800-1000.

3.14 POINTE SÉRAPHINE (97110-021; SC01)

3.14.1 Site location and preservation

The Pointe Séraphine site (x: 713,500; y: 1807,125) was discovered on the southern coastal plain of La Désirade, at approximately 50 m west of the lighthouse, during the 1999 surveys (fig. 5.2). The terrain is rather flat and the slope leading to the sea borders it in the south. Site dimensions are 170 m from east to west and 85 m from north to south. The archaeological material appears to be limited to the surface and consists of an even distribution of flakes and hammer-stones fashioned from locally available rocks and *Strombus gigas* fragments. A very limited amount of lithic off-site material has been encountered east of the site, in the area leading to the Pointe Doublé site (97110-014), and west of the site, in the area leading to the Morne de Baie Mahault site (97110-011). Very little vegetation consisting of some small shrub and coastal grassland, covers 0-20 percent of the soil, which consists of compact, well-drained sand with a moderate structure. Surface visibility is very good. As the terrain is not level and hardly any vegetation protects the soil, it is deemed that erosion may have exerted an important effect on the artefact distribution. Moreover, steep erosion

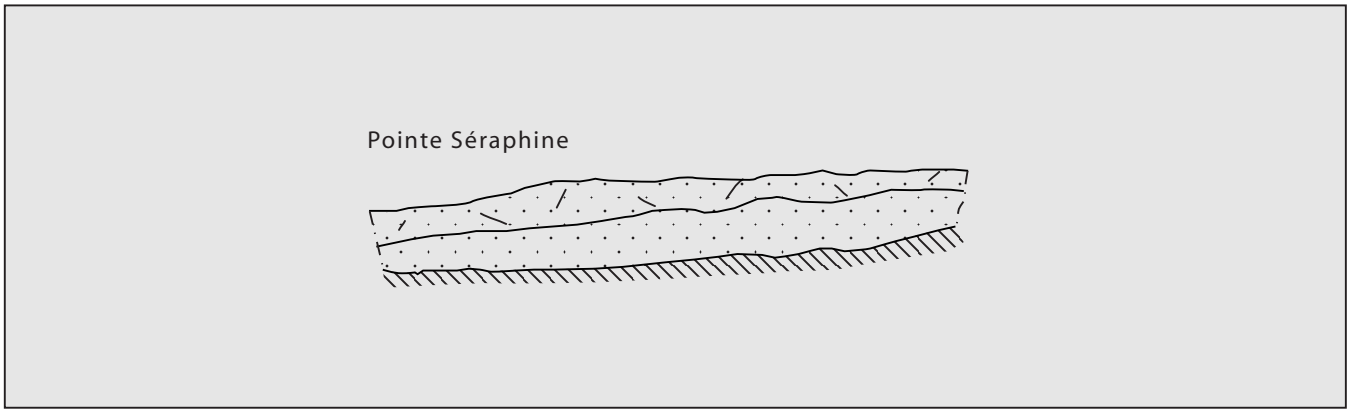


Fig. A3.22. Pointe Séraphine, unit 2 (1 m^2), north section.

channels are present nowadays, reinforcing the rate and impact of this process.

3.14.2 Test units and stratigraphy

Two test units measuring 1 m^2 were excavated (fig. A3.22). No real archaeological layer has been identified and most artefacts were collected at the surface. For both units, a 20 x 20 cm sample in the north-west corner has been sieved over 2 mm screens. The north-west corner unit 1 was located at 713464.290; 1807056.802; 14.44 (Guadeloupe - Ste. Anne system) or 16°19′56.8552″; -61°0′20.9039″; -29.42 (WGS84). The north-west corner unit 2 was located at 713432.010; 1807030.967; 9.69 (Guadeloupe - Ste. Anne system) or 16°19′56.0252″; -61°0′21.9997″; -34.16 (WGS84).

3.14.3 Archaeological materials

The material described includes surface collections and material from the test units from the 1999 fieldwork. Several lithic artefacts were collected, together with two shell artefacts. These are mostly from the surface of the site.

3.14.3.1 Lithic artefacts

During the 1999 fieldwork, several igneous rock artefacts were collected (tables A3.87-A3.88). These include two hammer-stone pebbles (pits at both ends, a side and one face), four pebble flakes, two pebble fragments, a flake core, three small probably natural pebbles, 14 unidentified probably natural fragments and one non-modified large pebble (one completely pecked face, the other face has pecked sides). One modified sharp edged limestone pebble fragment and 17 flakes, five flake cores from a pebble (few negatives), four shatter pieces (of which one is a possible flake from reddish unidentified material with white chert veins) and more than 215 natural non-modified fragments of red chert were found. One red chert flake core of another variety of rock type was found as well. This is more flint-like chert, slightly translucent and, although it may be local, it is different from what is generally found at the lithic exploitation sites on La Désirade. One flake and one large shatter piece of dark gray chert (similar to Morne de Baie Mahault site material and slightly different from Pointe Doublé site material) were collected as well.

3.14.3.2 Shell artefacts

One pointed object and one heavily polished adze of *Strombus gigas* were collected in 1999 and 2000.

3.14.4 Chronological assignment

The chronological assignment for the site remains largely

	Total
Local igneous rock	29 49.2
Local red chert	26 44.1
Red chert	1 1.7
Local dark gray chert	2 3.3
Limestone	1 1.7
Total	59 100.0

Table A3.87. Number and percentages of Pointe Séraphine rock types.

	Total
Pebble	4 6.8
Pebble fragment	3 5.1
Flake	22 37.3
Flake core	7 11.9
Hammer-stone	2 3.3
Fragment	16 27.1
Shatter piece	5 8.5
Total	59 100.0

Table A3.88. Number and percentages of Pointe Séraphine lithic artefact types.

undetermined, as neither ceramics nor ^{14}C samples could be collected for analysis. The Morne de Baie Mahault (97110-011) and Pointe Doublé sites (97110-014) were probably exploited on a very small scale from time to time by people living at different sites on La Désirade, and maybe even on Guadeloupe, in pre-Columbian times. No real blades have been found. This suggests that the sites are ceramic, as no pre-ceramic sites have been discovered yielding similar material (Knippenberg personal communication 2001). Pre-ceramic sites have not been found in the research area.

3.15 AU VENT (97110-022; SC02)

3.15.1 Site location and preservation

The Au Vent site (x: 713,125; y: 1807,150) was discovered on top of a small hill, north-east of the lighthouse of La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 60 m east-west and 50 m north-south. The archaeological material on the surface consists of small pottery sherds and flakes of locally available rocks, associated with colonial and sub-recent material. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Some off-site material, consisting of pre-Columbian ceramics, was found south-west of the site. Cactaceous savannah vegetation covers 0-20 percent of the soil, which consists of medium textured, well-drained compact sand. Surface visibility is very good. Erosion and cultivation of the terrain in the past appear to have disturbed the find distribution. The terrain is not in use nowadays.

3.15.2 Archaeological materials

The material described includes surface collections made in 1999. A very limited amount of pottery was collected. Fragments of *Cittarium pica* and *Strombus gigas* were observed on the surface of the site, but they were not collected. The pottery sample includes two rims and 15 body sherds, weighing 170 g. No red slipped or decorated sherds were collected, and no fragments belonging to the appendage/other category or bases or griddles were found. One rim larger than 5 cm was found. This is part of a bowl with an unrestricted composite contour with a rounded rim. Wall thickness is between 9-11 mm and orifice diameter is between 21-30 cm. The outer surface colour is dark brown/very dark brown, firing technique consists of incomplete or relatively good oxidation and the outer surface is highly burnished.

3.15.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.16 GRANDE RAVINE (97110-023; SC03)

3.16.1 Site location and preservation

The Grande Ravine site (x: 712,750; y: 1807,250) was discovered on a hilltop on the eastern plateaus of La Désirade, to the south of the road leading to the rubbish-dump, during the 1999 surveys (fig. 5.2). The site is located on a terrain bordered by agaves. Site dimensions are 150 m east-west and 50 m north to south. The archaeological material is rather dispersed on the surface and consists of small pottery sherds and flakes of locally available rock, associated with colonial and sub-recent material. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Grass covers 21-40 percent of the soil, which consists of well drained, coarse sand in a clayey matrix. Surface visibility is bad. Some ceramic off-site material was found north-west of the site. Erosion and cultivation of the terrain in the past appear to have disturbed the find distribution. The terrain is used from time to time to herd goats nowadays.

3.16.2 Archaeological materials

The material described includes the 1999 surface collection. Three rims and 42 heavily fragmented and weathered body sherds, weighing 534 g, were collected. Two sherds (4.4%) had red slipped surfaces and no decorated sherds were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

3.16.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.17 SITE 4 (97110-024; SC04)

3.17.1 Site location and preservation

Site 4 (x: 712,900; y: 1807,075) was discovered at the foot of a hill on the eastern plateaus of La Désirade, north of the road leading to the lighthouse, during the 1999 surveys (fig. 5.2). Site dimensions are 40 m east to west and 35 m

north to south. The archaeological material on the surface consists of small pottery sherds and flakes of local rocks. No archaeological material has been found on the hilltop and almost no off-site material was found. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Cactaceous savannah vegetation covers 0-20 percent of the soil, which consists of coarse, well-drained, sand in a clayey matrix. Surface visibility is very good. Erosion and cultivation of the terrain in the past appear to have disturbed the find distribution, but very serious perturbation is caused by some deep erosion gullies running across the site. The terrain is not used nowadays.

3.17.2 Archaeological materials

The material described includes the 1999 surface collection, which comprises 746 g of pottery, one unidentified flaked artefact of local volcanic rock and one pointed *Strombus gigas* object with an unidentified function. Four probably naturally occurring red chert fragments were collected as well. A total of 32 sherds was collected, including three rims and 29 body sherds, weighing 746 g. No fragments belonging to the appendages/other category, or bases or griddles were found. Two red slipped sherds (6.3%) were decorated with fine, narrow incisions. Three rims larger than 5 cm have been revealed. These were all part of dishes with unrestricted simple contours and two rims are inward thickened and the other is rounded. Wall thicknesses range between 6-8 mm for two fragments and 9-11 mm for the other and orifice diameters are 21-30 cm and for two rims orifice diameters could not be identified. The three rims have reddish brown outer surfaces, firing technique consists of incomplete or relatively good oxidation (one of the sherds is irregularly fired) and the finishing of the outer surfaces includes polishing and the finishing of two rims could not be identified as a result of heavily weathered surfaces.

3.17.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.18 SITE 5 (97110-025; SC05)

3.18.1 Site location and preservation

Site 5 (x: 712,525; y: 1807,875) was discovered on a flat terrain on the eastern plateaus of La Désirade, to the west of a sandy road leading to Grand Abaque, during the 1999 surveys (fig. 5.2). Site dimensions are 40 m east to west and 40 m north to south. The archaeological material on the surface consists of a very small number of heavily fragmented pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. No off-site material was found. Grass covers 21-40 percent of the soil, which consists of well drained, coarse sand in a clayey matrix. Surface visibility is very bad. Erosion and cultivation of the terrain in the past appear to have disturbed the find distribution. The terrain is not in use nowadays.

3.18.2 Archaeological materials

The material described includes the 1999 surface collection, which consists exclusively of eight sherds (36 g) of pottery. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

3.18.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.19 GRAND ABAQUE 1 (97110-026; SC06)

3.19.1 Site location and preservation

The Grand Abaque 1 site (x: 712,375; y: 1808,425) was discovered in the north-eastern part of La Désirade, on a plain extending between Pointe à Adrien and Pointe à Mombin, during the 1999 surveys (fig. 5.2). Mr. René Berchel (Baie Mahault) claims ownership of the site terrain. Site dimensions are 150 m from east to west and 100 m from north to south. The archaeological material on the surface consists of a dense and even distribution of heavily fragmented pottery sherds, shellfish remains and lithic and shell artefacts. A small isolated concentration of heavily fragmented and weathered sherds is located quite close to the site and a limited amount of ceramic off-site material was found north-east of the site. Grass and thorny brushwood with acacias cover 61-80 percent of the soil, which consists of loose, fine and well-drained, reddish brown clayey sand. Passage across the terrain is very problematic but surface visibility is good. The site appears to have been badly disturbed as a result of erosion processes and small-scale horticulture. Part of the terrain is used for cultivation and the herding of goats nowadays.

3.19.2 Test units and stratigraphy

Two 2 x 2 m test units were excavated, which demonstrated

the existence of a thin archaeological layer between 0-10/15 cm below the surface (fig. A3.23). Smaller amounts of archaeological material were found up to 30 cm depth. In level 3 of unit 2 (20-30 cm) seven features were identified. After sectioning these, features 001, 002, 004 and 006 appeared to be natural. Features 003, 005 and 007 were identified as possible post-holes. It remains to be debated, however, if these post-holes date from the pre-Columbian or the colonial period. Feature 003 (maximum depth 7 cm, 12 cm diameter) consisted of a reddish brown (5YR;4/3) sandy clay with a small sand component. The first 12 cm of feature 005 (maximum depth 26 cm, 23 cm diameter) consisted of a reddish brown (5YR;4/3) sandy clay with a small sand component. The second half of this feature consists of dark reddish brown (5YR;3/4) sandy clay with a small sand component. Feature 007 (maximum depth 11 cm, 12 cm diameter) is characterised by a dark reddish brown (5YR;3/3) compact sandy clay with a small sand component. The northwest corner of unit 1 was located at 712388.808; 1808295.469; 91.14 (Guadeloupe - Ste. Anne system) or 16°20′37.4845″; -61°0′56.7234″; 47.30 (WGS84). The northwest corner of unit 2 was located at 712382.466; 1808292.469; 91.14 (Guadeloupe - Ste. Anne system) or 16°20′37.3766″; -61°0′56.9381″; 47.30 (WGS84).

3.19.3 Archaeological materials

The material described includes the 1997 and 1999 surface collections and material from the 1999 test units.

3.19.3.1 Pottery

A total of 495 weathered sherds was collected, mostly body sherds (80.7%), weighing 4093 g (table A3.89). No fragments belonging to the appendages/other category were found. A total of 53 sherds has red slipped surfaces (10.7%) and 11 sherds (2.2 %) are decorated, mainly by incision, although punctation and nubbins occur as well (fig. A3.24); (table A3.90). Most of the bases are flat, although concave high and unidentified fragments have been found as well, and

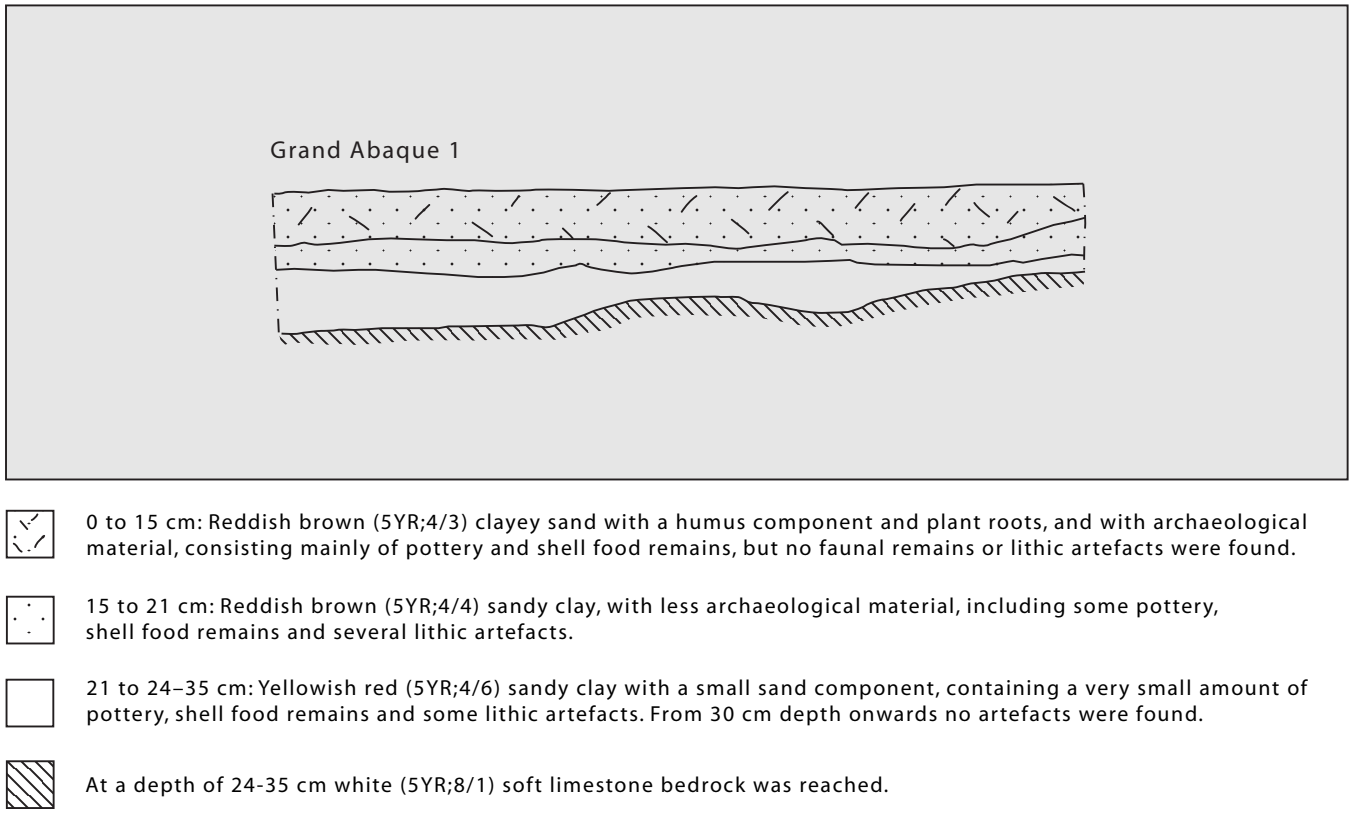


Fig. A3.23. Grand Abaque 1, unit 2 (2 x 2 m), north section.

griddles are straight or legged, although the shape of most fragments could not be identified (tables A3.91-A3.92).

The morphological description of the pottery has been based on the analysis of seven rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars and bowls with unrestricted simple contours

	Number	Number %	Weight	Weight %
Rim	61	12.3	603	14.7
Body	399	80.7	2697	65.9
Base	18	3.6	439	10.7
Griddle	17	3.4	354	8.7
Appendage/other	0	0.0	0	0.0
Total	495	100.0	4093	100.0

Table A3.89. Number, percentages and weight (g) of sherds collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Incision	9	81.8
Punctation	1	9.1
Nubbins	1	9.1
Total	11	100.0

Table A3.90. Number and percentages of sherds with particular decoration modes collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Flat	16	88.8
Concave high	1	5.6
Unidentified	1	5.6
Total	18	100.0

Table A3.91. Number and percentages of sherds within base shape categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Straight	3	17.6
Legged	1	5.9
Unidentified	13	76.5
Total	17	100.0

Table A3.92. Number and percentages of sherds within griddle shape categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Jar with unrestricted simple contour	2	28.6
Bowl with unrestricted simple contour	2	28.6
Bowl with restricted simple contour	2	28.6
Jar with independent restricted inflected contour	1	14.2
Total	7	100.0

Table A3.93. Number and percentages of sherds within vessel shape categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Rounded	5	71.6
Flattened	1	14.2
Outward thickened	1	14.2
Total	7	100.0

Table A3.94. Number and percentages of sherds within rim shape categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
1-5 mm	1	14.3
6-8 mm	1	14.3
9-11 mm	4	57.1
12-15 mm	1	14.3
Total	7	100.0

Table A3.95. Number and percentages of sherds within wall thickness categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
11-20 cm	2	28.6
21-30 cm	1	14.3
Unidentified	4	57.1
Total	7	100.0

Table A3.96. Number and percentages of sherds within orifice diameter categories collected at Grand Abaque 1 in 1997 and 1999.

(57.2%) and bowls with restricted simple contours (28.6%); (table A3.93). The dominant rim shape is rounded (71.6%); (table A3.94). Wall thicknesses range mainly between 9-11 mm (57.1%) and orifice diameters range between 11-20 cm (28.6%) and 21-30 cm (14.3%), while 57.1% remains unidentified (tables A3.95-A3.96). Surface colours are predominantly light brown-yellow (28.6%) and red (28.6%); (table A3.97). The main firing technique includes incomplete or relatively good oxidation (85.7%); (table A3.98). Surface finishing is predominantly characterised by light burnishing (42.8%) and for 28.6% the surface finishing could not be identified (table A3.99).

3.19.3.2 Lithic artefacts

The 1997 surface collection includes two pebbles and five pebble fragments without use wear of local igneous rock, five indistinct red chert pieces (two possibly local and three non-local) and one passive grinding-stone fragment from possibly local layered tuff or volcanic rock with relatively large inclusions. Several igneous rock artefacts were excavated as well, including seven pebbles, 30 pebble fragments without use wear, one large (possibly natural) pebble fragment, with a localised pitted area on one side, six small unidentified (probably natural) fragments and one possible passive grinding-stone fragment. The excavated sample further

	Number	Number %
Brown-gray/gray-brown	1	14.3
Light brown-yellow	2	28.6
Dark brown/very dark brown	1	14.3
Reddish brown	1	14.3
Red	2	28.6
Total	7	100.0

Table A3.97. Number and percentages of sherds within exterior surface colour categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Incomplete or relatively good oxidation	6	85.7
Unidentified	1	14.3
Total	7	100.0

Table A3.98. Number and percentages of sherds within firing colour categories collected at Grand Abaque 1 in 1997 and 1999.

	Number	Number %
Crude	1	14.3
Smoothed	1	14.3
Lightly burnished	3	42.8
Unidentified	2	28.6
Total	7	100.0

Table A3.99. Number and percentages of sherds within exterior surface finishing categories collected at Grand Abaque 1 in 1997 and 1999.

includes one possible polishing stone pebble with polish, one possible hammer-stone pebble fragment and one pebble fragment, with one used broken face which is smoother than the other face. A natural rock fragment, which may not be an artefact, one small pebble flake, one small flake, a flaked pebble and one unidentified rock shatter piece were found as well. It should be remarked that the lithic artefacts found at this site are clearly different from the volcanic material found at the Pointe Colibri site (97110-030). It consists of more Basse-Terre like material, and it is not clear whether this occurs locally on La Désirade (Knippenberg personal communication 2001); (tables A3.100-A3.101).

3.19.3.3 Shell artefacts
One small *Strombus gigas* adze was collected in 1999.

3.19.3.4 Shellfish remains
Hardly any shell was found. Most of it consisted of *Cittarium pica* (table A3.102).

3.19.3.5 Animal remains
The 2/5 inch sample (MNI 1, 1 g) of Grand Abaque 1 consists exclusively of unidentified vertebrate remains (Nokkert in appendix 5).

3.19.4 Chronological assignment

The pottery collected has been assigned to the Late Ceramic A (probably around AD 800-1200). The material is rather similar to the Pointe Colibri (97110-030) material.

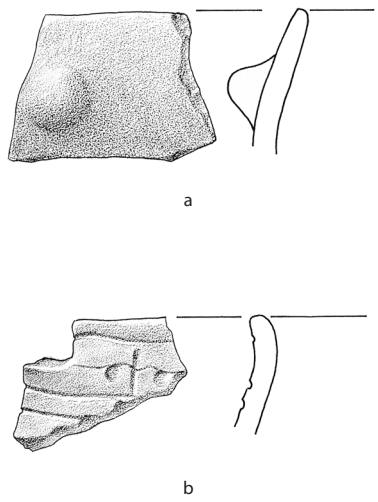


Fig. A3.24. Ceramics from Grand Abaque 1, decorated by a nubbin (a: unit 1, level 1, scale 1:2) and by incision and punctation (b: unit 1, level 2, scale 1:2).

	Total
Igneous rock	59 89.4
Local red chert	2 3.0
Non-local red chert	3 4.6
Tuff/volcanic rock	1 1.5
Unidentified	1 1.5
Total	66 100.0

Table A3.100. Number and percentages of rock types collected at Grand Abaque 1 in 1997 and 1999.

	Total
Pebble	10 15.2
Pebble fragment	38 57.6
Passive grinding-stone	2 3.0
Polishing stone	1 1.5
Hammer-stone	1 1.5
Flake	1 1.5
Shatter piece	1 1.5
Unidentified	12 18.2
Total	66 100.0

Table A3.101. Number and percentages of lithic artefact type collected at Grand Abaque 1 in 1997 and 1999.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	0	0	204	204
	0.0	0.0	95.4	93.6
Astraea caelata	1	4	8	12
	100.0	100.0	3.7	5.5
Unidentified	0	0	2	2
	0.0	0.0	0.9	0.9
Total	1	4	214	218
	100.0	100.0	100.0	100.0

Table A3.102. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all the shell species from the 1999 Grand Abaque 1 collection.

3.20 GRAND ABAQUE 2 (97110-027; SC07)

3.20.1 Site location and preservation

The Grand Abaque 2 site (x: 712,575; y: 1808,275) was discovered on a flat terrain at approximately 25 m south-east of the Grand Abaque 1 site during the 1999 surveys (fig. 5.2). Site dimensions are 30 m from east to west and 35 m from north to south. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. It consists of a small and even concentration of heavily fragmented pottery sherds and lithic artefacts, associated with colonial and sub-recent material. Almost no off-site material was found. Dry and thorny vegetation covers the soil, which consists of loose medium structured well-drained sand. Passage across the terrain, which is claimed by Mr. René Berchel (Baie Mahault), is complicated but surface visibility is good. Erosion and cultivation of the terrain in the past appear to have disturbed the find distribution. The terrain is not used nowadays.

3.20.2 Archaeological materials

The material described includes the 1999 surface collection, consisting of a small amount of pottery (290 g) and five lithic artefacts.

3.20.2.1 Pottery

The pottery sample includes three rims and 14 body sherds, together representing 290 g. No fragments belonging to the appendage/other category were found nor bases or griddles. One sherd (5.9%) was red slipped. One rim larger than 5 cm was found. This was part of a jar with an unrestricted simple contour with a rounded rim. Wall thickness of the vessel is between 9-11 mm and orifice diameter is between 11-20 cm. The colour of the outer surface is dark brown/very dark brown, firing technique consists of complete reduction and the finishing of the outer surface is unidentified as a result of weathering.

3.20.2.2 Lithic artefacts

Four flaked igneous rock pebbles without use wear and one unidentified igneous rock artefact were collected.

3.20.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.21 SITE 8 (97110-028; SC08)

3.21.1 Site location and preservation

Site 8 (x: 712,375; y: 1807,875) was discovered at the foot of La Montagne on a flat terrain during the 1999 surveys (fig. 5.2). Site dimensions are 30 m from east to west and 85 m from north to south. The distribution of archaeological material on the surface is thin but even and it is characterised by heavily fragmented pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A lot of ceramic off-site material was found north-east of the site, leading to Site 28 (97110-044), and south of the site. Rather open vegetation covers 0-20 percent of the soil, which consists of coarse, well-drained loose sand. Surface visibility is very good. Erosion and past

cultivation of the terrain, which is claimed by Mr. Berno Berchel (Baie Mahault), appear to have disturbed the find distribution. The terrain is not used nowadays.

3.21.2 Archaeological materials

The material described includes the 1999 surface collection. This consists of a very small number of pottery sherds and lithic artefacts.

3.21.2.1 Pottery

A total of 57 sherds was collected, mostly body sherds (92.9%), weighing 570 g (table A3.103). The appendages/other category, including one spout, represents 1.8% of the sample. No sherds have red slipped surfaces and one rim (1.8%) is decorated by punctation, which is combined with small, narrow incision. No base or griddle fragments have been found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

3.21.2.2 Lithic artefacts

Four local igneous rock artefacts were collected. These include one hammer-stone fragment, one axe fragment and two unidentified objects.

3.21.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.22 PIED DE LA MONTAGNE (97110-029; SC09)

3.22.1 Site location and preservation

The Pied de la Montagne site (x: 712,200; y: 1807,450) was discovered on a flat terrain at the foot of the central plateau of La Désirade during the 1999 surveys (fig. 5.2). Site dimensions are 585 m east to west and 100 m north to south. Grass covers 21-40 percent of the soil, which consists of medium clay in a sandy matrix that is moderately well drained. Surface visibility is good. The surface distribution is characterised by a patchy distribution of complete *Cittarium pica* and *Charonia variegata*, and a very small amount of pottery, associated with colonial and sub-recent material. Two *Strombus gigas* axes were found and Mr. Berno Berchel had collected another. Some shell off-site material was found west and east of the site. The site, of which the terrain is claimed by Mr. Berno Berchel and Mr. Etienne Speno (both from Baie Mahault), has been severely damaged as a result of erosion and long-term cultivation.

3.22.2 Test units and stratigraphy

Three 1 m^2 test units have been excavated. A very small amount of archaeological material was found, mainly consisting of small amounts of shell. In the sections of the test units, ploughing traces were clearly visible (fig. A3.25). The northwest corner of unit 1 was located at 712211.512; 1807458.703; 69.88 (Guadeloupe - Ste. Anne system) or 16°20′10.3248″; -61°1′2.9701″; 26.07 (WGS84). The northwest corner of unit 2 was located at 712168.937; 1807488.447; 73.78 (Guadeloupe - Ste. Anne system) or 16°20′11.3057″; -61°1′4.3945″; 29.98 (WGS84). The northwest corner of unit 3 was located at 712231.775; 1807584.304; 73.43 (Guadeloupe - Ste. Anne system) or 16°20′14.4036″; -61°1′2.2464″; 29.63 (WGS84).

	Number	Number %	Weight	Weight %
Rim	3	5.3	18	3.2
Body	53	92.9	522	91.6
Base	0	0.0	0	0.0
Griddle	0	0.0	0	0.0
Appendage/other	1	1.8	30	5.2
Total	57	100.0	570	100.0

Table A3.103. Number, percentages and weight (g) of sherds collected at the Site 8 surface.

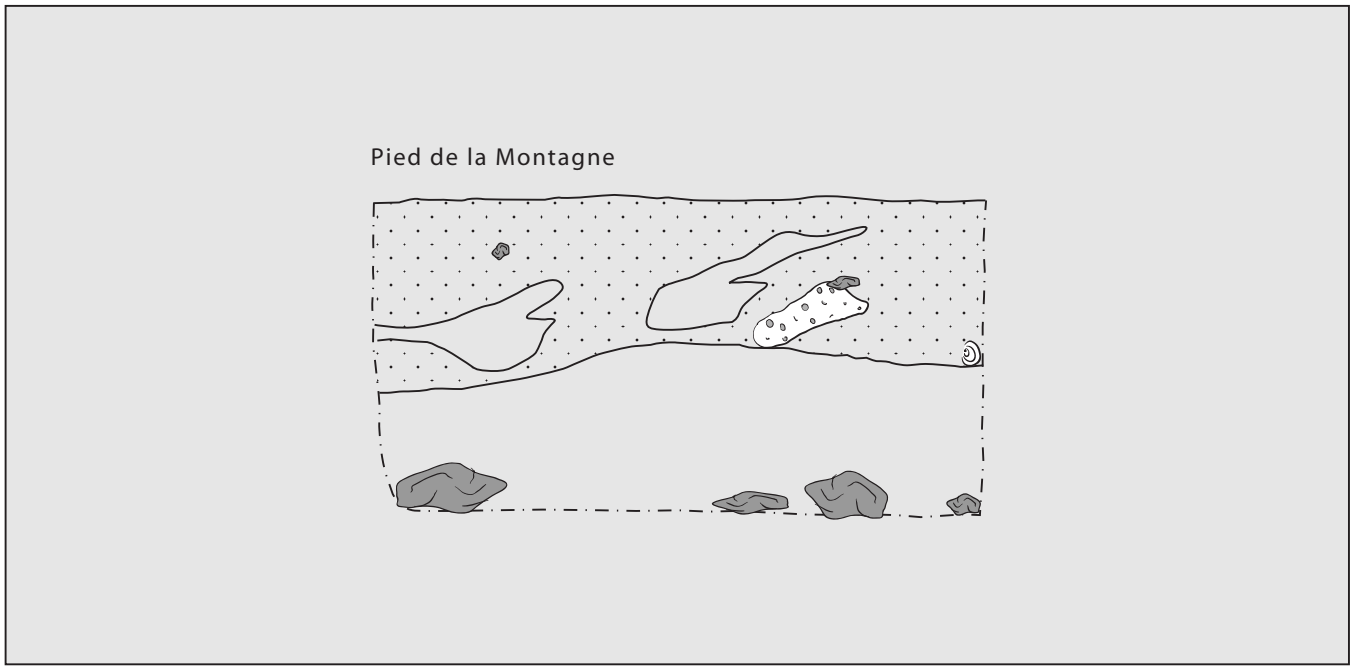


Fig. A3.25. Pied de la Montagne, unit 2 (1 m^2), north section.

3.22.3 Archaeological materials

The material described includes the 1999 surface collection and materials from the 1999 test units.

3.22.3.1 Pottery

A total of 27 sherds was collected, mostly body sherds (92.6%), weighing 340 g (table A3.104). No fragments belonging to the appendages/other category, no sherds with red slipped or decorated surfaces or griddle fragments were found. One flat base was collected. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

3.22.3.2 Lithic artefacts

Four lithic artefacts were collected in 1999. One fragment of a local igneous pebble, with one concave abraded face, which may have been used as a passive grinding/abrading stone, was found on the surface. The test units yielded one flaked fragment of local igneous rock, one local red chert flake and one local igneous rock pebble flake.

3.22.3.3 Shell artefacts

Two *Strombus gigas* adzes were collected. One has been reworked with an angular edge; the other is a small,

beautifully polished tool.

3.22.3.4 Coral artefacts
One axe-shaped *Acropora palmata* active grinding tool fragment and one unidentified object of an unidentified coral species were found.

3.22.3.5 Shellfish remains
The main shellfish remains consisted of *Cittarium pica*, *Charonia variegata* and *Nerita* sp. (table A3.105). Other shell species represented in very low numbers and weights at the site included *Astraea* sp., *Bulimulus guadalupensis*, *Nodilittorina tuberculata*, *Tectarius muricatus*, *Thais* sp., and *Tonna maculosa*. No *Acanthopleura granulata* and *Codakia orbicularis* were found, and hardly any *Strombus gigas*.

3.22.3.6 Animal remains
MNI counts of the 2/5 inch sample (MNI 6, 16 g) of Pied de la Montagne include mainly land hermit crab and some black land crab remains as well (Nokkert in appendix 5).

3.22.4 Chronological assignment
The date of the site is undetermined. No samples for ^{14}C analysis have been collected.

3.23 POINTE COLIBRI (97110-030; SC10)

3.23.1 Site location and preservation
The Pointe Colibri site (x: 703,900; y: 1802,725) was discovered on the coastal plain of Pointe des Colibris

	Number	Number %	Weight	Weight %
Rim	1	3.7	40	11.8
Body	25	92.6	260	76.4
Base	1	3.7	40	11.8
Griddle	0	0.0	0	0.0
Appendage/other	0	0.0	0	0.0
Total	27	100.0	340	100.0

Table A3.104. Number, percentages and weight (g) of sherds collected at the Pied de la Montagne surface in 1999.

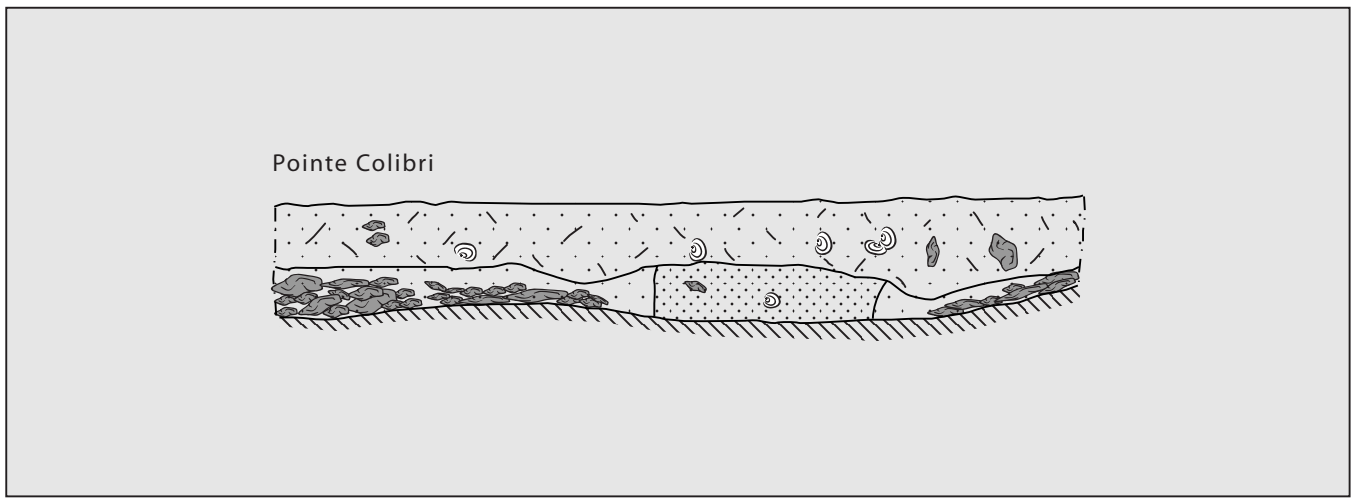
	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	86	4202	1287	5489
	39.8	85.7	98.8	88.4
Charonia variegata	3	582	0	582
	1.4	11.9	0.0	9.4
Nerita sp.	18	13	1	14
	8.3	0.2	0.1	0.2
Other	109	109	12	121
	50.5	2.2	0.9	1.9
Unidentified	0	0	2	2
	0.0	0.0	0.2	< 0.1
Total	216	4906	1302	6208
	100.0	100.0	100.0	100.0

Table A3.105. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Pied de la Montagne collection.

during the 1999 surveys (fig. 5.2). Site dimensions are 110 m from east to west and 125 m from north to south. The archaeological material on the surface consists of an even distribution of ceramics, lithic and coral artefacts and shellfish remains, including *Cittarium pica*, *Strombus gigas* and *Charonia variegata*. Two concentrations of surface material could be identified and test units were excavated there. A lot of ceramic off-site material was found. Thorny brushwood with acacias covers 10-30 percent of the soil, which consists of loose, medium-structured and well-drained sand. Passage across the terrain, which is owned by Mrs. Patrice St. Auret (Les Galets), is easy and surface visibility is very good. The uppermost layer may have disappeared as a result of cultivation in the past. The site is presently used for goat herding.

3.23.2 Test units and stratigraphy

Two 2 x 2 m units were excavated (fig. A3.26). They revealed the presence of a 30 cm thick archaeological layer, containing a very limited quantity of archaeological material. The upper layer of the site may have been removed as a result of cultivation and erosion. The northwest corner of unit 1 was located at 703827.456; 1802711.923; 6.12 (Guadeloupe - Ste. Anne system) or 16°17′38.5295″; -61°5′46.8817″; -37.06 (WGS84). The northwest corner of unit 2 was located at 703808.709; 1802711.202; 6.54 (Guadeloupe - Ste. Anne system) or 16°17′38.5117″; -61°5′47.5133″; -36.64 (WGS84).



0 to 15-25 cm: Fine, dark grayish brown (10YR;4/2) clayey sand containing many plant roots and most archaeological material, including pottery, shell and some lithic and coral artefacts.

15-25 to 23-30 cm: White (10YR;8/1) eroded chunks of chalky bedrock with cracks filled with material from the upper layer, containing less archaeological material.

15-20 to 30 cm: Very fine, brownish yellow (10YR;6/6) powdery clayey sand, containing less archaeological material. This feature, probably pre-Columbian, was not recognised in the excavated level thus it was not sampled separately.

At a depth of 23-30 cm calcareous bedrock was reached.

Cittarium pica

Rock

Fig. A3.26. Pointe Colibri, unit 2 (2 x 2 m), north section.

3.23.3 Archaeological materials

The material described includes the 1999 surface collection and material from the test units.

3.23.3.1 Pottery

A total of 419 sherds was collected, mostly body sherds (65.4%), weighing 6478 g (table A3.106). The appendages/other category, consisting of one lug, represents 0.2% of the sample. A total of 90 sherds has slipped surfaces (21.5%), of which four sherds are beige and the others are red. Ten sherds (2.4%) are decorated by incision on red slip, geometric modelling in the form of an *appliqué* and finger indentation (fig. A3.27; table A3.107). Broad and shallow as well as thin, narrow incision occurs. Almost all bases are

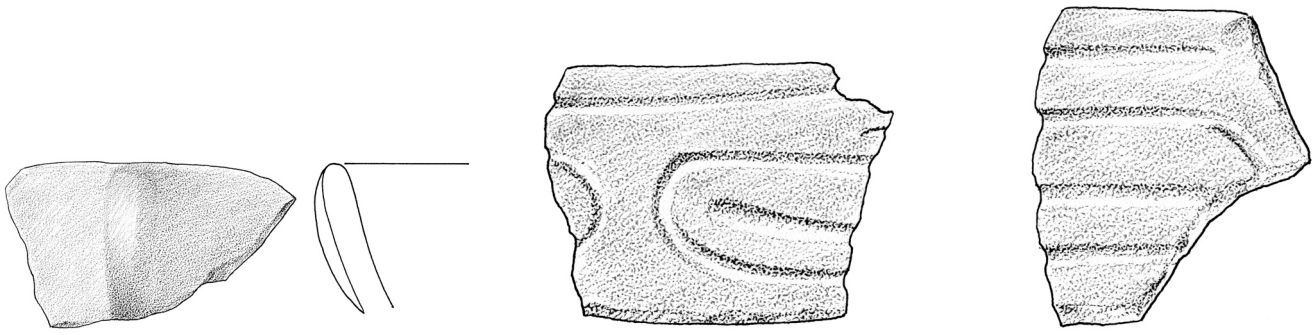


Fig. A3.27. Ceramics from the surface of Pointe Colibri, decorated by an *appliqué* and by incisions (scale 1:2).

	Number	Number %	Weight	Weight %
Rim	75	17.9	1408	21.7
Body	274	65.4	3694	57.0
Base	40	9.6	624	9.6
Griddle	29	6.9	709	11.0
Appendage/other	1	0.2	43	0.7
Total	419	100.0	6478	100.0

Table A3.106. Number, percentages and weight (g) of sherds from Pointe Colibri.

	Number	Number %
Incision	6	60.0
Modelling (geometric)	2	20.0
Finger indentation	2	20.0
Total	10	100.0

Table A3.107. Number and percentages of sherds with particular Pointe Colibri decoration modes.

flat, while straight or unidentified rims dominate the griddles (tables A3.108-A3.109).

The morphological description of the pottery has been based on the analysis of 27 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (70.4%), bowls with restricted simple contours (14.8%) and bowls with unrestricted inflected contours (11.1%); (table A3.110). Most of the rim shapes are rounded (63.0%), flattened (14.8%) and inward thickened (11.1%); (table A3.111). Most of the wall thicknesses are between 6-8 mm (48.2%) and 9-11 mm (48.2%) and orifice diameters range between 11-20 cm (14.8%), 21-30 cm (33.3%), 31-40 cm (14.8%) and 41-50 cm (14.8%), while 22.3% remains unidentified (tables A3.112-A3.113). Surface colours are predominantly reddish brown (44.5%) and red (33.3%); (table A3.114). Most of the firing techniques include incomplete or relatively good oxidation (74.0%), and complete reduction (22.3%); (table A3.115). Surface finishing is predominantly characterised by burnishing (48.1%). For 44.5% the surface finishing could not be identified, as the sherds are so heavily weathered (table A3.116).

	Number	Number %
Flat	34	85.0
Concave	1	2.5
Unidentified	5	12.5
Total	40	100.0

Table A3.108. Number and percentages of sherds within base shape categories from Pointe Colibri.

	Number	Number %
Straight	11	37.9
Triangular	1	3.5
Legged	3	10.3
Unidentified	14	48.3
Total	29	100.0

Table A3.109. Number and percentages of sherds within griddle shape categories from Pointe Colibri.

	Number	Number %
Jar with unrestricted simple contour	9	33.3
Bowl with unrestricted simple contour	7	26.0
Dish with unrestricted simple contour	3	11.1
Bowl with restricted simple contour	4	14.8
Bowl with unrestricted inflected contour	3	11.1
Jar with independent restricted inflected contour	1	3.7
Total	27	100.0

Table A3.110. Number and percentages of sherds within vessel shape categories from Pointe Colibri.

	Number	Number %
Rounded	17	63.0
Flattened	4	14.8
Inward thickened	3	11.1
Outward thickened	2	7.4
Double thickened	1	3.7
Total	27	100.0

Table A3.111. Number and percentages of sherds within rim shape categories from Pointe Colibri.

	Number	Number %
1-5 mm	1	3.6
6-8 mm	13	48.2
9-11 mm	13	48.2
Total	27	100.0

Table A3.112. Number and percentages of sherds within Pointe Colibri wall thickness categories.

	Number	Number %
11-20 cm	4	14.8
21-30 cm	9	33.3
31-40 cm	4	14.8
41-50 cm	4	14.8
Unidentified	6	22.3
Total	27	100.0

Table A3.113. Number and percentages of sherds within Pointe Colibri orifice diameter categories.

	Number	Number %
Dark gray-black	2	7.4
Dark grayish-brown	1	3.7
Light brown-yellow	1	3.7
Dark brown/very dark brown	2	7.4
Reddish brown	12	44.5
Red	9	33.3
Total	27	100.0

Table A3.114. Number and percentages sherds within exterior surface colour categories from Pointe Colibri.

	Number	Number %
Complete reduction	6	22.3
Incomplete oxidation or reduction	1	3.7
Incomplete or relatively good oxidation	20	74.0
Total	27	100.0

Table A3.115. Number and percentages of sherds within Pointe Colibri firing colour categories.

	Number	Number %
Smoothed	1	3.7
Lightly burnished	3	11.1
Highly burnished	10	37.0
Polished	1	3.7
Unidentified	12	44.5
Total	27	100.0

Table A3.116. Number and percentages of sherds within Pointe Colibri exterior surface finishing categories.

3.23.3.2 Lithic artefacts

Several local volcanic rock artefacts were collected (tables A3.117-A3.118). These include 15 pebbles without traces, four pebble fragments (two with pits and abrasion), a possible grinding/abrasive stone pebble fragment, one pitted hammer-stone pebble fragment, one burnt hammer-stone pebble, six polishing stone pebbles, two flaked pebbles with negatives and one complete pitted pebble hammer-stone. One non-local (similar to Martinique jasper) red chert flake core, one Long Island fire-cracked flint flake, an unidentified pebble without traces, one probably calcite pebble and a shatter piece of local red chert were found as well. In addition, eight non-modified, probably natural, conglomerate pebbles and one fragment and 12 natural limestone pieces were collected. The latter are not listed in the tables below.

3.23.3.3 Coral artefacts

A total of 12 coral artefacts was collected (table A3.119). The artefacts include ten, mostly heavily used, *Acropora cervicornis* rasp fragments, and two lightly used *Acropora palmata* passive grinding tool fragments.

3.23.3.4 Shellfish remains

The main shellfish remains consist of *Cittarium pica* and *Strombus gigas* (table A3.120). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata, Acmaea leucopleura*, *Astraea* sp., *Bulimulus guadelupensis*, *Chiton tuberculatus*, *Codakia orbicularis*, *Conus* sp., *Cypraea zebra*, *Cypraecassis testiculus*, *Littorina angustior*, *Murex (phyll.) pomum*, *Nerita* sp., *Nodilittorina tuberculata*, *Tectarius muricatus* and *Tellina* sp.

3.23.4 Chronological assignment

The site yielded Late Ceramic A pottery (probably dated around AD 800-1200) that is rather similar to the material of the Grand Abaque site (97110-026). The ceramic lug shows Suazan Troumassoid style influence and the *appliqué* has rounded forms.

3.24 RAVINE CÉSAR (97110-031; SC14)

3.24.1 Site location and preservation

The Ravine César site (x: 709,075; y: 1806,025) was discovered on a terrain bordered by the slopes of the Rivière ravine and the César ravine during the 1999 surveys (fig.

	Total
Long Island flint	1 2.8
Local volcanic rock	31 86.0
Calcite	1 2.8
Local red chert	1 2.8
Non-local red chert	1 2.8
Unidentified	1 2.8
Total	36 100.0

Table A3.117. Number and percentages of Pointe Colibri rock types.

	Total
Pebble	19 52.7
Pebble fragment	4 11.1
Active polishing stone	6 16.7
Flake/flake core	2 5.6
Hammer-stone	3 8.3
Grinding-stone	1 2.8
Shatter piece	1 2.8
Total	36 100.0

Table A3.118. Number and percentages of Pointe Colibri lithic artefact types.

	Rasp fragment	Grinding tool fragment	Total
Acropora cervicornis	10 83.3		10 83.3
Acropora palmata		2 16.7	2 16.7
Total	10 83.3	2 16.7	12 100.0

Table A3.119. Number and percentages of Pointe Colibri coral species and artefact types.

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	57 73.1	2754 91.9	3199 87.7	5953 89.6
Strombus gigas	1 1.3	76 2.5	388 10.6	464 7.0
Other	20 25.6	166 5.6	58 1.6	224 3.4
Unidentified	0 0.0	0 0.0	3 < 0.1	3 < 0.1
Total	78 100.0	2996 100.0	3648 100.0	6644 100.0

Table A3.120. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Pointe Colibri.

5.2). It was found by accident while traversing the central plateau, looking for a way to get to the Voûte à Pin site (97110-018). Site dimensions are 20 m from east to west and 25 m from north to south. The archaeological material on the surface consists of a small and patchy distribution of moderately fragmented pottery sherds and a limited number of *Cittarium pica* fragments. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A surface collection was made instead. Almost no off-site material was found. Dense shrub and cultivated plants covers 60-80 percent of the soil, which consists of coarse, well drained, clayey sand with many stones. Surface visibility is not very good as dense vegetation hinders observation. Archaeological material was found at places with good visibility, such as the cultivated area and the sandy path. The site is seriously damaged as a result of erosion and cultivation of the terrain, which is claimed by Mr. Etienne Speno (Baie Mahault). It appears to have been ploughed often, which probably resulted in erosion and the displacement of artefacts.

3.24.2 Archaeological materials

The material described consists of the 1999 surface collection. This comprises one fragment of a local volcanic rock pebble with a pitted area on one face, suggesting that it had been used as hammering instrument or as anvil, and a very small amount of pottery. Five rim sherds, four body sherds and one flat base fragment were collected, weighing 196 g. No fragments belonging to the appendages/other category and no griddles were found. Four sherds have red slipped surfaces. The morphological description of the pottery has been based on the analysis of four rims larger than 5 cm. Three of these are part of one and the same vessel but they could not be fitted. The rims belong to bowls and dishes with unrestricted simple contours with rounded and inward thickened rims. Wall thicknesses range between 6-8 mm and 12-15 mm and orifice diameters range between 11-20 cm and 31-40 cm. Surface colours are reddish brown and red, firing technique includes incomplete or relatively good oxidation and surface finishing is crude or polished.

3.24.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.25 MORNE À MARTHE (97110-032; SC18)

3.25.1 Site location and preservation

The Morne à Marthe site (x: 704,300; y: 1803,850) was discovered at the foot of Morne à Marthe hill, north of the Latanier trail, during the 1999 surveys (fig. 5.2). Site dimensions are 100 m from east to west and 250 m from north to south. The archaeological material on the surface consists of an even distribution of small pottery sherds, and shell fragments including *Cittarium pica*, *Strombus gigas* and *Chiton* sp., associated with colonial and sub-recent material. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A very limited amount of ceramic off-site material was found, most of it west of the site. Leaves of the local shrubby vegetation cover 21-40 percent of the soil, which consists of loose, coarse, poorly drained clayey sand. Surface visibility is rather good. The site terrain, which is not in use nowadays, appears to have been perturbed to an important degree as a result of erosion and cultivation in the past. Rainwater runs down the site towards the sandy road and appears to cause serious erosion and artefact displacement.

	Number	Number %	Weight	Weight %
Rim	9	11.3	192	20.2
Body	69	86.3	690	72.6
Base	1	1.2	16	1.7
Griddle	1	1.2	52	5.5
Appendage/other	0	0.0	0	0.0
Total	80	100.0	950	100.0

Table A3.121. Number, percentages and weight (g) of sherds from Morne à Marthe.

3.25.2 Archaeological materials

The material described consists of the 1999 surface collection. This comprises one unidentified artefact of local volcanic rock and a small amount of pottery. A total of 80 weathered sherds was collected, mostly body sherds (86.3%), weighing 950 g (table A3.121). No fragments belonging to the appendages/other category were found. One flat base and one unidentified griddle fragment were collected. No red slipped or decorated sherds were found.

The morphological description of the pottery has been based on the analysis of three rims larger than 5 cm. These are from two bowls with unrestricted simple contours and one bowl with an unrestricted inflected contour. Two of the rims are rounded and the other is inward thickened. Wall thicknesses range between 6-8 mm for two sherds and between 9-11 mm for the other. The orifice diameters are between 21-30 cm but for two rims the orifice diameters remain unidentified. The colour of the outer surfaces of the rims is reddish brown, the firing technique consists of incomplete or relatively good oxidation and the finishing of the outer surfaces is unidentified.

3.25.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.26 AÉROPORT (97110-033; SC19A, SC19B)

3.26.1 Site location and preservation

The Aéroport site (x: 705,125; y: 1803,050) was discovered at the La Désirade airport, on the southern coastal plain, during the 1999 surveys (fig. 5.2). It extends out from both sides of the airstrip. Site dimensions are 450 m east to west and 75 m north to south. The archaeological material on the surface is characterised by an even distribution of moderately fragmented pottery, shellfish remains, including *Cittarium pica*, *Strombus gigas*, *Codakia orbicularis*, *Purpura patula*, *Chiton* sp., *Nerita* sp. and lithic and coral artefacts. Two large concentrations of archaeological material on the surface can be identified (SC19a and SC19b), belonging to one single site but as a result of regular bulldozer activities aimed at the levelling of the terrain, the central part of the site appears to have been destroyed. The densest concentration is found in the south-western part of the site. The northern part of the site, which is situated north of the airstrip, has the lowest number of artefacts on the surface. A lot of ceramic off-site material was found north and east of the site, in the area leading towards the Les Sables site (97110-010) in particular. Coastal vegetation, which consists of ground lianas and sea grape, covers 21-40 percent of the soil, which consists of loose, coarse, well-drained beach sand. Surface visibility is very good. Sand from the site has been used for the concrete that was used to build the airstrip, which is evidenced by several sherds and shells that are included. The site appears to be seriously destroyed as a result of bulldozing activities aimed at levelling parts of the site and removing vegetation, in the central part of the site in particular. This area is in between the two concentrations that were distinguished on the surface. Bulldozing works even hindered relocation of the second test unit that had been excavated in 1999. The upper layers of the central part of the site were simply too disturbed.

3.26.2 Test units and stratigraphy

Three test units were excavated (fig. A3.28). Unit 1 (2 x 2 m) was situated in SC19a in the western part of the site, unit 3 (1 x 2 m) in SC19b in the eastern part of the site and unit 2 (1 x 2 m) was excavated in between these two surface concentrations. Excavation of unit 2 was stopped at a depth of 50 cm as sterile layers were being excavated. Auger tests made in the corners and the centre of the unit demonstrated the presence of ground water at a depth of 145 cm. At 170 cm depth, bedrock had not been reached but further testing was impossible due to the water level. Unit 3 was started as a 1 x 2 m unit. From 70 cm depth onwards a 1 m^2 unit was excavated in the eastern part of the unit as sterile layers were being excavated. At a depth of 105 cm auger tests were made in the corners and the centre of the unit. These revealed the presence of groundwater at a depth of 190 cm. The northwest corner of unit 1 was located at 704917.022; 1802969.738; 1.78 (Guadeloupe - Ste. Anne system) or 16°17′46.5840″; -61°5′10.1052″; -41.47 (WGS84). Unit 2 could not be relocated for topographic measuring, as the area had been destroyed as a result of bulldozing activities. The northwest corner of unit 3 was located at 705310.903; 1803109.569; 1.35 (Guadeloupe - Ste. Anne system) or 16°17′51.0120″; -61°4′56.7955″; -41.92 (WGS84).

3.26.3 Archaeological materials

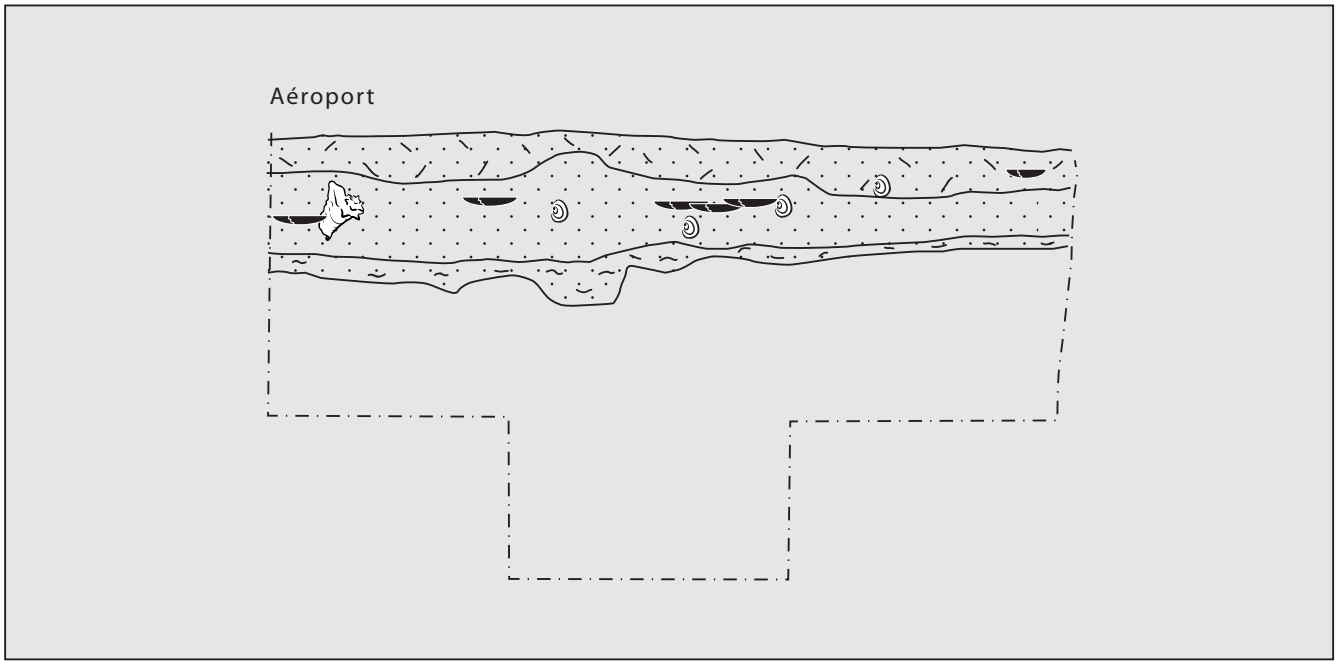
The material described consists of the 1999 surface collections and the material from the test units.

3.26.3.1 Pottery

A total of 998 weathered sherds was collected, mostly body sherds (72.3%), weighing 27,395 g (table A3.122). The appendages/other category represents 0.8% of the sample. This includes a handle, a lug, a spindle whorl, griddle legs and unidentified appendages (fig. A3.29; table A3.123). A total of 182 sherds has slipped surfaces (18.2%), of which three rims larger than 5 cm had beige slipped surfaces, and

seven sherds (0.7%) are decorated by incision and nubbins (table A3.124; fig. A3.30). Incision is usually associated with red slip, and small and deep as well as broad and shallow incision occurs. A rim with 5-double incision emphasised the coil manufacturing of the pottery. Most of the bases are flat and straight and legged griddles were found as well. The shape of most griddle fragments could not be identified, however (tables A3.125-A3.126).

The morphological description of the pottery has been based on the analysis of 101 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (79.2%); (table A3.127; fig. A3.31). Dominant rim shapes are rounded (70.3%) and inward thickened (15.8%); (table A3.128).



0 to 5-16 cm: Fine, grayish brown (10YR;5/2) clayey sand with root disturbance and a lot of archaeological material, consisting of pottery, shell, some faunal remains and lithic and coral artefacts.

5-16 to 27-32 cm: Fine, gray (7.5YR;5/1) clayey sand with root disturbance and a lot of archaeological material, consisting of pottery, shell, some faunal remains and lithic and coral artefacts.

27-32 to 32-44 cm: Fine, pale brown (10YR;6/3) sand, with a small amount of shell.

32-44 to 112 cm: Loose, fine, very pale brown (10YR;8/2) sterile beach sand, with two shell and two lithic artefacts and a very small amount of shell. At a depth of 60-70 cm it was decided to continue digging a 1 x 1 m unit, situated in the centre of the 2 x 2 m unit, since only sterile material was excavated. At 112 cm depth, excavation was stopped since no archaeological material had been found. Auger tests were made in the corners and the centre of the unit up to a depth of 240 cm. At this depth, bedrock had not yet been reached but the groundwater level was reached instead. One single sterile layer could be identified.

Pottery

Strombus gigas

Cittarium pica

Fig. A3.28. Aéroport, unit 1 (2 x 2 m), north section.

Wall thicknesses range between 6-8 mm (32.7%), 9-11 mm (51.5%) and 12-15 mm (11.8%) and orifice diameters range between 11-20 cm (20.8%), 21-30 cm (27.7%) and 31-40 cm (12.9%), while 29.7% remains unidentified (tables A3.129-A3.130). Surface colours are predominantly reddish brown (43.5%), dark brown/very dark brown (21.8%) and red (11.8%); (table A3.131). Most firing techniques include complete reduction (28.7%) and incomplete or relatively good oxidation (63.4%), the latter having 11 irregularly fired sherds (table A3.132). Surface finishing is predominantly characterised by burnishing (73.2%). For 13.9% the surface finishing could not be identified (table A3.133). One of the

	Number	Number %	Weight	Weight %
Rim	180	18.0	6378	23.3
Body	721	72.3	16,833	61.5
Base	41	4.1	1925	7.0
Griddle	48	4.8	1755	6.4
Appendage/other	8	0.8	504	1.8
Total	998	100.0	27,395	100.0

Table A3.122. Number, percentages and weight (g) of sherds from Aéroport.

	Number	Number %
Handle	1	12.5
Lug	1	12.5
Spindle whorls	1	12.5
Griddle leg	2	25.0
Appendage (unident.)	3	37.5
Total	8	100.0

Table A3.123. Number and percentages of sherds within appendages/other categories from Aéroport.

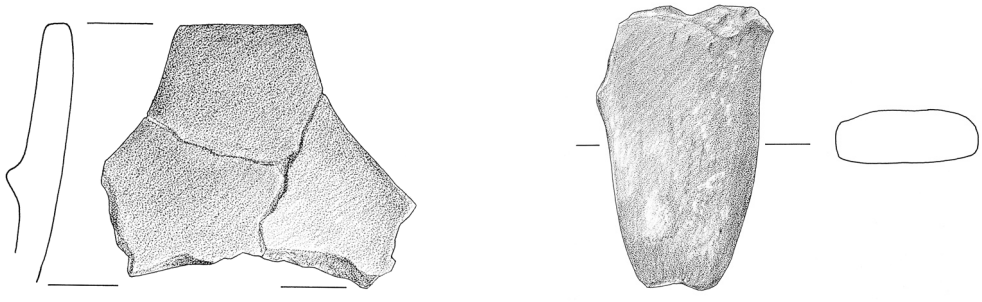


Fig. A3.29. Lug (surface, scale 1:2) and griddle leg (unit 1, level 2, scale 1:3) from Aéroport.

rims is part of a mini vessel, that is a simple open bowl.

3.26.3.2 Lithic artefacts

A total of 85 lithic artefacts was found in the 1999 test units and many are of volcanic rock (table A3.134-A3.135). These include six core tools (one local), four non-modified flake artefacts (two local), two flake fragments (one local), four core artefact fragments (one probable hammer-stone), five pebbles and two pebble fragments (no use wear), one *metate*-like fragment and one complete, flaked active grinding tool. Hypabyssal rock pieces include five flakes without retouch, two core artefacts of local water-worn pebbles, ten core artefact fragments (five local), ten shatter pieces and one modified flint flake fragment. Local plutonic rock pieces include one core artefact, one complete hammer-stone, 11 core artefacts, nine core artefact fragments (among which four grinding-stones), one unidentified core artefact fragment and one modified flake fragment. One complete non-modified limestone/chalk grinding tool was found, together with two sedimentary rock artefacts (one active abrading tool and one La Désirade polishing stone) and the jasper pieces consist of one La Désirade core artefact and

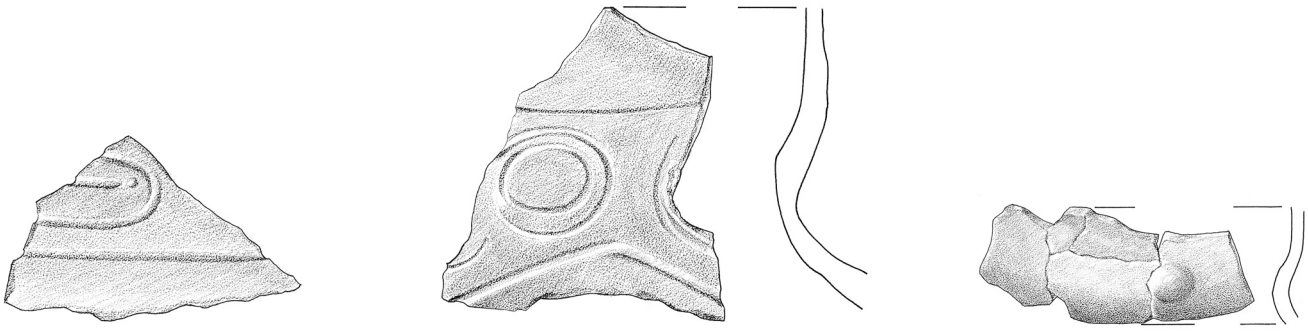


Fig. A3.30. Ceramics from Aéroport, decorated by incision (both from unit 1, level 2, scale 1:2) and by a nubbin (unit 1, level 1, scale 1:3).

	Number	Number %
Incision	6	85.7
Nubbin	1	14.3
Total	7	100.0

Table A3.124. Number and percentages of sherds with particular Aéroport decoration modes.

	Number	Number %
Flat	37	90.2
Concave high	1	2.5
Unidentified	3	7.3
Total	41	100.0

Table A3.125. Number and percentages of sherds within base shape categories from Aéroport.

	Number	Number %
Straight	8	16.6
Overhanging	2	4.2
Unthickened	2	4.2
Legged	7	14.6
Unidentified	29	60.4
Total	48	100.0

Table A3.126. Number and percentages of sherds within griddle shape categories from Aéroport.

	Number	Number %
Jar with unrestricted simple contour	32	31.7
Bowl with unrestricted simple contour	36	35.6
Dish with unrestricted simple contour	12	11.9
Bowl with restricted simple contour	6	5.9
Bowl with unrestricted composite contour	2	2.0
Bowl with unrestricted inflected contour	6	5.9
Jar with independent restricted inflected contour	2	2.0
Bowl with independent restricted complex contour	2	2.0
Unidentified	3	3.0
Total	101	100.0

Table A3.127. Number and percentages of sherds within vessel shape categories from Aéroport.

	Number	Number %
Rounded	71	70.3
Flattened	10	9.9
Inward thickened	16	15.8
Outward thickened	2	2.0
Double thickened	1	1.0
Unidentified	1	1.0
Total	101	100.0

Table A3.128. Number and percentages of sherds within rim shape categories from Aéroport.

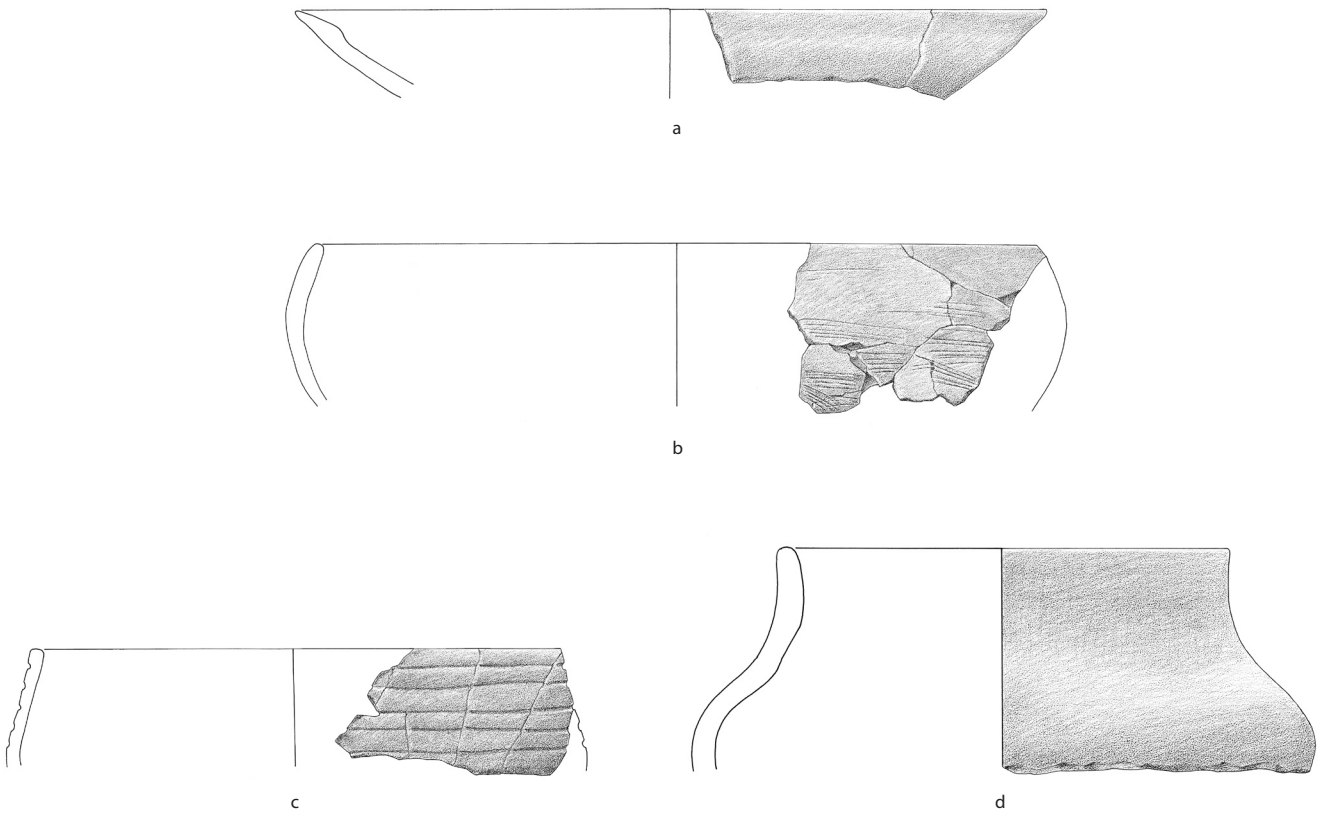


Fig. A3.31. Aéroport vessel shapes (a: unit 1, level 1, scale 1:3; b: unit 1, level 1, scale 1:4; c: unit 1, level 1, scale 1:4; d: unit 1, level 2, scale 1:3).

	Number	Number %
1-5 mm	4	4.0
6-8 mm	33	32.7
9-11 mm	52	51.5
12-15 mm	12	11.8
Total	101	100.0

Table A3.129. Number and percentages of sherds within Aéroport wall thickness categories.

	Number	Number %
11-20 cm	21	20.8
21-30 cm	28	27.7
31-40 cm	13	12.9
41-50 cm	6	5.9
51-60 cm	3	3.0
Unidentified	30	29.7
Total	101	100.0

Table A3.130. Number and percentages of sherds within Aéroport orifice diameter categories.

	Number	Number %
Gray	2	2.0
Dark gray-black	7	6.9
Dark grayish-brown	2	2.0
Light brown-yellow	4	4.0
Light brown/brown	4	4.0
Dark brown/very dark brown	22	21.8
Reddish-gray/dark reddish-gray	3	3.0
Reddish brown	44	43.5
Red	12	11.8
Unidentified	1	1.0
Total	101	100.0

Table A3.131. Number and percentages of sherds within exterior surface colour categories from Aéroport.

	Number	Number %
Complete reduction	29	28.7
Incomplete oxidation or reduction	7	6.9
Incomplete or relatively good oxidation	64	63.4
Unidentified	1	1.0
Total	101	100.0

Table A3.132. Number and percentages of sherds within Aéroport firing colour categories.

	Number	Number %
Crude	1	1.0
Smoothed	2	2.0
Lightly burnished	14	13.9
Highly burnished	60	59.3
Polished	10	9.9
Unidentified	14	13.9
Total	101	100.0

Table A3.133. Number and percentages of sherds within Aéroport exterior surface finishing categories.

one possible Martinique or St. Martin shatter piece. Three shatter pieces of unidentified rock were found as well.

3.26.3.3 Shell artefacts

Two shell artefacts were found, including an unidentified object with polished edges from *Strombus gigas* and a possible *Oliva* sp. bead with worked and polished edges.

3.26.3.4 Coral artefacts

A total of 188 coral artefacts was discovered in the 1999 units (table A3.136). The *Acropora cervicornis* artefacts include 102 rasp fragments (11 with a ground tip, five without use wear, 43 lightly used and 43 heavily used), two heavily used grinding tool fragments and one unidentified object (no use-wear). The *Acropora palmata* artefacts include 12 active grinding tool fragments (11 heavily used) and 68 passive grinding tool fragments (one with a ground tip, one without use wear and most of the remaining fragments were heavily used). One rasp fragment, one heavily used passive grinding tool fragment and one unidentified object of an unidentified coral species were found as well.

3.26.3.5 Shellfish remains

The main shellfish remains consisted of *Cittarium pica*, *Strombus gigas*, and *Nerita* sp. (table A3.137). Other shell species, represented in very low numbers and weights, included *Acanthopleura granulata*, *Arca zebra*, *Astraea* sp., *Bulimulus guadalupensis*, *Chama* sp., *Charonia variegata*, *Chiton tuberculatus*, *Codakia orbicularis*, *Columbella mercatoria*, *Conus* sp., *Cymatium femorale*, *Cypraea zebra*, *Diadora dysoni, Fissurella* sp., *Linga pensylvanica*, *Lucina pectinata*, *Nodilittorina tuberculata*, *Pisiano pusio*, *Polia aritula*, *Purpura patula*, *Tectarius muricatus*, *Thais* sp., *Tonna maculosa* and *Turbo casteana*.

	Total
La Désirade volcanic rock	4 4.7
Volcanic rock	21 24.7
La Désirade hypabyssal rock	7 8.2
Hypabyssal rock	21 24.7
La Désirade plutonic rock	24 28.2
Limestone/chalk	1 1.2
La Désirade sedimentary rock	1 1.2
Sedimentary rock	1 1.2
La Désirade jasper	1 1.2
St. Martin/Martinique jasper	1 1.2
Unidentified	3 3.5
Total	85 100.0

Table A3.134. Number and percentages of Aéroport rock types.

3.26.3.6 Animal remains

MNI counts show that the Aéroport 2/5 inch faunal sample (total MNI 47, total weight 118 g) consists of crab (74.5%), fish (16.9%), mammal (6.4%) and reptile (2.1%). It has a terrestrial component (78.9%) that consists of agouti, unidentified mammal, land hermit crab, black land crab and land crab. A particularly large amount of black land crab has been found. Without land hermit crab included the terrestrial component makes up 44.9% of the total sample. The majority of invertebrate remains may be explained by small sample size or by unrecognized recent intrusive fragments. Several reef herbivores/omnivores (10.6%) have been found, including parrotfish and surgeonfish, while reef carnivores (4.2%) consisting of grouper and Spanish hogfish, make a smaller contribution. Inshore (4.2%) species are represented by sea turtle and porcupinefish (Nokkert in appendix 5).

3.26.4 Chronological assignment

Three unmodified *Cittarium pica* shell samples were obtained from the 1999 test units. They were sent to the Laboratory for Isotopic Research in Groningen (The Netherlands). The BP dates have been calibrated using CALIB 4.2 by M. Stuiver, P.J. Reimer and R. Reimer using the calibration curve for marine shell.[6] Calibrated radiocarbon dates with a 68.3% confidence level suggest that the site was in any case occupied between cal. AD 1074-1136 or 1147-1151, between cal. AD 1049-1112, and between cal. AD 1001-1036 and at a 95.4% confidence level calibrated dates range between cal. AD 1057-1167, cal. AD 1036-1155 and cal. AD 976-1053 (table A3.138).

The pottery collected suggests Late Ceramic A site occupation around AD 1100-1200.

	Total
Core artefact (fragment)	40 47.0
Hammer-stone	2 2.4
(Modified) flake fragment	13 15.2
Grinding-stone (passive or active)	7 8.3
Pebble	5 5.9
Pebble fragment	2 2.4
Passive grinding-stone (fragment)	1 1.2
Shatter piece	14 16.4
Polishing stone	1 1.2
Total	85 100.0

Table A3.135. Number and percentages of Aéroport lithic artefact types.

	Rasp fragment	Active grinding tool fragment	Passive grinding tool fragment	Unidentified	Total
Acropora cervicornis	102 54.3		2 1.0	1 0.5	105 55.8
Acropora palmata		12 6.5	68 36.2		80 42.7
Unidentified	1 0.5		1 0.5	1 0.5	3 1.5
Total	103 54.8	12 6.5	71 37.7	2 1.0	188 100.0

Table A3.136. Number and percentages of Aéroport coral species and artefact types.

3.27 SITE 17 (97110-034; SC20)

3.27.1 Site location and preservation

Site 17 (x: 703,900; y: 1803,050) was discovered on a non-cultivated terrain south of the Route Départementale 207, very close to the western coast of La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 85 m east to west and 20 m north to south. The archaeological material on the surface is thinly but evenly distributed all over the terrain and consists exclusively of very small pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. No off-site material was found. Vegetation lightly covers the soil, which consists of compact clayey sand. Surface visibility is good. The site appears to have been largely destroyed as a result of the construction of the road.

3.27.2 Archaeological materials

A very small amount of non-diagnostic pottery was collected. This included 17 sherds, weighing 198 g.

3.27.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.28 LA RAMÉE (97110-035; SC21)

3.28.1 Site location and preservation

The La Ramée site (x: 704,350; y: 1803,375) was discovered at La Ramée, at the western part of La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 100 m east to west and 75 m north to south. The archaeological material consists of heavily fragmented pottery sherds. As

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	202	32,735	3570	36,305
	25.9	59.8	29.7	54.4
Cittarium pica	364	20,413	7905	28,318
	46.7	37.3	65.9	42.4
Nerita sp.	44	32	10	42
	5.6	< 0.1	0.1	0.1
Other	170	1550	491	2041
	21.8	2.8	4.1	3.0
Unidentified	0	0	18	18
	0.0	0.0	0.2	< 0.1
Total	780	54,730	11,994	66,724
	100.0	100.0	100.0	100.0

Table A3.137. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from Aéroport.

Sample ID	Provenance (unit, level)	Material	BP date	Cal. AD 2σ (95.4%)	Cal. AD 1σ (68.3%)
GrN-26811	Unit 1, level 2	*Cittarium pica*	1290 ± 20	1057-1167	1074-1136, 1147-1151
GrN-26812	Unit 1, level 4	*Cittarium pica*	1315 ± 25	1036-1155	1049-1112
GrN-26813	Unit 1, level 7	*Cittarium pica*	1390 ± 25	976-1053	1001-1036

Table A3.138. Aéroport radiocarbon dates.

the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A limited amount of ceramic off-site material was found. Vegetation lightly covers the soil, which consists of compact, clayey sand. Surface visibility is rather good. The site appears to have been destroyed as a result of cultivation of the terrain and of constructions at La Ramée.

3.28.2 Archaeological materials

A small surface collection was made at the site consisting of 25 non-diagnostic sherds, weighing 202 g.

3.28.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.29 SITE 19 (97110-036; SC22)

3.29.1 Site location and preservation

Site 19 (x: 704,600; y: 1803,600) was discovered east of the Ramée site across several fenced properties in the western part of La Désirade during the 1999 surveys (fig. 5.2). The La Ramée inhabitants own the site terrain. Site dimensions are approximately 200 m east to west and 85 m north to south. The archaeological material consists of a thin and even distribution of small pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A limited amount of ceramic off-site material was found. Vegetation lightly covers the soil, which consists of compact clayey sand. Passage across the terrain is hindered as a result of the many fences but surface visibility is rather good. The site appears to have been perturbed as a result of cultivation of the terrain.

3.29.2 Archaeological materials

A small surface collection was made at the site consisting of 32 pottery sherds, together weighing 302 g, and one local volcanic rock hammer-stone.

3.29.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.30 CHEMIN DE LA MONTAGNE (97110-037; SC27)

3.30.1 Site location and preservation

The Chemin de la Montagne site (x: 710,575; y: 1806,775) was discovered on a flat terrain, north of the sandy road that crosses the central plateau of La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 225 m east to west and 135 m north to south. The archaeological material on the surface is characterised by a thin and even distribution of heavily fragmented non-diagnostic pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Some ceramic off-site material was found south of the site. Vegetation densely covers the soil, which consists of loose clayey sand. It is not difficult to traverse the terrain, though, as vegetation is not thorny. Surface visibility is rather good. The site appears to be seriously eroded and disturbed as a result of cultivation in the past.

3.30.2 Archaeological materials

A surface collection has been made at the site, including one rim, 35 body sherds, together weighing 444 g, and three local volcanic rock grinding-stone fragments. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological description could be provided for the ceramics of this site.

3.30.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.31 POINTE GROS REMPART (97110-038; SC28)

3.31.1 Site location and preservation

The Pointe Gros Rempart (x: 712,600; y: 1806,625) was discovered on a protruding coastal plateau on the southern plain of La Désirade, just west of Baie Mahault bay, during the 1999 surveys (fig. 5.2). Site dimensions are 75 m from west to east and 60 m north to south. The archaeological material on the surface consists of an even distribution of mainly lithic artefacts of local raw materials such as chert and igneous rock. Lithic artefacts include flakes, cores, a small quantity of hammer-stones and flaking waste material. In addition, some pottery sherds and shell and coral artefacts were collected as well. Shell fragments, including *Cittarium*

pica, *Strombus gigas* and *Chiton* sp., and some coral fragments were observed but not collected. A small concentration of artefacts, measuring 10 x 25 m, was identified at the centre of the site. Two test units were excavated there. No off-site material was found. Low shrubby vegetation covers 0-20 percent of the soil, which consists of loose, medium-structured, well-drained clayey sand with exposed bedrock at many locations. Surface visibility is very good. The site, which is presently used for goat herding, and which appears to be rather superficial, and is slightly disturbed as a result of erosion.

3.31.2 Test units and stratigraphy

Two test units measuring 1 m^2 were excavated (fig. A3.32). The north-west corners of the units, measuring 20 x 20 cm, were sieved over 2 mm screens. The units demonstrated that the archaeological material is mostly restricted to the surface and that the site is very shallow. The northwest corner of unit 1 was located at 712581.719; 1806612.033; 5.82 (Guadeloupe - Ste. Anne system) or 16°19′42.6695″; -61°0′50.7781″; -37.98 (WGS84). The northwest corner of unit 2 was located at 712570.502; 1806612.394; 5.85 (Guadeloupe - Ste. Anne system) or 16°19′42.6848″; -61°0′51.1558″; -37.95 (WGS84).

3.31.3 Archaeological materials

The material described includes the 1999 surface collections as well as material from the test units.

3.31.3.1 Pottery

One rim and seven body sherds, weighing 108 g, were collected. No fragments belonging to the appendage/other category, bases or griddles were found. No red slipped or decorated sherds were collected. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims had been found, no morphological and technological

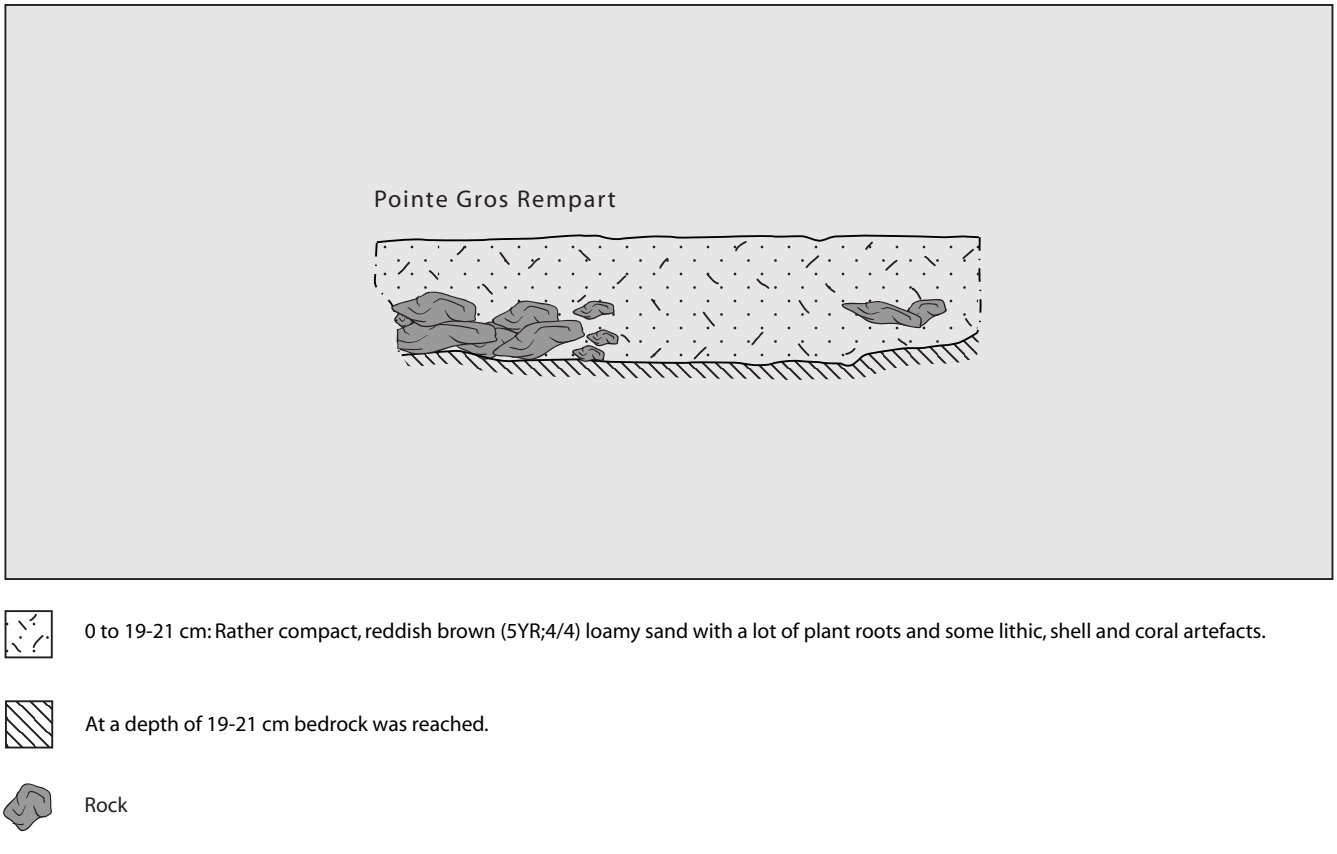


Fig. A3.32. Pointe Gros Rempart, unit 2 (1 m^2), south section.

description could be provided for the ceramics of this site.

3.31.3.2 Lithic artefacts
A total of 63 lithic artefacts was collected (tables A3.139-A3.140). These include several igneous rock pieces such as one unidentified piece (possibly a flake), one pebble, a burnt and broken pebble, one flaked pebble fragment, two pitted hammer-stone pebbles and one fragment, three pebble fragments, one flaked pebble (possibly a flake core), six flakes and two pebble flakes. One flake core, five flakes, one indistinct flake core and four shatter pieces of dark gray chert were collected as well, as were 20 flakes, three flake cores and one shatter piece of local red chert, two small white chert flakes and three shatter pieces of a non-local red chert. One burnt unidentified flint flake, two Long Island flint flakes and one dark gray-brown flake of a chert or flint pebble, were found as well. The cortex of the latter artefact suggests that it is chert. The material is dissimilar to the other dark chert found at the site. It uncertain whether this material is local. The dark gray chert artefacts are very similar to those from the Pointe Doublé site, although the material is more flint-like there. This further confirms the local origin of the material. Although no red chert has surfaced at the site, the material appears to actually have been worked there.

3.31.3.3 Shell artefacts
Two *Strombus gigas* artefacts, possibly gouges with a sharpened edge, were discovered.

3.31.3.4 Coral artefacts
Very few coral artefacts were found. Three unidentified *Acropora palmata* objects were collected at the surface and the units yielded nine heavily used *Acropora palmata* passive grinding tool fragments.

3.31.4 Chronological assignment
The chronological assignment for the site is largely undetermined, as neither ceramics nor ^{14}C samples could be collected for analysis. The site was probably used on a very limited scale from time to time by people living at different sites on La Désirade in pre-Columbian times. The archaeological material does not suggest pre-ceramic use of the site.

3.32 RAVINE À MOKO (97110-039; SC29)

3.32.1 Site location and preservation
The Ravine à Moko site (x: 711,000; y: 1806,700) was

	Total
Igneous rock	19 30.2
Long Island flint	2 3.2
Unidentified flint	1 1.6
Local dark gray chert	12 19.0
White chert	2 3.2
Local red chert	24 38.1
Non-local red chert	3 4.7
Total	63 100.0

Table A3.139. Number and percentages of Pointe Gros Rempart rock types.

	Total
Pebble	2 3.2
Pebble fragment	4 6.4
Hammer-stone	3 4.7
Flake	39 61.9
Flake core	6 9.5
Shatter piece	8 12.7
Unidentified	1 1.6
Total	63 100.0

Table A3.140. Number and percentages of Pointe Gros Rempart lithic artefact types.

discovered during the 1999 surveys on the western border of the Moko ravine and east of the trail leading to Morne Cybèle (fig. 5.2). Site dimensions are 170 m east to west and 230 m north to south. The archaeological material on the surface consists of five patches characterised by small pottery fragments, which are linked by areas with fewer artefacts. Shell fragments, including *Cittarium pica* and *Strombus gigas*, have been observed on the surface but these have not been collected. The material in the concentrations is not evenly distributed neither. The concentrations measure 60 x 40 m (SC29a), 8 x 20 m (SC29b), 10 x 10 m (SC29c), 20 x 40 m (SC29d) and 15 x 40 m (SC29e). SC29a and SC29b have the densest find densities, while SC29d contains very few artefacts. A lot of ceramic off-site material was found. No test units were excavated. Dense thorny bush covers 21-40 percent of the soil, which consists of fine, moderately well drained sandy clay with many stones. Several open patches facilitate passage across the terrain and surface visibility. The terrain is not used at present but it appears to have been moderately disturbed as a result of erosion.

3.32.2 Archaeological materials

The material described includes the 1999 surface collection, which consists of 540 g of pottery and four lithic artefacts.

3.32.2.1 Pottery

A total of 20 sherds was collected, together weighing 540 g (table A3.141). No fragments belonging to the appendages/other category were collected. Six red slipped and two sherds decorated by incision were found. One red slipped rim larger than 5 cm was decorated by an elaborate scroll-motif incision (fig. A3.33). One flat base and a legged griddle fragment were found as well.

The morphological description of the pottery has been based on the analysis of four weathered rims larger than 5 cm. Vessel shapes include one jar and two bowls with unrestricted simple contours and one remains unidentified. Rim shapes are rounded, inward and double thickened and unidentified. The wall thickness of all rims is 9-11 mm and orifice diameters are 21-30 cm and 31-40 cm and the orifice diameter of two rims remains unidentified. Surface colours are reddish brown for two sherds, dark brown/very dark brown and unidentified. Incomplete or relatively good oxidation is the firing technique and for one sherd it remains unidentified. One of the sherds has been irregularly fired. The finishing of the outer surfaces of all four rims is unidentified.

3.32.2.2 Lithic artefacts

Three flaked pebbles and one flake of local volcanic rock were collected.

3.32.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

Fig. A3.33. Sherd from the surface of Ravine à Moko (scale 1:2) decorated by an elaborate scroll-motif incision.

	Number	Number %	Weight	Weight %
Rim	10	50.0	276	51.1
Body	8	40.0	152	28.2
Base	1	5.0	34	6.3
Griddle	1	5.0	78	14.4
Appendage/other	0	0.0	0	0.0
Total	20	100.0	540	100.0

Table A3.141. Number, percentages and weight (g) of sherds from Ravine à Moko.

3.33 LES ÉOLÉENS (97110-040; SC30)

3.33.1 Site location and preservation

The Les Éoléens site (x: 708,825; y: 1804,900) was discovered on the terrain of the windmills that were built above Souffleur on the southern part of the central plateau on La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 200 m east to west and 30 m north to south. The archaeological material on the surface consists of an even distribution of moderately fragmented ceramics. Shell fragments, including *Cittarium pica* and *Chiton* sp., were observed but not collected. The western part of the site appears to have a slightly denser concentration of archaeological material. A very limited amount of ceramic off-site material was found north of the site. No test units were excavated. Low thorny shrub covers 21-40 percent of the soil, which consists of loose, fine, moderately well drained, dusty sandy clay. Surface visibility is very good. The biggest part of the site has been destroyed as a result of windmill constructions on the site. The surface distribution is further negatively influenced by cultivation in the past and by continuing erosion as the site is virtually without protection of vegetation.

3.33.2 Archaeological materials

The material described consists of the 1999 surface collection that includes two lithic artefacts and a small amount (1150 g) of pottery.

3.33.2.1 Pottery

A total of 88 rather weathered sherds was collected, mostly body sherds (71.6%), together weighing 1150 g (table A3.142). No fragments belonging to the appendages/other category were found. A total of 30 sherds has red slipped surfaces (34.1%) and four red slipped sherds (4.5%) have been decorated by small, narrow incision. Three flat and one unidentified base fragment and four unidentified griddle fragments were found as well. The morphological description of the pottery has been based on the analysis of two rims larger than 5 cm. These belong to a jar and a bowl with unrestricted simple contours. Rim shapes are rounded and flattened. Wall thicknesses range between 6-8 mm and 9-11 mm and orifice diameters range between 11-20 cm and 21-30 cm. Surface colours are reddish brown and red. Firing techniques include complete reduction and incomplete or relatively good oxidation. The finishing of the outer surfaces includes light burnishing or unidentified finishing.

3.33.2.2 Lithic artefacts

Two local volcanic rock artefacts were collected. These include one pebble fragment, with hammering pits on the edge and sides, and one complete pebble with clear use wear. The latter is probably an axe-preform with lightly pecked sides and ends, which are the result of hammering activities.

3.33.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.34 MORNE SOUFFLEUR (97110-041; SC31A, SC31B)

3.34.1 Site location and preservation

The Morne Souffleur site (SC31a; x: 708,725; y: 1804,800) was discovered during the 1999 surveys on the southern border of the central plateau of La Désirade, west of the terrain of the windmills (fig. 5.2). Site dimensions are 90 m east to west and 35 m north to south. The archaeological

	Number	Number %	Weight	Weight %
Rim	17	19.2	250	21.7
Body	63	71.6	602	52.4
Base	4	4.6	170	14.8
Griddle	4	4.6	128	11.1
Appendage/other	0	0.0	0	0.0
Total	88	100.0	1150	100.0

Table A3.142. Number, percentages and weight (g) of sherds from Les Éoléens.

material on the surface consists of an even distribution of moderately fragmented Morne Cybèle style ceramics. Some shell fragments, including *Cittarium pica*, *Strombus gigas*, *Codakia orbicularis* and *Chiton* sp., were found as well. A 30 x 50 m concentration was identified near the border of the plateau. Another small concentration (SC31b), with hardly any shell material on the surface, was identified 15 m west of the Éoléens site (97110-040) and 15 m east of SC31a. This 10 x 10 m concentration is also situated right on the border of the plateau and it is deemed to be part of the Morne Souffleur site. Both concentrations are linked by a very small amount of ceramic surface material. A lot of unidentified Late Ceramic A ceramic off-site material was found. Vegetation covers 41-60 percent of the soil, which consists of loose, fine, moderately well drained dusty clay with a small sand component. Passage across the terrain is very easy and surface visibility is good. Mr. Jean De l'Orme (La Montagne) claims the site terrain that is presently used for cultivation as it probably was in the past. Parts of the site are seriously disturbed as a result of cultivation. During the 2000 fieldwork campaign, it turned out to be complicated to find the exact 1999 test unit locations as a result of recent digging activities. Moreover, the part of the site that is at the edge of the plateau is eroded. As was also reported for the Morne Cybèle site (97110-012), archaeological material appears to be present in bedrock cavities. Other parts of the archaeological deposits and the midden area, which are located in the interior part of the site, appear to be intact. However, archaeological intervention is highly recommendable!

3.34.2 Test units and stratigraphy

Two 2 x 2 m test units were excavated (fig. A3.34). These demonstrated the existence of an archaeological layer at 0-20 cm below the surface. The northwest corner of unit 1 was located at 708666.459; 1804733.933; 274.62 (Guadeloupe - Ste. Anne system) or 16°18′42.8127″; -61°3′3.2616″; 231.10 (WGS84). The northwest corner of unit 2 was located at 708666.797; 1804739.472; 274.43 (Guadeloupe - Ste. Anne system) or 16°18′42.9927″; -61°3′3.2484″; 230.92 (WGS84).

3.34.3 Archaeological materials

The material described includes the 1999 surface collections as well as the material from the test units.

3.34.3.1 Pottery

A total of 385 sherds was collected, mostly body sherds (74.6%), together weighing 4723 g (table A3.143). The appendages/other category represents 1.3% of the sample. This includes a lug, vessel-legs, an *adorno* and an unidentified appendage (table A3.144). The legs may also belong to a figurine, however. A total of 31 sherds has red slipped surfaces (8.1%) and eight sherds (2.1%) are decorated by incision, geometric modelling decorated by punctation, anthropomorphic modelled incised *appliqué* and punctation (table A3.145; fig. A3.35). One lug and one small leg are decorated by a combined decoration of incision and punctation. The anthropomorphic modelled incised *adorno* is also embellished by punctation. A total of 19 flat bases was found, as were eight unthickened griddles. All griddle fragments are part of one griddle but they could not be fitted. A significant share of the pottery has rather weathered surfaces.

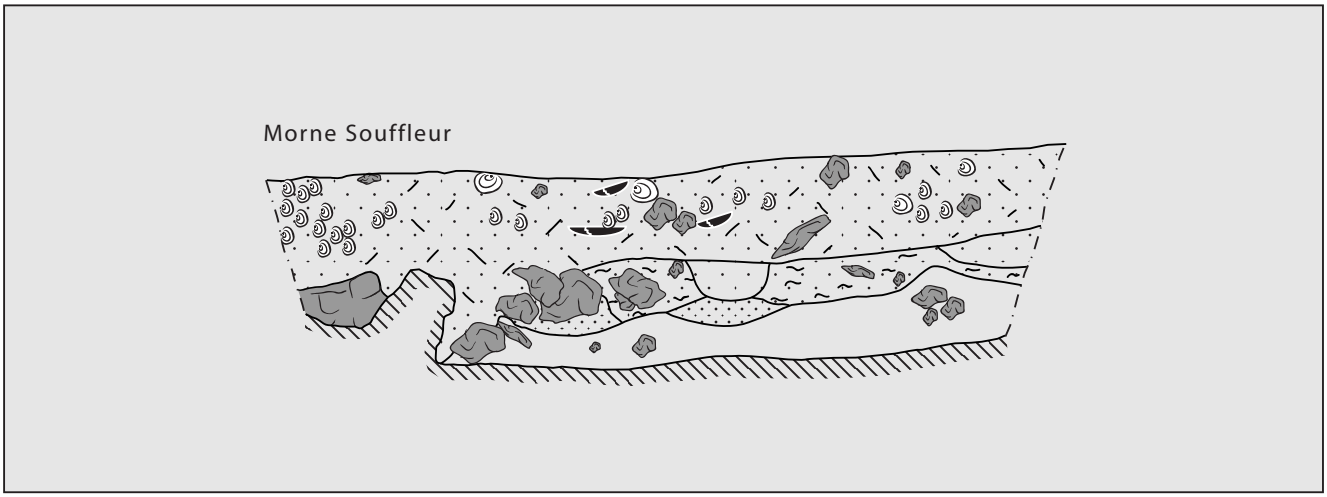
The morphological description of the pottery has been based on the analysis of 19 rims larger than 5 cm. These belong to jars and bowls with unrestricted simple contours (79.0%) and bowls with restricted simple contours (21.0%); (table A3.146; fig. A3.36). Dominant rim shapes are rounded (68.4%) and flattened (21.0%); (table A3.147). Wall thicknesses range between 1-5 mm (26.4%), 6-8 mm (36.8%) and 9-11 mm (36.8%) and orifice diameters range between 11-20 cm (21.0%), 21-30 cm (21.0%), 31-40 cm (21.0%) and 41-50 cm (10.6%), while 26.4% remains unidentified (tables A3.148-A3.149). Surface colours are predominantly reddish brown (47.4%), dark gray-black (15.5%), dark brown/very dark brown (10.6%), reddish-gray/dark reddish-gray (10.6%) and red (10.6%); (table A3.150). Firing techniques include incomplete or relatively good oxidation (47.4%), complete reduction (36.8%), as well as incomplete oxidation or reduction (15.8%); (table A3.151). One incomplete or relatively well oxidised rim and one incomplete oxidised rim had been irregularly fired. Surface finishing is predominantly characterised by burnishing (52.6%) and polishing (10.6%). For 36.8% the surface finishing could not be identified (table A3.152).

3.34.3.2 Lithic artefacts

The Morne Souffleur lithic artefacts include a lot of igneous pieces (tables A3.153-A3.154). These include three pebble fragments without use wear, four flakes, one angular abraded active or passive grinding/abrading stone pebble fragment, two large abraded pebble fragments (possible passive grinding/abrading stones), two complete pitted hammer-stones and 12 unidentified (possibly natural) fragments. In addition, one flaked pebble, three flakes and two shatter pieces of local red chert and one non-local red chert shatter piece, two conglomerate rock passive grinding-stone fragments, one complete and heavily weathered St. Martin chert petaloid celt (fig A3.37), unidentified green chert-like flake core and one limestone flake were found.

3.34.3.3 Shell artefacts

Three shell artefacts were found. These include two perforated unidentified *Cittarium pica* objects and a carved and heavily polished *Strombus costatus* shell mask (fig. A3.38). This 12 cm long mask, representing a human face adorned with a headband decorated by punctation, appears to be more or less three-dimensional as it follows the rounded structure of the complete shell. Somewhat similar shell masks, referred to as Taíno style (e.g. Bodu 1985[a]; see section 4.2.4 for comments), have been found in the region, for example at the Anse du Coq site on Marie-Galante (Hoogland and Hofman 1999) and at the Rendezvous Bay and Sandy Hill sites on Anguilla (Crock 2000; Crock and Petersen 1999); (*cf*. section 5.5.1). The style of the shell mask from the Morne Cybèle-1 site (97110-012) is slightly different.



0 to 19-52 cm: Fine, very dark brown (10YR;2/2) sandy clay with a humus component, a lot of plant roots and almost all the archaeological material, consisting of pottery, shell food remains, and lithic, shell and coral artefacts. At 15 cm depth, a beautifully decorated shell mask was found in the western part of the section.

19 to 29 cm and 26 to 36 cm: Sterile, dark brown (10YR;3/3) sandy clay with several rocks.

25 to 28-41 cm: Sterile, brown (10YR;4/3) sandy clay with a small humus component, intersected by patches of dark brown (10YR;3/3) and dark yellowish brown (10YR;4/6) sandy clay. This layer contained one lithic artefact, two coral artefacts and a very small amount of shell.

35 to 44 cm and 36 to 42 cm: Sterile, dark yellowish brown (10YR;4/6) sandy clay (maximum length 30 cm).

28-42 to 55 cm: Sterile, light gray (10YR;7/2) very powdery sandy clay with a lot of lithic bedrock nodules.

In the western part of the section, light-brownish gray (10YR;6/2) calcareous bedrock was reached at a depth of approximately 55 cm.

Pottery

Rock

Cittarium pica

Fig. A3.34. Morne Souffleur, unit 2 (2 x 2 m), south section.

	Number	Number %	Weight	Weight %
Rim	66	17.1	1272	26.9
Body	287	74.6	2651	56.1
Base	19	4.9	164	3.5
Griddle	8	2.1	580	12.3
Appendage/other	5	1.3	56	1.2
Total	385	100.0	4723	100.0

Table A3.143. Number, percentages and weight (g) of sherds from Morne Souffleur.

	Number	Number %
Lug	1	20.0
Vessel leg	2	40.0
Adorno	1	20.0
Unidentified appendage	1	20.0
Total	5	100.0

Table A3.144. Number and percentages of sherds within appendages/other categories from Morne Souffleur.

	Number	Number %
Incision	3	37.5
Modelling (geometric)	1	12.5
Modelled incised *appliqué* (anthropomorphic)	1	12.5
Punctation	3	37.5
Total	8	100.0

Table A3.145. Number and percentages of sherds with particular Morne Souffleur decoration modes.

	Number	Number %
Jar with unrestricted simple contour	6	31.6
Bowl with unrestricted simple contour	9	47.4
Bowl with restricted simple contour	4	21.0
Total	19	100.0

Table A3.146. Number and percentages of sherds within vessel shape categories from Morne Souffleur.

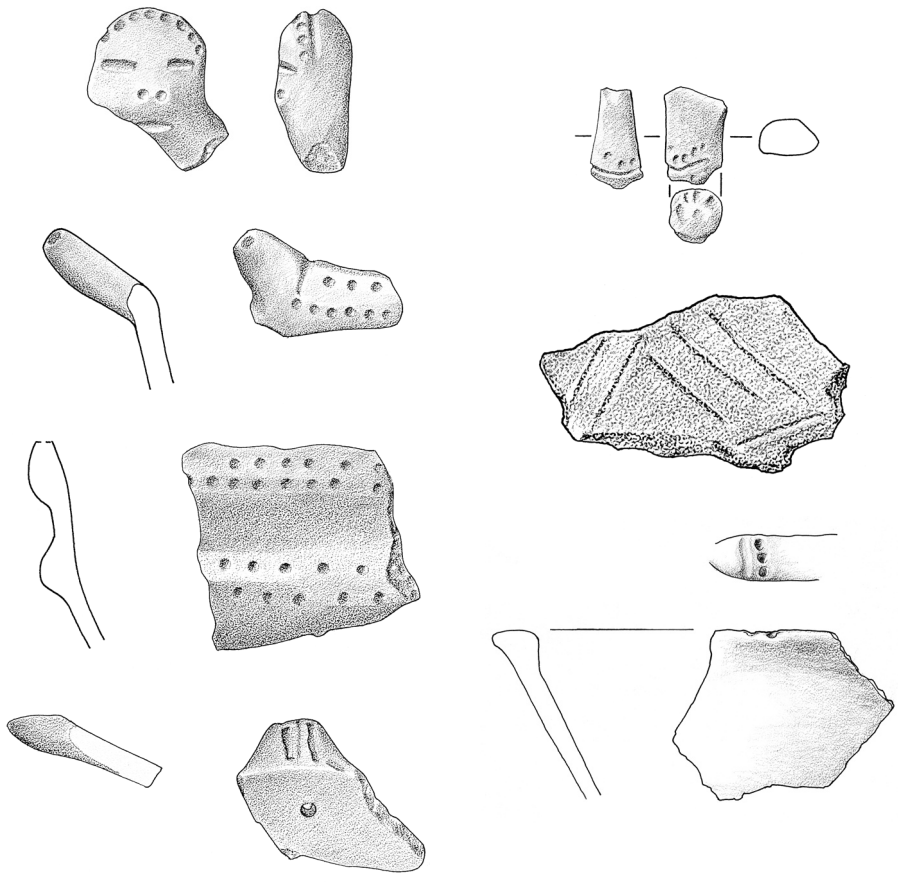


Fig. A3.35. Morne Cybèle style ceramics from the surface of Morne Souffleur (scale 1:2), decorated by incision and punctation.

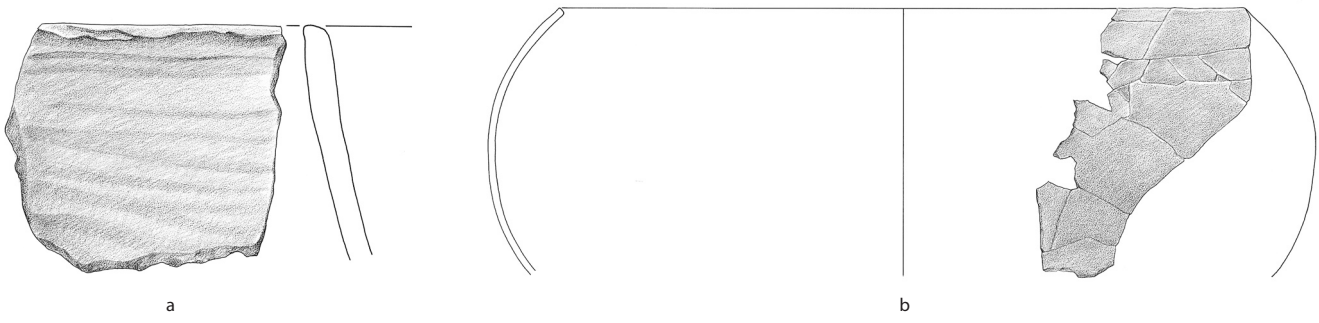


Fig. A3.36. Morne Souffleur ceramic vessels (a: surface, scale 1:3; b: unit 2, level 1, scale 1:4).

	Number	Number %
Rounded	13	68.4
Flattened	4	21.0
Inward thickened	1	5.3
Outward thickened	1	5.3
Total	19	100.0

Table A3.147. Number and percentages of sherds within rim shape categories from Morne Souffleur.

	Number	Number %
1-5 mm	5	26.4
6-8 mm	7	36.8
9-11 mm	7	36.8
Total	19	100.0

Table A3.148. Number and percentages of sherds within Morne Souffleur wall thickness categories.

	Number	Number %
11-20 cm	4	21.0
21-30 cm	4	21.0
31-40 cm	4	21.0
41-50 cm	2	10.6
Unidentified	5	26.4
Total	19	100.0

Table A3.149. Number and percentages of sherds within Morne Souffleur orifice diameter categories.

	Number	Number %
Dark gray-black	3	15.5
Light brown/brown	1	5.3
Dark brown/very dark brown	2	10.6
Reddish-gray/dark reddish-gray	2	10.6
Reddish brown	9	47.4
Red	2	10.6
Total	19	100.0

Table A3.150. Number and percentages of sherds within Morne Souffleur exterior surface colour categories.

	Number	Number %
Complete reduction	7	36.8
Incomplete oxidation or reduction	3	15.8
Incomplete or relatively good oxidation	9	47.4
Total	19	100.0

Table A3.151. Number and percentages of sherds within Morne Souffleur firing colour categories.

	Number	Number %
Lightly burnished	1	5.2
Highly burnished	9	47.4
Polished	2	10.6
Unidentified	7	36.8
Total	19	100.0

Table A3.152. Number and percentages of sherds within Morne Souffleur exterior surface finishing categories.

	Total
Igneous rock	24 66.6
Local red chert	6 16.7
Non-local red chert	1 2.8
St. Martin chert	1 2.8
Unidentified green chert	1 2.8
Limestone	1 2.8
Conglomerate rock	2 5.5
Total	36 100.0

Table A3.153. Number and percentages of Morne Souffleur rock types.

	Total
Pebble	1 2.8
Pebble fragment	3 8.3
Axe	1 2.8
Active or passive grinding-stone	1 2.8
Passive grinding-stone	4 11.1
Hammer-stone	2 5.5
Flake	8 22.3
Flake core	1 2.8
Shatter piece	3 8.3
Unidentified	12 33.3
Total	36 100.0

Table A3.154. Number and percentages of Morne Souffleur lithic artefact types.

3.34.3.4 Coral artefacts
Coral artefacts include 14 heavily used *Acropora palmata* passive grinding tool fragments, seven heavily used *Acropora palmata* active grinding tool fragments and one *Acropora palmata* unidentified object.

3.34.3.5 Shellfish remains
The main shellfish remains consisted of *Cittarium pica* (table A3.155). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata*, *Astraea* sp., *Codakia orbicularis*, *Columbella mercatoria*, *Nerita* sp., *Nodilittorina tuberculata*, *Polia aritula*, *Polynisus lacteus*, *Strombus gigas, Tectarius muricatus*, *Tellina* sp., *Thais* sp., and *Tonna maculosa*.

3.34.3.6 Animal remains
The very small 2/5 inch sample (MNI 2, 6 g) of Morne Souffleur consists of the inshore species of porcupine fish and land hermit crab (Nokkert in appendix 5).

3.34.4 Chronological assignment
The Morne Souffleur site was frequented during the Late Ceramic B. The archaeological materials found at the site are rather identical to those found at the Morne Cybèle-1 site (97110-012). The style of the pottery is typically Morne Cybèle and it is quite a coincidence that both sites yielded a shell mask. The period of use of both sites may be similar as well. Calibrated radiocarbon dates, from a *Cittarium pica* sample, with a 95.4% confidence level suggest that Morne Cybèle was used around AD 1440-1480.

3.35 MORNE FRÉGULE (97110-042; SC36)

3.35.1 Site location and preservation
The Morne Frégule site (x: 703,850; y: 1803,750) was discovered at the slope descending from Morne Frégule towards the Anse des Galets site, in the western part of La Désirade, during the 1999 surveys (fig. 5.2). Morne Frégule is a small cave site where a small amount of heavily fragmented pre-Columbian pottery and two shell artefacts were found on the surface. Shell fragments were observed on the surface of the site, but they were not collected. No test units have been excavated. Almost no off-site material was found. The site has been almost completely destroyed as a result of the collapsing of an important part of the cave.

3.35.2 Archaeological materials
The material described includes the 1999 surface collection. This consists of a very small amount of pottery and two unidentified pointed artefacts from *Strombus gigas*. A total of

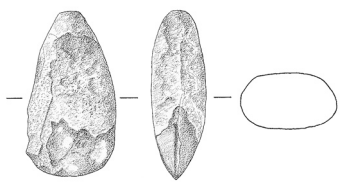


Fig. A3.37. St. Martin chert petaloid celt from the surface of Morne Souffleur (scale 1:3).

Fig. A3.38. *Strombus costatus* mask from Morne Souffleur (unit 2, level 2, scale 1:3).

	MNI count	MNI weight	Fragment weight	Total weight
Cittarium pica	165	6032	7183	13,215
	73.7	94.2	95.9	95.1
Nerita sp.	13	7	0	7
	5.8	0.1	0.0	< 0.1
Other	46	362	303	665
	20.5	5.7	4.1	4.7
Unidentified	0	0	5	5
	0.0	0.0	< 0.1	< 0.1
Total	224	6401	7491	13,892
	100.0	100.0	100.0	100.0

Table A3.155. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species collected at Morne Souffleur.

14 sherds, weighing 82 g, has been collected. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided for the ceramics of this site.

3.35.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.36 GROTTE DE MORNE BLANC (97110-043; SC37)

3.36.1 Site location and preservation

The Grotte de Morne Blanc site (x: 705,200; y: 1803,800) was discovered at Morne Blanc during the 1999 surveys (fig. 5.2). The site is on a terrain that was cultivated in the past, but which has recently been abandoned. It is a cave site, of which the greater part has collapsed, making it difficult to estimate the dimensions and the importance of this site. In the cave, a very small concentration of heavily fragmented non-diagnostic ceramics was encountered, associated with small shell and lithic fragments. No test units were excavated. Limited amounts of ceramic off-site material were found. As the cave has partly collapsed, a substantial part of the site cannot be studied.

3.36.2 Archaeological materials

A surface collection was made at the site, consisting of 13 sherds, representing 174 g of pottery. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided for the ceramics of this site.

3.36.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

3.37 SITE 28 (97110-044; SC38)

3.37.1 Site location and preservation

Site 28 (x: 712,325; y: 1807,975) was discovered at the foot of the central plateau of La Désirade, between Site 8 (97110-028) and the sites of Grand Abaque 1 (97110-026) and Grand Abaque 2 (97110-027) during the 1999 surveys (fig. 5.2). Site dimensions are 60 m east to west and 40 m north to south. The distribution of archaeological material on the surface is thin but even and it is characterised by heavily fragmented pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A lot of ceramic off-site material was found, in the area leading towards Site 8 to the south-west of the site in particular. Rather open vegetation covers 0-20 percent of the soil, which consists of coarse, well-drained loose sand. Surface visibility is very good. Although the terrain is not used nowadays, the site seems to have been disturbed by cultivation in the past.

3.37.2 Archaeological materials
A surface collection was made at the site consisting of 21 non-diagnostic sherds, weighing 224 g.

3.37.3 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

3.38 SITE 29 (97110-045; SC39)

3.38.1 Site location and preservation
Site 29 (x: 705,375; y: 1803,425) was discovered in an abandoned terrain at the southern plain of La Désirade, east of the saline and at the foot of Morne Blanc, during the 1999 surveys (fig. 5.2). Site dimensions are 70 m east to west and 50 m north to south. Grass covers 41-60 percent of the soil, which consists of rather loose, medium structured, moderately well drained sand. Surface visibility is rather good. The site is situated very close the north-western border of the Les Sables site (97110-010). The distribution of archaeological material on the surface is even and consists of small non-diagnostic pottery sherds. No off-site material was found. No test units were excavated. The site appears to be eroded as a result of cultivation in the past.

3.38.2 Archaeological materials
A surface collection was made, consisting of a small amount of heavily fragmented, non-diagnostic, ceramics. A total of 13 sherds was collected, mostly body sherds (76.9%), weighing 324 g (table A3.156). No fragments belonging to the appendages/other category, griddle fragments or decorated sherds were found. Four sherds with red slipped surfaces (30.8%) and one flat base were collected. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided for the ceramics of this site.

3.38.3 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

3.39 TROU MADAME (97110-046; SC40)

3.39.1 Site location and preservation
The Trou Madame site (x: 708,500; y: 1804,575) was discovered on the southern border of the central plateau of La Désirade during the 1999 surveys (fig. 5.2). Site dimensions are 175 m east to west and 60 m north to south. The archaeological material on the surface consists of a small, even distribution of heavily fragmented, non-diagnostic, pottery sherds. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. No off-site material was found. Dense vegetation covers the soil, which consists of loose clayey sand. Although the vegetation is not thorny, it was quite difficult to traverse the terrain. Surface visibility is very good. The site appears to have eroded as a result of cultivation in the past.

3.39.2 Archaeological materials
A surface collection was made, consisting of four rims and 42 body sherds, weighing 410 g. No fragments belonging to the appendages/other category, bases, griddles, red slipped or decorated sherds were found. The morphological description of the pottery has been based on the analysis of two rims, with weathered surfaces, larger than 5 cm. These belong to a jar and a bowl with unrestricted simple contours

	Number	Number %	Weight	Weight %
Rim	2	15.4	44	13.6
Body	10	76.9	222	68.5
Base	1	7.7	58	17.9
Griddle	0	0.0	0	0.0
Appendage/other	0	0.0	0	0.0
Total	13	100.0	324	100.0

Table A3.156. Number, percentages and weight (g) of sherds from Site 29.

with rounded rims. Wall thicknesses range between 9-11 mm and orifice diameters are between 21-30 cm or unidentified. Surface colours are reddish brown, firing techniques include incomplete or relatively good oxidation and surface finishing is unidentified.

3.39.3 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

3.40 PARC À JOJO (97110-047; SC41)

3.40.1 Site location and preservation
The Parc à Jojo cave site (x: 705,125; y: 1803,475) was discovered on the slope of Morne Blanc during the 1999 surveys (fig. 5.2). Site dimensions are 10 x 10 m and the cave is approximately 4 m high. A very thin distribution of heavily fragmented, non-diagnostic ceramics was found on the surface of the cave floor. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Ceramic off-site material was found in limited quantities at a large distance from the site, in the area leading towards the salina. The soil in and just outside the cave consists of loose, coarse, moderately well-drained sand with stones. The site appears to have been rather well preserved.

3.40.2 Archaeological materials
A small surface collection was made, consisting of seven sherds, representing 252 g of pottery.

3.40.3 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

3.41 CHEMIN DU LATANIER (97110-048; SC42)

3.41.1 Site location and preservation
The Chemin du Latanier site (x: 704,150; y: 1803,875) was discovered on an abandoned terrain between Morne Frégule and Morne à Marthe, at the north-western part of La Désirade, during the 1999 surveys (fig. 5.2). Site dimensions are 30 m east to west and 30 m north to south. The archaeological material on the surface consists of a small and even distribution of heavily fragmented, non-diagnostic, pottery sherds associated with colonial and sub-recent material. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. A very limited amount of ceramic off-site material was found. Leaves of the local shrubby vegetation cover 21-40 percent of the soil, which consists of loose, coarse, poorly drained clayey sand. Surface visibility is rather good.

3.41.2 Archaeological materials
A small surface collection was made, consisting of 15 sherds, representing 78 g of pottery.

3.41.3 Chronological assignment
The site yielded Late Ceramic A pottery (unidentified style).

3.42 CHEMIN DE M. DE L'ORME (97110-049; SC43)

3.42.1 Site location and preservation
The Chemin de M. De l'Orme site was discovered in the middle of a dirt track, leading to the gardens of Mr. De l'Orme on the central plateau, during the 1999 surveys (fig. 5.2). It was revealed by accident while traversing the plateau for a tourist walk. The site is a small isolated depot, consisting of a complete vessel, decorated with an elaborate pelican motif, in which a small stone axe and an adze of non-local material had been deposited (fig. A3.39). The surroundings of the find-spot have been intensively investigated but no off-site material was discovered, except for seven small sherds (653 g) and two small lithic artefacts close to the depot, and no evidence was found for a burial or a house-construction with which the deposition may have been associated. No test units were excavated. No vegetation covers the soil, which consists of clayey sand with limestone bedrock nodules. Surface visibility is very good. A very thin layer of sediment covers bedrock. Before deposition of the vessel, a small hole had been dug in the bedrock layer to provide a snug fit and protection. The base of the vessel was firmly placed in this cavity, while only the rim of the vessel was visible on the surface. A 12 cm deep sediment layer hid the rest of the vessel from view. As the find-spot is situated in the middle of a dirt track, slight erosion influenced the find spot.

The vessel was located at 707544.554; 1804749.133; 269.41 (Guadeloupe - Ste. Anne system) or 16°18′43.6548″; -61°3′41.0437″; 225.96 (WGS84).

3.42.2 Archaeological materials
The site consists of one complete pelican-decorated vessel,

in which two lithic artefacts were deposited. The complete vessel is red slipped and pelican-formed. Although the decoration as a whole is quite impressive, the incisions appear to have been applied quite carelessly. The vessel is a jar with an independent restricted inflected contour with an inward thickened rim shape. Wall thickness is between 6-8 mm and orifice diameter is between 11-20 cm. The colour of the outer surface is reddish brown, the vessel is incompletely or relatively well oxidised and the outer surface is highly burnished. The lithic artefacts found in the vessel are a finely made small axe and adze of non-local material. They appear not to have been used prior to deposition. A small local red chert flake core and a shatter piece of an unknown chert variety were found in the vicinity of the site.

3.42.3 Chronological assignment

The site dates to the Late Ceramic A.

3.43 POINTE À GODARD (97110-051; SC35)

3.43.1 Site location and preservation

Although Bodu reported the Pointe à Godard site (x: 707,000; y: 1803,775) in 1984, on the basis of information provided by Père Guilbert, it was not registered in the DRAC site inventory. The site was restudied in 1999. It is situated in a cultivated field close to the sea on the southern coastal plain of La Désirade, south of the easternmost salina in Grande

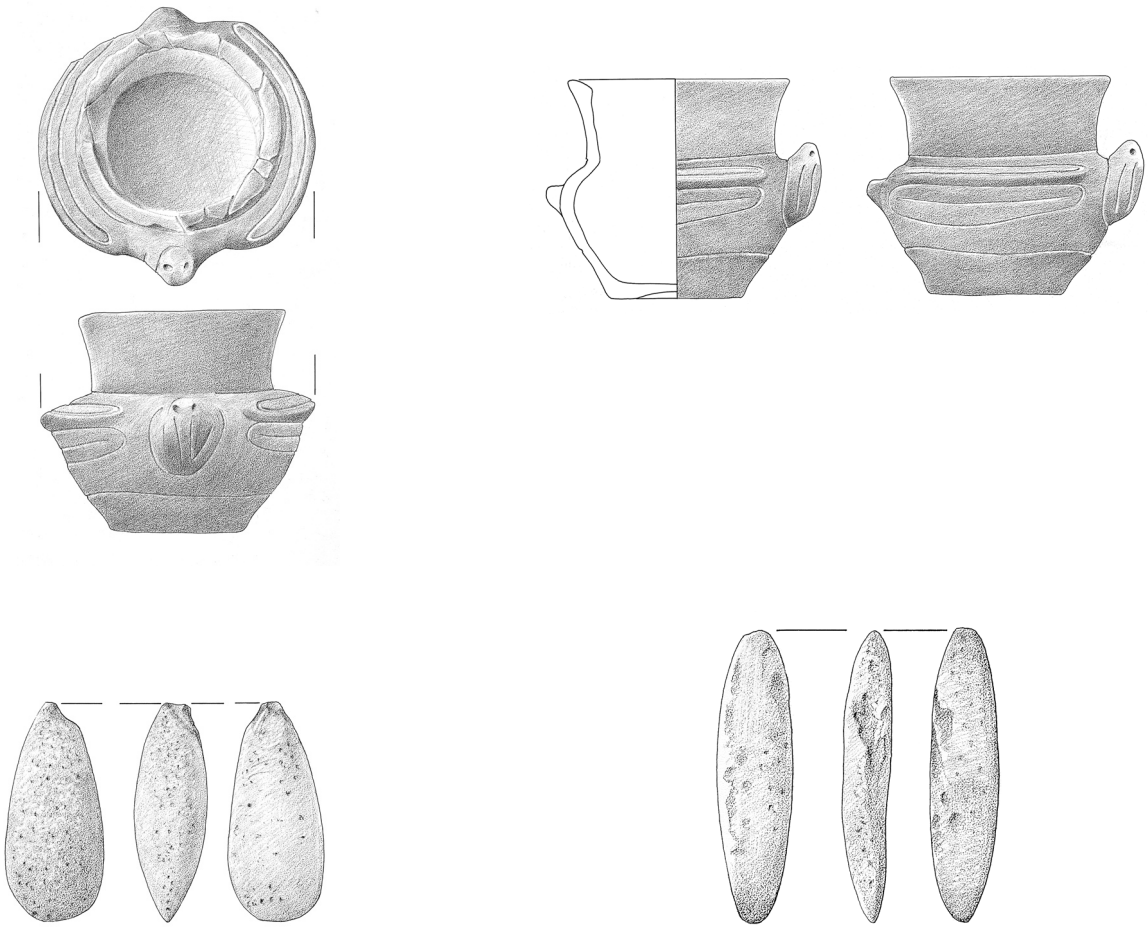


Fig. A3.39. Pelican vessel (scale 1:4) from Chemin de M. de l'Orme and its contents: a stone axe (scale 1:3) and an adze (scale 1:4) of non-local material.

Anse (fig. 5.2). Bodu mentions that a lot of ceramic material could be collected in 1984. Unfortunately, this material was not available for study and almost no new surface material could be collected as the 1999 survey revealed that the site has been almost completely destroyed. The dimensions of the area where nowadays a very small amount of archaeological material can be found, are 25-50 m from north to south and 475 m from west to east. The surface material consists of an even distribution of moderately fragmented ceramics and fragments of *Cittarium pica* and *Strombus gigas*. Some ceramic and shell off-site material was found north and east of the site. Leaves of the local mancenilla tree and sea grape cover 0-20 percent of the soil, which consists of loose, coarse, well-drained sand. Surface visibility is good. The road appears to have destroyed an important part of the northern site area, and coastal erosion has demolished the southern part of the site. The site terrain is currently used for gardening, sand pillage and constructions, impacting negatively on what is left of the site. A large part of the site appears to have been bulldozed. No test units were excavated.

3.43.2 Archaeological materials

The material described includes the 1999 surface collection. This consists of two weathered rims, two body sherds and two griddle fragments, representing 182 g of pottery. No fragments belonging to the appendage/other category and no base fragments were collected. Two of the collected sherds have red slipped surfaces and one sherd is decorated by small narrow incision on red slip. Two straight griddle fragments were found as well. The morphological description of the pottery has been based on the analysis of two rims larger than 5 cm. These are part of a jar with an unrestricted simple contour and of a jar with an independent restricted inflected contour with rounded rims. Wall thicknesses are between 6-8 mm and orifice diameters range between 11-20 cm and 21-30 cm. Surface colours are dark brown/very dark brown and reddish brown, the firing technique includes incomplete or relatively good oxidation and surface finishing is polished and unidentified. Both rim sherds belong to irregularly fired pottery. In addition, one *Strombus gigas* adze and a large piece of amethyst were found on the surface of the site in 1999.

3.43.3 Chronological assignment

Bodu tentatively dated the site to approximately AD 600-650 on the basis of the pottery he collected. However, the material found during the 1999 surveys belongs to the Late Ceramic A.

NOTES

1 *Ampulladoria* sp. is a fresh water shell.

2 http://www.depts.washington.edu/qil/calib/, accessed October 2002.

3 Compare with Saban assemblages around AD 800-1200.

4 The land snail *Bulimulus guadalupensis* accounts for the large numbers and weights for other shell species.

5 Bodu also mentioned the existence of a Morne Cybèle-3 site, located between the Morne Cybèle-1 and Morne Cybèle-2 sites, but as it yielded just one single base-sherd the site has not been registered here.

6 http://www.depts.washington.edu/qil/calib/, accessed October 2002.

APPENDIX 4. PETITE TERRE SITE CATALOGUE

4.1 BALEINE DU SUD (97110-003; S2SC02)

4.1.1 Site location and preservation

The Baleine du Sud site (x: 701,800; y: 1788,800) is situated near the central lagoon on the southern coast of Terre de Bas, partly on rocks and partly on sand (fig. 5.3). It was discovered and surveyed by Bodu (1985[c]) and restudied in 1999. The dimensions of the site are 110 m east to west and 100 m north to south. The archaeological material on the surface consists of an even distribution of small pottery sherds and shell fragments, including *Strombus gigas*, *Cittarium pica*, *Chiton* sp. and *Charonia variegata*. In this distribution, four small concentrations can be identified, measuring 5 x 4 m, 6 x 3 m, 15 x 3 m and 6 x 3 m, that are separated by areas with much lower find densities. A test unit was excavated in

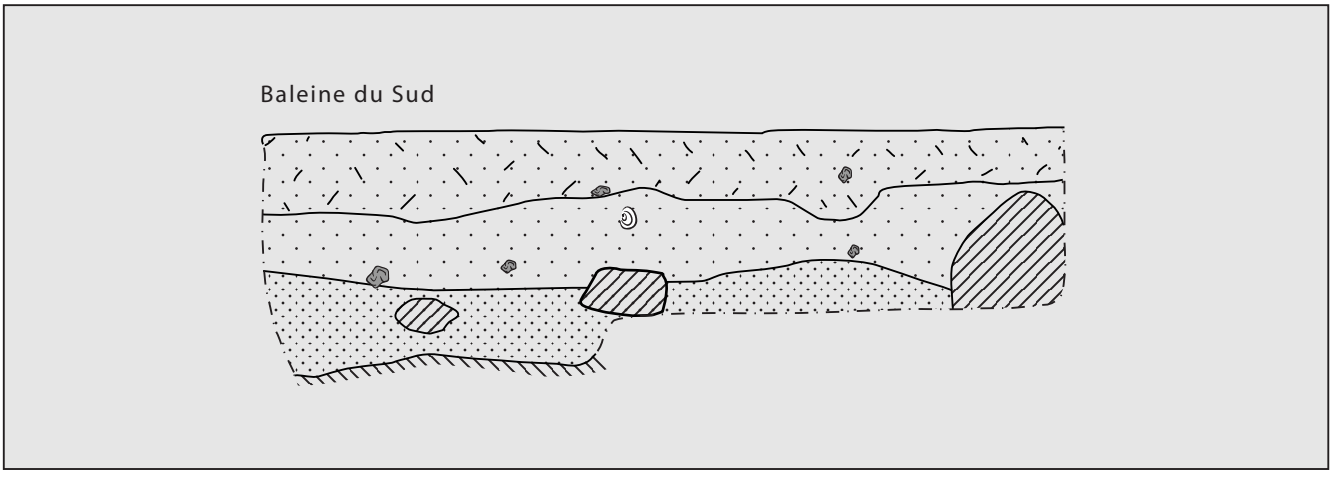


Fig. A4.1. Baleine du Sud, unit 2 (2 x 2 m), north section.

two of these concentrations. A very small amount of ceramic off-site material was found. Thorny brushwood with acacias in the inland part of the site and a coastal strip of mancenilla trees and sea grape cover 21-40 percent of the soil, which consists of coarse, moderately well drained clayey sandy soil. Passage across the terrain is rather troublesome but surface visibility is good. The site appears to have been moderately disturbed as a result of erosion and iguana digging activities. Although Bodu mentioned possible site destruction by illegal excavation, no evidence has been found to support this idea and the midden areas situated near the coast appear to be intact. As the site is situated in a protected area, no human destruction appears to take place nowadays.

4.1.2 Test units and stratigraphy

Two test units were excavated. The first unit (1 m^2) was situated in a surface concentration in the interior part of the site consisting largely of ceramic fragments. This part of the site was rather shallow and most of the archaeological material was found 0-20 cm below the surface. A very small amount of archaeological material was found in this unit. A second unit, measuring 2 x 2 m, was excavated in a concentration of archaeological material closer to the coast. A rather deep archaeological deposit was found here, up to a depth of 50 cm below the surface (fig. A4.1). The northwest corner of unit 1 was located at 702049.224; 1788847.258; 4.22 (Guadeloupe - Ste. Anne system) or 16°10′8.0868″; -61°6′51.0666″; -38.37 (WGS84). The northwest corner of unit 2 was located at 702033.017; 1788816.916; 3.32

	Number	Number %	Weight	Weight %
Rim	37	29.4	945	33.5
Body	74	58.7	1404	49.7
Base	7	5.6	233	8.3
Griddle	7	5.6	207	7.3
Appendage/other	1	0.7	34	1.2
Total	126	100.0	2823	100.0

Table A4.1. Number, percentages and weight (g) of sherds from the 1999 Baleine du Sud collection.

	Number	Number %
Incision	6	85.7
Modelling (geometric)	1	14.3
Total	7	100.0

Table A4.2. Number and percentages of sherds with particular decoration modes from the 1999 Baleine du Sud collection.

	Number	Number %
Straight	1	14.2
Legged	3	42.9
Unidentified	3	42.9
Total	7	100.0

Table A4.3. Number and percentages of sherds within griddle shape categories from the 1999 Baleine du Sud collection.

(Guadeloupe - Ste. Anne system) or 16°10′7.1046″; -61°6′51.6214″; -39.28 (WGS84).

4.1.3 Archaeological materials

The pottery described was collected at the surface in 1985 and 1999 and from the 1999 test units. Shellfish remains, faunal remains and coral artefacts were collected in 1999.

4.1.3.1 Pottery

Bodu collected five rims and 20 body sherds, weighing 838 g, in 1985. His sample does not include any fragments belonging to the appendages/other category, bases or griddles. One sherd has red slipped surfaces and no decorated sherds have been found. The morphological description of the pottery has been based on the analysis of four rims larger than 5 cm. Three of these are part of jars with unrestricted simple contours and one belongs to an unidentified vessel shape. Three rims are rounded and one is outward thickened. Wall thicknesses range between 6-8 mm (50%) and 9-11 mm (50%) and orifice diameters range between 11-20 cm (25.0%), 31-40 cm (25.0) or 41-50 cm (25.0%) or remains unidentified (25.0%). Surface colours are reddish brown (75%) and red (25.0%), firing techniques include complete reduction (25%) and incomplete or relatively good oxidation (75%) and outer surfaces are lightly burnished (25.0%) or the surface finishing could not be identified (75%).

A total of 126 sherds was collected in 1999, mostly body sherds (58.7%), weighing 2823 g (table A4.1). One fragment belonging to the appendages/other category (0.7%), a spindle whorl, was found. A total of 30 sherds has red slipped surfaces (23.8%) and incision (fig. A4.2) and geometric modelling decorate seven sherds (5.6%); (table A4.2). Seven flat bases and fragments of straight, legged or unidentified griddles were collected as well (table A4.3).

The morphological description of the pottery has been based on the analysis of 20 rims larger than 5 cm, half of which have heavily weathered surfaces. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (75.0%); (table A4.4). The dominant rim shape is rounded (65.0%); (table A4.5; fig. A4.2). Most of the wall thicknesses range between 6-8 mm (35.0%) and 9-11 mm (45.0%) and most of the orifice diameter range between 11-20 cm (15.0%), 21-30 cm (35.0%) and 41-50 cm (15.0%), while 30.0% remains unidentified (tables A4.6-A4.7). Surface colours are predominantly reddish brown (50.0%) and red (30.0%); (table A4.8). Firing techniques include mainly incomplete or relatively good oxidation (40.0%) and complete reduction (40.0%); (table A4.9). One of the incompletely or relatively well oxidised sherds was irregularly fired. Surface finishing is predominantly characterised by burnishing (40.0%) and for 55.0% the surface finishing could not be identified (table A4.10).

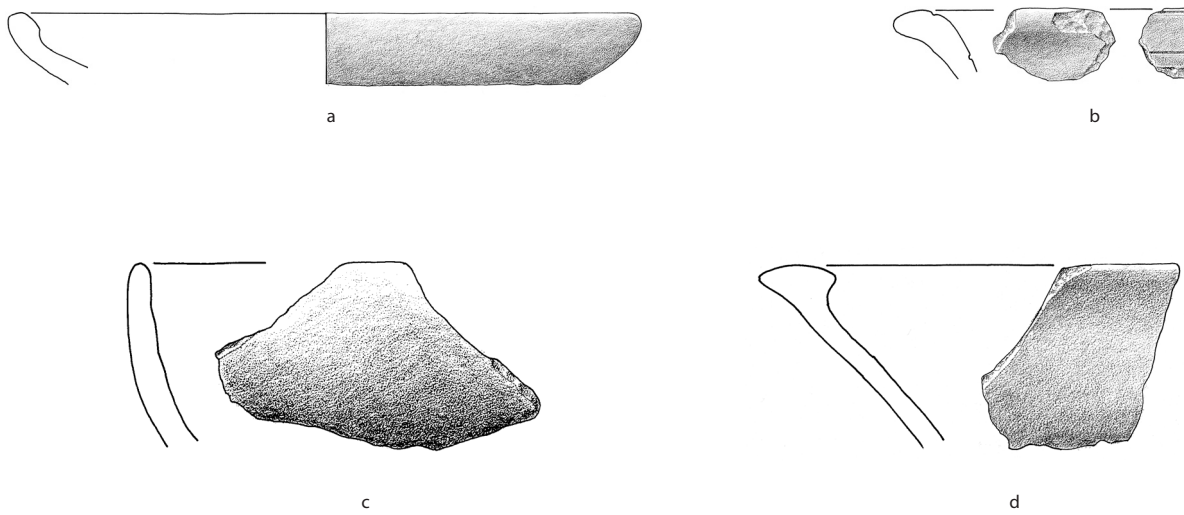


Fig. A4.2. Ceramics from the surface of Baleine du Sud (a: scale 1:3; b: scale 1:3; c: scale 1:3; d: scale 1:2).

	Number	Number %
Jar with unrestricted simple contour	9	45.0
Bowl with unrestricted simple contour	5	25.0
Dish with unrestricted simple contour	1	5.0
Bowl with restricted simple contour	1	5.0
Bowl with unrestricted inflected contour	1	5.0
Unidentified	3	15.0
Total	20	100.0

Table A4.4. Number and percentages of sherds within vessel shape categories from the 1999 Baleine du Sud collection.

	Number	Number %
Rounded	13	65.0
Flattened	2	10.0
Inward thickened	2	10.0
Outward thickened	1	5.0
Unidentified	2	10.0
Total	20	100.0

Table A4.5. Number and percentages of sherds within rim shape categories from the 1999 Baleine du Sud collection.

	Number	Number %
1-5 mm	1	5.0
6-8 mm	7	35.0
9-11 mm	9	45.0
12-15 mm	1	5.0
Unidentified	2	10.0
Total	20	100.0

Table A4.6. Number and percentages of sherds within wall thickness categories from the 1999 Baleine du Sud collection.

	Number	Number %
11-20 cm	3	15.0
21-30 cm	7	35.0
31-40 cm	1	5.0
41-50 cm	3	15.0
Unidentified	6	30.0
Total	20	100.0

Table A4.7. Number and percentages of sherds within orifice diameter categories from the 1999 Baleine du Sud collection.

	Number	Number %
Dark brown/very dark brown	2	10.0
Reddish brown	10	50.0
Red	6	30.0
Unidentified	2	10.0
Total	20	100.0

Table A4.8. Number and percentages of sherds within exterior surface colour categories from the 1999 Baleine du Sud collection.

	Number	Number %
Complete reduction	8	40.0
Incomplete oxidation or reduction	1	5.0
Complete oxidation	1	5.0
Incomplete or relatively good oxidation	8	40.0
Unidentified	2	10.0
Total	20	100.0

Table A4.9. Number and percentages of sherds within firing colour categories from the 1999 Baleine du Sud collection.

	Number	Number %
Smoothed	1	5.0
Lightly burnished	5	25.0
Highly burnished	3	15.0
Unidentified	11	55.0
Total	20	100.0

Table A4.10. Number and percentages of sherds within exterior surface finishing categories from the 1999 Baleine du Sud collection.

	Rasp fragment	Grinding tool fragment	Total
Acropora cervicornis	13 81.2		13 81.2
Acropora palmata		2 12.5	2 12.5
Unidentified		1 6.3	1 6.3
Total	13 81.2	3 18.8	16 100.0

Table A4.11. Number and percentages of coral species and artefact types from the 1999 Baleine du Sud collection.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	10 5.0	7828 53.8	744 26.6	8572 49.4
Cittarium pica	67 33.5	6092 41.9	1650 59.0	7742 44.6
Other	123 61.5	638 4.3	368 13.1	1006 5.8
Unidentified	0 0.0	0 0.0	35 1.3	35 0.2
Total	200 100.0	14,558 100.0	2797 100.0	17,355 100.0

Table A4.12. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Baleine du Sud collection.

4.1.3.2 Coral artefacts

A total of 16 coral artefacts was found in 1999, consisting of 13 heavily used *Acropora cervicornis* rasp fragments, two heavily used *Acropora palmata* grinding tool fragments and one grinding tool fragment of an unidentified coral species. The latter is part of an active or passive grinding tool (table A4.11).

4.1.3.3 Shellfish remains

Main shellfish remains, collected in 1999, consisted of *Cittarium pica* and *Strombus gigas* (table A4.12). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata, Acmaea leucopleura*, *Ampulladoria* sp., *Arca Zebra*, *Astraea* sp., *Bulimulus guadalupensis*, *Cassis flammea*, *Chama sarda*, *Charonia variegata*, *Chiton tuberculatus*, *Codakia orbicularis*, *Columbella mercatoria*, *Conus* sp., *Cyphoma gibbosum*, *Cypraecassis testiculus*, *Diadora dysoni*, *Fissurella* sp., *Hipponix antiquatus*, *Nerita* sp., *Nodilittorina tuberculata*, *Purpura patula*, *Tectarius muricatus*, *Tellina* sp., *Thais* sp., and *Tonna maculosa*.

4.1.3.4 Animal remains

MNI counts, excluding the intrusive elements, show that the Baleine du Sud 2/5 inch faunal sample (total MNI 33, total weight 69 g) consists of crab (72.8%), fish (18.1%), reptile (3.0%) and sea urchin (3.0%). It has a terrestrial component (75.8%), including black land crab, iguana and land hermit crab. As for MNI counts, black land crab makes up an important percentage of this component and iguana makes an important contribution to its weight. Leaving out land hermit crab the terrestrial component makes up 69.7% of the total sample. The majority of invertebrate remains has been explained by small sample size or by unrecognised recent

intrusive fragments. Reef carnivores (3.0%), including grouper, reef herbivores/omnivores (15.1%), including parrotfish and surgeonfish, and inshore species (3%), in this case red rock urchin, were found as well (Nokkert in appendix 5).

4.1.4 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

4.2 SITE DU PHARE (97110-004; S2SC03)

4.2.1 Site location and preservation

Bodu and Petitjean-Roget surveyed the Site du Phare (x: 702,100; y: 1789,100) in 1985, although Barbotin, Clerc and Pierre Verin already knew of its existence and Nicholson (1975) excavated a 2 m^2 unit. The site was restudied in 1999. It is situated on an elevated plain at some distance from the coast, extending from the east of the lighthouse at Terre de Bas towards the easternmost salina (fig. 5.3). Site dimensions are approximately 300 m west to east and 50-150 m north to south, which is slightly larger than the 12000 m^2 surface estimated by Bodu in 1985. The archaeological material on the surface consists of a dense distribution of moderately fragmented pottery sherds, lithic and coral artefacts and shellfish remains, mainly *Cittarium pica* and *Strombus gigas*. Eight concentrations of shell and pottery were found, located very close to one another, that are considered different patches belonging to one midden area. The pottery from the different concentrations appears to represent a single period. A small amount of ceramic and shell off-site material is evenly spread over a large area, in north-western and south-western direction towards the Est de Mouton de Bas site (97110-005). Thorny brushwood with acacias covers 60-90 percent of the soil, which consists of rather compact, well-drained sand with a humic component. Passage across the terrain is difficult but surface visibility is rather good. Although Bodu reported that the site was partially destroyed by illegal excavation, no evidence has been found to confirm this idea. Superficial perturbation has taken place as a result of cultivation in the past and intensive iguana action.

4.2.2 Test units and stratigraphy

A 1 m^2 unit and a 2 x 2 m unit were excavated in two of the concentrations identified on the surface. The 1 m^2 unit was situated somewhat inland on the elevated plateau. The site appeared to be rather shallow there, with a thin archaeological layer 0-20 cm below the surface. Unit 2 (fig. A4.3) was located on the lower-lying area closer to the mooring bay where deeper deposits were encountered. This unit was originally excavated as a 1 m^2 unit, but in order to prevent collapsing of the section while digging, an additional 1 m^2 unit was added. A hearth feature was identified in the 1 x 2 m unit thus created and it was decided to excavate an additional 1 x 2 m unit south of the original unit in order to investigate the feature and to obtain a clearer section. The northwest corner of unit 1was located at 702368.391; 1789184.131; 4.54 (Guadeloupe - Ste. Anne system) or 16°10′18.9491″; -61°6′40.2200″; -38.08 (WGS84). The northwest corner of unit 2 was located at 702337.711; 1789264.812; 1.37 (Guadeloupe - Ste. Anne system) or 16°10′21.5827″; -61°6′41.2278″; -41.26 (WGS84).

4.2.3 Archaeological materials

The materials described include pottery and lithic artefacts from the 1985 and 1999 surface collections and the 1999 test units. The shellfish remains, faunal remains and shell and coral artefacts described were collected in 1999. Nicholson (1975) only reported on the ceramics he excavated. His collection has been stored in the Yale University collections (Nicholson personal communication 1999). This description is added to the pottery analysis presented below.

4.2.3.1 Pottery

Bodu collected 44 heavily weathered sherds in 1985, weighing 1506 g (table A4.13). The appendages/other category represents 15.9% of the sample. This includes a handle, a lug, spindle whorls, a griddle leg and unidentified appendages (table A4.14). Four sherds have red slipped surfaces (9.1%) and four sherds (9.1%) are decorated by incision and geometric modelling (table A4.15). One concave high base was collected, together with straight, triangular and legged griddle fragments (table A4.16).

The morphological description of the pottery collected in 1985 has been based on the analysis of 14 rims larger than 5 cm, of which 12 have heavily weathered surfaces. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (85.7%); (table A4.17). Dominant rim shapes are rounded (50.0%) and inward thickened (35.8%); (table A4.18). Wall thicknesses range between 6-8 mm (50.0%) and 9-11 mm (42.9%) and orifice diameters range between 11-20 cm (35.7%) and 21-30 cm (50.0%), while 14.3% remains unidentified (tables A4.19-A4.20). Surface colours are predominantly reddish brown (85.8%); (table A4.21). Firing techniques include mainly incomplete or relatively good oxidation (85.7%) and 14.3% of the surfaces are highly burnished, while for most of the rims (85.7%) surface finishing could not be identified (table A4.22).

A total of 1035 sherds was collected in 1999, mostly body sherds (78.4%), weighing 15,069 g (table A4.23). The appendages/other category represents 0.7% of the sample. This includes the body attachment part of a handle, four spindle whorls (fig. A4.4a), a figurine leg fragment and a bird *adorno* (fig. A4.4b). A total of 232 sherds has red slipped surfaces (22.4%). Nine sherds (0.9%) are decorated by small, narrow incision on red slip (fig. A4.4c-d), geometric modelling in the form of an *appliqué*, zoomorphic modelled incised *appliqué* in the shape of a frog-foot on a red slipped sherd (fig. A4.4e) and punctation on red slipped rim smaller than 5 cm (table A4.24). Most of the bases are flat, and straight, rounded, legged and unidentified griddle fragments were found as well (tables A4.25-A4.26; fig. A4.4f).

The morphological description of the pottery collected in 1999 has been based on the analysis of 43 rims

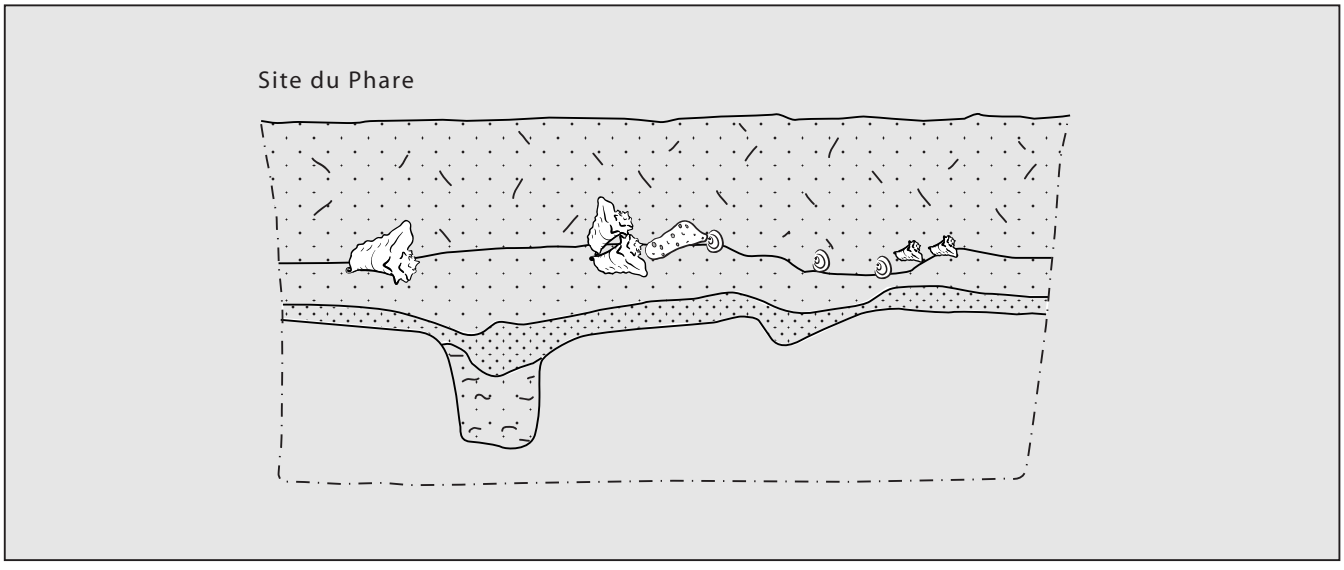


Fig. A4.3. Site du Phare, unit 2 (2 x 2 m), south section.

	Number	Number %	Weight	Weight %
Rim	20	45.5	532	35.3
Body	10	22.7	268	17.8
Base	1	2.3	54	3.6
Griddle	6	13.6	368	24.4
Appendage/other	7	15.9	284	18.9
Total	44	100.0	1506	100.0

Table A4.13. Number, percentages and weight (g) of sherds from the 1985 Site du Phare collection.

	Number	Number %
Handle	1	14.3
Lug	1	14.3
Spindle whorls	2	28.6
Griddle leg	1	14.3
Unidentified appendage	2	28.6
Total	7	100.0

Table A4.14. Number and percentages of sherds within appendages/other categories from the 1985 Site du Phare collection.

	Number	Number %
Incision	3	75.0
Modelling (geometric)	1	25.0
Total	4	100.0

Table A4.15. Number and percentages of sherds with particular decoration modes from the 1985 Site du Phare collection.

	Number	Number %
Straight	4	66.6
Triangular	1	16.7
Legged	1	16.7
Total	6	100.0

Table A4.16. Number and percentages of sherds within griddle shape categories from the 1985 Site du Phare collection.

	Number	Number %
Jar with unrestricted simple contour	1	7.1
Bowl with unrestricted simple contour	7	50.0
Dish with unrestricted simple contour	4	28.6
Bowl with restricted simple contour	2	14.3
Total	14	100.0

Table A4.17. Number and percentages of sherds within vessel shape categories from the 1985 Site du Phare collection.

	Number	Number %
Rounded	7	50.0
Inward thickened	5	35.8
Outward thickened	1	7.1
Inwardly bevelled	1	7.1
Total	14	100.0

Table A4.18. Number and percentages of sherds within rim shape categories from the 1985 Site du Phare collection.

	Number	Number %
1-5 mm	1	7.1
6-8 mm	7	50.0
9-11 mm	6	42.9
Total	14	100.0

Table A4.19. Number and percentages of sherds within wall thickness categories from the 1985 Site du Phare collection.

	Number	Number %
11-20 cm	5	35.7
21-30 cm	7	50.0
Unidentified	2	14.3
Total	14	100.0

Table A4.20. Number and percentages of sherds within orifice diameter categories from the 1985 Site du Phare collection.

larger than 5 cm, of which 16 have seriously weathered surfaces. The characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (67.5%); (table A4.27; fig. A4.4g-h). Dominant rim shapes are rounded (60.5%) or flattened (14.0%); (table A4.28). Wall thicknesses range between 1-5 mm (27.9%), 6-8 mm (51.2%) and 9-11 mm (18.6%) and orifice diameters range between 11-20 cm (11.6%), 21-30 cm (48.8%), 31-40 cm (18.6%) and 41-50 cm (7.0%), while 14.0% remains unidentified (tables A4.29-A4.30). Surface colours are predominantly red (20.9%), reddish brown (18.6%), dark gray-black (11.6%) and dark brown/very dark brown (11.6%); (table A4.31). Firing techniques include mainly incomplete or relatively good oxidation (65.1%) and incomplete oxidation or reduction (16.3%); (table A4.32). One incomplete or relatively well oxidised sherd had been irregularly fired. Surface finishing is predominantly characterised by burnishing (34.9%) and smoothing (16.3%). For 37.2% the surface finishing could not be identified (table A4.33).

The pottery excavated by Nicholson (1975) was reported to be very thick, coarse and tempered with coarse sand. Surfaces are predominantly red slipped and scratched and decoration includes simple linear incision, circular flat *appliqués* and small, rounded appendages. Griddle shapes include legged, straight, triangular and overhanging griddles and vessel rims are mostly unmodified, although inward thickened rims are found as well. This pottery appears to have been quite similar to the pottery collected in 1985 and 1999, although scratched surfaces are rare in these samples.

	Number	Number %
Reddish-gray/dark reddish-gray	1	7.1
Reddish brown	12	85.8
Red	1	7.1
Total	14	100.0

Table A4.21. Number and percentages of sherds within exterior surface colour categories from the 1985 Site du Phare collection.

	Number	Number %
Incomplete oxidation or reduction	2	14.3
Incomplete or relatively good oxidation	12	85.7
Total	14	100.0

Table A4.22. Number and percentages of sherds within firing colour categories from the 1985 Site du Phare collection.

	Number	Number %	Weight	Weight %
Rim	134	12.9	2953	19.6
Body	811	78.4	8766	58.2
Base	46	4.4	2043	13.6
Griddle	37	3.6	1076	7.1
Appendage/other	7	0.7	231	1.5
Total	1035	100.0	15,069	100.0

Table A4.23. Number and percentages of sherds and their weight (g) from the 1999 Site du Phare collection.

	Number	Number %
Incision	6	66.7
Modelling (geometric)	1	11.1
Modelled incised *appliqué* (zoomorphic)	1	11.1
Punctation	1	11.1
Total	9	100.0

Table A4.24. Number and percentages of sherds with particular decoration modes from the 1999 Site du Phare collection.

	Number	Number %
Flat	42	91.3
Concave	2	4.3
Pedestal/annular	1	2.2
Unidentified	1	2.2
Total	46	100.0

Table A4.25. Number and percentages of sherds within base shape categories from the 1999 Site du Phare collection.

	Number	Number %
Straight	5	13.5
Rounded	1	2.7
Legged	13	35.1
Unidentified	18	48.7
Total	37	100.0

Table A4.26. Number and percentages of sherds within griddle shape categories from the 1999 Site du Phare collection.

	Number	Number %
Jar with unrestricted simple contour	15	34.9
Bowl with unrestricted simple contour	8	18.6
Dish with unrestricted simple contour	6	14.0
Bowl with restricted simple contour	3	7.0
Bowl with unrestricted composite contour	4	9.3
Jar with independent restricted inflected contour	5	11.6
Unidentified	2	4.6
Total	43	100.0

Table A4.27. Number and percentages of sherds within vessel shape categories from the 1999 Site du Phare collection.

4.2.3.2 Lithic artefacts

The lithic material from the Site du Phare is rather poor, taking into account that it consists of the 1985 surface collection by Bodu and of material from the 1999 surface collections and test units. Although it is possible that Bodu collected more lithic artefacts, only three rather large pieces from his collection were available for analysis. These include a non-modified water-worn pebble of La Désirade hypabyssal/plutonic rock, one unidentified plutonic rock water-worn pebble with flake removal (possible shapeless core) and one passive rubbing/grinding/abrading stone fragment of an unidentified hypabyssal rock that was flaked on at least three sides for unclear reasons after usage.

The 1999 investigations yielded 11 lithic artefacts, among which are three artefacts of limestone/chalk including a

	Number	Number %
Rounded	26	60.5
Flattened	6	14.0
Inward thickened	3	6.9
Outward thickened	2	4.7
Double thickened	2	4.7
Flanged	3	6.9
Unidentified	1	2.3
Total	43	100.0

Table A4.28. Number and percentages of sherds within rim shape categories from the 1999 Site du Phare collection.

	Number	Number %
1-5 mm	12	27.9
6-8 mm	22	51.2
9-11 mm	8	18.6
Unidentified	1	2.3
Total	43	100.0

Table A4.29. Number and percentages of sherds within wall thickness categories from the 1999 Site du Phare collection.

	Number	Number %
11-20 cm	5	11.6
21-30 cm	21	48.8
31-40 cm	8	18.6
41-50 cm	3	7.0
Unidentified	6	14.0
Total	43	100.0

Table A4.30. Number and percentages of sherds within orifice diameter categories from the 1999 Site du Phare collection.

	Number	Number %
Gray	2	4.7
Dark gray-black	5	11.6
Brown-gray/gray-brown	1	2.3
Dark grayish-brown	2	4.7
Light brown-yellow	2	4.7
Light brown/brown	3	6.9
Dark brown/very dark brown	5	11.6
Reddish-gray/dark reddish-gray	2	4.7
Reddish brown	8	18.6
Red	9	20.9
Unidentified	4	9.3
Total	43	100.0

Table A4.31. Number and percentages of sherds within exterior surface colour categories from the 1999 Site du Phare collection.

	Number	Number %
Complete reduction	2	4.7
Incomplete oxidation or reduction	7	16.3
Incomplete oxidation	2	4.7
Complete oxidation	3	6.9
Incomplete or relatively good oxidation	28	65.1
Unidentified	1	2.3
Total	43	100.0

Table A4.32. Number and percentages of sherds within firing colour categories from the 1999 Site du Phare collection.

	Number	Number %
Crude	1	2.3
Scratched	4	9.3
Smoothed	7	16.3
Lightly burnished	1	2.3
Highly burnished	14	32.6
Unidentified	16	37.2
Total	43	100.0

Table A4.33. Number and percentages of sherds within exterior surface finishing categories from the 1999 Site du Phare collection.

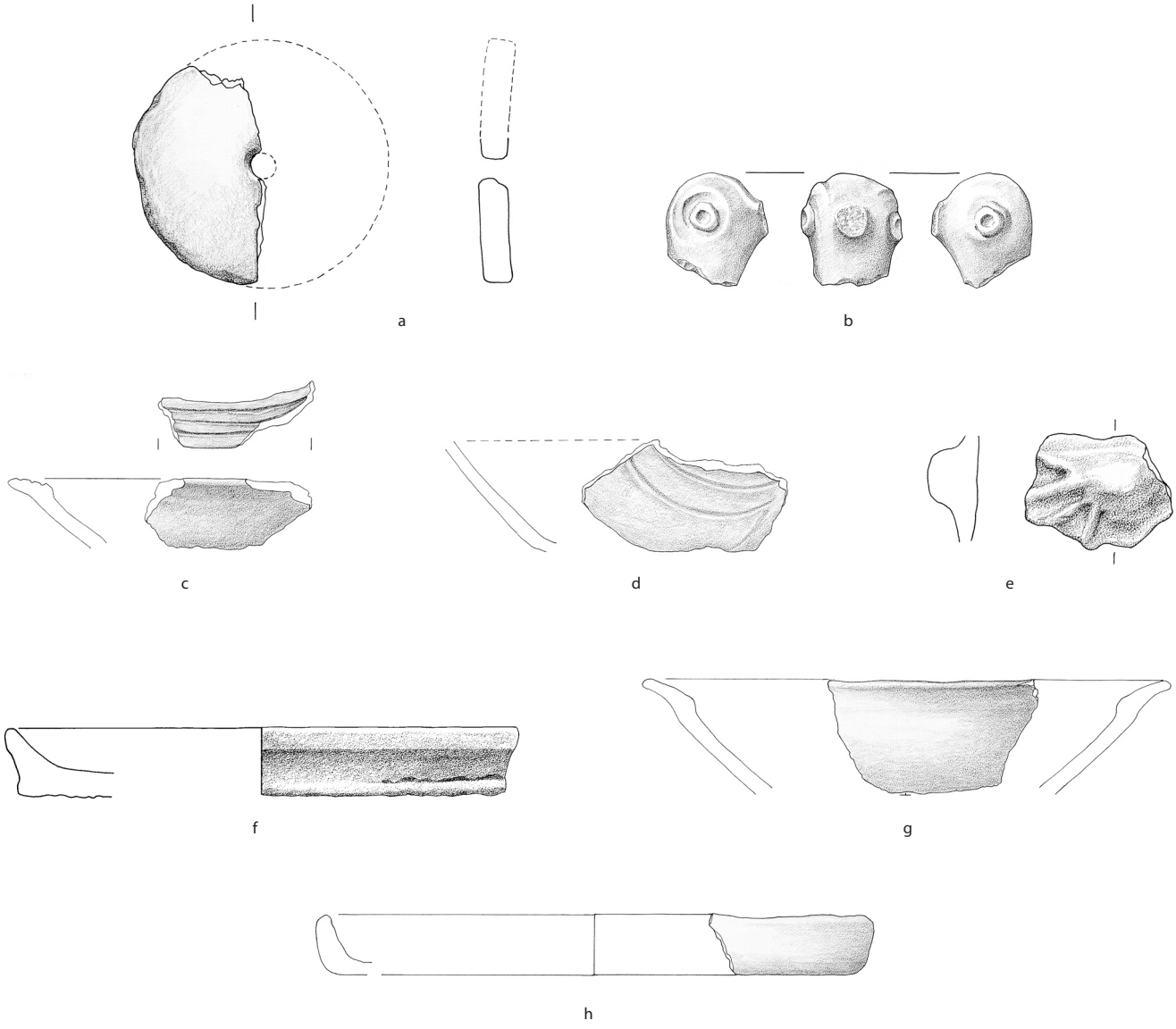


Fig. A4.4. Site du Phare ceramics (a: surface, scale 1:2; b: unit 2, level 5, scale 1:3; c-e and g-h: surface, scale 1:3; f: unit 1, level 1, scale 1:3).

beautifully carved *zemi* (fig. A4.5), one non-modified flake artefact and an unidentified core artefact fragment (tables A4.34-A4.35). One non-modified Long Island flint flake, one non-modified fire-cracked unidentified flint flake fragment, a distal part of a small ground petalloid axe of possible St. Martin/St. Barths chert, and a large water-worn pebble with flake removal of an unidentified material were found as well. In addition, an unidentified flake artefact and a non-modified water-worn pebble of a possible La Désirade hypabyssal rock and one water-worn pebble fragment and one small rubbing/grinding/abrading stone fragment of a possible La Désirade volcanic rock were collected.

4.2.3.3 Shell artefacts

Two possible shell artefacts were collected in 1999, including one bead with an irregular perforation for which the upper part of a *Murex* sp. shell was used and another possible bead of *Oliva* sp. shell with a polished edge and an irregular perforation.

4.2.3.4 Coral artefacts

A total of 205 coral artefacts was found at Site du Phare (table A4.36). These include 166 rasp fragments (most of these had been heavily used, except for seven fragments that are without use wear and six fragments that have a ground tip) and eight unidentified objects of *Acropora cervicornis* (three without use wear and five intensively used). In addition, 26 heavily used active grinding tool fragments and two unidentified pieces of *Acropora palmata* and three unidentified objects of an unidentified coral species were found.

Fig. A4.5. Carved limestone/chalk *zemi* (c. 8.5 cm base-length) from Site du Phare.

	Total
Long Island flint	1 9.1
Unidentified flint	1 9.1
La Désirade volcanic rock	2 18.2
La Désirade hypabyssal rock	2 18.2
St. Martin/St. Barths chert	1 9.1
Limestone/chalk	3 27.2
Unidentified	1 9.1
Total	11 100.0

Table A4.34. Number and percentages of rock types from the 1999 Site du Phare collection.

	Total
Core	1 9.1
Pebble	2 18.2
Pebble fragment	1 9.1
Grinding-stone	1 9.1
Flake	3 27.2
Axe	1 9.1
Zemi	1 9.1
Unidentified	1 9.1
Total	11 100.0

Table A4.35. Number and percentages of lithic artefact types from the 1999 Site du Phare collection.

4.2.3.5 Shellfish remains

The main shellfish remains consisted of *Strombus gigas, Cittarium pica* and *Nerita* sp. (table A4.37). Other shell species represented in very low numbers and weights at the site included *Acanthopleura granulata, Acmaea leucopleura*, *Antigona listeri*, *Arca zebra*, *Astraea* sp., *Bulimulus guadalupensis, Cerithium litteratum*, *Chama* sp., *Charonia variegata, Chione cancellata*, *Chiton* sp., *Codakia orbicularis, Columbella mercatoria*, *Conus* sp., *Cypraea zebra*, *Cypraecassis testiculus*, *Diadora* sp., *Fissurella* sp., *Hipponix antiquatus*, *Linga pensylvanica*, *Natica canrena*, *Nitidella ocellata*, *Nodilittorina tuberculata*, *Olivea* sp., *Ostrea frons*, *Polia aritula*, *Serpulorbis decustatus*, *Tectarius muricatus*, *Tellina* sp., *Thais* sp., *Tonna maculosa*, *Trachycardium magnum*, *Trivia pediculus* and *Turbo casteana*.

4.2.3.6 Animal remains

MNI counts show that the Site du Phare 2/5 inch faunal sample (total MNI 48, total weight 269 g) consists of fish (73.2%), crab (18.8%), reptile (6.3%) and mammal (2.1%). It has a terrestrial component (23.0%) that consists of unidentified mammal, iguana, land hermit crab, coral crab and black land crab. Leaving out land hermit crab the terrestrial component makes up 20.9% of the total sample. Many reef herbivores/omnivores (41.7%) have been found, including parrotfish, surgeonfish and triggerfish, while the reef carnivores (25.2%), that make a smaller contribution

	Rasp fragment	Active grinding tool fragment	Unidentified	Total
Acropora cervicornis	166		8	174
	81.0		3.9	84.9
Acropora palmata		26	2	28
		12.7	0.9	13.6
Unidentified			3	3
			1.5	1.5
Total	166	26	13	205
	81.0	12.7	6.3	100.0

Table A4.36. Number and percentages of coral species and artefact types from the 1999 Site du Phare collection.

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	178	83,593	13,594	97,187
	18.2	86.6	63.8	82.6
Cittarium pica	188	10,201	6801	17,002
	19.2	10.6	31.9	14.4
Nerita sp.	312	488	124	612
	31.9	0.5	0.6	0.5
Other	301	2224	712	2936
	30.7	2.3	3.3	2.4
Unidentified	0	0	92	92
	0.0	0.0	0.4	0.1
Total	979	96,506	21,323	117,829
	100.0	100.0	100.0	100.0

Table A4.37. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Site du Phare collection.

to the sample consist of squirrelfish, grouper, jack, snapper, grunt and Spanish hogfish. Inshore (4.2%) species are represented by sea turtle, porgy and offshore-pelagic (4.2%) species by tuna/mackerel. Unidentified invertebrates make up 2.1% of the sample (Nokkert in appendix 5).

4.2.4 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

4.3 EST DE MOUTON DE BAS (97110-005; S2SC01)

4.3.1 Site location and preservation

The Est de Mouton de Bas site (x: 701,900; y: 1789,300) is situated on the northern coast of Terre de Bas, close to the easternmost salina (fig. 5.3). The site was discovered during a survey in 1985 by Bodu and it was restudied in 1999. Site dimensions are 140 m east to west and 75 m north to south. The archaeological material on the surface is characterised by a dense but patchy distribution of large ceramic fragments, coral artefacts, lithic and shellfish remains. Four clear concentrations of midden material could be identified. A small amount of ceramic and shell off-site material is evenly spread over a large area, in south-eastern direction towards the Site du Phare (97110-004). A dense coastal strip of mancenilla trees and sea grape and some *Gaïac* trees cover 10 percent of the soil, which consists of medium textured, well-drained, loose beach sand. Passage across the terrain is easy and surface visibility is very good. The site is seriously threatened by coastal erosion and iguana nests are another important factor in the destruction of the archaeological layer. The inland part of the site appears to be better preserved. At least, no human destruction takes place, as the site is situated in a protected area.

4.3.2 Test units and stratigraphy

Two 2 x 2 m test units were excavated in two of the surface material concentrations. The first unit was situated in a concentration consisting largely of *Cittarium pica* and *Strombus gigas*. From 50 cm onwards, a 50 x 50 cm unit was excavated in the centre of the 2 x 2 m unit, as merely sterile layers were identified. Auger tests were carried out in the corners and the centre of the unit in order to identify bedrock depth. The second unit was situated in a concentration consisting largely of pottery (fig. A4.6). At a depth of 70 cm, a 50 x 50 cm unit was excavated in the centre of the 2 x 2 m unit, as only sterile layers were identified. When level 8 was reached, auger tests were carried out in the corners and the centre of the unit in order to identify bedrock depth. Bedrock had still not been reached but at a depth of 220 cm, the ground water level was reached instead. The southeast corner of unit 1 was located at 702077.779; 1789273.165; 1.34 (Guadeloupe - Ste. Anne system) or 16°10′21.9319″; -61°6′49.9741″; -41.27 (WGS84). The northwest corner of unit 2 was located at 702092.804; 1789305.925; 1.67 (Guadeloupe - Ste. Anne system) or 16°10′22.9930″; -61°6′49.4582″; -40.95 (WGS84).

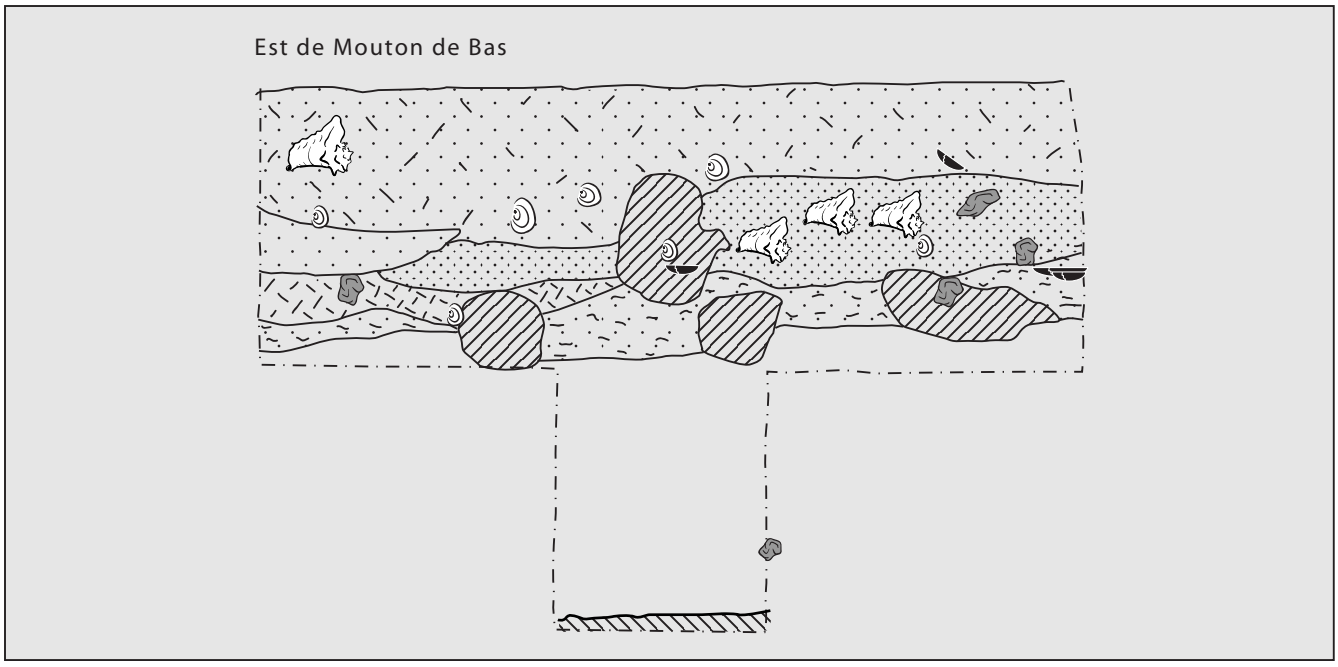
4.3.3 Archaeological materials

All the material described is from the 1999 surface collections and test units.

4.3.3.1 Pottery

A total of 1425 sherds was collected, mostly body sherds (70.9%), weighing 39,689 g (table A4.38). The appendages/other category represents 0.6% of the sample. This includes handles and lugs (fig. A4.7a-d), spindle whorls and griddle legs (table A4.39). A total of 270 sherds has slipped surfaces (18.9%). One rim, larger than 5 cm and belonging to a boat-shaped vessel, has beige slipped surfaces and the other sherds are red slipped. Incision (fig. A4.7e-f) and punctation decorate 22 sherds (1.5%); (table A4.40). Two boat-shaped vessel fragments (fig. A4.7g) were found in the sample (0.1%). Most of the bases are flat or unidentified and most griddles are straight or unidentified (tables A4.41-A4.42).

The morphological description of the pottery has been based on the analysis of 174 rims larger than 5 cm, of which 26 have weathered surfaces. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (64.3%), bowls with unrestricted composite contours (12.6%), bowls with restricted simple contours (7.5%) and bowls with independent restricted complex contours (6.3%); (table A4.43; fig. A4.8-A4.9). Dominant rim shapes are rounded (55.2%), flattened (17.8%), outward thickened (10.9%) and inward thickened (10.3%); (table A4.44). Wall thicknesses of most rims range between 9-11 mm (62.1%) and 6-8 mm (28.7%) and orifice diameters range mainly between 21-30 cm (25.3%), 31-40 cm (30.5%) and 41-50 cm (11.5%), while 17.2% remains unidentified (tables A4.45-A4.46). Surface colours are predominantly reddish brown (32.8%) and red (43.7%); (table A4.47). Firing techniques include mainly incomplete or relatively good oxidation (60.4%), complete reduction (12.6%) as well as complete oxidation (10.9%); (table A4.48). Ten of the incompletely or relatively well-oxidised rims had been irregularly fired, as well as one of the complete oxidised rims and one of the incomplete oxidised rims. Surface finishing is predominantly characterised by burnishing (54.6%) and smoothing (11.5%). For 16.1% the



0 to 22-40 cm: Rather loose, medium, dark grayish brown (10YR;4/2) beach sand with a small humus component and a lot of plant roots, containing a lot of ceramics, shell food remains (mainly *Strombus gigas* and *Cittarium pica* fragments), faunal remains and lithic and coral artefacts.

30-35 to 46 cm: More compact, dark brown (10YR;3/3) beach sand with a small humus component, appearing only in the northern part of the section.

22-38 to 42-50 cm: Less compact, coarse, grayish brown (2.5YR;5/2) beach sand with a smaller humus component, seriously disturbed by an iguana nest consisting of pale yellow (2.5YR;7/3) sterile beach sand. This layer contains a lot of archaeological material, including ceramics, large *Strombus gigas* and *Cittarium pica* shells, faunal remains and lithic and coral artefacts.

45-50 to 55-60 cm: Rather compact, coarse, very dark gray (10YR;3/1) sand, with rather abundant archaeological material including pottery, shell food remains, faunal remains, lithic, shell and coral artefacts. The lower part of level 6 showed the existence of a hearth with ash, charcoal and chalky concretion. The south-eastern corner of the upper part of level 6 contained a ceramic concentration, one isolated *Cittarium pica* shell and a *Cittarium pica* fish hook associated with this hearth feature.

45-58 to 60-67 cm: Loose, brown (10YR;5/3) beach sand containing rather abundant archaeological material, seriously perturbed by three large iguana nests.

Perturbations (igunana nests).

58-66 to 131 cm: Sterile, pale yellow (2.5Y;7/3) beach sand with much less archaeological material. From 70 cm depth onwards no archaeological material was found.

At a depth of 131 cm bedrock was reached.

Pottery

Rock

Cittarium pica

Strombus gigas

Fig. A4.6. Est de Mouton de Bas, unit 2 (2 x 2 m), south section.

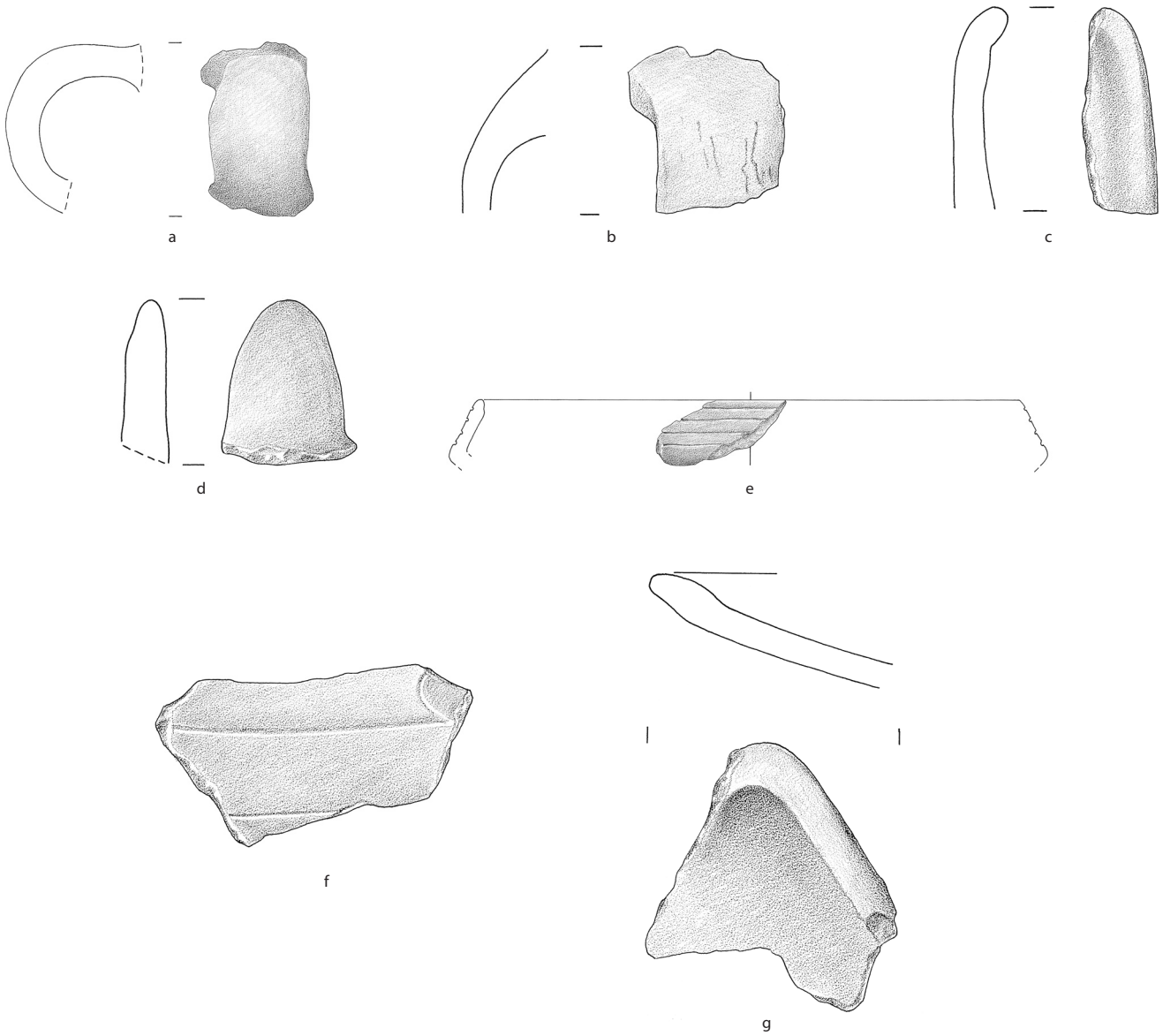


Fig. A4.7. Handles and lugs from Est de Mouton de Bas (a: unit 2, level 6, scale 1:3; b: unit 2, level 1, scale 1:2; c: unit 2, level 1, scale 1:2; d: unit 2, level 6, scale 1:2; e: unit 2, level 2, scale 1:4; f: unit 2, level 2, scale 1:2; g: surface, scale 1:2).

	Number	Number %	Weight	Weight %
Rim	264	18.5	11,978	30.2
Body	1011	70.9	22,241	56.0
Base	105	7.4	3566	9.0
Griddle	37	2.6	1646	4.1
Appendage/other	8	0.6	258	0.7
Total	1425	100.0	39,689	100.0

Table A4.38. Number, percentages and weight (g) of sherds from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Handle	3	37.5
Lug	2	25.0
Spindle whorls	2	25.0
Griddle leg	1	12.5
Total	8	100.0

Table A4.39. Number and percentages of sherds within appendages/other categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Incision	20	90.9
Punctation	2	9.1
Total	22	100.0

Table A4.40. Number and percentages of sherds with particular decoration modes from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Flat	81	77.1
Convex	3	2.9
Concave	8	7.6
Unidentified	13	12.4
Total	105	100.0

Table A4.41. Number and percentages of sherds within base shape categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Straight	8	21.6
Triangular	1	2.7
Unthickened	1	2.7
Legged	3	8.1
Unidentified	24	64.9
Total	37	100.0

Table A4.42. Number and percentages of sherds within griddle shape categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Jar with unrestricted simple contour	66	37.9
Bowl with unrestricted simple contour	31	17.8
Dish with unrestricted simple contour	15	8.6
Bowl with restricted simple contour	13	7.5
Bowl with unrestricted composite contour	22	12.6
Jar with restricted composite contour	4	2.3
Bowl with unrestricted inflected contour	6	3.5
Jar with independent restricted inflected contour	1	0.6
Bowl with independent restricted complex contour	11	6.3
Unidentified	5	2.9
Total	174	100.0

Table A4.43. Number and percentages of sherds within vessel shape categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Rounded	96	55.2
Flattened	31	17.8
Inward thickened	18	10.3
Outward thickened	19	10.9
Flanged	6	3.5
Unidentified	4	2.3
Total	174	100.0

Table A4.44. Number and percentages of sherds within rim shape categories from the 1999 Est de Mouton de Bas collection.

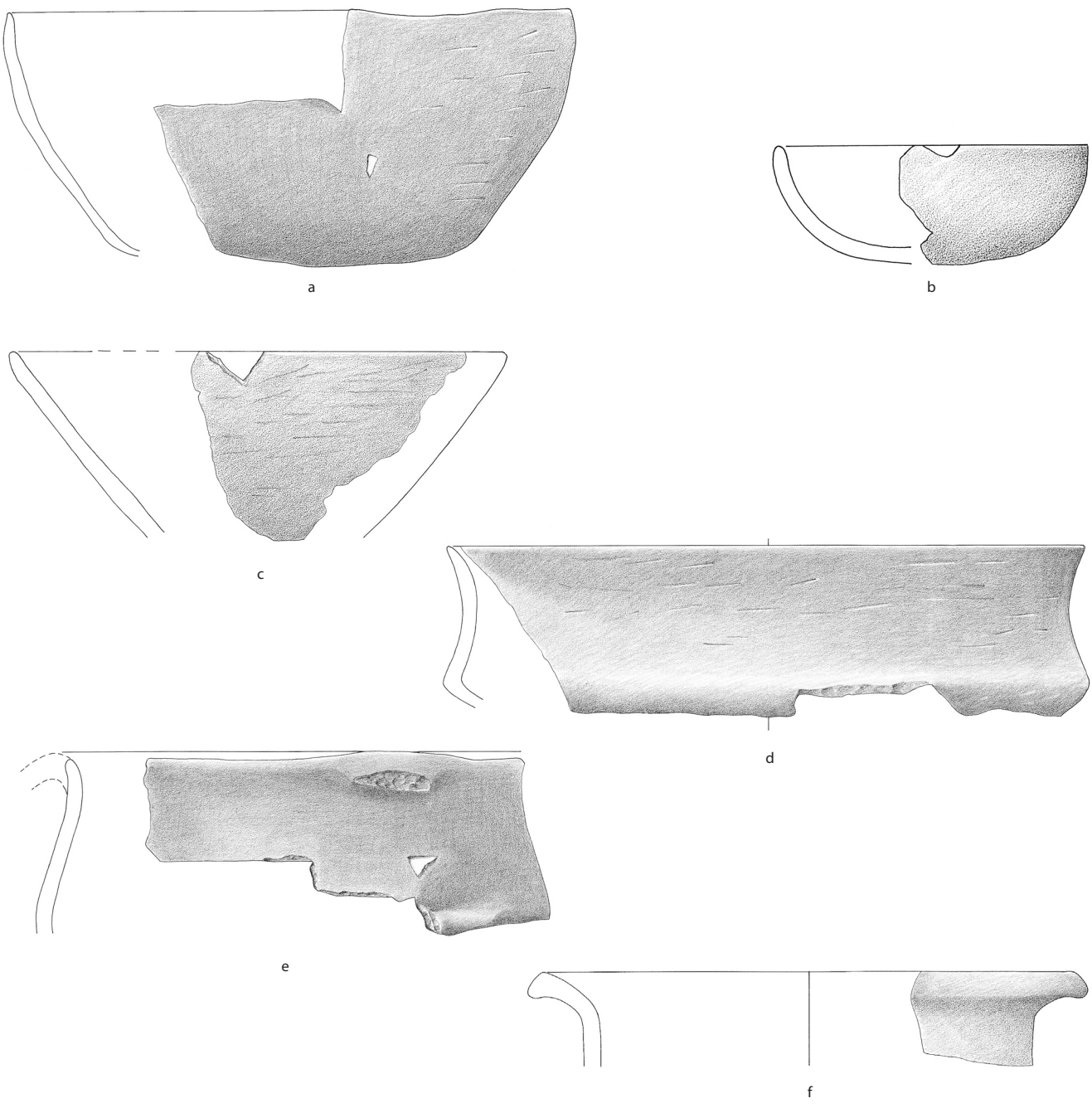


Fig. A4.8. Open vessel shapes from Est de Mouton de Bas (a: unit 1, level 6, scale 1:4; b: unit 1, level 2, scale 1:2; c: unit 1, level 2, scale 1:3; d-f: unit 2, level 6, scale 1:4).

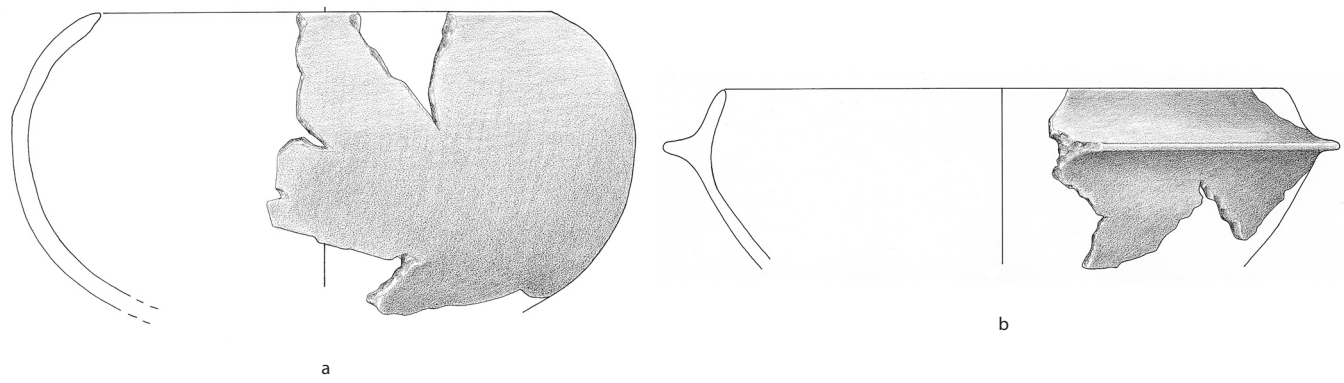


Fig. A4.9. Restricted vessel shapes from Est de Mouton de Bas (a: unit 1, level 1, scale 1:3; b: unit 2, level 6, scale 1:4).

	Number	Number %
1-5 mm	3	1.7
6-8 mm	50	28.7
9-11 mm	108	62.1
12-15 mm	9	5.2
Unidentified	4	2.3
Total	174	100.0

Table A4.45. Number and percentages of sherds within wall thickness categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
1-10 cm	1	0.6
11-20 cm	11	6.3
21-30 cm	44	25.3
31-40 cm	53	30.5
41-50 cm	20	11.5
51-60 cm	15	8.6
Unidentified	30	17.2
Total	174	100.0

Table A4.46. Number and percentages of sherds within orifice diameter categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Dark gray-black	5	2.9
Light brown-yellow	6	3.4
Light brown-gray	6	3.4
Light brown/brown	3	1.7
Dark brown/very dark brown	9	5.2
Reddish-gray/dark reddish-gray	4	2.3
Reddish brown	57	32.8
Red	76	43.7
Unidentified	8	4.6
Total	174	100.0

Table A4.47. Number and percentages of sherds within exterior surface colour categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Complete reduction	22	12.6
Incomplete oxidation or reduction	17	9.8
Incomplete oxidation	5	2.9
Complete oxidation	19	10.9
Incomplete or relatively good oxidation	105	60.4
Unidentified	6	3.4
Total	174	100.0

Table A4.48. Number and percentages of sherds within firing colour categories from the 1999 Est de Mouton de Bas collection.

	Number	Number %
Crude	9	5.2
Scratched	11	6.3
Smoothed	20	11.5
Lightly burnished	28	16.1
Highly burnished	67	38.5
Polished	11	6.3
Unidentified	28	16.1
Total	174	100.0

Table A4.49. Number and percentages of sherds within exterior surface finishing categories from the 1999 Est de Mouton de Bas collection.

surface finishing could not be identified (table A4.49). Three rims have highly burnished surfaces that show the slightest traces of light scratching.

4.3.3.2 Lithic artefacts

A total of 23 artefacts was found (table A4.50). These include one large flake fragment that could originally have been a blade and one small flake fragment of Antigua flint, two square La Désirade pieces of jasper and two pebbles of fine-grained La Désirade sedimentary rock. Seven pebbles and three pebble fragments of fine-grained local volcanic rock, seven water-worn limestone artefacts with signs of abrasion (two burnt, three flaked, one possible core-artefact preform) and six other, probably natural, limestone fragments were collected as well.

4.3.3.3 Shell artefacts

Three shell artefacts were found, including a beautifully polished axe fragment and a *spatula* with polished edges, decorated with a carved design, both of *Strombus gigas*. A small, beautifully carved, polished and incised *Cittarium pica* fishhook was also found (fig. A4.10).

4.3.3.4 Coral artefacts

A total of 115 coral artefacts was collected (table A4.51). These include 86 heavily used *Acropora cervicornis* rasp fragments (four without use wear and seven with a ground tip), 22 *Acropora palmata* active grinding tool fragments, four heavily used *Acropora palmata* passive grinding tool fragments, an unidentified object of *Acropora palmata* and

Fig. A4.10. Carved *Strombus gigas spatula* (c. 9 cm long) and carved and incised *Cittarium pica* fishhook from Est de Mouton de Bas.

	Pebble	Pebble fragment	Flake	Core preform	Unidentified	Total
La Désirade volcanic rock	7 30.4	3 13.1				10 43.5
Antigua flint			2 8.7			2 8.7
La Désirade jasper					2 8.7	2 8.7
Limestone				1 4.3	6 26.1	7 30.4
La Désirade sedimentary rock	2 8.7					2 8.7
Total	9 39.1	3 13.1	2 8.7	1 4.3	8 34.8	23 100.0

Table A4.50. Number and percentages of rock types and lithic artefact types from the 1999 Est de Mouton de Bas collection.

two unidentified objects of an unidentified coral species.

4.3.3.5 Shellfish remains

The main shellfish remains consisted of *Acanthopleura granulata*, *Strombus gigas*, *Cittarium pica* and *Nerita* sp. (table A4.52). Other shell species represented in very low numbers and weights included *Arca zebra*, *Astraea* sp., *Bulla striata*, *Chama* sp., *Charonia variegata*, *Chiton tuberculatus*, *Codakia orbicularis*, *Conus* sp., *Cymatium femorale*, *Cypraea* sp., *Cypraecassis testiculus*, *Diadora* sp., *Olivea* sp., *Purpura patula*, *Tectarius muricatus*, *Tellina* sp., *Thais rustica*, and *Thyfela fausta*.

4.3.3.6 Animal remains

MNI counts (excluding the intrusive species) show that the Est de Mouton de Bas 2/5 inch faunal sample (total MNI 118, total weight 1325 g) consists of fish (51.3%), crab (33.7%), reptile (10.1%), mammal (1.7%) and bird (1.7%). It has a terrestrial component (40.6%) that consists of rice rat, unidentified bird, iguana, unidentified reptile, land hermit crab, great land crab, black land crab, land crab and unidentified crab species. Leaving out land hermit crab the terrestrial component still makes up 37.2% of the total sample. Reef herbivores/omnivores, including parrotfish, surgeonfish and triggerfish, represent 28.0% of the sample,

	Rasp fragment	Active grinding tool fragment	Passive grinding tool fragment	Unidentified	Total
Acropora cervicornis	86 74.8				86 74.8
Acropora palmata		22 19.1	4 3.5	1 0.9	27 23.5
Unidentified				2 1.7	2 1.7
Total	86 74.8	22 19.1	4 3.5	3 2.6	115 100.0

Table A4.51. Number and percentages of coral species and artefact types from the 1999 Est de Mouton de Bas collection.

	MNI count	MNI weight	Fragment weight	Total weight
Acanthopleura granulata	95 6.9	1578 0.7	980 1.5	2558 0.9
Strombus gigas	264 19.1	148,026 69.5	19,777 30.4	167,803 60.4
Cittarium pica	432 31.2	61,232 28.8	43,931 67.6	105,163 37.8
Nerita sp.	536 38.8	826 0.4	174 0.3	1000 0.4
Other	56 4.0	1313 0.6	103 0.2	1416 0.5
Unidentified	0 0.0	0 0.0	7 < 0.1	7 < 0.1
Total	1383 100.0	212,975 100.0	64,972 100.0	277,947 100.0

Table A4.52. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of the main shell species from the 1999 Est de Mouton de Bas collection.

and reef carnivores, consisting of shark, squirrelfish, grouper, jack, snapper, grunt and wrasse, make up 19.2% of the sample. Inshore species (7.4%) are represented by sea turtle, needlefish, porgy, common spider crab and coral crab, and offshore-pelagic (2.5%) species by barracuda and tuna/mackerel. Unidentified invertebrates make up 0.8% of the sample (Nokkert in appendix 5).

4.3.4 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

4.4 MOUTON DE BAS (97110-009; S2SC04)

4.4.1 Site location and preservation

The Mouton de Bas site (x: 701,750; y: 789,150) is located somewhat inland east of the easternmost salina containing water (fig. 5.3). It was discovered and surveyed by Bodu in 1985 and restudied in 1999. Site dimensions are approximately 150 m north to south and 75-150 m west to east. The site is characterised by a dispersed surface distribution, consisting almost exclusively of heavily fragmented ceramics and *Cittarium pica* fragments. The 1999 survey demonstrated that the site has two main parts, the northernmost part containing more sherds than the southern part, separated by areas with far less dense surface material. Small amounts of ceramic off-site material have been found west of the site. As the dispersed distribution, the limited number and the heavy fragmentation of the finds suggested that the site was rather shallow, no test units were excavated. Although thorny brushwood with acacias, which severely hinders passage across the terrain, covers 41-60 percent of the soil, which consists of coarse, moderately well drained sand, surface visibility is rather good. As the site is situated in an area that is nowadays protected, no recent human destruction appears to have taken place, but cultivation in the past may have caused superficial damage to the site.

4.4.2 Archaeological materials

The archaeological materials described comprise the 1999 surface collection, which consists exclusively of a small pottery sample. Although shell fragments were observed on the surface these were not collected and no other archaeological materials were found. A total of 20 sherds was collected, weighing 534 g (table A4.53). No fragments belonging to the appendages/other category were found. Two sherds (10.0%) have red slipped surfaces and one rim (5.0%) larger than 5 cm has beige slip. Four decorated sherds (20.0%) were decorated by incision. Bases are flat, concave, concave high or unidentified (table A4.54) and two triangular griddle rims were collected as well.

The morphological description of the pottery was based on the analysis of three rims larger than 5 cm. These are part of two jars with unrestricted simple contours and one bowl with an unrestricted simple contour, all three with rounded rims. For two vessels wall thicknesses range between 9-11 mm and for another it is between 12-15 mm. Orifice diameters are 11-20 cm, 41-50 cm and 60-70 cm. The outer surfaces of two rims are reddish brown and the other is red. The firing technique for one of the rims included complete reduction and the two other were incompletely or relatively well-oxidised. Surface finishing includes smoothing, light burnishing and high burnishing.

4.4.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

4.5 TROU CANARD (97110-017; S2SC05)

4.5.1 Site location and preservation

The Trou Canard site (x: 701,700; y: 1789,800) is situated on a flat terrain, bordering the rocky southern coast of Terre de Bas (fig. 5.3). It was discovered and surveyed by Bodu in 1985 and restudied in 1999. As hardly any material was found on the surface during the 1999 surveys it was impossible to estimate site dimensions. Off-site material is very scarce as well. Although thorny brushwood with acacias, which severely hinders passage across the terrain, covers 41-60 percent of the soil, which consists of coarse, moderately well drained sand, surface visibility is rather good. Bodu (1985[c]) reported illegal excavations at the site, which at that time had already partially destroyed it. As the site appeared completely destroyed in 1999 no test units were excavated.

4.5.2 Archaeological materials

A very small surface collection could be made in 1999, consisting exclusively of one body sherd and one fragment of a legged griddle, weighing 240 g. No other archaeological materials were found. As it had been decided to use rims larger than 5 cm for further investigation, and no such rims were found, no morphological and technological description could be provided for the ceramics of this site.

4.5.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

	Number	Number %	Weight	Weight %
Rim	8	40.0	228	42.7
Body	6	30.0	178	33.3
Base	4	20.0	82	15.4
Griddle	2	10.0	46	8.6
Appendage/other	0	0.0	0	0.0
Total	20	100.0	534	100.0

Table A4.53. Number, percentages and weight (g) of sherds from Mouton de Bas.

	Number	Number %
Flat	1	25.0
Concave	1	25.0
Concave high	1	25.0
Unidentified	1	25.0
Total	4	100.0

Table A4.54. Number and percentages of sherds within base shape categories from Mouton de Bas.

4.6 POINTE SABLÉ (97110-050; S1SC01)

4.6.1 Site location and preservation

The Pointe Sablé site (x: 702,275; y: 1789,650) is situated on the southern coast of Terre de Haut (fig. 5.3). It was excavated in 1965 or 1968 and Mr. H. Petitjean-Roget, director of the Edgar Clerc Museum, suggested that Mr. M. Barbotin was the excavator. The 1965/1968 excavations have not been documented. The site was revisited in 1995 and 1997 and restudied in 1999 and it has been registered in the DRAC archives since then. In 1999, site dimensions were estimated at 120 m east to west and 75 m north to south. The archaeological material collected at the site in 1965/1968 is quite abundant and it was deposited in the depot of the Edgar Clerc Museum. Presently, the site is characterised by a very poor and patchy surface distribution consisting of modestly fragmented ceramics and shell fragments, notably *Cittarium pica*, *Strombus gigas*, *Chiton* sp. and *Nerita* sp. Shell fragments are mainly found near the coastline, in the inland part of the site they are less abundant. Ceramic and shell off-site material has been found. Mancenilla trees and sea-grape at the coast and cactaceous vegetation in the inland part of the site cover 41-60 percent of the soil, which consists of medium textured, poorly drained sandy clay. Passage though the terrain is relatively easy and surface visibility is good. Coastal erosion and excavations in the past almost completely destroyed the site.

4.6.2 Test units and stratigraphy

As the 1965/1968 excavations have not been documented, there is no information on unit location, unit number and excavation methodology. The only information available mentions the levels in which the pottery was collected. These had been labelled 0-20 cm, 0-40 cm, 0-60 cm and 40-60 cm. One 1 m^2 test unit has been excavated in 1999 (fig. A4.11), demonstrating that the archaeological layer at this part of the site has been completely destroyed. The unit was located in a high find density area. The northwest corner of unit 1was located at 702328.070; 1789711.984; 1.59 (Guadeloupe - Ste. Anne system) or 16°10′36.1309″; -61°6′41.4140″; -41.05 (WGS84).

4.6.3 Archaeological materials

The archaeological materials described include surface collections and test unit material from the 1965/1968 and

1999 fieldwork campaigns. Most of the pottery was collected in the 1965/1968 units, although a small amount was surface collected in 1995, 1997 and 1999. No pottery was found in the 1999 unit. Lithic artefacts and faunal remains are also from both fieldwork campaigns. The coral artefact and the shellfish remains are from the 1999 fieldwork.

4.6.3.1 Pottery

A total of 722 sherds was collected during the 1965/1968 excavations, mostly body sherds (51.9%), weighing 43,785 g (table A4.55). The appendages/other category represents 1.8% of the sample. This includes handles (one knobbed item), lugs, pot-stands, a spindle whorl, griddle legs and a ceramic disc (table A4.56; fig. A4.12). A total of 218 sherds has red slipped surfaces (30.2%) and 51 sherds (7.1%) are decorated by broad shallow incision, often on red slip (fig. A4.13), geometric modelling and finger indentation (table A4.57). A human face bowl was found as well (fig. A4.14). Most of the bases are flat (table A4.58), while griddle fragments are mainly from legged, unidentified or straight griddles (table A4.59; fig. A4.15).

The morphological description of the pottery from the 1965/1968 collection has been based on the analysis of 196 rims larger than 5 cm. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (78.6%) and bowls with restricted simple contours (11.7%); (table A4.60; fig. A4.16-A4.17). The dominant rim shape is rounded (69.9%), although a lot of inward thickened rims (16.9%) have been found as well (table A4.61). Wall thicknesses range mainly between 6-8 mm (43.4%) and 9-11 mm (41.8%) and orifice diameters range mainly between 11-20 cm (11.2%), 21-30 cm (35.8%), 31-40 cm (12.8%) and 41-50 cm (10.7%), while 26.0% remains unidentified (tables A4.62-A4.63). Surface colours are predominantly dark brown/very dark brown (25.0%), reddish brown (22.9%) and red (22.4%); (table A4.64).

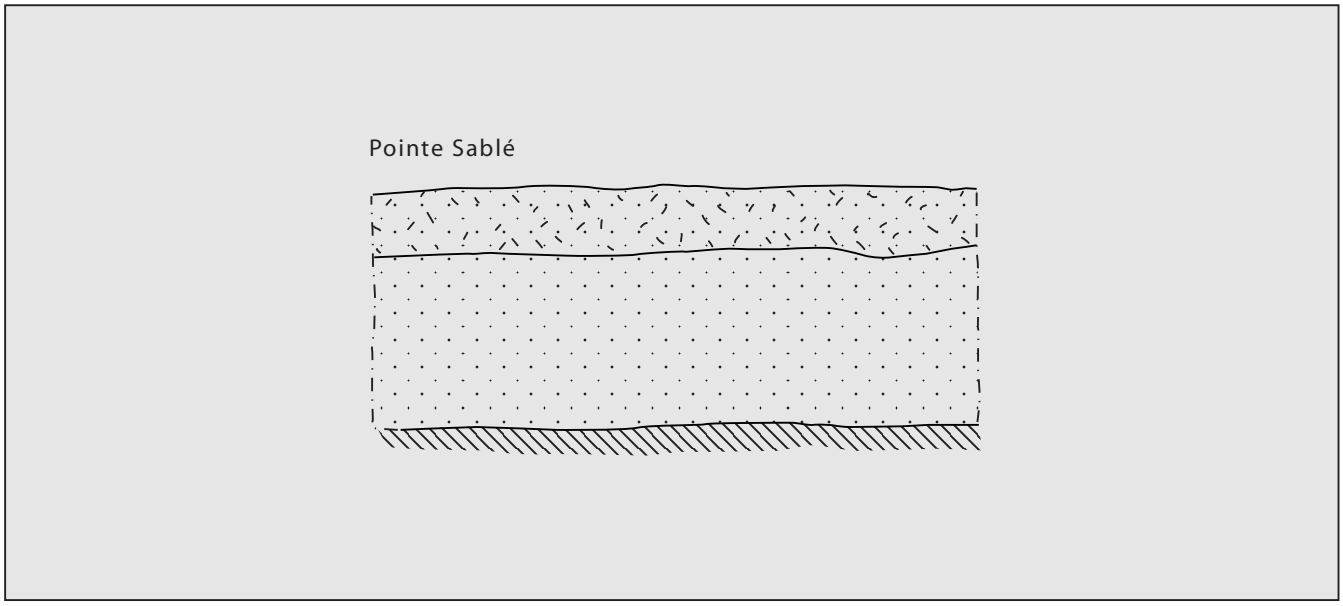


Fig. A4.11. Pointe Sablé, unit 1 (1 m^2), south section.

Firing techniques include incomplete or relatively good oxidation (77.0%) and complete reduction (14.3%); (table A4.65). A total of 35 sherds (17.9%) has been irregularly fired. Surface finishing is predominantly characterised by burnishing (49.5%) and smoothing (26.0%). For 13.3% the surface finishing could not be identified (table A4.66).

In 1995, 1997 and 1999, a total of 13 rims, one body sherd and one flat base fragment was collected, weighing 988 g. Six sherds (46.2%) with red surfaces and two decorated sherds (15.4%), embellished by incision and a modelled incised anthropomorphic design, were found as well. The morphological description of the pottery has been based on the analysis of 12 rims larger than 5 cm, of which three had weathered surfaces and two had probably been burnt. These demonstrate that the characteristic vessel shapes include jars, bowls and dishes with unrestricted simple contours (83.4%); (table A4.67). Rim shapes are rounded (50.0%), inward thickened (41.7%) or outward thickened (8.3%). Wall thicknesses range between 1-5 mm (8.3%), 6-8 mm (41.7%) and 9-11 mm (50.0%) and orifice diameters range between 11-20 cm (33.3%), 21-30 cm (33.3%) and 31-40 cm (16.7%), while 16.7% remains unidentified. Surface colours are predominantly reddish brown (50.0%), red (25.0%) and dark brown/very dark brown (16.7%); (table A4.68). Firing techniques include mainly incomplete or relatively good oxidation (75.0%) and complete reduction (16.7%); (table A4.69). Three rims belonged to irregularly fired vessels. Surface finishing is characterised by high burnishing (25.0%) and for 75.0% the surface finishing could not be identified.

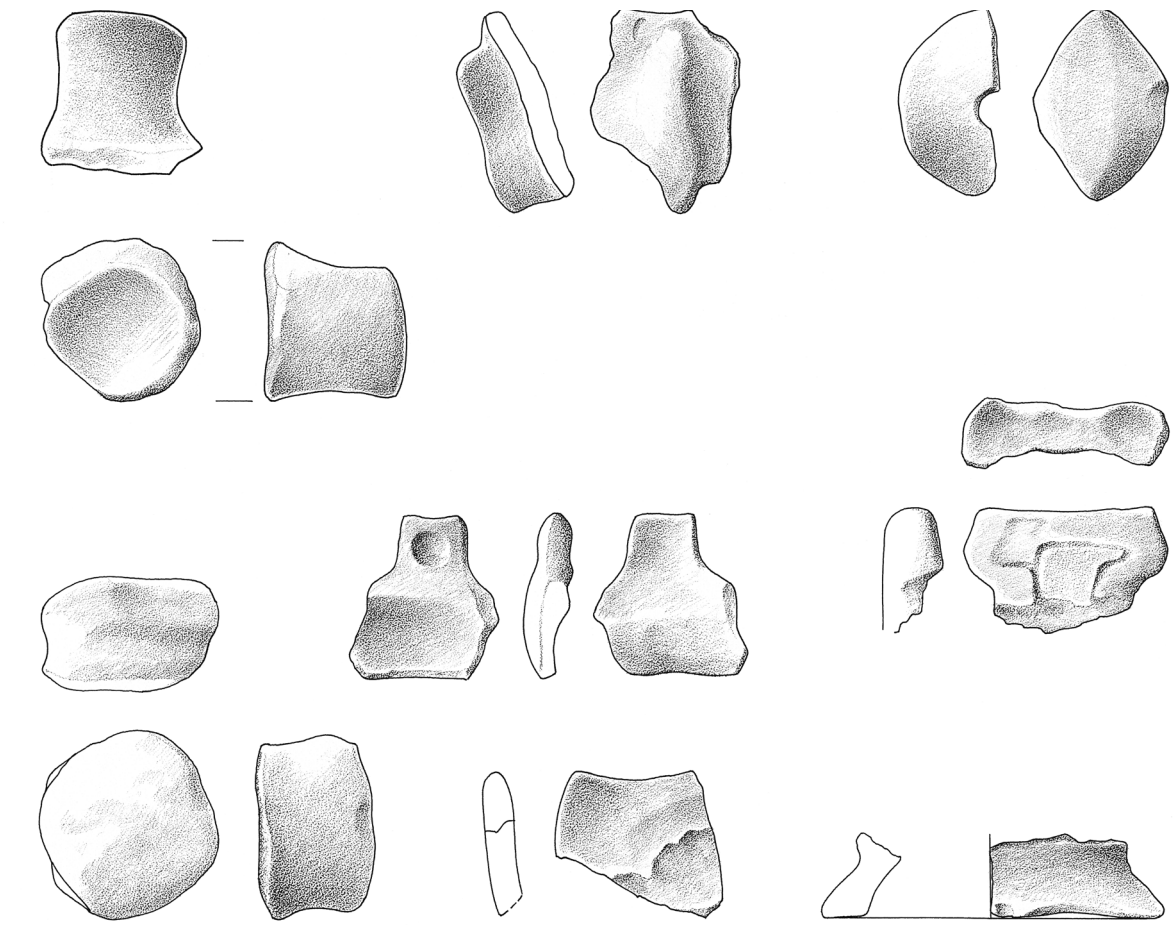


Fig. A4.12. Handle, *appliqué*, spindle whorl, handle, three lugs and a pot-stand from Pointe Sablé (scale 1:1, except for the upper lug on the left which is scale 1:3).

	Number	Number %	Weight	Weight %
Rim	221	30.6	19,230	43.9
Body	375	51.9	14,998	34.3
Base	87	12.1	5994	13.7
Griddle	26	3.6	2941	6.7
Appendage/other	13	1.8	622	1.4
Total	722	100.0	43,785	100.0

Table A4.55. Number, percentages and weight (g) of sherds from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Handle	2	15.4
Lug	3	23.1
Pot-stand	2	15.4
Spindle whorls	1	7.7
Griddle leg	4	30.7
Ceramic disc	1	7.7
Total	13	100.0

Table A4.56. Number and percentages of sherds within appendages/other categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Incision	48	94.1
Modelling (geometric)	2	3.9
Finger indentation	1	2.0
Total	51	100.0

Table A4.57. Number and percentages of sherds with particular decoration modes from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Flat	69	79.3
Convex	1	1.2
Concave	2	2.3
Concave high	1	1.2
Unidentified	14	16.0
Total	87	100.0

Table A4.58. Number and percentages of sherds within base shape categories from the 1965/1968 Pointe Sablé collection.

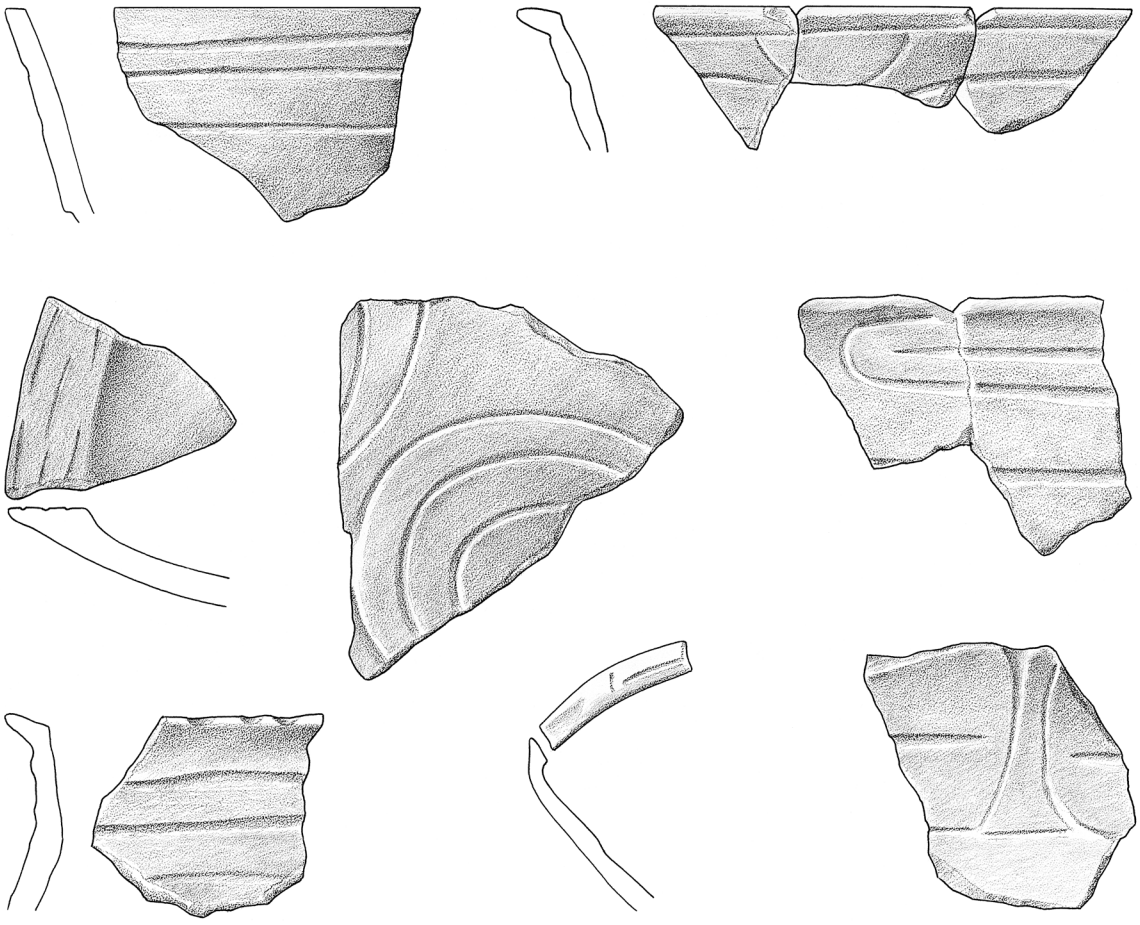


Fig. A4.13. Ceramics from Pointe Sablé, decorated by incision (scale 1:2).

	Number	Number %
Straight	3	11.6
Triangular	1	3.8
Unthickened	1	3.8
Legged	13	50.0
Unidentified	8	30.8
Total	26	100.0

Table A4.59. Number and percentages of sherds within griddle shape categories from the 1965/1968 Pointe Sablé collection.

Fig. A4.14. Human face bowl from Pointe Sablé (surface, scale 1:2).

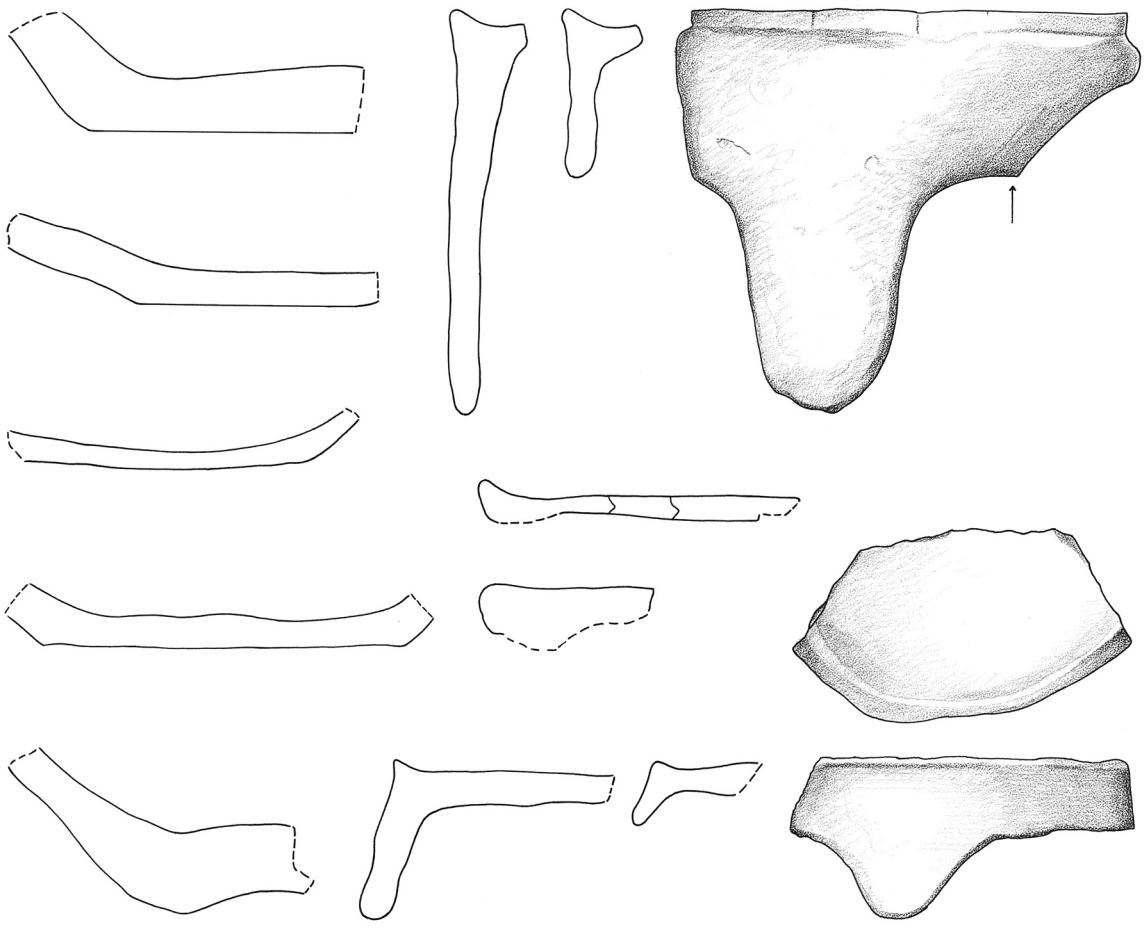


Fig. A4.15. Pointe Sablé base shapes and griddle rim shapes (scale 1:4).

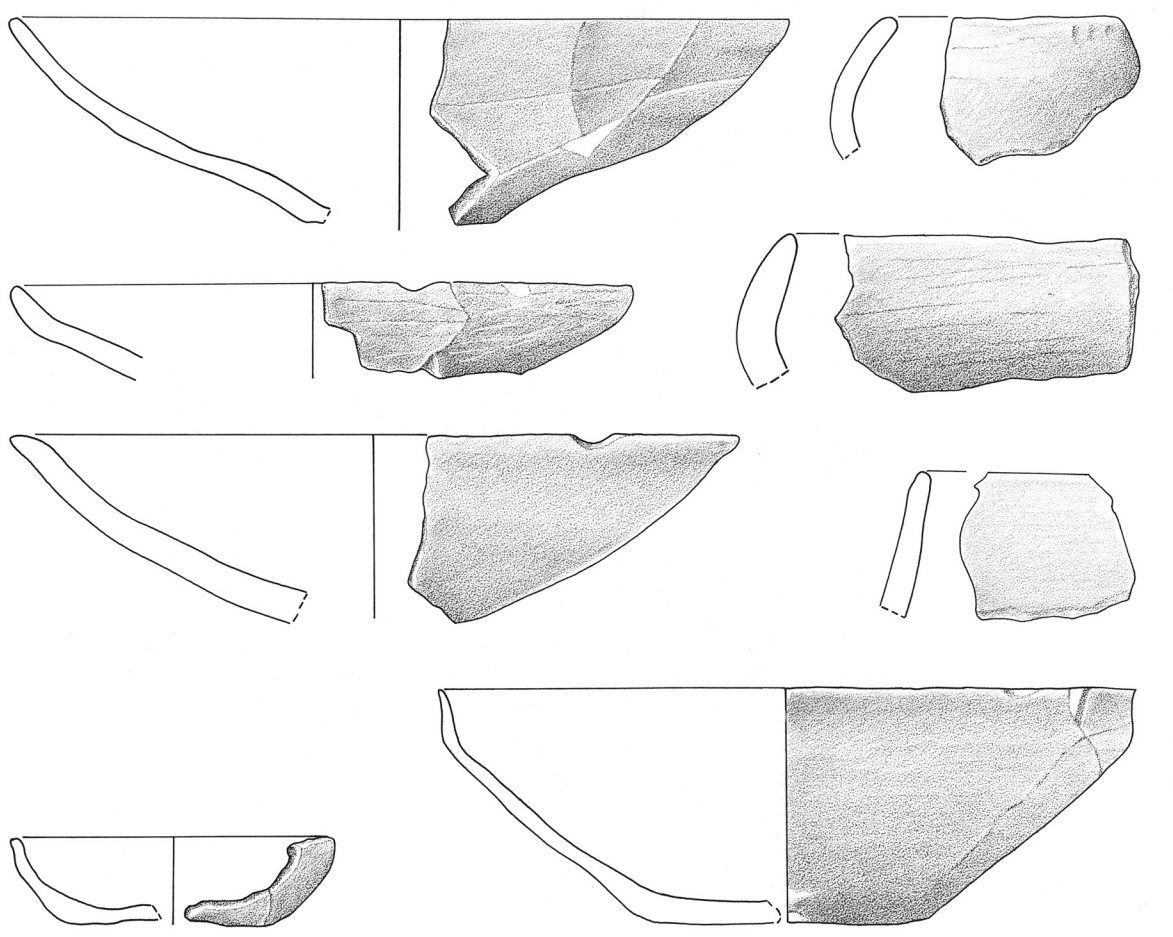


Fig. A4.16. Pointe Sablé vessel shapes (from left to right, from top to bottom scales 1:5, 1:3, 1:3, 1:5, 1:3, 1:4, 1:3, 1:3).

	Number	Number %
Jar with unrestricted simple contour	50	25.5
Bowl with unrestricted simple contour	79	40.3
Dish with unrestricted simple contour	25	12.8
Bowl with restricted simple contour	23	11.7
Bowl with unrestricted composite contour	6	3.6
Jar with restricted composite contour	1	0.5
Bowl with unrestricted inflected contour	3	1.5
Bowl with independent restricted inflected contour	1	0.5
Unidentified	7	3.6
Total	196	100.0

Table A4.60. Number and percentages of sherds within vessel shape categories from the 1965/1968 Pointe Sablé collection.

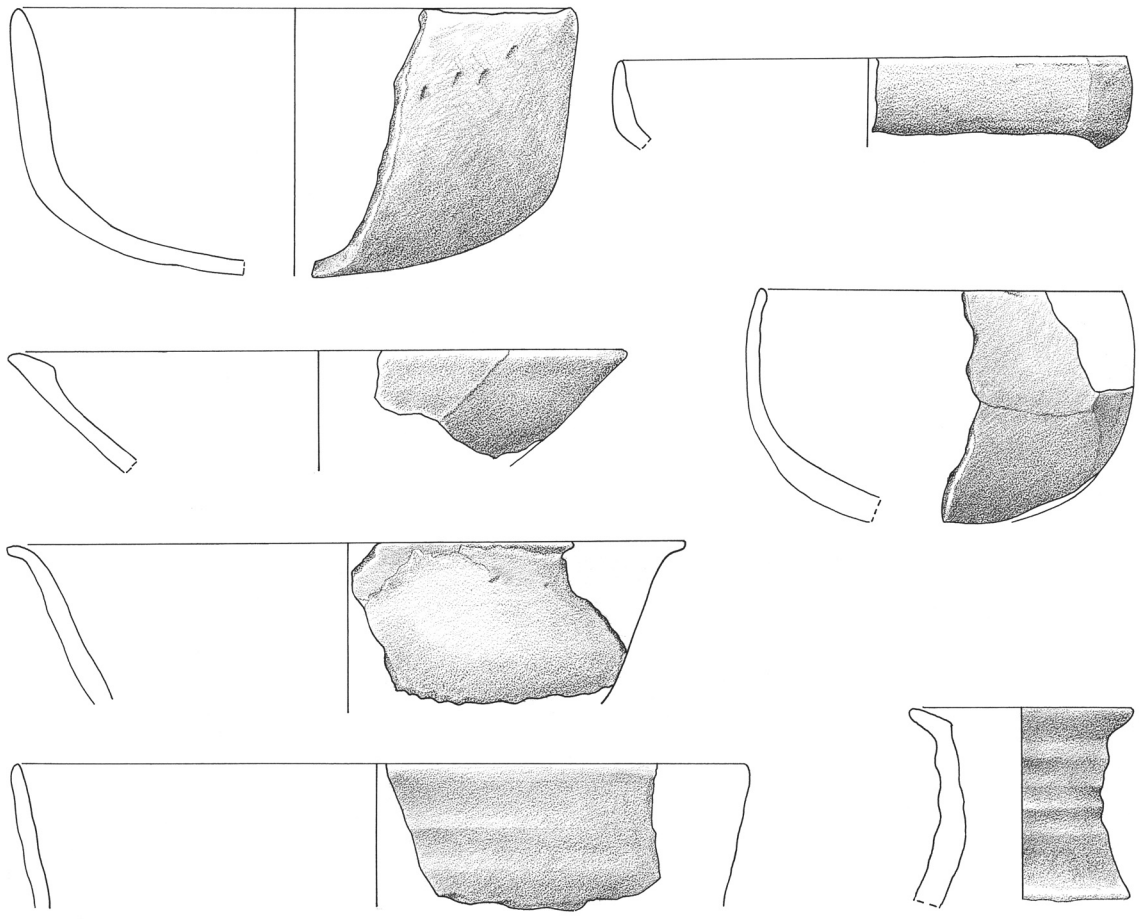


Fig. A4.17. Pointe Sablé vessel shapes (from left to right, from top to bottom scales 1:3, 1:2, 1:2, 1:3, 1:2, 1:5, 1:1).

	Number	Number %
Rounded	137	69.9
Flattened	9	4.6
Inward thickened	33	16.9
Outward thickened	2	1.0
Double thickened	3	1.5
Inwardly bevelled	1	0.5
Flanged	3	1.5
Unidentified	8	4.1
Total	196	100.0

Table A4.61. Number and percentages of sherds within rim shape categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
1-5 mm	10	5.1
6-8 mm	85	43.4
9-11 mm	82	41.8
12-15 mm	19	9.7
Total	196	100.0

Table A4.62. Number and percentages of sherds within wall thickness categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
1-10 cm	4	2.0
11-20 cm	22	11.2
21-30 cm	70	35.8
31-40 cm	25	12.8
41-50 cm	21	10.7
51-60 cm	3	1.5
Unidentified	51	26.0
Total	196	100.0

Table A4.63. Number and percentages of sherds within orifice diameter categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Light gray	1	0.5
Gray	7	3.6
Dark gray-black	16	8.2
Brown-gray/gray-brown	6	3.1
Dark grayish-brown	12	6.1
Light brown-yellow	2	1.0
Light brown/brown	1	0.5
Dark brown/very dark brown	49	25.0
Reddish-gray/dark reddish-gray	6	3.1
Reddish brown	45	22.9
Red	44	22.4
Unidentified	7	3.6
Total	196	100.0

Table A4.64. Number and percentages of sherds within exterior surface colour categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Complete reduction	28	14.3
Incomplete oxidation or reduction	16	8.2
Incomplete or relatively good oxidation	151	77.0
Unidentified	1	0.5
Total	196	100.0

Table A4.65. Number and percentages of sherds within firing colour categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Scratched	4	2.0
Smoothed	51	26.0
Lightly burnished	33	16.8
Highly burnished	64	32.7
Polished	18	9.2
Unidentified	26	13.3
Total	196	100.0

Table A4.66. Number and percentages of sherds within exterior surface finishing categories from the 1965/1968 Pointe Sablé collection.

	Number	Number %
Jar with unrestricted simple contour	6	50.0
Bowl with unrestricted simple contour	2	16.7
Dish with unrestricted simple contour	2	16.7
Bowl with unrestricted composite contour	1	8.3
Bowl with independent restricted complex contour	1	8.3
Total	12	100.0

Table A4.67. Number and percentages of sherds within vessel shape categories from the 1995, 1997 and 1999 Pointe Sablé collections.

	Number	Number %
Dark brown/very dark brown	2	16.7
Reddish brown	6	50.0
Red	3	25.0
Unidentified	1	8.3
Total	12	100.0

Table A4.68. Number and percentages of sherds within exterior surface colour categories from the 1995, 1997 and 1999 Pointe Sablé collections.

	Number	Number %
Complete reduction	2	16.7
Incomplete or relatively good oxidation	9	75.0
Unidentified	1	8.3
Total	12	100.0

Table A4.69. Number and percentages of sherds within firing colour categories from the 1995, 1997 and 1999 Pointe Sablé collections.

	Pebble	Core artefact	Flake	Hammer-stone	Axe	Total
Long Island flint		1				1
		8.3				8.3
Volcanic rock	1		2		1	4
	8.3		16.8		8.3	33.4
Hypabyssal rock	3			1		4
	25.1			8.3		33.4
La Désirade, sedimentary rock	1					1
	8.3					8.3
Sedimentary rock	1					1
	8.3					8.3
La Désirade, unidentified material	1					1
	8.3					8.3
Total	7	1	2	1	1	12
	58.3	8.3	16.8	8.3	8.3	100.0

Table A4.70. Number and percentages of rock types and lithic artefact types from the 1965/1968 Pointe Sablé collection.

4.6.3.2 Lithic artefacts

Most of the Pointe Sablé lithic artefacts are from the 1965/1968 excavations. These include 12 artefacts such as one Long Island flint polyhedral core-artefact, and an eared axe butt-part, one non-modified complete flake and one broken flake, and a non-modified volcanic rock water-worn pebble. Two sedimentary rock pebbles with polished surfaces (one from La Désirade), three pebbles and one complete hammer-stone of hypabyssal rock and one pebble of an unidentified material (probably from La Désirade) were collected as well. The heavily pitted areas on this artefact suggest that it may have been used as a hammer-stone before being flaked (table A4.70).

One small shapeless core-artefact from La Désirade jasper without patination and with some cortex was found during a 1997 visit to the site. Two other lithic artefacts were found during the 1999 excavations. These include a non-modified, broken, La Désirade hypabyssal rock flake without retouch, which could probably be the last part of a core, and a possible Basse-Terre hypabyssal rock hammer-stone fragment.

4.6.3.3 Coral artefacts

One lightly used passive *Acropora palmata* grinding tool fragment was found in the 1999 test unit.

4.6.3.4 Shellfish remains

A very small number of shellfish remains were found in 1999. All shellfish remains could be identified. They include *Cittarium pica, Nerita* sp., *Strombus gigas, Tectarius muricatus* and *Tellina fausta* (table A4.71).

4.6.3.5 Animal remains

MNI counts (excluding the intrusive species) show that the

	MNI count	MNI weight	Fragment weight	Total weight
Strombus gigas	0	0	16	16
	0.0	0.0	55.2	4.7
Cittarium pica	2	306	9	315
	33.3	98.7	31.0	92.9
Nerita sp.	2	1	4	5
	33.3	0.3	13.8	1.5
Tectarius muricatus	1	1	0	1
	16.7	0.3	0.0	0.3
Tellina fausta	1	2	0	2
	16.7	0.7	0.0	0.6
Total	6	310	29	339
	100.0	100.0	100.0	100.0

Table A4.71. MNI counts, MNI weights (g), fragment weight (g), total weight (g) and percentages of all shell species from the 1999 Pointe Sablé collection.

Pointe Sablé hand-collected faunal sample (total MNI 12, total weight 737 g) consists of fish (66.6%) and reptile (25.0%). It represents reef carnivores (41.7%) such as grouper and jack. It further consists of inshore species (25%), in this case sea turtle and manatee, as well as reef herbivores/omnivores (16.6%), including parrotfish, triggerfish. The manatee bone and some turtle costals have been worked (fig. A5.5-6). Offshore-pelagic barracuda (8.3%) were found as well. It is remarkable that a lot of sea turtle, and quite some grouper and jack were collected. This may be due to collection biases (Nokkert in appendix 5).

It has been suggested that the hand-collected sample of the unknown site on Petite Terre actually belongs to Pointe Sablé as well. MNI counts demonstrate that this sample (total MNI 9, total weight 418 g) consists of fish (66.6%), crab (11.1%), mammal (11.1%) and reptile (11.1%). It represents terrestrial fauna (22.2%), including great land crab, inshore (33.3%) species such as sea turtle and porcupinefish, and reef herbivores/omnivores (22.2%), in this case parrotfish. Reef carnivores (11.1%) were represented by grouper and offshore-pelagic fish (11.1%) by barracuda (Nokkert in appendix 5).

4.6.4 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

4.7 EST DE TROU CANARD (97110-052)

4.7.1 Site location and preservation

The Est de Trou Canard site (x: 701,000; y: 1788,800) was discovered at the rocky southern coast of Terre de Bas, immediately east of a sandy beach, during the 1999 surveys (fig. 5.3). Site dimensions are 40 m north to south and 140 m west to east. Surface material is evenly distributed and characterised by modestly fragmented ceramics and *Cittarium pica*, *Strombus gigas*, *Chiton* sp. and *Nerita* sp. fragments. Hardly any off-site material has been found. No test units were excavated. Mancenilla trees and sea grape at the coast and thorny brushwood with acacias in the inland part of the site cover 21-40 percent of the soil, which consists of coarse, well-drained sand. Passage across the terrain is seriously hindered but surface visibility is rather good. The site appears to be heavily disturbed as a result of coastal erosion and cultivation in the past.

4.7.2 Archaeological materials

A small surface collection was made, consisting of a very small amount of non-diagnostic pottery. Although shell fragments were observed on the surface, these were not collected. No other archaeological materials have been found. The pottery collection consisted of four rims and four body sherds, weighing 192 g. One of the body sherds has been drilled and is considered a spindle whorl preform. Two sherds had red slipped surfaces and one sherd was decorated by incision.

The morphological description of the pottery has been based on the analysis of three rims larger than 5 cm. Two of these belong to bowls with unrestricted simple contours and one is from a dish an unrestricted simple contour, all three with rounded rim shapes. Wall thicknesses are between 6-8 mm and orifice diameters range between 11-20 cm, 21-30 cm or is unidentified. Two sherds have a red outer surface, while the other is reddish brown and incomplete or relatively good oxidation is the firing technique. Two sherds have highly burnished outer surface while the surface finishing of the other is unidentified.

4.7.3 Chronological assignment

The site yielded Late Ceramic A pottery (unidentified style).

APPENDIX 5. FAUNAL REMAINS FROM THE PRE-COLUMBIAN SITES OF POINTE DES CHÂTEAUX, LA DÉSIRADE AND PETITE TERRE

By Mark Nokkert

5.1 INTRODUCTION

This zooarchaeological study is a supplement to the archaeological study of the micro-region of La Désirade, Petite Terre and Pointe des Châteaux (De Waal this volume). During fieldwork related to this study, substantial numbers of faunal remains were found within the area of interest. Although originally not incorporated in the research design (De Waal 1997), it was thought that a study of these faunal remains could make a contribution to an understanding of the pre-Columbian use and the organisation of the environment. Since the excavations were originally not designed with the purpose of obtaining sufficiently large faunal samples, the numbers and quality of the faunal remains excavated varied considerably between the sites. Although this imposed some limitations on the analysis, enough material was available to yield information on pre-Columbian social organisation within the studied micro-region.

5.2 AIMS

The research focused on identification, quantification and contextual analysis of faunal remains from pre-Columbian sites in the studied micro-region, including analyses at site level and inter-site level. The study aims to contribute to a better understanding of pre-Columbian subsistence in the Early Ceramic and Late Ceramic Age, the functioning and use of pre-Columbian sites and the exploitation of the natural environments surrounding these sites.

In this respect, the results of the faunal analyses make a contribution to the analysis of site systems (De Waal this volume). Also, the study of the exploitation of the various environmental zones helps to reconstruct and understand pre-Columbian Amerindian use and perception of the landscape.

5.3 MATERIALS AND METHODS

The faunal remains originated from the undisputed archaeological contexts of Early Ceramic and Late Ceramic sites excavated within the research area. A total of 16,232 faunal remains were recovered and analysed from a total of 28 sites, accounting for a total MNI (Minimum Number of Individuals) of 739 and weighing 6014 grams.

Of the 28 sites excavated, 12 sites were located on La Désirade, 11 on Pointe des Châteaux, and five on Petite Terre. Three sites are on Terre de Bas and one is on Terre de Haut. Archaeological material from one Petite Terre site was stored in the depot of the archaeological museum in Le Moule but the name of this site had not been recorded. The collection strategy suggests that the sample from the unknown site was actually part of the Pointe Sablé site at Terre de Haut. There were great differences between the three islands in the numbers of faunal remains recovered: eight of the 12 sites on La Désirade yielded faunal remains, accounting for 86.3% (14,008 specimens) of the total number of analysed faunal remains; on Pointe des Châteaux only five of the 11 sites contained faunal remains, accounting for only 2.2% (362 specimens), while all five sites on Petite Terre yielded faunal remains accounting for 11.5% (1862 specimens) of the total amount. Not only were there large differences between the islands, major differences in the numbers of recovered faunal remains could also be observed between the individual sites.

Ten of the 28 sites chosen for excavation did not yield any faunal remains at all, even though a relatively large amount of soil was excavated at some of these sites (table A5.1). Most sites without or with only a few faunal remains were on Pointe des Châteaux, with only the Petites Salines site containing reasonable numbers. La Désirade showed the largest variety in the number of faunal remains recovered, varying from none to the À l'Escalier site with the most remains of all sites analysed. All sites on Petite Terre yielded relatively moderate to large numbers of faunal remains.

The absence of sites without faunal remains on Petite Terre is likely related to the survey strategy employed on Petite Terre, which focused mainly on relatively large sites that were already known. In contrast, at Pointe des Châteaux and on La Désirade large areas were systematically and intensively surveyed, resulting in the discovery of several small-sized sites, many of which lacked faunal remains altogether (De Waal this volume).

When comparing the density data (N faunal remains/m^3)

Island	Site name	Soil excavated[1]	N faunal remains	N (1/m³)
Pointe des Châteaux	Grande Saline	4.00 m³	29	7
	Petites Salines	4.53 m³	218	48
	Site 1	1.36 m³	0	0
	Village des Pêcheurs	0.48 m³	0	0
	Montagne Petites Salines	3.00 m³	12	4
	Ouest Résidence Kahouanne	0.21 m³	0	0
	Degrat	2.85 m³	1	<1
	Site 7	0.46 m³	1	2
	Est Pointe Tarare	1.55 m³	0	0
	Ouest Morne Zambi	0.54 m³	0	0
	Nord Morne Zambi	1.25 m³	0	0
La Désirade	À l'Escalier	4.80 m³	2715	566
	Anse des Galets	0.80 m³	17	21
	Cocoyer	0.40 m³	0	0
	Les Sables	0 + 2.82 m³ ('85)	0 + 120 ('85)	43
	Voûte à Pin	0.60 m³	45	75
	Pointe Séraphine	0.40 m³	0	0
	Grand Abaque 1	2.80 m³	13	5
	Pied de la Montagne	2.10 m³	23	11
	Pointe Colibri	3.20 m³	0	0
	Aéroport	3.10 m³	222	72
	Pointe Gros Rempart	0.60 m³	0	0
	Morne Souffleur	0.60 m³	2	3
Petite Terre (Terre de Haut)	Pointe Sablé	0.3 + ? m³ ('65 [2])	0 + 68 ('65)	?
Petite Terre (Terre de Bas)	Baleine du Sud	2.10 m³	185	88
	Site du Phare	2.30 m³	446	194
	Est de Mouton de Bas	4.00 m³	1132	283
Petite Terre	Unknown	0 + ? m³ ('65)	0 + 21 ('65)	?

Table A5.1. Number of faunal remains recovered relative to the amount of soil excavated for each of the 28 excavated sites (after Bodu 1985[b] and De Waal 1998[b], 1999[g]).[3]

from table A5.1 with the available contextual and dating data no apparent relationship between the relative density of faunal remains in a site and its supposed function could be detected. Similarly, there was no apparent relationship between the surface area covered by a site and the density of faunal remains encountered (table A5.2). There seems, however, to be a relationship between the presence of a midden area in a site and the numbers of faunal remains recovered. Sites with deep midden deposits showing little post-depositional disturbance, such as the sites of À l'Escalier and Est de Mouton de Bas, usually also contained dense concentrations of faunal remains. The combination of relatively rapid accumulation of artefacts in midden deposits, generally few post-depositional disturbances and the general alkaline conditions in middens, caused primarily by leaking of calcium-carbonate from shells, usually results in very favourable micro-environmental conditions for the preservation of faunal remains.

Site name	Site Function	Period	Midden[4]	N (1/m³)	Area (m²)
La Désirade					
À l'Escalier	Habitation site	Late Ceramic A	Present	566	1700
Anse des Galets	Habitation site	Late Ceramic A	Absent	21	14,800
Les Sables	Habitation site	Early Ceramic B	Present	43	19,000
Voûte à Pin	Ceremonial	Late Ceramic A	Absent	75	70
Grand Abaque 1	Habitation site	Late Ceramic A	Absent	5	10,000
Pied de la Montagne	Unidentified	Unidentified	Absent	11	39,000
Aéroport	Habitation site	Late Ceramic A	Present	72	28,200
Morne Souffleur	Habitation site	Late Ceramic B	Absent	3	2800
Petite Terre					
Baleine du Sud	Habitation site	Late Ceramic A	Absent	88	9500
Site du Phare	Habitation site	Late Ceramic A	Present	194	25,100
Est de Mouton de Bas	Habitation site	Late Ceramic A	Present	283	8200
Pointe Sablé	Habitation site	Late Ceramic A	Absent	?	8400
Unknown	Unidentified	Unidentified	Unknown	?	?
Pointe des Châteaux					
Grande Saline	Habitation site	Late Ceramic A	Absent	7	12,200
Petites Salines	Habitation site	Early Ceramic B + Late Ceramic A	Present	48	5200
Montagne Petites Salines	Habitation site	Early Ceramic B	Absent	4	15,500
Degrat	Habitation site	Late Ceramic A	Absent	<1	1200
Site 7	Habitation site	Late Ceramic A	Absent	2	17,000

Table A5.2. Contextual information for the sites with faunal remains.

In addition to the presence or absence of a midden, the relative abundance of faunal remains was for some sites also influenced by other factors. The Voûte à Pin site, for instance, showed a relative good recovery of faunal remains, which is probably related to the protective cave environment in which they were found. Furthermore, the relatively successful recovery of faunal remains from three of the Petite Terre sites is related to the lack of recent developments on Petite Terre compared to Pointe des Châteaux and La Désirade. Finally, the sites Baleine du Sud and Pointe Sablé, although they most likely contained extensive midden areas in the past, are today severely disturbed or even totally destroyed due primarily to marine erosion.

Sites with no or only few faunal remains were mainly small-sized surface concentrations with no apparent middens. Although it is possible that test units excavated within these sites were located outside of any existing midden, there seemed, however, to be a close relationship between the amount of material encountered on the site surface and in the units: sites with midden areas usually also showed clear concentrations of material on the surface. Sites with few or no faunal remains in general showed evidence of ploughing activities as well, exposing faunal remains to more intense weathering processes (Lyman 1994), which may have resulted in near-complete destruction of the organic remains.

5.3.1 Field recovery methods

Test units, excavated in 1998 and 1999 at the various sites, were usually dug in areas with relatively high concentrations of surface material (De Waal this volume). Test units that were 1 m² in size and occasionally 2 m² or 4 m² were excavated by trowel in 10 cm arbitrary levels, with subdivisions when different geological or archaeological layers were

Site name	Context location	Type of context	Screen size	Amount of soil
À l'Escalier	Unit 1, Level 6	Midden	1 mm	5 litres
À l'Escalier	Unit 1, Level 7	Midden	1 mm	5 litres
À l'Escalier	Unit 2, Level 5	Midden	1 mm	5 litres
À l'Escalier	Unit 2, Level 6	Midden	1 mm	5 litres
Site du Phare	Unit 2, Level 7, F 001	Hearth	1 mm	5 litres
Petites Salines	Unit 4, F 001	Natural feature	2 mm	5 litres
Petites Salines	Unit 4, F 002	Natural feature	2 mm	5 litres

Table A5.3. Samples taken for the specific purpose of zooarchaeological analysis.

Excavations	N faunal remains recovered	Total weight (g)	Average weight per artefact (g)
1965	120	583	4.9
1985	89	1154	13.0
1998-1999[5]	5061	3877	0.8

Table A5.4. Average weight of faunal remains recovered by De Waal in 1998 and 1999 compared with remains from earlier excavations.

encountered and were dry sieved over a 2/5 inch screen. This mesh-size was used at all sites, therefore allowing direct comparison between the various assemblages. At some of the sites showing unusual features or an abundance of faunal remains in certain contexts, additional samples were taken for zooarchaeological purposes. These were wet sieved over 1 mm or 2 mm mesh screens (table A5.3).

The artefacts from the 1985 excavations at the Les Sables site were shovel excavated and hand-collected (Bodu 1985[b]). Although it is not known how the faunal remains from the sites excavated in 1965, including the site of Pointe Sablé and an unidentified site at Petite Terre, were collected, judging from the average weight of the faunal remains it seems most likely that they were also hand-collected (table A5.4). Since collection of faunal remains by hand can heavily bias the results (e.g. Payne 1972) the results from the earlier excavations cannot be directly compared with the recent ones. Detailed contextual information is also lacking and therefore only qualitative results will be presented for these sites. Furthermore, since the screen size used can also heavily influence the analysis of an assemblage (e.g. Cannon 1999; Shaffer and Sanchez 1994), faunal remains from different screen sizes have been analysed separately. Remains from the 1 mm and 2 mm screens have mainly been used to complement information obtained from material from the 2/5 inch screens, for example to check whether the 2/5 inch screens were fine enough to collect all identifiable remains.

5.3.2 Recording methods

The identification of the faunal remains was carried out with the aid of the author's comparative reference collection. The zooarchaeological reference collection at the Department of Archaeology at the University of Southampton was also used, primarily for the identification of human remains and European mammals. In addition, some of the mammal bones and marine crab remains were analysed using the collections of the Natural History Museum in London. In addition, relevant literature with anatomical illustrations was also used.

All faunal remains were identified to element and to taxon. The portion of the skeletal element present was recorded (distal, proximal, shaft; with a percentage of completeness), and for paired elements also the side. The remains were identified to the lowest taxonomic level possible. Since most tropical fish families consist of many different species, the bones of which are often very similar in shape, most fish remains were therefore not identified

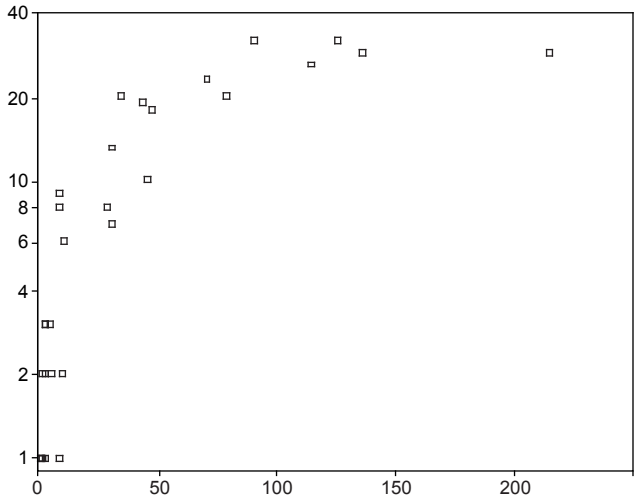


Fig. A5.1. MNI plotted against the Number of Identified (consumed) taxa (logarithmic).

beyond the family or genus level.

Notes were also taken about taphonomic phenomena, such as burning, cut marks, gnaw marks, and bone modifications. In the case of burning, the colour and the proportion of the element that was burned was noted.

5.3.2.1 Quantification

For this study, the Number of Identified Specimens (NISP), the Minimum Number of Individuals (MNI) and the Weight of the bone fragments were employed for quantification of the remains. Comparisons within and between sites were primarily based on the MNI%, which is the percentage of the MNI of a certain species in an assemblage in relation to the total MNI of that assemblage. NISP% and Weight% were also used, primarily in order to see how they compare with MNI%.

NISP and MNI were calculated using common zooarchaeological procedures (Reitz and Wing 1999). In the case of cross-mendable specimens, for NISP the elements were counted as one, if these elements showed recent breaks. For the MNI the highest MNE (Minimum Number of Elements) was used per taxon, for each context, taking into account the side, size, and the age and sex from the elements. For sea turtles (*Cheloniidae*), this often meant that measured differences in the thickness of the costals were used to calculate MNI. Similarly, for fish remains, MNI was occasionally calculated from differences in size classes, based on measurements of the fish vertebral centra.

In order to obtain substantially large samples, for most sites the results from the analysis of individual contexts were aggregated into larger samples. Due to relatively low overall numbers of faunal remains this meant that for most sites all faunal remains were amalgamated into one larger sample. The MNIs for the various taxa for these aggregated samples have been calculated as if the remains had been physically amalgamated (*cf*. Grayson 1984). By doing so, it was taken into account that two bones from the same taxon but found in two different levels within the same test unit could in fact have originated from the same animal. For this study it has, however, been assumed that the remains from different test units within the same site belonged to different animals, as long as these test units were not located directly next to each other. The calculated MNI from different test units were therefore added up to create a species list for a site as a whole. For Pointe Sablé and the unidentified site at Petite Terre all remains were treated as if they had come from the same test unit, since no contextual information was available to separate the materials satisfactorily. For the 1 mm and 2/5 inch remains from À l'Escalier and the 2/5 inch remains from Est de Mouton de Bas there were relatively large amounts of material in the different test units. Therefore for these two sites species lists were created for each test unit separately as well as for these sites as a whole (table A5.5).

5.3.2.2 Adequacy of samples

Before comparing the site assemblages, one first needs to establish whether they are large enough. Small samples may be too biased for use in comparative research. When comparing by MNI, small samples are, for instance, heavily biased in favour of the rare species (Grayson 1984). Table A5.6 gives an overview of the relationship between the NISP, MNI and number of consumed taxa for all 30 assemblage-lists. This is further visualised in figure A5.1 where MNI is plotted against the number of identified (consumed) taxa.

For prehistoric sites in the circum-Caribbean it is often thought that, when species saturation is used as a measure of adequacy, assemblages need at least an MNI of 125 to reach the point of diminishing returns (e.g. Wing 1996; Wing and Brown 1979). Following from this, it is clear that only a limited number of the thirty assemblages can be used for inter-site comparisons. These include the samples from the À l'Escalier site and possibly those from Est de Mouton de Bas. All other assemblages are clearly too small to be statistically reliable. The results of many of these assemblages are, however, still useful for certain inter-site comparisons, although primarily on a qualitative level.

Site name	Contexts	Screen size
A l'Escalier	Unit 1	2/5 inch
A l'Escalier	Unit 2	2/5 inch
A l'Escalier	All remains (units 1 and 2)	2/5 inch
A l'Escalier	Unit 1, levels 6 and 7	1 mm
A l'Escalier	Unit 2, levels 5 and 6	1 mm
A l'Escalier	All remains (all samples combined)	1 mm
Anse des Galets	All remains	2/5 inch
Baleine du Sud	All remains	2/5 inch
Site du Phare	Unit 1, Feature 001	2/5 inch
Site du Phare	Unit 2, Feature 001	2/5 inch
Site du Phare	All other remains	2/5 inch
Site du Phare	Unit 2, level 7, Feature 001	1 mm
Est de Mouton de Bas	Unit 1	2/5 inch
Est de Mouton de Bas	Unit 2	2/5 inch
Est de Mouton de Bas	All remains (units 1 and 2)	2/5 inch
Les Sables	All remains	Hand-collected
Voûte à Pin	All remains	2/5 inch
Grand Abaque 1	All remains	2/5 inch
Pied de la Montagne	All remains	2/5 inch
Aéroport	All remains	2/5 inch
Morne Souffleur	All remains	2/5 inch
Pointe Sablé	All remains	Hand-collected
Name Unknown	All remains	Hand-collected
Grande Saline	All remains	2/5 inch
Petites Salines	All remains	2/5 inch
Petites Salines	Unit 4, Feature 001	2 mm
Petites Salines	Unit 4, Feature 002	2 mm
Montagne Petites Salines	All remains	2/5 inch
Degrat	All remains	2/5 inch
Site 7	All remains	2/5 inch

Table A5.5. The various assemblages created after amalgamating smaller samples. The resulting assemblages were used for further comparable analysis.

5.4 RESULTS

5.4.1 Species identified

Of the 16,232 faunal remains recovered and analysed a total of 4763 (29%) of the faunal remains could be identified to at least family level, with the remainder identified to higher levels of taxonomy. At least 41 taxa are represented in the various assemblages analysed (table A5.7).

Of the mammal remains identified (N=86), the majority originated from two different rodents, indigenous rice rats of the *Oryzomyini* tribe, now extinct, and agoutis

Assemblage	N of taxa	NISP	MNI
A l'Escalier, units 1 and 2: 1 mm	32	10,850	126
A l'Escalier, unit 1: 1 mm	32	9360	91
A l'Escalier, units 1 and 2	29	2710	215
A l'Escalier, unit 1	29	2028	136
Est de Mouton de Bas, units 1 and 2	26	1125	115
Est de Mouton de Bas, unit 2	23	787	71
A l'Escalier, unit 2	20	682	79
A l'Escalier, unit 2: 1mm	20	1490	35
Est de Mouton de Bas, unit 1	19	338	44
Site du Phare	18	319	48
Les Sables	13	119	31
Aéroport	10	215	46
Est de Mouton de Bas, unit 2: Feature 001	9	116	9
Petites Salines	8	205	29
Site with unknown name	8	21	9
Baleine du Sud	7	175	31
Pointe Sablé	6	67	11
Les Sables	3	20	5
Est de Mouton de Bas, unit 2, Feature 001: 1 mm	3	10	3
Est de Mouton de Bas, unit 1, Feature 001	3	9	3
Petites Salines, Feature 002	2	54	10
Pied de la Montagne	2	23	6
Voûte à Pin	2	18	3
Morne Souffleur	2	2	2
Petites Salines, Feature 001	1	47	9
Montagne Petites Salines	1	12	3
Anse des Galets	1	17	2
Grand Abaque 1	1	13	1
Site 7	1	1	1
Degrat	1	1	1

Table A5.6. The relationship between NISP, MNI and the number of taxa for all assemblages. Only the taxa presumed to have been consumed are included in these calculations.

(*Dasyprocta* sp.). The rice rat bones were all relatively large-sized, similar in size to *Megalomys* rice rat remains, as previously described by Steadman *et al.* (1984[b]), Reitz (1994) and Wing (1995) for prehistoric sites on nearby Montserrat and Antigua (table A5.8). *Oryzomyini* rodents were indigenous to many of the Lesser Antillean islands (Pregill *et al.* 1994).

The remains of *Dasyprocta* sp. from La Désirade and Petite Terre, when compared to the *Dasyprocta* remains in the collection of the Natural History Museum of London, best resembled both in size and body proportions a skeleton labelled *Dasyprocta cristata* (1957.2.12.4; origin: 'Antilles'),

Class	Order	Family	Genus/Species	Common name
Mammalia	Primates	*Hominidae*	*Homo sapiens*	Human
	Sirenia	*Trichechidae*	*cf. Trichechus manatus*	Manatee
	Artiodactyla	*Suidae*	*Sus scrofa*	Domestic pig
			cf. Capra hircus	Domestic goat
	Rodentia	*Muridae*	*Rattus* sp.	Norway rat/ Black rat
		Oryzomyini	*cf. Megalomys*	Rice rat (extinct)
		Dasyproctidae	*Dasyprocta* sp.	Agouti
Aves				Unidentified bird
Reptilia	*Testudines*	*Cheloniidae*		Sea turtle
	Squamata (Suborder *Lacertilia*)	*Iguanidae*	*Iguana* sp.	Iguana
		Teiidae	*cf. Ameiva* sp.	Lizard
	Squamata (Suborder *Serpentes*)	*Colubridae*	*cf. Alsophis* sp.	Snake
Chondrichthyes	*Lamniformes*	*Carcharhinidae*	*Carcharhinus* sp.	Shark
Osteichthyes	*Clupeiformes*	*Clupeidae*		Herring
	Cyprinodontiformes	*Belonidae*		Needlefish
	Beryciformes	*Holocentridae*		Squirrelfish
			cf. Myripristis jacobus	Blackbar soldierfish
	Perciformes	*Serranidae*		Grouper
			Epinephelus sp.	Grouper
			Mycteroperca sp.	Grouper
		Priacanthidae		Big eye
		Carangidae		Jack/Scad
			Caranx sp.	Jack
		Lutjanidae		Snapper
		Haemulidae		Grunt
			Haemulon sp.	Grunt
		Sparidae		Porgy
		Mullidae		Goatfish
		Sphyraenidae		Barracuda
		Labridae		Wrasse
			Bodianus rufus	Spanish hogfish
			Halichoeres sp.	Wrasse
		Scaridae		Parrotfish
			Scarus sp.	Parrotfish
			Sparisoma sp.	Parrotfish
		Acanthuridae		Surgeonfish
		Scombridae		Tuna/Mackerel
	Tetraodontiformes	*Balistidae*		Triggerfish
		Ostraciidae		Boxfish
		Diodontidae		Porcupinefish
Echinoidea	*Echinacea*	*Echinidae*		Unidentified sea urchin
			Echinometra lucunter	Red rock urchin

Class	Order	Family	Genus/Species	Common name
Malacostraca	*Decapoda*, (Infraorder) *Anomura*	*Coenobitidae*	*Coenobita clypeatus*	Land hermit crab
	Decapoda, (Infraorder) *Brachyura*		*Mithrax* sp.	Common spider crab
		Xanthidae	*Carpilius corallinus*	Coral crab
		Gecarcinidae	*Cardisoma guanhumi*	Great land crab
			Gecarcinus lateralis	Black land crab
			cf. Gecarcinus lateralis	Black land crab
			cf. Gecarcinus ruricola	Mountain crab
			Gecarcinus sp.	Land crab

Table A5.7. Taxa identified in the various assemblages (previous page and above).

Site name	Island	Average alveolar length, lower cheek teeth row	N
Trants (Reitz 1994: table 7)	Montserrat	10.1	4
Brook site (Wing 1995: table 7)	Antigua	9.5	8
Est de Mouton de Bas	Petite Terre	9.4	1

Table A5.8. Measurements of *Megalomys* specimens found at pre-Columbian sites on Lesser Antillean islands.

now also known as *D. leporina*. Agoutis were not endemic to the region. During the Early Ceramic Age Amerindians introduced them to the islands, where some may have been kept in captivity (Wing 1993). Agoutis, as well as rice rats, were probably also attracted to the horticultural plots of the Amerindians, were they could have been hunted easily (Linares 1976).

An interesting find is a piece of a rib, almost certainly from a manatee (*Trichechus manatus*), found in the assemblage of the unidentified site on Petite Terre, which might be the Pointe Sablé site. It was worked into a small object (fig. A5.5). Nowadays, manatees are almost completely extirpated from the West Indies as they were regularly hunted during the early colonial period, but they were probably relatively abundant in prehistoric times (Lefebvre *et al.* 1989). Since manatees are usually found in or near fresh water sources (Lefebvre *et al.* 1989), the presence of a manatee bone on Petite Terre is surprising, considering the complete absence of rivers here. Most likely, therefore, this bone originated from a manatee killed elsewhere (for instance Basse-Terre on Guadeloupe). It may have been transported as raw material, or it was possibly exchanged as a finished object.

A few human remains were also encountered at the cave site of Voûte à Pin on La Désirade. This site, therefore, may have been used as a burial ground. A piece of a human skull was also found in test unit 1 of the À l'Escalier site on La Désirade. Rare finds of other mammalian remains consisted of European intrusive species in the disturbed topsoil at the sites, including pig (*Sus scrofa*), goat (*Capra hircus*) and European rat (*Rattus* sp.).

Birds (N=56) consisted mainly of pigeons and doves (*Columbidae*), which were hunted for their relatively large size, easy capture, and their tasty flesh. The bird remains await further analysis.

Of the reptiles (N=359), most bones found belonged to Iguanas (*Iguana* sp.) and sea turtles (*Cheloniidae*). The iguana remains probably belonged to the indigenous iguana (*Iguana delicatissima*). *Iguana delicatissima* is indigenous to the Lesser Antilles, and is only present on a few islands today, including La Désirade and Petite Terre. Petite Terre has the largest remaining colony of this iguana species (Office National des Fôrets 1994). Today, there are still three sea turtle species that come to lay eggs on Petite Terre, including

Chelonia mydas, *Eretmochelys imbricata* and possibly also *Lepidochtelys* sp. (*Office National des Fôrets* 1994). A few bones of small-sized reptiles were also encountered, which belonged to small lizards (*cf. Ameiva* sp.) and a small snake (*cf. Alsophis* sp.), the latter now exterminated from most islands in the region. These small reptiles probably died in situ and were not part of the prehistoric diet.

Most faunal remains found belong to fishes (N=12,475). The fish remains identified belonged to 18 different fish families, but were dominated by parrotfish (*Scaridae*) and surgeonfish (*Acanthuridae*). Both of these fish families today are usually the dominant fish on Caribbean shallow-water reefs (Randall 1983). A few small-sized shark vertebrae were also found.

Of the invertebrates (N=3151), the most common remains were of land crabs (*Cardisoma guanhumi*, *Gecarcinus lateralis*, and *Gecarcinus ruricola*), as well as large-sized marine crabs (*Carpilius corallinus* and *Mithrax* sp.). Remains of the land hermit crab (*Coenobita clypeatus*) were also found in abundance. In addition, remains of sea urchins (*Echinidae*) were also found, most of which could be identified as *Echinometra lucunter*. A small, unidentified insect, found in the À l'Escalier site, was probably intrusive in the deposit.

5.4.2 Composition of the assemblages

Although in the species lists (tables A5.15-A5.44) all remains have been included, it should be noted that species not directly associated with prehistoric human consumption have been excluded from the subsequent subsistence studies made. The excluded remains consisted of recent intrusive and European species (pig, goat, European rat; insect), prehistoric intrusives (*Ameiva* sp., *Alsophis* sp., other small reptiles), human remains, some of the iguana remains from Petite Terre originating from iguana burrows, plus some of the land crab (*Gecarcinus* sp.) and land hermit crab (*Coenobita clypeatus*) remains. The crab remains posed a problem in this respect. Sometimes it was possible to identify a modern intrusion, but many intrusive crab remains may have gone unnoticed, as they closely resemble the prehistoric archaeological material. When crab remains were obviously recent, they were excluded from further calculations. If they *could* have been original, they were included in further calculations of subsistence studies.

5.4.2.1 Animal classes

Several of the larger assemblages were compared for their composition of the various animal classes. Whether one looks at the NISP%, MNI% or Weight% this table shows that mammals and birds comprised only a very small component of the diet in all assemblages analysed (table A5.48).

Reptile remains are rare in the assemblages from La Désirade, but are somewhat more abundant on Petite Terre, which is primarily due to higher numbers of sea turtle remains in the Petite Terre sites. Sea turtles were possibly more readily available on Petite Terre than on La Désirade since Terre de Bas beaches are extensive, while La Désirade beaches consist of more isolated patches. Measurements of the thickness of the costals found at the various sites indicate that the average sea turtle eaten on Petite Terre was somewhat larger than the ones caught on La Désirade (table A5.9). This would suggest that relatively more adult sea turtles were hunted on Petite Terre. More adult female sea turtles may have been nesting on Terre de Bas during spring times compared to La Désirade. They could have easily been killed whilst laying their eggs. The only exception to this pattern seems to be the les Sables site on La Désirade where reptiles comprise a large part of the assemblage. This is, however, most likely a reflection of the collection strategies (*i.e.* hand- collection), favouring larger remains such as sea turtle bones against much smaller fish remains. The average size of the costals of this site (table 5.9) is, therefore, probably also artificially high.

Fish bones are most numerous in nearly all assemblages, closely followed by invertebrate remains, the only exceptions being the sites of Baleine du Sud, Les Sables, Aéroport and Petites Salines. This picture stays the same whether one looks at NISP%, MNI% or Weight%. Only for the 2/5 inch assemblage from unit 2 of the À l'Escalier site are the MNI% invertebrate remains more abundant than fish remains. However, for the 1 mm samples from the same test unit fish are clearly more abundant than invertebrates, and the difference between test unit 1 and test unit 2 of À l'Escalier as observed for the 2/5 inch material is almost absent for the 1 mm samples. This indicates that test unit 2 contained relatively more small-sized fish elements than test unit 1. The À l'Escalier invertebrates mainly consisted of large amounts of hermit crab (*Coenobita clypeatus*) remains, which may not have contributed much to the diet anyway.

There is a clear difference in the percentages of fish relative to invertebrates in the various assemblages when one compares the NISP% and Weight% on the one hand, and MNI% on the other. For NISP% and Weight%, fish remains outnumber invertebrate remains by a factor 2 to 3, whilst the difference for MNI% is in the order of a factor 1.5. This is caused by the higher number of elements usually identified *per taxon* for fish than for invertebrates, the latter often being identifiable only by their chelipeds or dactyls.

The unusual composition of the assemblages of the sites of Baleine du Sud, Aéroport and Petites Salines, in each case consisting of an overwhelming majority of

Island	Site Name	Collection method	N	Average (mm)	Standard deviation (mm)
La Désirade	A l'Escalier	2/5 inch	16	4.0	1.240
Petite Terre, T.de Bas	Est de Mouton de Bas	2/5 inch	29	5.0	1.769
La Désirade	Les Sables	Hand-collected	7	5.3	2.575
Petite Terre, T. de Haut	Pointe Sablé	Hand-collected	1	5.4	-

Table A5.9. Measurements of the thickness of sea turtle costals found in the various assemblages.

Assemblage	*Coenobita*	*Mithrax* sp.	*Carpilius*	*Cardisoma*	*Gecarcinus*	MNI
A l'Escalier, units 1 and 2: 2/5 inch	21.4%	0.9%	5.0%	2.7%	9.3%	220
A l'Escalier, units 1 and 2: 1 mm	14.2%	0.8%	0.8%	1.6%	15.7%	127
Est de M. de Bas, units 1 and 2	3.4%	0.8%	0.8%	12.7%	14.6%	118
Site du Phare	2.1%	-	2.1%	-	12.5%	48
Baleine du Sud	6.1%	-	-	-	66.7%	33
Petites Salines	30%	6.7%	6.6%	23.3%	10%	30

Table A5.10. Crab species (percentages of the total MNI as calculated for the assemblages).

invertebrate remains cannot readily be explained. The observed differences may reflect the different types of deposits encountered in these sites. The relatively low sample sizes of the three assemblages may also have partly added to these differences. Furthermore, many of the land crab and land hermit crab remains found at these sites may have been recent intrusives, not recognisable as such.

5.4.2.2 Crab remains

Marine crabs, including *Mithrax* sp. and *Carpilius corallinus*, generally constitute only a small portion of the assemblages within the crab remains identified (table A5.10). The largest land crab, *Cardisoma guanhumi*, is only sparsely represented at the À l'Escalier site on La Désirade, whilst the Est de Mouton de Bas site on Petite Terre yielded a fairly large number of remains of this land crab. This may be related to the location of Est de Mouton de Bas, very close to salinas, where these crabs could have been found in large numbers. The total absence of remains of this crab at the two other sites on Petite Terre can also be seen in this light. Both sites, Baleine du Sud and Site du Phare, are located at a fair distance from any swampy area. The other land crabs, the two species of *Gecarcinus*, including *Gecarcinus ruricola* and *Gecarcinus lateralis*, are relatively well represented at all sites. Similarly, remains of the land hermit crab, *Coenobita clypeatus*, are also relatively well represented at most sites. There is, however, a striking difference in the composition of the 2/5 inch and 1 mm samples from À l'Escalier in this respect. In the 1 mm samples both the land hermit crab and the *Gecarcinus* remains are well represented, in near-equal numbers, but in the 2/5 inch samples *Coenobita* remains clearly outnumber *Gecarcinus* remains. The high number of *Coenobita* remains in the 2/5 inch samples is difficult to explain, since the remains of *Coenobita* and *Gecarcinus* are all generally fairly small, and would, therefore, have been expected in similar numbers in the 2/5 inch samples as well.

5.4.2.3 Fish remains

A very consistent pattern can be observed in the fish remains (table A5.11). Just a few fish families make up the bulk of the fish remains. Moreover, there seems to be a consistent pattern in that the same fish families are repeatedly the most abundant in the various assemblages. Parrotfish (*Scaridae*) is clearly the most abundant of the various fish families in the 2/5 inch-screened assemblages, closely followed by surgeonfish (*Acanthuridae*) and triggerfish (*Balistidae*). These three fish families account for 58.9% of the fish remains (by MNI) in the 2/5 inch samples of the À l'Escalier site, for 52.8% in the 2/5 inch samples of the Est de Mouton

Assemblage	*Scaridae*	*Acanthuridae*	*Balistidae*	*Serran.*	*Clupeidae*	MNI
A l'Escalier, units 1 and 2: 2/5 inch	27.3%	18.4%	13.2%	8.9%	-	111
Est de M. de Bas, units 1 and 2: 2/5 inch	33.6%	(6.4%)	12.8%	9.4%	-	61
Site du Phare, 2/5 inch sample	37.2%	11.4%	8.6%	8.6%	-	35
A l'Escalier, units 1 and 2: 1 mm	10.0%	25.9%	(5.7%)	(5.7%)	10.0%	69

Table A5.11. The abundance of the most common fish families in the four largest assemblages (percentages of the total MNI of fish in the assemblages). Considered common are those families with a MNI% of 8 or more; lower MNI-percentages are in brackets.

de Bas site, and for 57.2% in the 2/5 inch samples of the Site du Phare, and for 41.6% in the À l'Escalier 1 mm sample. Groupers (*Serranidae*) are also fairly common. Other fish families that are moderately common (*i.e*. a MNI% of 4-8) in most 2/5 inch-screened assemblages are *Carangidae*, *Lutjanidae* and *Labridae*.

Whilst the composition of the fish families between the 2/5 inch-screened assemblages of À l'Escalier on La Désirade and Site du Phare and Est de Mouton de Bas on Petite Terre are surprisingly similar, there are some striking differences with the 1 mm assemblage from À l'Escalier. These differences can be fully attributed to differences in collection strategies. Not surprisingly, the generally small-sized surgeonfish are much more abundant in the 1 mm samples than in the 2/5 inch À l'Escalier assemblages. Furthermore, herring-like fish (*Clupeidae*) are only found in these 1 mm samples, albeit fairly abundantly; the remains of these small schooling fish are too small to be recovered in the 2/5 inch screens.

5.4.3 Resource exploitation

In order to further analyse the assemblages a distinction can be made between those taxa that were taken from the sea, those that were hunted on land and those from an unknown environment (table A5.12). The results can shed light on the main focus for food procurement activities.

The terrestrial component is in each case almost entirely composed of invertebrates, while terrestrial vertebrate species comprise only a small proportion of the assemblages (table A5.13). Most taxa consumed were rather obtained from a marine environment, whether one looks at NISP%, MNI%, or Weight%. A slight difference can, however, be observed between NISP% and Weight% on the one hand and MNI% on the other, with MNI% being somewhat lower on average for marine taxa. This last difference is primarily caused by the difference in numbers of identified elements per taxon between fish and invertebrates, as explained above.

Interestingly, when comparing three of the largest assemblages, including the samples from À l'Escalier and Est de Mouton de Bas, by MNI, the relative proportions of terrestrial and marine taxa in the diet are virtually identical. This similarity may reflect a similar use of the environment and/or similar cultural affinities between the people living on La Désirade and those on Petite Terre. In order to study whether the actual proportions of terrestrial and marine meat in the diet are also similar between these assemblages, one would have to convert the quantified data into edible meat weight. This, however, is beyond the scope of this study.

5.4.3.1 Marine environments

More can be learned when further dividing the marine component on the basis of the various environments where the identified taxa are most commonly found (tables A5.45 and A5.49). Following divisions by Wing (1996), the taxa were grouped into inshore, reef, and offshore or pelagic. The reef fish were further divided into carnivorous species on the one hand, and omnivorous species or herbivores on the other.

The offshore habitat is quite insignificant in all assemblages, suggesting that people preferred to stay relatively close to the shore when fishing (table A5.49). However, the offshore component is somewhat larger for the sites on Petite Terre than for À l'Escalier on La Désirade. Tunas (*Scombridae*) make up most of the offshore component; they are virtually absent in the La Désirade assemblages. Perhaps the slightly smaller reefs surrounding Petite Terre (Bouchon *et al.* 1995) compared with the reefs around La Désirade forced the people on Petite Terre to fish somewhat more in pelagic waters as well.

Furthermore, it is clear that reef fish constitute the bulk of the marine taxa in all assemblages analysed. Considering MNI%, the proportion of reef carnivorous fish versus reef omnivorous and herbivorous fish remains fairly constant between the various assemblages, with the reef

	NISP%			MNI%			Weight%		
	Terr.	Marine	Unkn.	Terr.	Marine	Unkn.	Terr.	Marine	Unkn.
La Désirade:									
À L'Escalier, units 1 and 2, 2/5 inch	11.4%	77.5%	11.1%	39.1%	60.0%	0.9%	10.7%	82.0%	7.2%
À L'Escalier, unit 1, 2/5 inch	8.3%	81.7%	10.1%	30.1%	69.1%	0.7%	7.2%	86.6%	6.2%
À L'Escalier, unit 2, 2/5 inch	20.7%	65.2%	14.1%	54.4%	44.3%	1.3%	22.6%	66.7%	10.8%
Les Sables, 2/5 inch	30.3%	65.5%	4.2%	48.4%	51.6%	0.0%	26.6%	72.7%	0.7%
Aéroport, 2/5 inch	55.3%	14.4%	30.2%	80.4%	19.6%	0.0%	54.3%	29.3%	16.4%
La Désirade:									
À L'Escalier, units 1 and 2, 1 mm	2.7%	89.4%	7.9%	38.9%	61.1%	0.0%	15.4%	76.8%	7.8%
À L'Escalier, unit 1, 1 mm	2.3%	90.2%	7.5%	36.6%	63.7%	0.0%	12.9%	79.0%	8.1%
À L'Escalier, unit 2, 1 mm	5.0%	84.4%	10.5%	45.7%	54.3%	0.0%	23.9%	69.3%	6.8%
Petite Terre:									
Baleine du Sud, 2/5 inch	58.9%	4.0%	37.1%	77.4%	22.6%	0.0%	71.2%	15.2%	13.6%
Site du Phare, 2/5 inch	11.3%	80.6%	8.2%	20.8%	77.1%	2.1%	7.4%	89.2%	3.3%
Est de M. de Bas, units 1 + 2, 2/5 inch	19.6%	66.2%	14.2%	39.1%	59.1%	1.7%	25.7%	67.6%	6.7%
Est de Mouton de Bas, unit 1, 2/5 inch	10.4%	85.5%	4.1%	27.3%	72.7%	0.0%	4.8%	93.6%	1.6%
Est de Mouton de Bas, unit 2, 2/5 inch	23.5%	57.9%	18.6%	46.5%	50.7%	2.8%	38.6%	51.6%	9.8%
Pointe des Chateaux:									
Petites Salines, 2/5 inch	55.6%	3.9%	40.5%	79.3%	20.7%	0.0%	62.1%	13.7%	24.2%

Table A5.12. Composition of the larger assemblages (with an MNI > 28).

omnivores and herbivores clearly dominating. Carnivorous fish may have been caught with hook and line while fishes with all three modes of feeding may be caught in traps set in or near the reefs (Wing 1996). The south coast of la Désirade is composed of an extensive fringing reef. A similar maritime environment is present in the area between the two islands of Petite Terre, Terre de Bas and Terre de Haut (Bouchon *et al.* 1995). The predominance of reef omnivores and herbivores, the similar proportions of reef omnivores/herbivores versus reef carnivores, as well as comparable reef environments surrounding both islands, together suggest that similar fishing techniques were employed by the inhabitants of the two islands. It is likely that most fish were caught with the aid of traps.

The difference between the 1 mm assemblage and the 2/5 inch assemblage from À l'Escalier is mainly an increase in the proportion of inshore taxa in the 1 mm assemblage, when comparing by MNI%, at the cost of reef omnivores/herbivores. This is caused by the relative abundance of small schooling species (Clupeidae), which were only recovered thanks to a smaller mesh size. These small species may have been caught with the aid of nets in the inshore waters.

Measurements were taken of fish vertebrae and atlases in order to obtain more information about the most likely fishing strategies employed. The measurement taken is the greatest medial-lateral breadth of the centrum, as described by Morales and Rosenlund (1979). The results are presented in tables A5.46 and A5.47. Figures A5.2-A5.4 present the size distribution of the vertebrae found at À l'Escalier and Est de Mouton de Bas. The measurements show that the majority of the fish are within a rather restricted size range. Therefore it is likely that most fish were caught with the aid of traps (Wing and Reitz 1982). However, when comparing the graphs of the measurements from the 1 mm and 2/5 inch screens from À l'Escalier it is also clear that the majority of the fish caught were considerably smaller than suggested by the 2/5 inch screen distribution. Therefore,

Assemblage	Collection method	NISP%	MNI%	NISP	MNI
A l'Escalier, units 1 and 2	2/5 inch	2.7	5.6	2715	220
A l'Escalier, units 1 and 2	1mm	0.3	6.3	10,851	127
Site du Phare	2/5 inch	1.9	6.3	319	48
Est de Mouton de Bas, units 1 and 2	2/5 inch	3.5	7.8	1132	118

Table A5.13. Terrestrial vertebrates as a percentage of the total NISP and MNI in the largest assemblages.

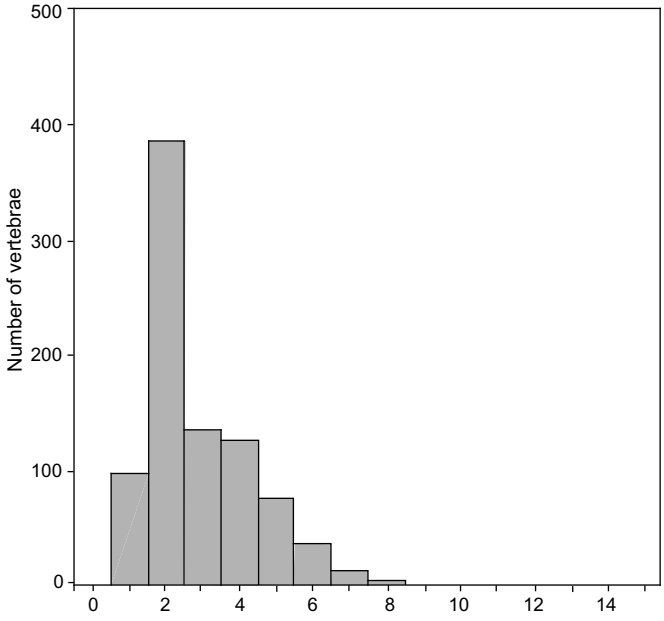


Fig. A5.2. Size distribution (mm) of the À l'Escalier fish vertebrae (1 mm).

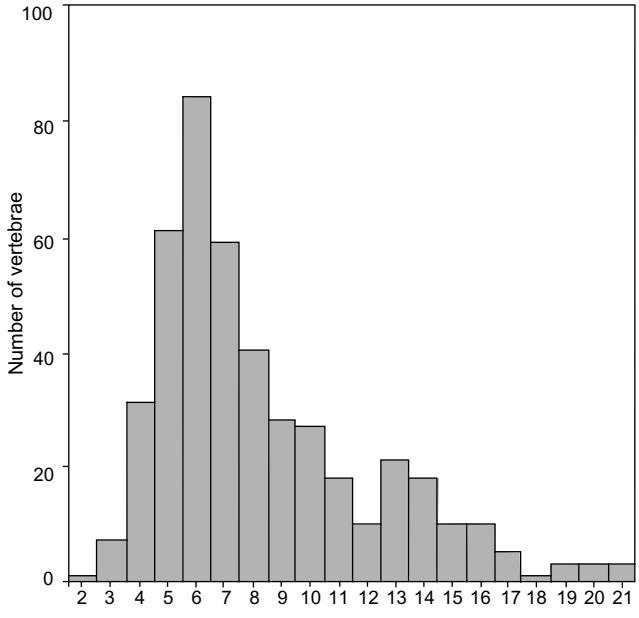


Fig. A5.3. Size distribution (mm) of the À l'Escalier fish vertebrae (2/5 inch).

many of the fish may not necessarily have been caught in traps, but many smaller specimens may have been caught in the inshore waters instead, as many of the immature reef fish species can be found in the inshore waters as well.

5.4.4 Taphonomical considerations

5.4.4.1 Collection methods

Some of the influences of the collection method on the species

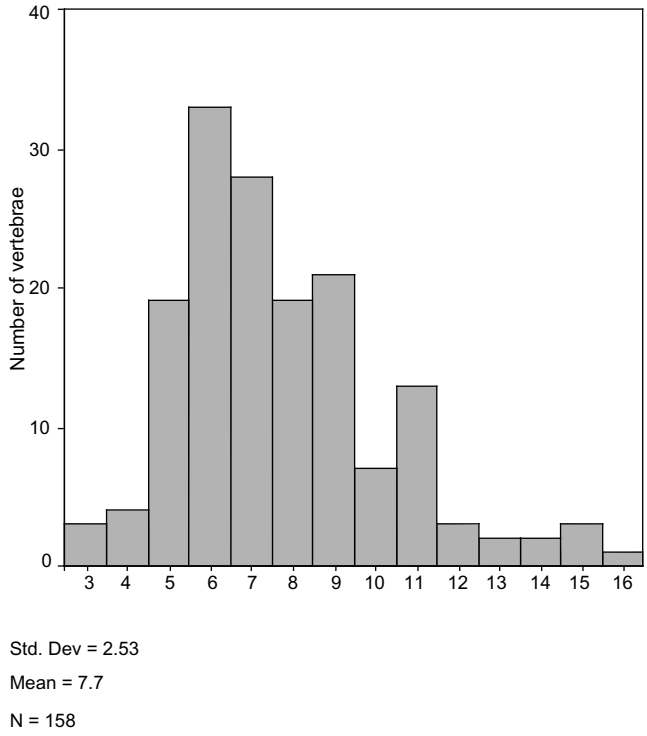


Fig. A5.4. Size distribution (mm) of the Est de Mouton de Bas fish vertebrae (2/5 inch).

composition of the assemblages were already mentioned when the results from the 2/5 inch screens were compared with those of the 1 mm screen. When comparing the results from the 1 mm samples with the 2/5 inch material from À l'Escalier on La Désirade, some further observations were made. First of all, there was a huge difference in the number of retrieved elements per m^3 excavated. While the 2/5 inch screens contained 566 faunal remains per m^3 on average, the 1 mm screens contained 10,851 remains in only 20 litres. Although the 1 mm screens contained relatively more unidentifiable material, the composition of the assemblage was clearly different from the 2/5 inch material, as has been shown above. In addition, for most fish taxa a substantially larger number of different skeletal elements was recovered from the 1 mm screens in comparison with the 2/5 inch screens.

Unfortunately, such differences in the composition of the assemblages between the 1 mm and the 2/5 inch remains suggest that the interpretations made in this study based on the 2/5 inch remains may perhaps have to be adjusted in future if more remains, screened over very small mesh sizes, will be analysed from any of the sites in the studied micro-region.

5.4.4.2 Burning

The incidence of burning on the faunal remains was generally rather low throughout all assemblages. Of all remains analysed, a total of 1027 fragments (or 6.3%) were fully or partially burned. Only 1.2% of the mammal bones was burned, together with 1.8% of the bird bones, 3.1% of the reptile bones, mainly consisting of *Cheloniidae* bones (3.2% burned; NISP=282), and 3.0% of the invertebrate remains, particularly *Carpilius corallinus* (9.3% burned; NISP=43) and *Coenobita clypeatus* remains (7.1% burned; NISP=631). Of the fishes, 7.2% was burned, mainly accounted for by unidentified fish remains (8.1% burned; NISP=9599), followed by *Balistidae* (6.6%; NISP=792) and *Acanthuridae* (5.4%; NISP=651). Most other fish families had, however, a relatively low burn rate (ca. 3%).

When comparing the amount of burning between the sites with most remains, the sites of À l'Escalier and Est de Mouton de Bas, it is clear that the amount of burning is very low in both assemblages for the 2/5 inch screened material: 2.2% for À l'Escalier and 4.5% for Est de Mouton de Bas. The 1 mm À l'Escalier material showed somewhat more burning: 7.3%. Since burning of bone usually results in a higher fragmentation of the remains, this slightly higher percentage is not surprising.

In all assemblages most of the burned faunal remains were either dark brown, partially blackened, or entirely blackened. These types of burning could have occurred during roasting or grilling of the meat (Lyman 1994). Relatively few faunal remains showed signs of having reached higher temperatures, which may occur when bones are disposed of in a fire, usually showing up as blueish-grey or white in colour (Nicholson 1993; Steadman *et al.* 1984[b]; Stiner *et al.* 1995).

5.4.4.3 Pathologies

Pathologies were very rare in any of the assemblages. A few fish remains showed cases of hyperostosis (table A5.14). Furthermore, the same triggerfish bone with hyperostosis from À l'Escalier also showed a healed fracture. One cheliped of a *Cardisoma guanhumi* land crab, found in level 7 of unit 2 at Est de Mouton de Bas, also had a healed fracture.

5.4.4.4 Modified bone

Cut marks were very rarely seen on the remains. One À l'Escalier *Dasyprocta* sp. femur had a possible cut mark, as did one Les Sables *Serranidae* bone, and one Est de Mouton de Bas *Osteichthyes* bone and one Aéroport

Site Name	Taxon	N of bones with hyperostosis
A l'Escalier	*Balistidae*	1
A l'Escalier	*Osteichthyes*	7
Site du Phare	*Osteichthyes*	1
Est de Mouton de Bas	*Osteichthyes*	8
Les Sables	*Osteichthyes*	4
Name Unknown	*Osteichthyes*	2

Table A5.14. Occurrence of fish bones with hyperostosis in the various assemblages.

Osteichthyes bone. One xiphiplastron of a rather large sea turtle (*Cheloniidae*) from Pointe Sablé was chopped at the proximal end. Furthermore, there were some fish remains with possible or clear butchering marks. The distal end of a first dorsal spine of *Balistidae* in Site du Phare was chopped off, and a possible similar chop was noticed on one first dorsal spine of *Balistidae* in À l'Escalier and Pointe Sablé.

A few pieces of bones were worked: the most interesting piece has already been mentioned, probably made from manatee (*Trichechus manatus*) bone, from the site on Petite Terre of which the name remains unidentified and which is possibly Pointe Sablé (fig. A5.5)**.** The piece of worked bone resembles in shape, size and bone density the lateral end of an adult manatee rib. Just before the final tip the rib is extremely dense, and almost perfectly round in shape. Manatee ribs are composed entirely of compact lamellar bone (Reitz and Wing 1999:58), which makes them very suitable to shape into almost any form.

Three small pieces of sea turtle costals were also worked. A piece from the Est de Mouton de Bas site and one from the unknown site on Petite Terre (fig. A5.6) are part of a similar *spatula*-shaped piece of bone. Similar, more complete objects have previously been found at Anse à la Gourde on Guadeloupe (Grouard 1999), Hillcrest (Wing 2000:151) and Silver Sands (Drewett 1991:135, 362) on Barbados, the Hichmans site on Nevis (Nokkert 2002), Anse des Pères on St. Martin and Golden Rock on St. Eustatius (Nokkert 1999[a]:120-121). Its function is unknown, but a function as large scraper, perhaps used during the manufacture of manioc cakes on griddles, is suggested here. A piece from Les Sables is the greater part of what was probably originally a small square bone inlay.

5.5 DISCUSSION

The analysis of the assemblages from La Désirade and Petite Terre has shown that the types of animals exploited and their relative contribution to the diet was remarkably similar between the various sites on these two islands, at least for the sites with large enough samples. This pattern was the same whether analysing the data based on NISP, MNI or Weight. Furthermore, no evidence could be found of any specialisation for any of the analysed assemblages. In addition, even when there was enough material available of a site to carry out an intra-site analysis, no differences

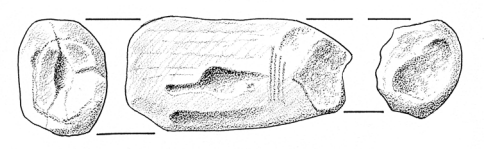


Fig. A5.5. Worked manatee rib fragment.

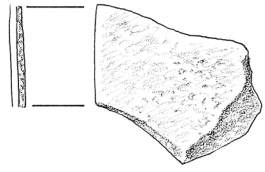


Fig. A5.6. Worked sea turtle costal.

could be observed indicating the existence of special-activity areas within a site. The remains from the excavated midden deposits, therefore, probably represent a mixture of refuse from every-day activities. As such, based on the data from the faunal remains, the sites (at least those with large samples) can most likely be interpreted as ordinary settlement sites.

The numbers of mammal remains were very low at all sites. This is most likely a reflection of the environmental constraints, with small island sizes and limited environmental diversity resulting in a low diversity and low overall numbers of mammals on these islands. Due to the very small size of La Désirade and Petite Terre these islands may never have supported large numbers of terrestrial animal populations. Once the first Amerindians settled on these islands, the existing animal populations were therefore probably very vulnerable to rapid depletion. It is likely that deposits of these first settlers are now entirely destroyed by cultural or natural changes on the islands (*cf*. De Waal this volume), and excavated deposits seem to represent a period long after the original animal populations had already been depleted. Although the Amerindians introduced agoutis to the islands as an extra protein supply, agouti remains were very limited in number in all archaeological deposits, indicating that they were not eaten very regularly.

Bird remains were also very rare at the sites. Although a limited environmental diversity probably would have resulted in a narrow range of available bird species, their actual numbers may, however, have been rather large. Large flocks of migratory bird species may, for instance, have been attracted to the salt ponds on the islands (*cf*. ONF 1994). The absence of large numbers of bird remains in the various assemblages may therefore be a reflection of cultural choices or a lack of appropriate hunting technologies.

Reptile remains were scarce at the La Désirade sites but somewhat more abundant at the Petite Terre sites. On both islands the number of iguana remains was very low. This is most likely a result of cultural choices, as the present large populations of *Iguana delicatissima* on Petite Terre and Désirade show that these islands could easily have sustained large populations of these animals in prehistoric times as well. The slightly more intensive use of reptiles by the inhabitants of the Petite Terre sites is almost fully accounted for by remains of sea turtles. Although this may suggest that the inhabitants of Petite Terre were somewhat specialised in hunting sea turtles, the higher abundance of these sea turtle remains at the Petite Terre sites is most likely a reflection of the difference in the natural environment between La Désirade and Petite Terre, with the latter having relatively much longer sandy beaches along its coast, which are ideal sea turtle nesting grounds.

Somewhat more important in the diet of the inhabitants of the various sites examined were crustaceans. Of these, marine crabs were only rarely encountered. Most crustacean remains comprised land crabs and land hermit crabs. The observed differences in the relative contribution of different crab species to the diet between the La Désirade and Petite Terre sites, especially the relative importance of the mangrove crab in the diet, are most likely a reflection of differences in the size of the prehistoric populations of these animals, resulting from differences in present suitable environments.

At all sites fish were clearly the most commonly consumed resource. When examining the types of fish exploited there were once more clear similarities between the various sites analysed, with only a few fish families accounting for the majority of fish consumed. Furthermore, the composition of the types of fish exploited showed that the sites were all very similar in respect to the location where the fish were most likely caught. Offshore fishing was, in all instances, very rare. Fishing on the coral reefs, closely followed by inshore fishing, was clearly most commonly carried out. Small schooling inshore fish were most likely caught with nets, while most fish on the coral reefs were almost certainly caught in traps set near the reefs. The latter is clear from the predominance of herbivore and omnivore fish in the assemblage, fish that cannot be caught with hook and line, and would normally not have been caught with the aid of nets, since these are very impractical over reef areas. Today, fish such as parrotfish and surgeonfish are therefore typically caught in traps (Wing 1991:363). The relatively narrow range of the fish vertebrae indicated that most fish were likely caught in fish traps, although the distribution of the fish vertebrae measurements from the 1 mm samples indicated that a considerable amount of inshore fishing may also have taken place.

Although the presence of a wide variety of taxa in the assemblages shows that the inhabitants of the sites used most animals available to them, it is clear that the primary focus of the Amerindian food procurement strategies was maritime. Only land crabs were regularly exploited, other terrestrial animals only sporadically. It seems that the Amerindians chose to settle close to where their food was most densely present: the location of all the larger habitation sites with large enough samples is on or very close to the shore. From here they primarily exploited the environments directly near the sites: the fringing reefs and the shallow waters between the reefs and the land.

The very similar composition of the various assemblages, as well as the likely similar fishing strategies employed suggests that there were strong cultural affinities

between the people living on La Désirade and Petite Terre, resulting in a very similar use of their local environments. Unfortunately, the assemblages from Pointe des Châteaux were all either too small or too much disturbed by post-depositional processes to be able to compare these assemblages with the assemblages from the other islands.

However, zooarchaeological work carried out for the Anse à la Gourde site on the western end of Pointe des Châteaux, gives some indications as to the prehistoric situation on this land mass (Grouard 1997, 1999, 2001). The material identified, sieved over a 2.8 mm screen, originated from the Early Ceramic B and Late Ceramic A (Troumassoid) occupation of the site. Similar to the largest sites on La Désirade and Petite Terre, À l'Escalier and Est de Mouton de Bas, both the Early Ceramic B and Late Ceramic A layers of the Anse à La Gourde assemblage were dominated by fish remains. The Early Ceramic B levels, however, additionally showed a somewhat higher percentage of mammals, primarily rice rats, as well as many land crabs. The larger landmass of Pointe des Châteaux (connected with the large land mass of Guadeloupe's Grande-Terre) may have sustained relatively large populations of terrestrial animals for much longer in comparison to the smaller islands nearby, although it seems that eventually these resources would also have been depleted. Remarkably, the fish families most commonly found in the Anse à la Gourde assemblage are the same ones which are most abundant in the assemblages from La Désirade and Petite Terre: parrotfish, surgeonfish and triggerfish. The Early Ceramic B layers furthermore yielded relatively high numbers of jacks (*Carangidae*) and grunts (*Haemulidae*) as well.

The analysis of the molluscs, invertebrate and vertebrate fauna from the Early Ceramic B and Late Ceramic A Anse Petite Rivière site on La Désirade, the only other site in the studied area for which faunal remains have been analysed to date, also indicated that the subsistence was based mainly on marine resources, especially reef and estuarine fish (De Waal 1996[b]). Terrestrial species were poorly represented here as well. The d13C and d15N signatures of bone collagen from three skeletons from the Anse Petite Rivière site confirmed the zooarchaeological data in that the dietary protein was based primarily on marine resources. The signature was more marine than any other Lesser Antillean site for which bone collagen signatures have been analysed (Stokes 1998). In fact, the collagen values were quite similar to those of the Amerindian populations that lived in the Bahamas, who were subsisting on an almost entirely marine diet. Since both La Désirade and the Bahamas are composed of similar dry, low-lying limestone landscapes with very few available terrestrial animals, in both instances the natural environment clearly influenced the choice of prey species to a high degree.

When comparing the data from the sites within the studied micro-region with other sites on Guadeloupe and other Lesser Antillean islands, it is clear that the sites in the micro-region do indeed show an exceptionally high reliance on marine resources. Although set in a relatively similar environment as that found on Pointe des Châteaux, Early Ceramic A deposits from the Morel site on the north-eastern coast of Grande-Terre (Guadeloupe), for instance, showed a much higher reliance on terrestrial resources, especially on terrestrial crustaceans, although terrestrial vertebrate remains were also more abundant (Nokkert 1999[b]).

Assemblages from other low-lying limestone islands in the wider region, with similarly limited prehistoric terrestrial animal populations, such as Barbados (Wing 1991, 2000) and Barbuda (Watters *et al.* 1984) nevertheless did not show such an extreme dependence on marine resources as was seen in this study. Compared with such sites, the extremely low numbers of terrestrial vertebrate remains in the sites in the Pointe des Châteaux, La Désirade and Petite Terre micro-region are especially striking.

On many Lesser Antillean islands a general shift has been noted from early sites with a high terrestrial component in the diet to later sites with primarily marine resources (e.g. Wing 2001[b]). The differences in the importance of the terrestrial component in the diet between the Early Ceramic B deposits of the Anse à la Gourde site and the Morel site on the one hand and the generally much later sites from the micro-region on the other hand can be seen in this light. The shift to a more marine diet may be related to depletion of the terrestrial resources due to a gradual increase in the population on the islands.

In addition, on many islands supposed overexploitation of the reef fish resulted in a gradual shift from predominantly reef fish towards inshore and pelagic species, especially tuna fish (Wing 2001[a-b]). Since tuna fish was only rarely encountered in the assemblages of the studied micro-region it can be assumed that such extreme overexploitation of the local reef fish populations did not occur near the sites in our micro-region. Possibly the size of the human populations never reached such high numbers as has been estimated for some of the other islands of the region.

However, another shift seen on many of the Lesser Antillean islands is in the type of reef fish most commonly caught, a shift over time from predominantly reef predators to reef prey (Wing and Wing 2001). As the sites in the studied micro-region show a predominance of the reef prey species, reef herbivores and omnivores, it can be assumed that such a shift may have occurred earlier in the habitation

of the islands in the micro-region for which no site deposits have been encountered. Therefore it can be postulated that the earliest inhabitants of these islands, of whom we did not find archaeological evidence, have had a significant impact on the reef populations.

The largely similar natural environments both on La Désirade, Petite Terre and Pointe des Châteaux, as well as in their surrounding waters, may have influenced the similarities in the assemblages to a certain degree. Nevertheless, the choice of food procurement within certain environments, as well as the likely identical fishing strategies employed in these environments, can all be seen as cultural choices. Since all three islands within the micro-region have a very dry climate and relatively limited food resources on land, it has been thought that the islands would not have been very inviting for pre-Columbian occupation. Even so, this work has shown that the Amerindians had a precise knowledge of their environments and used their available technologies in the most effective way, obtaining high returns with relatively little input. Previous work on the Anse Petite Rivière site on La Désirade and the Anse à la Gourde site on Pointe des Châteaux has also shown that the local environment provided enough food to sustain sizeable village populations (De Waal 1996[b]; Grouard 1997, 1999, 2001).

As a final note, it has been suggested that Petite Terre could not have been inhabited permanently in prehistoric times due to a lack of suitable drinking water. However, the results of this study show no indication that the sites on Petite Terre were used as temporary camping places for special activities only. The density of the Petite Terre middens, the general nature of the faunal remains in the middens, the very strong similarities between the assemblages from La Désirade and Petite Terre, as well as the identical cultural choices in the environmental exploitation between the inhabitants of these islands strongly suggest that the sites on Petite Terre were permanently inhabited. The study of the other artefacts from the Petite Terre sites also could not bring to light any specialisation at these sites (De Waal this volume). It can, therefore, be assumed that people who had a very precise knowledge of their environments and knew how to survive in seemingly inhospitable conditions permanently inhabited the small Petite Terre islands.

5.6 CONCLUSION

Clear patterns could be observed in the prehistoric exploitation of the environment within the micro-region of Pointe des Châteaux, La Désirade and Petite Terre. Due to a very limited range of available terrestrial animal resources, the focus of the inhabitants of the sites in this region was clearly maritime. Based on a virtual absence of terrestrial vertebrates and a predominance of reef herbivores and omnivores instead of reef carnivores in all assemblages it is likely that the studied assemblages represent a period when the environment as well as the terrestrial and marine animal populations had already been seriously affected and altered by generations of ceramic-producing groups living on these islands. The remains of the pre-ceramic and earliest ceramic occupants, who may have encountered a rather pristine environment, have not been found in the studied micro-region and have most likely been destroyed by natural and cultural events (*cf*. De Waal this volume).

The sites yielding a large number of remains – exclusively larger settlements with relatively extensive midden areas – were, without exception, all located very close to the shore. These settlements were clearly positioned to ensure the best access to those natural environments that the inhabitants valued and exploited most: the fringing reefs and the inshore waters between these reefs and the coastline. It can, therefore, be postulated that the choice for the location of such large settlements was dictated by the need for proximity to those environments where relative dense fish populations could be encountered.

This exploitation pattern can be further expanded to include the fishing strategies employed. Based on the types of fish species found and their relative contributions to the diet, as well as the narrow size range of the commonly exploited taxa, it seems very likely that the majority of the fish consumed were obtained through the setting of traps near the reefs as well as the use of nets in the inshore shallow waters. Both of these techniques give relatively high returns for little input.

The maritime focus of the Amerindians in this micro-region is made even more clear by the huge similarities in the composition of the various assemblages studied. Thus, it is very likely that there was a very intensive contact between these groups, whereby, for instance, information about the best fishing techniques was readily exchanged between the local fishermen. Due to the close similarities in the composition of the various assemblages it can be postulated that the Amerindians of this micro-region all had some cultural affinity, and were perhaps part of a regional hierarchical site system.

This project has greatly contributed to the general knowledge of pre-Columbian Amerindian subsistence strategies within the Lesser Antillean region, since a large sample resulting from a micro-regional project has been studied. Most zooarchaeological research carried out in the Caribbean

to date usually considered archaeological sites as isolated units, with a few notable exceptions (Wing 1996; Kozuch and Wing nd.). This study can therefore be regarded as indicative of the potentials within the Caribbean area for studying faunal remains on a regional scale. Zooarchaeology is one of the very few archaeological 'tools' to obtain a better understanding of the way Amerindians lived within, and viewed their own natural environments, and how they exploited and changed this environment.

Although the consistent use of a similar-sized mesh during the excavations in 1998 and 1999 proved to be very useful for inter-site comparisons, future research should take into account the results from the differences in the assemblages sieved over 2/5 inch and 1 mm screens. Some important differences could, for instance, be noticed in the composition of the various fish taxa, with more smaller species, and more inshore species present in the 1 mm material. The reconstruction of the exploitation of the ecological zones and the interpretations of the fishing technologies employed as presented in this study, may thus be more refined with future research using smaller mesh screens for faunal remains recovery.

As the survey and excavations in the micro-region have shown, there are only very few sites within the studied micro-region that show little post-depositional disturbance and an intact stratigraphy. Except for Petite Terre, which is now a nature reserve, modern construction work also threatens the sites studied here. Only the sites with (partly) intact stratigraphies, such as À l'Escalier and Aéroport, are sites that may hold important clues to the environmental history of the islands. It is therefore of utmost importance that the very few undisturbed sites remaining in the micro-region should obtain full protection measures, in order to be able to continue studying how humans have interacted with and lived in these very special environments in the past.

5.7 ACKNOWLEDGEMENTS

Several people and organisations have contributed to the successful completion of this study. First of all I would like to thank NWO (Dutch Foundation for Scientific Research) for their generous funding, and Prof. dr. L.P. Louwe Kooijmans (Faculty of Archaeology, Leiden University, The Netherlands) for his advice and support throughout the research. Research took place within the general Caribbean research program of the Faculty of Archaeology at Leiden University, which is supervised by dr. M.L.P. Hoogland and dr. C.L. Hofman. Thanks also for their advice. Furthermore thanks to mr. André Delpuech (DRAC, Guadeloupe) for the transport permissions for the remains. Mr. Bos and mr. Tolido of the CITES commission in Den Haag, The Netherlands, supplied information concerning the transport of archaeological faunal remains and zooarchaeological reference material within the EEG. Thanks also to Ms. Daphne M. Hills and Mr. Richard Sabin (Mammal Department, Natural History Museum London) and Mr. Paul F. Clark (Invertebrates II Department, NHM London) for their aid with identifications. Thanks to Ms. Dale Serjeantson and dr. Jacobo Weinstock (Department of Archaeology, University of Southampton, UK) for letting me use the departmental reference collection. Thanks also to the 1998 and 1999 field crews for their correct handling of bones in the field and during sorting. Finally, special thanks to Maaike De Waal, for her help, providing of contextual and other information and advice throughout the research.

Table. A5.15. Species list of À l'Escalier (unit 1, 2/5 inch collection); (next page).

Taxon	Intrusive[6]	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Homo sapiens	*	2/5 inch	1	0.0%	1	0.7%	6	0.4%
Dasyprocta sp.		2/5 inch	26	1.3%	3	2.2%	16	1.2%
Unidentified bird		2/5 inch	21	1.0%	2	1.4%	2	0.1%
Cheloniidae		2/5 inch	82	4.0%	2	1.4%	164	12.0%
Iguana sp.		2/5 inch	9	0.4%	1	0.7%	7	0.5%
Unidentified small reptile	*	2/5 inch	1	0.0%	1	0.7%	1	0.1%
Carcharhinus sp.		2/5 inch	1	0.0%	1	0.7%	2	0.1%
Belonidae		2/5 inch	1	0.0%	1	0.7%	1	0.1%
Holocentridae		2/5 inch	3	0.1%	1	0.7%	2	0.1%
Epinephelus sp.		2/5 inch	4	0.2%	2	1.4%	9	0.7%
Mycteroperca sp.		2/5 inch	2	0.1%	1	0.7%	8	0.6%
Serranidae		2/5 inch	107	5.3%	4	2.9%	148	10.9%
Priacanthidae		2/5 inch	1	0.0%	1	0.7%	4	0.3%
Carangidae		2/5 inch	65	3.2%	7	5.0%	36	2.6%
cf. Carangidae		2/5 inch	1	0.0%	0	0.0%	2	0.1%
Lutjanidae		2/5 inch	9	0.4%	1	0.7%	11	0.8%
Haemulon sp.		2/5 inch	1	0.0%	1	0.7%	2	0.1%
Haemulidae		2/5 inch	12	0.6%	2	1.4%	8	0.6%
Sparidae		2/5 inch	4	0.2%	2	1.4%	11	0.8%
Sphyraenidae		2/5 inch	7	0.3%	1	0.7%	17	1.2%
Labridae		2/5 inch	16	0.8%	6	4.3%	14	1.0%
cf. Labridae		2/5 inch	2	0.1%	0	0.0%	1	0.1%
Scarus sp.		2/5 inch	80	3.9%	8	5.8%	134	9.8%
Sparisoma sp.		2/5 inch	80	3.9%	16	11.5%	95	7.0%
Scaridae		2/5 inch	29	1.4%	0	0.0%	16	1.2%
Acanthuridae		2/5 inch	109	5.4%	11	7.9%	28	2.1%
Balistidae		2/5 inch	28	1.4%	11	7.9%	28	2.1%
Ostraciidae		2/5 inch	2	0.1%	1	0.7%	2	0.1%
Diodontidae		2/5 inch	1	0.0%	1	0.7%	6	0.4%
Osteichthyes		2/5 inch	969	47.7%	2	1.4%	355	26.1%
Vertebrata, unidentified		2/5 inch	34	1.7%	0	0.0%	14	1.0%
Echinometra lucunter		2/5 inch	2	0.1%	1	0.7%	2	0.1%
Coenobita clypeatus		2/5 inch	80	3.9%	26	18.7%	36	2.6%
cf. Mithrax sp.		2/5 inch	3	0.1%	1	0.7%	4	0.3%
Carpilius corallinus		2/5 inch	28	1.4%	9	6.5%	51	3.7%
cf. Carpilius corallinus		2/5 inch	7	0.3%	0	0.0%	11	0.8%
Cardisoma guanhumi		2/5 inch	5	0.2%	2	1.4%	11	0.8%
Gecarcinus lateralis	(*)	2/5 inch	4	0.2%	3	2.2%	3	0.2%
Gecarcinus sp.		2/5 inch	21	1.0%	5	3.6%	19	1.4%
Gecarcinidae		2/5 inch	3	0.1%	0	0.0%	5	0.4%
Unidentified crab species		2/5 inch	1	0.0%	1	0.7%	3	0.2%
Decapoda		2/5 inch	169	8.3%	0	0.0%	67	4.9%
Total			2031	100.0%	139	100.0%	1362	100.0%

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Rattus sp.	*	2/5 inch	1	0.1%	1	1.2%	1	0.2%
Dasyprocta sp.		2/5 inch	8	1.2%	3	3.7%	7	1.7%
cf. Dasyprocta sp.		2/5 inch	1	0.1%	0	0.0%	1	0.2%
Unidentified bird		2/5 inch	5	0.7%	2	2.5%	4	1.0%
cf. Cheloniidae		2/5 inch	1	0.1%	1	1.2%	1	0.2%
Iguana sp.		2/5 inch	4	0.6%	1	1.2%	2	0.5%
cf. Alsophis sp.	*	2/5 inch	1	0.1%	1	1.2%	1	0.2%
cf. Myripristis jacobus		2/5 inch	1	0.1%	1	1.2%	1	0.2%
Holocentridae		2/5 inch	2	0.3%	1	1.2%	2	0.5%
Serranidae		2/5 inch	29	4.2%	3	3.7%	32	8.0%
Carangidae		2/5 inch	9	1.3%	2	2.5%	8	2.0%
Labridae		2/5 inch	3	0.4%	1	1.2%	6	1.5%
Scarus sp.		2/5 inch	36	5.3%	4	4.9%	49	12.2%
Sparisoma sp.		2/5 inch	14	2.0%	3	3.7%	18	4.5%
Scaridae		2/5 inch	14	2.0%	0	0.0%	11	2.7%
Acanthuridae		2/5 inch	74	10.8%	10	12.3%	19	4.7%
Balistidae		2/5 inch	10	1.5%	4	4.9%	8	2.0%
Diodontidae		2/5 inch	1	0.1%	1	1.2%	8	2.0%
Osteichthyes		2/5 inch	234	34.2%	0	0.0%	81	20.2%
Vertebrata, unidentified		2/5 inch	1	0.1%	0	0.0%	2	0.5%
cf. Echinometra lucunter		2/5 inch	5	0.7%	1	1.2%	3	0.7%
Coenobita clypeatus		2/5 inch	78	11.4%	21	25.9%	41	10.2%
cf. Mithrax sp.		2/5 inch	4	0.6%	1	1.2%	3	0.7%
Carpilius corallinus		2/5 inch	8	1.2%	2	2.5%	16	4.0%
Cardisoma guanhumi		2/5 inch	7	1.0%	4	4.9%	13	3.2%
Gecarcinus sp.		2/5 inch	34	5.0%	12	14.8%	17	4.2%
Gecarcinidae		2/5 inch	4	0.6%	0	0.0%	5	1.2%
Unidentified crab species		2/5 inch	2	0.3%	1	1.2%	3	0.7%
Decapoda		2/5 inch	93	13.6%	0	0.0%	38	9.5%
Total			684	100.0%	81	100.0%	401	100.0%

Table A5.16. Species list of À l'Escalier (unit 2, 2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Homo sapiens	*	2/5 inch	1	0.0%	1	0.5%	6	0.3%
Rattus sp.	*	2/5 inch	1	0.0%	1	0.5%	1	0.1%
Dasyprocta sp.		2/5 inch	34	1.3%	6	2.7%	23	1.3%
cf. Dasyprocta sp.		2/5 inch	1	0.0%	0	0.0%	1	0.1%
Unidentified bird		2/5 inch	26	1.0%	4	1.8%	6	0.3%
Cheloniidae		2/5 inch	82	3.0%	2	0.9%	164	9.3%
cf. Cheloniidae		2/5 inch	1	0.0%	1	0.5%	1	0.1%
Iguana sp.		2/5 inch	13	0.5%	2	0.9%	9	0.5%
cf. Alsophis sp.	*	2/5 inch	1	0.0%	1	0.5%	1	0.1%
Unidentified small reptile	*	2/5 inch	1	0.0%	1	0.5%	1	0.1%
Carcharhinus sp.		2/5 inch	1	0.0%	1	0.5%	2	0.1%
Belonidae		2/5 inch	1	0.0%	1	0.5%	1	0.1%
cf. Myripristis jacobus		2/5 inch	1	0.0%	1	0.5%	1	0.1%
Holocentridae		2/5 inch	5	0.2%	2	0.9%	4	0.2%
Epinephelus sp.		2/5 inch	4	0.1%	2	0.9%	9	0.5%
Mycteroperca sp.		2/5 inch	2	0.1%	1	0.5%	8	0.5%
Serranidae		2/5 inch	136	5.0%	7	3.2%	180	10.2%
Priacanthidae		2/5 inch	1	0.0%	1	0.5%	4	0.2%
Carangidae		2/5 inch	74	2.7%	9	4.1%	44	2.5%
cf. Carangidae		2/5 inch	1	0.0%	0	0.0%	2	0.1%
Lutjanidae		2/5 inch	9	0.3%	1	0.5%	11	0.6%
Haemulon sp.		2/5 inch	1	0.0%	1	0.5%	2	0.1%
Haemulidae		2/5 inch	12	0.4%	2	0.9%	8	0.5%
Sparidae		2/5 inch	4	0.1%	2	0.9%	11	0.6%
Sphyraenidae		2/5 inch	7	0.3%	1	0.5%	17	1.0%
Labridae		2/5 inch	19	0.7%	7	3.2%	20	1.1%
cf. Labridae		2/5 inch	2	0.1%	0	0.0%	1	0.1%
Scarus sp.		2/5 inch	116	4.3%	12	5.5%	183	10.4%
Sparisoma sp.		2/5 inch	94	3.5%	19	8.6%	113	6.4%
Scaridae		2/5 inch	43	1.6%	0	0.0%	27	1.5%
Acanthuridae		2/5 inch	183	6.7%	21	9.5%	47	2.7%
Balistidae		2/5 inch	38	1.4%	15	6.8%	36	2.0%
Ostraciidae		2/5 inch	2	0.1%	1	0.5%	2	0.1%
Diodontidae		2/5 inch	2	0.1%	2	0.9%	14	0.8%
Osteichthyes		2/5 inch	1203	44.3%	2	0.9%	436	24.7%
Vertebrata, unidentified		2/5 inch	35	1.3%	0	0.0%	16	0.9%
Echinometra lucunter		2/5 inch	2	0.1%	1	0.5%	2	0.1%

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
cf. Echinometra lucunter		2/5 inch	5	0.2%	1	0.5%	3	0.2%
Coenobita clypeatus		2/5 inch	158	5.8%	47	21.4%	77	4.4%
cf. Mithrax sp.		2/5 inch	7	0.3%	2	0.9%	7	0.4%
Carpilius corallinus		2/5 inch	36	1.3%	11	5.0%	67	3.8%
cf. Carpilius corallinus		2/5 inch	7	0.3%	0	0.0%	11	0.6%
Cardisoma guanhumi		2/5 inch	12	0.4%	6	2.7%	24	1.4%
Gecarcinus lateralis	(*)	2/5 inch	4	0.1%	3	1.4%	3	0.2%
Gecarcinus sp.		2/5 inch	55	2.0%	17	7.7%	36	2.0%
Gecarcinidae		2/5 inch	7	0.3%	0	0.0%	10	0.6%
Unidentified crab species		2/5 inch	3	0.1%	2	0.9%	6	0.3%
Decapoda		2/5 inch	262	9.7%	0	0.0%	105	6.0%
Total			2715	100.0%	220	100.0%	1763	100.0%

Table A5.17. Species list of À l'Escalier (units 1 and 2, 2/5 inch collection); (previous page and above).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Oryzomyini		1 mm	1	<0.1%	1	1.1%	1	0.3%
Dasyprocta sp.		1 mm	7	<0.1%	1	1.1%	8	2.7%
Unidentified bird		1 mm	9	0.1%	1	1.1%	2	0.7%
Cheloniidae		1 mm	11	0.1%	1	1.1%	4	1.4%
Iguana sp.		1 mm	7	<0.1%	1	1.1%	3	1.0%
Unidentified reptile		1 mm	3	<0.1%	1	1.1%	1	0.3%
Carcharhinus sp.		1 mm	1	<0.1%	1	1.1%	2	0.7%
Clupeidae		1 mm	193	2.1%	5	5.4%	3	1.0%
Belonidae		1 mm	9	0.1%	2	2.2%	3	1.0%
Holocentridae		1 mm	8	0.1%	2	2.2%	2	0.7%
Epinephelus sp.		1 mm	2	<0.1%	2	2.2%	1	0.3%
Mycteroperca sp.		1 mm	1	<0.1%	1	1.1%	3	1.0%
Serranidae		1 mm	31	<0.1%	0	0.0%	7	2.4%
Priacanthidae		1 mm	1	<0.1%	1	1.1%	1	0.3%
Carangidae		1 mm	36	<0.1%	3	3.3%	8	2.7%
Lutjanidae		1 mm	7	<0.1%	1	1.1%	4	1.4%
Haemulidae		1 mm	17	0.2%	3	3.3%	4	1.4%
Sparidae		1 mm	2	<0.1%	1	1.1%	1	0.3%
Mullidae		1 mm	2	<0.1%	1	1.1%	1	0.3%
cf. Mullidae		1 mm	1	<0.1%	0	0.0%	1	0.3%
Sphyraenidae		1 mm	3	<0.1%	1	1.1%	2	0.7%
cf. Bodianus rufus		1 mm	1	<0.1%	1	1.1%	2	0.7%
Halichoeres sp.		1 mm	3	<0.1%	2	2.2%	2	0.7%
Labridae		1 mm	9	0.1%	0	0.0%	2	0.7%
Scarus sp.		1 mm	15	0.2%	2	2.2%	11	3.7%
Sparisoma sp.		1 mm	16	0.2%	3	3.3%	3	1.0%
Scaridae		1 mm	31	0.3%	0	0.0%	6	2.0%
Acanthuridae		1 mm	289	3.1%	13	14.1%	19	6.4%
cf. Acanthuridae		1 mm	1	<0.1%	0	0.0%	1	0.3%
Balistidae		1 mm	686	7.3%	3	3.3%	10	3.4%
Ostraciidae		1 mm	11	0.1%	1	1.1%	2	0.7%
Osteichthyes		1 mm	6765	72.8%	2	2.2%	106	35.8%
Vertebrata, unidentified		1 mm	42	0.5%	0	0.0%	2	0.7%
Echinometra lucunter		1 mm	11	0.1%	4	4.3%	3	1.0%
cf. Echinometra lucunter		1 mm	116	1.2%	0	0.0%	6	2.0%
Echinidae		1 mm	155	1.67%	0	0.0%	5	1.7%
Coenobita clypeatus		1 mm	125	1.3%	15	16.3%	12	4.1%

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
cf. Mithrax sp.		1 mm	2	<0.1%	1	1.1%	1	0.3%
Carpilius corallinus		1 mm	3	<0.1%	1	1.1%	6	2.0%
cf. Carpilius corallinus		1 mm	2	<0.1%	0	0.0%	1	0.3%
Cardisoma guanhumi		1 mm	1	<0.1%	1	1.1%	2	0.7%
Gecarcinus sp.		1 mm	41	<0.1%	11	12.0%	6	2.0%
Gecarcinidae		1 mm	25	<0.1%	1	1.1%	3	1.0%
Decapoda		1 mm	658	7.0%	0	0.0%	22	7.4%
Unidentified insect	*	1 mm	1	<0.1%	1	1.1%	1	0.3%
Total			9361	100.00%	92	100.0%	296	100.0%

Table A5.18. Species list of À l'Escalier (unit 1, 1 mm collection); (previous page and above).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Oryzomyini		1 mm	1	0.1%	1	2.9%	1	1.1%
cf. Oryzomyini		1 mm	1	0.1%	0	0.0%	1	1.1%
Dasyprocta sp.		1 mm	4	0.3%	1	2.9%	3	3.4%
Unidentified bird		1 mm	4	0.3%	1	2.9%	2	2.3%
Clupeidae		1 mm	70	4.7%	2	5.7%	3	3.4%
Belonidae		1 mm	1	0.1%	1	2.9%	1	1.1%
Holocentridae		1 mm	2	0.1%	1	2.9%	1	1.1%
Epinephelus sp.		1 mm	1	0.1%	1	2.9%	1	1.1%
Serranidae		1 mm	6	0.4%	0	0.0%	2	2.3%
Carangidae		1 mm	6	0.4%	1	2.9%	2	2.3%
Haemulidae		1 mm	1	0.1%	1	2.9%	2	2.3%
Sparidae		1 mm	1	0.1%	1	2.9%	1	1.1%
Sphyraenidae		1 mm	1	0.1%	1	2.9%	1	1.1%
Halichoeres sp.		1 mm	1	0.1%	1	2.9%	1	1.1%
Scarus sp.		1 mm	5	0.3%	1	2.9%	4	4.5%
Sparisoma sp.		1 mm	3	0.2%	1	2.9%	2	2.3%
Scaridae		1 mm	2	0.1%	0	0.0%	2	2.3%
Acanthuridae		1 mm	111	7.4%	5	14.3%	8	9.1%
Balistidae		1 mm	25	1.7%	1	2.9%	3	3.4%
Osteichthyes		1 mm	1013	68.0%	0	0.0%	24	27.3%
Vertebrata, unidentified		1 mm	5	0.3%	0	0.0%	1	1.1%
cf. Echinometra lucunter		1 mm	1	0.1%	1	2.9%	1	1.1%
Echinidae		1 mm	8	0.5%	0	0.0%	2	2.3%
Coenobita clypeatus		1 mm	32	2.1%	3	8.6%	5	5.7%
Cardisoma guanhumi		1 mm	2	0.1%	1	2.9%	3	3.4%
Gecarcinus sp.		1 mm	24	1.6%	9	25.7%	4	4.5%
Gecarcinidae		1 mm	7	0.5%	0	0.0%	2	2.3%
Decapoda		1 mm	152	10.2%	0	0.0%	5	5.7%
Total			1490	100.0%	35	100.0%	88	100.0%

Table A5.19. Species list of À l'Escalier (unit 2, 1 mm collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Oryzomyini		1 mm	2	<0.1%	2	1.6%	2	0.5%
cf. Oryzomyini		1 mm	1	<0.1%	0	0.0%	1	0.3%
Dasyprocta sp.		1 mm	11	0.1%	2	1.6%	11	2.9%
Unidentified bird		1 mm	13	0.1%	2	1.6%	4	1.0%
Cheloniidae		1 mm	11	0.1%	1	0.8%	4	1.0%
Iguana sp.		1 mm	7	0.1%	1	0.8%	3	0.8%
Unidentified reptile		1 mm	3	<0.1%	1	0.8%	1	0.3%
Carcharhinus sp.		1 mm	1	<0.1%	1	0.8%	2	0.5%
Clupeidae		1 mm	263	2.4%	7	5.5%	6	1.6%
Belonidae		1 mm	10	0.1%	3	2.4%	4	1.0%
Holocentridae		1 mm	10	0.1%	3	2.4%	3	0.8%
Epinephelus sp.		1 mm	3	<0.1%	3	2.4%	2	0.5%
Mycteroperca sp.		1 mm	1	<0.1%	1	0.8%	3	0.8%
Serranidae		1 mm	37	0.3%	0	0.0%	9	2.3%
Priacanthidae		1 mm	1	<0.1%	1	0.8%	1	0.3%
Carangidae		1 mm	42	0.4%	4	3.1%	10	2.6%
Lutjanidae		1 mm	7	0.1%	1	0.8%	4	1.0%
Haemulidae		1 mm	18	0.2%	4	3.1%	6	1.6%
Sparidae		1 mm	3	<0.1%	2	1.6%	2	0.5%
Mullidae		1 mm	2	<0.1%	1	0.8%	1	0.3%
cf. Mullidae		1 mm	1	<0.1%	0	0.0%	1	0.3%
Sphyraenidae		1 mm	4	<0.1%	2	1.6%	3	0.8%
cf. Bodianus rufus		1 mm	1	<0.1%	1	0.8%	2	0.5%
Halichoeres sp.		1 mm	4	<0.1%	3	2.4%	3	0.8%
Labridae		1 mm	9	0.1%	0	0.0%	2	0.5%
Scarus sp.		1 mm	20	0.2%	3	2.4%	15	3.9%
Sparisoma sp.		1 mm	19	0.2%	4	3.1%	5	1.3%
Scaridae		1 mm	33	0.3%	0	0.0%	8	2.1%
Acanthuridae		1 mm	400	3.7%	18	14.2%	27	7.0%
cf. Acanthuridae		1 mm	1	<0.1%	0	0.0%	1	0.3%
Balistidae		1 mm	711	6.6%	4	3.1%	13	3.4%
Ostraciidae		1 mm	11	0.1%	1	0.8%	2	0.5%
Osteichthyes		1 mm	7778	71.7%	2	1.6%	130	33.9%
Vertebrata, unidentified		1 mm	47	0.4%	0	0.0%	3	0.8%
Echinometra lucunter		1 mm	11	0.1%	4	3.1%	3	0.8%
cf. Echinometra lucunter		1 mm	117	1.1%	1	0.8%	7	1.8%
Echinidae		1 mm	163	1.5%	0	0.0%	7	1.8%

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		1 mm	157	1.5%	18	14.2%	17	4.4%
cf. Mithrax sp.		1 mm	2	<0.1%	1	0.8%	1	0.3%
Carpilius corallinus		1 mm	3	<0.1%	1	0.8%	6	1.6%
cf. Carpilius corallinus		1 mm	2	<0.1%	0	0.0%	1	0.3%
Cardisoma guanhumi		1 mm	3	<0.1%	2	1.6%	5	1.3%
Gecarcinus sp.		1 mm	65	0.1%	20	15.7%	10	2.6%
Gecarcinidae		1 mm	32	0.3%	1	0.8%	5	1.3%
Decapoda		1 mm	810	7.5%	0	0.0%	27	7.0%
Unidentified insect	*	1 mm	1	<0.1%	1	0.8%	1	0.3%
Total			10,851	100.00%	127	100.0%	384	100.0%

Table A5.20. Species list of À l'Escalier (units 1 and 2, 1 mm collection); (previous page and above).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Gecarcinus lateralis		2/5 inch	2	11.8%	1	50.0%	2	66.7%
Decapoda		2/5 inch	15	88.2%	1	50.0%	1	33.3%
Total			17	100.0%	2	100.0%	3	100.0%

Table A5.21. Species list of Anse des Galets (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
cf. Capra hircus	*	2/5 inch	1	0.5%	1	3.0%	1	1.4%
Iguana sp.		2/5 inch	13	7.0%	1	3.0%	14	20.3%
Serranidae		2/5 inch	1	0.5%	1	3.0%	1	1.4%
Sparisoma sp.		2/5 inch	4	2.2%	4	12.1%	6	8.7%
Acanthuridae		2/5 inch	1	0.5%	1	3.0%	1	1.4%
cf. Echinometra lucunter		2/5 inch	1	0.5%	1	3.0%	2	2.9%
Coenobita clypeatus	(*)	2/5 inch	16	8.6%	2	6.1%	6	8.7%
Gecarcinus cf. lateralis		2/5 inch	81	43.8%	22	66.7%	27	39.1%
Gecarcinus sp.		2/5 inch	2	1.1%	0	0.0%	2	2.9%
Decapoda		2/5 inch	65	35.1%	0	0.0%	9	13.0%
Total			185	100.0%	33	100.0%	69	100.0%

Table A5.22. Species list of Baleine du Sud (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Mammalia, unidentified		2/5 inch	1	0.3%	1	2.1%	1	0.4%
Cheloniidae		2/5 inch	6	1.9%	1	2.1%	14	5.2%
Iguana sp.		2/5 inch	5	1.6%	2	4.2%	4	1.5%
Holocentridae		2/5 inch	5	1.6%	2	4.2%	5	1.9%
Serranidae		2/5 inch	20	6.3%	3	6.3%	48	17.8%
Caranx sp.		2/5 inch	3	0.9%	2	4.2%	3	1.1%
Carangidae		2/5 inch	2	0.6%	0	0.0%	3	1.1%
Lutjanidae		2/5 inch	2	0.6%	2	4.2%	2	0.7%
Haemulidae		2/5 inch	2	0.6%	2	4.2%	2	0.7%
Sparidae		2/5 inch	1	0.3%	1	2.1%	1	0.4%
Bodianus rufus		2/5 inch	1	0.3%	1	2.1%	2	0.7%
Labridae		2/5 inch	3	0.9%	0	0.0%	5	1.9%
Scarus sp.		2/5 inch	16	5.0%	5	10.4%	35	13.0%
Sparisoma sp.		2/5 inch	37	11.6%	8	16.7%	33	12.3%
Scaridae		2/5 inch	4	1.3%	0	0.0%	3	1.1%
Acanthuridae		2/5 inch	29	9.1%	4	8.3%	9	3.3%
Scombridae		2/5 inch	7	2.2%	2	4.2%	10	3.7%
Balistidae		2/5 inch	4	1.3%	3	6.3%	4	1.5%
Osteichthyes		2/5 inch	114	35.7%	0	0.0%	60	22.3%
Vertebrata, unidentified		2/5 inch	1	0.3%	0	0.0%	2	0.7%
Coenobita clypeatus		2/5 inch	2	0.6%	1	2.1%	1	0.4%
Carpilius corallinus		2/5 inch	1	0.3%	1	2.1%	1	0.4%
Gecarcinus cf. lateralis		2/5 inch	28	8.8%	6	12.5%	14	5.2%
Decapoda		2/5 inch	24	7.5%	0	0.0%	5	1.9%
Invertebrata, unidentified		2/5 inch	1	0.3%	1	2.1%	2	0.7%
Total			319	100.0%	48	100.0%	269	100.0%

Table A5.23. Species list of Site du Phare (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Scarus sp.		2/5 inch	1	11.1%	1	33.3%	2	22.2%
Balistidae		2/5 inch	1	11.1%	1	33.3%	2	22.2%
Osteichthyes		2/5 inch	1	11.1%	0	0.0%	1	11.1%
Gecarcinus cf. lateralis		2/5 inch	1	11.1%	1	33.3%	2	22.2%
Decapoda		2/5 inch	5	55.6%	0	0.0%	2	22.2%
Total			9	100.0%	3	100.0%	9	100.0%

Table A5.24. Species list of Site du Phare (unit 1, Feature 001, 2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Aves, unidentified		2/5 inch	2	1.7%	1	10.0%	1	4.5%
Lutjanidae		2/5 inch	1	0.8%	1	10.0%	1	4.5%
Scarus sp.		2/5 inch	1	0.8%	1	10.0%	6	27.3%
Sparisoma sp.		2/5 inch	1	0.8%	1	10.0%	1	4.5%
Scaridae		2/5 inch	1	0.8%	0	0.0%	2	9.1%
Balistidae		2/5 inch	1	0.8%	1	10.0%	1	4.5%
Osteichthyes		2/5 inch	98	83.1%	1	10.0%	4	18.2%
Echinidae		2/5 inch	5	4.2%	1	10.0%	1	4.5%
Coenobita clypeatus	(*)	2/5 inch	5	4.2%	2	20.0%	2	9.1%
Gecarcinus cf. lateralis		2/5 inch	1	0.8%	1	10.0%	1	4.5%
Gecarcinus sp.		2/5 inch	1	0.8%	0	0.0%	1	4.5%
Decapoda		2/5 inch	1	0.8%	0	0.0%	1	4.5%
Total			118	100.0%	10	100.0%	22	100.0%

Table A5.25. Species list of Site du Phare (unit 2, Feature 001, 2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Scaridae		1 mm	2	20.0%	1	33.3%	1	25.0%
Acanthuridae		1 mm	5	50.0%	1	33.3%	2	50.0%
Balistidae		1 mm	3	30.0%	1	33.3%	1	25.0%
Total			10	100.0%	3	100.0%	4	100.0%

Table A5.26. Species list of Site du Phare (unit 2, Feature 001, 1 mm collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Unidentified bird		2/5 inch	7	2.1%	1	2.2%	2	0.4%
Cheloniidae		2/5 inch	68	20.0%	3	6.5%	186	37.0%
Iguana sp.	(*)	2/5 inch	4	1.2%	3	6.5%	5	1.0%
cf. Ameiva sp.	*	2/5 inch	1	0.3%	1	2.2%	1	0.2%
Carcharhinus sp.		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Epinephelus sp.		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Serranidae		2/5 inch	16	4.7%	3	6.5%	34	6.8%
cf. Serranidae		2/5 inch	1	0.3%	0	0.0%	2	0.4%
Caranx sp.		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Carangidae		2/5 inch	9	2.6%	1	2.2%	8	1.6%
cf. Carangidae		2/5 inch	2	0.6%	0	0.0%	3	0.6%
Lutjanidae		2/5 inch	2	0.6%	1	2.2%	5	1.0%
Haemulidae		2/5 inch	2	0.6%	1	2.2%	4	0.8%
Sparidae		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Sphyraenidae		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Labridae		2/5 inch	5	1.5%	2	4.3%	5	1.0%
Scarus sp.		2/5 inch	27	7.9%	7	15.2%	108	21.5%
Sparisoma sp.		2/5 inch	14	4.1%	4	8.7%	19	3.8%
Scaridae		2/5 inch	7	2.1%	0	0.0%	9	1.8%
Acanthuridae		2/5 inch	15	4.4%	2	4.3%	9	1.8%
Balistidae		2/5 inch	6	1.8%	2	4.3%	6	1.2%
Osteichthyes		2/5 inch	107	31.5%	0	0.0%	53	10.5%
Coenobita clypeatus		2/5 inch	9	2.6%	3	6.5%	7	1.4%
Carpilius corallinus		2/5 inch	2	0.6%	1	2.2%	7	1.4%
cf. Carpilius corallinus		2/5 inch	1	0.3%	0	0.0%	1	0.2%
Cardisoma guanhumi		2/5 inch	1	0.3%	1	2.2%	2	0.4%
Gecarcinus cf. lateralis		2/5 inch	15	4.4%	5	10.9%	9	1.8%
Decapoda		2/5 inch	14	4.1%	0	0.0%	8	1.6%
Total			340	100.0%	46	100.0%	503	100.0%

Table A5.27. Species list of Est de Mouton de Bas (unit 1, 2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Oryzomyini		2/5 inch	4	0.5%	2	2.8%	4	0.5%
Unidentified bird		2/5 inch	3	0.4%	1	1.4%	3	0.4%
Cheloniidae		2/5 inch	32	4.0%	2	2.8%	102	12.4%
cf. Cheloniidae		2/5 inch	1	0.1%	0	0.0%	13	1.6%
Iguana sp.	(*)	2/5 inch	25	3.2%	3	4.2%	25	3.0%
cf. Iguana sp.		2/5 inch	1	0.1%	0	0.0%	1	0.1%
Unidentified reptile		2/5 inch	1	0.1%	1	1.4%	1	0.1%
Belonidae		2/5 inch	2	0.3%	1	1.4%	4	0.5%
Holocentridae		2/5 inch	1	0.1%	1	1.4%	1	0.1%
Serranidae		2/5 inch	13	1.6%	2	2.8%	11	1.3%
cf. Serranidae		2/5 inch	1	0.1%	0	0.0%	2	0.2%
Carangidae		2/5 inch	35	4.4%	2	2.8%	23	2.8%
Lutjanidae		2/5 inch	14	1.8%	3	4.2%	13	1.6%
Haemulidae		2/5 inch	3	0.4%	1	1.4%	5	0.6%
Labridae		2/5 inch	3	0.4%	3	4.2%	5	0.6%
Scarus sp.		2/5 inch	5	0.6%	1	1.4%	17	2.1%
Sparisoma sp.		2/5 inch	31	3.9%	9	12.5%	53	6.4%
Scaridae		2/5 inch	5	0.6%	0	0.0%	6	0.7%
Acanthuridae		2/5 inch	16	2.0%	2	2.8%	12	1.5%
Scombridae		2/5 inch	18	2.3%	2	2.8%	20	2.4%
Balistidae		2/5 inch	27	3.4%	6	8.3%	25	3.0%
Osteichthyes		2/5 inch	246	31.1%	0	0.0%	95	11.6%
Vertebrata, unidentified		2/5 inch	1	0.1%	0	0.0%	1	0.1%
Coenobita clypeatus		2/5 inch	11	1.4%	1	1.4%	9	1.1%
Mithrax sp.		2/5 inch	1	0.1%	1	1.4%	11	1.3%
cf. Mithrax sp.		2/5 inch	2	0.3%	0	0.0%	3	0.4%
Cardisoma guanhumi		2/5 inch	80	10.1%	14	19.4%	201	24.5%
Gecarcinus cf. lateralis		2/5 inch	9	1.1%	3	4.2%	8	1.0%
Gecarcinus sp.		2/5 inch	34	4.3%	9	12.5%	41	5.0%
Gecarcinidae		2/5 inch	22	2.8%	0	0.0%	28	3.4%
Unidentified crab species		2/5 inch	2	0.3%	1	1.4%	4	0.5%
Decapoda		2/5 inch	141	17.8%	0	0.0%	71	8.6%
Invertebrata, unidentified		2/5 inch	2	0.3%	1	1.4%	4	0.5%
Total			792	100.0%	72	100.0%	822	100.0%

Table A5.28. Species list of Est de Mouton de Bas (unit 2, 2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Oryzomyini		2/5 inch	4	0.4%	2	1.7%	4	0.3%
Unidentified bird		2/5 inch	10	0.9%	2	1.7%	5	0.4%
Cheloniidae		2/5 inch	100	8.8%	5	4.2%	288	21.7%
cf. Cheloniidae		2/5 inch	1	0.1%	0	0.0%	13	1.0%
Iguana sp.	(*)	2/5 inch	29	2.6%	6	5.1%	30	2.3%
cf. Iguana sp.		2/5 inch	1	0.1%	0	0.0%	1	0.1%
cf. Ameiva sp.	*	2/5 inch	1	0.1%	1	0.8%	1	0.1%
Unidentified reptile		2/5 inch	1	0.1%	1	0.8%	1	0.1%
Carcharhinus sp.		2/5 inch	1	0.1%	1	0.8%	2	0.2%
Belonidae		2/5 inch	2	0.2%	1	0.8%	4	0.3%
Holocentridae		2/5 inch	1	0.1%	1	0.8%	1	0.1%
Epinephelus sp.		2/5 inch	1	0.1%	1	0.8%	2	0.2%
Serranidae		2/5 inch	29	2.6%	5	4.2%	45	3.4%
cf. Serranidae		2/5 inch	2	0.2%	0	0.0%	4	0.3%
Caranx sp.		2/5 inch	1	0.1%	1	0.8%	2	0.2%
Carangidae		2/5 inch	44	3.9%	3	2.5%	31	2.3%
cf. Carangidae		2/5 inch	2	0.2%	0	0.0%	3	0.2%
Lutjanidae		2/5 inch	16	1.4%	4	3.4%	18	1.4%
Haemulidae		2/5 inch	5	0.4%	2	1.7%	9	0.7%
Sparidae		2/5 inch	1	0.1%	1	0.8%	2	0.2%
Sphyraenidae		2/5 inch	1	0.1%	1	0.8%	2	0.2%
Labridae		2/5 inch	8	0.7%	5	4.2%	10	0.8%
Scarus sp.		2/5 inch	32	2.8%	8	6.8%	125	9.4%
Sparisoma sp.		2/5 inch	45	4.0%	13	11.0%	72	5.4%
Scaridae		2/5 inch	12	1.1%	0	0.0%	15	1.1%
Acanthuridae		2/5 inch	31	2.7%	4	3.4%	21	1.6%
Scombridae		2/5 inch	18	1.6%	2	1.7%	20	1.5%
Balistidae		2/5 inch	33	2.9%	8	6.8%	31	2.3%
Osteichthyes		2/5 inch	353	31.2%	0	0.0%	148	11.2%
Vertebrata, unidentified		2/5 inch	1	0.1%	0	0.0%	1	0.1%
Coenobita clypeatus		2/5 inch	20	1.8%	4	3.4%	16	1.2%
Mithrax sp.		2/5 inch	1	0.1%	1	0.8%	11	0.8%
cf. Mithrax sp.		2/5 inch	2	0.2%	0	0.0%	3	0.2%
Carpilius corallinus		2/5 inch	2	0.2%	1	0.8%	7	0.5%
cf. Carpilius corallinus		2/5 inch	1	0.1%	0	0.0%	1	0.1%
Cardisoma guanhumi		2/5 inch	81	7.2%	15	12.7%	203	15.3%
Gecarcinus cf. lateralis		2/5 inch	24	2.1%	8	6.8%	17	1.3%

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Gecarcinus sp.		2/5 inch	56	4.9%	9	7.6%	69	5.2%
Unidentified crab species		2/5 inch	2	0.2%	1	0.8%	4	0.3%
Decapoda		2/5 inch	155	13.7%	0	0.0%	79	6.0%
Invertebrata, unidentified		2/5 inch	2	0.2%	1	0.8%	4	0.3%
Total			1132	100.0%	118	100.0%	1325	100.0%

Table A5.29. Species list of Est de Mouton de Bas (units 1 and 2, 2/5 inch collection); (previous page and above).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Sus scrofa	*	Hand-collec.	1	0.8%	1	3.1%	4	0.7%
Unidentified mammal		Hand-collec.	2	1.7%	1	3.1%	9	1.5%
Unidentified bird		Hand-collec.	3	2.5%	1	3.1%	2	0.3%
Cheloniidae		Hand-collec.	43	35.8%	5	15.6%	287	49.2%
Holocentridae		Hand-collec.	1	0.8%	1	3.1%	2	0.3%
Serranidae		Hand-collec.	7	5.8%	3	9.4%	28	4.8%
cf. Serranidae		Hand-collec.	2	1.7%	0	0.0%	6	1.0%
Carangidae		Hand-collec.	1	0.8%	1	3.1%	3	0.5%
Lutjanidae		Hand-collec.	2	1.7%	1	3.1%	5	0.9%
Scarus sp.		Hand-collec.	1	0.8%	1	3.1%	4	0.7%
Sparisoma sp.		Hand-collec.	2	1.7%	1	3.1%	6	1.0%
Scombridae		Hand-collec.	3	2.5%	2	6.3%	6	1.0%
Diodontidae		Hand-collec.	1	0.8%	1	3.1%	13	2.2%
Osteichthyes		Hand-collec.	15	12.5%	0	0.0%	61	10.5%
Vertebrata, unidentified		Hand-collec.	3	2.5%	0	0.0%	2	0.3%
Cardisoma guanhumi		Hand-collec.	22	18.3%	10	31.3%	119	20.4%
Gecarcinus sp.		Hand-collec.	5	4.2%	3	9.4%	16	2.7%
Gecarcinidae		Hand-collec.	4	3.3%	0	0.0%	8	1.4%
Decapoda		Hand-collec.	2	1.7%	0	0.0%	2	0.3%
Total			120	100.0%	32	100.0%	583	100.0%

Table A5.30. Species list of Les Sables (Hand-collected).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Homo sapiens	*	2/5 inch	7	15.6%	1	16.7%	29	56.9%
cf. Homo sapiens	*	2/5 inch	12	26.7%	0	0.0%	9	17.6%
Vertebrata, unidentified		2/5 inch	2	4.4%	0	0.0%	1	2.0%
Coenobita clypeatus	(*)	2/5 inch	10	22.2%	2	33.3%	4	7.8%
Gecarcinus cf. ruricola		2/5 inch	2	4.4%	1	16.7%	2	3.9%
Gecarcinus sp.	(*)	2/5 inch	2	4.4%	2	33.3%	2	3.9%
Decapoda		2/5 inch	10	22.2%	0	0.0%	4	7.8%
Total			45	100.0%	6	100.0%	51	100.0%

Table A5.31. Species list of Voûte à Pin (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Vertebrata, unidentified		2/5 inch	13	100.0%	1	100.0%	1	100.0%
Total			13	100.0%	1	100.0%	1	100.0%

Table A5.32. Species list of Grand Abaque 1 (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		2/5 inch	13	56.5%	4	66.7%	10	62.5%
Gecarcinus cf. lateralis		2/5 inch	2	8.7%	2	33.3%	2	12.5%
Decapoda		2/5 inch	8	34.8%	0	0.0%	4	25.0%
Total			23	100.0%	6	100.0%	16	100.0%

Table A5.33. Species list of Pied de la Montagne (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Dasyprocta sp.		2/5 inch	3	1.4%	2	4.3%	5	4.2%
Unidentified mammal		2/5 inch	2	0.9%	1	2.1%	4	3.4%
Cheloniidae		2/5 inch	1	0.5%	1	2.1%	2	1.7%
Serranidae		2/5 inch	1	0.5%	1	2.1%	2	1.7%
cf. Bodianus rufus		2/5 inch	1	0.5%	1	2.1%	1	0.8%
Labridae		2/5 inch	1	0.5%	0	0.0%	1	0.8%
Sparisoma sp.		2/5 inch	7	3.2%	4	8.5%	10	8.5%
Scaridae		2/5 inch	2	0.9%	0	0.0%	2	1.7%
Acanthuridae		2/5 inch	2	0.9%	1	2.1%	3	2.5%
Diodontidae		2/5 inch	1	0.5%	1	2.1%	6	5.1%
Osteichthyes		2/5 inch	15	6.8%	0	0.0%	7	5.9%
Coenobita clypeatus	(*)	2/5 inch	65	29.3%	16	34.0%	27	22.9%
Gecarcinus lateralis		2/5 inch	35	15.8%	13	27.7%	13	11.0%
Gecarcinus cf. lateralis		2/5 inch	8	3.6%	3	6.4%	4	3.4%
Gecarcinus sp.		2/5 inch	13	5.9%	3	6.4%	12	10.2%
Decapoda		2/5 inch	65	29.3%	0	0.0%	19	16.1%
Total			222	100.0%	47	100.0%	118	100.0%

Table A5.34. Species list of Aéroport (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Diodontidae		2/5 inch	1	50.0%	1	50.0%	5	83.3%
Coenobita clypeatus		2/5 inch	1	50.0%	1	50.0%	1	16.7%
Total			2	100.0%	2	100.0%	6	100.0%

Table A5.35. Species list of Morne Souffleur (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
cf. Bos taurus	*	Hand-collec.	1	1.5%	1	8.3%	30	4.1%
Cheloniidae		Hand-collec.	34	50.0%	3	25.0%	497	67.5%
Epinephelus sp.		Hand-collec.	2	2.9%	2	16.7%	15	2.0%
Serranidae		Hand-collec.	6	8.8%	1	8.3%	72	9.8%
Carangidae		Hand-collec.	2	2.9%	2	16.7%	7	1.0%
cf. Carangidae		Hand-collec.	1	1.5%	0	0.0%	8	1.1%
Sphyraenidae		Hand-collec.	1	1.5%	1	8.3%	7	1.0%
Scarus sp.		Hand-collec.	4	5.9%	1	8.3%	50	6.8%
Balistidae		Hand-collec.	1	1.5%	1	8.3%	4	0.5%
Osteichthyes		Hand-collec.	16	23.5%	0	0.0%	46	6.3%
Total			68	100.0%	12	100.0%	736	100.0%

Table A5.36. Species list of Pointe Sablé (Hand-collected).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
cf. Trichechus manatus		Hand-collec.	1	4.8%	1	11.1%	40	9.6%
Cheloniidae		Hand-collec.	5	23.8%	1	11.1%	243	58.1%
Serranidae		Hand-collec.	3	14.3%	1	11.1%	26	6.2%
Sphyraenidae		Hand-collec.	1	4.8%	1	11.1%	6	1.4%
Scarus sp.		Hand-collec.	1	4.8%	1	11.1%	13	3.1%
Sparisoma sp.		Hand-collec.	1	4.8%	1	11.1%	5	1.2%
Diodontidae		Hand-collec.	2	9.5%	2	22.2%	49	11.7%
Osteichthyes		Hand-collec.	6	28.6%	0	0.0%	27	6.5%
Cardisoma guanhumi		Hand-collec.	1	4.8%	1	11.1%	9	2.2%
Total			21	100.0%	9	100.0%	418	100.0%

Table A5.37. Species list of the site with the unknown name (Hand-collected).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		2/5 inch	4	13.8%	2	33.3%	3	9.1%
Cardisoma guanhumi		2/5 inch	4	13.8%	2	33.3%	18	54.5%
Gecarcinus lateralis	*	2/5 inch	9	31.0%	1	16.7%	2	6.1%
Gecarcinus cf. lateralis		2/5 inch	1	3.4%	0	0.0%	2	6.1%
Gecarcinus sp.		2/5 inch	1	3.4%	1	16.7%	2	6.1%
Decapoda		2/5 inch	10	34.5%	0	0.0%	6	18.2%
Total			29	100.0%	6	100.0%	33	100.0%

Table A5.38. Species list of Grande Saline (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Aves, unidentified		2/5 inch	2	0.9%	1	3.3%	1	0.5%
Sparisoma sp.		2/5 inch	1	0.5%	1	3.3%	1	0.5%
cf. Echinometra lucunter		2/5 inch	1	0.5%	1	3.3%	1	0.5%
Coenobita clypeatus	(*)	2/5 inch	79	36.2%	9	30.0%	37	20.2%
Mithrax sp.		2/5 inch	4	1.8%	2	6.7%	19	10.4%
Carpilius corallinus		2/5 inch	1	0.5%	1	3.3%	2	1.1%
cf. Carpilius corallinus		2/5 inch	1	0.5%	1	3.3%	2	1.1%
Cardisoma guanhumi		2/5 inch	27	12.4%	7	23.3%	49	26.8%
Gecarcinus lateralis		2/5 inch	4	1.8%	3	10.0%	4	2.2%
Gecarcinus cf. lateralis		2/5 inch	1	0.5%	0	0.0%	1	0.5%
Gecarcinus sp.		2/5 inch	6	2.8%	3	10.0%	8	4.4%
Gecarcinidae		2/5 inch	8	3.7%	1	3.3%	14	7.7%
Decapoda		2/5 inch	83	38.1%	0	0.0%	44	24.0%
Total			218	100.0%	30	100.0%	183	100.0%

Table A5.39. Species list of Petites Salines (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		2 mm	47	100.0%	9	100.0%	3	100.0%
Total			47	100.0%	9	100.0%	3	100.0%

Table A5.40. Species list of Petites Salines (feature 001, 2 mm collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Vertebrata, unidentified		2 mm	3	5.6%	1	10.0%	1	16.7%
Coenobita clypeatus		2 mm	50	92.6%	9	90.0%	4	66.7%
Decapoda		2 mm	1	1.9%	0	0.0%	1	16.7%
Total			54	100.0%	10	100.0%	6	100.0%

Table A5.41. Species list of Petites Salines (feature 002, 2 mm collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		2/5 inch	3	25.0%	3	100.0%	4	66.7%
Decapoda		2/5 inch	9	75.0%	0	0.0%	2	33.3%
Total			12	100.0%	3	100.0%	6	100.0%

Table A5.42. Species list of Montagne des Petites Salines (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Coenobita clypeatus		2/5 inch	1	100.0%	1	100.0%	1	100.0%
Total			1	100.0%	1	100.0%	1	100.0%

Table A5.43. Species list of Degrat (2/5 inch collection).

Taxon	Intrusive	Screen size	NISP	NISP%	MNI	MNI%	Weight (g)	Weight%
Gecarcinus sp.		2/5 inch	1	100.0%	1	100.0%	2	100.0%
Total			1	100.0%	1	100.0%	2	100.0%

Table A5.44. Species list of Site 7 (2/5 inch collection).

Environment	Taxon	Environment	Taxon
Terrestrial	*Oryzomyini*	Reef: Carnivores	*Carcharchinus* sp.
	Dasyprocta sp.		*Holocentridae*
	Unidentified bird		*Serranidae*
	Iguana sp.		*Priacanthidae*
	Unidentified reptile		*Carangidae*
	Coenobita clypeatus		*Lutjanidae*
	Gecarcinidae		*Haemulidae*
	Unidentified mammal		*Labridae*
Inshore[7]	*Trichechus manatus*	Reef: Herbivores/Omnivores	*Scaridae*
	Cheloniidae		*Acanthuridae*
	Clupeidae		*Balistidae*
	Belonidae	Offshore-Pelagic	*Sphyraenidae*
	Sparidae	Unknown Marine habitat	*Osteichthyes*
	Mullidae	Unknown habitat	Unidentified vertebrate
	Ostraciidae		Unidentified crab species
	Diodontidae		*Decapoda*
	Echinidae		Unidentified invertebrate
	Mithrax sp.		
	Carpilius corallinus		
	Scombridae		

Table A5.45. Different environments and related taxa that have been consumed.

Site	Taxon	Screen size	Average	Standard deviation	N
À l'Escalier	*Acanthuridae*	1 mm	2.6	0.54	13
	Belonidae	1 mm	3.5		1
	Carangidae	1 mm	4.2		1
	cf. Mullidae	1 mm	1.0		1
	Clupeidae	1 mm	1.9	0.07	2
	Priacanthidae	1 mm	4.0		1
	Sparidae	1 mm	6.0		1
À l'Escalier	**all fish**	**1 mm**	**2.8**	**1.06**	**22**
À l'Escalier	*Carangidae*	2/5 inch	11.0		1
	Haemulidae	2/5 inch	8.7	0.95	3
	Lutjanidae	2/5 inch	8.7		1
	Priacanthidae	2/5 inch	19.4		1
	Scaridae	2/5 inch	6.9		1
	Serranidae	2/5 inch	10.6	7.14	2
	Sparisoma sp.	2/5 inch	6.6		1
À l'Escalier	**all fish**	**2/5 inch**	**9.6**	**4.65**	**13**
Site du Phare	*Acanthuridae*	1 mm	2.7		1
	Serranidae	1 mm	10.4	3.73	3

Table A5.46. Summary of measurements, i.e., greatest medial-lateral breadth of the vertebral centre (Morales and Rosenlund 1979:44-45) taken on fish atlases found.

Site	Taxon	Screen size	Average	Standard deviation	N
À l'Escalier	*Acanthuridae*	1 mm	3.9	1.08	100
	Belonidae	1 mm	3.7	1.49	8
	Carangidae	1 mm	4.5	2.43	18
	Carcharhinus sp.	1 mm	12.4		1
	Clupeidae	1 mm	1.7	0.21	245
	Ostraciidae	1 mm	2.4		1
	Scaridae	1 mm	5.1	1.09	8
	Serranidae	1 mm	5.2	1.36	11
	Sphyraenidae	1 mm	3.9	0.07	2
À l'Escalier	**all fish**	**1 mm**	**2.8**	**1.73**	**875**
À l'Escalier	*Acanthuridae*	2/5 inch	5.2	1.01	95
	Balistidae	2/5 inch	13.3	1.52	4
	Belonidae	2/5 inch	8.4		1
	Carangidae	2/5 inch	7.6	2.14	40
	Carcharhinus sp.	2/5 inch	17.6		1
	Ostraciidae	2/5 inch	8.5		1
	Scaridae	2/5 inch	5.7		1
	Serranidae	2/5 inch	8.4	2.37	28
	Sparisoma sp.	2/5 inch	6.3		1
	Sphyraenidae	2/5 inch	20.1		1
À l'Escalier	**all fish**	**2/5 inch**	**8.3**	**3.76**	**440**
Baleine du Sud	*Acanthuridae*	2/5 inch	2.9		1
	Serranidae	2/5 inch	9.8		1
Baleine du Sud	**all fish**	**2/5 inch**	**3.9**	**1.34**	**2**
Site du Phare	*Acanthuridae*	1 mm	4.3	0.81	3
Site du Phare	**all fish**	**1 mm**	**3.7**	**1.56**	**4**
Site du Phare	*Acanthuridae*	2/5 inch	5.4	0.80	14
	Carangidae	2/5 inch	6.3		1
	Scaridae	2/5 inch	6.3		1
	Scombridae	2/5 inch	10.2	1.76	6
	Serranidae	2/5 inch	13	4.89	4
Site du Phare	**all fish**	**2/5 inch**	**9.1**	**4.20**	**52**
Est de Mouton de Bas	*Acanthuridae*	2/5 inch	5.8	1.06	20
	Belonidae	2/5 inch	4.8		1
	Carangidae	2/5 inch	7.4	1.51	19
	Scaridae	2/5 inch	7.5		1
	Scombridae	2/5 inch	10.7	1.40	13
	Serranidae	2/5 inch	9.5	2.57	8
Est de Mouton de Bas	**all fish**	**2/5 inch**	**7.7**	**2.53**	**158**

Site	Taxon	Screen size	Average	Standard deviation	N
Grande Saline	*Carangidae*	Hand-collection	9.3		1
	Lutjanidae	Hand-collection	13.8		1
	Scombridae	Hand-collection	11.5		1
	Serranidae	Hand-collection	20	0.92	2
Grande Saline	**all fish**	**Hand-collection**	**14**	**4.90**	**6**
Aéroport	*Acanthuridae*	2/5 inch	4.2	0.35	2
	Scaridae	2/5 inch	7.5	0.00	2
Aéroport	**all fish**	**2/5 inch**	**9.1**	**5.30**	**6**

Table A5.47. Summary of measurements, i.e., greatest medial-lateral breadth of the vertebral centre (Morales and Rosenlund 1979:44-45) taken on fish atlases found; (previous page and above).

	NISP%						MNI%						Weight%					
Site	Mammal	Bird	Reptile	Fish	Vertebrate	Invertebrate	Mammal	Bird	Reptile	Fish	Vertebrate	Invertebrate	Mammal	Bird	Reptile	Fish	Vertebrate	Invertebrate
La Desirade (2/5 inch)																		
À l'Escalier, units 1+2	1.3%	1.0%	3.5%	72.4%	1.3%	20.6%	2.8%	1.9%	2.3%	51.6%	0.0%	41.4%	1.4%	0.3%	9.9%	67.5%	0.9%	20.0%
À l'Escalier, unit 1	1.3%	1.0%	4.5%	75.6%	1.7%	15.9%	2.2%	1.5%	2.2%	59.6%	0.0%	34.6%	1.2%	0.1%	12.6%	69.4%	1.0%	15.6%
À l'Escalier, unit 2	1.3%	0.7%	0.7%	62.6%	0.1%	34.5%	3.8%	2.5%	2.5%	38.0%	0.0%	53.2%	2.0%	1.0%	0.8%	60.9%	0.5%	34.8%
Aéroport	2.3%	0.0%	0.5%	14.0%	0.0%	83.3%	6.5%	0.0%	2.2%	17.4%	0.0%	73.9%	7.8%	0.0%	1.7%	27.6%	0.0%	62.9%
La Desirade (1 mm)																		
À l'Escalier, units 1+2	0.1%	0.1%	0.2%	86.5%	0.4%	12.6%	3.2%	1.6%	2.4%	54.8%	0.0%	38.1%	3.7%	1.0%	2.1%	69.2%	0.8%	23.2%
À l'Escalier, unit 1	0.1%	0.1%	0.2%	87.0%	0.5%	12.2%	2.2%	1.1%	3.3%	56.0%	0.0%	37.4%	3.1%	0.7%	2.7%	70.2%	0.7%	22.7%
À l'Escalier, unit 2	0.4%	0.3%	0.0%	83.8%	0.3%	15.2%	5.7%	2.9%	0.0%	51.4%	0.0%	40.0%	5.7%	2.3%	0.0%	65.9%	1.1%	25.0%
Petite Terre (2/5 inch)																		
Baleine du Sud	0.0%	0.0%	7.4%	3.4%	0.0%	89.1%	0.0%	0.0%	3.2%	19.4%	0.0%	77.4%	0.0%	0.0%	21.2%	12.1%	0.0%	66.7%
Site du Phare	0.3%	0.0%	3.4%	78.4%	0.3%	17.6%	2.1%	0.0%	6.3%	72.9%	0.0%	18.8%	0.4%	0.0%	6.7%	83.6%	0.7%	8.6%
Site du Phare, unit 2, F001	0.0%	1.7%	0.0%	88.8%	0.0%	9.5%	0.0%	11.1%	0.0%	55.6%	0.0%	33.3%	0.0%	4.8%	0.0%	71.4%	0.0%	23.8%
Est de M. de Bas, units 1+2	0.4%	0.9%	11.2%	56.7%	0.1%	30.8%	1.7%	1.7%	8.7%	53.0%	0.0%	34.8%	0.3%	0.4%	24.8%	43.1%	0.1%	31.4%
Est de M. de Bas, unit 1	0.0%	2.1%	21.0%	64.5%	0.0%	12.4%	0.0%	2.3%	11.4%	63.6%	0.0%	22.7%	0.0%	0.4%	37.9%	54.9%	0.0%	6.8%
Est de M. de Bas, unit 2	0.5%	0.4%	7.0%	53.4%	0.1%	38.6%	2.8%	1.4%	7.0%	46.5%	0.0%	42.3%	0.5%	0.4%	16.7%	35.8%	0.1%	46.6%
Pointe des Chat. (2/5 inch)																		
Petites Salines	0.0%	1.0%	0.0%	0.5%	0.0%	98.5%	0.0%	3.4%	0.0%	3.4%	0.0%	93.1%	0.0%	0.5%	0.0%	0.5%	0.0%	98.9%
La Desirade (hand-coll.)																		
Les Sables	1.7%	2.5%	36.1%	29.4%	2.5%	27.7%	3.2%	3.2%	16.1%	35.5%	0.0%	41.9%	1.6%	0.3%	49.6%	23.1%	0.3%	25.0%
Petite Terre (hand-coll.)																		
Site with unknown name	4.8%	0.0%	23.8%	66.7%	0.0%	4.8%	11.1%	0.0%	11.1%	66.7%	0.0%	11.1%	9.6%	0.0%	58.1%	30.1%	0.0%	2.2%
Pointe Sablé	0.0%	0.0%	50.7%	49.3%	0.0%	0.0%	0.0%	0.0%	27.3%	72.7%	0.0%	0.0%	0.0%	0.0%	70.4%	29.6%	0.0%	0.0%

Table A5.48. Animal class (mammal, bird, reptile, fish, invertebrate) composition of the assemblages.

	NISP%						MNI%						Weight%					
Site	Inshore[8]	Reef carnivores	Reef omnivores/ herbivores	Reef total sum	Offshore/pelagic	Unknown	Inshore	Reef carnivores	Reef omnivores/ herbivores	Reef total sum	Offshore/pelagic	Unknown	Inshore	Reef carnivores	Reef omnivores/ herbivores	Reef total sum	Offshore/pelagic	Unknown
A l'Escalier, units 1 + 2	7.1%	12.8%	22.6%	35.3%	0.3%	57.3%	18.6%	27.1%	51.9%	79.1%	0.8%	1.6%	19.7%	20.6%	28.2%	48.8%	1.2%	30.3%
A l'Escalier, units 1 + 2: 1 mm	6.2%	1.4%	12.2%	13.6%	0.0%	80.2%	28.6%	28.6%	37.7%	66.2%	2.6%	2.6%	15.3%	16.0%	23.5%	39.5%	1.0%	44.2%
Site du Phare	3.1%	14.8%	35.0%	49.8%	2.7%	44.4%	8.1%	32.4%	54.1%	86.5%	5.4%	0.0%	6.7%	29.2%	35.0%	64.2%	4.2%	25.0%
Est de Mouton de Bas, units 1+2	14.8%	14.8%	20.5%	35.3%	2.6%	47.4%	13.2%	33.8%	48.5%	82.4%	4.4%	0.0%	37.0%	14.3%	29.7%	43.9%	2.5%	16.6%

Table A5.49. Marine habitats including inshore, reef carnivores, reef omnivores/herbivores, Reef total sum, offshore/pelagic habitats and unknown habitat. Percentages are calculated for Marine Habitat = 100%.

NOTES

1 The amount of soil excavated at the sites of À l'Escalier, Baleine du Sud, Site du Phare, Est de Mouton de Bas and Aéroport was considerably larger than shown in the table, but the remainder only consisted of deep layers of sterile sand from underneath the cultural deposits.

2 For the sites excavated in 1965 no data are available on the amount of soil excavated.

3 For the sites of À l'Escalier, Site du Phare and Petites Salines only 2/5 inch samples have been used for these calculations, resulting in lower numbers of remains for these sites than actually analysed.

4 Some sites may actually have had middens in the past that have now disappeared due to post-depositional disturbances, such as recent ploughing activities or marine erosion.

5 From the 1998-1999 excavations only the remains from the 2/5 inch screens were used for this comparison.

6 All taxa presumed to be *not* consumed (all elements are intrusive *; only part of the elements are intrusive (*)).

7 Inshore environments include beaches, rocky shores, turtle grass areas and shallow waters.

8 Inshore includes beach, rocky shore, turtle grass and shallow inshore waters.

SUMMARY

The present thesis is the outcome of a PhD study that was carried out between 1997 and 2003 at Leiden University (The Netherlands). It focuses on pre-Columbian social organisation and interaction in a micro-region in the Lesser Antilles, comprising the Pointe des Châteaux peninsula and the islands of La Désirade and Petite Terre (Guadeloupe). It investigates what information can be obtained on pre-Columbian social organisation and interaction through intensive and systematic study of this micro-region, instead of focusing on the study of large and well investigated settlement sites exclusively, as is common practice in Caribbean archaeology. Very little attention has traditionally been paid to site function differentiation and to pre-Columbian use of other types of sites other than permanent settlements. It is thought that without a detailed insight into processes related to pre-Columbian social organisation and interaction on a micro-regional scale, it is impossible to properly understand these processes on a larger, regional scale. Therefore, the present study aimed at creating detailed site inventories, based on systematic surveys covering a complete micro-region, in order to be able to obtain a more accurate understanding of social organisation and of local and micro-regional contacts. Four research objectives were formulated: (1) to collect information on the past and present physical landscape of the micro-region, (2) to create reliable archaeological databases by means of intensive surveys, (3) to obtain information on (micro-)regional socio-political, economic and ceremonial organisation and interaction, and (4) to compare this information to archaeological data from Guadeloupe and other Lesser Antillean islands. As a starting-point, it was deemed that pre-Columbian social organisation in a micro-regional perspective would be best understood through the analysis of site patterns, providing dynamic overviews through time (chapter 1).

The required archaeological databases, in the form of site inventories, were created through intensive and systematic surface surveys. These are a reliable means of attaining region-wide and diachronic archaeological information. Systematic archaeological surveys with well-defined areas and strategies have generally been scarce in the Caribbean. The focus of the survey was the recovery of archaeological sites. Although site definitions are often rather vague interpretations, possibilities for a regional non-site study were too limited within the study area. The most important limitation is the fact that it is hard to make chronological assignments for off-site material as it is often heavily eroded and fragmented and the percentage of decoration is generally small. Moreover, the study specifically demands information on longer-term processes and resulting accumulations of material. Finally, concentrations within the surface material, bordered by empty areas could be clearly distinguished in the research area. Off-site data are used as merely complementary to the site data collected. The surveys should serve three goals. First, the surveys should provide a site inventory, including all types, functions, locations and periods of sites. Secondly, they should produce detailed site descriptions, in order to better understand spatial artefact distributions, geological and archaeological stratigraphies, site functions, and chronological assignments. Thirdly, it should be possible to estimate the accuracy of the inventory. In addition, the surveys contributed significantly to the *Carte Archéologique* project of the archaeological service on Guadeloupe, which aims at the completion of the archaeological heritage inventory of Guadeloupe.

The surveys included an intensive field-walking program. Parallel 1 m wide transects, separated by 10 or 20 m intervals, were investigated. Interval surfaces were randomly checked to see if archaeological material had been missed. Steep slopes were not included in the survey. The transects were compass-oriented north-south all over the study area. Transect surfaces were cleared with machetes in order to optimise observation. Sandy beaches were surveyed several times and in different weather conditions. Collections of diagnostic material from all discovered concentrations of archaeological material were made in the field. In addition, off-site material was collected. Off-site material and surface concentrations of archaeological material were mapped on aerial photographs (scale 1:5000). Sites – consisting of one or more surface concentrations – were described using forms. The Pointe des Châteaux study area as well as Terre de Haut (Petite Terre) were completely surveyed using 10 m intervals. As the survey results did not justify continuation of this time-consuming approach, intervals were set at 20 m on La Désirade and Terre de Bas (Petite Terre). The latter islands could not be surveyed completely in an intensive and systematic manner due to the large dimensions of La Désirade and the extremely dense vegetation at Terre de Bas.

Several sites were selected for sub-surface testing. The excavation of (series of) north-south oriented 1 m^2 test units was aimed at the collection of information on geological and archaeological stratigraphies and on site formation and deformation processes as well as collection of a sample of diagnostic archaeological material that could help to provide a chronological and cultural context. Test unit locations were

randomly chosen in areas with relatively dense archaeological deposits and were positioned with sub-decimetre precision using relative GPS (Global Positioning System) measurements and infrared theodolite. The units were excavated in 10 cm arbitrary levels, taking geological and archaeological layers into account, until the bedrock was reached. Archaeological material was hand-sorted from 2/5 inch dry sieve residues – although some site samples were wet-sieved over 1 or 2 mm screens. Additional sub-surface information was provided through auger testing of some of the sites and the sandy beaches of Pointe des Châteaux (chapter 2).

In order to evaluate the conditions for fieldwork and site survival, the present physical landscape of the research area is described. In addition, an attempt is made to describe the environment in pre-Columbian times, in order to evaluate conditions for Amerindian settlement.

Pointe des Châteaux, which is the easternmost tip of Grande-Terre (Guadeloupe), is approximately nine kilometres long and 50 m to 2.5 km wide. The study area covers the eastern seven kilometres. Pointe des Châteaux is a calcareous plateau, which is intersected in its western part by a large, flat-bottomed valley. Today, more than 50% of the northern coast consists of beaches with dunes and beach-rock formation processes are common. The southern coast consists of uplifted reefs and beaches without dunes. Nowadays, Pointe des Châteaux is characterised by the presence of small, natural water basins and seven salinas. La Désirade, situated 12 km east of Pointe des Châteaux, is an 11 km long and two kilometres wide calcareous table mountain that has a volcanic substratum. Characteristic features are the more than 200 m high (uninhabited) limestone plateau, the inaccessible north coast and the presence of caves and of suitable, albeit low-quality, rock for the manufacture of stone tools. The islands of Petite Terre (Terre de Haut and Terre de Bas) are situated 12 km south of La Désirade and 7.5 km south-east of Pointe des Châteaux. Nowadays, Terre de Bas (2.5 km by 600 m) and Terre de Haut (1.1 km by 200-300 m) are a nature reserve. The islands, which originally consisted of one flat, elevated coral plateau, are separated by a 150 m wide channel. Characteristic features are the reefs that almost completely enclose the islands, the dynamic dune formations and salinas.

Local relief and vegetation in the research area made the fieldwork very uncomfortable, but they did not hinder systematic surface surveys. Sedimentation is quite modest and it is suspected that mud streams or landslides, which would have covered archaeological sites, did not take place. Conditions for the survival of coastal sites are less favourable, however, as a result of coastal erosion and beach-rock formation processes. In addition, dune formations along the northern coasts of Terre de Bas and of Pointe des Châteaux may cover archaeological deposits. Inland sites will be better preserved although they may have been damaged by human action, and, if situated at the edge of La Désirade's plateau, by erosion.

Although the study area is situated in the driest and warmest part of Guadeloupe, local conditions were probably favourable for pre-Columbian settlement. The area is characterised by large stretches of flat terrain suitable for habitation, small-scale horticulture and food gathering, and by small bays protected by coral reef barriers. Marine food resources are easily and widely available. Terrestrial fauna appears to be only moderately abundant and diverse. Fresh water was available, although its collection would have demanded some effort. Various shell and coral species, lithics and *Gaïac* wood, which may have served raw material demands for tools and ornaments, were present as well. It is not clear where wood used to fashion dug-out canoes and construct houses was obtained, as large trees are only present in the La Désirade ravines, nowadays. A less positive aspect for pre-Columbian settlement in the study area is the almost annual passage of hurricanes. It is possible that caves at La Désirade were used for shelter during such events (chapter 3).

On the basis of a general overview of the cultural chronological framework for the research area and its surroundings, covering the pre-Columbian, the colonial and the recent period, expectations are formulated on pre-Columbian site occurrences in the study area. First, pre-ceramic sites, Huecan and Cedrosan Saladoid sites as well as sites yielding Troumassan and Suazan Troumassoid material and/or Mamoran Troumassoid and Ostionoid features might be expected to be present in the study area.

Secondly, large parts of the research area will be superficially disturbed as a result of intensive cultivation of cotton, sugarcane and indigo during colonial times. Disturbance as a result of colonial habitation occurs in more limited areas, but causes a more radical destruction of the archaeological record. Amerindian sites dating from the European contact period might be expected as well, as a Carib territory and a small Carib habitation were located at Pointe des Châteaux. The native inhabitants of Guadeloupe lived here until the end of the nineteenth century or the beginning of the twentieth century.

Thirdly, archaeological sites are nowadays damaged by tourists, camping in the dunes of Pointe des Châteaux and Petite Terre, and constructions, illegal excavation and sand pillage cause even more serious disturbances. Recent cultivation hardly affects the archaeological record (chapter 4).

After having described the expectations on the presence of archaeological sites in the research area, the actual survey results are presented and the accuracy of the fieldwork is evaluated. The surveys successfully provided reliable inventories of pre-Columbian sites in the selected micro-region (appendices 2-4). Large parts of different geological and ecological zones have been investigated, and a large number of pre-Columbian sites, with various functions, locations and chronological assignments, have been discovered. Notwithstanding the use of the intensive systematic survey technique, several factors may have affected the observation and collection of site and off-site material, thus leading to a biased site record. These factors are related to the intensity and the method of surface observation, the use of surface material, the characteristics of the archaeological material, personal observation of the survey crews, environmental factors and natural and cultural post-depositional processes. In addition, the excavation of small test units involves certain biases as well. The attempt to keep the influence of these factors to a minimum is described, as is the result of this attempt.

The identification of different site types, using site parameters including site location, site dimensions, site area, site function, duration of use or occupation and chronological assignment, is subsequently described. The surveys demonstrated shortcomings in the understanding of marginal site types, labelled indistinct sites in this study, characterised by modest distributions of fragmented ceramics mainly occurring on the surface. Although barely documented in earlier studies in the Caribbean they represent an important component of the Eastern Guadeloupe site inventories and it is thought that they must be present in other areas and on other islands too.

Finally, the archaeological sites of the research area are presented. On Pointe des Châteaux a total of 21 sites were found. Most of the sites, 16 in total, were deemed Late Ceramic A (AD 600/850-1200/1300), three others could be assigned to the Early Ceramic B (AD 400-600/850) and two sites are multi-component. The sites on Pointe des Châteaux include 11 large habitation sites, which yield typical habitation refuse and generally have site locations that are well accessible from the sea and have good exploitation potential and observation facilities. The sites have a settlement function primarily, but ceremonial or other special activities may have been carried out as well. In addition, a small strategic outpost was found on a protruding plateau dominating the northern coast of the peninsula. It consists of a small and probably shallow distribution of pottery, coral and shellfish remains. Furthermore, nine indistinct sites, consisting of small and probably shallow distributions of fragmented and weathered ceramics were found. Six of these sites, providing indications for food preparation on the spot, have been tentatively labelled temporary habitation sites that were probably used by a small group of people. The three other sites may have been related to gardening activities.

The La Désirade site inventory consists of 43 sites. A total of 33 sites was assigned to the Late Ceramic A. One Early Ceramic B site, two Late Ceramic B (AD 1200/1300-1493) sites, and one multi-component site were found as well. For six sites the period of use could not be identified. The La Désirade sites include 11 large habitation sites, generally situated on a flat terrain near soils that are suitable for small-scale horticulture and close to reefs and canoe landing-spots. The sites yield typical habitation refuse; some habitation sites probably served ceremonial or other special activity functions as well. Morne Cybèle-1 and Morne Souffleur are the most remarkable habitation sites. The sites occupy spectacular locations on the southern edge of the plateau. The archaeological material consists of Morne Cybèle style pottery and both sites yielded a shell mask. In addition, four shallow lithic workshops were found, where simple, mostly *ad-hoc*, artefacts of local raw materials were made. No settlement refuse was found. Subsequently, two ceremonial sites were identified: the sites of Chemin de M. De l'Orme (a deliberate deposition of a small pelican-vessel, which functioned as a container for a small stone axe and adze of St. Martin chert) and the cave site of Voûte à Pin. Finally, 26 sites – shallow and dispersed distributions of fragmented and weathered ceramics – have been listed as indistinct sites. Eight of these sites probably functioned as temporary habitation areas or campsites. A total of 14 indistinct sites, lacking evidence of food preparation, may reflect gardening activities. Four indistinct sites are small cave sites that may have been used for shelter.

The Petite Terre site inventory comprises five large Late Ceramic A habitation sites with attractive locations, being situated on flat areas, near canoe landing-spots, reefs and good soils. The sites yield typical habitation refuse, but ceremonial or other special activities probably also took place at some of the sites. Two Late Ceramic A indistinct sites – small and shallow distributions of fragmented and weathered ceramics and shell fragments – were found as well. These sites are probably satellite sites of habitation sites on Pointe des Châteaux or La Désirade (chapter 5).

Reviewing the site data for Pointe des Châteaux, La Désirade and Petite Terre, micro-regional overviews are presented for each pre-Columbian occupation period. These overviews include descriptions of settlement patterns, settlement structures, settlement territories and hierarchies, and inter-settlement contacts.

The pre-ceramic period and the Early Ceramic A (2000 BC - 400 AD) are hypothetically labelled pioneer

phases as no evidence for habitation prior to the Early Ceramic B was found. Although the option that there simply were no pre-ceramic and Early Ceramic A sites in the micro-region should be considered, such sites, once present in coastal areas, may by now have been eroded or covered.

The first occupation of the micro-region took place during the Early Ceramic B period (AD 400-600/850). People lived in six large permanent coastal settlements on Pointe des Châteaux and La Désirade, most of which were located on flat areas close to fresh water sources, easily accessible bays, reefs, salinas and good soils. Petite Terre was uninhabited. Rich subsistence and non-subsistence resources in the vicinity allowed villages to be independent. The inhabitants practised a mixed and broad-spectrum economy, focusing on root crop horticulture, hunting of land animals, fishing, catching birds and collecting molluscs, fruits, wild tubers and seeds. They used their villages for most socio-political, economic and ceremonial activities; they apparently did not establish special places away from the settlements although it is possible that special activity sites, e.g. for harvesting shellfish, were located along the coasts, though now destroyed by erosion. The villages were dispersed and evenly distributed along the coasts of Pointe des Châteaux and La Désirade and had equally spaced territories. The presence of one temporary habitation site or a campsite on Pointe des Châteaux suggests that people from villages outside Eastern Guadeloupe may have exploited resources within this micro-region and that access to settlement territories was probably not restricted. No evidence has been found for the existence of settlement hierarchy, although Anse à la Gourde and Les Sables were probably the most prominent villages. Inhabitants of the Early Ceramic B villages apparently maintained long-distance contact networks stretching as far as their South-American homeland. The inhabitants of Anse à la Gourde and Les Sables obtained rocks from Martinique, Basse-Terre and Antigua for the manufacture of lithic artefacts and procured finished green chert tools directly from the inhabitants of production sites on St. Martin. Most lithic artefacts in Eastern Guadeloupe, however, were manufactured from rock types that were available within the micro-region (for example at La Désirade).

The number of villages increased during the Late Ceramic A, especially after AD 1000. The site pattern of this period consists of 22 habitation sites, two ceremonial sites, one strategic outpost and 34 indistinct sites. Occupation of the micro-region, which was still concentrated in large permanent villages, was consolidated and intensified. It is possible that the population grew, but settlements may also have been inhabited for shorter periods and they possibly moved from time to time. Inhabitants of villages of increasing size may also have decided to split up and found new, smaller, economically independent settlements, effectively filling up the open spaces within the landscape. Petite Terre was now settled and exploited as well. Inter-settlement distances and territories were smaller as compared to the preceding period. Most settlements probably had territories of roughly similar size, resulting in a balanced use of subsistence resources in the direct environs of the villages. Although most settlements were still situated along the coast, some La Désirade villages were located inland and proximity of fresh water was rarer when compared to the Early Ceramic B. People continued to practise a mixed economy of root crop horticulture, hunting of land animals, fishing, catching birds and collecting molluscs, fruits, wild tubers and seeds, and they still exploited zones near the settlements. Site type diversity increased and greater parts of the landscape were used for ceremonial, socio-political and economic activities. The landscape was used more intensively. Special ceremonial sites were established (Voûte à Pin and Chemin de M. De l'Orme), as well as temporary camps and sites related to gardening activities and to the exploitation of natural resources outside the villages, and caves were used for shelter. Anse à la Gourde evolved into a central settlement and particularly its burial area probably had a central ceremonial function in the micro-region. Social differentiation began to play a role and incipient social stratification developed. Long distance contacts, stretching as far as the South American mainland and the Greater Antilles, continued to exist, although they appear to be less frequent than during the Early Ceramic B. The inhabitants of Anse à la Gourde played a central role in these networks. The inhabitants of À l'Escalier and Site Du Phare also participated in contact networks in which finished green chert artefacts circulated. Local groups were clearly involved in frequent and intensive short distance contacts as well. In addition, trips to La Désirade were still undertaken as well.

During the Late Ceramic B period (AD 1200/1300-1493), the Eastern Guadeloupe micro-region became desolate: only three small villages were inhabited during the latest part of the pre-Columbian period. These were Anse à la Gourde on Pointe des Châteaux and Morne Cybèle-1 and Morne Souffleur on La Désirade. This depopulation was probably an effect of the influence of developing *cacicazgos* on the Greater Antilles, attracting people from the Lesser Antilles because of the greater social opportunities. The Late Ceramic A population increase – and possibly a related decline in the availability of food resources – may have provoked socio-political dissatisfaction and made people susceptible to the attractions of complex social societies on the Greater Antilles. The inhabitants of Morne Cybèle-1 and Morne Souffleur established villages in impressive and well-defensible locations on the La Désirade plateau. They

therefore had to cover a distance equivalent to at least one hour's walk in order to exploit coastal resources, which they continued using. Another new development was reduction of site type diversity. Ritual and economic activities were once again restricted to the settlements and the landscape was apparently used less intensively. It is not clear whether Anse à la Gourde still held the central role that it had assumed during the Late Ceramic A. Interaction networks necessarily covered larger areas, to the south and the north, but local contact networks continued to exist and short distance trips, for example aimed at the procurement of La Désirade rock, were still organised (chapter 6).

SAMENVATTING (DUTCH SUMMARY)

Dit proefschrift beschrijft een onderzoek dat tussen 1997 en 2003 aan de Universiteit Leiden is uitgevoerd. Het richt zich op pre-Columbiaanse sociale organisatie en interactie in een microregio in de Kleine Antillen. Deze microregio omvat het schiereiland Pointe des Châteaux en de eilanden La Désirade en Petite Terre (Guadeloupe). Er is onderzocht welke informatie verkregen kan worden over pre-Columbiaanse sociale organisatie en interactie door middel van een intensieve en systematische studie van deze microregio, in plaats van de studie alleen te richten op grote en goed onderzochte nederzettingen, zoals in de Caribische archeologie gebruikelijk is. Traditioneel wordt erg weinig aandacht geschonken aan de verschillende functies van vindplaatsen en aan het pre-Columbiaanse gebruik van andere vindplaatstypen dan permanente nederzettingen. Zonder een gedegen inzicht in de processen die gerelateerd zijn aan pre-Columbiaanse sociale organisatie en interactie op een microregionaal niveau, is het onmogelijk om deze processen op een grotere, regionale, schaal te begrijpen. Om die reden richt deze studie zich op het creëren van gedetailleerde vindplaatscatalogi die gebaseerd zijn op systematische *surveys* die een hele microregio beslaan, om een beter inzicht te krijgen in de sociale organisatie en de locale en microregionale contacten. Er zijn vier onderzoeksdoelen geformuleerd: (1) informatie verzamelen met betrekking tot de natuurlijke omgeving in heden en verleden, (2) een betrouwbare archeologische database opstellen door middel van intensieve *surveys*, (3) informatie verzamelen met betrekking tot (micro)regionale sociaal-politieke, economische en ceremoniële organisatie en interactie en (4) deze informatie vergelijken met archeologische gegevens van Guadeloupe en andere Kleine Antillen. Als uitgangspunt diende het idee dat pre-Columbiaanse sociale organisatie in een microregionaal perspectief het beste bestudeerd kan worden door de analyse van vindplaatspatronen, waardoor een dynamisch diachroon overzicht ontstaat (hoofdstuk 1).

De benodigde archeologische database, in de vorm van vindplaatscatalogi, is gemaakt op basis van intensieve en systematische *surveys*. Deze vormen een betrouwbaar middel om regionale en diachrone archeologische informatie te verkrijgen. Systematische archeologische *surveys*, met goed afgebakende onderzoeksgebieden en een goed gedefinieerde strategie zijn over het algemeen zeldzaam in het Caribisch gebied. De nadruk van de *survey* lag op het in kaart brengen van archeologische vindplaatsen. Hoewel vindplaatsdefinities vaak tamelijk vage interpretaties inhouden, werden de mogelijkheden voor een regionale *non-site*-studie te beperkt geacht. De belangrijkste beperking is het feit dat het moeilijk is om het *off-site*-materiaal te dateren, omdat het vaak zwaar geërodeerd en gefragmenteerd is en er over het algemeen weinig versiering op voorkomt. Bovendien vraagt het onderzoek juist om informatie met betrekking tot langetermijnprocessen en de daaruit voortkomende materiaalconcentraties. Tenslotte konden duidelijke concentraties, begrensd door lege zones, onderscheiden worden in het oppervlaktemateriaal in het onderzoeksgebied. *Off-site*-gegevens zijn alleen als aanvulling gebruikt op de vindplaatsgegevens die verzameld zijn. De *surveys* moesten drie doelen dienen. Op de eerste plaats moesten ze een vindplaatscatalogus opleveren, waarin alle vindplaatstypen, -functies, -locaties en -dateringen zouden voorkomen. Op de tweede plaats moesten de *surveys* gedetailleerde vindplaatsbeschrijvingen opleveren, om de ruimtelijke artefactverspreidingen, de geologische en archeologische stratigrafie, de vindplaatsfuncties en de chronologische toewijzingen te kunnen bestuderen. Op de derde plaats zouden de *surveys* het mogelijk moeten maken een inschatting te maken van hoe betrouwbaar de vindplaatscatalogi zijn. De *surveys* hebben, behalve voor het huidige onderzoek, ook veel informatie opgeleverd voor het *Carte-Archéologique*-project van de archeologische dienst op Guadeloupe, dat zich erop richt de archeologische vindplaatscatalogus voor Guadeloupe aan te vullen.

De *surveys* bestonden uit intensieve oppervlakte-*surveys*, waarbij 1 m brede, parallelle transecten, gescheiden door 10 of 20 m brede tussenafstanden werden onderzocht. De oppervlakten tussen de transecten werden op willekeurige plaatsen nagelopen om te zien of hier archeologisch materiaal gemist was. Steile hellingen zijn niet onderzocht. De transecten werden over het hele onderzoeksgebied met behulp van een kompas noord-zuid georiënteerd. De oppervlakte van de transecten is met machetes schoongeveegd om de waarnemingsmogelijkheden te optimaliseren. De *survey* van de zandstranden is meerdere keren en onder wisselende weersomstandigheden uitgevoerd. Voor elke ontdekte concentratie oppervlaktemateriaal is tijdens het veldwerk een verzameling diagnostisch materiaal gemaakt. Daarnaast is *off-site*-materiaal verzameld. Het *off-site*-materiaal en de oppervlakteconcentraties met archeologisch materiaal zijn ingetekend op luchtfoto's (schaal 1:5000). De vindplaatsen – bestaand uit één of meer oppervlakteconcentraties – zijn beschreven op formulieren. Pointe des Châteaux en Terre de Haut (Petite Terre) konden volledig onderzocht worden met afstanden van 10 m tussen de transecten. Omdat de

resultaten van de *survey* voortzetting van deze tijdrovende benadering niet legitimeerden, werden de tussenafstanden voor de transecten op La Désirade en Terre de Bas (Petite Terre) vergroot tot 20 m. Deze eilanden konden niet volledig op intensieve en systematische wijze onderzocht worden in verband met de grote afmetingen van La Désirade en de grotendeels ondoordringbare vegetatie van Terre de Bas.

Verschillende vindplaatsen zijn vervolgens geselecteerd om onderzocht te worden door middel van proefputten. Het graven van (meerdere) noord-zuid georiënteerde proefputten van 1 m^2 was gericht op het verzamelen van informatie over de geologische en archeologische stratigrafie en over de formatie- en deformatieprocessen van de vindplaats. Bovendien moesten ze diagnostisch materiaal verschaffen dat zou kunnen helpen om de chronologische en culturele context van de vindplaats te bepalen. De locaties van de proefputten werden willekeurig gekozen in zones met een relatief hoge vondstdichtheid en werden met behulp van GPS (*Global Positioning System*) en infraroodtheodoliet ingemeten met een precisie beter dan een decimeter. De proefputten zijn opgegraven in arbitraire lagen van 10 cm tot het moedergesteente bereikt was. Hierbij zijn geologische en archeologische lagen apart beschreven en bemonsterd. De opgegraven lagen zijn droog gezeefd met zeven met 2/5-inch-mazen. Het archeologisch materiaal in de zeefresiduen is vervolgens met de hand gesorteerd. Voor sommige vindplaatsen zijn echter monsters genomen die nat gezeefd zijn met 1- of 2-mm-zeven. Aanvullende informatie werd verkregen door het uitvoeren van een booronderzoek op een aantal vindplaatsen en op de zandstranden van Pointe des Châteaux (hoofdstuk 2).

Om de omstandigheden voor veldwerk en voor de conservering van vindplaatsen te kunnen evalueren, wordt hieronder de huidige natuurlijke omgeving van het onderzoeksgebied beschreven. Bovendien wordt getracht een beeld te schetsen van de omgeving in de pre-Columbiaanse periode, om de omstandigheden en mogelijkheden voor de oorspronkelijke bewoning te bestuderen.

Pointe des Châteaux, de meest oostelijke punt van Grande-Terre (Guadeloupe), is ongeveer 9 km lang en 50 m tot 2,5 km breed. Het onderzoeksgebied beslaat de meest oostelijke 7 km. Pointe des Châteaux is een kalkplateau, dat aan de westkant doorsneden wordt door een brede en ondiepe vallei. Tegenwoordig bestaat de noordkust voor meer dan de helft uit stranden met duinen, waar processen die samenhangen met de vorming van *beach-rock* veel voorkomen. De zuidkust bestaat uit opgeheven riffen en stranden zonder duinen. Typerend voor Pointe des Châteaux zijn de kleine, natuurlijke waterbassins en de zeven *salinas*. La Désirade, dat 12 km ten oosten van Pointe des Châteaux ligt, is een 11 km lange en 2 km brede tafelberg van kalksteen. Hieronder bevindt zich vulkanisch gesteente. Typerend voor La Désirade zijn het meer dan 200 m hoge (onbewoonde) plateau, de ontoegankelijke noordkust van het eiland en de aanwezigheid van grotten en grondstoffen die, hoewel van lage kwaliteit, geschikt zijn voor het vervaardigen van stenen werktuigen. De eilanden van Petite Terre (Terre de Haut en Terre de Bas) liggen 12 km ten zuiden van La Désirade en 7,5 km ten zuidenoosten van Pointe des Châteaux. Tegenwoordig vormen Terre de Bas (2,5 km bij 600 m) en Terre de Haut (1,1 km bij 200-300 m) een natuurreservaat. De eilanden, die oorspronkelijk uit één plat, opgeheven koraalplateau bestonden, worden nu gescheiden door een circa 150 m brede strook water. Typerend zijn de riffen die de eilanden bijna volledig omgeven, de dynamische duinformaties en de *salinas*.

Het locale reliëf en de vegetatie in het onderzoeksgebied maakten het veldwerk erg oncomfortabel maar ze verhinderden de uitvoer van de systematische oppervlakte-*surveys* niet. De mate van sedimentatie is tamelijk beperkt en naar verwachting hebben er geen modderstromen of aardverschuivingen plaatsgevonden, die archeologische vindplaatsen zouden kunnen bedekken. De omstandigheden voor de conservering van vindplaatsen aan de kust zijn echter minder gunstig als gevolg van kusterosie en de vorming van *beach-rock*. Bovendien kunnen duinen aan de noordkusten van Terre de Bas en Pointe des Châteaux archeologische resten bedekken. Vindplaatsen in het binnenland zullen beter bewaard zijn gebleven, hoewel deze beschadigd kunnen zijn door menselijk handelen. Als ze op de rand van het plateau op La Désirade liggen zijn ze waarschijnlijk aangetast door erosie.

Hoewel het onderzoeksgebied in het droogste en warmste deel van Guadeloupe ligt, waren de omstandigheden ter plaatste waarschijnlijk geschikt voor pre-Columbiaanse bewoning. Kenmerkend voor het gebied zijn grote vlakke stukken land die geschikt zijn voor bewoning, kleinschalige tuinbouw en het verzamelen van voedsel, evenals kleine baaien die afgeschermd worden door koraalriffen. Mariene voedselbronnen zijn in overvloed aanwezig en eenvoudig te exploiteren. De fauna op land is minder overvloedig. Zoet water was beschikbaar, maar het verkrijgen ervan zal wel een zekere inspanning gevraagd hebben. Verschillende soorten schelp en koraal, evenals steen en *Gaïac*-hout, die als grondstoffen voor werktuigen en ornamenten gediend kunnen hebben, waren eveneens aanwezig. Het is niet duidelijk waar het hout, dat gebruikt werd voor die bouw van kano's en huizen, gehaald werd, aangezien grote bomen tegenwoordig alleen in de ravijnen op La Désirade voorkomen. Een minder positieve kant voor pre-Columbiaanse bewoning in het onderzoeksgebied zijn de bijna jaarlijks langskomende orkanen. Het is mogelijk dat de grotten op La Désirade gebruikt werden als schuilplaats

tijdens dergelijke stormen (hoofdstuk 3).

Op basis van een algemeen overzicht van het cultureel chronologisch kader voor het onderzoeksgebied en de directe omgeving worden hieronder verwachtingen geformuleerd ten aanzien van pre-Columbiaanse vindplaatsvoorkomens in het onderzoeksgebied. Dit algemene overzicht beslaat de pre-Columbiaanse, de koloniale en de meer recente geschiedenis.

Ten eerste zouden preceramische, Huecan Saladoïde en Cedrosan Saladoïde vindplaatsen, evenals vindplaatsen met Troumassan en Suazan Troumassoïd en/of Mamoran Troumassoïd en Ostionoïd materiaal in de onderzoeksregio voor kunnen komen.

Op de tweede plaats zullen grote delen van het onderzoeksgebied oppervlakkig verstoord zijn als gevolg van intensieve verbouw van katoen, suikerriet en indigo tijdens de koloniale periode. Verstoring als gevolg van koloniale bebouwing heeft waarschijnlijk weliswaar in kleinere delen van het onderzoeksgebied plaatsgevonden, maar dit heeft wel een ingrijpendere verstoring van vindplaatsen opgeleverd. Vindplaatsen die dateren uit de Europese contactperiode zouden ook verwacht kunnen worden, aangezien bekend is dat er een *Carib territory* en een kleine *Carib* nederzetting is geweest op Pointe des Châteaux. De oorspronkelijke bewoners van Guadeloupe woonden hier tot het eind van de 19e eeuw of het begin van de 20e eeuw.

Op de derde plaats, worden archeologische vindplaatsen tegenwoordig beschadigd door toeristen, die in de duinen van Pointe des Châteaux en Petite Terre kamperen. Recente bouwwerkzaamheden, illegale opgravingen en afgravingen ten behoeve van zandwinning brengen zelfs nog omvangrijkere verstoringen teweeg. Hedendaagse tuinbouw lijkt het archeologisch bestand nauwelijks te verstoren (hoofdstuk 4).

Nadat de verwachtingen voor de aanwezigheid van archeologische vindplaatsen in de onderzoeksregio zijn beschreven, worden hieronder de *survey*-resultaten gepresenteerd. Daarnaast wordt de betrouwbaarheid van het veldwerk onder de loep genomen.

De *surveys* hebben met succes betrouwbare catalogi van pre-Columbiaanse vindplaatsen in de geselecteerde microregio opgeleverd (bijlagen 2-4). Grote delen van verschillende geologische en ecologische zones zijn onderzocht en een groot aantal pre-Columbiaanse vindplaatsen, met verschillende functies, locaties en dateringen zijn ontdekt. Ondanks de intensieve systematische *survey* kunnen verschillende factoren de observatiemogelijkheden en het verzamelen van vindplaats- en *off-site*-materiaal hebben beïnvloed en derhalve een gekleurd vindplaatsbestand hebben veroorzaakt. Deze factoren hangen samen met de intensiteit en de methode van oppervlakteonderzoek, het gebruik van oppervlaktemateriaal, de eigenschappen van het archeologisch materiaal, de persoonlijke waarnemingsvermogens van de *survey*-ploegen, omgevingsfactoren en natuurlijke en culturele post-depositionele processen. Bovendien levert het onderzoek door middel van kleine testputten ook bepaalde beperkingen op. De poging om de invloed van deze factoren tot een minimum te beperken is beschreven, evenals het resultaat van deze poging.

Vervolgens is de identificatie van verschillende vindplaatstypen, aan de hand van parameters zoals vindplaatslocatie, -afmetingen, -oppervlakte, -functie, -datering en duur van het gebruik of de bewoning beschreven. De *survey*s hebben tekortkomingen voor de analyse van de marginale vindplaatstypen aan het licht gebracht. Deze worden in deze studie 'onduidelijke' vindplaatsen genoemd. Ze worden gekenmerkt door kleine verspreidingen van gefragmenteerd aardewerk die zich hoofdzakelijk tot de oppervlakte beperken. Hoewel ze bijna nooit in andere Caribische studies naar voren komen, vertegenwoordigen deze een belangrijk deel van de vindplaatscatalogi van het onderzoeksgebied. Derhalve wordt verondersteld dat ze in andere gebieden en op andere eilanden ook aanwezig zouden moeten zijn.

Tenslotte worden de archeologische vindplaatsen in het onderzoeksgebied gepresenteerd. Op Pointe des Châteaux zijn 21 vindplaatsen ontdekt. De meeste hiervan dateren uit de *Late-Ceramic-A*-periode (600/850-1200/1300 na Chr.), drie anderen konden worden toegewezen aan de *Early-Ceramic-B*-periode (400-600/850 na Chr.) en twee vindplaatsen zijn *multi-component*. De vindplaatsen op Pointe des Châteaux omvatten onder andere 11 grote nederzettingen. Deze hebben typisch nederzettingsafval opgeleverd en hebben over het algemeen locaties die goed bereikbaar zijn vanaf de zee en die goede mogelijkheden bieden voor exploitatie en observatie van de omgeving. Deze vindplaatsen hebben voornamelijk een woonfunctie, maar het is goed mogelijk dat er ook ceremoniële of andere speciale activiteiten zijn uitgevoerd. Behalve de nederzettingen is er een kleine observatiepost aangetroffen, die strategisch op een vooruitstekend plateau aan de noordkust van het schiereiland ligt. Deze vindplaats bestaat uit een kleine en waarschijnlijk ondiepe verspreiding van fragmenten aardewerk, koraal en schelp. Daarnaast zijn er negen onduidelijke vindplaatsen gevonden. Ook deze vindplaatsen bestaan uit een kleine en waarschijnlijk ondiepe verspreiding van gefragmenteerd en geërodeerd aardewerk. Zes van deze vindplaatsen, waar aanwijzingen voor de bereiding van voedsel zijn aangetroffen, zijn hypothetisch tijdelijke bewoningsplaatsen

genoemd. Waarschijnlijk werden zij gebruikt door een kleine groep mensen. De drie overige vindplaatsen waren mogelijk gerelateerd aan tuinbouwactiviteiten.

De vindplaatscatalogus van La Désirade omvat 43 vindplaatsen. In totaal 33 vindplaatsen zijn toegewezen aan de *Late-Ceramic-A*-periode. Hiernaast werden één *Early-Ceramic-B*-vindplaats, twee *Late-Ceramic-B*-vindplaatsen (1200/1300-1493 na Chr.) en één *multi-component*-vindplaats aangetroffen. Zes vindplaatsen konden niet gedateerd worden. De vindplaatsen op La Désirade bestaan onder andere uit 11 grote nederzettingen, die over het algemeen op plat terrein liggen in de nabijheid van zones die geschikt zijn voor kleinschalige tuinbouw en dichtbij riffen en landingsplaatsen voor kano's. Deze vindplaatsen hebben typisch nederzettingsafval opgeleverd. Sommige nederzettingen dienden waarschijnlijk ook ceremoniële of andere speciale functies. Morne Cybèle-1 en Morne Souffleur zijn de meest opmerkelijke nederzettingen. Deze vindplaatsen hebben spectaculaire locaties op de zuidrand van het plateau. Het archeologisch materiaal bestaat uit aardewerk in Morne-Cybèle-stijl en op beide vindplaatsen is een schelpmasker gevonden. Behalve deze vindplaatsen zijn er op La Désirade ook vier ondiepe vindplaatsen aangetroffen waar steen bewerkt werd tot eenvoudige, meestal *ad-hoc*-artefacten van locale grondstof. Op deze vindplaatsen lag geen nederzettingsafval. Er werden ook twee ceremoniële vindplaatsen geïdentificeerd: Chemin de M. De l'Orme (een doelbewuste depositie van een kleine pelikaanvormige pot waarin een kleine stenen bijl en dissel zaten, beide gemaakt van *chert* van St. Maarten) en de Voûte-à-Pin-grot. Tenslotte zijn er nog 26 vindplaatsen gedocumenteerd als onduidelijke vindplaatsen. Deze bestaan uit ondiepe en verspreide concentraties van gefragmenteerd en geërodeerd aardewerk. Acht van deze vindplaatsen functioneerden waarschijnlijk als tijdelijke bewoningsplaatsen of als kampen. Veertien onduidelijke vindplaatsen, waar geen aanwijzingen voor de bereiding van voedsel zijn aangetroffen, werden mogelijk gebruikt voor tuinbouwactiviteiten. Vier onduidelijke vindplaatsen zijn gesitueerd in grotten en werden waarschijnlijk gebruikt als schuilplaats.

De vindplaatscatalogus van Petite Terre bestaat uit vijf grote nederzettingen uit de *Late-Ceramic-A*-periode met aantrekkelijke locaties, op platte terreinen, dichtbij kanolandingsplaatsen, riffen en vruchtbare bodems. Deze vindplaatsen hebben typisch nederzettingsafval opgeleverd, maar ceremoniële of andere speciale activiteiten hebben waarschijnlijk ook plaatsgevonden in enkele van deze nederzettingen. Twee onduidelijke vindplaatsen uit de *Late-Ceramic-A*-periode – kleine en ondiepe verspreidingen met gefragmenteerd en geërodeerd aardewerk en schelp – zijn ook aangetroffen. Dit zijn waarschijnlijk satelliet-*sites* die bij nederzettingen op Pointe des Châteaux of La Désirade horen (hoofdstuk 5).

Na deze korte weergave van de vindplaatsgegevens voor Pointe des Châteaux, La Désirade en Petite Terre worden microregionale overzichten gepresenteerd voor elke pre-Columbiaanse periode. Deze overzichten omvatten beschrijvingen van nederzettingspatronen, -structuren, -territoria en -hiërarchieën en van contacten tussen nederzettingen.

De preceramische en de *Early-Ceramic-A*-periode (2000 BC-400 AD) zijn hypothetisch pionierfasen genoemd aangezien er geen aanwijzingen voor bewoning voorafgaand aan de *Early-Ceramic-B*-periode aangetroffen zijn. Hoewel het mogelijk is dat er eenvoudigweg nooit preceramische of *Early-Ceramic-A*-vindplaatsen zijn geweest in het onderzoeksgebied, is het ook mogelijk dat als dergelijke vindplaatsen in kustgebieden gelegen zouden hebben, deze tegenwoordig weggeërodeerd of bedekt zijn.

De vroegste bewoning in de onderzoeksregio begon tijdens de *Early-Ceramic-B*-periode (AD 400-600/850). Men leefde in zes grote permanente nederzettingen aan de kusten van Pointe des Châteaux en La Désirade. De meeste nederzettingen lagen op vlakke terreinen dichtbij zoetwaterbronnen, makkelijk toegankelijke baaien, riffen, *salinas* en vruchtbare bodems. Petite Terre was niet bewoond. Overvloedige voedsel- en andere natuurlijke bronnen in de nabijheid zorgde ervoor dat de dorpen onafhankelijk konden zijn. De inwoners hadden een gemengde en *broad-spectrum*-economie, waarbij knolgewassen werden verbouwd, landdieren werden bejaagd, vis en vogels werden gevangen en schelpdieren, vruchten, wilde knolgewassen en zaden werden verzameld. Ze gebruikten hun dorpen voor de meeste sociaal-politieke, economische en ceremoniële activiteiten. Blijkbaar creëerden ze hiervoor geen speciale plaatsen verder weg van de nederzettingen, hoewel het mogelijk is dat vindplaatsen die gerelateerd waren aan speciale activiteiten, zoals bijvoorbeeld het verzamelen van schelp, aan de kusten lagen en tegenwoordig door erosie verdwenen zijn. De dorpen lagen verspreid en met min of meer gelijke tussenafstanden over de kusten van Pointe des Châteaux en La Désirade verdeeld. De territoria hadden ongeveer gelijke afmetingen. De aanwezigheid van een tijdelijke bewoningsplaats of kamp op Pointe des Châteaux suggereert dat mensen van buiten het onderzoeksgebied bronnen in de microregio hebben geëxploiteerd en dat hun de toegang tot nederzettingsterritoria waarschijnlijk niet ontzegd werd. Er zijn geen aanwijzingen gevonden voor het bestaan van een nederzettingshiërarchie, hoewel Anse à la Gourde en Les Sables waarschijnlijk de meest vooraanstaande dorpen waren. Inwoners van de *Early-Ceramic-B*-dorpen

onderhielden contactnetwerken over lange afstanden, die zo ver reikten als het Zuid-Amerikaanse vasteland. De inwoners van Anse à la Gourde en Les Sables verkregen steen van Martinique, Basse-Terre en Antigua om stenen artefacten van te vervaardigen en ze verkregen afgewerkte werktuigen van groene *chert* direct van de inwoners van de nederzettingen op St. Maarten, waar ze vervaardigd werden. De meeste stenen artefacten in het onderzoeksgebied werden echter vervaardigd van steentypes die in de microregio (bijvoorbeeld op La Désirade) zelf beschikbaar waren.

Het aantal dorpen nam tijdens de *Late-Ceramic-A*-periode toe, vooral na 1000 na Chr. Het nederzettingspatroon bestond in deze periode uit 22 nederzettingen, twee ceremoniële plaatsen, een observatiepost en 34 onduidelijke vindplaatsen. Bewoning van de microregio, die zich nog steeds in grote permanent bewoonde dorpen concentreerde, werd geconsolideerd en geïntensiveerd. Het is mogelijk dat de bevolking toenam, maar het is ook mogelijk dat nederzettingen gedurende kortere periodes bewoond werden en zich van tijd tot tijd verplaatsten. Inwoners van steeds maar groeiende dorpen zouden ook besloten kunnen hebben zich af te splitsen en nieuwe, kleinere, economisch onafhankelijke nederzettingen te stichten, en zo op een effectieve manier de lege plaatsen in het landschap op te vullen. Petite Terre werd in deze periode ook bewoond en geëxploiteerd. De afstanden tussen de nederzettingen en de territoria waren kleiner in vergelijking met de voorgaande periode. De meeste nederzettingen hadden waarschijnlijk territoria van ongeveer gelijke grootte, wat tot een evenwichtig gebruik van de voedselbronnen in de directe omgeving van de dorpen leidde. Hoewel de meeste nederzettingen nog steeds langs de kust lagen, was een aantal dorpen op La Désirade in het binnenland gesitueerd en minder nederzettingen lagen dicht bij zoetwaterbronnen in vergelijking met de *Early-Ceramic-B*-periode. De voedseleconomie bleef gemengd, waarbij knolgewassen werden verbouwd, landdieren werden bejaagd, vis en vogels werden gevangen en schelpdieren, vruchten, wilde knolgewassen en zaden werden verzameld. Men concentreerde hierbij zich nog steeds op zones dichtbij de nederzettingen. De diversiteit in vindplaatstypen nam toe en grotere delen van het landschap werden intensiever gebruikt voor ceremoniële, sociaal-politieke en economische activiteiten. Speciale ceremoniële locaties werden in het leven geroepen (Voûte à Pin en Chemin de M. De l'Orme), evenals tijdelijke kampen en locaties die gerelateerd waren aan tuinbouwactiviteiten en aan de exploitatie van natuurlijk bronnen buiten de dorpen. Grotten werden gebruikt als schuilplaats. Anse à la Gourde ontwikkelde zich tot een centrale nederzetting en vooral het grafveld had waarschijnlijk een centrale ceremoniële functie in de microregio. Sociale differentiatie ging een rol spelen en sociale stratificatie begon zich te ontwikkelen. Contacten over lange afstand, die zich zo ver uitstrekten als het Zuid-Amerikaanse vasteland en de Grote Antillen, bleven bestaan, hoewel ze minder veelvuldig lijken te zijn geweest dan tijdens de *Early-Ceramic-B*-periode. De inwoners van Anse à la Gourde speelden een centrale rol in deze contactnetwerken. De inwoners van À l'Escalier en Site Du Phare namen ook deel aan contactnetwerken waarbinnen afgewerkte artefacten van groene *chert* circuleerden. Locale groepen onderhielden ook frequente en intensieve contacten over korte afstanden. Verder werden nog steeds tochten naar La Désirade ondernomen.

Tijdens de *Late-Ceramic-B*-periode (1200/1300-1493 na Chr.) raakte de onderzoeksregio verlaten. Slechts drie kleine dorpen werden bewoond tijdens het laatste deel van de pre-Columbiaanse periode. Dit zijn Anse à la Gourde op Pointe des Châteaux en Morne Cybèle-1 en Morne Souffleur op La Désirade. Deze ontvolking was waarschijnlijk het resultaat van de invloed van zich ontwikkelende *cacicazgos* op de Grote Antillen, die door de grotere sociale mogelijkheden mensen van de Kleine Antillen aantrokken. De bevolkingstoename die tijdens de *Late-Ceramic-A*-periode plaatsvond – en mogelijk een samenhangende afname in de beschikbaarheid van voedselbronnen – kunnen sociaal-politieke ontevredenheid hebben opgewekt en mensen ontvankelijk gemaakt hebben voor de aantrekkingskracht van sociaal complexe samenlevingen op de Grote Antillen. De inwoners van Morne Cybèle-1 en Morne Souffleur stichtten hun dorpen op indrukwekkende en goed verdedigbare locaties op het plateau van La Désirade. Daardoor moesten ze een afstand van minstens een uur lopen overbruggen om natuurlijke bronnen aan de kust te kunnen exploiteren, die ze desalniettemin bleven gebruiken. Een andere nieuwe ontwikkeling is dat de diversiteit in vindplaatstypen afnam. Rituele en economische activiteiten werden weer beperkt tot de nederzettingen en het landschap werd blijkbaar minder intensief gebruikt. Het is niet duidelijk of Anse à la Gourde nog steeds de centrale functie had die het tijdens de *Late-Ceramic-A*-periode had aangenomen. Interactienetwerken besloegen uit noodzaak langere afstanden, zowel richting het zuiden als richting het noorden, maar plaatselijke contactnetwerken bleven bestaan en tochten over kleine afstanden, bijvoorbeeld om steen van La Désirade te halen, werden nog steeds georganiseerd (hoofdstuk 6).

RÉSUMÉ (FRENCH SUMMARY)

Cette thèse de doctorat est le résultat des études qui furent réalisées entre 1997 et 2003 à l'université de Leyde (Pays-Bas). L'étude se concentre sur l'organisation sociale et l'interaction dans une microrégion dans les Petites Antilles, comprenant la péninsule de la Pointe des Châteaux et les îles de la Désirade et Petite Terre (Guadeloupe). Elle analyse quels renseignements peuvent être obtenus sur l'organisation sociale et l'interaction précolombiennes par une étude intensive et systématique de cette microrégion, au lieu de se concentrer uniquement sur l'étude des grands sites d'habitat bien étudiés, comme généralement faite en archéologie caraïbe. Très peu d'attention a traditionnellement été payée à la différenciation des fonctions des sites et à l'usage précolombienne des types de sites autres que des sites d'habitation permanente. Sans compréhension détaillée des processus relatifs à l'organisation sociale et l'interaction précolombiennes à l'échelle microrégionale, il reste impossible de comprendre d'une manière précise ces processus à une échelle régionale. C'est pourquoi cette étude vise à créer des inventaires des sites détaillés, basées sur des prospections systématiques couvrant une microrégion complète, afin de pouvoir obtenir une compréhension plus précise de l'organisation sociale et des contacts locaux et microregionaux. Quatre buts de recherche furent formulés: (1) collectionner des renseignements sur le paysage de la microrégion dans le passé et le présent, (2) créer des banques de données archéologiques solides en réalisant des prospections intensives, (3) obtenir des renseignements sur l'organisation sociopolitique, économique et cérémoniel et sur l'interaction (micro-)régionale, et (4) comparer ces renseignements avec les données archéologiques de la Guadeloupe et d'autres Petites Antilles. Point de départ était l'idée que l'on pouvait mieux comprendre l'organisation sociale précolombienne dans une perspective microrégionale en analysant des modèles des sites, en provenant des résumés dynamiques et diachroniques (premier chapitre).

Les banques de données requises, sous forme des inventaires des sites, furent réalisées par des prospections en surface intensives et systématiques. Celles-ci sont des moyens solides pour obtenir des renseignements archéologiques régionaux et diachroniques. Des prospections archéologiques systématiques qui utilisent des secteurs et des stratégies bien définis sont assez rares dans la région caraïbe. L'accent des prospections concernait la découverte des sites archéologiques. Quoique des définitions du concept de 'site' soient souvent des interprétations assez imprécises, des possibilités d'une étude régionale *non-site* furent trop limitées. La limitation la plus importante concerne le fait qu'il est difficile de dater du matériel *off-site* parce que ce matériel est souvent gravement érodé et fragmenté et un petit pourcentage est décoré. En plus, l'étude demande spécialement des renseignements des processus de plus longue durée et des accumulations de matériel archéologique résultants. Finalement, des concentrations dans le matériel en surface, bordées par des zones vides, pouvaient être bien identifiées dans la région de recherche. Les données *off-site* n'ont été utilisées que complémentairement aux données des sites. Les prospections devaient servir trois buts. Premièrement, les prospections devraient produire un inventaire des sites, tous types, fonctions, situations et attributions chronologiques compris. Deuxièmement, ils devraient produire des descriptions détaillées des sites afin de mieux comprendre les distributions spatiales des artefacts, des stratigraphies géologiques et archéologiques, des fonctions des sites, et des attributions chronologiques. Troisièment, il devrait être possible d'estimer la précision de l'inventaire. En plus, les prospections ont fortement contribué au projet de la 'Carte Archéologique' du service archéologique de la Guadeloupe, visant au complétement de l'inventaire des sites archéologiques de la Guadeloupe.

Les prospections consistaient en des prospections en surface intensives. Des transects parallels, d'un m de large, séparés par des intervalles de 10 ou bien de 20 m, furent étudiés. Des surfaces des intervalles furent contrôlés arbitrairement pour savoir si des concentrations de matériel archéologique n'avaient pas été remarquées. Des pentes abruptes ne furent pas examinées pendant les prospections. Les transects furent orientés nord-sud en utilisant des boussoles afin d'étudier la région de recherche complète. Les surfaces des transects furent nettoyées avec des machettes afin d'optimaliser les possibilités d'observation. Les surfaces des plages sableuses furent examinées plusieurs fois, sous différentes conditions atmosphériques. Pour chaque concentration de matériel archéologique, des collections de matériel diagnostique furent réalisées pendant les recherches de terrain. En plus, du matériel *off-site* fut collectionné. Du matériel *off-site* et des concentrations de matériel archéologique en surface furent documentés sur des photographies aériennes (échelle 1:5000). Des sites – comprenant une ou plusieurs concentrations en surface – furent décrits en utilisant des fiches de description. La Pointe des Châteaux et Terre de Haut (Petite Terre) pourraient être complètement étudiés en utilisant des intervalles de 10 m. Puisque les résultats des prospections ne justifiaient pas la continuation de cette approche qui

prend beaucoup de temps, les intervalles furent élargis vers 20 m à La Désirade et Terre de Bas (Petite Terre). Ces îles ne pourraient pas être complètement étudiées d'une manière intensive et systématique à cause des grandes dimensions de La Désirade et de la végétation qui est impénétrable en grande partie à Terre de Bas.

Plusieurs sites furent sélectionnés pour des tests sous surface. La fouille des (séries des) sondages de 1 m^2, orientés nord-sud, avait comme but de collectionner des renseignements concernant les stratigraphies géologique et archéologique et concernant des processus de formation et de déformation des sites. Ensuite, elle devait produire des échantillons de matériel archéologique diagnostique qui pourrait aider à fournir un contexte chronologique et culturel. La place des sondages fut sélectionnée arbitrairement dans des zones avec les distributions archéologiques les plus denses et elle fut mesurées en utilisant un GPS (*Global Positioning System*) et un théodolite infrarouge avec une précision meilleure qu'un décimètre. Les sondages furent creusés dans des niveaux arbitraires, en analysant des différents niveaux géologiques et archéologiques, jusqu'à ce que le substrat fût atteint. Ces niveaux furent tamisés en sèche avec des tamis avec des mailles de 2/5 *inch*. Du matériel archéologique fut collectionné à la main des résidus. Pour certains des sites, des échantillons furent tamisés avec de l'eau avec des tamis avec des mailles de 1 ou bien 2 mm. Des renseignements sous surface additionnels furent fournis par des tests de tarière sur certains des sites et sur des plages sableuses de Pointe des Châteaux (deuxième chapitre).

Afin de pouvoir évaluer les conditions pour les recherches de terrains aussi bien que les conditions pour la conservation des sites, le contexte naturel de la région de recherche est décrit. En plus, on a essayé de décrire l'environnement dans la période précolombienne, afin de pouvoir évaluer des conditions pour l'habitation précolombienne.

Pointe des Châteaux, la pointe la plus orientale de la Grande-Terre (Guadeloupe) est à peu près de 9 km de long et 50 m jusqu'à 2,5 km de large. La région de recherche couvre 7 km de l'est vers l'ouest. La Pointe des Châteaux est un plateau calcaire, qui est caractérisé dans l'ouest par la présence d'une vallée large et pas profond. À présent, la côte au nord consiste en plus de 50% de plages avec des dunes et des processus de formation de *beach-rock* sont partout présents. La côte au sud consiste en des récifs élevés et des plages sans dunes. Pointe des Châteaux est caractérisée par la présence de petits bassins naturels qui contiennent de l'eau et par ses sept salines. La Désirade, située à 12 km de l'est de la Pointe des Châteaux, est une montagne de table calcaire de 11 km de long et de 2 km de large, qui a un substrat volcanique. La Désirade est caractérisée par son plateau calcaire inhabité, qui est plus de 200 m de haut, la côte au nord inaccessible et la présence des grottes et de matière première appropriée, malgré sa qualité inférieure, à la fabrication des outils en pierre. Les îles de la Petite Terre (Terre de Haut et Terre de Bas) sont situées au 12 km sud de La Désirade et à 7.5 km au sud-est de la Pointe des Châteaux. À présent, Terre de Bas (2,5 km sur 600 m) et Terre de Haut (1,1 km sur 200-300 m) sont une réserve naturelle. Les îles, qui originalement consistaient en un plateau en corail plat et élevé, sont séparées par une passe qui est à peu près de 150 m de large. Leurs caractéristiques sont les récifs qui entourent les îles presque complètement, les formations de dunes dynamiques et des salines.

Le relief et la végétation dans la région de recherche rendaient les recherches de terrain inconfortables, mais ils n'ont pas empêché des prospections en surface systématiques. La sédimentation est assez modeste et on ne croit pas que des torrents de boue ou bien des glissements de terrain, aient couvert des sites archéologiques. Cependant, les conditions de conservation des sites côtières sont moins favorables, à cause de l'érosion côtière et les processus de formation de *beach-rock*. En plus, des formations des dunes aux côtes au nord de Terre de Bas et de la Pointe des Châteaux peuvent couvrir des distributions de matériel archéologique. Des sites à l'intérieur du pays seront mieux conservés, quoiqu'ils aient été perturbés peut-être par des actions humaines, et, si situés aux bords du plateau de La Désirade, par érosion.

Quoique la région de recherche soit située dans la partie la plus sèche et la plus chaude de la Guadeloupe, les conditions locales étaient probablement favorables à l'habitation précolombienne. La région est caractérisée par énormément de terrain plat convenable à l'habitation, l'horticulture à petite échelle et la collection des ressources de subsistance, et par des petites baies protégées par des récifs en corail. Des ressources marines de subsistance sont disponibles facilement et amplement. La faune terrestre est moins abondante et diverse. De l'eau fraîche était disponible, quoique la collection dût demander un effort. Plusieurs espèces de coquillage et de corail, des roches et du bois *Gaïac*, qui ont pu fonctionner comme matières premières pour des outils et des ornements, étaient présents aussi. Il n'est pas bien sûr où le bois utilisé pour en construire des canoës et des maisons était collectionné, comme des grands arbres ne sont présents aujourd'hui que dans les ravines à La Désirade. Un aspect moins positif pour l'habitation précolombienne dans la région de recherche est le passage presque annuel des ouragans. Il est possible que les grottes de La Désirade fussent utilisées comme refuge pendant de tels événements (troisième chapitre).

À la base d'un résumé général de l'encadrement culturel et

chronologique pour la région de recherche et ses environs, des espérances ont été formulées sur la présence de sites précolombiens dans la région de recherche. Ce résumé couvre la période précolombienne et la période coloniale, ainsi que la période plus récente. D'abord des sites précéramiques, des sites Huecan ou bien Cédrosan Saladoïdes ainsi que des sites fournissant du matériel Troumassan et Suazan Troumassoïde et/ou Mamoran Troumassoïde et Ostionoïde pourraient avoir existé dans la région de recherche.

Ensuite, de grandes parties de la région de recherche ont dû avoir été perturbées superficiellement, ce qui est le résultat de la cultivation intensive de coton, de canne à sucre et d'indigo pendant la période coloniale. Perturbance résultant de construction coloniale a eu lieu dans des régions plus limitées, mais elle cause une destruction plus radicale des sites archéologiques. On peut s'attendre à des sites datant de la période de contact avec des Européens, parce qu'un territoire caraïbe et une habitation caraïbe étaient fondés à la Pointe des Châteaux. Les habitants indigènes de Guadeloupe vivaient ici jusqu'à la fin du XIX^{e} siècle ou jusqu'au début du XX^{e} siècle.

Finalement, des sites archéologiques sont endommagés sérieusement aujourd'hui par des touristes qui font du camping dans les dunes de Pointe des Châteaux et de Petite Terre, et des constructions récentes, des fouilles illégales et du pillage de sable endommagent les sites encore plus gravement. La cultivation récente ne perturbe qu'à peine des sites archéologiques (quatrième chapitre).

Ayant décrit les prévisions concernant la présence des sites archéologiques dans la région de recherche, les résultats des prospections sont présentés et la sûreté des recherches de terrain est commentée. Les prospections ont produit avec succès des inventaires sûrs des sites précolombiens dans la microrégion sélectionnée (appendices 2-4). De grandes parties des différentes zones géologiques et écologiques ont été étudiées, et un grand nombre de sites précolombiens, avec des différentes fonctions, situations et datations, a été découvert. Malgré l'application d'une technique de prospection intensive et systématique, plusieurs facteurs ont pu influencer l'observation et la collection de matériel des sites et de matériel *off-site*, et ont pu influencer ainsi la sûreté de l'inventaire des sites. Ces facteurs sont reliés à l'intensité et à la méthode de l'observation en surface, à l'utilisation de matériel de la surface, aux caractéristiques du matériel archéologique, à l'observation personnelle des équipes de prospection, aux facteurs environnants et aux processus naturels et culturels post-dépositionnels. En plus, la fouille des petites unités implique certaines limitations aussi. L'effort pour minimaliser l'influence de ces limitations est décrit, ainsi que le résultat de cet effort.

L'identification des différents types de sites, utilisant des paramètres comme situation, dimensions, superficie, fonction, durée d'utilisation et d'occupation et datations de site, a été décrite ensuite. Les prospections ont démontré des défauts dans la compréhension des marginaux types de sites, qui ont été dénommés sites 'indistincts' dans cette étude. Ces sites sont caractérisés par des distributions modestes et pas profondes de céramique fragmentée. Quoiqu'ils ne soient presque jamais documentés dans des études plus anciennes dans la Caraïbe, ils représentent une partie importante des inventaires des sites de la région de recherche et on pense qu'ils doivent être présents dans d'autres zones et dans d'autres îles aussi.

Finalement, les sites archéologiques de la région de recherche ont été présentés. À la Pointe des Châteaux, on a découvert 21 sites. La plupart des sites, 16 au total, datent de la période *Late Ceramic A* (600/850-1200/1300 après J.C.), trois autres sites ont été assignés à la période *Early Ceramic B* (400-600/850 après J.C.) et deux sites ont plusieurs périodes d'occupation. Les sites à la Pointe des Châteaux consistent entre autres en 11 sites d'habitation larges, qui fournissent des déchets d'habitation typiques et qui ont généralement des situations qui sont bien accessibles quand on accoste et qui ont un potentiel d'exploitation et des facilités d'observation favorables. Les sites ont premièrement une fonction d'habitation, mais des activités cérémonielles ou bien d'autres activités spéciales ont pu être réalisées aussi. En plus, un petit poste d'observation a été découvert sur un plateau avancé qui domine la côte nord de la péninsule. Il consiste en une petite distribution probablement pas profonde contenant des fragments de céramique, de corail et de coquillage. De plus, neuf sites indistincts, consistant en petites distributions pas profondes, consistant de la céramique fragmentée et érodée furent découverts. Six de ces sites indistincts, fournissant de l'évidence de la préparation de la nourriture sur place, ont été dénommés hypothétiquement des sites d'habitation temporaire, qui furent utilisés probablement par un petit groupe d'habitants. Les trois autres sites ont pu être reliés aux activités d'horticulture.

L'inventaire des sites de La Désirade consiste en 43 sites. Un total de 33 sites fut assigné à la période *Late Ceramic A*. Un site date de la période *Early Ceramic B*, deux sites sont *Late Ceramic B* (1200/1300-1493 après J.C.) et un site a plusieurs phases d'occupation. Six sites ne pouvaient pas être datés. L'inventaire des sites de La Désirade contient 11 larges sites habitation, situés en général dans des terrains plats près des terres fertiles, aptes à l'horticulture à petite échelle et près des récifs et des places de débarquement des canoës. Les sites ont fourni des déchets d'habitat typiques; certains des sites d'habitat ont eu des fonctions cérémonielles ou bien reliées aux autres activités spéciales aussi. Morne Cybèle-1 et Morne Souffleur sont les sites d'habitat les plus remarquables. Ces sites se trouvent dans

des situations spectaculaires au bord sud du plateau. Le matériel archéologique consiste en céramique en style de Morne Cybèle et les deux sites ont produit un masque en coquillage. En plus, quatre sites où on travaillait la roche locale pour en faire des artefacts simples, en majorité *ad-hoc*, ont été trouvés. Ces sites ne sont pas très profonds. Des déchets d'habitation ne furent pas trouvés. Ensuite, on a identifié deux sites cérémoniels: les sites de Chemin de M. De l'Orme (une déposition intentionnelle d'un vase en forme de pélican, qui fonctionnait comme conteneur d'une petite hache et une herminette en *chert* de St. Martin) et le site de Voûte à Pin, situé dans une grotte. Finalement, 26 sites – des distributions pas très profondes et dispersées contenant de la céramique fragmentée et érodée – ont été documentés comme des sites indistincts. Huit de ces sites fonctionnaient probablement comme des sites d'habitation temporaire ou bien de campements. Un total de 14 sites indistincts, sans évidence de la préparation d'alimentation sur place, pourrait être utilisé pour l'horticulture. Quatre sites indistincts sont de petits sites dans des grottes, utilisés comme abris.

L'inventaire des sites de Petite Terre consiste en cinq sites d'habitat larges datant de la période *Late Ceramic A*, situés dans des terrains plats, près de lieux ou des canoës peuvent accoster, et pas loin des récifs et des terres fertiles. Les sites ont fourni des déchets d'habitation typiques, mais des activités cérémonielles ou bien d'autres types d'activités spéciales ont eu lieu probablement aussi à certains de ces sites. Deux sites indistincts datant de la période *Late Ceramic A* – des petites distributions des fragments de céramique et de coquillage érodés – furent trouvés aussi. Ce sont probablement des sites satellites des habitations à Pointe des Châteaux ou bien à La Désirade (cinquième chapitre).

En analysant des données sur les sites à Pointe des Châteaux, La Désirade et Petite Terre, des résumés microrégionaux sont présentés pour chaque période d'occupation précolombienne. Ces résumés consistent en des descriptions des modèles et des structures des habitations, des territoires et des hiérarchies, et des contacts entre des habitations.

La période précéramique et la période *Early Ceramic A* (2000 avant J.C. - 400 après J.C.) sont intitulées hypothétiquement des phases pionnières comme on n'a pas trouvé d'évidence pour l'habitation avant la période *Early Ceramic B*. Quoique la possibilité doive être considérée que des sites précéramiques ou des sites datant de la période *Early Ceramic A* simplement n'étaient pas présents dans la région de recherche devrait être considérée, de tels sites, si présents autrefois, ont pu avoir été érodés ou couverts aujourd'hui.

La première occupation de la région de recherche eut lieu pendant la période *Early Ceramic B* (400-600/850 après J.C.). Des gens habitaient six larges établissements côtières à la Pointe des Châteaux et à La Désirade, dont la plupart sont situés dans des terrain plats pas loin des sources d'eau fraîche, des baies facilement accessibles, des récifs, des salines et des terres fertiles. Petite Terre n'était pas habitée. D'amples ressources de subsistances et autres dans les environs des établissements ont permis aux villages d'être indépendants. Leurs habitants pratiquaient une économie mixte et variée: l'horticulture des tubercules, la chasse aux animaux terrestres et aux oiseaux, la pêche, la collection des coquillages, des fruits, des racines et des graines non-cultivés. Ils utilisaient leurs villages pour la plupart des activités sociopolitiques, économiques et cérémonielles; apparemment, ils n'ont pas créé des sites spéciaux en dehors des établissements, quoiqu'il soit possible que des sites relatifs aux activités spéciales, par exemple à la collection des coquillages, étaient situés aux côtes et sont à présent détruits par l'érosion. Les villages étaient dispersés à distances à peu près égales le long des côtes de la Pointe des Châteaux et de La Désirade et ils avaient des territoires aussi grands les uns et les autres. La présence d'un site d'habitation temporaire à la Pointe des Châteaux suggère que des gens des villages en dehors de la partie orientale de la Guadeloupe ont pu exploiter des ressources dans cette microrégion et que, probablement, l'accès aux territoires des établissements n'était pas restreint. Pas d'évidence n'a été découverte pour l'existence d'une hiérarchie de sites, quoique Anse à la Gourde et Les Sables fussent probablement les villages proéminents. Des habitants des villages de la période *Early Ceramic B* entretenaient apparemment des réseaux de contacts sur longue distance, vers la terre ferme d'Amérique du Sud. Les habitants d'Anse à la Gourde et Les Sables obtenaient des roches de Martinique, de Basse-Terre et d'Antigua pour la fabrication des artefacts lithiques et ils obtenaient directement des outils finis en *chert* vert des habitants vivant aux sites de production à St. Martin. Cependant, la plupart des artefacts lithiques dans la région de recherche étaient fabriqués des types de pierre qui était disponibles dans la région même (à La Désirade par exemple).

Le nombre des villages augmente pendant la période *Late Ceramic A*, particulièrement après l'an 1000 après J.C. Le modèle des sites de cette période consiste en 22 habitations, deux sites cérémoniels, un poste d'observation et 34 sites indistincts. L'occupation de la microrégion, toujours concentrée en villages larges et permanentes, fut consolidée et intensifiée. Il est bien possible que la population augmentât, mais il se peut aussi que des établissements fussent habités pendant des périodes plus courtes et que les établissements se déplaçassent de temps en temps. Des

habitants des villages toujours agrandissants ont pu décider de se séparer et d'établir de nouveaux établissements plus petits et indépendants économiquement. Ceci est une manière effective de remplir des espaces vides dans le paysage. Dans cette période, Petite Terre fut habitée et exploitée aussi. Les distances entre les établissements et les territoires étaient plus petites comparées à la période précédente. La plupart des établissements avaient des territoires avec des mêmes dimensions, à peu près, résultant dans une utilisation équilibrée des ressources de subsistance dans les environs directs des villages. Quoique la plupart des villages fussent toujours situés le long de la côte, certains des villages à La Désirade étaient situés à l'intérieur du pays et la proximité de l'eau potable était plus rare comparée à la période *Early Ceramic B*. Des gens continuaient à pratiquer une économie mixte consistant de l'horticulture des tubercules, la chasse aux animaux terrestres et aux oiseaux, la pêche, la collection des coquillages, des fruits, des racines et des graines non-cultivés, et ils exploitaient toujours des zones tout près des établissements. La diversité des types des sites augmente et de plus grandes parties du paysage furent utilisées pour des activités cérémonielles, sociopolitiques et économiques. Le paysage fut utilisé plus intensivement. Des sites cérémoniels furent créés (Voûte à Pin et Chemin de M. De l'Orme), aussi bien que des campements temporaires et des sites reliés aux activités d'horticulture et d'exploitation des ressources naturelles hors des villages, et des grottes furent utilisées comme abris. Anse à la Gourde se développait comme un établissement avec une fonction centrale et surtout sa zone d'enterrement a probablement eu une fonction cérémonielle centrale dans la microrégion. Une différentiation sociale a commencé à se développer ainsi qu'une stratification sociale. Des contacts à longue distance, qui s'étendaient jusqu'à la terre ferme d'Amérique du Sud et des Grandes Antilles, continuaient à exister, quoiqu'ils semblent moins fréquents que pendant la période *Early Ceramic B*. Les habitants d'Anse à la Gourde ont joué un rôle central dans ces réseaux. Les habitants d'À l'Escalier et de Site Du Phare participaient aussi à des réseaux dans lesquels des artefacts en *chert* vert circulaient. Des groupes locaux s'étaient évidemment alliés à d'autres groupes par des contacts à courte distance fréquents et intensifs. En plus, on entreprenait toujours des voyages à La Désirade.

Pendant la période *Late Ceramic B* (1200/1300-1493 après J.C.), on abandonna la microrégion Est de Guadeloupe: il ne restait que trois petits villages pendant la phase la plus tardive de la période précolombienne. Ce sont Anse à la Gourde à la Pointe des Châteaux, Morne Cybèle-1 et Morne Souffleur à La Désirade. Ce dépeuplement était probablement un résultat des *cacicazgos* des Grandes Antilles qui se développaient et attiraient des habitants des Petites Antilles à cause des possibilités sociales plus grandes. L'augmentation de la population pendant la période *Late Ceramic A* – et peut-être une diminution des ressources alimentaires – pourraient avoir provoqué un mécontentement sociopolitique et renforcé l'attrait des sociétés sociales complexes dans les Grandes Antilles. Les habitants de Morne Cybèle-1 et de Morne Souffleur créaient des villages dans des locations impressionnantes et bien défendables sur le plateau de la Désirade. C'est pourquoi ils devaient marcher plus d'une heure au minimum pour pouvoir exploiter des ressources côtières, qu'ils continuaient à utiliser. Un autre développement concerne la réduction de la diversité des types de sites. Des activités rituelles et économiques furent de nouveau limitées aux établissements et apparemment le paysage fut utilisé moins intensivement. Il n'est pas clair si Anse à la Gourde continuait à tenir sa fonction centrale qu'elle avait prise pendant la période *Late Ceramic A*. Nécessairement, les réseaux couvraient des régions plus étendues vers le nord et vers le sud, mais les réseaux locaux continuaient exister et des petits voyages, pour obtenir des roches de La Désirade par exemple, continuaient à être organisés (sixième chapitre).

CURRICULUM VITAE

After completing her secondary education (gymnasium α) at the *Hertog Jan College* in Valkenswaard, Maaike Sibilla De Waal (Eindhoven, 1972) studied Archaeology and Culture-history of Indigenous America and Prehistory of North-Western Europe at Leiden University (1991-1996). She participated in several archaeological projects in the Netherlands, both underwater (Department of Underwater Archaeology) and on land (Universities of Leiden, Groningen and Amsterdam; commercial archaeological companies Jacobs and Burnier and *Archeologisch Diensten Centrum*) and in a survey project on Sardinia (Leiden University). Her fieldwork in the Caribbean concentrated on excavations and surveys on St. Martin (1993), Guadeloupe, La Désirade and Petite Terre (1994-2000) and St. Lucia (2002). In the meantime she worked as free-lance guide in the Leiden Museum of Antiquities (1995-1999) and as tour guide on Martinique, Dominica and Guadeloupe for Baobab Travels in Amsterdam (2002). Her PhD research focusing on pre-Columbian organisation and interaction on the Eastern part of Guadeloupe was conducted at Leiden University between 1997 and 2003. Since 2004, Maaike has been working for *RAAP Archeologisch Adviesbureau*, a Dutch archaeological company specialised in archaeological reconnaissance and counselling.

Names of the sites in the Eastern Guadeloupe micro-region and general legend for the maps.

La Désirade	**Pointe des Châteaux**
1. À l'Escalier	1. Anse à la Gourde
2. Anse des Galets	2. Grande Saline
3. Grotte de Grande Anse	3. Petites Salines
4. Grotte le Baigneux	4. Site 1
5. Cocoyer	5. Village des Pêcheurs
6. Les Sables	6. Est Petite Saline Orientale
7. Morne de Baie Mahault	7. Montagne des Petites Salines
8. Morne Cybèle-1	8. Ouest Résidence Kahouanne
9. Morne Cybèle-2	9. Degrat
10. Anse Petite Rivière	10. Site 7
11. Pointe Doublé	11. Ouest Pointe Tarare
12. Tropique	12. Site 9
13. Voûte à Pin	13. Site 10
14. Pointe Séraphine	14. Ouest Anse à Plume
15. Au Vent	15. Est Pointe Tarare
16. Grande Ravine	16. Ouest Morne Zambi
17. Site 4	17. Nord Morne Zambi
18. Site 5	18. Fond Caraïbe
19. Grand Abaque 1	19. Pointe à Cabrits 1
20. Grand Abaque 2	20. Pointe à Cabrits 2
21. Site 8	21. Fond St. Bernard
22. Pied de la Montagne	
23. Pointe Colibri	
24. Ravine César	**Petite Terre**
25. Morne à Marthe	
26. Aéroport	1. Baleine du Sud
27. Site 17	2. Site du Phare
28. La Ramée	3. Est de Mouton de Bas
29. Site 19	4. Mouton de Bas
30. Chemin de la Montagne	5. Trou Canard
31. Pointe Gros Rempart	6. Pointe Sablé
32. Ravine à Moko	7. Est de Trou Canard
33. Les Éoléens	
34. Morne Souffleur	
35. Morne Frégule	
36. Grotte de Morne Blanc	
37. Site 28	
38. Site 29	
39. Trou Madame	
40. Parc à Jojo	
41. Chemin du Latanier	
42. Chemin de M. De l'Orme	
43. Pointe à Godard	

Reef

Salina

(sandy) Road

5 m height contours