Archaeological Investigations between Cayenne Island and the Maroni River

a cultural sequence of western coastal French Guiana from 5000 BP to present

Martijn M. van den Bel

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Back: Beach at Les Salines, Cayenne Island (photograph by the present author)

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Avec le concours de l'Institut national de recherches archéologiques préventives

Institut national de recherches archéologiques préventives
Inrap

To Mo and our children

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List of Abbreviations

A.	Arawakan
Br.	Brazilian Portuguese
D.	Dutch
C.	Cariban
E.	English
Fr.	French
G.	German
P.	Portuguese
Sp.	Spanish
Sr.	Sranantongo
T.	Tupian

BPS	Barrage de Petit-Saut
CPP	Cimetière paysager de Poncel
CSL	Chemin Saint-Louis
LPB	La Pointe de Balaté
PDM	Plateau des Mines
SBE	Sable Blanc Est

AFAN	Association de fouilles archéologiques nationales
AGAE	Association guyanaise d'archéologie et d'ethnographie
BRGM	Bureau de recherches géologiques et minières
CIRA	Commissions interrégionales de la recherche archéologique
CNRS	Centre national de recherche scientifique
DOM	Départements d'outre mer (now DROM)
DAC	Direction des affaires culturelles (formerly DRAC)
IEPA	Instituto de esquisas ciêntificas e technológicas do Estado do Amapá
INRA	Institut national de recherches agronomiques
INRAP	Institut national de recherches archéologiques preventives (formerly AFAN)
IRD	Institut de recherche pour le développement (formerly ORSTOM)
ONF	Office National des Forets
ORSTOM	Office de la recherche scientifique en technique outre-mer
SA	Service d'archéologie (formerly SRA)
VAT	Volontaire à l'aide technique

AD	*Anno Domini* (or CE, Common Era)
ADE	Amazonian Dark Earths
BC	Before Christ (or BCE, Before the Common Era)
BP	Before Present
ECA	Early Ceramic Age
HSAI	Handbook of South American Indians
HSAA	Handbook of South American Archaeology
LCA	Late Ceramic Age
MSL	Mean Sea Level

Preface

This study entitled *Archeological Investigation between Cayenne Island and the Maroni River* is not a history of Amerindian life in French Guiana from *c*.5000 BP to the present-day. Rather, it presents us with an anthology of archaeological materials with which this history has to contend, extracting from them and reconstructing with them not only a hypothetical view of the Amerindian prehistory but also a history of French Guiana. This study is primarily based on a large number of archaeological data, gathered from excavations in the western coastal zone of French Guiana. The outcome hereof served to construct a cultural chronology for this region in an attempt to insert this information into the already existing chronology, as is usually the case in archaeology.

In the Guianas, the cultural chronology has been firmly settled for many decades. Moreover archaeologists apply this framework as a tool in order to describe any change or development in human culture. However, this framework in the Guianas is not as elaborate as in the Andes or the Caribbean. In fact, during the last quarter of the 20th century, it was adopted from the synthesis of archaeological research on the Orinoco and Amazon Rivers (where archaeological research was more advanced) and applied to the Guianas (Rouse et al. 1984). This *topdown* approach allowed little space for the existence or emergence of local cultures because a regional distinction was considered an adaptation or diffusion of previous migrations. Furthermore, the debate on the presence of chiefdoms in the Americas during the 1990s obscured local and regional diversity as it did in other regions such as the Greater Antilles (Curet and Stringer 2010:5; Torres 2013). Pre-Colombian society during the Late Ceramic Age (LCA) tends to be more variably composed and segmented. It is not a single encompassing complex society of chiefdoms as proposed by Rostain (2008b).

The results of the excavations forwarded here indicates that this existing framework, as defined by Stéphen Rostain (1994a) as to French Guiana, as well as its general approach, is obsolete and needs to be revised from the bottom up. First and foremost, not all stages of development are present in Rostain's framework, (e.g. the Archaic and the Early Ceramic Age), are non-existent or hardly discussed. Secondly, the data base of the existing framework is ridiculously small when compared with the data bases of current (compliance) archaeological research. This bias posed two major problems when comparing both data sets: (a) the modes or techniques of collecting archaeological materials differ and are thus difficult to compare and (b) the quantities of the material and site contexts are also different. Eventually, in order to revise the framework, scientific resistance (rather then debate) is met from members of the ruling archaeologist elite, or *caciques*, which have dominated the Guianas for many decades. Similar scientific situations have been acknowledged in the Caribbean (Bright 2011). Therefore, the confrontation between pioneering archaeology and modern (compliance) archaeology is referred to as "scant archaeology" (cf. Section 12.2.2).

In this regard, the introduction of compliancy archaeology in French Guiana has clearly brought a massive body of information to the table concerning Amerindian prehistory. Again, the present publication does not include a history of the mutual relationships between Amerindians, but it provides ideas on the Amerindians, embodied by the way of Western research and ideology. It is therefore a study dealing with Western perceptions on Amerindian cultural processes and development. Although the artefacts found during our excavations were produced by Amerindians, and do not speak directly to us as modern Amerindian objects can do, they represent not only useful information but can also share indications on their way of life from which we are able to create a synthesis (analogies).[1]

Initially, a synthesis implying a people culturally dissimilar to my own appeared to me as a wager. Indeed, the prehistory of the Amerindians who still inhabit the western coastal zone of French Guiana certainly deserves more than 1000 pages, and not the mere 500 pages that are presented here. How is it possible to capture the hardly known prehistory of this region and combine it with the overall history of the Guianas? As we shall see, this research evidences numerous elements, (e.g. Archaic earthovens, early ceramics, the appearance of black earths, the new ceramic series, a necropole). All this can be related to the archaeological results from neighbouring countries or even Greater Amazonia.

Two solutions are present: (a) the encompassing and sometimes tedious description of the excavations the INRAP teams compiled by means of a “Final excavation report,” or *Rapport final d'opération de fouille* (RFO), which is openly available at the desk of the Ministry of Culture or at the INRAP library (www.dolia.fr) and (b) one can attempt to analyse the results of a number of sites which have been selected because together they constitute a regional chronology or cultural sequence from 5000 BP to present as indicated in the subtitle. The latter option is chosen here while focusing on the sites located between the Cayenne Island (Fr., *Île de Cayenne*) and the Lower Maroni River excavated by the INRAP under the responsibility of the present author. This ensemble of sites not only provides us with a diachronic development of this particular area, but also represents a current state of affairs on the prehistory of French Guiana.

Therefore, notwithstanding the lengthy time span between the first excavations in 2005 and the completion of the present study as well as the fruits of ongoing field research, the presentation of the various archaeological projects or sites have been placed in chronological order. The earliest sites will be thus discussed first in Chapter 4, whereas the most recent examples will be dealt with in Chapter 11, despite the fact that they were found at the same site. In this manner we can also compare the material culture originating from a pre-Columbian context with the material ascribed to the Amerindians of the Historic Age in order to gain an insight in the continuity or the lack hereof during this era.

The title firstly includes a *clin d'oeil* to our predecessors Clifford Evans and Betty J. Meggers who started structural archaeological research or “investigations” as they called it, in former British Guiana and Territory of Amapá. Without their contributions, the present study could not have been carried out or would have been different. Secondly, the term investigations may best be applied to the present-day compliance archaeology when compared with programmed archaeology. Both types of archaeology pretend to conduct scientific research but have clearly

1 More recently, the anthropological concept of 'Amerindian perspectivism' (Viveiros de Castro 1996, 1998, 2002; Stolze Lima 1996, 2006) or Amerindian ontologies is gaining significance in Brazilian archaeology in which pan-Amazonian concepts of regarding (modern) Amerindian religion, cosmology, warfare and politics play an important role in archaeological interpretation (Gomes 2007).

dissimilar approaches. Compliance archaeology is guided by public law which creates a demand to be fulfilled within a certain period of time and a fixed budget (cf. Section 1.3). The result of this archaeological operation, or investigation, is an administrative report, hence my preference for investigations. This continuous process, often evolving far too hastily for the project leaders, results in the stockpiling of numerous reports consisting of a multitude of scientific studies which, at the end of the line, eventually receive little attention as to further hypothesis and integration into the larger picture, albeit that efforts are certainly made. Therefore, this dissertation is also a general synthesis or an attempt to provide an overview of my research in French Guiana. It has clearly a bottom-to-top approach which stands out as an important difference with programmed archaeology which is guided by a scientific demand and limited by time and money. Compliance archaeology cannot choose its subject of research, hence the term investigation (again). Programmed archaeology determines its sites in an attempt to answer questions. Most often it chooses the sites or areas in which a positive answer to the questions raised is most likely to be found, resulting in a topdown approach and eventually representing a self-fulfilling prophecy.

Compliancy archaeology in Amazonia also results in a large amount of data. However, this frequently occurs in void archaeological areas, which are at first hand difficult to assess due to the absence of a chrono-cultural context. Indeed, the results of these investigations must be further examined in order to provide a suitable source of information for further research, as will be pointed out. I will reach out to previous and actual research questions in order to provide a helpful contribution and even propose modifications to the existing archaeological body of evidence in French Guiana. Needless to say, the heart of this anthology consists of administrative reports originally written in French of which the contents have been evaluated and translated in order to propose a regional chronology. The reason for this is that the majority of those engaged in research in the Guianas are well-versed in it. This book reflects my views on the results of these excavations; any errors and flaws are therefore mine.

Acknowledgements

Conducting archaeological fieldwork demands many enthusiastic people: archaeologists, both professional as well as avocational. The introduction of compliance archaeology in French Guiana conducted since 2002 enabled multiple archaeological surveys and numerous important excavations. I officiated as project leader (Fr., *responsable d'opération*) of an INRAP team working on several of these projects, having previously carried out achaeological research at sites in French Guiana and the French Lesser Antilles, notably Guadeloupe (FWI). This not only enhanced my knowledge of the prehistory of French Guiana (Department 973) but also allowed me to appreciate various projects located at e.g. Malmanoury, Kaw, Nancibo, Cayenne, Iracoubo, Saint-Georges de l'Oyapock, Régina, Maripasoula, Sparouine, Macouria, Saint-Laurent du Maroni, Mana. Each site or project introduced me to a specific environment adding further experience to my understanding and teaching me about regional differences to be recognised in the field. My finest memories are most certainly related to excavations, for example at Eva 2, Crique Sparouine and Chemin Saint-Louis, but also to those carried out at Pont de l'Oyapock and Yaou where I was employed as a field

technician. Furthermore, much time was spent at the INRAP Archaeological Center in Cayenne, studying the excavated material and taking care of samples to be analysed. I am indebted to all my co-workers during these projects.

My thesis relies heavily upon the information and ideas of earlier researchers. Even though the hypotheses and conclusions presented here are the result of original analysis, they could not have been rendered without any previous research. Therefore, I am deeply grateful to my predecessors, all the colleagues in French Guiana as well as my fellow archaeologists in the Netherlands, Brazil, French Guiana and elsewhere. The degree of cooperation the archaeological projects received during the preparation of fieldwork, the excavations and the recording of features in the field, the washing and bagging of the excavated material for further study has impressed me greatly. Otherwise any further studies would have been impossible. A large number of colleagues and other (external) researchers eventually contributed to the final administrative excavation reports and eventually this (syn)thesis. Having translated, abridged and edited these texts, I accept the full and sole responsibility for any misrepresentations and distortions herein are mine. Moreover, I hereby wish to acknowledge the work of those colleagues and express my sincere gratitude (cf. Annexe 1 for the original reports):

Eva 2, Malmanoury, Municipality of Sinnamary (May-July 2005)
Topography: Pierre Texier and Axel Daussy (INRAP);
Fieldwork: Sandra Kayamaré, Sandrine Delpech, Clara Samuelian, Christian Vallet (INRAP) and Monique Ruig;
Studies: FUGRO Guyane, geomorphology; Christian Vallet (INRAP), European material; Sandrine Delpech (INRAP) lithic material; Matthieu Hildebrand (INRAP) ceramic material and archives; Christine Fouilloud and Sandra Kayamaré for their drawings.

AM 41, Iracoubo Municipality of Iracoubo (February 2006)
Topography: Georges Lemaire (SRA) and Matthieu Hildebrand (INRAP);
Fieldwork: Mickaël Mestre (INRAP), Sandra Kayamaré (INRAP), Eric Gassies (SA), Nadir Boudheri, Cencia Campa, Elodie Etienne and Laurent Berson (volunteers).

Crique Sparouine, Municipality of Saint-Laurent du Maroni (December 2006)
Topography: Pierre Texier (INRAP);
Fieldwork: Sandrine Delpech, Marc Rimé (INRAP), Lydie Clerc and volunteer Deborah Deschamps (†).

Chemin Saint-Louis, Municipality of Saint-Laurent du Maroni (November-December 2008, January 2009)
Topography: Pierre Texier, Vincent Arrighi (INRAP), Cabinet Zaepfel (Mana);
Fieldwork: Nathalie Serrand, Jérôme Briand, Jean-Jacques Faillot (INRAP), Agnès Berthé, Stéphane "Charly" Brebant, Lydie Clerc, Daan Isendoorn, Lydie Joanny;
Study: Laurent Bruxelles (INRAP), geomorphology; Cecilia Cammas (INRAP, AgroParisTech) and Jeanne Brancier (University Paris I Panthéon-Sorbonne), micromorphology; Jago Birk (University Bayreuth), multi-element mapping; Sebastiaan Knippenberg (ARCHOL BV, University of Leiden), lithic analysis; Pascal

Verdin (INRAP), phytolith analysis; Jaime Pagán Jiménez (EK Consultadores, University of Leiden), starch grain analysis; Nathalie Serrand (INRAP), drawings.

PK 11, Route des Plages, Municipality of Rémire-Montjoly (April 2010)
Topography: Cabinet Zaepfel (Mana);
Fieldwork: Sandrine Delpech (INRAP), Lydie Joanny and Emile Eustache;
Study: Dominique Todisco (INRAP/University of Orléans), geomorphology; Sandrine Delpech (INRAP), lithic analysis; Jaime Pagán Jiménez (EK Consultadores, University of Leiden), starch grain analysis; Gilles Fronteau (University of Reims), thin-sections.

Cimetière paysager Poncel, Municipality of Rémire-Montjoly (June-July 2010)
Topography: Axel Daussy (INRAP);
Fieldwork: Mickael Mestre, Sandrine Delpech, Sandrine Moules Mages, Sophie Capelle (INRAP), Lydie Clerc;
Study: Dominique Todisco (INRAP/University of Orléans), geomorphology; Sandrine Delpech (INRAP), lithic analysis; Jaime Pagán Jiménez (EK Consultadores, University of Leiden), starch grain analysis; Matthieu Le Bailly (University of Franche Comté), parasite analysis.

I would like to thank my supervisors Prof. Dr. Corinne L. Hofman and Dr. Arie Boomert at the Leiden University. Without their support and critical guidance this thesis would not have been possible. I must acknowledge the INRAP for granting my request, which was deposited in 2009, and has been spread over four years: the time needed to edit the excavation reports and to re-examine the results of each project I carried out for the INRAP in French Guiana. I would also like to thank INRAP as well as Leiden University for the financial aid in order to publish this dissertation published in collaboration with Sidestone Press.

A number of researchers kindly helped me to answer my questions on various matters in the last ten years which enhanced my understanding of the archaeological data and helped me during the progess of this work. I would like to thank Neil Lancelot Whitehead (†) for introducing me to the Guianas and furthermore, in random order, Gérard Collomb, Pierre Grenand, Sylvie Jérémie, Sandra Kayamaré, Jérôme Briand, Sandrine Delpech, Matthieu Hildebrand, Clara Samuelian, Christine Fouilloud, Mickaël Mestre, Dominique Todisco, Pierre Texier, Cécilia Cammas, Christophe Jorda, Laurent Bruxelles, Thomas Romon, Nathalie Serrand, André Delpuech, Christian Stouvenot, Benoit Bérard, Thierry L'Etang, Reginald Murphy, John Crock, Davy Damien, Nathalie Cazelles, Claude Coutet, Catherine Losier, Fabrice Lavallette, Stéphen Rostain, Eric Gassies, Hervé Théveniaut, Bruno Hérault, Julien Engel, Vanessa Hecquet, Maël Dewynter, Guillaume Feuillet, Stéphanie Barth, Damien Davy, Vincent Freycon, Eric Palvadeau, Matthieu Le Bailly, Jago Birk, Jaime Pagán Jiménez, José Oliver, Kay Scaramelli, João Saldanha, Mariana Cabral, Nelson Sanjad, Denise Gomes Cavalcante, Eduardo Góes Neves, Michael Heckenberger, Lillian Rebellato, José Iriarte, Alston Thoms, Steve Black, Cheryl White, Aad Versteeg, Laddy van Putten, Jimmy Mans, Tom Hamburg, Sebastiaan Knippenberg and Lodewijk Hulsman. Last but not least I have to thank Peter Richardus for checking my Franglish while proofreading previous versions of the manuscript as well as Jimmy Mans and Sebastiaan Knippenberg for being my "paranymphen".

My friends in French Guiana, Brazil and the Netherlands have always been great distractions from my work. Their invitations for *apéro*, bbq's or beer brawls are very much appreciated. My parents, Jos and Tatiana, have always supported me during the various stages of my life, for which I am very thankful. Finally, I would like to express the deepest gratitude to my wife Monique and our children Kees and Piet, for being so patient and for showing me that archaeology is probably "an occupational hazard".

oft imant hier enge foūten in fonde die ick gisse seer wennich te zien
die dinck dat dar nit is sonder gebreck en verbetert stiel swigende
want imants werck wert vel erder berispt dan verbetert

Gelein van Stapels (*c.*1630:24v)[2]

C'est semble-t-il le destin constant de la Guyane, que chaque génération, ignorant ou rejetant systématiquement l'œuvre de la précédente, reprenne indéfiniment les tentatives et butté sur les mêmes obstacles

Jean-Marcel Hurault (1989:65)

2 'If anyone finds any faults herein that I reckon to be very few, he should think that nothing is without fault and should correct them in silence, for one's work tends to be sooner criticised than corrected.' These are the last sentences of the journal of Gelein van Stapels on his voyage to the Amazon River, the Guianas and the Caribbean in 1629 and 1630' (Zeeuws Archief, MS 182, Middelburg). Transcription made by the present author and translation by van Wallenburg et al. (2015:52). All translations are by the present author unless indicated otherwise. Citations are in chronological order, quotations in running text are 'single' hyphoned, expressions or terms are "double" hyphoned and words in other languages are in *italics*.

Chapter 1

The present study and its objectives

1.1 Introduction

The present study on the archaeology between Cayenne Island and the Maroni River is an update of the state of affairs in the archaeology of French Guiana and aims to fill the hiatus of the earlier periods, notably the Late Archaic and Early Ceramic Age. Moreover, it presents the results of multidisciplinary archaeological research in order to enhance our knowledge of the settlement patterns, subsistence economies and sociopolitical organization and their development from the Late Archaic to modern times. These data have been collected by means of compliance archaeology from various coastal sites located between Cayenne Island and the Maroni River applying a topdown approach in order to attain a regional synthesis. This research is based on the description of archaeological investigations I conducted in the western coastal plains of French Guiana between Cayenne Island and the Maroni River between 2005 and 2010. I present not only the data but also analyse all the data per site as well as an analysis of the historical documents in order to provide a synthesis of the pre-Columbian population that once inhabited this coastal region and reflections on pre-Columbian society as well as historic and modern Amerindian communities.

The archaeology of French Guiana as well as the other Guianas is fairly young. The first archaeological investigations date back to the 1950s. In French Guiana, the first systematic excavations were conducted in 1975 by Hugues Petitjean Roget and Dominique Roy (1976) at the Rorota site on Cayenne Island. During the 1980s, archaeological fieldwork was conducted by the AGAE (*Association Guyanaise d'Archéologie et d'Ethnographie*), Alain Cornette and Stéphen Rostain. During the early 1990s, AFAN members carried out the first compliance research during the *Barrage de Petit-Saut* (BPS) Project on the Sinnamary River (Vacher et al. 1998). In 2002, the INRAP introduced compliance archaeology on Cayenne Island near Vieux Chemin (Cazelles 2002), followed by a survey and excavations at Katoury in 2002 and 2003 (Jérémie 2002; Mestre et al. 2005).[3]

The first test pits in the Maroni River Delta (D., *Marowijne rivier*), the modern border between French Guiana and Suriname, were dug by Dirk C. Geijskes during the second half of the 1950s at the Amerindian villages of Bigiston and Christiaankondre, situated on the left bank of the Maroni (Geijskes 1961). In 2003, the first compliance survey was carried out by INRAP members at the trace of the road between the villages of Saint-Laurent du Maroni and Apatou (Mestre

3 Before the INRAP was working in Cayenne, its predecessor the AFAN had executed a salvage project at the summit of Mont Grand-Matoury (Grouard et al. 1997).

2004).[4] The latter survey and the 2003 French ACR Program called *Préhistoire du littoral de Guyane* represent the start of modern archaeology in the western coastal plains beyond Kourou in French Guiana (Rostain and Versteeg 2003). Until this date, the area between Iracoubo and Saint-Laurent was virtually unknown to archaeologists, with the exception of several sites Alain Cornette had discovered in the community of Mana, such as Crique Jacques and Coswine (Cornette 1985a, 1985b, 1988b). In addition, a handful of pre-Columbian sites has recently been discovered during two pedestrian surveys along the RN 1 (Jérémie and Kayamaré 2001; Migeon and Mestre 2004).

In order to illustrate this dismal situation in western French Guiana, the National Archaeological Chart, or *Carte archéologique*, was compiled in 2002. It concerns the Municipalities of Saint-Laurent du Maroni, Mana and Iracoubo, and contains a total of 98 sites, comprising both prehistoric and historic Amerindian sites located on historic maps (Hildebrand 2002a, 2002b; Gassies et al. 2002).[5] The only radiocarbon datings as to this region were obtained by means of a charcoal sample taken from an urn found in the Kali'na village of Awala in 1997 (Janin 2002).[6] At the start of the 21st century, the archaeological state of affairs is rather similar in eastern Suriname: Aad Versteeg counted approximately 70 pre-Columbian sites as to the Commewijne and Marowijne Districts together; he has put forth radiocarbon dates for seven of these sites (Versteeg 2003:267–270).

It may be evident that the archaeology of Cayenne Island and that of the Sinnamary River represent exceptions in the archaeological history of French Guiana. The latter area has been extensively explored by AFAN members during the first half of the 1990s. This resulted in a ground breaking publication on the prehistory of the drainages of the Upper Sinnamary and Courçibo Rivers (Vacher et al. 1998). On the other hand, the Island of Cayenne, the most populated part of French Guiana, has since the end of the 1960s probably witnessed the largest number of archaeological investigations. Eventually, this formed the empirical database for the Late Ceramic Age ceramic complex of Thémire, as defined by Stéphen Rostain in his 1994 PhD dissertation. Archaeological research in French Guiana until the introduction of compliance archaeology during the early 1990s albeit to a lesser extent than in Suriname, however, consisted primarily of pedestrian surveys, surface collecting and the excavation of one or two test pits measuring 1 m^2. In general, this implies that the quantities and quality of the artefacts is low and that their context is poorly understood on site level. We

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4 During the early 1950s, Feriz (1957) described archaeological material collected at the Maroni River which D. G. A. Findlay exhibited at the International Congress of Americanists in Copenhagen in 1956 (Geijskes 1961). The site reports on Bigiston and Christiaankondre are no longer traceable but both sites have not only yielded Koriabo ceramics but also provided the first radiocarbon dates related to pre-Columbian sites for the Lower Maroni River (Vogel and Lerman 1969:373).

5 Alain Gilbert (1996) contributed to the archaeology of the Municipality of Saint-Laurent du Maroni by means of a chronological study on four selected stone axes from a private collection in Saint-Laurent du Maroni. In addition, the *Association Mami Bobi*, seated in the village of Saint-Laurent, owns a small permanent exhibition of its own collection consisting of glass bottles and various ceramics from their municipality. More recently, the personal collection of Patrick Debost, resident on the Maroni River since 1962, was confiscated by the Ministry of Culture, despite the standing convention with the Muncipality of Saint-Laurent du Maroni to start a small local museum.

6 The ethnic terminology for native populations in the Americas differs per country, even within a country among the various groups. I will therefore adopt group names wherever possible and apply the inclusive terms such as Amerindian, indigenous or native population whenever inevitable. When applying terms as "ethnic groups" or *ethnie* in French, we prefer the definition forwarded by Anne-Christine Taylor (1991:242–244) or even Luc de Huesch's definition (2002:54).

certainly must not underestimate the efforts these archaeologists made back then, hereby creating the existing chrono-cultural framework. Nonetheless we shall see in the following chapters that this type of research contrasts with the mechanical survey and excavation techniques applied by the INRAP or even its predecessor, the AFAN, in French Guiana. For example, the original data set of artefacts that was once served to create the ceramic complex of Thémire is surpassed by the data from only one excavated site in compliance archaeology (cf. Table 3.1). Consequently, the results of both types of archaeological research are difficult to compare. They often generate theoretical friction when integrating the results of compliance archaeology into the existing chrono-cultural framework, founded on "old school" archaeology.[7]

Furthermore, the archaeological data between Cayenne Island and the Maroni River have generally been ascribed to the Late Ceramic Age (AD 900-1500), whereas earlier periods are considered to be rare or non-existent here (Rostain 1994a). However, the recent INRAP archaeological excavations at the sites of Plateau des Mines and Eva 2 proves that pre-Columbian occupation now dates at least 7000 years back, revealing an ancient prehistory as to this coastal zone which also featured the earliest ceramics related to French Guiana (Mestre 2004; van den Bel et al. 2006, 2012; Mestre and Delpech 2008). Interestingly, the excavations at Eva 2 also enlarged our scope of the Historic Age while offering an insight into the processes of ethnogenesis and cultural continuity of the modern Amerindian society that survived colonialism (van den Bel et al. 2006).

1.2 The research objectives

Introduction

The cultural diversity and continuity in the (pre)history of the western littoral of French Guiana represents the central issue of this research project. The continuity between the prehistoric and contemporary Amerindian populations is part of a worldwide phenomenon as the encounter between the American and Western world is fairly recent. The presence of native populations gave birth to the origins of scientific studies, (e.g. sociology, ethnology and anthropology) in order to better understand Western civilization. On the other hand, the prehistory of these native populations themselves was only of any scientific interest if they had acquired a certain level of sociopolitical development such as the Inca or Aztec in South and Middle America respectively (Trigger 1980).

The archaeology of "less" developed pre-Columbian populations generally consists of a mere projection of the actual state and social position of these populations into the past. In Amazonia, these populations inhabit ecological niches where possibilities of higher social development were thought to be simply impossible (Meggers 1971:120). However, recent revisionism in archaeology through ethnohistory and ethnobotany in Amazonia contradict these assertions

7 In Anglo-Saxon countries that carry out commercial rescue archaeology, imposed by national law, preventive archaeology is most often referred to as compliance archaeology. The term "preventive archaeology" is a direct translation of the French term "archéologie preventive," without any linguistical sense. However, I will apply both terms for "imposed archaeology," but prefer "compliance archaeology" because "preventive" is misleading in both French and English. Indeed, preventive or compliance archaeology does not prevent history from being destroyed by construction or archaeological excavations; rather the contrary…

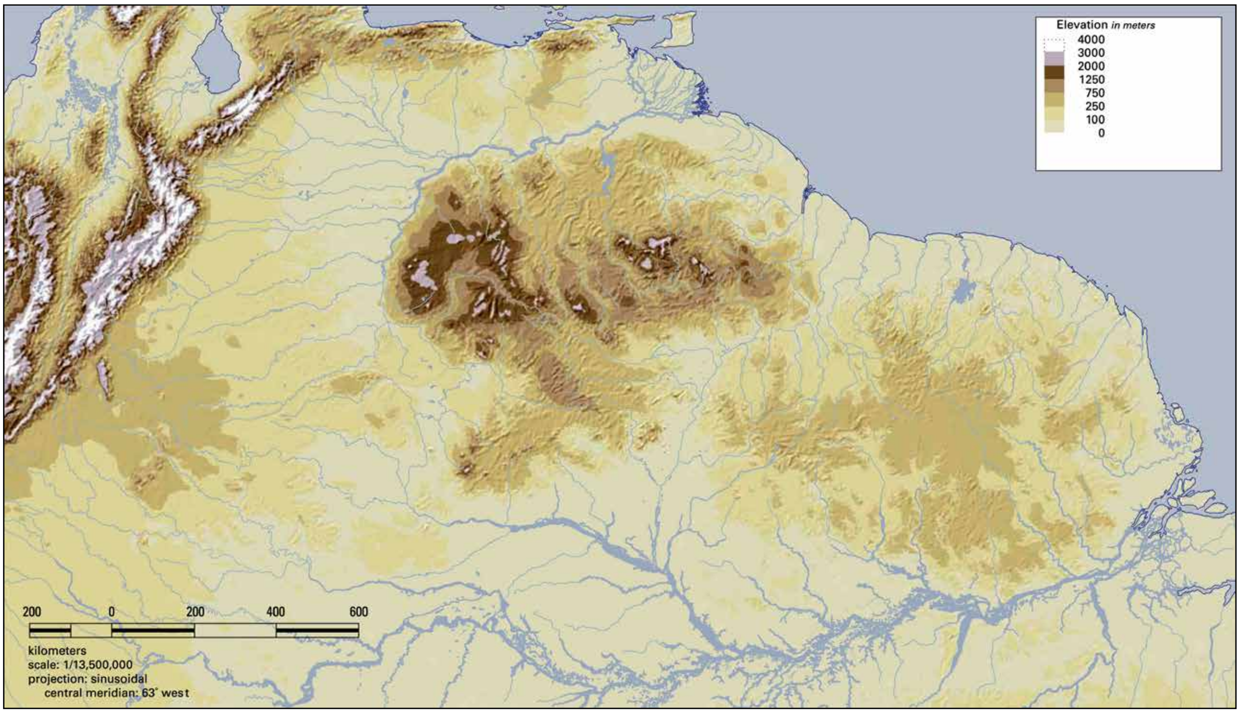

Figure 1.1. A topographic map of the Guiana Plateau (adapted from Guyana Shield Conservation Priorities 2002 Consensus 2003:76).

and conclude that 'there is solid evidence for dramatic cultural change over the past two millennia and substantial prehistoric cultural variability, including the presence of chiefdoms or kingdoms' (Heckenberger et al. 2001:329).

The majority of researchers currently working in Amazonia share these views in one way or another.These opinions have also been acknowledged by researchers in the Guianas (Boomert 1977, 1980a, 2000; Versteeg 1985, 2003; Rostain 2008a, 2008b, 2009, 2010, 2013). Whereas higher sociopolitical developments in Amazonia occurred approximately during the last 2000 years, these developments in the Atlantic or coastal Guianas have only been pointed out with regard to the last 1000 years, also known as the Late Ceramic Age, that is to say from about *c.*AD 900 on. If this difference in these two regions is related to various pre-Columbian cultures or to the state of archaeological research is to be further discussed.[8] As to the coastal Guianas, the prehistoric inception of complex society is considered to be related to the expansion or the migration/diffusion of the Arauquinoid Tradition originating from the Middle Orinoco (Rostain 2008b).

In the Guianas, the current hypothesised existence of these complex Late Ceramic societies is materialized by way of a handful of small-scale excavations and numerous surface collections. Carried out between the 1950s and 1980s in Suriname and to some extent in French Guiana, they constitute a rather slim archaeological data set with heterogenic information. During the second half of the 1970s, Dutch archaeologists and researchers (e.g. Frans C. Bubberman, Arie Boomert and Aad H. Versteeg) hypothesized theories based on the analysis of local excavations and compared them to the archaeology of Greater Amazonia. Eventually, this culminated in the acceptance of the inception of the Arauquinoid Tradition in the western coastal Guianas (Boomert 1976, 1977, 1978, 1980a; Rouse et al. 1984; Versteeg 1985; Versteeg and Bubberman 1992). Hitherto,

8 Cf. Section 1.4 for the application of chrono-cultural terminology adopted in the present study.

pioneering research in Suriname had been highly focussed on the identification of "Carib" and "Arawak" artefacts, yielding little perspective according to the "newly" arrived archaeologists (Arie Boomert, personal communication, 2011; Bérard 2011). This thriving episode in Surinamese archaeology was cut off by a civil war that struck the recently founded nation at the beginning of the 1980s and lasted for over a decade. Since then archaeological research in Suriname is at a lamentably low level as is unfortunately also the case regarding Guyana.[9] In French Guiana, however, the implemtation of the European legislation, i.e. the Valetta Treaty of 1992, saw to it that archaeological research rocketed, producing large quantities of information (reports). It nurtured an entire new generation of archaeologists questioning the views of their predecessors.

First of all, we must recall the difficulties encountered and the questions posed by the members of the BPS Project in order to affiliate their data with the existing framework, as Rostain was now in the process of establishing. A possible discrepancy between the littoral and interior obscured the possibility that these two parties were probably related to different excavation techniques and methods (cf. Section 1.3.1). Beyond this scope, another point of interest can be found in the discovery of new features and unknown ceramic series. Illustrations hereof are: the large-scale archaeological excavations at Eva 2 and Chemin Saint-Louis which clearly revealed thus far unknown Early Ceramic series, possible cooking pits and dark earths or *terra pretas*, all predating the Late Ceramic Age sites. However, earlier sites such as Wonotobo Falls had been excavated in the interior of the Guianas, i.e. Kaurikreek (Suriname), Yaou (French Guiana), but further multi-disciplinary data concerning cultural persistence or subsistence economy were non-existent (Boomert 1977, 1983; Versteeg 1978; G. Mazière and M. Mazière 1993; Mestre et al. 2013). The earliest sites, dating back to the (Early) Archaic Age were only known from the upland savannahs in Suriname and Guyana (Cruxent 1972; Boomert 1980b). Similar coastal sites were hitherto only known from northwestern Guyana, notably the Alaka Phase sites (Williams 2003). More recently they have also been encountered at the Middle Berbice and Canje Rivers (Whitehead et al. 2010).

Covering the period of *c*.3000 BC-AD 1900, the archaeological data discussed in the following chapters are the result of six large-scale excavations conducted by the present author. Their results, combined with ethnohistoric and ethnographic accounts, will not only serve to reconstruct a cultural chronology regarding the coastal region located between Cayenne Island and the Lower Maroni River but will also be compared with the adjacent areas. The results of these excavations provide us with data on the material culture (ceramic and lithic material), macro- and microscopical remains, and feature patterns which will indeed enhance our understanding of prehistoric subsistence systems, the local social and political organization, and ritual activities in order to reconstruct a regional pre-Columbian cultural chronology. The existing cultural framework sketches a rough outline requiring further adjustment and investigation at a regional level in order to discern local cultural entities. The identification of local and regional settlement patterns through detailed archaeological field studies (and research

9 The Surinamese Ministry of Education and Development (MINOV) has recently reactivated the National Archaeological Service: http://www.starnieuws.com/index.php/welcome/index/nieuwsitem/23773.

methodologies) is crucial when reconstructing ancient sociocultural variability within a specific area.

The multi-disciplinary analysis of the following excavations allows us to not only update the existing cultural framework but also to attempt to reconstruct a regional chronology between Cayenne Island and the Maroni River spanning from the Late Archaic Age throughout the entire Ceramic Age to the present by the way of the following four stages:

a. The Late Archaic Age (LAA: 6000-3000 BC) represented by means of the site of Eva 2 (No. 97321.171: van den Bel et al. 2006);

b. The Early Ceramic Age (ECA: 3000 BC-AD 900). It is divided into an Early Ceramic Age, Phase A (3000 BC-0) represented by means of the sites of Chemin Saint-Louis (No. 97311.121; van den Bel 2008; van den Bel et al. 2011) and Eva 2 (van den Bel et al. 2006). The Early Ceramic Age, Phase B (0-AD 900) is represented by means of the site of Chemin Saint-Louis (van den Bel et al. 2011) and the site of Cimetière paysager Poncel (No. 97309.106: van den Bel et al. 2013);

c. The Late Ceramic Age (LCA: AD 900-1500) is represented by means of the sites of Crique Sparouine (No. 97311.110: van den Bel 2007b), Chemin Saint-Louis (van den Bel et al. 2011), La Pointe de Balaté (No. 97311.120: van den Bel 2008b; Briand et al. 2015), AM 41 (No. 97303.061: van den Bel 2006, 2009a), PK 11 Route des Plages (no. 973109.010: van den Bel et al. 2012a), and Cimetière paysager Poncel (No. 97309.106: van den Bel et al. 2013);

d. The Historic Age (AD 1500-1900) is represented by means of the site of Eva 2 (van den Bel et al. 2006).

The results of these excavations will be compared with the results of recent and earlier excavations in the direct vicinity (and sometimes further afield) in order to gain a better insight into the reliability of the data and/or to test these data sets as to further hypotheses. All in all these sites define our area of study to between the Island of Cayenne and the Lower Maroni River, while representing diversity in environment and landscapes. The Young and Old Coastal Plains of which the site AM 41 and Eva 2 are emblematic and dominate the area of research. Cayenne Island (positioned between the western coastal plain and the eastern swamp lands) is represented by two sites: PK 11 and Cimetière paysager Poncel. The sites at the Maroni River are: the Chemin Saint-Louis and La Pointe de Balaté sites, both situated on its lower terraces, and the Crique Sparouine site to be found in an upland context of the Precambrian interior (cf. Chapter 2).

All the above-mentioned sites yielded large quantities of artefacts which were acquired systematically in coherent collecting grids and per feature. The ceramics have been studied according to an adopted regional model-classification. Colleagues as well as external researchers have examined the lithic materials, botanical remains and chemical soil samples. The results forwarded here are the fruit of this collaboration and present fresh evidence in corresponding fields of research. The numerous features found within the excavated areas have been analysed and most often served radiometric dating, providing an absolute chronology as to the sites and sometimes even regarding specific zones at site level. The analysis and interpretation of these results will help to reconstruct the Amerindian ways of life during pre-Columbian times in our area of study. Furthermore, these sites revealed an important diversity in site location, stratigraphy, features and artefact density. This will permit us to obtain a better spatial understanding of the site's function and possible activity areas (e.g. plazas, house floors, kitchen areas, middens and cemeteries).

The research objective and questions

The main objective of the present study is to present the general chrono-cultural development of the western littoral for which the following research questions have been drafted concerning the various sites presented here:

a. Which kind of (material) cultural change does the analysis of the ceramic and lithic assemblages as well as of excavated settlement patterns reveal? Can we recognize persistent elements such as pottery wares and styles, the use of specific lithic tools or the presence of certain features throughout various periods?

b. Is it possible to identify a pre-Columbian ceramic complex that is culturally related to a present-day Amerindian community? Can we follow any ceramic development through post-Columbian times to the present?

c. Can we determine cultural affiliations with other areas by means of material culture alone and did these affiliations change through time? To which extent does this imply a change in social networks within the wider region during colonial times and, if so, to which degree can we speak of cultural continuity or discontinuity?

Aside from the data of the historic Amerindian excavations at the Eva 2 site, an attempt will be made in order to link the modern Amerindian population of the western coastal plains and the most recent pre-Columbian populations. As to this issue, the LCA sites of our area of study, and notably the Koriabo complex, serve as a stepping stone into the Historic Age. The available radiocarbon dates allow us to state that the population(s) who produced this Koriabo pottery must have witnessed the arrival of the first Europeans on the coast of the Guianas from AD 1500 onwards (Boomert 1986, 1995, 2004, 2011). Today, the most prominent Amerindian ethnic group occupying the western littoral of French Guiana are the Kali'na and, to a lesser extent, the Lokono. Their ethnohistory and material culture presumably present us with the best opportunity to reveal such a possible cultural link through time (cf. Chapters 10 and 11):

a. Numerous historical documents and maps confirm a Carib or Galibi presence in our area of study;

b. Carib or Galibi cultural traditions have been well-documented by means of ethnographic studies since the beginning of the 20th century;

c. The Kali'na actively produce pottery to the present-day.[10]

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10 It must be noted here that when using the word Carib (E.) and/or Galibi (Fr.) I refer to the historic, Cariban speaking population of the Guianas. Today the Cariban speaking population of coastal Guiana call themselves Kali'na (Fr.), Kari'na (Sr.) or Karinya (Sp.). When using the word Arawak, I refer to the historic Arawakan population whereas the modern Arawakan speaking communities of the coastal Guianas call themselves Lokono (cf. Appendix 2).

The analysis of these topics may answer the following question: to which extent we can speak of continuity or discontinuity of Amerindian material tradition (and habitation) on the littoral? The subsequent discussion will provide us with a hypothesis concerning the degree in which certain cultural elements influence the persistence of ceramic tradition within a changing ethnic society.

In sum, we will seek to clarify if it is possible to identify a cultural relationship between a pre-Columbian ceramic complex and that of a present-day Amerindian group. The latter question is highly associated with the notion of "ethnic group" as defined by ethnologists, based on the idea that each ethnic group is characteristic with a distinct culture, language, and psychology (Taylor 1991). In this respect, we must ask the following open questions regarding the public interest of archaeology in Amazonia:

a. Can modern Amerindian groups benefit from archaeological research when in need of an (Amerindian) identity (Oliver 2005:281)?

b. Can archaeological cultures reflect political cultures in a practical way with regard to a social demand?

c. When recognizing any cultural continuity, how can we establish such a link between the contemporaneous populations and the LCA population of the Guiana littoral (Boomert 1993, 2004; Rostain 1994a, 2008b, 2010, 2012; McKey et al. 2010), knowing that more than four centuries separate the later sites from the earliest ethnographic works dealing with this area (Kappler 1857; Penard and Penard 1907; Ahlbrinck 1931)?

1.3 Compliance archaeology in French Guiana

1.3.1 The fieldwork

Introduction

The archaeological studies on the sites mentioned above represent the database of the present thesis. These data are the result of the application of methods and field techniques utilised in French compliance archaeology that clearly differ from previous, more traditional excavation techniques adopted in French Guiana. It is very important to understand this issue because: (a) the existing chrono-cultural framework of the western littoral merely consists of theoretical projections from other regions (topdown) and (b) very little systematic archaeological research was carried in this area during the last four decades as pointed out in Chapter 3. In reality, this implies we must first understand the origins and implications of both data sets before reconstructing them to an existing framework. Another important aspect is: data obtained through compliance archaeology are primarily guided by the economic development of French Guiana (e.g. road constructions and the development of housing lots, industrial zones).

In French Guiana, and elsewhere in the Guianas, this local development is firmly related to the existing infrastructure which extends along the littoral and into expanding agglomerations. In fact, this geographical expansion predicts and decides where any future archaeological research will occur. This means we do not choose an area of research in compliance archaeology but carry out research wherever someone is carrying out constructing work. This obviously represents a major difference with programmed archaeological research. For example, concerning the latter type of research, the site chosen for programmed archaeology may indeed not even be endangered by construction at all. It can therefore be excavated in the course of multiple field sessions, usually during the dry season, creating opportunities for method, study and, more importantly, contemplation (Barone-Visigalli and Prost 1991; Rostain et al. 2008; McKey et al. 2010).[11]

The methods and techniques applied and developed through compliance archaeology across Europe have been similarly applied in the French "*metropole*" and the Department of French Guiana since the early 1990's. The aid of mechanical means applied when excavating extensive surfaces in order to cope with the time pressure with regard to public works and regional economic interest is almost imperative. The notion of time and money, when compared to programmed excavations, is probably the most important difference between both types of excavation. This aspect of compliance archaeology is generally accepted among European scholars but did (and still does) encounter resistance amongst scholars in Amazonia (Roosevelt 1991:143–144). More recently, however, archaeologists from Brazilian universities or state museums, guided by compliance archaeology, carry out archaeological rescue projects in Amazonia with regard to mining permits in the State of Amapá (MMX 2) and Pará (Salobó, Belo Monte) or even the continental pipeline between Coari and Manaus in the State of Amazonas.[12]

The intensification of archaeological research in French Guiana since the foundation of the INRAP in 2001 by means of French legistlation has yielded a large body of archaeological data. Firstly, in addition to huge amounts of characteristic artefact categories (e.g. ceramic and lithic materials), these excavations also resulted in numerous radiometric dates, feature information, and additional micro- and macro-analysis. In most cases, the quantities of artefacts excavated per site surpass the total number of ceramics that once served to identify a regional ceramic complex, such as Barbakoeba and Thémire. Secondly, it may be evident that certain data are most often considered "new" as we have little reference material, consider the Phase 2 ceramics of Chemin Saint-Louis. Thirdly, it can also present contradicting information regarding the local cultural chronology as encountered during the scientific validation of the Katoury final report (Mestre et al. 2005) (cf. Section 3.3).

The origin and scientific value of the archaeological data presented by both methods are dissimilar. Most of the time, any comparison is impossible; it is difficult to compare pears with apples as suggested by Popper and Hastorf (1988) on quantitative paleobotanical research. Hence, one must be careful and attempt to make intelligible comparisons. In the course of the present study, we shall present the archaeological data drawn from compliance archaeology and propose

11 Unfortunately, the results of important programmed excavations, such as the excavations at Montagne Favard conducted by Guy Mazière, have never been completed or published. The archaeological material is still stored in boxes (G. Mazière 1996). Moreover, members of the Earthmovers Project have not published the complete material studies (ceramics and lithics) on the programmed excavations at Sable Blanc Est (2007) and Bois Diable/La Sablière (2008). Compliance archaeology has also had its share: the archaeological excavation at Roche Savanne de Ouanary (2002) has as yet not been finished nor published.

12 I would like to thank João Saldanha and Mariana Cabral (IEPA, Macapá), Maura Imazio da Silveira (Museu Goeldi, Belém) and Anne Rapp-Py-Daniel (Federal University of Amazonas, Manaus) for discussing their experiences with regard to the archaeological work they carried out in the above-mentioned projects. For a short overview of Brazilian public archaeology and management, see Bastos and Funari (2008).

a regional chronology which will then be compared to the existing chronology concerning French Guiana. Next, this chronology will be discussed in comparison with the chronologies concerning Suriname, Guyana, and Amapá, and eventually, to a larger extent, compared with those of northern Amazonia. Here the question must be raised if we can utilise our area of study in order to construct a consistent regional framework and understand its role within a larger cultural area such as that of the Guianas? After all, it is clear that French Guiana not only needs to extend its chronology but also requires further reflection on: (a) the representativity of the existing chronology and (b) how it was constructed by previous research(ers).

Traditionally, scientific research in French Guiana is dominated by biosciences. For over 50 years researchers from various national institutes (e.g. IRD, CIRAD, INRA), have studied the "virgin" Amazonian rainforest of French Guiana, stressing the stunning biodiversity of the Guianas.[13] Only recently, the young but relatively stable presence of compliance archaeology in French Guiana has sparked the interest of the bioscientists, notably of the ECOFOG and the INRA institutes, who are finally acknowledging the ancient presence of Amerindians in the rainforest, where they have dwelled for thousands of years. The native population is often left out in beta-sciences as they are forgotten in modern society too; they face cultural change but, at the same time, also demand first-hand cultural information because of their total absorption into French culture, dubbed 'francisation' by Jean-Marcel Hurault (1989:141).[14]

The quest for Amerindian identity and history is *ad hoc* and necessary: the Amerindian population is frequently confronted with an unfavourable sociopolitical situation. During fieldwork, the INRAP members often encounter Amerindians, notably in the Municipalities of Awala, Iracoubo, Mana, and Saint-Laurent du Maroni, who contact local Captains and informing them of our activities. It is important to state here that one of the INRAP's missions is to diffuse or communicate the archaeological data drawn from their excavations to the (local) population.[15]

The field techniques and surveys in the Neotropics

This section describes the protocol for compliance archaeological research in French Guiana and the Caribbean as practiced by INRAP members. Although every project is different and each agent has its proper ideas how to conduct his or her research, the following stages are applicable to the majority of the surveys and excavations. Concerning the sites in this present study, every chapter contains a description of the apllied techniques and methods.

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13 Paleobotanical research in French Guiana during the 1990s, notably in the *Reserve des Nouragues* on the Upper Approuague River, concluded that 'the tropical rain forest, thought to have remained stable since the last glacial event, has in fact undergone deep modifications' (Charles-Dominique et al. 1998:296, 300), as Meggers (2011:151) points out. The latter applied this conclusion to underscore the argument that climatic fluctuations and various environmental factors are also responsible for contemporary biodiversity. However, pedestrian surveys in the alleged Nouragues Reserve in French Guiana as well as several other reserves (e.g. Paracou), have yielded numerous archaeological sites (Tardy 1998; Barthe 2012).

14 For further readings on the position of Amerindians in French Guiana, see for instance P. Grenand and F. Grenand (1979, 1992), P. Grenand and Menget (1985), Collomb (2006b, 2007, 2008).

15 For example, in collaboration with the Municipality of Saint-Laurent du Maroni and the Lokono elders of Balaté, INRAP provided archaeological data for an introductionary booklet on the history of this Lokono village which has been translated in Lokono too.

Site detection in the Guianas can often be accomplished by means of a simple pedestrian survey, notably on the Precambrian Shield. A trained eye can spot ceramic sherds or lithic debris located between the roots of fallen trees and around holes made by an agouti, or armadillo. The larger part of the compliance research in French Guiana consists of surveys or "diagnostic research" reported in French. It represents an important first step concerning the detection of sites and further steps to be taken when an excavation is considered necessary.

Surveys are a specific or even specialized branch of modern archaeology that must finally result in an objective interpretation regarding the nature and status of the site. In French Guiana, surveys are mainly carried out in the coastal savannahs or in secondary forests near villages. Sometimes these operations may also be conducted in areas with mining permits or road constructions located in the "uninhabited" interior. In all cases, the archaeologists aim to: (a) detect archaeological sites, (b) uncover parts of the sites, (c) characterize these parts and (d) delimit the size of the site. In my opinion, this sequence represents the general outline of any survey striving to detect pre-Columbian and historic sites in French Guiana (or elsewhere). Various INRAP members have applied certain adaptations to the Neotropical environment.

When starting a survey, all sorts of maps and documents concerning existing archaeology and geology are to be checked, including all available information drawn from geotechnical and environmental impact studies. In most cases, the developer provides them. These data will get you started on possible site locations or landscape markers within the project limits or in its vicinity. It will also provide information on the depths of various geological deposits and geomorphology that may contain remains of human occupation. This will ultimately determine the choice of your excavation strategy.

Depending on the type of construction, mechanical intervention in a regular grid is most often applied in compliance archaeology in order to detect hidden sites. In specific cases, when a forest is still standing and/or the project includes road construction and mining permits, a pedestrian reconnaissance is first conducted on the basis of topographic maps. In remote areas, maps are often lacking or rendered in a scale not precise enough for field walking.[16] A pedestrian survey in this environment must be conducted in pairs and with a mobile (satellite) telephone in case of an emergency. Local tracking guides with a sound knowledge of the forest are often sufficiently skilled participants when recognizing trees and plants that are related to (recent or ancient) human activities. Most often, the company holding the mining permit has created an initial rough infrastructure in the forest within the boundaries of their permit allowing them not only to explore the terrain with mobile augers and all-terrain vehicles but also creating a rather easy access for archaeologists to the field.

Once sites have been discovered, a selection hereof is often made prior to mechanical intervention which is determined by the accessibility of the site by means of machines and *vice versa*. However, rivers that are too wide and steep hills frequently form the natural barriers with regard to such a mechanical intervention. In certain areas the accessibility also depends on the presence of digging engines

16 Large projects are, for instance, the ASARCO/Iamgold mining permit in the Kaw Mountains. It covers 38 km² of tropical rainforest whereas the project of Yaou near Maripasoula covers 52 km² (van den Bel 2007a; Mestre et al. 2013) The new national highway between Saint-Laurent du Maroni and Apatou stretches out for more than 70 km (Mestre 2004).

which are usually not readily available (and very expensive), notably in the interior. In most cases, when the forest has been cleared and machines have access to the lots or project limits, we immediately start to dig trenches. When orientating the grid for archaeological trenches, we prefer to dig perpendicularly to the existing geomorphologic landscape in order to better understand the successive geological layers and the connection with possible human occupations. Multiple studies have indicated that trenches every 20 m in quincunx, representing an excavated surface of between 5 and 10%, establish an efficient sampling grid (Verhagen 2007). However, this system must often be adapted in trace elements in order to check the geomorphologic direction of the sediments which is cut by the future road construction. This system of diagnostic research is a tool to quickly cover large areas in the most efficient way in search of sites. However, one must always remain aware and utilise apparent features in the landscape for further exploration with other (traditional) techniques.[17] In principle, all trenches must be dug until the earliest geological formations have been reached. As much as 90% of the actual surface of French Guiana consists of Precambrian and Pleistocene Formations, thus requiring only shallow trenches: the sterile subsoil is often reached after between 40 and 60 cm once the humic forest floor has been removed. Only 10% is represented by means of Holocene deposits which are mainly found along the Atlantic coast and principal estuaries. This does not imply, however, that we can only encounter stratified sites in the Holocene deposits. Recent colluvionary processes such as soil creep as well as other (still unknown) processes in the interior have yielded stratified sites, i.e. Eva 2, at a mean depth of 1 m in the Pleistocene White Sand Formations of western French Guiana. Deeper trenches are regularly dug in order to establish the presence of other (unknown) paleosols and/or other geomorphological formations.

Geological sections are recorded in both negative and positive trenches which are all georeferenced by means of an infrared theodolite, when not applying a precise handheld GPS device. Whenever a site is encountered, additional trenches or extensions may be dug in order to uncover further anthropogenic features and charcoal samples as to radiocarbon dating or to obtain a larger ceramic sample for chrono-cultural purposes. Meanwhile, the regular grid of trenches is often sufficient to limit the extension of the new site, if this site has not been delimited by topographical features such as creeks or a mountain top.

When excavating trenches, the archaeologist follows the scraping movements of the machine and must continuously test the subsoil for possible artefacts while estimating the necessity of testing deeper levels. This ability can only be learned or experienced in the field and may imply the difference between a positive or negative survey. The presence of geomorphologic and lithic specialists in the field (on demand of the field supervisor) can be a guiding element in detecting and recognizing less evident sites such as lithic workshops or cemetery sites.

In more densely populated areas (e.g. Cayenne Island) where (sub)recent perturbation is more likely, the interpretation of geological profiles, the nature and density of artefacts and various taphonomic processes must be evaluated attentively in order to determine the site's general condition. Sites may be

17 The 5 to 10% rule is accepted in the metropolitan *Grand Sud Ouest* (GSO) region, one of INRAP's five inter-regions. However, other inter-regions have different percentages but due to the fact that French Guiana resides under the GSO administration, this rule has been applied (uncritically) to the DOM.

Figure 1.2. A view of the excavations at Chemin Saint-Louis.

(partially) disturbed by recent bull-dozering or colonial agricultural activities. Although disturbed sites do not immediately receive any scientific interest, they may represent a local or even regional interest as to specific archaeological periods. It must be remembered that the survey and its product, i.e. the report, play a key role in our understanding of pre-Columbian society and landscape. It is frequently the only archaeological document in a certain area (often for decades to come).

The excavation

Based on the survey report as well as on other existing data and the concluding (personal) opinion of the State Conservator of the local regional Archaeological Service (SA), the latter decides if the site will be (partially) excavated or not. In French compliance archaeology this second phase is submitted to the public market. This implies that other institutions and commercial companies with a legal permit to excavate can offer their services. The intended archaeological excavation is regulated by means of a *cahier des charges*, written by the SA. The latter official document represents a methodological framework as to each and every site to be excavated (compliance or programmed). It often includes general and specific research questions, the utilization of special field techniques, the (obligatory) presence of specialists during the fieldwork and the obligations as to post-excavation studies, etc. In addition to these general elements, the limits of the excavation area are determined by the SA, culminating in a certain number of square meters to be excavated.

The developer is the only legal person allowed to choose an archaeological project which will be its future partner during the excavations. In fact, the developer is the executive legal person whereas the archaeological partner (the INRAP or any other legal party) is paid for its services. Moreover, the developer is also responsible for the safety and security during the excavations since he is Master of Works during the entire construction project, including the archaeological research. Once the required equipment (stock containers, excavation tools, lunch cabins) has arrived, and the link-up to running water and electricity has been established –if possible–, the project leader, who is proposed by the excavating company and designated by the SA, can start the project. Unforeseen anomalies or discoveries during fieldwork that may alter the content of the scientific program must rapidly be signalled to both parties.

From this moment on, the project leader applies excavation techniques best suited to: (a) the proposed research questions, (b) the total surface to be excavated and (c) the allowed budget. As mentioned above, the bulk of the excavations is situated in the coastal area and predominantly represents LCA sites which often include a dark occupation layer consisting of several dm in which archaeological material is dispersed. Sometimes this layer appears in various spatially concentrated areas or middens. Depending on the above-mentioned parameters and possible disturbances, the archaeological material in the darker layer is systematically gathered in squares per level either by handpicking or sieving both arbitrary levels and/or geological layers (Harris et al. 1993). Whenever the site is (heavily) disturbed, notably after bull-dozering, the archaeological material is to be discarded without any collecting. The latter procedure can also also be applied when (a) manpower is lacking, (b) when a fairly large surface has to be excavated or (c) when the dark layer is (too) disturbed by other (recent) activities.

Once the dark layer is removed, dark features appear in the lighter coloured subsoil. These features are tested and often manually excavated in order to determine their anthropogenic or natural origin and to gather artefacts and possible (soil) samples. During and after excavation, all features are recorded by means of photographs, drawings, and geo-referenced by means of a theodolite in order to obtain a spatial overview. Geological profiles and/or sections are also photo-referenced, drawn, and sometimes sampled as to further soil analysis (e.g. micromorphology).

During the fieldwork the project leader takes care of the general progression of the project on a logistic and scientific level, allowing the excavation to be finished on time and in order to fulfil all research questions concerning additional issues raised in the course of the fieldwork as well as possible. This protocol is fairly common with regard to Neolithic, Bronze and Iron Age sites in Western Europe. It may be evident that Lithic and Archaic Age sites as well as Ceramic Age sites revealing specific landscape features or architecture (e.g. ring ditches, artificial habitation mounts, megaliths) are excavated differently. This was the case with the Late Archaic sites of Eva 2 and Plateau des Mines: the designated project leader decided to excavate the Late Archaic paleosol of the Plateau des Mines site manually in accordance with the "Leroi-Gourhan method," as is customary with regard to Paleolithic sites in France (Leroi-Gourhan and Brezillon 1966).

It is important to understand that these compliance excavations, with which we are familiar today, only yield information on that part of the site that is excavated, thus contrasting with programmed excavations (theoretically) capable of excavating or investigating an entire site. If the latter projects do not excavate the entire site, they usually carry out additional test-pit and/or auger campaigns assessing the surrounding areas in order to assure a more secure extrapolation of the excavated data. Compliance archaeology is clearly restricted to the excavation perimeter. The reason for this is that beyond this limit, excavations are illegal and may result in fines or imprisonment of the project leader (!). On the other hand, the local economic development increases continuously in French Guiana and in the future will most certainly touch upon adjacent building plots. In this manner, sites can be entirely excavated in multiple phases that go on for several years or even decades. In sum, all sites presented here have been excavated with a compliance character that differs from the conventional methods generally not only applied to programmed excavations but also to previous "traditional" small-scale research.

1.3.2 The analysis and reporting

The processing of artefacts (cleaning and bagging) has usually started during fieldwork and may provide feedback with regard to the excavation. Post-excavation studies are determined by the proposed research project. This may change whenever the excavation has proven otherwise and its objectives are thus adapted. Although the budget is also fixed as to this processing part of the excavation too, it can be redistributed according to research issues and discoveries. For example, if only a few ceramics but large amounts of lithic material have been excavated, each study will receive a proportional part of the budget as to an analysis.

The INRAP agents carry out the majority of the artefact, geological, anthropological, and feature studies. However, microanalysis (e.g. phytoliths, pollen, starch grains) and chemical analysis (e.g. radiometric dating, soil analysis) are often provided either by external national or international research institutes, or by private companies. The reports of all these studies are bundled. Next the results are combined and interpreted as to a synthesis by the project leader who finally compiles the definite report destined for the developer who paid for the excavations. The diagnostic and excavation report have a legal status as they are the result of a public and private demand, respectively, but are commonly treated as grey literature since no ISSN number is attributed to them.

The radiometric datings

The excavations presented here provided nearly 80 radiocarbon dates by applying both conventional and AMS methods. In Appendix 1, all the results of the radiocarbon datings of the presented sites as well as the discussed sites have been listed per site and per laboratory number, including uncalibrated radiocarbon measurements in years Before Present (BP). If results have been calibrated in order to obtain calendar years, they are calibrated at 2σ for 95% as to the Northern Hemisphere (Stuiver et al. 1998, Reimer et al. 2004, Reimer et al. 2009). It must be added here that radiocarbon measurements as to Brazil are often calibrated by means of a curve developed for the Southern Hemisphere (McCormac et al. 2004). Calibration in calendar years with the latter Southern Hemisphere curve as to samples taken in the eastern Atlantic Guianas, located very near to the Equator between the latitude 0 and 6° N (the city of Macapá in the State of Amapá is situated upon the Equator), tend to result in (much) more recent dates than those calibrated by means of the Northern Hemisphere curve. One must certainly bear this in mind when comparing the calibrated dates of both regions.

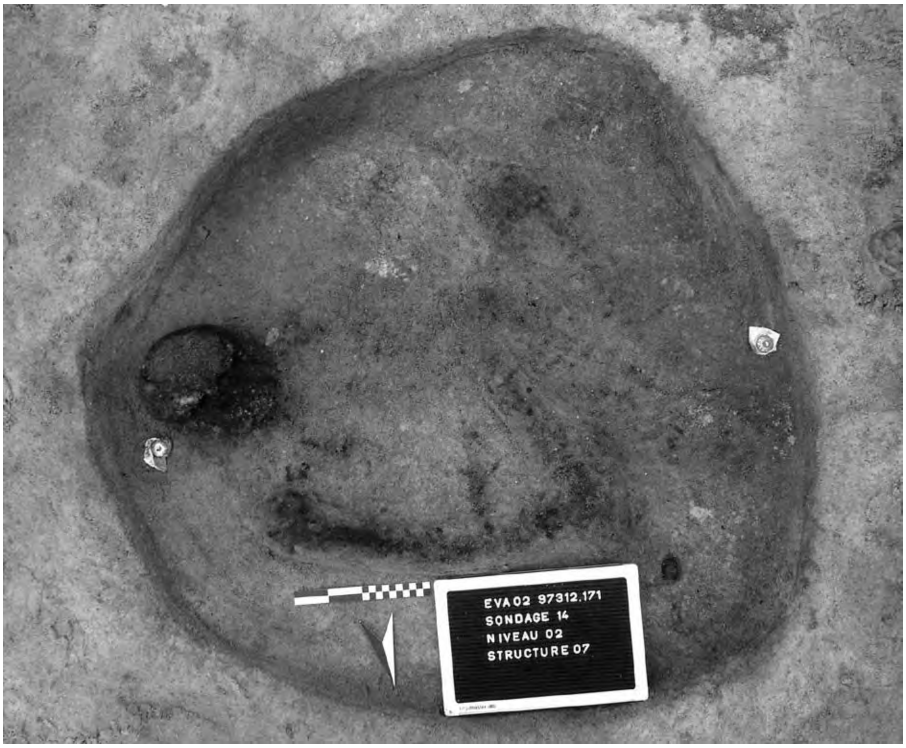

Figure 1.3. The Burial 1 at Eva 2. The shape of the burial pit and the outline of the body are recognisable in the white sand. In general, (human) bones do not survive in a Neotropical climate (photograph by Sandrine Delpech).

The sampled materials consist of charcoal, wood, (human) bone, and carbonised residues. When radiocarbon dating a piece of wood or charcoal, the so-called "old wood" problem must be taken into account when linking artefacts to event and context.[18] Analysis of charcoal in ceramic sherds has also been tested, but this technique is still problematic, and needs to be falsified by regular charcoal samples. In order to minimize the outcome of incoherent dates, the majority of charcoal samples were extracted from restricted environments (post holes, pits). An occasional sample from an archaeological layer has been dated, but we tend to consider this layer to be the final result of an occupation and subsequently disturbed by various processes (e.g. later occupation, treefalls, bioturbation). The result does therefore not necessarily correspond to the ancient human occupation –rather problematic when compared to charcoal samples taken from small test pits. The marine or riverine effect of human bone, i.e. the consumption of fresh or sea fish by ancient populations, can distort the actual age but have been matched by other charcoal samples (e.g. La Pointe de Balaté) (van den Bel 2008b). However, little is known about the paleodiet of the Atlantic Guiana Amerindians. Finally, inconsistencies in the results of the radiocarbon dates will be discussed per site.

18 The event dated is the growth of the tree ring. Trees grow by means of the addition of rings, which cease to exchange carbon with the biosphere once they are felled. The radiocarbon age of a single tree's heartwood and sapwood will therefore not be the same with the innermost heartwood that is significantly older than the sapwood. Any charcoal or wood sample that is carbon dated will produce an apparent age. This may result in errors of up to hundreds of years unless short-lived tree species or twigs are selected. The radiocarbon age tells us when the organism was alive and not when the material originating from that organism was utilized (http://www.radiocarbon.com/carbon-dating-charcoal.htm). See for example Ostapkowicz et al. (2011:951–957) when dating guaiacum statuettes from the Greater Antilles, regarding the old wood effect of tropical hard wood.

The feature analysis

In the Guianas, large-scale or feature excavations are still a novelty. However, they receive more attention in the State of Amapá where Brazilian archaeologists from the IEPA in Macapá also employ compliance excavation techniques.[19] On the other hand, programmed excavations as conducted by the members of the UMR 8096 *Archéologie des Amériques* who carried out excavations in Iracoubo and Kourou also applied mechanical shovels resembling the way compliance archaeology does (Rostain et al. 2008a, 2008b, 2009, 2010).

The majority of the anthropogenic features represent ancient digging activities carried out in order to deposit wooden posts, rocks, litter, dead bodies and offerings or to store food. Other features (e.g. hearth pits, canals, gutters, water and extraction pits, ring-trenches, ditches) do occur at prehistoric sites but are considered less common. Among the hundreds of features to be found during an excavation, only a certain number hereof have probably functioned simultaneously and thus represent one specific moment or occupation phase. Villages that have persisted for several centuries on the same hilltop or riverbank are indeed represented by hundreds to thousands of features, of which only those encountered within the boundaries of the excavation pit are dug up. For example, habitation areas have been abandoned, re-occupied or left abandoned to then be re-used as a plaza or a garden, and may eventually have served as a burial ground. It is important to state that one must be aware of the fact that not all occupations are to be found or recognized within the excavated area.

The stripping (Fr., *décapage*) of archaeological sites by means of mechanical shovels was introduced in the Guianas by members of the AFAN during the BPS Project (Vacher et al. 1998). By the end of the 1980s, Aad H. Versteeg and Kees Schinkel (1992) introduced this type of excavation to the Lesser Antilles yielding, for the first time, conclusive evidence of pre-Columbian house plans. At present, a LCA house plan has only been identified in western Venezuela. Its four central posts with an outer ring consist of smaller posts, covering *c.*230 m² (Oliver 1995). Similar house plans have been found in the Lesser Antilles and are generally attributed to the post-Saladoid period (Etrich et al. 2003; Morsink 2006; van den Bel and Romon 2010).

However, archaeological house plans still remain a mystery in the Guianas. To put it boldly, at present we do not know what to look for: round houses or square ones with one, two or three central posts? Did the prehistoric Amerindians build houses on stilts as we can observe today? Eventually, we decided that restricted areas with numerous post holes and other house-related features (pits, hearths, burials) are to be considered as a possible "House Location" (HL), when a clear house plan is lacking. These HLs probably represented a habitation area in which the basic house configuration is no longer visible due to the construction of multiple houses or extensions on approximately the same spot, creating a palimpsest (Mans 2012:64, Fig. 3.17).

Another general feature problem is the interpretation of (visible?) pits with complete vessel deposits. Although technically speaking we do not find any human bone in these pits, they presumably represent inhumation graves, as indicated by the excavations of Eva 2 (cf. Chapter 11). The latter excavations provided us with more or less round or oval shaped pits with the negative print of the body

19 See note 12.

coloured into the sand. Since these inhumations were not older than 200 years, the interpretation of these pits as inhumation pits was easily established thanks to the presence of a human body and an occasional burial gift. We assume that more or less round, shallow pits with (in most cases) complete ceramic deposits represent inhumation pits (Fig. 1.3), but rectangular pits also occur on Cayenne Island (cf. Fig. 9.6). In rare cases, such as at the LCA La Pointe de Balaté site, anthropologists indentified sufficient quantities of human bones in a flexed position which support this hypothesis (van den Bel 2008b).

The ceramic study

Classification of pottery constitutes the culturally interpretable identification of groups of vessels based on common features, techniques of manufacture, form and decoration (Rice 1987:274–275). One of these classifications is the type-variety analysis, or Fordian method, applied to handmade pottery which has a long tradition in the Guianas and was introduced by Betty J. Meggers and Clifford Evans during the 1950s (Meggers and Evans 1969:2). It was most popular among North American scholars when studying pottery and is still applied today (Meggers 2010; Rostain et al. 2008) thanks to its apparent ability to quickly compare ceramic material taken from small-scale excavations and museum collections in order to study the distribution of ceramics within large geographical areas (e.g. the region of the Amazon Delta and Amapá) (Meggers and Evans 1957:15–16).[20]

Crucial characteristic elements, such as temper or decoration modes, have served to classify pottery assemblages and to ultimately 'detect significant differences that will permit the recognition of cultural and temporal change' (Evans and Meggers 1960:10). In French Guiana, Stéphen Rostain applied the Fordian method in his PhD dissertation (cf. Section 3.2.) despite the fact that his predecessors utilised a French morphological classification system devised by Hélène Balfet (Cornette 1988a:22–24). In Suriname, Peter Goethals (1953:8) was the first to study Amerindian handmade ceramics applying the Fordian method. Eventually Arie Boomert introduced Suriname to the terminology developed by Irving Rouse and subsequently a modal approach in order to define vessel shapes (Boomert 1976, 1977, 1978, 1980a, 1983, 1986, 1993, 2004; Rouse et al. 1984).

After several decades, the Fordian method was heavily criticized; it was felt that the use of a type was 'meaningless' (Shepard 1956:316). One considered it inadequate to deal with the large degrees of variability and diversity of Amerindian

20 The word ceramic(s) derives from the Greek *keramos* meaning: burnt matter, earthenware, a fired product. The terms ceramics and pottery are used synonymously in archaeology. According to Longman's *Dictionary of Contemporary English* (1989), however there is a difference between the term ceramics: 'the making of pots, tiles etc. by shaping pieces of clay and baking them until they are hard or articles produced in this way' and pottery: 'the work of a potter or (pots and other objects made of) baked clay,' although they are fairly similar. In the Guianas, we come across low-fired, usually (relatively) coarse cooking and serving utensils and other objects made of earthenware clays, making the choice for "pottery" understandable; however, several authors adopt the terms "earthenware" or "ware". Although some apply the term "ceramics" in Guiana archaeology, the fact remains that "pottery" fits the Guiana material best. Here, we apply "pottery,", even when referring to the chemical analysis of the pottery., In certain cases the term "ceramics" is unavoidable, for example when discussing chronology, mentioning terms such as Early and Late Ceramic Age or when associated with typological terms such as "ceramic series".

ceramics, as Rouse (1930) had stated.[21] Therefore, he developed another method based on "modes" or modal series, which is still very popular in Caribbean archaeology (Rouse 1939:11–12, 1960, 1961, 1965, 1983, 1984, 1992; Rouse and Cruxent 1963; Rouse and Allaire 1978; Rouse and Morse 1999; Rouse et al. 1984). When Peter Siegel (1996a:675) asked Rouse about the procedure of manufacturing pottery, the latter answered he had 'coined the term "mode" to refer to the diagnostic attributes of a class of features, as opposed to the term "type," which refers to the diagnostic attributes of a class of whole artefacts.' However, the key element is the "feature" which represents any part of the pot that potters would have been recognized as being distinct, and therefore a mode is a type of feature.[22] In sum, 'Thus Rouse's system begins by grouping these attribute sets, or modes, and then establishes types of attributes rather than types of artefacts' (Petersen et al. 2004:21).

Notwithstanding Rostain's introduction of the Fordian method, the ceramologist Jérôme Briand adopted a combination of two other methods in order to classify pottery found at the BPS Project at the Sinnamary River (in Vacher et al. 1998:182–183). He labelled the vessel shapes according to the method developed by Hélène Balfet et al. (1983), hereby continuing Alain Cornette's proposals with regard to Amerindian ceramics (Cornette 1992:49). Nevertheless (rim) sherds were described following the methods developed by Bernard Debet and Michel Py (1975) with regard to Neolithic ceramics in France. Briand made several adaptations to the latter mode of description in order to include the regional Amerindian modes of decoration, surface finishing as well as other ceramic objects (e.g. griddles, specific clay objects). Briand's method was an innovation as to the Guianas. On the other hand, it was difficult to attach the results to the chrono-cultural framework Rostain had recently established as to French Guiana (Vacher et al. 1998:206–210). The authors were aware of this and drew the following general conclusions: (a) comparisons were either difficult to make because dissimilar methods of ceramic analysis were applied and/or (b) the large sample of ceramics studied at the BPS yielded very detailed results as to the existing "coarse" cultural framework (Jérôme Briand, personal communication, 2012). Further disconcordance may also be found in the fact that the BPS excavated data on pre-Columbian settlements had been gathered in either the interior or in the vicinity of a large river, i.e. the Sinnamary River, whereas previous ceramic studies had been carried out on material originating from the central coastal plain. In retrospective, we may state that these advanced ceramic studies were indeed realized "in the middle of nowhere," being the hinterland of slightly better known regions such as the Island of Cayenne and Paramaribo.

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21 Interestingly, with regard to his Haitian research, Rouse actually applied the modal and the typological methods (Rouse 1939:42–56) as did Roosevelt (1980:193) in her Parmana research. Rouse was also strongly criticized, notably by Thomas Patterson (1991:4), who states that Rouse focussed too much on 'the products of observable behaviour […] rather than the social relations, actions and circumstances that structure and constrain this behaviour.'

22 An attribute can be described as a 'minimal characteristic of an artefact such that it cannot be further subdivided.' It can be seen as a property, characteristic feature or variable of an entity. It often involves aspects of form, style, decoration, colour and raw material (Renfrew and Bahn 1996:539; Rice 1987:275). However, according to Rice (1987:276), a type is 'a cluster of items, a group or class of items that is internally cohesive and can be separated from other groups by one or more discontinuities in attribute states.'

During the following years Briand continued to apply the combined Balfet/Debet and Py method when analysing the ceramic material from Montagne Favard (in G. Mazière 1996:32–33) and Mont Grand-Matoury (in Grouard et al. 1997). By this time, Matthieu Hildebrand (1999) had adopted the Rousian concept of modal series in order to classify Amerindian pottery in French Guiana as well as the Briand's method of describing vessel shapes. In addition, Hildebrand made further regional affiliations as did, for example, Dominique Bonnissent with regard to the French Lesser Antilles (Hildebrand 2000; Hildebrand in Mestre et al. 2005; Hildebrand in van den Bel et al. 2006; Hildebrand 2008; Bonnissent 2008). The INRAP members, when studying Amerindian ceramic material, had by now adopted the combination of these methods. In combination with my Leiden ceramic background, the applied method in this present work is the fruit of these studies.[23]

The objective of the modal method is to define modal units (morphological, morpho-decorative and decorative units) which reveal the diversity and the most significant morphological and decorative components of the ceramic collection (Balfet et al. 1989:7–23; Rice 1987:216, Fig. 7.4). The principal elements of this classification of ceramic vessels and tools consist of the relationship between the orifice and the height of the vessels. In this way, we can distinguish five open forms: griddle (Fr., *platine*), platter (Fr., *assiette*), bowl (Fr., *écuelle*), cup (Fr., *bol*) and goblet (Fr., *gobelet*), as well as three restricted forms: pot (Fr., *pot*), bottle (Fr., *bouteille*), and restricted bowl (Fr., *écuelle fermée*). All these forms can be subdivided according to their dimensions. For example orifice diameters serve when defining very large bowls (Fr., *jatte*) or jars (Fr., *jarre*).[24] Ceramic utensils mainly consist of lids, stoppers, tool sherds, spindle whorls, stools and tablets, statuettes and other clay items frequently found during excavations. For Anglo-Saxon comparisons, see Anna Shepard's (1956:224–251) classification of vessel shapes which also evokes an aestetic perception, in addition to taxonomic and functional ones. In general, whenever the vessel's height is unknown, I have adopted the descriptive method as proposed by Prudence Rice with regard to vessel classification (1987:217–219).

The classification of vessel shapes is primarily based on the rim profile, which thus functions as a principal marker of the vessel shape. When realising my ceramic analysis, I used rim sherds measuring more than 5 cm in length in order to determine the vessel's orientation and diameter (forms) (Hofman 1993:56). These large rims or constituent elements (Fr., *élément constituant*, EC) are subsequently isolated and inspected in (macroscopic) detail on texture, temper, firing, surface finishing (technology) and decoration modes in order to establish a modal series (Fr., *série modale*, SM). This first inventory allows us to determine the proportions of the shapes of the various vessels as well as the principal characteristics of the ceramic assemblage. Quantification of the assemblage is proposed not only by counting all fragments (rim, wall, base fragments) per excavation unit (layer and/

23 At the Leiden University I was schooled in the prevailing Rousian classification method in Caribbean archaeology, as adopted by Corinne L. Hofman for her PhD research on the island of Saba (Hofman 1993:49–71). At the start of my work for the INRAP, I ceased to apply the "Leiden method" and adopted the "French" method, but adding some Anglo-saxon terminology, which the former AFAN and current INRAP members already utilised in French Guiana.

24 The function (cooking/preparation, consumption/service, storage) of these vesselshapes remains hypothetical since microscopic analysis is often lacking, at least for Amazonia, to confirm the proper usage of these vessels.

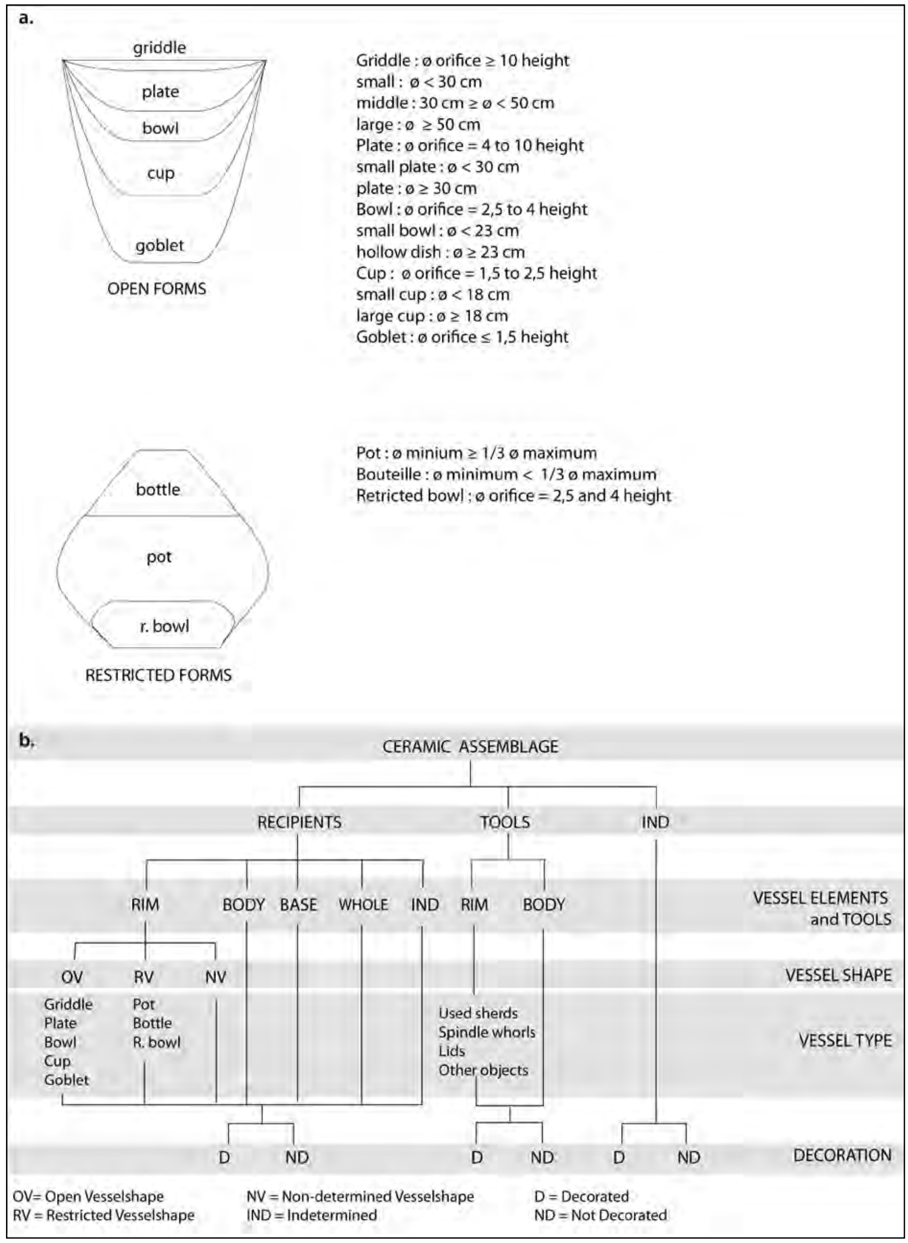


Figure 1.4. (a) The classification of vessel shapes (after Balfet et al. 1989:9), (b) the quantification procedure of a ceramic assemblage (adapted from Bonnissent 2008 ii, Fig. 14).

or feature) but also with regard to the presence of decorative elements such as modelling and slipping. Special attention is paid to: (a) the bias between the ceramics found in the archaeological layer, (b) the features which may reveal multiple occupations or shifting activity areas and (c) the spatial distribution of vessels shapes and their fragmentation.

Ceramics are often the most abundant and characteristic archaeological material at sites and therefore receive much attention from archaeologists. Next to a proper description of this material, the general objective of its study is to distinguish a change or evolution in the ceramic repertoire that may inform us how their makers once lived and what happened to them. In fact, archaeologists consider ceramics to be excellent cultural markers of ancient societies as these items are deeply embedded in human history.

Since the 19th century, not only in Amazonia but all over the world, change and evolution have been associated with or seen as caused by human migration and/or diffusion (Adams et al. 1987:485). Migration or diffusion, ceramics often serve to construct models in order to reflect the human environment or a society's socio-economical and cultural status (Binford 1965; Arnold 1985). In addition to this North American paradigm, we encounter a West-European or French perspective. In it technology (over environment) is thought to represent a cultural and social marker, as forwarded by André Leroi-Gourhan (1964). For example, Claude Coutet (2009) applied this technological point of view in her PhD dissertation on the prehistoric pottery of coastal French Guiana. Various modes of ceramic production among present Amerindian potters served as guidelines in order to distinguish technological as well as morphological variability per ceramic assemblage.[25] She not only concluded that every site had a characteristic pottery production but that sites can also be attributed to one larger cultural unit, in her case the Barbakoeba complex (Coutet 2009:435). However, this technological approach, inspired by the anthropologist Pierre Lemonnier (1986, 1993) is perhaps typically a French perspective when recalling the lithic technology studies, such as the above mentioned Leroi-Gourhan method. It often discards the social aspects of pottery as a means of communication and identity which are only recently becoming more popular in Amazonia (Bowser 2002; Schaan 2004, 2008; Barreto 2008; Silva 2007, 2008).[26]

The chrono-cultural interpretation is generally based on the presence of specific typological elements (e.g. morphology, decoration and/or technology) allowing us to characterize the ceramic assemblage and eventually an interaction sphere (Boomert 2000:1). Once these distinctive elements have been radiocarbon dated, an absolute chronology with regard to the ceramic production can be established per site. Eventually whenever a large body of ceramic data has been acquired in this manner, a valid definition for a specific ceramic complex can be established.[27] From this point of view, the concepts of "style" (or ceramic style) and "series" which Rouse (1986:7) defined as 'progressively higher levels to trace cultural affinity geographically as well as temporally, where the series are found at the highest level and the sub-series and styles at the lower one' are of interest

25 Her research followed more or less the same approach as Olivier Gosselain's in southeast Cameroun (Gosselain and Livingstone 1995). He had already forwarded conclusions implying that technological aspects, in his case temper, were highly conservative elements that marked particular ethnic groups and, consequently, specific regions. However, during the congress *Préhistoire de l'Autre* in January 2011 in Paris, Gosselain acknowledged that such research was too static and had represented a "frozen" moment in time (Gosselain 2012).

26 Decoration modes can represent social affiliation or status within Amerindian societies stored in local politics and oral tradition (van den Bel 1995, 2009b; Guapindaia 2001; Bowser 2002; Vredenbregt 2002, 2004b).

27 Analysis of archaeological data obtained from small geographical regions forms the basis for accumulating knowledge on prehistoric ways of life. Eventually, various regions can be grouped into supra-regions and compared if similar stages have occurred in each region. However, the falsification or subsequent testing of results, as forwarded by Sir Karl Popper (1963), is often not applied in recent archaeological research. Thus, misleading supra-regional conclusions are drawn too hastily from punctual evidence or tend to prove existing ideas (induction) in the topdown point of view.

to comparative ceramic research. They have, however, as yet not been applied extensively in French Guiana.[28]

The need for the chronological ordering of the ceramic assemblages in French Guiana is even today an important field of research. This is demonstrated by means of a lack of archaeological data on the Early Ceramic Ages (but also the LCA), a situation in which Caribbean archaeology was locked for decades during the second half of the 19th century. By utilising mainly ceramic materials, Rouse (1986, 1992) addressed the timing, geographic distributions and context of various migrations, focussing almost exclusively on the chronology or temporal-geographic models as is still the case in French Guiana (Zucchi 1991; Boomert 2004; Rostain 2009; Meggers 2010). However, this no longer satisfies many archaeologists in Amazonia, who rather wish to include the complexities of populations, adaptation strategies, gender, interregional interactions, etc. (Roosevelt 1980, 1989, 1999; Sanoja and Vargas 1983; Boomert 2000; Rostain 2013).

The lithic study

The lithic materials have been collected in the same way as the pottery and have also been subjected to investigation per element. This study focuses on: (a) the geological origin of the artefacts, (b) the different types of quartz and the debitage of quartz (Fr., *chaîne opératoire*) and (c) the polished tools. A geological reconnaissance in the vicinity of the sites was not always realized in order to discover the primary sources. However, the majority of the lithic material found on the sites located on the littoral is *a priori* exogenous. Knowledge of the pre-Columbian lithic industries of the Guianas is scarce. Research has focussed primarily on polished tools (Boomert and Kroonenberg 1977; Boomert 1977, 1980b; Rostain and Wack 1987; Rostain 1994a). With the exception of the BPS project (Vacher et al. 1998:140–149) and the Plateau des Mines site (Mestre and Delpech 2008:43–63), little attention has been paid to the bulk of the lithic debris, to wit: quartz flakes. These flakes, fragments or blades are produced by striking a rock (core) with another tool (hammer) with the hand or when held on an anvil. This free-hand and bipolar technique was the main technique applied in order to process quartz cores during the Preceramic and Ceramic Age in Amazonia (Prous et al. 2010). This allegedly opportunistic method primarily served to obtain short flakes.

The lithic material has been classified according to function or type of tool, most often based on the observation of use-wear by the naked eye. However, it has to be stated here that the function of the tools has not been tested by means of a microscopic use-wear analysis except in the case of several lithic implements from the Chemin Saint-Louis site (Knippenberg 2012). Various distinct activities may have been performed with one particular tool. In most cases we therefore suggest only one activity; however, other activities of lesser importance, or of which the

28 However, the classic Rousian terminology defines "style" as synonymous with complex or phase as the entire repertoire based on various assemblages made by a people during a single cultural period in a particular geographic location (Rouse 1972, 1985:385, 1992:175; see also Cruxent and Rouse 1958:23). A "series" is a group of styles related throughout space and time that are known to have descended from a common ancestor (Rouse 1986, 1992:183–184). Other definitions of "ceramic style" are proposed by Roosevelt (1997:87–88) or Zucchi et al. (1984:159): 'Combinaciones unica de pasta, forma y decoración [halladas en quatro alfalfarias (A–D)], nos llevaron a proponer que estas probablemente corresponden a diferentes entidades sociales a las cuales hemos denominado componente cerámicos.'

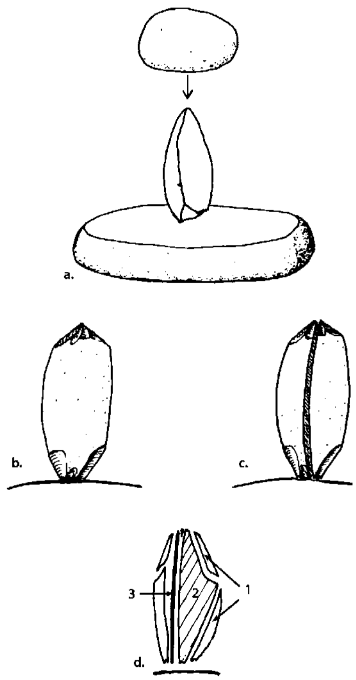


Figure 1.5. Core reduction: (a) the position of the core and direction of the blows, (b) the stabilization scars, (c) the splitting and (d) the products of bipolar reduction, to wit: (1) the marginal bipolar flakes, (2) the bipolar core (nucléiforme) and (3) the complete bipolar flake with counter-blow scars (after Prous et al. 2010:203, Fig. 2).

traces have eroded away due to later use, could have been carried out with the same tool. In addition to the search for type-artefacts, this study also explores usewear analysis on quartz artefacts as well as the determination of starch grains (Fr., *amidon*), extracted from pores and fissures of grinding stones, in order to obtain data on the function of these tools among ancient Amerindian populations.

The starch grain analysis

Starch grain, one of the microscopic residues of roots, tubers and seeds of food plants, has proven to be essential as to the archaeobotanical identification of the plants with regard to ancient human subsistence. Starch is the predominant polysaccharide that serves as a food reserve for plants. Its morphology, size, chemical composition and basic structure differ per species (Reichert 1913; Czaja 1978; Trease and Evans 1986; Gott et al. 2006). Due to its intrinsic physical-chemical qualities, this residue can be preserved for millennia in lithic, coral, ceramic and shell tools related to plant processing and cooking as well as in human dental calculus and coprolites (Horrocks 2006; Loy et al. 1992; Pagán Jiménez 2007; Mickleburgh and Pagán Jiménez 2012; Piperno et al. 2009). If starch grains of various plant sources can be extracted from archaeological plant processing/cooking tools or human remains, and ascribed to a known plant, then a direct relationship between such tools and the plants that were processed or manipulated with them can be established (Pearsall et al. 2004; Perry 2004). Of all the archaeobotanical remains that have been studied, e.g. pollen grains, phytoliths, starch grains appear to be the only ones that can be directly correlated with human plant processing, use and consumption. Starch residues do not stand free in the natural environment. Therefore, the pedological and taphonomic processes ascribed to other plant structures such as pollen and phytoliths (e.g. "pollen rain," phytolith formation, natural dispersion), do not apply to starch grains (Beck and Torrence 2006; Pagán Jiménez 2007).

Lithic and ceramic tools have been analysed with regard to several sites, notably Eva 2, Chemin Saint-Louis and Cimetière paysager Poncel. The taxonomic ascription of the starch grains has been carried out by Jaime Pagán Jiménez and the extraction by Sebastiaan Knippenberg, by the present author and by Pagán Jiménez in either Cayenne or Puerto Rico. Firstly, the work space as to the extraction procedures was thoroughly cleaned. A sterile paper was then placed on the working surface where the tool was to be sampled. Next, sediment residues (dry method) were extracted by means of a sterilized metal pick (Pearsall et al. 2004; Perry 2004). Before each new sample was taken, the work space was cleaned again and materials were replaced. The extracted sediments of each tool surface were positioned on sterile white paper and packed in plastic bags for shipment to Puerto Rico. The other residues were inserted into plastic tubes. All the samples were processed as to the separation of starch grains with cesium chloride (CsCl), as discussed below.

The separation of starch from sediment

The following protocol, modified from Atchison and Fullagar (1998), Barton et al. (1998) and Pearsall et al. (2004), was applied as now described. Each sample was placed in a sterile plastic micro-centrifuge tube of 1.5 ml before a solution of CsCl with a specific gravity of 1.79 g/cm^{-3} was added. The objective was to separate the starch grains by means of flotation and to isolate them from other particles as the starches are known to have a mean specific gravity of 1.5 g/cm^{-3} (Banks and Greenwood 1975). The separation was realised by means of a micro-centrifuge running at 2500 rpm for as long as 15 minutes during the first phase. The supernatant, in which the starch grains would be contained, were decanted and poured into a new sterile micro-centrifuge plastic tube. The next step was to add distilled water and agitate the mixture for ten seconds. This process reduced the specific gravity of the mixture by means of the dilution of salt crystals with the objective of eliminating their presence through repeated washes. This final step was repeated two more times (three times in total), adding less water in each successive step, and running each sample through the micro-centrifuge at 4500 rpm for a period of 15 minutes. The remaining solution with the residues was then placed on a sterile slide. Half a drop of liquid glycerol was now added and stirred with a stick or needle in order to increase the viscosity of the medium, to enhance the birefringence of the starch grains, and to rotate them when necessary during the analysis.

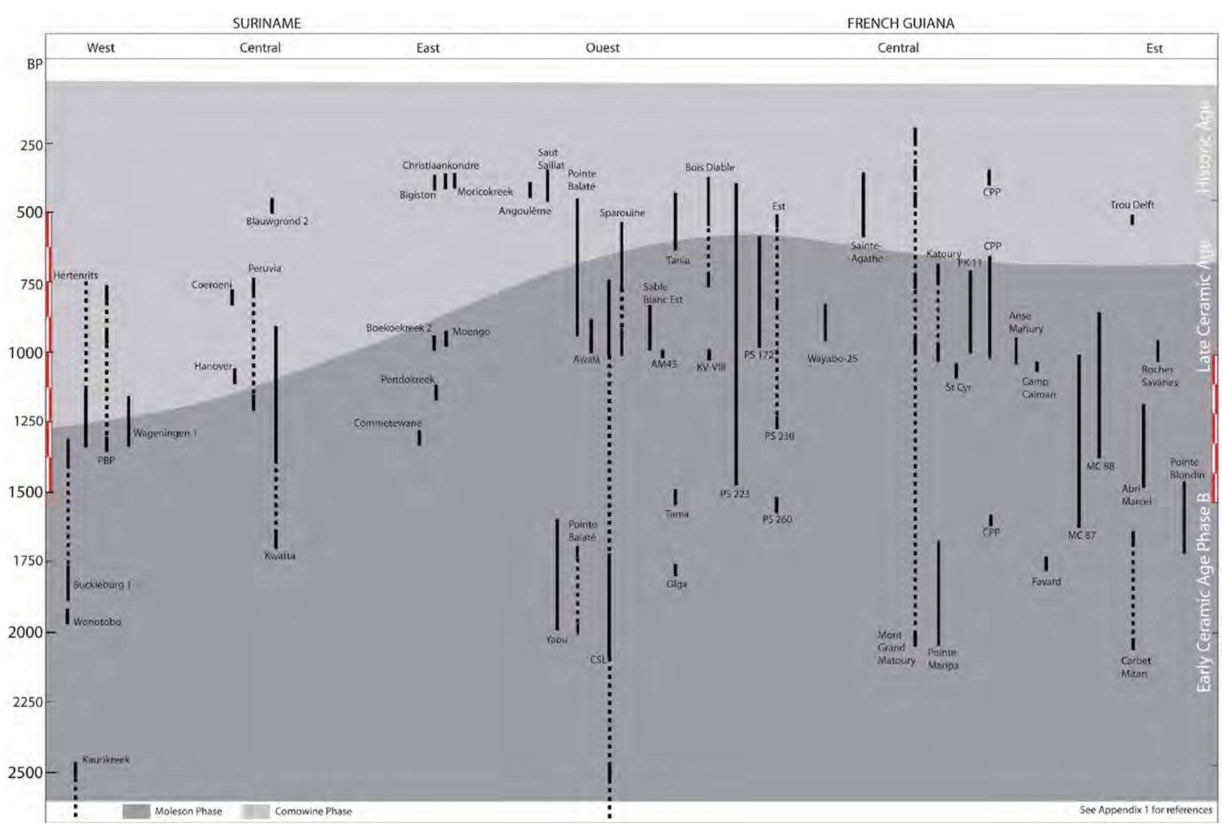
The taxonomic ascription of the recovered starch grains

The study of starch grains in archaeology provides us with a useful means to address questions concerning plant utilization. As other studies have shown, starch residues can be preserved for a long time in the imperfect, irregular surfaces of lithic, ceramic, and shell tools, i.e. pores, fissures, cracks, related to the processing and cooking of plant organs (Haslam 2004; Loy et al. 1992; Pagán Jiménez 2005, 2007; Pearsall et al. 2004; Piperno and Holst 1998). If starch grains can be extracted from a tool and correlated to the starch of a known plant, then a direct link can be established between the implement and the starch-rich plant or plants it processed. Pagán Jiménez has assembled a comparative reference collection of starch grains obtained from modern economic plants. It includes

40 specimens that have been formally described along with 45 others informally described others. All in all they represent today 76 species that encompass wild, domesticated, and cultivated species from the Antilles, continental tropical America (mainly the continental Circum-Caribbean area) and some from the Old World (Pagán Jiménez 2007, Appendix B). The detailed morphometric description of the features of modern starch allows us, by means of comparison, to identify the taxa of the archaeological starch as long as these grains exhibit the necessary diagnostic traits in sufficient quantities. These characteristics have been established according to the descriptive analysis of the modern samples in the reference collection. If these conditions are not met by the archaeological starch grains, the taxonomic identification is unfortunately less secure. In such cases, we adopt the categories "cf." (in reference to the closest tentative classification) and "unidentified." A reliable or secure identification will not be established if the archaeological starch grains exhibit traits that are *not* documented in the reference collection, or in published literature (Pearsall et al. 2004; Piperno and Holst 1998; Piperno et al. 2000; Perry 2001, 2002a, 2002b, 2004, 2005; Reichert 1913; Ugent et al. 1986).

The identification of archaeological starch grains was realized through an Olympus BH-2 (with polarizer), employing a magnifying eyepiece (10 x) and objective (40 x). The principal diagnostic, but not unique, element to discern starch grains from other residues is the presence of the extinction, or Maltese cross, observable under polarized light. Firstly the slides with the archaeological samples were examined. Moreover, their *X* and *Y* coordinate positions were noted in order to facilitate the location as well as the perspective during later inspections. All the recovered starch grains were photographed in various positions (when possible) by means of rotation. After analysis the slides were stored in a standard cardboard slide-holder.

Figure 1.6. A chronological overview of the radiocarbon dates of Suriname and French Guiana excluding the Archaic sites. See Annexe 1 for references; as to Suriname Versteeg (2003).



1.4 The chronological stages and cultural taxonomy

The developmental stages

The current terminology of the chronological stages and cultural taxonomy in the Guianas is based on the archaeological research carried out in two distinct areas: (a) the Orinoco River and (b) the Lower and Middle Amazon. The development of archaeological research in both areas has been highly influenced by the use of ethnohistoric evidence in order to reconstruct pre-Columbian culture. It was not until the 1950s that a chronological sequence was developed based on archaeological data alone (Boomert 2012). In Volume 4 of the *Handbook of South American Indians* (HSAI), Rouse sought to summarize the prehistoric sequence in the West Indies. Still conforming to the ethnohistoric approach, he modified Jesse Fewkes' and Sven Lovén's scheme into three linguistic-cultural groups, including Ciboney, Arawak, and Carib (Rouse 1948). Prior to the beginning of radiocarbon dating, the result of Rouse's fieldwork in the Greater Antilles led to the development of a relative chronology concerning this region too, exclusively based on archaeological research. It is constituted of four arbitrary periods: Period I, II, III and IV (Rouse 1951, 1964). This scheme was subsequently correlated with another framework composed of three successive Caribbean-wide stages and units of relative time or "Epochs," based on a combination of Amerindian technology and subsistence. This resulted in: (a) the Paleo-Indian Epoch, defined by chipped stonework, big-game hunting and gathering, (b) the Meso-Indian Epoch (Period I), characterized by means of ground stone as well as shell artefacts in addition to small-game hunting, fishing and gathering and (c) the Neo-Indian Epoch (Periods II through IV), characterized by the introduction of horticulture and pottery making. A fourth period (Indo-Hispanic) was added in order to represent the protohistoric episode of European colonization (Rouse and Cruxent 1963:20–21).

However, it soon appeared that the basic assumptions of the framework, i.e. the existence of a one-to-one correlation between technology and subsistence base, was not tenable. For this reason Rouse (1972:136–138) proposed four subsequent "Ages" which were based on technological parameters: Lithic, Archaic, Ceramic, and Historic Ages (Philips and Willey 1953; Willey and Sabloff 1974; Willey 1971; Rouse and Allaire 1978). The latter scheme has found wide acceptance when describing material culture and is adopted here. On the other hand the terms Paleo-Indian, Meso-Indian, and Neo-Indian will be applied exclusively when referring to past modes of subsistence or the ancient "way of life." As to the Historic Age, I will also refer to the Modern Age in which the discovery of the Americas is seen as the beginning of complete globalisation as well as the end of European medieval era.

In addition, when discussing the chronology of ceramic series and/or complexes (the Ceramic Age) I will also apply the chronological subdivisions in Early and Late periods as Peter Siegel suggested with regard to the Caribbean region (Siegel 1989, 1992) and as did William Keegan (1994). I will apply the term Formative Period when discussing the dawn of (incipient or initial) pottery and the transition to full horticulture in the Guianas and Lowland Amazonia (Williams 2003; Oliver 2001, 2008; Willey and Philips 1958:144–147).[29]

29 Rouse (1986, 1992) also distinguished a Formative Age, marked by chiefdoms.

The ceramic sequences

When defining chrono-spatial units, the hierachic cultural taxonomy as developed by Rouse (Cruxent and Rouse 1958:2–3, 22–23; Rouse and Allaire 1978; Rouse 1986:126–128; Oliver 1989:313–321) has been adopted here (cf. Section 1.3.2). This taxonomic framework distinguishes three important cultural units: complex, series and macroseries forming an ascending progression of time depth and geographical extension.[30] The local chronological unit is the complex which is normally named after its type of site. It can be defined as the pattern of diagnostic cultural traits of a number of related archaeological assemblages, representing the material culture of a particular group of people. Various related complexes form 'subseries' named by adding the suffix *–an* to the term for one of its constituent complexes. In this manner, classes of related subseries can be grouped into series consisting of subseries which have evolved from each other, and named by adding the suffix *–oid* to the name of a characteristic complex or locality. A number of related series represent the macroseries or macro-tradition.[31]

In Rouse's view, this system is intended to be analogous to a linguistic phylogeny (Rouse 1982, 1986). However, archaeological ideas on cultural complexes are not at all equivalent to linguistic, ethnic or even (proto) historic groups (Boomert 2000:5). In fact, speech communities can crosscut ethnic boundaries or unite culturally dissimilar groups or nations. Similarly, ethnic groups may include linguistically and/or culturally heterogeneous populations, admitting, as does Fernando Santos-Granero (2002:49), that: '… language and culture are connected. This connection is not genetic but historical and thus dependent on geographic contiguity and social vicinity. In other words, the notion of culture area could be more adequate than that of language family if the aim is to understand interethnic similarities and dissimilarities.'

The cultural taxonomy in French Guiana

In addition to this short introduction of the terminology applied in the present study, a brief summary of the discussions on cultural taxonomy in French Guiana is provided here too, reflecting its geographical and cultural position between the Amazon and Orinoco. In 2005, the INRAP and the SA Guyane decided to create uniformity with regard to the terms occuring in archaeological reports and adopted the Rousian cultural chronology (Rouse and Cruxent 1963:1–3). This "Venezuelan" choice may seem far off as French Guiana has clear archaeological and historical affinities with northeastern Brazil. Several early and more recent discoveries on the Oyapock River and Territory of Amapá (referred to as the State of Amapá since 1988) revealed numerous polychrome human shaped Aristé urns found in caves and funerary pits proving a clear cultural link between both regions (Goeldi 1900; Geay 1901; Nimuendajú 1926, 2004; Linné 1928; Petitjean Roget 1983, 1995; Rostain 1994a).

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30 Later, Rouse (1992:184) adopted the term subseries from Gary Vescelius (1980) as a 'subdivision of a series consisting of smaller geographical, chronological and cultural units that share a common ancestor' (Petersen et al. 2004:22).

31 Rouse was drawn towards taxonomy, as he revealed during an interview with Peter Siegel (1996a:671). His background in forestry and botany brought about his interest in classification within the field of archaeology.

The Amazonian sequence, as defined by Meggers and Evans (1961), is primarily based on so-called ceramic Traditions and Phases. These authors eventually replaced the latter terms with Style Horizons following archaeologists who worked in the Andes during the 1920s (Willey and Philips 1958; Sanoja and Vargas 1983; Willey 1971). However, this sequence has been intertwined with the Orinocan ceramic series which resulted in a hodge-podge of chronologies only to be discarded recently by the many archaeologists at work in Central Amazonia who consider this framework obsolete (Neves 2008; Lima 2008).

As mentioned before, the Venezuelan/Rousian chronology is adopted here. The reason for this is that the latter chronology also has a historic link with the Guianas and notably with the coastal plain of its western part which had been incorporated into the Caribbean cultural sphere as early as the late 1950s (Meggers and Evans 1960; Rouse 1962, 1963, 1964; Rouse et al. 1984; Boomert 1977, 2000). This part of the coastal Guianas (Guyana and Suriname) can be considered to represent a transition area between (a) the Orinoco valley and the Amazonian cultural sphere and (b) the eastern part of the Guianas (French Guiana and Amapá).

In 2005, it was further decided to identify three coastal zones in French Guiana where the majority of the archaeological research has been conducted: (a) an eastern zone located between the Oyapock and Comté Rivers, (b) a central zone with Cayenne Island and its surroundings, (c) a western zone located between the Kourou and Maroni Rivers and a fourth zone (d) which includes the interior upland or Precambrian Shield. The latter region is geographically not partitioned. The reason for this is that there is insufficient data on this part of French Guiana.

Independently, Stéphen Rostain proposed five evolutionary stages in Chapter 16 of the *Handbook of South American Archaeology* (HSAA): (a) nomadic hunter-gatherers, (b) semi-sedentary fishermen-gatherers, (c) the first farmers employing slash-and-burn agriculture, (d) raised-field farmers and (e) people undergoing cultural changes after AD 1200 (Rostain 2008b:279). This chronology is somewhat misleading because changes in human behaviour had been defined. Moreover, it is highly susceptible to changes and new discoveries.[32] Furthermore, these stages are not only based on scant regional evidence but also on hardly any empirical data. This refers especially to the Stages 1-3 which represent mere projections of archaeological research in the Orinoco and/or Amazon River Basin. This hiatus is now (partially) filled with the results of the presented excavations.

As to Stages 3 and 4, it is indeed thought that culture areas possess specific regional agricultural techniques as proposed for other regions (Denevan 2001:115–123). As to the Lower Amazon River, for example, it is considered more likely that the majority of *terra pretas* or *Amazonian Dark Earths* (ADE) were created within semi-permanent farming systems. Here frequent infield and fallow burning, composting and mulching sustained fertility. Patches of various sizes were quite permanent. A rotation system consisted of cultivated fields with managed fallows and fruit orchards (Denevan 2006). Historical ecology evidenced that Amerindian farming practices were massively disrupted in the wake of European contact and colonialism (Balée 1998; Denevan 1992a, 2006). The pre-Columbian sedentary

32 However, the utilisation of this framework is not consistent, Rostain applied the term Ceramic Age (Rostain 2009:36) only to return to the HSAA terminology in 2010 (McKey et al. 2010).

subsistence modes were (partially) abandoned to be replaced by hunting, gathering and small scale (slash-and-burn) agriculture (Balée 1992; Rival 2006).[33]

By way of a conclusion, a specific taxonomy was once created in order to assess archaeological data, but can also serve as a first tool in various regions, away from where it was created, providing a first comprehensive chronology. The latter chronology is perhaps obsolete but still represents the baseline of our own archaeological experience. Therefore a cautionary observation is recalled here: 'it may be tempting for some of us to succumb to criticizing our predecessors (and each other) at the same time that we are revising past conceptions and better resolving the regional record through archaeology and new ethnohistoric investigations. However, it is beholden on all such critics to present a reasonable alternative to the existing taxonomies for the region and this will be a difficult task indeed' (Petersen et al. 2004:30).

1.5 A brief outline of this study

Providing a brief introduction to the biophysical context of the area of research, Chapter 2 deals with the geology, vegetation, climate and landscape of the coastal zone of French Guiana. Chapter 3 consists of an anthology of the archaeology in the Guianas. In it the development of archaeological research is emphasised in order to understand the existing cultural chronology and its scientific foundation. The excavations of key sites are briefly discussed in order to clarify their role within the creation of archaeological complexes and the ascription to existing traditions. This framework needs to be described in order to propose changes or present useful additions.

Chapters 4 to 9 present the body of empirical data per excavation as well as an analysis hereof. In general, each chapter features the following components: the geographical and geological contexts, absolute chronology, feature and material studies, micro and/or chemical analysis and synthesis. Chapter 10 consists of an introduction to the colonial encounter. It is chronologically inserted after the Late Ceramic and before the Historic Age and includes a brief description of the way in which the Amerindian society developed allowing us to acquire an insight into the trajectory of their society until the 20th century. Chapter 11 deals with the data of an excavation dating from the Historic or Modern Age and presenting us with opportunities to understand the differences between modern Amerindian society and its history.

Chapter 12 provides a synthesis of the cultural development in the coastal zone from early prehistoric times until the end of the 19th century, roughly 6000 years of Amerindian history (3000 BC-AD 1900) in which various excavations represent key elements. Finally, the conclusions of our research are compared to the questions raised. An attempt is made to answer them briefly. A bibliography and five Appendices have been added. Moreover, eight Annexes are put on-line. They include the original field reports as well as additional Tables and Figures of concerning each archaeological site.

33 Historical ecology concerns 'the study of changing human-environmental relations' (Crumley 1996:560). This interdisciplinary subject involves anthropology, archaeology, geography, history, demography as well as the physical and biological sciences (Balée 1998).

Chapter 2

The landscapes of the eastern Guianas

2.1 The geographical setting

The Guianas are situated in northeastern Lowland South America and consist of five regions, from west to east: the eastern and southeastern part of Venezuela (formerly Spanish Guayana), Guyana (formerly British Guiana), Suriname (formerly Dutch Guiana), French Guiana or *La Guyane* (Department 973 of France) and a large part of northern Brazil, located to the north of the Amazon and east of the Rio Negro Rivers.[34] The latter rivers flow through the vault between the Guiana and Brazilian Shield, i.e. the southern limits of the Guiana Shield (Fr., *Bouclier des Guyanes*). The Orinoco River roughly presents the western limit of the geologic Guianas whereas the Atlantic Ocean represents the northern limits, combining in order to constitute an independent geological formation, better known as the Precambrian Guiana Shield of which 80% consists of crystalline basement rocks (Gibbs and Baron 1993; de Vletter et al. 1998). This shield features two mountainous regions: (a) the Roraima Highlands in the west and (b) the Tumuk Humak in the east. These are divided by the Essequibo and Rio Branco Rivers (Fig. 1.1).

Between the Atlantic Ocean and the Precambrian core, a Tertiary and Quaternary belt stretch parallel to the coast: 10 km in width near Kourou in the east and 120 km wide at the Courantyne River in the west (Delor et al. 2004:211). In French Guiana, the Quaternary deposits correspond to the littoral or lowlands (Fr., *terres basses*) representing *c.*6% of its surface. The Precambrian and Tertiary deposits represent the remaining part, i.e. the upland interior (Fr., *terres hautes*).

French Guiana is situated between 2 and 5° N latitude and 52 and 54° W longitude implying it lies within the equatorial zone of the northern hemisphere. Its tropical humid climate comes with an annual mean of 80% rainfall and four seasons of unequal length, mainly characterized by variations in the volume of rainfall. The Intertropical Convergence Zone (ITCZ) often sweeps French Guiana between November and February and again between April and July, corresponding with the rainy or winter seasons. However, we see significant differences between various years as to shifting seasons or extreme droughts or heavy rainfalls. In general, however, the western coast of French Guiana is drier than the eastern part. Trade winds are predominantly east-north-easterly and the mean temperature is 27° C.

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34 Lowland South America designates almost the entire South American continent excluding the Andes, Pacific Coast, and its southernmost part. Amazonia usually refers to the Amazon and Orinoco drainages (Fausto 2007:498, note 1) or to merely the Amazon River and its tributaries (Erickson 2008:158). The Guiana Rivers that drain into the Amazon River are thus part of Amazonia whereas the northern watershed, draining into the Atlantic Ocean is merely part of Greater Amazonia. See also Fig. 1 in Eva and Huber (2005 ii) for Amazonia including the 'Atlantic Guianas' (*sensu latissimo*) and without (*sensu stricto*).

According to the classification presented by Köppen, the littoral has an equatorial climate (Af) where as the interior of the country has a monsoon climate (Am).

The Maroni River is the most important drainage (65,000 km²) located between Cayenne and Paramaribo. It springs in the Tumuk Humak region at a distance of *c.*520 km from the coast. Important affluents join the Oyapock and Maroni drainages in the east and the west. When ascending the Tapanahoni River one can not only reach the Courantyne River by means of the converging headwaters of the Sipaliwini Savannah on foot but also the East and West Paru Rivers. Moreover, when ascending the Ouaqui River one can reach the Oyapock River by descending the Tamouri and Camopi Rivers after a hike of between four to five days, which to the present-day is known today as the "Trail of the Émerillons" (Fr., *Sentier des Émerillions*).[35] When travelling along the Marouini River, one reaches the Upper Jari River and eventually the Amazon River. In this manner the interior of French Guiana is accessible to other regions of the Guiana Shield by means of rivers and trails. Here the Tumuk Humak serves as a pivot for the eastern Guianas. Following the planation principle of the Guiana shield, another set of rivers (e.g. the Mana, Sinnamary and Approuague Rivers) is also interconnected at their headwaters which rise at the *Central Massif* near the modern village of Saül. Yet again, these drainages are also connected to the affluents of the larger rivers and thus linked to the entire network of rivers. A third group of rivers (e.g. the Organabo, Iracoubo, Kourou and Cayenne Rivers) originate from the septentrional mountain range. Their sources are also connected to the affluents of the previous set of rivers, providing another link from the Atlantic coast to the Amazon River.

All rivers have tidal estuaries with a mean difference of 2 to 3 m between high and low tide. In general, the tidal influence of each river is discontinued at the first important rapids of which the Hermina Falls in the Maroni and the Maripa Falls in the Oyapock Rivers are perhaps the best known. The Lower Oyapock, Approuague and Maroni Rivers feature several stretched islands, of which the Arouba Islands and Portal Island in the Maroni River are suitable for human habitation. The latter delta also includes numerous winding creeks, such as the Coswine and Wane Creeks. The latter is a lateral creek, i.e. a natural canal, which joins the Coermontibo River. It is in turn a tributary of the Cottica River and finally falls into the mouth of the Suriname River. The former two rivers share an east-west direction. Another similar bifurcation is also found between the Coppename and Courantyne Rivers: the Wayombo Creek. This riverine phenomenon is probably caused by the larger coastal plains of Suriname and is absent in French Guiana. Another interesting feature –rivers flowing from east to west– is the fact that the Oyapock, Maroni and Suriname Rivers are joined in their mouth by another river: the Urucauá, Mana and Nickerie (Marataka) Rivers, respectively.

2.2 The geological setting

Geological research in the Guianas started during the 19th century but has been hampered by the application of dissimilar terminologies as to each Guiana. The founding of the National Mining Companies in both Suriname and French

35 See the travels of Jean-Baptiste Leblond (Hurault 1965) or Raymond Maufrais (2014).

Guiana during the latter half of the 20th century has increased scientific research concerning natural sources (e.g. water, bauxite, gold, oil). As mentioned above, the eastern Guiana Shield possesses a vast Precambrian crystalline rock core with an altitude of between 50 and 900 m. At its foot, a succession of Tertiary and Quaternary deposits represents a changing littoral zone generally situated below 50 m in altitude. Three geological formations are distinguished in a north-south cross-section of the Tertiary and Quaternary belt: (a) the Pliocene White Sand Formations, (b) the Pleistocene Plain and (c) the Holocene Plain (Wong et al. 1998:77, Fig. 1). This classification is adopted here because it is suitable for an archaeological perspective (e.g. different habitats, exploitation areas). However, Cayenne Island and, to a lesser extent, the coastal plain near Kourou are exceptional features in this littoral setting. These important Precambrian outcrops represent table mountains which stand alone in the Atlantic Ocean and also include Pleistocene and Holocene deposits.

2.2.1 The Precambrian Shield

When ascending the Guiana rivers, an important rapid frequently marks the transition between the interior and the lowlands. However, as mentioned above, this does not apply to the Island of Cayenne or Kourou which are home to impressive table mountains (e.g. Mont Mahury, Cabassou, Montabo, Mont Grand-Matoury, Montagne des Pères and the Devil Islands respectively). In general, the geomorphology of the Precambrian Shield is dominated by means of a series of step-like planation surfaces which can be followed over large distances (Krook and Zonneveld 1998). These surfaces are laterite-capped and constituted once vast peneplains. The presence and individuality of each planation surface can be established by means of the following criteria: (a) they normally consist of peneplains which bevel various geological formations and rock types, (b) they have a fairly constant altitude, albeit they may display a slope of several promilles and (c) a pronounced escarpment often separates each peneplain from the next younger one.

The Precambrian crystalline core consists of rock formations, of which the Granitoid Formation represents the solid foundation of the Shield. The Paramaca Formation borders the coastal zone. The latter formation is of particular interest as it consists predominantly of chloritic green tuffs (Choubert 1974:27–34), often referred to as the “greenstone belt.” The prehistoric Amerindian population often extracted it as raw material for axes, hatchets and chisels. This Paramaca Formation is part of the northern belt (Fr., *chaîne septentrionale*) and forms the youngest Precambrian formation. It consists of superimposed volcanic and sedimentary layers (metapelits and metagrauwakes) which have been vaulted through tectonic movements and subjected to metamorphisation. As to the majority of massive greenstone rock in the Guianas, a ferralitic soil developped in the uppermost part of these formations. The weathering of this rock has created a kaolin clay coating which is rich in iron oxides and aluminium as well as pegmatite veins. At the highest parts, the clay coating has been washed away allowing the unaltered bedrock, or duricrust, to submerge from which the tabular shaped mountains and inselbergs originated. The sites of Crique Sparouine and Cimetière paysager Poncel are located at the summit of small tabular shaped mountains.

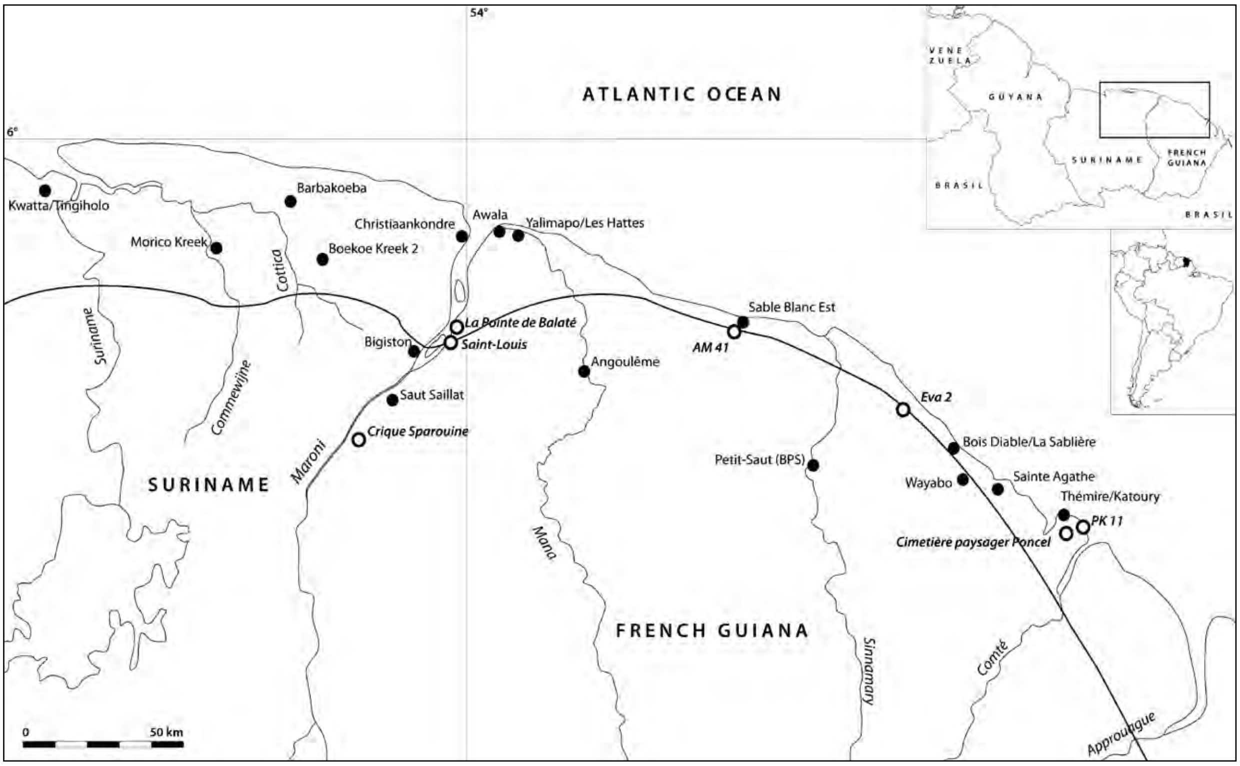

Figure 2.1. A schematic map of the area located between Paramaribo and Cayenne, including the archaeological sites discussed in the present publication. The black line indicates the approximate limit of the coastal zone between the Atlantic Ocean and the Precambrian Shield.

2.2.2 The White Sand Formation

The white sand savannah belt coincides with the outcrops of the Zanderij Formation and represents a rather flat, slightly undulating landscape, also known as the Cover Landscape.[36] The latter landscape comes with specific ombrophilic vegetation which has very frequently changed into a secondary forest because of (recent) human occupation. Its deposits consist of white bleached and brown loamy non-bleached angular quartz sands. These are encountered on flat hilltops, or plateaus (and alluvial fans), that vary between *c.*15 and 45 m in height (D., *Coesewijne Series*; Fr., *Serie détritique de base*; E., White Sand Series). These so-called giant podsols are dated to the Pliocene in Suriname and to the Pleistocene in French Guiana, indicating that the origins of this formation are still uncertain (Boyé 1963; Blancaneaux et al. 1973; Palvadeau 1999; Wong et al. 1998).

In French Guiana, two white sand belts are currently hypothesized: (a) a younger belt (~133 ka) situated between Saint-Laurent du Maroni, Mana, Organabo and Iracoubo, measuring between 15 and 25 m in height and (b) a much earlier belt (330 ka) is located to the south of the former belt. It measures from 35 up to 45 m in height and is positioned roughly between the Lower Kourou River and the Plateau des Mines at the Maroni River. According to Palvadeau (1999:136, 141), these white sand deposits could once have been coastal dune formation as we can observe today in Céara, Brazil: 'Il est donc envisageable que le long des côtes guyanaises se soit développées en période de haut niveau marin des dunes éoliennes littorales, peut-être dans des conditions climatiques sensiblement plus sèches.'

36 'A landscape is an area, which as a result of its specific geological origin, morphologically forms a unit, characterized by a special rock formation and a variation in soil conditions and vegetation typical of this area' (van Eyk [1957] in de Boer 1972:12).

Today, the known Archaic sites in French Guiana are located on these white sand belts. The Eva 2 site is situated on the lower younger belt and the Plateau des Mines site on the older inner belt, based on their mean sea level heights (MSL). When observing the impressive escarpments, still visible along the national highway (RN 1), we may conclude that between Iracoubo and Organabo, and to the east of Mana, the younger white sand belt has been subjected to significant (marine) erosion.

2.2.3 The Coastal Plains

The landscape of the Coastal Plains, both Old and Young Coastal Plains, includes four principle geomorphological elements (Brinkman and Pons 1968:6; Wong et al. 1998:84, Table 2):

a. *Beach ridges*. Narrow elongated ridges of sand or shells are formed along deep parts of the coast. Their tops reach to highest wave level, i.e. between 2 and 4 m above MSL. When the coast eroded during their formation only one or two ridges occurred on the edge of the clay flat. Under accretive conditions, broad bundles of deep-rooted ridges are formed. Their maximum height measures 3.5 m. In French Guiana, abandoned sand ridges are referred to as *cheniers* and in Suriname as *ritsen*.[37]

b. *Marine tidal clay flats and marshes*. During accretion, they develop from uncovered mudbanks positioned in front of the coast into brackish and salt Rhizophora and Avicennia marshes. Once cut off from sea water and subsequent desalinization, they evolve into clay marshes with fresh water forests or grass swamps covered with a thin pegasse or peaty layer.

c. The *natural levees* of the rivers and estuaries as found as broad to narrow bands parallel to the rivers with mainly silty clay textures. They are silted up to above mean high tide level and carry an evergreen seasonal forest.

d. *Peat swamps*. Eustatic peat is formed in back swamps on top of tidal clay flats under the conditions that prevail during a relative rise of the sea level. Very poor drainage conditions in large areas lead to the formation of ombrogenous peats with swamp vegetation.

A complete geomorphologic landscape thus includes each of the elements described above. Due to incomplete development or partial erosion, merely poorly developed elements or remnants may be found as is the case in French Guiana (Palvadeau 1999). The coastal plain of the three Guianas consists of a series of such geomorphologic landscapes, sometimes incomplete.

The soils of the Young Coastal Plains and Old Coastal Plains are formed on Demerara and Coropina (Coswine in French Guiana) sediments dating from the Holocene and Pleistocene eras, respectively. The Old Coastal Plain soils of the Coropina Formation are described as deeply developed, sticky and intensely red-mottled clays (Fr., *arigles bariolées*). In French Guiana, the Pleistocene is divided into *Coswine supérieur* and *Coswine inférieur*, coinciding with the division of the Coropina Series in Suriname into the (higher) Lelydorp and the (lower) Para landscapes (Boyé 1963). The former sand deposits represent early coastal barriers

37 According to Marie-Thérèse Prost (1992:398), the term *chenier* is derived from the French Creole population in Louisiana (USA), where the sandy ridges of the Mississippi were covered with oak trees (Fr., *chênes*).

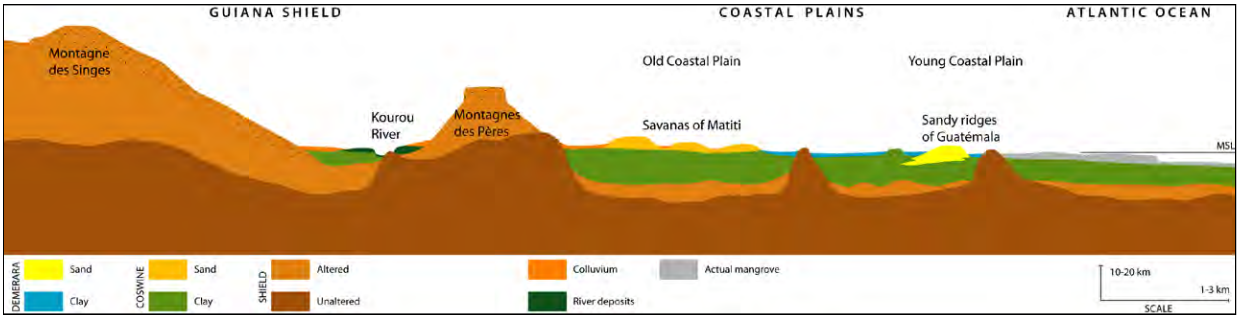

Figure 2.2. A schematic cross-section of the Coastal Zone and Guiana Shield representing the geologic formations near Kourou (after Cautru 1994). A similar cross-section as to Suriname can be found in Wong et al. (1998:86).

(Fr., *barres pré-littorales*). During the Wisconsin glacial these barriers were eroded by means of small rivers and creeks forming the characteristic dissected landscape that was partly filled up afterwards (Wong et al. 1998). They measure between 5 and 15 m high above MSL and generally overlook the surrounding younger swamps filled with Holocene sediments. Any transgressions in these fine sand deposits, indicating its age, partially eroded the Old Coastal Plain.

The Young Coastal Plain soils of the Demerara Formation are shallow and consist of physically hardly ripened clays (marine and estuarine) with reduced, soft subsoils which have been deposited during the Holocene sea level rise. In French Guiana, these deposits have been divided into recent (Coronie) and the earlier Demerara (Mara) deposits; the former comprise the saline soils whereas the latter comprise the desalinized older soils which display soil formation. The presence of *cheniers*, arranged in bundles, and apparently closely related to the river mouths represent old beaches and highly characterize the Young Coastal Plain (Wong et al. 1998). These beaches have transformed into *cheniers* because of a renewed accretion of the mudflats at large. The ocean current transports this mud, with its Amazonian origin, in steadily westward moving mud-shoals, as can still be observed today (Prost 1989, 1992).[38]

In Suriname, subsequent phases within the evolution of the Recent Demerara deposits were detected by means of pedological methods and named Wanica, Moleson and Comowine (Brinkman and Pons 1968:31–36). The Mara deposits consisting of clay and peat that developed during the start of the Holocene era preceded these Coronie deposits. In western Suriname, the first appearance of shell ridges and clays attributed to the Wanica phase and has been dated to between *c.*6000 and 3000 BP. The following Moleson deposits, dated in the vicinity of the Hertenrits archaeological site, were deposited between 2500 and 1300 BP. The beginning of the Comowine transgression is dated just before 1000 BP and continues to the present day (Versteeg 1992). Versteeg also pointed out that the end of the Moleson sedimentation was not synchronous along the Surinamese coast (Versteeg 1985:737). He describes a shift from east to west that ends at 2000 BP near the Burnside habitation mound and at 1300 BP near the Hertenrits site, revealing an east-west sedimentation pattern. It is very probable that similar shifts did exist in French Guiana; geological research near the Sinnamary and Kourou Rivers confirms the existence of the Moleson transgression, dated between 2700 and 500 BP (Palvadeau 1999:89).[39]

38 Roeleveld and van Loon (1979), Augustinus (1980) and Rine and Ginsburg (1985) have studied the coastal dynamics of Suriname.

39 The uplift of the Guiana Shield in French Guiana of 0.01 mm per year has changed the height of the geological formations when compared to MSL as well as to similar deposits in Suriname (Palvadeau 1999).

2.2.4 The River Terraces

The Maroni and Sinnamary Rivers have either river terraces or old alluvial plains consisting of Tertiary and Quaternary deposits. The Maroni River –which has been subjected to more scientific research than the Sinnamary River on this matter– features terraces along the entire river trajectory: between Pilima Pata upon the Upper Lawa until the village of Saint-Laurent du Maroni. The alluvial sediments have been deposited during glacial periods when erosion and sedimentation are more active. The rivers transport such a quantity of sediment that they also deposit it along their trajectories. In the course of the interglacial periods, the river erodes or cuts into the earlier deposited sediments, thereby forming its terraces.

De Boer (1972:23–28) and Palvadeau (1999:166–174) distinguished four terraces with regard to the Maroni River (T1-T4), based on their relative height during the midst of the dry season:

a. The *High Terrace* rises at 20 to 30 m above the riverbed. It consists of coarse grained gravel covered with sandy clay (4 m above MSL);

b. The *Medium Terrace* is situated between 5 and 14 m above the actual Maroni level. It also consists of gravel and is covered with sandy clay (6 m above MSL);

c. The *Intermediate Terrace* is found within the Medium Terrace deposits and measures 14 m in relative height. This not very thick alluvial formation is composed mainly of clayey sand. T1, T2 and T3 date from the Pleistocene age;

d. The *Low Terraces* date from the Holocene era (between 10,000 and 8000 BP). They are found at *c.*5 m in relative height above river level and consist mainly of sandy clay.

Below the terraces, the streambed develops (alluvial) flats composed of silty clays. These are often flooded during the rainy season and thus form levees (riverbanks) and alluvial fans. Despite the fact that these flats are fairly recent, they already show a clear pedogenesis whenever its soils have not been eroded by sedimentation. The sites of Chemin Saint-Louis and La Pointe de Balaté are located on the Low Terraces, overlooking such a flat. At present, a large number of Lokono and Kali'na villages (e.g. Bigiston, Balaté, Village Pierre), are located on the terraces of the Lower Maroni River (Kambel and de Jong 2006; Armanville 2010) as is the village of Saint-Laurent du Maroni itself.

2.2.5 The pedogenesis

This section on pedogenesis includes a short introduction to the terminology applied in the following chapters in order to describe soil processes on the excavated sites. Although multiple elements generate pedogenesis according to de Boer (1972), its most important factors in eastern Suriname are the following:

a. *Bioturbation*: the mixing of soil components by animals very active in well-drained soils.

b. *Appauvrissement*: the removal of clay from the A-horizon without any correlative accumulation in the B-horizon; nearly all soils show an increase in clay content from surface to subsoil. In general, it can be stated that

<table>
<tr><th colspan="3">Coastal Plain Suriname</th><th>Age (years BP)</th><th colspan="2">Plaine côtière guyanaise</th><th>Age (years BP)</th></tr>
<tr><td rowspan="4">DEMERARA</td><td rowspan="3">Coronie</td><td>Comowine</td><td>Recent</td><td colspan="2" rowspan="4">DEMERARA</td><td rowspan="4">Holocène</td></tr>
<tr><td>Moleson</td><td>2500 - 1300 years BP (Versteeg 1985)</td></tr>
<tr><td>Wanica</td><td>6000 - 5500 yrs BP and 3500 - 3000 yrs BP Brinkman & Pons 1968)</td></tr>
<tr><td colspan="2">Mara</td><td>Holocène (older than 6000 years BP; Brinkman & Pons 1968)</td></tr>
<tr><td rowspan="4">COROPINA</td><td rowspan="3">Lelydorp</td><td>Lelydorp Sand</td><td rowspan="3">Eemien 120,000 years BP (Brinkman & Pons 1968; Veen 1970)</td><td rowspan="4">COROPINA-COSWINE</td><td>Supérieure (cordons sableux)</td><td>Eémien sup. (Boyé 1963)</td></tr>
<tr><td>Clayey Santigron</td><td rowspan="3">Inférieure (argiles à lentilles de sable)</td><td rowspan="3">Eémien inf. (Boyé 1963)</td></tr>
<tr><td>Clayey Onoribo</td></tr>
<tr><td colspan="2">Para</td><td>Holsteinien 300 - 350,000 years BP or 48,000 years BP (Brinkman & Pons 1968)</td></tr>
<tr><td colspan="3" rowspan="2">DE ZANDERIJ SANDS</td><td rowspan="2">Pliocene (2 to 5 Ma) (Wijmstra 1971)</td><td rowspan="2">SERIE DETRITIQUE DE BASE</td><td>Série des sables à faciès Zanderij</td><td>Pléistocène moyen 300-120,000 yrs BP (Boyé 1963)</td></tr>
<tr><td>Série des sables micacés</td><td>Pléistocène inférieur 1,8 Ma – 700 ka BP (Boyé 1963)</td></tr>
</table>

Figure 2.3. A schematic overview of the stratigraphy of the Holocene Series in the Coastal Plains of Suriname and French Guiana (after Palvadeau 1999:32).

superficial erosion has contributed to the coarser texture of the A-horizons. A surface wash, however, that deprives the soil of its finer constituents affects only the immediate surface.

c. *Lessivage*: the process of migration and deposition of unaltered clay-sized particles in the soil profile. This process is often related to a climate in which the soils become either thoroughly or partially dried during a certain season. It refers to an important pedogenesis during a drier period such as a Late Glacial Period as witnessed on the Old Coastal Plain (Veen et al. 1971).

d. *Ferrallization*: a complex process, principally composed of hydratation, hydrolysis and oxidation of primary minerals, followed by leaching of the liberated bases and silica. Here the neosynthesis of goethite, kaolinite or gibbsite is a characteristic phenomenon.

e. The *podzolization* results in the formation of podzols or spodosols. A distinction can be made between humus podzols and iron podzols but both podzols occur under hydromorphic conditions. In the very common first type humus has accumulated, but iron is almost absent. An (illuvial) accumulation of iron characterizes the second type, while humus accumulation is not detectable.

f. The *anthropogenic soils* (dark earths or *terra preta*) are characterized by means of its black surface layer which often contains archaeological material. They occur on well-drained and imperfectly drained soils, such as river terraces. This black colour is the result of (intentional) soil enrichment by means of household garbage, dung as well as the refuse of hunting and fishing, as suggested by the *terra preta* pioneer Wim Sombroek (1966) with regard to Lowland Amazonia. De Boer was the first to pay attention to this phenomenon in Suriname and analysed two *terra preta* profiles both yielding ceramic material just below the surface. During the last two decades, *terra preta* studies in Greater Amazonia have focussed principally on its origin and chemical components (Lehman et al. 2003; Glaser and Woods 2004; Woods et al. 2009).[40] A more extensive introduction to *terra preta* as well as the results of the chemical analysis performed on dark earths from the site of Chemin Saint-Louis will be presented in Section 5.2.2.

2.3 The coastal vegetation

The vegetation of the Guiana coast follows a systematic sequence dictated by means of various geological formations. We will describe here the types of vegetation as presented by Jean-Jacques de Granville (1992) with regard to French Guiana with an adopted classification as proposed by Jan Lindeman (1955) regarding Suriname.[41] From the sea towards the interior, one finds:

a. *The vegetation of the Young Coastal Plain.* The sandy beaches are colonized by rampant herbs, mainly *Ipomoea pescaprae* and *Canavalia maritime*, or sea beans. *Avicennia germinans*, or black mangrove, grows on the mud banks along the coast, dominating the coastal mangrove. Cypéracées (*Eleocharis mutate*, *Cyperus articulates*, *C. giganteus*) and ferns (*Acrostichum aurem*, *Blechnum indicum*) dominate the vast coastal swamps, or "wet savannahs." In certain swamps we can observe isolated bushes consisting of trees such as fat pork (*Chrysobalanus icaco*) and corkwood (*Pterocarpus officinalis*). The *Virola surinamensis* and *Symphonia globufera* dominate the inundated forests or wooded marshes. The manicole palm, or açai (*Euterpe oleracea*),

40 In French Guiana, a dissimilar pedogenetical terminology and criteria for subdivisions are applied. In short, De Boer (1972) focussed especially on the soils displaying consistencies with eastern Suriname: the *sols podzolisés* are similar but have different diagnostic criteria dealing with the characteristics of the B-horizon; the *podzols à gley* are also found here. The *sols ferrailitiques* are related to oxisols and may include soils with an argillic or with a cambic horizon. The *sols ferrallitiques fortement désaturés* is a subdivision including all well drained soils. They are characterized by means of a number of exchangeable bases and are subdivided in groups, i.e. *typique*, *remaniée*, *appauvrie*, *rajeunie* and *lessivée*. The *sols hydromorphes* have no equivalent in Suriname since it affects the majority of soils and constitutes the essential aspect of pedogenesis. The *sols hydromorphes à gley* correspond to soils where the groundwater oscillates at a shallow depth.

41 Lindeman (1955) formulated four types of vegetation: (a) the marsh, or seasonal swamp, forest, (b) the savannah vegetation, (c) the rainforest and (d) the secondary forest.

can indeed form entire mono-forests (Fr., *pinotières*). These marshes as well as areas along the rivers also feature the renowned moca-moca (*Montrichardia arborescens*) and the majestic *Mauritia flexuosa*, or ité palm. Upon the sandy ridges of the Young Coastal Plain we find richer vegetation consisting of *Parinari campestris* and *Triplaris surinamensis*. The *Rhizophora racemosa*, or red mangrove, dominates the riverine estuaries. Higher up the river, however, we also find the ité palm and corkwood intermingling with the mangroves.

b. *The vegetation of the Old Coastal Plain.* This plain with its higher location consists of: (1) old swamps and forest on well-drained higher, sandy ridges and (2) lower lying swampy soils on the flats representing both so-called "dry savannahs." The higher savannahs consist of grasses and herbs dotted with small paper trees (*Curatella americana*) whereas the lower savannahs occur more frequently but come with poorer vegetation consisting of Cyperaceae shrubs (*Byrsonima verbascifolia* and *Byrsonima crassifolia*).

c. *The vegetation of the White Sand Formations.* These old estuary deposits consist mainly of white quartz sand. They are principally populated by xerophilic forest, or "wallaba forest" (*Eperua falcate*), known as *wapa* (C.) in French Guiana. However, shrubs (*Clusia fockeana* and *Humiria balsamifera*) dominate the lower white sand deposits and even the high savannahs.

d. *The vegetation of the Precambrian outcrops.* As stated above, the Precambrian hilltops reach the Atlantic Ocean on Cayenne Island and Kourou in central French Guiana. Nevertheless, the vegetation of the summit does not differ from that of the Precambrian Shield on ferralitic soils. Thus, the diversity of trees expected in the interior can also be encountered at these outcrops.

e. *The secondary forest.* It is to be suspected that since their arrival in and appropriation of the coastal plain *lato sensu* more than at least 7000 years ago the prehistoric Amerindians did cut and burn down or modify the above-mentioned types of vegetation. Therefore, we must add here the concept of *kapoewerie* (Sr.), i.e. secondary vegetation, as Lindeman (1955) suggests.[42] Today, the secondary forest is often the result of shifting cultivation. Moreover, it is also frequented after abandonment as many fruits and other useful plants can still be gathered (P. Grenand 1981; Balée 1989, 1992; Rios et al. 2001). In its first stage, after abandonment, it frequently consists of a seedling crop of species that require much light in order to germinate. After several years a slender-stemmed forest develops, which very gradually regenerates into a rain forest, but seldom into a savannah. The period of land use spans between two and five years to the most. The fallow period may vary from between several decades to less than ten years.

These cultivated grounds or gardens (Fr., *abattis*) are usually situated on well-drained soils such as hilltop flanks or sandy elevations near the villages; as far as 5 km out of the village is not considered to far for Amerindian, Maroon and Creole populations. In French Guiana, the local population cultivates the land primarily

42 *Kapoewerie* is the Surinamese Dutch term for an abandoned garden claimed by the forest which still provides food. It is derived from the Portuguese *capoeira* that refers to the place of the "old garden".

for their own needs but also to supply the local market. In 1978, approximately 5000 Hmong refugees from northern Laos and Vietnam settled in French Guiana. They soon controlled the local fruit and vegetable market (Géraud 2000).

2.4 The archaeological landscapes

This section provides a geological chronology of the coastal plain emphasising how and when prehistoric Amerindians might have experienced and utilised it. In addition, it allows us to present (a) a chronological description of the geomorphologic development and (b) the climatic changes that occurred in the coastal zone.

The first peopling

Although scholars have much debated the arrival of mankind in the South American continent, the earliest radiocarbon dates go back as far as 40,000 years BP with regard to the Late Pleistocene.[43] The reconstruction of climatic changes in Greater Amazonia suggests that around this date the climate must have been warmer and more humid. The Last Glacial Maximum (LGM) dated between 20,000 and 18,000 BP evolves into the actual interglacial stage in *c*.12,000 BP (Hewitt 2000). It became much drier after the LGM between 17,000 and 14,000 BP (Ledru 1993:94). After 12,000 BP we observe a much more humid and cooler climate.[44] By this time, all archaeologists generally agree on the fact that the Paleo-Indians inhabited the Guianas (cf. Section 3.4).

This Paleo-Indian population is mainly found in the interior of the Guianas such as the Sipaliwini and Rupunini Savannahs. With regard to these upland areas, recent sedimentary studies indicate that a dry and cold climate was still present here in *c*.11,700 BP (Montoya et al. 2011) and that this did not change before 4300 BP (Nogué et al. 2009). However, these open spaces render a pedestrian survey more successful. This perhaps biases the fact that these early hunter-gatherers did not inhabit the humid forests or the coastal zone. Indeed the Old Coastal Plain had been deposited. The Precambrian outcrops were probably accessible to humans. Nonetheless, to the present-day, we find no artefactual evidence of Paleo-Indians in the coastal plain.

The Early Holocene or the Meso-Indian way of life

The transition from the Late Glacial to the Early Holocene is marked by a relatively rapid warming trend. Beginning in 10,500 BP, it culminates between 7500 and 5200 BP (6300-4000 BC). It is eventually followed by a gradual cooling down period that continues to the present-day (Wijmstra and van der Hammen 1966; Roeleveld 1969; Bush et al. 1990, 2008; Tardy 1998; Ledru 2001). In the Early

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43 The survival of vegetation during the LGM is much debated too. On the one hand, the Refuge Theory suggests a separation of the Amazonian forest into multiple small, isolated forests by means of large open spaces which come together again during the Quaternary (Haffer 1969). On the other hand, too little geological data are available in order to support a contraction of the Amazonian forest linked to a drier LGM (Bush and Oliveira 2006). Modelling of the paleo-vegetation based on the climate and the concentrations of CO2 suggest a humid dense forest during the LGM (Mayle 2004). See also note 64.

44 Between 11,000 and 10,000 BP, this cooler climate "disappeared". This could be related to the Younger Dryas event (Ledru 1993).

Holocene, this trend resulted in a regular rise of the sea level, i.e. between 1 and 2 m per century, caused by an increased precipitation and steady melting of the ice caps as well as a consequent eustatic transgression (van der Hammen 1974). Various sea level curves have been presented, but it is generally accepted however that the sea rise flattened out in *c.*6200 BP (*c.*5100 BC) when the current level was reached (Roeleveld and van Loon 1979).

The deposition of Amazonian clays by the long-shore drift of the South Equatorial Current (SEC) was not important prior to the flattening of the sea level rise in 6200 BP. Therefore eustatic peat covered the Old Marine Clays, especially in Guyana and the Orinoco Delta. Throughout the Early Holocene, the littoral of the Guianas thus formed one, extended mangrove woodland to which the sea had easy access.[45] Soft humic (pyrite rich) clays were deposited under a growing vegetation consisting of red mangrove (*Rhizophora mangle*; Mara Formation) (Tissoti et al. 1988:135). Pre-Columbians could indeed have exploited this mangrove which most certainly at the time the sea rise had flattened out: just before 6200 BP. Archaeological sites now appear along the littoral of Guyana (Alaka Phase) revealing the exploitation of the mangroves by means of large shell middens (Evans and Meggers 1960; Williams 2003). Albeit situated more towards the interior upon the White Sand Formation, the Archaic sites of Eva 2 and Plateau des Mines in French Guiana reveal no tangible shell litter, only large amounts of quartz debitage, chopping tools, grinding tools and earth ovens. On the Pleistocene ridges, no artefacts have been found at all. However, radiocarbon dates from this era occur on LCA sites located at these ridges (e.g. the site of PK 11 on Cayenne Island) and may reveal an earlier human presence as yet not tangible (see also below).

The Late Holocene or the Neo-Indian way of life

Once the sea had reached its present level, the Amazonian floodplain, or *várzea* (Br.), was formed. Now all the Amazonian riverine deposits reached the Atlantic Ocean to be subsequently transported by the SEC along the shore of the Guianas, i.e. the Coronie Formation. At the same time, negative but smooth oscillations of the sea level did occur at various dates (Brinkman and Pons 1968:8–9; Roeleveld and van Loon 1979). In Suriname three depositional phases were detected implying a rhythmic human occupation in the coastal plains: Wanica (6000-3000 BP), Moleson (2500-1300 BP) and Comowine (700 BP to the present-day) (Brinkman and Pons 1968; Versteeg 1985). The Moleson transgression filled up various river estuaries with sediment whereas the Comowine sediments have been deposited all along the coast (Brinkman and Pons 1968:25). Similar patterns are found to the east in French Guiana (Prost 1992; Palvadeau 1999) and to the west on Trinidad (van Andel 1967).

By now, the river terraces and the Old Coastal Plain had become permanently available for human activities but they were apparently left aside as to permanent installation –but perhaps a research bias is another plausible explanation. Today we find Early Ceramic Age sites upon the river terraces (e.g. Chemin Saint-Louis

45 However, possible Early Holocene standstills or regressions of the sea level have been recorded in the Gulf of Paria about 9510 ± 400 BP (van Andel 1967) for at depth of 20 m below MSL. A similar event has been recorded at the mouth of the Maroni River at about the same depth (22 m). This implies a sandy delta with a possible reef (Nota 1971).

Phase 2) and lateritic outcrops in the coastal plain (e.g. Olga, Cimetière paysager Poncel). As mentioned before, Pleistocene sand ridges have not yet yielded ECA sites, but elements hereof have been found during surveys (van den Bel 2007b). The littoral is as yet heavily influenced by the sea, i.e. the Moleson transgression. After 900 AD, however, once the latter transgression has ended, the LCA population settles the Holocene plains of Suriname and French Guiana. Notably the pre-Columbian population of western Suriname had constructed artificial mounds on the Holocene plains to dwell on several centuries earlier, whereas similar constructions have not been found (yet?) in French Guiana. It is possible that these habitation mounds have existed here but have eroded away.[46]

Spaced cheniers and (wet) savannahs mark the Young Coastal Plain. Thousands of small heaps of soil, known as *champs suréléves* in French Guiana (Rostain 1991), mark these savannahs. Recent multidisciplinary research carried out by Rostain and McKey in similar wet savannahs near Kourou and Organabo has indicated that these savannah soils have been modified and that they represent raised fields in order to grow maize, squash, manioc, sugar cane and bananas (Rostain 2013:183).[47] However, it is also stated that: 'It also shows that studies of the resilience of pre-Columbian anthropogenic legacies need to consider the role of ecosystem engineers [ants] in the preservation of material signatures of past land use' (McKey et al. 2010:6). Hereby some doubt is cast on the anthropogenic origins of these heaps (cf. Section 12.2.2).

Palynological and anthractological research in French Guiana has demonstrated the existence of a series of wet and dry cycles during the Holocene. Several hereof have reduced precipitation phases that occurred on a supra-regional level. These drier periods are associated with the ubiquitous occurrence of charcoal in the forest soils, as has also been identified in French Guiana (Tardy 1998; Ledru 2001; Tardy et al. 2010:108). Extremely wet circumstances have been attested in southwest Amazonia between 1300 and 800 BP, i.e. between AD 750 and 1200 (Colinveaux et al. 1985; Iriarte et al. 2012). Moreover, we see reduced precipitation in southeast Brazil between 800 BC and AD 50 (Bigarella and Ferreira 1985; Ledru 2001:174; Moy et al. 2002; Sifeddine et al. 2001). Similar climatic circumstances/patterns have also been reported in archaeological excavations carried out in northwest Guyana (Williams 1982, 1985) and at various sites in the Lesser Antilles (Malaizé et al. 2011).

In addition the eye catching table mountains, the Old and Young Coastal Plains are also marked by other Precambrian outcrops, such as dolerite dykes, which pre-Columbians now and again utilized as a support for rock engravings (e.g. the Carapa site near Kourou or Crique Pavé at Mont Mahury). The larger table mountains represent habitation and (ring) ditched sites occupied during the ECA and LCA (e.g. Montagne des Pères near Kourou and Mont Grand-Matoury, Mahury, Paramaná) on Cayenne Island. These mountains are excellent

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46 The coastal and estuary zones are still very dynamic and change continuously through erosion or accretion of the land mass. During the low tide shifting mud banks close to the coast fall dry and hamper coastal traffic and fishing. Modern Amerindian villages (e.g. Awala-Yalimapo, Christiaankondre, Langamankondre) are located on these ridges. Certain villages (e.g. Pasikondre, Point Isère), have been abandoned several decades ago due to erosion (Kloos 1971; Cornette 1987).

47 For some reason, the 2010 publication by McKey et al. does not feature bananas and sugar cane which were presented by Rostain of their research at the 22nd International Congress of Caribbean Archaeology held in Kingston (Jamaica) in 2007, but they reappear in *Islands of the Rainforest* (Rostain 2013).

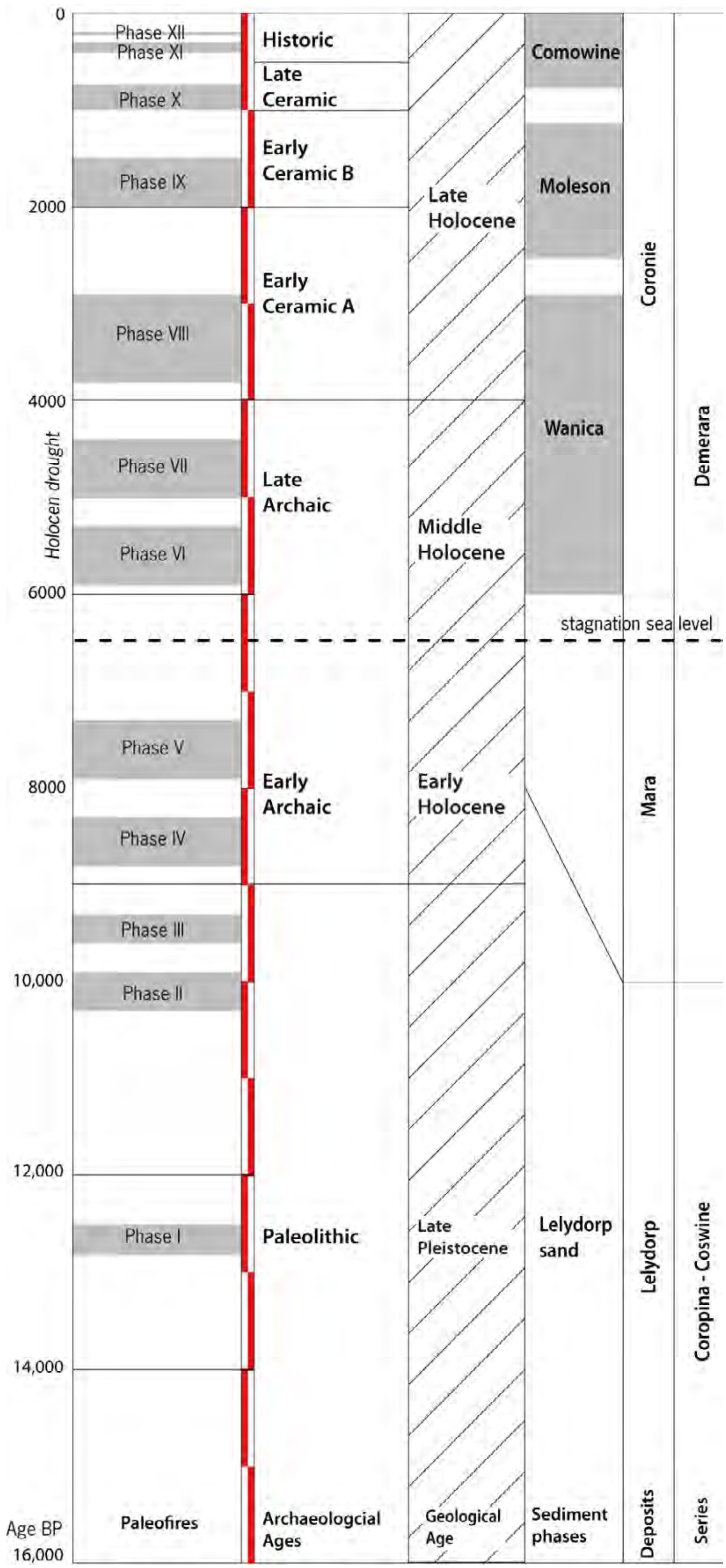

Figure 2.4. The Holocene period with paleofires and archaeological periods after Tardy (1998), Brinkman and Pons (1968:30) and Wong et al. (1998:85).

landmarkers for the pre-Columbian population and may have had various other functions through time. These higher "forest islands," cheniers, dry and wet savannahs, tidal creeks and large rivers provide good quantities of fish, crabs, sea turtles (although protected nowadays) as well as large game (e.g. deer, agouti, peccaries, iguana, armadillo), found in marshes and creeks. Today, gardens located upon the sandy ridges produce manioc, sweet potato, bananas, maize, pepper along with many other edible and/or useful plants.[48]

In sum, the actual littoral is still changing whereas the former littoral has been (partially) eroded or fossilised. Since the Pliocene, not only the discharge of the rivers but also the changes in the sea level have provided an accretion of sediment at the foot of the Precambrian Shield which consists of various geological formations and landscapes each with a distinct vegetation. This entire littoral, fossilised and new, will serve here as the archaeological landscape of the coastal plains, including the Pliocene White Sand Formation, the Pleistocene and Holocone coastal plains, the river terraces and the Precambrian outcrops. Thus, when applying the term "coastal plain" or coastal zone we refer to these components as a whole and not only to the Pleistocene and/or Holocene coastal plains.

48 In order to gain a better knowledge of modern Amerindian gardening and what for instance, the Wayãpi grow in their gardens, see P. Grenand (1979). However, it must be noted that Amerindian crops in Amazonia have changed in time and most certainly throughout the colonial period (Clement 1999).

Chapter 3

A short history of archaeology in the Guianas

3.1 Introduction

Three major stages can be distinguished with regard to the history of archaeological research in the Guianas (Boomert 2000:8–11):

a. The *Early Period* of investigation stretching from the second half of the 19th century to the beginning of the 20th century. It is is characterized by means of the collecting and rudimentary description of artefacts.

b. The *Intermediate Period* represents the initial stratigraphic excavations, classificatory-historical studies and local chronologies. This period is more or less absent in French Guiana but well represented in Venezuela and the Antilles.

c. The *Recent Period* spans between the 1960s and the 1990s. A continuation of chronological studies in addition to the development of stressing the reconstruction of past life-ways, environmental relations and socio-cultural development characterise this period. Although ethnology has played an important role throughout these stages, ethnohistorical studies and anthropology are intensified.[49]

Today, we may add compliance archaeology as stage (d) in French Guiana (Vacher et al. 1998; Jérémie 1997, 2002a, 2007). The same applies to the State of Amapá and Pará (Brazil) that have recently witnessed the development of large scale excavations and the introduction of compliance archaeology, as mentioned before.

3.2 Between the Orinoco and Amazon Rivers

Many European voyagers and naturalists have wandered through Guianas during the 19th century, acquiring a large number of ethnographic and archaeological objects. The majority hereof can now be found in the collections of various European museums to which Museu Paraense Emílio Goeldi in Belém (Brazil) is an important exception. At the turn of the 20th century many Europeans had begun to obtain archaeological and ethnographic information in order to understand the prehistory of the Amerindian population, for example Emílio Goeldi, Henri Coudreau and Curt Nimuendajú in the Territory of Amapá; Jules Crevaux,

49 General overviews of the history of archaeological research in the Guianas and northern Amazonia have been provided by Geijskes (1961a), Barreto (1992), M. Mazière and G. Mazière (1997), Neves (1998), Boomert (2000), Gassón (2002), Migeon (2006, 2010), Rostain (1994a, 2007) and Versteeg (1998).

François Geay and his wife in French Guiana; Christiaan Hering, Claudius de Goeje and Hermann ten Kate in Suriname; William Brett, Everard Im Thurn and Walter Roth in British Guiana; Adolfo Mercano in Venezuela.[50]

From the 1930s on, archaeological research in the Guianas is highly influenced by North American scholars attached mainly to the Yale University and the Smithsonian Institute. The latter institute funded investigations carried out by Clifford Evans and Betty Meggers on the Lower Amazon (1957) and in former British Guyana (1960). The Yale University funded Irving B. Rouse's and his partner José M. Cruxent's (Central University of Caracas) research dealing with the archaeology of the Lower Orinoco River (1958/1959, 1963).[51] Both schools of North American archaeologists applied dissimilar methodologies and techniques when studying their materials or conducting fieldwork primarily based on multiple small-scale stratigraphic excavations of several square meters. It may be evident that, in those days, any infrastructure was completely absent and that field techniques were mainly adapted to transportation:

> *Arch[a]eology in the tropical forest of South America presents, in addition to the usual problems, many difficulties that are not encountered in the more arid or more accessible parts of the New World. Manuals of field procedure and precision methods of excavation technique frequently cannot be followed, and the field situation must be met with an understanding of what is pertinent and what is unprofitable in order to gain the maximum of information in the shortest possible time. Otherwise, one could easily spend a full year in the field and have very little to show for it. This we learned, however, only by experience* (Meggers and Evans 1957:6).

The artefact classifications which North American scholars adopted were based on ceramic material and, to a lesser extent, on lithic material, representing the only artefact readily available in the Neotropics (New World Tropics) due to a better resistance with regard to weathering. Despite the dissimilar methods, both schools aimed at creating ceramic seriations/typologies in order to reconstruct cultural chronologies per region. However, in John Gillin's view, archaeological research was considered random and not systematic at all, as he states in the *Handbook of South American Indians* (HSAI, Vol. 3):

> *The archeology of the Guianas has not been systematically investigated by planned field surveys and coordinated excavations. Our present knowledge is derived from reports of chance finds by ethnologists and travellers, plus a few exploratory excavations. Perhaps because of the relative paucity of European settlements and travel in the interior, the bulk of the finds have been made around the*

50 According to Henri and Paule Reichlen (1943), Jules Crevaux (1883:144, 211) mentioned drawings of the rock engravings of Bigiston for the first time when travelling up the Maroni River in 1877. In 1882, these petroglyphs were drawn by Constantin Hering (Versteeg 2003:43). Charles Fredrick Hartt (1871:139–147) published rock art drawings reproduced by Senhor Penna, member of the Pinto de Gaya expedition in 1728, as encountered at the Montagne d'Argent (M. Mazière 1996:28). However, Edithe Pereira actually discovered this as a researcher for the Museu Paraense Emílio Goeldi. Published in 1992 it was rectified in the erratum of the *Bilan Scientifique Régional de Guyane* 1997 (2000:42). For further information on early French naturalist explorers in French Guiana and the French Lesser Antilles, see also the papers presented by Lucile Allorge, Bruno Bordenave and Michel Hoff (2001) as well as the article by Jean Lescure (2001) in: *L'exploration naturaliste des Antilles et de la Guyane*, edited by Jean-Loup d'Hondt and Jacqueline Lorenz, respectively.

51 For further reading on the influences of the "American School" and on the influence of the French School on Brazilian archaeology, see Cristiana Barreto (1998).

> *geographical margins of the area. In the absence of a comprehensive picture of the actual archeological resources of the interior, statements regarding prehistoric distributions of culture and population for the Guianas as a whole must remain highly tentative. Furthermore, chronological determinations are almost entirely lacking. Typological divergence of artefacts from types used by historic tribes implies prehistoric status, of course; but, although typological cross-dating to dated sites outside the Guianas seems to offer an approach to a more refined prehistoric chronology, it has not been accomplished successfully, nor as yet hardly attempted* (Gillin 1948:819).

Although radiometric dating was on the brink of being discovered after W.W. II, Betty J. Meggers and Clifford Evans applied relative dating through superposition in combination with a detailed pottery description in order to fulfil their scientific aspirations (Evans 1950). They had adopted the type-variety method, also known as "Fords quantitative method", regarding pottery studies as numerous North American researchers had done in other regions (e.g. Mesoamerica). This method was developed in the southwest of the U. S. A. by James Ford and Alfred Kidder who were highly influenced by the works of Leslie White on human evolution and diffusion (Ford 1962; Kidder 1962; Evans 1955:33–39). Ripley P. Bullen introduced this method to the Antilles during the early 1960s (Bullen 1962, 1965; Haag 1965).

The ideas on evolution and diffusion formed the theoretical basis for the cultural and geographical division Julian Steward had created regarding South America. He stated in the HSAI that 'Marginal Tribes' inhabited the Tropical Lowland of South America (Steward 1948:883–888, 1949:762). Although complex societies had been recorded in eastern Bolivia by Alfred Métraux and Paul Kirchhoff (1948) –published in the same HSAI volume–, Steward refused to accept these facts. According to the latter, the Tropical Forest Cultures (TFC) formed a devolution from the Circum-Caribbean tribes which had devolved from the Andean culture. This theory was later discarded by Irving Rouse (1953:196), but Meggers and Evans choose Steward's side.[52] They opined, by means of the mere observation of present Amerindian life that chiefdom-type society had to devolve towards tribes because of a tropical forest environment that limited these populations to witness a socio-political and technological evolution (Meggers 1954:807–812; 1971:144–146; Meggers et al. 1988:291). According to Meggers, following her description of lowland ecology, two types of groups inhabited Lowland Amazonia: (a) the Marginal Tribes, i.e. nomadic bands wandering in the useless swamps and savannahs looking for food, and (b) a second group inhabiting the forest with its economic or agricultural potential. This enabled a higher sedentary population and would allow pottery, basketry and weaving to develop. A family organisation with a chief and a shaman as leading authorities represents this TFC (Meggers 1954:803).

In 1970, Donald Lathrap proposed another vision as published in *The Upper Amazon*. In it he stated that the Amazonian floodplain was actually at the origin of ceramics and agriculture. His cardiac-model indicated that Central Amazonia had been occupied continuously and densely since the Middle Holocene, contradicting Betty Megger's views in every possible manner (Lathrap 1970;

52 Curt Nimuendajú mentions interconnected and large archaeological dark earth sites on the Lower Tapajós River during expeditions in the 1920s along the Lower and Middle Amazon River (Nimuendajú 1949, 2001).

Myers 1973; Lathrap and Oliver 1987). Although Lathrap's vision was original and later proved to be correct at least with regard to the earliest ceramics, his theory was based on stylistic and/or aesthetic ceramic evidence in which complex societies create more elaborate ceramics. Anna Roosevelt (1980) later discarded this opinion. However, both Meggers and Lathrap did not approve of two cultural hearths in northern South America as is now suggested with regard to the Lower Amazon and northern Colombia (see Neves 2008).

Furthermore, Lathrap (1970) ascribed prehistoric linguistic movements to ceramic complexes in which the Barrancoid ceramic series represent the Maipuran speakers that dispersed from the Middle Amazon throughout the first millennium BC. Another linguistic movement Lathrap proposes concerns the late prehistoric Cariban expansion (from AD 500 on). It is correlated to the Arauquínoid ceramic series and is finally encountered by the first Europeans. According to Lathrap, the latter expansion is also linked to the utilization of raised fields to enable food production (Lathrap 1970:127, 160–165). Rouse later rejects the linguistic affiliation of ceramic complexes because similar ceramics can be produced by dissimilar linguistic groups (Rouse 1986:110; Bowser 2002).

The TFC and cardiac-model confronted Meggers and Lathrap who soon launched themselves into a short-lived scientific debate on the Mabaruma Phase in former British Guyana.[53] Evans and Meggers (1960, 1964) defined the latter ceramic phase according to variations in temper modes whereas Lathrap (1964, 1966) studied the same material from a style-morphological point of view. His results, combined with the regional (absolute) chronology presented by Rouse and Cruxent, suggest that (a) the Mabaruma Phase is related to the Barrancas styled ceramics of the Lower Orinoco and (b) it is to be dated *c.*500 BC instead of AD 500 as Evans and Meggers propose by means of relative dating.

On the other hand, Irving Rouse, having discarded Steward's Circum-Caribbean theory, adopted a cultural-historic approach when studying pre-Columbian cultures in which culture areas –as defined by Gordon Childe– were of eminent importance. Rouse developed a systematic line of research focussing primarily on the modal classification of pottery in order to establish a chronology that, at that time, was considered an important innovation with regard to American archaeology (Willey and Sabloff 1974). In the Caribbean, Rouse carried out small scale stratigraphic excavations in arbitrary levels. In eastern Venezuela he conducted research in collaboration with José Cruxent. This resulted in the construction of a chronological framework for the entire Caribbean region, including the northwestern Guianas (Rouse 1939, 1952, 1992; Rouse and Cruxent 1963; Rouse and Alegria 1990; Rouse and Morse 1999).

After this wave of archaeological research, often carried out along the banks of the most important rivers of northern South America, local archaeologists continued their work during the late 1960s and throughout the 1970s, focussing on the regional chrono-cultural framework. Here we must mention Alberta Zucchi, Mario Sanoja Obediente, Iraida Vargas, Erika Wagner with regard to Venezuela and Eurico Miller, Peter and Klaus Hilbert together with the PRONAPA Project regarding Brazil. During this period, new goals were aimed at in attempt to move

53 This discussion was finally abandoned when Conceição Gentil Corrêa and Mario Simões (1971) discovered the Mina ceramics at Salgado (Pará) during the late 1960s. The radiometric dates from the latter excavations have also allowed us to redefine the Alaka Phase ceramics in British Guyana as a formative ceramic complex (Williams 2003).

away from the merely adjusting the cultural chronology carried out by North American scholars. One now searched for other characteristics of cultures (e.g. subsistence modes and paleo-environment) by means of ethno-archaeology or by employing field techniques, thus establishing a second wave of North American research (Wing and Brown 1979; Roosevelt 1980, 1991; Roe 1982, Pearsall 1989; Piperno 1989; Siegel 1989, 1992; Oliver 1989).

Midden material which had formerly served to define cultural complexes in the majority of the cases now became subjected to a more ecological adaptive objective that aimed at reconstructing subsistence strategies. Anna Roosevelt, for instance, illustrated that pre-Columbian cultures of the Middle Orinoco and of the mouth of the Amazon River (Marajó Island) had once been populated by complex societies such as chiefdoms (Roosevelt 1980, 1991). Roosevelt picked up the scientific debate against Betty Meggers' "environmental determinism" which Lathrap had left untouched, but also fought their political dominance on Amazonian archaeology in general (Roosevelt 1991:105–125).

The latter research as well as the early historic testimonies of large and complex societies in the floodplains and high river banks stimulated the birth of the *Central Amazonian Project* (CAP) during the 1990s. Amazonian archaeological research became more focused on understanding the social-political organisation of Amerindian societies inhabiting the Lower Amazonian river banks (Barreto 1998; Heckenberger et al. 1999, 2001; Neves 1999, 2008; Heckenberger and Neves 2009). Certain pre-Columbian sites in this area featured very impressive black earth soils, or *terra preta* and *terra mulata*, suggesting an intensive human occupation (Sombroek et al. 2002). These *Amazonian Dark Earths* (ADE) are thought to be the result of an accumulation of all sorts of material that prehistoric Amerindians had discarded which then transformed the natural soil into an anthropogenic soil. Momentarily, the *terra preta* sites are dated between 500 BC and AD 1500. Moreover, they are associated with the Incised Rim and Polychrome Tradition of the Middle and Lower Amazon River, respectively (Heckenberger et al. 2003; Machado 2005; Moraes 2006; Rebellato 2007; Neves 2008; Lima 2008, 2010; Arroyo-Kalin 2008, 2010; Gomes 2008, 2011; Balée 2010; Eriksen 2011; Denevan 2014).

However, the most important conclusion of the last two decades is probably the awareness of the enormous impact of pre-Columbian populations on their environment once thought to be *nihil* (Neves and Petersen 2006). Amerindians have transformed large parts of tropical forest in Amazonia since the beginning of the Holocene through their mobility and consistent presence in certain areas: the existing biodiversity would not have been present without human intervention. Today it is evident that Steward's TFC model which Viveiros de Castro (1996:180) dubbed the 'Standard Model,' is obsolete. Indeed the pre-Columbian society is now considered more complex than c.100 or 50 years ago.

3.3 French Guiana and Suriname

Betty Meggers' and Clifford Evans' work in former British Guyana and Amapá must have inspired Dirk Geijskes, Director of the *Stichting Surinaams Museum* (SSM, founded in 1947), to conduct archaeological research on the Hertenrits site in October 1957. As an entomologist, he had come across archaeological material during road constructions in the vicinity of Paramaribo and the Maroni River. Peter

Goethals (1953), a student of Cornelius Osgood at Yale University, had studied these artefacts which have never been published. Fortunately his manuscript is still available albeit difficult to find (Fig. 3.1).[54] Geijskes continued to excavate archaeological sites (e.g. Commetawanekreek, Onverdacht, Kwatta-Tingiholo, Moengo-Boesmanhill and Wonotobo Falls) but eventually left Suriname in 1965.

When the museum at Fort Zeelandia was inaugurated in 1972, the SSM appointed Arie Boomert to study the archaeological material Dirk Geijskes and his collaborator Frans Bubberman had obtained during the 1950s and 1960s. Boomert also conducted archaeological fieldwork at Wontobo Falls and Amadoekoekasi Kreek. In 1975, he was succeeded by Aad Versteeg whose small scale archaeological operations in the western part of the Holocene plains took place at sites known as Buckleburg-1, Wageningen-1, Peruvia, and Prins Bernhardpolder. Versteeg also excavated in the interior of Suriname, notably at Kauri Kreek where he uncovered ancient, unknown ceramics. The same can be said of the ring-ditched hill site of Pondo Kreek, a type-site shared with French-Guiana (Versteeg 1981; Petitjean Roget 1991; Mestre 1997). His interdisciplinary and processual research was finalized in his 1985 PhD dissertation (University of Leiden) entitled: *The Prehistory of the Young Coastal Plain of West Suriname.*

Versteeg, who continued to work in the Netherlands Antilles, returned two decades later – after the civil war– to Suriname in order to participate in Stéphen Rostain's research program (Rostain and Versteeg 2003). He further recorded rock engravings discovered at the *Werehpai* rock shelter located to the east of the mixed Trio village of Kwamalasamutu in the southern part of Suriname. Meanwhile, Boomert continued his studies concerning ceramic material stored in the Museum of Paramaribo despite the fact he was first working on Trinidad and Tobago and later in the Netherlands. Boomert presented important scientific papers on the Hertenrits site (1980), the Koriabo complex (1986), and the Barbakoeba material of eastern coastal Suriname (1993). All are considered standard works on the archaeology of the Guianas to the present-day.

The North American impetus is hardly detectable in French Guiana as it was in Suriname.[55] Indeed, classic North American styled archaeology or even *New Archaeology* was hardly incorporated in French Guiana or France at all, as was the case for example in northern Brazil, Venezuela or Guyana. The Swiss Henri Reichlen and his wife Paule Reichlen-Barret published a first reconnaissance of pre-Columbian French Guiana in 1943. They had listed all the petroglyphs they had encountered in existing literature and had also described the stone tools kept at the *Musée de l'Homme* in Paris. However, Emile Abonnenc (1952) published the first inventory dealing with 120 archaeological sites and localities in French Guiana, by now a French Department. His inventory consisted mainly of stone-polishing sites positioned near rapids, locations where stone axes or petroglyphs had been

54 Peter Goethals studied the archaeological material exhumed by Dirk C. Geijskes since 1949. Goethals eventually delivered this study as a Bachelors thesis and then set off for the Pacific. At present three copies of his manuscript are known to exist, one of which Goethals sent from Hawaii to Boomert during the early 1970s. It had belonged to Clifford Evans. Meggers and Evans (1957:164–165) referred to this document. It dealt with similarities between vessel shapes of open carinated bowls with wide, flaring rim lobes of the Aristé Painted type as well as carinated bowls of the Serra Painted type.

55 It is noteworthy that the North American army was present in French Guiana during W.W. II. It built the International Airport of Rochambeau in March 1942, replacing the airport named Le Galion. We see similar developments regarding Trinidad and Suriname where the International Zanderij airport replaced Zorg en Hoop near Paramaribo.

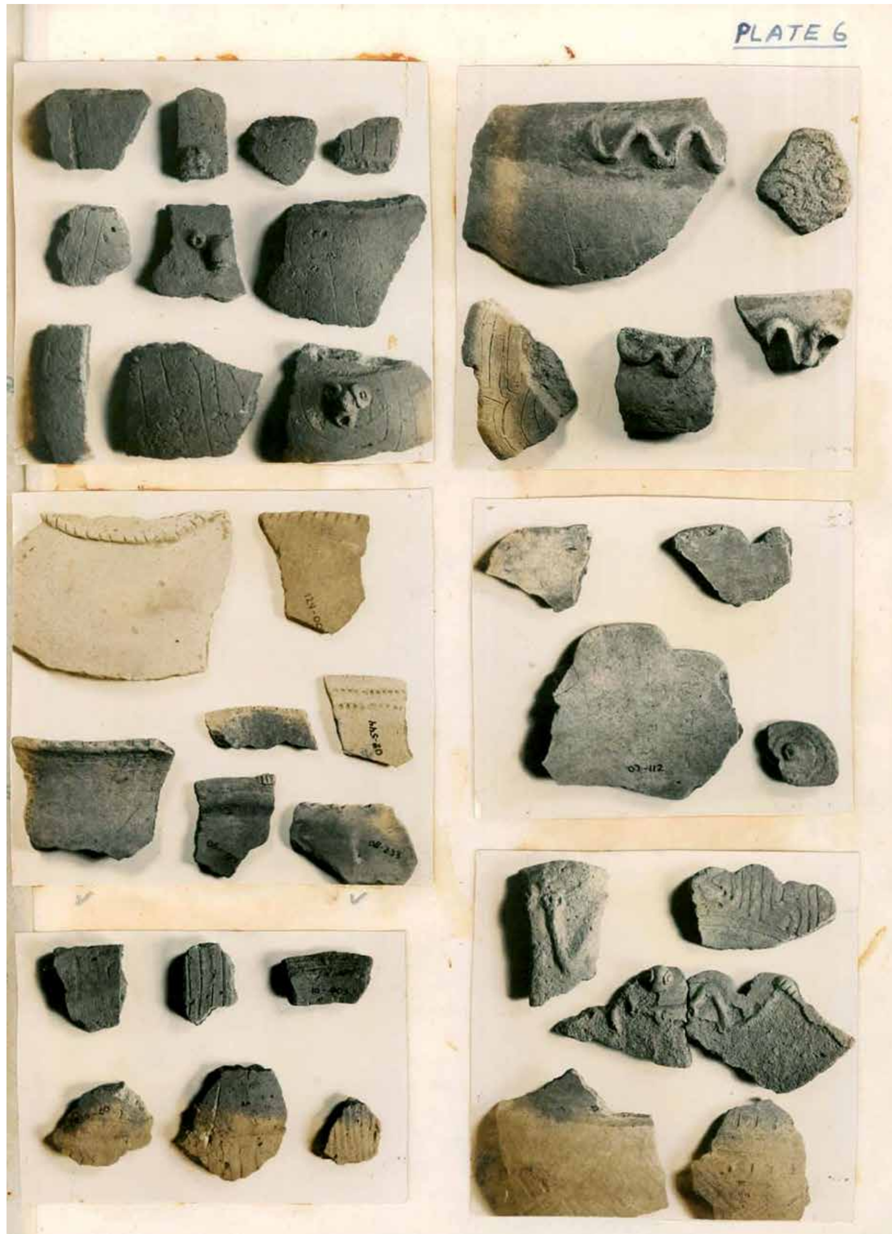

Figure 3.1. Examples of the material described by Peter Goethals (1953, Plate 6).

found. About 20 years later, the first structured archaeological excavations were carried out by avocational archaeologists such as Michel Boyé, Gérard Lefèbre, Jean-François Turenne, Denis Groene, Hugues Petitjean Roget and Dominique Roy (Lefèbre 1973; Turenne 1974; Petitjean Roget and Roy 1976; Groene 1976). The agronomist Jean-François Turenne synthesized the result of their work and published it in Chapter 17 of the *Atlas des Départements Français d'outre-Mer* on Archaeology and Amerindian History. It was co-written with the anthropologist Pierre Grenand (Turenne and P. Grenand 1979).

The increasing number of archaeological activities during the 1970s contributed to the creation of various archaeological associations of which the *Association Guyanaise d'Archéologie et d'Ethnographie* (AGAE, founded in 1979) eventually appropriates the majority of the fieldwork, consisting predominantly of pedestrian surveys and surface collecting. The *Centre National de Recherche Scientifique* (CNRS) recruits two *Volontaire à l'Aide Technique* (VAT), or volunteers, in order to structure archaeological research in French Guiana (1984-1987). Alain Cornette was the first to occupy this post and was succeeded by Stéphen Rostain. Both conducted multiple small scale operations along the littoral between the Oyapock and Maroni Rivers. In 1987, the Ministry of Education and the ORSTOM (founded in 1947, now named IRD) eventually recruited Rostain in order to conduct programmed archaeological research in French Guiana which is included in his 1994 PhD dissertation (University of Paris I Panthéon-Sorbonne) entitled: *L'occupation amérindienne ancienne du littoral de Guyane* (Rostain 1994a).[56]

The objective of this thesis was to comprehend the pre-Columbian occupation of the littoral. It was supported by four projects: (a) a technological study of the lithic material, (b) the Oyapock Project, (c) the Approuague Projects focussing on site analysis of each region and (d) the Savannah Project focussing on the analysis of the raised fields (Rostain 2007:44). In his dissertation he proposed a type-variety analysis of the ceramics found during his fieldwork as well as in various public and private pottery collections. Drawing upon Versteeg's and Boomert's earlier work, he inserted the Late Ceramic Age of central French Guiana into the Arauquínoid interaction sphere as proposed with regard to western Suriname.[57] Rostain further suggested that this Arauquínoid population met and mingled with the Aristé culture from eastern French Guiana and northern Amapá at the Island of Cayenne (Rostain 1994a).

Meanwhile, in 1991, the construction of a hydraulic dam (Fr., *barrage*) was launched at Petit-Saut, a minor rapid on the Lower Sinnamary River.[58] Large scale archaeological research was planned in the area that was to be inundated. This salvage operation was conducted by members of the *Association des fouilles archéologiques nationales* (AFAN, founded in 1973) and represented the first state-funded archaeological research project in French Guiana. Better known as the project of the *Barrage de Petit-Saut* (BPS), it yielded not only a considerable number of radiocarbon datings, a richly illustrated ceramic register, a systematic site analysis and feature research, but also soil and lithic analysis (Vacher et al. 1998). Yet, one of its most important results was actually the sheer abundance of pre-Columbian sites within the supposed "virgin" forest as well as the huge volume of archaeological material in a well-documented context. Eventually, the AFAN archaeologists met with considerable difficulties when ascribing "their"

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56 A condensed version of Rostain's thesis is published in the *Journal de la Société des Américanistes* and entitled: *Archéologie du littoral de Guyane. Une région charnière entre les influences culturelles de l'Orénoque et de l'Amazone* (Rostain 1994b). His dissertation, including several minor changes, was published in 1995 by the ORSTOM on microfilm in *Travaux et Documents Microfiches* (TDM) No. 129.

57 In July 1989, Rostain completed the salvage excavation at Thémire (Rostain 1989) and attended the 19th International Congress of Caribbean Archaeology organized by Jay Haviser and Edwin Ayubi on Curaçao. Here he met Aad Versteeg and requested the latter to present a paper at the International Meeting of *Evolution des littoraux de Guyane et de la zone caraïbe méridionale pendant le quaternaire* organized by Marie-Thérèse Prost (ORSTOM) organized in Cayenne in November 1990. On this occasion they discussed all the ceramic material from the French Guiana littoral and compared it with the other Guianas (Aad Versteeg, personal communication 2012). This resulted in the first reference of Surinamese (Barbakoeba) ceramic complexes for the western littoral between Cayenne Island and the Sinnamary River, as published in the proceedings of the latter meeting (Rostain 1992:486).

58 The *Electricité de France* (EDF), *Conseil Régional* and the Ministry of Culture funded this construction.

ceramics to the regional cultural framework as proposed by Rostain only several years earlier.

After this enormous project had come to a conclusion, the AFAN continued to conduct archaeological operations in French Guiana in collaboration with the Ministry of Culture or *Direction des Affaires Culturelles* (DAC).[59] For instance, the excavations at Mont Grand-Matoury (Grouard et al. 1997) and the pedestrian survey of the RN 2 between Régina and Saint-Georges de l'Oyapock (Jérémie 1998). In February 2002 the AFAN changed its associative status into a public one. It was now renamed *Institut national de recherches archéologiques préventives* (INRAP).[60]

Since 2002, the law obliges construction companies, the State, local communities or private persons in France to see to it that their construction permits and project perimeters are checked by state archaeologists and engineers attached to the *Service d'archéologie* (SA), a body of the regional DAC. The SA is the only legal entity allowed to impose archaeological interventions. In reality, this implies that compliance archaeology is primarily conducted in communities expanding and developing at socio-economical levels; thus mainly in the vicinity of urban centres, such as the Municipalities (e.g. Cayenne, Rémire-Montjoly, Kourou, Macouria, Matoury and Saint-Laurent du Maroni). Less populated areas presumably have far less development projects and therefore compliance archaeology is hardly present in these regions. However, the INRAP does now and again intervene in remote areas with regard to often large-scale projects, such as mining permits (Camp Caïman and Yaou), new roads into the interior (the national highway to Apatou), sand quarries (EVA) or hydraulic plants on the upper drainages of rivers (Saut-Maman Valentin, Mana River). In this way, the INRAP is often concerned with areas that are unknown from an archaeological point of view.

This issue, which members of the BPS had already suggested, was again confirmed by means of numerous INRAP operations: prehistoric settlements are omnipresent in French Guiana, including every type of landscape. At least one prehistoric site per square km is found in the Neotropical forest. Examples of pre-Columbian settlement patterns can be illustrated by means of: (a) results of archaeological surveys in the mining permit of IAMGOLD (formerly owned by ASARCO and CAMBIOR) on the southern flank of the Kaw Mountain ridge (Briand 2002; van den Bel 2007), (b) the mining permit of Yaou near Maripasoula (Mestre et al. 2013), (c) the agricultural project of Wayabo near Kourou (Briand 2011) and (d) Project Couac at MC 87 and MC 88 to the east of Régina (van den Bel et al. 2012b).

A large number of data was also gathered by the INRAP in the course of numerous extensive excavations or surveys based on compliance archaeology. For example, the LCA site of Katoury on Cayenne Island covered *c.*1.5 ha and yielded over 1000 anthropogenic features, i.e. post holes, pits, water pits, gullies, midden areas, as well as *c.*80,000 potsherds (Mestre 2003; Mestre et al. 2005, 2007). Although Katoury is situated in the close vicinity of the Thémire type-site, it again appeared difficult to compare these two data sets as both sites had been excavated and studied dissimilarly (see Table 3.1 for the general site data).

59 The Ministry of Culture serving the Lesser Antilles and Guyane was only seated in Martinique (FWI) prior to 1992.

60 For the history of salvage and public (compliance) archaeology in France, the birth of the AFAN and of the INRAP, see Jean-Paul Demoule and Christan Landes (eds.) *La Fabrique de l'Archéologie en France*, Éditions La Découverte (2009).

Apart from data that appear difficult to attribute to the existing framework, we must also evoke the discovery of new or unknown material by means of compliancy archaeology, notably at sites located outside the trodden paths of the coastal zone, such as the Late Archaic sites of Plateau des Mines (PDM) and Eva 2 (Mestre 2004; Delpech 2005; van den Bel et al. 2006). Interestingly, both Archaic sites were positioned on the summit of a flat hill belonging to the White Sand Formation. The occupation layer was found at a depth of 1 m below the surface, rendering it rather difficult to detect during a pedestrian survey. The PDM sites yielded AMS and TL dates as early as 7000 BP, presenting archaeologists in French Guiana with a previously undiscovered era (Mestre and Delpech 2008).

Having left French Guiana in 1992, Rostain continued to work in Ecuador and on the Netherlands Antilles (together with Aad Versteeg) to eventually return to French Guiana in 2003. Initially cooperating again with Versteeg, he started a research program, or *Action Collective de Recherches* (ACR), entitled: *Préhistoire du littoral occidental de Guyane* (2002-2005). Funded by the CNRS and the INRAP and in collaboration with the SA, the University of Paris I and X, the University of Leiden and the SSM, it aimed at enhancing the knowledge of the pre-Columbian peopling of the French Guiana littoral to the west of Cayenne (Rostain and Versteeg 2003:161).[61]

After 2005, this project was continued as the more ambitious *Earthmovers Project*. It now focussed on the diachronic and cultural line of research within the Guianas. In it, the Arauquínoid Tradition was materialized by means of the Barbakoeba complex in western French Guiana and eastern Suriname.[62] The project's objectives were: (a) to reclassify the ceramic collections in order to establish one regional definition, (b) to obtain a cartography of the pre-Columbian habitat and the raised field complexes, (c) to then model the occupation, (d) to define pre-Columbian culture and complex societies and (e) to reconstruct the cultural evolution from the pre-Columbian era to the present-day. This project resulted in numerous field reports inspiring several PhD students. In 2009, Claude Coutet completed her PhD dissertation entitled: *Archéologie du Littoral de Guyane française*. Delphine Renard's thesis dealt with the functioning of contemporary ecostystems (Renard 2010). However, the most significant publication of this joint project discussed the origins of the raised fields at Iracoubo and Kourou (McKey et al. 2010; Iriarte et al. 2012; Rostain 2013).

In 2008, the INRAP embarked upon a following multidisciplinary project named *Project Couac*. It was carried out in collaboration with the ECOFOG in Kourou and the *Institut National de Recherches Agronomiques* (INRA) in order to study 'the impact of ancient Amerindian occupation on forest diversity and its soils.' Three important issues were raised: (a) To which degree did mankind occupy the actual tropical forest? (b) Did ancient behaviour significantly modify soil fertility? and (c) Can actual diversity of species be explained by its old usage? (Jérémie and Dambrine 2009, 2010). Firstly, the role of the INRAP was to search for archaeological evidence in botanically and geologically "referenced" forest

61 A monograph of this project was never finalised. However preliminary results were published in the BAR International Series 1273, entitled *Late Ceramic Age Societies in the Eastern Caribbean* (Rostain and Versteeg 2004). They were presented at the University of Leiden (2002) and at the Twenty-First IACA Conference (Trinidad, 2005).

62 For more information on this subject, visit: http://www.mae.u-paris10.fr/archam/Earthmovers-Guyane.html.

plots in which precise vegetation inventories had been established in order to check for (possible) spatial relationships between vegetation diversity and ancient occupations. Secondly, the INRAP participants would point out important archaeological sites with strongly modified soil structures which were to be investigated with regard to their physical, chemical and microbiological properties as well as for the vegetation diversity in reference to adjacent undisturbed areas. It is evident that the results of the CAP at the Middle Amazon River (Neves and Petersen 2006) had inspired the above-mentioned archaeo-ecological projects bringing about clearly proposed innovative views on pre-Columbian societies which needed to be tested elsewhere in Greater Amazonia.

3.4 The Prehistoric Ages

3.4.1 The Lithic Age

Sites dating back to the arrival and occupation of the first prehistoric Amerindians in the Guianas have not been found in French Guiana (yet) but can most certainly be encountered some day. The vestiges attributed to Paleo-Indians have been discovered in other parts of the Guianas albeit almost exclusively in the highland savannahs of the interior (Dillehay 2008:30, Fig. 2.1). Sites such as Canaima in Guyana, the Upper Caroni sites, and Tupukén in Venezuela, but also those located in the Sipaliwini Savannah of southern Suriname and bordering northern Brazil have yielded radiocarbon dates between 14,000 and 9,000 BP (Cruxent 1972; Barse 1995; Sanoja and Vargas-Arenas 2006).[63]

Very little reliable data are available. However, the Paleo-Indian population is believed to have consisted of small bands hunting certain megafauna during the Late Pleistocene period. The known sites are considered to be either temporary campsites or persistent workshops where tools were manufactured (Dillehay 2008). Other site types have not been discovered (yet). Evidently, South American Paleo-Indians have adapted to a different environment than the North American Amerindians (Kipnis 1998:582). Bifacial triangular projectile points ranging from between 7 to 10 cm in length are characteristic lithic markers from this era. Hereto we can add certain types of bifaces and hammer stones (Boomert 1980, 2000).

3.4.2 The Archaic Age

Towards 9000 BP, at the beginning of the Holocene, an overall shift is observed in the lithic toolkit of these populations. This suggests a change in their behaviour and marks the transition into the (Early) Archaic Age as to the Americas in a more general sense (Philips and Willey 1953; Willey 1971). For various reasons, the megafauna had disappeared and hunting was focused on a wider variety of small game detected

63 Earlier dates, going back to *c.*40,000 years ago, have been found all across the Americas. The subsequent debate on earlier migrations (pre-Clovis) into the Americas lies beyond the scope of this introduction. A recent update is provided by Walter Neves and Luis Piló (2008) regarding the South American point of view.

by means of a larger range of lithic points. In addition, the toolkit has been extended with grinding and retouched flaked tools.[64] Again, little archaeological data are available with regard to the Early Archaic Age in the Guianas.

However, Early Archaic sites in Columbian Amazonia, i.e. Peña Roja (Gnecco and Mora 1997; Mora 2001), evidenced the presence of notched axes, indicating tree felling and possibly hoeing for limited soil tillage or digging for roots (Oliver 2001). Phytolith analysis in Panama of contemporaneous sites have revealed the presence of domesticated arrowroot (*Calathea* cf. *allouia*), bottle gourd (*Lagenaria* sp.), and calabash (*Cucurbita* sp.; Piperno and Blake 1999). Arrowroot detected at Las Vegas (Ecuador) is dated between 10,000 and 9000 BP (Piperno and Pearsall 1998:186–187). As to North America, processing tuberous roots and vegetables during the Meso-Indian era is associated with various types of earth ovens or cooking pits (Dering 1999; Thoms 2003, 2009).

In the Guianas, (Late) Archaic sites have been found along the old coastline and can be attributed to the 'North West South-American Littoral Tradition' (Willey 1971:361). Several key-sites, i.e. Banwari Trace and St. Johns in southwestern Trinidad, El Conchero in northeastern Venezuela, Alaka Phase sites in northwestern Guyana, are mainly identified by means of the presence of shell middens and represent this Archaic tradition (Harris 1973, 1975; Boomert 2000; Cruxent and Rouse 1958/1959, 1961; Evans and Meggers 1960; Williams 1985; Reid 2011). The toolkit of these sites has been affiliated to the Ortoiroid series, as it is based on a crude percussion-flaked lithic technology (Cruxent 1971; Rouse 1992).

The lithic tools of the Alaka sites, roughly dated between 6000 and 2000 BC, consist of simple percussion implements produced primarily from andesite, quartz and fine-grained schist. If dating from the earlier phase, they also include percussion-made choppers, hammer stones and picks from water worn cobbles. The latter part of the phase evidenced ground stone tools (e.g. celts, mortars, *manos*, pestles, grinding and rubbing stones). Small tools (e.g. quartz scrapers), were produced from percussion-made flakes (Evans and Meggers 1960:38–53). The Hosororo Creek site, the most recent phase of Alaka, also yielded an "incipient" or Formative type of pottery, dated *c.*1800 BC. It may represent a cultural link with the Brazilian Mina ceramics (Williams 1992, 1997, 2003; Roosevelt 1995).

Along the banks of the Lower Amazon River and the northeastern Atlantic coast of Pará (Brazil), Archaic sites were excavated towards the end of the 1960s (Côrrea and Simões 1971). They have also been identified by means of the presence of conical shell mound, or *sambaquís* (Br.), that vary in size but can measure 80 x 30 x 1.5 m. Test pitting aimed at excavating *sambaquis* not only yielding good quantities of bone and lithic artefacts, but also early ceramics (Simões 1981:14;

64 The current vision on the Meso-Indian way of life is highly influenced by modern anthropology, ethnography and ethnoarchaeology as researchers among present-day foragers or hunter gatherers report (Politis 1996, 2001; Rival 1998). Although no foraging groups conform exactly to any culture type, foraging peoples can be described by means of common features, including: (a) family and band social organization, (b) a high degree of individualism with relative egalitarianism, (c) same age-members, (d) a tendency toward weak expression of gender hierarchy, (e) a high degree of nomadism with a seasonal concentration and dispersion pattern, (f) a common-property regime and (g) little to no raising of domesticated plants and animals (Lee and Daly 1999:3–5). Certain contemporary forager groups were once farmers and have lost agricultural knowledge due to the cultural upheaval following European colonization. However, various case studies have posed alternate explanations (e.g. symbiosis with agriculturists, cultural allopatry, political choice and precolonial foraging) (Cormier 2006).

Roosevelt 1995:117).[65] The excavations in the Mina region inspired Mario Simões to create the so-called Mina Tradition as to this specific coastal environment (Simões 1981; Gaspar and Imazio 2000). Sites such as Ponta das Pedras, Porta da Mina and Sambaqui de Urua, dating from between 3100 and 2100 BC, represent these Late Archaic and Early Ceramic sites.[66] Their lithic assemblage consists of polished stone axes, flaked and polished pounders, abraders, scrapers and pitted anvils. The Mina sites reflect the exploitation of the mangroves and estuaries. They represent a population with a broad spectrum diet whose subsistence was based on shellfish gathering, hunting, and the collecting of (wild) vegetable foods. Human burials and erratic human bones are also often found in these shell mounds, but if these bands were already (semi)sedentary is unknown. It is thought that the forebearers of the early Mina ceramics were probably located on Archaic sites on the Lower Amazon (e.g. the cave sites of Pedra Pintada and Monte Alegre) and the fresh-water shell mound, or *sernambís* (Br.), site of Taperinha. To the present-day they yield the earliest radiometric dates (*c.*5700-4300 BC) as to ceramics in South America (Roosevelt et al. 1991; Roosevelt 1995:123–124).

The Banwari Trace site, dating back to between 6000 and 4000 BC, revealed artefacts made of bone and stone. The latter tools consisted mainly of crude percussion-flaked choppers, grinding stones, oval *manos*, edge grinders, conical pestles, pitted anvils (Harris 1973).[67] Percussion flaking by applying a bipolar technique produced a large variety of small, irregular chips as well as cores made of quartz, flint and chert. Very few flakes were intentionally reworked by means of secondary retouche. They do however include flake scrapers, cutters, burins, and blades which presumably served multiple purposes (Boomert 2000:60–61). Large quantities of broken and crumbling (soft sand) stones were found at the Banwari site which were most likely utilised as heating or cooking stones. Large fish, shells and shellfish, game meat and edible tubers may have been cooked or roasted in hearths, albeit that these combustion features were not found at these sites (Boomert 2000:64; Peter O'Harris, personal communication, 2007).

The Late Archaic lithic artefacts of the El Conchero complex in northeastern Venezuela, dating back to between 5000 and 3000 BC, are also characterised by means of the crude and often small percussion-flaked chips and cores made of quartzite, chalcedony and quartz (Cruxent 1972:39–40). The shell middens of this complex yielded an Ortoiroid lithic industry, resembling that of Banwari Trace and Alaka. Grinding stone artefacts presumably served to process (plant) foods and were common to the final period of this complex, as pestles, side grinders, *manos*, polishers, mortars, and small stone vessels indicate (Boomert 2000:73). The Manicuaran Ortoiroid subseries probably evolved from Late El Conchero. It is characterised by means of shell tools, a lithic industry of tiny quartz flakes and ground stone tools such as grinding stones, pitted stones and *manos* (Cruxent and Rouse 1958/1959). The origins of the Littoral Tradition or Ortoiroid series are

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65 *Sambaquis* is a Tupi term: *tamba* means shellfish and *ki* refers to a stack of shellfish (Prous 1992:204).

66 IEPA members obtained an early radiocarbon date (6140 ± 40 BP, BETA-2557794) in Central Amapá (Saldanha and Cabral 2011b). Klaus Hilbert discovered preceramic material in the State of Amapá at the Igarapé do lago Larangal on the left bank of the Lower Amazon River (K. Hilbert 1990:169). He found another site with lithic tools at Serra do Carajás, yielding radiocarbon dates going back to between 8140 ± 130 BP and 2900 ± 90 BP (K. Hilbert 1991:150). The nearby Larangal do Jari II site excavated by the IEPA also featured stone hearths perhaps of preceramic or ECA origin (Saldanha and Cabral 2011a).

67 Also note the 'cobble choppers' as identified by Ranere (1980:26–28).

unclear. They probably originate either from the Ancient Flake Tradition situated in the interior of the Guiana Highlands or from eastern Brazil (Boomert 2000:69).

William Barse came across three Archaic sites near Puerto Ayacucho on the Upper Orinoco. They were located in stratified alluvial terraces and relict channels, namely Culebra, Provincial and Pozo Azul of which the latter site yielded the earliest dates, *c.*9000 years old (Barse 1989, 1990, 1995). Barse defined an Archaic sequence, named Atures I and II. The latter phase has been attributed to the Late Archaic period, dated *c.*7010 ± 190 BP distinguished by the presence of projectile points. Quartz flaking is an indicator of adaptation to the drier savannahs during the Middle Holocene (Barse 1990:1380). Charcoal filled hearth pits and fire-cracked rocks were found at these sites, too. Unfortunately spatial patterns could not be detected due to the small size of the test pits.

The latter upland sites in Venezuela and the coastal sites in French Guiana did not reveal shell middens. This can be related to the type of site, the absence of shell in certain coastal areas or to the heavy leaching in Neotropical soils. Although its absence limits any direct cultural affiliation to the above-mentioned marine orientated littoral sites, the upland sites in Venezuela and the coastal French Guiana sites share a very similar lithic industry with all other sites. This industry produced mainly large quantities of small quartz flakes. The absence of the latter marker may well be related to the applied field methods where lithic (small) waste material was not collected and/or considered of little informative value.

In this manner the absence of rock clusters, omnipresent at the French Guiana sites, can also be associated with the choice of field techniques and research issues regarding these Archaic sites. Archaeological research as to this period was highly focussed on the eye catching shell middens in order to not only collect identifiable artefacts but also to reconstruct the ancient diet. In French Guiana, however, (ancient) shell middens are absent, at least at the moment. Their excavations, when applying various techniques, yielded multiple rock-filled pits and grinding stones hitherto unknown to this period in (northern) South America (van den Bel 2010c).

3.4.3 The Ceramic Age

The differences between Archaic and Ceramic Age are still under debate. The transition between these eras however certainly requires more research in order to understand the origins and socio-economical characteristics of this cultural change. Indeed, the majority of archaeological data concerning the Ceramic Age has been obtained by means of ceramics. Only recently has the microscopic analysis of ceramic artefacts contributed to a wider understanding of pre-Columbian subsistence economies (McKey et al. 2010; Arroyo-Kalin 2010, 2012; Pagán Jiménez 2012, 2013; Iriarte et al. 2012).

The Late Ceramic Age is presumably the best known period with regard to the Guianas. It is mainly encountered within the inhabited littoral when compared to the lesser known interior. The Early Ceramic Age has been divided in two phases: (a) an early phase (ECA-A) and (b) a late phase (ECA-B). I have created this distinction after the excavation at Chemin Saint-Louis in order to discern the earliest incipient ceramics (Eva 2, CSL, Alaka, Mina) and the much younger Cedrosan Saladoid/Barrancoid series found in the western Guianas. The reason for this is that few data are available concerning the presumed intermediate period.

Furthermore, this distinction emphasizes the emergence of larger sites, such as ring-ditched sites (Fr., *montagnes couronnées*) as well as dark earth sites in French Guiana of which evidence has been recorded dating from the end of the first millennium BC. Interestingly, the above-mentioned time gap or lack of data between these two ECA phases is, in additon to French Guiana, also hypothesized with regard to Suriname, Guyana, the Lower Orinoco and the Lower Amazon Rivers (van den Bel et al. 2011; Versteeg 2003; Williams 2003; Roosevelt 1997; Neves 2008:363; Oliver 2001, 2008; Whitehead et al. 2010; Carling et al. 2013).

3.4.3.1 The Early Ceramic Age

Sedentary societies and the presence of horticulture, polished tools and pottery characterize the ECA. This is considered the result of a particular "Neolithisation process" (P. Grenand and F. Grenand 1997; Lavallée 2005) which had started during the Archaic Age and intensified during the drier Middle Holocene Period (6000-4000 BP) or Late Archaic/Early Ceramic Age. This so-called Holocene Drought in Amazonia was also recognized in French Guiana by Marie Ledru (2001) and Christophe Tardy (1998). It may well have urged the Amerindian population to manage plants and roots differently or to cultivate them. Horticulture evidenced significant changes in society. Certain groups developed extensive agriculture and (semi-)intensive strategies in order to produce food (Denevan 2001; Oliver 2008). The ECA population developed an important, wide variety of domesticated and (semi-)domesticated plants, root crops, particularly manioc and arboriculture whereas other pre-Columbian systems relied predominantly on maize (Harris 2006; Perry 2004, 2005; Perry et al. 2006; Roosevelt 1980).

However, it may be evident that domestication and agricultural development in tropical regions differ drastically from the classic Neolithic context, i.e. European cereal-based agriculture. Moreover, in parts of Amazonia, it also includes wetland management and fish farming (Erickson 2000; Schaan 2004; Eriksen 2011:221). It is believed that numerous non- or semi-domesticated plants were actively tended or cultivated in Amazonia. For example, the peach palm (*Bactris gasipaes*), ité or buritî palm (*Mauritia flexuosa*), manicole or açai (*Euterpe oleracea*) were subject to intense management (Clement 2006; Fleury et al. 2014).[68] These fruits as well as numerous tubers were processed by means of polished tools, direct fire-cooking and/or hot-rock cooking by a population still unfamiliar with the innovation of pottery.

The Early Ceramic Age, Phase A

The changing agricultural developments during the ECA demanded innovative ways of food processing. This favoured the usage of ceramic bowls and griddles. At present, the earliest dates as to ceramics in French Guiana have been established at the sites of Eva 2 and Chemin Saint-Louis. They have been attributed to the latter half of the third millennium BC. Starch grain analysis has indicated the presence of maize and arrowroot at both sites (cf. Chapters 4 and 5).

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68 At present, the faunal exploitation in the Guianas consists of birds (ducks, parrots, macaws) and an occasional monkey or agouti pet. On European demand, sea turtles, and sea cows were hunted excessively during colonial times (Hulsman 2009:226). This must surely have played an important role in the pre-Columbian manners of food procurement.

If all the early ceramic sites in northern South America represent unique cultural hearths or belong to one and the same Early Ceramic Age (Phase A) Horizon is difficult to say at present; however, it does seem unlikely as the quality of the ceramics is quite different. The early ceramics of Taperinha, Mina, Eva 2 and Alaka are rather crude in comparison with the earliest ceramics found on the Orinoco River and in northern Columbia (Roosevelt 1980; Rouse and Cruxent 1963; Reichel Dolmatoff 1965; Oyuela-Caycedo 1995).[69] The latter ceramics were already of a fairly good quality and even featured sophisticated decoration when compared to the ceramics found along the Atlantic coast of the Guianas or the Lower Amazon. The earliest ceramics excavated at La Gruta and Ronquin have been attributed to the Saladoid subseries of the Middle Orinoco River. They exhibit white-on-red painting, zoomorphic adornos and incisions on the vessel rims (Cruxent and Rouse 1958/1959).

Another ECA site, Kauri Kreek (2400-1600 BC), is situated at a distance of *c.*10 km from Apoera on the Courantyne River (western Suriname). It revealed 'a distinctive kind of ceramics' hitherto unseen in the western Guianas (Versteeg 1978).[70] It was opined that this unknown application of geometric motifs with clay strips, or "fretwork," was related to the Early Saladoid ceramics of La Gruta or Ronquin (Versteeg 1978:18–26). The reason for this is that Rouse compared this material to the inferior levels of the Ronquin site and confirming the possible link (Versteeg 2003:83). La Gruta ceramics dated back to *c.*2100 BC and those found at the Ronquin site date from between 1600 and 1100 BC (Roosevelt 1980:195). However, it is opined that the early Orinocan sites require further excavation (Barse 2009; Oliver 2014).

More recently, the anthropologist Neil L. Whitehead (1956-2012) located more ECA sites in eastern Guyana (Whitehead et al. 2010). In collaboration with George Simon, he conducted archaeological research on the (anthropogenic?) hills of the Wironi, the Nassau and Canje savannahs of the Lower Berbice River in eastern Guyana. At the site of Dubulay Hill his team found more Kauri Kreek fretwork-decorated ceramics. The radiocarbon dates taken from the lower layers of their test pit, at *c.*2 m below the surface, yielded a date of *c.*3000 BC (Whitehead et al. 2010:96). It is highly probable that these mounds are also multi-component sites. Further micro-morphological research is certainly required here.

The Early Ceramic Age, Phase B

The first dates after Kauri Kreek occur during the final centuries BC in Suriname and Guyana (in French Guiana, too, as we shall see). They are related to the Cedrosan Saladoid sites of Wonotobo Falls and Kurupukari Falls (Boomert 1977, 1983; Williams 2003:305). Both are dark earth sites and feature multiple occupations. The latter site is situated on the left bank of the Upper Essequibo River and the former on the right bank of the Courantyne River. The only radiocarbon dates available yielded 2080 ± 70 BP as to Kurupukari and 1900 ± 40 BP as to Wontobo Falls. The deepest arbitrary layers of both sites contained

69 Betty J. Meggers (2011:149–150) believes there is a link between Valdivia, San Jacinto, and a possible later phase of Taperinha. She also states that the Caribbean coast of Columbia is probably the best option regarding the heated Early Ceramic debate.

70 This dark earth site is probably a multi-component site as Aad Versteeg evokes in a note. In fact, the results of the radiocarbon dates do not correspond necessarily with the type of ceramics depicted in the article. See note 143.

Saladoid ceramics decorated with geometric white-on-red painting, fine zone-incised-crosshatched incisions (some painted), biomorphic modelled applications and D-shaped handles. The upper layers yielded pottery including Barrancoid traits suggesting a continuous cultural influence from the Lower Orinoco River.[71] These more recent Barrancoid influences are also observed on the Guyana coast where it is affiliated with the Late Mabaruma and Early Abary Phases (Evans and Meggers 1960).

In coastal Suriname, Early Mabaruma pottery is also found in the deepest levels of the Buckleburg-1 site (1845 ± 45 BP and 1735 ± 35 BP), an artificial mound located in the coastal swamps of Nickerie (Versteeg 1985:668–685). We do not come across this type of sites east of Paramaribo although a similar swamp landscape occurs in this part of Suriname and in western French Guiana. Man-made hills may have existed to the west of Nickerie in the Berbice and Canje savannahs (Boomert 1978a; Whitehead et al. 2010). However, they have been identified with certainty at the confluence of the Middle Orinoco and Apure Rivers, i.e. Hato Arauquín and in the Llanos of Venezuela (Cruxent and Rouse 1958/1959). The Buckleburg mounds are the most easterly located Barrancoid sites of the Atlantic Guianas and as yet have not been found in French Guiana. The same applies to the Cedrosan Saladoid-styled ceramics (Versteeg 2008). In fact, these ECA sites represent the eastern cultural border of the Caribbean region as defined by Rouse (1992:83–84).

The Maroni River reveals ECA sites dating back to *c.*2000 BP, as materialised by the lower river terrace site of Chemin Saint-Louis and the ring-ditched hilltop site of Yaou near Maripasoula (van den Bel et al. 2008, 2011; Mestre et al. 2013). White-on-red painting as well as ZIC have been found at these sites. However, the general vessel morphology differs from the Cedrosan Saladoid repertoire. Other Cedrosan characteristics (e.g. zoomorphic modelling, outward thickened lips and D-shaped handles) are absent from the above-mentioned Maroni sites (see Rouse 1992:77–85; Boomert 1983, 2000:128–145; Boomert et al. 2013:69–80). Nevertheless, it is probable that the Maroni basin is associated with the cultural interaction sphere of the Saladoid/Barrancoid occupation in the western Guianas.

Furthermore, the Maroni sites evidenced a link between anthropogenic landscape management and consistent human occupation. Chemin Saint-Louis revealed an important dark earth layer as well as a long occupation that thrived between *c.*300 BC and AD 400. Yaou featured an impressive four ha large, man-made ring-ditch probably occupied for at least 500 years (Mestre et al. 2013).[72]

Other ECA sites situated in the western coastal zone of French Guiana have been uncovered recently by applying compliance archaeology. The slightly younger Olga site (1795 ± 25 BP, KIA-26024) has been found in the coastal savannah near the former hamlet of Malmanoury (van den Bel 2004). This dark earth site is located on the summit of a Precambrian outcrop at 30 m above MSL,

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71 Boomert (2000:231) re-examined the Wonotobo Falls material to then conclude that all the ceramic material is Saladoid, thereby discarding his previous conclusion that Late Wonotobo ceramics are Barrancoid.

72 In Amapá, Suriname and French Guiana, ring-ditched sites are usually situated on mountaintops in the immediate hinterland of large creeks (Versteeg 1981; Wack 1989; Petitjean Roget 1991). Mickael Mestre (1997) dedicated his Master thesis to this type of sites of which the ring-ditched site of Yaou is as yet perhaps the most impressive site to be discovered. BRGM members reported this site to Hugues Petitjean Roget in 1986 (Petitjean Roget 1991:247). It was reinvestigated by Hélène and Guy Mazière (1993:23).

juxtaposing the Pleistocene savannah (van den Bel 2004). Another dark earth site in this coastal zone providing us with similar ECA dates (2035 ± 35 BP, POZ-30852) is Site 9 at Wayabo, to the west of Kourou, located at the first Precambrian hillocks bordering the savannah (Briand 2010:56).

East of Cayenne Island, the ECA is represented by means of the Early Aristé phase. It is associated with the decorated rim-type *Ouanary encoché* and roughly dated to the second half of the first millennium AD (Rostain 1994a:434–437). These rim decorations consisting of series of fingernails applied to the interior of the rim were been found at the ditched sites of Favard, Pointe Maripa and Blondin (Briand in G. Mazière 1996; Mestre 1997, 2013) as well as at numerous sites on Cayenne Island (cf. Chapters 8 and 9).

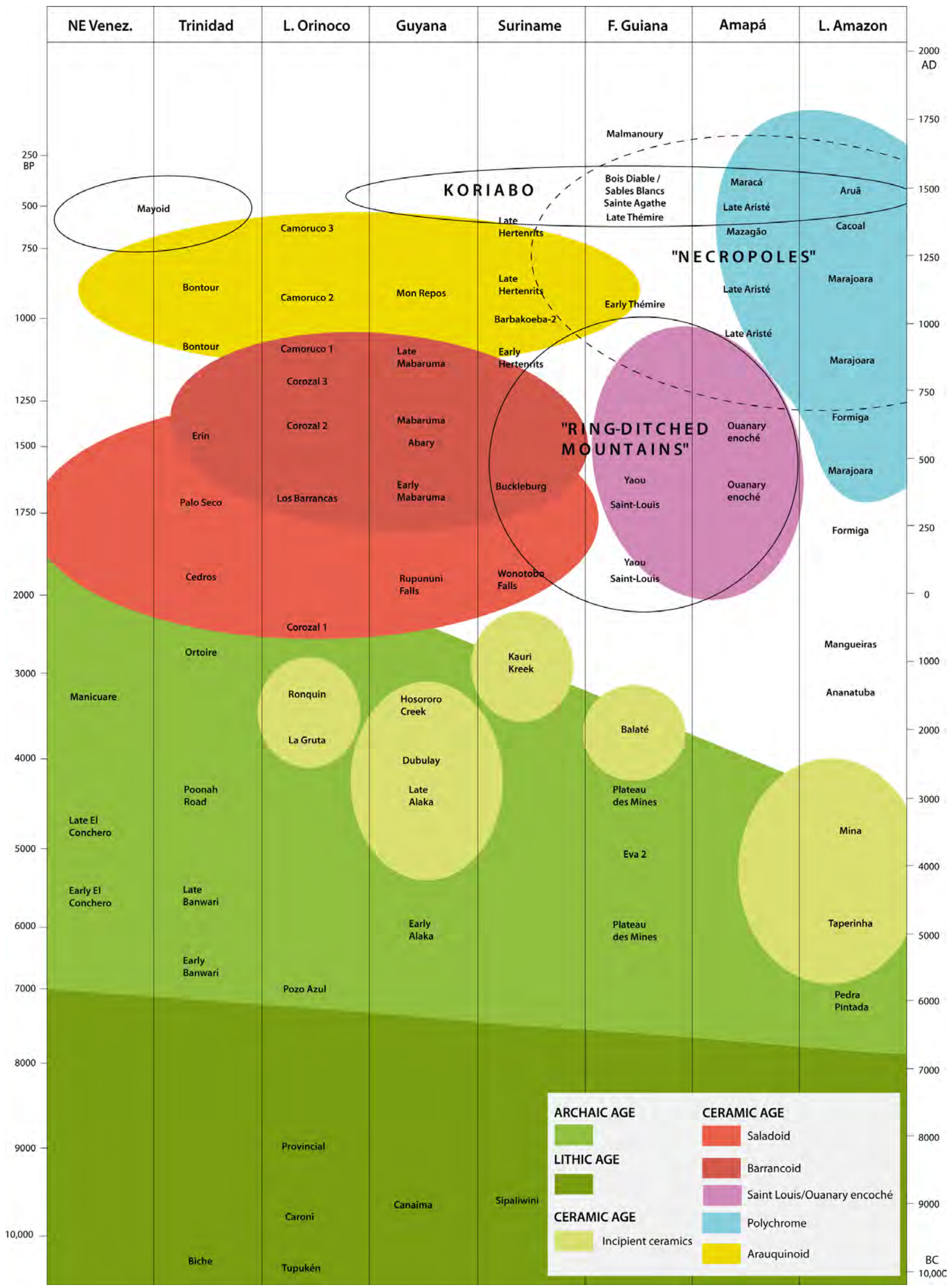
Along the Amazon River, ECA sites have been excavated at: (a) the Lower Trombetas River, Pocó Phase (Guapindaia 2008; P. Hilbert and K. Hilbert 1980), (b) the confluence of the Solimões and Rio Negro Rivers near Manaus, Açutuba Phase (Lima et al. 2006; Neves et al. 2014) and (c) Santarém, Terra Preta site (Gomes 2008:198-200). They are also represented by means of large dark earth layers located on the higher parts, or bluffs, of the interfluvial area. Pocó is dated between 200 BC and AD 400 (Guapindaia 2008:184) whereas Açutuba dates back to 300 BC-AD 360 (Lima et al. 2006:46). Both sites yielded vessels decorated with polychrome painting, modelling and flaring rims. They have been attributed to the Saladoid or Barrancoid series, pre-dating the Marajoará ceramics of the Amazonian Polychrome Tradition, and are roughly dated between AD 400 and 1300 (Roosevelt 1991; Schaan 2004).[73]

One is probably drawn to compare the ceramic complexes/cultures of Guianas with the Lower and Middle Amazonian ones. However, I would like to stress here that the Amazonian drainage as well as its pre-Columbian occupation is probably of a much larger scale. On the one hand, Amazonian (multi-component) sites are represented by means of multiple hectares consisting of dark earths yielding a large number of artefacts. These sites surpass the important sites of French Guiana in grandeur. On the other hand, despite dissimilarities with regard to site dimensions and intensification, apparently modest dark earth sites such as Chemin Saint-Louis, may nevertheless evoke significant occupations on a regional scale bearing a certain degree of regional complex socio-political organisation as witnessed for instance on the island on Marajó Island (Roosevelt 1991:113–114).

Although we find large earthworks, such as ring-ditched mountains, in French Guiana that reveal the first evidence concerning possible social stratification, other types of (visible) earthworks as well as elaborate ceramics and large necropoles are still absent as to the ECA. At the moment, primary burials (although burial pits often do not contain human bones) excavated at these ECA sites do not feature any important differentiation. Scant information on valuable trade goods with regard to this period indicate, when compared with the Antilles, a non-restricted availability of the latter and exclude any hereditary stratification (Curet 1992; Siegel 1999). Notwithstanding this view, Boomert (2000:394) argues for the existence of a Big-Men society during the Cedrosan Saladoid occupation on the Lesser Antilles. Senior leaders with regional power, based on the wide distribution

Figure 3.2 (opposite page). An updated cultural chronology of the coastal Guianas and the mouth of the Amazon, adapted by the present author from: Boomert (2000:54, 218), Roosevelt (1997:185), Rostain (2008:280–281), Rouse et al. (1984:82–83) and Schaan (2004:80).

73 Other early ceramic phases at Marajó Island (e.g. the Anatuba and Mangueiras phase) predate the Marajóara period of which the first dates back to the beginning of the first millennium BC (Schaan 2004:113).



NE Venez.
Trinidad
L. Orinoco
Guyana
Suriname
F. Guiana
Amapá
L. Amazon
2000 AD
1750
250 BP
1500
500
1250
750
1000
1000
750
1250
1500
500
1750
250
2000
0
3000
1000
4000
2000
3000
5000
4000
6000
5000
7000
6000
8000
7000
9000
8000
10,000
9000
BC 10,000
Malmanoury
KORIABO
Bois Diable / Sables Blancs
Sainte Agathe
Late Thémire
Maracá
Aruã
Late Aristé
Mazagão
Cacoal
"NECROPOLES"
Mayoid
Camoruco 3
Late Hertenrits
Bontour
Camoruco 2
Mon Repos
Late Hertenrits
Early Thémire
Late Aristé
Marajoara
Barbakoeba-2
Late Aristé
Bontour
Camoruco 1
Late Mabaruma
Early Hertenrits
Marajoara
Corozal 3
Corozal 2
Mabaruma
Abary
"RING-DITCHED MOUNTAINS"
Ouanary enoché
Formiga
Erin
Yaou
Ouanary enoché
Marajoara
Palo Seco
Los Barrancas
Early Mabaruma
Buckleburg
Saint-Louis
Formiga
Cedros
Rupununi Falls
Wonotobo Falls
Yaou
Saint-Louis
Corozal 1
Ortoire
Kauri Kreek
Mangueiras
Manicuare
Ronquin
Hosororo Creek
Ananatuba
La Gruta
Balaté
Dubulay
Poonah Road
Late Alaka
Plateau des Mines
Late El Conchero
Mina
Eva 2
Early El Conchero
Late Banwari
Early Alaka
Plateau des Mines
Taperinha
Early Banwari
Pozo Azul
Pedra Pintada
Provincial
Canaima
Sipaliwini
Caroni
Biche
Tupukén
ARCHAIC AGE
LITHIC AGE
CERAMIC AGE
Incipient ceramics
CERAMIC AGE
Saladoid
Barrancoid
Saint Louis/Ouanary encoché
Polychrome
Arauquinoid

of semi-precious stones (suggesting frequent present-giving activities), would have held such meetings between rivalling, regional Big-Men groups.[74]

Other researchers in the Caribbean area (Hoogland 1996; Siegel 1989, 2011) have adopted the term “complex tribe” in order to denote societies with communal activities and status variation, but without a centralized authority, hereby following John Hoopes (1988:2). Eventually, however, these scholars all stress the communal character of the ECA society, thereby separating it from the autonomous villages into tribal societies (Carneiro 1998). It is thought that this type of communal society may also imply village leaders with significant regional power, revealing possible regional (supra-)hierarchy. In due course, all these models represent a socio-cultural typology with a descriptive character (Siegel 1996b:328), but do not explain the historical circumstances and socio-political processes leading to to the emergence and organization of various types of society.

3.4.3.2 The Late Ceramic Age

The majority of the dated sites can be attributed to the LCA and are mainly found on the coastal plains of the Guianas. This is probably due to the greater accessibility of this stretch of land by means of modern infrastructure and the development of archaeological research, albeit the progradation of the Holocene littoral may also account for the attribution to the LCA (cf. Section 8.8). This biased spatial distribution is clearly visible in the archaeological site maps of Amapá, French Guiana and Suriname (Cabral and Saldanha 2010:53; Gassies 2004:21; Versteeg 2003). The supposed cultural decline with regard to the Guiana littoral (Rostain 2008b:279) and Amazonia (Neves and Petersen 2006:302) at *c.*AD 1300 may even illustrate a lack of research. Moreover, it indicates the supposed abandonment of complex societies well before the arrival of the Europeans (Schaan 2004). Nonetheless, this final prehistoric age is generally viewed as the highest evolutionary level of cultural development in the Guianas (Boomert 1980, 2004; Versteeg 1985, 2003, 2008; Rostain 2008b). This vision is presumably also biased due to the absence of sufficient earlier archaeological sites. It is quite likely that the latter sites may also have reached a similar level of socio-political complexity as is the case with the better known LCA sites along the littoral. In fact, they may have given birth to this hypothesised cultural climax after AD 900.

The classification of the LCA societies caused considerable debate in Greater Amazonia. It was discussed if these societies were stratified, hierarchical chiefdoms or egalitarian, hetero-archical societies or both? (Drennan 1995; Heckenberger et al. 1999; Roosevelt 1987, 1993, 1999). Chiefdoms are ranked societies, characterized by means of hierarchical variation in size, lay-out, and density of residential structures, the appearance of monumental architecture, a high degree of craft specialization and differentiation in mortuary customs (Carneiro 1981, 1998; Redmond and Spencer 1994). According to Elman Service (1962:134), these chiefdoms are also redistributional societies with a permanent central agency of coordination which is guaranteed by means of a surplus production.[75] The population and the access to natural resources, however, certainly had an impact

74 It must be observed that the term Big-Men may also refer to a Big-Women society: a long standing tradition in Amazonia! For further information on this Melanesian concept see: *Big-Men and Great-Men: Personifications of Power in Melanesia* (Godelier and Strathern 1991).

75 Among scholars there is certainly some dissatisfaction with Service’s ideas, notably by Laura Crumley (1995, 1999) and Anna Roosevelt (1999:127).

on the emergence of polities but the processes of consolidation and evolution of social complexity remain unclear. Control and command of production is thought to be related to ideological factors. The "paths of power" or the ability to gain and maintain control over ideology and economy (Earle 1997) emphasize the emergence of chiefs who excert manipulation of religious ideology in community-based rituals (Siegel 1999). Thus, political dominance mainly depends on elite-centered strategies in which households and exclusive mortuary practices have developed during the LCA in the Greater Antilles. However, various researchers also propose a decrease in kinship emphasis and the beginning of a corporation or instituted status and rank (Curet 1992; Curet and Oliver 1998). This implies that village leaders and shamans held a very important status utilizing symbollically charged objects and places in order to control their power (Oliver 2009).

At present, the possible existence of LCA chiefdoms in the coastal Guianas (Rostain 2008a:231) is argumented by the mere statement that 'the intensification of agriculture using the raised field technique progressively resulted in population growth, social complexity, intersocietal interaction, crafts specialization and long-distance trade' brought about the emergence of chiefdoms (Rostain 2010:348). The view that the origins of chiefdoms in the Guianas, by means of the introduction of supposedly superior agricultural earthworks, resulted in a larger population guided by means of a centralised power is oversimplified and in need of verification. The academic and evolutive aspects of this framework lack an (ethnographic) indigenous point of view, or ontologies, of polities, cosmology, warfare, and leadership.[76] This framework is rather founded on shamanism and has largely been promoted by anthropologists during the last decades in: (a) southern Brazil, notably among the Tupi (Clastres 1974; Menguet 1993; Santos-Granero 1993, 2009b; Fausto 2000, 2001; Viveiros de Castro 2002; Sztutman 2005), (b) western Amazonia (Taylor 1985; Descola 1988) and (c) the Guianas (P. Grenand 1982), Joanna Overing (1983, 1986), Simone Dreyfus (1983-4, 1992), Peter Rivière (1984), Dominique Tilkin Gallois (1986), Neil Whitehead (1988, 1994, 1998), and Jean Chapuis (1993). However, regarding political power, Michael Heckenberger (2005) and Renzo Duin (2009) took a stand against "Society against the State" in favour of complexity and social politics in Lowland South America and the Guianas respectively.

The LCA of French Guiana is represented by the following ceramic complexes: (a) Aristé, (b) Koriabo, (c) Barbakoeba, and (d) Thémire. They are attributed to two supra-regional traditions and ceramic series in northeastern South-America: (a) the Polychrome and Incised-and-Punctate Tradition from the Middle and Lower Amazon River and (b) the Arauquínoid series from eastern Venezuela (Rostain 1994b:11; Rostain 2013). Concerning the Guianas, similarities between the Incised-and-Punctate Tradition and Arauquínoid series have been suggested by Boomert (1980), Versteeg (1985), Zucchi (1985b), Tarble (1985), and Rostain and Versteeg (2004). In general, the origins of the ceramic complexes of French Guiana, as well as those in Suriname and Guyana, have been attributed to the ceramic complexes of the Orinoco Basin. To a lesser extent this also applies to the Amazon River, eventually colliding on Cayenne Island (Rostain 2012). The regional complexes of the coastal Guianas are presented here.

76 On Amerindian leadership in the Guianas, see Brightman (2007).

The Arauquínoid series

The majority of the ceramics dated to the LCA has been affiliated to the Arauquínoid ceramic series. They are found mainly along the littoral of Suriname and western French Guiana. According to Arie Boomert (1976:138; 1977:511; 1978:47; 1980:69), the dispersion of the Incised-and-Punctate Tradition of northern Lowland South America coincided with the distribution of the Arauquínoid ceramic series in this area. The Arauquínoid ceramic series of the Lower Orinoco is part of a larger chrono-cultural framework. It was preceded by the Saladoid and Barrancoid ceramic series, as Cruxent and Rouse (1958/1959) and later Roosevelt (1980, 1997), have defined as to Venezuela. This tripartite framework also served as a model for the pre-Columbian societies of Suriname (Boomert 1977, 1980; Rouse 1983; Rouse et al. 1984; Versteeg 1985, 2003).

The Arauquínoid ceramic series play an important role in the understanding of successive prehistoric migrations from the Middle and Lower Orinoco watershed into the Caribbean region and the western Guianas. During the 1970s, ascribing prehistoric Suriname to this rather recent chronology, replaced the existing obsolete ideas on pre-Columbian "Arawak" and "Carib" societies in Suriname, as advocated by Geijskes (1963) (Arie Boomert, personal communication 2011). In the course of the following decades, Versteeg (1985) and Boomert (1986, 1993) further utilised this model which Rostain eventually adopted as to French Guiana (1994a-b).

As Boomert states (1978:48), the expansion of the Arauquínoid influences or a possible migration of Arauquínoid populations towards the western Guianas revealed inconsistencies, such as: (a) the earlier inception dates of the sites (before AD 1000), (b) the absence of excision and (c) the total lack of *cauixí* as a ceramic temper. All are characteristic of the Arauquínoid ceramics. It is thought that the Arauquínoid population left the Middle Orinoco River in *c*.AD 650 –halfway Rouse and Cruxent's Period III (1963:30)– to move down towards its mouth and intermingle with and replace other groups. Then, in *c*.AD 700, this mixed population set off for Trinidad and the western Guianas. Here they once again replaced and mixed with the scant Barrancoid groups in order to form a new *Arauquínoid Guiana Group* (Rostain 2008b:286–287), reflecting the above-mentioned migration concept. It is generally referred to as the first "wave" which was to be followed by a second influx in *c*.AD 1000 (Rostain and Versteeg 2004:234–235).

Initially, Cruxent and Rouse have defined the Arauquínoid ceramic series with regard to the Orinoco River. Having attributed this series to Period IV (AD 1000-1500), they also suggest it was probably initiated during the second half of their Period III (AD 300-1150), i.e. in *c*.AD 650, and located in the San Fernando area of the Venezuelan Llanos and the confluence of the Apure with the Orinoco Rivers (1963:9).[77] In the course of Cruxent and Rouse's excavations, only a single absolute date was obtained for one of the four Arauquínoid ceramic subseries named *Guarguapo* (1963:155). The other subseries/styles are referred to as *Arauquín*, *Matraquero* and *Camoruco*. Their cultural affiliation is primarily based upon relative stratigraphy:

77 In their publication Cruxent and Rouse refer to archaeological material Vincenzo Petrullo (1939) acquired at the Arauquín Ranch (Venezuelan Spanish: Hato Arauquín).

The Camoruco and Guarguapo excavations are discussed in connection with the Saladoid and Barrancoid series respectively, since they have yielded primarily material of those series […]. *Here, we need only repeat that refuse of Camoruco style […] overlay a much thicker deposit of Ronquin style refuse at the site of the latter name, while Guarguapo pottery overlay that of the Los Barrancas style at the sites of Saladero and Guarguapo. Since Ronquin and Los Barrancos both date from Period III, we are able to place Camoruco and Guarguapo in Period IV* […]. *Guarguapo is extended into Period V because of the presence of European trade sherds and a radiocarbon date of AD 1640* […].

The Arauquín and Matraquero styles are likewise placed in Period IV, but only because their stylistic resemblances to Camoruco and Ronquin and also Valencia, the Periord IV style of Valencia basin […]. *Arauquín also has lugs like those of the Los Barrancas style, which leads us to extend the Arauquin style back into the second half of Period III, making it the earliest of the Arauquínoid styles* […]. *Presumably, it is the source of the few Arauquínoid sherds that have been found associated with the Ronquin and Los Barrancas styles, and with the Cotua style up the river* […]. (Rouse and Cruxent 1963:90–91)

Orinocan Arauquínoid pottery is easy to distinguish by means of the pounded sponge spicules or *cauixí* temper (Zucchi 1985b). Characteristic vessel shapes are globular, collared jars or bottles with human faces (with coffee bean eyes and round eyebrows) in appliqué work on the collars as well as bowls with outwardly sloping and bevelled rims with incised designs. Decoration varies per style, but consists basically of parallel lines inclined in alternate directions. They are bordered at the top and bottom with horizontal lines (Fr., *cartouche*). The spaces between the incisions are excised in the Arauquín style and filled with punctations in the Matraquero and Camoruco styles. Guarguapo designs are the most simple and most crude ones. All styles have often punctated appliqué ridges on the wall which are often punctated. Painting is almost non existent. The nature of the Arauquín site is unknown, whereas Matraquero and Camoruco are situated on man-made mounds. Rouse and Cruxent (1963:92) hypothesised that, since Arauquín was presumed to be the earliest site, this series diffused down the Orinoco River as the increasing simplicity of the ceramic styles also moved downriver, i.e. the Bontour complex of Trinidad.

The origins of the Arauquínoid series are said to be situated between the eastern Venezuelan Llanos and the confluence of the Rio Negro and Solimőes Rivers (Boomert 1980). Meggers and Evans (1961) concluded that the Arauquínoid series spread in two directions from the Middle Orinoco: (a) downstream towards Trinidad and the Guianas (Late Mabaruma Phase) and (b) upriver (Nericagua Phase). It eventually dispersed further down into the Amazon Basin, joining the renowned Santarem and Konduri styles of the Lower Tapajȯs River (AD 1300-1600) which is related to the Amazonian Incised-and-Punctate Horizon (see Arroyo et al. 1999). Notably Sigvald Linné (1925:53) proposed a reverse diffusion of *cauixí* tempering into the Orinoco Basin from the Lower Amazon River. As mentioned, Donald Lathrap correlated the late prehistoric Cariban expansion to the Incised-and-Punctate Horizon and the Arauquínoid ceramic series, hereby integrating the raised field agricultural subsistence system (Lathrap 1970). According to Lathrap, this rapid expansion depended on the warfare of raiding parties who killed all the men and abducted the women. However, the arrival of the first Europeans altered this expansion. Again, according to Lathrap, the above-mentioned ceramics featured a *cauixí* temper, a fine V shaped incisions creating rectilinear designs and continuous triangles together with a complex clay strip appliqués (Lathrap 1970:164–165).

During the mid-1970s, Anna Roosevelt conducted her PhD research at Parmana on the Middle Orinoco River. She provided the first evidence of maize cultivation in *c*.800 BC as well as more radiocarbon dates and ceramic data on the Camoruco subseries (AD 400-1500) which were now divided into three subseries (Roosevelt 1980:195). Several ceramic characteristics or Rousian modes of the Camoruco subseries (e.g. appliqué ridges with incision and punctation, maroon post-fired paint, sharp rectilinear incision, punctation on necked jars) linked the Camoruco phases to the widespread Arauquínoid ceramic series (ibid., p. 196). Additional excavations at Corozal in that same Parmana region redefined the Camoruco Tradition (AD 800-1550). Here maroon paint, rectilinear incisions, and modelled incised lugs are now attributed to the later Camoruco 2 and 3 Phases, to be dated between AD 1000-1300 and AD 1300-1550 respectively (Roosevelt 1997:94–95, 185). The later phases are related to the Incised-and-Punctate Horizon or "conquest chiefdoms" which, according to Lathrap (1970) and Meggers and Evans (1961), are generally attributed to the beginning of the second millennium AD.

To summarize, the ceramic complexes of the Corozal and Camoruco phases seem to have their distant stylistic origins in the Saladoid and Barrancoid series and have some functional and iconographic continuities with them, but their pottery has diverged significantly form the earlier traditions in certain aspects of technology, function, and decoration. Based on the nature and rate of changes in pottery, the Corozal tradition seems to represent an intrusion into the Parmana region and a major cultural-ecological transition. The Camoruco tradition could well have developed locally out of Corozal in Parmana, but the specific Arauquínoid ceramic complex that takes form in late Camoruco times indicates a sudden intensification of outside contacts as well as a rapid in place crystallisation of new economic, social, political, and religious forms. (Roosevelt 1997:165)

This final expansion of the Arauquínoid population is believed to be related to the cultivation of maize, taken from the Lower Orinoco into the Antilles and beyond. This has been confirmed by Venezuelan archaeologists who excavated the Agüerito site, dated between AD 1200-1400, i.e. Period 3 (Zucchi et al. 1984:179; Zucchi 1988). Thermoluminescent and radiocarbon results have convinced these archaeologists, as to the Orinoco River, to favour a short Ceramic Age chronology, i.e. the Saladoid–Barrancoid–Arauquínoid sequence, starting in the first millennium BC. On the other hand, Rouse and Roosevelt prefer a longer chronology commencing in the course of the third millennium BC.[78]

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78 The discussion on a Short and Long Chronology has captured archaeologists working at the Orinoco River for a long time (Boomert 2000:110–112; Oliver 2014:103, fig. 4). Zucchi et al. (1984:176) stated they were content that 'the acceptance of Rouse's dates of 1760 BC-2140 BC for La Gruta would imply a complete stagnation of ceramic style for more than 1,500 years between the La Gruta and Ronquin Phases' They went on to remark that 'The dates obtained by the different authors corresponding to the 3rd and 4th millennium should not be rejected without a careful examination, especially those obtained from reliable contexts, such as hearths and living floors. We must not overlook the possibility of an early and extended ceramic horizon in the tropical lowlands of South America unrelated either to the Saladoid or Barrancoid traditions, exemplified by the pottery of Puerto Hormiga, Monsu in Colombia, and Mina in Brazil, and related to the beginnings of Tropical Forest agricultural practices' (ibid., p. 178). As pointed out before, we also see this hiatus in other parts of Amazonia, mainly due to insufficient research.

William Barse put the entire Middle Orinoco ceramic sequence to the test when AMS-dating five charcoal samples taken from carchoal encrusted sherds, excavated by George Howard in 1941 (Barse 2000). The results suggest that the Ronquin phase is posterior to Corozal, thereby replacing the inception date of the Ronquin component in the second half of the first millennium AD. Barse proposed a complete revision of the Middle Orinoco sequence which he published ten years later (Barse 2009:97). He suggested that the Arauquínoid series, having spread throughout the Orinoco drainage, should be dated after *c.*AD 1100 (Barse 2000:341).

In sum, the Arauquínoid migration into the western Guianas is dominated by the study of ceramic material, as this brief introduction clearly demonstrates. Further study is required in order to comprehend the cultural evolution of this large ceramic series and its origins. Its ceramic series is also associated with large earthworks and complex societies. However, this type of landscape management already existed during the preceding Barrancoid occupation (Versteeg 1985, 2008; Rostain 2008a, 2010b, 2013). Although the date of inception is as yet debated, the concept of migration and diffusion from the Orinoco River into the Caribbean and Guianas has solely been proposed in order to explain the presence of similar ceramics in these distant areas. The Cedrosan Saladoid and Barrancoid ceramics are probably the most obvious traits of this concept. The Arauquinoid expansion subsequently presents one more movement from the Lower Orinoco into the Lesser Antilles and Guianas. It starts during the second half of the first millennium to arrive at the coastal Guianas in *c.*AD 1000, reaching even further than the previous Saladoid/Barrancoid expansion. However, little room is left for local development or earlier migrations from the Lower Amazon River. This issue is often neglected because of the strong scholarly preference for the Orinocan sequence.

The Barbakoeba complex

Since the 1970s, the Holocene coastal sites of eastern Suriname have initially been associated with ridged field complexes and later with the Arauquínoid ceramic series (Boomert 1976, 1980, 1993; Versteeg 1985). The anthropogenic origins of these raised fields, either pre-Columbian and/or colonial, remained speculative until the end of the 1950s. In this decade, multiple aerial observations of the Nickerie District (western Suriname) indicated a spatial relationship between the raised fields and the prehistoric man-made hill site of Hertenrits (Boomert 1976).[79] According to Boomert, the presence of prehistoric sites on the sandy ridges in the Marowijne District, combined with the parallel orientated raised fields, provided sufficient proof of their cultural authenticity and their synchronicity, despite the absence of any radiocarbon dates:

> *Especially in Marowijne, vast raised field systems have been discovered which directly border and run parallel to the old coastal barriers. On the ritsen sometimes the old settlements associated with the raised fields could be localized. Better proof that artificially raised fields were constructed to be sure of well-drained floors for cultivation during the wet season, is hardly necessary! The complexes situated in Marowijne along the ritsen were most probably extended again and again in*

79 These aerial observations were followed up by Dirk Geijskes' archaeological excavations. This did boost the international interest in the archaeology of Suriname as is proven by the ascription of these Surinamese sites in numerous publications of the North American researchers by James Parsons, James Bowden, William Denevan and in Donald Lathrap's *The Upper Amazon* (1970:162, fig. 41).

prehistoric times. As a result sometimes at both sides of the rits, but mostly only at the southern one, a large complex more or less regularly shaped raised fields with ditches can be found. (Boomert 1976:136)

The pottery of the Marowijne District, then named “Barbakoeba styled ceramics,” was not yet radiocarbon dated. In order to obtain these samples for the construction and usage of these raised fields, Dutch archaeologists chose the site of Hertenrits in order to study the hypothesized relationship between the raised field phenomenon and Barbakoeba ceramics. The Hertenrits site came with advantages: (a) its configuration was thought to possess clear evidence it was contemporaneous with the raised fields, (b) its anthropogenic origins and (c) it probably has a well-defined stratigraphy (van der Heide 1973).[80]

The tested areas of this mound did not yield the desired quantities of (decorated) ceramics as to the lower stratigraphic layers (Boomert 1976:138; Geijskes 1963:73). Nevertheless, according to Boomert, the decorated ceramics form the upper layers showed Arauquínoid and (Late) Mabaruma Phase characteristics whereas the youngest ceramics of Hertenrits were considered to be a local variation of the Arauquínoid series. This was confirmed by the presence of raised fields and habitation mounds associated with Orinocan Arauquínoid ceramic complexes in Venezuela. The results of the Hertenrits radiocarbon dates indicated that its occupation started in c.AD 650 and ceased in *c.*AD 900. However, the first date is problematic as Boomert pointed out: it is considered too early to have any cultural link with the Arauquínoid ceramic series of the Lower Orinoco River or with the Late Mabaruma Phase in Guyana (Rouse 1983:13; Boomert 1976:138).

At the beginning of the 1990s, Arie Boomert finally defined the ceramic complex of Barbakoeba, ascribing it to the Arauquínoid Tradition and forwarding a date between AD 650 and 1200 (Boomert 1993:205).[81] He also suggested that the Crique Jacques site in French Guiana, situated on the Pleistocene edge of the Holocene swamp land between the Lower Mana and Maroni Rivers, was also part of the Barbakoeba complex. Again, Rostain (1994a:439–441) complied with this view. Boomert’s ceramic study is based on a total of 500 sherds, collected from the surface of seven sites and one test pit. The latter sites are located between the Wane Kreek and the confluent of the Cottica and Commewijne Rivers. The main diagnostic elements are: (a) pounded potsherd as a temper, (b) necked jars representing the most typical vessel shape of this complex (Boomert 1993:206) and (c) “unerased coils” or corrugated rims (ibid., p. 202). The latter mode not only represented a diagnostic decorative element with regard to Suriname, but also to coastal French Guiana according to Rostain et al. (2008:38). Fifteen years later, the Earthmovers Project also provided seven radiocarbon dates for the acclaimed Barbakoeba site of Sable Blanc Est. It indicated that the excavated part

80 H. Dost discovered the pre-Columbian artificial mound of Hertenrits in 1956 during a geological survey for agricultural purposes. It is situated close to Wageningen in the Nickerie District (western Suriname) and measures 2.5 m in height. The pre-Columbian habitat covers *c.*4 ha and consists of anthropogenic layers of clay extracted at the foot of the ridge as well as from its swampy surroundings, to eventually form a ring ditch. The first archaeological excavations were conducted under the auspices of the Suriname Museum in 1957 (Geijskes 1963:72).

81 Versteeg took the only existing radiocarbon date for the Barbakoeba complex from the Boekoe Creek-2 site. The charcoal was collected from a hand dug test pit at between 15 and 20 cm below the surface. The C^{14} measure yielded a date of 975 ± 50 BP (GrN-7936) to be calibrated to c.AD 1050. Another charcoal sample taken from the Koriabo site of Morico Creek yielded 455 ± 65 BP (GrN-2321). However, Boomert considered this date too young and therefore discarded it.

had been occupied roughly between 1000 and 800 BP, i.e. the first half of the second millenium AD (McKey et al. 2010, Table S1). Despite the existing dates, the chronology of Barbakoeba, as well as other Arauquínoid sites (e.g. the Late Hertenrits, Kwatta, Thémire complexes) is thought to evolve around between AD 1000 and 1400 (Versteeg and Bubberman 1992; Rostain 2008b:281).[82]

Concerning pre-Columbian landscape management, the Earthmovers Project also proposed that the extensive raised field complexes and other earthworks (e.g. canals, residential mounds, causeways), were introduced by an invading Arauquínoid population (McKey et al. 2010; Rostain 2010b). Furthermore, micro-botanical evidence revealed the cultivation of maize, manioc and sweet potato, esteemed to be sufficient for a dense population of between 50 and 100 individuals per square km. Their ruler was believed to be a regional central authority such as in a chiefdom (Rostain 2010a). If there were any similar (supra-) chiefdoms in French Guiana and Suriname, as proposed by Rostain (2008a:231, 2010) and Versteeg (2008:306), is as yet speculative, as not all the above-mentioned elements have been confirmed by any concrete archaeological data. The presence of prehistoric chiefdoms has been hyped during the last two decades obscuring the regional picture. We must remain objective as mentioned in the introduction of this section; it is Boomert (2000:382) who states: '… we can by no means compare the minimal chiefdoms and/or Big-Men collectivities of the Lower Orinoco (and Guianas) with the socio-political complexity of the chiefdom type societies known in the Greater Antilles and the Amazon Valley.'[83]

The Thémire complex

The sites of this complex are often found on the sandy ridges of the Holocene plains in central French Guiana, roughly situated between the Kourou River and Cayenne Island (Rostain 1994a, 2008b, 2013). The type-site of Thémire is located on a Pleistocene ridge in the northwestern part of Cayenne Island overlooking the Montabo bay (Rostain 1989, 1994a). All archaeological material related to this complex has been discovered during various pedestrian surveys, several test pits and one programmed excavation. Rostain synthesised the material and dubbed it the Thémire ceramic complex in his PhD dissertation (Rostain 1994a). Despite existing ceramic studies presented by Alain Cornette (1990, 1992) as to Cayenne Island, Rostain introduced three ceramic types for Cayenne: *Cayenne peint*, *Mahury incisé* and *Mechior Kwep* as well as one class called *Montabo rouge*. His typology is based on 7874 sherds, found at ten sites of which the type *Cayenne*

82 There are no radiocarbon dates with regard to the Late Hertenrits occupation at the site itself. This later occupation is cross-referenced by dated Late Hertenrits ceramic material found at the Prins Bernhard Polder man-made mound site.

83 The present author agrees with Dieter Heinen and Alvaro García-Castro (2000:562–567) in that the visions of the Garden of Eden *vs*. the Counterfeit Paradise are not quite correct and that the concept of chiefdom has a wide range in Amazonia.

peint represents *c*.70% of the entire assemblage.[84] All these ceramic types have been attributed to the Arauquínoid series whereas *Cayenne peint* is also attributed to the Polychrome Tradition. Together they form the Thémire ceramic complex (Rostain 1994a:221, 408). Rostain further suggested that the polychrome influences were unilateral as Thémire diagnostic elements are lacking in Aristé sites (2008b:293).

This typo-chronology is based on only two accepted radiometric dates on shell for: (a) one for the excavation at Bois Diable (Kourou) of 510 ± 40 BP (OBDY-794) and (b) one for the site of Sainte-Agathe (Macouria) of 380 ± 35 BP (OBDY-796). This suggests a combined date of between *c*.AD 1400 and 1670 (Rostain 1994a:224). Instead of acknowledging the existing data and creating a local entity first, the results of the radiocarbon dates were partially ignored in order to obtain a desired cultural affiliation to the second Arauquínoid expansion into the Guianas. Thus, the results were considered too recent for an evident Arauquínoid affiliation. The Thémire culture is therefore probably interpreted as 'the ultimate manifestation of the Arauquinoid tradition both geographically and chronologically' (Rostain 2013:122). Ironically, recent excavations at Sainte-Agathe , situated on a Holocene ridge, indicate that the single result obtained by Yves Wack (1990b) does indeed correspond with this proto-contact period (Samuelian 2009).

Despite these radiometric results, it appeared more probable to Rostain and Versteeg (2003) that this complex would be culturally affiliated with the LCA coastal sites of Suriname (e.g. Hertenrits, Kwatta, Barbakoeba). Their hypothesis suggests an occupation span as to the Thémire complex ranging from between *c*.AD 900 and 1650. The Thémire complex was thereby incorporated into the existing cultural framework of the western Guianas (Rostain 1994a, 2008b, 2013; Versteeg and Rostain 2004). As to the Barbakoeba and Hertenrits ceramic complexes, the sites of the Thémire complex are often surrounded by ridged fields although no such fields have been found on Cayenne Island. In sum, the Thémire complex embodies the most eastern expansion of the Arauquínoid Tradition (Rostain 2008b:292).

Several years after Rostain's PhD dissertation, Matthieu Hildebrand rejected the diffusionist model of an Arauquínoid Tradition in the Guianas, as stated in his Bachelors and Masters thesis (Hildebrand 1999, 2000). In Hildebrand's view, the Arauquínoid presence is not based upon tangible evidence but solely upon the conviction of researchers such as Boomert, Versteeg and Rostain who applied the Orinocan chronology in the east. The two latter scholars primarily utilise decorative elements when characterizing Venezuelan influence which cannot be considered to be a diagnostic of a singular tradition. Hildebrand further

84 Rostain (1994b:10, note 2) simply ignored the ceramic typology proposed by Cornette (1990) for French Guiana during the 1985 IACA Congress held in San Juan de Porto Rico. Rostain however added to this statement that his classification was only preliminary and needed further adaptation in the future: 'Comme aucune typologie céramique n'avait été définie en Guyane, et comme il n'existe pas de méthodologie encore bien adaptée au matériel amazonien, nous avons adopté une classification préliminaire simplifiée; il sera nécessaire dans le futur de distinguer de nouveaux types et de subdiviser certains de ceux qui existent en plusieurs variétés.' The radiocarbon dates for Cayenne at Glycérias and Route Montabo have been discarded because they are considered much too young (Rostain 1994a:29–30, Table 3).

stresses that the type-variety classification Rostain applies is inappropriate when researching hand-made ceramics.[85]

When Hildebrand started working for the INRAP, he studied the ceramic material of the large scale excavations at *Lotissement Katoury*, situated not far from the Thémire type-site itself (Mestre et al. 2005, 2007). Rostain investigated the latter site in 1989 which was also partially excavated by Philippe Nowacki and Olivier Puaux in 1990 (Rostain 1994a:558–560). After studying more than 30,000 sherds Hildebrand boldly stated he had identified a new ceramic complex with radiocarbon dates ranging between the 10th and 13th century AD, hereby completely ignoring any previous research.[86] From that moment on, the Katoury-Thémire issue is in deadlock. Another ceramic study of the Katoury material, however, evidenced several shared characteristics, but Claude Coutet prefered the term Katoury Style because 'the distinct traits are in fact idiosyncratic features which may not have been emphasised sufficiently when the Thémire complex was created' (Coutet 2009:250).[87] At present, after numerous other compliance excavations, this so-called "Katoury" complex or "Cayenne Style" –by now retrieving the initial terminology of Cornette– has been recognized at numerous other sites on Cayenne Island and in its vicinity (e.g. Montjoly Bar, Cimetière paysager Poncel, Montabo-Sud, Lycée Professionnel de Rémire, Saint-Cyr, Soula, PK 11, Stoupan, Crique Anguille, Mombin) (cf. Chapters 8 and 9).

According to Rostain (2008b:288), the origins of Thémire are thought to be related to a population explosion that occurred in the coastal area between the Berbice River and Cayenne Island. He further suggested that this territory was at that time occupied by the Barbakoeba, Thémire, Kwatta and Late Hertenrits ceramic sites, all Arauquínoid cultures. These complexes, or cultures, possess their own territory and are specialised in certain trade items (Rostain 2006). The Hertenrits and Barbakoeba chiefdoms disappear gradually after AD 1250, but the Thémire complex continues to thrive until after the first contacts with Europeans.

The Aristé complex

To the east of Cayenne Island and notably the Lower Oyapock River as well as the northern part of the State of Amapá, we find habitation and funerary sites ascribed to the Aristé Phase, as defined by Betty Meggers and Clifford Evans (1957:103–167).[88] They studied the excavated ceramic and lithic material of fourteen sites in Amapá –seven habitation and seven funerary sites– located between the lower

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85 Hildebrand drew his conclusions after comparing the excavated ceramic material of the Mont Grand-Matoury site (Grouard et al. 1997, 2003) with the BPS 230 site (Vacher et al.1998) which Jérôme Briand had already studied.

86 M. Hildebrand (in Mestre et al. 2005:63) states: 'Le mobilier découvert sur le site de Katoury est donc extrêment intéressant puisqu'il permet de circonscrire une nouvelle occupation amérindienne sur l'île de Cayenne, une hypothèse soutenue par l'existence d'un mobilier céramique dont les composants décoratives et morphologiques sont assurément diagnostiques d'un "archéo-complexe" singulier.' The conclusion of this report was thought to be preposterous and was rejected by the members of the National Archaeology Committee (CIRA).

87 A condensed version of Coutet's PhD dissertation is published in *Karapa* (Coutet 2014a).

88 Clifford Evans defended his PhD dissertation entitled: *The Archeology of the Territory of Amapá*, *Brazil (Brazilian Guyana)* in March 1950 at the Faculty of Political Science of the Columbian University. It is the first comprehensive study of the Guianas (Evans 1950). Betty Meggers completed her thesis entitled; *The Archeological Sequence on Marajó Island, Brazil*, 2 years later (see Meggers and Evans 1957:xxviii).

courses of the Oyapock and Araguarí Rivers. In addition, they also dealt with the material Emílio Goeldi had excavated in 1896 at Cunaní as well as with several other sites described by Henri Coudreau and Curt Nimuendajú.

The majority of the archaeological material was collected from the surface and in various test pits, totalling 2156 potsherds, 97 restorable vessels, four figurines, a few axes, some quartz debris and European ware. The acquired ceramic material as well as the vessels kept at the Museu Goeldi in Belém (N=118), was classified into seven types of which two are described as undecorated or plain. The most important elements distinguished with regard to this classification were: (a) the presence (*Aristé* and *Serra painted*, *Flexal scraped* and *Davi incised*), (b) the absence (*Serra* and *Aristé plain*) of decoration, (c) the colour and (d) the nature of the non-plastics (e.g. sand and crushed quartz) visible in the paste (*Aristé plain* and/or *Aristé painted* and *Flexal scraped*), quartz sand (*Davi incised*) and grog (*Serra plain* and *Serra painted*).

Aristé habitation sites are located on higher ground near a lake or creek (Br., *igarapé*) whereas rock shelters represent burial sites in which urns have been deposited directly on the ground. When Meggers and Evans carried out their research, absolute dating was already feasible. However, according to the latter, it appeared that the Aristé Phase had not been long present in the region before the first Europeans arrived. The beautiful polychrome painted anthropomorphic Aristé urns have been ascribed to the Polychrome Tradition of Lowland Amazonia (Meggers and Evans 1961; P. Hilbert 1968; Simões 1972). They have also been associated with the Marajoará urns of Marajó, which are considered to be the cradle of the Amazonian Polychrome Tradition and the carrier of complex societies (Roosevelt 1991; Schaan 2004, 2007; Barreto 2008).

In fact, Rostain obtained the first radiocarbon dates with regard to the Aristé complex from rock shelter sites at Montagne Bruyère, situated between the mouths of the Lower Oyapock and Ouanary Rivers in French Guiana. Two rock shelter sites (Carbet Mitan and Abri Marcel) date from AD 600 on (Rostain 1994a; 2008b:294–298).[89] Recent excavations at two Aristé funerary sites, including artificial shaft pits (Br., *poços*), are located near Calçoene (Amapá) and Pointe Morne (French Guiana) and yielded more dates, all ranging between AD 900 and 1400. These excavations also provided innovative insights on (Late) Aristé funerary practices and their aftermath (Mestre and Hildebrand 2011; Cabral and Saldanha 2009; Saldanha and Cabral 2010, 2011b; Carbral 2011).

The regional Aristé chronology of eastern French Guiana is represented by the following ceramic typo-chronology: (a) *Ouanary encoché*, (b) *Caripo kwep* and (c) *Enfer polychrome*. They are partially present in northern Amapá too (Rostain 1994a, 2011, 2012). The first type represents an Early Aristé phase (AD 700-1100) attributed to the Incised-and-Punctate Tradition of the Lower Amazon. The Enfer Polychrome represents the Late Aristé phase (AD 1100-1600). The Final Aristé phase (AD 1600-1700) is solely attributed to the Polychrome Tradition (Rostain 2011:14). Apart from dissimilarities regarding decoration modes, the Early and

89 Two charcoal samples from Carbet Mitan furnished two dates: 2070 ± 45 BP and 1650 ± 40 BP. They have been judged too early for the 2008b publication by Rostain. The Abri Marcel site featured five radiometric dates on shell from between 1470 ± 40 BP and 1170 ± 30 BP (Rostain 1994a:173). The charcoal sample GrN-20167 Hugues Petitjean Roget took from the Trou Delft site in 1992 was dated 160 ± 25 BP and is obviously too recent. Two other dates for Trou Delft have been published: 530 ± 60 BP and 6660 ± 80 BP. The latter is considered too early while the first may refer to a functional occupation (Petitjean Roget 1995a:384).

Late Aristé ceramic types also come with various secondary urn burial practices. One speculates that during its early period, burial practices are characterised by the deposition of de-fleshed bones. During the later period, the body of the deceased [or merely the bones?] has been cremated before being placed in the urn (Rostain 2008b:294).

In recent years, the Aristé complex has received more attention due to more excavations. Incoming data suggest that is highly possible that the Early Aristé complex comes with a singular ECA-B phase and, moreover, that is materialized by *Ouanary encoché* with dates from approximately the 4th century AD. In fact, it may represent a distinct complex and not be *per se* related to the Late Aristé phase (LCA) which is principally materialized by means of polychrome urns (cf. Section 9.8).

Finally, several Aristé funerary sites in the State of Amapá and a few in French Guiana have been associated with European artefacts, i.e. faïence, glass beads, iron nails. This is also the case with regard to the Arũa and Maracá urns of the Lower Amazon. However, we must take care when ascribing these urns to the contact period. Amerindians have re-used urns and urn sites throughout the colonial period, i.e. Nimuendajú (1926, 2004:43–44). This may well have been an Amerindian tradition inherited from pre-Columbian times (van den Bel 2009b).

The Koriabo complex

Another ceramic series ascribed to the LCA is the renowned Koriabo complex. Its decorated ceramics are easy to recognize and have been interpreted as a trade ware among the LCA pre-Columbian groups (Boomert 1993). These ceramics occur in almost the entire Guiana Shield and possibly beyond (Evans and Meggers 1960; Groene 1976; Boomert 1977, 1978, 1986, 1993, 2004; P. Hilbert 1982; Versteeg 1985, 2003; Rostain 1994a, 2008b, 2009; Hildebrand 2008; van den Bel 2010a; Cabral 2011; Mestre and Hildebrand 2011; Saldanha and Cabral 2009, 2011a, 2011b, 2012; Bastos and Kern 2011). In fact, Rostain (2009:47) refers to the Koriabo complex as 'a unique product of the Guianas', found as far as in the Lesser Antilles (Allaire 1984; Boomert 1986, 2011).[90]

Clifford Evans and Betty Meggers defined the Koriabo ceramic complex in the 1950s when excavating sites in the North-West District of former British Guiana, one of which was called Koriabo Point (Evans and Meggers 1960:124–154).[91] The ceramic register of the Koriabo Phase is based on the collection of archaeological material from four habitation sites, located on the banks of the Barima and Waini Rivers. Evans and Meggers carried out pedestrian surveys and excavating several test pits ($13m^2$ in total) in order to obtain their material. They collected 4,378 potsherds allowing them to establish the first characteristics of this complex.

The excavated material was classified by means of five ceramic types: three non-decorated or ordinary types, referred to as *Barima plain*, *Koriabo plain* and *Warapoco plain*, as well as two decorated ones: *Koriabo incised* and *Koriabo scraped*. Not only the presence or absence of any decoration, but also the colour and nature of the non-plastics visible in the paste served to distinguish the following types:

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90 Gudmund Hatt acquired a beautiful polychrome notched flower bowl at the Salt River site of the Virgin Islands (Hardy 2008:204). It includes striking similarities with painted Koriabo flower bowls.

91 According to Cornelius Osgood (1946:32), the Venezuelan anthropologist Elias Torro had discovered the Koriabo type-site in 1905 when exploring the British Guiana and Venezuelan international boundary.

(a) with *caraipé*, or *kwepi* (*Barima plain*), (b) coarse sand (*Koriabo plain, incised, scraped*) and (c) coarse sand mixed with transparent quartz (*Warapoco plain*). Koriabo "trade" sherds were found only in the latest Mabaruma phase, therefore an ascription to the LCA ranging between AD 1200 and 1600 was proposed by Evans and Meggers as to Koriabo (1960:147–148). Furthermore, Boomert (1986:27–36) designated Koriabo ceramics found in Suriname decorated with elaborate polychrome painting (black and red on white slip) as funeral specimens. He dubbed them *Koriabo Painted* attributing Koriabo to the Amazonian Polychrome Tradition (ibid., p. 27; 2004:261).

The first Koriabo sherds in French-Guiana were discovered during the mid 1970s on the right bank of the Middle Maroni River at the Maroon hamlet of Kormontibo (Groene 1976). A pedestrian survey, ten test pits each measuring 50 x 50 cm, and one trench measuring 7 m x 50 cm, dug perpendicular to the streambed of the river, yielded 1894 selected sherds of which 114 were decorated and brought to Cayenne. After being studied, several slides depicting the discovered decorated ceramics were discussed with Frans Bubberman in Suriname who attributed them to the Koriabo complex. The French translation of his conclusion was published by Denis Groene:

> *Les ornementations apparentes sur plusieurs diapositives montrent clairement l'appartenance à la phase Koriabo qui est supposée s'être développée dans les Guyanes depuis la célèbre culture de Santarem dans la partie la plus basse de l'Amazone. Celle phase Koriabo a été découverte jusqu'au Nord-Ouest du Guyana, et est présente dans de nombreux sites archéologiques au Suriname. Cette phase à principalement les caractéristiques suivantes: Lignes incisées étroites en motifs géométriques sur les bords; Large usage de toutes sortes de figures appliquées, principalement zoomorphiques, allant du simple bouton à des têtes de singes et de grenouilles élaborées, en particulier ces dernières sont très fréquentes; Vases avec un goulot étroit dirigé vers le haut entre les flancs et le bord. À l'embouchure de la rivière Marowine, l'âge de ces poteries a été évalué à 500 ans environ.*
>
> *Cette phase Koriabo est supposée être, par plusieurs scientifiques, la preuve de l'invasion des Indiens Caraïbes, depuis la partie moyenne et la partie basse de l'Amazone, dans toutes les directions, y compris la route côtière, depuis l'embouchure de l'Amazone jusqu'à la Guyane (Voir "Upper Amazone" par D. W. Lathrap [The Upper Amazon] - Thames and Hudson, 1970). Le nom encore existant de Kormontibo, dans lequel le suffixe ibo, peut être reconnu, est en accord avec cette proposition.* (Groene 1976:163)[92]

92 'The visible decorations on various slides clearly show an affiliation to the Koriabo phase which is supposed to have developed out of the famous Santarem culture of the Lower Amazon River into the Guianas. This phase has been discovered in north-west Guyana and is found in many archaeological sites in Suriname. The Koriabo phase has the following main characteristics: rectilinear incised lines forming geometric motifs on the rims, abundant use of appliqué-modelling, mainly zoomorphic and ranging from simple nubbins to monkey heads and elaborate frog-shapes, of which the latter are particularly popular; vessels with a straight vertical neck between the rim and its sides. At the mouth of the Maroni River, this pottery is considered to be *c.*500 years old. Among certain scholars, the Koriabo phase supposedly represents the proof of a Carib invasion from the Middle and Lower Amazon River and radiating in many directions, including a coastal route, from the mouth of the Amazon towards French Guaiana the coast (by D. W. Lathrap - Thames and Hudson, 1970). The toponym of Kormontibo, featuring the suffix –ibo, is likely to be in favour of this proposition.'

In 1986, Boomert presented a publication in which Koriabo pottery from Suriname is analysed and compared with its Antillean off-shoot, the so-called Cayo complex from Saint Vincent. Boomert's morphological analysis in combination with the frequency of decoration modes put forward thirteen vessel shapes. He identified various regular shapes (Forms 1, 3, 4, 8, 9, and 10), two special shapes (Forms 2 and 12), and two diagnostic shapes (Forms 5 and 11). The latter shapes represent typical Koriabo shapes: (a) the so-called flower bowls with lobed rims and (b) necked jars (Evans and Meggers 1960:133, Fig. 53). These vessels reveal stylistic and morphological homogeneity, evoking a certain standardization which is identified or shared across the Guiana Shield and beyond. These highly recognizable vessel shapes often feature a repetitive combination of a specific decoration technique (Boomert 2004:254). In general, we can distinguish the following decorative characteristics as to Koriabo: painting/slipping, incision, scraping, impressions, notching, punctation, digit impressions, simple, and complex modelling. The non-plastics of the paste are divided into four temper modes: (a) quartz associated with (majority) of mica, (b) quartz elements with burnt vegetal matter, (c) fine sand, and, but more rare, and (d) pounded potsherds.

Rostain redefined Koriabo material found in French Guiana in his thesis, creating an entirely new type, dubbed *Chaton fantastique* (Rostain 1994a:199–212). It comes with three temper varieties, eight vessel shapes and various decoration techniques, i.e. incising, scraping, modelling. This register consists of ceramic material from several test pits at the Mapaou site on the Approuague River (N=551) as well as the PK 9.3 site (N=353), located on the upper Malmanoury Creek. However, the majority of the studied archaeological material consists of either fully or partially complete vessels, most of which have been found in rapids of the Approuague River (Migeon et al. 2010). It may be clear that this highly characteristic riverine context only provides us with a morphological variety of vessel shapes without any chronological context or any radiocarbon dates.

The majority of the Koriabo sites is thought to be found on the banks of the larger rivers and its affluents, in particular close to their junction, but they can also be located on the sandy ridges of the coastal plains (Boomert 2004:252). In French Guiana, Koriabo ceramics have also been associated with ditched sites (Fr., *eperon barré*), such as Angoulême on the Lower Mana River and Pointe Morne on the Lower Oyapock River (Kayamaré 1997; Hildebrand 2002a; Mestre 2006b; Mestre and Hildebrand 2011; Gassies and Dauphin 2013). It has nevertheless been attested that these sites have witnessed multiple occupations.

The origins and development of the Koriabo complex are still very difficult to grasp. This is due to its wide geographical distribution. Actual modelling is based on a relatively small database; therefore we must consider diffusionist conclusions with precaution. Boomert proposed a cultural affiliation with the Lower Amazonian Polychrome Tradition as it displays close affinities with the 'Ancestral Mazagão-Aristé' complex of Amapá (Boomert 1986, 2004:258). His stylistic approach regrouped the Late Aristé, Late Mazagão, and Koriabo styles to the Koriaban subseries which are yet again attributed to the Marajoaroid series of the Amazonian Polychrome Tradition (Boomert 2004:261). His chronology ranges from between AD 750 and AD 1500 (ibid., p. 256). Boomert further proposed that the Koriaban groups moved slowly from the interior of the Guiana Shield towards the littoral and that shortly before the moment of contact, this movement has resulted in an accumulation of Amerindian populations on the littoral. Consequently, the (proto)historic ceramic productions of the Kali'na, Palikur, and Island Carib potters evolved out of Koriabo and have been attributed to 'an Aristan subseries, which is largely post-Columbian in age' (ibid., p. 260).

Versteeg (1980b:50) presents another hypothesis, following Evans and Meggers (1960), suggesting that all dates prior to AD 1200 must be rejected due of contamination. This hypothesis is supported by Rostain and Versteeg (2004) who both attribute Koriabo to the Early Historic Age too. In sum, its chronology remains unclear but when accumulating all radiocarbon dates as to the Koriabo sites, we observe that the highest number of dates is found between AD 1000 and 1500 as proposed by Boomert (1986:37, Fig. 15; 1993:221).

3.4.4 The Historic Age

As mentioned in the above section, various Aristé funerary urns contained European trade goods, thus marking the arrival of the Europeans in the Guianas. These burial sites are dated to the 17th century, based on blue glass beads, probably manufactured in Amsterdam, and the iron trinkets found in these urns (Nimuendajú 2004:19, Fig. 4).[93] Apart from these sites, we have little archaeological data on historic Amerindian villages in French Guiana, Suriname or Amapá. However, radiocarbon dates referring to this early period have been obtained as to numerous sites often linked to Koriabo style ceramics. Arie Boomert (1986) already pointed out this early historic aspect regarding Koriabo when defining the Cayo complex as to the Lesser Antilles as did Louis Allaire (1984) before him. In fact, Boomert demonstrated the striking stylistic similarities between Koriabo ceramics found in Suriname and the ceramics excavated by Bullen at Cayo, establishing in this manner a cultural link between the Antilles and the Guianas, as recorded by 17th century chroniclers who frequented the Island Caribs or *Callinago* (Boomert 1995:32–33).

Along the Middle Orinoco River, the local Amerindian pottery traditions tend to be somewhat conservative. According to Kay Scaramelli (2006:272), they incorporate very few innovative techniques, i.e. potter wheel, kilns, nor do they replicate much European ware; only superior utilitarian table ware is admitted into their households during the 17th century. In the course of the 18th century, the colonial Amerindian sequence shows the disappearance of Amerindian styles as well as the birth of new Criollo styles (ibid., p. 249–256).

As to the Guianas, the French anthropologist Collomb (2003:134) has already pointed out that all Amerindian pottery series described with regard to the early 20th century are quite similar, suggesting that various Amerindian groups shared pottery production techniques and/or cultural traits. If these similarities are the result of (forced) cultural harmonisation or ethnogenesis during the colonial period is still under debate, but the latter cultural processes represent important factors concerning cultural change, indigenous survival and resistance. The historic Amerindian occupation of Eva 2 provides further clues to these questions (cf. Chapter 11). They involve ethnicity and cultural identity, too, and are linked to important social as well as political issues among present-day Amerindian groups.

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93 Scholars at the University of Bordeaux III have recently carried out a chemical analysis of the Trou Delft and Trou Reliquaire sites at Ouanary. The result suggests a German origin (Lower Rhine area) of the cobalt raw material (Ollagnier et al. 2011).

Site	Archaeology	Research	Type site	Region	Geomorphology	Geology	Year	m^2	Features	Ceramics	Lithics	RC datings	Reference
Rorota	salvage	survey	habitation	coastal	sandy ridge	pleistocene	1975	1	0	1896	1	0	Petitjean Roget and Roy 1976
Criques Jacques	salvage	survey	habitation ?	coastal	hilltop	white sand	1985	15	unknown	150 kg	unknown	0	Cornette 1985b
Abri Marcel	programmed	excavation	rock shelter	coastal	hilltop	shield	1988	10	0	3875	245	5	Rostain 1994a
Carbet Mitan	programmed	excavation	rock shelter	coastal	hilltop	shield	1989	20	1	1484	2334	2	Rostain 1994a
Themire	programmed	excavation	habitation	coastal	sandy ridge	pleistocene	1989	5	0	2370	131	0	Rostain 1994a
Thémire	salvage	survey	habitation	coastal	sandy ridge	pleistocene	1990	87	1	2259	5	0	Rostain 1989, 1994a
La Sablière	salvage	survey	habitation	coastal	sandy ridge	holocene	1991	7	3	1306	137	2	Barone-Visigalli and Prost 1991
BPS 13	salvage	excavation	habitation	interior	riverbank	holocene	1991	1400	114	23,855	99	20	Vacher et al. 1998
BPS 16	salvage	excavation	habitation	interior	hilltop	shield	1991	1850	13	7238	37	2	Vacher et al. 1998
BPS 17	salvage	excavation	habitation	interior	hilltop	shield	1993	700	15	1368	9	3	Vacher et al. 1998
BPS 172	salvage	excavation	habitation	interior	hilltop	shield	1993	136	81	26,433	108	7	Vacher et al. 1998
BPS 223	salvage	excavation	habitation	interior	riverbank	holocene	1993	1850	290	10,304	105	28	Vacher et al. 1998
BPS 230	salvage	excavation	habitation	interior	hilltop	shield	1993	2200	420	63,631	1062	20	Vacher et al. 1998
La Sablière	programmed	excavation	habitation	coastal	sandy ridge	holocene	1993	204	0	200 kg	18	0	Thooris 1994a
Favard	programmed	excavation	eperon	coastal	hilltop	shield	1996	43	unknown	4295	unknown	1	G. Mazière 1996
Mont Grand Matoury	programmed	excavation	habitation	coastal	hilltop	shield	1996	400	220	44430	1620	12	Grouard et al. 1997
Katoury	compliance	excavation	habitation	coastal	sandy ridge	pleistocene	2003	15000	937	32,033	6473	4	Mestre et al. 2005
Eva 2	compliance	excavation	habitation	coastal	hilltop	white sand	2005	5100	470	6960	12,115	5	van den Bel et al. 2006
Crique Sparouine	compliance	excavation	habitation	riverine	hilltop	shield	2006	2002	428	3702	112	4	van den Bel 2007b
Saut Saillat	compliance	excavation	habitation	riverine	riverbank	holocene	2006	1500	62	7542	21	4	Hildebrand 2008
Plateau des mines	compliance	excavation	habitation	interior	hilltop	white sand	2006	579	32	0	17,564	8	Mestre and Delpech 2008
AM 41	compliance	survey	habitation	coastal	sandy ridge	pleistocene	2006	1200	122	663	2	1	van den Bel 2006
Sable Blanc Est	programmed	excavation	habitation	coastal	sandy ridge	pleistocene	2007	330	113	unknown	unknown	7	Rostain et al. 2008; McKey et al. 2010
Bois Diable	programmed	excavation	habitation	coastal	sandy ridge	holocene	2008	1120	81	unknown	unknown	1	Rostain et al. 2009; McKey et al. 2010
Yaou	compliance	survey	ring-ditched	interior	hilltop	shield	2007	1408	77	5500	181	7	Mestre et al. 2013
Chemin Saint-Louis	compliance	excavation	habitation	riverine	riverbank	terrace	2008	5108	32	33,351	4774	28	van den Bel et al. 2011
Pointe Balaté	compliance	excavation	habitation	interior	riverbank	holocene	2009	3271	157	6667	323	9	Briand 2015
PK 11	compliance	excavation	habitation	coastal	sandy ridge	pleistocene	2010	1250	58	4280	721	7	van den Bel et al. 2012
Cimetière paysager	compliance	excavation	habitation	coastal	hilltop	pleistocene	2010	5763	203	5979	211	15	van den Bel et al. 2013

Table 3.1. A short overview of technical data per site excavated in French Guiana.

3.5 Final remarks

In sum, the LCA of the Guianas is certainly the best known archaeological period and primarily based on the study of ceramics. In general, such studies represent small, often selected samples, which I have attempted to illustrate throughout this summary. All the early ceramic studies evidenced diagnostic elements regarding archaeological ceramic complexes, series or even cultures. However, the ceramic material was most often acquired during unsystematic pedestrian surveys, test pitting and by means of private collections with hardly any stratigraphic control or documentation (e.g. Saut Léssé Dédé near Grand Santi) (G. Mazière and Pascual-Gaborit 1994).

The ceramic collections safeguarded at the SA depot in Cayenne serving to define existing ceramic complexes rarely surpass 8,000 potsherds per site. For instance, the type-chronology of the four ceramic complexes found in French Guiana (Barbakoeba, Thémire, Aristé, Koriabo), as Rostain presents in his thesis, is based on a total of 23,206 potsherds and 296 complete vessels (Rostain 1994b:10) regarding a coastal area spanning *c.*400 km!

The ceramic studies carried out with regard to compliance archaeological excavations (Katoury, Chemin Saint-Louis) largely surpass the above-mentioned total (*c.*110,000 sherds). This not only demonstrates its validity and representativity on a local level, but also its reliability in combination with numerous radiocarbon dates taken from excavated features being a more reliable context. It may be evident that large scale excavations are needed in order to gain a better insight into the site function, site dimensions, possible multiple occupations, (recent) disturbances, etc., than surface collecting and several test pits alone (cf. Table 3.1). Indeed, continuous archaeological research and the introduction of compliance archaeology to French Guiana have boosted the archaeological record in this region. As in any field of research, the existing framework based on previous research must be adjusted in order to continue active research, in full realisation that this could not have been carried out without previous (pioneering) research.

Chapter 4

The Archaic Eva 2 site

A Late Archaic occupation in the Pliocene savannahs

The Eva 2 and Plateau des Mines sites represent the first preceramic sites of French Guiana to be discovered. They were partially excavated between 2004 and 2006 by INRAP members. The Eva 2 site is situated on a sandy quartz hill belonging to the White Sand Formation and is juxtaposed between the upland forest of the Precambrian Shield and the Old Coastal Plains. The other sites, Plateau des Mines and Carrière des Ananas (PDM 1 and PDM 2) are probably contemporaneous and are situated on the edge of a large, flat summit or plateau which also belongs to the White Sand Formation. Both Archaic sites show a dark grey coloured archaeological layer (10-15 cm thick) buried at a depth of *c.*1 m. This paleosol revealed large quantities of dispersed quartz debitage, numerous polished stone tools. The Eva 2 site also included "incipient" or initial ceramics.

In and just below this occupation level, multiple rock clusters were found and interpreted as earth ovens or cooking pits. The supposedly long occupation span of these sites, the characteristic lithic toolkit and the spatial distribution of the cooking pits generate important questions concerning mobility, seasonality and site function as to this prehistoric period. The Eva 2 ceramics display similarities with the earliest known ceramics in the northern part of South America, such as Alaka (Guyana) and Mina (Pará, Brazil).

In this chapter the results of the excavation at Eva 2 will be discussed (van den Bel et al. 2006; see Annexes 1.1 and 2). Eva 2 also featured a historic Amerindian occupation, but this episode will be dealt with in Chapter 11. Here we will continue with the general introduction to both occupations.

4.1 Introduction

In 2004, a mechanical survey in the future sand quarry of EVA, situated in the territory of the *Centre Spatial Guyanais* (CSG), brought the Eva 2 site to light (Jérémie 2005). In fact, this survey yielded two Amerindian sites of which the Eva 1 site (No. 97312.170) was protected by the operators of the Russian/European Soyuz Project (the planned acces road had been diverted). The latter site is located on a low lateritic outcrop in the northern part of the quarry perimeter (Fig. 4.1). This ceramic site covered *c.*5 ha and is characterized by means of a dark coloured archaeological layer.

The Eva 2 site (No. 97312.171) is located on top of a bean-shaped hill, measuring *c.*100 x 250 m. It is situated in the southern part of the quarry perimeter, which is part of the Malmanoury Savannah. The summit of this hillock is flat and reaches 26 m above MSL. With a height of *c.*10 m it protrudes and overlooks

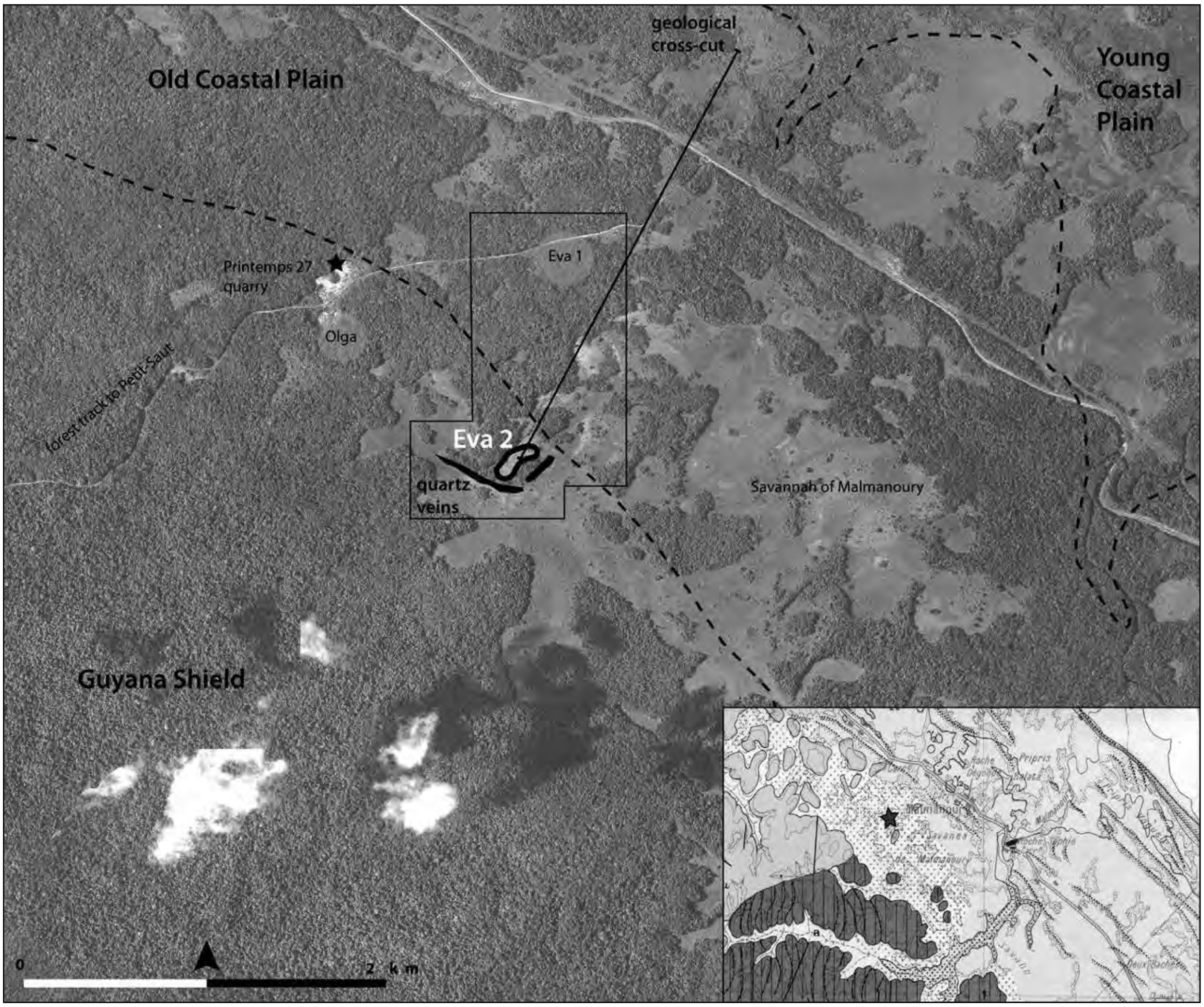


Figure 4.1. An aerial photograph of the Malmanoury Savannah with the EVA quarry perimeter in the middle (courtesy of the CNES). In the right corner a detail of the geological map of Kourou (after Choubert et al. 1958).

the latter savannah. Nineteen mechanical trenches were dug on top of and in the vicinity of this hillock in order to find the site's boundaries (Jérémie 2005). Domesticated pineapples and other edible fruits on the summit demonstrated a fairly recent human presence at this site.

A dark layer found in the first 30 cm of the soil extended over the entire summit. This layer yielded 25 kg of ceramic and 10 kg of lithic material. The ceramic assemblage appeared quite homogeneous. It was probably recent: the presence of *kwepi* as a temper and the application of brown varnish (referred to as *simili* in present-day Kali'na; cf. Section 11.6.3) which are still applied by Amerindian potters today. Several features were observed below the dark layer of which a small number evidenced spatial associations, notably in Trenches 19 and 26. One radiocarbon date (KIA-26019, 3025 ± 20 BP) taken from a dark layer suggested an ancient occupation or possibly a paleofire. The latter result however contrasted with the imported European ware found among the Amerindian ceramics in the dark layer (e.g. glass fragments and beads, iron tools, clay pipes).

Also in 2004, the INRAP carried out two other surveys with regard to the Soyuz Project: one concerned the zone of the future rocket launch-platform to the North in the Young Coastal Plains and the other concerned four other sand quarries named NATASCHA, IRINA, OLGA and TANIA positioned along the Malmanoury forest track, all southwest of the EVA quarry. The former survey revealed a pre-Columbian site located on a Holocene sand ridge and was heavily disturbed by the former hamlet of Malmanoury. In the savannah to the north, small heaps were detected, possibly including weathered raised fields (Hildebrand 2005a). The other survey yielded two pre-Columbian sites called Olga and TANIA (van den Bel 2004).[94] The OLGA site, situated opposite to the former white sand quarry of *Printemps 27*, is located on a Precambrian hilltop to the west of the excavated Eva 2 site. This site has a well-developed dark earth layer (40 to 80 cm thick) covering the summit of the hill, yielding a large quantity of ceramic and lithic material. Only one radiocarbon date (KIA-26024, 1795 ± 25 BP) places it in the ECA, but it is highly probable that Olga is a multi-phased site.[95] Remarkably the former sand quarry was once a white sand hillock –as was Eva 2– which had completely disappeared after extraction. A large number of hammer stones, quartz cores, and quartz blocks were found scattered at the borders of the quarry, possibly indicating the presence of another Archaic site.

The second site, called Tania, is rather small when considering the extention of its dark layer and is located at the centre of a stretched white sand plateau. It yielded three radiocarbon dates (e.g. KIA-26022, 410 ± 20 BP; KIA-26021, 675 ± 75 BP and KIA-26020, 1535 ± 25 BP) that have been associated with Koriabo styled ceramic material. The last date is probably too early for Koriabo and may imply an earlier occupation. Other pre-Columbian sites were detected between the villages of Kourou and Sinnamary, next to raised fields, polishing and rock art sites.

4.2 The excavation methods and techniques

Prior to the excavation, the result of the radiocarbon date obtained during the survey was not yet available. According to the *cahier des charges* imposed by the SA, we were supposed to excavate the entire summit of 2.5 ha knowing that the INRAP proposed a contract spanning *c*.3 months. These numbers were based on the presence of a single archaeological layer just below the surface (Jérémie 2005). The excavation commenced in the northeastern part of the hillock, since the developper had demanded to start extracting sand as soon as possible from this point onwards to the south. In order to explore this part of the site six Pits (P), or Sectors (S), were excavated in order to apprehend the stratigraphy and to check for sufficient artefact quantities in order to adopt an appropriate collecting strategy. As to the first four pits, the material was collected per pit. As to the two other pits, it was collected per rectangle measuring 175 x 300 cm or one passing/scraping of the mechanical shovel.

While working on the archaeological layer, we attempted to distinguish features which were not outlined clearly despite the lighter coloured subsoil. At this level (Level 1), features containing archaeological material were the only ones distinguished without any doubt. These features were best visible between 50

94 The term "open-air sites" serves here to translate the French term *site de plein-air* emphasising the fact that this site is not a cave site. Both type of sites can have many functions, i.e. habitation, funerary, workshop, etc., but is not defined by means of its usage (Vacher et al. 1998:38).

95 In the autumn of 2008, Jago Birk and the present author sampled the archaeological sites of Olga and Crique Jacques (situated in a similar geological position as Eva 2) plus the reference samples. The chemical analysis indicated that 'Black Carbon (charcoal) was enhanced in the settlement soils vs. reference soils' (see Annexe 3.3).

and 80 cm below the surface and numbered per pit. Each feature was dug out manually, drawn, photographed and georeferenced in order to record its shape and character. Multiple features were sampled by means of placing the content in bags in order to check for the presence of charred grains, charcoal, phytoliths, bones, etc.

Surprisingly, a second and deeper archaeological layer (Level 2) was detected when digging for features in Pits 1 and 2. It was now decided to create a second decapage level with the mechanical shovel, while respecting the collecting rectangles. This second dark greyish archaeological layer was encountered between 80 and 120 cm below the surface. It yielded abundant lithic material, various rock clusters and a small number of heavily weathered ceramics. In fact, the quartz clusters ressembled the clusters I had witnessed several weeks earlier during the archaeological survey of *Carrière des Ananas,* situated at the Plateau des Mines (Delpech 2005) (Fig. 4.2).[96]

The geological section of Pit 6, which was subsequently dug in order to verify the presence of multiple layers, confirmed two seperate archaeological layers, clearly representing two occupations. In that same Pit 6, when digging the geological profiles, two primary inhumations were discovered: a rarity in French Guiana! After inspection, they appeared to be post-Columbian burials, evidenced by the presence of imported European glass beads adorning the deceased's head. In sum, after three weeks of excavating, we were confronted with a stratified site that required all our attention.

The first goal was to excavate the whole summit. However, after a field meeting with the SA, this plan had to be abandoned because extra manpower was not available. A second important choice was made concerning the second level. We now decided to investigate the spatial distribution and variety of the rock clusters (e.g. shape, size, composition). Therefore a maximum of space had to be excavated. However, this level was not always easy to identify when removing the sediment by means of the mechanical shovel in the white sand. The second archaeological level was slightly darker and often only recognizable thanks to the presence of artefacts. It was most often attested for by the presence of the quartz clusters. The latter were excavated manually. The quartz blocks were inspected and selected in the field in order not to accumulate too much rock material. Several clusters were bagged completely.

It was decided not to screen the second layer entirely. Thus, only a small area was choosen for sampling, i.e. Pit 12, in order to obtain the smaller lithic fraction and additional data on the modes of quartz production. Fifty-nine squares measuring 1 x 1 m (200 L) were screened in three layers over a 0.5 cm mesh: 35,400 litres in total. All in all 19 pits were excavated at two different levels each measuring 5100 m², i.e. over 1 ha in total, corresponding to *c*.20% of the summital surface.

96 The Plateau des Mines is probably named after mining activities carried out by Georges Conrad who played an important role in the goldmining history of French Guiana when officiating as the Director of the Ipoucin riverbed at the Lower Approuague River. Together with Jean Galmot, Conrad founded the *Society des Mines d'or du Maroni* in 1910 in order to extract the gold from the lower layers of this white sand plateau with the aid of *bagnards*, already on site, as the Penitentiary Administration had set up a wood logging camp here (Petot 1993:163–177).

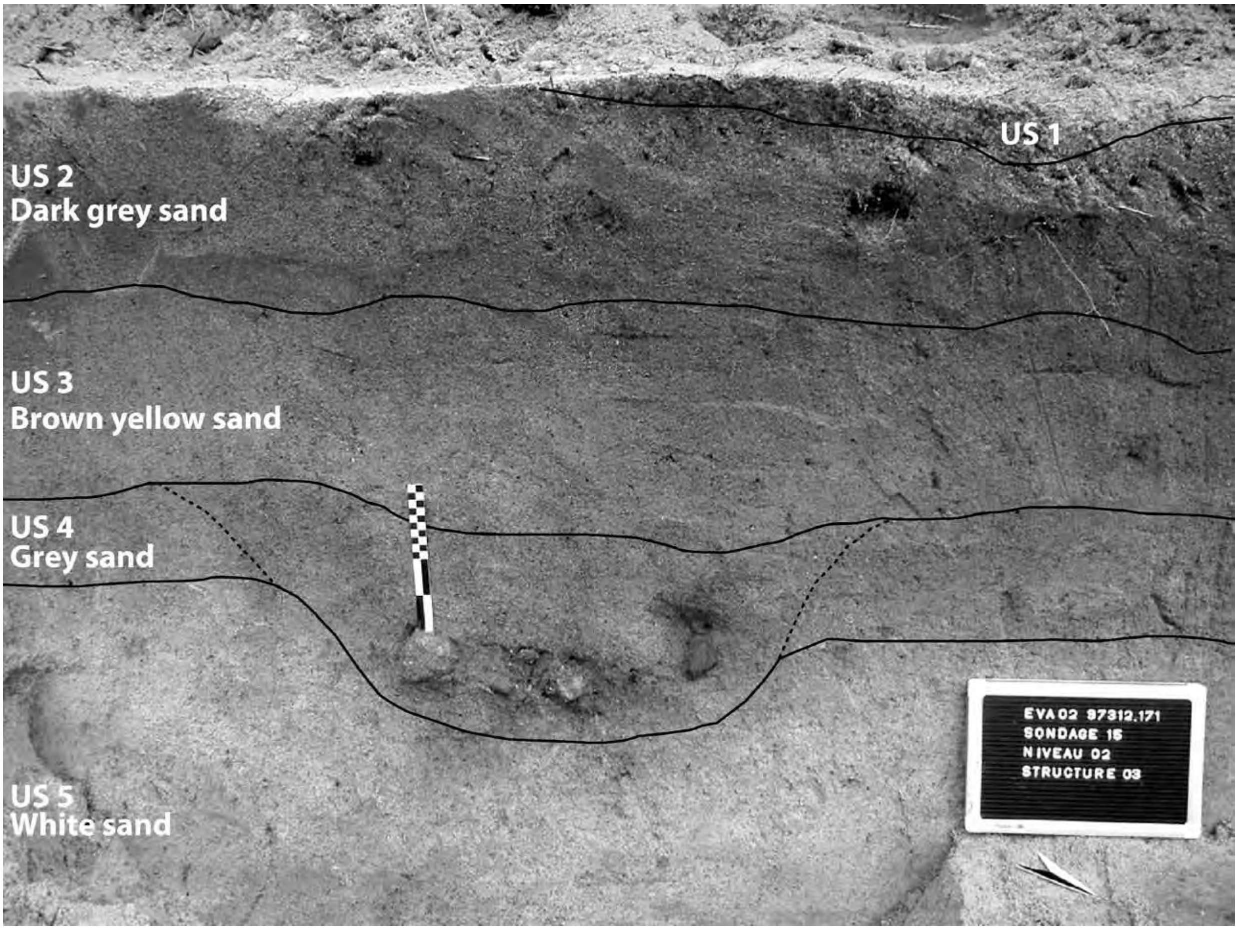


Figure 4.2. A section of Pit 15 with Stratigraphic Units (US) and a rock cluster (F 3 in Pit 15).

4.3 The geological context

4.3.1 Introduction

Between the Atlantic Ocean and the site's hinterland, various geological formations are observed. They can roughly be divided in the Precambrian Shield and the Tertiary/Quaternary belt (see Figs. 2.1 and 4.1). The base of our geological cross-section is the final part of the Precambrian era: the so-called Carib granitization. This type of bedrock developped ferrallitic soils of various types known as *remaniés*, *rajeunis*, *lessivés* and *appauvris* in French (cf. Section 2.3). Metamorphic bedrock represents the greenstone belt, but both series are mainly constituted of schistes and micaschistes. These schistes have a grey colour when fresh but turn red when exposed to the elements. This ferrallitic alteration is typical of these soil sequences. Originally, this bedrock has a kaoline clay coating and features the exchange of iron, aluminium oxides and hydroxides. The soil is heavily weathered and very acid (Blancaneaux 2004:50–51).

The sediments of the White Sand Formation (Fr., *Série détritique de base*) follow these geological series. They probably belong to the outer White Sand savannah belt (Palvadeaux 1998:136).[97] It is thought that these important

97 This series were not identified on the map by Choubert et al. (1958). See dotted area of Fig. 4.1.

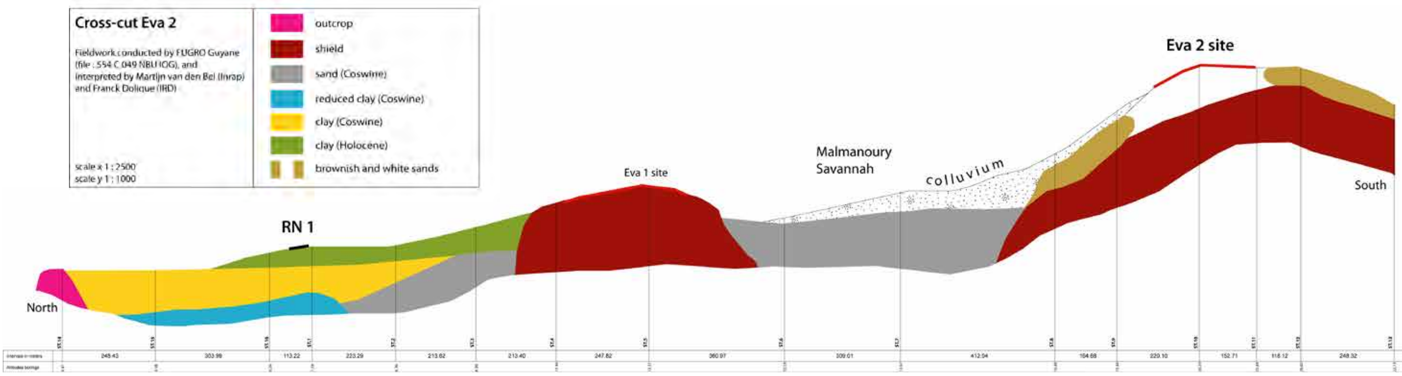


Figure 4.3. A geomorphological interpretation of the 3.5 km cross-section (see Fig. 4.1 for the geographical position).

quartz sand deposits have a fluvial origin, represented by a braiding riversystem (Wong et al. 1998:86). These deposits feature two soil-types: (a) white bleached sediments with a very thin A-horizon and almost no clay particles (less than 1%) and (b) brownish yellow non-bleached sediments containing 5-20% clay (de Boer 1972:45; Blancaneaux et al. 1973:148). The artefacts of Level 2 are found in both soil-types. The archaeological layer is either continuous or traverses both soil types.

At the foot of the hill, 12 m below the site's summit, the sandy and clayey sediments of the Old and Young Coastal Plains have been deposited, represented by means of the Coswine and Demerara Formations respectively. The coastal plains include various punctual outcroppings of the cristalline shield forming so-called islands as well as podzols and/or hydromorphic soils. These outcroppings have ferrallitic *lessivés* as well as *appauvris* soils that may have developed very sandy topsoils, a process also known as "arenisation." According to Hervé Théveniaut and Franck Dolique, geologists of the BRGM and the IRD respectively, the geological maps of this part of French Guiana were not made to suit this type of micro-regional research. Therefore it was decided to: (a) draw our own geological cross-section from the Atlantic Ocean towards the site in collaboration with the FUGRO Guyane, (b) test the possibility of palynological analysis in the Malmanoury savannah in collaboration with the TNO Utrecht (The Netherlands) and (c) perform a metric analysis of the quartz sand in collaboration with the BRGM Guyane.

4.3.2 The coring project with FUGRO

The geological cross-section has been positioned perpendicularly to the old RN 1, cutting all possible deposits to a depth of 6 m with intervals of *c.*500 m in distance (depending on the access in the field with a mechanical auger). The topography of the cross-cut varies between 4 and 26 m above MSL and covers 3.5 km (Fig. 4.3). The first coring (ST 14) took place in a granite outcrop of the Precambrian Shield, situated in the Holocene savannah. The three following augers all have marine clays at their base. These are all attributed to the Coswine Series and again partially covered with *cheniers* (Coronie transgression?), i.e. ST 16, 1, 2 and 3. The stratigraphy of the latter profiles consists of yellow and beige (oxidized) clays deposited on top of brown sandy clays (reductive). In turn, they are deposited on coarse grey sand of fluviomarine origins also attributed to the Coswine Series. This coarse sand has also been found in ST 6 and 7, which is deposited around another Precambrian outcrop. The latter savannah island, on which the archaeological site

Figure 4.4. (a) Pollen sample A taken from the site and (b) sample B from the foot of the hill in the savannah.

of Eva 1 is situated, showed heavy weathering while reaching 13 m in height above the Pleistocene savannah (ST 4 and 5). The coarse sand is probably the result of this weathering and has subsequently been transported in creeks, dissecting the landscape. We can observe that the Eva 2 hill-site reaches 26 m above MSL, i.e. ST 8-13. The white sands have been deposited on the Precambrian Shield.

4.3.3 The palynological potential with NITG/TNO

I sampled two profiles to be sent to the NITG/TNO (Utrecht, The Netherlands) in order to not only test the palynological potential of this region but also to obtain data aimed at reconstructing the environment of the site. Sample A was extracted from the flank of the hill-site, in the yellow brown quartz sand, and sample B from the northeastern foot of the hill in the savannah. Both profiles showed a "double" stratigraphy: two A-horizons of which one is buried. In total, Frans Bunnik tested 21 samples in Utrecht (Fig. 4.4).

The quantity of pollen in sample A is very low, probably due to the intensive lessivage and bioturbations (Fig. 4.4a). The majority of the pollen is found in the humic subsurface layer (5-30 cm) of the savannah sample. The upper part hereof yielded various predominating grass species but also the pollen of palmtrees (*Arecaceae*). The other layers did not yield any pollen.

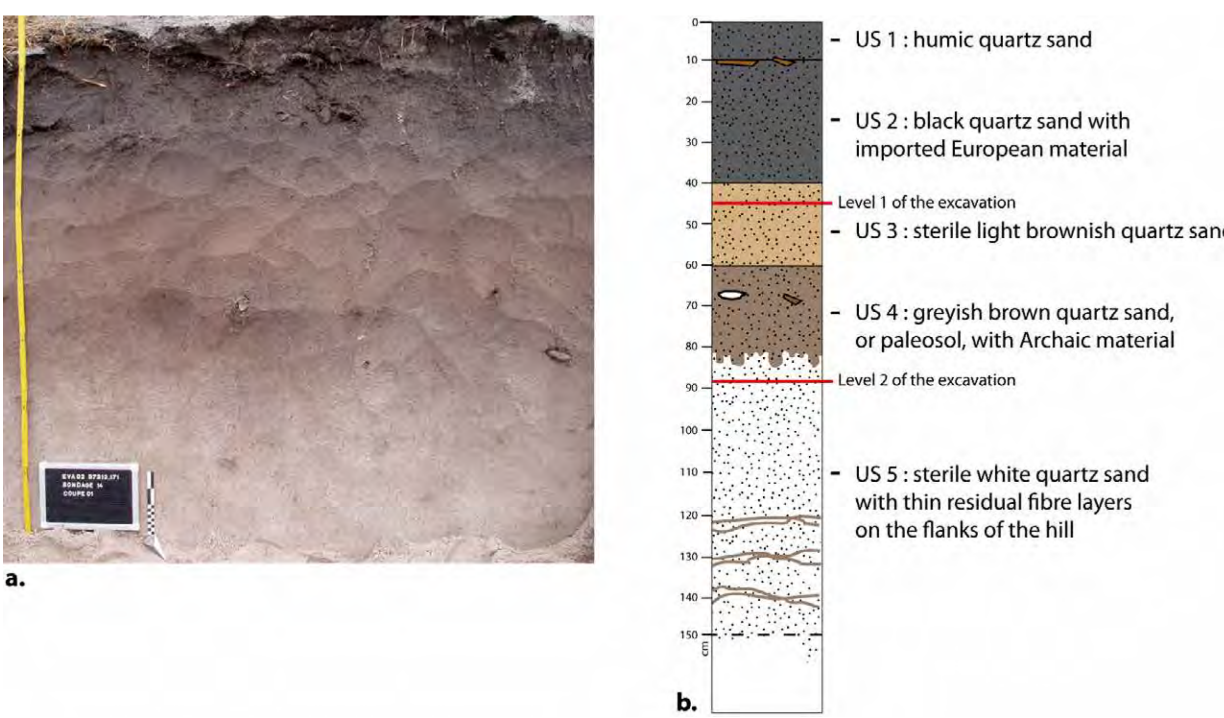
Further research is required in order to analyse these samples in detail. Moreover, phytolith determination could most certainly attest the presence of ancient human activities in this region (McKey et al. 2010; Iriarte et al. 2012), but establishing a chronology would be difficult. The present pilot study also indicated the existence of pollen in those hydromorphic regions of the Old Coastal Plain suiting such research despite the high acidity of the soils.

4.3.4 The site stratigraphy

Multiple soil sections have been recorded on the site. Once combined they allow us to define not only a schematic cross-section featuring two separate occupation layers, but also a difference between the sommital and lateral profiles, as is common for white sand podzols. In the top of both sections we encounter a thin, dark grey to black humic sandy quartz layer with rootlets. It is called Stratigraphic Unit 1, or US 1 (Fr., *Unité Stratigraphique*), and measures 10 cm in thickness (see Figs. 4.2 and 4.5). Below this superficial layer, a second dark grey to black, sandy quartz layer (US 2) measures *c.*20 cm in thickness. On top we found the majority of the sherds in a flat position, which presumably represented the old surface or "trodden" level related to the most recent occupation (Level 1). Its dark colour corresponds *a priori* with the enrichment of the soil with organic matter by means of this occupation. However, neither chemical analysis nor systematic sampling has been realized in order to study the spatial distribution of this layer or its chemical signatures. Nevertheless, we observed that this apparent anthropogenic dark layer was less developped now and again even absent on the summit and flanks of the hill. This may account for a certain patchiness, possibly reflecting the spatial distribution of house locations, garbage areas and gardens (Schmidt 2010).

Below this A-horizon, a brownish sandy quartz layer (US 3) was found without any archaeological material –the first level of excavation ceased here. This layer was on occasion difficult to observe (when less then 10 cm in thickness) and has been interpreted as a sterile layer of unknown origin. Below this intermediate layer, a grey to dark grey coloured, sandy quartz layer (US 4) measures between 10 and 15 cm in thickness. The top of this layer has been interpreted as an old surface level due to the abundance of archaeological material. It represents a buried A-horizon, or paleosol, corresponding to the second and much earlier occupation (Level 2).

Figure 4.5. (a) A photograph of a section in Pit 14 and (b) a schematic section with a stratigraphic position of US 1-5.



Below this layer, a thick layer of white quartz sand (US 5) was encountered without any archaeological material. It measured a minumum thickness of 2 m. The second decapage was ceased just below US 4. Towards the northwestern part of the summit, the thickness of US 5 has been measured at 4.20 m below surface where it rests on red mottled clay (US 6), probably a kind of bedrock (cf. Section 4.3.2). On the flanks of the summit, US 5 is of a brownish yellow colour and represents an iron podsol (Bf) or ferrallitic soil (de Boer 1972:93–101; cf. Sample A, Fig. 4.4) whereas the summital part is a so-called *giant* podzol (Blancaneaux et al. 1973).

4.3.5 The (possible) origins of US 1-3

US 4 represents a paleosol, hereby demonstrating stratification of this hilltop site but questioning the origins of the quartz sand deposit on top of the paleosol. The first question here is: Where does this sand originate from? Secondly, we wished to learn what had happened after the abandonment of the site and/or what kind of natural event or event(s) may have occurred. Considering 2000 BC as a possible final date as to the Archaic occupation (cf. Section 4.4), we wanted to find out what kind of process(es) (e.g. marine, riverine, eolian or anthropogenic), may have provoked the deposition of *c.*80 cm of quartz sand on top of this ancient A-horizon at *c.*25 m above MSL? Without knowing the exact origins of this process, it appears to be a non-destructive process. The reason for this is that it did not affect the deposition or spatial distribution of the artefacts or produce any erosion of the archaeological layer.

Théveniaut's microscopic analysis of the upper sand layers (US 1-3) in Pit 6 excluded the hypothesis of a marine transgression. The marine deposits of contemporaneous Late Holocene transgressions have been deposited at the height of the old RN 1, about two km north of the site (!). Additional geological observations in the vicinity of this site evidenced the presence of two submerging pegmatite veins, delimitating the southern side of the Eva 2 hillock. One vein is orientated WNW-ESE and the other SW-NE (cf. Fig. 4.1). These veins are common in this area and consist of quartz, feldspar, mica (white and black coloured) and tourmaline. The quartz (70-80%) and troumaline are still present. However, the feldspars have eroded completely, leaving holes in the rock whereas mica was only observed in the southwestern vein. The weathering of the feldspars fragilizes the veins and provoke general desintegration. Subsequently, the tourmaline and mica eroded away, leaving only desintegrated quartz sand (Fr., *arène*) (Blancaneaux 1981:24–25) (cf. Fig. 4.6). This mass may have covered the ancient level. The way in which this took place remains rather mysterious but an eolian event is thought most probable (Palvadeau 1998:141).

Nevertheless, we must reconsider the amount of sediment deposited on top of the paleosol or Archaic occupation. Which quantity of sand was actually deposited in 4000 years? The total volume amounts to *c.*12,000 m^3, based on the estimated dimensions of US 1-3 combined as to the summit: 400 x 50 x 0.8 m. The average length of both veins is *c.*200 m for a width of *c.*30 m or 12,000 / (2 x 200 x 30) = 1 m. The erosion of 1 m of pegmatite vein would be sufficient to cover the entire site. When taking into account the 4000 years as a possible deposition time, an accumulation of *c.*44 cm per 1000 years is to be expected. This linear ratio of 0.4 mm per year is rather low, but nonetheless plausible.

Figure 4.6. Pegmatite rock: the square holes are caused by the eroded feldspars (photograph by Hervé Théveniaut 2005).

In conclusion, we can state that the paleosol is covered with white quartz sand produced by a process of desintegration of two local pegmatite veins –and possibly eolian redeposition–, partially situated around the hill-site. Podzolization and arenization are still active under actual climatic conditions as they were during the most recent millenia. If similar processes also occured on Plateau des Mines, that also features an Archaic paleosol, is unknown. Finally, we must not underestimate the impact of human activities (e.g. deforesting, digging holes, lighting fires). They may not only have directly altered the site's local environment but could also have indirectly caused numerous postdepositional processes that ultimately may have changed its surface, i.e. its apparent flatness (cf. Section 5.2.3).

4.4 The radiocarbon datings

In total 23 samples, taken principally from features, were dated by means of two techniques. Thermoluminescence (TL) served to date 18 samples: 12 rocks and six ceramic fragments. The AMS dated five charcoal samples of which three were analysed by Archéolabs (France) and two by Leibniz Labor (Germany).

4.4.1 AMS dating

One AMS date (KIA-26019) had been obtained after the survey (Jérémie 2005). It was taken from a dark coloured layer in Trench 18 at a depth of *c.*60 cm and may refer to US 4. Its stratigraphic position, however, is uncertain and its provenance remains unclear rendering this result unreliable as to any comparison. The other four charcoal samples were taken from various rock clusters of which one result (ETH-31230) is considered to be too recent (Table 4.1). Two dates fall in *c.*4000 BC and the other in *c.*2100 BC.

The results of the AMS dates are believed to be correct. Nevetheless, one must be aware of taphonomic processes and paleofires in the Neotropics when interpreting these results. Geomorphologic research and numerous isotopic dates indicate that, from the end of the Pleistocene on, the Amazonian forest has known multiple climatic changes as well as alternating humid and dry periods (Carcaillet et al. 2002; Araujo et al. 2005; Bush et al. 2008). It is thought that the drier periods encouraged forest fires as recorded across Greater Amazonia. This has been confirmed with regard to French Guiana by means of research carried out

Table 4.1. An overview of the absolute dates of Late Archaic sites in French Guiana (Mestre and Delpech 2008; van den Bel et al. 2006). All results are taken from rock clusters, excluding KIA-26019 which has a doubtful context (calibration after Stuiver et al. 1998; Radiocarbon 40).

Site	Location	C^{14} age BP	Cal. BC 2σ	Lab No.
Ananas	Trench 40, RC 5	6190 ± 30	5214 - 5047	KIA-27194
Eva 2	Trench 18	3025 ± 20	1290 - 1263	KIA-26019
Eva 2	F5, Pit 13	3690 ± 25	2142 - 2010	KIA-27630
Eva 2	F19, Pit 14	5125 ± 50	4221 - 3944	ETH-31229
Eva 2	F16, Pit 23	1775 ± 45	AD 132 - 381	ETH-31230
Eva 2	F1, Pit 1	5150 ± 55	4216 - 3796	ETH-31228
PDM	F 4	6200 ± 30	5262 - 5056	KIA-26154
PDM	F 67	6190 ± 60	5299 - 4961	Eth-30438
PDM	F 72	6180 ± 25	5213 - 5041	KIA-26153
PDM	F 70	6095 ± 30	5070 - 4914	KIA-26155
PDM	XV (P8)	6020 ± 30	4996 - 4828	KIA-33567
PDM	X (K13)	4480 ± 25	3338 - 3207	KIA-33566
PDM	V (J18)	4135 ± 25	2712 - 2620	KIA-33565

at the BPS project and Nouragues Nature Reserve in French Guiana (Vacher et al. 1998:76; Tardy 1998:246; Ledru 2001). These paleofires propelled huge quantities of charcoal into the soils which subsequently entered archaeological sites too. If these fires are the result of human activity or due to natural events is still a subject of scientific debate.

4.4.2 Thermoluminescence dating

Thermoluminescence (TL) is a dating method applicable to materials with cristalline structures that may have been subjected to heat, and in particular to quartz rock (see Annexes 2.1 and 2.2). This principle allowed us to compare the AMS results with TL dated material, notably the ceramics found in the paleosol which are tempered with pounded quartz/sand temper as well as the fire-cracked rocks from the rock clusters.

Alas, the results did not correspond to the obtained AMS dates and appeared randomly between AD 550 and 1680. The only acceptable date of F 8 in Pit 8 had to be discarded because the *kwepi* tempered ceramics were collected from level 1 or the youngest occupation. Another batch of twelve quartz rocks taken from twelve different clusters at Level 2 yielded a similar random image. Archéolabs (Saint-Bonnet, France) proposed a second running to make up for possible procedure mistakes, but these results differed greatly from the previous series, hereby questioning their methods. Despite the fact that certain results fell within the suggested older time span, the randomness of the results rendered both series unreliable and thus need to be discarded. In fact, the method that Archéolabs applied corresponds to TL estimations for objects without any context (e.g. stray finds, museum objects), but not to conventional TL datings (see Roque and Vartanian 2007). Either way, the results cannot serve to construct an absolute chronology.

4.4.3 The site chronology

Despite this error, we had obtained three reliable AMS results, proposing two occupations as to Level 2: *c.*4000 BC and *c.*2100 BC. The latter, more recent date is associated with the ceramics found in a rock cluster, corresponding to the earliest dates concerning ceramics in French Guiana. When we received the dates concerning Eva 2, the two PDM sites had already provided the first Archaic dates as to French Guiana. Their rock features were similar, but differed in size (Mestre 2004; Delpech 2005). Altogether these results correspond with the first clear evidence of an Archaic population in French Guiana, thus providing an important contribution to this early prehistoric period in the eastern Guianas. Although more dates are certainly necessary, Eva 2 can be positioned during the Late Archaic Age with a possible Preceramic phase in *c.*4000 BC and second phase during the Early Ceramic Age in *c.*2100 BC. We shall see that the latter date corresponds with the early ceramic dated as to the Chemin Saint-Louis site on the banks of the Lower Maroni River as discussed in Chapter 5.

The Late Archaic Age (from *c.*6000 BP) corresponds not only with the end of the rising of the sea level (Brinkman and Pons 1968:30, Fig. 7), but also to two important paleofires during the Middle Holocene, i.e. Phase VI and VII (see Fig. 2.4). The flattening out of the sea level and the subsequent Coronie transgressions created a fairly stable coastline, when compared to the previous period. This suggests that certain Amerindian groups may have settled just behind this newly formed coastline. A similar pattern is to be recognized in northwestern Guyana. Here, Late Archaic sites (Alaka) also appear on the border of the ancient littoral at *c.*6000 BP (Williams 1998, 2003).

The PDM site is situated more towards the interior on the earlier White Sand belt, but nevertheless quite close to the Maroni River. The two earliest PDM dates are *c.*1000 years older than the earliest Eva 2 dates. However, PDM also has two more recent dates, perhaps suggesting multiple occupations as to this site, too, within this excavated area. In fact, the radiocarbon datings of both sites reveal an occupation over a longer period of time, allowing us to hypothesize a cyclic occupation at each site. This pattern of multiple dates covering a large timespan has also been recorded with regard to other Archaic sites situated in northwestern Guyana or the river terraces of the Lower Amazon River (Roosevelt et al. 1991; Roosevelt 1995). The same applies to the ancient dune landscape of northeastern Pará (Simões and Corrêa 1971; Simões 1981; Imazio da Silveira and Schaan 2005; Bandeira 2009, 2010).

4.5 The spatial organization

In total, 470 features were excavated of which 260 have been attributed to the Archaic occupation. Fourteen hereof are considered to be natural features i.e. treefalls and pivot roots (cf. Annexes 2.3 and 2.9). The latter types of carrot shaped roots penetrate very deeply into the subsoil (2.5 m or more!) and leave a very clean imprint. Large treefalls may cover 10-15 m² (e.g. F 1 in Pit 13) but usually represent only a small number of m² (80-250 cm in diameter at excavation Level 2). Treefalls can easily be recognized by means of an irregular bean shaped outline and may sometimes even contain a large quantity of "trapped" archaeological material. The extention of the Archaic site has not been reached during the excavation nor by means of additional test pitting.

4.5.1 The Archaic layer (US 4)

This layer represents a buried A-horizon situated between 80 and 100 cm below the actual surface. Its darker colour is certainly due to the presence of black charcoal and the decompositon of organic matter. The colour of this layer may

Type of features	N
Pivot roots	7
Treefall	7
Large blocs	17
Grinding stone	1
Ceramic concentration	1
Rock cluster	210
Layer	5
Polished stones	11
	259

Table 4.2. The general feature count (US 4).

have been darker at one time, but has probably faded after several thousand years of podzolization. No erosion has been observed with regard to this layer, only a more recent human disturbance, such as burial pits dug during the historic occupation.

Whenever the intermediate layer (US 3) is very thin, the two darker archaeological layers were difficult to separate from each other as they formed a single thick black to dark grey layer. The thickness of US 4 varies between 5 and 20 cm with an average of 10 cm. It contains archaeological material (e.g. ceramics, quartz debitage, quartz tools, polished tools), dispersed throughout the layer, but now and again represented patches. Artefacts were hand-picked whenever the machine scraped off the dark layer to be collected in rectanglar units (cf. Section 4.2). Polished tools and grinding stones were georeferenced by means of a theodolite and were treated as a feature (cf. Annexes 2.8 and 2.9).

4.5.2 The features

In total, 245 features (F) have been identified as anthropogenic features. They comprise rock clusters, polished objects, grinding stones, ceramic concentrations and (concentrations of) large blocks (Table 4.2). The spatial distribution of rock clusters played an important role during the excavation and their discovery in the field piloted the implantation of excavation pits. We were able to distinguish three zones with rock clusters. Unfortunately, not one zone was completely excavated.

The rock clusters

In total, 210 rock clusters (Fr., *amas de pierres*) of various shapes and dimensions were identified during the excavation (Fig. 4.8; cf. Annexes 2.3.2-4). Nearly all rocks found in these clusters showed cracks due to thermal shock. These blocks measured between 5 and 20 cm and did not show any sign of percussion. The limited size or possible calibration of the rocks is thought to be the result of a selection made by the Amerindians, who probably picked them up from the nearby submerging pegmatite veins.

Generally speaking, the quartz stones were deposited into a shallow, more or less roundish pit with a maximum depth of 30 cm, revealing a sink shaped outline (cf. Fig. 4.2). In other cases, we were not able to distinguish a pit contour. It is possible that these rock clusters were placed on the surface or in a very shallow

Type	Characteristic	N	N per Type	Description
1		54	103	organised and compact
1a	hole	29		
1b	square	20		
2		31	52	organised and compact with one irregular side
2a	hole	11		
2b	square	6		
2c	square + hole	4		
3		24	24	organised, compact, and horse shoe-shaped
4		23	23	irregular
x		8	8	undetermined
		210		

Table 4.3. The general count of rock cluster types.

depression. In certain clusters, the blocks appear to be arranged in several layers of rocks which may be an indication of intentionally deposited rocks.

The sizes of the clusters vary between 20 and 115 cm in diameter with an average of 54 cm (Figs. 4.7 and 4.10c). The majority has either a "hole" or empty space in the middle measuring 15 to 20 cm, thus displaying a doughnut, or hoof shaped, outline. This variability enabled us to distinguish four morphological shapes or types of clusters by means of defining the shape, size, and the manner of arranged rocks: (1) clusters with an organized and defined shape (round and square) of any size, (2) clusters of the latter type, but with an irregular and one scattered side (25 to 50%), (3) clusters with a horse shoe shape and (4) irregular clusters (Table 4.3). Cluster types 1, 2 and 4 may also have a hole in the middle.

All the rock features are considered to be single features since only 6% of the rock clusters overlap with other clusters. The latter fact suggests that their locations were visible or may even have been marked at the surface by means of a stick or a pile of rocks. Screening the sediment taken from the rock clusters yielded poor results. Very small quantities of carbonized material were detected. It is, however, more likely that possible macro and microbotanical residues have disappeared due to an extensive leaching in this particular sediment, as stated before. The clusters contained predominantly quartz blocks, but several also contained iron nodules. Fifty-eigth clusters contained a small number of potsherds and only one cluster contained a polished tool: a bell-shaped or conical pestle, i.e. F 2, Pit 7 (cf. Fig. 4.16a).

During our fieldwork we had already observed that several clusters combined formed an alignment (Fr., *batterie*) consisting of four to six rock clusters in a linear and/or crescent partition. We further noticed during our fieldwork that Pits 13 and 14 as well as Pits 2 and 9 contained a great number of clusters and aligned clusters. The excavation area thus evidenced three distinctive zones with a high density of clusters (N≈70): Zones 1, 2 and 3. They were located on the flat central part of the hilltop and indicated a NW-SE orientaton. Outside these zones only a small number of (isolated) clusters and polished stones have been identified (Fig. 4.9a).

In order to characterize these three zones we applied Mapinfo GIS software in order to compare them and/or detect possible characteristics. Various queries were tested of which the following were found relevant to discuss: (a) the cluster type,

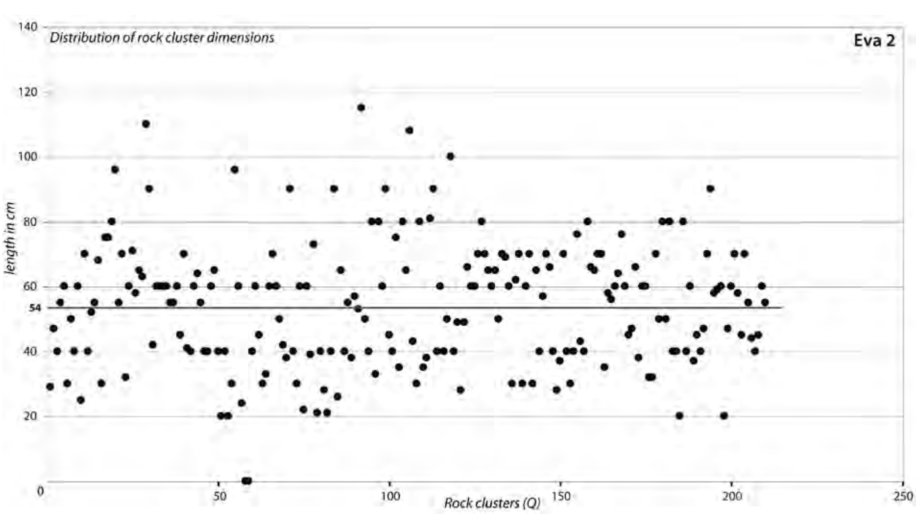


Figure 4.7. The distribution of rock clusters according to length.

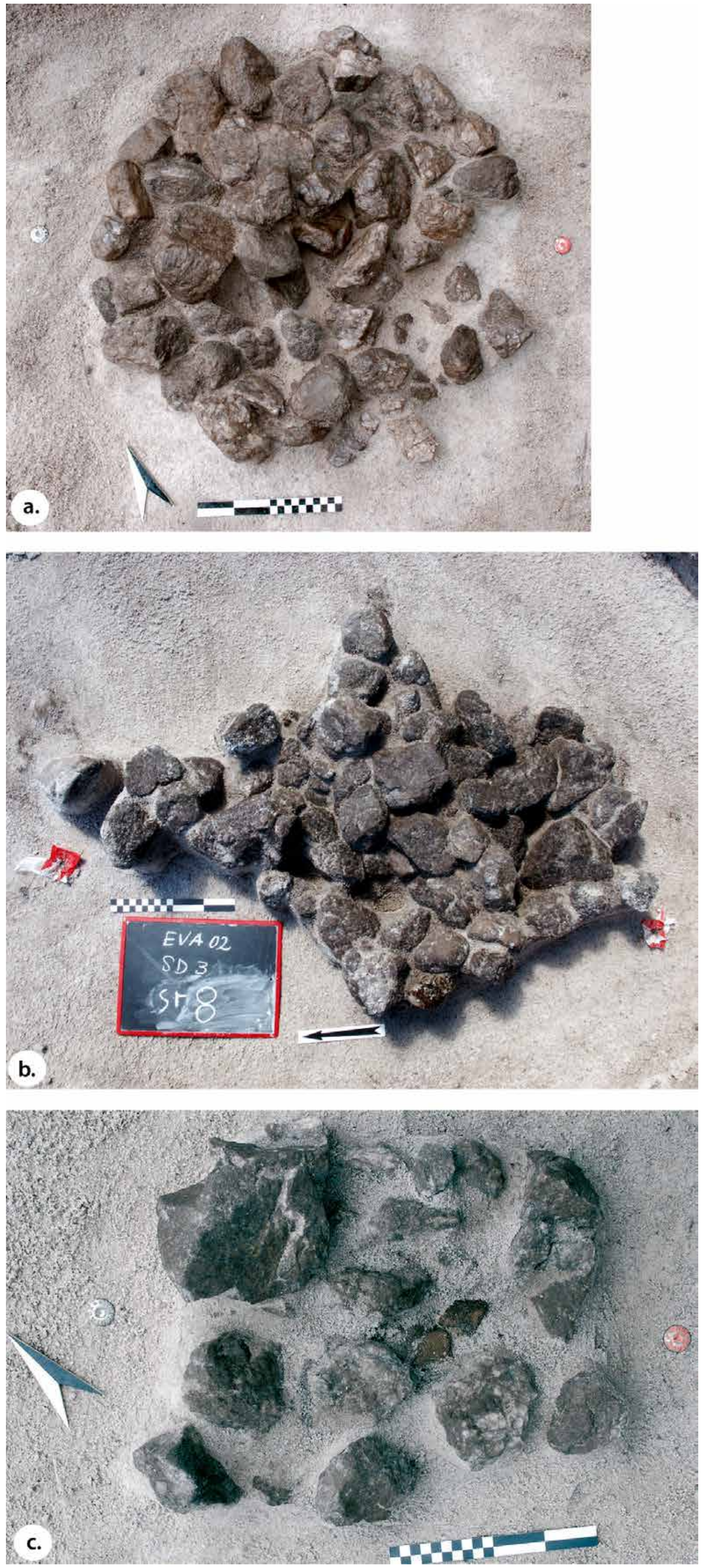


Figure 4.8. Three examples of rock clusters: (a) F 43, Pit 2, (b) F 8, Pit 3, (b) F 8, Pit 2. The latter also contains ceramics (Fig. 4.9b).

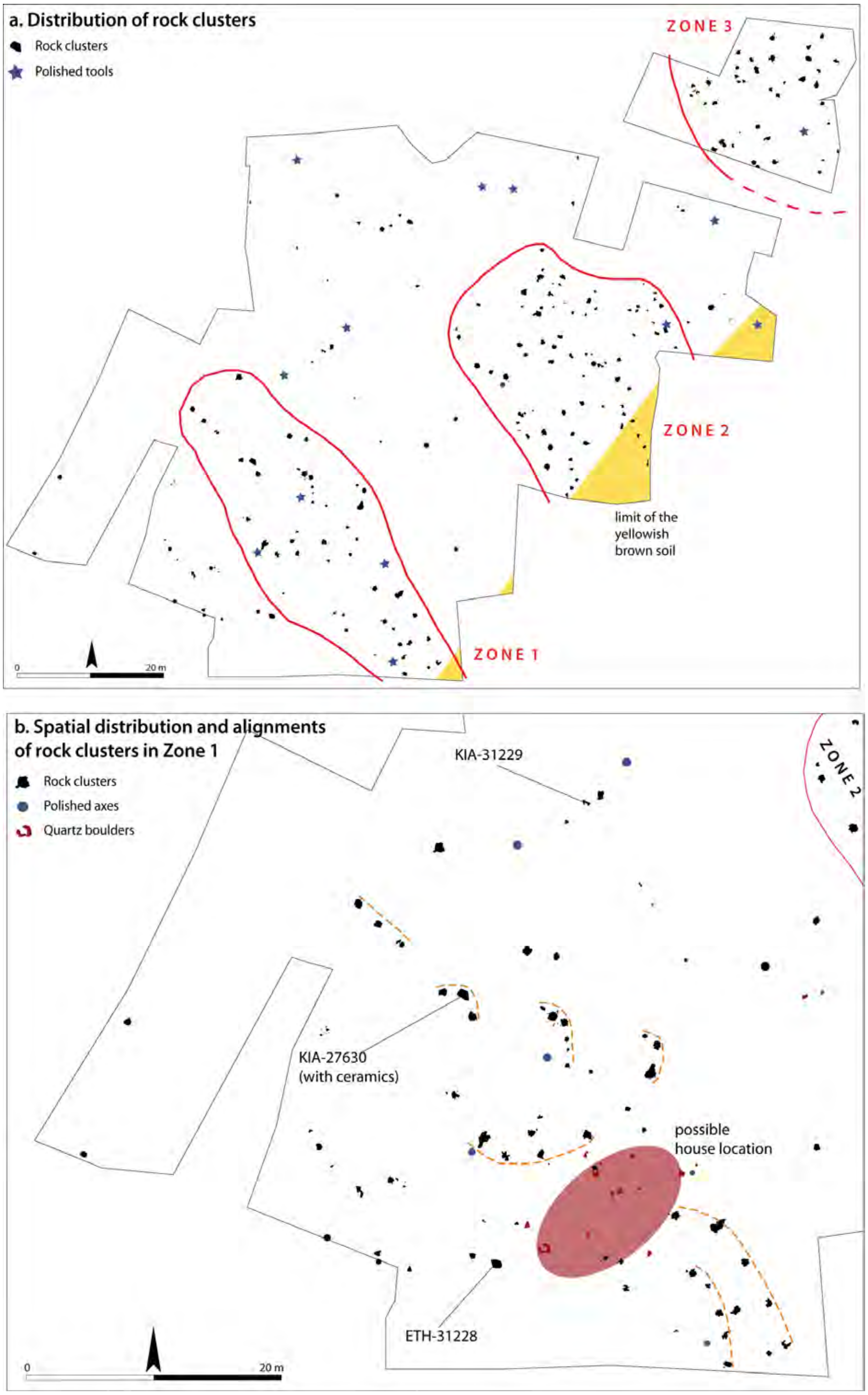


Figure 4.9. (a) The spatial distribution of rock clusters and hypothetical concentration of rock clusters in three distinct zones and (b) the spatial distribution of rock clusters and hypothetical alignments (batteries) in Zone 1.

(b) the presence or absence of ceramics and (c) the length (maximal diameter) of the clusters (see Fig. 4.10).

This visualization presented the already observed zonage, but also stressed the linear outlines of the zones and alignments, in particular that of Zone 1 (Fig. 4.9a). The presence of ceramics in a cluster is not a diagnostic marker as to a specific morphological type of rock cluster. Zone 2, however, did evidence a concentration

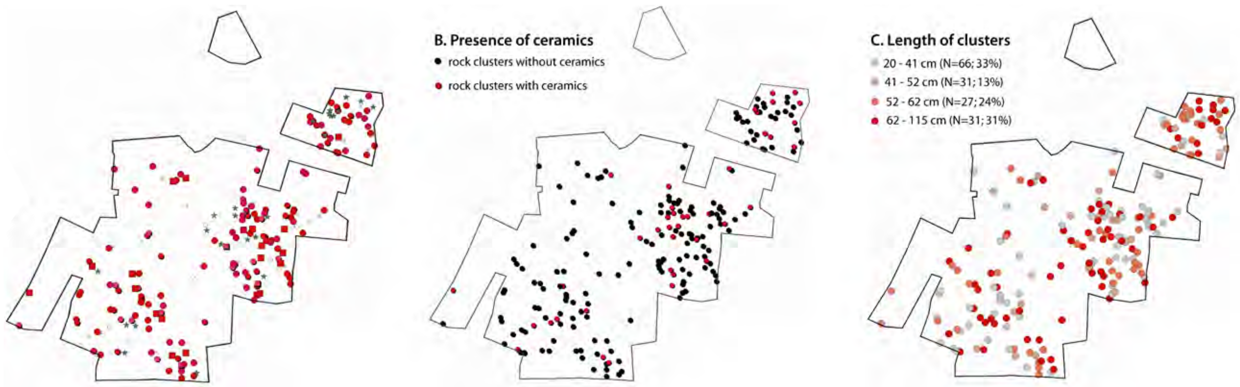


Figure 4.10. The spatial distribution of rock clusters according to three GIS queries: (a) per cluster type, (b) the presence of ceramics and (c) the length of clusters.

of ten clusters including pottery. The variations in feature morphology and/or diameter did not allow us to define a typical cluster pattern or alignment. In fact, they do not reveal much homogeneity at all and merely display a wide range of dimensions and various morphologies. This may suggest that these different morphologies represent different stages, possibly reflecting the abandonment after a certain way of using and re-using them. With regard to this point of view, the small-sized rock clusters are considered to be disintegrated or abandoned clusters.

The large quartz blocks

This feature type (N=17) is composed of several large quartz blocks or boulders (measuring ≥ 25 cm in circumference) together with several other (smaller) quartz blocks with various dimensions. Two features have exclusively large boulders in the shape of a horse shoe as found with F 27 and F 39 in Pit 16. The others consist of two large boulders placed beside or on top of each other along with several smaller blocks. Rather large isolated blocks have also been recorded. Unfortunately, we did not observe any holes or pits. The composition of the stones, however, reminded us of the fillings of post holes where the blocks serve to support a specific position of the (wooden) post (Fig. 4.11).

Interestingly, the majority of these features are situated in the middle of Pit 16. Together they represent a concentration of similar features with a surface of *c*.70 m² (see Fig. 4.9b). During the excavation we had already distinguished this ensemble or structure, but could not define any organization. If this possible structure represents the outline of a house or *House Location* (HL), it cannot be attributed with certainty to the Archaic occupation. The reason for this is that none of these features have been dated and (diagnostic) ceramics (prehistoric or historic) were sadly entirely absent in these features. However, a spatial association with the alignments can be established because various alignments were found on both sides of this possible HL and only one cluster (F 76) was found within the limits of this location. On the otherhand, it is noteworthy that two historic Amerindian burials were found next to this type of feature. This may also suggest a possible spatial relationship with the historic occupation.

The polished stones

The following twelve polished objects have been recorded seperately: one grinding stone and nine axes were found in the archaeological layer. In addition, two caches of polished stones were positioned just below this layer. The latter intentional

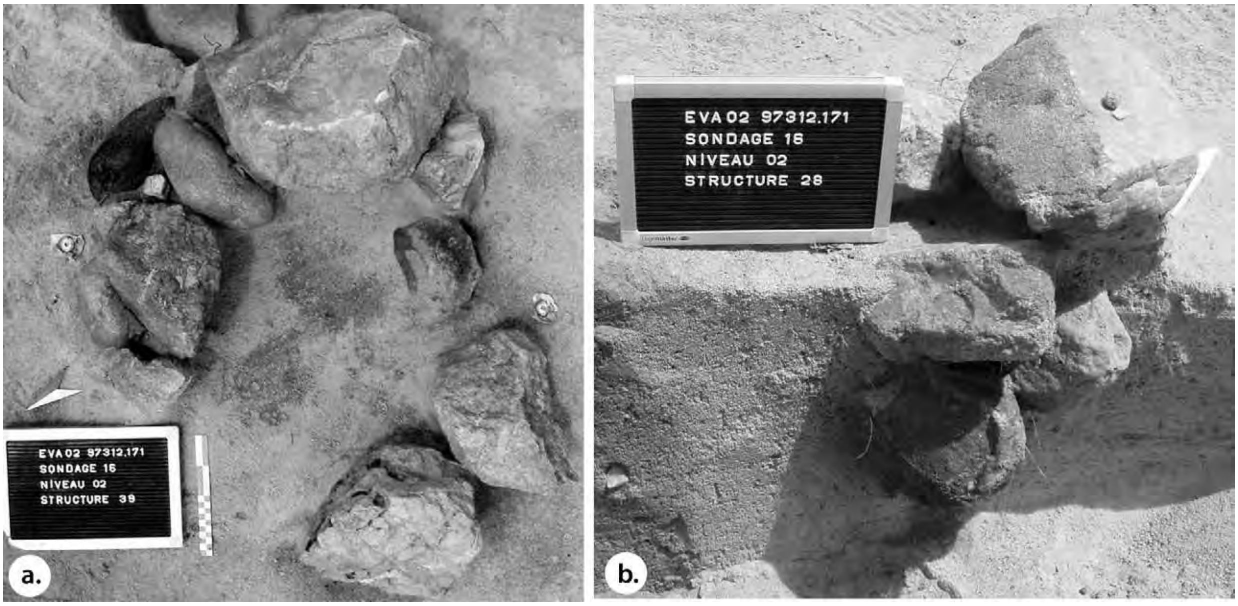


Figure 4.11. The large quartz boulder features in Pit 16: (a) F 39, and (b) F 28.

depositions revealed one cache with five non-used specimens (Pit 10) as well as one cache with four hammerstones. Pits or holes were not identified. The cache-axes display morphologic similarities with those found in US 4. They have therefore have been attributed to the Archaic and not to the historic occupation. The other cache also was attributed to the ancient occupation despite the fact that a radiocarbon date is lacking. Two axes were encountered in treefalls, i.e. Pits 5 and 8.

4.5.3 The spatial distribution and interpretation of the features

In French Guiana, the PDM site is momentarily the only other Archaic site to yield similar features (Mestre and Delpech 2008; Delpech 2005). However, rock clusters have been found at other sites in French Guiana (e.g. BPS 13, 223, 230) on the Sinnamary River (Vacher et al. 1998:74–75). These sites are generally attributed to the LCA despite the fact that these rocky features have not been dated. It is possible that these BPS features may refer to an earlier occupation, indicating a possible stratigraphy.

A large number of Archaic sites have indeed been excavated in northwestern Guyana or along the Lower Amazon River, but archaeological data on similar rock-filled pits has not been recorded. Although fire-cracked rocks were discovered during the majority of the excavations at Archaic sites, notably in shell middens, we hold the view that this is probably due to the excavation techniques and the scientific desire to excavate the shell midden itself in order to obtain specific data. These features have therefore not yet been detected in other regions. It is highly probable that rock-filled pits may have been detected at excavated Archaic sites in Lowland South America, but that they have not been recognized as such or have remained unpublished (Rohr 1959:267; Chmyz 1976:11, 98; Prous 1991:276; Vialou 2006:170, Fig. 1; André Prous 2005 and Lucas Bueno, personal communication 2008). In order to obtain further ideas concerning the function of these rock clusters, we must look beyond the Guianas and create analogies with ethnographic material and experimental archaeology.

Similar rock clusters were recorded in Central Pará to the south of the Lower Amazon River at Salobó (Imazio 2006) as well as in the Caribbean area. In the latter region, they have been found in a preceramic context on the island of Saint-Martin (Red Bay), the Virgin Islands (Belmont), and the Bahamas (Three Dog Site).[98] Other types of combustion features with rocky elements were discovered close to the Carribean coast of northwestern Columbia. The Late Archaic site of San Jacinto 1, dated to 6th millennium BP, revealed 112 clay-lined earth ovens, containinig small amounts of fire-cracked rocks. Large quantities of dispersed fire-cracked rocks were found all over the excavation pit (Oyuela-Caycedo 1993:198, 202; Oyuela-Caycedo and Bonzani 2005; Stahl and Oyuela-Caycedo 2007). The latter authors suggested that: (a) the San Jacinto 1 site served as a special-purpose settlement for foraging groups when moving from base camps to special-purpose camps and (b) these groups collected and processed plants as well as animals at the onset of the dry period in a highly seasonal tropical savannah (Bonzani 1995:212–227).

Further afield, in the southern parts of the U.S.A., numerous excavations yielded similar features dating back to the very beginning of the North American Archaic period.[99] Here, rock clusters have been recorded for over a century in archaeological and ethnographic contexts and interpreted as earth ovens. In literature, these stones are often called "Fire Cracked Rocks," or FCR's, and have been defined as cook stones for hot-rock cookery (Dering 1999; Thoms 2003, 2009). Within the last decades, North American archaeologists have systematically studied these cook stones and have concluded that these types of features represent a distinctive marker with regard to the Archaic period. The striking similarity between the cooking pits in French Guiana and those in the U.S.A. confirms our empiric observations with regard to recognizing them as South American or Guiana cooking pits.[100]

In North America, the modelling of the introduction and the use of cooking pits during the Archaic Age suggested a wide increase in the number of rock heating elements during the Holocene. This increase is thought to be a result of population packing and related to an intensification of broad-spectrum foraging (Binford 2001; Willey and Philips 1958). Ethnographic data as well as experiments

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98 I discussed information on these sites with respectively Dominique Bonnissent, Peter Drewett and Mary Jane Berman whom I met at the 21st IACA Congress held in Trinidad 2005. Rafael Gassón (2002) and Augusto Oyuela-Caycedo (both personal communication, 2008) confirmed the absence of Archaic rock-filled pits for both Venezuela and Columbia, as described here. More recently, rock clusters have been identified by IEPA members along the left bank of the Amazon River (João Saldanha, personal communication 2014).

99 The following part is mainly based on the publications presented by Steve Black and Alston Thoms of the University of Texas with whom I exchanged numerous photographs in order to discuss hot-rock cookery and I would like to thank both again for their contributions. The North American Archaic period has therefore inspired this segment of Section 4.5.3.

100 Cooking pits are common in northwestern Europe too. Rock filled and/or charcoal filled cooking pits not only often feature in Mesolithic and the Early Neolithic sites (Carozza et al. 2005) but also in the Iron Age sites of France. It has been suggested that the spatial organisation of the pits in France may reflect their utilisation during ceremonies (Beausoleil and Poirier 2006-2007). Ethnographic data demonstrate that multiple earth ovens or alignments are even today found with certain tribes of West Papua (Indonesia) who roast wild pigs during intercommunal feasts and ceremonies (P. Pétrequin and A. M. Pétrequin 1993:389, Fig. 321).

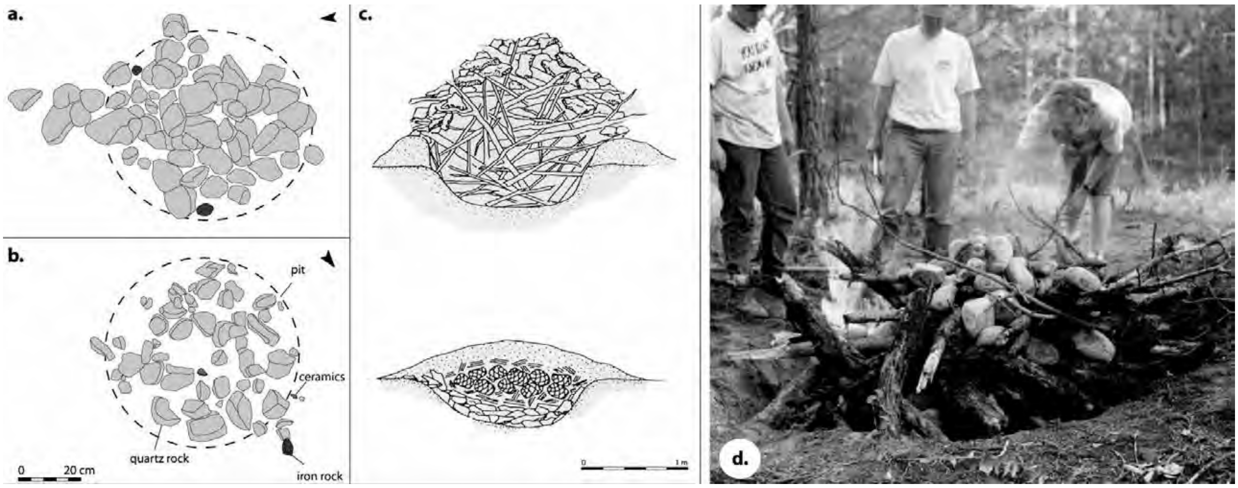

Figure 4.12. Two earth ovens from Eva 2: (a) Pit 3, F 8, (b) Pit 6, F 13, (c) a drawing of an experimental cooking pit (after Dering 1999:664, Fig. 5) and (d) a photograph by Alston Thoms demonstrating his students how to reconstruct a cooking pit.

with various roots, squash, agaves, lilies and bulbs have confirmed the relationship between foods and cook stone technology.[101]

Alston Thoms (2003:93–94) suggested a working model for land-use intensification through time in which the earth oven represented a transition phase in cooking technology that evolved from direct cooking to direct boiling in a ceramic container. He describes an earth oven as follows. Firstly, a pit is dug in which a hot fire is built. Rocks are thrown and heated on top of or within this fire. Once the rocks are hot (the wood is now reduced to coals and ash), a long wooden pole or stick serves to position the rocks in a circular layer, i.e. the oven bed. This arranging may explain the "holes" in the Eva 2 and PDM rock clusters. Next, a layer of green plant material is added in order to generate moisture/steam and protect the next layer from burning. A layer of food is now added, often consisting of roots/tubers. This requires between 24 and 48 hours of (steam) cooking due to their carbohydrates. Eventually, a second layer of green plants is added in order to separate the food from the sealing earth layer in order to retain a steamy heat (Fig. 4.12c-d).

The excavations at Eva 2 revealed numerous rock clusters, with various sizes and morphologies (cf. Annexe 2.9). The majority hereof was found in shallow pits, containing fire-cracked quartz rocks. It is suggested here that these rock filled pits can be interpreted as cooking pits or earth ovens in which food (e.g. meat, (shell)fish, tubers), was prepared by means of hot air or steaming. Although no micro-analytical information is available in order to determine a possible content, this hypothesis is as yet the most plausible one when taking into account the fire-cracked aspect of the rocks and their voluntary deposition in a pit, i.e. a Polynesian oven.[102] The dissimilar shapes of the rock clusters can be interpreted to be the final stage or stages of their utilisation as a cooking pit. Furthermore, three distinct cooking pit zones have been observed. This may be linked to very large activity areas where the Archaic population constructed and used these cooking pits. Within each cooking zone we also identified the alignments of several

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101 Dugas and Rollins (2003) experimented with shell tools and cooking pits when preparing mussels in order to gain insight into the food processing technique of Panhandle Amerindians in Ohio (U.S.A.).

102 Next to the Polynesian oven, Mestre and Delpech (2008:92–93) suggested another ethnographically based analogy. They proposed that these rock clusters could have been the remnants of steambath ovens which Mexicans refer to as *temezcalli*.

clusters, suggesting that the latter cooking pits represent a single cooking event in which multiple pits served simultaneously. Let us presume that a single alignment represents a single cooking event or small activity area. A number of alignments, and eventually a single zone with alignments, may thus represent cooking events or visits made by one group over a period of time. However, the lifetime of one cooking pit still remains an arbitrary factor. Further experimentation is required in order to confirm such information.

At PDM, the rock clusters were composed mainly of quartz pebbles as well as of rocks intentionally positioned in two layers and distributed in several clusters. They also featured a "hole" in the middle. However, a shallow pit has not been observed (Mestre and Delpech 2008). Having only this site for comparison, we wish to point out that the main differences between the rock clusters encountered at Eva 2 and PDM cannot only be found in the choice of raw material but also in the dimensions of the clusters. The site's location near incisive creeks explains the dominance of (water washed) quartz pebbles at PDM. Needless to say, further investigation is required in order to reveal a possible typo-chronology of rock clusters based on raw materials and size. However, it is suggested here that the larger quartz clusters (without a pit) may represent an early phase which developed into a phase with smaller clusters in shallow pits during the Late Archaic and Early Ceramic Age.

4.6 The lithic study

The lithic assemblage comprises 12,031 artefacts and was entirely collected from the second archeological layer (US 4) of which 10,378 artefacts were acquired during the screening of sample Pit 12 (cf. Annexe 2.4). The other specimens were collected at Level 2 during mechanical decapage (N=762) and feature excavations (N=891). The quartz material is difficult to "read" hampering the identification of tools and tool types (cf. Section 5.6). The non-quartz material (if not polished) is very weathered, rendering the observations of possible use-wear traces rather strenuous. Sandrine Delpech (in van den Bel et al. 2006:77–91) conducted this study. A translated and abridged version is presented here.

4.6.1 The raw material

The determination of the used raw material is hampered by the highly weathered surfaces which render any macroscopic classification without breaking the artefatcs a problematic exercise. Despite this fact, the raw material showed little variation: 80% of the specimens consist of hyalin quartz collected in the form of blocks or pebbles. The blocks were presumably extracted or obtained from the submerging pegmatite veins located to the south of the site (cf. Fig. 4.1). During a geological survey, we observed that these veins displayed a sharp (man-made?) section from which large quartz blocks may have been extracted, similar to an open air quarry. Unfortunately, no further archaeological research has been conducted within this area to test this hypothesis. The reason for this is that the veins were situated outside the legal excavation perimeter. The quartz pebbles found at the site are water worn and must have been collected in creeks or old river beds.

In addition to quartz, the pre-Columbians also utilized dolerite and amphibolite as a raw material when manufacturing tools, in particular axes. Various dolerite veins are known to the proximity of the site: outcrops occur near Pointe Combi, *c*.10 km to the southwest of Eva 2 near the Sinnamary River but also on Devil's Island situated off the Kourou River. An amphibolite outcrop is found in the savannah at Roche Sophie, 3 km to the north of the site, i.e. ST 16 of the coring profile (cf. Fig. 4.3).

Several fragments of coarse grained granite were also discovered. This material mainly served as milling stones and/or mortars. The few ferrallitic nodules acquired appear to be rolled rather than polished.

4.6.2 The lithic tools

Introduction

The majority of the lithic material can be attributed to the production of flake tools. In general, this group is placed under the header "flaked stone". A much smaller portion is part of a core tool technology and not only includes ground stone tools (axes), but also less modified tools (querns). The assemblage also includes a number of use-modified tools: rock pieces that have not undergone any modification before being used (e.g. water worn pebbles), which have been used as hammer stones and a small number of "manuports," i.e. rocks or rock fragments which do not exhibit any modification and must have been brought to the site, as they do not naturally occur on the site or direct surroundings.

The material from the non-screened context will be discussed first, as this sample comprises the largest variation in artefact types. This will be followed by a presentation of the material from sample pit 12.

Flaked stone

The bulk of the lithic material is represented by means of flaked stone, almost exclusively associated with the quartz material. This group includes flakes, unspecified fragments (shatter) and flake cores. The predominant flaking technique applied to the quartz material is the bipolar technique in the course of which a core is placed on an anvil while being reduced with a hard hammer stone. This quite opportunistic procedure generally produces flat and straight flakes with clear points of impact and often edged striking platforms. Occasionally two impact points may be present on the flakes, one on the proximate and one on the distal end. The direct freehand percussion technique was also applied in order to work the quartz material, but this had occurred only in rare instances (cf. Fig. 1.5).

	US 4		**Pit 12**	
	N	**% quartz**	**N**	**% quartz**
Flakes	776	99.6	8485	100
Pebble / hammer stones	173	94	34	97
Flake cores	118	100	237	100
Anvil	25	100	6	100
Unidentified	444	96	1613	100
Other	105	16.2	3	0
Axes	12	0	0	-
Total	**1653**	**72.3**	**10378**	**82.8**

Table 4.4 The general lithic count.

The aim of the bipolar quartz reduction is the production of expedient flake tools, which are difficult to identify. The reason for this is that secondary shaping (Fr., *retouch*) is not a recurrent aspect of the reduction trajectory. In sum, the bipolar technique results eventually in a large amount of unspecified rock pieces, grouped here under the header "fragments", or shatter.

The flakes

Of the 776 hand-collected flakes, 314 were found in the archaeological layer and 462 in the features (Tables 4.4 and 4.5a; cf. Annexes 2.4 and 2.8). The majority of the flakes measures less than 2 cm whereas a large number measures between 2 and 4 cm. Almost all flakes (99.65%) consist of quartz and have been interpreted as core preparation and reduction flakes or flake tools. The latter are considered to be the goal of this technology whereas the former represent the debris (Fr., *débitage*).

The non-quartz material is represented by means of merely three flakes: a greenstone flake (F 43, Pit 5) and two unidentified stone flakes. These can be associated with the manufacturing or re-shaping of axes (ground stone technology), as one of them displayes traces of polishing on its dorsal face (Pit 14, A7) whereas the others possess multiple dorsal negatives (Pit 15, B5 and B6) which are very dissimilar to quartz flakes.

Among the quartz flakes, the following five retouched tool flakes were recorded:

a. A large flake (8 x 5.5 cm) with distal and medial-proximal negatives as well as abrasive use-wear traces on the upper part (Pit 16, E14);

b. A medial flake (2.5 x 2.5 cm) with unifacial retouch (Pit 17, B5) (Fig. 4.13a);

c. A flake (4.5 cm long) with retouch on both sides and traces of heating (F 34, Pit 16) (Fig. 4.13b);

d. A pair of grater or scraping flakes (F 39, Pit 6). One flake measuring 12 x 10 cm has a trapezoidal outline with negatives on the upper part and evidenced traces of heating. The other flake is a triangular shaped specimen with a length of 5 cm. It is retouched at its distal end which is probably the result of use-wear rather than intentional.

The fragments

We identified 440 fragments of which 96% consisted of quartz. Almost all represent flake tool production debitage. Only 15 fragments consisted of other rock materials: seven made of dolerite or amphibolite and one of gneiss. Seven specimens consisted of an undetermined raw material (Table 4.5b). These fragments measure between 0.5 and 4 cm. The majority hereof ranges between 2 and 4 cm. Use-wear traces have been identified on 25 specimens: (a) with percussion (N=14), (b) with abrasion (N=5), (c) with percussion or abrasion (N=1) and (d) with traces of polishing (N=6). Originally, these fragments with use-wear belonged to core tools. The majority was presumably formed during usage.

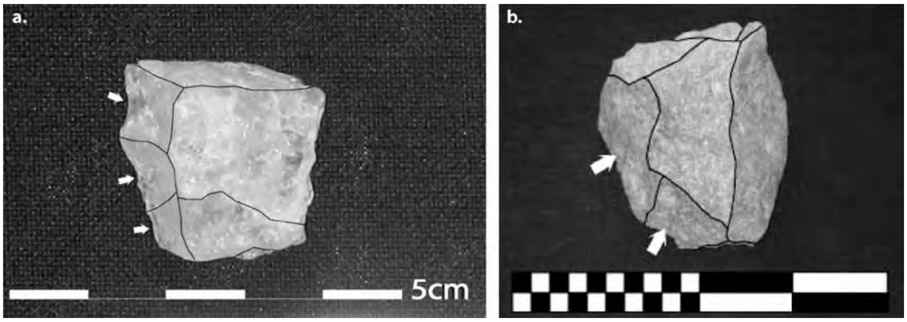

Figure 4.13. (a) A medial retouched flake (Pit 17, B 5), and (b) a scraper (Pit 6, F 36).

A. Flakes	< 2 cm	2-4 cm	4-6 cm	6-10 cm	>10 cm	Total
Layer	111	151	36	10	2	314
Features	278	151	25	6	2	462
Total	389	302	61	16	4	**776**
%	50	39	8	2	1	100
B. Fragments						
Layer	35	83	42	13	2	175
Features	94	131	26	14	0	265
Total	129	214	67	27	2	**440**
%	29	48	16	6	1	100
C. Cores						
Layer	4	38	23	5		70
Features	8	27	11	2		48
Total	12	65	34	7		**118**
%	10	55	29	6		100

Table 4.5. The inventories of (a) quartz flakes, (b) fragments and (c) cores.

The cores

In total, 118 cores were collected. All consist of quartz and are characterized by means of a high variety in shapes, many with an irregular appearance (N=96) (Table 4.5c). However, more recurrent shapes have been identified: (a) eleven cores are plano-convex shaped, (b) ten are pyramidal and (c) one is bi-convex. The abundance of irregular core shapes can be attributed to the apprehension of the bipolar technique: an opportunistic, and to some degree, uncontrolled mode of reducing rock material. This debitage technique is applied in order to produce short, thin flakes. The use of an anvil probably facilitated the production of this type of flake.

The anvils

All 25 anvils (Fr., *enclume*) consist of quartz and in particular of large blocks or fragments of blocs (Table 4.4). These (fragments of) tools have at least one or two flat and/or plano-concave surfaces. These flat faces generally show traces of percussion over the entire surface. Their dimensions vary between 6.5 and 21 cm in length and 4.5 to 13.5 cm in width, with an average height of 6 cm. Certain tools or fragments may have been re-used as cores or even as hammer stones.

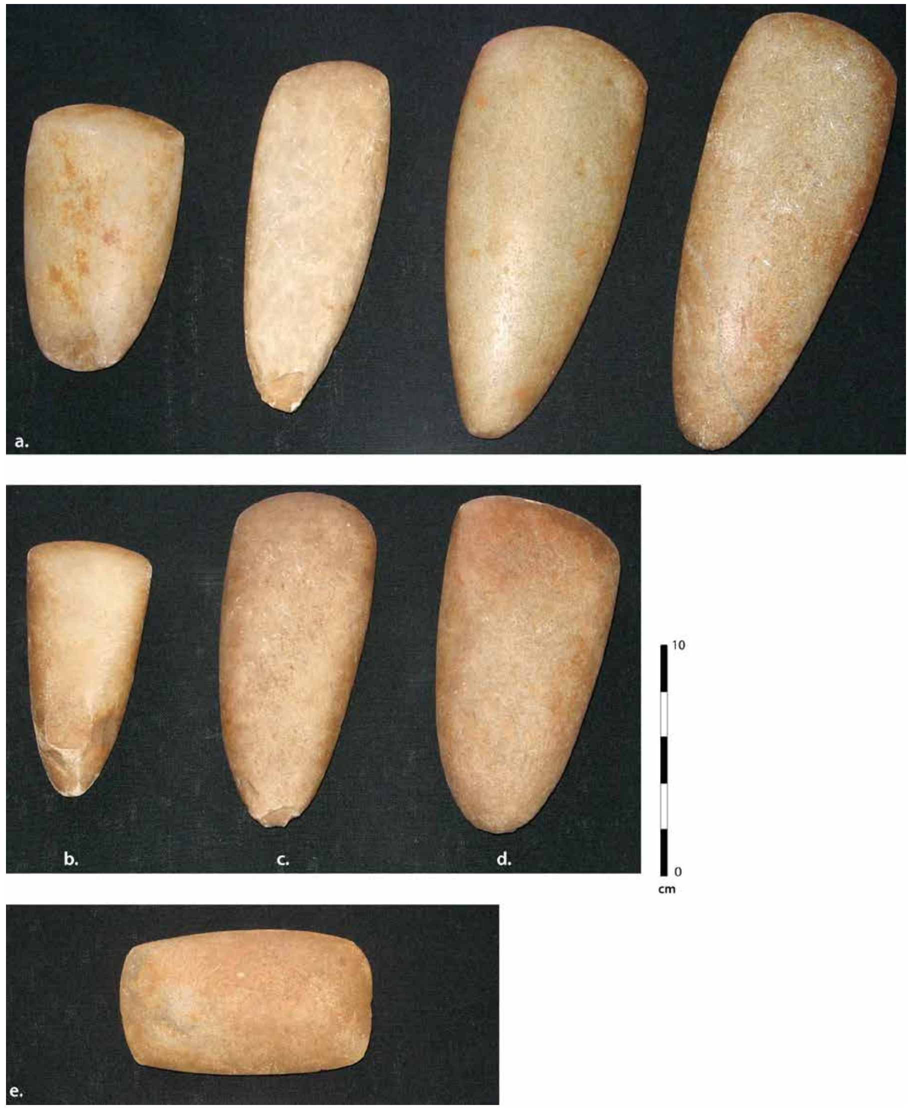

Figure 4.14. The polished axes found at US 4 and in features: (a) cache F 26, Pit 10, (b) F 39, Pit 5, (c) F 16, Pit 14, (d) F 29, Pit 10 and (e) F 34, Pit 1 (photographs by Sandrine Delpech).

The manuports and use-modified tools: the pebbles and hammer stones

In total, 173 (fragments of) pebbles have been recorded. More than 90% exhibits signs of use-wear, suggesting they served as tools. The majority consists of quartz, whereas the other materials include four dolerite or amphibolite, one iron oxide, one gneiss and eight unidentified rock specimens (Table 4.4). The quartz pebble tools vary between 3 and 14.5 cm in length. These (fragments of) pebbles have been classified according to use-wear traces (macroscopically):

a. Eighty-three specimens served as hammer stones (Fr., *percuteur*), including a gneiss pebble;

b. Twenty specimens show traces of abrasion of which the gneiss specimen is perhaps intentionally rounded; one pebble has probably been heated. These may have served as active abraders, or *manos* (Fr., *broyeur*);

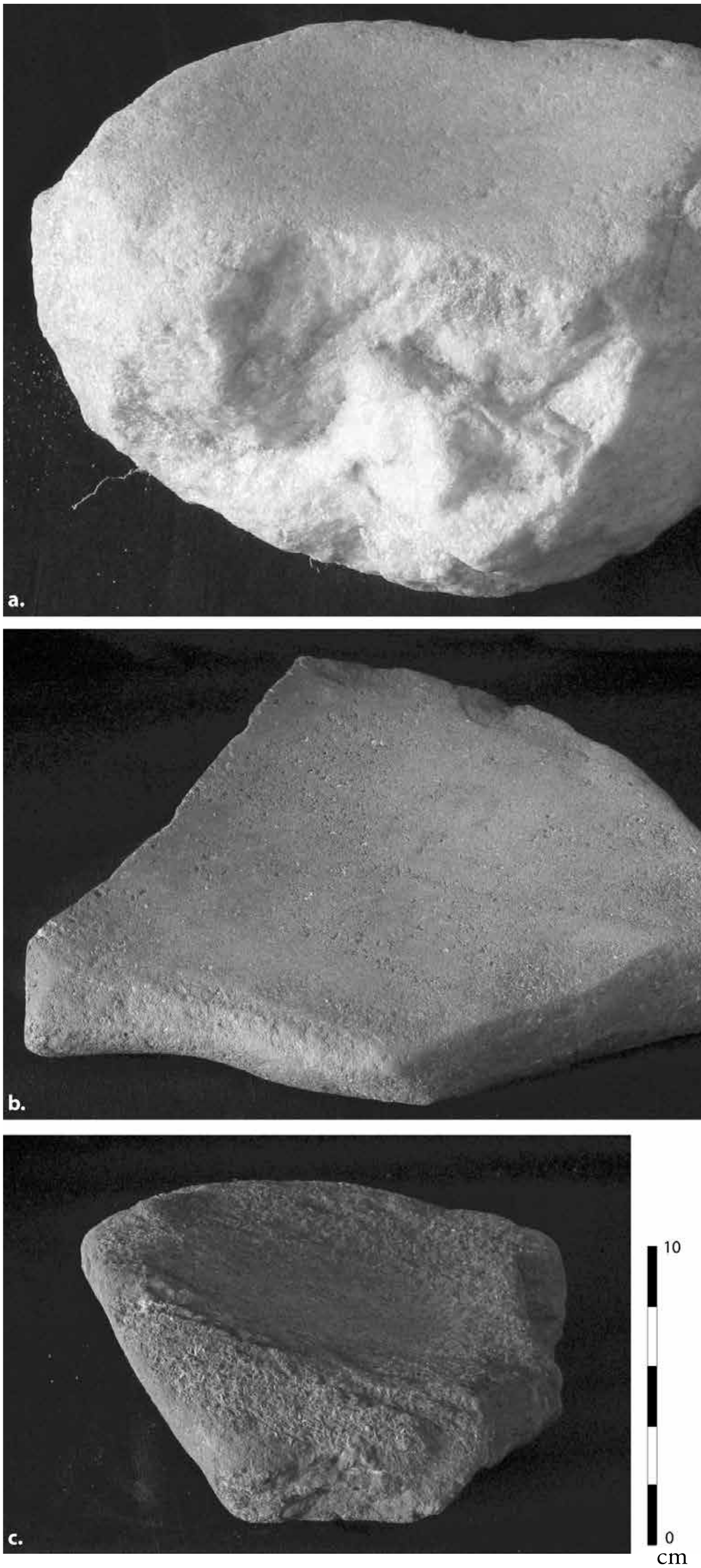

Figure 4.15. Examples of metates: (a) Pit 1, (b) Pit 14, A 15 and (c) Pit 10, A 5 (photographs by Sandrine Delpech).

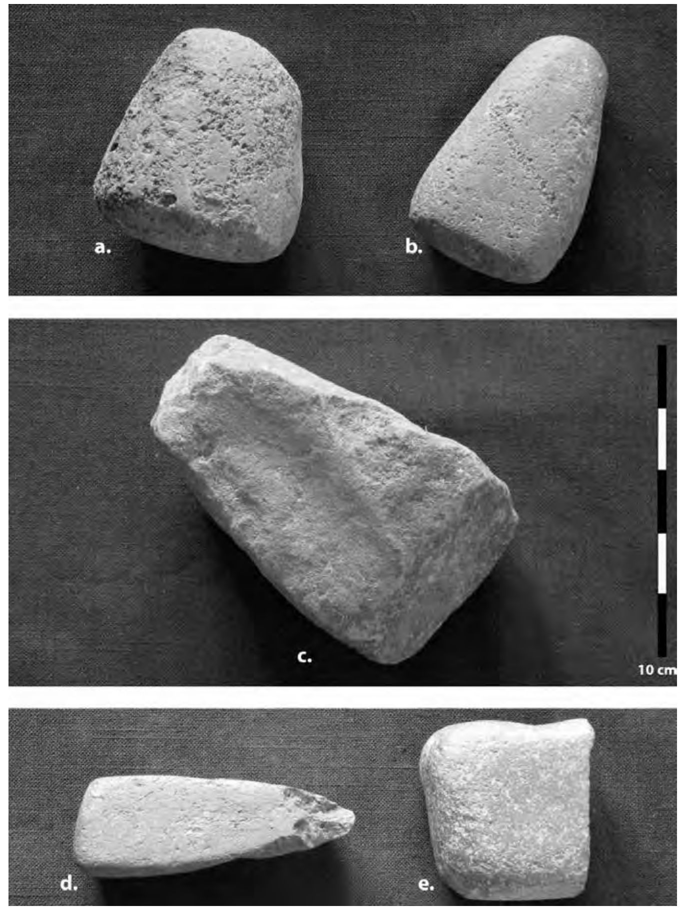

Figure 4.16. Examples of polished tools: (a) F 2, Pit 7, (b) Pit 13, A 1, (c) Pit 9, A 5, (d) Pit 16, F 7 and (e) Pit 16, E 5 (photographs by Sandrine Delpech).

c. Two pebbles are polished; the iron oxide specimen measures 6 cm in length; the smaller one is unidentified;

d. Thirty-five pebbles show traces of percussion and also have an abraded surface; one pebble fragment (unidentified rock variety) of 7.5 cm has two indented areas (Fr., *cupules*) on one side;

e. One pebble of dolerite or amphibolite has an abraded and polished concave face and may have been used as a metate (Fr., *meule dormante*) or perhaps a passive polishing stone (Fr., *polissoir*);

f. Three pebbles are hammered as well as polished: an unidentified rock pebble; a pebble of dolerite or amphibolite of 5.5 cm in length with cupules (probably by percussion), and a quartz pebble that may be a smoothing tool (Fr., *lissoir*). Four (dolerite or amphibolite) pebbles were found together in a cache (F 15, Pit 18) (Fig. 4.17b);

g. Thirteen pebbles and three fragments did not display any use-wear traces at all.

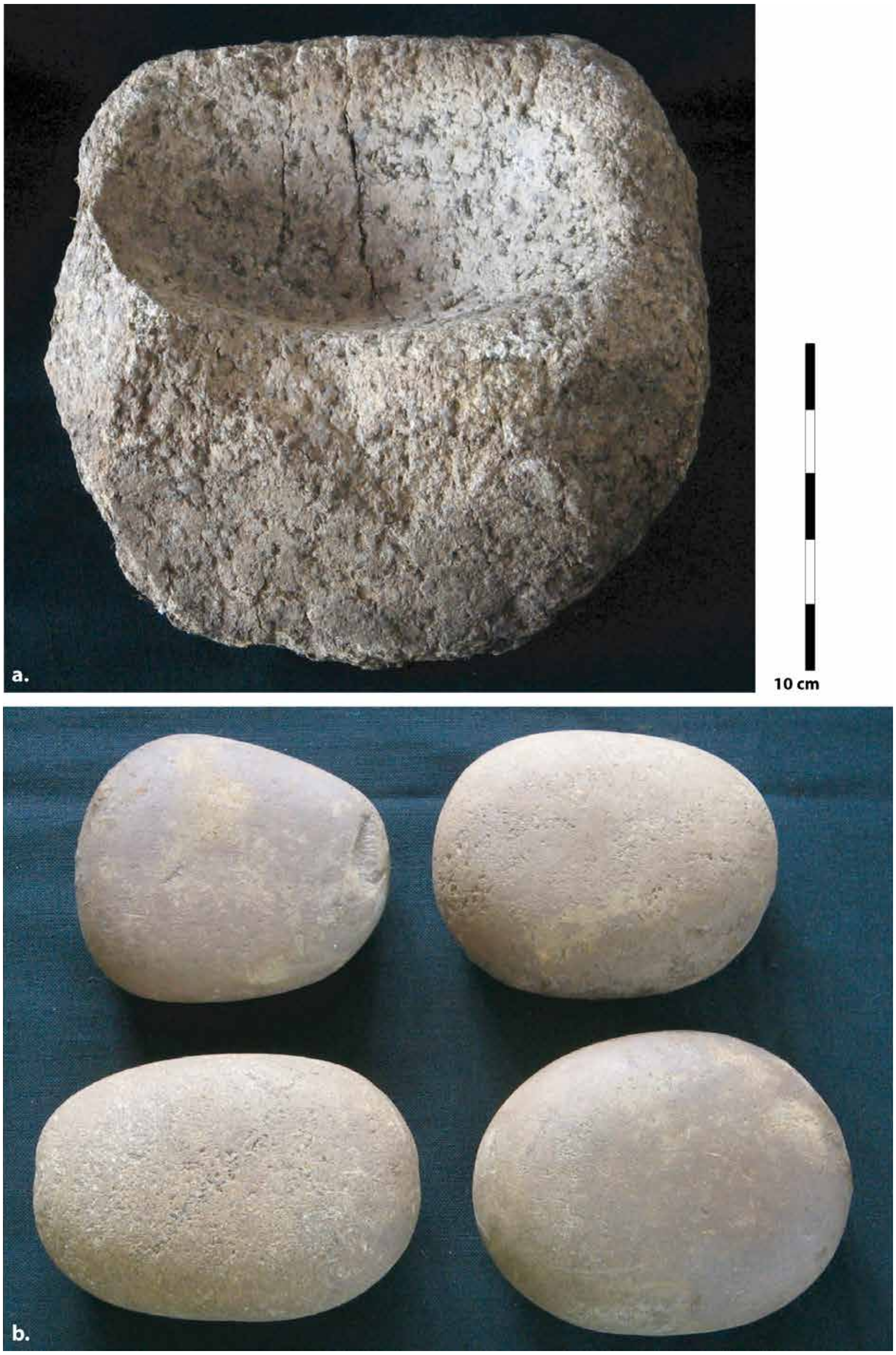

Figure 4.17. (a) A mortar (F5, Pit 16) and (b) pebble stones (cache F 15, Pit 18) (photograps by Sandrine Delpech).

Ground stone: the polished axes

In total, twelve polished axes were recorded of which eleven were found in features of which four together in a cache (F 26, Pit 10) (see Table 4.4 and Fig. 4.14). All axes consist of of dolerite or amphibolites. Hervé Théveniaut identified three hereof with certainty by means of a portable magnetic meter (Fr., *susceptibilimètre*): two consist of amphibolite (F 39, Pit 5 and F 16, Pit 14) and one of dolerite (Pit 1).

Seven axes are petaloid shaped, four are rectangular, and one is trapezoidal shaped. Their dimensions vary between 7.5 and 20 cm in length with an average width of 6 cm and a thickness of 2 to 4 cm. Eleven axes have a rectangular profile and one is slightly curbed. The latter specimen is classified, from a typological perspective, as an adze (Fr., *herminette*). All possess a finley ground or smooth cutting-edge (Fr., *tranchant)* of which one is double edged (F 34, Pit 1). The pointed heel, or butt, is characteristic. Several axes display traces of percussion on the heel which is commonly found among axes and probably relates to their use as a wedging tool.

The metates

Fourteen large blocks display traces of abrasion on one of the plano or plano-concave surfaces or on both. They were identified as metates or milling stone bases (Fig. 4.15):

a. Three quartz blocks measuring between 25 and 30 cm in length with an average thickness of 16 cm (Pit 1);

b. Four granite blocks measuring between 4 and 12 cm; one fine grained specimen has an abraded face measuring between 21 and 31 cm in length (Pit 10, A5);

c. Two unidentified specimens: a plaque measuring 18 x 14 x 4 cm and a bifacial abraded rock measuring 18 x 14 x 7 cm with similar dimensions as the former but having a thickness of 7 cm (Pit 14, A15);

d. Two unidentified rock fragments with a length of 23 cm;

e. Two fragments of bifacially abraded dolerite rock measuring 11 x 7.5 cm and 17.5 x 9.5 cm, respectively;

f. A highly weathered quartz fragment measuring 18 x 14 cm with traces of abrasion and percussion on one side; this piece may have served as an anvil, too.

The other tools

The numerous other collected tools can be described in short as follows:

a. *Manos*: six dolerite or amphibolite blocks measuring 6.5 x 10.5 cm have been altered due to abrasion. These rocks are flattened of which several have a straight edge, representing a so-called "edge grinder" (Fig. 4.18);

b. *Pestles*: three triangular shaped dolerite or amphibolite specimens, respectively 7, 8, and 18 cm in length; two have a quadrangular section and one has a flat surface (Fig. 4.16d, e);

c. *Passive grinders stones*: two dolerite or amphibolite blocks which have served as a support when grinding minerals; the 11.5 cm long block has a remarkable groove on one side (probably the result of abrasion) and also features red (pigment?) traces: the 7.5 cm long block re-served again as a core (Fig. 4.16c);

d. *Mortar*: a weathered granite block measuring 24 x 19 x 12 cm with one very pronounced concave face (Fig 4.17a);

e. *"Calibrator"*: an indented fragment consisting of dolerite or amphibolite;

f. *Preformes*: five blocks (four consisting of dolerite or amphibolite and one of gneiss) measuring between 8.5 and 13 cm in length. They have been interpreted as preformes and display a square cross-section with either a pseudo-edge or a pseudo-heel, suggesting they might be axe preforms. Their rectangular sides include polishing.[103]

4.6.3 Pit 12

It may be evident that a huge amount of lithic artefacts was lost during the mechanical excavation. When handpicking these artefacts in the field, it was extremely difficult to spot the transparent quartz elements in the white subsoil because of the blazing sun. In order to collect the small lithic fraction and to realise what we had missed, we dug Pit 12 as our reference sample. This pit, measuring 8 x 9 m, was excavated in three arbitrary levels including squares of 1 x 1 m (200 L). The sediment was dry-screened in the field over a mesh of 0.5 cm and yielded 10,378 lithic elements in total (Annexes 2.4.13-17).

Flaked stone: the flakes and fragments

The total number of collected flakes amounts to 8537 and constitutes 70% of the lithic assemblage found during this excavation (Fig. 4.19b) We counted 7848 flakes smaller than 2 cm, of which 655 flakes measured between 2 and 4 cm, 31 measured between 4 and 6 cm, and only three flakes measured over 6 cm. These flakes consist of coarse hyaline quartz and have a triangular and quadrangular morphology with a trapezoidal section. The heels of the flakes are absent either due to fragmentation or because they were crushed by means of the bipolar debitage technique and represents a common feature when applying the latter technique.

The number of unidentified fragments is high (N=1613) and, with regard to the flakes, the majority varies between 0.5 and 4 cm in size. Ten specimens show traces of percussion. They may have been fragments of hammer stones, anvils or heavily battered flake cores. The prehistoric population at Eva 2 clearly favoured the production of small flakes (92%). Without the use of microscopic analytical techniques, the function of these flakes remains difficult to assess. Based on sundry studies, the current hypothesis is that these small flakes were inserted in graterboards (Prous 1990; Perry 2001:260, 2005).[104] However, they may have been used inserted in other (wooden) tools or used to cut directly organic matter or meat (cf. Section 12.5.2 for a further discussion on grater boards).

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103 Finally, with regard to the 74 stone elements consisting of various raw materials with traces of percussion, abrasion, polishing, and heating, we were not able to define a type or function. This applies to ten ferrallitic elements, one cache of four polished pebbles, probably (un-used) hammer stones (cf. Fig. 4.17), five small granite plaques, 52 unidentified fragments and rocks and three rocks displaying percussion traces.

104 For further reading, see William Barse's (2008) reaction concerning the quartz flake sample he provided to Linda Perry, contesting the identification of grater flakes for this sample.

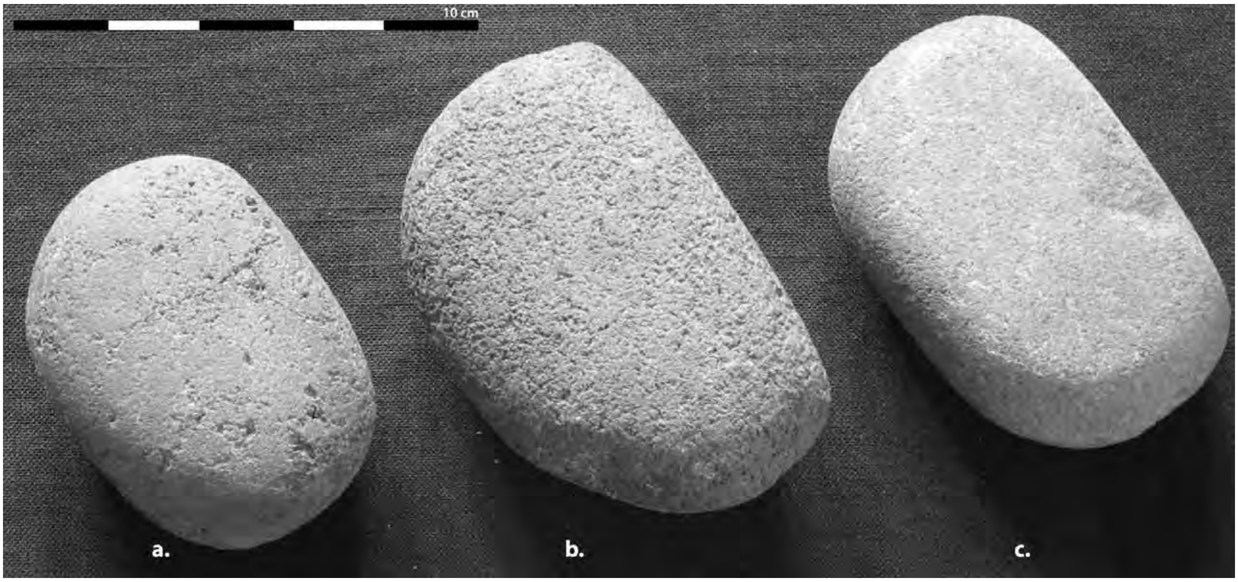

Figure 4.18. Examples of edge grinders: (a) Pit 10, A 13, Pit 16, B 8 and (c) Pit 4 (photographs by Sandrine Delpech).

The cores

The small size of the cores reflects the production of small flakes. All cores are made of hyaline quartz (Table 4.6). About 56% are smaller than 2 cm in length, 41% vary between 2 and 4 cm, and 3% measures between 4 and 10 cm. The majority has a plano-convex morphology. A small number, however, has an irregular or pyramidal shape with one or two striking platforms.

The anvils

We recorded only six blocks (angular and flat) with use-wear traces (cupules) related to bipolar reduction of quartz material. These tools are generally larger in size, varying between 8 and 13 cm, with the exceptioin of one block with a length of 4 cm (it may also be a hammer stone). Percussion traces were visible all over one or two faces, being more or less flat surfaces. Despite their small dimensions, several cores and hammer stones may indeed have served as anvils too and probably served over a very long period. This perhaps explains their low number.

The use-modified tools: the pebbles and hammer stones

This category counts 34 pebbles and pebble fragments consisting of hyalin quartz, with the exception of one pebble of an unidentified material. The dimensions of these tools vary between 3 and 11.5 cm in length and a width of between 3 and 6 cm. Only two pebbles that may have served as anvils had a relatively large width of *c.*10 cm and a length of 11 cm (perhaps representing anvils).

The pebbles (N=14) display percussion traces on various sides: six on the short side exclusively, one on both sides, and two large pebbles (anvil?) on only one side. Two feature bifacial use-wear. One pebble has bifacial percussion use-wear

A. Flakes	< 2 cm	2-4 cm	4-6 cm	6-10 cm	>10 cm	Total
Level 1	1196	61	12	3		1272
Level 2	2662	188	8	0		2858
Level 3	3939	405	11	0		4355
Level 4	51	1	0	0		52
Total	7848	655	31	3		**8537**
%	92	7.6	0.3	0.05		100

B. Fragments						
Level 1	51	62	2	7	2	124
Level 2	158	120	5	2	0	285
Level 3/4	960	230	14	0	0	1204
Total	1169	412	21	9	2	**1613**
%	72.5	25.5	1.4	0.5	0.1	100

C. Cores						
Level 1	4	3	0	1		8
Level 2	32	19	2	3		56
Level 3/4	97	75	1	0		173
Total	133	97	3	4		**237**
%	56	41	1.5	1.5		100

Table 4.6. The inventories of Pit 12; (a) flakes, (b) fragments and (c) cores.

on its short side too. Two pebbles show traces of abraded use-wear of which one side shows traces on only one surface whereas the other has traces on both sides.[105]

4.6.4 The spatial distribution

The paleosol (US 4)

This layer contains archaeological material extracted from all over the excavated area in quantities of varied significance (Fig. 4.19a). The spatial distribution map shows remarkable concentrations of lithic tools as to Pit 17, in the southeastern and northwestern parts of Pit 16, and in the northern half of Pit 15. Remarkably, these concentrations correspond to regions where very few rock clusters were recorded. We also observe that the majority of anvils are situated in Pit 15. Considering the other tools (e.g. pebbles and/or hammer stones), their quantities do not suffice to draw any conclusions regarding spatial distribution.

Pit 12

The spatial distribution of Pit 12 is a test. We can observe the occurrence of flakes in every square and mostly in the deeper levels. We do not know if similar quanties are representative of the entire archaeological layer. Nevertheless we assumed that we dug Pit 12 in the centre or the vicinity of a quartz concentration, which may represent a quartz knapping workshop. Interestingly Pit 12 is situated between rock

105 Three objects from Pit 12 are unidentified: (a) a dolerite or amphibolite fragment (5 x 5 cm) with some polishing on the upper part, (b) a ferrallitic pebble (5 x 4 cm) which appears to be intentionally polished and (c) a *mano* (10.5 x 8 cm) with use-wear on both sides.

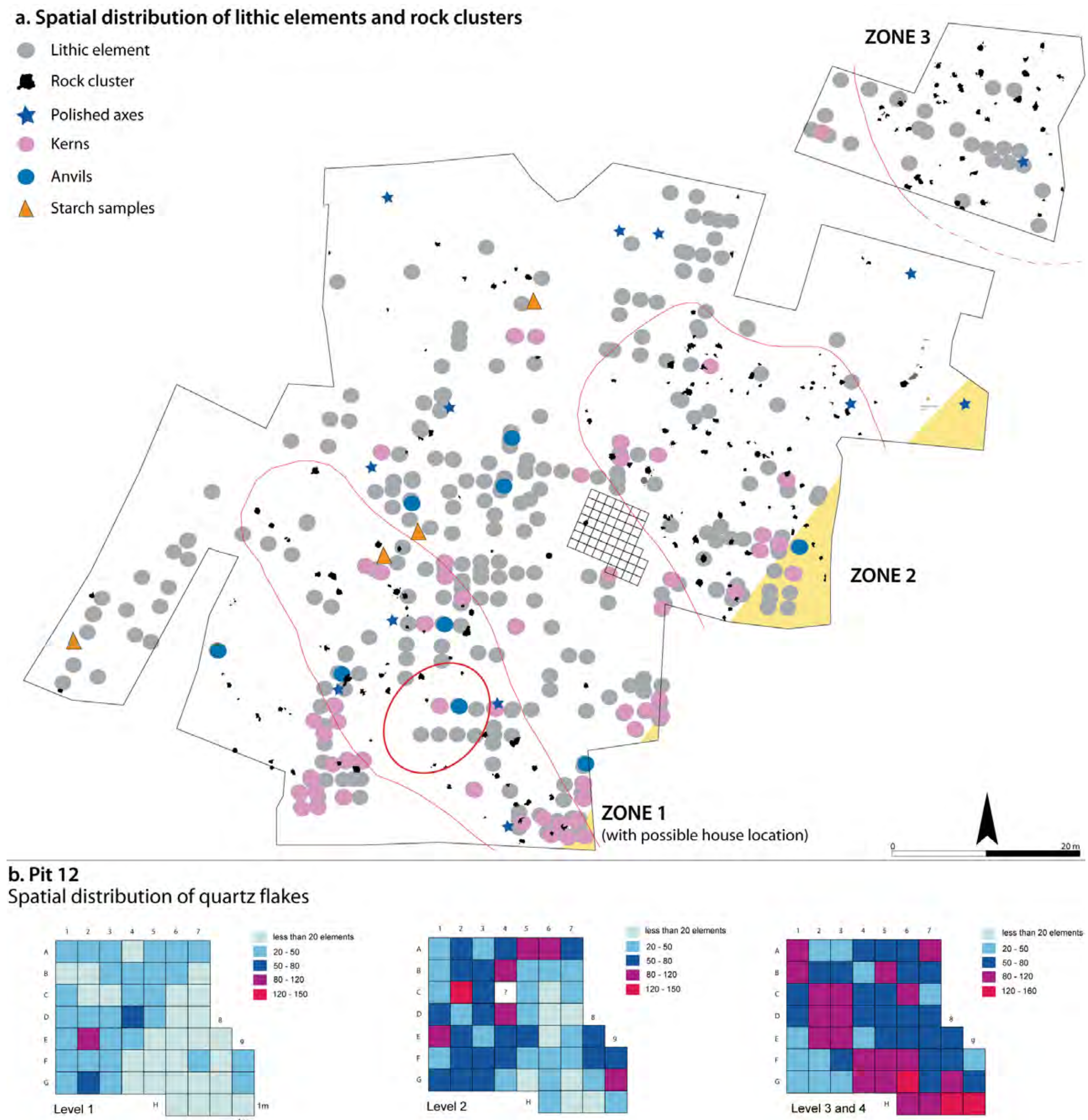

Figure 4.19. The spatial distribution of lithic elements (a) excavated area and (b) Pit 12 (plans by Sandrine Delpech).

cluster Zones 1 and 2, and not in the middle of one of them. This may suggest that the site has various activity areas: (a) lithic workshop(s), (b) food-processing zones consisting of aligned earth ovens as well as (c) a possible house location.

Considering the surface of 72 m², this pit did indeed yield a large amount of lithic material, mainly quartz tools and debris produced by means of indirect flaking. As indicated by this high number of flakes, the applied screening technique thus demonstrated the presence of an important lithic production of small flakes on this site. The results of Pit 12 are somehow isolated because of the fact that the excavated area has not been screened entirely nor did we repeat this test elsewhere on the site. Therefore, we can only presume that this site would have revealed many more, smaller artefacts if the entire archaeological layer had been screened.

No.	Sector	Square	Type	material	Use wear sections	Lab. No.	sample w. // vol.
Eva 1	5	A2	milling stone base; frag.	quartz	concave used face and the opposite side	10 to 25	0.216g//0.3ml
Eva 2	13	G3	milling stone base; comp	quartz	slightly concave used face and two other unused sides	10 to 26	0.023g//0.03ml
Eva 3	19	A15	milling stone base;frag	ign. rock	concave used face and two other unused sides	10 to 27	0.155g//0.1ml
Eva 4	15	B3	milling stone base;frag	ign. rock	concave used face and two other unused sides	10 to 28	0.084g//0.08ml

Table 4.7. General information on starch grain samples.

Taxa	Eva-1	Eva-2	Eva-3	Eva-4	Ubiquity	Total
Canavalia sp.				3	50	3
cf. Canavalia sp.			2	18		18
Not identified		1		1	25	1
Ipomoea batatas	10				50	1
cf. Ipomoea batatas						10
Calathea sp. (C. veitchiana type)			8		25	8
cf. Calathea sp.			6			6
Zea mays	2	2			75	4
cf. Zea mays	3	1	1			5
Not identified (possibly palm starch from the heart)	1				x	1
Not identified	1	8	2	1	x	12
Total starch grains	17	12	19	23	x	71
Species richness	2	2	3	2	x	x

Table 4.8. The starch grain identifications and distribution per artefacts. In order to propose a species richness index per sample, all the identified taxa (approximate or cf. and secure ones) were combined. Here the ubiquity combines approximate and secure identifications in the family, genus or species levels.

	Plain	Decorated	Total	Weight	Mean weight
Layer	1407	0	1407	8372	5.9
Features	390	0	390	4583	11.7
Total	1797	0	1797	12955	7.2

Table 4.9. The general ceramic count.

However, such an excavation would have been very expensive and time-consuming but may nonetheless be an interesting objective regarding future programmed and/or compliance excavations. On the other hand, one must be aware of the huge amount of lithic material to be analysed to which sampling may lend a helping hand.

4.7 The starch grain analysis

Four metates, or milling stone bases, were sampled as to starch grain analysis by Sebastiaan Knippenberg in 2010 in Cayenne.[106] These samples were analysed by Jaime Pagán Jiménez in order to obtain botanical data on the material ground ground on these milling stones. All milling stones were collected during the mechanical excavation at Level 2 (Table 4.7). The technical data per artefact can be found in Annexe 2.5 and the methods of extraction in Section 1.3.2.

The results presented in Table 4.8, indicate the identification of the starch grains found on the four milling stones. We recorded maize, sweet potatoes, arrowroot (*Calathea* sp.) and jack beans. The latter two are not very common in present-day food processing. The presence of maize and sweet potato starches is important because both can now be associated with a Late Archaic and ECA subsistence economy. The absence of manioc is interesting but striking. Perhaps these tubers were processed by means of another production mode, without grinding or milling, but more samples are needed in order to draw reliable conclusions.

106 These results have also been published in *Quaternary Science Review* (Pagán Jiménez et al. 2015).

4.8 The ceramic study

Ceramic fragments were found dispersed not only in the dark grey layer (US 4), as the excavation of Pit 12 (nearly 1.7 kg of sherds) demonstrates, but also in various features (Table 4.9; Annexe 2.6). The fragmentation and conservation of this pottery is problematic because the majority hereof is severely weathered. Any surface finishing or possible painted decoration was rather difficult to distinguish. However, the weathered condition of this coiled material allowed us to separate it instantly from the upper (historic) ceramics because of a heavy sand or (pounded) quartz tempered paste and a light brown yellowish core.

As much as 93% of the ceramic assemblage is represented by body sherds measuring less than 5 cm (mean weight: 7 gr.), featuring very little morphological information. These elements were dispersed across the entire excavated area with only a higher concentration in Pits 2, 7, 10 and 14 forming altogether one large area (cf. Fig. 4.20a). The small size of the sherds may be due to trampling.

Only 18 constituent elements (EC) have been recognized during this inventory, to wit 15 rim and three base fragments. The difference between a rim and the edge of a coiled body fragment was often difficult to determine. The rim sherds have pointed lips. The wall thickness varies between 4 and 8 mm, revealing a rather thin ware. Diameters vary between 20 and 28 cm representing simple small open (N=12) and restricted (N=3) bowls (Fig. 4.20b). Four fragments featured a careen of which one measured 30 cm in diameter, i.e. F 7, Pit 8. Collar or neck fragments were recorded. One large concentration (F 31) of body fragments (N=188 for 3.3 kg) was encountered in Pit 1. It probably belonged to one large spheric (restricted?) vessel, however, no rim or base fragments were identified as to this vessel. Only three base fragments were found allowing us to define its parameters. They have a convex shape and were manufactured by means of enrolling a coil which is still clearly visible. Its diameter measures *c.*5 cm.

The sherds are exclusively tempered with coarse grained sand representing *c.*20% of the paste (Mathews et al. 1991).[107] The omnipresence of silica (quartz/SiO2) in these sherds has been confirmed by means of a mineral analysis of two sherds. One fragment was taken from the above-mentioned feature F 31 in Pit 1 (05-38-03-B) and the second from the radiocarbon dated rock-filled pit F 5 in Pit 13 (05-38-03-F).[108] Furthermore, possible vegetal material, i.e. black dots or "fibers," was identified in a small number of few sherds. If they were added intentionally or represent burnt roots of raw clay material remains as yet unknown, but certainly deserves further attention.

Despite the little information obtained from these ceramics, their age and general features can be linked to ancient ceramic sites located in coastal northern South America, e.g. the Alaka Phase in northwestern Guyana and the Mina Tradition in northeastern Brazil (Williams 2003; Roosevelt 1995). Although we cannot establish a direct link between these early ceramic sites yet, the ceramics of Eva 2 certainly reveal another production area of ancient ceramics. They appear to be a common phenomenon in the coastal Guianas from 5000 BP on, into which French Guiana is now integrated (cf. Section 5.5.5).

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107 See also Orton et al. (1993). Heavily tempered ceramics are often related to a better performance of cooking pots, thanks to the conduction of heat (Skibo and Schiffer 1995:83).

108 This mineral analysis was conducted by Archeolabs (2005); cf.Annexe 2.7.

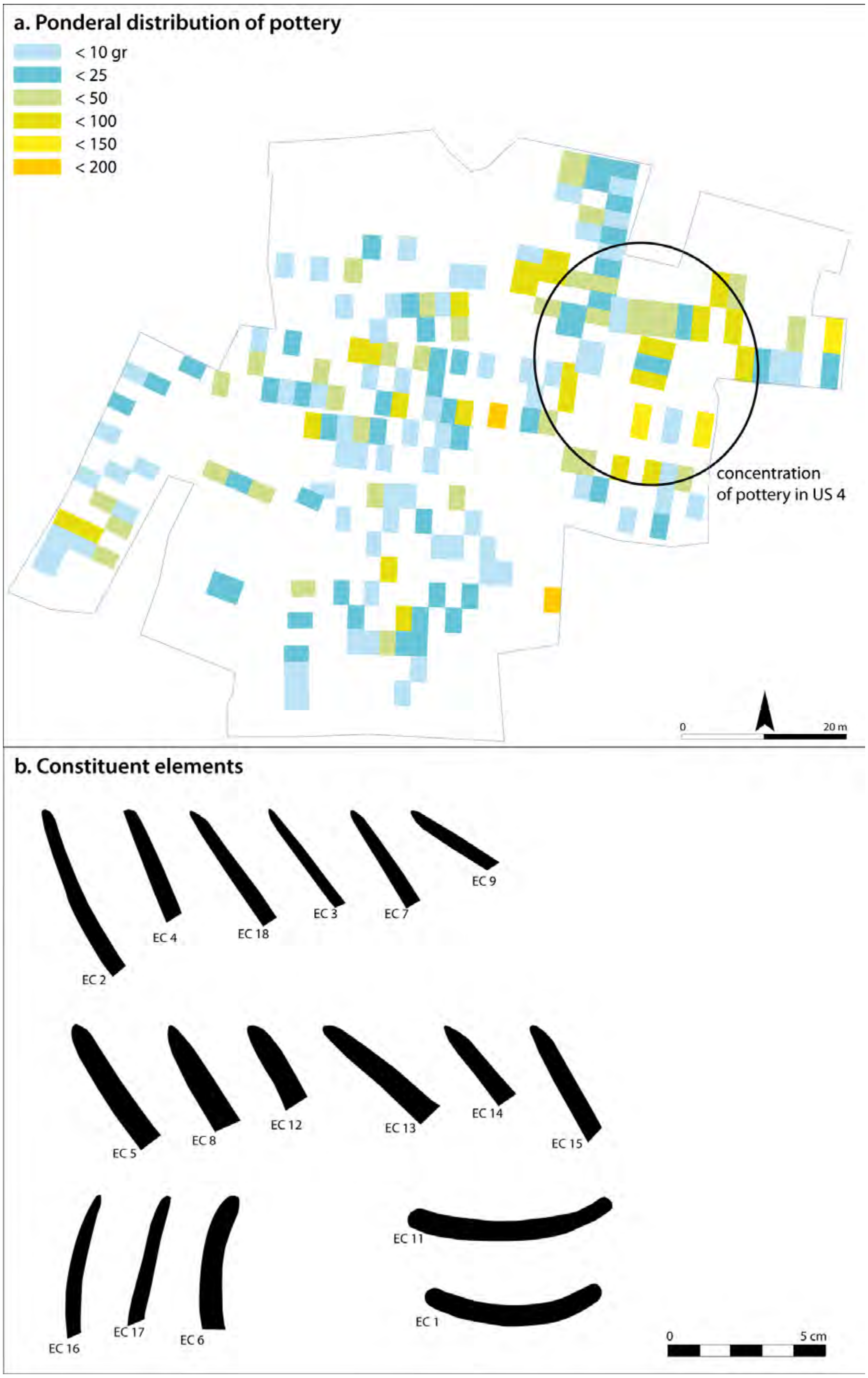

Figure 4.20. (a) Pondered ceramic distribution and (b) drawings of constituent elements (EC 1-18).

4.9 The site synthesis

The regional context

The excavations at Eva 2 and at Plateau des Mines premiered the revelation of a set of characteristics concerning the Late Archaic occupation in coastal (Pleistocene) French Guiana. One may now conclude that:

a. Its implantation on the White Sand Formations indicates that archaeologists need to watch out for buried occupation surfaces in these sediments;

b. Such an occupation layer contains large quantities of lithic material of which the production of small quartz flakes (2 cm) applying the bipolar knapping technique is a primary interest of this opportunistic production mode;

c. We can find multiple rock clusters in shallow pits in or just below this layer. They are organised spatially in alignments and delimited zones. It is hypothesised that these clusters represent earth ovens, attesting a food processing activity on site;

d. The presence of grinding stones, mortars, pestles and edge grinders and other polished tools presumably implies another stage of food processing. This refers to the processing of edible plants (e.g. various tubers, rhizomes, maize).

Furthermore, four important characteristics of the late Meso-Indian way of life can be pointed out here concerning the use of the landscape, flaking industry, and food processing:

1. Some two decades ago, preceramic or Archaic sites were barely known in French Guiana and even considered 'hard to detect' (Rostain 1994a:411). In fact, this appears to be true, at least for the Archaic occupation present at the White Sand Formations. The ancient Amerindian occupation of the white sand plateaus such as at Eva 2 and PDM (but also at possibly similar sites such as PK 97 at RN 1) reveal an unexplored field of interest to archaeologists in the Guianas.[109] Archaic occupation was hitherto associated with the *sambaquis* found at low islands in the marshy northwestern region of Guyana, the dune landschape of northeastern Pará or the high terraces of the Middle Amazon River. The paleo-environment of the White Sand Formations may present similarities with the contemporary dune landscapes of Pará. Needlees to say, this hypothesis requires further research.

2. Pit 12 at Eva 2 clearly shows an important production of small, short flakes of *c.*2 cm. This opportunistic production of quartz flakes by means of applying a bipolar technique apparently represents the main goal of the Archaic population. Retouched flakes are rare. Therefore, this quartz industry producing a wide variety of small, irregular flakes, chips and small cores with very few intentionally reworked flakes –by means of secondary retouch– is considered to be an important marker as to the Late Archaic Age in French Guiana.

   However, the function of these short flakes remains unclear. In addition to the research of short flakes as implements of grater boards in Venezuela, as forwarded by Linda Perry (2001, 2002, 2004, 2005; Barse 2008), further research on quartz flakes is necessary in order to better understand not only this type of production, but also to find out what the Amerindians attempted to do with it. Use-wear traces on quartz are difficult to recognize. Moreover, there is very little expertise on this matter in the Guianas contrary to

109 Sebastiaan Knippenberg and the present author discovered the PK 97 site in 2010. It is located on the highest white sand belt. A small number of preformes, quartz tools and debitage were acquired and deposited at the SA in Cayenne. The PK 97 site is endangered due to illegal quarrying.

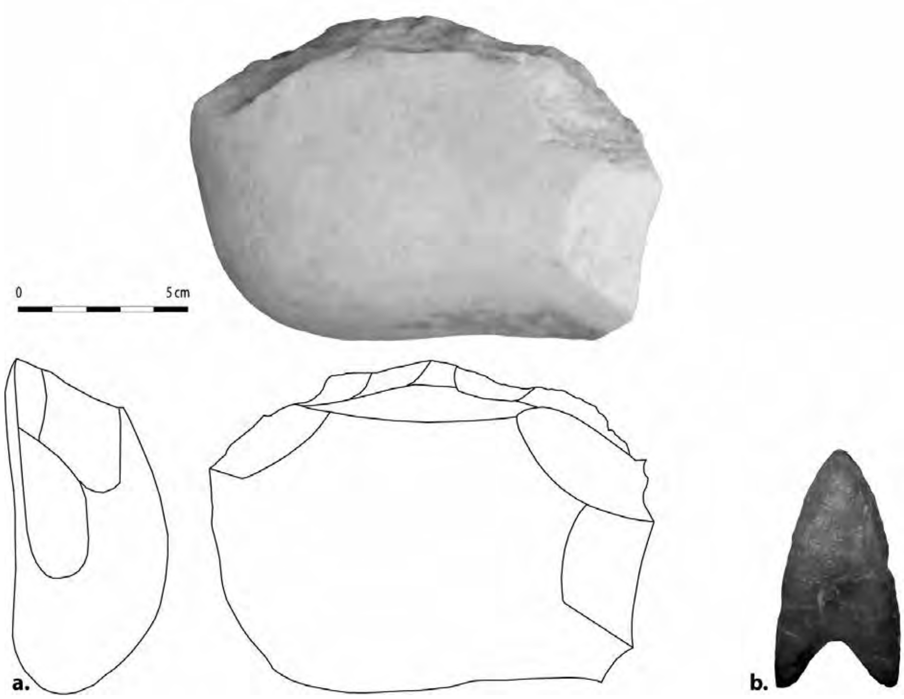

Figure 4.21. (a) A quartz chopper the present author found at the white sand plateau of Bastien (97311.126) and (b) a photograph of the rhyolite Jorka point "M 4004/005" (Courtesy of the Stichting Surinaams Museum).

surrounding countries, e.g, Colombia (Nieuwenhuis 2002; cf. Section 5.6), Venezuela (Perry 2005).

Furthermore, it is remarkable that projectile points have not been found at Eva 2 (or PDM) because these emblematic objects are frequently associated with the Lithic and Archaic tool kit. Stray finds of projectile points are rare in the Guianas. As yet only a single projectile point is known with regard to the Lower Maroni drainage: 'The Surinam finds include an unstemmed, triangular projectile point with hollow base, before 1949 found in the Jorka creek near Langa Tabriki in the Marowijne District' (Boomert 1980:98).[110] Interestingly, the Jorka Creek is situated opposite the Maroon village of Bastien on the French side. Here recent road constructions have uncovered numerous Archaic artefacts, which were also found on a white sand plateau called Bastien (Mickaël Mestre, personal communication 2010 and personal observations, 2010) (cf. Figs. 2.1 and 4.21b).

3. The presence of rock-filled pits and their alignments had not been recorded before as to other Archaic sites outside French Guiana. The PDM is currently the only reference with regard to similar rock features (Mestre and Delpech 2008). Based on analogies with North American Archaic sites, the rock-filled

110 According to Arie Boomert (personal communication, 2011), this projectile point was detected in 1937 by A. J. Ambel near Langa Tabriki, an island in the lower course of the Maroni River. Albert Helman (1982:43) published a photograph of this object. When I contacted Laddy van Putten to ask for permission to see this so-called Jorka point (cf. Fig. 4.21b), he was not able to find it and suggested it was probably "lost" during the transfer of the depot during the Civil War. Fortunately, Boomert possesses a paper copy of various artefact files and kindly forwarded the inventory number of above-mentioned Jorka point. Once in Paramaribo, van Putten and the present author checked all projectile points on display in the Fort Zeelandia Museum. Eventually we found the Jorka point which had been attributed to, the Sipaliwini collection to which it does not belong. Thus, Rostain's ascription (2013:95, Fig. 27, below right) is erroneous. We can indeed recognize the inventory number in Fig. 4.21b!

pits of Eva 2 and PDM can be interpreted as Archaic earth ovens. We assume they served to cook all kinds of food which was apparently one of the major reasons for the occupation of this site. It is suggested that this type of food processing is an intermediate developmental stage in prehistoric cooking from open fire to a ceramic container, where hot-rock cooking in earth ovens represents a step in this culinary evolution during the Archaic Age. Thus, these rock clusters represent a chrono-cultural marker for the latter period.

This small database does not allow us to define a type-chronology for these clusters. However, a tendency from large bed-like ovens towards smaller rock-filled pits is probable. At Eva 2, the spatial pattern of the clusters reveals three possible activities areas which may correspond to cyclic visits by Amerindian groups. Archaeological research carried out on settlement patterns of nomadic bands in northwestern South America tends to indicate a strict geographical cycle within a specific area or territory over a long period of time (Gnecco and Aceituno 2004). The cyclic territorial settlement behaviour of the actual Nukak hunter-gatherers in southeastern Colombia supports this hypothesis (Politis 1996, 2001).

4. If the production of short flakes and earth ovens are characteristic of the Late Archaic subsistance economy, this also applies to the use of various grinding tools (e.g. metates, mortars, manos, pestles, edge grinders). The latter tools are generally viewed as the 'most typical plant-processing lithic tool found at the early and middle Holocene sites in the Humid tropics' (Piperno and Pearsall 1998:187). Reniel Rodriguez Ramos (2005) experimented with Archaic 'edge-ground cobbles' (Stothert 1985:621-622) or edge grinders (cf. Fig 4.18b) from the Greater Antilles demonstrating they had served to crush tubers and nuts.[111] These tools have been identified at PDM as 'molette à morphologie de pilon' by Sandrine Delpech (Mestre and Delpech 2008:51, Fig. 20). Although samples form the edge grinders have not been analysed, the milling stone bases from Eva 2 indicate that maize, sweet potato, arrowroot and jack beans have been ground on these stones. On the one hand, the latter tools perhaps refer to the processing of raw tubers into a paste or half-product which is first wrapped in leaves as with *tamales* (Sp.) and then cooked in earth ovens (Rodriguez 2005:8).[112] On the other hand, it may also be the case that the starchy products were cooked previously in the cooking pits prior to being mushed on the milling stones.[113] Furthermore, it is also possible that the raw tubers, such as the potatoes and rhizomes, were grated before grinding them into a mushy paste. In fact, the presence of grinding tools, while marking a

111 According to Jaime Pagán Jiménez (personal communication 2011), edge grinders served to process raw vegetables such as maize, beans and other seeds. They were probably also applied during a second or third stage of processing tubers and rhizomes, for example after the tubers had been grated. This may well be the case in the Greater Antilles of the Zamia sp. processing. Ethnographic and ethnohistoric documentations inform us that first the tuberous stem is peeled. Next, the organs are placed to rest and dry until the resins have disappeared. The tuberous stems are now grated, that is during the contact and postocolonial period. Finally the substance is placed in the sun to dry (and for passing the larvae which functions as the eradicator agent of the toxic compound). Subsequently the dry and larvae infested matter is ground.

112 Interestingly *Calathea* sp., or *oeroewa*, is also consumed among the historic Warekulé or Akurio, a foraging group in southern Suriname, as recorded by Lodewijk Schmidt in 1941 (Findlay 2011:45).

113 Boomert (2000:83) also refers to the processing of maguey, i.e. wild agave heart (*Agave cantala*) with manos after being roasted 'for 1-5 days on hot stones in pits.' This is related to the Manicuaran subseries which developed from Late El Conchero (Sanoja and Vargas 1983).

transition between Lithic and Archaic Ages, stress the importance of starchy foods among the Archaic populations (Harris 1973; Simões 1982; Gnecco and Mora 1997). This is reflected more generally in the Meso-Indian broad spectrum economy and exploitation of the natural resources.

The cultural affiliation

The radiocarbon datings, the bipolar percussion technique on quartz material in order to produce small flakes and the multiple grinding tools all evoke an ascription to the Ortoroid series as José Cruxent (1971), Irving Rouse (1992) and Arie Boomert (2000) defined with regard to the Caribbean and eastern Venezuela. The latter further stresses the importance of the (edge) grinders by stating that: 'Although the function of the edge grinders at the Ortoiroid sites of Trinidad and South American mainland is not sufficiently known [at that time], these implements should be considered as the type artefacts of the Ortoiroid series.' (Boomert 2000:74).[114]

Boomert also splits the Ortoroid series into an older Banwarian and a younger Manicurian Ortoroid subseries. The latter displays more cultural differentiation as manifested in various regional complexes (Boomert 2000:54). The Early and Late Banwari series are contemporaneous with Early Alaka of Guyana (6000-4000 BC). Its characterics are: flaked choppers, grinding tools and *quebra-cocos* (Br.), or pitted anvils. Similar tools made by means of crude percussion (e.g. choppers, hammer stones, large flakes or picks), were found at the PDM site. They can be attributed to this early phase (see for comparison the choppers in Mestre and Delpech 2008:58 vs. Boomert 2000:59). A similar crude chopper was found at the Bastien site, situated to the south of PDM (cf. Fig. 4.21a). A second, more recent occupation of the PDM site (Mestre and Delpech 2008:70) coincides more or less with the first occupation of Eva 2 and can be positioned between 4000 and 3000 BC. This occupation corresponds to Late El Conchero (Cruxent 1972:39–40), Late Alaka (Evans and Meggers 1960:38–53) and Early Mina complexes with regard to the Atlantic coast (Simões and Côrrea 1971; Simões 1981; Roosevelt, 1995:117; Marques 2009) or even to the larger South American Littoral Tradition (Willey 1971).

All above-mentioned sites represent the (Late) Archaic occupation of the coastal Guianas and adjacent littoral regions. The presence of important shell middens, or *sambaquis*, characterizes these sites. These small conical mounds vary in size but can measure 80 x 30 x 1.5 m. They consist of shell, shell fish, bone, lithic debris, stone tools, fire-cracked rocks, and an occasional burial. These middens reflect the exploitation of the mangrove swamps and estuaries, representing a broad-spectrum economy based on shellfish gathering, hunting of animals, and the collection of wild vegetable foods. This broad spectrum subsistence economy is also reflected by means of an advanced lithic toolkit in which grinding tools, i.e. ground stone tools such as celts, mortars, manos, (conical) pestles, pitted anvils, abraders, grinding and rubbing stones applied in plant processing become more and more important. In addition, small retouched flaked tools such as scrapers, cutters and burins generally consist of quartz.

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114 For further reading on these tools see Barse (1995:110).

This type of subsistence economy also reveals "early" or "incipient" ceramics as found at the Alaka Phase and Mina sites, displaying a technological shift in food processing. The absence of griddles as to this period indicates that tubercules and maize were perhaps not consumed as cassava or flatbreads (Sp., *tortillas*). We assume that edible plants were processed by means of grating, grinding and cooking in order to produce pastes or balls, initially in earth ovens and later in ceramic vessels, possibly even serving to provide thick, starchy soups. The introduction of ceramic baking plates, or griddles (Sp., *comalli* or *burèn*), marks the presence of another way of cooking starchy food. Thus, the griddle enables the baking of cakes consisting of maize and/or manioc flour. This marks an innovative phase with regard to the Early Ceramic Age.

Chapter 5

The Chemin Saint-Louis site

An Early Ceramic Age site upon the Holocene terraces of the Maroni River

The site of the Chemin Saint-Louis (No. 97311.121), or CSL, as we shall henceforth refer to it, represents the following chapter on the Early Ceramic Age as well as the transition to the Late Ceramic Age as it includes three important occupations. However, its main occupation (Phase 2) concerns an Early Ceramic Age assemblage dated to the first centuries AD. Its dark earth layer measuring 40 to 100 cm in thickness yielded numerous ceramic and lithic artefacts. The feature level includes over 400 features revealing multiple post holes as well as ceramic deposits in oval pits. The extension of the site, its geographical location, the quantity and spatial distribution of the features indicate a large pre-Columbian superimposed habitation site.

Twenty-seven radiocarbon dates display at least three major occupations. Together they represent the first long chronology and ceramic typology with regard to the Lower Maroni River. The first occupation is dated between 2500 and

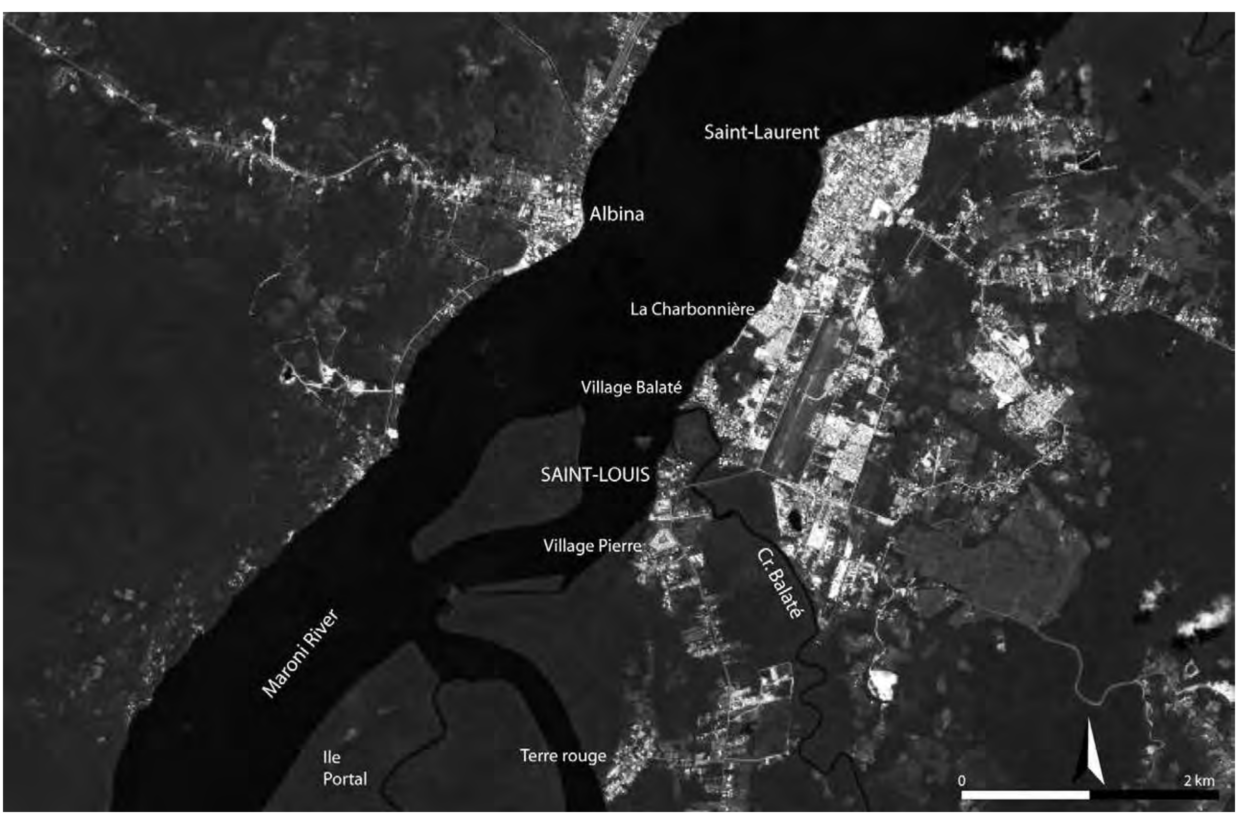


Figure 5.1. The location of the hamlet of Saint-Louis on the Maroni River (courtesy of the IRD and the CNES).

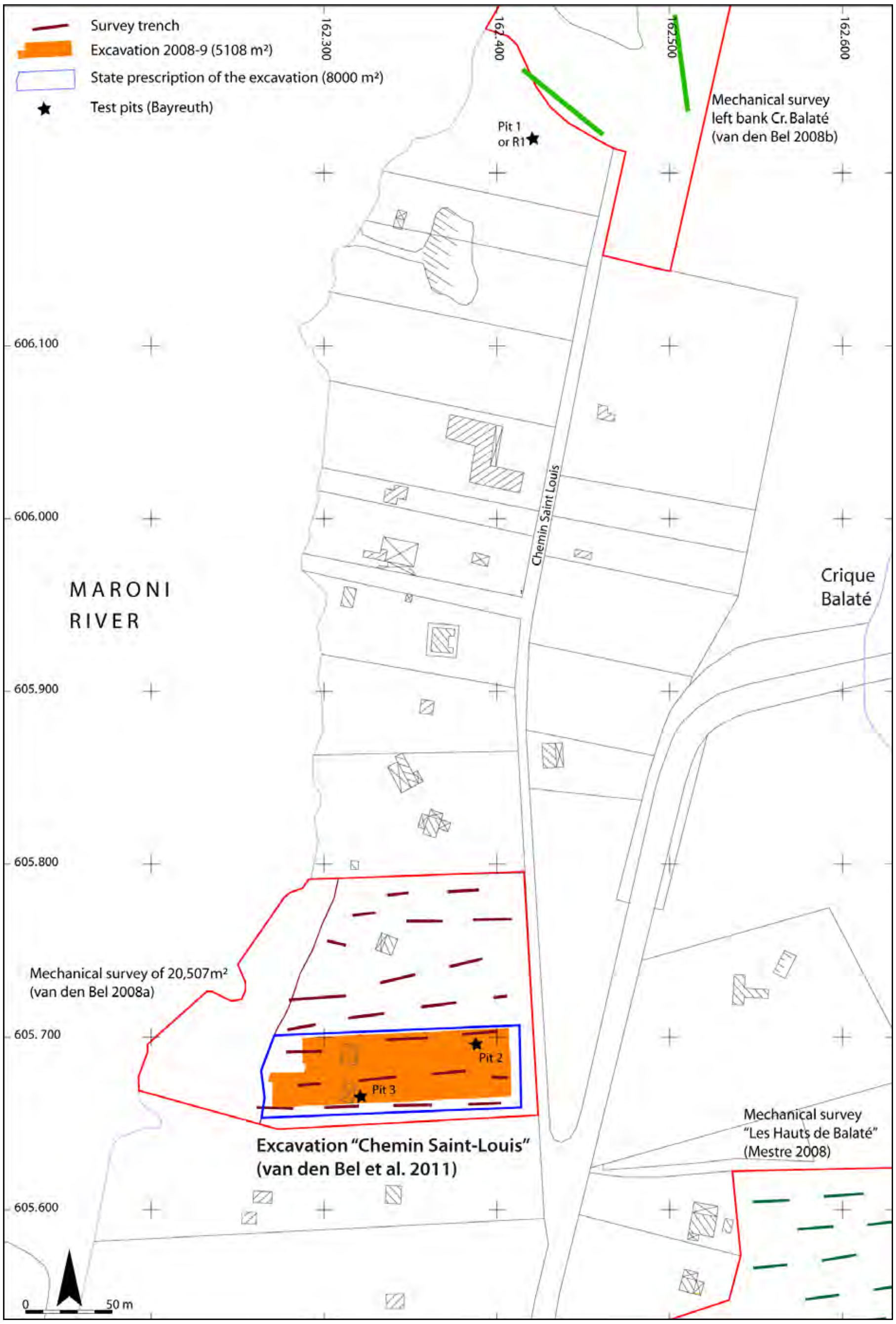


Figure 5.2. The location of the mechanical survey, excavation, and other nearby surveys.

1900 BC. It evidences large open, sometimes slightly restricted, spheric vessels with small rounded bases and pounded quartz temper. A second and the most important occupation phase is situated between 0 and AD 400. It is characterised not only by means of small carinated, hyperboloid bowls and large composite bell shaped vessels, but also by a more unique ware, including platters with hollow rims and interior red-on-white painting. This occupation also yielded several decorated sherds with possibly Middle Amazonian decoration styles, thereby uncovering a possible (trade) link through the interior between the Maroni River and the affluents of the Lower Amazon. The third and final occupation is represented by means of a single urn burial and a ceramic deposition dated between AD 1200 and 1300 as well as by several open bowls with bevelled rims, tempered primarily with *kwepi* or *caraipé* (burnt tree bark). Two Koriabo styled sherds have also been attributed to this phase.

The present chapter will discuss the results of the CSL excavation (van den Bel et al. 2011; cf. Annexes 1.2-3). Two occupations have been dated to the ECA, suggesting the existence of two phases (dubbed A and B) for this era whereas the third and final occupation was dated to the Late Ceramic Age. The ceramic series of this LCA occupation are compared to the contemporaneous neighbouring site of La Pointe de Balaté (Briand et al. 2015), hereby forming a bridge to the following chapters on the LCA.

5.1 Introduction

In January 2008, Christine Fouilloud of the INRAP and the present author located this site in the course of a mechanical survey on plot AL 579 (covering 20,507 m²), which was destined for future house allocation (van den Bel 2008a; Figs. 5.1-2). The promising results of this survey caused the SA to decide to excavate the southern half of the plot. It consisted of a long strip of land across the site measuring 50 x 160 m (8000 m²). The SA determined the excavation's goals allowing room to develop other matters of interest met with in the course of the excavation.

One of the most important observations made during the preliminary research was an important dark earth layer varying between 40 and 100 cm in depth. Although dark earths, or *terra preta*, had already been attested for in French Guiana (Vacher et al. 1998:53; van den Bel 2004), the rather thick dark layer at CSL was considered an exceptional feature (Figs. 5.3c and 5.4c).[115] Therefore, before starting the mechanical excavation, a systematic boring campaign was carried out in October 2008. In cooperation with Jago Birk (Bayreuth University, now Mainz) this dark layer was sampled in order to compare the results of the chemical analysis per boring with the eventually obtained spatial distribution of artefacts and features within the excavation perimeter (cf. Section 5.2.4). In total, we carried out 75 borings (Fr., *tarrières*) using a 7 cm screw-tap Edelman core going at a maximum depth of 80 cm in a 10 x 10 m grid. A soil sample was collected (N=600) at every 10 cm. Two pits measuring 1 x1 m (Reference pits 2 and 3) were dug within the perimeter of the excavation in order to obtain a detailed geological section whereas a single reference pit (Pit 1) was dug to the north of the excavation on the same levee opposite of the leftbank of the Crique Balaté (Fig. 5.2). A complementary pedestrian survey as well as additional borings over the entire Saint-Louis terrace, in combination with the additional data from other mechanical surveys located to the north and east of the CSL site (van den Bel 2008b; Mestre 2008), allowed us to conclude that this site extends at least over 12 ha and that our excavation pit only covers *c.*3% of that estimated surface.

115 When discussing dark earths (Br., *terra preta do índio*), the term Indian Black Earth is prefered here. The reason for this is that it refers to an anthropogenic origin of these soils in Greater Amazonia (voluntary or unvolontary). They constitute patches of black earths with huge carbon and nutrient-rich A-horizons that provide a sustainable land use, amidst intensively weathered, nutrient poor soils in Amazonia, i.e. Oxisols, Ultisols, Acrisols (Glaser et al. 2003:9). *Terra preta* in French Guiana however has different characteristics and is attributed a proper name as is explained in the following Section 5.2.

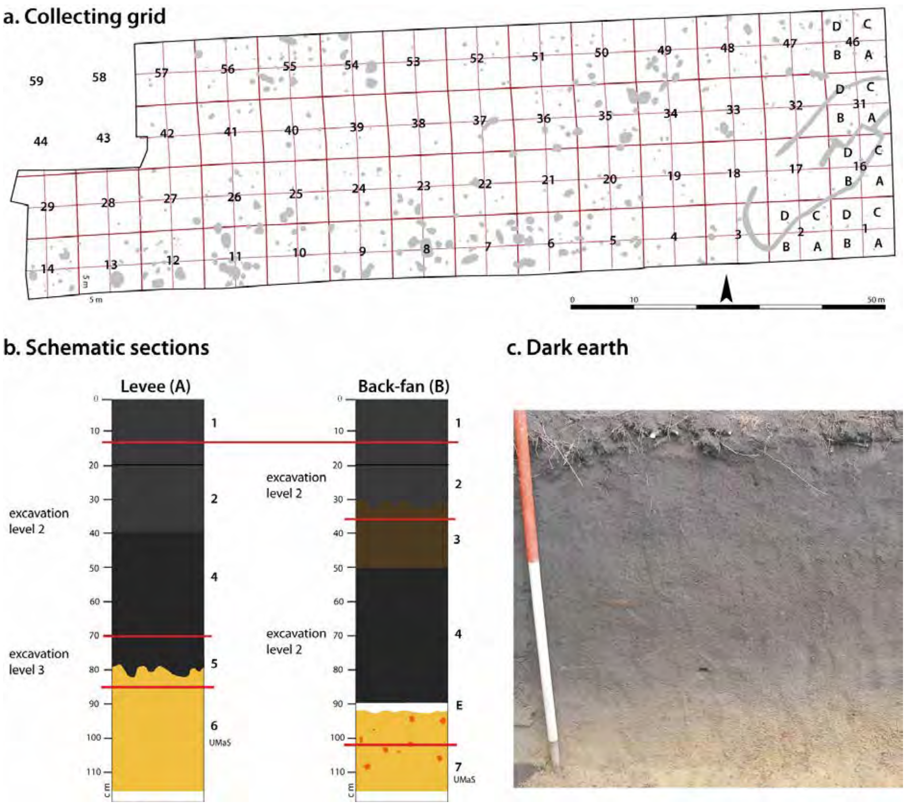


Figure 5.3. (a) A general plan of the collecting grid, (b) schematic sections of Levee and Back-fan with excavation levels Macroscopic Stratigraphic Units (UMaS) and (c) a photograph of the dark earth layer taken during the preliminary survey in Trench 24 in the fan area (after van den Bel 2008a:57).

After this phase, the dark layer was excavated in thin layers by means of a mechanical shovel. Artefacts were handpicked after each pass of the shovel, per Stratigraphic Unit (US) as well as per Sector (S), thus covering four squares measuring 5 x 5 m, called A, B, C and D for one Sector (Fig. 5.3a). Once the material from the upper dark layer had been collected, we began to observe darker-coloured features in the light-brown to yellow subsoil. They represented not only post holes, pits, hearths, but also treefalls, root and animal holes (e.g. armadillo, iguana). These features were excavated manually, photographed, topographed and drawn by the INRAP team. Features such as large pits were cross-sectioned by a means of a 7 tonne mini-shovel in order to check and spot deeper traces of human activity.

It has to be stated here that, when scraping off the dark layer, we noticed many nuances in black, grey and dark brown colours, but very few features could be recognized with a clear outline. In other words, we could observe impressive amounts of artefacts in this dark layer, but no clear features. Time was not on our side, so we continued to collect artefacts in the above mentioned manner. Ultimately, we excavated four strokes measuring 10 m wide and 140 m long. They included 56 Sectors (covering 5108 m^2) and yielded almost 33,000 ceramic and 15,000 lithic artefacts. Sectors 43, 44, 58 and 59 have not been excavated because, prior to our excavation, the constructor had dug a sewer system in this protected area.[116]

116 Such activities are illegal because the excavated part is protected by law. The plot itself often lacks any physical protection whatsoever when awaiting excavation. Nevertheless, such archaeological site destruction is as yet uncommon to French Guiana and the Antilles.

The survey and reference pits had supplied us with a stratigraphic sequence which served to collect the artefacts per Macroscopic Stratigraphic Unit (UMaS).[117] Two sequences were established within the excavated area with regard to: (a) the terrace, representing the higher levee or riverbank and (b) the lower fan area, situated behind the levee. In the latter area, we acquired material in two stratigraphic units, i.e. UMaS 2 and 3 corresponding to the first level of excavation. The material collected from UMaS 3, 4, and 5 was acquired during the second decapage (Fig. 5.3b). The lighter coloured layer UMaS 3 which was rather easy to discern in the field allowed us to separate the archaeological material from the layers UMaS 2 and 4.

On the higher levee, however, this distinctive layer was absent and perhaps mixed with UMaS 1. We therefore collected the material of both UMaS 2 and 4 during the same decapage, whereby material from varied occupations was doubtlessly mixed. Furthermore, a particular tempered and fired kind of ceramics, found at the base of UMaS 5, allowed us to distinguish a third level which was only recognized at the higher part of the levee, i.e. Sectors 54 and 55. The material encountered in the first layer, or modern surface (UMaS 1), was not collected due to recent disturbance and pollution.

Soil samples served: (a) the phytolith analysis (Pascal Verdin, INRAP), (b) the chemical analysis (Jago Birk, Bayreuth) or (c) other possible (future) analysis. These soil samples as well as charcoal samples for radiocarbon dating were mainly acquired from features.

In January 2009, at the end of the excavation, two INRAP geomorphologists (Christophe Jorda and Laurent Bruxelles) accompanied by two micro-morphologists from the INRAP and the AgroParisTech (Julia Wattez and Cécilia Cammas respectively) visited the site in order to discuss the geomorphological composition of the site. The latter two also extracted thin-section samples from the northern and southern wall (Sections 1 and 2) for a future analysis. Furthermore, three geological sections were described and photographed (Sections North 1 and 2 and South 1) as well as the hypothetical reconstruction of a geological cross-section of the site, based on borings and a description of the South Section (Sectors 1 to 14).

Last but not least, ceramic fragments (griddles and ceramic sherds with carbonized matter) as well as matter scratched from the pores of grinding stones were sent to Puerto Rico regarding a starch grain analysis. Here Jaime Pagán Jiménez (EK Consultadores/University of Leiden), sought to answer questions on the kind of starchy plants consumed or used at this site.

5.2 The geological context

As described in the geological outline (cf. Section 2.3), the Maroni delta consists of various marine and fluvial deposits (Fig. 2.3). As is to be expected, the archaeological site of Chemin Saint-Louis is situated on a riverine deposit: a slightly elevated river terrace representing the final fossilized riverbed of the Maroni River. This terrace stretches roughly from the Amerindian village of Terre Rouge in the south to the regional capital Saint-Laurent du Maroni in the north

117 A difference is made between the stratigraphic unites when (a) distinguished by means of the naked eye or in a macroscopical manner (UMaS) and (b) distinguished by means of microscopical analysis (UMiS), as the thin section-reseach defines (cf. Section 5.4).

and forms a long strech of land situated along the present Maroni River and occupied by various Kali'na and Lokono villages (Kambel and de Jong 2006; Armanville 2010). Near La Pointe de Balaté, where the mouth of Crique Balaté dissects the terrace, another LCA site has been discovered (van den Bel 2008b).

A similar geological situation (de Boer 1972:126, fig. 47) is recorded with regard to the left bank of the Maroni River. Here another river terrace of approximately the same length is located between the villages of Bigiston in the south and Ewarte in the north. It also includes Amerindian settlements (Kambel and de Jong 2006). Previous geological research in Suriname indicates that the youngest fossilized phase (Terrace IV) of the Maroni River must be dated between 10,000 and 6000 BP (de Boer 1972:19; Palvadeau 1999:174) (Fig. 5.4a). Once the Maroni had abandoned this streambed, sediment was deposited only by means of flooding during high tides. This resulted in the formation of a natural levee which the first prehistoric Amerindians inhabited just after 4500 BP, when taking into account the earliest radiocarbon dates available as to CSL. The riverbank represents an alluvial levee, separating the riverbed and the alluvial plains or back-fan. An accumulation of sediment during high tides forms the natural levee, corresponding to a natural phenomenon in delta areas. A cross-section reveals the dissymmetrical shape of this terrace: a higher but eroded steep edge next to the present river in the west and a slightly sloping part towards the interior in the east (Fig. 5.4b).

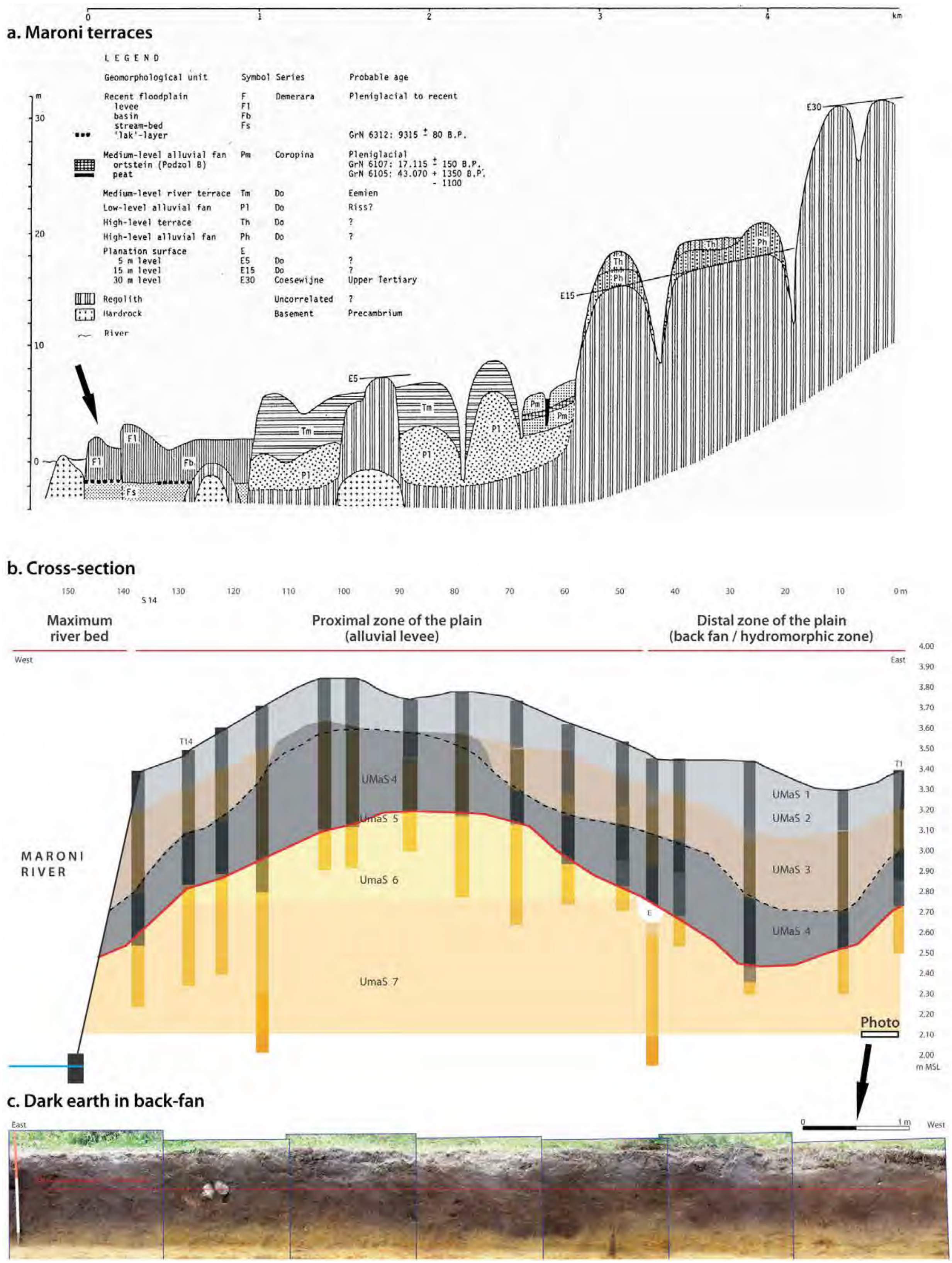
5.2.1 The geomorphology

In order to assess the origins and evolution of the river terrace as to CSL, a description of the stratigraphic sequence of the levee (Section A) and the hydromorphic back-fan area (Section B) is provided here (Fig. 5.3b).

The upper part or surface layer is represented by means of *c.*20 cm of greyish brown sand. This first and disturbed layer, which is wholly destructured, contains pottery and charcoal (UMaS 2). Below this layer, we observed a dark brown homogeneous sand layer measuring between 30 and 40 cm containing ceramics and charcoal (UMaS 3). After a transition zone, measuring *c.*10 cm, we came across a rather heterogenous dark grey to black sand layer containing pottery, charcoal and quartz fragments (UMaS 4). Between a depth of 70 and 80 cm, a sandy homogeneous ocre coloured formation is reached. It is quite compact because it contains an important clayey fraction (UMaS 6).

These two sections are similar –notwithstanding the absence of UMaS 3 as to Section A. However, both have a different morphological formation at its base which is of particular interest. At the levee, we observed a transition layer (UMaS 5) located between UMaS 4 and 6 whereas, regarding the hydromorphic zone, a more abrupt transition is visible. Here, we also identified patches of white fine sand (E) measuring only several cms thick which corresponded to zones of bioturbation, notably at the interface of these white sand patches and the subsoil just below it. The latter subsoil (UMaS 6) consisted of a thick formation of clayey sand of an ocre orange colour. It was not only marked by means of brown patches linked to bioturbation, but also by orange patches containing iron (Fe) nodules (Fig. 5.4b).

Figure 5.4. (opposite page) (a) A general plan of the collecting grid, (b) schematic sections of Levee and Back-fan with excavation levels Macroscopic Stratigraphic Units (UMaS) and (c) a photograph of the dark earth layer taken during the preliminary survey in Trench 24 in the fan area (after van den Bel 2008a:57).



a. Maroni terraces
LEGEND
Geomorphological unit / Symbol / Series / Probable age
Recent floodplain / F / Demerara / Pleniglacial to recent
levee / Fl
basin / Fb
stream-bed / Fs
'lak'-layer / GrN 6312: 9315 ± 80 B.P.
Medium-level alluvial fan / Pm / Coropina / Pleniglacial
ortstein (Podzol B) / GrN 6107: 17.115 ± 150 B.P.
peat / GrN 6105: 43.070 + 1350 B.P. - 1100
Medium-level river terrace / Tm / Do / Eemien
Low-level alluvial fan / Pl / Do / Riss?
High-level terrace / Th / Do / ?
High-level alluvial fan / Ph / Do / ?
Planation surface / E
5 m level / E5 / Do / ?
15 m level / E15 / Do / ?
30 m level / E30 / Coesewijne / Upper Tertiary
Regolith / Uncorrelated / ?
Hardrock / Basement / Precambrium
River
b. Cross-section
Maximum river bed
Proximal zone of the plain (alluvial levee)
Distal zone of the plain (back fan / hydromorphic zone)
West
East
MARONI RIVER
UMaS 1
UMaS 2
UMaS 3
UMaS 4
UMaS 5
UmaS 6
UmaS 7
Photo
m MSL
c. Dark earth in back-fan
East
West

With regard to both sections the following interpretation is proposed here. At their bases, the orange-coloured hardened (ripened) clayey sand layer reminds us of a B-Horizon, enriched by means of clay illuviation descending from the upper horizons (UMaS 7). The ocre colour, on occasion even greenish in the lowest parts, is associated with oxydation and reduction (iron elements), reflecting a temporarily hydromorphic zone influenced by means of water levels. This B-horizon can also be considered a pseudo-gley (Btg), which slowly transforms into a leached horizon in the upper part of the profile. In this case, the transition between the dark grey sand layer and the archaeological material is brutal. We observe a truncation causing the original upper horizons of this profile to disappear. Possibly one or multiple, more violent high tides of the Maroni River brought about this natural truncation. The upper layers, weakened by the leaching, have been washed away whereas the sturdy B-horizon is as yet present, making place for a new sandy sequence on top of it. This new sequence consists of the accumulation of overwash caused by the Maroni River as well as by (human) activities at the levee, resulting in colluviation towards the back-fan. In this manner, the natural depressions surrounding the site were filled with sediment.

The dark grey layer containing archaeological material and charcoal (UMaS 4) at the base of this new sequence therefore corresponds with: (a) the presence of people, (b) the start of an accumulation of artefacts and erosion and (c) the formation of a dark earth layer or *terra preta*. Artefacts were found directly upon the orange basement after the truncation of the original (now disappeared) profile. These depositions, reflecting the site's occupation, are as yet influenced by means of the water level and overwash. Further accumulation, represented by means of the dark brown sands, eventually seals it (UMaS 3). Recent occupation or ploughing has disturbed the upper part of this layer implying we do not know exactly when this accumulation ceased.

The white sand patches in the back-fan area located between the *terra preta* (A-horizon) and the B-horizon represent leached sand pockets. This process is indeed comparable to a podzol. It is however very local as we find it only in a specific zone across the excavation. In contrast to the permeable dark layers, the yellow orange soils cannot be infiltrated and block the draining of this area. Hence, a lateral water circulation is favoured at this interface exporting fine fraction as well as various solubles elements. Certain iron elements have been redeposited in the upper parts of the clayey basement, whereby this level was hardened with iron nodules. Although this lateral leaching occurs in the entire site, it has only been materialised by means of white sand patches in the site's most hydromorphic part. Furthermore, it is highly plausible that anthropogenic features (e.g. post holes, pits, burials) which reached the orange hardened soil may have played an active role in the amplification of the podzolisation.

Before continuing with the results of the chemical and micromorphological analysis and thus completing this chapter on geology, a brief introduction in the history of *terra preta* research is provided. In fact, before starting the CSL excavations we wondered if the chemical components of dark earth sites in French Guiana (or the Guianas in general) would share any cultural origins or characteristics, i.e. chemical signatures, with the Amazonian Basin where *terra preta* research has advanced rapidly during the last two decades (Glaser et al. 2004; Kern et al. 2004).

5.2.2 Terra preta *in the Guianas?*

Terra preta *in Suriname and French Guiana*

Although researchers and explorers in Amazonia have reported the high fertility of dark earths since the second half of the 19th century, it is probably Wim Sombroek's 1966 publication that summons researchers in Suriname to look for *terra preta* on the Atlantic side of the Guianas instead of in the Amazon Basin where Sombroek carried out his research.[118] He proposes *terra preta* to be the result of kitchen middens containing leaves, bones, dung, pottery, etc., left behind in and around Amerindian villages whereas the so-called *terra mulata* is found only at sites with an extended agricultural history (Sombroek et al. 2002).

Albeit that Sombroek (1966:248–259) dedicates only a small part of his thesis to the traits of 'Soils under Influence of Man,' it is very clear to him as well as it is to other archaeologists at work in the same region (Nimuendaju 1949; P. Hilbert 1955, Meggers and Evans 1957; Smith 1980; Simões 1982) that dark earth sites are not only places of former indigenous settlements but also that these sites were formed by means of human occupation. Other scholars (Woods and McCann 1999; Glaser et al. 2004) stress the intentional enrichment of the soil by pre-Columbians in order to allow intensive semi-permanent agriculture, instead of an accidental enhancement of the soil. The exact processes concerning the manner in which dark earths are formed, is still disputed. In the meantime, Sombroek also developed the view that "new" black earth, or *terra preta nova*, as he called it, was created in order to practise an intensive sustainable agriculture in Amazonia (Sombroek et al. 2002, 2003).[119]

Researchers in Suriname and French Guiana have identified dark earths during numerous fieldtrips (Frans Bubberman, personal communication, 2008). In fact, Geijskes had analysed soil samples from archaeological sites in the Commewijne District not only stating that 'the phosphate content is high' but also considering it an 'enrichment of the soil with the remains of human inhabitants of the site' (Geijskes 1961b:121).

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118 For further information on the history of *terra preta* in Amazonia, see Balée (2010).

119 When the Terra Preta Nova Project was conceived, the EPRIDA Corporation was founded in the U.S.A (www.eprida.com). Its founder, Danny Day, had collaborated with laboratories of the U.S. Department of Energy in order to develop a process through which biomass could serve to produce hydrogen fuel. Day had discovered that charcoal produced by means of this same process could also serve an agricultural amendment following the Amazonian Dark Earth model. Next, he filed a patent for his process of producing hydrogen fuel and charcoal fertilizer, which became known as "bio-char" (Kawa and Caycedo 2008).

The Dutch geologist M. de Boer (1972) was the first to mention that dark earths were anthropogenic soils. In support of his thesis he had carried out geological research in the Maroni Basin at the end of the 1960s.[120] De Boer and Sombroek had both studied at the University of Wageningen (The Netherlands) under the supervision of Dr. P. Buringh. It is thus highly possible that de Boer also included an analysis of its composition, cation-exchange capacity (CEC), and fine matter with regard to Suriname, hereby following Sombroek (de Boer 1972:101–106, 125). De Boer remarks that 'patches of Terra Preta also occur in the Marowijne area, on both well and imperfectly drained soils of the E5 planation surface and the Tm river terrace. They are usually located near navigable waterways. The influence of human occupation on Terra Preta can best be studied by comparing it with a nearby non-enriched soil. For this purpose, data on two Terra Preta and two reference sections were collected' (de Boer 1972:101). The archaeological sites with their numerous artefacts were named K4, if located at the Upper Litani River, and T3 if on the Tapanahony River. These sites revealed high phosphorus amounts and a lower CEC value when compared with Amazonia. De Boer reports that the *terra preta* he studied differed from the non-enriched soils. However, he also concluded that the A-horizons 'do not satisfy the requirements of the anthropic epipedon' because the base saturation is too low (de Boer 1972:103).[121]

Van der Heyde (1973) carried out further chemical analysis at Hertenrits during the early 1970s. A phosphorus and calcium analysis consisting of 15 samples, taken from the centre of the artificial mound, confirmed the presence of a first occupation at the base of the man-made mound (D., *terp*). This surface level was followed by a second phase represented by a rapid mound construction in various layers. The following surface level showed very high values implying an activity level linked to human occupation, according to van der Heide (1973:36–40).

In May 1977, only two months after Versteeg's test pit excavations at Kaurikreek, a team of geologists visited this large archaeological site (250 x 120 m) located on a low Pleistocene elevation of a fossilised riverbed at a distance of *c.*10 km from the Courantyne River close to the Precambrian Shield (Versteeg 1978). As

120 Geological reports presented prior to Sombroek's 1966 publication do not mention *terra preta* in the Guianas despite the fact that geologists have been working on pre-Columbian sites. For example, R. Brinkman and L. Pons (1968:33) who had been active in Suriname for the *Netherlands Soil Survey Institute* (STIBOKA) at the archaeological site of Hertenrits, do not apply this term *terra preta* nor do they refer to Sombroek's earlier publication. M. Boyé (1963), when carrying out his survey on the Lower Mana and Maroni Rivers, visited numerous "islands" located in this large swamp region. Having spent time on the important Amerindian site of Crique Jacques, he does not mention any black earth or artefacts. Boyé dug a test pit at Couachi (Lower Mana River), another significant Amerindian site at the Lower Mana River. It featured a black A-Horizon measuring c.50 cm, which perhaps represents a *terra preta* (1963:80, Table 7). For the archaeological site at Couachi (Mana), see the results of the survey conducted by S. Kayamaré accompanied by the present author (Kayamaré 1997).

121 An epipedon is a horizon that forms at or near the surface in which most of its structure has been destroyed. It is darkened by organic matter or shows evidence of eluviation (or both). The so-called "plaggen epipedon" is a human-made surface layer of 50 cm or more thick produced by long-continued manuring (Key to soil Taxonomy 2010) during medieval times in northwestern Europe which contributed to Sombroek's concept of *terra preta*. During his pedological fieldwork in September 1969 upon the Upper Litani River, de Boer was accompanied by seven Djukas and a Wayana. In order to look for the Wama or Akurio 'Stone Age Indians' (de Boer 1970:250–252), he utilised the basecamp built by Ivan Schoen and Claude Leavitt, both American missionaries attached to the *Surinam Interior Fellowship*. Here de Boer met the Frenchman André Cognat who was once again searching for Akurio Amerindians, or so-called "Longues Oreilles," as he explained to de Boer (Cognat 1967:110–149).

does CSL, Kauri Kreek featured a sloping effect towards a back-fan. It not only contained a larger number of artefacts in the area surrounding the summit, but also multiple occupations. Samples were taken from all five test pits (four pits on the site and one reference pit on the same hillock 'without artefacts') in order to carry out granulometric and chemical analysis, i.e. carbon content, carbon total and available phosphorus content. It revealed much higher values as to the site of which the 'high phosphorus contents are a common feature of "terra preta" soils,' hereby drawing on the results of Sombroek and de Boer (Versteeg 1978:20).

The Wonotobo Falls, another ECA site along the Courantyne River, also yielded a dark-coloured occupation layer measuring 85 cm deep and speckled with potsherds (Boomert 1983:98).[122] Although no chemical analysis was carried out, these sites represent probably important archaeological dark earth sites located at major fossilized riverbeds in the Guianas, such as along the Courantyne and Maroni Rivers. Interestingly the thickness of a *terra preta* layer is thought to depend on the occupation span. However, as Woods and McCann (1999) have indicated with regard to the site's geological context: the thickest *terra preta* layers are found in alluvial and aeolian (sandy) deposits, thus providing river banks and terraces with excellent opportunities of developing *terra preta*. According to Boomert (1993:200), 'all sites of the Barbakoeba complex are *terra pretas* in the Amazonian sense, consisting of an uninterrupted habitation layer of black earth which measures some 30 to 40 cm in thickness at the Wane Creek and Barbakoeba Creek-2 sites.' This LCA complex is found mainly on the Late Holocene sand ridges of eastern Suriname and western French Guiana (Boomert 1993).

Concerning French Guiana, Rostain (1994a:19–20) simply repeats Boomert's and de Boer's statement concerning the presence of *terra preta* in coastal French Guiana. Several years later, the archaeologists of the BPS project dedicate Section 2.3 to the presence of *terra preta* at the archaeological sites of the Sinnamary River (Vacher et al. 1998:52–55). Based on Dirse Kern's (1996) work in Caxiuanã (Pará), the team agrees with the latter that 'the presence of terra preta is solely a consequence of anthropisation' (Vacher et al. 1998:53).[123] Although they did not carry out any chemical analysis, they asked pertinent questions concerning the colour-sequence of the geological profiles recorded at various sites, notably with regard to BPS 13 and BPS 172. Firstly, they pointed out that a dark layer (Couche 2b), containing multiple artefacts is often sealed by means of a less dark layer (Couche 2a), that usually includes less artefacts (Vacher et al. 1998:90, Fig. D). Secondly, they asked if 'terra preta is an archaeological level' and pointed out that this *terra preta* layer would probably be the result of a post-occupational re-deposition of this layer by means of leaching and lateral diffusion (Vacher et al. 1998:54). It was concluded that *terra preta* is an artefact as much as features are, although a stratigraphic connection is not always visible. Recently, members of the Berbice Project documented important *terra preta* sites on islands in the savannah

122 According to Boomert, one test pit dug by Geijskes in 1962 yielded archaeological material up to a depth of 135 cm! The latter dug in total 22 pits measuring 1 x 1 m., spaced every 20 m, in two axes in order to create a cross at the centre of the site. Geijskes obtained almost 162 kg of ceramic as well as some lithic material. After Geijskes retirement in 1965, these finds were stored in the Suriname museum where they got mixed up unfortunately. Thus, in order to check the stratigraphy of this site, Boomert dug two 2 x 1 m pits, controlled in 10 cm levels, at the site's heart in January 1975 (Boomert 1983).

123 'Nous nous inscrivons donc dans le courant qui voit dans la présence de la terra preta uniquement une conséquence de l'anthropisation, au même titre que notre collègue brésilienne D. C. Kern.'

region of the Canje and Berbice Rivers. It yielded ceramics and radiocarbon dates going back as far as 5000 BP (Whitehead et al. 2010).[124]

Terra preta *in Amazonia*

During the second half of the 20th century, huge archaeological *terra preta* sites have been discovered along the Middle Amazon River and its affluents. Researchers from Brazil, Germany, Colombia and the U.S.A. have presented a historic analogy not only between the Amerindian villages as described by the first Spaniards and Portuguese who explored the Amazon River from 1541 on (Carvajal 1899; Acuña 1698; Betendorf 1910), but also between the large archaeological *terra preta* sites revealing earthworks currently visible in the Amazonian landscape (Nimuendaju 1949; P. Hilbert 1968; Myers 1973; Smith 1980). In fact, historians felt a need to revise the documents dating from the 16th and 17th century which dealt with Greater Amazonia which were seen as highly ambiguous by many scholars. Moreover, combined with the archaeological data, historians established consensus that 'during the thousand years that preceeded European occupation, several Amazonian populations reached a more complex degree of social development than the one observed by ethnographers since the nineteenth century' (Porro 1994:80). This quote demonstrates too that the debate on complex societies in Amazonia (and the Antilles), notably the presence of chiefdoms, was awarded a more permanent place within the archaeological debate (Carneiro 1981, 1998; Roosevelt 1987, 1991, 1993; Curet 1992; Drennan 1995; Whitehead 1994, 1998). Ethnobotanists such as William Balée forwarded yet another spur in favour of a complex Amerindian society and against the "limiting factors" of the Amazonian environment. It was now opined that 'at least 11.8% of the *terra firme* forest in the Brazilian Amazon alone is of cultural origin. As such, one can logically argue that modern indigenous peoples who depend on, manage, and use the resources of anthropogenic forests display an adaptive orientation toward past Amazonian cultures, not merely towards Amazonian nature' (Balée 1989:2).

The *Central Amazonian Project* (CAP), a combination of North American and Brazilian researchers, started excavations at large sites located in the *varzéa* and on bluffs of the Middle Amazon River. They aimed at improving our understanding of the social-political organisation of the pre-Columbian populations residing in this region (Heckenberger et al. 1999). The CAP members concluded that *terra preta* within the area of study (Manaus and surroundings) was the result of a transformed natural soil due to human activity. In addition, these sites had (continuously) been occupied between 500 BC and AD 1500 (Neves 1999; Petersen et al. 2001). Their ceramic series were attributed to the Incised-Rim and Polychrome Tradition of the Middle and Lower Amazon River (Machado 2005; Moraes 2006; Neves 2008; Lima 2008).

At present, the studies on *terra preta* focus on the precise reasons why it is so fertile and what created the chemical soil-signature (Arroyo-Kalin 2014) (Fig. 5.5). According to the principal chemical values (N, P, K, Ca, Mg, pH), the fertility of dark earths is highly related to: (a) human excrement, (b) accumulation of domestic

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124 These first conclusions are based on 1 x 1 m test pits. Further research is required in order to compare the dates with the ceramics. Due to the unexpected demise of the project leader Neil Whitehead in 2012, Michael Heckenberger continues this research (Michael Heckenberger, personal communication, 2013).

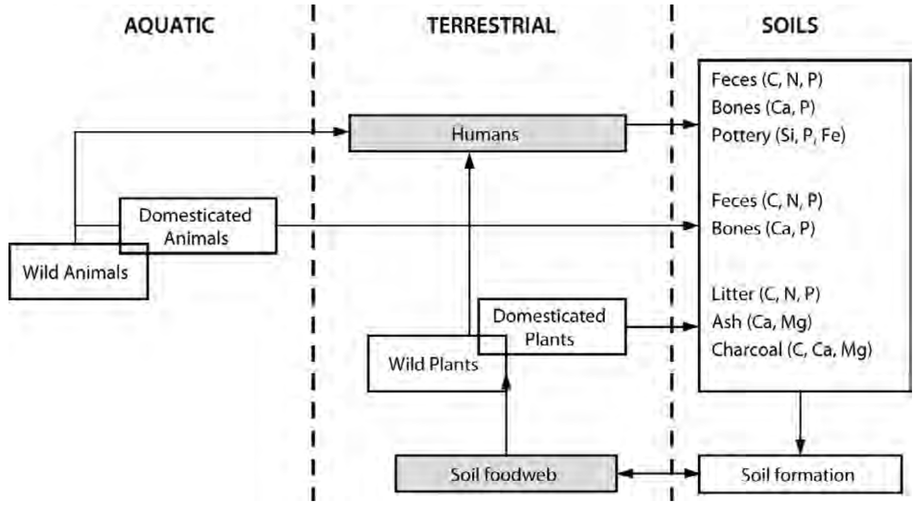


Figure 5.5. The inputs in terra pretas presenting humans and the soil food web as drivers of terra preta formation. The major elements required for for terra preta in order to function are also indicated. The animal food is assigned to only an aquatic provenance. All vegetable inputs are assigned to a terrestrial provenance (Sponsel 1986). If terra pretas as graveyards also constitutes a source of human-derived calcium phosphate (bones) requires further investigation (after http://www.terrapretaprogram.org/origin.aspx, consulted May 2012).

garbage and (c) food remains (Zech et al. 1990; Glaser et al. 2004; Glaser 2007). Soil enrichment by means of adding black charcoal is often refered to as slash-and-char and is ethnographically accounted for among many Amerindian groups (Hecht 2003; Silva and Rebellato 2004; Schmidt 2010). It has been suggested 'that the production and manipulation of soil inputs such as charcoal and ash are a common feature of village life in the Amazon basin, whilst archaeological studies show that charcoalrich anthropogenic soils are not exclusive to the Amazon basin' (Arroyo-Kalin 2012:11). This reveals a larger distribution of this practise.

Another important enhancement of the soil is caused by the degradation of organic matter. This occurs especially with certain species of palm leaves with which contemporaneous Amerindian groups tatch their roofs. The higher Zn and Mn levels now modify the original soil signature (Kern et al. 2004). The goal of our chemical and micromorphological analysis is to determine the origins of *terra preta* as well as the various chemical signatures as to CSL in order to gain a better understanding of the human activities at this site.

5.2.3 The micromorphology

Two geological sections were sampled: (a) one from the southern excavation wall (Section 1) and (b) another from the northern wall of the pit (Section 2). Both samples are located in the back-fan zone (see Section B) because this area has the thickest dark earth layer (Fig. 5.7). Cécilia Cammas and Jeanne Brancier have analysed these samples (in van den Bel et al. 2011:51–53; Brancier 2009; Brancier et al. 2014) (cf. Annexe 3.1). A translated and abridged version hereof is presented here.

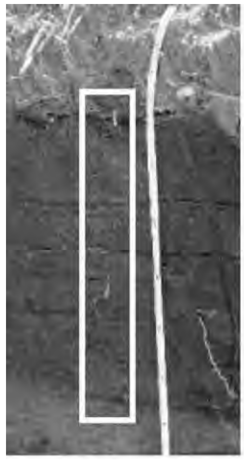
For both sections, the texture of the matrix consists of clayey sand, 60% of which consisted of quartz elements. The largest elements measure up to 2 to 3 mm in size (Annexe 3.1, Table 1). The morphology of these grains is predominantly rounded indicating they have been transported by water (Maroni River). The dark brown fine mass is randomly orientated throughtout the entire section, suggesting a rapid accumulation of these sediments. Numerous inclusions of phyotliths and organic residu, materialised by means of oxydized and carbonized matter, were observed (Annexe 3.1, Table 2). We also came across unorganised aggregations (clusters) within the dark earth micro-stratigraphy. When the latter feature is associated with destructuration activities as well as with "washed channels" it indicates old vegetation surfaces. The horizontal position of quartz elements confirms the presence of these old surfaces which were seen in successive layers, revealing a progressive sedimentation.

The section description

We shall now present a microscopic description from bottom to top of the various Microscopic Stratigraphic Units (UMiS) as observed with regard to the two sections. Of particular interest is the truncation between the A- and B-horizon materialized mainly by means of an explosive augmentation of organic matter and phytoliths (Fig. 5.6).

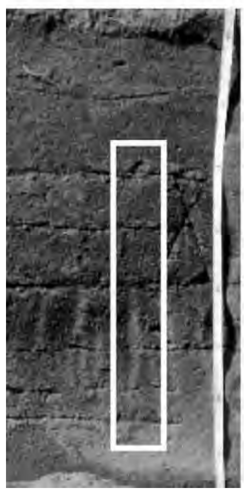
An equally dispersed fine mass, especially around the quartz particles characterizes the yellow orange subsoil (UMiS 8). UMiS 7 contains fragments of composed clay fragments which belong to the subsoil and suggest a brutal mixture of both layers (trampling?). In contrast, the upper limit between UMiS 7 and 6 illustrates a slow transition into a zone with (quasi-) continuous horizontal accumulation. This reveals a much darker colour caused by the higher quantities of a finer fraction. All the space in between the particles is filled with this finer fraction. However, this layer also displays erosive characteristics. The reason for this is that patches of a lighter colour are observed in this layer. This is the result of a smaller quantity of fine fraction caused by lateral leaching, probably due to overwash by means of flooding or erosion during heavy rains. UMiS 6 is a highly micro-stratified layer consisting of multiple layers of various thicknesses. Large quartz particles mark the limit with the upper layer. They are positioned in a horizontal manner and suggest water erosion.

UMiS 5 contains a large quantity of fine matter, mainly concentrated around quartz particles. It also features many phytoliths. Relict channels linked to bioturbation are clearly visible. The transition between UMiS 4 and 5 shows a surface intensively marked by means of water erosion. In fact, small lenses of washed sand and lenses with high concentrations of fine mass display an imbricated pattern. Higher up in this layer we distinguish not only horizons enriched with fine matter (around/between the quartz particles), but also numerous cracks. Phytoliths are abundant. The transition between UMiS 3 and 4 is also marked by means of an old surface. The fine matter within this layer, albeit present in lesser quantities than in the lower layer (UMiS 4), is much more crumbly (aggregations). From this level up to UMiS 2, we come across the presence of larger particles of black charcoal and, in addition to brown organic matter, orange coloured organic matter of a slightly larger size. As to UMiS 2, however, we distinguish an abundant fine mass with a darker colour as well as a cracked structure with several clusters. The charcoal particles include graphite crystals, suggesting carbonisation whereas phytoliths are still in abundance. Here the observation of a melted silicate aggregate (> 600°) indicates the presence of combusted elements. UMiS



Section 1

UMaS	UMiS	Colour	Depth
1	1	7,5YR2,5/3 : very dark brown	0-22
2	2	7,5YR2,5/2 : very dark brown	22-36
2	3	7,5YR2,5/2 : very dark brown	36-45
3	4	7,5YR2,5/2 : very dark brown	45-50
3	5	7,5YR2,5/2 : very dark brown	50-58
4	6	7,5YR2,5/2 : very dark brown	58-68
4	7	7,5YR2,5/2 : very dark brown	68-76
6	8	7,5YR 4/6 : brown	76-100



Section 2

UMaS	UMiS	Colour	Depth
1	1	x	0-20
2	2	10YR2/1 : black	20-30
3	3	10YR2/2 : very dark brown	30-40
3	4	10YR2/2 : very dark brown	40-50
4	5	10YR2/2 : very dark brown	50-60
4	6.1	10YR2/2 : very dark brown	60-70
4	6.2	10YR2/1 : black	70-80
4	6.3	10YR3/6 : dark yellowish brown	80-85
6	7	10YR3/3 : dark brown	85-90

Figure 5.6. The description of Sections 1 and 2, sampled for micromorphological research (photographes by Julia Wattez). See also Brancier et al. (2014:8, Fig. 6).

1 corresponds to the actual superficial horizon and is characterised by means of a darker colour of the fine mass, due to the abundance of organic matter.

In sum, we can distinguish three major phenomena in this dark earth layer. From bottom to top:

a. An organic layer has accumulated rapidly on the the truncated subsoil, followed by a period of stabilisation (transition between UMiS 7 and 6);

b. The upper limits of layers UMiS 5 and 4 mark a more durable period, revealing pedogenesis and stabilisation;

c. The next layers, UMiS 3 and 2, contain more black charcoal, organic residus, and phytoliths, suggesting a stabilized activity surface.

The succession of surfaces in fine layers (Fr., *littage*) in combination with very large quantities of black charcoal, ceramics and phytoliths, suggest that this dark earth corresponds with an accumulated anthropogenic soil (Fr., *anthrosol cumulique*). In fact, the formation and anthropisation processes of the fine matter ressemble the dark earths found at medieval urban centres in Western Europe (Cammas 2004; Wattez and Cammas 2009). The origins of this accumulation can best be explained by means of human activities on the higher parts of the terrace (levee), combined with the weathering and flooding of the surface on the site. The lower back-fan area represents a zone where "run-off" and overwash material, i.e. sand, charcoal, ceramics, etc., deposited from the higher levee. It also represents a possible garbage area of any matter, but notably of organic matter (phytoliths). This organic fraction (residus and fine matter) is again very well intermingled with the mineral fraction, mainly by means of bioturbation, suggesting soil formation on site. The dark earth stratification represents a rather regular sedimentation of micro-layers, now and again marking old surfaces, notably in UMiS 4 and 5. Their preservation indicates they must have been covered quite rapidly, such as during the rainy season and flooding.

The chemical analysis

AgroParisTech realised a first chemical analysis of all layers of Section 1 as well as of the dark layers (UMiS 2 to 7) of Section 2 (Annexe 3.1, Table 3 and 4). The results are in part outlined here:

a. The surface horizon of Section 1 presents the highest values as to the majority of the elements. As to Section 2 the highest values are obtained between 40 and 50 cm in depth. The lowest values are found in the subsoil (UMiS 8) of Section 1 and 2. All recorded in the lowest horizon, with the except of total phosphorus values;

b. The pH-level, generally speaking, characterises the immediate environment. It is rather acid in all levels, but diminishes when descending in both sections. The lowest value (4.44) corresponds to the surface horizon, followed by a slight increase of the values when going deeper and than diminishes again. The values themselves are similar to ferralitic soils (< 4.5) whereas podzols show the lowest values (< 4) (Duchaufour 1991);

c. The carbon values and organic matter diminish in depth. The organic matter level (correlated to carbon) is significant: at 40 cm deep, Section 2 has a level consisting of organic matter that approaches the surface horizon of Section 1, respectively weighing 12.6 g/kg^{-1} and 15.8 g/kg^{-1};[125]

d. The nitrogen level also diminishes in depth. The C/N correlation varies between 16.4 and 10.7 as to Section 1 and between 17.2 and 13.8 as to Section 2. The levels rise in depth with regard to Section 1 and eventually drop with regard to the subsoil;[126]

e. The CEC values are low, between 1 and 2, and are thus considered non-significant. This low value is probably related to the presence of kaolinite (Duchaufour 1991);

f. The nutricient levels are weak, too. Moreover, we can observe that they do not vary in a regular manner, but switch from one horizon to another. We do notice, however, a tendency towards lower nutricient levels. Nonetheless,

125 In absence of any carbonates, the organic carbon is equivalent to the total carbon (Duchaufour 1991). The limit of 8 gr per 100 gr of carbon serves to separate humic-organic and organic-mineral matter according to Anne and Walkley-Black's methods (Duchaufour 1991). The surface horizon is humic-organic whereas the others are of organic-mineral origin.

126 The C/N values of the surface horizons measure between 9 and 28, and correspond with cultivated soils. When the C/N level rises above 12 a weak mineralisation is reflected (Duchaufour 1991).

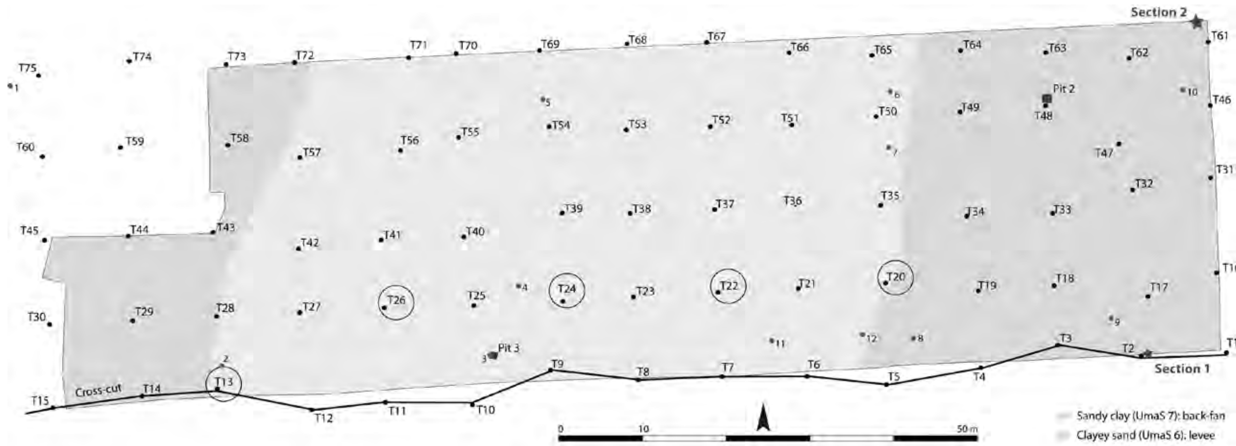


Figure 5.7. The exploration borings with numbers and sampled borings (e.g. T 42). The analysed examples are encircled. The cross-section (cf. Fig. 5.4a) is between T 1 and T 15. Two reference test pits (Pits 2 and 3) as well as the micromorphological Sections 1 and 2 are indicated (photographes by Julia Wattez).

the total number of phosphorus values appears to increase in depth in both sections. It varies in the same manner as the pH-levels but in reverse sense when compared to the CEC values.

The chemical analyis of these dark earth samples enable us to present a first general impression concerning the site of CSL (no other sites in French Guiana are currently available) and the archaeological sites on the Middle Amazon River featuring *Amazonian Dark Earths* (ADE). We can remark that the CSL samples are very acid (between 4 and 5) when compared to the Brazilian *terra preta* that is generally approximately 6 (Glaser et al. 1998; Glaser 2007). This probably reveals the present soil variation despite the fact that the majority of the sites are located on old river terraces. Furthermore, the CEC values from CSL are lower than the Amazonian ones, possibly related to the fact that dissimilar methods of analysis were applied here.

5.2.4 The multi-element analyses

As mentioned in Section 5.1, a systematic augering campaign, totalling 75 borings or profiles (T), was conducted prior to the excavations. Jago Birk (University of Bayreuth) and the present author were able to obtain a large quantity of soil samples as to chemical analysis which the University of Bayreuth carried out (in van den Bel et al. 2006:53–60) (see Annexe 3.2). A reference profile (R1) was sampled in Pit 1 to the north of the excavation area (cf. Fig. 5.2 for its location). This pit was located at the same terrace as the excavated area, but it differed slightly from the geological profiles in the excavation area (Pits 2 and 3) with regard to texture and stone content. It is therefore possible that this part of the terrace may have a slightly different morphology as it is situated closer to the mouth of Crique Balaté. For this presentation, we have chosen to utilise samples from borings taken at the higher part of the terrace or levee, to wit from east to west T 20, 22, 24, 26 and 13 (Fig. 5.7). Before presenting the results, a short introduction to the study and methods mulit-element analysis is presented. The following section is an abridged version of the Bayreuth report.

Short introduction to methods in element concentrations in archaeological soils

Numerous methods serve to extract elements regarding multi-element mapping. However, no consensus concerning the appropriate technique has been reached yet (Parnell and Terry 2002; Wilson et al. 2006). Total digestions are criticized as it has been opined that the variations of the element concentrations in the parent material would overwhelm the anthropogenic soil modifications (Middleton 2004). A large number of soil science departments cannot carry out this type of analysis because highly hazardous acids are applied in the case of total digestions (hydrofluoric acid). However, extraction of labile pools (e.g. plant available elements, exchangeable elements), would not solve the problems that variations of the parent material cause either. The reason herefor is that they are also strongly influenced by the parent material. Furthermore, they are closely correlated to recent soil properties such as pH.

In the present study, pseudo-total extractions are conducted by means of heating the samples in HNO3 in a microwave oven. Pseudo-total extractions elements in tectosilicates and crystalline concretions are not (only partly) extracted. This analysis often serves to measure the contamination of soils with trace elements added by human beings. The elements in geogenic tectosilicates are not of any interest now. In addition, it is assumed (only recently) that anthropogenic deposited trace elements are completely extracted (Blume et al. 2000ff). Pseudo-total extractions serve to analyse archaeological soils at forehand (Linderholm and Lundberg 1994). In the past, aqua-regia extraction has been applied widely with regard to pseudo-total extractions. Digestions utilising HNO3 in microwave ovens has recently become more common (Jørgensen et al. 2005).

The case of Chemin Saint-Louis

All samples were air-dried until they reached a constant weight and were then assessed by means of a 2 mm screen. Small stones, roots, and plant parts were removed. This fine earth fraction served the analysis of pH (KCl) and VIS-NIRS analyses. However, in order to carry out the analysis of total C and pseudo-total element concentrations, the earth fraction is finely ground in a bead mill.

The pH analysis is measured in KCl according to the method established by the ISRIC (van Reeuwijk 2002). In order to determine the pH values a 1:2.5 (w/v) suspension has been generated. Hereby 5 g of fine earth is weighed in a small PE-bottle to which 12.5 mL of 1M KCl is added. This mixture is placed in a horizontal shaker for two hours. Next, the samples are vigorously shaken by hand. The pH-values were determined by means of a calibrated pH electrode.

The total carbon concentrations are measured by means of dry combustion (Thermo Quest, Flash EA, 1112; Thermo Fisher Scientific Inc., Waltham, MA 02454).

With regard to pseudo-total element concentrations: 100 mg of fine earth is weighed in Teflon extraction tubes (50 ml) to which 5 ml of concentrated HNO3 (65%) and 100 µgl concentrated HCl (37%) is added. These samples were heated at 200 °C in a microwave during 17 minutes. After cooling, deonisized water was added to reach a final volume of 25 ml. The soil particles were allowed to sink. The presence of P, K, Ca, Mg, Ba, Zn, Cu and Na was assessed in the clear extraction solution by means of an inductively coupled plasma optical emission spectrometer (ICP-OES, Varian, Vista-Pro radial, Varian Deutschland GmbH, Darmstadt).

Due to the relatively low number of analysed borings, multivariate statistics would not be meaningful. In addition many multivariate statistics require a higher number of cases. Such statistics were therefore not applied in the present study. Instead, arithmetic means were calculated for each profile. A relative enrichment/depletion was calculated in order to compare the extention of enrichment and depletion of the elements in the soil profiles. The mean of each profile was divided by the mean of all profiles of the excavated area. For each variable the relative variation between the profiles within the excavated area was assessed by calculating the standard deviation of the relative enrichments/depletions of the soil profiles within the excavated area. Spearman's rank correlation coefficients were calculated in order to test for relationships between variables.

The results

The pH values of the soils in the excavated areas are low (Annexe 3.2, Fig. 1), with the exception of the upper 10 cm of profile T 26. These values rise slightly with an increasing soil depth. The upper 10 cm of T 26 have a higher pH value than the other samples in the upper part of the profiles. The reference profile R1 has slightly higher pH values in the topsoil and presents us with a more pronounced increase of the pH values in the subsoil.

The carbon concentrations in all profiles decrease when going deeper (Annexe 3.2, Fig. 1). With regard to R1, these concentrations decrease constantly below a depth of 20 cm. However, this does not apply to the excavation profiles. Certain parts of the profiles with relatively homogeneous carbon concentrations were also encountered below a depth of 20 cm.

The concentrations of P, K, Mg, Zn and Ba are generally enhanced in the lower parts of the excavation profiles in relation to their upper parts (Annexe 3.2, Figs. 2 and 3). We often came across a sharp increase of concentrations of these elements with an increasing depth. However, the depth at which this increase was recorded differed considerably between the profiles. For example, T 24 shows a high variability of K, Mg, and Ba concentrations. Nowhere Cu was found in concentrations above the quantification limit (5 mg/kg). However, Cu tended to have higher concentrations in the lower parts of the profiles when compared with the upper parts. Ca showed maximal concentrations in the upper samples T 26 and T 22. Na was only found in a small number of samples containing concentrations above the quantification limit of 37.5 mg kg-1. The concentrations of P, K, Zn and Ba did not display clear trends according to depth with regard to R1. The highest concentrations of Ca were measured in the middle part of R1. The quantity of Mg grew slightly when the depth increased. Only in a small number of samples did Cu and Na surpass the quantification limit.

Important significant correlations were found regarding K vs. Mg and K vs. Ba. In addition, Mg showed a close and significant correlation with Ba (Annexe 3.2, Fig. 4). The ratios of these elements in R1 were similar to the ratios in the excavation area (R1 data within the point cloud of the data of the excavation area). On the one hand K, Mg and Ba were significantly and relatively closely correlated with P and Zn. On the other hand P and Zn were also significantly and relatively closely correlated. In the reference area, only the ratios of Zn vs. K and

Ba, respectively, were close to the ratios encountered in the excavated area. The ratios of P vs. K, Mg, Zn and Ba respectively as well as those of Zn vs. Mg differed from R1 and the excavated area.

In general, only the mean values of the profiles of P were higher in the excavated area when compared to R1 (Annexe 3.2, Fig. 5). The profiles of the excavated area have mean Zn concentrations. They were similar or enhanced in relation to the mean of R1 whereas the mean values of Ca, K, Mg, and Ba of the excavation profiles are lower than the mean values of R1.

We only came across a significant correlation with regard to the profile means of Mg and Ba (Annexe 3.2, Fig. 6). The ratios of K vs. Mg and Ba, respectively, in the excavated area were comparable to the ratios found in this area. The ratio Ba vs. Mg was slightly higher in R1 than in the excavation profiles. The relative variation of the mean values of the profiles was highest for Ca (Annexe 3.2, Tables 1-2; cf. Table 5.1). The relative variation of the means of the profiles was much lower for P. However, the relative variation of the means of the profiles of P was considerable higher than the relative variations of the other elements which had relatively similar relative variations.

T 13 was relatively enriched in Zn and depleted of Ca when assessed in relation to the other profiles of the excavated area (Annexe 3.2, Fig. 7). The other mean element concentrations were close to the mean of the entire area. T 26 indicates an enrichment of Zn comparable to the enticement of Zn of T 13, but was strongly enriched in Ca. The differences in the mean concentrations of P, K and Ba were considerably lower in magnitude. It was depleted of P and enriched in K and Ba whereas the mean Mg concentrations did not differ from the mean.

T 24 presents the highest enrichment of P, Mg and Ba of all profiles. The enrichment of P was higher than the enrichment of Mg and Ba and the latter was more enriched than Mg. This profile was depleted of Ca and Zn in relation to the mean values of the other profiles, but this depletion was relatively small. The mean K concentrations of T 24 did not differ from the mean of all profiles of the area.

T 22 was enriched in Ca, K and P. However, the difference of P between this profile and the mean of all profiles of the excavated area was relatively small. It was depleted on Zn and Ba and did not provide a mean Mg content which differs from the mean Mg concentrations of all profiles of the excavated area. T 20 had the strongest depletion of all elements in relation to the mean concentrations in the other profiles of the excavation.

Discussion

The higher concentrations of K and Mg in the lower parts of most profiles as well as the close correlations of K, Mg and Ba concentrations in the samples (Ba also occurred in a higher concentration in the deeper parts of the profiles) could be caused by the variaton of clay contents within the soils of the excavated area. Thus, field observations indicate higher clay content in the deeper part of the profiles in comparison with the upper parts.

Minerals built during the weathering of parent material and pedogenesis (clay minerals) have a similar size as clay, but they should be dissolved by means of the pseudo-total extractions. However, pseudo-total extractions have not entirely dissolved geogen minerals or tectosilicates (quartz, feldspars) and can have larger particle sizes. Mg and K are included in the lattice of three-layer clay minerals. Ba is present as a substituted ion in silicates and is associated with clay (Kabata-Pendias and Pendias 2001; Salminen et al. 2005). A dissimilar type of sedimentation may cause such differences. Additional pedogenese may result in variations with regard to clay concentrations (clay migration).

In addition to differences in clay contents, ferralisation during soil formation in the Neotropics also causes a depletion of basic cations and enrichment of two-layer clay minerals (and oxides) vs. three layer clay minerals. The low pH values and the slight increase of the pH values with increasing depth (with the exception of the upper 10 cm of T 26) tally with the explanation of the element concentrations, at least to a certain degree, by means of soil formation processes. The concentrations of K, Mg and Ba in T 24 could hint to a strong disturbance of this profile.

The high Ca concentrations in the upper samples of the T 22 and T 26 do not comply with the explanation that K and Mg concentrations are caused by differences in mineralogy due to pedogenesis. Clay migration as well as ferralisation would not cause such a distribution of Ca concentrations within the soil profiles. However, the presence of carbonates normally causes more neutral pH values in soils. A lack or correlation of Ca and P concentrations in Central Amazonian anthrosols has been discussed without much result. However, a correlation of the Ca concentrations and the C contents has been detected (Lehmann et al. 2003). According to the latter study, Ca could also be associated with organic matter in the excavated area. More C data is required in order to evaluate this possibility. At any rate, we do not know if the correlation of Central Amazonian anthrosols is caused by: (a) the deposition of materials rich in Ca and organic matter or (b) the stabilization of Ca by means of organic matter (Lehmann et al. 2003).

In the field, minor variations of soil texture have been reported concerning the reference Pit R1. However, an increase of the clay content with increasing depth comparable to the excavated area has not been observed within a depth of 0-80 cm or, in other words, a clear depletion in the upper part of the profile. The pH values of R1 are higher whereas the concentrations of K and Mg do not show clay migration or ferralisation. A soil less developed in comparison with the excavated area could therefore cause the absence of a clear depletion in the upper part of the profile. Indeed, weathering and acidification of the surface could cause the more acidic pH values close to the surface and the relatively low Ca concentrations in these samples. Ca is very mobile and during pedogenesis leaches more rapidly than Mg and K. The start of the weathering process of the parent material could be at the origin of the enhanced Ca values (Cross and Schlessinger 1995; Magid et al. 1996; Neufeld 1998). In fact, this was also encountered in anthrosols of the Middle Amazon (Glaser 1999). Thus, the clay contents can partially explain the distribution of P within the profiles. However, the correlation coefficients of P vs. K, Mg and Ba are lower than the correlation coefficients of K, Mg and Ba between each other. We know that an enrichment of P in deeper parts of soil profiles was attested for in anthrosols of Central Amazonia, but also independently from clay contents (Glaser 1999). P is also bound to other soil constituents such as oxides. Moreover, clay content appears not to be the only factor influencing the P concentrations in the excavated area.

Clay minerals rapidly absorb Zn (Salminen et al. 2005). This can explain the correlation of Zn with K, Mg and Ba. On the other hand, it is also strongly bound by means of organic matter and other soil constituents. It is acknowledged that a

T	Depth (cm)	mean depth (cm)	Ba mg/kg	Ca mg/kg	Cu mg/kg	K mg/kg	Mg mg/kg	Na mg/kg	P mg/kg	Zn mg/kg	%C	pH (KCl)
13	0 - 10	5	11,94	45,41	<	261,60	115,25	<	246,79	17,40	0,59	
13	10 - 20	15	16,89	54,15	<	398,12	145,15	<	254,70	19,29	0,64	
13	20 - 30	25	16,11	45,54	5,06	325,98	130,87	<	242,09	19,58	0,54	
13	30 - 40	35	16,12	44,39	7,04	349,70	143,35	<	224,95	23,02	0,42	
13	40 - 50	45	16,22	47,26	7,32	340,69	154,03	<	251,92	27,35	0,44	
13	50 - 60	55	16,95	45,39	6,35	358,19	150,15	<	294,41	27,48	0,36	
13	60 - 70	65	16,51	59,62	8,27	365,55	119,48	<	301,77	20,22	0,18	
13	70 - 80	75	21,07	43,71	7,86	518,17	166,99	38,06	378,19	21,61	0,20	
26	0 - 10	5	16,53	418,7	8,84	293	162	<	256	23,2	1,34	4,45
26	10 - 20	15	12,5	69,7	5,41	253	108	<	232	18,7	0,65	3,9
26	20 - 30	25	17,9	55,0	5,40	387	145	<	206	19,4	0,53	4,1
26	30 - 40	35	20,7	45,9	9,03	461	169	<	258	24,4	0,55	4,2
26	40 - 50	45	17,6	45,0	6,04	388	147	<	265	23,3	0,42	4,3
26	50 - 60	55	20,1	48,6	8,16	436	158	37,5	311	25,6	0,43	4,3
26	60 - 70	65	21,6	129,6	9,00	428	150	<	294	22,8	0,31	4,2
26	70 - 80	75	18,2	50,3	8,23	355	118	<	276	18,6	0,20	
24	0 - 10	5	14,4	79,6	<	275	128	<	236	17,3	0,73	4,1
24	10 - 20	15	25,1	77,2	7,27	496	264	49,8	261	21,3	0,85	4,1
24	20 - 30	25	15,0	55,1	5,97	300	136	<	203	15,4	0,52	4,1
24	30 - 40	35	11,7	36,9	5,60	195	105	<	253	15,6	0,51	4,2
24	40 - 50	45	21,4	43,0	5,94	480	169	<	285	18,8	0,42	4,3
24	50 - 60	55	18,8	35,3	5,97	348	150	<	353	18,8	0,37	4,3
24	60 - 70	65	17,2	33,4	5,00	327	134	<	378	16,4	0,30	4,3
24	70 - 80	75	29,4	95,9	7,35	436	173	<	559	22,4	0,32	4,3
22	0 - 10	5	10,75	333,2	4,66	211	111	127,5	195	12,7	1,31	
22	10 - 20	15	9,5	110,1	7,13	223	102	<	223	12,1	1,20	
22	20 - 30	25	13,7	54,0	5,29	321	129	<	223	13,9	1,20	
22	30 - 40	35	15,6	44,5	6,42	374	127	<	212	14,0	0,71	
22	40 - 50	45	15,8	42,4	7,19	344	145	<	297	17,3	0,51	
22	50 - 60	55	24,7	64,9	6,26	609	205	52,1	392	22,0	0,48	
22	60 - 70	65	20,1	37,5	7,92	468	164	<	370	17,6	0,34	
22	70 - 80	75	19,9	36,4	7,91	472	158	<	361	17,2	0,26	
20	0 - 10	5	7,9	33,4	<	144	79	<	162	10,9	0,71	
20	10 - 20	15	11,2	33,3	<	220	105	<	180	12,2	0,72	
20	20 - 30	25	13,9	42,3	<	294	143	<	208	16,0	0,68	
20	30 - 40	35	15,0	35,1	7,53	300	131	<	227	15,2	0,45	
20	40 - 50	45	14,8	39,3	8,00	318	119	<	230	14,6	0,32	
20	50 - 60	55	14,9	41,0	6,37	296	123	<	258	16,4	0,22	
20	60 - 70	65	13,8	35,9	9,60	262	116	<	334	16,0	0,33	
20	70 - 80	75	28,9	66,9	7,83	686	204	48,4	417	19,1	0,31	
R1	0 - 10	5	20,4	244,8	5,56	450	211	53,9	98,2	16,2	0,7	4,2
R1	10 - 20	15	21,8	318,7	<	385	196	<	101	15,5	0,7	4,4
R1	20 - 30	25	22,9	418,3	<	514	203	53,1	100	16,2	0,6	4,8
R1	30 - 40	35	23,1	342,1	<	503	193	42,0	102	14,9	0,5	4,9
R1	40 - 50	45	22,7	488,0	<	550	206	43,0	102	16,5	0,4	5,0
R1	50 - 60	55	17,1	288,3	<	390	182	<	100	14,6	0,3	5,1
R1	60 - 70	65	17,6	299,8	<	406	173	<	96,5	14,3	0,2	5,1
R1	70 - 80	75	19,4	246,8	5,16	477	181	<	93,4	15,1	0,2	5,1

Table 5.1. The mean element concentrations measured in the profiles and reference pit (R1).

more uniform distribution of the Zn concentrations throughout the profile are in conformance with observations in other soils (Kabata-Pendias and Pendias 2001; Salminen et al. 2005). According to the latter authors, the same processes can also explain the distribution of copper in the profiles which did not reveal any clear dissimilarity between the profiles.

Na was measured in order to analyse the possible element enrichment due to sea water. However, the very scattered occurrence of Na concentrations above the quantification limit in the soil profiles did not indicate that sea water flooding or higher ground water levels could cause differences in Na concentrations, despite the fact that this part of the Lower Maroni River is under tidal influence. Independent of the dissimilarities in the distribution of C contents in the profiles of the excavation and R1, the variations between the distribution of P, K, Mg, Zn, Cu, and Na concentrations and carbon concentrations indicated that the amounts of organic matter in the profiles were not the determining factor that explained the concentrations of these elements. Due to the influence of differences in clay contents between the profiles and/or the influence of pedogenesis on the distribution of the element concentrations in the profiles, mean element concentrations of each profile could provide more significant information on human soil information than element concentrations in single samples, especially if the element distribution in the profiles have been influenced by post-depositional soil processes.

The minor dissimilarities between the ratios of the mean element concentrations in R1 and the excavated profiles indicate that the lower mean element concentrations of K, Mg, and Ba in the excavated profiles in relation to R1 are mainly the outcome of varying clay contents. Moreover, differences with regard to the mean concentrations of these elements within the excavated area (e.g. the strong depletion of these elements in T 20), could have resulted from differences of the clay contents rather than from anthropogenic soil modifications. However, T 24 not only displays an enrichment of Mg and Ba, but also no relative enrichment of K. This could thus be caused by factors other than differences in clay contents. The concentrations of K, Mg and Ba were found to be altered by means of organic refuse disposal (Parnell and Terry 2002; Oonk et al. 2009).

The enrichment of the mean P contents of the profiles relation to the mean concentration in R1 as well as the higher mean relative variations of P concentrations in the excavated area in relation to these variations of K, Mg and Ba indicate that the mean concentrations of P in the profiles within the excavated area are not strongly correlated with clay contents and/or differences in mineralogy. Differences in parent material cannot be excluded, but an anthropogenic P enrichment is also possible. Thus, waste deposition could have caused this P enrichment in combination with the enrichment of Mg and Ba as to T 24 (Parnell and Terry 2002; Oonk et al. 2009), as the micromorphological research witnessed (cf. Section 5.2.3).

The distribution of the mean Zn concentrations differs from the distribution of the other elements. Enhanced concentrations of Zn have been associated with the deposition of faeces, but are also accompanied by an enrichment of P (Woods 2003). The enrichment of Ca in T 22 is correlated with a small enrichment of P as to this specific profile. The enrichment of Ca in T 26 is correlated with a small enrichment of Ba. A combined enrichment of P and Ca would be a characteristic of the deposition of bones [hydroxyapatite: Ca10(PO4)6(OH)2]. A combined enrichment of Ca and Ba would be a characteristic of the deposition of mollusc shells (Puchelt 1978). The distribution of the Ca concentrations in the soil profiles as well as the small magnitude of the enrichments of P and Ba within these profiles, however, implies that interpretations ought to be very speculative.

The VIS-NIRS pilot study

The aim of this analysis was to test the applicability of visible and near infra-red spectroscopy (VIS-NIRS) of our soil samples, thereby creating a pilot study as to an archaeological site in French Guiana. VIS-NIRS analyses serve to predict soil properties by means of multivariate statistics drawn from spectral data (Viscarra Rossel et al. 2006). Calibrations with further soil analyses are not required if only the detection of similarities and differences of the soil properties is of interest. VIS-NIRS measurements can be carried out within seconds and portable instruments produce data directly on site. However, in this case, the samples were taken to the laboratory for analyses and preparation. The reflectance was measured by means of a VIS-NIR spectrometer (visible and near infrared; resolution: 1 nm; AgriSpec, ASP 350-2500, DeltaASD Inc., Boulder, Colorado, USA).

The second derivative is calculated on the basis of the relative reflectance data (gap: 25). Next to the relatively low number of samples meant for analysis, multivariate statistics may not suit the analysis of small numbers as statistics serve to analyse the spectral data (see above). Nevertheless, this was carried out in order to form an idea of the applicability of VIS-NIRS analyses in archaeological soils the intending to obtain reliable values.

We also carried out a Principal Component Analysis (PCA). As to the computation of the PCA a small constant was hereby added to the diagonal of the matrix in order to compute the inverse of the matrix. Having determined the number of factors by means of a screen test, four factors were extracted. The factor scores served to calculate a hierarchical cluster analysis, i.e. distance measure: squared Euclidean distance: linkage rule: Ward's method.

The hierarchical cluster analysis of the factor scores was calculated by means of a principal component analysis drawn from the VIS-NIRS data revealed that samples of the same profile often have relatively similar spectral properties (visible and near infrared) in relation to the samples of other profiles (Annexe 3.2, Fig. 8). Although only a small number of samples was analysed, the similarity of relative reflectance (visible and near infrared) often found in samples from the same profile, is in concordance with the hypothesis that VIS-NIRS has a high potential as to exploration of archaeological sites.

5.3 The radiocarbon datings

Twenty-seven charcoal samples and one bone sample, mainly extracted from anthropogenic features (e.g. pits, post holes), were sent to Germany and Poland for an analysis (cf. Appendix 1). Two radiocarbon dates had already been obtained after the mechanical survey, resulting in a total of 30 dates as to CSL.

The probability at 2σ ratios was satisfying regarding all samples with the exception of the charcoal sample collected from F 120 and one taken during the mechanical survey, respectively POZ-30943 and KIA-35513. Two results, both from pit F 56, are fairly spectacular. They yielded two calibrated dates of *c.*28,000 BC –indeed the earliest radio carbon dates linked to French Guiana. Clearly, this date is too early for the Holocene deposits in which this charcoal was found. Christophe Tardy, an anthracologist at the INRAP, pointed out that similar and even earlier dates have been obtained for non-carbonised floating wood in the alluvial deposits of the Rio Negro and Amazon confluence region (Christophe

Tardy, personnal communication 2012). Very early dates have also been retrieved from alluvial deposits in Suriname and Guyana (Vogel and Lerman 1969:365).

The results indicate a pre-Columbian presence covering almost 5000 years as to CSL. It is dated between 3300 BC and AD 1300, ranging from the Early Ceramic to the Late Ceramic Age. According to the radiocarbon dates, this era can be divided into three major occupations phases (Fig. 5.8):

a. Phase 1 regroups all dates between 3300 and 1900 BC. It is split up in a Late Archaic Age occupation (Phase 1a), *c.*3000 BC, and an Early Ceramic phase (Phase 1b), *c.*2400 BC.

   With regard to Phase 1a, we only have radiocarbon dates from undetermined pits (tree falls?). No archaeological material is clearly related to these features (cf. Section 5.6). Phase 1b can be linked to human activity thanks of two charcoal-filled pits (F 42 and F 362) as well as ceramic depositions discovered in more or less circular pits (F 56 and F 140). The dates of F 267 and F 42 are probably the result of ulterior disturbances because the ceramics found in F 267 can be associated to Phase 2 whereas charcoal pit F 42 is similar to F 362, which contains incipient ceramics and has an earlier date. Furthermore, the radiocarbon dates linked to the ceramics of Phase 1b can be compared to the early ceramics of Eva 2 (cf. Table 4.1).

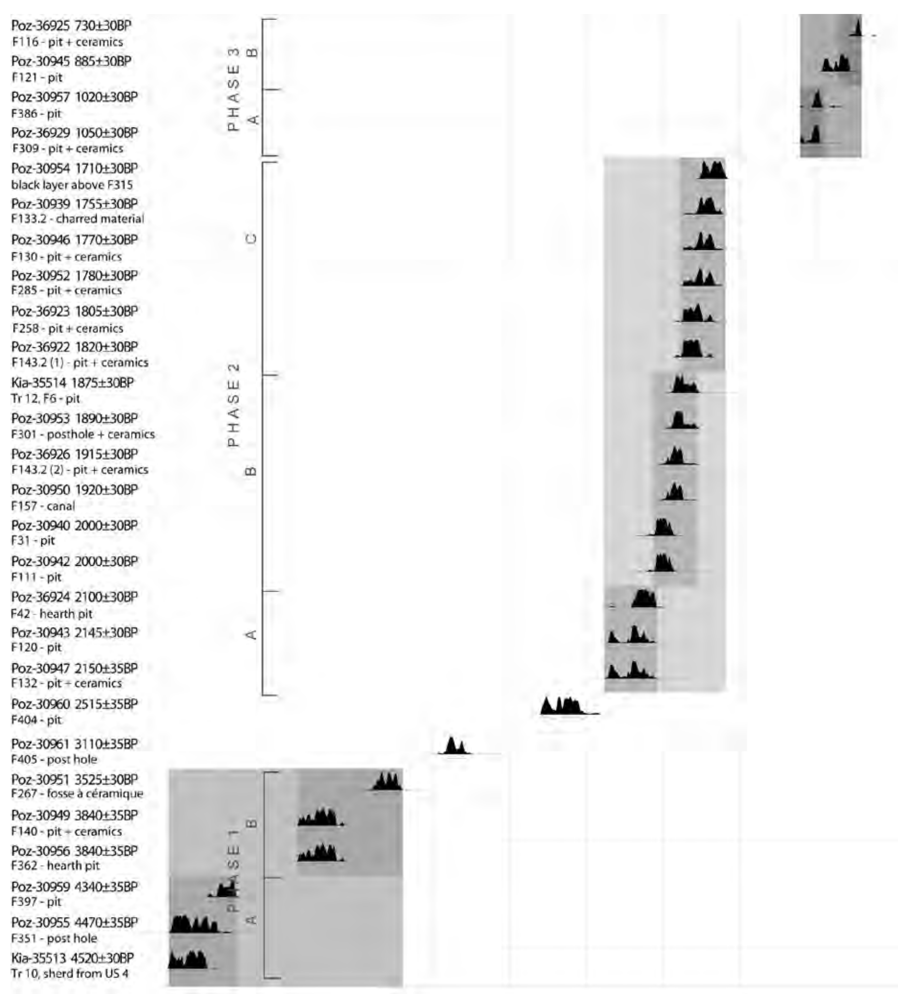


Figure 5.8. The results of the radiocarbon dates. Atmospheric data from Reimer et al. (2004), calibrated at 2σ with OxCalv3.10 Bronk Ramsey (2005).

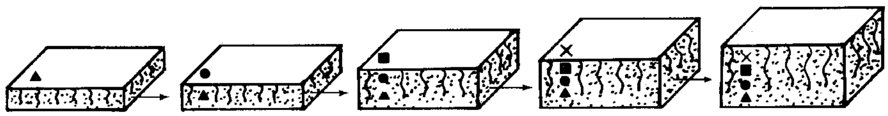


Figure 5.9. The incorporation of artefacts in soils over time (after 'example D' from Waters 1992:94, fig. 2.34).

b. Phase 2 corresponds to a close sequence of 11 radiocarbon dates from between 260 BC and AD 410. This presumably implies an occupation of *c.*700 years. This phase is divided into three subphases. After calibration at 2σ, three closely related sequences were noted: (i) Phase 2a: before Christ, (ii) Phase 2b: between 0 and AD 200 and (iii) Phase 2c: between AD 200 and 400, but with an emphasis on the steady sequence AD. The time span between these phases did yield several radiocarbon dates. However, the features (F 404-5 and F 267) did not contain corresponding archaeological material or any significant chronological clustering. These dates are therefore not attributed to a specific occupation.

b. Phase 3 appears after 500 years of supposed human absence. It has been identified by means of four dates between *c.*AD 1000 and 1300. The date of pit F 309 is erroneous as its ceramics belong to Phase 2, suggesting a later disturbance. This phase is contemporaneous with the LCA occupation of La Pointe de Balaté site, situated on the right bank of Crique Balaté (cf. Appendix 1 and Section 5.5.7). The results of Phase 3 appear to form two pairs of which one pair is situated *c.*1000 BP and the other *c.*750 BP.

We would like to stress the fact that the excavated area represents probably less than 3% of the total site surface. Furthermore, the excavated area lies on the southern slope of the longitudinal levee which stretches along the Maroni River. The central part of the site is possibly located at the highest point of this levee positioned further to the north. The excavated part accounts for multiple occupations, but may reflect various diachronological spatial patterns in comparison with other parts of this multi-compound site.

For example, the first and second occupations are well represented thanks to archaeological artefacts. However, the third occupation is less materialized when considering the excavated part of the site. Perhaps Phase 3 may be more "materialized" with regard to other (non-excavated) parts of the site, such as the northern part of the levee. We therefore consider this final occupation to be less important for the excavated area than the others. The second occupation is very homogeneous when considering the feature types and radiocarbon sequence. It is generally located at the feet of the slope within the excavated area and represents a permanent or consistent habitation site. The earliest occupation, however, is mainly found on the higher levee. It is represented by means of two small feature concentrations, each located around a charcoal hearth pit. The ceramic depositions, currently interpreted as inhumation graves, may stress a more permanent habitation site (cf. Section 5.4).

The synthesis of the site context

The data drawn from the micro- and macro morphology in combination with the radiocarbon dates enables us to sketch an initial history of sedimentation, erosion, and human occupation at the CSL site. Apparently these phenomena often go hand in hand.

Once the Maroni River started to cut into its streambed towards 6000 BP, it still flooded the old river bed and created levees and flood plains. It is suspected that prehistoric Amerindians first visited the site after 4500 BP, when the levee was sufficiently high enough and the local environment sufficiently stable for human habitation. Although no archaeological material clearly confirms this hypothesis, it is possible that specific lithic material can be attributed to the Late Archaic Age (cf. Section 5.6). We are confident that habitation took place at the higher levee after 4000 BP. Specific ceramics and lithic material found in the lowest level of the top of the levee is linked to charcoal filled hearth pits and ceramic depositions, revealing a more permanent, but restricted habitation area. Two radiocarbon dates from after 3500 BP are not related to artefacts. Human occupation is less clearly defined around this date, but charcoal is present at the levee.

We propose that the Maroni River gains force after this date. It now floods its plains regularly, probably disturbing the previous occupation. It eventually erodes away its floodplain by means of parallel situated floodplain creeks or crevasses, i.e. the truncation of the back-fan. After this period which apparently ended in *c.*2200 BP, the Amerindian population returned in order to re-occupy the site, trampling their sherds in the mud of the new back-fan area where a new humic horizon started to develop. From 2000 BP onwards, occupation intensified. The back-fan area began to fill up with sediment, ceramics, and organic matter.

The manner in which artefacts are incorporated in accumulating soils over time (dark earth) is believed similar to the pedological processes the North American geologist M. Waters describes (Fig. 5.9). Because the accumulation of sediment in the back-fan appears to be the outcome of erosion and not of the dumping of sediment by Amerindians, it is proposed here that the CSL dark earth is rather an ecofact (unvoluntary accumulation) than an artefact (voluntary accumulation). In this case, I thus adhere to Schiffer's (1987:290–291) definition of an ecofact as: 'material not directly altered or modified by humans but associated with human exploitation, such as faunal remains, carbon from burning, or stone transported to home bases as the raw material for tool manufacture.' However, this erosion is probably the result of clearing the village of trees facilitating rainfall to erode the nude levee surface.

More charcoal and organic residues were deposited in the depression towards the end of the second occupation which was discontinued in *c.*1700 BP. By now, we presume the back-fan area was filled as yet visible in the landscape during the rainy season only as a depression. In *c.*1000 BP, CSL was occupied until at least 700 BP to be abandoned once again. It is very likely that the contemporaneous site of La Pointe de Balaté is occupied at the same time and culturally related to this third occupation at CSL. We have, however, little information on this last episode because the topsoil has been worked and disturbed when the Penitentiary of Saint-Louis was installed during the second half of the 19th century, destroying the final pre-Columbian layer on surface level (Mestre 2008).

Type	N
Post hole	178
Post pits	72
Double post holes	8
Hearth	2
Pit	13
Canal	1
Well	2
Lithic object in situ	4
Ceramic deposition	11
Pit with ceramics	12
	303

Table 5.2. The general feature count.

5.4 The features

The presence of the dark earth did not enable us to recognise many features (F) within this cumulative layer. Consequently, the majority hereof was recognised just before the sterile subsoil was reached (Eduardo Góes Neves, personal communication, 2011). However, the higher density of the ceramics and the stone artefacts or the darker coloured patches often highlighted the presence of features, but their limites remained invisible. We decided to excavate the features at subsoil level (UMaS 6 and 7), with the exception of F 320 and F 399 which were both excavated in UMaS 2. Not withstanding the interpretation of the dark earth horizon as one giant ecofact, we recorded 303 features with an anthropogenic origin. They were attributed to the pre-Columbian era. A total of 110 were attributed a non-anthropogenic origin. The twenty features attributed to the Penitentiary of Saint-Louis are not discussed here.

The anthropogenic features were divided into the following types: (a) post holes (N=258), (b) pits (N=25), (c) ceramic depositions (N=11), (d) lithic objects *in situ* (N=4), (e) hearth pits (N=2), (f) deep pits (N=2) and (g) a single curvilinear "canal" (N=1) (Table 5.2). Attribution of the features to a particular occupation phase was possible only once the ceramic study had been finished, but also rendered an absolute chronology in combination with the results of the radiocarbon datings. The features were recorded and interpreted in the field. However, it was not always easy to determine a feature's function or character. This is probably related to its vague outlines or contours in a sandy context due to leaching. Although the majority of our interpretations are believed correct, our interpretations must be taken with caution.

In the field we had already been aware of dissimilarities with regard to the collected ceramic wares (e.g. quartz, sandy, "soapy" ware). Nevertheless, minor variations between the feature types were observed that may serve when attributing features to a specific phase. In order to create a chronological attribution of the features, we opted to apply the results of the ceramic study as their first

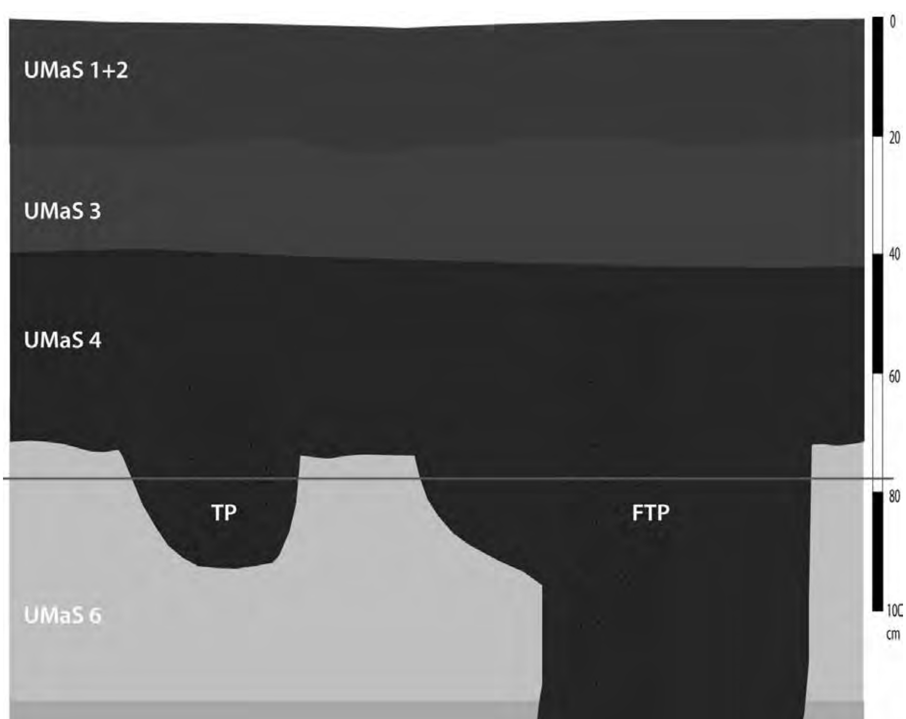


Figure 5.10. A schematic cross-section of the simple (TP) and holster post holes (FTP).

relative chronology because: (a) the funding of the excavation did not allow the determination of 303 radiocarbon dates and (b) all features did not have a charcoal sample of a sufficient quantity or quality.

Of the non-anthropogenic features, as many as 54 anomalies probably represent natural phenomena (e.g. animal holes, treefalls, roots) whereas the remainder (N=56) is unknown. In general, non-anthropogenic features have an irregular shape. They end up as "pointy" holes with increasing depths and have a fairly loose fill (Annexes 3.4 and 3.8).

5.4.1 The feature description

The post holes

We distinguished two types of post holes (Fr., *trou de poteau*, TP), based on the depth of the hole: (a) small post holes (TP) with a length of between 20 and 75 cm and (b) large post holes with a pre-hole or holster-shape (FTP) with a depth of more than 75 cm (Fig. 5.10). In the double post holes (DTP), we observed two post cavities.

The shape of the FTP cavities is often ovoid whereas the smaller post holes are roundish at excavation level. The fill is homogeneous with mostly a dark brown colour in the upper part of the fill. The lighter coloured lower part often makes it difficult to spot a difference with the subsoil. The ratio "depth vs. type of post hole" is linear at CSL. This implies that the mean depth of the smaller post holes (38 cm) is smaller than of the openings (55 cm).

We did not come across any archaeological material in the post holes other than ceramics which could have served to support the wooden posts. It is suspected that the pre-Columbians used perishable objects (wooden blocks, diagonal side poles) in order to support the standing posts although the latter could also have stood alone in the clayey subsoil of the back-fan (UMaS 7). We observed that *c.*21% of the TP and 75% of the FTP contained artefacts. The smaller post holes occur in the entire excavation area whereas the larger ones (FTP) were primarily encountered at the foot of the levee (UMaS 6). Post holes can be attributed to any occupation whatsoever if undated, but have been attributed to a particular phase when yielding any characteristic ceramic material.

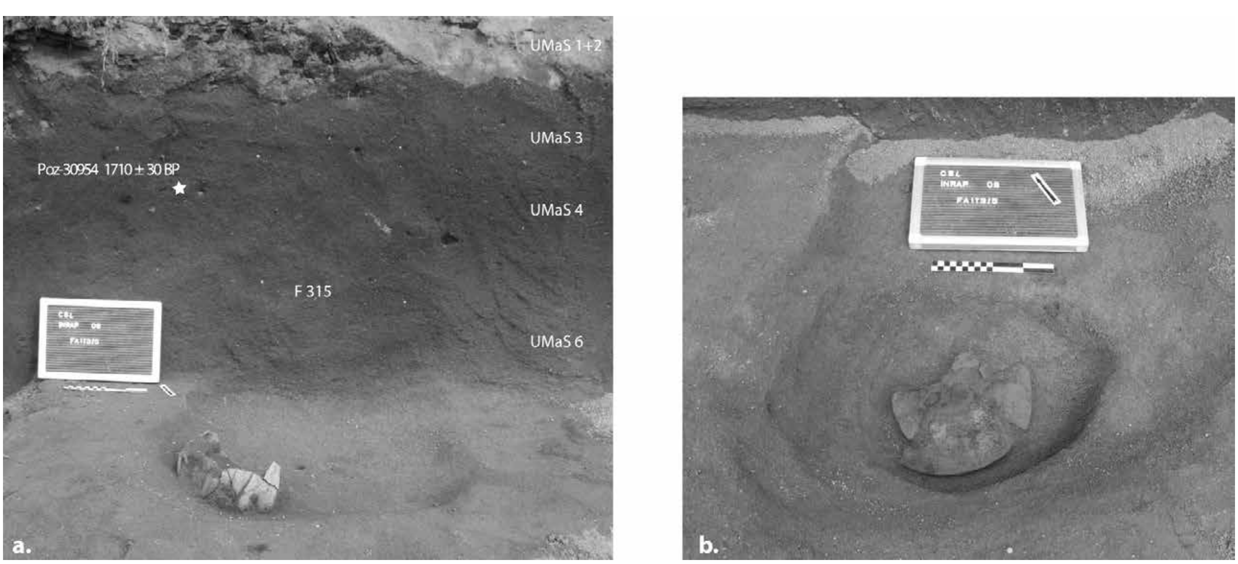


Figure 5.11. Pit F 315 during excavation: (a) the first level of manual excavation of the oval pit and a first ceramic deposition of two vessels (EC 729 and EC 730). This pit was partially situated in the northern profile. We were therefore able to measure its depth: c.70 cm, (b) the ceramic deposition (EC 731) found at a deeper level in the pit.

The ceramic depositions in pits

This type of feature represents the deposition of (partially) complete ceramic vessels in pits (DC), dug in the subsoil (UMaS 6). Their position suggests a volontary act. We distinguished two types of deposition consisting of: (a) a vessel or a large fragment of a vessel in a post hole (either TP or FTP) and (b) a deposition of one or more vessels in a pit.

As to (a), the presence of pottery, often in upright position, may well be interpreted as either a support for the standing post (F 120, F 132, F 258) or as a small ceramic deposition next to the post (F 301). These ceramics may also have been purposefully left or deposited after a ceremony held in that particular wooden construction. As to (b), we observed that these vessels were often enterred in a voluntary manner. Their imbricated, inversed and/or upright position suggests a certain *modus operandi*. All were encountered in deep, round or oval-shaped pits or post holes with exception to the ceramic deposition in the canal (F 157). The latter consisted of three entire vessels found during the survey, i.e. Trench 24 (Fig. 5.11).

The presence of entire vessels in (deep) round/oval pits evokes a funerary practice (primary burial) although no human bone has been found in the pit. Next to the presence of intact ceramics, its shape and dimensions (75 x 50 cm) suggest the deposition of a human body, possibly wrapped in a hammock and placed inside the pit in an upright position or on its side, but depositions of bone bundles are possible too. This hypothesis is based on archaeological analogies from the Lesser Antilles, notably the Saladoid and the post-Saladoid burials (van den Bel and Romon 2010; Hoogland and Hofman 2013) as well as from Amazonia (Rapp Py-Daniel 2009, 2010, 2015). In addition it is stooled upon various ethnohistorical and ethnographic data of which the primary burials of Eva 2 are evident witnesses (cf. Chapter 11).

The paucity of more satisfying interpretations and while awaiting future methods (paleo-parasitological analysis?) in order to confirm/discard this hypothesis, we suggest that these pits with ceramic deposits are inhumation graves. Some (unburnt) bone was found in the fill of pit F 252 as well as in the vessel of F 121, suggesting a secondary inhumation mode as to the latter. Samples of various pit fills were analysed regarding phytoliths (cf. Section 5.4.2).

A number of charcoal samples as to radiocarbon dating were taken from these types of pits in order to check for (or the absence of) contemporaneity with regard to other pits and vessel shapes. The majority of the ceramic deposits were located on the higher and sloping part of the levee (UmaS 6), with the exception of F 301 and F 157 situated in the back-fan area. Interestingly, these types of pits were discovered as to all three occupations. One standing urn in pit F 121 is dated to Phase 3. In fact, one inhumation grave was found during the mechanical survey at La Pointe de Balaté site. It provided a number of long bones placed in articulated position as well as parts of a skull (Romon in van den Bel 2008b), demonstrating the presence of primary burials at this site.

The charcoal-filled pits

Another type of pit was filled primarily with black charcoal (N=2; F 42 and F 362). Two examples hereof were situated on the higher levee only. F 362 measures 88 x 80 cm with a depth of 38 cm and the second measures 52 x 48 cm and has a depth

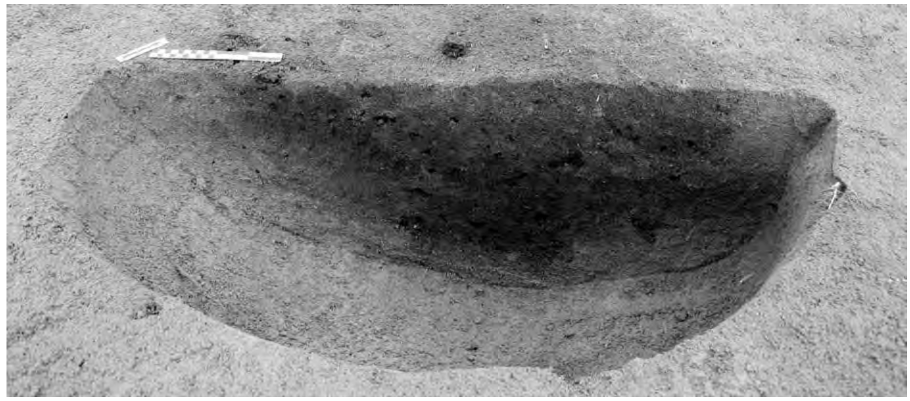


Figure 5.12. A cross-section of the charcoal pit F 362. Charcoal and phytolith samples were extracted from this specific feature and dated by means of charcoal (POZ-30956, 3840 ± 35 BP).

of 21 cm. These circular to oval shaped pits have a round, sink shaped bottom. Its fill consists of black sand and abundant charcoal particles. With the naked eye we observed fine layers as well as sherds stacked to the wall of pit F 362 (Fig.5.12). Although the subsoil does not show any traces of fire to the naked eye (revealing orange coloured sand), we suggest that these pits served to heat food, stones, and/or produce tar, etc. Both pits are attributed to Phase 1, despite an absent date with regard to F 42.

The deep pits

Two pits were very large: F 339 and F 386 respectively. The first measured 200 x 180 cm, with a depth of 110 cm. The second measured 180 x 176 x 117 cm at excavation level once at least 80 cm had been removed by means of a mechanical shovel.

Their shape is slightly rectangular with straight walls and includes various kinds of fills. F 386 has a "step" or small entrance in the east, probably in order to gain better acces to the deeper part of the pit. Based on their dimensions, both pits were interpreted as wells, but they have different locations: F 386 was found on the levee and F 339 in the back-fan area. One radiocarbon date (POZ-30957) as to Fill 2 in pit F 386 suggests a LCA affiliation (Phase 3). Deep pits are quite rare to extensive excavations, but those pits deeper than 2 m were found at BPS 223 (Vacher et al. 1998:66, Fig. 49), Katoury (Mestre et al. 2005), Cimetière paysager Poncel (van den Bel et al. 2013), and Pointe Morne (Mestre and Hildebrand 2011). The deep pits of the latter site were certainly funerary pits whereas the BPS 223 and Katoury pits may have served as water wells or extraction pits, but further research is certainly needed.

The "simple pits"

In general, we referred to pits without specific characteristics as "simple pits" (N=14). These round pits have straight walls, stressing a vertical cylindrical shape, or curving ones. The former have flat bottoms whereas the latter have sink shaped bottoms. The diameters vary between 60 and 330 cm with a depth between 8 and 46 cm. These pits often contain large quantities of archaeological material and are therefore interpreted as garbage pits at their final stage at least. Holes caused by treefalls may also have served as waste areas.

The canal

We came across a mysterious feature with a curvilinear shape located in the back-fan area (F 157). It was thought to be a small canal with a width of 70 cm and a depth of maximum 40 cm at excavation level (cf. Annexe 3.8). It ran in an irregular oval shape that covers a large area measuring *c.*30 x 10 m (300 m²). The opening witnessed in Sectors 17 and 18 may well be the result of a recent disturbance.

The canal is filled with black sand, similar to UMaS 4. It holds patches of ceramic and lithic material and even one ceramic deposition. This type of feature is rather unique and currently bears no equivalents in scientific publications. We suggest that this canal marks an activity zone related to its topographical position in the lower, hydromorphic area. According to the radiocarbon dating (POZ-30950), as well as to the ceramics of Phase 2 found in the fill of the canal, it presumably drained a plot (garden, house?) in the course of this phase.

The available pH values (following the Mehlich III method) of a sample taken from the base of the canal are very low. They show a high concentration in Al (756 mg/kg), Ca (40 mg/kg), K (2 mg/kg) and P (36 mg/kg). This most certainly reveals an enrichment of the fill by means of human excrement (Jago Birk, personal communication, 2011).

5.4.2 The phytolith analysis

Pascal Verdin (INRAP) carried out a phytolith analysis of 14 samples extracted from various features from various phases (in van den Bel et al. 2011:69–72). All samples were positive, including more than 150 phytoliths per section. The goal of this analysis was to determine the presence of plant species, both cultivated and used on site (Table 5.3). The extracting of samples and the determination of the phytoliths was done in accordance to the procedure developed by Dolores Piperno (2006a).[127] A translated and abriged version is presented here.

Phase 1

F 362 (charcoal-filled pit) The phytoliths found in this sample show a dominance of arboric taxa (79.4%). They probably belong to the primary matter found in this pit, such as black charcoal (Fig. 5.12). These phytoliths presumably reflect the site environment. We also found domesticated manioc (*Manihot esculenta)* phytoliths (0.7%) (Fig. 5.13). Its small significance may indicate that this presence is erratic and not linked to the function of the pit itself, although food preparation is possible in such pits.

8.1% of the phytoliths have been attributed to the Annonaceae family (custard apples). However, they also comprise numerous species of trees, shrub and lianas, several of which produce edible fruits, such as *Annona muricata* (soursop) and *Annona squamosa* (sugar-apple). Its abundance suggests this pit may have served to prepare or discard these fruits in. This can also be suggested with regard to the Marantaceae phytholiths (0.7%), but with more caution as determination has

127 This procedure consists of: (a) decomposing of the sediments in hexamétaphosphate sodium, (b) eliminating the particles larger than 125 µm by means of screening, (c) eliminating the particules smaller than 5 µm by means of decantation, (d) eliminating Ca by means of HCl, (e) eliminating the organic matter by means of HNO3, (f) the retrieval of phytoliths by means of Polytungstate Sodium, (g) storing the final residue in ethyl alcohol and (h) thin-sectioning the residue in a bath of Canadian balm.

	POACEAE	POACEAE Panicoides			ANNONACEAE	ARACEAE/Dioscorea	ARECACEAE	CHLORANTHACEAE	EUPHORBIACEAE	EUPHORBIACEAE		
	bulby celles	short cells. bilobed	short cells. round	short cells. cross	short cells	Cystolithes	Spheric	Polyfaceted	Polyfaceted	Manihot esculenta		
Pits												
F 31	0.7		0.7									
F 82												
F 252			1.2		19.6		5.2					
F 258	0.6											
Well												
F 386 (fill 2)			0.7	0.7	7.3		8.7			2		
Hearths												
F 362					8.1		1.5		1.5	0.7		
Canal												
F 157		0.5					6					
Post hole												
F 41					1.7			3.3				
F 208			0.6									
F 301			1.9				0.6					
F 405										1.5		
Vesels												
F 130 , EC 96												
F 143, EC 89	0.7					31	3.5					
F 143, EC 88												

	HELICONIACEAE	MARANTACEAE/ BOMBACACEAE		ZINGIBERACEAE	DICOTS			TREES			INDET	
	Heliconia	Spheric	Fruit	Spheric	Polyfaceted	smooth epiderme	deco-rated epiderme	Sclereidic fibres	Spheric, smooth	Spheric, smooth		
Pits												
F 31					0.7			2	87.1	5.4	3.4	100
F 82					2		1	2.5	85.5	4	5	100
F 252		5.2						5.2	8.1	52.6	2.9	100
F 258		0.6						4	90.8	4		100
Well												
F 386 (fill 2)		0.7						3.3	4	69.3	3.3	100
Hearths												
F 362		4.4	0.7					1.5	1.5	76.4	3.7	100
Canal												
F 157		7.1			1.1	0.5	1.1	8.8	4.9	68.4	1.6	100
Post hole												
F 41		1.1			3.3		1.7	1.1	73.9	11.7	2.2	100
F 208									90.3	6.5	2.6	100
F 301								3.2	81.3	10.4	2.6	100
F 405		3		0.8			0.8		87.1	5.3	1.5	100
Vesels												
F 130, EC 96				0.8	0.8				94.6	2.3	1.5	100
F 143, EC 89	2.1	0.7	0.7					55	4.9	1.4	100	
F 143, EC 88	1.1							89.7	6.5	2.7	100	

Table 5.3. The identifications of phytoliths per feature.

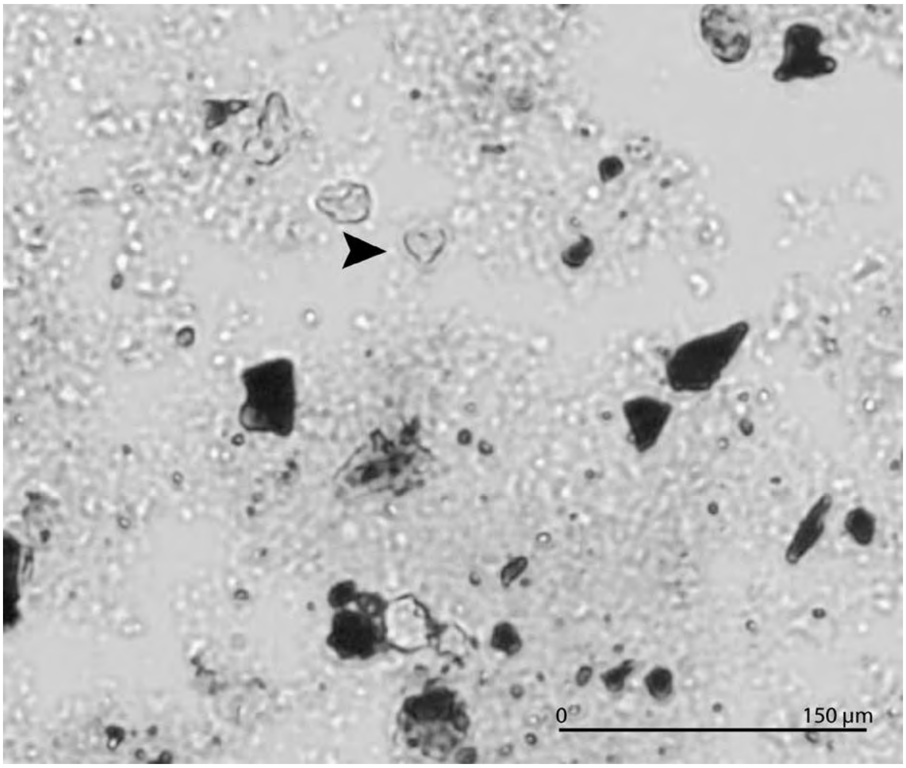


Figure 5.13. The small black arrow indicates a phytolith of Manihot esculenta found in F 362 (see Fig. 5.12). The characteristic phytoliths of this species are conceived in the plant's edible tuber (photo by P. Verdin).

only taken place at a family level. Nevertheless, we cannot exclude the presence of *Maranta arundinacea* (arrow root) nor any other functions of this pit. It thus remains a problematic case: contamination, waste or broiled in fire?

F 405 (large post hole) Again, manioc phytoliths (1.5%) characterise this sample which is also dominated by arboric taxa (92.4%). However, it also contained a large number of starch grains (21.5% of the micro-residues). Perhaps this provides this feature with a more appropriate function although it may be a contamination. On the one hand, when this post hole was dug, or afterwards, it could perhaps have trapped various plant residues prepared in the vicinity. On the other hand, it may have been another type of feature.

Phase 2

F 31 (large pit) Arboric taxa (92.5%) dominate the sample taken from this pit. No species indicated human presence.

F 252 (large pit with ceramic deposition**)** This sample differs from the above-mentioned examples. It does not contain phytoliths from edible, cultivated or used plants. It does, however, include taxa we had already recorded, but in much higher numbers. For instance, 19.6% of the phytholiths can be attributed to the Annonaceae family. With regard to the present study, this is a very elevated number representing a concentration of edible specimens of this specific family in this pit, whereas the taxon in pit F 362 was considered organic waste.

This sample contained up to 5.2% phytoliths of palm tree leaves (*Arecaceae* sp.). This very large family remains difficult to interpret because present-day and prehistoric Amerindians utilise its leaves and fruits. Moreover, it is difficult to exclude the same significance of 5.2% of Marantaceae phytoliths and to

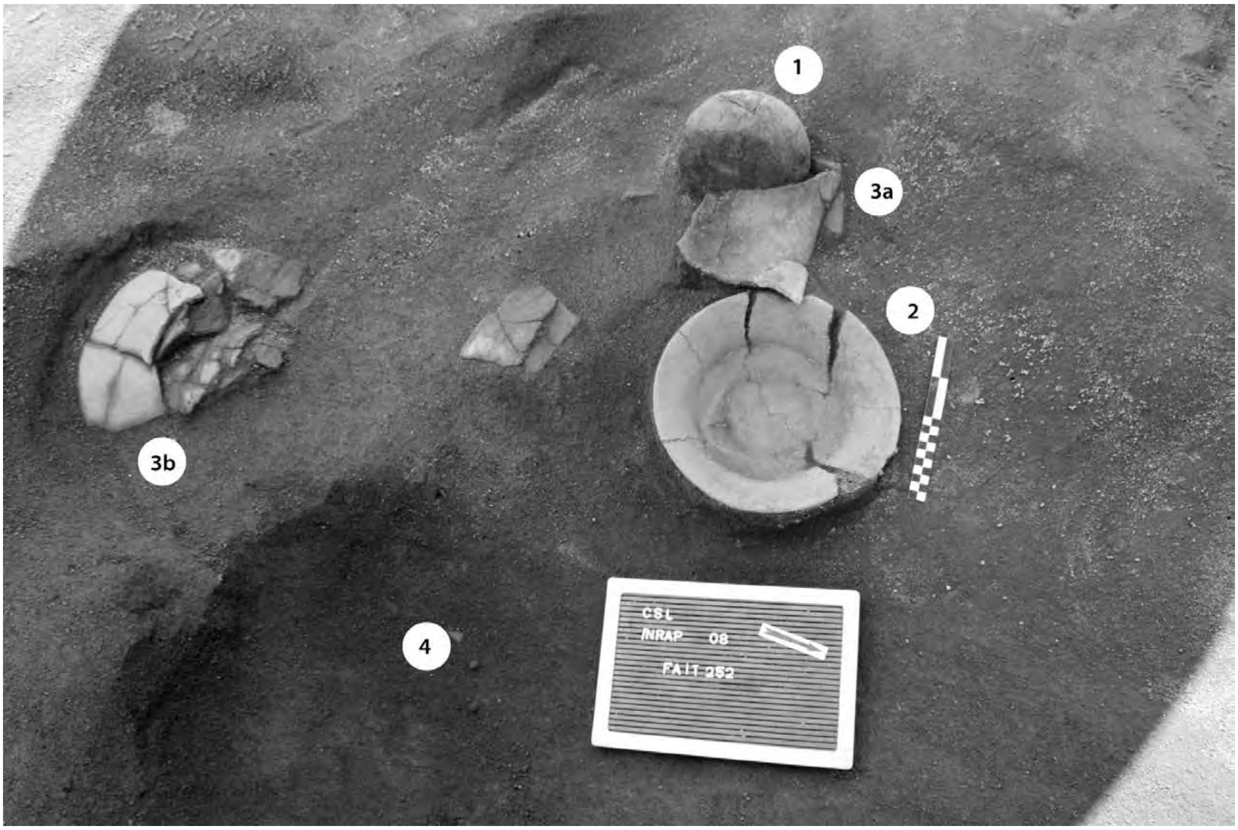


Figure 5.14. An overview of the shallow pit F 252 with pottery depositions. The key to ceramic numbers: (1) EC 715, (2) EC 716, (3a) EC 717 and (3b=4) EC 718.

interpret them only as an environmental background, as we did as to the *Maranta arundinacea* of F 362. In fact, this pit with a ceramic deposition can be interpreted as an inhumation grave which is, taking into account the above-mentioned funerary hypothesis, also a complementary argument for a funerary pit, such as the deposition of grave goods or a funerary meal (Fig. 5.14).

F 258 (large pit with ceramic deposition) This sample is similar to F 31. As much as 98.8% of the phytoliths are arboric taxa.

F 41 (post hole), **F 208** (large post hole) and **F 301** (ceramic deposition) These samples are all rather similar and dominated by arboric taxa, to wit 86.7%, 96.8% and 93.9% respectively. No anthropogenic impact has been observed.

F 157 (the canal) This sample is dominated by arboric taxa (82.1%). It also contains Marantaceae (7.1%) and Arecaceae (6%) phytholiths, but no phytoliths that may evoke a human enrichement which is in contrast with the chemical analysis as stated in Section 5.4.1 (Fig. 5.15).

F 130 (contents of EC 96) This sample not only contains phytoliths, but also starch grains (26.2%) of which a small number show traces of pounding, indicating they have been ground. However, the phytoliths do not display any particularities as can be evidenced with regard to the starch grains. As much as 96.9% of the phytoliths can be ascribed to arboric taxa.

F 143 (contents of EC 89) Again, this sample contains a large quantity of starch grains (26.4%). The phytolith sample displays a specific pattern as 31% of the cystoliths are found in the tubers of two taxa: the Araceae family and the genre

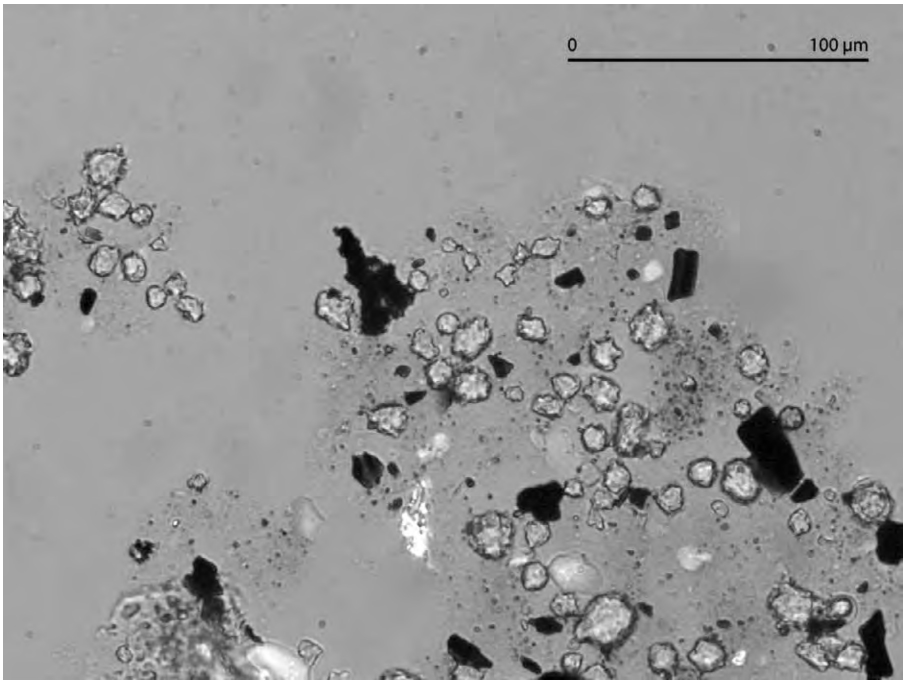


Figure 5.15. A microscopic photograph of Fill 2 of F 157 including spherical shaped arboric phytoliths and Marantaceae (photo by P. Verdin).

Dioscorea (Dioscoreaceae). In the latter case, we find food plants such as yams. Considering its archaeological context, we may conclude that this vessel contained (processed) tuberous food.

F 143 (contents of EC 88) This sample also contains a large quantity of starch grains (11.1%). However, the phytolith spectre does not teach us much about the plants stored inside this vessel. As much as 96.2% of the phytoliths represent arboric taxa.[128]

Phase 3

F 386 (Fill 2 of a possible well) Aboric phytoliths (77%) dominate this sample whereas 2% originate from manioc (*Manihot esculenta*) and 7.3% from Annonaceae (see also sample F 362). The presence of the latter phytoliths may reveal the preparation or consumption of food plants in the vicinity.

Conclusion

The cultivation and/or prepartion of manioc, but perhaps also of arrowroot, yams, soursop, and sugar-apple have been practised at CSL or in its (immediate) surroundings. In fact, important food taxa were mainly encountered inside the vessels, the charcoal pit, the well and other types of pits, but were absent in the samples from the post holes and the canal. It may be added here that, this phytolith analysis is limited due to the low level of species determination (with the exception of manioc). Moreover, this analysis depends solely on the archaeological context, enabling us to propose coherent interpretations with regard to a hypothesis concerning the (direct) environment of the site. It represents one of the first phytolith case studies dealing with archaeological excavations in French Guiana.

128 Pascal Verdin and Jaime Pagán Jiménez did not analyze the above-mentioned starch grain samples.

5.4.3 The feature distribution

Having completed a description of the features we now propose a preliminary interpretation of their spatial distribution with regard to three occupations, in association with the distribution of the radiocarbon dates. The mere fact that this site has been re-occupied several times demonstrates that this river terrace represents an important landscape feature of the Maroni River delta. This is again emphasised by means of the accumulation of dark earth on site, stressing an intensive pre-Columbian occupation. In addition to the dark earth, CSL also demonstrated a high density of various types of features in a high density. These important components enable us to interpret this site as a multi-occupied prehistoric habitat, or palympcest. In this case, we may suggest it has more or less been occupied for nearly 5000 years. Phase 1 and 2 represent distinct prehistoric occupations, each with a dissimilar magnitude of which Phase 2 represents the most intense occupation. Phase 3 appears to be the least presented occupation within the excavated area.

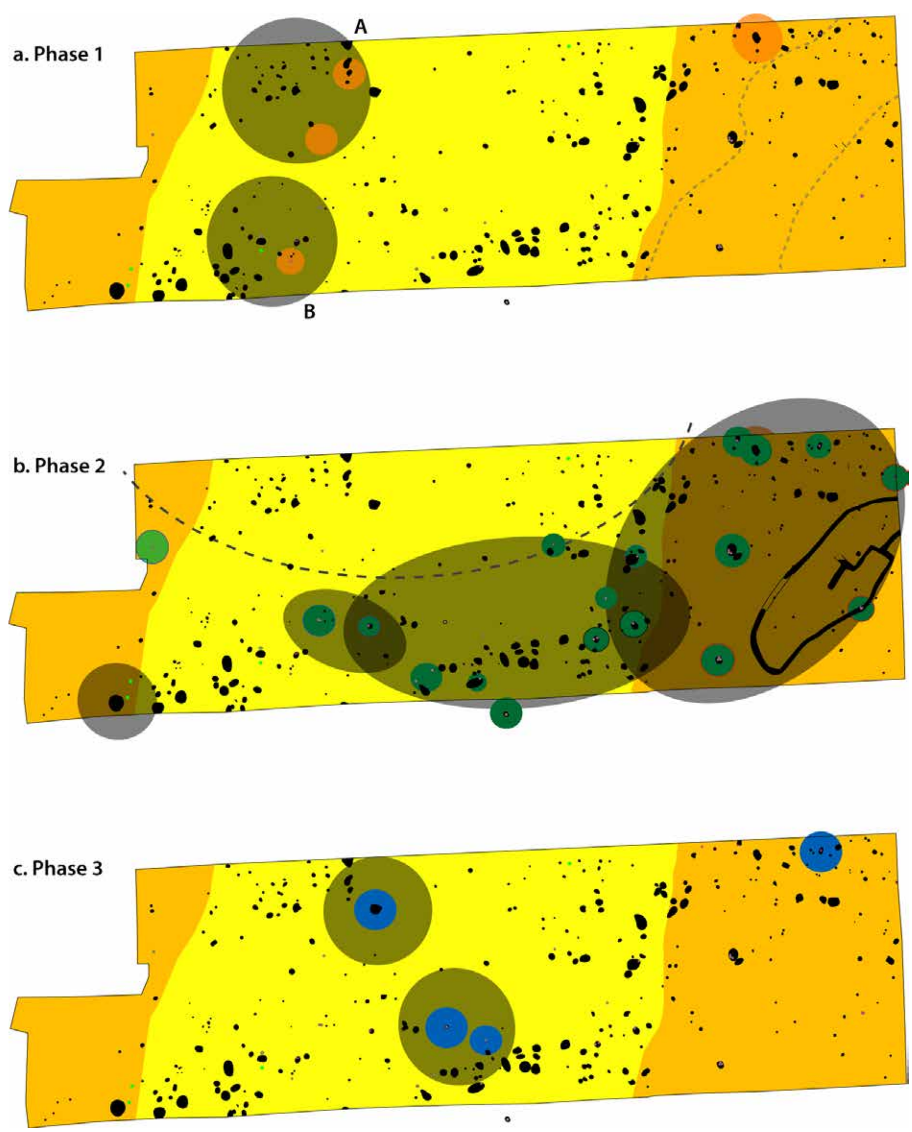


Figure 5.16. The spatial distribution of the three major occupations. The radiocarbon dated features are marked by means of smaller circles. The dotted line marks the boundary of the Phase 2 ceramic depositions.

Phase 1

The features attributed to Phase 1 are mainly situated on the higher levee, towards the escarpment of the river bank, which borders the Maroni River (Fig. 5.16a). Two charcoal filled pits clearly mark this occupation. Surrounding each pit, we see a small number of other features, either simple pits or ceramic depositions, yielding early ceramics and corresponding radiocarbon dates. These two spatial units, each covering *c*.100 m^2, probably represent small activity areas.

The first area (A) is located near Sectors 54 and 55. It is represented by means of features F 362, F 397, F 400 and F 405 as well as an archaeological level containing artefacts (UMaS 5, Level 3). A second area (B) is located near Sectors 24 and 25 represented by charcoal-filled pit F 42 as are two pits containing ceramic depositions (F 56 and F 140). In retrospective, we did not distinguish an archaeological Level 3 in area B during our fieldwork. When studying the artefacts afterwards, however, a higher number of early ECA-A ceramics and "Archaic" lithics (cf. Section 5.6) were found within these specific sectors, probably also comprising the quartz milling stone F 45.

Although these two areas are spatially more or less separated, both may have been occupied simultaneously. They are represented by means of only a small number of features within a relatively small area, possibly evoking a punctual visit of the site. The apparent absence of (large) post holes supports this view although we cannot be certain about this because numerous post holes did not yield (ceramic) material preventing a possible chronological indication. However, the presence of ceramic depositions, if we consider them to be inhumation graves, may suggest a more permanent habitat or one frequented over a longer period of time, despite the absence of detectable house plans.

Furthermore, rock filled pits were not identified at CSL as was the case with the Eva 2 or PDM sites. However, an adjacent allotment investigated by the INRAP did evidence their presence at the latter site (Mestre 2008:21). This suggests the Late Archaic population's larger interest in this area albeit that no radiocarbon dates are available as to the latter site.

The Phase 1 radiocarbon date of F 351, located in the northeastern corner of the excavation pit, may represent another ECA-A area or else only a charcoal particle that had lost its primary context due to post depositional processes, such as overwash. We may further remark that the non-attributed radiocarbon dates of F 400 and F 405 are situated in area A. This may imply a continuation of the human occupation in the time span between Phase 1 and 2 or else a habitat located just outside the excavated area.

Phase 2

The features attributed to this occupation were found all over the excavated area, i.e. on the levee as well as in the fan area, revealing an intensive and/or long occupation period with regard to this excavated part of the site (Fig. 5.16b). However, fewer features are recorded in the fan area (Sectors 1, 2, 16, 17, 31, 32, 46) and the area located along the Maroni River (Sectors 13, 14, 27, 28, 29, 42, 57). The absence of treefalls and ceramic deposition pits with regard to the fan area appears to be coherent with the interpretation of this hydromorphic area – leached soils and stagnating water levels– that favours draining features such as the canal in order to discharge any excessive water. The absence of any anthropogenic features along the river is probably related to a topographic position close to the river representing an exterior, thus eroding bend of the Maroni River.

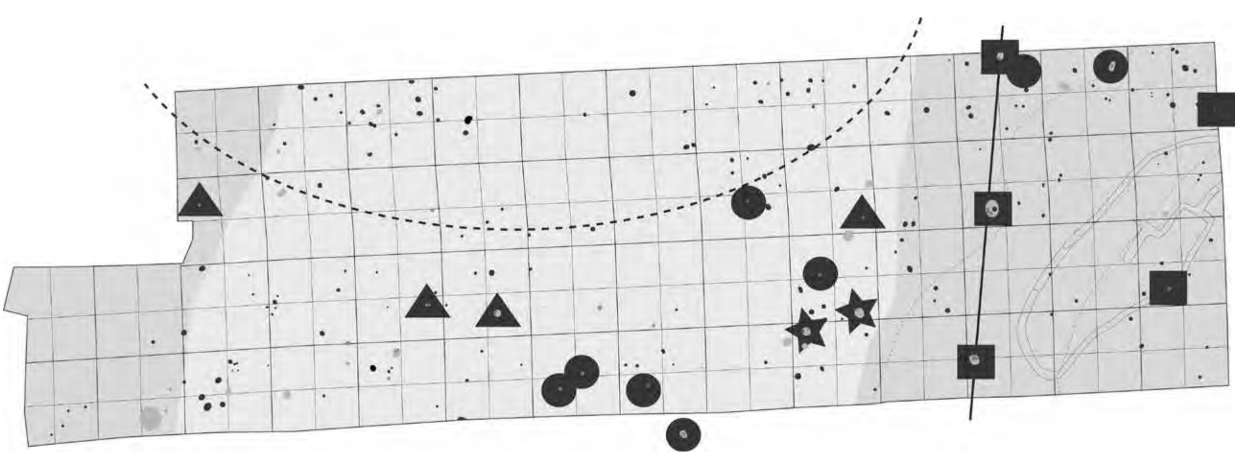
The features are distributed predominantly at the slopes of the higher levee, forming a crescent shape. This particular spatial pattern reminds us of the fact that the excavation pit is situated at the southern end of an elongated terrace. The higher levee (Sectors 35 to 41 and Sectors 50 to 55) only yielded three ceramic depositions (F 260, F 267, F 285). The absence of other features in this area, suggests a rather "empty" area during this occupation.

In combination with the distribution of the radiocarbon dates we now propose a diachronic view of Phase 2. Figure 5.17 illustrates the hypothetic sub-phases with regard to Phase 2 whereby the stars represent Phase 2a, the squares Phase 2b and the triangles Phase 2c. Circles represent the non-dated depositions attributed to Phase 2 by means of ceramic ware. We observe that: (a) Phase 2a is represented by two features (F120 and F132) situated in Sector 5, (b) two features (F 157 and F 301) located in Sector 31 represent Phase 2b and (c) two features (F 130 and F 133) situated in Sectors 25 and 42 (F 285) represent Phase 2c. The dated simple pits are represented by F 31 and F 111 and are situated in Sectors 6 and 13 respectively, of which the latter is located next to Sector 5 for Phase 2a. This description illustrates the presence of "paired" pits on various locations which may indeed reflect successive occupations within Phase 2.

Whenever pits with ceramic depositions do indeed represent inhumation graves we would like to stress the possible alignment of three graves, to wit F 143 (Sector 3), F 252 (Sector 33), and F 315 (Sector 48). Moreover, it is opined that these burials are situated within the domestic habitat and not outside the village, i.e. in a burial ground. The relationship between these burials and the habitat, however, still remains a question difficult to address. Ethnographic based information suggests abandonment of the house once its builder or founder had passed away, on occasion even the abandonment of the village (Rivière 1984).

Although we did not come across a wooden construction, the distribution of the ceramic depositions and post holes allow us to hypothesize various house locations (HL). The excavation of a pre-Columbian house plan (Archaic, Early Ceramic or Late Ceramic Age), in French Guiana and even the Guianas is as yet unknown, despite the results of the extensive excavations carried out during the last decade. Hence, the outline or cluster of post holes, ceramic depositions and

Figure 5.17. The spatial distribution of Phase 2. The small post holes (TP) are indicated by means of a dark grey colour, the pits by means of light grey, and the ceramic depositions by means of large circles. Stars represent the ceramic depositions of Phase 2a, squares those of Phase 2b, and triangles those of Phase 2c. The dotted line illustrates the "empty" zone that goes without any ceramic depositions. The straight black line suggests the alignment of inhumation graves.



Excavation level	Total	Plain	Decorated	Weight (gr)	Mean weight
1	829	812	17	5770	6.96
2	27,936	25,991	1945	198,515	7.1
3	338	338	0	3238	9.57
Features	4248	3973	275	60,808	14.31
	33,351	31,114	2237	268,331	

Table 5.4. The general ceramic count.

voids indicate a possible house location. We distinguish, in accordance with the radiocarbon dates, the following major zones: (a) an "empty" zone, (b) a zone with ceramic depositions, post holes and a canal and (c) a zone along the river side (escarpment). The latter two zones are situated around the first zone, representing the foot of the higher levee. In chronological order, we observe a first implantation at the slope of the levee, followed by a second occupation situated in the back-fan area (canal) and finally an occupation at the southern part of the levee and escarpment area. Interestingly, the continuous presence of ceramic depositions reveals a strong (funerary) tradition underlining the cultural continuity of Phase 2. The occupation of this site apparently ends in the course of the 5th century AD (POZ-30954). It is re-occupied only 500 years later.

Phase 3

The Phase 3 features are located mainly on the higher levee, i.e. Sectors 23 and 54 (Fig. 5.16c). This third occupation is represented firstly (Phase 3a) by means of radiocarbon dates from a well (F 386) and pit F 309, containing Phase 2 ceramics (POZ-36929). Radiocarbon dates from F 121 and F 116, of which the former is presumably an urn burial, represent the second subphase (Phase 3b). The latter features are both dated *c*.800 BP and indicate another occupation at the site compared to Phase 3a. All radiocarbon dates from CSL correspond to the majority of the La Pointe de Balaté site datings which have been attributed to the LCA and contact period (van den Bel 2008b:53, Plate 2; Briand et al. 2015; cf. Section 5.5.7).

Next to four dates and several features, the little further information on other aspects of this occupation draws us to conclude that it is apparently less important, at least within the excavated area. It is also possible that its other features did not reach the yellow subsoil (with the exception of the ceramic depositions) and may therefore appear invisible. In this case, the applied excavation techniques only revealed the deeper features, the others being hidden in the dark earth. However, we can also imagine a site with a dissimilar activity, such as a garden or food preparation site, distanced from the village (La Pointe de Balaté?). The urn burial F 121 demonstrates that this site may have served as a burial ground too.

5.5 The ceramic analysis

The ceramic assemblage of CSL contains 33,351 fragments, weighing *c*.268 kg. All were collected by hand from: (a) the dark earth layer in three stratigraphic levels and (b) the excavated features (Annexe 3.5). Radiocarbon dates reveal that this assemblage reflects at least three ceramic complexes corresponding to three phases of occupation, as the excavation levels roughly reflect.

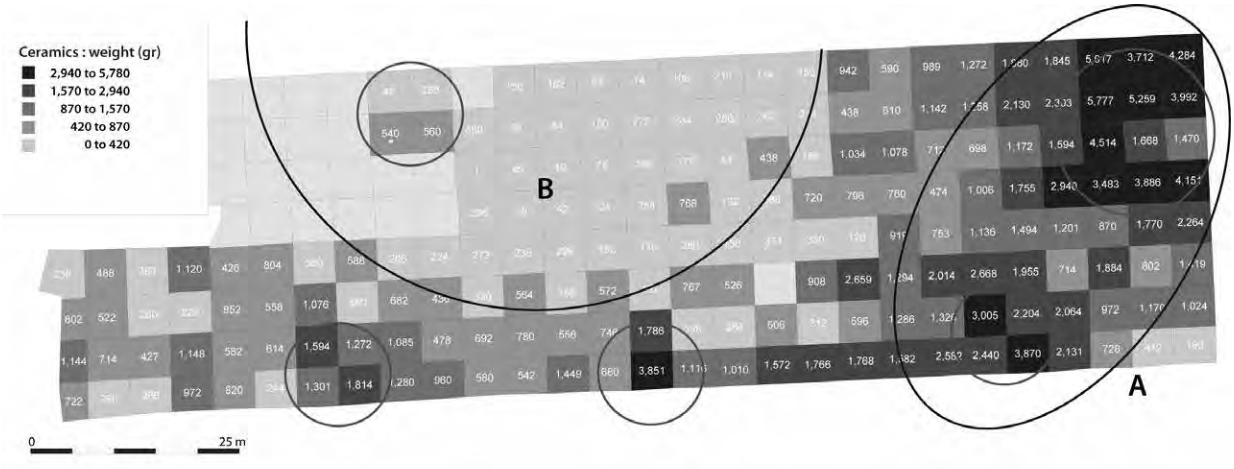


Figure 5.18. A spatial distribution of the hand collected ceramic material at excavation Level 2, revealing one large waste zone (A) and an "empty" zone (B).

Ceramics from Level 1 were found only in Sectors 1 to 6, 31 and 46 (UMaS 1-3). Level 2 (UMaS 2-5) was present in the entire excavated area whereas Level 3 (UMaS 5 and 6) was only recognized in Sectors 54 and 55 (Table 5.4). We suppose that excavation Levels 1 and 2 contain archaeological material from all phases. Sectors 40-44 and Sectors 56-59 remained unexcavated due to recent disturbances (cf. Annexe 3.5.1).[129]

5.5.1 Introduction

The ceramic study is primarily based on the variety of rim and whole vessel shapes. It is represented by means of 741 constituent elements (ECs) (cf. Section 1.3 for the methods). These elements comprise both the mechanical survey (N=81) and the excavation (N=659), representing the backbone of this ceramic study.

Approximately 87% of the constituent elements from the entire ceramic assemblage –combining each and every occupation phase– are taken from the handpicked collection. On the one hand, this underlines its importance on a statistic level. On the other hand, the latter collection only yielded four whole vessel shapes (13%). Approximately 78% of the features (all phases) yielded ceramic material: the average weight of an individual fragment found in the dark earth is *c.*7 gr whereas a fragment from the features weighs 14 gr. The discrepancy between decorated and non-decorated ceramics is fairly elevated with regard to the second level of excavation: *c.*7% of the acquired artefacts are decorated. Roughly 25% of the constituent elements are decorated and represent a very important category.

A comprehensive image of the ceramic spatial distribution can be best presented for the second excavation level because the entire excavated area is covered. We observed a high density not only in the northeastern corner of the excavated area (Sectors 31, 32, 46 and 47), but also in the southeastern angle (Sector 3) with an average weight between 3 and 5.7 kg per collection square of 5 x 5 m (Fig. 5.18). These two concentrations presumably represent two dumps which may eventually have formed one large successive dump area located in the lower back-fan area (Area A). Another dump shows a more residual dispersion of ceramics weighing

129 This ceramic study was partially published in *Archaeology and Anthropology, Journal of the Walter Roth Museum* (van den Bel 2012b).

between 0.5 and 1.5 kg positioned in a crescent shaped zone around the higher levee which is accentuated by means of more significant material concentrations in Sectors 7 and 11. On the higher part of the levee, a "pocket" of ceramics in Sector 55, possibly reflects a residual area of ceramics attributed to Phase 1b, i.e. excavation Level 3.

The degree of conservation regarding the ceramic artefacts was mediocre. This may well be due to the extensive leaching of sandy soils, as is especially the case with the earlier ceramics attributed to Phase 1b. The ceramics found in the features are often in a better condition. Nevertheless, finishing techniques and decoration modes were now and again difficult to determine. The only manufacturing technique observed for recipients was the coiling technique. However, certain griddles evidenced the application of the lumping technique by superposing two clay slabs.

The non-plastics in the paste were determined by the naked eye. The paste contained various non-plastic elements which the potters may have added as a temper. In total, four temper modes were observed with regard to the constituent elements: (a) mineral, (b) vegetal, (c) mixed and (d) a pounded potsherd temper, also known as grog (Fr., *chamotte*). However, the latter temper, if crushed and sieved is difficult to detect with the naked eye. A microscopic analysis is required to attest its presence (cf. Section 8.5.2).

Based on temper, we can easily single out the ECs of Phase 1 (EC 692-94, EC 521-34, EC 737-9 and EC 741) thanks to the large quantities of sand and/or pounded quartz in the paste. This temper is highly recognisable among the other potsherds and thus characteristic, with the exclusion of two vessels found in pit F 56. Furthermore, their paste is coloured light grey to yellow and includes a singular reducing firing mode.

As to Phase 2 and 3, the mineral tempers dominate this assemblage (81%) of which sand temper is most popular (64%). The (runiquartz) sand applied here was presumably obtained on the sandy river beaches of the Lower Maroni River during low tide as the rounded sand grains and feldspar (often coloured white after heating) indicate. The other tempers (e.g. vegetal (6%) and mixed (12%)) are less popular whereas grog is considered anecdotal knowing it is based on a macroscopic analysis.[130] The vegetal temper can be subdivided. It consisted of a charcoal or an ash temper, of which the latter is often referred to as *kwepi*, or *caraipé* (Table 5.5).[131]

The macroscopic observations on the firing methods can be grouped into the following colours: (a) red all-over, (b) orange to brown all-over, (c) dark center (grey/black) and lighter margins and (d) dark colour all over (grey or black) (see Rye 1981:116, Fig. 104). The two latter colours are the result of a firing technique applied in a reducing environment (20%) whereas (a) reflects an oxidizing environment (45%). Mineral tempered ceramics were preferably fired within an oxidizing environment (93%). Vegetal tempered ceramics are slightly more popular in reducing firing conditions (52%) over mineral tempered ceramics.

130 The analysis of La Pointe de Balaté site has pointed to a more popular application of this temper with regard to the LCA (cf. Section 5.5.7).

131 It is difficult to determine the species of the vegetal temper in pre-Columbian ceramics. However, according to ethnographic and historic analogies, the origins of the greyish ash as a temper is often considered a siliceous bark that has been burnt and pounded (Boomert 1985). In French Guiana this bark is popular among the present-day coastal Amerindian potters and has been identified as *Licania sprucei* (P. Grenand et al. 2004:308).

			Mode	N
Mineral (81%)	**1**	sand	11	380
		sand + mica	12	116
		sand + mica + black minerals	13	32
		sand + pisoliths	14	41
		sand + finely crushed mica	15	21
Vegetal (6%)	**2**	charcoal particles	21	7
		ash	22	37
Mixed (12.6%)	**3**	charcoal particles + sand	31	39
		ash + sand	32	32
		charcoal + mica + sand	33	21
Grog (0.4%)	**4**	pounded potsherd	41	3

Table 5.5. The distribution of temper modes. Note the black minerals and pisoliths may not have been added to the paste on purpose. They occur naturally in the clay but often provide a remarkable indicator when inspecting the paste, as does the crushed mica with its glittering effect. Although the vegetal particles have not been determined taxonimically, they are thought to represent the pounded fraction of burnt tree bark of a species known as kwepi in French Guiana.

SM	N	Form	Profile
I	63	Open	Rectilinear
II	62	Open	Cconvexe
III	249	Open	Concave
IV	25	Restricted	Rectilinear
V	94	Restricted	Convexe
VI	32	Restricted	Concave
VII	15	Collared	Miscellaneous
VIII	8	Unique	Miscellaneous
	548		

Table 5.6. A short outline of rim series established for the present ceramic assemblage.

This vegetal tempered ware can often be easily recognized because it makes the fingers feel soft and "soapy" whenever the sherds are touched.

The DRX analysis carried out by Jean Frenette (University of Laval, Québec) with regard to six sherds enabled the comparison of the pastes with a raw clay sample extracted from the banks of the Lower Maroni River to the south of the *La Charbonnière* hamlet (54° 02' 23" W and 05° 29' 19" N; cf. Annexe 3.5.6). This sample consisted of kaolinite, illite and lépidocrocite. The latter element is an oxide-hydroxide iron mineral formed in iron rich and mineral altered soils, i.e. ferralitisation, corresponding to the ferralitic soils found in French Guiana. The soft (Holocene) clays deposited along the coast of Guiana have an Amazonian origin. However, the youngest deposits consist of illite (33%) and chlorite (13%). They hail from an Andean region (or rather a mountainous source), but also consist of kaolinite (28%) and smectite (26%) which originates from the Lower Amazonian Basin and/or the Guiana lower belt. In sum, when comparing the results, the raw clay sample consists of sediments issued from the altered Guiana belt and deposited in the mouth of the Maroni River. The presence of illite is indeed quite common in littoral/marine clays.

Profile	i	ia	ii	iia	iib	iii	iiia	iiib	iiic	iiid	iv	iva	ivb	v	va	vb	vc	vi	via	Total
Rectilinear	46	17									6	13	6							88
Convexe			32	13	17									35	22	17	20			156
Concave						109	45	22	35	38								17	15	281
Keeled		17		13				22	35	38		13	6			17	20		15	196
Flexed lip				13			45	22		38			6		22		20			166
Thickened lip				13				22		38							20		15	108
Hollow rim					17															17
																				525

Table 5.7. The rim subseries SM I-VI.

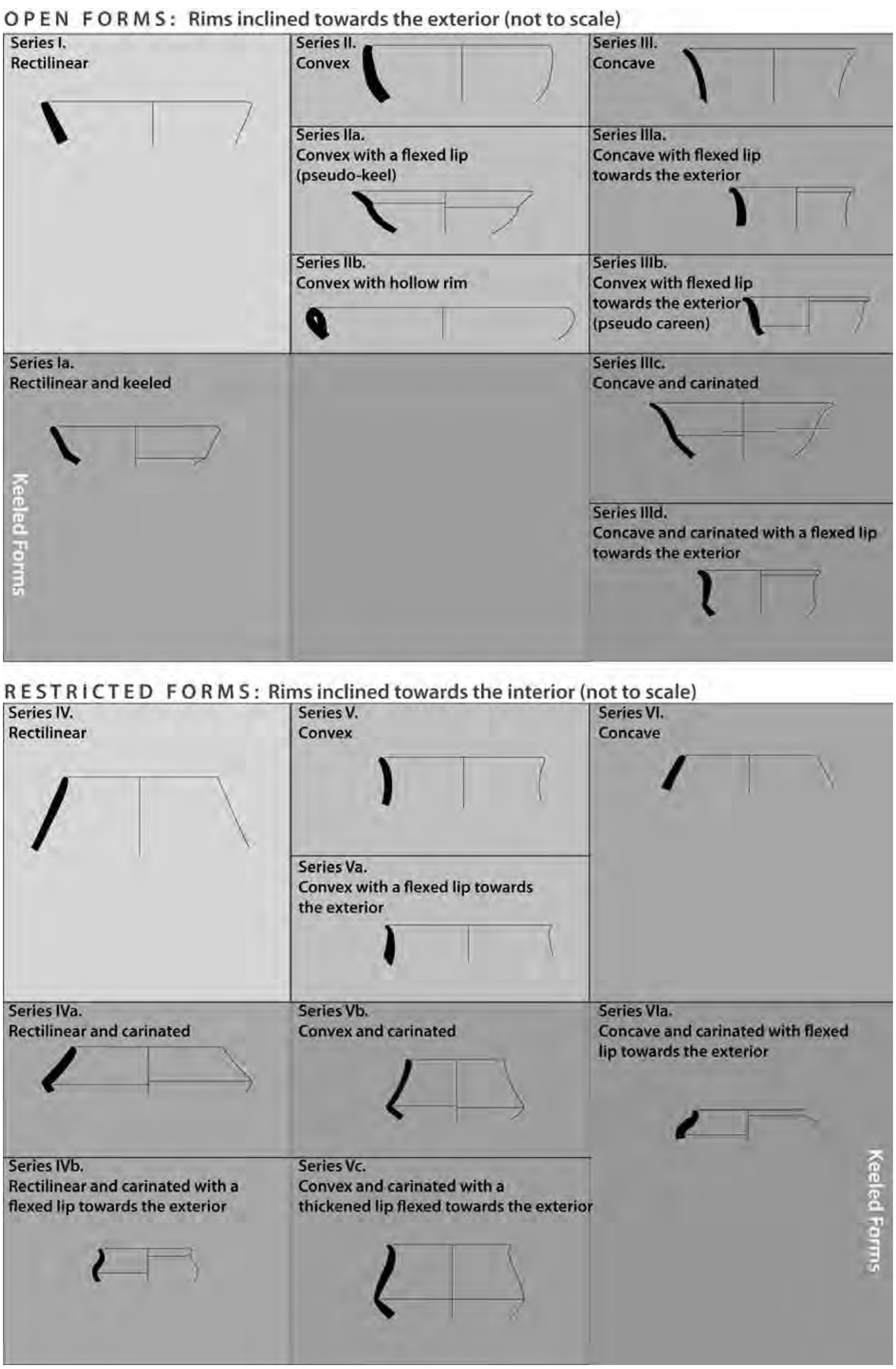


Figure 5.19. The morphological characteristics per subseries SM I-VI.

The DRX analysis performed on powdered sherds revealed a silty-clay dust and fine sand. Due to this treatment, the minerals (e.g. quartz, feldspars, amphiboliths, mica), were considered to be non-plastics. The raw clay is evidenced by means of the signature of chlorite which may have originated from the soft coastal clays, but certainly not from the interior belt. The pre-Columbians did presumably not gather the sampled clay source in order to manufacture the analysed pottery sherds; other sources need to be tested in order to locate their clay sources.

5.5.2 The constituent elements

The diagnostic register consisted of 741 ECs including 38 complete archaeological vessel shapes (Annexe 3.5.3). As to Phase 1 we counted 12 constituent elements (seven bases, eight rims, and three complete vessel shapes). Phases 2 and 3 are composed of 548 rims, 187 bases, and 29 griddle fragments. It may be added here that 25% of the constituent register was decorated.[132]

The rims

The ECs of Phases 2 and 3 are discussed together in order to determine the series for each phase. Phase 1 ceramics are discussed in Section 5.5.5. The collection of rims, with the exception of the griddles, contains 548 items. The diversity of the rim profiles observed during the study allowed us to create eight morphological modes or modal series (SM). The principal diagnostic elements of the profiles are represented by means of its shape: (a) rectilinear, (b) concave and (c) convex shapes with regard to open and restricted vessels (SM I-VI) (Tables 5.6-7).

Subdivisions were established according to the presence or absence of inflection points or keels and a varied labial treatment (SM IIIa-d), thereby generating 13 subseries of which ten are carenated and nine have a specific labial treatment (Fig. 5.19). Diameter and paste were recorded for all these series. The series SM VII and SM VIII were excluded due to absence of morphological repetition and an orifice diameter of less than 13 cm (bottles) respectively. Open vessel shapes dominate the rim assemblage (71%). The most important series are SM I-III and SM V. The remaining series are less important. The unique elements (SM VIII) are not defined because of their scarcity (1.6%).

SM III The series SM III represents the rims of open vessels with a concave profile and is by far the most popular series (N=249, 45%). It represents almost half of all the ECs and is the most important product at this site.

The distal ends of the lips are rounded (68%), flattened (10%) or tapered (22%). The presence of specific labial treatment and of keels enable us to define four subseries, or classes (SM IIIa-d, N=140). The rims that were not subdivided were classified in the overall concave rim series (SM III, N=109). Within the subseries, the inflection of the lip towards the exterior is the most significant feature (75%) and was combined in 57% of the cases with a thickening of the lip. The presence of a keel (36%) was also observed. In fact, the latter aspect formed the second most popular feature of this series (70%).

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132 Constituent elements drawn from the 2008 survey have been added to this EC count (N=81).

The diameters varied between 14 and 56 cm.[133] When applying the average diameter (27 cm) of the sum (N=220) of the most frequent number (N=6.5) as a possible discriminating element, we soon spotted several peaks or higher frequencies: a peak at 18 cm (between 14 and 20 cm), at 24 cm (between 22 and 26 cm), but also at 35 cm (between 30 and 38 cm). These peaks reflect three vessel sizes (Fig. 5.20). The diameters of the subseries display the same signature and reveal a certain homogeneity at the pottery production level.

The significance of mineral temper is unmistaken in this series (90%). The sand temper is the most important one (62%), followed by the same temper containing a mica component (27%). Vegetal (N=1) and grog (N=2) tempers are almost non-existent whereas a mixed temper seldomly occurs (8%). Oxidizing firing (48%) is the most popular firing technique However, a significant relationship between temper and firing technique was not observed. The oxidizing firing technique was apparently not applied to vessels with a vegetal or mixed temper.

Approximately 22% of this series included decorations of which 7% was found within the features and the remaining part collected by means of handpicking. Red slip was the most popular application (76%) of which 63% covered the interior and 37% the exterior. A preference was noted regarding the application of slip to the upper part of the composite recipient, between the lip and the keel. The remaining 25% of the decorations mainly consisted of incisions (e.g. zoned (hatched) parallel lines), in order to decorate the interior of the vessel wall.

SM IIIa and SM IIId may possibly represent the same vessel shapes. In fact, this series shares similar characteristics. They underline an important production of the latter series and include the following combination of diagnostic elements: (a) a sandy paste, (b) labial inflection, (c) keel, (d) application of red slip on the interior and (e) three significant diameter frequencies.

SM V The second most important series SM V is less significance than SM III. Restricted vessels with convex rims (N=94, 17%) represent this series. The rounded (74%), flattened (18%) or tapered (8%) lips also reveal a subdivision based on labial treatment as well as the presence of a keel (SM Va-c, N=59). The convex rims without the above-mentioned features have been classified separately as SM V (N=35).

Within the subseries, the inflection of the lip towards the exterior is the most significant element (44%), followed by the keels (40%). However, the sinuous rims also enjoyed a certain popularity (37%). Interior thickening of the lip is restricted to the SM Vc subseries and perhaps even to the keeled profiles more generally. More importantly, the corner points of the keels are often very thin. They measure between 2 and 3 mm, clearly explaining why this part of the vessel has that many fractures. The diameters vary between 8 and 55 cm. A frequency peak (N=91) is observed at 17 cm, constituting a ceramic container with a fairly small diameter, but also at 24 cm or between 22 and 26 cm (Fig. 5.20).

The preponderance of mineral pastes (85%) is noteworthy with regard to this series. The sand temper (59%) dominates and is followed by the same temper containing inclusions of mica (24%). The popularity of mixed temper is respectable (14%) whereas vegetal temper is almost absent with only three individuals. The reducing-oxidizing technique is as popular as the oxidizing one (both as much as 37%). The technique involving a reducing firing environment is least popular

133 Diameters over 30 cm are measured per 2 cm.

(21%). We were not able to distinguish sufficient associations between temper and firing mode, with the exception of the fact that the oxidizing mode did not show any mixed or vegetal pastes as was the case with SM III.

Approximately 45% of the elements were decorated. As much as 28% hereof was collected during the excavation of the features. The remaining 72% consisted of handpicked elements. This high percentage is due to the presence of elements found in features which can also be attributed to the collection of whole vessel shapes (75%). The application of a red slip to the exterior is the most popular decoration mode (76%). The other red slip elements (interior and bifacial) were both found on one element and thus rare. Other means of decoration (22%) consist of incisions and additional simple modelling of which the modes of fingernail impressions on the rim are rather heterogeneous and hardly informative. With 31% the subseries SM Vc proved most popular with regard to application of red slip to the interior.

SM I and **SM II** These two are minor series when compared to SM III and SM V, but more popular than SM IV and SM VI. They are quite similar and correspond to open vessels. SM I has a rectilinear profile (N=63, 11%) whereas SM II a convex profile (N=62, 11%). SM I is characterised by means of its pointed, rounded and flattened lip shapes.

SM II features a unique type of labial treatment: the so-called "hollow" rim, as defined in a proper subseries SM IIb. This remarkable category consists of 17 elements and represents 27% of this series, i.e. 3% of the total of constituent rims. Interestingly, the hollow rim individuals were exclusively found within the archaeological layer. It may thus be added here that we did not come across a complete vessel shape or any corresponding base fragments, but it is presumed that this specific rim belonged to a platter. Despite the lack of radiocarbon dates as to this subseries, they are considered to belong to Phase 2 because of their paste, thin walls, morphology and decoration mode.

SM IIb has proper dimensions and characteristics: (a) the application of uniform red slip to the interior, (b) very thin profiles with an average of 6 mm (body and rim elements), (c) a diameter with an average of 27 cm, (d) an exclusive mineral temper and (e) an oxidizing firing technique. This uniformity allows us to recognize a characteristic and well-defined pottery ware.

Dissimilarity between these two modal series is the absence of the keel with SM II. SM Ia represents open vessels with straight rims and a keel (27%). SM IIa represents open vessels with convex profile and inflected lips. The latter inflection is only marked at the interior of the vessel and is stressed when creating a (flaring) lip.

The paste of SM II (without SM IIb, N=44) consists mainly of quartz sand (61%) which is followed by means of a vegetal (25%) and mixed temper (14%). SM IIa slightly dominates because of a *kwepi* temper. The latter temper agent combined with a reducing firing technique occurs in all fragments. When touching this type of sherds your fingers will feel soft and "soapy." In fact, the latter phenomenon dominates the remaining part of this modal series (53%). The oxidizing firing environment enjoys general popularity (39%).

As to SM I, the sand temper (79%) is followed by mixed temper (17%). Vegetal temper is rare (N=2). The oxidizing firing technique dominates (56%) and is associated with mineral tempers (92%). Other firing modes are less frequent.

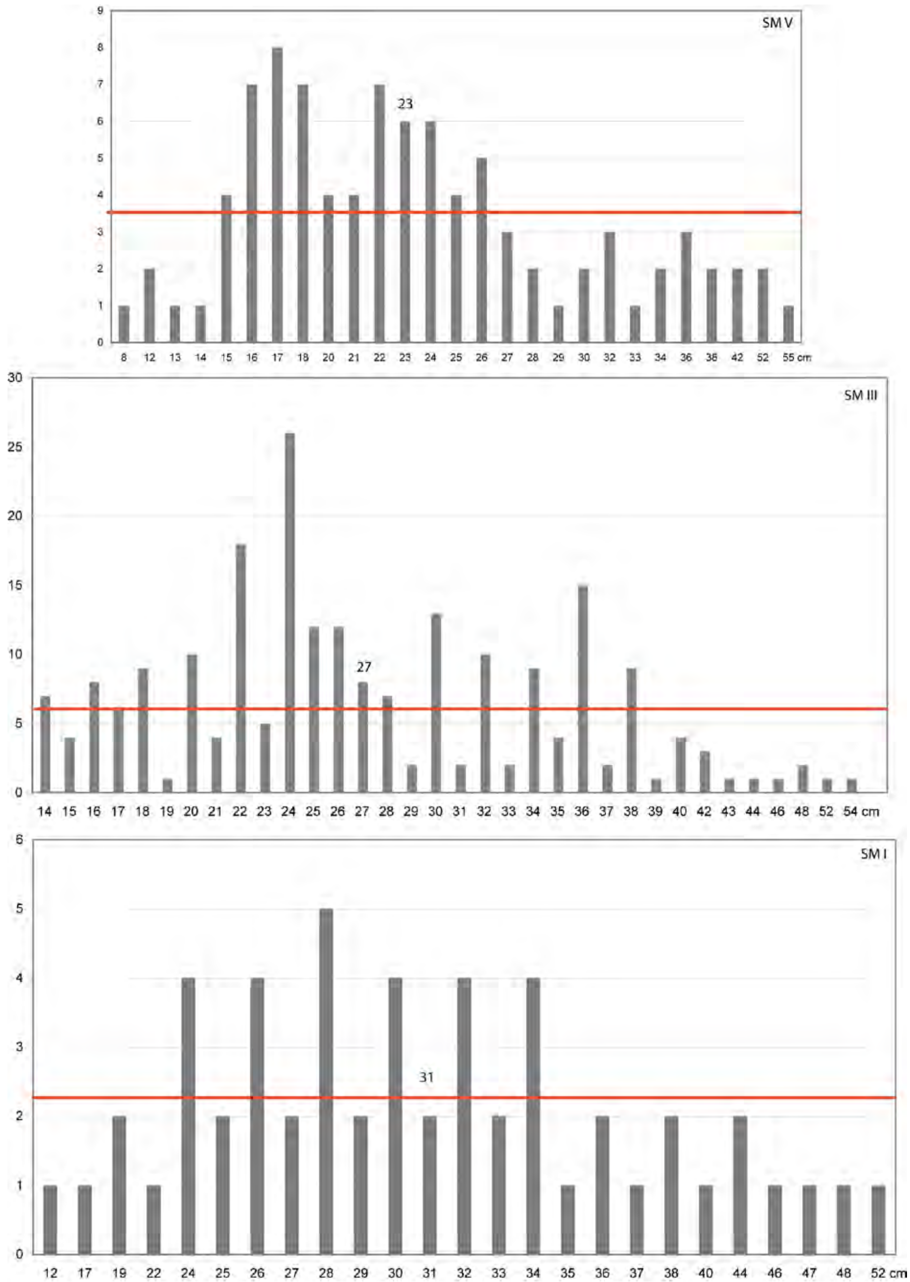

Figure 5.20. The diameter frequency of SM I, V and III. The red line indicates the most frequent number.

The average of SM I diameters (N=53) is 31 cm and varies between 23 and 34 cm (Fig. 5.20). SM II is more heterogeneous. It displays an important peak (N=53) at 24 cm and shows a less significant peak at 18 cm (Fig. 5.21). The decorative aspect for both SM I and II is small (excluding SM IIb) when compared to SM III and SM V: 8% and 16% respectively. Regarding both series we can mention three individual fragments with a red slip and two examples with an incision on the interior. SM II and SM IIa include two modelled elements or lugs on the rim. The majority of the decorated examples were found in the archaeological layer.

SM IV and **SM VI** Without considering SM VII and SM VIII (see below), these modal series are the least important. They consist of 32 and 25 individual fragments, i.e. 6% and 4% of the rim total respectively. Both represent restricted

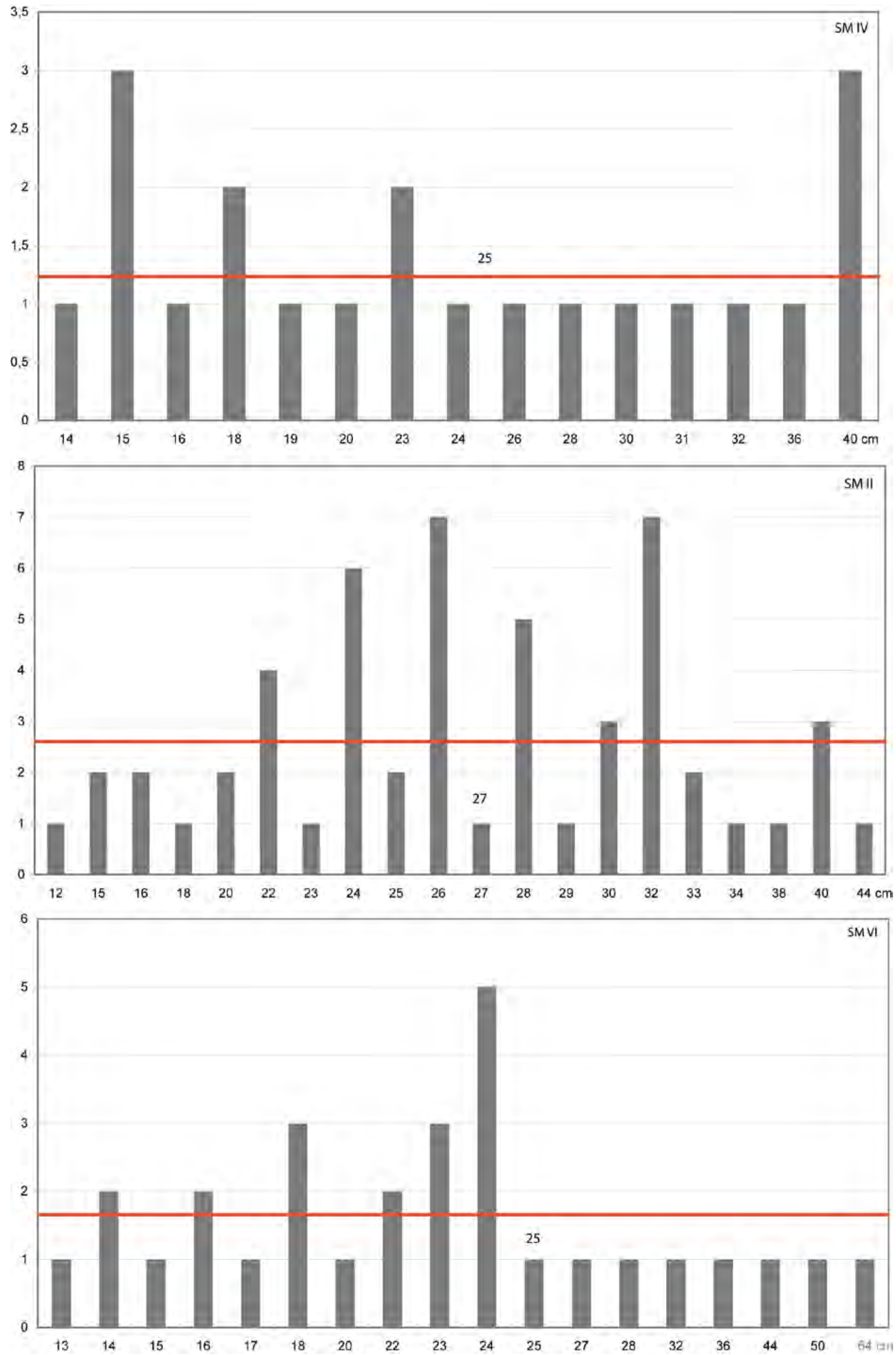

Figure 5.21. The diameter frequency of SM II, IV and VI. The red line indicates the most frequent number.

vessels of which SM VI features a concave profile (SM VI, 53%). SM IV has the same profile, but is more complex with a keel plus an inflection of the lip towards the exterior (SM VIa, 47%). SM IV also includes restricted vessel shapes with a straight profile. The presence of a keel is the most significant trait of this series (76%). Almost all individual fragments of both series were collected from the archaeological layer.

Pointed (15%), rounded (70%) and flattened (15%) lips characterise the labial finishing of SM VI. The labial distribution of SM IV implies pointed (40%), rounded (56%) and flattened (4% or one individual) lips. Both series feature an inflection of the lip towards the exterior. The latter trait in combination with a keel is a significant characteristic as it served to separate this series.

The paste of SM IV consists largely of a sand temper (84%), but also includes three individual items with a mixed temper and one with grog. Oxidizing firing dominates (44%), followed by reducto-oxidizing (36%) and by reduced firing (20%) of which the latter corresponds to a mixed temper. Regarding the SM VI paste we observed an identical signature whereby sand temper dominates (88%) and vegetal and mixed tempers form a minority. Similar numbers exist with regard to firing: oxidizing (41%), reducing-oxidizing (44%) and the far less popular reduced firing (15%).

The average rim diameter of SM IV measures 25 cm. It features four minor frequency peaks at 15, 18, 23 and 40 cm (N=21). In other words, one group measures between 15 and 23 cm whereas a second measures *c.*40 cm (Fig. 5.21). The diameters of SM VI vary between 22 and 25 cm and it has another secondary peak at 18 cm (N=29).

As much as 35% of SM VI is decorated. SM VIa forms the majority (82%) hereof and differs from the others because of the addition of red-on-white slip to the exterior. Two other decorated elements are attributed to SM VI. They include one individual element with an incision on the interior and a second with a modelled appliqué. In all, 28% of series SM IV is decorated: three elements with a red slip, two with incisions and two modelled appliqués.

SM VII and **SM VIII** The rims of SM VII distinguish themselves by means of a diameter varying between 6 and 10 cm. The general shape resembles a bottle or a neck. SM VII is rather small and contains 15 individual elements, i.e. 3% of the entire population of the total of constituent elements. Apart from the above-mentioned traits, it displays very little homogeneity. This is perhaps due to the small sample, to the fact that five items were found in features (e.g. pits with ceramic caches) or that Phases 2 and 3 are mixed.

The cache fragments also represent the decorated specimens: one red slipped rim, one polychrome painted rim and one with a thicker part around the neck of a bottle. SM VIII presents us with unique elements when compared with the other series.[134]

The keeled rim profiles

The composite and complex shapes with keels (SM Ia, IIIc, IIId, IVa, IVb, Vb, Vc and VIa, N=164) as well as the pseudo-keels, or "interior marked carination" (SM IIa and SM IIIb, N=35), represent a fair number of individuals (N=199), i.e. 38% of the series referred to as SM I-VI. This manufacturing technique appears to be an important trait of the assemblage from CSL. It is highly possible that the upper

134 Since no chemical analysis has been conducted in order to determine the origins of the colours (vegetal or sediment vs. painting or slipping), painting and slipping (Fr., *engobe*) are interchangable for this matter. In French, the encompassing word *aplat* for a thin, coloured film applied to the surface of the vessel, serves this matter very well. In a similar way, the difference between incising soft and/or leatherhard pots vs. incising or engraving (Fr., *gravure*) fired pots is used for both methods only when mentioned explicitly.

parts of broken keeled rims can be included in the non-keeled rim elements. In this case, the presence of a (rounded) inflected lip towards the exterior or a thickened rim (between keel and lip) serves as a marker or guiding element in order to determine these specific rim series.

The mineral temper (83%) dominates the paste of the keeled rims. The sand temper is most popular (63%), followed by the same temper with mica (23%). Mixed temper (11%) precedes vegetal temper (5%) which is hardly of any importance. All grog-tempered rims are keeled. The oxidizing firing technique occurs with 44% of the keeled elements which are (almost) exclusively tempered with minerals. The reducing-oxidizing technique represents 36% of the total of which 80% has a mineral temper. As to the reducing firing technique (20%), the vegetal tempers balance the mixed ones.

The rim thickness varies between 3 and 10 mm (mean 6.3 mm). The mean frequency of the rim thickness (N=25) enables us to define the most frequent thickness. Ranging between 4.5 and 8 mm, it can be considered as a fine ware with regard to handmade ceramics. The diameter varies between 7 and 55 cm (mean 25 cm). The mean frequency of the orifices reveals three popular diameter sizes: (a) between 14 and 19 cm, (b) between 21 and 25 cm and (c) between 27 and 33 cm.

Almost 35% of the keeled elements are decorated of which 25% was collected from the features, i.e. those with ceramic depositions. As much as 22% of the keeled individuals were taken from the features. The most abundant decorative element was red slip (78%) of which 61% was applied to the exterior, 28% to the interior and 15% to both sides. With regard to the rims with red slip on the interior, these are primarily added to SM III (84%), and concerned a uniform red slip. However, the application of red slip between the lip and the keel (11%) or even a white-on-red slip (11%) must be noted here. Other slip-decorated elements (e.g. the application on the lip or a dark red-painted geometric design on a lighter coloured red slip) occur infrequently. The remaining decoration modes (15%) are less important and fairly heterogeneous. Modelled appliqués are rare (e.g. small clay strips, handles).

In conclusion, keeled profiles represent a very homogeneous ensemble based on their: (a) mineral paste, (b) fine wall thickness (6 mm) and (c) the application of red slip to the interior or exterior. Keeled rim profiles may represent three types of bowls, based on their diameter.

The bases

The base profiles contained 187 individual elements, i.e. 25% of the total amount of ECs. They may be divided into seven modal series (Table 5.8) and have been defined according to their morphology: flat bases (SM 1-3, 54%), concave or dimpled bases (SM 4-5a, 40%), rounded bases (SM 6, 1.6%) and annular bases (SM 7, 3.7%). The latter two series are less dominant. Flat bases are the most popular, followed by dimpled bases.

The flat bases A subdivision was created with regard to flat bases (N=100), in accordance with the angle and smoothness of the application of the first coils, to wit: (a) flat bases with a straight profile (SM 1, 34%), (b) flat bases with a convex profile (SM 2 and SM 2a, 52%) and (c) flat bases with an appendicular profile (SM 3, 14%). Another subdivision concerns bases with a convex thickened

SM	N	Shape	Profile
1	34	Flat	Rectilinear
2	38	Flat	Convexed
2a	14	Flat	Convexed and "bombed"
3	14	Flat	Appendicular
4	18	Dimpled	Rectilinear
5	33	Dimpled	Convexed
5a	23	Dimpled	Convexed and "bombed"
6	3	Rounded	x
7	7	Annular	x
8	3	Unknown	x
	187		

Table 5.8. The base series SM 1-7.

profile. The thickening of the interior of the base is dubbed here a "bombed" base. It may refer to a certain fabrication technique. In it the attachment point of the first coil, which creates the first part of the lower wall, is modelled and therefore not only much thinner but thus very fragile, too.

Mineral paste (79%) dominates this series, followed by mixed (20%) and vegetal paste (9%). As to the fragments with a mineral paste, the oxidizing and reducing-oxidizing firing environments are balanced: 45% and 37% respectively. Among those with other pastes, the reducing technique is the most important one (77%).

The majority of the bases have a diameter varying between 8 and 13 cm with an average of 11 cm. When comparing the diameters with the temper modes, we observed that flat convex bases with the most frequent diameter tend to have a sand paste (58%), notably paste Nos. 11 and 12. Furthermore, bases with a pedestalled profile express a slight preference for mixed and vegetal pastes as well as for diameters ranging between 11 and 14 cm. Twelve elements were decorated (12%). One base had incisions and eleven bases included a red slip, principally applied to the exterior (64%).

The concave bases These bases (N=74) were split into two groups: (a) concave bases with a straight profile (SM 4, 24%) and (b) concave bases with a convex profile (SM 5 and SM 5a, 76%). The latter series has been subdivided by means of isolating the convex profiles with a bombed aspect. This turned out to be the case regarding flat bases, too. The thickness varies between 4 and 13 mm (average 8 mm). The diameter measures between 3 and 18 cm. The mean frequency is between 7.5 and 13 cm.

Mineral paste (74%) dominates of which sand temper is most popular (67%). Mixed temper (15%) is the runner-up of which No. 31 is very popular. Vegetal temper is only represented by means of the *kwepi* temper (No. 22, 11%). It is much favoured in association with a reducing firing technique.

As the flat bases have indicated, concave bases with convex profiles possess a mineral paste (64%). Straight-profiled concave bases, their highest frequency diameter measuring between 8 and 14 cm, form a minority (16%). Only ten individual elements (14%) were decorated of which one base was adorned with cross-hatched incisions. Only nine bases included red paint, 80% of which covered the exterior.

SM	N	Profile
A	3	Straight
B	3	Pointed
C	4	Rounded
D	9	Thickened
E	10	Appendicular
	29	

Table 5.9. The griddle series SM A-E.

The rounded and annular bases Three individual bases had round bases. Considered rare, they are of little informative value. Annular bases consisted of seven elements of various shapes: high and low annular rings. The lower ones were placed in a straight angle and the higher ones in a more diagonal direction. We observed all the types of paste and only one decorated fragment (red slip).

In sum, bases with a convex profile are the most homogeneous group with regard to diameter frequency and mineral temper. Flat bases with pedestalled profiles and convex bases with straight profiles were preferably processed with mixed as well as vegetal tempers.

The griddles

This morphological category consists of 29 constituent elements, i.e. less than 4% of the total. The griddles were divided according to their rim shape: (a) straight (SM A, 10%), (b) pointed (SM B, 10%), (c) rounded (SM C, 14%), (d) thickened (Fr., *bourrelet*) (SM D, 31%) and (e) appendicular (SM E, 35%) (Table 5.9).

The first three modal series are rare. Only SM D and SM E provide us with information but of little statistic value which is presumably due by the small quantity and poor quality (only small fragments). Although griddles are generally supposed to be abundant at pre-Columbian sites, their quasi-absence may suggest a specific site function of the excavated area. Using griddles in this part of the site may have been restricted; hence, a certain place for griddle-related activities is proposed here.

The average thickness of SM D and SM E measures 15 mm. Their diameters vary between 15 and 60 cm. As much as 52% of the griddles possessed a mineral temper (52%), the remainder either a mixed or vegetal temper. Only one griddle (EC 297) featured decorative incisions (circles). We would like to mention the presence of fairly small, thin griddles with an appendicular profile and mineral paste, i.e. EC 23, EC 577, EC 611. In fact, they rather resemble flat platters with a high straight rim. In spite of their appealing shape we positioned them among the griddles.

5.5.3 The description of the complete archaeological vessel shapes

We recorded 38 vessels of which 31 reveal a complete vessel shape and seven projected shapes. They consist of 28 forms found in 18 pits. Four pits contained triple depositions and two double ones. Eight forms were encountered in the archaeological layer (Fig. 5.22). More than half (55%) of the vessels are decorated. All have red slip, but any incisions are absent. As mentioned before, we presume that the pits with complete ceramic vessel depositions are inhumation graves containing personal ceramics or even especially manufactured ones for the (funerary) occasion. On the one hand, if the latter case is accepted, these vessels represent a bias and may not necessarily reflect the utilitarian ware. On the other hand, one should keep in mind that the distribution of constituent rim elements between features and archaeological layer was similar and did not reveal such a statistical bias.

After an analysis of the constituent rim fragments, we continued to apply the same criteria with regard to the complete vessel shapes, to wit: (a) marked interior (pseudo-keel), (b) position of the keel, (c) general shape (open, restricted, necked), (d) base shape (flat, concave, thickened), (e) inclination of the rim and profile, inflection of the lip towards the exterior, (f) thickening of the rim and (g) the rim diameter compared to vessel height. In fact, the following description or exercise enables us to compare the repertoire of complete vessel shapes with those of the ECs. It may seem superfluous, but does indeed render a check of our analysis and chronology.

The above-mentioned diagnostic elements combined with the radiocarbon dates also allowed us to distinguish 13 vessel groups (Group A-M): (a) Group A-I represents Phase 2, (b) Group J-N represents Phase 3 whereas (c) Group K represents rare vessels which cannot be securely attributed to a certain phase.

Group A Three open composite vessels with a medial interior keel represent this group. These bowls were found together in one and the same pit (F 315) and are considered to be contemporaneous. They consist of constituent elements EC 729 (SM Ia), EC 730 (SM Ia) and EC 731 (SM IIIa). One bowl has a bifacial red slip application. The lips are tapered and have thickened dimpled bases. The wall thickness varies between 5 and 6 mm and the base thickness between 8 and 9 mm. The rim diameters vary between 19 and 24 cm and the base diameters between 7 and 10 cm. This group has a mineral paste. The firing was carried out in an oxidizing environment. The height of these bowls ranges from 7-10 cm. They presumably served to drink beverages from.

Group B This group consists of five open composite vessels with concave rim profiles and are keeled at the lower part of the recipient, to wit: EC 69 (F157, POZ-30950), EC 94, EC 424, EC 490 and EC 716. All were attributed to SM IIIc, but were found in dissimilar anthropogenic features. The lips are rounded. The rim diameter varies between 22 and 28 cm. The wall thickness measures between 5 and 7 mm and base thickness between 5 and 8 mm. In general, the bases are represented by means of flat specimens with a diameter varying between 10 and 14 cm. The firing environment is oxidizing and the paste is mineral. Two vessels are decorated with a red-slipped zone on the interior between the lip and keel, forming a "red band." One vessel has a uniform red colour (EC 490). Another includes a geometric design in white paint (EC 424). The heights are 6 cm (N=2) and 9 cm (N=3). These small platters were probably used as serving ware.

Group C This group consists of two open composite vessels, or deep platters, with a rounded lip everted towards the exterior: EC 68 (SM Ia; F 157, POZ-30950) and EC 402 (SM IIId). With regard to EC 68, the thickness of the upper part of the wall measures 5 mm It has a straight but slightly inclining profile. The height is 6 cm and rim diameter 25 cm. Its concave base measures 11 cm in diameter with a thickness of 7 mm. This platter was found in the filling of the canal (F 157) along with two other bowls, EC 67 (Group H) and EC 69 (Group B). The platter was probably used as serving ware.

The other platter (EC 402) measures 10 cm in height and has a rim diameter measuring 23 cm. The upper parts of the wall are rather thin (6 mm) showing a grooved incision at the exterior marking the (pseudo) keel. Its paste consists of mineral with mica. This group is considered heterogeneous.

Group D This group also consists of two open composite bell shaped vessels or pots with an outward directed concave rim profile and a medial keel. However, the general dimensions are larger than the former group: EC 87 (SM IIId) and

EC 740 (SM IIIc, F 120, POZ-30943). The lips are rounded with diameters of 34 and 32 cm, respectively. The wall thickness varies between 9 and 6 mm and the thickness of the bases measures 11 mm. The base diameter measures 8 cm with both vessels. The heights are 18 and 11 cm respectively, and represent the only difference between both vessels. The paste of EC 740 is mixed. The thickened base is slightly concave. This group does not feature any decorative elements.

Group E This group also consists of large open composite vessels but with rims inclined towards the exterior with a concave profile. Both possess medial and superior keels, but their dimensions are even larger than those of the above-mentioned group. The morphology of both groups can best be described as bell shaped vessels: EC 76, EC 680 and EC 721 (POZ-36923), attributed to SM IIId. The heights are 10 and 14 cm and the rim diameters vary between 42 and 56 cm. The wall thickness measures between 6 and 7 mm and the thickness of the bases measures between 5 and 9 mm. As to the orifices, the diameters of the flat bases vary between 16 and 18 cm. The firing is variable. The pastes are sandy. This group did not feature any decoration.

Group F This group consists of three open bowls with rims inclined towards the exterior and a concave profile with medial keels: EC 84 (F133, POZ-30939), EC 96 (F130, POZ-30946) and EC 724 (F267, POZ-30951) of which all can be attributed to SM IIId subseries. The heights are 7, 6 and 11 cm, respectively. The upper part of the wall is inclined towards the exterior, but its extreme concavity may give the impression of a closed vessel shape. In fact, the latter trait is accentuated by means of a thickening of the rim profile and an inflection of the rounded lip towards the exterior. The rim diameters measure 15, 19, and 20 cm, respectively. The wall thickness measures between 6 and 7 mm and the thickness of the bases measures 8 mm. All bases are thickened and are either flat or concave. Their diameters vary between 7 and 11 cm. The paste consists exclusively of sand. The firing was carried out in an oxidizing environment. Only EC 96 is decorated by means of a red band around the top part (7.5R 5/8).

Group G This group consists of two small bowls with straight rim profiles slightly inclined towards the exterior and medial keels: EC 691 and EC 727. Both have been attributed to SM Vb and are equally high, i.e. 7.5 cm. These two bowls have a red slip (7.5YR 4/6) applied to the exterior wall of which EC 727 features a band of white slip on the shoulder of the keel. The lips are rounded. The wall thickness measures between 5 and 6 mm, and the orifices measure between 15 and 17 cm. The diameters of the flat thickened bases measure between 8 and 9 cm and their thickness varies between 5 and 10 mm. The paste of EC 691 is mixed and that of EC 727 has a sand temper. The firing technique was oxidizing. Only EC 96 is decorated by means of a red band around the upper part of the bowl.

Group H This is the most important group and consists of the following constituent elements: EC 67 (F 157, POZ-30950), EC 89-92, EC 715, EC 718, EC 725 (F 285, POZ-30952) and EC 728. The pairs EC 90 and EC 91 (F 106, 7.5R 4/6) as well as EC 715 and EC 718 (F 252) were found in the same pits. They represent small keeled bowls with concave rims inclined towards the interior and possess a restricted hyperboloid shape (Shepard 1956:235, Fig. 24; Rice 1987:219, Fig. 7.6). The concavity of the rim, the inclination towards the interior and the thickening at the interior of the rim profile may suppose an open vessel as to a small number of specimens (if the keel is missing). However, we considered this group to have restricted vessel shapes attributed to SM Vb or SM Vc. One specimen is attributed to SM VIa.

The lips are rounded and the rim diameters vary between 2 and 18 cm. The vessel heights vary between 7 and 11 cm and wall thickness between 5 and 8 mm. The thickened concave base diameters range between 9 and 12 cm and their thickness between 5 and 9 mm. Pastes are mainly composed of mineral temper. Only one had a vegetal temper (EC 91) and the other a mixed one (EC 89). All were fired in an oxidizing environment with the exception of the vegetal-tempered bowl. It is important to stress the coexistence of both tempers (vegetal and sandy) within the same group which were also found in the same pit (EC 90 and EC 91 in F 106).

This group features six decorated vessels. All specimens have a red slip applied to the exterior of which three pieces are slipped all-over. Regarding the others, slip was restricted to the zone located between the keel and the lip (F 309; colour between 7.5R 5/8 and 10R 4/8 hues). This group is considered very homogeneous. Its repetitive geomorphological traits display a well-defined production of hyperboloid bowls.

Group I This group consists only of two collared vessels with a red-slipped exterior: EC 88 (7.5R 4/6, F 143.2, POZ-36922 and POZ-36926) and EC 99 (F 120, POZ-30943). The collar of the first specimen is restricted to 7 cm and that of the latter to 20 cm.The base diameters measure 15 and 12 cm, respectively. The paste of the first vessel is a mineral one whereas the other vessel has a mixed temper. The morphological outline is similar. However this group's characteristics differ greatly and is therefore considered heterogeneous.

Group J This group is composed of two keeled complex vessels of which one represents a necked upper part and the other only a base: EC 95 (F 132, POZ-30947) and EC 710 (F 206). We hold the view that these two pieces (SM VII) are complementary: one represents (perhaps is?) the missing part of the other although they were found in different pits, at a distanced of *c*.10 m from each other.

These represent highly complex vessel shapes with painted decoration applied to the exterior. The opening of the lower neck measures 11 cm and the keel measures 18 to 20 cm. The pastes are dissimilar but the complex vessel shape and the polychrome painting bring them close together. This may even introduce a special usage of these vessels of which one is dated to the beginning of Phase 2. In retrospective, however, the polychrome and complex morphology may also present an affiliation to the LCA (cf. Chapter 9) suggesting that the result of the radiocarbon date is too early.

Group K This group consists of two composite pots with the same type of decoration: the application of vertical clay strips between the lip and the keel which have been indented by means of fingernails. Both shapes are keeled, but have very different dimensions (EC 398 and EC 399). The first specimen represents a keeled vessel with a rim inclined towards the interior and features a D shaped handle. The rim diameter measures 14 cm and its base thickness meaasures 8 mm. This specimen has a mixed temper and was fired in a reducing environment. The other specimen is a 6 cm high cup of which the base is fire-cracked. To the naked eye, its paste did not show any temper at all and it appeared to be produced from pure clay. We consider this small vessel to be a finger pot. Both are found in the dark earth layer and may belong to Phase 2 or 3.

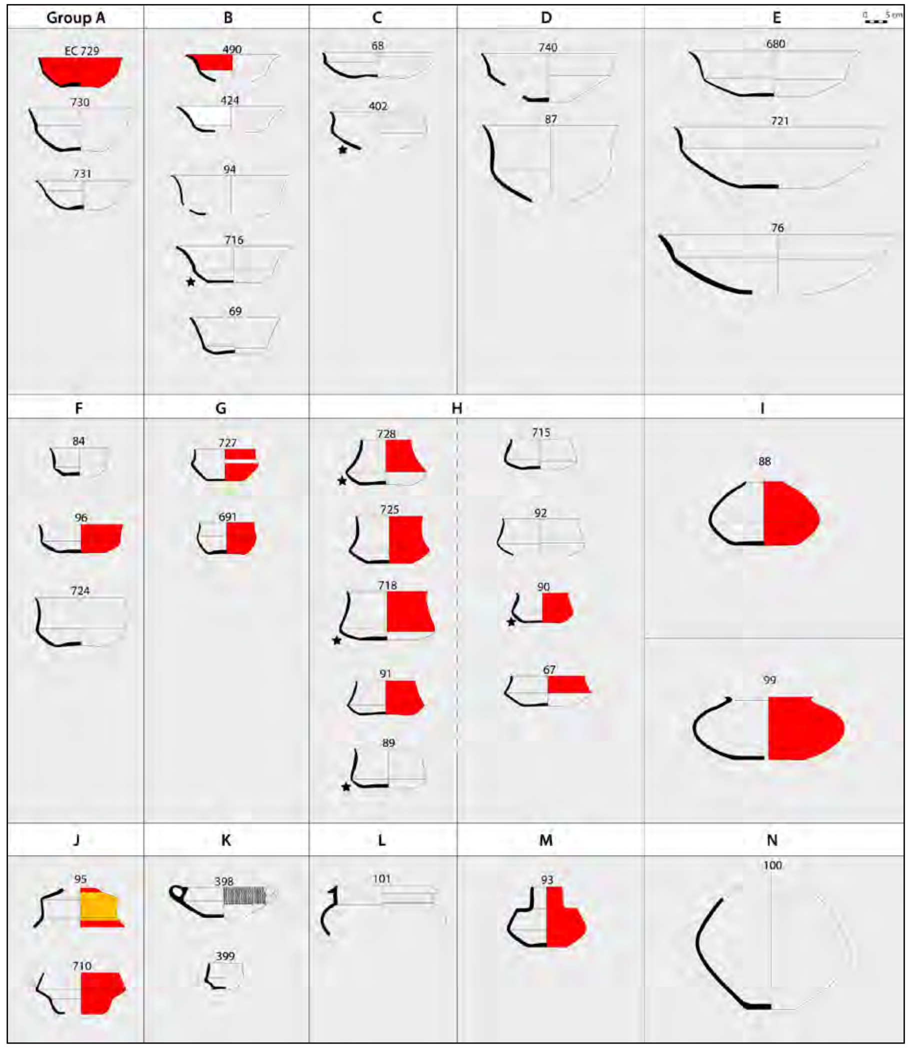

Figure 5.22. An overview of the ceramic groups A to N. (Red) slipping on the right is located on the outside. On the left, it is applied on the inside. The black star indicates starch grain analysis.

Group L This group consists of only one vessel, to wit EC 101 (F 399). However, a similar rim (EC 530) was found in the same sector. It comprises of a straight collar (thickness 7 mm) with a diameter of 21 cm. The lip is inflected at an angle of 90° towards the exterior evidencing three grooves around the vessel lip.

This type of rim profile is a highly diagnostic element with regard to necked jars or toric pots. In general, these vessels have two keels, one at the base of the neck and the other just above the base. The upper keel is marked with a scraped groove. Despite the fact we do not have a complete vessel profile, it is possible to project the missing part as the morphology of this vessel is standardized. Indeed, it represents one of the most characteristic Koriabo vessel shapes. The doughnut shaped wall is often divided in four panels separated by means of vertical grooves. Each panel is decorated with fine geometrical or curvilinear incisions and furnished with (anthropomophic or zoomorphic) modelled appliqués. Figurative handles placed between the rim and the first (upper) keel now and again mark the panels. Any red slipping or painting is absent. The temper agent consists of sand. The vessel was fired in an oxidizing to reducing environment. Necked jars are often highly decorated and may have had a special function during ceremonies and/or formed objects of trade.

Group M This group consists of only one complex vessel shape: EC 93 (F 116). It comprises of a bottle with a collar showing an orifice of 7 cm, of which the upper keel measures 13 cm whereas the lower keel meausures 16 cm. The wall thickness measures 8 mm and the thickness of the base measures 9 mm. Its height is 14 cm. The base is bombed as to a diameter of 8 cm. The temper is vegetal and fired in a reducing environment. This specimen has been dated (POZ-36925). It was found very close to pit F 121 (Group N) which resulted in a similar radiocarbon date.

Group N This group includes one large necked spheric vessel: EC 100 (F 121, POZ-20945). The collar has a diameter of 15 cm. Its vessel is at least 30 cm high. Around the base of the neck an extra coil was applied in order to accentuate the neck. The wall thickness measures 9 mm and the base thickness measures 13 mm. The diameter of the base measures 11 cm. This vessel has a vegetal (perhaps grog) temper and was fired in a reducing environment. The burnt bone found in this jar may indicate that this recipient served as an urn.

5.5.4 The decoration modes

The decorated fragments (N=2485 or 6.7%) represent a modal category of the entire ceramic CSL assemblage (Annexe 3.5.4). The handpicked material taken from the archaeological layer (6.9%) and the anthropogenic features (6.5%) seem to differ little. The decorative repertoire is fairly basic and consists mainly of the application of slip (92%).

The application of slip

Red slip (Fr., *engobe rouge*; 7.5R 4/6, 7.5R 5/8, and 10R 4/8 hues) is the most popular decoration mode (87%). As much as 63% of the slipped ceramics include red slip applied to the exterior of the vessels, 35% covers the interior and 2% both sides. In general, the slip is uniform and monochrome. However, rare variations have been observed, such as spiralled circles of a darker red on a lighter red slip (N=5, 0.2%) or a "red band" located between the keel and the lip (N=25, 1.1%). Other colours are less important. The second most popular slipped decoration mode concerns the application of white slip (3.6%) of which 67% was applied to the exterior and 31% to the interior. Now and again, a "white band," a simple stroke or even a complex design was recorded, but these elements remain rare. Black paint was identified on only seven items (0.3%).

Red-and-white (bichrome) slipping is, after uniform white slipping, the third most popular mode of slipping (1.5%). It must be stressed here that by red-*and*-white slipping: both colours have been applied separately on the bare surface. SM VIa regroups this type of decoration and reveals a diagnostic combination of morphology as well as a specific mode of decoration. The largest part of this red-and-white painting was applied to the exterior of the wall profile (83%). In addition, we identified several specimens with this type of painting on its interior or even on both sides. Fragments with polychrome painting were rare, too, and found only in Group J: yellow, orange and red (EC 95).

The high percentage of uniform red slipping is probably biased due to the quality of the ceramic material. We presume that any possible (complex) geometrical designs, especially made of white engobe, have disappeared through time. This can also be stated with regard to the application of vegetal resins which often provide the exterior of the ceramics with a thin brownish veneer. We

Type	N	Zoned
Simple lines	10	
Grooves	5	
Double lines	4	
Spirals	9	
Circles	2	
Complex	20	10
Parallel lines	34	8
Crossed parallel lines	8	
Hachures (zic)	8	8
Piquétages	15	11
Ponctuations	13	2
Incised clay strips	3	
Indented	2	
	133	**39**

Table 5.10. The various types of incisions.

observed remnants of this brownish colour on multiple soft and "soapy" sherds, possibly representing a marker with regard to Phase 3 or perhaps the LCA in general (cf. Section 5.5.7.1)

The incisions, punctations, and piquétage

The second most popular mode of decoration is incision (N=193, 7.8%).[135] A total of 57% was decorated on the interior and 42% on the exterior. With 57 elements (31%) of this collection, the sherd was too small to be able to identify the type of incision (Table 5.10). The most popular type of incising includes parallel incisions (28%), followed by complex incisions (16%). The latter consists of geometrical or curvilinear motifs. As to 12% we observed the application of small scraped or picked incisions produced by means of a pointy tool (Fr., *piquétage*) forming parallel lines or zoned geometric motifs. Hatched incisions (both fine hatching and coarse hatching) are also popular (13%), of which coarse hatching is the most popular. The fine hatching technique is represented only in a delimited zone (Fr., *cartouche*). The latter type of hatching resembles the so-called zone incised cross-hatched (ZIC) decorations as defined by Irving Rouse and named the 'Cedrosan Style' on Trinidad (Rouse 1947:94; Boomert et al. 2013).

Punctations are represented by 13 individuals (11%) of which two are zoned. Other types of incisions (simple traits, spirals) occur, but remain rare. The other identified types of incisions (e.g. wide grooves; Fr., *cannelures*), double-lined incisions, circles, regular spaced spatuled imprints on top of the lip or the careen) are all considered rare elements. More importantly, incisions were not identified in combination with slipped decoration techniques.

Modelling and pottery artefacts

The application of clay modelling is rare. It represents only 1.6% of all decorated specimens. In general, this technique receives much importance as a diagnostic element of pre-Columbian ceramic collections. It is therefore relevant to note the almost entire absence of this decorative element in the present ceramic assemblage.

135 We have adopted the description proposed by Anna Shepard (1956:195–203) concerning incisions.

We recorded eight fragments with clay strips, five fragments with biomorphic figurations, thirteen handles, ten lugs, and four modelled pedestals. With regard to the eight clay stripped fragments, four types were distinguished: (a) a single coil applied just below the lip (N=2), (b) a single coil with finger-top imprints on the upper part of the wall (N=2), (c) a single coil applied around the lower part of the vessel (N=2) and (d) spatuled incised coils applied vertically to the upper part of the vessel (N=2). As to handles (N=13), we mainly identified so-called "coiled" handles (N=9) consisting of two or three coils (9 to 12 mm) which have been applied to the rim and upper body part. The other handle elements remained unclassified with the exception of one D shaped handle (EC 398).

Biomorphic representations are limited to: (a) the figuration of small clay balls (Fr., *pastillage*) on necked jars forming a face (F 399, EC 101), (b) one clay roll with ears (F 162), (c) one eyebrow handle on a wall fragment (6B2) and (d) one fragment showing modelling of toes. The lugs represent very small lumps of clay placed on top of the lip or the upper part of the wall. In fact, it is thought that these lumps may represent stylised bio or anthropomorphic articulated members (e.g. legs, arms, tail).

A clay flute and two clay balls have also been identified. Other ceramic objects made of (discarded) sherds are represented by rounded or ground sherd fragments, which are often referred to as spindles. We also observed eight fragments with a drilled hole which may have served to suspend the vessel.

We must stress the presence of the so-called "hollow" rims that represent SM IIIb. This rim modelling technique (N=70) by folding the rim towards the interior and leaving a "hollow" rim, represented 2.8% of the decorated elements. It may well have served this ceramic assemblage as a diagnostic decorative element, albeit relatively rare.[136]

Last but not least, we must note the presence of *c.*4 kg of modelled, non-tempered clay. In certain cases, these (large) clay fragments evidence finger imprints and/or imprints of tree branches. We presume that this type of material was applied in wattle constructions (e.g. small walls, basements utilized in firing and/or combustion structures). The most significant quantity of this material was found in the lower fan area.

5.5.5 The Phase 1 ceramics

To the naked eye, the ceramics of Phase 1 appear quite dissimilar when compared with the more recent ceramics, but they only represent a small number of elements (Annexe 3.5.5). The ceramic collection provided twelve ECs, consisting of seven bases, eight rims and three complete vessel shapes: EC 692-4. These elements were found mainly in Sector 54D3 and in features F 56, F 140, F 397 and F 400 (Fig. 5.23). These ceramics are characterised by means of a heavy sand temper with possibly coarse pounded quartz which is easy to recognize on the eroded surface of the sherds. In addition, two vegetal tempered specimens were identified. The exterior was heavily eroded, but displayed a characteristic pale yellow colour (10YR 7/4-6). The smoother interior had survived in a better way, with a faint brownish colour (7.5YR 6/3-4). Other finishing techniques were not observed. The absence of griddles is noteworthy.

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136 See the results of the mechanical survey carried out at Les Hauts de Balaté, opposite the CSL site. Here decorated sherds were encountered of which one re^presented a hollow rim (Mestre 2008:26).

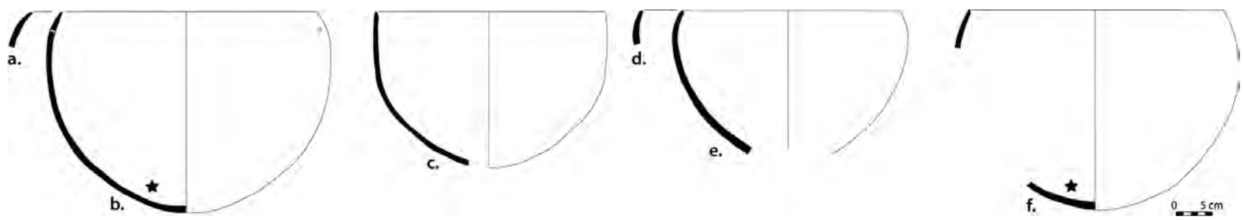

Figure 5.23. The vessel shapes of Phase 1. (a) EC 531, (b) EC 693, (c) EC 692, (d) EC 739, (e) EC 694 and (f) EC 741. The black star indicates starch grain analysis.

We only came across one general shape with regard to the three complete vessels which the remaining ceramic material from the archaeological layer (Level 3) confirmed. The morphology of these vessels is fairly simple and consists of spheric, slightly restricted vessels without keels. The bases are fairly thick, measuring between 9 and 15 cm. Their rounded almost pointed shape has a diameter varying between 5 and 8 cm. These bases were created by enrolling a large coil as a curled up snake would do and it is easily detectable with the naked eye. The wall thickness varies between 6 and 9 mm whereas the lips are flattened or pointed. The rim diameters vary between 28 and 35 cm and the height of these vessels measures *c.*30 cm. The rims are straight or convergent while EC 693 includes two "suspension" or "reparation" holes at 2 cm below the rim (Fig. 5.23b). The complete vessel shapes and the remaining ceramic material all feature very similar traits. This assemblage is considered to be very homogeneous. The morphology and its dimensions evoke a utilitarian function such as the cooking and preparation of food (cf. Section 5.5.7 for strarch grain analysis).

The chrono-cultural affiliation

The radiocarbon dates obtained as to F 362 and F 140 with precisely this specific ware allows the advancement of a first chronological marker for this assemblage between *c.*2500 and 2200 BC, or the second half of the third millennium BC, referred to here as the Early Ceramic Age, Phase A. This period is generally referred to as the ECA, and/or Late Archaic Age, but also as the Formative Period creating a transition between the Archaic and Ceramic Ages (Williams 1998, 2003).

Currently, the only reference assemblage in French Guiana is the ceramic assemblage of Eva 2, situated *c.*140 km to the east of CSL on a small white sand hillock (cf. Section 4.8). On the one hand, an important difference between both sites concerns: the presence of earth ovens at Eva 2 site and the dissimilar geological setting (terrace vs. white sand hill). On the other hand, both sites yielded early ceramics dated to the second half of the third millennium BC. However, the vessel shapes and notably the dimensions differ. The Eva 2 site contains small hemispherical bowls with thin walls whereas CSL includes fairly large spheric vessels with relatively thicker walls. It is thought that Eva 2 recipients may represent consumption bowls whereas the larger CSL vessels may have been utilised when processing food.[137]

137 The Eva 2 ceramic concentration in Pit 1 (F 31) may possibly represent a large spheric vessel (cf. Section 4.8).

Other ECA sites have been found in the Guianas, notably at Kauri Kreek (Versteeg 1978).[138] This dark earth site is situated at a distance of *c.*10 km from Apoera on the river terrace of the Middle Courantyne River (western Suriname) and dated *c.*1500 BC. The decorative aspects of the ceramics found here are entirely different from those of the eastern Guianas. However, my short visit in August 2012 to the *Zorg en Hoop* depot in Paramaribo evidenced similarities between the paste and the firing colour (yellowish-white) of the Kauri Kreek decorated rim sherds (Versteeg 2003:85, Fig. 5.16) and Phase 1 ceramics of CSL.[139] However, it is highly possible that this early site also represents a multicomponent site regarding to which Versteeg stated: 'the results of the radiocarbon dates do not correspond necessarily with the type of ceramics depicted in the article' (Versteeg 1978:18).[140]

More recently, the late Neil Whitehead and George Simon carried out research not only on the (anthropogenic?) hills of the Wironie Creek but also on the Nassau and Canje savannahs on the Lower Berbice River in eastern Guyana. For the first time after the discovery of Kauri Kreek, they came across similar fretwork or appliqué decorated ceramics at Dubulay Hill. The charcoal samples taken from the lower layers of their test pit at *c.*2 m below surface yielded a first date of 3000 BC (Whitehead et al. 2010). These mounds may possibly be multicomponent sites which certainly require further detailed (micro-)stratigraphic research (Versteeg 2003:94).

To conclude, the Phase 1 CSL ceramics as well as the early Eva 2 ceramics form part of the Early Ceramic Age assemblages of Greater Amazonia found in northwestern Guyana (Alaka Phase), northeastern Brazil, on the Lower Amazon River (Mina Tradition) and in northern Colombia (San Jacinto 1) (Williams 2003; Simões 1981; Imazio 1994; Roosevelt 1995, 1999; Roosevelt et al. 1991, 1996; Gaspar and Imazio 2000; Raymond et al. 1998; Oyuela-Caycedo and Bonzani 2005; Oyuela-Caycedo 2006; P. Hilbert and K. Hilbert 1980; Quinn 2004; Gomes 2008, 2011; Guapindaia and Ayres da Fonseca Jr. 2013).

Therefore, the Phase 1 ceramics of CSL and the early ceramic of Eva 2 were attributed to the <u>Balaté ceramic complex</u>, named after Crique Balaté situated to the north of Saint-Louis. It thus belongs to the larger early, or initial ceramic tradition of the northern Atlantic littoral of South America.

5.5.6 The Phase 2 ceramics

The ceramic typology of Phase 2 and 3 is based on 729 constituent elements, 38 complete vessel shapes and associated modes of decoration. Although we collected them from various stratigraphic layers, it was impossible to separate these layers in wares (with the exception of the so-called "soapy" ware). This was probably

138 The presence of fretwork decorated ceramics at onother site must be mentioned here. They were discovered at the Orealla site, just above the tideal reach of the Corentyne River (Williams 2003:341, Fig. 3.48g-h). Only one date was obtained for this site (BETA-20008, 1080 ± 60 BP). It may well be a multi-component site, too, because it includes hyperboloid bowls (ibid., Figs. 4.68.8-9).

139 No complete vessels shapes were detected in the Kauri Kreek boxes (N=2) when I visited the Zorg en Hoop depot. However small rounded bases were observed that resembled those of CSL.

140 Two samples were taken from the same test pit: (a) at a depth of 55-60 cm and (b) at 44-60 cm (below the surface): 3620 ± 160 BP (GrN-10303) and 2530 ± 30 BP (GrN-10875) or a calibrated date at 2σ (a) between 2400 and 1600 BC for the first and (b) between 800 and 500 BC for the second (Versteeg 1985:658). Versteeg favours the earliest date because this sample consisted of one charcoal fragment whereas the other consisted of various charcoal particles collected from this specific layer (Versteeg and Bubberman 1992:25, 59).

due to the homogeneity of the dark earth layer during mechanical decapage. The morphological dissimilarities and temper modes (kwepi or sand) in combination with the radiocarbon dates marked the differences between the two ceramic phases. This enabled us to attribute a very large part of the ceramic assemblage to Phase 2 and a smaller part to Phase 3. In fact, the elements not attributed to Phase 2 were consequently supposed to belong to Phase 3 in concordance with the dated features of the latter phase. Here one must also be fully aware of possible trade wares and other undated occupations (Fig. 5.25).

The analysis of Phase 2

The rim profiles evolve around SM III (45%). This important series is followed by SM V (17%), then by SM I (11%) and finally by SM II (11%). The others are considered minor series, but are nevertheless of significance because of their well-defined morphological traits, i.e. SM IV, SM VI. As to all modal series we identified popular morphological traits were: (a) concave rim profile (54%), (b) keels (38%; pseudo-keels included), (c) inflected lip treatment (30%) and (d) convex rim shapes (28%). The remaining characteristics are less in number, but their presence is nonetheless pertinent. For example, the hollow rims (SM IIb) represent a minor subseries, representing a very homogeneous ceramic ware, if we accept they belong to Phase 2. This appears plausible because they have not been found at La Pointe de Balaté.

Furthermore, certain series entailed a correlation of particular morphological traits and decoration modes which occur together. This refers to a possible standardization among the potters at CSL. The most significant recipients are the high quality keeled hyperboloid bowls with concave rim profile (SM IIIc-d) and the hyperboloid bowls with a convex profile (SM Vb-c) or Group F-H. Their rim diameters vary between 12 and 20 cm. The wall thickness is fairly thin with an average of 7 mm. The diameter frequency of SM III and SM V together enables us to define three vessel sizes with a similar morphology. They measure: (a) between 14 and 18 cm, (b) *c.*24 cm (between 22 and 26 cm) and (c) 35 cm (between 30 and 38 cm). When this size morphology analysis is projected on the chart of complete vessel shapes, we may assume that the keeled hyperboloid bowls, i.e. Group H, corresponds to the above-mentioined group (a) and that the above-mentioned group (b) corresponds to Group B and C whereas size group (c) corresponds to Group D and E.

The morphology of the subseries of SM III and SM V are also homogeneous. However, they differ with regard to paste, firing technique and decoration modes. Here we must combine the typology of the complete vessel shapes with the EC register in order to obtain projected vessel types. This stylistic crossing may create a theoretical bias between the anthropogenic features and the archaeological layer, but we recall no statistic difference between both registers. The three subgroups as to SM III and SM V are:

a. The keeled hyperboloid bowls with a uniform red slip applied to the interior or exterior. The partial application between the lip and the careen, or "red band," is related to SM V (see Group H). Incisions are absent;

b. The keeled bell shaped basins were not only decorated by means of a red and/or white-slipped interior ("band" included), but also by means of applying incisions, or *piquétage*, to the interior of the rim. Although we have not identified this type of decoration among the vessels taken from the features, it may point to another use or origin. The incisions represent parallel or cross-hatched lines applied just below the lip and/or are zoned. *Piquétage* is mainly represented by means of geometrical designs also added below the lip or either in a cartouche;

c. The keeled basins are seldom decorated. In the interior they may feature zoned, cross-hatched incisions forming geometric figures. Any application of slip was not observed.

Let us now continue with the less popular series of Phase 2. They consist of specific subseries: hollow rims (SM IIb) and keeled rims inclined towards the interior with an inflected lip towards the exterior (SM VIb). The exceptional homogeneity of SM IIb (diameter, hollow rim technique, red slip on the interior) and SM VIb (inclination of the rim, the dominating red-and-white-painted band) render them excellent markers with regard to Phase 2.

Group A can be associated with the first projected subgroup of the small keeled bowls. However, it requires a proper group because of its slightly dissimilar traits, suggesting the hand of an individual potter. This is stressed by the fact that all three recipients were found in the same anthropogenic pit, probably representing an inhumation. The collared groups (Groups I and J) or EC 99 and EC 95 (and consequently EC 710) are attributed to the early occupation of Phase 2 because of their radiocarbon dates. They may even entail a different occupation although the other early date of Phase 2a was associated with a bell-shaped basin (EC 721) also found in a later context. Bottle EC 88 (found in pit F 143) was dated too. This specimen was found together with a vessel shape from Group H. However, EC 95 and EC 710 may represent later intrusions, based on the vessel complexity and polychrome painting which is absent in Phase 2a and 2b.

The griddles were almost exclusively found in the archaeological layer (Level 2). The small quantity impedes us to determine chronological attributions to any series ((Phase 2 or 3). EC 723 was found in pit F 258 containing diagnostic ceramics from Phase 2. This may possibly allow us to attribute pedestalled griddles to Phase 2.

In conclusion, the ceramic analysis indicates that the ceramic series of Phase 2 are the result of a regulated ceramic production that can be identified with multiple, clearly defined series forming a remarkable typology. Figure 5.24 illustrates a short chronology of several dated vessel shapes as to Phase 2. Although this morphological evolution only represents a small number of vessels, Phase 2a reveals various shapes, emphasised by EC 95 and EC 99. These vessels differ in shape as well as paste and represent the earliest occupation of Phase 2. However, these vessels may entail another function (funerary?) of the site during its initial stage. As mentioned before, when discarding radiocarbon dates, it can also be attributed to the LCA or Phase 3. The vessels of Phase 2b and 2c refer rather to domestic utensils, such as consumption and serving ware, than to cooking or specially produced funerary ware, despite the fact that these vessels were found in possible graves –personal or domestic objects were given to the deceased. In fact, these latter phases are thought to represent the most important occupation of CSL, having the closest range of dates and a singular pottery style.

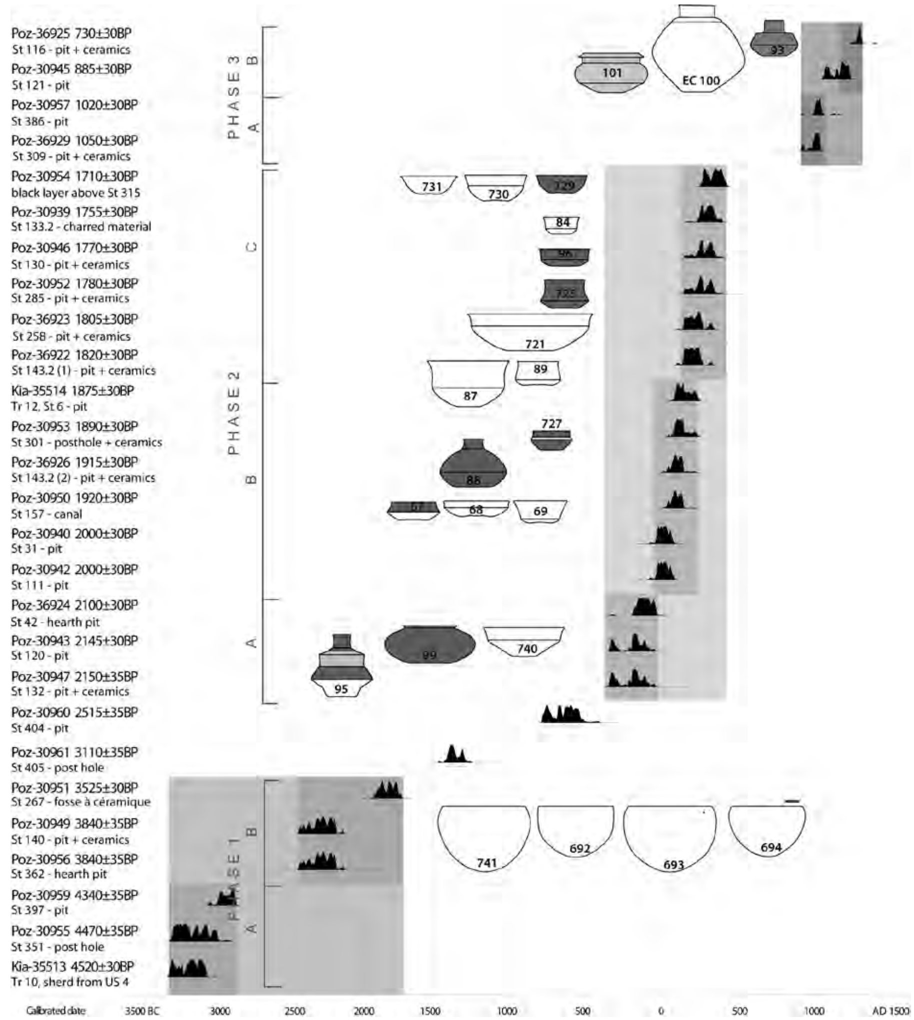

Figure 5.24. The vessel sequence per phase

Radiocarbon dates clearly evidence an ECA assemblage. However, it differs from Phase 1b and is separated by *c.*2000 years. Therefore a difference is made between ECA-A with regard to Phase 1 (and Eva 2). This ceramic assemblage at CSL is subsequently labelled as ECA-B.

The ceramic series of CSL

The ceramic series presented here concerning Phase 2b and 2c (0-AD 400) is based on morphological features and/or decorative recurrences of the CSL assemblage, corresponding to a close series of radiocarbon dates. It serves as a first tentative as to the ECA-B complex of the CSL site or <u>Saint-Louis ceramic complex</u>, as is customary in the field of archaeology:

Series A comprises keeled hyperboloid bowls with concave rims (SM IIIc-d) as well as convex rims (SM Vb-c) or Forms F-H. If decorated, this series predominantly features a uniform red slip on the interior and/or exterior. Zoned slipping was applied between the lip and the keel and is common for SM V (Form H). Incisions are lacking.

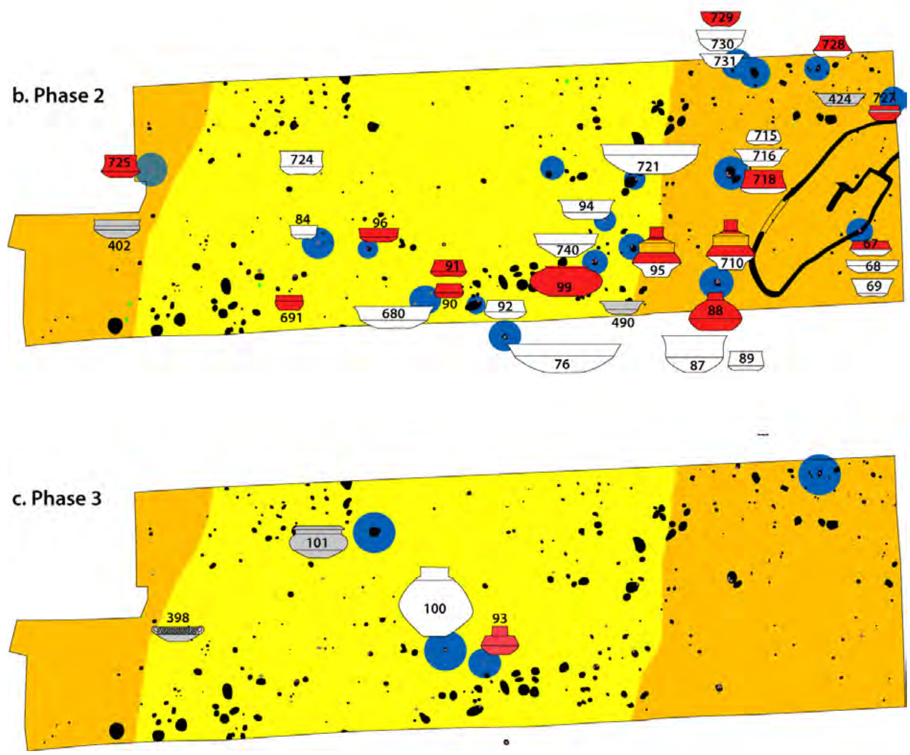

Figure 5.25. The vessel distribution per phase.

Series B comprises keeled bowls (SM III, Forms B and C) as to which two types of decoration have been identified: (a) a red or white slip applied to the interior ("banded" version included) and (b) the application of incision and *piquétage* to the interior of the rim. Simple parallel or crossed parallel lines applied below the lip represent incisions. *Piquétage* is represented by means of geometrical figures applied below the lip and more frequently in a cartouche (Fig. 5.26).

Series C represents the keeled basins (SM III, Forms D and E). They are are seldom decorated but may feature incisions applied to the interior vessel walls such as crossed parallel lines in zones forming geometrical figures. Slipping is lacking.

Series D represents the inclined rims towards the interior with inflected lips towards the exterior (SM VIb). This minority series exhibits an exceptional morphological and decorative homogeneity including inclination of the rim and banded red-and-white painting.

Series E represents the hollow-rim platters (SM IIb). Despite being a minority series (undated), it features exceptional diagnostic features: rim diameters measuring between 28 and 34 cm as well as internal uniform red slipping.

The other characteristic elements, as mentioned above, are statistically less relevant and have been excluded from this seriation. Nevertheless they certainly belong to this assemblage and can indeed be referred to as (minor) diagnostic elements of the Saint-Louis complex. It is evident that the above-mentioned series reflect a homogeneous pottery production consisting of various recipients featuring similar morphologies, red slipping and on occasion incisions.

These series and vessel shapes (Forms A-J) were hitherto unknown to the Lower Maroni River area. However, they may have been discovered at sites in other parts of French Guiana or in private collections not only from the Maroni and Mana Rivers, but also in Suriname and Guyana. For example, the keeled bowl No. 122 Mofina found on the Middle Maroni River is very similar to Series A or SM Vb (Fig. 5.26g). This specimen further suggests it is highly probable that part of the red slipping formed a coloured background as to the geometrical designs applied in a white slip, creating white-on-red painting. Another specimen from this collection (No. 100 Grand Abounami) is a hollow-rim platter, an emblematic feature of Saint-Louis. It includes a uniform dark red slip and a complex, white painted geometrical design.[141]

The chrono-cultural ascription of this ECA-B occupation is rather problematic. The reason for this is that similar sites dated to the first half of the first millennium AD are rare in the coastal French Guiana or the Guianas. However, the interior or the Precambrian Shield is momentarily the best reference as to ECA sites in French Guiana. With regard to the Maroni River we can refer to the ring-ditched site of Yaou near Maripasoula (Mazière and Mazière 1993; Mestre et al. 2013), as well as other (dated) ring-ditched sites in Suriname (Versteeg 1981; White 2010) or even in eastern French Guiana (Wack 1989; Petitjean Roget 1991; G. Mazière 1996; Mestre 1997; Mestre et al. 2013) and Amapá (Cabral 2014).[142]

The dated ring-ditched sites in French Guiana, i.e. Yaou, Point Maripa, Favard, Blondin, MC 88 and M87 (cf. Appendix 1), can be attributed to the first millennium AD. Several early dates begin in the first centuries BC and end towards the end of the millennium AD or prior hereto. The INRAP excavations at Yaou revealed more early dates concerning this important and large ring-ditched site as well as a very homogeneous ceramic production, entailing a sandy paste, red slipping and hollow rims (Mestre et al. 2013:84, Fig. 68.3-4; ibid., p. 124, Fig. 105.3). Although the sites of CSL and Yaou sites are separated in distance, they were probably contemporaneous. The inhabitants may have been in contact as the presence of hollow rims in both ceramic assemblages indicates.[143]

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141 Hollow rims, known as *borda vazada* (Almeida 2008:100–102), also occur frequently in the Amazon region.

142 Since the inventory of Emile Abonnenc (1952:52), these ring-ditched hilltop sites are called *montagne couronnée* in French Guiana, according to the Saramacca oral tradition. The Wayapi oral tradition consider these sites to be the works of the extinct Kalana (Grenand 1982:270).

143 The dates for Yaou were taken from the bottom of the ring-ditch, to wit 1975 ± 70 BP (ARC 859) and 1985 ± 50 BP (ARC 860). Rostain (1994a, Figs. 123.11-2) incorporated two hollow rims, found on the Approuague River, into the Melchior Kwep type (LCA *sic*).

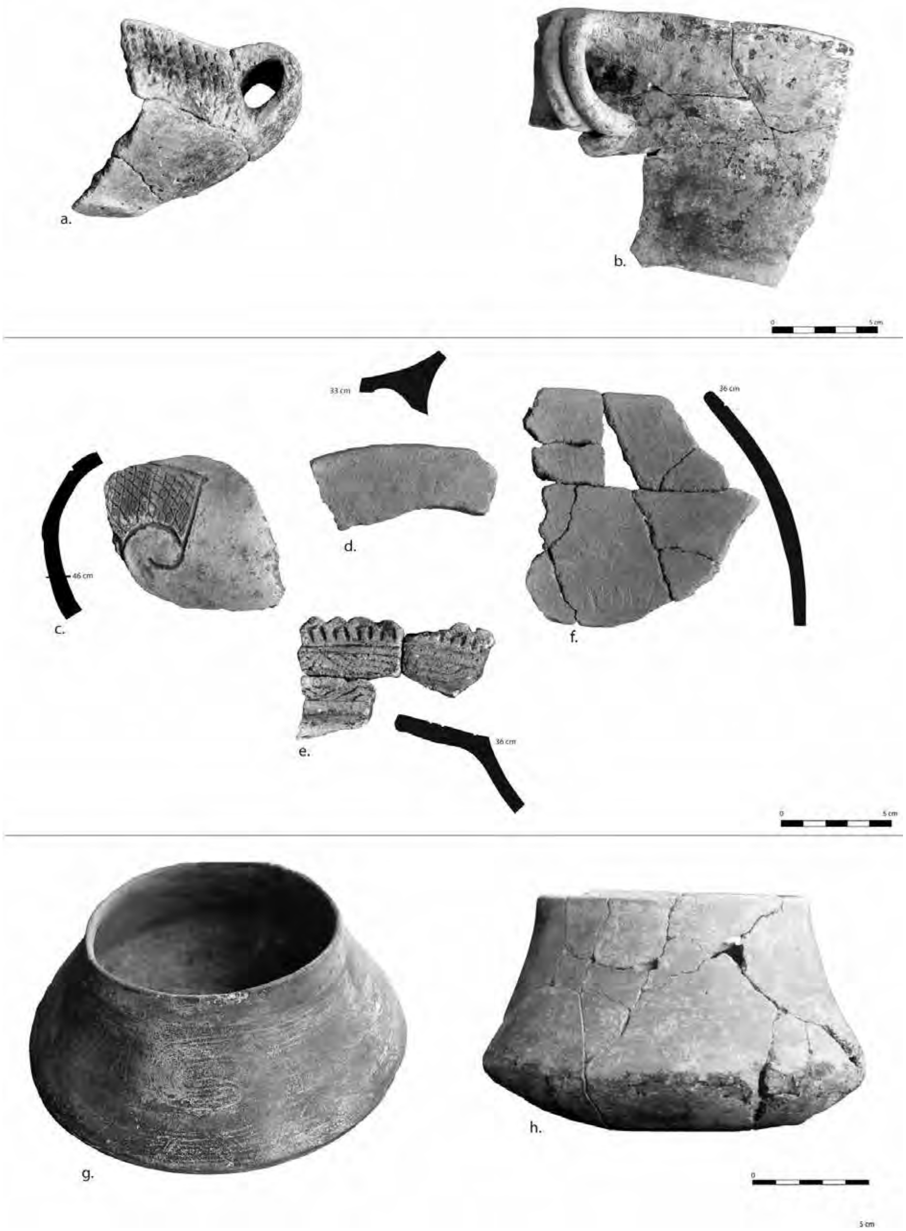

Figure 5.26. Examples of decorated ceramics: (a) EC 398, (b) F 89, EC 705, (c) 32D2, (d) EC 249, (e) F 31, EC 682, (f) EC 664, (g) No. 122 Mofina (Debost collection) and (h) F 309, EC 705.

Arie Boomert (personal communication 2012) pointed out two other sites near Paramaribo: Kwatta-Tingiholorits and Kwatta-Vierde Rijweg. They provided us with a small number of quartz-sand tempered sherds, often including a red and white painting in horizontal zones and one hollow rim (Goethals 1953:24, Plate 10:11).[144]

Another ECA-B site, named Olga near Malmanoury (van den Bel 2004), features a fairly thick dark earth layer and is situated on the summit of a Precambrian outcrop at the edge of the Pleistocene savannah (cf. Annexe 3.3 for the chemical analysis of the Olga black earth). The ceramics (N=2552) yielded similar vessel shapes, evoking possible concordances with SM III and SM V (van den Bel 2004:26). However, the decoration modes are diverse and varied. It is highly probable that the Olga site is multiphased and to be dated slightly more recent: 1793 ± 25 BP (KIA-26024). The above-mentioned ECA sites match with the Saint-Louis chronology. It is to be expected that numerous first millennium sites will be discovered in the near future.

Reflections on the origins of Phase 2

As mentioned in Section 1.1, the existing archaeological data of the Lower Maroni and Mana Rivers is scant and, if existing, difficult to compare statistically with our database, on both quantitative and qualitative levels. This is especially true with regard to the ECA-B material (Phase 2) of CSL, hitherto an unknown ceramic series as to this region.

In spite of the very little tangible evidence, we wish to explore a number of possible routes and origins as to Phase 2. The earliest dates as to this occupation in the Lower Maroni Basin are roughly positioned towards the end of the first millennium BC after a long period of little or no activity on site since the initial occupation. Interestingly this ECA-gap has also been identified in other regions, such as the Orinoco and Amazon River Basins (Roosevelt 1997:161; Neves 2008:365).

Phase 2 features a thick dark earth layer (in concordance with the sandy subsoil of the terrace) as well as a high quality predominantly sand-tempered ceramic production that developed during the first half of the first millennium AD. This particular combination corresponds roughly to the appearance of large *terra preta* sites during the second half of the first millennium BC on the Middle Amazon River (Petersen et al. 2001). These Amazonian sites are located on high river terraces and bluffs, similar to the ECA sites of Wonotobo Falls and Kauri Kreek situated on the Courantyne River terraces in western Suriname (Versteeg 1978; Boomert 1983) and CSL at the Maroni River. By drawing this possible comparison over a long distance, it is important to acknowledge the magnitude of the Middle Amazonian sites: it is hardly comparable to the Guiana sites. Nevertheless, it emphasises the possibility of similar cultural developments at approximately the same moment in time with regard to both areas, hereby evoking a larger cultural interaction

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144 I came across a beautiful hollow rim platter in the *Zorg en Hoop* depot found at the Goliathkreek-1 site (SUR-098) with a white slip on the inside and a flat modelled zoomorphic head with *papules* attached on the outside of the rim, numbered A-27-13. According to Boomert's manuscript (not dated), this site is located on a low hilltop at a small affluent of the Coesewijne River c.2.4 km east of the Goliath Kreek (another small affluent). The unbleached sands of the Cover Landscape characterise this region. F. C. Bubberman discovered this site during the construction of the forest road between Zanderij and Bitagron in January 1959. Here Geijskes, Bubberman, Kairamana and Boomert all acquired ceramics: 363 pot sherds and 15 stone artefacts, notably a duck shaped pendant (Boomert 1987:45, Fig. 3.10; Versteeg 2003:219, Fig 11.4). In September 1967 a fortuitous find on the edge of the hilltop revealed a number of complete vessels at c.75 cm deep. All in all Bubberman obtained 104 sherds from eight vessels.

sphere. For example, keeled hyperboloid bowls as found at CSL (Series A) include morphological similarities with keeled bowls found at Kurupukari falls (Williams 2003; Plew 2005), the Upper Amazon region (Lathrap 1970), and the Middle Amazon River (P. Hilbert 1955; Gomes 2005; Moraes 2006; Guapindaia 2008), albeit that we find few references in both French Guiana and Suriname. Due to this lack of data, we must enlarge our scope to the entire Guiana Shield to then compare the general characteristics of the CSL assemblage with more distanced sites. The small database and underlying diffusionistic traits, of course, bias this stylistic comparison, that is principally based on decorative aspects.

The combination of red, white-on-red, and red-and-white painting or slipping is probably pan-Amazonian with diachronic and regional stylistic variations. In French Guiana, white-on-red painting is fairly common on Cayenne Island (Wack 1990b; Rostain 1994a: fig. 113; Grouard et al. 1997; Mestre et al. 2005) and the Sinnamary drainage (Vacher et al. 1998). However, all sites yielding this decoration mode are generally dated to the LCA. In Suriname, white-on-red painting of complex negative motifs is best known from the Wonotobo Falls, a site bordering Guyana (Boomert 1983)[145]. It is dated by means of a single radiocarbon date (GrN-4551, 1900 ± 40 BP) and corresponds to the most easterly border of the Cedrosan Saladoid subseries. On the one hand, CSL did not reveal any other diagnostic (Cedrosan) Saladoid pottery modes such as biomorphic modelled applications, D shaped handles, so-called incense burners, etc.; see also the decoration modes as to Saladoid series as Cruxent and Rouse (1958/1959:246–157) defined. On the other hand, both Wonotobo Falls and CSL feature white and red painting, bell shaped vessels, and zone-incised-cross-hatching (ZIC), i.e. a type of incising emblematic of Cedrosan Saladoid assemblages although rare at CSL.[146] However, the CSL type of ZIC was applied to the inside and outside of the vessel wall. Stylistically, it is rather a crude and squarish type of ZIC differing from the coastal Venezuelan and Trinidadian fine oblique type of ZIC that resembles the ZIC patterns of the Zoned Hachure Tradition on the Amazon River (P. Hilbert 1968:291, Table 7; Gomes 2011:291, Fig. 8). It can be be hypothesised that CSL potters picked up and adapted several Cedrosan traits.

Several decorative elements, however, suggest a possible link with this Amazon River:

a. The technique of *piquétage*. It was hitherto unknown in French Guiana and Suriname, but resembles the *marcado com corda* technique encountered in the Pocó Phase of the Rio Trombetas in Brazil (Guapindaia 2008:66; P. Hilbert and K. Hilbert 1980, Table 3k-n).[147] The latter ceramic complex is dated between 200 BC and AD 400. It occurs in dark earth sites situated on the higher parts of the interfluvial area (Guapindaia 2008:184). The Pocó phase is thought to be attributed to the Barrancoid series of the northern part of South America (Gomes 2011:298; Guapindaia and Ayres da Fonseca Jr 2013:669).

145 According to Father Ahlbrinck (1927:24) the toponym Wonotobo Falls has a Cariban origin: 'w-onë-topo', can be translated as "the place to sleep".

146 It may be added here that a sand tempered platter with a flaring rim incised with ZIC was identified in a private collection hailing from the Lawa River or Upper Maroni (van den Bel 2012:29, Fig. 9d). Similar ZIC fragments were found at the ECA-B site of Favard. They are now stored at the SA depot (No. 97301.052/62).

147 To our knowledge, this specific type does not occur in the Orinoco River area.

b. The important undated element referred to as EC 682 (Fig. 5.26e). This incised, flaring rim displays striking similarities with the decoration modes attributed to the Itacoatiara Phase (P. Hilbert 1968: 325, Figs. 41a, e). Moreover, this Central Amazonian style shared similar stylistic decorations with the Barrancoid Manacapuru Phase (Lima et al. 2006:32). According to Denis Williams (2003:315), the Itacoatiara Phase shares ceramic decorative similarities with the site of Kurupukari Falls in Guyana.[148] The latter dark earth site is situated on the left bank of the Upper Essequibo River and yielded one radiocarbon date of 2080 ± 70 BP. Its lower layers revealed Saladoid ceramics resembling those found at the Wonotobo Falls (Williams 2003:305).

c. Another interesting vessel shape is EC 398 which may have Amazonian origins, but which is probably attributed to Phase 3 (Fig. 5.26a). This keeled bowl with D shaped handle features a series of appliqué clay strips, attached vertically to the upper wall displaying a "fishbone" motif. In French Guiana this technique or means of decoration is unknown. However, it can be ascribed to the Brazilian *serrungulado*-type of decoration which is attributed to the Tupi Tradition in Brazil (PRONAPA 1970:17, Fig.11).[149] These *serrungulado*-styled ceramics have various styles. The CSL specimen reveals similarities with specimens found on the Lower Amazon River (P. Hilbert and K. Hilbert 1980, Table 3o-p).

To conclude, the ceramic series found at the Saint-Louis do not sustain clear-cut cultural relationships with other ECA-B complexes in French Guiana or even with the Guianas in general. This may imply a local origin as to the series. However, the CSL Phase 2 assemblage as a whole does share decoration modes, notably ZIC elements and a small number of rare fragments with distant sites in Greater Amazonia: this suggests that the Lower Maroni River had contact with the Central Amazon region and the western Guianas, perhaps implying a trade network in which the headwaters of the Maroni, Courantyne, Jari and Cuminá Rivers played and important role.

5.5.7 The Phase 3 ceramics

These ceramics are rather scarce at CSL when compared to Phase 2. In order to gain a better grip on this third phase, the present author studied the ceramic material of the neighbouring La Pointe de Balaté (LPB) site, enabling a better identification of the LCA at CSL. Therefore, this ceramic study is presented here first, followed by the combined ceramic analysis of both sites.[150]

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148 Furthermore, Boomert kindly displayed similarities with the Mount Irvine site of Tobago (Boomert 2000:178, Fig. 37.1). The latter site expresses stylistic affiliation with the Blanchisseusse site of northern Trinidad (Boomert 2013:145, Fig. 10.1).

149 Eduardo Góes Neves –following Lathrap, Brochado and Oliver– proposes a Tupi origin for the Polychrome Tradition (Neves 2011:46).

150 I am indebted to Jérôme Briand for kindly allowing me to study the ceramic material collected during the excavation.

	Plain	Decorated	N	Weight (gr)	EC
Decapage	2270	37	2304	37362	57
Features	4327	36	4363	63811	90
Total	6597	73	6667	101,173	147

Table 5.11. The general ceramic count.

		Description	Mode	N
mineral	1	sand	11	18
		sand + mica	12	11
		sand + mica + black minerals	13	2
vegetal	2	charcoal particles	21	2
		ash particles	22	42
mixed	3	charcoal particles with sand	31	10
		ash particles with sand	32	27
grog	4	(finely) pounded pot sherd	41	35
				147

Figure 5.12. The distribution of temper modes.

5.5.7.1 La Pointe de Balaté site[151]

Mickael Mestre and I discovered this site during a standard mechanical shovel survey (van den Bel 2008b). It is located on the same Holocene terrace as CSL. Both terraces are separated by means of the mouth of the Crique Balaté. The SA designated only a part of the surveyed surface to be excavated: the site itself extends towards the north to the present-day Lokono village of Balaté. Bulldozers altered its original topography during the early 1960s when constructing a gravel station. Nevertheless, parts of the original dark layer were still present at the site (Briand et al. 2015).

The ceramic material collected during the mechanical decapage was hand collected in 11 Sectors or Zones and in 160 features (Table 5.11). Only 1% of the collected material is decorated. It was evenly distributed between the decapage and features. The feature collection represents 66% of the entire collection. The constituent elements (N=147) include six complete vessel shapes and are represented by means of 82 rims, 63 bases and seven griddles (Annexes 3.5.7-10).

The rims

The rim collection, excluding the griddles, contains 82 individual items (Table 5.11, Annexe 3.5.9). The variety of rims enabled the creation of a morphological distribution into eight modal series: SM I-VIII. SM I and SM III are the most popular series, providing 63% of the EC rim count (Table 5.12). During this research, we found labial treatment to be an important marker distinguishing rectilinear, concave and convex profiles as to both open and restricted vessels. This enables us to establish six subseries. This repartition was again enriched when measuring the diameter and wall thickness as well as recording the temper and firing mode. The unique elements (SM VIII) were later excluded. SM VII represents the collars or bottles of which the diameter measures less than 14 cm.

151 The name of the Balaté village, situated at the mouth of the Balaté Creek, is derived form the Arawakan *baleta*, with regard to the rubber tree (*Manilkara bidentata*), as identified by Patte (2011:54).

SM	Form	Profile	Lip	N
Ia	O	Rectilinear		11
Ib	O	Rectilinear	Everted	9
Ic	O	Rectilinear	Everted and thickened	7
II	O	Rectilinear to concave		3
IIIa	O	Convex		10
IIIb	O	Convex	Everted	10
IIIc	O	Convex	Everted and thickened	6
IV	O	Rectilinear to concave (collar)	Bevelled	7
Va	R	Rectilinear		4
Vb	R	Convex	Tapered	5
VI	R	Highly convex (converging)		5
VII	R	Miscellaneous (bottles)		3
VIII		Unique		2
				82

Table 5.13. The rim series SM I-VIII.

This was considered a conclusive element concerning morphological repartition. Notably F 115 and F 123, either ceramic concentrations or waste areas, were of particular interest because they provided us with numerous constituent elements.

The paste of the ECs was determined by the naked eye (on occasion aided by means of a small 8X binocular) after breaking the fragment in order to obtain a fresh cut. Four principal temper agents were observed: mineral, vegetal, mixed, and grog temper. All were evenly distributed. However, the vegetal temper and notably ash (No. 22) was the most popular with nearly 30% (Table 5.13). In some cases, grog and sand was observed in very low quantities, notably in dominant mineral and vegetal tempered sherds. In these cases the fragments were attributed to the dominant temper mode and not to the mixed one. Crushed shell or burnt bone as well as feldspars were observed in various elements. The rather specific mica temper is related to the mineral temper. It was observed in vegetal, mixed or grog tempering and is associated with an oxidizing firing technique. This latter technique is represented by means of *c.*20% of the elements. The reducing firing technique is the most popular (71%). It is associated to the vegetal, mixed and grog tempers.

SM I This modal series consists of 27 elements (33%) and is the most popular series within the excavated area. Together with SM III, these series refer to the abundance of open vessels on this site (77%). The labial treatment served as a means of classifying the various rectilinear profiles: (a) unmodified or straight, (b) everted and (c) thickened of which the everted lip represents a characteristic element (60%). The mean wall thickness measures 8 cm. It varies between 5 and 12 mm whereas the diameters vary between 20 and 60 cm. Utilising the mean diameter (36 cm) of the sum of the most frequented number (N=1.7) as determinant element, we see a higher frequency between roughly 28 to 36 cm, but also at 42 and 50 cm. The latter suggests larger shapes (Fig. 5.27).[152] These frequencies reflect the distribution of the labial treatment because, when the

152 Diameters over 30 cm were measured per 2 cm.

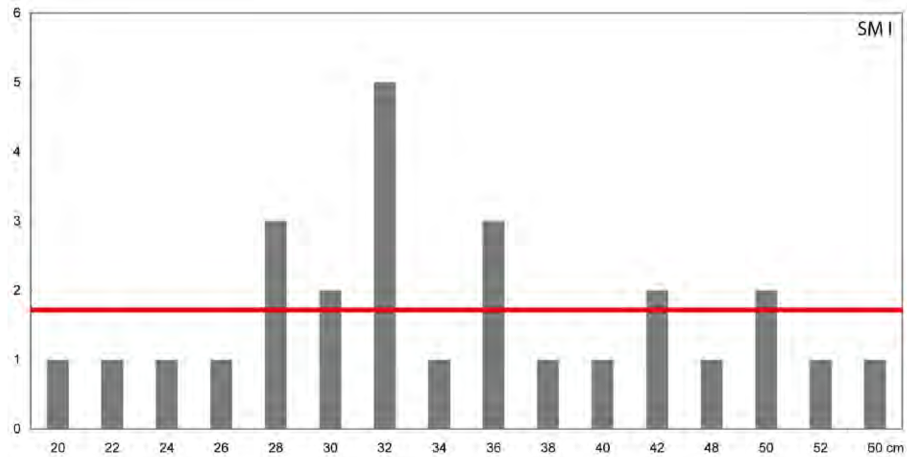

Figure 5.27. The diameter frequency of SM I.

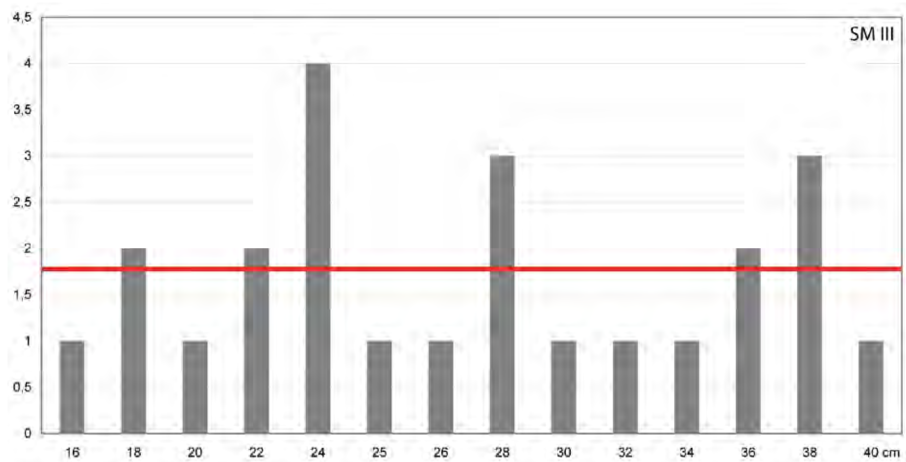

Figure 5.28. The diameter frequency of SM III.

diameter is calculated in the same manner per subseries, the larger diameters (50 cm) are significant as to SM Ic whereas the smaller ones represent SM Ia and SM Ib or 32 and 28 cm, respectively.

Vegetal, mixed, and grog temper dominate this series whereas only two constituent efragments present mineral temper. The reducing firing technique is almost exclusive. Decoration is absent. Only one complete archaeological vessel occurs: a boat shaped example (cf. Fig. 5.29a).

SM III Almost as popular as SM I is SM III with 26 individuals (30%; cf. Table 5.12). Again, labial treatment enabled us to distinguish three subseries regarding the convex profiles: (a) unmodified (mainly rounded or flat), (b) everted and (c) thickened lips of which those only everted are the most popular (60%). The wall thickness has an average of 7 mm and varies between 4 and 10 mm whereas diameters vary between 16 and 40 cm. When the only miniature vessel (EC 55) is excluded, we see a higher number of vessels with diameters measuring 24, 28 and 38 cm. The first hereof is the most frequent with a mean diameter (28 cm), if the sum of the most frequented number (N=1.7) is taken as determinant element (Fig. 5.28).

Again, decoration is nearly absent with the exception of one small bowl with bifacial red paint (EC 92). The only archaeologically complete bowl possesses an indented grooved rim and small nubbins (EC 7). Here we must point out EC 46 and EC 47 of SM IIIa which share a specific trait: a spatuled accentuation around the upper part of the vessel applied several cm below the lip, suggesting the presence of an inclination into the opposite direction (keel). Both rim fragments are sand-tempered. Their large diameter that measures 38 cm may be part of complex “eared” vessels (Figs. 5.29f and 11.13). The firing and temper modes are dominated by means of reductive firing techniques and burnt vegetal matter, as to SM I.

SM IV and **SM V** Both are minority series of which SM IV and SM V occur the most frequently (Table 5.12). Although not very popular, they represent strong markers with regard to the assemblage, notably as specific vessel shapes and decoration modes. Both series display characteristic vessel shapes. The SM IV possesses straight, concave and necked rims whereas SM V has restricted convex ones. The labial treatment enabled us to define a subseries with regard to SM V whereas SM IV is characterised by means of beveled and strongly everted lips of which one bevelled lip features double scraped grooves (EC 61). The SM Vb subseries includes tapered lips and three individual sherds come with finger-indented clay strips applied to the exterior. One object includes a decorative, “false” ribbed handle set upon the lip of the vessel (EC 94). Interestingly, both series appear to have proper temper modes. The SM IV has predominantly a sand temper. SM V is more or less grog tempered, suggesting two wares.

The series **SM II** and **SM VII** are the least popular series, but represent highly characteristic morphological elements: extremely flaring rims and small collars, respectively. The grog tempered collars of SM VII have diameters measuring less than 14 cm. They probably represent the necks of large spheric vessels or jars, as often found in funerary context on the western plain of French Guiana (Coutet 2010). One small item has a finger-indented clay strip around its neck (EC 91).

The sand-tempered flaring rims of SM II represent shallow open bowls with diameters measuring *c.*30 cm. They are characterised by means of white painting on the interior and regularly indented rims forming large lobs. SM VI represents restricted vessels of various sizes of which two were in a funerary context (urn burial) with a sand or vegetal temper. SM VIII contains only two elements which do not fit into the above-mentioned descriptions and do not share any morphological resemblance.

The bases

The base register is composed of 63 fragments or 42% of the EC total. They were divided into four modal series which, in turn, were subdivided according to the way in which the first coil was applied to the base slab (Table 5.14). The flat bases (57%) are most popular, followed by the concave or dimpled examples (38%). Pedestalled bases are rare. Only EC 40 had white paint applied to its interior. All remaining base fragments were undecorated.

The flat bases These bases (N=36) were divided according to: (a) a convex profile (SM 1a, 36%), (b) a rectilinear profile (SM 1b, 25%), (c) a concave profile (SM 1c, 14%) and (d) an appendicular profile (SM 1d, 25%). Profile (a) was the most frequent. The base thickness measured 8 mm on average and varies between 4 and 15 mm. The diameters vary between 2 and 17 cm with a mean of 8.6 cm. As to the rims, the vegetal, mixed and grog paste are all common to this series. Sand tempered bases are rare.

SM	Shape	Profile	N
1a	Flat	Convex	13
1b	Flat	Rectilinear	9
1c	Flat	Concave	5
1d	Flat	Appendicular	9
2a	Concave	Convex	10
2b	Concave	Annular	12
3	Pedestal		1
4	Unknown		4
			63

Table 5.14. The base series SM 1-4.

The dimpled bases This series (N=24) has two principal profiles of which the annular bases occur slightly more frequently than the convex ones. The thickness varies between 6 and 15 mm with an average of 9 mm. The diameters range between 4 and 14 cm with an average of 9.4 cm. This series includes ovoid bases. The vegetal temper dominates and any decoration is absent. The remaining series are of lesser interest.

The griddles

Only seven individuals, or 7%, of the EC total represent the class of griddles which was divided according to its rim morphology of which the rounded ones (SM A) are the most popular (Table 5.15). The thickness (measuring between 12 and 24 mm) and the diameters (roughly between 30 and 50 cm) reveal rather small griddles. The temper is predominantly mixed. However, the small quantity and poor quality (very small fragments) ultimately provide little information. On the one hand, this fact may suggest there was but a small number of griddles within the habitation site which perhaps served over a longer period of time. On the other hand, it may suggest a presence of more important griddle related activities outside the habitat area.

SM	Shape	N
A	Rounded	5
B	Pointed	1
C	Straight	1

Table 5.15. The griddle series SM A-C.

The decoration modes

The total number of decorated sherds (N=73 or 1%) is limited (Table 5.16a). However, the EC count reveals a more elevated percentage: 7% (Annexe 3.5.10). The rather rich decorative repertoire is composed of painting/slipping (20%), incision (11%), indented clays trips (16%), figuration (37%) and adjunctions (16%).[153] Figuration, the plastic modelling of biomorphic figurines made of clay strips with nubbin eyes indented with circular tools (a small reed?), is most popular. Generally speaking, modelling is abundant as to LPB (70%) whereas slipping or painting and incisions are minor modes of decoration. White painted ware is favoured over red coloured ware. Only two fragments feature white-on-red painting.

Interestingly, several sand-tempered fragments (some refitted) of white painted sherds from F 115 with modelled clay strips represent a human face with coffee bean eyes, ear shells, and nose. It may have belonged to the upper part of an

Decoration	N
Red paint	4
White paint	8
WOR	2
Incisions	8
Fillets	12
Figuration	27
Adjunctions	12
	73

Table 5.16. The decoration modes.

153 The difference between paint or slip application is not indicated with regard to the ceramic studies discussed in the present research. Chemical analysis is required in order to verify this application which was too expensive to carry out for the various ceramic studies. See also note 134.

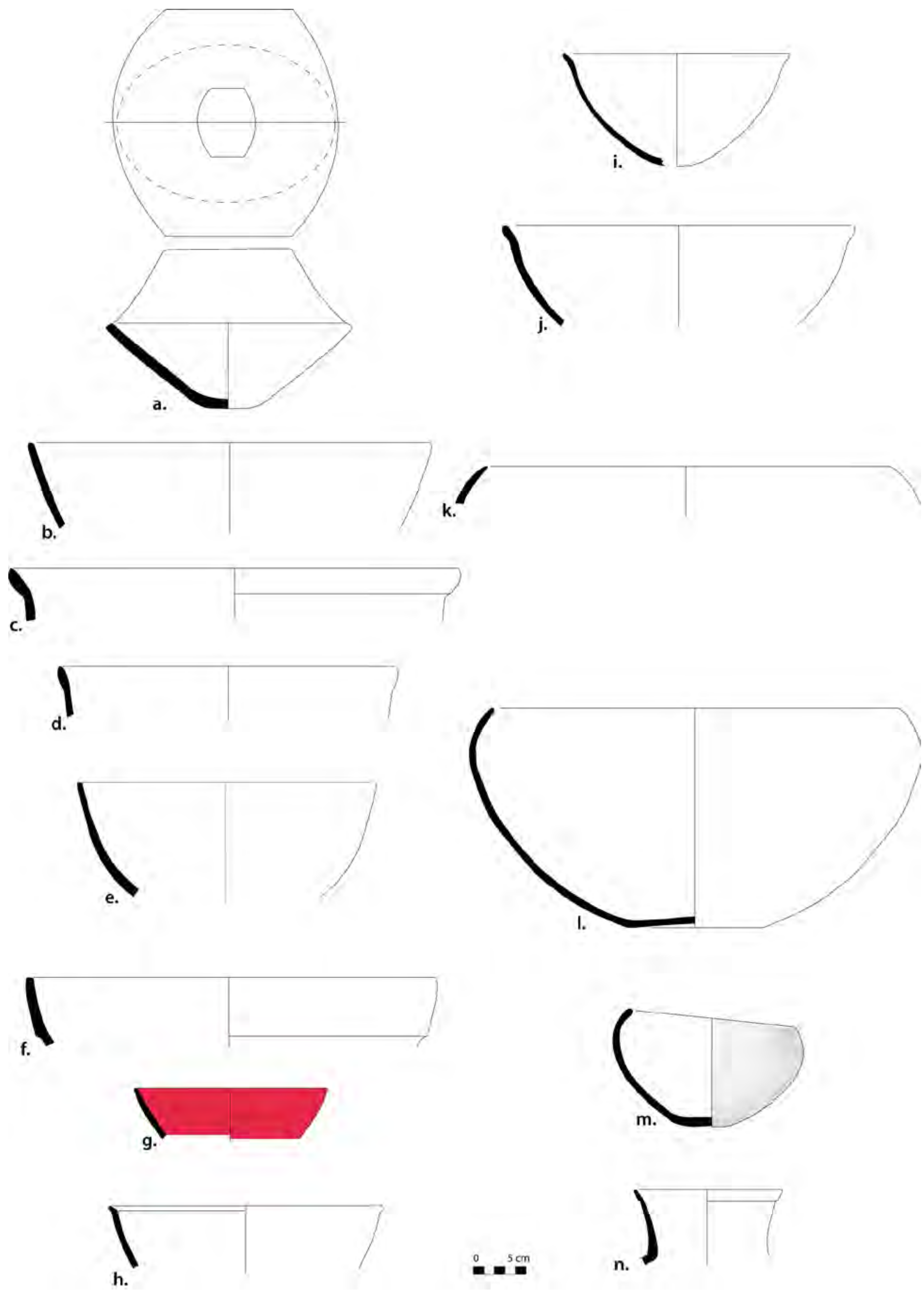

Figure 5.29. The reconstructions of vessel shapes per SM: (a) EC 21, SM Ia, (b) EC 59, SM Ia, (c) EC 37, SM Ic, (d) EC 32, SM Ic, (e) EC 17, SM IIIa, (f) EC 47, SM IIIa, (g) EC 92, SM IIIa, (h) EC 51, SM IIIb, (i) EC 3, SM IIIb, (j) EC 10, SM IIIb, (k) EC 58, SM Vb, (l) EC 11, SM VI, (m) EC 1, SM VI (drawing by Christine Fouilloud) and (n) EC 22, SM VII. Series SM II and IV can be found in Fig. 5.30.

anthropomorphic vessel. Another exceptional piece is EC 12 (Fig. 5.30e). This "toric pot" with five chambers each featuring a scraped circle in which a human face (eyes and nose) is modelled with appliqué.[154] Simple and double lugs, nubbins and possibly stylistic heads and paws of zoomorphic vessels represent other types of plastic modelling.

154 The so-called "toric pot" (Fr., *pot torique*) has a doughnut shaped body. This term was coined by Jérôme Briand during his study of the BPS ceramic material: 'Forme C: Panse à profil torique; panse se dégageant du col et de la base par un ressaut lui donnant l'aspect d'un tore,' as defined by Jérôme Briand (Vacher et al. 1998:183, Table XXIII).

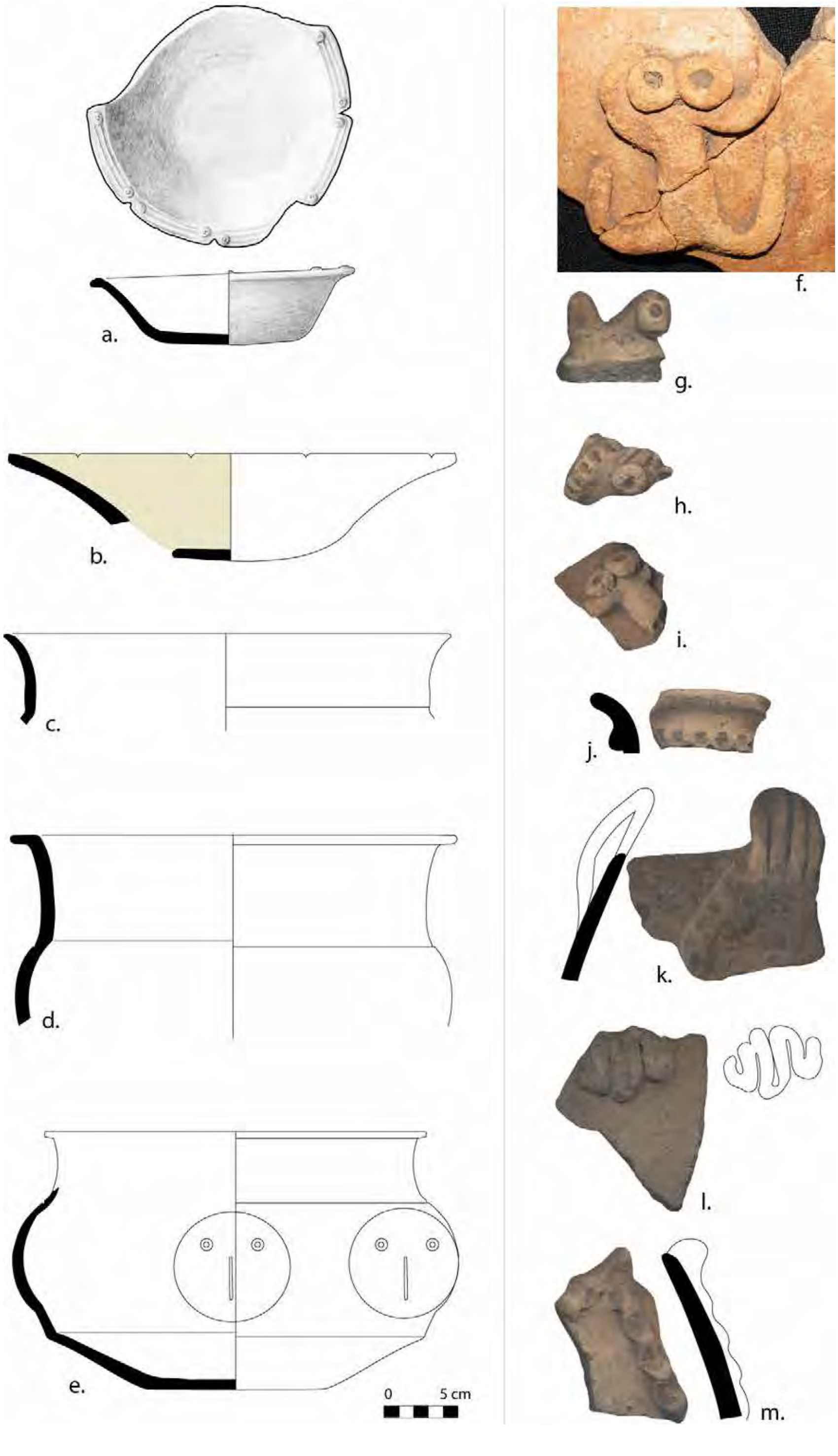

Figure 5.30. Various decorative elements: (a) EC 7, SM IV (drawing by Christine Fouilloud), (b) EC 40, SM II; (c) EC 49, SM IV; (d) EC 60, SM IV; (e) EC 12, SM IV; (f) F 123, (g) F 123, (h) Zone 10, (i) F 123, (j) EC 91, SM VII; (k) EC 94, SM Vb, (l) Zone 9 and (m) EC 93, SM Vb (photographs by Jérôme Briand).

The incisions are varying from series of nail indentations on the lip (N=2) to scraped incisions on the lip (N=2). Fillets of clay are indented by means of the fingertips, forming hanging strips (Fr., *guirlandes*), at the upper part of the vessel (Fig. 5.30k) or around the lower neck of a collar (EC 91). One false ribbed handle is also adorned by means of finger indented strips (Fig. 5.30j). A highly remarkable, wavy strip was found in Zone 9 (Fig. 5.30l).

The synthesis of La Pointe de Balaté

The LPB ceramic assemblage declines in SM I and SM III. These large, open vessels are characterised by means of everted and thickened lips, representing nearly 40% of the total EC count. These objects are predominantly tempered with vegetal matter, notably grey ash particles, nowadays better known as *kwepi*. However, mixed and grog tempered specimens are also important temper agents of these series, which a reductive firing technique dominates. This combination provides sherds with a soft, or "soapy," feeling, as experienced at CSL, i.e. SM II. These series are hardly decorated.

Although less frequent, the other series are readily recognisable, not only by means of specific morphology and temper agent, but also by means of specific decoration modes. Here we must point out: (a) the (white painted) indented flaring rims of the SM II, (b) the necked jars with bevelled lips of the SM IV, (c) the collars of the SM VII, (d) the restricted tapered rims of the SM V and (e) the converging rims of the SM VI. Although decorative elements are generally rare, plastic modelling, notably biomorphic figures as well as finger indented clay strips, appear to mark the decorative repertoire of this assemblage.

Of the fifteen radiocarbon dates, seven suggest a LCA occupation as to the LPB site, ranging between *c.*AD 1000 and 1500. Six samples were taken from anthropogenic features (primary and secondary burials) indicating a secure dating result.

A second set of dates suggest a Historic Age between 1600 and 1850 (N=4). A third set (N=3) suggests an ECA in the first half of the first millennium AD. The latter samples correspond to Phase 2 occupation of CSL. However, I was not able to identify any ceramics of this specific phase at LPB. One the one hand, the historic radiocarbon dates may indeed be correct and suggest an historic Amerindian occupation of LPB, such as evidenced at Eva 2 (cf. Section 11.6). On the other hand, European artefacts lack in order to confirm this hypothesis.[155]

The LPB ceramic assemblage shows stylistic similarities with other LCA coastal sites located in western French Guiana and eastern Suriname. In the following analysis of CSL Phase 3, the cultural affiliation of LPB is integrated in order to create a better understanding with regard to the LCA at both sites.

5.5.7.2 The Phase 3 analysis

As mentioned in the introduction of the CSL ceramic study, the ceramic series that did not pertain to Phase 2 have been attributed to Phase 3. Radiocarbon dated features have enabled us to isolate various series concerning each phase while aiming to establish its general characteristics. In this way, we observed that *kwepi* temper is absent from the important SM III series of Phase 2. In addition, the dated vessel depositions of Phase 3b were both tempered by means of a vegetal agent. However, other Phase 2 series reveal several sherds with a vegetal ash temper, albeit rare (N=8). Furthermore, mixed and charcoal temper –also present at LPB– is considered a minor temper agent as to Phase 2. These paste criteria served to isolate SM I, SM II and SM IIa as to the LCA. The latter series display a high concentration of ECs in Sectors 6 and 21. They are situated at a distance of *c.*10 m from from the pits dated to Phase 3 (cf. Figs. 5.24-5).

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155 Europeans have frequented the Lower Maroni since the end of the 16th century (cf. Chapter 10).

This ceramic Phase 3 concentration consists of eleven specimens. Their rim diameters vary between 18 and 24 cm and 32 and 44 cm. The everted lips correspond to the everted specimens of La Pointe de Balaté, i.e. LPB SM Ib, SM IIIb. All these sherds are *kwepi* tempered and include a "soapy" feeling at the fingertips. *Kwepi* is also popular with regard to the CSL dimpled bases with rectilinear or convex profiles (SM 4 and 5) as well as regarding flat bases with rectilinear profiles (SM 1) which are also frequently found at LPB. In general, the CSL series correspond with the thick bases with large diameters (12-14 cm).

Thus, the ceramic analysis of CSL Phase 3 is primarily based on the projection of vessel types not related to Phase 2 ceramics. They share relevant morphological features with LPB, suggesting contemporaneity with the latter neighbouring site which the radiocarbon dates confirm. However, the low quantity of the Phase 3 material at CSL suggests an occasional occupation of the site, or the excavated area. One must realise that the terrace stretches further along the Maroni. The presence of only two ceramic depositions at CSL (EC 93 and EC 100) contrary to the 11 depositions at LPB may be a first indication of a less important or different kind of pre-Columbian activity at this part of the CSL site.

With the exception of temper and morphology, both LCA assemblages hardly share any decorative aspects, perhaps suggesting a different function of these spaces. The finger indented fillets and biomorphic modelling recorded as to LPB is associated with the Barbakoeba complex of eastern coastal Suriname, as defined by Boomert (1993). Despite the fact that corrugated rims are missing at both CSL and LPB, the latter site shares more morphological traits with Barbakoeba, such as annular bases and mean wall thickness. More importantly, they share the following characteristics: (a) everted lips (SM Ib and SM IIIb vs. Boomert 1993:204, Fig. 3.2 and 3.3; mark the annular base on the latter), (b) collars with indented clay fillets (SM VII vs. ibid., p. 206, Fig. 5.2-4), (c) undecorated collars (SM VII vs. ibid., p. 206, Fig. 5.5), (d) 'eared' rims (ibid., p. 208, Fig. 6.8 and p. 210, Fig. 7.2) and (e) certain restricted vessels (SM VI vs. ibid., p. 208, Fig. 6.1).

Despite the fact that the LPB site has a dominant *kwepi* temper, grog (the dominant Barbakoeba temper) and, to a lesser extent, mixed temper, are also important temper agents. LPB also features possible links with more afield sites such as Kwatta and Hertenrits, based only on several rare (trade?) sherds. The false handle and wavy-strip (cf. Fig. 5.30l) represent decorative elements also found in Late Hertenrits and Kwatta assemblages (see Boomert 1980:75, Fig. 4.6; Versteeg 2003:117, Fig 6.24; p. 118, Fig. 6.27; p. 143, Fig. 7.5)

The sites of CSL and LPB share a Koriabo component, such as the highly decorated toric pots of Group L as to CSL and SM IV as to LPB indicate. With regard to CSL, two LCA phases were proposed (cf. Section 5.3). They imply possibly dissimilar occupations representing dissimilar ceramic wares, i.e. the Koriabo and Barbakoeba wares. Interestingly, the only dated Koriabo vessel (EC 7; cf. Fig. 5.30a) was discovered in F 89 at LPB. It yielded a radiocarbon date from towards the end of the 15th century. This complies not only with the Suriname dates obtained from Bigiston, Christiaankondre, Moricokreek (Versteeg 2003), but also with those from Saut-Saillat (Hildebrand 2003) and Angoulême (Gassies and Dauphin 2013). The other dated features with characteristic material (F 123, F 142-3) are dated between AD 1100 and 1300 or ulitmately the Historic Age (F 115). The latter result may be erroneous. This ambiguity between Koriabo and local wares and chronology is also encountered at Crique Sparouine where this discussion is continued (cf. Section 6.5). As to CSL, however, it is possible that this third phase is less obvious from an archaeological point of view considering the excavated part of this very large site.

5.6 The lithic study

The excavations at CSL produced a substantial number of lithic artefacts. They not only exhibit a considerable variety in types, but also in used materials. Sebastiaan Knippenberg's lithic inventory (in van den Bel et al. 2011:115–127) presents us with a description focussing on the study of the procurement, manufacture and use of raw materials and tools.[156]

During recent years the study of lithic artefacts originating from Preceramic and Ceramic Age sites in the Guianas has finally received the attention it deserves. This can largely be attributed to the systematic approach applied by compliance archaeology with regard to large complete lithic assemblages (Vacher et al. 1998; Delpech in van den Bel et al. 2006; Mestre and Delpech 2008) rather than merely studying single artefact types or describing individual artefacts in French Guiana (Rostain and Wack 1987; Rostain 1994a). At the core of this approach lies the notion that stone tool manufacture is a subtractive process. In it each step of making, using, and (re)using lithic artefacts, they may leave traces in the archaeological record.[157] This often provides us with an excellent opportunity to study this entire process (Fr., *chaîne opératoire*).

In this particular study, with regard to the CSL lithic material, the model of activity sets as defined by Collins (1975) serves as a basic guideline. He divides the production process into distinct steps: (a) acquisition, (b) primary reduction, (c) secondary reduction, (d) tool finishing and (e) (re)use. Although it recently has been heavily debated that such steps would be identifiable within the archaeological record (Bradburry and Carr 1995; Shott 1996), a number of attributes were chosen that were assumed to provide at least some insight into which steps had been taken at the site. Utilising this approach it was attempted to obtain insight into which stone materials had been used at CSL, from where they had been taken and how they had been procured. Furthermore it was studied how the inhabitants had worked the various raw materials and which purposes the artefacts had served.

5.6.1 Introduction

The lithic assemblage comprises 4774 artefacts (Annexe 3.6). The majority of the elements (N=3955) was collected by hand from the dark earth layer when descending with the mechanical shovel. The remaining 819 specimens were obtained from the features (Table 5.11). The subsoil is primarily composed of sand. This implies that the lithic material, which is larger than the terrace bed sediments, is *a priori* exotic to the site itself. Therefore it must have been transported to this site by the pre-Colombians occupying the region. It may

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156 For a condensed version of this lithic study, see *Archaeology and Anthropology, Journal of the Walter Roth Museum* (Knippenberg 2012).

157 For an extensive study on this subject, see Torrence (1986).

be added here that all lithic objects were weathered in one way or other when discarded after final use. In addition, nearly all lithic material studied (98%) was attributed to the pre-Columbian occupation of the site.[158]

It must be added here that the methodology of hand-collecting the material during the excavation of the archaeological layers (by means of the mechanical shovel, the hand-held shovel or trowel) biases the collected sample towards the larger specimens. Small artefacts are thus strongly underrepresented. This has farfetching consequences regarding our understanding of any on-site manufacturing of lithic tools, because the debris (flakes and shatter) linked to such processes are generally small in size. Moreover, we must state that a significant portion of the lithics displays a certain degree of post-depostional weathering, mainly due to chemical soil processes. All the material was studied, but at various levels of analysis, due to time and budget.

We distinguish the following levels of analysis:

1. The handpicked material from eight sectors: Sectors 1, 16, 31, 46, adjacent Sectors 7, 22, 37, 52 and the additional Sector 32. This material was considered the core sample to be analysed to the highest level of detail. We recorded the following parameters when compiling our database: (a) the type of artefact, (b) the raw material, (c) the maximum dimension, (d) weight, (e) length, (f) width, (g) thickness, (h) traits of the cortical or outer surface, (i) the percentage of cortical or outer surface, (j) the presence of macroscopically visible traces of use-wear and (k) the presence or absence of traces of burning, i.e. discolouration, cracks, fissures, etc. Concerning the flaking cores, we recorded: (l) the knapping method. With regard to the flakes we observed: (m) the traits of the flaking technique and (n) the distal end (Knippenberg 2006, Appendix D).

   All artefacts from the handpicked squares (Sectors 1, 16, 31, 46, 7, 22, 37, 52, 32) were recorded in accordance with the following parameters;

2. As to the remaining sectors, a less detailed analysis was applied. Only the parameters (a) to (d) were recorded;

3. As to the feature material, only the parameters (a) and (b) were noted.

5.6.2 The raw material

The quartz material

The lithic assemblage presents a great variety of rock belonging to three principal species: (a) igneous, (b) metamorphic and (c) sedimentary species, reflecting the geology of the Guianas. However, various types of quartz are by far dominant, containing more than 80% of all lithics recorded at the site (Tables 5.17-8). We distinguished the following main kinds of quartz in addition to the rarely occurring varieties (Fig. 5.31a):

158 The remaining 2% of the lithic material belongs to the 19th century penitentiary of Saint-Louis and is not discussed here.

a. A saccharin or "sugary" form, built up by means of multiple crystal particles, including rare specimens possessing muscovite. Compared to the other quartzes it has a mediocre quality as to flaking.[159] This saccharin variety occurs most frequently at the site and was acquired in the form of angular blocks as well as waterworn pebbles. The presence of muscovite suggests that at least part of this variety represents a meta-granite, i.e. a granite rock that has witnessed a process of metamorphism altering its composition;

b. A coarser grained type of saccharin quartz built up by means of large crystal particles. It possesses the poorest flaking quality of all the varieties found at the site. It was obtained in blocks, including several relatively large ones. The large quantity of such blocks on the site suggests a source which may have been located nearby.

c. A white quartz with a fine, homogeneous texture, with blurring crystal boundaries. It is sometimes referred to as milky quartz. In general, it is considered to occur as veins in igneous or metamorphic rocks and represents the best variety with regard to quartz flaking. It is mainly found in the shape of small waterworn pebbles, but rare more angular blocks do occur.

d. A hyaline or translucent quartz, which may either represent fragments of rock crystal or void fillings inside igneous rock. Thanks to its fine and homogeneous texture, it is considered a relatively good quality material as to flaking. Being a rare variety, the pre-Columbians only used small angular blocks as a raw material.

The other materials

The other types of rocks occur in much smaller amounts at the site which have been classified as follows: (a) igneous, (b) metamorphic, (c) sedimentary, (d) siliceous[160] and (e) ferralitic rock materials (Fig. 5.31a).[161]

The igneous group is a very heterogeneous collection of stones and mainly composed of varied extrusive rock types: dolerites and basalts. However, plutonic rock varieties, such as granites and diorites, also occur. The fine grained igneous rock has macroscopically been classified on the basis of its colour as well as the presence and size of phenocrysts.[162] We observed five common varieties: (a) a dark grey to black coloured mafic rock with a fine-grained homogeneous matrix, but without clearly visible phenocrysts; this is probably a dolerite, (b) a black coloured mafic rock with heavily altered phenocrysts, (c) a bluish rock with

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159 "Saccharoid" is a translation of the French term *saccharoïde*. In general, French geologists and archaeologists use it when describing this specific variety of quartz (Delpech 2005; Delpech in van den Bel et al. 2006; Mestre and Delpech 2008). It may be added here that compared to flint, chert, and obsidian, varieties of quartz can be considered at least mediocre or, in most cases, rather poor material with regard to the production of (thin) flakes.

160 Without knowing the geological context of siliceous rocks (rocks composed of crypto-crystalline quartz) and with only small samples of artefacts, a proper distinction between varieties formed as sedimentary rocks (flints, deep-marine cherts) or igneous rock (jasper, chalcedony) is sometimes difficult to make. They were however classified in separate groups.

161 Considering the extraordinary process of formation and rather frequent occurrence of this material in the Guianas, it is also treated as a separate class.

162 For a proper classification of igneous rocks, either petrographic thin-sections studies or geo-chemical compositional analyses are required. Both types of analyses are beyond the scope of the present study.

Raw material	Dark layer (5x5)		Features	
	N	%	N	%
quartz	3176	80,3	706	86,2
saccharin	1755	44,4	-	-
coarse saccharin	41	1,0	-	-
white	998	25,2	-	-
translucent	175	4,4	-	-
other	207	5,2	-	-
jasper	2	0,05	-	-
siliceous rock	5	0,13	2	0,24
siltstone	6	0,15	1	0,12
sandstone	157	3,97	19	2,32
conglomerate	7	0,18	-	-
igneous rock	181	4,58	15	1,83
granite	212	5,36	25	3,05
diorite	9	0,23	1	0,12
other plutonic rock	6	0,15	2	0,24
greenstone	38	0,96	12	1,47
quartzite	15	0,38	2	0,24
phyllite	23	0,58	-	-
schist	16	0,4	3	0,37
gneiss	8	0,2	2	0,24
amphibolite	6	0,15	1	0,12
other metamorphic rock	2	0,05	-	-
red ochre	5	0,13	-	-
ferrogeneous nodules	63	1,59	28	3,42
unidentified	18	0,46	-	-
total	**3955**	***100***	**819**	***100***

Table 5.17. An overview of the various types of raw materials.

clearly discernible phenocrysts, (d) a lightly felsic coloured rock and (e) a highly porphyritic rock that almost resembles the plutonic rock varieties and is rather weathered.

The plutonic rocks distinguish themselves by means of differences in their composition and the size of the minerals. The granite rocks are the most frequent and exhibit quartz minerals, feldspar, hornblende and muscovite. The majority is weathered and crumbles easily. These rocks may have been acquired in the vicinity of the site. We observed that the diorite specimens do not show quartz minerals and that they primarily consisted of feldspars and hornblendes.

Metamorphic rocks entail a great diversity. We have identified amphibolite, gneiss, schiste, phyllite, quartzite and a fine-grained green rock often referred to as “greenstone.” Sandstone and a very fine-grained species, probably a siltstone, occur among the sedimentary stones.

Jasper and chalcedony represent the siliceous rocks. In addition, the collection includes a small number of flakes consisting of a fine-grained rock. However, its heavy white patina impedes a proper identification of its raw material. It either is a fine-grained igneous rock or a chert. The lithics include residual lateritic

		Quartz variety					Total
		white	hyalin	sacch.	sacch.gr.	autre	
Flakes		**424**	**101**	**705**	**1**	**75**	**1306**
	complete flake	278	66	491	-	52	887
	split flake	40	7	59	1	2	109
	broken flake (proximal)	35	9	35	-	5	84
	flake fragment (medi/distal)	60	13	66	-	7	146
	firecracked	11	6	54	-	9	80
Blade		**-**	**2**	**1**	**-**	**-**	**3**
	complete	-	2	-	-	-	2
	blade	-	-	1	-	-	1
Other debitage		**166**	**27**	**434**	**19**	**58**	**704**
	shatter	165	27	433	19	58	702
	potlid	1	-	1	-	-	2
Flake core		**321**	**39**	**410**	**10**	**51**	**831**
	single platformed, unifacial	59	8	112	2	15	196
	single platformed, bifacial	78	5	7	-	2	92
	double platformed	16	2	39	-	5	62
	double platformed, opposed	14	2	9	-	3	28
	bi-directional bipolar core (piece esquille)	10	2	7	1	0	20
	unidirectional bipola core	1	-	4	-	1	6
	discoidal	1	1	1	-	0	3
	multiple platformed	9	-	15	-	2	26
	polyhedral	7	2	3	-	1	13
	split cobble	18	3	42	-	4	67
	tested cobble/pebble	29	3	31	-	1	64
	shapeless	79	11	140	7	17	254
Core tool		**22**	**-**	**49**	**1**	**4**	**76**
	hammer stone	15	-	22	-	1	38
	hammer stone fragment	5	-	23	1	3	32
	pestle	1	-	2	-	-	3
	pestle fragment	1	-	1	-	-	2
	anvil fragment	-	-	1	-	-	1
Unmodified rock		**65**	**4**	**122**	**5**	**13**	**209**
	water worn pebble	60	2	32	-	6	100
	water worn pebble fragment	-	-	30	2	1	33
	angular piece	5	2	15	1	3	26
	angular fragment	-	-	45	2	3	50
Unidentified		**-**	**2**	**34**	**5**	**6**	**47**
Total		**998**	**175**	**1755**	**41**	**207**	**3176**

Table 5.18. An overview of artefacts according to species of quartz.

nodules ascribed to the duricrust, but may have been transported by the Maroni after erosion. Nearly all the latter material does not feature any traces of working or use-wear.

The exact geographical location of prehistoric primary or secondary raw material sources or workshops as to quartz and other raw materials in French Guiana is unknown. Petrographic study and the morphological distribution of polished implements (Boomert 1977; Boomert and Kroonenberg 1979; Rostain and Wack 1987; Theveniaut 2005), is primarily based on axes and chisels, referring generally to the exising rock formations in the Guianas. However, extraction sites have not been pinpointed yet, with the exception perhaps of Brownsberg in Suriname (Boomert and Kroonenberg 1979:37). These LCA Brownsberg sites are represented by way of multiple flakes as well as finished and pre-fabricated tools presenting a great variety of raw materials, probably within a settlement, but do not reveal a stand-alone lithic workshop (or preceramic site?). However, sites that predominantly yielded lithic debitage (perhaps even a handful of sherds) have been recognised within the mining perimeter of Yaou and Camp Caiman (Mestre et al. 2013:113, 126; van den Bel 2007a:121), but their chronology remains unknown. The submerging quartz veins at the Eva 2 site (situated southeast of the inhabited hillock) may represent a primary source or even an extraction site, thus favouring human installation at the site (cf. Fig. 4.1).

From the careful analysis of the outer surface it has become clear that waterworn rock forms a predominant portion of the assemblage. It is therefore probable that river beds containing sizeable pebbles were exploited. The Maroni River crosscuts an extensive area with an important geological diversity. A result hereof is that its gravel beds may potentially contain a huge variation of rock materials. In this respect the Paramaca Series should be mentioned, as it contains an extensive variety of rock types, including numerous forms of (a) igneous rock (e.g. basalts, andesites, dacites, rhyolites, gabbros, dolerites) and (b) metamorphic rock (e.g. greenstones, schists, phyllites) (Choubert 1979; Delor et al. 2001). Another possibility is the exploitation of local tributaries such as Crique Balaté. This smaller stream springs from regions dominated by the Bonidoro and Orapu Series as well as certain local gneissic outcrops. The Bonidoro Series is the most interesting formation, as it contains sandstone, quartzite, schist and granite. The Orapu Series consists mainly of conglomerates and schists (Delor et al. 2001).

Concerning all quartz varieties it was observed that they had not been exhaustively worked as we found a large number of unworked pebbles and blocks at the site. This may suggest that the primary or secondary quartz sources were situated rather close to the site. This pattern is also the case with regard to the granite and ferralitic material. As to the other raw materials, we can state that the number of artefacts is considered too low to obtain a better understanding of their fabrication modes.

In sum, we agree that all rocks originate from the Guianas and, in particular, from the Paramaca and Bonidoro Series. The former series consists of a diversity of igneous and metamorphic rock material whereas the latter consists of sandstone, quartzites and schists (Choubert 1979, Plate 4). Both series cross the Maroni River.

5.6.3 The artefacts

The quartz material

Looking closely at the lithic technology and stone tools, we can distinguish five large groups of lithic artefacts.[163] Each forms an inter-related set of items, established following a similar procurement-manufacture-use sequence. These groups can be described as including all:

a. Artefacts (flakes, retouched flakes, shatter, core tools) formed during the manufacture and use of flake tools, generally referred to as flake tool technologies;[164]

b. Artefacts (flakes, shatter, pre-forms, core tools) formed during the manufacture and use of core tools and other core artefacts, also referred to as core tool/artefact technologies or ground stone technologies. Examples of such technologies not only include axes/adzes and rare quern (core tools) manufacture, but also pendant or bead (core artefacts) productions;

c. Artefacts that were only modified as a result of usage and not modified by means of a prior shaping stage. These are also referred to as use-modified lithics, i.e. cobbles used as hammer stones or polishing stones (Rodríguez Ramos 2001);

d. Non-modified rock items that do not occur in the site area naturally and must therefore have been brought here by the inhabitants. Such items are also referred to as manuports;

e. Artefacts only modified by means of burning (e.g. cooking stones or hearth bases).

Further subdivisions can be made in the first three groups either in the manufacture sequence or according to the types of tools made and used. Table 5.18 summarises the association of the specific raw material classes with the various sets of artefact, as discussed above.

The flake tool technology

The large quantity of flakes, cores and debris associated with all varieties of quartz suggests it was worked and reduced at the site (Table 5.19). The purpose of knapping quartz was to produce flakes that could be utilized as tools in various tasks. This required hard and sharp edges as to activities such as scraping, cutting, drilling, and grating. In addition, a significant portion of these artefacts served as core tools, predominantly hammer stones, without any prior manufacturing process. These items will be dealt with in the section on the core tools, as they form part of another procurement-manufacture-use sequence (see below).

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163 Here, a stone is considered an artefact if it is either modified by humans or brought to the site by humans (manuport) as it does not occur in the site area by nature. Modification is regarded in the broadest sense of the word. This not only includes the general stone working techniques (e.g. flaking, pecking, grinding, sawing), but also related modifications as a result of abrading, hammering, and polishing as well as modifications in shape and colour due to intentional burning of the rock (Knippenberg 2006).

164 Blade technologies should be included in this group. True blades, however, were not manufactured at CSL.

As mentioned above, the collected sample is strongly biased towards the larger artefacts. This explains the high occurrence of flake cores and unmodified raw material (30%) compared to the other material (flakes, shatter, chips) (cf. Table 5.19). This bias has considerable consequences as to our knowledge of the end goal of this reduction: flake tools. The larger tools will be over-represented whereas the smaller ones might be missed or at least strongly underrepresented.

When attempting to reconstruct the manner in which material had been reduced we therefore focussed on the study of the flake cores rather than of flake tools or flakes. Based on a careful study and comparison of the cores, a broad distinction can be established between three reduction modes strongly correlated to the choice of the raw material: (a) a reduction mode involving small waterworn pebbles of the white or milky quartz type (C), (b) a reduction mode associated with the somewhat larger pebbles and blocks of varied shapes consisting mainly of the quartz types A and B, and to a lesser degree type C, and (c) a reduction mode visible on flat blocks consisting of the quartz types A and B. These three reduction modes (Modes 1-3) all belong to the same method or tradition (<u>Method 1</u>) as presented here:

Mode 1 This production mode is the most sophisticated and structured. The inhabitants specifically collected small round pebbles and knapped them bifacially from one end, often leaving the other end unworked (Figs. 5.31b-c). The knapping was carried out by means of the direct free-hand percussion technique applying a hard hammer. The goal of this production was to obtain small flakes (cf. Section 4.6.2). Because of their small size and the artefact collecting methodology, the excavated flakes only represent a small part of the original inventory. Consequently, our knowledge on the variation of this end product remains limited. From this small sample, however, it can be discerned that almost none of the items have retouched edges or resemble recurrent tool types (scrapers, drills, etc.). Moreover, we observed that only a very small number of flakes exhibited macroscopic use-wear traces.

Mode 2 The second mode of reduction can be considered more opportunistic. The shape of the raw material largely guided the reduction sequence. The pre-Columbians had chosen a diversity of raw material forms and sizes, including strongly rounded, but also more angular shaped waterworn pebbles, as well as truely angular blocks. As a result, the collection includes a large set of varied shaped and sized flake cores without a clear predefined systematic reduction strategy. It must be added here that cores vary strongly with regard to the degree of reduction. The large amount of hardly reduced cores is remarkable and suggests that raw material availability was not an issue with regard to these materials. The direct freehand technique and the bipolar percussion technique were applied during reduction, both utilising hard hammer stones.

Mode 3 The third mode of production relates to flat saccharin type quartz blocks. These were reduced in a relatively straightforward manner, utilising one of the flat sides as the platform and maintaining this type of working during the reduction. Knapping was carried out in one direction, predominantly by means of the bipolar percussion technique. Especially among this group, even more than with Mode 2, it was observed that the number of limitedly reduced cores is high; again an indication that raw material was readily available.

A high percentage of angular fragments (often referred to as "shatter") found among the saccharin artefacts can be related to both Modes 2 and 3. Such high percentage is a characteristic of coarse quartz flake technologies, as has been demonstrated with regard to two Late Archaic sites in French Guiana (Delpech 2005; van den Bel et al. 2006; Mestre and Delpech 2008). Besides the poor flaking quality of the material, the application of the less controlled bipolar technique should be held responsible for this trait (Knippenberg 2006).

In addition to these three reduction modes (associated with the three most frequent quartz varieties), the excavations not only produced a number of other quartz types, but also cryptocrystalline rocks that were probably worked to enable the manufacture of flake tools. This relates in particular to the translucent quartz, jasper, chalcedony and the heavily patinated fine-grained rock of an unknown composition. Unfortunately their numbers are too small to properly understand their modes of reduction and to obtain any insight into the end products.

Remarkably the lithic assemblage lacks hyaline cores. The small size of the flakes and the utilisation of the direct percussion technique resemble the debitage of white quartz.

A second method is presumably present at the site (Method 2). The jasper and chalcedony are poorly diagnostic and difficult to classify, but they may well have been generated following a similar reduction mode, as with the majority of the saccharin quartz. Concering Method 2, the two heavily patinated flakes, however, display a morphology as well as a dorsal scar pattern. Both are completely different from the quartz material. The latter two artefacts are more closely related to flake or possibly blade debitage associated with the Archaic or even Lithic tradition involving larger sized cores and tools.

Use-wear analysis

As mentioned above, the purpose of reducing quartz at the site was the production of flake tools. The technology can be classified as expedient whereby flakes possessing the proper size and proper usable edge were selected and applied without a subsequent stage of tool shaping by means of secondary working techniques, such as retouching. The instant creation of sharp flakes rather than producing pre-defined tool types, was the main goal. Only five flakes (< 0.5%) included edges with any intentional retouch which was rather crude with two examples and doubtful with one.

As a result the majority of flake tools are only recognizable by means of the presence of visible use-wear on their edges. This places severe limitations on a proper overview of tool types present which in the case of the coarse grained quartz varieties becomes even more problematic. It is more difficult to spot use-wear on this material as it is on finer grained rocks. Regarding the latter, fine but well-identifiable use-retouch can develop, as extensive work on flint has shown. Nevertheless, various wear types in the form of polish may also occur, which can only be identified by means of microscopic techniques.

Within the CSL collection, macroscopically use-wear is visible on a small number of flakes (N=34, ~3%), supporting the notion that quartz was worked when producing flake tools. As expected, the majority of flakes with use-wear are of the finer grained quartz C or D varieties. Among the flakes with use-wear, the majority display thin, sharp edges with micro-retouch, suggesting they were meant for cutting. Several used edges are steep, suggesting they served as scrapers. Only one small flake could potentially be a small grater tooth that, for example, had been inserted into a wooden board in order to grate tubers (cf. Section 12.5.2). Apart from these flakes with macroscopically visible use-wear, we may presume that more flakes have served as tools when carrying out tasks that did not produce any significant wear. In fact, use-wear studies on flint assemblages always indicate that part of the tools that can only be identified by means of microscopic techniques (van Gijn 1990; Lammers 2008).

In order to improve our understanding of the purpose of quartz and other flake tools, four quartz flakes (N=4) were selected for microscopic study to be carried out by Channah Nieuwenhuis at the Laboratory for Artefact Studies at Leiden University (The Netherlands). This small sample consisted of flakes with an edge that was sufficiently long to serve as a tool and/or flakes exhibiting macroscopically visible use-wear in the form of micro-retouch. The specific aims of this analysis were: (a) to verify if microscopic use-wear traces could be seen on quartz material and (b) if these traces could be interpreted as linked to the tool's function. If the first goal proved successful, additional flakes were to be analysed.

Nieuwenhuis applied the "low- and high-power" method as developed over the last 25 years with regard to flint tools in European archaeology (Tringham et al. 1974; Keeley 1980; van Gijn 1990). Nieuwenhuis (2002) had applied this method in South America (Columbia) and it was also utilized in the Caribbean region (Briels 2004; Lammers 2008). All implements were initially studied by means of a Nikon stereomicroscope with 10-64X magnification in order to assess: (a) the tool's morphology, (b) the macroscopic traces of use-wear and (c) the possible presence of residue.[165] Next, these artefacts were examined by means of a metallographic microscope (Nikon Optiphot; 10-560X magnification) with incident light and fitted with polarizing as well as Nomarski DIC filters. The tools were not chemically cleaned and only alcohol was occasionally utilised in order to remove any finger grease. This high-power technique serves to study the various types of polish that occur on a used surface as a result of the contact between the rock (tool) and the material (e.g. plants, shells, wood, leather, etc.) that is being worked. These polishes are very characteristic of the worked material. Therefore they are able to identify and distinguish the contact materials.

The results indicated that use-wear is present on three artefacts and possibly on the fourth one (20C2). Flake 10A2 includes microscopic edge-retouch on one of the edges and several rough spots with small striations positioned parallel to the edge. Flake 17C2 has a limited roughened area on one edge and irregular retouch on the other, indicating a perpendicular motion of usage. Flake 9C2 has some impact-retouch on the pointed edge (no traces of circular motion). One edge has roughened areas with traces of linear motion.

Unfortunately this limited analysis proved it is impossible to properly identify, study and interpret traces of polish on quartz material due to the already present natural polish of the crystalline quartz surface. Precisely this characteristic of quartz distinguishes it from flint, rendering it less suitable with regard to this type of use-wear analysis. The microscopic study, however, confirmed the macroscopic observations illustrating that these flakes have served as tools, each with dissimilar motions.

165 This technique is often referred to as the low-power method.

It can be added that these quartz tools have been utilised without any secondary manufacturing. We may therefore classify them as opportunistic or "expedient."

Discussion

The presence of three distinct reduction modes, strongly associated with certain specific quartz varieties, is remarkable and requires further discussion. Comparing all three, we observed that the bifacial reduction of small white quartz pebbles clearly stands out (Mode 1). However, Modes 2 and 3 are predominantly associated with the saccharin varieties and more interrelated. This latter similarity is not only concluded from a raw material, but also from a technological point of view. Mode 3 can be considered a variation of the opportunistic way of reducing a large variety of quartz shapes (Mode 2), the flat blocks being only one of them. On the other hand, the bifacial reduction Mode 1 is unique. It is associated with the small milky quartz pebbles, follows a similar reduction protocol for all cores (bifacial from one end) and involves only one percussion technique (direct free-hand percussion). This dissimilarity suggests a difference in the approach of and work on lithics, in other words a variation in tradition.

The occupations at CSL, from the Late Archaic to the LCA, may explain this coexistence of these two lithic technologies. We suggest that the more standardized reduction of white quartz pebbles (Mode 1) is associated with a Late Archaic Age or ECA-A occupation at the site, whereas the opportunistic saccharin quartz production (Modes 2 and 3) is associated with the younger ECA-B occupation and possibly the LCA too. Despite the fact that our knowledge on preceramic quartz flake tool technologies in the Guianas is as yet insufficient, archaeological research in the adjacent and culturally related region of the Antilles, has demonstrated that Archaic flake technologies are more standardized and more sophisticated than the Ceramic Age ones, the latter relying much more on the application of the bipolar technique (Hofman and Hoogland 2003; Knippenberg 2006; Fouéré and Chancerel 2006; Bonnissent 2008). Moreover, the spatial analysis at CSL, based on an independent set of data, supports this hypothesis (see below). This point of view also allows us to attribute the two patinated flakes (Method 2) to the earliest occupation phase at CSL (Phase 1) as their patina suggests.

On a larger scale both technologies can be classified as expedient: without any pre-defined formal types of tools. They thus strongly resemble technologies found at other sites in French Guiana, Venezuela, the Antilles and Brazil (Knippenberg 2006; Perry 2004; Prous et al. 2010; van den Bel et al. 2006; Bueno 2007; Prous et al. 2010). In the Antilles, for example, we observe that this type of technology appears during the Late Archaic Age, when it is assumed people were semi-sedentary foragers (Knippenberg 1999, 2006; Fouéré and Chancerel 2006). This corresponds well with our findings at CSL and other sites in French Guiana, where this technology can also be attributed to the Archaic Age occupation (Mestre and Delpech 2008). This also suggests that expedience is not totally dependent upon being sedentary, but may well depend on the type of activity and perhaps, more importantly, on the variation of the types of activities carried out with lithic tools.

Sadly we remain poorly informed on the kind of tasks carried out by means of quartz tools. Examples of small material including the majority of the flake tools, is underrepresented within the excavated assemblage. In addition, the quartz material itself is difficult to analyse as to the presence of use-wear. For now we

	silstone	sandstone	conglomerate	igneous rock	diorite	granite	plutonic rock	greenstone	quartzite	phyllite	schist	gneiss	amphibolite	metamorphic rock	red ochre	ferrigenous nodules	unidentified	Total
Flake																		
complete flake	-	-	-	16	-	19	-	9	1	2	-	-	1	-	1	-	1	53
split flake	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
broken flake (proximal)	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	3
flake fragment (medial / distal)	-	-	-	2	-	-	-	2	-	-	-	-	-	-	-	-	-	4
unidentified	-	-	-	5	-	3	-	-	-	1	-	-	-	-	-	-	1	10
Shatter	**-**	**1**	**-**	**-**	**-**	**6**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**13**
Flake core																		
shapeless	-	-	-	-	-	2	-	-	3	-	-	-	-	-	-	-	-	5
single platformed, unifacial	-	-	-	-	-	2	-	-	1	-	-	-	1	-	-	-	-	4
double platformed, bifacial	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
bi-directional bipolar core (piece esquille)	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
flaked rock	-	-	-	3	-	7	1	2	1	-	2	-	-	-	-	-	-	16
Core tool																		
axe	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
axe/wedge	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
axe fragment	-	-	-	2	-	-	-	10	-	-	-	-	-	-	-	-	-	12
axe preform	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	3
edge flake	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
hammer stone	-	-	-	1	-	1	-	-	1	1	-	-	-	-	-	-	-	4
hammer stone fragment	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	3
anvil fragment	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
quern fragment	-	-	-	4	-	7	-	-	-	-	-	-	-	-	-	-	-	11
pestle	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	3
hammer-grinder fragment	-	-	-	4	-	-	-	1	-	-	1	-	-	-	-	-	-	6
abrading stone	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	3
abrading stone fragment	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	2
grinding stone with grooves	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-	3
pebble with abraded surface	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
pebble fragm. with abarded surface	-	1	1	6	-	1	-	-	-	1	-	-	-	-	-	-	-	10
multi-purpose tool	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
drill	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Natural unmodified rock																		
water-worn pebble	-	1	-	8	-	-	-	1	-	1	1	-	-	-	1	4	3	21
water-worn pebble fragment	-	-	-	25	-	3	-	1	2	1	-	-	-	-	1	3	2	38
angular rock	1	31	-	27	1	1	1	-	1	-	1	-	2	-	-	35	5	106
angular fragment	4	111	5	44	6	18	1	3	-	3	2	3	-	1	1	19	4	225
unspecified fragment	1	11	1	22	2	137	2	4	-	7	7	3	2	-	1	-	1	202
Unidentified	**-**	**-**	**-**	**3**	**-**	**5**	**-**	**-**	**-**	**-**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**11**
total	6	157	7	183	9	212	6	38	15	23	16	8	6	2	5	63	18	781

Table 5.19. The number of artefacts related to function and raw material.

suggest that quartz flakes primarily served when cutting, scraping, crating, and coring played a role. These activities, on a more general level, were related to (a) food preparation, (b) basketry manufacturing and (c) the production of varied wooden tools and objects. One cannot specify to which degree the activities of the Archaic Age occupation differed from those of the latter Ceramic Age. It is noted, however, that the size of tools manufactured during the Archaic Age was much more restricted than during latter Ceramic Age, given the small size of the white quartz pebbles.

The core tools

The number of core tools is relatively small. The excavations produced 143 tools of which hammer stones constituted more than 50% of the total (N=76) (Table 5.19 and Fig. 5.31b). A proper classification per tool type is hampered in many cases due to the fragmented nature of the artefacts. In particular a distinction between a “passive” and “active” grinding stone remains problematic if there is only a small fragment. Only 55 specimens are complete, including 41 hammer stones. Another complicating factor is due to the fact that the typology not always correlates well with the tool’s actual function. Even in the case of less damaged artefacts this distinction may only be correctly established if microscopic techniques concerning the use-wear or residues are applied (see below). This becomes all the more complicated whenever tools served multiple functions, whereby earlier traces were blurred or erased.

Therefore, tools have been classified on the basis of: (a) the shape of the used surface and (b) the nature of the macroscopically visible use-wear traces. With regard to numerous fragments, a distinction was made between stones with: (a) a concave, abraded surface and (b) a convex, abraded surface. In case of (a) it was assumed these belonged to passive and in case of (b) that they belonged to active tools. In rare instances, certain tools were microscopically analysed as to wear patterns or the presence of starch grains (cf. Section 5.7). With certain fragments only a very descriptive terminology was applied when classifying these specimens.

Among the core tools we distinguished manufactured tools belonging to Mode 2 –as defiend above– and only use-modified tools belonging to Mode 3. The group of manufactured tools is small and mainly consists of axes. In addition, rare examples of roughly worked blocks that subsequently served as abrading stones are also present. Some debitage related to the on-site manufacture of core tools was recorded. However, this is rare and sometimes difficult to relate to one of the tool types. This suggests they were partially manufactured locally, whereas the remainder entered the site as rough-outs or finished tools. With regard to a small portion of the tools, it remains unclear if any manufacturing had occurred prior to their usage. This often relates to a small number of abrading stones, of which only very few and quite weathered fragments are present, thereby strongly blurring a clear insight into any manufacturing traces.

The use-modified tool group principally consists of pebbles and angular blocks that served as hammer stones, abrading stones, (edge) grinders and (mobile) polishing stones. Within this group, the hammer stones occur the most. Notably the number of grinding and polishing stones and other abrasive tools is fairly low. In fact, they are considered rare.

The axes

In total fourteen axes, including eleven fragments, two incomplete and one complete specimen were found during the excavations (Table 5.19 and Fig. 5.32). The majority was located in the dark earth layer (N=13), two in the feature fills and two at the surface. Fine grained greenstone is the most common raw material among the axes (N=11). The majority of the other identified raw materials consist of an igneous rock variety. One axe was identified as metamorphic rock, probably of the schistoid variety and exhibited foliation.

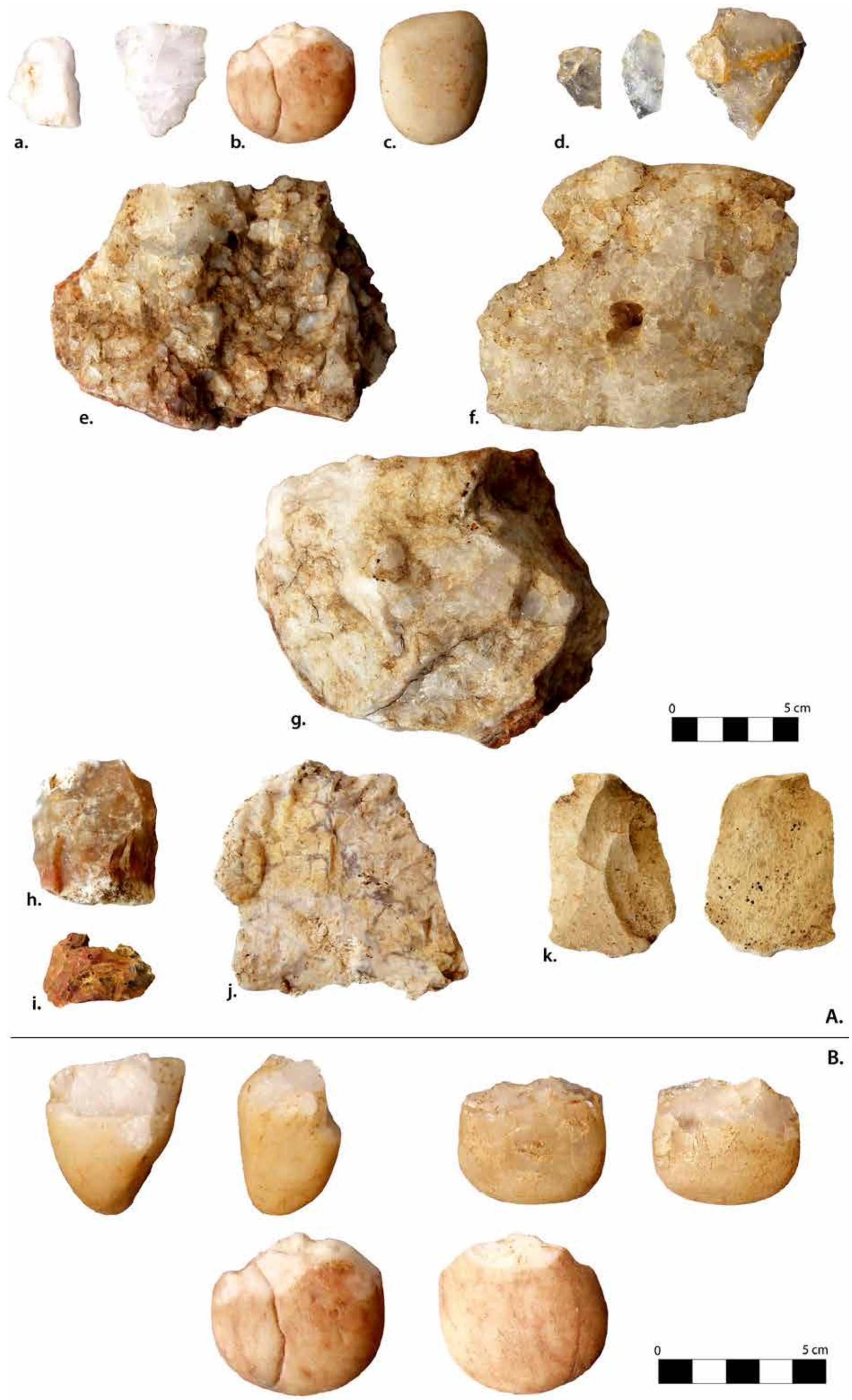


Figure 5.31. (A) Varieties of quartz and other siliceous rock: (a) utilized flakes of a white fine grained quartz (variety C), (b) a bifacial flake core on small pebble of a white fine grained quartz (variety C), (c) an unmodified pebble of a white fine grained quartz (variety C), (d) utilized flakes of a translucent quartz (variety D), (e) a flake core of a coarse saccharin quartz (variety B), (f) a flake of a saccharin quartz (variety A), (g) a flake core of a saccharin quartz (variety A), (h) a flake core of chalcedony, (i) a shatter of red jasper, (j) a flake of white chalcedony and (k) a flake of fine grained white patinated rock; (B) Quartz material: bifacial flake cores on small pebbles of white fine grained quartz (variety C) (photographs by Sebastiaan Knippenberg).

Numerous fragments consist only of small parts of the original axe, impeding further insight into their original shape. Based on the complete axes it can be stated that their morphology is quite diverse. Two are notched (Fig. 5.32a, d), a specific trait of axes in the Guianas (Boomert 1979; Vacher et al. 1998:128, Figs. 78.1-2, 10). One included a wide distal part and narrows towards the edge, a characteristric of other sites (Vacher et al. 1998:128, Fig. 78.12). The irregularly shaped schistoid axe was only ground at the edge and had become very blunt due to frequent usage. This specimen may have served as a wedge.

Certain tools show signs of re-working or re-use. The former was observed on a proximal and medial fragment bifacially flaked at the distal part. Two grooves on one of the faces suggest it had served as a hand-held grinding implement. A proximal fragment made from a finely grained igneous rock had been re-used as an active hammer-abrading tool (Fig. 5.32b). Its edge had become abraded as a result of this re-use. This phenomenon has been observed in many collections originating from sites in the Antilles and indicates it was a recurrent feature (Knippenberg 2006). It probably relates to that fact that many of the rock materials of the axes consist of durable and strong material. This allows them to fullfill a range of tasks.

The presence of several greenstone and igneous rock flakes and possibly two igneous rock rough-outs suggests that the inhabitants manufactured or at least used axes on site. The debitage quantities can be considered low, especially when one realizes that producing an axe implies quite some flake debitage. Even if taking the sample bias into account, we can state that axe manufacture did not form a frequent activity at the site. It also suggests that part of the axes must have been fabricated somewhere else. The following possibilities can be presented here: (a) the preparation of rough-outs, which produces the most debitage, may have occurred at source localities from which the inhabitants acquired their material, (b) the axes may have been made along a river or small stream where axe grinding and polishing stones are frequently manufactured and found and (c) the finished axes were obtained through trade with neighbouring communities.

The passive grinding tools

The total number of this passive type of tool, commonly utilised when grinding food substances, is low. We recorded only one complete specimen and twelve fragments. The actual number of grinding tools or querns within the collected sample may have been higher. Due to fragmentation and heavy weathering of certain raw materials, notably granite, it was impossible to identify the used areas on many of these stones. Therefore the grinding related rock materials include many unidentified fragments. As raw material, we recorded granite (eight fragments), magmatic rock (four fragments) and one complete saccharrin quartz milling stone (Fr., *meule dormant*).

The latter tool (F 45) was found upon the higher levee at Level 3. It stands out in its morphology and raw material used. This large, thick, flat angular pebble measures 22.8 x 15.3 x 7.7 cm and had been used intensively on both flat faces and on one of the lateral sides. Both flat faces had become very concave (Fig. 5.35b). The used lateral side exhibits a similar concavity, but is much smaller as to its surface and shows a preference for a single direction parallel to its length. All three used surfaces were sampled for starch grain analysis, indicating that this tool had served as a milling stone. Among the identified food remains ground on this tool, we discovered starch grains of: (a) beans (common and Lima beans), (b) maize, (c) sweet potato and (d) grasses (cf. Section 5.7).

Notwithstanding these results the possibility exists that this tool had also served as an axe grinding stone. Especially the narrow width of the lateral used side and the morphology of the used surface render it a proper face for axe grinding.

Figure 5.32. The axes (1): (a) an incomplete notched axe, greenstone, (b) a re-utilized axe fragment (proximal), igneous rock, (c) a proximal axe fragment, greenstone and (d) a distal fragment of a notched axe, greenstone (photographs by Sebastiaan Knippenberg).

The high hardness of the quartz, indeed harder than the axe related rock types, enables it to be an excellent material for this type of work. Apart from starch grain analysis, no additional microscopic work was carried out in order to support this

Figure 5.33. The axes (2): (a) a proxi- and medial fragment of a reworked axe, with the grooves of a fine grained igneous rock and (b) a tapered axe of a fine grained igneous rock (photographs by Sebastiaan Knippenberg).

second hypothesis. However, it has to be realised that heavy usage of the latter type of work may entirely erase earlier traces of work.

As to the other grinding tool fragments, they are mainly classified as grinding tools on the basis of: (a) the nature of the used surface and (b) the type of rock material they are made of. The majority of most pieces had abraded surfaces. To a certain degree they display some roughness and are not completely polished. The latter type of surface is common among axe grinding stones. Moreover, granites are a recurrent rock type among these artefacts. It is a suitable, abrasive material because of its coarse mineralogical texture including minerals with a varied hardness keeping the surface "rough." As axe grinding material, however, it is less suitable. This is due to its coarser texture and to the relative softness of certain mineral components (e.g. feldspars). All over the world we see that granites and other coarse igneous rocks have therefore served as raw material for querns.[166]

166 In northwestern Europe, for example, granite and other coarse grained igneous and crystalline metamorphic rocks (gneiss) are very common raw materials for querns dating from the Neolithic and Bronze Age (cf. Harsema 1979; Santallier et al. 2002).

Figure 5.34. The core tools (1): (a) a hand-held grinding stone with grooves of greenstone, (b) a hand-held grinding stone with broad grooves of phyllite and (c) a quern fragment of granite.

The active grinding tools

In the present study active grinding stones are considered tools (e.g. axes, wooden objects), against which hard materials had been ground. On a macroscopic level these tools often distinguish themselves from passive grinding tools (querns) by their much more polished used surfaces. This type of tool is rare within the lithic assemblage of CSL. Due to the fragmented nature, the same difficulties as with passive grinding tools arise when identifying this type of tool properly.

Only three grinding stone fragments were recorded. They represent hand-held tools with specific features such as abraded grooves. Apart from the large, possibly multifunctional stone (F 45) discussed above, any additional large passive grinding slabs are missing. This rarity, or even absence, is likely due the fact that large rock boulders extracted from rapids had primarily served this purpose. The co-occurrence of: (a) large abrasive stones, often recognized by means of the

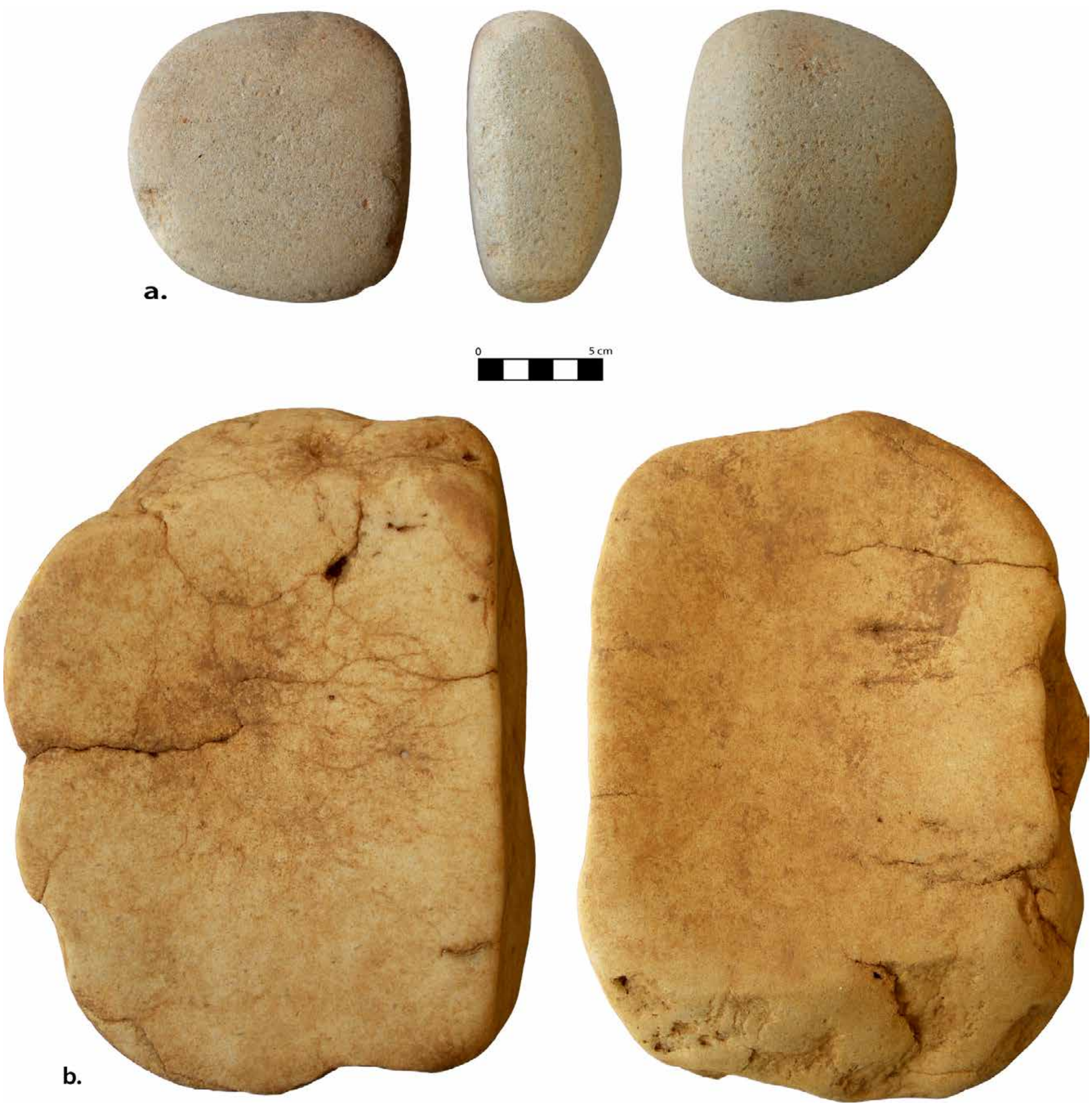


Figure 5.35. The core tools (2): (a) an active abrading stone (F 58) with facetted used faces of fine grained green igneous or metamorphic rock (greenstone) and (b) quern of quartz (F 45) (photographs by Sebastiaan Knippenberg).

presence of clear regular concavities and (b) sufficient water makes this location very suitable for time-consuming work. The Ilet Lepreux, just opposite the site, has such passive grinding stones (Fr., *polissoirs*). This location might have served as the axe grinding spot for the inhabitants of CSL.

The three fragments of hand-held grooved stones include two flat items consisting of phyllite and a large waterworn pebble fragment of greenstone. The pair of phyllite pieces has parallel, undeep grooves on both flat sides of the stone (Fig. 5.34b). The greenstone specimen has three clear grooves on a slightly concave side (Fig. 5.34a).

Annemiek Verbaas (Leiden University) microscopically analysed both phyllite artefacts as to the presence and nature of use-wear. She confirmed the macroscopic determination: both objects have been used. However, it was impossible to identify the material ground by means of these tools, probably due to post-depositional changes on the used surfaces of the stone. On the basis of the dimensions of the tools as well as the width of the grooves, we can suggest the possibility that the inhabitants may have applied this type of tool to sharpen their wooden and/or bone arrow tips.

The active hammer, pounding and abrading stones

This assemblage includes a large number of use-modified pebbles that were actively applied in order to hammer, pound, abrade, or polish stones. All but one had served multiple tasks.

Hammer stones are by far the predominant tool type at the site. In total we identified seventy-six stones with pitted areas (Fr., cupules) signifying they had served to hammer or crush hard materials. However, the majority had probably been involved in quartz flaking. They include forty-one complete ones and thirty-five fragments. The pre-Columbians almost exclusively utilised quartz and to a lesser extent quartzite as a raw material (N=70). The other raw materials include rare examples of igneous rock (N=3), granite (N=1), phyllite (N=1) and unspecified metamorphic rock (N=1). Among the quartz specimens, the round to oval shaped waterworn pebbles of all four varieties are most recurrent, but more angular shaped pebbles are also present (Fig. 5.36a-c).

Complete tools vary in size between 23 and 86 mm. A comparison between the various raw materials shows that hammers made of saccharin quartz are larger than the white or hyaline quartz examples (Fig. 5.37). Variation in type and number of used areas is also noted. Most recurrent stones include: (a) use-wear on a single zone, often one of the ends of the piece, (b) use-wear on both ends (bipolar type) and (c) the use-wear on multiple sides or almost the entire object.

Nine artefacts display a characteristic wear which is the result of utilizing the stone both as a pounding and grinding device. The used surface is pitted, but it also includes abrasions. Three specimens resemble the shape of true pestles, i.e. long and slender with flattened used ends (Fig. 5.36c). They include a specimen consisting of quartz, one of magmatic rock, and one of phyllite. The quartz example has also served as a hammer stone.

The other active tools have different shapes (N=3) or represent tool fragments with a convex used side (N=3). In the latter case, we can only state they served simultaneously as hammers and grinders (Rostain 1994a, Fig. 153.5). We recorded tools consisting of quartz (N=4), greenstone (N=1) and schist (N=1).

A small number of tools was grouped as active grinding or abrading tools. They differ from the above-described hammer-grinders, because these only possess abraded used surfaces, but lack any pitted areas. These tools may have served as active devices for food grinding, i.e. *manos* (Sp.). Among this type of tools only a small number of complete specimens were identified. The majority hereof contains small fragments. A myrad of raw materials, including igneous rocks (granite and a dark fine rock), gneiss, schist, phyllite, greenstone and one lateritic nodule is present among these tool types.

Figure 5.36. The core tools (3): (a) a hammer stone fragment of quartz, (b) a small hammer stone of quartz and (c) a pounding-grinding stone (pestle) of quartz (photographs by Sebastiaan Knippenberg).

One complete specimen is extraordinary (F 58). It entails a round slightly flat pebble with multiple used facetted sides (Fig. 5.35a). Such a tool is referred to as an edge grinder. The microscopic use-wear analysis revealed it can indeed be classified as a *mano*, i.e. the handheld, active tool applied when grinding food on a milling stone and that it had been used actively on various sides: at its flat distal end and on both sides.[167] The use-polish of the used facets resembles polish acquired during experiments in which siliceous plants (e.g. grasses, maize kerns), were ground. We must point out here that this microscopic analysis is not capable of identifying the species of the vegetal substance, but that it only allows for a distinction between harder siliceous and softer non-siliceous plants. Another round pebble, similar in shape and made of a coarse igneous rock, has abraded areas on only one side. Given the striking similarity in shape and the type of use-wear, it probably served a similar function as the specimen analysed microscopically. However, another flat artefact made of sandstone with two utilised faces rather resembles a sharpener or "calibrator".

Only one active use-modified stone could be classified as a multipurpose tool: a relatively thick waterworn pebble (11.1 x 7.8 x 7.6 cm) made of igneous rock. It has pits on one end and various abraded areas on its sides, suggesting it had served as a hammer as well as a *mano* or grinding stone.

The Anvils Only two fragments can be classified as this passive type of tool. It relates to one fragment of a flat pebble consisting of saccharin quartz and another fragment of magmatic rock. Both fragments have pitted areas on their flat surfaces. The presence of only two of these tools is surprising, considering the importance of the bipolar technique in reducing the quartz material.

A drill A small elongated block (32B2) measuring 5.3 x 2.3 x 1.6 cm was classified as a drill. It is mainly composed of feldspar and was probably part of a very coarse plutonic rock. Its pointed end exhibits clear use-wear as it was significantly rounded. This suggests it was handled in a circular motion. The pointed used end was analysed microscopically applying the low and high power techniques (cf. Section 5.6.3). Unfortunately we could not determine the kind of material which had been drilled with this device.

A multifunctional tool We found one tool showing varied use-wear traces which suggested multiple functions. It consisted of an igneous pebble (11.1 x 7.8 x 7.6 cm) with cupules on one end and several polished zones on its sides. It is presumed that it served as a hammer and polishing stone as well as a *mano*.

A bead A stone bead was found in F 83. It consisted of a rare variety of slightly translucent quartz or perhaps chalcedony. It has a barrel-shape and measures 12 x 12 x 12 mm (1.8 gr). It is entirely ground and the perforation is biconical. With only a single specimen it is difficult to formulate any views on if this bead had been manufactured locally or obtained through exchange from elsewhere. Based on the rarity of the specific quartz or a variety of chalcedony as well as the absence of any rough-outs or related debitage, the latter option seems more likely. One must realise that beads and bead-related manufacturing debris are small in size and that they could easily have been missed due to the excavation methodology applied at CSL.

167 Annemiek Verbaas (Leiden University) carried out this analysis too.

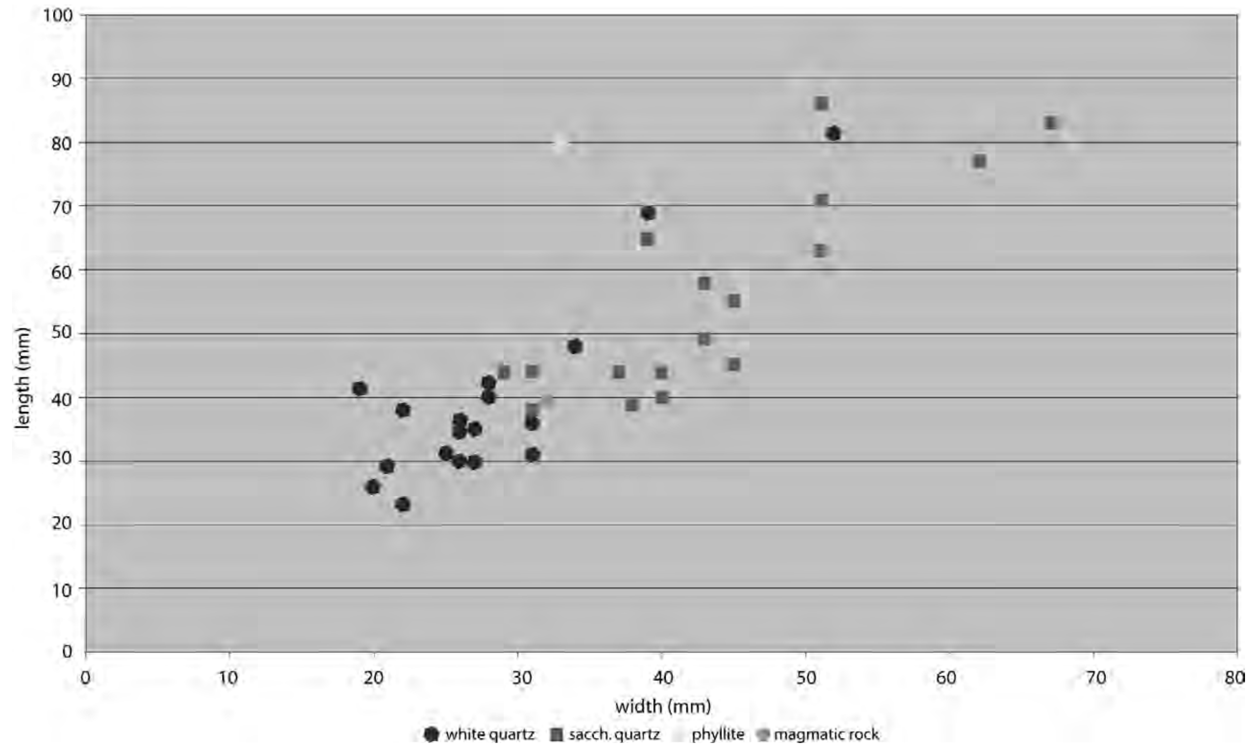


Figure 5.37. An overview of complete hammer stones related to size and raw materials.

5.6.4 The spatial distribution

The spatial distribution of the lithic material reveals three areas where lithic material is more abundant (Figs. 5.38a-b). One concentration was found in the Sectors 31-32 as well as in the Sectors 46-48, situated in the northeastern part of the excavation. A second concentration was observed in the central part of the excavation (Sectors 3, 4, 18) and a third one in the central-western part (Sectors 10-12 and Sectors 25-27). The majority of the artefacts discovered in the third, central-western concentration consisted predominantly of quartz. Notably, the white and hyaline variety occured (relatively) more often than the saccharin quartz, although the differences were small.

The first two concentrations correlate with the ceramic spatial distribution (cf. Fig. 5.18) that is relatively more abundant than the saccharin quartz variety (compare Figs. 5.38b vs. 5.38c-d). Furthermore, a similar pattern occurs with regard to the spatial distribution of bifacial quartz cores which are more abundant in this part of the excavation (cf. Fig. 5.38e). This analysis indicates that the bifacial reduction of small white and hyaline quartz pebbles (Mode 1) can, to a certain degree, be spatially distinguished from the other reduction modes. Their negative spatial correlation with the ceramic material supports this hypothesis of this particular reduction mode which can be attributed to Phase 1.

It was observed that the distribution of core tools meets its highest diversity in the back-fan area and in particular in the sectors with the highest artefact counts of both lithic and ceramic objects (Fig. 5.39). Such diversity is in agreement with the household activities familiar to a permanent settlement site, as compared to a more limited variation in activities within a forager encampment. We therefore suggest that the majority of the core tool material found in this part of the excavation can be attributed to Phase 2.

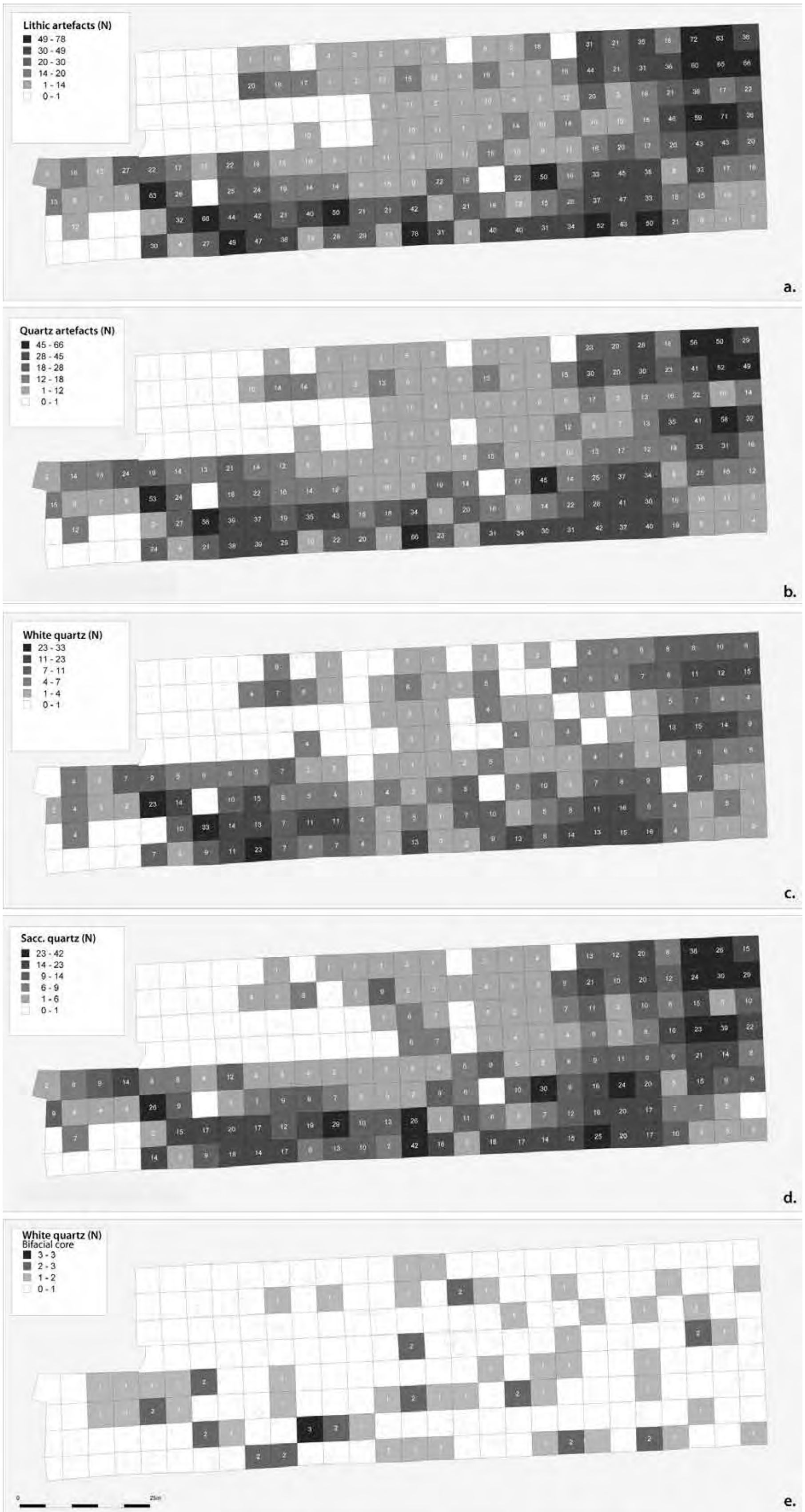


Figure 5.38. (a) The distribution of lithic material and (b-e) quartz in particular.

5.6.5 Conclusions

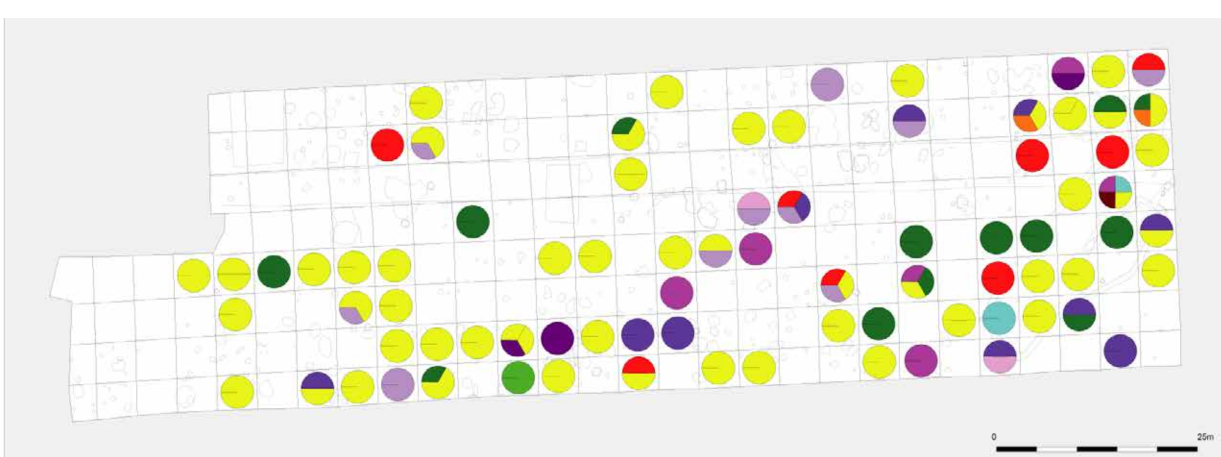
The population from CSL acquired a large variety of raw materials as to their stone tools. The surroundings of the site provide the majority of these used rock materials *in natura*. It is therefore likely they were collected by the inhabitants themselves. At present the exact location cannot be determined. The large amount of waterworn rock at least suggests the exploitation of the Maroni riverbeds. In addition, more inland outcrops must have been visited, given the "angular" character of another portion of the assemblage. On the other hand, certain artefacts, such as the axes, may have a distant (exotic) origin. In that case, we may presume they were obtained by trade with other communities.

Quartz material dominates the site's lithic assemblage. This material was locally reduced in order to create proper flakes to serve as cutting, scraping and grating or drilling tools, but it was also acquired to serve as hammer stones. We were able to distinguish three production modes, or technologies, in order to obtain quartz cores (Modes 1-3), attributed to one lithic tradition or Method 1. Two modes have a strong opportunistic character (Modes 2 and 3). They were associated with Phase 2 and to a lesser extent with Phase 3. Mode 1 represents a more standardised reduction. It served to produce small flakes and is probably linked to Phase 1, the Late Archaic and ECA-A occupation situated upon the higher levee. Despite the differences in preparing the cores when obtaining flakes for the three above-mentioned technologies, secondary knapping of the flakes does not play an important role in all modes of production. Another, more ancient tradition (Method 2), is materialised by only a small number of specimens, related to blade-technology and may represent the presence of Early Archaic or even Lithic Age Amerindians on site or direct surroundings.

Insight into the functions of flakes tools remains limited. Numerous flakes could be classed as tools because of the presence of fine micro-wear on their edges. The microscopic analysis, however, was not able to provide any additional information regarding materials that had been worked. This was due to the high natural polish present on quartz blurring any use-wear polish. Therefore an important aspect of its function remains undefined.

In addition to flake tools, the inhabitants at CSL manufactured and utilized a variety of core tools: (a) axes, (b) passive and active grinding stones, (c) abrading stones, (d) hammer stones and (e) anvils. The fragmented nature of the material often

Figure 5.39. The distribution of bifacial core tools.



hampered identifying the correct type of tool. This also indicates that the excavated material mainly represents refuse material. Macroscopic use-wear and starch grain analysis, however, did in certain cases provide very detailed information on their functions, thereby supporting the macroscopic identifications. The majority of this material is probably associated with the later two occupation phases at the site. This variety of tools is often encountered in Ceramic Age contexts in the Guianas and surrounding regions (Rostain 1994a; Vacher et al. 1998; Knippenberg 2006).

Among the core tools we observed a large variety of rock types. On the one hand, this indicates that the pre-Columbians choose specific materials for specific purposes. For example, granite served almost exclusively as a passive grinding material. On the other hand, the large variety reflects, to a certain degree, the opportunistic application of a wide range of available rock types, i.e. different materials were used for axes. To which degree this variation is related to changes in time is difficult to determine, given the limited number of tools. The identification of certain spatial and diachronic patterns thus proves rather difficult if not impossible. At least with regard to quartz it is clear that the presumed Late Archaic and initial Ceramic Age reduction mode primarily was carried out on small white, possibly translucent fine grained quartz pebbles (Mode 1). In later phases one utilised all kinds of material, mainly made of coarser grained saccharin quartz.

5.7 The starch grain analysis

5.7.1 The description of the samples

Ten ceramic and four lithic artefacts (CSL-14) were choosen for a starch grain analysis (N=14) carried out by Jaime Pagán Jiménez (in van den Bel et al. 2011:129–141) (Annexe 3.7). Artefacts from a radiocarbon dated context were favoured in order to obtain a chronological attribution per phase (Table 5.20 and Fig. 5.7).[168]

Table 5.20 presents general information on the extracted samples and the provenances of the studied artefacts. Sebastiaan Knippenberg extracted three sediment (residu) samples from artefact CSL-1 (F 45) during the lithic study in French Guiana. Three surfaces of this passive grinding stone, or *metate*, were sampled in order to pinpoint one or more locations. The reason for applying this sampling strategy was in order to insure the recovery of potential starches trapped in various elements (cracks, fissures, porous) of the surfaces with evident use-wear patterns. One of the CSL-1 samples was extracted from one side in the periphery of an (evident) use-wear area as reference sample in order to compare the results from the sections or facets of the same tool, with or without evident use-wear signs.

The samples CSL-3 (F 140, EC 741) and CSL-13 (F 252, EC 718) were processed in Puerto Rico by Pagán Jiménez, who took pinpointed samples from various locations of the potsherds. Artefact CSL-3 displayed charred residues attached to the exterior section. Artefact CSL-13 was sampled on the interior section where a charred crust was visible. The present author sampled the remaining artefacts (CSL-2, CSL-4 to 12, CSL-14), following a detailed protocol developed by Pagán Jiménez (2007, Appendix A and B) which has been adopted in numerous archaeobotanical studies throughout the Antilles (cf. Section 1.3.2).

168 The results of this research have been published by Jaime Pagán Jiménez in *Communities in Contact* (2011) as well as in the *Journal of the Walter Roth Museum of Archaeology and Anthropology* (2012). A slightly abridged version is presented here.

No.	Phase	Prov.	Cera. EC	Type and raw material	Sampled use-wear sections	Sampled use-wear sections	Lab. Number; sample weight // volume
CSL-1	"Phase 1"	F 45		Milling stone base, quartz	Used faces and periphery; No charcoal particles within the samples	Used faces and periphery; No charcoal particles within the samples	10-09 to 10-11; 0.006g.//0.01ml; 0.014g.//0.025ml; 0.028g.//0.03ml
CSL-2	Phase 1b	F 56	693	Cooking bowl fragment, clay	Interior; Many charcoal particles within the sample	Interior; Many charcoal particles within the sample	10-dec; 0.275g.//0.5ml
CSL-3	Phase 1b	F 140	741	Cooking bowl fragment, clay	Charred material, exterior; many charcoal particles within the sample	Charred material, exterior; many charcoal particles within the sample	okt-13; 0.087g.//0.1ml
CSL-4	Phase 2	F 309	728	Serving bowl, clay	Exterior; Many charcoal particles within the sample	Exterior; Many charcoal particles within the sample	okt-14; 0.032g.//0.1ml
CSL-5	Phase 2	F 252	716	Serving bowl, clay	Exterior; Many charcoal particles within the sample	Exterior; Many charcoal particles within the sample	okt-15; 0.058g.//0.2ml
CSL-6	Phase 2b	F 143	89	Serving bowl, clay	Exterior; Many charcoal particles within the sample	Exterior; Many charcoal particles within the sample	okt-16; 0.065g.//0.2ml
CSL-7	Phase 2	46C2	423	Griddle, clay	Cracks in the used side; No charcoal particles within the sample	Cracks in the used side; No charcoal particles within the sample	okt-17; 0.055g//0.7ml
CSL-8	Phase 2	48C2	503	Griddle, clay	Cracks in the used side; No charcoal particles within the sample	Cracks in the used side; No charcoal particles within the sample	okt-18; 0.280g.//0.45ml
CSL-9	"Phase 2"	35B2		Edge-grinder	Used face and periphery; very few charcoal particles within the sample	Used face and periphery; very few charcoal particles within the sample	okt-19; 0.397g.//0.48ml
CSL-10	"Phase 2"	51D2		Pestle [pilon]	Used face and periphery; no charcoal particles within the sample	Used face and periphery; no charcoal particles within the sample	okt-20; 0.416g.//0.49ml
CSL-11	"Phase 2"	35B2		Grinding tool	Used face and periphery; No charcoal particles within the sample	Used face and periphery; No charcoal particles within the sample	okt-21; 0.150g.//0.2ml.
CSL-12	Phase 2	28C2	402	Serving bowl, clay	Exterior; Many charcoal particles within the sample	Exterior; Many charcoal particles within the sample	okt-22; 0.007g.//0.03ml
CSL-13	Phase 2	F 252	718	Cooking bowl fragment, clay	Charred material, interior; Very few charcoal particles within the sample	Charred material, interior; Very few charcoal particles within the sample	okt-23; 0.073g//0.25ml
CSL-14	Phase 2	F 106	90	Serving bowl, clay	Exterior; No charcoal particles within the sample	Exterior; No charcoal particles within the sample	okt-24; 0.094g.//0.3ml

Table 5.20. The artefact provenances, chronological ascriptions and short contextual information on the analyzed samples. Underlined Phases have absolute dates. The hyphenated "Phases" are hypothetical ascriptions. Phases without markings represent relative ascriptions based on ceramic morphology.

5.7.2 The results

Table 5.21 synthesizes the results of the present study. The distribution of recovered starch grains combined with dated ceramics and their assigned identifications to a family (genus or species level), were placed within the site's chronological context. The lithic artefacts were not dated and may be attributed to any occupation whereby Phase 1 and 2 are considered the most probable ones (cf. Section 5.6.4). Ubiquity (expressed in %) combines approximate ("cf.") and secures identifications while referring to the occurrence of the identified taxa between the sample spectra. Species richness also combines both approximate and secure identifications.

The sections below provide a detailed description of the archaeobotanical data recovered with regard to each artefact in order to create the conditions for generating further meaningful interpretations that should be integrated into a broader site analysis.

The ceramics of Phase 1b

Two ceramic artefacts (CSL-2 and CSL-3), were dated and ascribed to Phase 1b, representing the earliest ceramics at the site submitted to starch grain analysis. However, it must be added here that earlier dates obtained go back to *c.*3300 BC (Phase 1a). For drawings of the sampled ceramic vessels see Fig. 5.23.

CSL-2 (F 56) is a complete ceramic cooking bowl (EC 693). Here four starch grains were recovered from the charred crust attached to the interior. Two of them were tentatively identified as maize (cf. *Zea mays*). The third was positively identified as *Maranta* cf. *arundinacea* and the fourth was tentatively identified as sweet potato (cf. *Ipomoea batatas*). The two apparent maize starches correspond to almost every trait documented as to the numerous domestic species (Pagán Jiménez 2007, Appendix B; Holst et al. 2007). However, the overall dimensions recorded in both cases (27 and 24.75 µm respectively) appear to be above the standard deviation range as we and other researchers registered (Holst et al. 2007) concerning starches from present-day maize land species (Annexe 3.7_A and photos: Granules 2 and 4).

However, it should be noted that certain present-day maize species exist that produce starch grains with dimensions above the mean usually oscillating between 11 and 15.8 µm (Annexe 3.7, Table 2; Holst et al. 2007, Table 2). This is the case with land species, such as *Pollo* from Columbia (a "primitive" popcorn variety with hard endosperm), *Pepitilla*, *Jala* and *Reventado*r from Mexico (all with hard endosperm). All these species of present-day maize produce starches which can measure up to 28 µm. Other kinds of maize of pre-Columbian origin currently found in tropical (Lowland) South America have not been subjected to a detailed characterization as to their morphology and size. This implies that we cannot discard the possibility that South American indigenous species of maize were able to produce starches similar to those recovered here at CSL. This is an important aspect when considering the identifications of ancient maize starch grains recorded as to later pre-Columbian periods in French Guiana, where their length varies between 12 and 26 µm (McKey et al. 2010, Table S4 of Supplementary Information).

A single starch grain adjudicated to *Maranta* cf. *arundinacea* in artefact CSL-2 was not identified to the species level because of its width (56.25 µm), which falls above the range size documented as to present-day specimens of *M. arundinacea* (Annexe 3.7_A and photos: Granule 1). However, we observed starches measuring up to 70 µm long in the original, or green, variety as well as variegated cultivar in our comparative collection of modern starches of arrowroot. They were however scarce and quite far from the common range of size: between 30 and 40 µm. Piperno and Holst (1998) established a general size range as to the starches of this species which oscillates between 10 and 50 µm. Reichert (1913:224) mentions an average size as to the starches of this species ranging between 40 and 50 µm. He also remarks that another author documented sizes up to 60 and 70 µm as to the same species.

Another starch grain from artefact CSL-2 was tentatively identified as originating from the sweet potato (*Ipomoea batatas*). This was based on its irregular shape and pronounced "T" fissure, as well as on its overall size (35.6 µm) which is relatively common in starches from present-day varieties of this species (Annexe 3.7_A and photograph: Granule 3).

CSL-3 (F 140) is a ceramic sherd (EC 741) and part of a spheric cooking vessel. Four starch grains were recovered on its exterior wall in a charred crust, probably a remnant of charred food residue. Two of these starches (Annexe 3.7_B and photographs: granules 1-2) are commonly found in the *Calathea* species and, to a lesser degree, in the *Maranta* genus (arrowroot). Taking into account that these two starches positively match with those of the Marantaceae family, we preferred to tentatively identify them as *Calathea* sp. because of the registered size together with its general shapes and lamellae (when rotated) which is more common within this genus. The third starch grain retrieved from CSL-3 is too damaged (probably due to the previous pounding of its organ source) in order to propose a reliable identification (Annexe 3.7_B and photograph: Granule 3).

A large asymmetric fissure, combined with the numerous thin striations (running from the centre to the border of the granule), are the normal signs of pounding despite the fact that the starch grain did not loose its Maltese cross. These characteristics indicate there is more than only damage related to gelatinization, i.e. a degradation-molecular process high temperatures cause in a liquid base. In addition it is highly probable that this starch grain was previously submitted to pounding (cf. Henry et al. 2009).

The last starch grain recorded as to CSL-3 matches the examples numerous Marantaceae species (Annexe 3.7_B and photograph: Granule 4) produce. When rotated, it was possible to observe a broader picture of its morphology, showing various aspects in shape and lamellae resembling the starch grains of various Marantaceae species. However, it should be noted that the asymmetrical fissure registered in this starch grain could also be produced by means of pounding and/or smashing of its original source (e.g. rhizomes). We observed thousands of charcoal particles in the microscope slide, attesting the origin and conditions of the charred sample as well as the source of several starches recovered here.

The ceramics of Phase 2b

Only a single ceramic artefact was dated to Phase 2b. For drawings of the sampled ceramic bowls see Fig. 5.25.

CSL-6 (F 143) This serving bowl (EC 89) contained *c.*121 starches in the charred material sampled at the exterior. Three were registered separately whereas the remaining *c.*118 were documented in a cluster or aggregate, possibly encapsulated by cellulosic tissue (Annexe 3.7_H and photographs).

One starch granule (see Granule 1 in photogtaphs) was tentatively identified as maize. It was partially damaged, probably by means of grinding. A second single starch grain could not be identified due to the damage (gelatinization, grinding/pounding?) observed on its overall morphology. A third single starch grain was tentatively ascribed to the Marantaceae because of its morphology and centric view (Annexe 3.7_H and photograph: Granule 121), which resembles those often observed in various Marantaceae genera and species including the domesticated varieties, such as *Maranta arundinacea*, *Calathea allouia* as well as the wild *C. rufibarba*, *C. lutea*.

The starch aggregate containing *c.*118 granules was ascribed to the family level of the Leguminosae (Annexe 3.7_H and photographs: cluster 3-120). The dimensions of certain starches are easily visible within the aggregate. They oscillate between 6 and 42 µm, albeit that common sizes usually fall between 8 and 15 µm. A considerable quantity of larger starch grains displaying morphometric features (e.g. lamellae, longitudinal fissures) and in particular, interference or Maltese crosses are similar to starches legumes (wild and domestic) produce. As it is too time-consuming and strenuous to register all the morphological and metric features of these starches, only a family level identification is proposed here.

The ceramics of Phase 2

The sample CSL-4 was dated, but its result considered erroneous. However, the morphology of this ceramic vessel as well as of the following samples CSL-5, CSL-12 to 14 can, without doubt, be ascribed to Phase 2, and most certainly to Phases 2b and 2c (0-AD 400)

CSL-4 (F 309) This complete serving bowl (EC 728) had five starch grains within the charred material extracted from the exterior. Three starch grains positively coincide with those *Manihot* sp., or manioc (Annexe 3.7_L and photographs: Granules 3-5), produce. One starch grain (Granule 3) exhibits a lineal fissure characteristic of domestic manioc starches (Pagán Jiménez 2007; Perry 2004; Piperno 2006b; Piperno and Holst 1998). Another starch grain found within this sample was tentatively ascribed to the genus level of *Manihot* sp. The reason for this was that evident alterations (probably gelatinization and pounding) did not allow us to define the morphology and other important features required for a secure identification (Annexe 3.7_L and photograph: Granule 2). The final starch grain to be retrieved could not be identified due to the high degree of damage (pounding). However, its shape, size and the Maltese cross traits resemble certain oval starches the sweet potato (Annexe 3.7_L and the photogtraph: Granule 1) produces.

CSL-5 (F 252) was described as perhaps being a serving bowl (EC 716). Here *c.*391 starch grains could be recovered from charred material attached to an exterior part of the artefact. Nine starch granules were registered individually. The remaining *c.*382 was observed in three clusters or aggregates. Two of the individual starch grains were positively classed as maize because all its features (shape, size, fissures and especially the prominent double border) coincide with those previously described with regard to present-day landraces of maize (Annexe 3.7_G and photographs: Granules 1 and 3). A third starch grain was tentatively identified as originating from sweet potato (*Ipomoea batatas*). Its distinct lamellae (symmetric circles), shape, size, hilum and the position of this element tally more with the *Ipomoea batatas*, although other species, such as arrowhead (*Sagittaria lancifolia*) and arrowroot (*Maranta arundinacea*), can produce similar starch grains but with very dissimilar Maltese crosses.

The remaining *c.*382 starch grains where registered as clusters and/or aggregates (Annexe 3.7_G and photographs: Clusters 4-64, 65-84 and 91-*c.*391) of a single taxa (cf. Aracaceae) because all shared exactly the same morphological and metric features. A more specific identification was not established due to the absence in our comparative collection of modern starch grains, representing the many palm species of central and northern South America. As to the data concerning two Antillean species of palm, it is suggested that the starch grains ascribed to cf. Aracaceae in CSL-5 and those documented as to CSL-13 (Annexe 3.7_I), originate from palm seed pulps and not from the trunk or stems.

Further research into the region should consider the analysis and description of present-day starch grains extracted from the numerous palm species of economic value and of historic significance, perhaps focussing on the highly esteemed starches obtained from seeds and/or trunks (Clement 2006).

CSL-12 (28C2) This serving bowl (EC 402) yielded eight individual starch grains. Two important domestic plants were identified: maize and the common bean (*Phaseolus vulgaris*) (Annexe 3.7_K and the photographs: Granules 1-8). Three of the five maize starch grains (Granules 1-3) show clear signs of alteration, i.e. a central depression or indented area, to be interpreted as damage due to heat. The other two maize starches (Annexe 3.7_K and photographs: Granules 6-7) were not damaged and provide us with the majority of the diagnostic features described as to this species.

All five starches include Maltese crosses with a varied birefringence related to the individual state of preservation. The two common bean starches display signs of alteration due to grinding or pounding (e.g. large longitudinal, asymmetrical fissures, numerous striations). The final granule documented as to this artefact was tentatively classed as the wild arrowhead (cf. *Sagittaria* sp.), a genus with a broader distribution in the Neotropics. The shape, size and type of fissure and the distinctiveness of its Maltese cross correspond to the proposed genera and not to other known domestic plants or cultivars.

CSL-13 (F 252) This ceramic serving bowl fragment (EC 718) includes a charred crust attached to the inside yielding a starch cluster or aggregate (counting *c.*200 starches), as described with regard to CSL-5. This aggregate of cf. Aracaceae starches is embodied by means of cellulosic tissue (Annexe 3.7_I and the photographs: Clusters 1-200).

Another important economic plant with regard to the Neotropics was identified as chili pepper (*Capsicum* sp.) as to CSL-13. Perry et al. (2007:986) defines many starch grain features this genus possesses: (a) the lenticular shape, (b) a smooth central depression and (c) an elliptical shape with a longitudinal figure when rotated (Annexe 3.7_I and the photograph: Granule 201). The above-mentioned starch grain measures 26.25 x 22.5 μm, which is within the size range of the domestic species of *Capsicum* as studied up till now (Perry et al. 2007, Supplementary Information). Considering that this starch has a smooth Maltese cross, it was perhaps not heavily ground. Indeed, Perry et al. (2007) states that starches from this genus can easily loose this feature when ground.

Another single and damaged starch grain was identified tentatively as maize (Annexe 3.7_I and the photograph: Granule 202). Two more single starch grains were ascribed to *Maranta* cf. *arundinacea* because they matched almost all the features described as to this genus and species. One of these starches (Granule 204) showed signs of heavy damage related to grinding. The other starch grain is almost identical to numerous *M. arundinacea* starches (Annexe 3.7_I and the photographs: Granules 204-5).

The last recorded starch grain was not identified although it included many traits of the sweet potato (Annexe 3.7_I and the photograph: Granule 203). The present-day sweet potato starch reaches similar dimensions and can be compared to the example (measuring 33.75 μm) recovered here. However, the accentuated lamellae do not comply with this case.

CSL-14 (F 106) This ceramic serving bowl (EC 90) was sampled for starch analysis on the exterior. It produced the highest count of individual starches as well as the highest species richness as to all samples included in the present study. Plants such as sweet potato (*Ipomoea batatas*), Marantaceae, manioc (secure and cf. *Manihot esculenta* Cranz), Fabaceae and maize (*Zea mays*) were positively identified. The other four starch grains could not be ascribed to any genus or species (Annexe 3.7_M and the photographs). As much as 66% of the 24 recovered starches include one or more signs of damage, allowing an interpretation as partially affected by means of gelatinization and/or grinding, pounding or grating.

The secure identifications of manioc starch oscillate in size between 19 and 28.1 μm. The last starch grain is composed of two truncated granules. If we consider the individual length of each granule mentioned above (the compound grain), the size range of the three secure identifications of starch granules lies between 18.75 to 22.5 µm. These dimensions are often found on domestic manioc starch grains. The shapes observed with regard to those starches, when considering the granules of the compound grain individually, are truncated and oval shaped, almost spherical (Annexe 3.7_M and the photographs: Granules 2 and 18).

Truncated starches, i.e. the two extracted from of the compound grain, possess an open and centric hilum whereas the oval-spherical example has an open hilum with an irregular, linear fissure placed just above it. Tentative identifications of manioc fall between 13.1 and 19.3 µm. Combined with their shapes, they range between truncated to oval (Annexe 3.7_M and the photographs: Granules 4-5 and 11). Two of these granules, and specifically those with a truncated shape, have a centric or eccentric open hilum too. The combination of secure and tentative manioc starches correspond to the numerous principal characteristics described with regard to the domestic species of manioc.

The starch grain identified as maize (cf. *Zea mays*) carries sufficient morphological features to be assigned to this species (Annexe 3.7_M and the photograph: Granule 14). The size, morphology and characteristics of the Maltese cross as well as other features (e.g. the eccentric open hilum, a prominent double-border) are all traits of domestic maize. An interesting phenomenon was documented concerning this starch grain. Its surface is quite rough. It has "bumps" distributed over the grain, when following the description Pearsall et al. (2004) presented. These bumpy maize grains have been found in other flour landraces, for instance, in *Cuzco*, an Andean maize variety.

Sweet potato (*Ipomoea batatas*) was positively identified. This was based on all the features documented with regard to the two recovered granules (Annexe 3.7_M and the photographs: Granules 16 and 21). In fact, Granule 21 displays a clear damage most certainly due to pounding or grinding of the starch source, i.e. the vegetal organ, or by grinding flour prepared prior to its integration to the studied ceramic bowl.

A single Marantaceae starch grain was also recovered. However, it did not fit all traits attributed to domestic/cultivated species, such as *Maranta arundinacea* or *Calathea allouia* (Annexe 3.7_M and the photograph: Granule 3). Combining the shape (irregular oval), the eccentric position of the hilum (almost imperceptible) and the length (24.3 µm), it coincides better with starches rhizomes, or tubers, of wild species, such as *Calathea rufibarba* and C. *veitchiana*, produced. The same may well apply to other species too, notably those which in the past served medicinal purposes in the Guianas, such as *Ischnosiphon arouma* or moroko-mokor, *Maranta ruiziana* or *alapalu* (DeFilipps et al. 2004).

Eleven starch grains with various degrees of damage were also documented in CSL-14 (Annexe 3.7_M and the photographs: Granules 6-10, 15, 19-20, 22-24). Based on the shapes (all oval-like) defined as to many of these starches, they were ascribed to the Fabaceae family. Other elements utilised in order to identify them as Fabaceae are: the lamellae registered in certain starches and their size ranging between 48 and 63.7 µm.

Wild species of Fabaceae (e.g. *Canavalia* sp.) can produce starches measuring up to 60 µm. Nevertheless one may consider here that the high levels of damage observed in these starches could cause the enlargement of these residues. Only one of the eleven starches commented upon here does not have a Maltese cross. Each shows a kind of amorphous depression in the central area or an evident alteration to its surface. Dissimilar to other cases documented in the present study, these starches (or their vegetal source) appear to have been submitted to high temperatures in a liquid or wet environment resulting in gelatinization. Among the mechanical processes that could create considerable starch enlargement and damage, gelatinization by means of boiling is the most important (Henry et al. 2009). Four starch grains could not be identified in artefact CSL-14 (Annexe 3.7_M and the photographs: Granules 1, 12-13, 17) due to its high degree of fragmentation and gelatinization or both. On the subject of manioc, see Chandler-Ezell et al. (2006:110).

The griddles

The clay griddles (CSL-7 and CSL-8) were collected from the dark earth layer and cannot be attributed to a particular phase. However, Phase 1 did not yield any griddles. Their overall presence at the site is generally low, not enabling us to draw significant conclusions on their morphology as to any chrono-typological purposes. However, the sandy and mixed paste favours a Phase 2 attribution (cf. Section 5.5.2)

CSL-7 (46C2) This clay griddle (EC 423) produced two starch grains. One example possesses several main traits defined for domestic chilli pepper, or *Capsicum* sp. (e.g. lenticular and elongated shapes) when seen in plain and rotated views respectively, summed to a transversal figure observed in the second position (Perry et al. 2007). The other starch grain exhibited only a small number of these features (Annexe 3.7_J and the photographs: Granules 1-2). The principal consideration for proposing a domestic nature of the identified chilli is the overall size documented on the recovered examples (26 and 30 µm respectively). Perry et al. (2007, Table S1) illustrates that starch grains from wild species of *Capsicum* range in size from 2 to 6.3 µm. These differ from sizes documented as to many domestic species.

CSL-8 (48C2) This fragment of a clay griddle (EC 503) revealed seven starch grains. Three originate from maize (*Zea mays*), two from sweet potato (a secure and a cf. *Ipomoea batatas*) and two remain unidentified. Maize starch grains measure between 18 and 20.6 µm long. They come in irregular shapes and have an open/eccentric hilum. One example (granule 2) has a bumpy surface as described previously with regard to CSL-14 (Annexe 3.7_N and the photographs: Granules 1-3).

The sweet potato was identified by means of two starch grains. One matched nicely and the other could tentatively be ascribed to the species (Annexe 3.7_N and photographs: granules 4 and 6). Two starch grains could not be identified of which one (Granule 5) appears to be partially gelatinized considering its perhaps melted border and almost imperceptible Maltese cross (Annexe 3.7_N and the photographs: Granules 5 and 7). It should be noted that the remaining six starch grains recovered in this artefact did not show any signs of gelatinization or heavy pounding/grinding.

The lithic tools

All lithic tools were collected from the dark earth layer and cannot be attributed to a specific phase. However, their raw material and spatial position in the excavated area may refer to an early occupation of Phase 1, notably as to CSL-1 and 10, which are situated on the higher levee and found at Level 3. The remaining tools may be attributed to Phase 1 or 2.

CSL-1 (F 45) is a quartz-stone base used for milling (Sp., *metate*) (Fig. 5.35b). It revealed ~130 starch granules from three sampled sections. The vast majority (~120) were encountered in the used concave face #1. They occurred as three different starch grain clusters. The remaining two granules were registered separately (Annexe 3.7_F-1 to F-3).

Several relevant phenomena were documented in all three clusters: (a) shape, (b) size, (c) type of Maltese cross, (d) types of margin/pressure facets and (e) lamellae (Annexes 3.7_F-1, F-2 and the photographs). This strongly matches with the previously documented features concerning the genus *Phaseolus* (beans) in our reference collection of modern starch grains. It must be taken into account that the characteristics of the documented granules converge between the species *P. vulgaris* and *P. lunatus* (both domesticated). Unfortunately, a more precise distinction could not be established at that time.

Several larger starch grains in the third documented cluster (Annexe 3.7_F-1: Granules 99-121) show clear fissures possibly produced by means of the milling/pounding of seeds. None of the registered cases could illustrate starches altered by means of excessive heat (Henry et al. 2009; Reichert 1913). In general, the dimensions of the previously described granules range between 15 to 17 µm. We did however come across granules, albeit in lower numbers, with dimensions as small as 3 µm and as large as 45 µm.

The presence of an open hilum was documented among the small starch grains. The largest grains evidenced the typical symmetric lamellae commonly seen in the starches of Fabaceae. Thanks to the size of Granule 122 (41.3 x 34 µm), it matched nicely with *P. lunatus* whereas the other known traits are shared with *P. vulgaris*.

Granule 98 (Annexe 3.7_F-1 and the photographs: Granules 98-104) was ascribed to the Poaceae (grass) family. It has a pentagonal shape, a large cross shaped fissure and small linear fissures running from the centre towards the margins, as is often seen in starches produced by means of certain wild grass seeds. This is actually the case with starch grains from northern Central America, such as *teosintle* (*Zea mays* ssp. *parviglumis* and others) or other wild grasses of the genera *Anthephora* and *Cenchrus* (Holst et al. 2007). However, it is stressed here that races of domesticated maize (e.g. *Reventador* from Mexico and "soft" Chilean archaeological maize) can produce starch grains with forms, fissures and striations very similar to those described above (Pagán Jiménez 2007:240).

Another seven starch granules were recovered separately in the used concave face #2 of CSL-1 of which two could not be identified. Two others share the same traits as described for *Phaseolus vulgaris-lunatus* (Annexe 3.7_F-2 and the photographs: Granules 37-52). Two other granules were tentatively ascribed to *Zea mays* (Annexe 3.7_F-2 and photographs: Granules 25-35, 53-64) and the final granule to *Ipomoea batatas* (Annexe 3.7_F-2 and the photographs: Granules 1-12).

Of the above-mentioned identified *Phaseolus* granules, one features a compound structure consisting of two single, but joint starches, forming a shape known as an "oval kidney" which is common to this genus (Annexe 3.7_F-2 and the photosgraphs: Granules 41-51). One granule, tentatively ascribed a *Zea mays*, is broken (possibly by means of grinding of seeds). Its irregular-expanded oval shape has been recorded almost exclusively among certain species of maize: the *Negrito* and *Pollo* (both from Columbia) and *Tuśon* (Cuba). It is presumed that this shape is also common to maize races currently under consideration as to the reference collection of present-day starch grains. The granule tentatively ascribed as *Ipomoea batatas* shares a set of shapes (documented after rotating the granule), dimensions, and fissures enabling a safe taxonomical classification.

The third analyzed sample from artefact CSL-1 corresponds to an unused side of the milling stone base. When analyzing this sample, it was possible to compare the results obtained with those of the used surfaces in order to then determine any possible source of external contamination with regard to this passive grinding tool, or quern. The results suggest that the soil matrix, which had been in contact with the tool, is not a source of potential contamination with exogenous starch grains. However, only one starch was recovered and positively identified as *Zea mays* (Annexe 3.7_F-3 and photographs: 65-70). Based on an analysis of ancient starch grains from Real Alto in Ecuador, Pearsall et al. (2004) proposed that archaeological tools, applied when processing plant storage organs, could be the source of dispersion of starch grains into the surrounding soils of the studied tools. This explanation, drawn from the results shown above, applies to the present case.

CSL-9 (35B2) This edge grinder provided seven starch grains. Two were positively identified as maize whereas two others were tentatively identified as the same species (Annexe 3.7_C and the photographs: Granules 1, 5-7, respectively). The Granules 1 and 5 have a radiant double border which has been recognized as a diagnostic feature of maize starches (Holst et al. 2007; Piperno and Holst 1998). Their shape (oval variants with smooth pressure facets), size (13.1-20.6 µm) and open hilum (in Granule 5) correspond to all the diagnostic criteria previously published concerning maize starch, especially with regard to those produced in landraces with soft endosperm. Two other cf. maize starches correspond well with the established criteria regarding this species. However, when observed in a dark field, they appear to be slightly altered, probably due to grinding: those starch grains could be considered as maize starches. It was impossible to confirm, with a higher level of confidence, the purpose of all features (mainly the traits of the Maltese cross) in order to propose a secure identification.

The same artefact also contained two other starches originating from *Phaseolus* sp. (either the *vulgaris* or *lunatus* species). One was positively identified as belonging to the genus level. The second could only be identified tentatively due to its high degree of damage (Annexe 3.7_C and the photographs: Granules 2 and 4). A definite identification of the species was not proposed considering the fact that both starches share features, especially morphology, size, extinction crosses, which are indistinctive between *P. vulgaris* and *P. lunatus*.

The final starch grain recovered from CSL-9 could not be identified at all due to heavy damaging (pressure) (Annexe 3.7_C and the photograph: Granule 3). However, its apparent oval shape and the characteristics of the smooth Maltese cross, partially seen under a dark field, resemble the elongated starches familiar to *Phaseolus* sp.

CSL-10 (51D2) This pestle yielded four starch grains that were positively identified as of the sweet potato (*Ipomoea batatas*). Two other residues could not be identified (Annexe 3.7_E and the photographs: Granules 1-6). On the one hand, positive identifications of the sweet potato starches were based on: (a) the size (between 24 and 30 μm), (b) the shape which evolves between irregular-oval to transovate and pentagonal (all multifaceted shapes considered) and (c) the presence of other features (e.g. distinctive irregular fissures (stellate and asymmetric)). On the other hand, the unidentified starches (Annexe 3.7_E and the photographs: Granules 1-2) appear to be joint, thus constituting a compound grain. A more comprehensive view of this aspect could not be witnessed during the microscope analysis. Nevertheless, it is highly probable that the two starches are indeed a compound grain. Considering the above-mentioned observations it is possible that this potential compound grain could also originate from *Ipomoea batatas*, if we realise that this species often produces compound grains made of "truncated" granules, i.e. the two recovered in CSL-10.

CSL-11 (35B2) This grinding stone or pestle yielded three starch grains of which two were highly altered as a consequence of pressure by means of grinding the organ source of the starches (Annexe 3.7_D and the photographs: Granules 1-2). The third starch grain, in spite of its visible damage (fissures and striations; Annexe 3.7_D and the photograph: Granule 3), could be identified as maize because it presented a double border, a combination of fissures, commonly found in maize starches. Moreover, its size (22.5 μm) fell within the average range of modern as well as ancient maize starches (Annexe 3.7, Table 2; Holst et al. 2007; McKey et al. 2010).

5.7.3 Final remarks

The results of this pilot-study demonstrate the usefulness of ancient starch grain analysis as to archaeological research in French Guiana. When interpretating the results, the following criteria must be taken into account:

1. As to the association between human actions and plant use as well as between starch grain preservation and the occurrence within archaeological artefacts, considering that of all the microbotanical remains (pollen grains, phytoliths) studied elsewhere, starch grains appear to be the only elements that can be correlated directly to human plant processing and use (Holst et al. 2007; Pagán Jiménez 2007; Pagán Jiménez et al. 2005; Pearsall et al. 2004; Perry 2004). The pedological and taphonomical processes ascribed to plant structures, such as pollen and phytoliths (e.g. "pollen rain," phytolith formation, natural dispersion) (cf. Section 5.4.2), simply do not at all apply to starch grains (Beck and Torrence 2006; Pagán Jiménez 2007).[169]

2. We must now take certain considerations into account concerning the preservation of starch grains found in problematic or destructive artefact contexts (e.g. ceramic cooking bowls, clay griddles). Both kinds of utensils show evidence of having been exposed to heat and in several cases a charred crust was developed. It was once opined that the cooking of masses or pastes containing starch grains could destroy them (Chandler-Ezell et al. 2006).

169 Compare the results of the starch grain analysis vs. the phytolith analysis (cf. Section 5.4.2).

	CSL-1	CSL-2	CSL-3	CSL-4	CSL-5	CSL-6	CSL-7	CSL-8	CSL-9	CSL-10	CSL-11	CSL-12	CSL-13	CSL-14	**Total**	Ubiquity
Tubers																
Ipomoea batatas								1		4				2	**7**	42.86
cf. *Ipomoea batatas*	1	1			1			1							**4**	
Marantaceae			1											1	**2**	35.7
cf. *Marantaceae*						1									**1**	
Maranta cf. *arundinacea*		1											2		**3**	
cf. *Calathea* sp.			2												**2**	7.14
Manihot sp.				3											**3**	14.29
cf. *Manihot* sp.				1											**1**	
Manihot esculenta														2	**2**	
cf. *Manihot esculenta*														3	**3**	
cf. *Sagittaria* sp.												1			**1**	7.14
Seeds/Fruits																
Fabaceae														11	**11**	7.14
Phaseolus sp. (*vulgaris/ lunatus*)	122								1						**123**	21.43
cf. *Phaseolus* sp. (*vulgaris/ lunatus*)									1						**1**	
cf. *Phaseolus lunatus*	1														**1**	
Phaseolus vulgaris												2			**2**	
Leguminosae						118									**118**	7.14
Zea mays	1				2			3	2		1	5		2	**16**	62.5
cf. *Zea mays*	2	2				1			2				1		**8**	
Poaceae	1														**1**	7.14
cf. *Aracaceae*					□388								200		**588**	14.29
Capsicum sp. (domestic)							1						1		**2**	14.29
cf. *Capsicum* sp.							1								**1**	
Not identified	2		1	1		1		2	1	2	2		1	3	**16**	
Total starches	130	4	4	5	391	121	2	7	7	6	3	8	205	24	**917**	per family or genus (%)
Species richness	4	3	2	1	3	3	1	2	2	1	1	3	4	5		

Table 5.21. The taxa ascriptions of recovered starch grains per sample.

Recent studies have however also demonstrated the varied levels of starch grain preservation in such cases (Babot 2003; Zarrillo et al. 2008; Henry et al. 2009).

Nonetheless, the present study yielded well-preserved starch grains together with heavily affected starch grains. They were recovered from all ceramic artefacts related to food preparation or cooking. Various factors can explain this phenomenon of preservation of starch grain in cooking (heating) contexts (Rodríguez Suárez and Pagán Jiménez 2008):

a. Clay is an inferior heat conductor. Even when clay is heated, this process takes place very gradually. Taking fairly thick clay griddles, albeit that some are relatively thin and may have a fine temper, we must consider the following possibilities:

    i. If the starches are exposed to heat in a dry environment (e.g. in the prepared dough or in a soft state over a hot surface), the water component in the molecular structure would respond slowly to the temperature gradient in the clay griddles. Hence, the grain would dehydrate little by little. The loss of water could have helped it to preserve its structure and morphology. This very principle could even apply to a clay griddle (or cooking bowl) that has reached high temperatures because the dough or paste had been placed on the cooking surface "at room temperature." It is to be expected that the dough warms up slowly.

ii. Dehydration of the starches, not in direct contact with the artefact's cooking surface, would have taken place in the same way. Under these circumstances, the starches would not be in a liquid environment that would allow them to gelatinize. As they are not strictly organic material, they could not carbonize by means of contact with hot surfaces. This could explain that when hydrating the starch grains during the process of sample flotation or when analyzing the sample directly, it could return them to their original state, unless they were broken by means of another cause.

b. Certain starch grains found on cooking bowls and clay griddles showed various degrees of damage directly related to the pounding/grinding process. Thus, starch grains were partially or heavily affected prior to their integration into the cooking artefacts.

3. Six of the fourteen samples analyzed here originated from ceramic serving bowls. In those cases it would not be difficult to explain any starch grain preservation. The reason being that the most evident degrading factor (heat) was not present, although foodstuffs were prepared in another cooking bowl. The handling of raw food in these serving bowls during the confection of food recipes should be considerd too. Such possibilities would guarantee preservation, possibly aided by means of glutinous substances from other sources when mixing foodstuffs, such as fats. Elements involved in the preparation of certain recipes (e.g. vegetable oil, animal, resins, minerals) when mixed with starch grains in a recipient missing intentional exposure to an open flame, could perhaps have provoked an isolating, consolidating environment enabling the starches to "survive" *in situ*.

4. Five samples of the six serving bowls as well as one cooking bowl were extracted from exterior sections of the artefacts. These samples were not found in parts of the artefacts where foodstuffs are usually directly placed. We recovered the starch grains because the artefacts (and/or the specific archaeological contexts of them) were related to plant processing, food preparation or food consumption. Pathways enabling starch grain release and dispersion are mainly related to human actions, with few exceptions (Pagán Jiménez 2007).

5. With regard to the lithic artefacts, it has been demonstrated that cracks and pores present on the used surfaces of lithic tools reveal a possible protection of the starch grains against the typical taphonomical processes that occur in buried contexts. These cracks and pores allowed adequate protection of starch grains from those "sometimes" aggressive processes of washing and curating archaeological materials during field and lab work. It is precisely the cracks and pores in the lithic artefacts that enable a contextual relationship between the extracted samples and the functions of the studied tools.

6. The archaeobotanical data raised in the present study constitute the first starch grain research developed on an ECA archaeological site in northeastern South America, the northern Atlantic frontier of Amazonia. It also evidences the first secure identification of several of the most important economic plants of the Neotropics. Because the identification and chronological ascription of

these economic plants will greatly impact our knowledge on the human-plant interactions in this part of South America, it is recommended to revise and improve the contextual associations of artefacts in future excavations.

In sum, for the first time in this region, maize was traced back to archaeological contexts dated to the second half of the third millennium BC (see also the results of Eva 2 in Section 4.7). Moreover, maize, as well as sweet potato, were the more ubiquitous plants identified throughout all the chronological contexts the present study defined. Marantaceae species were also related to the same chronological contexts of maize and sweet potato, albeit in lower numbers. Fabaceae-*Phaseouls* sp. (beans) was first identified as to Phase 2 and its occurrence was more important in the subsequent subphases. Chili pepper has also been identified dated to the first century BC whereas manioc could be identified only in ceramic serving bowls from the first century AD onwards.

Further research and discussion on these archaeological and ethnobotanical interpretations is required. Needless to say, it is recommended to consider all the remarks mentioned above prior to any relevant interpretation on human-plant dynamics as to CSL or the northern frontier of Amazonia in general.

5.8 The site synthesis

The excavations at CSL revealed a multicomponent site, situated on the banks of the youngest Maroni river terraces. Once this river abandoned its course after *c.*6000 BP, the pre-Columbians soon settled on its banks and occupied it for many centuries.

Phase 1

The earliest radiocarbon dates between 4500 and 4300 BP probably refer to the first human presence although we have no direct evidence hereof. It is presumed that various stone tools can be attributed to these first human activities at the site (Phase 1a), possibly representing a preceramic occupation, i.e. lithic Method 2.

A second Late Archaic and/or ECA-A occupation (Phase 1b) is more certain. This is thanks to: (a) the presence of slightly restricted heavy sand-tempered spheric vessels deposited voluntarily in pits and (b) charcoal filled hearths with corresponding radiocarbon dates. This occupation is situated at the highest part of the levee where an old surface layer has been witnessed too (Level 3). It is represented by means of two dwellings both located around two charcoal pits of which one also features two pits with ceramic depositions. The latter features, as with the subsequent Phase 2, can be interpreted as inhumation graves, suggesting a more permanent character of the occupation. Next to knapping quartz material, these early ceramic pre-Columbians also produced pottery in order to cook sweet potatoes, arrowroot, calathea and maize. It is thought that this type of starchy food was prepared by means of (edge?) grinding it upon metates (CSL-1) or grating it down on grater boards (small flakes?) in order to obtain a pulp for further processing, as when preparing thick soups in cooking pots.

As to the site of Eva 2, the results of the radiocarbon dates and the standardised bipolar percussion technique on quartz material in order to produce small flakes evoke an ascription to the Ortoroid series, as José Cruxent (1971), Irving Rouse (1992) and Arie Boomert (2000) defined as to the Circum-Caribbean region.

The implantation of the site in the mouth of the Maroni River in between the mangrove coast and the higher forested interior suggest a "broad spectrum" economy reflected by means of an advanced lithic toolkit. In it, a standardized mode of production of small quartz flakes (Mode 1) as well as grinding tools applied in plant processing play an important role. The latter group consists of ground stone tools (e.g. *metates*, *manos*, pestles, anvils, abraders). This type of subsistence economy also features early ceramics, just as Eva 2. Together, they have been dubbed the Balaté ceramic complex and ascribed to Phase A of the ECA, comparable to the ceramics found at the Alaka Phase and Mina sites, indicating a technological shift in food processing. The absence of griddles as to this early occupation is noteworthy, illustrating that tubers and maize were probably consumed in a cooked form.[170]

Phase 2

A second and principal occupation of this site is situated at about the beginning of the first millennium, between 300 BC and AD 400, as a gap with previous occupation proves. It is proposed that increasing river activity during the second and first millenium BC hampered any prehistoric installation on site, but further archaeological research is certainly needed here.

Features (e.g. post holes, various kinds of pits, a specific canal structure) are found all over the excavated area. The lower back-fan area is now being filled up with colluvial sand, organic matter, charcoal and artefacts, resulting in the accumulation of a dark layer on site. This dark earth is enriched by means of organic matter (e.g. leaves, black charcoal), with human excrement, bones, and possibly shells. This eventually resulted in a huge waste zone.

Radiocarbon dating results evidence a shift of ceramic depositions in pits or graves (as we believe them to be) through the excavated area. To a certain degree this also manifests a change in ceramic wares. The latter morphological change was identified for Phase 2a vs Phases 2b and 2c combined, whereas the dated ceramics of Phase 2a (300-0 BC) have: (a) a dissimilar morphology and temper reflecting rather complex vessel shapes and (b) display elaborated polychrome painting, suggesting possibly a funerary origin. The latter vessels could belong to the LCA, generally representing urn vessels in western French Guiana (cf. Chapter 7).

The two later phases (AD 0-400) include highly standardised vessel shapes of keeled hyperboloid bowls which appear to have been applied in a domestic context when serving food. The starch grain analysis which revealed the presence of sweet potatoes, arrow root, manioc, beans, maize and chili pepper confirm the latter hypothesis.

The ceramics of Phase 2, and in particular the more recent ones (Phases 2b and 2c), reflect an important and solid ceramic production during the first half of the first millennium AD. It is attributed to the later ECA (Phase B) and dubbed Saint-Louis ceramic complex in order to separate this production from the (completely different) ceramics of the first occupation (Phase 1b) or Balaté ceramic complex. Thus, CSL reveals another homogeneous ceramic series. At present, it has no known equivalent in coastal French Guiana. However, scant archaeological data in the Guianas and various particular characteristics of the assemblage may provide us with a larger context for this ceramic complex during the first centuries AD.

170 The ECA site of Kauri Kreek did feature griddles (Versteeg 1985:658). However, their ascription to this early occupation is unclear.

Firstly, the presence of similar hollow rimmed platters at the ring-ditched site of Yaou (Mestre et al. 2013) may evoke a cultural link with the Upper Maroni River. Secondly, a link is hypothesied with regard to the highly recognisable trade sherds of the Itacoatiara complex of the Lower Amazon River (compare EC 682, Fig. 6.36 vs. P. Hilbert 1968:325, Fig. 48e-f). Thirdly, there is possibly a link concerning the hollow rims of the Marajoará Pacoval phase at the mouth of the Amazon River (Meggers and Evans 1957:367, Fig. 130.1).

To the west of the Maroni River, sites dated to the same period are generally attributed not only to the Orinoco Delta derived ceramic series, as identified at Wonotobo Falls (Boomert 1983), but also to the Upper Essequibo River, according to Denis Williams (1998:24): 'The search for Mina-like ceramics on the upper Essequibo (Meggers and Evans 1978:551; Simoes 1981) yielded six C^{14} dates in a Saladoid-Barancoid sequence of the first millenium BC. The Polychrome Horizon Style (Guarita subtradition) came in there around the time of Christ (Williams ms).'[171]

Although extensive material publications are unavailable at the moment, general descriptions of carinated hyperboloid bowls, hollow rims and polychrome pottery may suggest a possible link, but this remains very speculative. To the east of the Maroni River, little data are available too. However, an ECA-B Horizon is probably outlined by means of the *Ouanary encoché* ceramic complex. At present it is attributed to the Aristé Phase of eastern French Guiana and northern Amapá (cf. Section 9.8).

Phase 3

The last occupation at CSL has been dated between 1100 and 700 BP. It can be attributed to the LCA, marking a gap with the previous occupation. It is hypothesised that this third occupation may also consist of two phases, one in *c.*1000 BP and one in *c.*800 BP. The latter is associated with ceramic urn depositions and the former with the filling of a deep pit or well. How this possible double occupation is expressed in the ceramic assemblage is still under discussion.

The small number of features attributed to Phase 3 is situated just behind the highest point of the levee. This is illustrated by means of a concentration of *kwepi* tempered ceramics in this particular area. It features morphological and temper similarities with the neighbouring site of LPB related to the Barbakoeba complex. The radiocarbon dates of this third occupation correspond to the most common fourchette for archaeological sites in coastal French Guiana and Suriname. However, the relatively small number of ceramics attributed to this phase does not reveal sufficient characteristic elements in order to assure a solid ascription to the Barbakoeba ceramic complex of eastern Suriname (Boomert 1993) and western French Guiana (Rostain 2008a), although present at LPB. According to these authors, it is the dominant ceramic complex between approximately Paramaribo and Cayenne. This may be related to a secondary role of this part of the larger CSL site.

The presence of two necked sherds of toric pots, without any doubt Koriabo ware, illustrates the presence of this widely distributed ceramic macro-complex or horizon, from which CSL is not excluded. Further considerations and conclusions on the LCA complexes of the coastal Guianas are dealt with in the discussions unfolding in the following chapters in which the LCA sites are presented.

171 Concerning Guarita, note the stylistic similarities: van den Bel (2012:29, Fig. 9a) vs. Tamanha and Neves (2014:54, Fig. 4b).

Chapter 6

The Crique Sparouine site

A Late Ceramic Age occupation in the uplands of the Lower Maroni River

The site of Crique Sparouine is located in the hinterland of the Maroni River Delta and was discovered in the course of a pedestrian survey during the future construction of the National Highway 3 (RN 3) to Apatou. INRAP members carried out a mechanical excavation (2000 m²) revealing a LCA village site, dating from between the 10th and 14th century AD (van den Bel 2007b; Annexe 1.3).[172] The dark coloured archaeological layer contained a large number of artefacts delimiting two principal dump zones. Over 400 features were recorded, including 177 postholes and 23 pits of which 12 contained complete ceramic vessels. The latter were interpreted as burial pits. A small number of complete vessels exhibits decorations related to the Koriabo complex, such as open floral bowls with poly-lobed rims and white slip applied to the inside as well as necked jars with geometrical and curvilinear incisions or scrapings on the outside. Other shapes include less common characteristics (e.g. open vessels with sinuous rims and boat-shaped vessels with red slip applied to the inside). The extensive excavation of the site suggests a multi-component occupation and possibly a restricted area of the site with specific purposes.

6.1 Introduction

In 2003, INRAP members located the Crique Sparouine site (No. 97311.110) during a pedestrian survey of the future trajectory of the National Highway 3 connecting Saint-Laurent du Maroni and Apatou (Mestre 2004). The site lies on a table shaped hilltop overlooking Crique Sparouine. The flat summital surface covers *c.*7500 m² and culminates at *c.*40 m above MSL (Figs. 2.1 and 6.1).

This site is covered in secondary forest associated with recently abandoned gardens. Bamboo-like grasses (*Guadua* sp.) form part of a secondary bambou patch (Fr., *cambrouze*) (Cremers and Hoff 1993:173). Other light loving pioneering plants have taken over the old garden in which maripa palms were probably left untouched. Once multiple sherds were discovered at the summit Mickaël Mestre and his team dug one additional test pit measuring 2 x 1 m. The section of this pit included a black layer with ferralitic nodules in the first 40 cm, after which sterile orange clay was visible. Archaeological material was collected at a depth of

172 The results of this excavation were presented at the *Primero Encontro Internacional de Arqueologia Amazônica* (EIAA I) held in Belém (2008) and duely published in the proceedings (van den Bel 2010a).

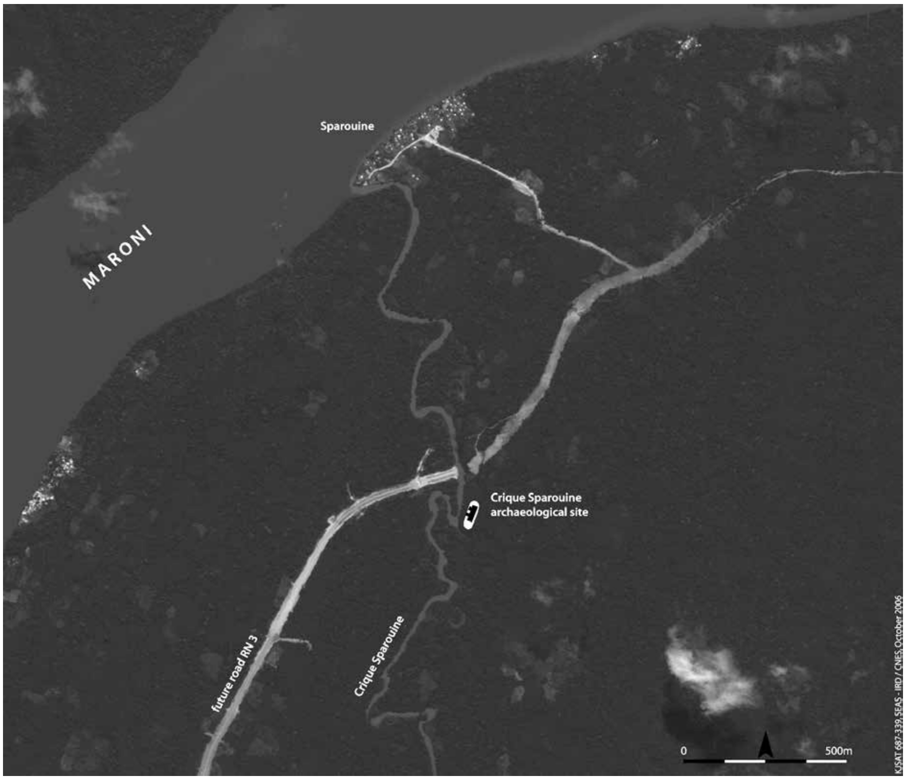


Figure 6.1. A satellite photograph taken during road construction work near the village of Sparouine, indicating the site's flat hill top (courtesy of the IRD and the CNES).

between 5 and 10 cm (Mestre 2004:40–42), probably related to the surface of the pre-Columbian occupation.[173]

When clearing the site for the compliance excavation, which was conducted in November and December 2006, several 19th century gin bottles were found, illustrating the Late Historic presence in this region (Klein 1966, Figs. 30-46). The Amerindian or Maroon population of the Lower Maroni River may well have acquired these bottles from the Dutch at Albina or from the penitentiary staff at Saint-Laurent du Maroni.

The Sparouine toponym

The toponym of Sparouine probably stems from the Carib language, or Cariban.[174] Sparouine is read as *siparu* and *unnï* whereby *siparu* refers to the (fresh water) ray and *unnï* to water, thus meaning "water of rays" (Eithne Carlin, personal communication, 2007).[175] In fact, the rivers of the Guiana Plateau are reputed for the dangers of the very painful dorsal spines of these riverine rays (e.g. *Dasyatidae* sp., *Potamotrygon hystrix*) (Planquette et al. 1996:40). Numerous hydronyms bear a similar name, such as an affluent of the Oyapock River, as the French explorer Jules Crevaux stated during his ascent of the latter river:

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173 A survey carried on the steep hill situated to the northwest of the Crique Sparouine site, revealed another hilltop containing ceramic material (No. 97311.111) (cf. Fig. 6.5a). During the excavation, we stayed in the Maroon village of Sparouine, on a terrace stretching along the Maroni River and also found potsherds as well as quartz debitage (No. 97311.112).

174 See also Chapter 11 in *Guyane, Guyanes* (Lézy 2000).

175 Father Antoine Biet (1664:427) recorded the Carib word *chibali* meaning ray or fish.

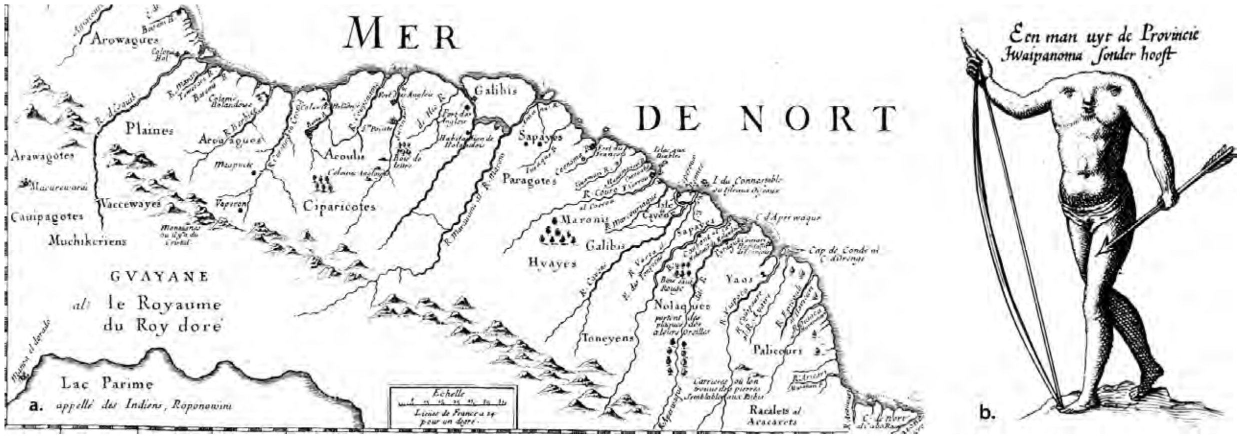

Figure 6.2. (a) Detail of the map drawn by Pierre du Val (1664) showing Ciparicotes in southern Suriname and (b) detail of 'A man from the Province Iwaipanoma without head' from the map drawn by Jodocus Hondius (1599). Both maps can be found in Rio Branco's Atlas (1900), Maps 77 and 45, respectively.

> *Une demi-heure après, je découvre sur la même rive une crique appelée Siparini, navigable à une demi-journée. Nous devons remarquer que ce nom désigne un grand nombre de cours d'eau de la Guyane. Il y a une crique Siparini dans le bas Maroni, une autre dans l'Essequibo. Dans la langue de tous les indigènes sipari signifie « raie ». Ce poisson, qui est un objet de terreur pour les canotiers à cause des piqûres qu'il fait, est commun dans tous les cours d'eau appelés Siparini. L'explorateur doit s'attacher à conserver les noms géographiques des indigènes, puisqu'ils ont toujours une signification.* (Crevaux 1883:151)

Crevaux's additional phrase implying that indigenous toponyms always have a certain significance probably also is true with regard to Sparouine. On 28 August 1609, Robert Harcourt (1928:117) states that '… the first mountaine towards the high countrie of Guiana, called Sapparow' when ascending the Maroni River. It was drawn by Gabriel Tatton (1613) at the left bank of this river after two falls and presumably refers to the modern Nassau Mountains (in Rio Branco 1899, Map 54). In addition, John Ley (Lorimer 2006:324) notes that 'Sparry are Certaine starrs which they fashion like a large broade fish soe called with them in manner of a Playse with us' when mentioning the 'Indian obs*er*vac*i*on of the Starrs,' hereby revealing a possible symbolic connotation.

According to Renzo Duin (2009:199), the Cariban speaking Wayana refer to the Spine-ray star constellation as *sipalihke* which is also accounted for in early historic sources (Keymis 1890:152; Ley in Lorimer 1989:324): 'He certified me of headlesse men, and that their mouthes in their breastes are exceeding wide. The name of their nation in the *Charibes* language is *Chiparemai* and the *Guianians* call them *Ewiapanomos*.' Duin further refers to the headless man drawn by Jodocus Hondius (Fig. 6.2b). In addition, he argues that their existence on the headwaters of the Guianas is only 'possibly indicating the presence of spine-rays (rather than monstrous "headless" men) in the interior of Guiana' (Duin 2009:69).

However, with regard to the ray's abdomen, it may be evident that the eyes are not there. Anatomically they belong to the dorsal side. It can thus certainly be possible to imagine that the animal has no eyes or head (?). Hence, we can only observe 'their mouths in the middle of their breasts' as Sir Walter Ralegh and

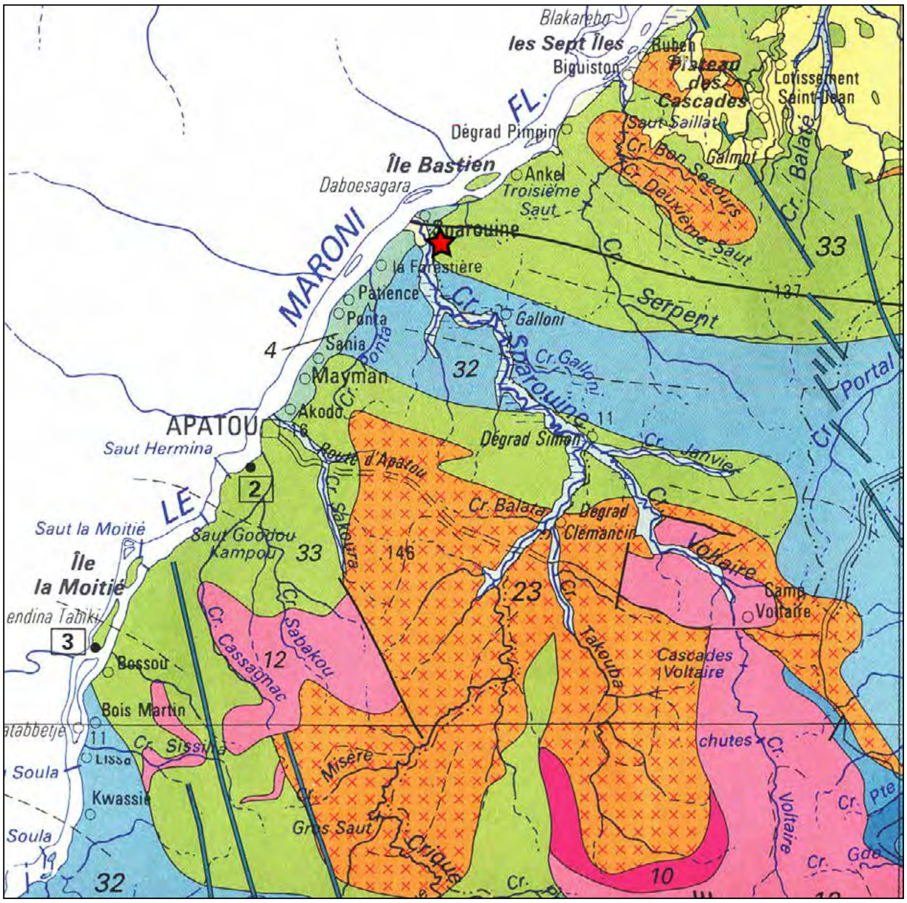

Figure 6.3. A detail of the geological map of French Guiana (after Delor et al. 2001). Nos. 32 (metapeliths) and 33 (metagrauwackes) represent the greenstone belt.

Keymis stated when discussing the Ewaipanoma who by the way also have 'a long train of haire growth backward between their shoulders' (1848:85).[176]

The existence of historic Amerindian groups, to whom the coastal Amerindian Caribs or others referred to in this manner, is likely but was lost in translation during early post-Columbian times, as in many cases.[177] Although the names of Amerindian groups of the historic period may have been incorrectly spelled or

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176 According to Whitehead (in Ralegh 1997:42–43) the strange creatures or supposed myths are indeed true but 'Ironically, the major ethnological elements that Ralegh incorporated from the intelligence that the Spanish had already gathered were exactly those for which his account has been most pilloried by subsequent generations: *El Dorado*, the invasion of the *Epuremei*, the headless *Ewaipanoma*, woman-warriors-without-men, the *Amazons*, and the *Canibals*. However, if the claims of Ojer and others ring true, as they appear to be, they are indeed the elements of Ralegh's account that should be considered the *most* credible; precisely because they were based on a far more extensive and enduring series of relationships between the Spanish and indigenous population than Ralegh's own brief reconnaissance of the lower Orinoco and interview with Topiawari.'
Whitehead (ibid., p. 114, note 16) further states that the historic Taruma probably wore hats and that they did not speak Arawakan or Cariban, underscoring a possible (Peruvian) origin of the Taruma and linking them to the Epuremei when explaining Ralegh (1596:63). See also Chapter 10 in *Guyane, Guyanes* (Lézy 2000).

177 One must not forget the many imaginary enemies and peoples, for instance as recorded among the present-day Araweté by Eduardo Viveiros de Castro (1992:53): 'A considerable legion of enemies, more or less imaginary, existed in the early days : the *Iapï'ï wĩ*, the *Kɨpe iwawi* (who carried beehives on their backs), the *Ayɨrɨ awĩ*, "parrot enemies," the *Ãñirã awĩ*, "bats," (who sleep hanging upside-down, the *Tato awĩ*, "armadillos", and many others, in a quasi-totemic proliferation in which natural species or other criteria differentiate the types of people who populate the earth.'

attributed to subgroups, enslaved or enemy groups or even represent nick-names, the general tendency is that both historical and present-day ethnic groups bear similar names, such as "Harpy eagle people" for the Pianokoto, "Wasp people" for the Okomayana, "Pigeon people" for the Aramicho, etc. (Rivière 1969:16–18). Indeed, these people are not eagles, wasps or pigeons, but are known as such to others because they identify themselves with these animals.

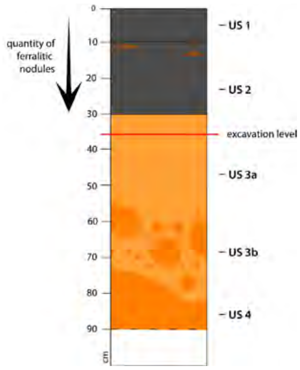


Figure 6.4. A schematic section illustrating the stratigraphic layers (US) and mean excavation.

Remarkably the approximate location of the *Ciparicotes*, as indicated on the map drawn by Pierre du Val (1677) corresponds to the modern toponym of Sipaliwini in the interior of Suriname (Fig. 6.2a). When Lord de Bretigny arrived in Cayenne in 1643, one of his crew members referred to these "Ray people" in southern Suriname:

> *Les Ciparis sont certains Sauvages monstrueux qui habitent au de-là des sauts de la riviere Suriname. Les Galibis les appellent ainsi, parce que ce mot de Cipari, signifie une Raye en leur langue. Aussi font-ils faits de mesme: car ils n'ont point de teste, non plus que ces pauvres animaux que la Nature semble n'avoir formez ainsi, que pour faire peur aux autres. Et si Dieu ne leur avoit mis des yeux & vne bouche à l'estomach, ces prodiges raisonnans seroient bien empeschez de leur perfonne.* (Boyer 1654:245)

6.1.1 The geological setting

The site is located in the heart of the greenstone belt or northern range, consisting of chlorite green tuff ascribed to Paramaca Formation (Delor et al. 2001) (Fig. 6.3). This belt consists of several superimposed volcanic and sedimentary layers vaulted by means of tectonic movements (Choubert 1974:27–34). The site's hilltop has a ferralitic soil as is common to all hilltops of the Precambrian Shield of the Guianas. The weathering of this rock has created a kaolin clay coating rich in iron oxides, aluminium and pegmatite veins (Choubert 1979). At the highest parts, the clay coating has been washed away allowing the unaltered bedrock or duricrust to submerge which lies at the origin of the tabular shaped hills.

During the excavation, four stratigraphic levels or units (US) were distinguished (Fig. 6.4). The first (US 1) concerns a humic layer of rootlets, iron nodules and several dispersed artefacts probably exhumed by means of treefalls and animal burrows from the underlying archaeological level. This second level (US 2) is situated at a depth of between 10 and 30 cm and consists of clayey sand containing lateritic nodules. Their numbers increase with depth. This level contains the majority of the artefacts and represents the dwelling level of the ancient occupation. The dark colour of this layer is probably the result of the human occupation and is interpreted as an anthropogenic layer or dark earth. However, no chemical analysis was carried out nor did we observe any (micro) stratigraphy with the naked eye as to this archaeological layer US 2. It was eventually been interpreted as one archaeological layer, probably representing one occupation. Beneath this layer, on the slopes of the hilltop, a clayey orange-coloured layer (US 3) was detected representing the natural coating of the hilltop. This layer gradually changes into the unaltered solid mass (US 4) of the Precambrian Shield which is outcropping at the highest (southern) part of the hilltop. Remarkably the majority of the archaeological features have been dug into this solid base.

6.1.2 The excavation methods

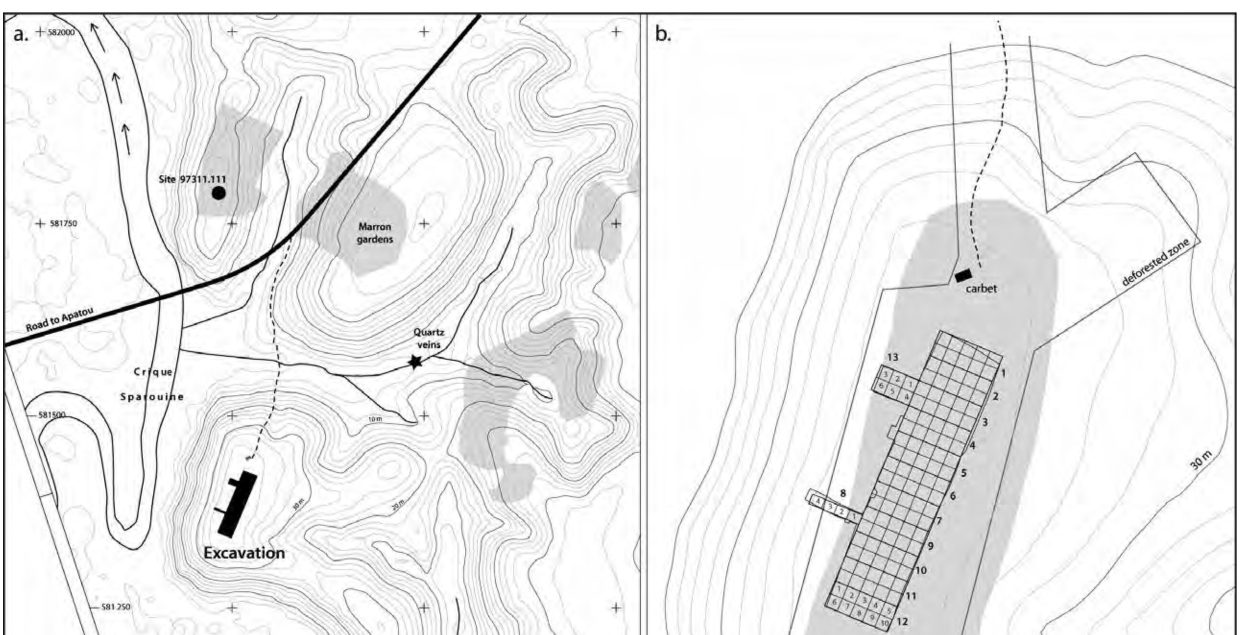
The summit was deforested by means of a mechanical shovel in order to set up a topographic grid (Fig. 6.5). We opted for excavation units or pits (Pit) measuring 8 x 20 m and were positioned in a NW to SE axis. In each pit, the dark layer (US 1 and 2) was removed in small levels with a mechanical shovel. We collected the archaeological material by hand in ten squares of 4 x 4 m per pit. In total, 13 pits were excavated: 11 pits measuring 8 x 20 m, one pit 4 x 16 m (Pit 8) and another 8 x 12 m (Pit 13), respectively. The excavated surface covered a total of 2002 m² for a mean depth of 40 cm (630 m³).

Due to the small budget as to an analysis and a rigid time schedule of only 6 weeks, it was decided to cover as much surface as possible. Eventually, we were unable to cover the entire summit in order to detect the boundaries of the occupation. After deforestation we already spotted the presence of ceramics on the surface (probably due to mechanical deforestation) which yielded a first indicative distribution of artefacts at the surface of the hilltop (Fig. 6.5b).

6.1.3 The radiocarbon datings

The four charcoal samples obtained from the anthropogenic features were dated by means of AMS (Appendix 1, Table 6.1). The results indicate an occupation span dating between *c.*550 and *c.*1050 BP. It is calibrated between the end of the 10th and the second half of the 14th century AD, suggesting an occupation of *c.*300 years. The high probabilities of samples KIA-32396 and KIA-33555 are significant. This may prove that both features are indeed separated by *c.*200 years.

Figure 6.5. (a) The localisation of the Crique Sparouine site and (b) the collecting grid.



Although we have only four dates, the following scenarios may have unfolded: (a) a permanent occupation lasting several centuries or (b) two short, successive occupations: an early phase around the 11th century and a second during the 13th and 14th century. The artefact studies and feature distribution may or may not confirm this hypothesis.

6.2 The features

Over 400 features (N=426) were identified (Annexes 4.1 and 4.4). The anthropogenic features consist of five depositions in the dark layers (US 1 and 2): four ceramic depositions (F 219, F 305, F 329, F 333) and two grinding stone *in situ* (F 225 and F 248) found in the southern part of the site. The latter depositions are considered to be objects which have been abandoned and/or discarded after the final occupation of the site. The rims of two complete "standing" ceramic vessels (F 102 and F 138) were also encountered in the top of the dark layer, apparently emerging from their pits above ground level. Below the dark layer, 269 post holes and 24 pits were recorded in the orange-yellow subsoil (Annexe 6.1, Table 6.2).

6.2.1 The pits

Eleven pits without artefacts were recorded of which four contained several potsherds whereas 13 pits revealed ceramic depositions of one or more complete vessels. The pits have a round or oval shape. Their depth (at excavation level) ranges between 6 and 70 cm. The interpretation of the pits remains difficult without a chemical analysis of the fill. However, at present, pits without ceramics or with only a small number of sherds are considered to represent waste pits. Pits with one or more vessel depositions were divided into three types based on their dimensions (Fig. 6.6):

Type 1 This oval shaped type of pit has maximum dimensions ranging between 60 and 90 cm, and a depth of *c.*20 cm (N=9, Fig. 6.6a). It generally contains one or two complete vessels deliberately placed at the bottom or at the side of the pit, but this position appears random. Although bone is absent, this type has been interpreted as a funerary pit. Its shape evokes a primary burial with the deceased placed in foetal or flexed position at the bottom or against the wall of the pit, or perhaps in secondary position as a bundle (F 36, F 52, F 149, F 210, F 211, F 278, F 358, F 375, F 377).

Type 2 This type consists of two small round pits dug into the solid duricrust (F 220 and F 221, Fig. 6.6b). They are situated close to each other. Their diameters measure between 30 and 36 cm respectively whereas the depths measure between 28 and 14 cm. The vessels were placed inside the very small pits and appear to fit perfectly, as if the pit was specifically dug for that specific vessel (occasion?).

Feature	Type	C^{14} age BP	Cal. AD 2σ	Lab. No.
F 197	post hole	585 ± 25	1303 - 1368	KIA-32394
F 306	post hole	905 ± 25	1037 - 1143	KIA-32395
F 380	post hole	750 ± 25	1238 - 1295	KIA-32396
F 121	pit with ceramics	1045 ± 20	977 - 1023	KIA-33555

Table 6.1. The results of the radiocarbon dates. Calibration after Stuiver et al. 1998, CALIB rev 4.3 (Data set 2).

Although we have no data on the contents of these vessels, they can be interpreted as secondary burials or ceremonial depositions, for example, linked to rites of passage.

Type	N
Post hole	269
Ceramicvessel *in situ*	4
Lithic object *in situ*	2
Ceramic deposition	13
Pit with ceramics	11
Roots	89
Treefall	36
Undetermined	2
	426

Table 6.2. The general feature count.

Type 3 This type consists of two very large round pits with diameters over 2 m and a depth of *c.*70 cm (Fig. 6.6c). Both contain one large vessel placed in an upright position on its base, i.e. standing upright. One pit contains two vessels of which one is a boat shaped vessel (F 138, EC 52). These huge, standing vessels must have been visible or marked at the time of the pre-Columbian occupation as their orifices were observed just below the humic forest floor (US 1). Further analysis is required with regard to such pits, but they were interpreted for the moment being as storage pits, primary inhumation graves or secondary urn burials. Similar features were excavated at: (a) the LCA site of Bois Diable/La Sablière, situated to the west of Kourou (Barone-Visigalli and Prost 1991:22–23, Figs. 2 and 3), (b) BPS 230 on the Sinnamary River (Vacher et al. 1998:70, Fig. 52), (c) PK 11, Cayenne (Briand et al. 2008:16) and (d) at Eva 2, but in this case in a historic context (cf. Fig. 11.5).

If we consider Type 1 to be primary burials, there would have been at least nine burials concentrated in the northern sectors. The dimensions of these pits do indeed correspond to inhumation graves as found for example in the Lesser Antilles at Saladoid and Troumassoid sites (Hofman and Hoogland 2004; Morsink 2006; Altena 2007; van den Bel and Romon 2010; Samson 2010). Recent

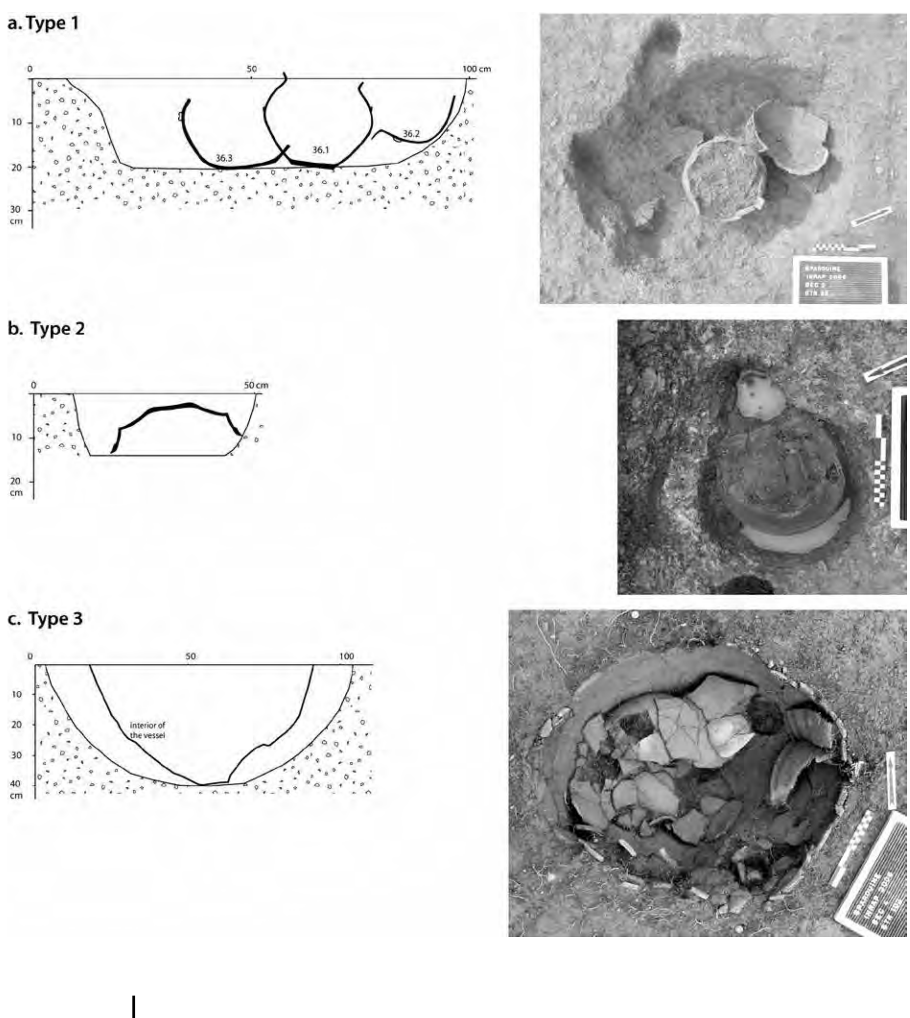


Figure 6.6. Three examples of pits filled with ceramics vessels: (a) F 35, multiple depositions (Type 1), (b) F 221, a small pit with one ceramic deposition (Type 2) and (c) F 102, a very large pit with upright deposition of one large ceramic vessel (Type 3).

paleoparasitological analysis on presumed burial pits did not help to confirm the hypothesis that they were burial pits (cf. Section 9.4.2). Moreover, the proximity of certain burial pits is perhaps not fortuitous: the spatial distribution of the pits may be related to the memory of former burials or to places to bury the dead, such as inside houses.

6.2.2 The post holes

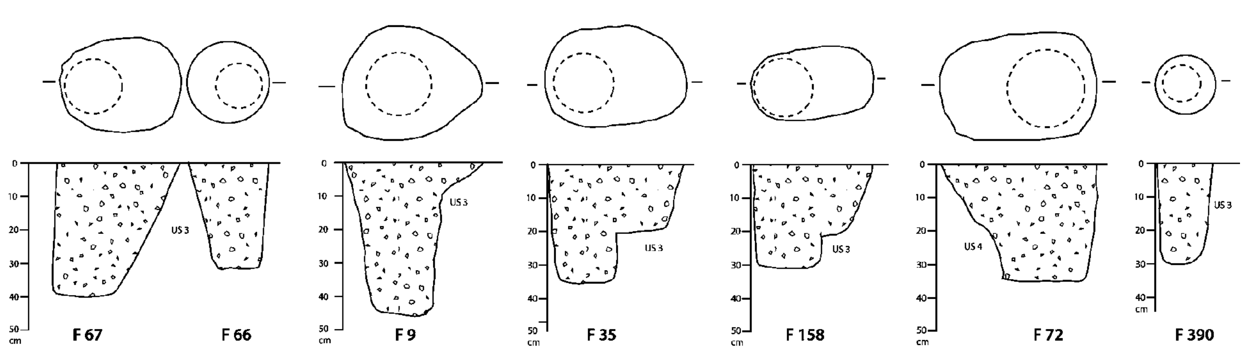
In total, 180 features were identified as post holes (Fig. 6.7). In addition, 89 features were labelled as possible or “probable” post holes. The dimensions of the post holes vary between 8 and 40 cm and their depths between 6 and 82 cm, very often with a flat bottom. The shape is round or oval at excavation level. Its filling is generally sandier and darker than the substratum (US 3 or 4). Six post holes contain sherds or stones in order to corner and stabilise the position of a wooden posts (Fr., *calage*). A large number of post holes were dug into the lateritic crust. Applying a hafted, stone tool or (burnt) wooden pole seems inevitable when digging a hole into this hard bedrock. The post holes correspond to wooden constructions such as houses, racks, shacks and other specific constructions utilised when manufacturing hammocks or smoking fish, etc.

6.2.3 The spatial distribution of the features

In general, the large-scale excavated prehistoric habitation sites in the Antilles or the Guianas yielded a so-called “cloud” of post holes and multiple pits, also referred to as a palympcests. Continuous occupation of one or multiple dwellings as well as houses which were extended or refitted, on (approximately) the same spot, makes it very difficult to reconstruct a house plan. Previous extensive excavations (e.g. Bois Diable/La Sablière, BPS 213, BPS 223, BPS 230, Mont Grand-Matoury, Katoury, Eva 2) did not provide any convincing house plans, as mentioned in the previous chapter (cf. Section 5.4.6). Moreover, it is especially difficult if there is no archaeological reference or blueprint available (for any period), as is the case in the Guianas, where only ethnographic or ethnohistoric analogies can be drawn (Mans 2012).

At present, pre-Columbian house plans are mainly known from the Caribbean region (Samson 2010:18-26). As to Crique Sparouine, it can be expected that the spatial distribution of post holes and the various pits also represent an pre-Columbian habitation site. Consider, for instance, the density of post holes: 1.3 post holes as to every 10 m^2. Although unable to recognize a house plan, we could identify alignments of post holes possibly representing wooden constructions (cf. Fig. 6.9). We applied the following parameters to identify a possible location: (a)

Figure 6.7. The examples of post holes.



post holes deeper than 40 and 30 cm, (b) holes with double posts, (c) the location of possible burial pits (Type 1) and (d) the location of the waste areas.

In this scheme, the post holes deeper than 30 cm are regarded as central or carrying posts. Without knowing the plan, these posts are estimated to have been situated at the centre or along the supporting (straight or circular) sidewalls of a construction to which the roof was attached. We did not find any information as to if the houses were built on stilts, i.e. with a wooden floor built above the ground, or if the pre-Columbians did indeed live on the former forest floor. In fact, both types of dwellings are common among contemporary groups inhabiting the Guianas and Greater Amazonia. The double posts can also be regarded as carrying, or important, posts. However, they can also be interpreted as construction posts enabling scaffolding or as posts that have been replaced. In this way, double posts may indicate key positions within a house construction. Furthermore, the presence of supposed burial pits and/or upright storage vessels may indicate the position of the interior of a house plan. Based on ethnohistorical analogies, burials inside houses have been accounted for during the second half of the 17th century among the Galibi (Fig. 6.8):

> *Je vis en passant les fosses de trois hommes décédés fraîchement, qui étaient dans le carbet du jour, et la femme était morte la nuit précédente, je la vis encore dans son hamac, entourée de pleureurs et de pleureuses, on l'allait mettre en terre. Les Indiens font leur fosse en carré et enterrent les corps ployés en double, comme ils se mettent naturellement quand ils se sentent mourir.* (Jean de la Mousse 2006:115)

The waste dumps or middens (Fr., *dépotoirs*) are often located in the periphery of a habitation site (e.g. behind the houses). The middens contain the bulk of the archaeological material and the largest number of artefacts (Midden A and Lithic Zone 1) (cf. Figs. 6.14-5). Secondary waste areas (Middens B and C and Lithic Zone 2) contain fewer artefacts and could be located within the habitation area. They are frequently situated in abandoned houses. The fact that the earliest date was obtained from a post hole beneath the secondary Midden C and Lithic Zone 2 confirms this view. It is reinforced by means of the presence of ceramic depositions, i.e. F 219, F 305, F 329 and F 333, of which the latter represents two imbricated Koriabo pots, found in the archaeological layer (US 2) restricted to the southern sector of the excavated area (Pits 9-11), stressing abandonment of the site.

The presence of underlying features evokes the diachronic presence of Midden B. The latter dump may well represent a continuous waste zone which probably existed throughout the entire occupation span. Following this assumption, the excavated area may have contained three house locations (HL), represented by HL 1-3 (Fig. 6.10). HL 1 and HL 2 are considered the first constructions on site, when compared to the waste areas and the superposition of the secondary Middens B and C as well as with the corresponding Lithic Zones 1 and 2. A third house location is situated between the former two locations. However, the most recent date is also found in this HL. Thus, it is also possible that HL 3 was indeed the first, but perhaps also the last (rebuilt) house of the site. It should be stressed that this interpretation remains hypothetical on the basis of the collected data. Nevertheless, it is notable that the distribution of the post holes over 40 cm in depth of HL 3 evokes a rectangular house plan. Moreover, small wooden constructions in its vicinity appear to be optional.

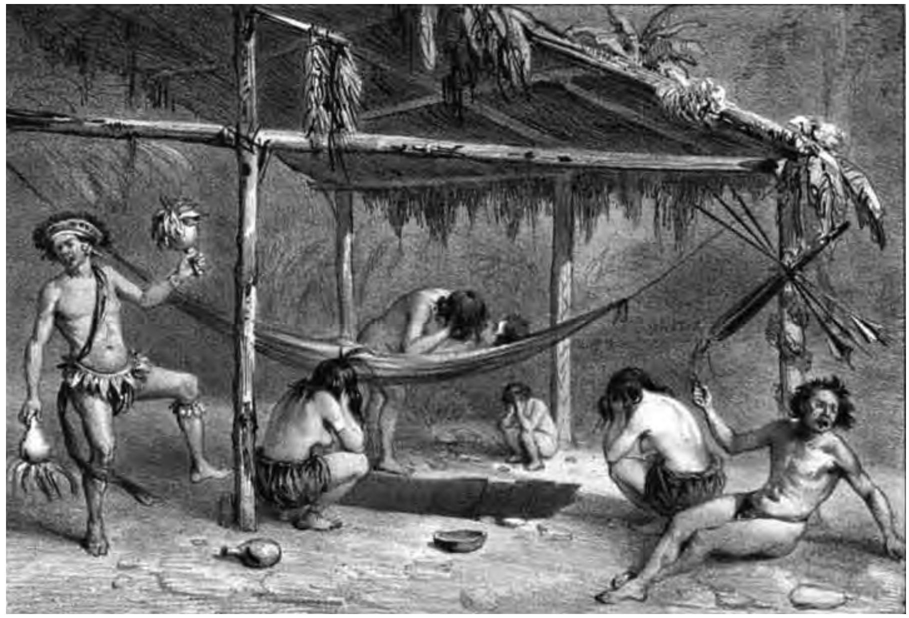


Figure 6.8. The burial of a Kali'na in a carbet on the littoral of Suriname during the first half of the 19th century (Benoit 1839, Fig. 86).

Figure 6.9. The levels of interpretation (a-d) of possible alignments. The last example is left open in order to acquire an impression the entire picture.

6.3. The lithic study

In total, 112 lithic elements (32 kg) were exhumed. They included 69 tools and 43 flakes of which 68 elements were taken from the dark layer and 43 from the features (Table 6.3). The material shows some weathering, as is common in the Guianas. The Crique Sparouine assemblage consists of: (a) flaked stone, (b) gound stone tools, (c) other core tools, (d) use-modified tools and (e) manuports. However, their small quantity does not allow an extensive study (Annexe 4.2).

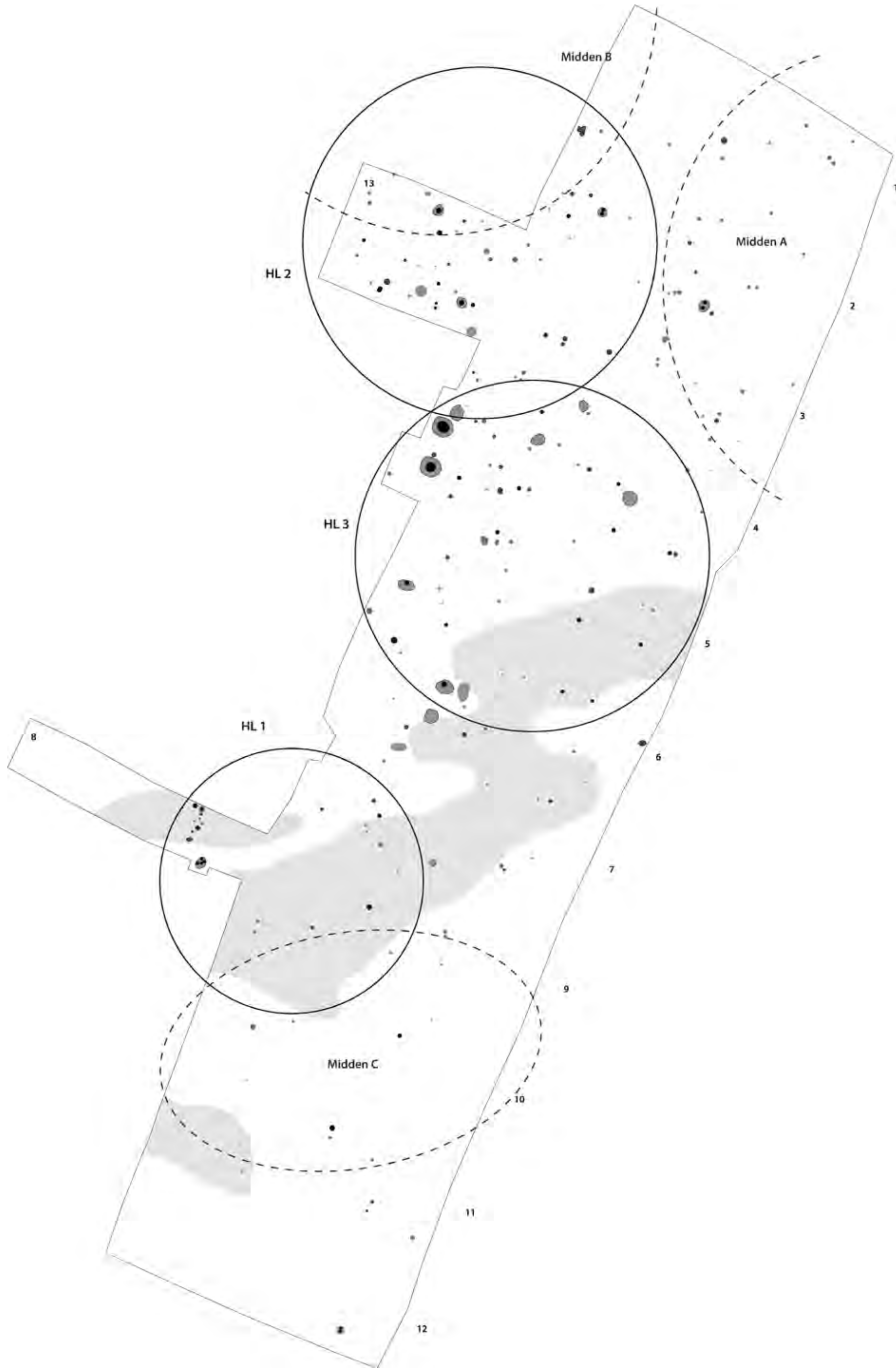


Figure 6.10. Three possible house locations (HLs 1-3) and middens (Middens A-C).

6.3.1 The flaked stone tools

Quartz tools

The flaked stone tools almost exclusively consist of quartz material. The small quantity of quartz artefacts compared to core tools is probably related to the collecting strategy in the field, where systematic screening was not employed. The quartz had been worked using the direct free-hand as well as the bipolar (anvil) flaking technique. Both have resulted in the formation of flakes, flake tools, unidentified fragments, and flake cores, representing the majority of the quartz tool production (Prous 1990a, 1990b; Prous et al. 2010; cf. Fig. 1.5).

Among the quartz material, two varieties can be distinguished: (a) hyaline or translucent quartz with fine texture and (b) saccharin quartz with an irregular texture due to the large crystal size. Hyaline quartz predominates among the flakes and fragments. Quartz veins are present in depth here. Nonetheless, it was probably easier to recover raw quartz material from the riverbed located to the northeast of the site where quartz veins submerge (Fig. 6.5a).

In total, 13 quartz flake fragments and 19 quartz flakes were counted. The length of the flakes varies between 18 and 54 mm and the width between 12 and 44 mm, whereas the length is often larger than the width. The thickness varies between 3 and 20 mm (Fig. 6.11a-f).

Eight quartz flake cores were found of which seven consisted of hyaline quartz and one of saccharin quartz. The dimensions vary between 34 and 65 mm. The cores have an irregular morphology, but several show a quadrangular and/or pyramid-like shape. This predominance of irregular shapes is probably due to an opportunist or non-standardised manner of lithic reduction during which the bipolar technique had been the main flaking technique (Fig. 6.11g-h).

The core tools

In addition to the flake tools, the peaople residing at Crique Sparouine utilized a variety of core tools, including: (a) tools that had been shaped before being used (e.g. ground stone tools (axes), as well as more moderately modified tools (e.g. querns and grinding stones), (b) use-modified tools (e.g. pebbles used as hammer stones) and (c) re-used quartz flake cores.

6.3.2 The ground stone tools

Ground stone tools generally include artefacts shaped by means of grinding in addition to possible other modification techniques. The most recurrent type is the axe or celt. These tools often are initially shaped by means of flaking, after

Table 6.3. The general lithic tool count per raw material.

	quartz							
Tool type	**hyalin**	**saccharin**	**diorite**	**greenstone**	**schist**	**granite**	**amphibolite**	**Total**
flake	10	3						**13**
utilised flake	14	3	1	1				**19**
anvil	1	2						**3**
axe			4					**4**
undetermined	2	1	1	1	1	1	1	**8**
polishing stone		2						**2**
milling stone						1		**1**
milling/polishing stone		1				1		**2**
quern	7	1						**8**
hammer stone	1	1						**2**
hammer stone/pestle		3						**3**
pilon/grinding stone		1						**1**
whet stone						2		**2**
pseudo-axe					1			**1**
	35	**18**	**6**	**2**	**2**	**6**	**1**	**69**

which the pre-form is ground and on occasion polished into its definite shape on a grinding stone, using water and fine sand. Grinding and polishing may have occurred on large boulders in rapids outside the village or on portable grinding slabs inside the village. Apart from axes, beads and pendants are also examples of products manufactured following the same combination of techniques.

At Crique Sparouine, four polished axes and one pre-form or "roughout" were found. All four axes are made from diorite and the roughout from schist (Fig. 6.12a, c). The axes have a rectangular shape and were often discarded after intensive usage as their heavily damaged edges indicate. One axe may have been an exception to this, as it still has a smooth edge.

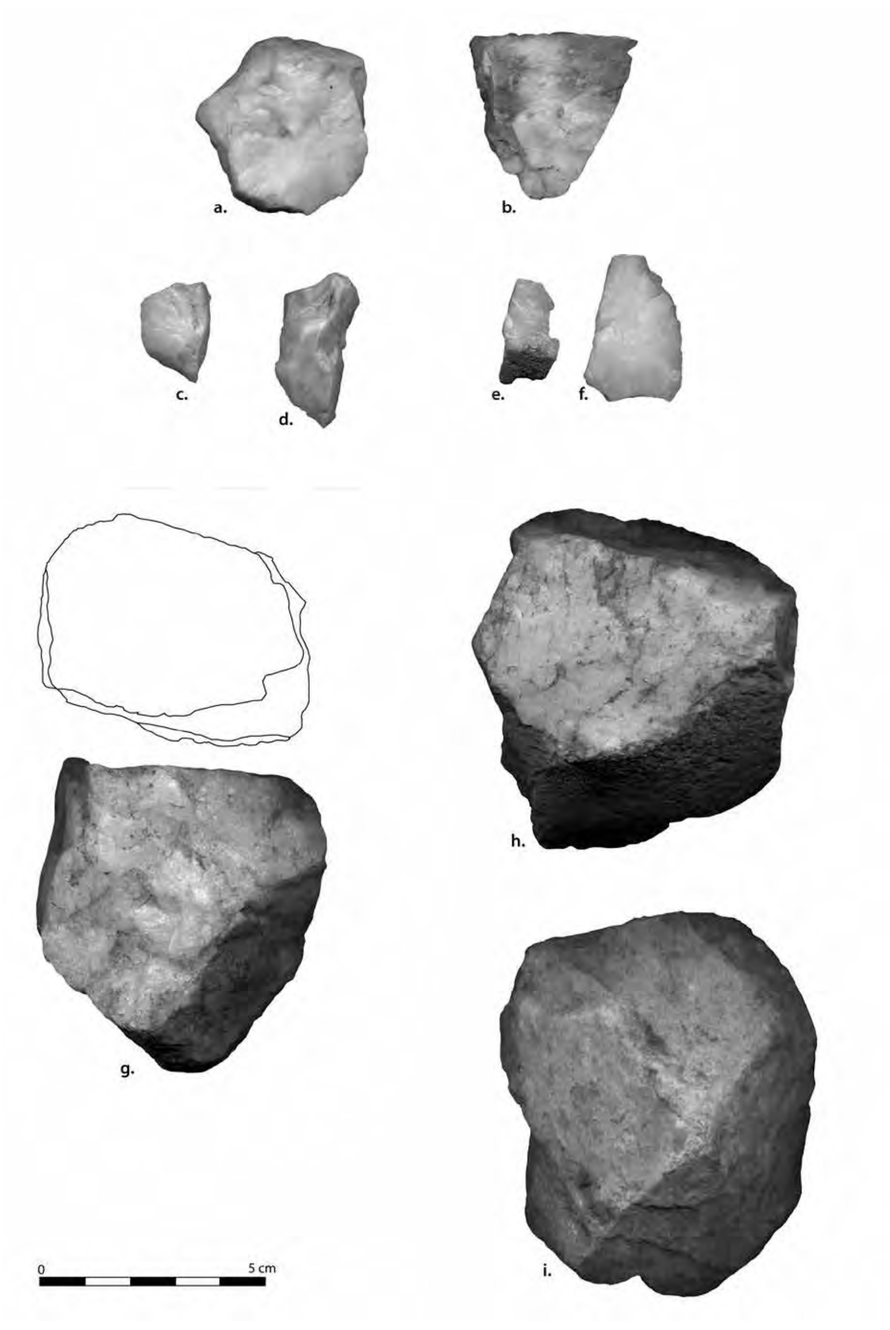


Figure 6.11. The quartz flakes and core tools: (a) a hyaline flake (F 125), (b) a quartz fragment (S11-7), (c, d) hyaline flakes (F 304), (e, f) a hyaline flakes (F 238), (g) a quartz core (S4-8), (h) a quartz core (S6-2) and (i) a possible quartz anvil (F 348).

6.3.3 The other tools

The other core tools include grinding stones and querns. The majority has undergone a very rudimentary shaping process, in which large blocks were (slightly) altered by means of flaking and pecking before serving as passive slabs for grinding objects (grinding stones) and food (metates). Generally, these tools had been used for long time spans resulting in extensively abraded tools, blurring most of the initial shaping features.

Quartz and granite are the rock materials associated with these types of tools. The grinding stones (N=5) are made of rather large blocks and have abraded sides. Two specimens are made of granite and one of saccharin quartz. Granites represent privileged raw materials for this type of activity due to their porosity (cf. Section 5.6.3). It is possible that grinding stones served as anvils too.

Very few unaltered blocks were found at the site. The re-use of discarded ground objects is common here as is the case with the majority of archaeological sites in the Guianas.

The quartz core tools

In addition to flaked stone, quartz had also been used for core tools which include: (a) both milling and grinding stones (see above), (b) types of use-modified tools and (c) re-used flake cores. Three anvils and five hammer stones were found. Three of the latter tools had also served as pestles (Fig. 6.13a-c). All are made from quartz. This exclusiveness is probably the result of a combination of the easy availability and relative hardness of the material, making it an excellent candidate for these types of tools. It is noted that several anvils and hammer stones actually represent re-utilized flake cores. The dimensions of the tools vary between 41 and 91 mm.

One hammer stone made of saccharin quartz with a trapezoidal shape (length of 72 mm) was found (Fig. 6.13a). Furthermore, eight rock fragments with either an irregular or quadrangular shape were recorded. Dimensions vary between 42 and 116 mm and show traces of use-wear. Morphology and primary materials exhibit some variation. One polished greenstone object is notable and may represent a fragment of a rubbing stone (Fig. 6.13d).

The manuports

Finally, 43 lithic items do not show any traces of modification or use-wear. These represent approximately half of the lithic assemblage found at the site. Nevertheless, these objects are exotic to the site area, and therefore must have been intentionally brought to the site, i.e. as manuports. The reasons herefor however remain unclear.

6.3.4 Conclusion

The small quantity of lithics recovered as well as the absence of small flakes (microchips) is probably the result of the collecting methodology in the field, where screening was not employed. When comparing the spatial distribution of the lithic tools not only to that of the ceramics (US 2) but also that of the features, it is evident that lithic material is concentrated in two distinct zones, i.e. Lithic Zones 1 and 2, which are likewise located as the ceramic Middens A-C (Figs. 6.14-5). This may suggest that two zones existed where activities related to the studied lithic tools took place.

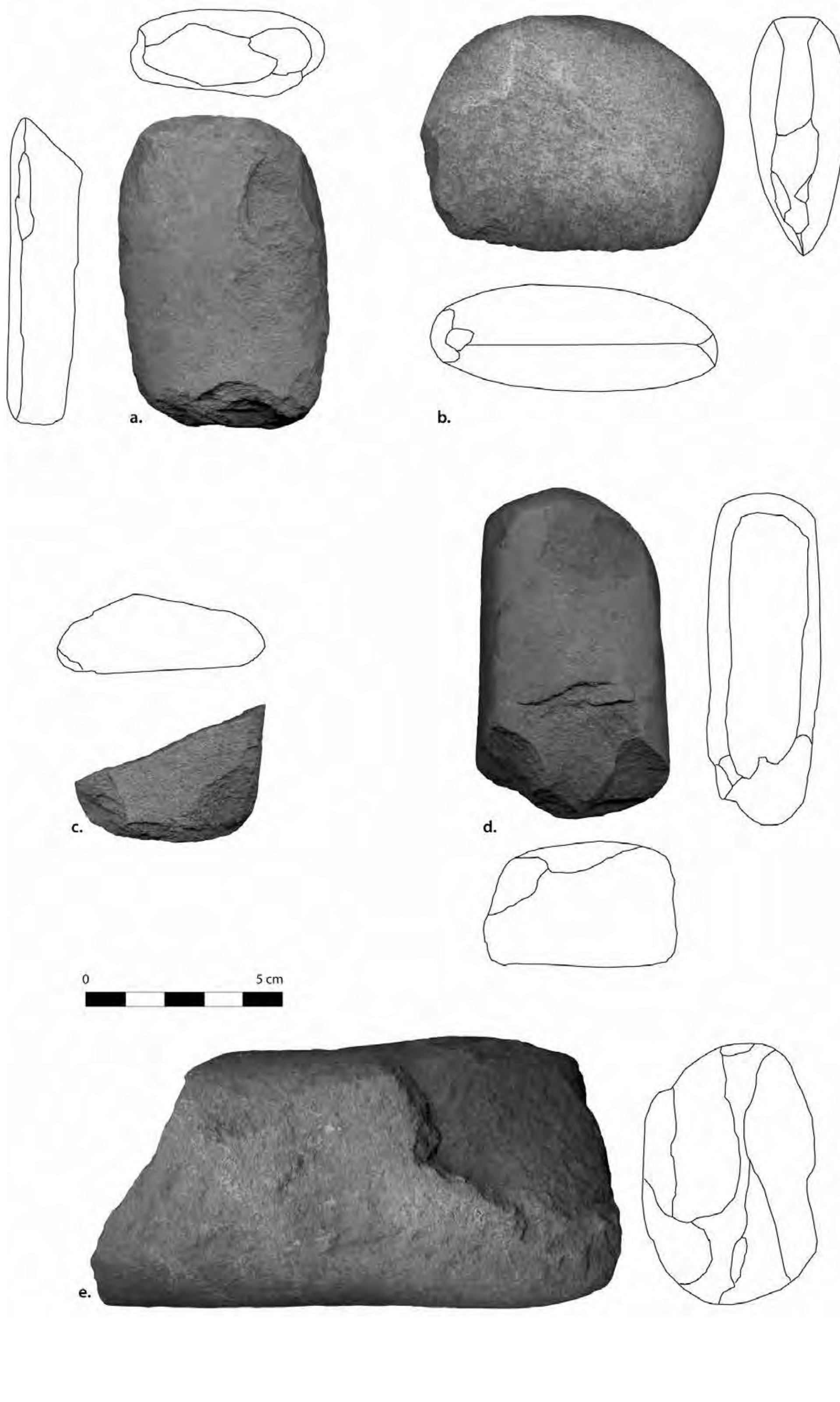


Figure 6.12. The axes: (a) a pre-form (S9-7), (b) an axe (S12-3), (c) a distal fragment of an axe or pre-form, (d) an axe (S3-9) and (e) an axe (F 999) found to the south of the excavation while clearing the forest.

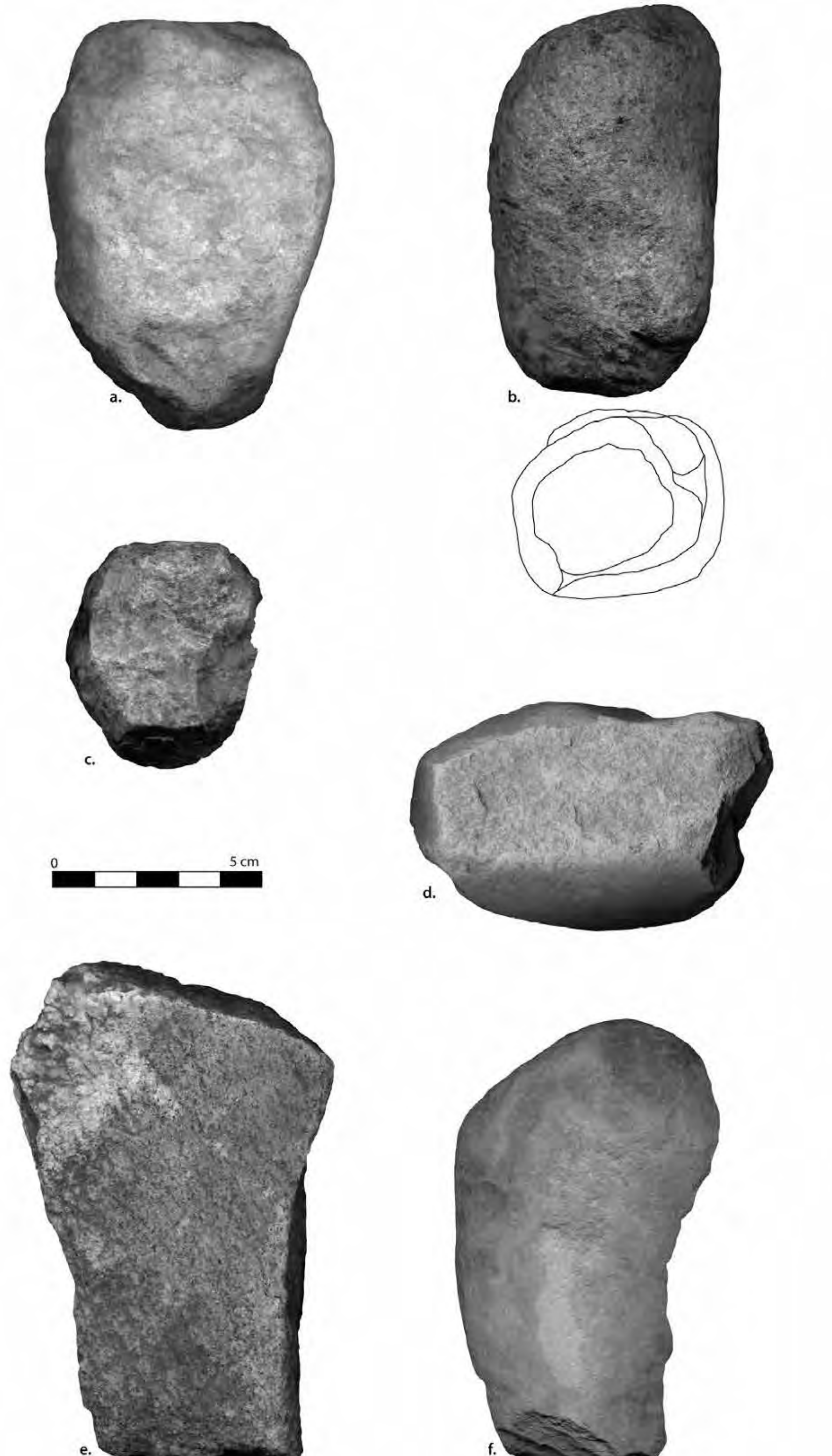


Figure 6.13. (a-c) The hammer/grinding tools and (d-f) grinding/polishing tools: (a) a hammer stone (F 282), (b) a hammer/grinding stone (S1-3), (c) a hammer stone (S11-7), (d) a fragment of a polished object, perhaps a grinder (S11-7), (e) a polishing/grinding stone (F 333) and (f) a fragment of a polished stone (F 59).

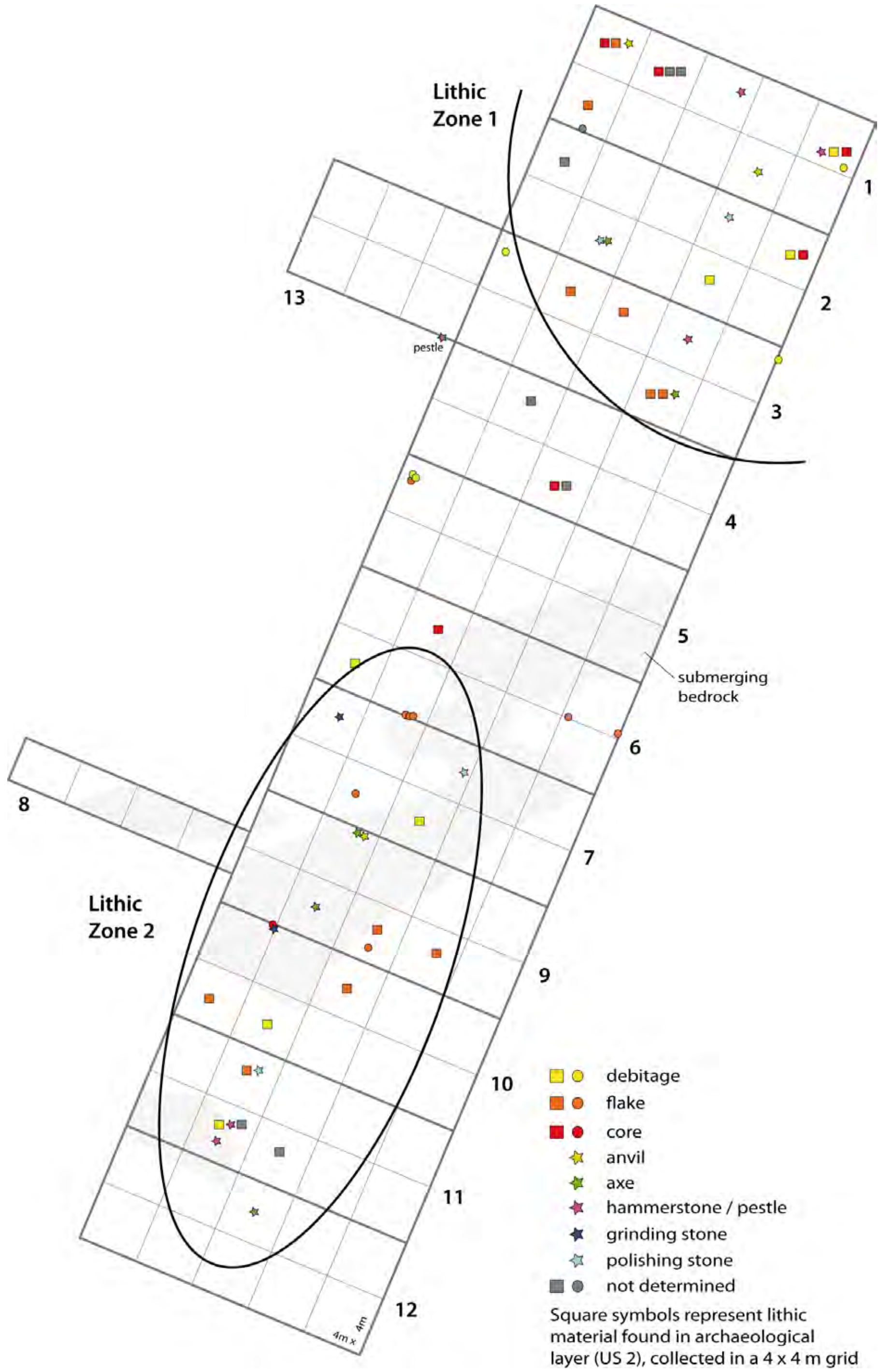


Figure 6.14. The distribution of lithic tools.

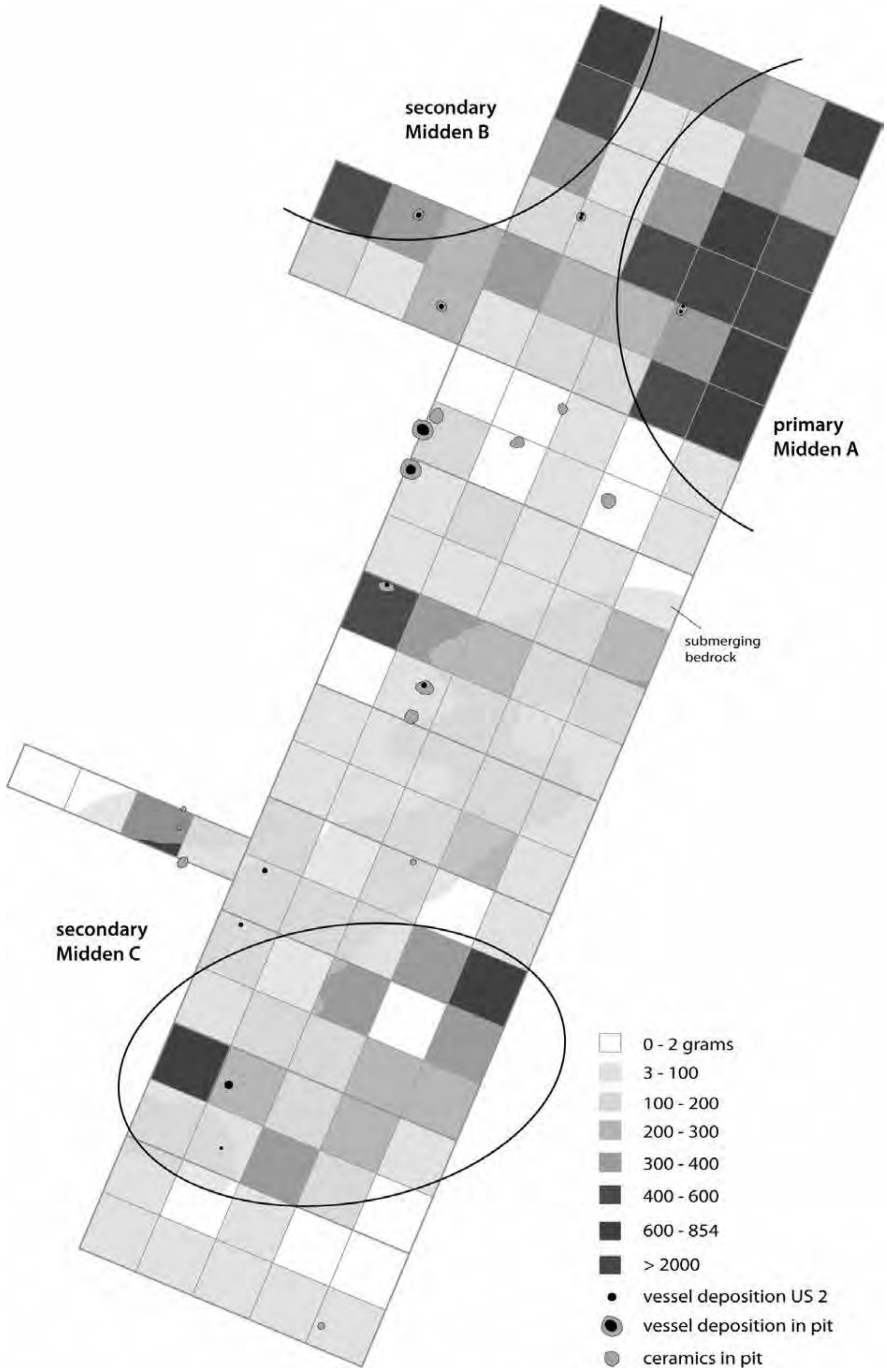


Figure 6.15. The distribution of ceramics found in the dark layer (US 1-2).

6.4. The ceramic study

6.4.1 Introduction

The register represents nearly 4000 potsherds, weighing *c.*114 kg. They were mainly collected from the features (in particular from the pits) and from the dark layer (US 1-2) (Table 6.4). It provides 21% of the weighed ceramics or 41% of the ceramic specimens with a mean weight of *c.*16 gr as tothe layer and 37 gr as to the features. The ceramics from the archaeological layer contained *c.*33% of the constituent elements (EC) (Annexe 4.3).

The discrepancy between decorated and plain ceramics is represented in 8.5% for the entire assemblage whereas 10.5% of the feature-ceramics and 5.4% of the dark layer are decorated. Twenty-four vessel shapes were reconstructed of which 58% were decorated: a relatively high percentage. This high number is probably related to the specific context of these vessels, i.e. possibly special purpose pits (burial pits).

Although ceramic material was detected all over the excavated area, we observed a higher density is in the northeastern (Sectors 1-3 or Middens A-B) and southeastern parts (Sectors 9-11 or Midden C) of the excavated area. The northeastern dump provided the bulk of the ceramic material (Fig. 6.15). This area may be linked to a dump located at the periphery of the dwelling area. This opinion is partially attested by means of: (a) the diversity and quantity of the ceramics found in this particular area and (b) the absence of anthropogenic features. Midden C is less rich in ceramics. It was interpreted as a secondary waste area.

The only manufacturing technique observed is the coiling technique albeit griddles may have been produced by means of a lumping technique consisting of two superimposed clay cakes or slabs. With the naked eye, four general types of non-plastics were detected in the paste of which the mineral type (66%) is the dominant temper. The most popular sand temper is the followed by means of a mixture of crushed mica and sand. The importance of (crushed) mica, present in

	Total	Plain	Decorated	Weight (gr)	Mean weight	EC
Black layer	1527	1445	82	24,645	16,14	34
Features	2388	2137	251	89,950	37,67	59
	3915	3582	333	114,595		93

Table 6.4. The general ceramic count.

			Mode	N
Mineral (66%)	1	sand / quartz	11	21
		sand + mica	12	8
		sand + mica + black minerals	13	13
		with milky quartz	14	1
		finely crushed mica + sand	15	16
		pisoliths + sand	16	1
		mica	17	0
		mica and black minerals	18	1
Vegetal (6%)	2	charcoal particles	21	3
		ash	22	3
Mixed (22%)	3	charcoal particles + sand	31	14
		ash particles + sand + pisoliths	32	6
Grog (6%)	4	pounded potsherds	41	6

Table 6.5. The distribution of temper modes. Note that pisoliths and black minerals may occur naturally in clays and are not necessarily added voluntarily.

various combinations (41%), is remarkable. It may well reflect a specific choice and/or clay source, with regard to the Crique Sparouine potters (Table 6.5).

A pure vegetal temper notably *kwepi*, or *caraipé* (either black or grey), represents only of 6% the non-plastics. However, a combination of mineral and vegetal temper is also fairly popular (28%). On the one hand, grog or pounded potsherds as a temper was observed in only a few vessels (6%). On the other hand, the latter vessels represent significant ceramic depositions (e.g. F 102, F 121, F 138, F 219, F 358) and may refer to a possible tradeware. Remarkably grog was also recorded in the mixed tempers, but in rather low quantities.[178] Six firing colours were macroscopically observed of which 55% point to a reduced firing, 20% to an oxidizing environment and 25% to a combination of both techniques (Rye 1981, Fig. 104).

6.4.2 The constituent elements

The diagnostic ceramics of Crique Sparouine consist of 93 ECs including twenty-four archaeologically complete vessels obtained from the features (26%) (Annexe 4.3.3). These complete vessels served as examples in order to determine the ceramic series for the site. The constituent elements are composed of 76 rims and 42 bases and seven collars (N=118).

The rims

The diversity of the rim profiles allows for a morphological distribution in eight modal series (SM) for which, next to an open or restricted vessel shape, labial treatment is an important marker applied in order to distinguish series (Table 6.6 and Fig. 6.16). Certain rare or unique rims (SM VIII) could not be allotted to a specific series (6.5%).

SM I is the most popular type of rim. It inclines towards the outside with a rectilinear profile (SM I, 21.1%) and included rounded, flattened, thickened or pointed lips. The wall thickness and rim diameter are highly variable, but the paste is predominantly mixed and fired in a reduced environment. Only 33% of this series has as a decorative element, notably red slip. Several hereof are presumably associated with boat shaped vessels.

SM V is the second most popular series (SM V, 15.7%) and represents inflected rims. The latter are characterized by means of lips with a rounded, pointed or flattened labial treatment and correspond to hemispherical and/or carenated open forms. The majority of these rims was obtained from the archaeological layer. However, it may have equivalents among the complete vessel shapes. The diameter of this type was only observed on three individuals and varied between 25 and 32 cm. Certain rims are probably neck fragments. Three objects of SM V are decorated: two rims with white slip and one rim includes finger indentations on the flattened inside of the lip. The preponderance of the mineral pastes is noteworthy and especially the mica component.

SM VI consists of eleven individuals and represents nearly 15% of the rim collection, corresponding to the sinuous rims, or "S" rims. This series consists entirely of rims collected in the (pit) features. The rounded and flattened lips on

178 The present author checked the Crique Sparouine contituent elements in July 2013.

SM	N	Form	Description
i	16	Open	Rectilinear profile
ii	7	Open	Outward thickened lip
iii	8	Restricted	Convergent
iv	10	Open	Flaring profile
v	12	Open	Inward flattened lip
vi	11	Open	Sineous rims
viia	5	Necked	Convergent collar
viib	2	Collared	Divergent collar (bottles)
viii	5	Unique	Miscellaneous
	76		

Table 6.6. The rim series SM I-VIII.

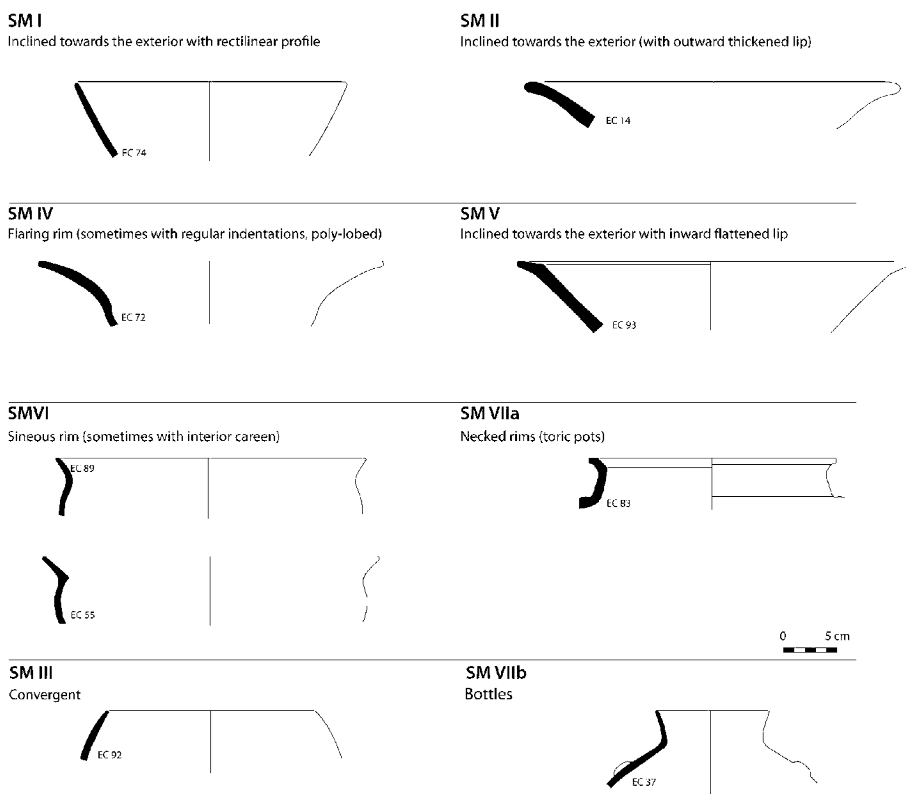


Figure 6.16. The rim series SM I-VII.

open bowls with hardly any decoration characterize the labial treatment. The wall thickness varies between 5 and 10 cm whereas diameters vary between 18 and 45 cm. The temper is either mineral or mixed.

SM IV contains flaring rims, or outwardly stretched rims, with a concave profile (13.1%). The open bowls have an opening measuring between 30 and 38 cm and a highly decorative aspect. This series may have served exclusivity concerning the application of white slip on the inside as the only exception displays complex geometrically scraped designs on the inside. The white slipped elements of this series were also provided with black and red painting as observed with EC 71. The labial treatment can be subdivided into polylobed rims and non-lobed rims. The sandy temper predominates.

SM	N	Shape	Profile
1	14	Flat	Convex and rectilinear
2	10	Flat	Appendicular
3	15	Dimpled	Convex and rectilinear
4	2	Rounded	Rectilinear
5	1	Annular	
	42		

Table 6.7. The base series SM 1-5.

SM III (10.5%) contains convergent rims and consist of restricted bowls with rounded or pointed lips. The wall thickness varies between 6 and 11 mm. The paste is predominantly mineral. As to decoration, we often see a red slip on the interior and the exterior of the vessel wall.

SM II consists of rims which are inclined slightly towards the outside with a sinuous or concave profile (9.2%). The lips are rounded and thickened on the outside. This series is difficult to define due to the high fragmentation (no diameter could be reconstructed). This is probably related to the fact that the majority of the rims were extracted from the dark layer. The wall thickness varies between 6 and 10 mm and has a predominantly sandy temper.

SM VII the necks or collars which are distinguished for this restricted series are: (a) a more restricted diameter regarding the opening and (b) an often straight profile, parallel with the axis of symmetry of the vessel. The Crique Sparouine necks are almost exclusively observed on toric pots (SM VIIb, 6.5%) whereas SM V has tendency to represent a divergent collar. The necks were subdivided according to inclination and labial treatment. The most popular series are the convergent ones (SM VIIa) with inflected lips. Now and again these lips have a large scraped groove applied to the lip as well as figurative "handles" (EC 84). The other subseries represent the divergent collars (SM VIIb), but consist of only two individual items. The temper is predominantly sand. The diameters vary, but the majority is rather small: *c.*10 cm whereas two others measure *c.*20 cm.

The bases

The 42 constituent bases are divided into five modal series: SM 1-5 (Table 6.4). The latter series are defined according to their morphologhy: (a) flat bases (57%), (b) dimpled bases (36%), (c) rounded bases (4.7%) and (d) annular bases (2.4%). Flat bases are the most popular and were subdivided as appendicular or convex shaped bases. The thickness of the latter varies between 6 and 22 mm with an average of *c.*10 mm. The diameter ranges from 7 to 22 cm with a median between 9 and 12 cm. These bases may have a red slip applied to the interior.

Appendicular bases have a thickness varying between 5.5 and 12 mm. Their diameter vary between 6 and 14 cm. The thickness of the concave bases varies between 5 and 12 mm. The diameter measures between 6 and 12.5 cm. Two concave bases have red-slipped interiors.

The only two rounded bases are restricted to two small toric pots (e.g. EC 84-5) which were extracted from the dark layer. The only annular base also has a red-slipped interior (EC 47). Another (technical?) aspect should be noted here: the paste of certain bases consists of much more sand temper compared to the upper walls of the same vessel. We did not observe an evident statistic relationship between the abundantly tempered bases and a specific series.

The griddles

Crique Sparouine provided only 49 body fragments and four griddle rims representing 1.43% of the total ceramic assemblage. The thickness ranges between 14 and 28 mm. The rims are unmodified and do not display any other labial treatment. The griddles are tempered with *kwepi*, sand or crushed mica. The low griddle quantities tend to prove that their utilisation was restricted to the site. We presume a satellite settlement site was dedicated to its use.

6.4.3 The complete vessel shapes

These vessels can be divided into eight morphological groups, named Groups A-H (Fig. 6.17). Of the 24 reconstructable vessel shapes, 14 specimens are decorated (58%). It should be noted that the majority of these vessels were found in alleged burial pits. Consequently, the latter may contain pottery especially produced for funerary occasions and therefore may not correspond to the utilitarian ware on site. In fact, this could explain the high level of decoration.

Group A represents the most popular vessel shape and dominates this inventory (N=8, 33%). These open vessels show sinuous rim profiles, rounded lips and a diameters varying between 22 and 40 cm. The wall thickness varies between 5 and 10 mm and the base thickness between 8 and 12 mm. With the exception of one concave base, flat bases with diameters varying between 9 and 14 cm dominate. The firing colours vary. The vessels are often tempered with sand or a mixture. Only one vessel (EC 36) is decorated with a finger-indented strip or coil applied around its wall. This group probably served when preparing food and forms a very coherent ensemble.

Group B consists only of two vessel shapes with divergently necked rims. Their wall thickness measures 6 and 8 mm with a diameter of *c.*10 cm. Their bases are flat. The firing was carried out in a reduced atmosphere. Both have a lug applied just below the keel of the neck. These shapes were probably linked to the preservation and pouring of liquids.

Group C represents restricted vessels. It consists of three shapes: (a) pot EC 65 is a non-decorated restricted so-called “eared” vessel, (b) pot EC 92 has a finger-indented or notched coil, or clay-strip, applied around its wall and one large lug applied to its rim. A band consisting of red slip was applied between the lip and this strip and (c) pot EC 47 inlcudes highly characteristic elements: the annular base and the uniform red slip applied to the interior partially continuing on the outside. The function of these vessels remains to be defined.

Group D includes boat shaped vessels. They are open forms with rectilinear or slightly convex rims and slightly rounded or pointed lips. The wall thickness ranges between 8 and 9 mm and the bases between 8 and 11 cm. The diameter of the latter varies between 8 and 9 cm. These boat shaped vessels have a red slip solely applied to the entire interior. Two other vessels are also considered to be

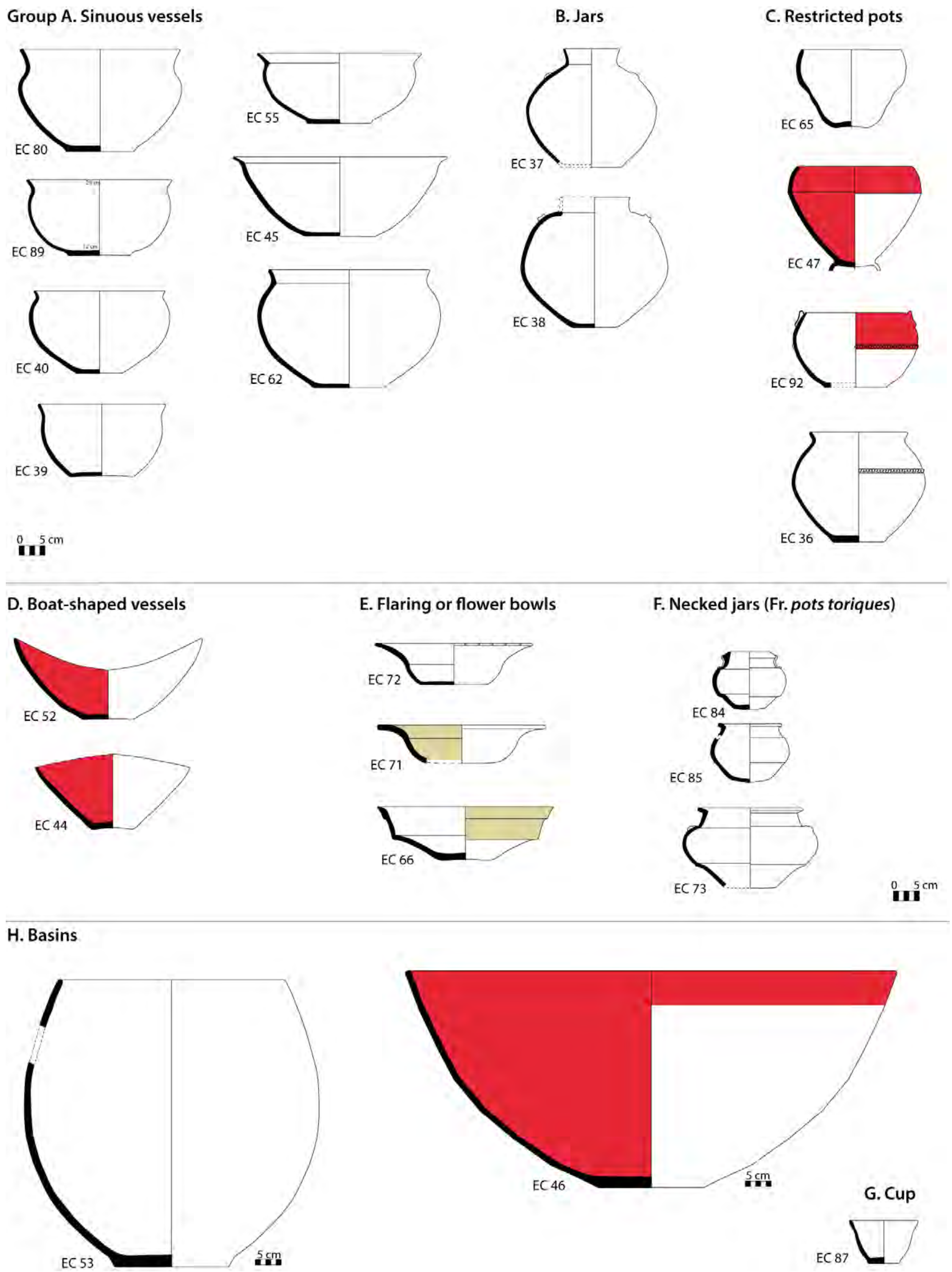


Figure 6.17. The complete vessel shapes (Groups A-H).

boat shaped vessels (e.g. EC 49, EC 91). The firing colours of this group are the result of reduced firing. The vessels have a vegetal temper only (with grog?) and all vessels reflect a very homogeneous group.

Group E concerns an open vessel type. The flaring rim represents a so-called "floral bowl" whith several characteristic elements. This concave flaring rim, or flange (Fr., *marli*), measures *c.*6 cm and has a pseudo-keel as well as a flat base.[179] The diameters measure *c.*32 cm. A sand temper and reducing firing atmosphere is predominant.

We observed curvilinear painted designs in black or red applied to a white slip on the inside of the vessel as well as geometrical scraped designs on the inside of the flaring rims. In both cases, the lip is notched in order to appear polylobed. Such decorations in combination with this particular vessel shape evoke an important pottery type which may reflect a specific function related to ceremonies or trade. Pot EC 66 (F 221) was added to Group (E) because of the application of white slip to the exterior. This type of vessel is described as bell shaped (Fig. 6.5b).

Group F, as with Group E, features one specific vessel shape: a toric-shaped pot with slightly converging neck. Their size may differ. The height varies between 10 and 20 cm. The bases are convex. The neck thickness varies between 6 and 9 mm. The diameters have an average of 9 cm as to the smaller pots and 20 cm as to the larger ones, as pointed out above. The highly inflected rims include a flattened part which is now and again provided with a broad, scraped groove, suggesting the possible presence of a lid. The toric body shows two keels, one at the points of attachment to the base and the other at the neck, forming the medial toric part. The base of the neck is often marked with a scraped groove.

The extended toric body can often be divided into four panels which in turn are divided by means of a vertical indented groove. They form segments decorated with finely incised or scraped geometrical or curvilinear patterns. Now and again stylized and decorated handles accompany the vertical grooves. At the upper central part of the segments, biomorphic appliqués represent the starting point for the geometric designs. We did not notice any painting on these pots at this site. The majority of the vessels show firing with a reducing mode. The paste consists of mineral agents only. Toric pots include a highly decorative aspect and, as the floral bowls, evoke a ceremonially inspired function.

Group G consists of one artefact. It has a slightly tilted rim towards the outside (with a diameter measuring 13 cm) and displays a rectilinear profile. The wall thickness measures 6 mm and the base 11 mm. The paste is sandy. This item probably served as a drinking cup or goblet.

Group H includes the two largest vessels or basins: EC 53 (F 138) and EC 46 (F 102). Their diameters measure more than 60 cm. Both were found standing in a pit. One has a convergent rim whereas the other is open with slipping on the inside. Their heights are *c.*55 and 42 cm respectively. The base thickness measuring 22 and 19 cm consists of two clay lumps. The diameters measure 22 and 20 cm.

179 The French term *marli* is most often encountered in the early (Cedrosan) Saladoid repertoire in the Lesser Antilles (Berard 2004:117; Bonnissent 2008:105). However, it is usually applied when describing wheel-turned ceramics and defined as 'the broad, sharply defined rim border on plates [or] brimmed platos' (Deagan 1987:190).

The wall thicknesses of both measures *c.*1 cm. The paste contains crushed mica or vegetal temper. We presumed that these basins served to ferment *kashiri* beer in and/or to hold water. In due course they may have become burial urns too.

6.4.4 The decoration modes

The red ware

As mentioned above, decorated ceramics represent a very low percentage of the total ceramic assemblage with the exception of the complete vessel shapes (Table 6.4; Annexe 4.3.4). The decorative repertories are relatively sober and consist mainly of the application of a uniform red slip or painting (42%), corresponding predominantly to "dark red" (7,5R 3/8) or "red" (2,5YR 5/8) of the Munsell© Soil Color Charts (1990). As much as 54% of the red slips were applied to the inside of the vessel, 26% to the outside and 25% is bifacial. In the latter case, red slip is often added between the upper part or shoulder and the lip. Interestingly the red slip was applied solely to the inside of all boat shaped vessels (Table 6.8).

The application of a white slip (27%) is the second most popular colour and corresponds to "white" (5YR 8/1). The white slip was mainly applied to the interior of the vessel (72%) and to the outside (27%), but not on both sides. Only two white-slipped fragments reveal an additional application of geometric painted designs in black. It is possible that all white-slipped surfaces were decorated by means of black and/or red (polychrome) painting, but that it has sadly worn off in the lateritic soil (cf. Section 5.5.7). The red and white slips represent more than 70% of the decorated ceramics and thus dominate the decorative register.

The incisions

After the red and white wares, incised decorations (18%) are the most popular decoration modes found at this site. They consist mainly of fine lined V-shaped incisions (65.8%) or broad U-scraped incisions (19%), revealing more or less complex geometrical or curvilinear designs. The former are nearly always applied to the outside walls of toric pots which have a biomorphic modelled appliqué at the base of the neck. Scraped geometrical incisions were added to toric pots in this

Type		int	ext	bif
Slipping and painting	red	32	16	12
	white	29	11	0
	bichrome	1	1	0
Incision	simple	0	3	0
	complex	0	18	0
	lip	0	9	0
Scraping		3	2	0
Appliqué	relief	0	8	0
	lug	0	2	0
	nubin	0	2	0
	clay strip	0	2	0
	figuration	0	7	0

Table 6.8. The decoration modes.

Figure 6.18. The decorated elements: (a) S13-1, a body fragment of a necked jar (Group F) with incised geometrical designs and appliqué (illustration by Monique Ruig), (b) EC 9 (S2-9), a fragment of a finger-indented rim, (c) EC 82 (F 330), a fragment of a polylobed rim with a white slip on the interior and a nubbin, (d) EC 72 (F 278), a polylobed rim with scraped geometric designs on the inside, (e) EC 92 (F 377), a lug on the rim and a red-slipped band on the upper part of the wall and (f) EC 36 (F 36), a wall fragment with finger-indented strip appliqué.

same manner. However these incisions also occur on floral bowls in combination with polylobed rims (Fig. 6.18d). In total, we counted nine rim fragments with polylobed rims. The remaining incisions are rectilinear and placed around the vessel wall below the rim.

The modelling

Modelling represents 9.7% of the decorated ceramics and mainly consists of the application of nubbins, lugs and clay strips. The latter are applied around the external vessel walls and feature spaced series consisting of finger indentations (Fig. 6.18f) or notches (Fig. 6.18e).

The majority of the nubbins were applied to toric pots on which nubbins with apparently small, hollow reed incisions represent biomorphic head lugs (Fig. 6.18a). One small fragment of a polylobed lip with red slip on the inside and scraped incisions also features reed incised nubbins (EC 28). Two non-incised nubbins are applied to the outside of a wall fragment. One was applied to the inside rim of floral bowl with white slip (Fig. 6.18c). Singular lugs were added to the shoulder (EC 37) or to the outside of the rim (Fig. 6.18e).

Three fragments are adorned with relief applications which in one case may represent a human face. One decorated clay spindle whorl (F 330) was found with heavy weathering. The presence here of a parallel incised (decorative) ribbon shaped handle is noteworthy.

6.4.5 The synthesis of the ceramic assemblage

Introduction

The typological synthesis is based on 93 constituent elements including 24 archaeologically complete vessels. When discussing the typology of Crique Sparouine, it has to be remembered that ceramics were extracted from the dark layer as well as from features, mainly pits.

The morphological register or series declines around open, hemispherical vessels with: (a) sinuous rims (SM VI), (b) flat bases (SM 1), (c) boat shaped vessels with red slip on the inside (Group D, SM I), (e) floral bowls of Group E (SM IV) and (f) toric pots of Group F (SM VIIa). The other series are considered to be minority series although jars and basins represent homogeneous groups too. Restricted vessels also include a variety of characteristic elements. Their presence is nevertheless relevant as is the case regarding convergent rims (SM III). Furthermore, one can observe a certain number of recurring morphological and decorative traits witnessing the standardisation of pottery production: the most eye-catching vessels are surely the floral bowls, necked jars, and boat shaped vessels. Sinuous rims presumably occur in series SM I and SM II too. A functional differentiation attempt can be established with regard to the complete vessels: (a) cooking and/or storage activities (Groups A and H), (b) serving and food preparation (Groups B, D and G) and (c) decorative or ceremonial value (Groups E-F and D).

The classification of the non-plastic agents consist of four principal classes. Herein mineral temper and a combination of a mineral and a vegetal or mixed temper dominate half of the morphological groups (e.g. Groups A, E, F-H). Interestingly, boat shaped vessels appear to be tempered exclusively with vegetal non-plastics, representing a specific component as to Crique Sparouine. In fact, these may evoke a specific function and/or an intrusive origin. As with *kwepi*, grog is a rarity compared to the other temper modes of which the restricted grog-tempered vessel EC 47 (F 102) with annular base and red-slipped interior is exceptional, possibly including the boat shaped vessels. All the more if we realise they were found in even larger vessels which may have been burial urns (e.g. F 138, F 102).

As mentioned above, there is an obvious dissimilarity between decoration modes and morphology of Groups A-D when compared with the sand-tempered Groups E and F. The latter two can be attributed to the Koriabo ceramic complex (Boomert 1986), whereas the former groups remain unclear at the moment. In fact, the decoration modes of the first group are quite modest. They comprise of red-slipped surfaces, finger indented strips or small lugs whereas the other series mainly display white-slipped surfaces with elaborate red-painted designs, indentations on the lip (polylobed rims), and fine line or scraped incised complex designs. Interestingly, the discovery of three Koriabo vessels in pit F 278 indicates the contemporaneity of Group E and F. Before discussing the cultural affiliation of this site, the neighboring site of Saut Saillat is briefly discussed in order to apprehend the LCA context of Koriabo on the Lower Maroni River.

The Saut Saillat site

Another Koriabo site along the RN 3, which INRAP members discovered and excavated, is the archaeological site of Saut Saillat at Crique Serpent, an affluent of the Maroni River just opposite the village of Bigiston in Suriname (Mestre 2004; Hildebrand 2008).[180] It is located on a high natural levee within the streambed of the latter creek marked by means of a small rapid (Fr., *saut*) (cf. Fig. 6.2). The excavation only touched the northern flank of the levee evidencing a small waste area at its foot which yielded the bulk of the ceramic material (N=7543).

Despite the relatively small sample and diversity of vessel morphologies, the ceramic material was nonetheless attributed to the Koriabo Horizon. Nevertheless it showed 'proper characteristics which make it different from other excavated sites such as BPS 230 and [Crique] Sparouine' (Hildebrand 2008:4). In addition to the familiar sand-tempered necked jars (ibid., p. 41: D-F3, F4) and flower bowls (ibidem, D1), Saut Saillat also featured various types of *bols*, *écuelles*, and *jattes* (Hildebrand 2008, Fig. 24: O-B1; O-C1, C2, C3; O-D2) as well as pots (ibidem: O-F1, F2; O-G2, G4, G5), as Hildebrand suggested (ibid., p. 47)[181]. However, Group B (jars), or *cols* (ibid., p. 45, Plate 4), occur in both assemblages as perhaps sinuous bowls do (EC 45 vs. ibid., p. 46, Plate 5, I10).

Firstly, the main difference between Crique Sparouine and Saut Saillat (only *c.*15 km as the crow flies separates them and less than a 30 minute-journey in a small motorised canoe), is elucidated by means of the fact that the radiocarbon dates as to Saut Saillat are more recent: between AD 1445 and 1510. All C^{14} results from Crique Sparouine are earlier, of which sample KIA-32394 is the most recent, approaching the end of the 14th century. Secondly, the Crique Sparouine ceramics (N=3915, *c.*50% of the amount found at Saut Saillat) were drawn from dumps as well as ceramic depositions in pits (burials?), whereas the Saut Saillat assemblage was primarily obtained from one large midden area.

The cultural affiliation

Aside from Saut Saillat, the ceramic assemblage of Crique Sparouine is also similar to La Pointe Balaté sites (cf. Section 5.5.7.2) as well as to sites at the *Barrage de Petit-Saut* (BPS) on the Sinnamary River (e.g. BPS 230-Est, BPS 172) (Vacher et al. 1998:244–256, 233–237).

The ceramic Groups A-B, D-E and F are present at the latter site whereas BPS 230 also yielded similar specimens of Groups A, C-F and H. Decoration modes of the latter BPS sites, however, include bichrome painting on the interior surfaces, labial notches, bands of punctations and external oblique incisions which

180 Another Koriabo site has been located at Saut Hermina during the 2003 pedestrian survey along the RN 3 but no radiocarbon dates were obtained (Mestre 2004:49).

181 The codes in Hildebrand's report refer to: O=Ordinary, D=Decorated, F=Form or Shape.

are absent at Crique Sparouine. On the other hand, relief decorations, finger indented strips, red slip on the inside, polylobed floral bowls and toric pots occur at all three sites. The above-mentioned BPS sites are linked to the Arauquinoid-Koriabo Unit (Vacher et al. 1998:206).

Groups E and F are evidently key vessel shapes to identify the Koriabo complex. Both are present at the above-mentioned BPS sites, Crique Sparouine, Saut Saillat, LPB and CSL. These specific vessel shapes have been recognised in French Guiana by Groene (1976) and Cornette (1985a) whereas Rostain (1994a:199–212) redefined them as Type *Chaton Fsantastique*. They were also found in Guyana (Meggers and Evans 1960:124–145) and in Suriname (Boomert 1986:32–34) (cf. Section 3.4.3.2).

Group E and F are similar to Forms 5 and 11, as Boomert defines. There is a strong resemblance between Group A and Boomert's Form 10 (Boomert 1986, Fig. 13.1) too. Here we must not only point at the resemblances between EC 65 vs. Form 13 (ibid., Fig. 14.2) as to Koriabo, but also at possible Barbakoeba associations with regard to EC 45 (cf. Section 5.5.7.1).

Four radiocarbon dates suggest a LCA for the Crique Sparouine excavations. It must be situated approximately between the end of the 10th and the first half of the 14th century AD. When considering the Koriabo ware, one must note the great deal of controversy concerning the chronology of the Koriabo complex on which researchers adhere to various views. According to Boomert (2004:256), for example, the chronology extends from AD 750 to 1500. In Versteeg's view (2003:183), it evolves between AD 1200 and 1600. The mean average of all known radiocarbon dated Koriabo sites is *c.*850 BP. The majority of the dates range between 1000 and 400 BP with a calibrated occupation span between AD 900 and 1500. The Crique Sparouine dates fall clearly within this time span.

The remaining ceramic groups, in particular Groups B-D, H and, to a lesser extent, Group A do not at present express a clear cultural affiliation. In fact, the obvious differences in decoration and temper modes as well as the morphology of these two groups may also represent a cultural difference or different wares, thus implying two ceramic complexes and/or occupations? (see below).

6.5 The site synthesis

The Crique Sparouine site is situated in the hinterland of the Lower Maroni River. Viewed from this river, it is located at the first natural elevation of importance on Crique Sparouine, emphasising its strategic position. At this point, the sea influences the creek. The western slope of this rather small lateritic table shaped hill is very steep and overhangs the creek. The principal conclusions based on these excavations can be drawn from: (a) the spatial distribution of the artefacts, (b) the ceramic filled pits and (c) the chronology of the ceramic series. Inspite of the small number of radiocarbon dates, we will attempt to resume and evaluate the prehistory of Crique Sparouine during the LCA.

The spatial organisation

The present depotoirs partially guide the distribution of the features. The pondered distribution of lithic and ceramic artefacts reveals two midden areas. From this perspective, one can assume that the southern part of the excavated area (the highest part of the hilltop) was the first to be occupied, although the

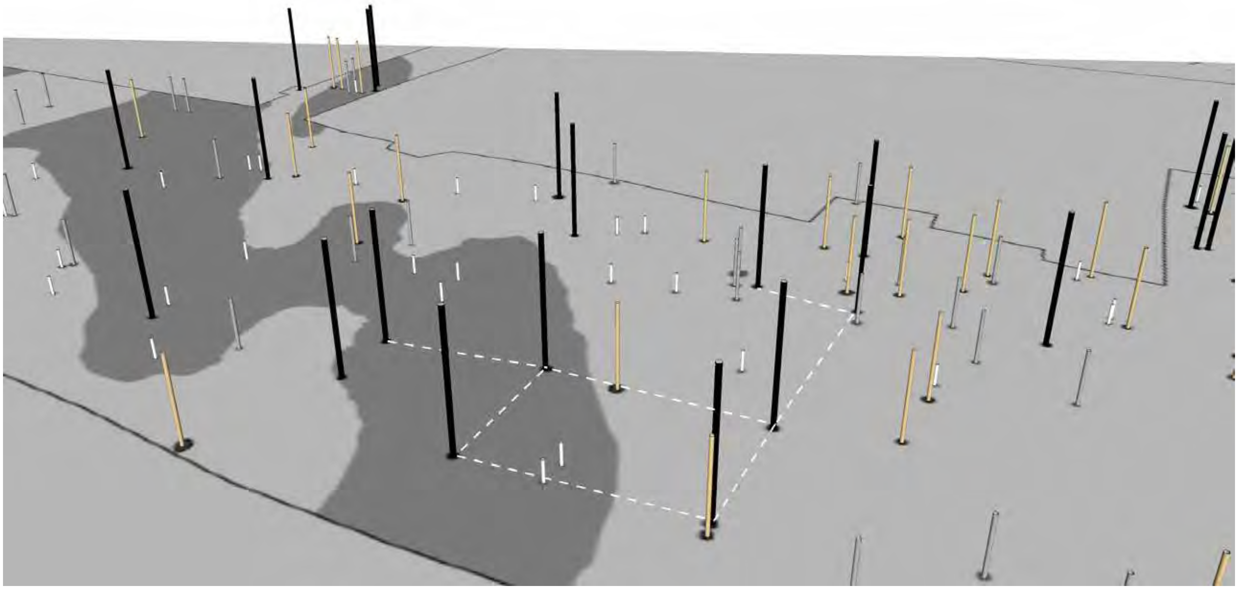


Figure 6.19. A 3D representation of HL 1 with a possible rectangular structure (courtesy of Jimmy Mans).

radiocarbon date obtained here cannot entirely confirm this opinion. In this area, concentrations of post holes represent a house location (HL 1) consisting of a small number of features. Lithic Zone 2 and a secondary ceramic Midden (C) were found here too. However, *in situ* ceramic and lithic objects, discovered in the dark layer (US 2), are probably related to the latest occupation. They were solely encountered in this southern area which in due course may have served as a plaza. The concentration of features and middens located to the north is denser when considering the quantity of the archaeological material and number of features. Midden B is presumably of secondary nature because of its superimposition as to post holes and pits. The location of a second house (HL 2) at this very spot is possible and could be contemporaneous to HL 1.

Midden A represents the major dump and was probably used during the entire occupation. Between these two house locations another concentration of post holes and ceramic pits was found which could be the site's final as well as the first HL. Its post hole configuration is more obvious as it is situated in the centre of the excavated area and consists of multiple posts measuring more than 30 cm in depth and forming clear angles. The dotted rectangular shape in Figure 6.19 measures *c.*6 x 4 m, to wit: post holes F 168, F 124, F 130 and F 146. They may represent the standing posts of just one small hut (Fr., *carbet*), but may also be a constructive element of a much larger house. Larger houses were found in archaeological context as José Oliver suggests for the Maticora Valley, situated along the Caribbean Coast of Venezuela (Oliver 1995:152). This oval shaped "longhouse" measures 18 m in length and 13 m in width. It includes four large central posts encircled by means of a series of smaller posts, covering a surface of 234 m². Inside the house, two hearths were identified as well as two "doors" on the long-side of the house. Although no radiocarbon dates were obtained, this dwelling was attributed to the LCA based on the ceramic assemblage found at the site (José Oliver, personal communication, 2010). Although this house plan does not show any similarities with the Crique Sparouine post hole assemblage, it appears to be part of a larger round-house tradition in the Caribbean as numerous similar house plans in the Lesser Antilles dating from the post-Saladoid period indicate (Versteeg and Schinkel 1992; Etrich et al. 2003; Morsink 2006; van den Bel and Romon 2010:5).

Early 17th century ethnohistoric data suggest that rather large houses were built in the coastal Guianas as John Wilson of Wansteed reports on the Lower Oyapock River and Lourens Lourenszoon dwelling among the Aricouros states on the Cassiporé River:

> *Their houses are built after the manner of our barnes in England, but much longer, for we have measured some of them which were one hundred and fiftie paces long, and some twenty paces, broad, one hundred persons keepe together in one of those houses; they are most artificially builded and thatched, so that no raine commeth into hem.* (Wilson 1906:347–348)[182]

> *One can witness there about thousand houses, tatched with straw, each house has about fivehundred people, each family has their separations [claustra or wicker-work compounds] opposing each other.* (Wassenaer 1627:62v)[183]

On the other hand, ethnohistoric data and later ethnographic literature suggest that various house types were favoured in Amerindian villages. In general, they consisted of 10 to 20 houses. Moreover, ethnic groups were familiar with specific house constructions and village infrastructure modified during (historic) time (Rivière 1969, 1984, 1995; Bos 1973; Arvelo-Jiménez 1977; Roe 1987; Duin 2009, 2012; Mans 2012). Considering the fact that house constructions may have changed over time, ethnographic analogies are our best shot at obtaining any insight into the "cloud of post holes" whenever clear archaeological data is lacking (cf. Fig. 6.20).

Another Koriabo assemblage?

Another interesting aspect of this feature excavation concerns the spatial distribution of the features and ceramic series, notably the Koriabo pottery (Groups E-F). The question arises if the other ceramic groups are part of the Koriabo complex or if they represent an innovative ceramic series: Were they contemporaneous or not?

In Guiana archaeology, the eye catching decorative designs and their highly characteristic vessel shapes served to pinpoint many Koriabo sites. However, often little is known about (a) the distribution or stratigraphy of these sites and (b) the plain ware which researchers often neglect. We are famililiar with the majority of the Koriabo sites by means of test pits, surface acquisition and private collections of which the latter almost entirely consists of complete vessels found in rapids or obtained from goldminers (Br., *garimpeiros*) (Migeon et al. 2010). Generally speaking, we may conclude that "Koriaboness" of a site is frequently declared whenever characteristic Koriabo decorations were observed at a specific site, i.e. Groups E-F.

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182 Prior to the section quoted here, Wilson also pointed out that the Suppayes 'have doores at each end of their houses, the men remaine at the one end of the house, and the women at the other' (Wilson 1906:347).

183 'Men vint ter plaets aldaer wel duysent Huysen met stroo ghedeckt, elck Huys heeft wel vijfhondert menschen, elcke Familie heeft sijn afschutselen aen d'overzijden tegens malkanderen' (Wassenaer 1627:62v). See also van den Bel (2009c:310).

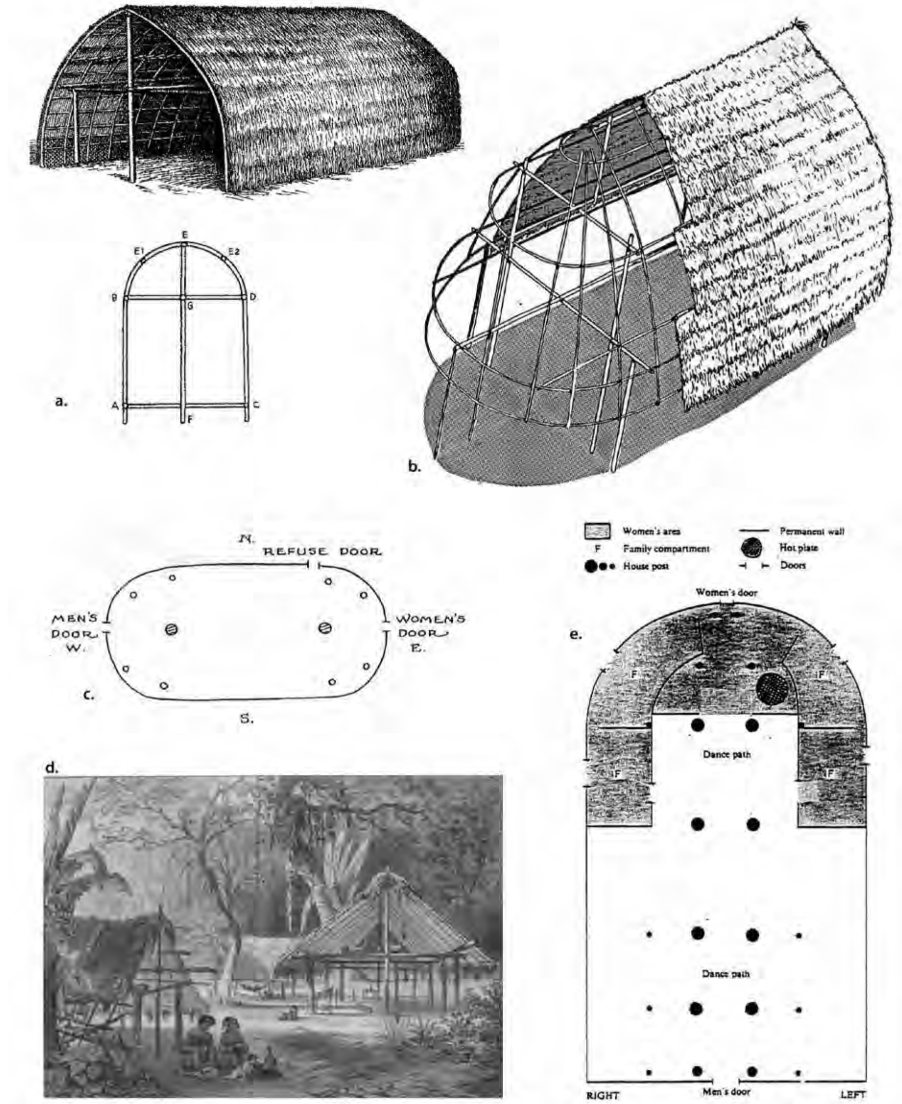

Figure 6.20. Examples of Amerindien house plans: (a) a tampatáraka or Trio house (Frikel 1973:283, Fig. 7a, b), (b) a Wayana house (Cornette 1988c:13), (c) a Wapishana house measuring 30 x 60 feet (Farabee 1918:16, Fig. 1), (d) a Kali'na house (Benoît 1839, Plate 76) and (e) a Tukanoan long house (Hugh-Jones 1993:99, Fig. 1; see also Hugh-Jones 1995:230, Fig. 11.1).

Interestingly, at Crique Sparouine, the latter ceramics were not only found in pit F 278 and F 221 (Type 2), but also *in situ* within the black layer located at the southern, higher part of the excavation (HL 1). In fact, they were completely absent from the lower northern part (HL 2-3). Two interpretations are presented here: (a) a single occupation, materialised by means of ceramic Groups A-D and H. It included a restricted area which may played a part in ceremonies during which Koriabo ceramics were handled and/or (b) two consecutive occupations: the first materialised by means of the "unknown series" and the second by means of highly decorated Koriabo ceramics (only?). Notably in both cases a "two-component" site is represented, as Versteeg (2003:187) pointed out for many LCA sites in coastal Suriname.

When adhering to (a) the first and most obvious interpretation, all ceramic series, consisting of both domestic and highly decorated wares, are contemporaneous. Together they reflect a habitation site with a designated plaza area for ceremonial activities, as the highly decorated Koriabo pottery suggests. In this case, the Koriabo ware is probably traded with "Koriabo people" elsewhere.

It may even represent local imitations of Koriabo ware, as possibly witnessed by means of regional style differences in Koriabo decorated ware. Indeed, it can also be produced by Crique Sparouine potters for certain occasions. Needless to say, the relatively small quantity of these Koriabo vessels is a reason for questions.

When complying with the second option (b), the Crique Sparouine site contains two occupations with a dual ceramic series. One consists of a domestic ware encountered in the northern part and the other of supposed (ceremonial) Koriabo ware found at the culminating point of the hillock. In this case, there must have been a habitation phase with an unknown Crique Sparouine-ware and a second phase with a particular site-function as any domestic ware is absent or unidentified.

The chronology of both series is unknown, i.e. fall within the same time span, but can be hypothesised as follows. Unfortunately, we were not able to date pit F 278 due to a lack of charcoal here. However, the long occupation lasting nearly 400 years may indeed comprise two successive occupations and/or two different types of occupation as the quantity of archaeological material is not extremely abundant (Saint-Louis or Katoury). From this point of view, we suggest a first occupation during the 11th century and a second one during the 14th century, in accordance with the existing radiocarbon dates.

Let us opine that the site witnessed (at least) two occupations. This implies that the other ceramic groups, restricted to the northern part of the site, could be attributed to a first occupation. This is confirmed by means of the only dated pit F 121 which contained such ceramics in this area. The remaining dates were ascribed to post holes. Moreover, the necked jars found *in situ* within the southern culminating Koriabo part of the site may subsequently be considered abandoned objects after the final occupation of the site and thus attributed to a second occupation.

This hypothesis makes some sense when compared with the chronology of other dated Koriabo sites on the Lower Maroni River, notwithstanding the bias of Koriaboness (e.g. La Pointe Balaté, Saut-Saillat, Christiaankondre (SUR-010), Bigiston (SUR-003). They were all dated to the second half of the LCA, supporting Versteeg's hypothesis concerning Koriabo to discard all dates earlier than AD 1200 (Versteeg 2003:183).[184] Importantly the CSL Phase 3 and LPB feature a similar possibility consisting of two components during the LCA and, again, only with a handfull of Koriabo sherds.

Another comparison can be drawn with the LCA two-component site of Pointe Morne on the Oyapock River (Mestre and Hildebrand 2011). This site firstly features a Late Aristé funerary occupation (AD 900-1400) which appears to

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184 With regard to both sites, my short visit to the *Zorg en Hoop* depot in Paramaribo on 16 August 2012 resulted in one box containing three bags of ceramic material (notably large and decorated sherds) for each site. Versteeg had worked on it during previous years. It is unclear how much and how Geijskes had acquired it as no field reports were found in the archives of *Zorg en Hoop* in spite of a publication on the survey in the Commewijne District (Geijskes 1961b). However, Arie Boomert holds a manuscript (undated but perhaps from c.1980) containing short descriptions of numerous Koriabo sites, based on now vanished documentation According to Laddy van Putten, it was presumably lost during the Civil War, or *Binnenlandse Oorlog* (1986-1992) in Suriname. An abstract of this manuscript is presented here concerning the archaeological sites of Bigiston and Christiaankondre. The Bigiston site occupies part of the village of Bigiston (C., *Timereng*) located on the high banks of the Maroni River, opposite Portal Island. Findlay discovered this site in August 1956 when he was looking for sherds in order to enhance his private collection. In September 1961 and in March 1962, D. C. Geijskes and P. Bolwerk collected surface material in the village. If they

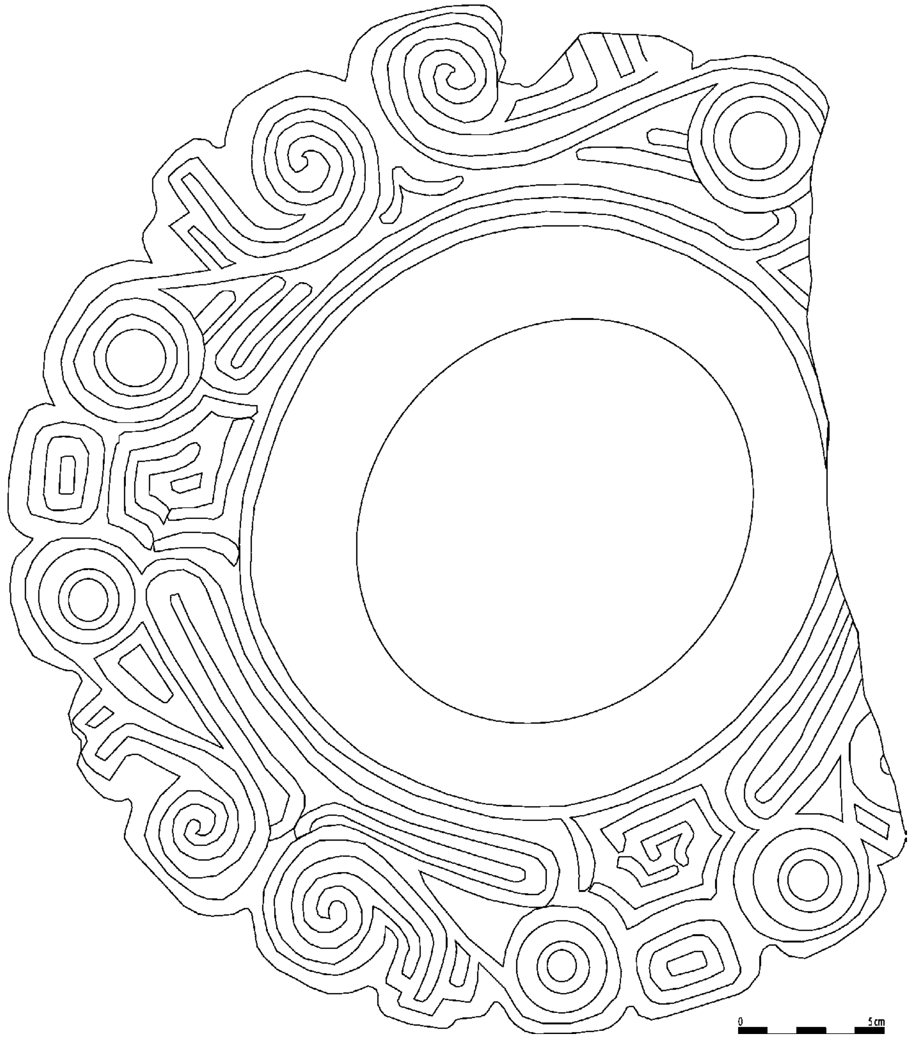

Figure 6.21. A drawing of the scraped rim decoration found on the notched flowerbowl EC 72 (F 278). Please note the squatted legs of a human being or an animal.

be followed by means of a Koriabo occupation (AD 1400-1500) that presumably stretches into the contact period, as suggested for the above-mentioned Maroni sites. With regard to the former site, it is hypothesised that the Koriabo population settled down at Late Aristé burial grounds after AD 1400 and took possession of

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dug a test pit or scraped the eroded riverbanks in order to obtain a geological section is unknown. This site appeared to consist of a thick black layer (measuring between 40 and 50 cm) of habitation earth, speckled with potsherds and stone artefacts. Charcoal was concentrated in a thin layer at a depth of 40 cm beneath the present surface and resulted in a radiocarbon dating: 410 ± 60 BP (GrN-4240). In total, 420 sherds and 11 stone artefacts were acquired of which several were published by Feriz (1957). With regard to Bigiston, he observed a large quantity of Koriabo pottery (notably incised ware), a stool fragment, a modelled bird head and a polychrome rim sherd showing a human face, with possibly Aristé traits.

The Christiaankondre bags I checked at *Zorg en Hoop* not only contained Koriabo material (necked jars) but also fragments with finger-tipped strips. According to Boomert (not dated), the Christiaankondre site occupies part of the present Kali'na village of Christiaankondre, *c.*500 m south of the mouth of a small creek. Geijskes and Bolwerk discovered this site in September 1961. They excavated eight test pits measuring 1 x 1 m, parallel to the river. The archaeological material was concentrated at a depth of 35 to 40 cm below the present surface. It was covered with a zone consisting of coarse, white to grey, sterile sand. Charcoal was sampled at a 40 cm depth from one of these pits, yielding a date of 440 ± 50 BP (GrN-4241). The depot holds 76 sherds and three stone artefacts linked to this site.

the site by means of destroying all evidence of a previous occupation. Pillaging the Aristé funeral site and replacing/imposing their material material culture, they utilised the Koriabo ceramics in order to "symbolically" claim or appropriate the site. When occupying the funerary site of the Aristé (potentially ancestors to whom they may have been related…), it is further possible that the booty, the "ancestral" Artisté urns, were taken as proof and/or trophys which played a part during certain ceremonies. Similar acts of conquering, desacrification, and subsequent cultural incorporation can also be encountered in warfare and slave-taking among Amerindian populations of the early 16th and 17th century (Roosevelt 1993:260; Santos-Granero 2009b).

In sum, the Crique Sparouine site reveals two ceramic series which can be distinguished on site level. The analysis reveals two possible occupations, but it remains difficult to establish if they represent different cultural groups. It may further be evident that the standardised Koriabo vessels played an important ceremonial role in specific (inter- or intra) social activities. It also served as tradeware among the LCA populations in the Guianas as its wide distribution all over the Guianas, stretching from northwestern Guyana to southern Amapá proves (Fig. 6.21). It is suggested that this culture area represents a huge social interaction sphere of nearly 1,000,000 km^2 enclosing a minimum time span of *c.*600 years (Boomert 2004:266).

However, further regional detail is required in order to understand the creation of this "big picture" founded on a statistically quite weak database. Further research on geographical differences (e.g. defining regional Koriabo styles and obtaining more radiocarbon dates) is paramount when revealing a cultural patchwork of Koriaboness in the Guianas, stressing the cultural diversity and social complexity of the Guianas.

Chapter 7

The AM 41 site

A Late Ceramic Age necropole to the west of Iracoubo

Part of an early LCA necropole excavated in February 2006 (van den Bel 2006; Annexe 1.4) is located in the southern part of allotment AM 41, west of Iracoubo. The local inhabitants referred to it as “Les Sables Blancs.” According to local hearsay, many urns have been found here. This funerary site lies on a natural sandy elevation and consists of two separated urn concentrations, dubbed Zone A and Zone B. The ceramic vessels were found in dissimilar positions and represent a variety of burial modes which may suggest a certain level of social complexity.[185]

7.1. Introduction

The funerary site of AM 41 (No. 97303.061) is situated 1.5 km west of the present-day village of Iracoubo. The site is registered under allotment number AM 41 (measuring 25,000 m² in total) within the community of Iracoubo.[186] In February 2006, it was excavated in the course of two weeks by INRAP agents and volunteers (Figs. 7.1a and 2.1). Its location, known as *Les Sables Blancs*, represents the first Pleistocene elevation to the west of the village of Iracoubo located in the lower Holocene floodplains next to the course of the Iracoubo River.

Prior hereto, in 2003, an archaeological site had been discovered at the same height as the above-mentioned allotment along the RN 1. This occurred during a pedestrian survey carried out by the *Action Collective de Recherche* (ACR) which was called *Préhistoire du littoral de Guyane* (Migeon and Mestre 2004).[187] This site was named Sable Blanc Est (SBE, No. 97303.060). At that time the necropole presented here was not yet discovered. As both sites are geographically separated, but registered under the same toponym, we will henceforth refer to them as AM 41 and SBE.

In 2005, (illegal) construction work on the AM 41 plot drew the attention of SA members who demanded its discontinuation. Next, when exploring the partially bulldozered terrain, they discovered numerous, decapitated ceramic

185 A condensed version of the fieldreport has been published by the present author in the first volume of *Revista amazônica* (van den Bel 2009a).

186 When Jérôme Briand (INRAP) conducted diagnostic reseach along the RN 1 near Iracoubo, he discovered that the plot number of the excavation was actually coded AM 41 and not AM 43, as was furnished by the State as the official plot number (Briand 2012a:23). Here we will refer to the correct plot number (AM 41), in full knowledge that previous reports and publications refer to it as AM 43.

187 Cf. Section 1.1 for this research project. Another pedestrian survey, held in 2000, covered the area between Sinnamary and Organabo, but did not encounter any archaeological material at this location (Jérémie and Kayamaré 2001).

vessels in two areas: (a) the first at 150 m south of the RN 1 and (b) the second at 250 m south of the RN 1 (Gassies and Lemaire 2005a). In order to comprehend the distribution of these vessels and its possible link with the previously found site positioned along the RN 1, the SA carried out a complementary mechanical survey (Gassies and Lemaire 2005b).

This evaluation resulted in the designation of the following zones: (a) comprising a site situated to the south representing a concentration of ceramic depositions interpreted as a necropole which the authorities "froze" legally, (b) a central part with only two vessels, which may represent an extention of the

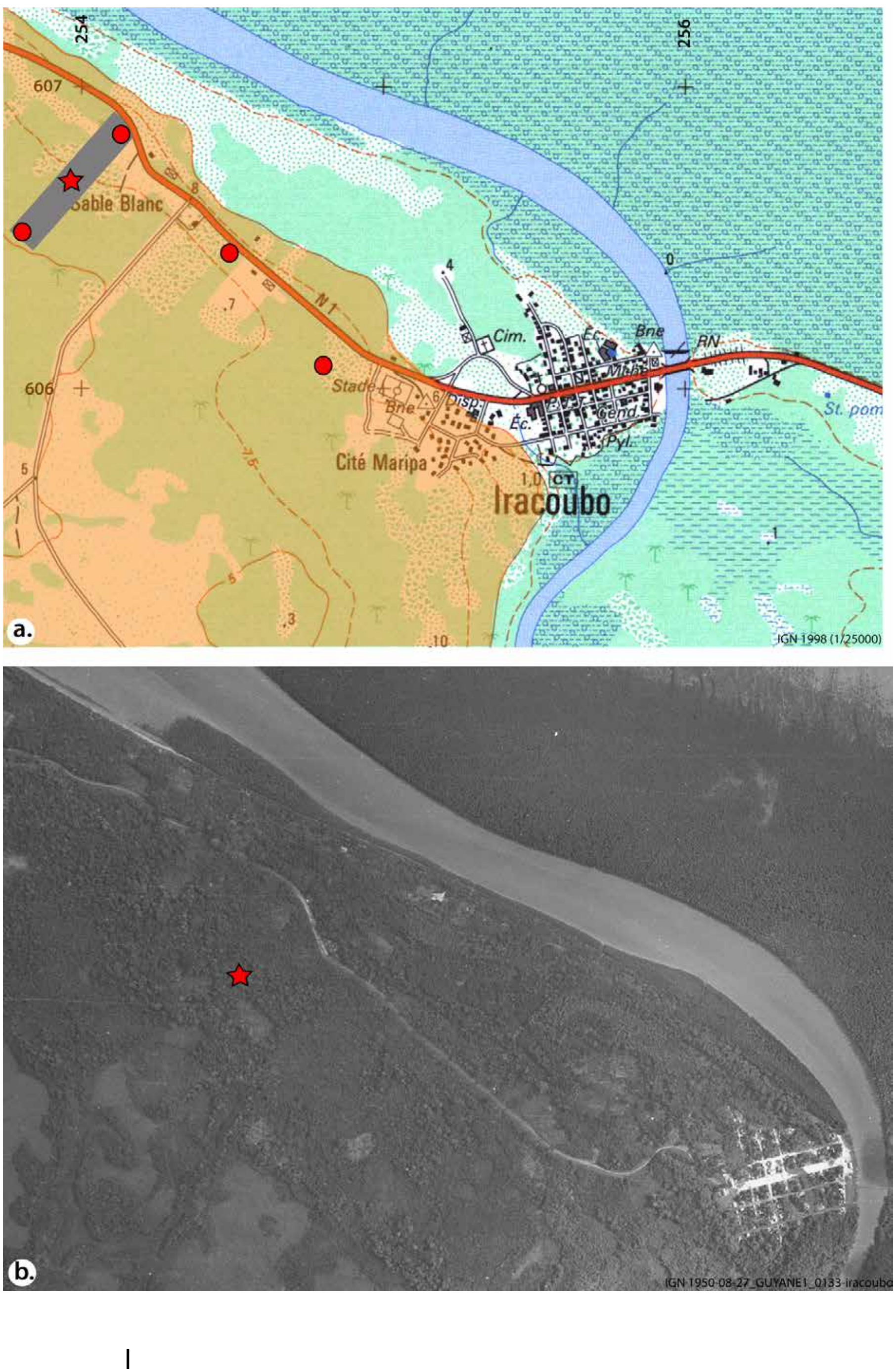

Figure 7.1. The geographical position of the site is marked with a star: (a) includes the other sites along the RN 1, situated on the border of the Pleistocene deposits (indicated in transparent orange) and (b) presents an aerial photograph of Iracoubo in 1950. Note the course of the Iracoubo River, the very nearby habitations (which by now have disappeared) as well as the large number of slash and burn fields (courtesy of the IGN).

southern necropole and (c) a northern part, next to the RN 1, representing the SBE site to which construction works inflicted heavy damage (Fig. 7.2).

Eventually, the SA selected the central part (covering 5400 m²) to be excavated in no less than two weeks. The INRAP was requested to do so between 6 and 16 February 2006. The goal of this investigation: to search for the boundaries of this central archaeological zone and to determine its characteristics. One year later, a small part of the northern zone (330 m²) was excavated in August 2007 as part of the Earthmovers Project (Rostain et al. 2008; Rostain 2010c) (cf. Section 7.3.3 for further discussion).

7.1.1 The setting

As mentioned above, this allotment (measuring 290 x 90 m) had been deforested and flattened by means of a bulldozer before the SA or the INRAP had been able to carry out any archaeological research. The natural relief of this terrain had completely disappeared. However, the mechanical survey conducted by Gassies and Lemaire (2005b) had indicated that the ceramic vessels found in the central part (60 x 90 m) as well as in the southern part must have been situated on geological elevations in the landscape, separated by means of lower hydromorphic zones. The bulldozers must have filled up a minor creek located north of the central part and in a lower area to the south. These assumptions were confirmed by means of the adjacent allotments the mechanical shovels left untouched. They revealed the original topography, reflecting the continuity of the geological formations at surface level.

The allotment is located on the Old Coastal Plain belonging to the Coswine Series and includes fine sand and mottled clays of marine and continental origins (Mazéas 1961:9–10). In fact, at this stage the RN 1 runs on the edge of the Old Coastal Plain overhanging the Young Coastal Plain which is accentuated by means of a steep truncation or escarpment measuring several metres deep (Fig. 7.1a).[188] The central part of AM 41 represents a natural longtitudinal elevation of the Coswine Series comprising ferralitic soils with a yellow horizon due to the accumulation of iron oxides (hematite), representing hydromorphic soils.

Prior to the pedestrian surveys carried out by Jérémie and Kayamaré (2000) as well as Migeon and Mestre (2004), the Muncipality of Iracoubo provided but a small number of archaeological sites of which only a handful represent pre-Columbian examples (Gassies et al. 2002). However, the latter surveys definitely illustrated a multitude of prehistoric sites, tripling their number along the littoral between the Sinnamary and Organabo Rivers. Even today, the local population is quite familiar with the presence of artefacts in their environment and knows the exact location of Amerindian burial grounds and urns.

The SA archaeological evaluation, comprising 22 mechanical test pits, eight trenches, and one cross-cutting trench of almost 290 m in length, evidenced multiple ceramic depositions, frequently imbricated and sometimes outlined with vertical placed griddles. In total, six sherds taken from the most southern zone were dated by means of thermoluminescence. They indicated two chronological episodes: (a) between the end of the 9th and 10th century AD and (b) between

188 However, according to Franck Dolique (geomorphologist at the IRD Cayenne), the central part of the terrain consisted of sediment belonging to the White Sand Formation (Fr. *Série Détritique de Base*) (Gassies and Lemaire 2005b:6).

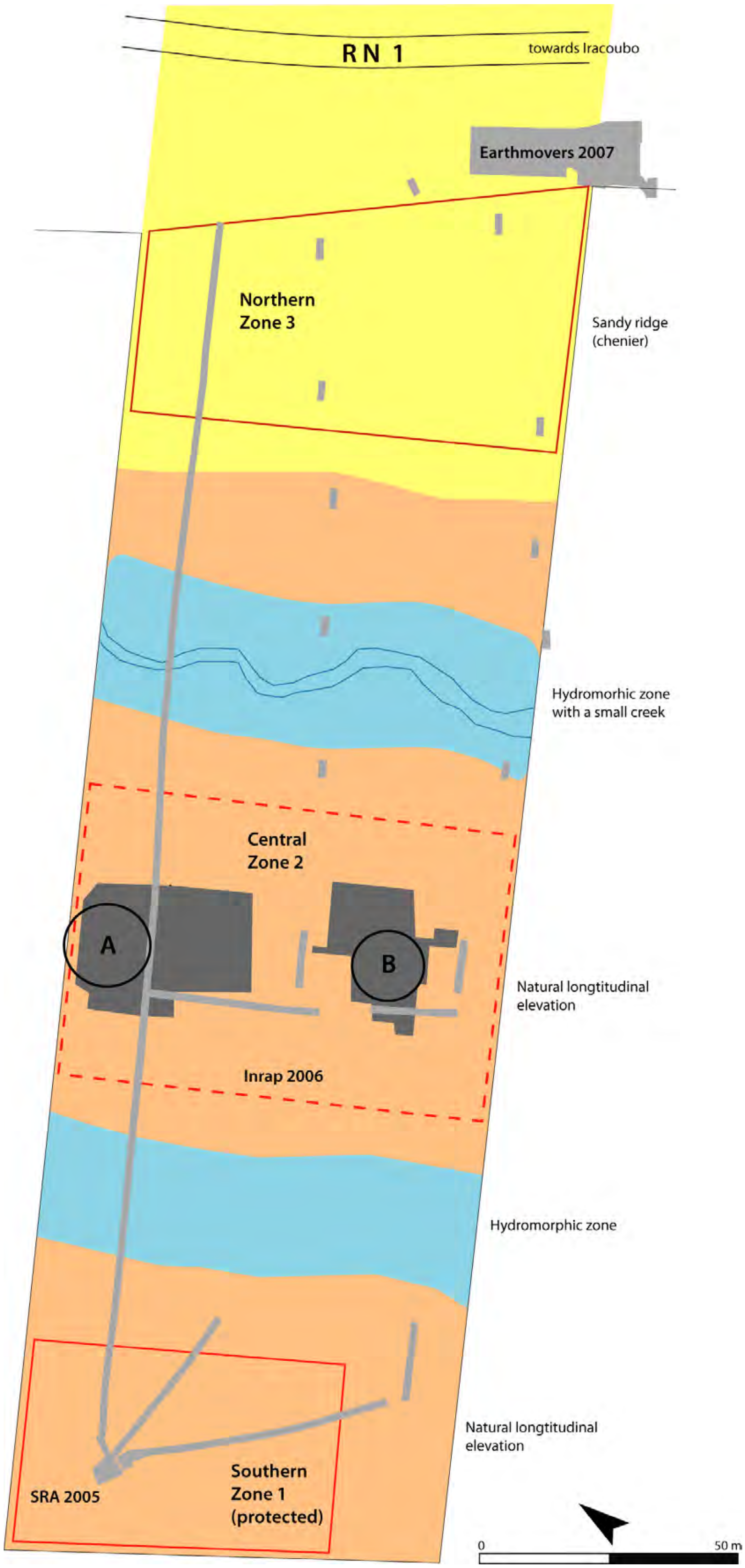

Figure 7.2. An overview of the AM 41 allotment and the three archaeological zones as defined by the SA in 2005. The colour orange represents the clayey deposits of the Old Coastal Plain whereas yellow refers to its sandy ridges. Blue depicts a hydromorphic zone. The 2005 trenches are indicated in grey, the 2006 excavation in dark grey and the 2007 excavation also in grey.

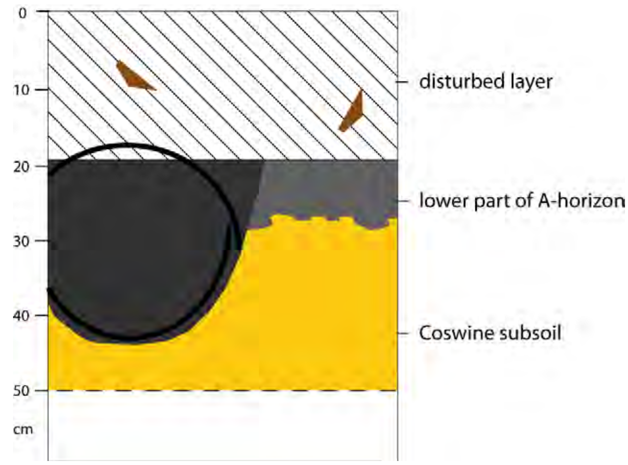

Figure 7.3. A schematic soil section with a ceramic deposition.

the end of the 12th and the beginning of the 13th century AD (Migeon 2006:65, Table 2a).[189] However, the low number of ceramics did not allow them to ascribe the archaeological material to a specific LCA complex (Gassies and Lemaire 2005b).

7.1.2 The methods of excavation

The SA and the conductor of the future works decided to program only one week as to the excavations of the central part covering 5400 m². The previous research in this part had resulted in two urns only. In addition, the evaluating reasearch suggested we would be in the periphery of the necropole. We therefore decided, bearing the envisioned two weeks in mind, to cover the entire area by means of a mechanical shovel of 8 tonnes provided by the conductor of works.[190]

In retrospective, the grey trenches the SA had dug during 2005 (Fig. 7.2) sadly indicate that these explorative trenches "missed" the two ceramic concentrations by several metres, stressing the fact it is indeed extremely difficult to locate these type of sites –despite the fact you know you must be very close. A systematic test trenching grid or further additional trenches would have proven more successful…

Firstly, we extended Pit 3 and Trench 18 of the mechanical SA survey on the location where two vessels were found (Gassies and Lemaire 2005b:8, Fig. 9, Photographs 10-12, 16). Our first Pit 1 (20 x 25 m) was extended towards the northern limit of the central part, revealing a large concentration of pottery depositions (Zone A). It presumably continues onto the adjacent plot in the west (cf. Fig. 7.2). The two vessels the SA had discovered were, in fact, isolated features, but were fortunately detected and initiated the excavations. We further observed that (a) this concentration was situated at the summit of a low longitudinal Pleistocene elevation and (b) the depositions were bounded by means of hydromorphic zones located on both sides of this natural levee. Unfortunately, the bulldozer had decapitated the majority of the vessels which were found at *c.*30 cm deep (Fig. 7.3). Interestingly, only the vessels found in an upright position in

189 The reliability of these results must be doubted, since the method used by Archeolabs corresponds to an estimation of age (Roque and Vartianen 2007). However, according to Cano et al. (2014:4), TL dating of seven pre-Columbian sherds permitted to confirm archaeological interpretation on the chronology of the Middle Amazon River. Cf. Section 4.4.2.

190 Provided with a small machine weighing only 8 tonnes we were incapable of covering the entire area.

Pit 3 were filled with very fine blond sand. This sand fill differed from the matrix and the cover layer the bulldozer brought up.

Once this concentration was uncovered, Pit 2 (15 x 20 m) was dug towards the centre of the central part. However, this pit did not yield any ceramic depositions but did feature only one pit which perhaps represented a hearth pit. With some time left, we still needed and wished to explore the other half of the area. Continuing with a trench towards the other side of the central part, we stumbled upon a second concentration of vessels (Zone B) after 30 cm and then extended Pit 3 (20 x 20 m) around these ceramic depositions. Thanks to this discovery the SA granted us three more days of excavation.

It rained cats and dogs the enitre two weeks. Within this extension we decided not only to remove all the ceramics, but also to adapt our registration procedures, in spite of the fact that this kind of haphazard archaeology is certainly not something we had hoped for nor was it something this site deserved. Fortunately, many people came to the rescue in the hope to “save” this necropole. All features were photographed, topographed and numbered per excavation pit.

Pits 2 and 3 included a canal system transsecting Zone B. This inspired us to carry out some fieldwalking in the vicinity of the site in order to locate more important canals. One canal was located to the south of the protected, “frozen” Zone 1, in the marshy outer bend –which was inundated during the rainy season and high tides– of the Iracoubo River, i.e. patchy area to the south of the site (cf. Fig. 7.1b,). Other parts of this canal system may have been excavated in 2007 alongside the RN 1 (Rostain et al. 2007:11), thus covering the entire allotment and maybe even the entire Sable Blancs area. The local residents cultivated the adjacent allotment to the southeast during the time of the excavation. It was covered with small conical heaps of earth on which peas, beans, maize, etc., were grown. In 2007, the Earthmovers team had reported this as a raised-field complex (Rostain et al. 2008:3, Fig. 1). Banana trees had been planted on the adjacent allotments to the northwest, but no permission was granted here for fieldwalking.

As to the excavation itself, the analysis was to be finished within one week. This merely enabled us to wash the material, but no further study with regard to the field report was allowed. Eventually the ceramic inventory, to be presented in this chapter, was studied with regard to the present dissertation by means of obtaining study days from the INRAP (cf. Section 7.3).

One radiocarbon date was acquired through other means –knowing that no radiocarbon dates at all had been calculated as to this project. This yielded one result concerning F 8 in Pit 3: a calibrated date of approximately the first half of the 10th century AD (KIA-33862, 1000 ± 35 BP; van den Bel 2009a:239), predating all the conventional radiocarbon dates of the SBE site, situated to the north of this necropole (McKey et al. 2010, Table S1) (cf. Appendix 1).

7.2. The spatial distribution and diversity of the features

7.2.1 Introduction

Table 7.1 and Figure 7.4 deal with the general data the excavation provided, yielding in total 131 features (Annexe 5.1). During the excavation, two concentrations, or Zones, have been observed, consisting of ceramic depositions. In Pit 1 a concentration of 23 pits with 28 ceramic depositions (Zone A) was excavated (Fig. 7.5). The core of this area measures *c*.10 m in diameter. Four depositions in Pit 1 (F 11, F 31, F 41-2) are found outside this core area. The other area, dubbed Zone B, is situated in Pit 3 at a distance of *c*.75 m from Zone A. It contains 16 pits with 19 ceramic depositions (Fig. 7.6). This concentration measures *c* 8 m in diameter. Only one deposition (Pit 3, F 22) is situated "outside" this core area, i.e. F 41 and F 42 in Pit 1.

Both excavation pits also exhibit two possible wooden structures situated at some distance from the two vessel concentrations. Excavation Pit 2, situated in between both concentrations, is empty. It only features a shallow more or less round pit (Pit 2, F 1) measuring 90 cm in diameter and is 21 cm deep. Its profile consisted of burnt clay fragments and numerous sherds. Its sandy fill also revealed large quantities of charcoal, suggesting it may have served as a combustion pit.

A large canal or ditch, measuring 110 cm in width and 30 cm in depth stretches E-W across the excavation. It runs from Pit 1 to Pit 3 where we observed at least four perpendicular side canals. This system probably facilitated the draining of this rather hydromorphic area, located near a large bend in the Iracoubo River in the southern of the allotment. However, it is difficult to date this system. The reason for this is that no diagnostic material was found in these ditches. We nevertheless presume it was dug after the funerary site was abandoned and its presence long forgotten. An ascription to the Historic Age is proposed here, probably towards the end of the 18th century when Iracoubo was first inhabited by European planters.

The principal shape of the pits is round, ranging between 35 and 60 cm in diameter. Several rectangular pits measure either 60 x 90 cm or between 110 to 220 cm. In certain cases, no pit was visible around the ceramic depositon. These ceramics were perhaps placed on the surface or in a shallow pit only, thus not detected during excavation (not to mention after the bulldozing). Furthermore, as witnessed during the first and second surveys, the ceramic depositions were found or positioned in a number of ways and included the following types of ceramic ware: (a) large griddle fragments, (b) one complete vessel, (c) two complete ("double") vessels of which one serves as a lid, (d) (various) half vessels and/or large ceramic fragments and (e) small piles of "stacked" sherds (Figs. 7.4-6).

During excavations carried out in the field or at the depot in Cayenne, no human bone, burnt or unburnt, was detected in the pits or in the pots, respectively. This is also the case at another urn site near Iracoubo (Briand 2012a:79). Even if any bone was spotted, it occurred in such small quantities that no type of analysis could claim an ascription to humans (or possible pets?). The interpretation of urns

	Pit 1	Pit 2	Pit 3	N
Post holes	6		5	11
Ceramic depositions	29		19	48
Ceramic concentration	2		1	3
Pit		1		1
Canal		1	5	6
Treefall	5		1	6
Root	18		1	19
Undetermined	35		2	37
	95	**2**	**34**	**131**

Table 7.1. The general feature count.

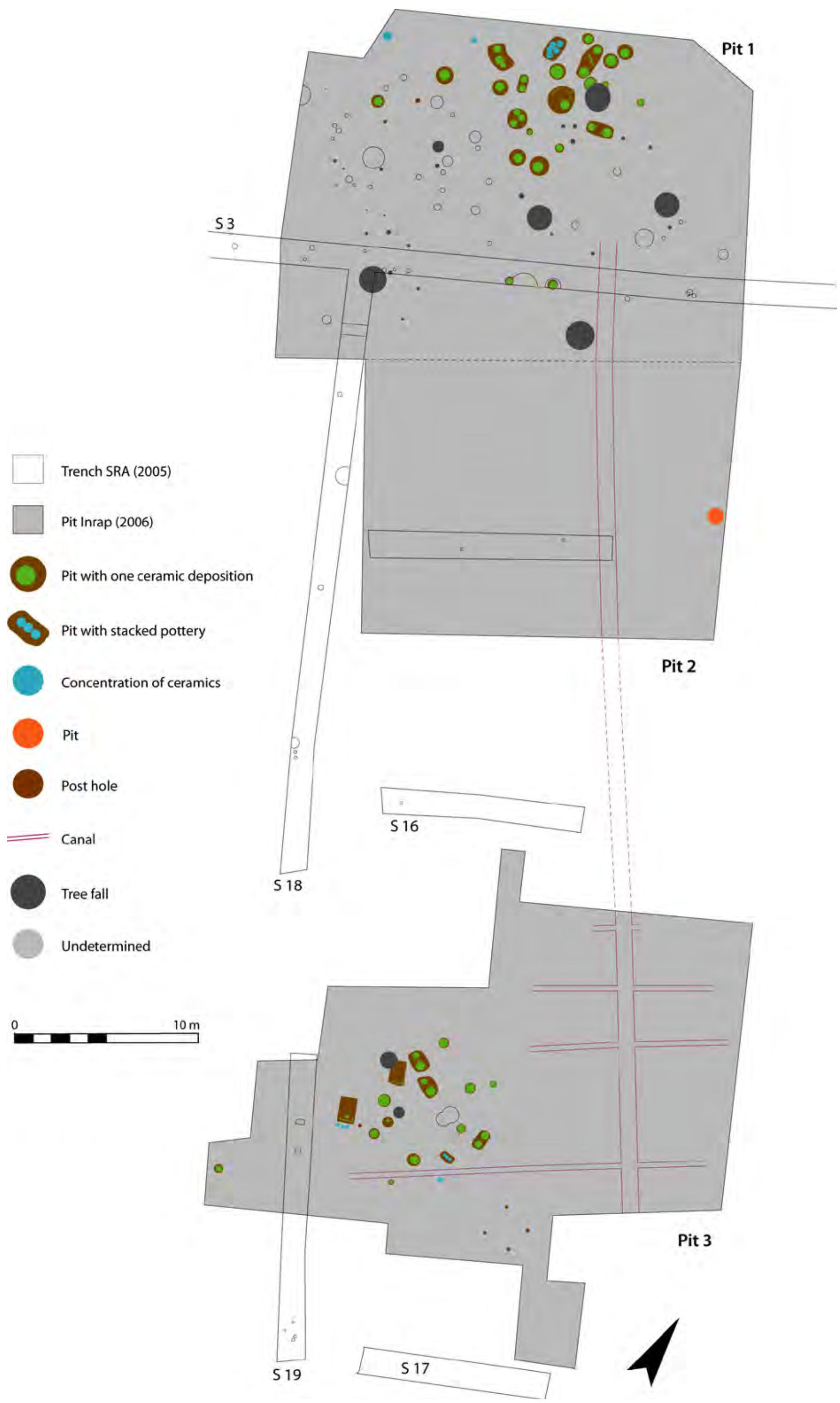

Figure 7.4. An overview of the excavation in the Central Zone with Pits 1-3, illustrating the distribution of features per type.

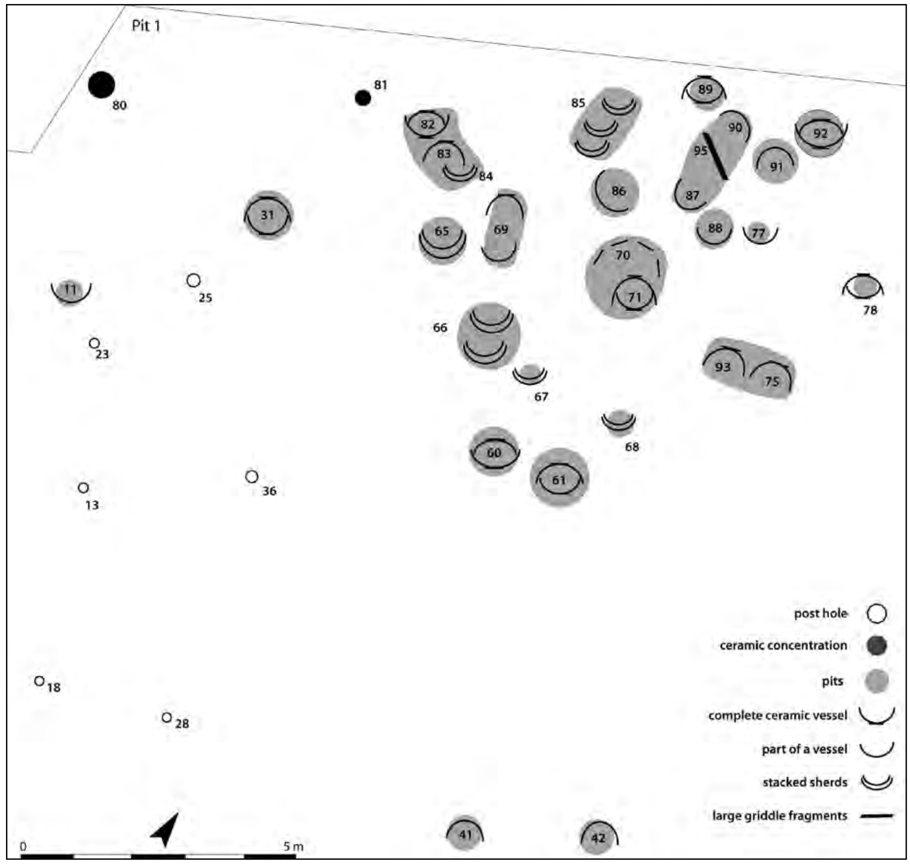

Figure 7.5. The distribution of features and types of the ceramic depositions in Zone A.

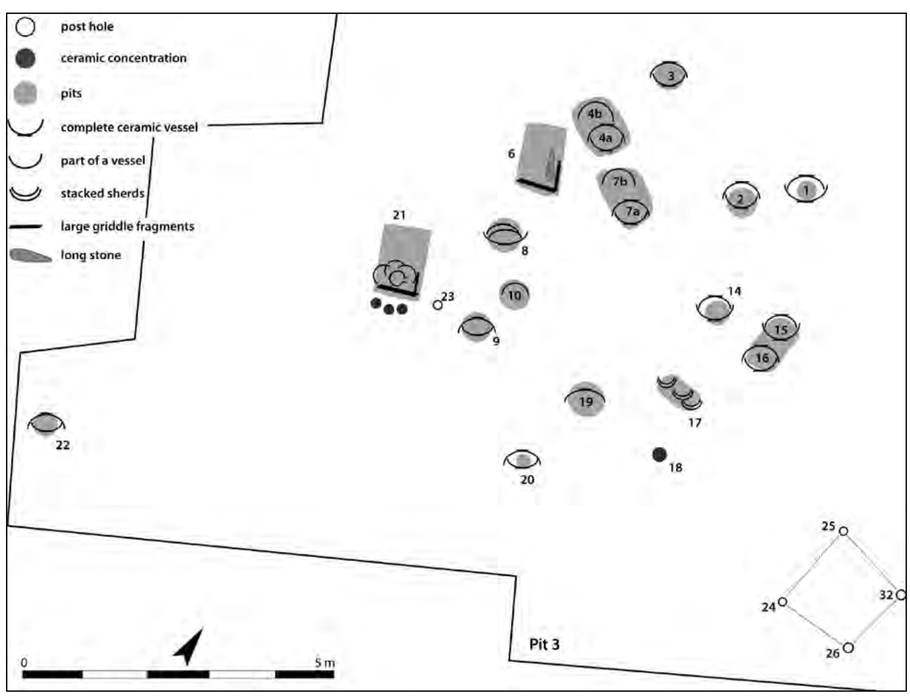

Figure 7.6. The distribution of features and types of the ceramic depositions in Zone B.

is therefore primarily based on the spatial configuration of the vessel depositions and their modes of enterrement.

Such a dense concentration of pits, that evidently indicates a clear voluntary action to deposit ceramics at one place, evokes a communal burial site or necropole. In this manner, the various burial modes suggest two major types of burials of which the primary and secondary ones are the most relevant. In addition, we suggest that the larger rectangular pits favour an inhumation, or primary burial, whereas a secondary burial is rather found in the contents of single or double depositions. No other important features were encountered during the excavation –indicating the presence of a habitation area– next to or among the alleged burial areas. The interpretation as a burial ground located at a distance from a habitation area (SBE?) underscores the interpretation of a necropole. Its isolated location is stressed due to its position on a slightly higher, albeit a small and stretched natural elevation surrounded and/or obstructed by means of two hydromorphic areas. More ceramic concentrations on this same elevation at both sides of the existing zones A and B are to be expected.

Interestingly, as mentioned above, the majority of the vessels in Zone B were filled with white fine sand, as can be found at the sandy ridge along the RN 1. If this sand was not transported by means of the bulldozer (which seems unlikely considering a distance of more than 100 m and with a minor creek in between), it might have been transported by the pre-Columbian population in order to cover the urns. After questioning the proprietor of this terrain, he confirmed the presence of two small "mounds" in the central area we were excavating. Perhaps this suggested the presence of a man-made mound, marking the location of the urns by means of a tumulus (Fr., *tertre*). The southern elevation (protected by law) was situated more than 125 m to the southwest of Zone A. It sat on a similar elevation and was also separated by means of a hydromorphic area on both sides. Unfortunately, we do not have any additional data on the articulation and distribution of the ceramic depositions in this area.

As mentioned before, members of the INRAP recently had come across another extensive funerary zone (Briand 2012a) along the RN 1. This suggests another funerary area, situated on the same Pleistocene elevation bordering the Holocene plains in the vicinity of a large, important river such as the Iracoubo River.

7.2.2 The types of depositions

Various types of ceramic depositions were observed in both zones. They may differ in one and the same burial pit. As to this site, the following modes of deposition (Modes 1-5) were recorded:

Mode 1 A single complete vessel placed in an upright position at the bottom of a pit. It was covered by means of a single complete vessel, positioned upside down above the standing vessel, which served as a lid and dubbed a "double" one. Clearly the most popular type of deposition, it consisted of the following features. Zone A: F 31, F 60-61, F 71, F 78, F 82, F 89, F 92; Zone B: F 1-4a, F 7a, F 8-9, F 14-16, F 19-20, F 22);

Mode 2 A single complete vessel placed upside down in a pit. Zone A: F 69, F 75, F 83, F 93;

Mode 3 A large fragment of a vessel (e.g. base, rim or half a vessel) placed in a pit. Zone A: F 11, F 69, F 77, F 86-88, F 90-91; Zone B: F 4b, F 7b, F 10;

Mode 4 Large sherds piled up or stacked together in a shallow pit. Zone A: F 65-68 and F 84-85; Zone B: F 17;

Mode 5 A deposition in a large pit set with griddle fragments against the pit wall. Each zone included two of these so-called "boxed" pits. Zone A: F 70 and F 95; Zone B: F 6 and F 21.

It is important to understand that these burial zones presumably represent the final moment of all funerary practices that may have continued the entire time span this necropole was functioning and possibly beyond. In fact, archaeological excavations in the Lesser Antilles and various ethnohistoric sources (cf. Appendix 4) have documented the complete cycle of funerary practices before, during and after the interment of the deceased, suggesting multiple manipulations of the body and redepositions (Hoogland and Hofman 2013). In this manner, for example, we may assume that Modes 2-4 were once deposited as a Mode 1. Moreover, they have been used or moved during post-interment rituals or served another burial ritual. In sum, this realm of the deceased is an active, living element of pre-Columbian society and village life as it is today among the Amerindians of the Guianas.

The description of the pits

In total, 39 pits were recorded in connection with ceramics. They were dug into the sterile subsoil (Fig. 7.3). Now and again their outer limits were difficult to distinguish. In general, however, the dimensions of the ceramic deposition itself served as a good indication as to the size of the pit. The pit fills, frequently less dark than the sediment in the vessels, did on occasion contain a small number of sherds. The majority of the pits were filled with clayey, slightly humic sediment (e.g. goetite or limonite). This may be an indication of their depth as well as a possible reopening, or a partial interment, of a vessel. Nonetheless, any type of bioturbation is possible.

The shape and dimensions of the pits depend on the content, such as the dimensions of the vessel or perhaps a human body or bone bundles as to larger pits. Whenever multiple vessels were found in a pit, the general outline of the pit was irregular, suggesting the presence of various moments of digging and/or the expansion of the first pit, such as for F 70-1, F 87, F 95 and F 90 in Zone A. This phenomenon is a clear indication of an explicit knowledge of the location of a specific pit within a larger concentration, revealing perhaps (social) memory of burials, reflecting family bands.

The rectangular shaped pits or boxes (Mode 5) represent a dissimilar type of pit when compared to the more or less round pits of Modes 1-4. Their rectangular shape is accentuated by means of vertically placed griddle fragments: half a griddle or even one complete griddle (F 21) as to two pit walls, forming an angle. Zone B features two rectangular pits (F 6 and F 21), containing a large dolerite stone, weighing 14 kg (Fig. 7.7) and two small decorated ceramic vessels, respectively. This stone artefact was encountered at the flat bottom of this box, aligning the "panelled" wall. F 21 included numerous large vessel fragments. They were found on top of the two decorated vessels and may have served as a "cover" forming altogether a "house" with walls and a roof (Fig. 7.8).

Figure 7.7. The dolerite stone found in boxed pit F 6 in Zone B.

Figure 7.8. The boxed pit F 21 in Zone B. One can clearly see the red painted bottle (EC 33) covered by large, thick body sherds. Note the stacked sherds next to the box's edge.

Interestingly, Zone A does not feature clear rectangular pits, but does have two fairly large pits set with vertical placed griddle fragments. This pair is situated approximately in the middle of the concentration. One pit is set with multiple griddle fragments (F 70) and contains a Mode 1 ceramic deposition (F 71). The other is elongated and has a vertically placed griddle fragment set in the middle (F 95). This fragment separates two Mode 3 ceramic depositions, on each side of the griddle, placed in the centre (Fig. 7.5)

7.2.3 The post holes

In Pit 1, six post holes were identified. Their diameters vary between 17 and 24 cm and their depths between 8 and 18 cm (cf. Fig. 7.5). Altogether they represent three pairs, situated to the southwest of Zone A, which may refer to some kind of wooden structure.

Pit 3 has five post holes of which four (F 24-26 and F 32) form a square, measuring *c.*1.5 x 1.5 m (Fig. 7.6). This possible construction is situated at c.5 m distance to the east of Zone B. The post hole diameters measure between 15 and 18 cm with a depth of between 21 and 32 cm. Although we have no radiocarbon dates regarding these features, a contemporaneity with the necropole is presumed because of (a) the absence of other post holes and (b) the presence of sherds found in vertical position against the wall of the hole, suggesting pre-Columbian mode of cornering post holes. In fact, the presence of sherds at the excavation surface revealed the existence of these post holes (Fig. 7.9). The function of this small construction remains uncertain, but it may well have been related to burial practices.

Figure 7.9. A possible square wooden construction next to Zone B.

7.2.4 The interpretations

As mentioned above, no human bones were found in these ceramic depositions. Its interpretation as a burial site is thus primarily based on: (a) the spatial configuration of the ceramic depostitions and (b) the manner in which these ceramic depositions were put in the ground. It is true that similar depositions at other sites have yielded human bone in their contents (e.g. Awala Yalimapo, CSL Phase 3, LPB, Wayabo). However, a further microspcopical and chemical analysis is required in order to check this hypothesis. Perhaps one day we will be fortunate enough to find well-preserved urnfields in the Neotropics. Furthermore, it is also possible that only bundles of bones may have been placed next to the urns and/or into the urns, as witnessed in southern Amapá, along the Canal do Norte (Saldanha and Cabral 2012:22–29). Hopefully, for French Guiana, bones and other perishable items (e.g. food, small wooden objects, shell) or anything else small enough to fit into these kinds of urns will be discovered one day in the future.

At present, the interpretation of it being a human burial ground is probably the most valid. Dissimilarities can nonetheless be witnessed in the diversity of ceramic depositions which may provide more detail with regard to pre-Columbian funerary practices in general. In sum, simple ceramic depostitions (Modes 1-3) may suggest secondary (burnt or unburnt) burials and the “boxed pits” and/or griddle-sided pits (Mode 5) may suggest the primary or secondary burial of a chief. So-called “stacked” piles of ceramics (Mode 4) may suggest ceramic depositions of pottery sherds which played a role during funerary rituals, such as the (ceremonial) breaking or “killing” of drinking bowls (Boomert 2001:68).[191]

It is proposed here that the diversity in ceramic depositions reflects dissimilarities in social positions (status) in pre-Columbian society. As noted above, the elaborate Mode 5 desposition differs from the other modes and provides us with a fine example. Zone B has two boxed pits (F 6 and F 21), both housing various

191 Archaeologists working in the Maya region refer to ceramics that are intentionally broken during rituals as “killed” ceramics. These objects are removed from the dynamic culture in order to contest its use (Stanton et al. 2008:235).

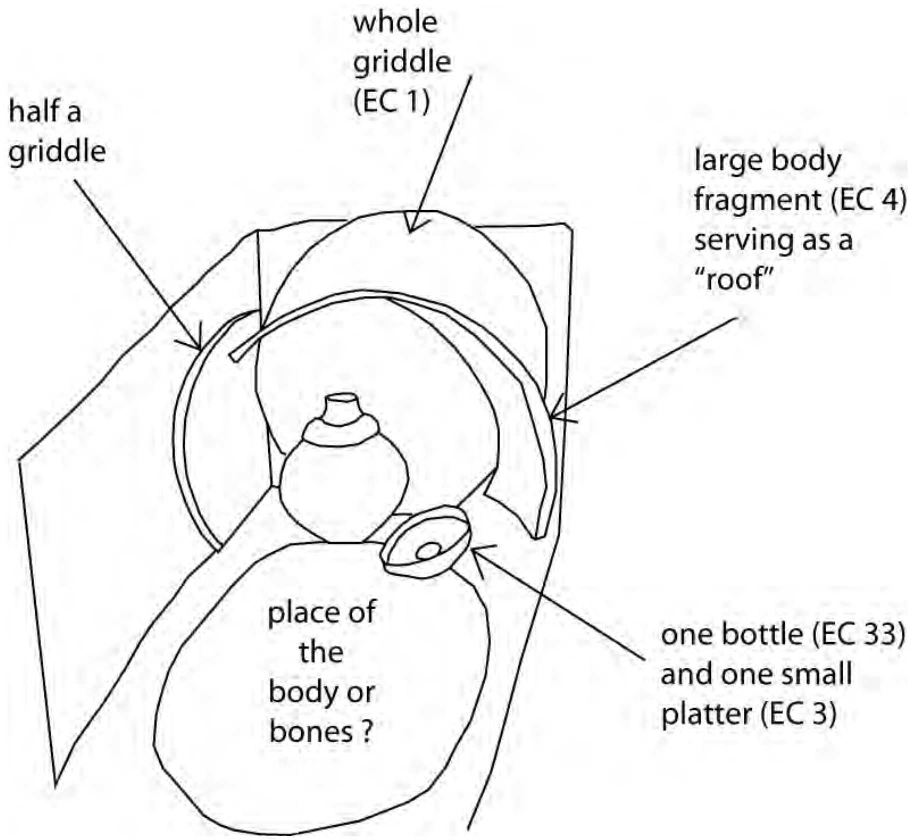

Figure 7.10. The hypothetical reconstitution of boxed pit F 21 in Zone B.

objects: F 6 contains a long dolerite rock (cf. Fig. 7.7) whereas F 21 contains two small decorated vessels. Both boxes are partially lined with standing griddles of which F 21 is also covered with large pottery fragments. A combination of a rectangular pit, "griddle walls" and a rounded cover or roof, evokes the shape of a house, created for the deceased individual (Fig. 7.10). Following this hypothesis, this burial mode reveals the specific cosmovision of life and death found among the pre-Columbian population around Iracoubo, suggesting the deceased are buried in "the house of the dead." Similar thought is also evoked when reading ethnohistoric and ethnographic sources, relating that primary graves are placed inside houses the owners subsequently abandoned by the owners. In this manner, this house represents not only the afterlife dwelling, but also a place to return to for the living in order to evoke memories of the deceased.

Interestingly, Mode 5 appears to be restricted with regard to each funerary zone. It may have played a central role, around which urns were added, eventually forming one compact necropole. This type of distribution refers to a possible ancestor or founder cult which is again comforted, if we further develop this idea, by means of the existance of a second funerary zone (and perhaps more on either side?) of which each may represent a lineage or clan tumulus. Similar configurations are known among the Late Historic and contemporary Palikur of the Urucauá River (Amapá): each social unit, or clan, has its own burial ground (Nimuendajú 1926:22; Passes 2004).

One or more burial grounds forming one extensive burial zone, represents a remarkable and identifiable feature in the landscape not only for Amerindians of a certain social or ethnic group as well as for the "other" (neighbouring) groups, hereby marking possible territories. This is even more evident when burial grounds are marked by means of placing urns together or stockpiling them in order to create landscape markers by way of: (a) creating small mounds (Guapindaia 2001:167), (b) erecting stone slabs as in Amapá (Nimuendaju 2004; Cabral and Saldanha 2009) or even (c) digging (ring-) ditches in order to mark the necropole and/or ceremonial area (Mestre and Hildebrand 2011).

The marking of the spot of a restricted funerary area, next to possible *tumuli*, is evidenced at AM 41 by means of the absence of a multitude of other features, i.e. many more post holes and midden areas. The various types of pits suggest that this quite small natural elevation exclusively served funerary purposes. The hearth pit of Pit 2, the supposed wooden structure next to Zone B and another small post hole cloud next to Zone A are indeed considered part of this funerary site. The presence of wooden structures next to the core areas may suggest actitvities related to mortuary rites (e.g. food production, feasts or celebrations, incineration, defleshing) notwithstanding that these activities may have been performed anywhere else and not in particular on the burial site.

Comprehending the entire cycle of mortuary rites by means of archaeological data remains difficult without the assistance of ethnographic and historical data. Numerous excavations in the Lesser Antilles, where human skeletal remains are very often well-conserved, have evidenced the complexity of primary burials in this region during the Early and Late Ceramic Age (Hoogland 1996; Altena 2007; Hoogland and Hofman 2013). In Lowland South America and, in particular, the southern and southeastern Guianas bordering the Middle and Lower Amazon River offered an abundance of primary and secondary urn burial sites attributed to the LCA. In certain areas, they have also evidenced anthropomorphic urns, of which the Marajò, Maracá and Aristé examples probably represent the most exquisite ceramic funerary art on the Lower Amazon River (Schaan 2001; Guapindaia 2001; Rapp Py-Daniel 2015; Saldanha and Cabral 2012). It is opined that urnfields represent a mayor aspect of the LCA society in the eastern Guianas (see below).

7.3. The ceramic study

7.3.1 Introduction

This inventory presents all the ceramics found in both zones, weighing in total 173 kg.[192] Having photographed the ceramics in the field per feature, the vessels were bagged and washed. As to this investigation, the ceramic study –which the present author conducted in August 2012– was not included in the fieldreport. Neither time nor money was available in order to carry out a ceramic analysis. Due to recent disturbance of the top layer (e.g. the destruction of vessels and high fragmentation) the ceramics were not counted, only weighed. After six years at the State Depot of the SA (Cayenne), the bags were destroyed by animals (mainly *piang* or opossum). Moreover, irresponsible users had mixed up their contents.

This ceramic study is primarily based on complete vessel shapes and the variety of rim profiles, represented by means of 74 constituent elements (EC) measuring more than 5 cm². All these diagnostic elements comprise ceramic material taken

192 A condensed version of this ceramic study combined with the LPB study has been published in *Boletim do Museu Paraense Emílio Goeldi* (van den Bel 2015).

from pit features. They belong either to Zone A (N=41) or Zone B (N=33) and reveal a larger quantity of ceramics as to the former zone.[193]

The goal of this research is to establish a catalogue of the vessel shapes and, if possible, gain insight into the vessels types found in each zone in order to discover any (dis)similarities.

The production modes

The sole manufacturing technique observed with regard to these recipients is the coiling technique. Only griddles and one collar fragment (EC 58) evidence the application of the lumping technique by means of superposing two clay cakes.

The paste contains various non-plastic elements which the potters may have used as a temper. In total, the naked eye spotted four modes: (a) a mineral, (b) a vegetal, (c) mixed and (d) a grog temper (pounded potsherds) of which the latter is the most popular (80%). The attribution to a specific mode was based on the dominant presence of a specific non-plastic. For example, grog tempered sherds also contain a minor portion of sand and/or ash, but the dominance of grog was found to be the most important element. Technically, it is probably more exact to refer to these pastes as a mixed temper. Further microscopical analysis is needed in order to determine these opinions. *Caraipé* or *kwepi* tempered sherds are rare (N=1). However, as mentioned before, *kwepi* has been observed in minor quantities in mixed temper but, generally speaking, it is not an important temper with regard to this site (Table 7.2).

Firing methods were also determined by means of the naked eye. They were grouped in four major colours: (a) red all-over, (b) orange to brown all-over, (c) dark centre (grey/black) with lighter margins and (d) a dark colour all over (grey or black) (Rye 1981:116, Fig. 104). The two latter colours are the result of a firing technique in a reducing environment (63%) which is predominant. The first technique reflects an oxidizing environment (7%) and represents the least observed firing technique. In general, the popular grog tempered ceramics are preferably fired in a reducing environment (48%).

7.3.2 The constituent elements

The EC-count (N=74) contains 15 decorated individuals and thirty-three complete vessel shapes (Annexe 5.2.3). We counted 62 rims, 40 bases and five griddles (N=107). There were also three re-used rims: that is to say, the lower part of a vessel broken at the keel was repaired and thought to have served as an unrestricted open vessel. Remarkably this type was only registered with regard to Zone B.

The rims

The diversity of the rim profiles observed during this study made it possible to establish eight modal series (SM) (Table 7.3; Figs. 7.13-4). The principal diagnostic elements of the rim profiles regarding morphology are rectilinear, concave and convex shapes as to open and restricted vessels (SM I-III and SM V-VII) as well as the presence of keels and collars, i.e. SM IV and SM VIII respectively. The most important series are SM I-III and SM V, the others are less relevant. Specific labial

193 We count one possible "double" number (EC 10 = EC 11) and two rims which have not been drawn.

Table 7.2. The distribution of temper modes

			Mode	N
Mineral (7%)	**1**	sand	11	5
		sand + mica	12	0
		sand + mica + black minerals	13	0
Vegetal (1%)	**2**	charcoal particles	21	0
		ash particles	22	1
Mixed (12%)	**3**	charcoal + minerals	31	5
		ash + minerals	32	4
Grog (80%)	**4**	pounded potsherds	41	59
				74

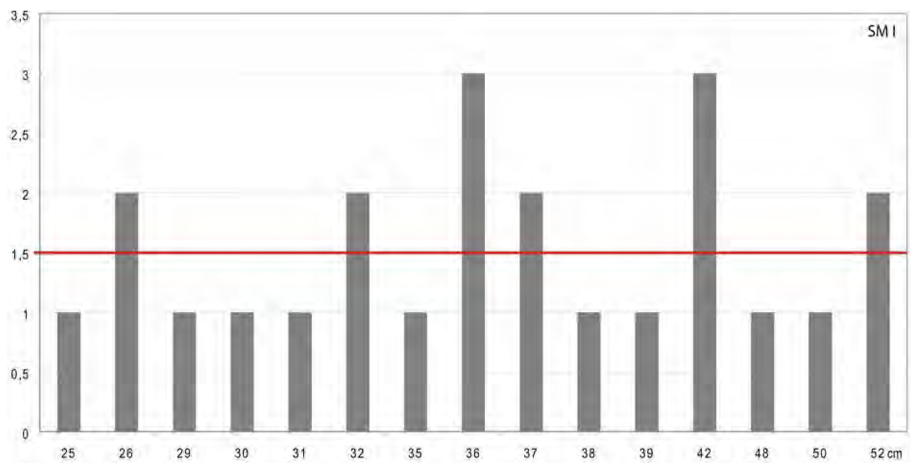

Figure 7.11. The diameter frequency of SM I.

treatment was only recorded with regard to SM III and the re-used vessels (SM 0). The thickness, diameter, firing, decoration and paste were recorded with each EC. A quick assessment learns that open vessel shapes are predominant with regard to this ceramic assemblage (72%).

SM I This series represent the rims of open vessels with a rectilinear (N=15) or a slightly convex profile (N=9). It is by far the most popular series (N=24, 39%) and represents nearly 50% of all ECs and is considered the most important product of this site (Table 7.3). The distal ends of the lips are rounded (54%), flattened (25%) or tapered (21%). The wall thickness varies between 6 and 11 mm.

The diameters of SM I vary between 25 and 52 cm.[194] Taking the mean (36 cm) of the sum of the most frequent number as a possible discriminating element, one observes several peaks or higher frequencies as to this series at 26, 32, 36, 37, 42 and 52 cm (Fig. 7.11). These peaks reflect vessel sizes of similar morphological shapes which are predominated by means of diameters measuring over 25 cm in circumference. The importance of grog temper is notable for this series (83%). In combination with a reducing firing technique (58%) it is the most important production technique recorded for this site. All other possible combinations of temper and firing technique are of less significance to this series. Interestingly, this series features no decoration at all.

194 Diameters over 30 cm are per measured per 2 cm.

SM II The second most important series, SM II, is of less significance than SM I albeit more relevant than the remaining series (Table 7.3). It comprises of restricted vessels with convergent or highly convex rim profiles (N=12, 19%). The lips are rounded (75%), tapered (16%) or flattened (8%) and the wall thickness varies between 7 and 12 cm. The diameters evolve between 23 and 52 cm and a frequency peak is observed between 32 and 28 cm. This reflects the predominance of a ceramic recipient with large diameters and illustrates the consistency in the manufacturing of these vessels (Fig. 7.12). The preponderance of a grog paste is evident (75%) as is also the case regarding reduced firing (75%).

In contrast to the most dominant series, this second best series counts three decorated vessels of which two feature a red slip (on one vessel red slip is applied bifacially and on the other only on the exterior) and the third is adorned with a double-headed modelled appliqué. Red slip is the most common mode of decoration, but one vessel with modelled application (EC 35) is remarkable and differs from the bulk of the material. Furthermore, its diameter is very small (23 cm) compared to the average of this series and its sandy paste (No. 11) is striking too. It is nevertheless a very homogeneous and important series as to this site.

SM		Shape	Description	N
I	a	O	rectilinear profile	15
	b	O	convex profile	9
II		R	convergent profile	12
III		O	lip demarcation on the interior	5
IV	a	O	keeled pots	2
	b	O	keeled vessel	4
V		O	boat-shaped vessel	3
VI		O	bowls	2
VII		O	platters	2
VIII	a	R	bottles (small)	2
	b	R	collared vessels (large)	3
0		x	re-used vessels	3
				62

Table 7.3. The rim series SM I-VIII.

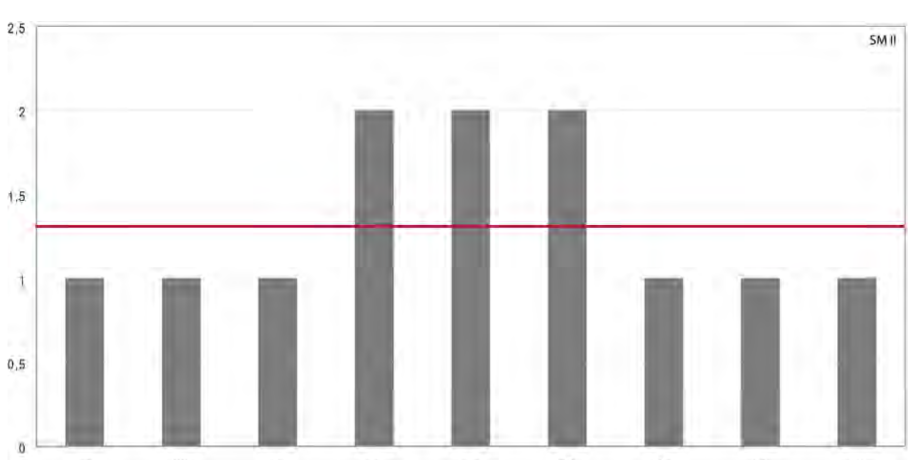

Figure 7.12. The diameter frequency of SM II.

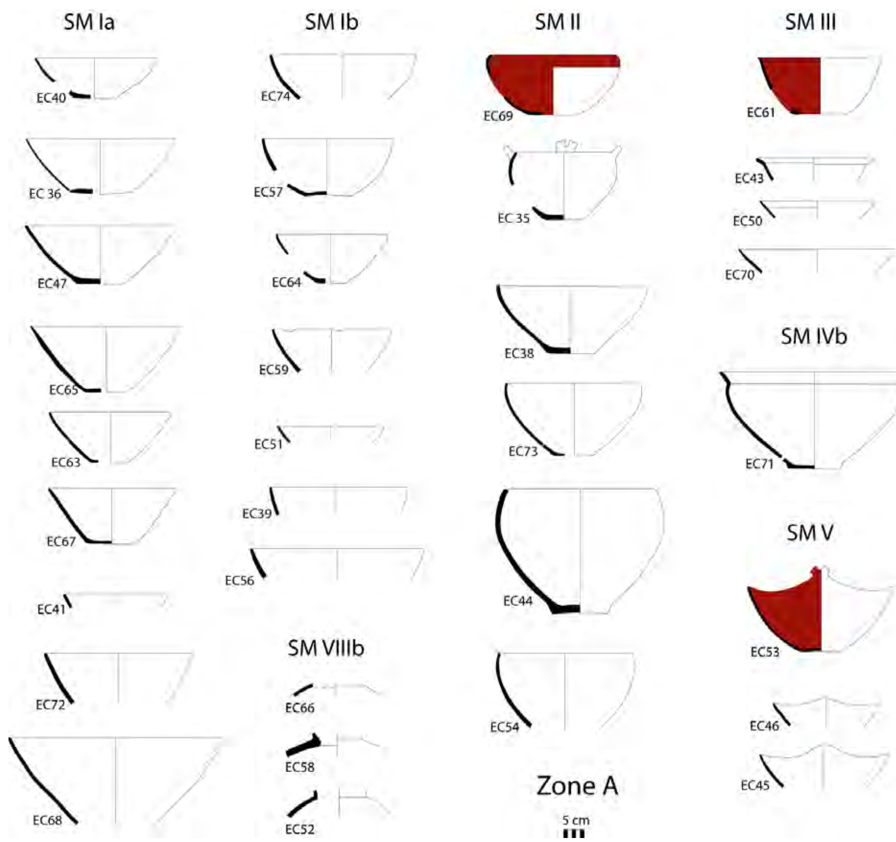

Figure 7.13. The ceramics found in Zone A.

SM III-IV and **SM VIII** These are minority series compared to the two previously discussed (Table 7.3). However, they occur more frequently than SM V-VII while featuring highly recognizable morphologies. The specific morphology of each series, demarcation, carenation and collar respectively, renders them dissimilar.

As to SM IV, we were able to distinguish the vessel height, resulting in small pots (SM IVa) and larger vessels (SM IVb). As to SM VIII we could distinguish a difference in size, resulting in small bottles (SM VIIIa) and collared, large jars (SM VIIIb). SM III featured one vessel with a red slip on the interior whereas the bottles of SM VIIIa included an extra strip of clay or thickening applied to the base of the collar. The SM IV series did not feature any decorated elements. However, its paste is mixed with sand and differs from the exclusively grog tempered SM III and SM VIII series, revealing a singularity with this keeled series.

SM V-VI and **SM VII** These infrequent series consist of seven individuals each of which represents distinct vessel shapes: (a) boat shaped vessels, (b) bowls and (c) platters respectively. Despite their less significant numbers, all are grog tempered and have at least one individual with a red slip decoration. The red slipped, boat shaped vessel EC 53 (F 65 of Zone A) is noteworthy. Apart from the red slip applied to the interior it features a double-headed modelled appliqué at the tip of higher rim part, i.e. EC 35.

SM 0 represents the lower half of broken vessels of which the broken body edge is smoothed in order to serve as a vessel again.

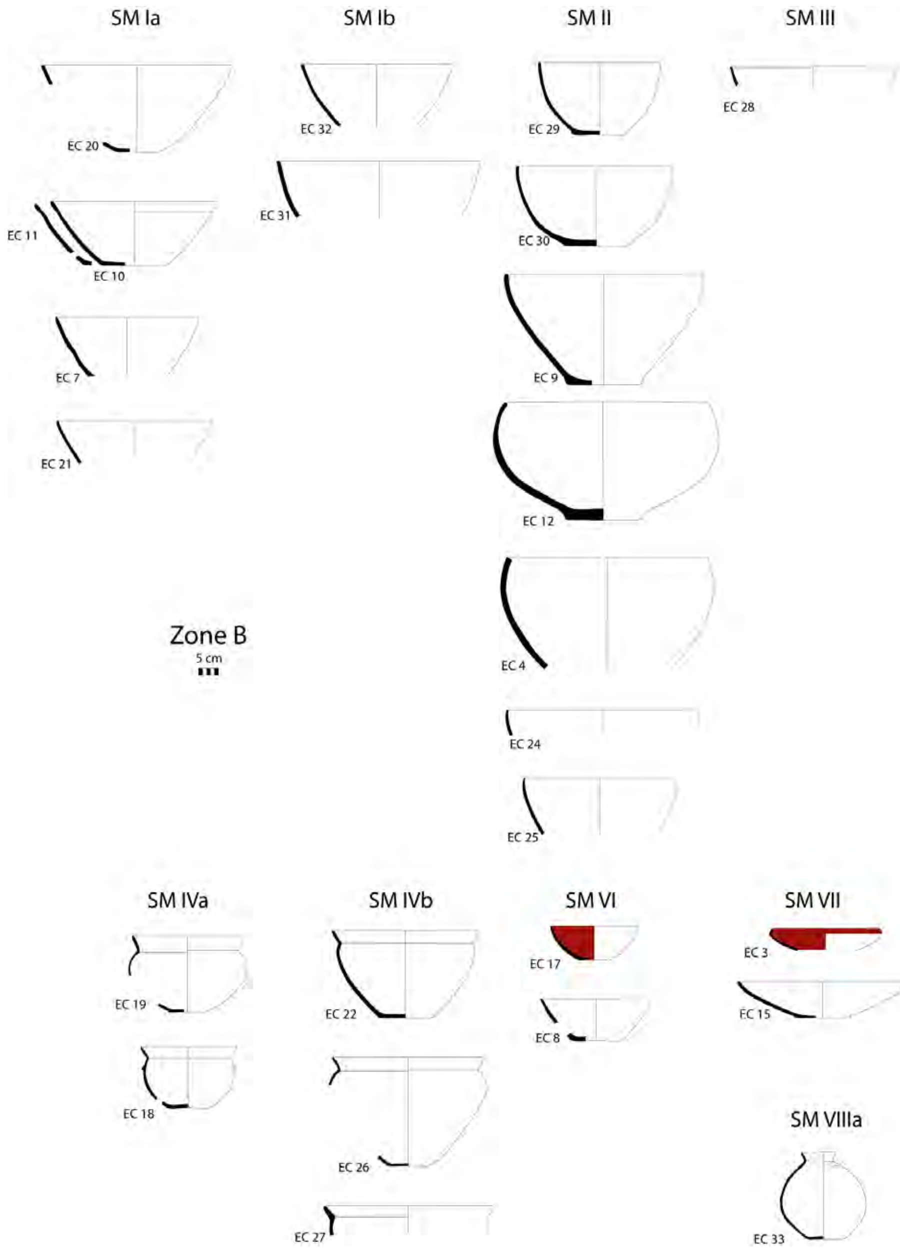

Figure 7.14. The ceramics found in Zone B.

The bases

The base profiles consist of 40 individuals, or 37% of the total EC count. These can be divided into seven modal series (Table 7.4, Fig. 7.15a, b) which have been defined according to morphology: (a) flat bases (SM 1-3, 70%), (b) concave or dimpled bases (SM 4-6, 28%) and (c) annular bases (SM 7, 2.5%), of which the flat bases are dominant. Appendicular or pedestalled profiles are the most frequent type of profile with 48%. It has to be noted that bases often showed traces of (secondary) fire, resulting in fragmented and fire-eroded base fragments (e.g. EC 9, EC 19, EC 42).

SM	Type	Profile	N
1	flat	convex	4
2	flat	straight	9
3	flat	appendicular	15
4	concave	straight	4
5	concave	appendicular	4
6	concave	convex	3
7	annular		1
			40

Table 7.4. The base series SM 1-7.

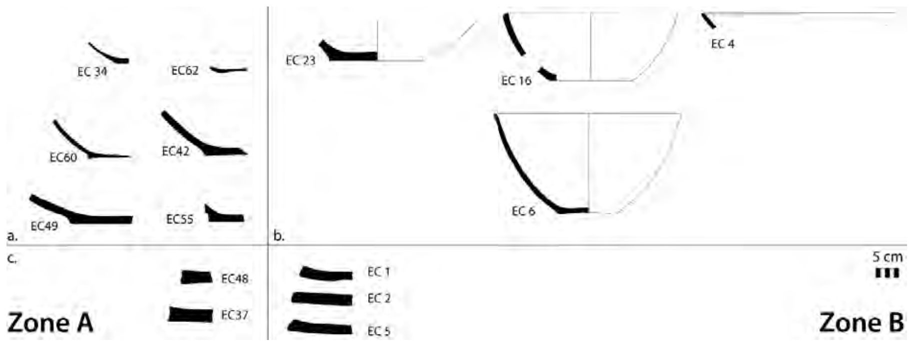

Figure 7.15. (a) The bases (without rim profiles), (b) SM 0 and (c) the griddles per funerary zone.

Flat bases A subdivision was established with regard to flat bases (N=28) according to the angle and smoothness of the first coils with: (a) a convex profile (SM 1, 14%), (b) a straight profile (SM 2 and SM 2a, 38%) and (c) an appendicular profile (SM 3, 63%). The grog paste (79%) dominates this series again in combination with a reducing firing technique. The majority of the flat bases have a diameter ranging between 6 and 12 cm and two larger ones measure 16 and 18 cm. The thickness varies between 8 and 18 mm. One very thick, flat base measures 21 mm! There appears to be no clear relationship between temper, diameter, and thickness. Two bases have red slipped interiors.

Concave bases These bases (N=11) were subdivided into three similar groups: concave bases with (a) a straight profile (SM 4, 36%), (b) an appendicular profile (SM 5, 36%) and (c) a convex profile (SM 6, 28%). The thickness of these bases varies between 6 and 18 mm and the diameters range between 8 and 13 cm with one large diameter measuring 24 cm. Pounded potsherds are again the most frequent ingredient (81%) in combination with a reducing firing technique. Three bases have a red slip on the inside.

Only one **annular base** was recorded (EC 60) with a 15 cm diameter. It is grog tempered.

We may conclude that the bases reflect the same image as the rim profiles. Dominated by means of a grog temper and red slip as a decoration, they correspond with a homogeneous production. With regard to this part of the assemblage, appendicular bases may represent a certain trait or cultural marker.

The griddles

Only five griddle rims were detected in this assemblage (Fig. 7.15c). Half or complete griddles served as standing objects in upright position –placed on their side– in order to create a wall-effect in the rectangular pits, i.e. F 21 in Zone B and F 70 and F 95 in Zone A). The paste consists of coarsely pounded potsherds and thickness varies between 22 and 28 mm whereas diameters measure over 60 cm. One griddle could be measured precisely (EC 1 measures 82 cm in diameter) since it was in one piece in pit F 21, Zone B.

7.3.3 The decoration modes

The ceramic assemblage has few decorations (N=11): (a) seven red slipped vessels, (b) two double-headed modelled appliqués and (c) two thickenings around the base of the collar, amounting to *c.*10% of the total number of individuals (Annexe 5.2.4).

The decorative repertoire is rather simple and consists mainly of the uniform application of red slip (64%) to the interior side or to both sides. When applied to the outside, only the upper part is painted, forming a "band" of red slip around the vessel. The absence of any incisions, punctations and finger indentations as well as other coloured modes, such as white, white-on-red, and/or polychrome slipping or painting is noteworthy.

7.3.4 The synthesis of the ceramic assemblage

The ceramic assemblage of AM 41

When discussing the ceramic assemblage of AM 41 it is important to point out that all ceramics were found together, constituting one large funerary zone, situated on a stretched natural elevation separated from the (supposed) village, situated to the north.

The ceramics were found in two concentations (Zone A and Zone B) in which ceramic vessels were deposited in various positions and manners. Although no (human) bone, either burnt or unburnt, was observed in the pits or pots, it is presumed that these ceramics represent existing, often domestic, vessels which were re-used for and during funerary rites.

The typological synthesis is based on 62 constituent elements including 33 archaeologically complete vessels. The morphological register declines around (a) simple, hemispherical bowls with rectilinear or convergent rims (SM I-II). Less frequent, but other characteristic vessels or series are: (b) hemispherical vessels with a lip demarcation on the interior (SM III), (c) keeled vessels (SM IV), (d) bottles (SM VIIIa), (e) jars (SM VIIIb), (f) boat shaped vessels (SM IV), (g) small bowls (SM V) and (h) platters (SM VI).

Decoration is rare and composed of the application of a uniform red slip to the interior and/ or outside wall, a thickening around the collar and double-headed appliqués. Omnipresent features are appendicular bases, pounded potsherds as a temper and a reduced firing technique. Altogether it represents a homogeneous complex in space, but eventually no (minor) differences between the ceramics from both funerary zones could be distinguished.

The cultural affiliation

The results of this ceramic inventory must evidently first be compared to the study of the 2007 Earthmovers' excavation at Sable Blanc Est (Rostain et al. 2008), situated to the north along the RN 1 (Fig. 7.2). However, the participants in this project never carried out the ceramic study of the latter site. Although features were plotted and described, sadly a full inventory of the ceramics is lacking. The report simply stated that:

> *Dès les premières prospections, il est apparu que la céramique est clairement de style Barbakoeba (Boomert 1993; Rostain 1994; Rostain & Versteeg 2003b; Versteeg 2003). Nature et qualité de pâte, état de surface et épaisseur, décor (rare) ne laissent aucun doute sur l'origine de ce matériel. Par ailleurs, le site de Sable Blanc Est est localisé au centre du territoire Barbakoeba, qui s'étend du fleuve Kourou en Guyane française au fleuve Cottica au Suriname, soit près de 250 km de long (Rostain 2004).* (Rostain et al. 2008:37)

These arguments are further elaborated in a statement that a "preliminary study" of the ceramic material indicated that visible, or apparent, coils (Fr., *colombins apparants*) and modelled appliqués are the dominating decoration modes of the excavated material, hereby including photographs of decorated sherds (Rostain et al. 2008, Figs. 31-2). In short, we are not able to compare the two assemblages regarding vessel morphology, pastes and decoration modes. We can only rely on the mere presence of (certain) decoration modes which have not been quantified either as to the SBE excavations.

Fortunately, Claude Coutet (2009:326–351) selected 881 sherds from the 2007 excavations taken from various features and surface collecting in order to serve her technological analysis. Acknowledging the omnipresence of grog (and mixed) as a temper in combination with reduced firing and characterising appendicular base, she proposed seven Types which correspond to the series as proposed for AM 41 (Table 7.5), suggesting the presence of similar vessel shapes as well as the contemporaneity of both sites (ibid., p. 351).

From this point of view, we can acknowledge the presence of double-headed appliqués, but must deny the presence of visible coils with AM 41. On the other hand, the resemblance between EC 17 of AM 41 vs. the red-slipped boat shaped vessel found in F 84 at SBE is noteworthy. Thus, both sites share certain decorative elements common to the entire littoral between Hertenrits and Kourou. However, an important difference is observed when comparing the sites themselves. Although both have ceramic depositions, AM 41 represents a funerary site alone whereas SBE appears to be a multi-occupation and/or mixed site, revealing both habitation and funerary features in the same excavation pit. Furthermore, the SBE radiocarbon dates (N=7; five hearth pits, one midden area and one urn burial) range from between 700 and 950 BP (McKey et al. 2010, Table S1) whereas the only AM 41 date is earlier, predating the excavated area of SBE.

Type	Series
1a	SM II
1b	SM V
2	SM IV
3a	SM I
3b	SM III / SM VII
4a	SM I
4b	SM I
4c	SM VI
5	SM VIII
6	SM VIII
7	SM II ?
8	x

Table 7.5. The comparison between SBE Types as defined by Coutet (2009) vs. AM 41 modal series.

Despite the lack of more comparative archaeological material between these sites, the geographical separation of both remains an important factor and needs further elaboration. The 2011 INRAP survey along the RN 1 between the SBE excavation and the village of Iracoubo provided complementary data on this question (Briand 2012a). It indicated that the entire stretch of elevated, Pleistocene land along this road, yielded almost exclusively ceramic depositions perhaps revealing one huge burial ground (Briand 2012a:93). The inventory of the exhumed ceramic material recorded apparent coils, indented rims, punctations, red slip and modelled appliqués, as observed at SBE. In addition, this survey also detected red-on-white painting (Briand 2012a, Figs. 89–92). Vessel shapes (ibid., Figs. 87-8) present us with similar characteristics when compared with AM 41: a thickened collar, open vessels (similar to SM 1a) and boat shaped vessels; all with a paste containing pounded sherds. Briand finally attributes these ceramics to the 'Barbakoeba culture and the Arauquinoid Tradition' (ibid., p. 81).

Here, we may also point out the morphological similarities between the collared vessels SM IV of Zone B and those found at BPS 13 (Vacher et al. 1998:225, Plates 9.159, 161, 167-8), BPS 172 (ibid, p. 237, Plates 26.106, 108-9), but also with regard to the boat shaped vessels of SM V, Zone B vs. BPS 172 (Vacher et al; 1998:236, Plate 25.99). Striking similarities can be found in EC 12, Zone A vs. BPS17 (Vacher et al. 1998:230, Plate 16.29-30) which included a double urn burial.

Another LCA site featuring similar decoration modes is Bois Diable/La Sablière, located on a Holocene sand ridge, west of the present-day village of Kourou (see Fig. 2.1). This site was excavated during the early 1990s (Barone-Visigalli and Prost 1991; Thooris 1994a) as well as in 2008 and 2009 during the Earthmovers Project (Rostain et al. 2009, 2010). According to Rostain et al. (2010:25), Bois Diable revealed ceramics attributed to two complexes: (a) Barbakoeba material was found, but the majority can be attributed to (b) the later Thémire occupation as he concluded some 20 years ago (in Barone-Visigalli and Prost 1991:52)[195].

The latter report contains Rostain's ceramic inventory of the 1991 excavations of which 7% is decorated (N=1306). A detailed analysis of 112 potsherds enabled the identification of four types based on paste (grog, sand or mica), but also on three types of rims and decoration modes of which complex white-on-red painting, vertical incisions (crossed and parallel), quadrillage and triangles are several of the observed modes (Rostain in Barone-Visigalli and Prost 1991:31–33).

As to the next salvage excavations at Bois Diable in 1993, the ceramic analysis carried out by Catherine Thooris (1994a:14–23) on 598 rims and 150 bases confirmed the abundance of grog as a temper and the presence of similar decoration modes, suggesting an ascription to the Kwatta and Barbakoeba complexes of Suriname (ibid., p. 26). Notably the indented clay-strips applied just below the rim, the apparent coils and the biomorphic modelling (eyes) represent important Barbakoeba markers according to Boomert (1993), also being important decorative aspects of this site (ibid., p. 20, Plates 14-15 and 17). The dominant vessel shapes are open, concave and convex vessels as well as the restricted convex rims which, all in all represent *c.*66% of the assemblage (ibid., p. 19).

There is (once again) no ceramic inventory included in the Earthmovers reports to continue this comparative analysis. However, Claude Coutet (2009:297–325) selected 846 potsherds for analysis from three different concentrations and several features. Her analysis confirmed the abundance of grog as a temper and the important application of red and white-on-red painting as decoration (7%) whereas incisions are rare, probably due to preselection in the field. Coutet distinguished ten types, confirming the rarity of restricted vessels at this site as well as the abundance of open everted bowls and platters with modelled lips (flattened on the inside or thickened on the outside) (Table 7.6).

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195 According to Rostain's analysis, Koriabo sherds as well as *kwepi* tempered material was identified at La Sablière (Barone-Visigalli and Prost 1991:52).

Table 7.6. *The comparison suggested with regard to Bois Diable/La Sablière between the Types as defined by Coutet (2009) vs. the series defined by Thooris (1994a).*

Type	Rims	Shape	Profile	%
	B	O	tangent	1
3, 8?	C	O	concave	32
1, 7	D	O	rectilinear	12
2, 5a, 6	E	O	convex	16
9	F	O (vertical)	rectilinear	9
	G	R	concave	5
	H	R	rectilinear	6
4, 10	I	R	convex	19
Coutet	Thooris			

In sum, the LCA material from AM 41 is (slightly) different when compared to the material from the above-mentioned sites. However, it also shares a number of traits which can indeed be attributed to a larger, perhaps regional ceramic entity, such as the alleged Barbakoeba complex. However, in my view, when considering the large distribution of the Barbakoeba style (roughly between Paramaribo and Kourou), we must pay attention to the diachronic local patterns during the LCA. In this manner we must adjust and/or enrich the original Barbakoeba complex, as Boomert (1993) developed for eastern coastal Suriname, on a regional level, i.e. regional diversity, in stead of simply contenting ourselves to attach the detailed results to an existing tradition. In fact, the proposed regional ceramic diversity of Barbakoeba is strengthened by means of the existence of various ways of primary and secondary burials in the coastal zone of the alleged Barbakoeba area and beyond. The LCA littoral population of the eastern Guianas may possibly share the concept of secondary burials in special burial grounds or necropole albeit materialized in various local and regional ways (see below).

7.4 The Iracoubo necropole

In addition to cultural affiliation, we would now like to explore the possible existence of a so-called "Urn-Horizon" during the LCA as to the eastern Coastal Guianas with AM 41 as a starting point.[196] The excavations at AM 41, SBE and recently along the RN 1, have revealed various burial grounds, mainly consisting of urns, perhaps forming a single, but diachronic burial ground, situated to the west of the present-day village of Iracoubo. Although similar extensive data are not readily available with regard to adjacent areas, the existing data allows us to suggest the existence of other LCA burial grounds in western French Guiana and Suriname. Hitherto, exclusive burial sites were thought to be located in eastern French Guiana, notably near the Brazilian border:

> *Les sites funéraires archéologiques connus en Guyane sont toujours localisés en dehors des sites d'habitat. Seules les sépultures secondaires, mises en urne après incinération ou après décomposition du corps, sont pour l'instant repérées. Les*

196 Although the term Horizon is obsolete in South American archaeology, it is applied here as discussed by Willey and Philips (1958:32). The notion of urns is susceptible to be understood from the perspective of the so-called 'urnfield-cultures' as found in Middle Europe during the Late Bronze Age i.e. *c.*1000 BC when, albeit briefly, various populations utilized highly similar interment modes over a large area.

nécropoles les plus remarquables et les mieux connues sont localisées dans les grottes des collines de Ouanary, qui ont livré des urnes funéraires élaborées. (Rostain 1994a:103)

The distribution of urn burials as to the LCA along the littoral of the eastern Guianas enables us to establish three important funerary areas from the east to the west:

a. The region between the Cayenne and the Araguarí Rivers. In this area, Late Aristé anthropomorphic urns are most often discovered in rock shelters or in deep pits (Br., *poços*) which are geographically separated from the village (knowing that Aristé habitat sites have not been excavated in French Guiana). These urns as well as other beautifully decorated pottery found in the same context are known since the first excavations by Emílio Goeldi in Amapá (Goeldi 1900; Nimuendajú 1926; Meggers and Evans 1957; P. Hilbert 1957; Cabral and Saldanha 2007, 2009).[197] In French Guiana, we are familiar with Late Aristé urns since the work of Hugues Petitjean Roget (1983, 1995a) and Stéphen Rostain (1994a) during the 1980s at the Ouanary Hills and more recently by means of the INRAP excavations concerning the international bridge across the Oyapock River (Mestre and Hildebrand 2011);

b. The Island of Cayenne which probably represents a stand-alone and/or transition area between the Late Aristé and Barbakoeba ceramic complexes. The Cayenne sites feature secondary urn burials as well as primary burials covered in ceramic debris placed in rectangular pits (cf. Chapter 9);

c. The Barbakoeba culture area roughly located between Paramaribo and Cayenne with at least three known necropoles: (i) the Kwatta-Tingiholo site near Paramaribo, (ii) the Awala and Yalimapo/Les Hattes site at the forked mouth of the Maroni and Mana Rivers and (iii) Iracoubo. Other probable sites are Organabo and Pointe Brigandin (Sinnamary River), of which the latter yielded one possible urn burial (Fig. 7.16). The former is solely known through local rumours –as was the case with Iracoubo prior to the 2006 excavations. Here we will shortly discuss the burial grounds of the Lower Maroni and Mana Rivers as well as the burials in the vicinity of Paramaribo alone in order to establish their (dis)similarities.

The Mana/Maroni River

Between the second half of the 1980s and 2000, only two urns were reported by the local Kali'na population of the villages of Awala and Yalimapo/Les Hattes of which we have written proof (Cornette 1987; Janin 2002; Thomas 2002). The first, found in 1987, contains a secondary burial in a spheric urn which was broken at the base of the collar. It was covered with a large open bowl.[198] In 1997, road reconstructions at the CD 7 near Awala in the so-called Zone IV, as described by Alain Cornette (1987) revealed the other composite, spheric

197 Further to the south, the urn burials of the Mazagão and Maracá ceramic complex are indeed part of this "Late Ceramic urn Horizon." It is not included in this discussion, but recent excavations along the Lower Amazon River banks by the IEPA have shown the co-existence of Mazagão, Maracá, and Koriabo (Saldanha and Cabral 2012).

198 The Kali'na of Awala considers this urn a cachiri vessel and the lid a water container (Cornette 1987).

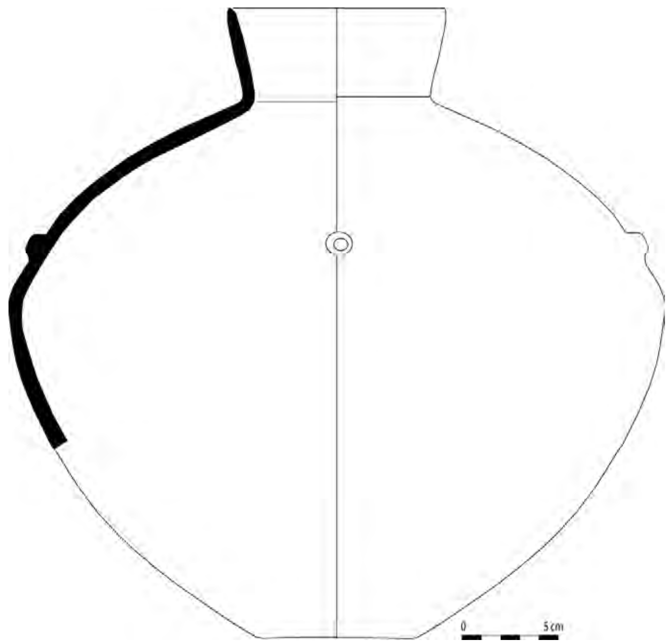

Figure 7.16. 'Profil de jarre à papule appliqué' found at the site of Pointe Brigandin, Lower Sinnamary River (adapted from Petitjean Roget 1995b).

urn which was (intentionally?) broken at the neck. It featured four vertical lugs applied to the upper wall just below the base of the collar (Sylvie Jérémie, personal communication 2010). Both urns contained human bones of which the latter yielded a date of 865 ± 40 BP (PA-1945) (Thomas 2002:15; Janin 2002:41).

In addition to human bones, the 1997 urn also contained animal bones, such as agouti (*Dasyprocta agouti*), acouchi (*Myoprocta acouchi*), paca (*Agouti paca*), capuchin monkey (*Cebus* sp.) and the cariacou (*Odocoileus* sp.), as determined by Sandrine Grouard and Eric Pellé (2002).[199] According to the latter authors, this could possibly reflect certain priviliges for these animals as offerings. It is to be presumed that the local Kali'na population who discovered this site, once a (pre-Columbian) burial ground, have found more urns:

> *La zone IV est la plus littorale: elle est localisée entre la piste et la mer, dans le secteur des carbets de passage. De cette zone, provient une urne funéraire quasi entière et plutôt énigmatique, d'une part par sa pos[i]tion et d'autre part par les deux récipients qui la composent. Sa fonction ne fait aucun doute, car une partie du contenu se trouvait encore associée à l'urne elle-même.*
>
> *Le premier problème posé est celui de sa position, qui n'était pas, au moment de la découverte, la position normale d'origine. Ici, au lieu d'être verticale, elle se trouvait couchée et en partie écrasée. Après avoir obtenu quelques renseignements de la part de William Daniel, le chef du village (Il nous a en effet signalé que « autrefois » la mer est venue jusqu'à l'emplacement des actuels carbets de passage, et qu'à d'autres endroits du littoral (vers le S.E.), d'autres poteries de ce type avaient été découvertes par les flots), il semblerait que ce fut la mer, lors d'une transgression, qui déterra l'urne qui ce coucha sur le côté.*

199 Interestingly, many animals bones (birds, rodents, crab) have also been identified in several burial pits at the LCA site of Curiaú Mirim 1 situated on the left bank of the Amazon River (Gambim 2012).

Le second problème est peut-être lié en partie au premier : l'urne est composée de deux récipients qui ne sont ni l'un ni l'autre destinés à cette utilisation à l'origine. Le récipient principal est une grande jarre à cachiri, et le second, qui apparemment coiffait le premier, est une vasque à eau. Il est possible que [l]a vasque ait été placée par la mer. Et pourquoi avoir employé une poterie d'usage habituellement domestique ? Il est certes encore trop tôt pour pouvoir répondre de manière plus sûre; nous attendons les résultats de l'étude complète de cette poterie qui est en cours. (Cornette 1987:82)

More recently, another restricted, spheric urn has been reported from Alatou near Awala. It featured a thickening around the base of the collar sharing a characteristic trait with the CSL Phase 3 (CSL EC 100 vs. Coutet 2009:343) and yielded two dates corresponding to the CSL date: Alatou 1 (ETH-40724, 805 ± 30 BP) and Alatou 2 (ETH-41721, 885 ± 40 BP) (Coutet 2011, 2014b; Coutet et al. 2014) corresponding to the SBE series. According to Thomas Romon, the Alatou 1 urn (Tukuali 2) contained the remains of two young adults and one newborn which had been exposed to fire (Coutet et al. 2014:208).

Paramaribo

To the west of Paramaribo, several burials were unearthed at the artificial mound site of Hertenrits. Here various burial modes were recorded: primary and secondary urn burials (Geijskes 1964; Boomert 1980). The Peruvia-2 site, west of the Coppename River, yielded two urn burials, one of which had a ceramic lid and contained human remains (Versteeg 1985:722–723).

However, the only necropole near Paramaribo is probably the Kwatta-Tingiholo site. The excavations Geijskes carried out during the 1950s revealed 38 primary burials, of which four skulls were covered with an inverted complete pottery vessel serving as a lid, next to secondary urn burials which probably contained the complete inhumated body (Khudabux et al. 1991). For a number of human skulls, supplementary research resulted in identifying voluntary cranial deformation (Tacoma et al. 1991).[200]

Two radiocarbon measurements of human bone have dated this ensemble between the 7th and 12th century AD (Versteeg 2003:159). Recently, in order to study the cranial deformation, Anne van Duijvenbode reviewed the entire "Geijskes" collection, containing human remains from Kwatta-Tingiholo (N=25), Hertenrits (N=8), Okrodam (N=3), Saramacca (N=4), Waterkant (N=2) and Aruba (N=1), at the University of Leiden (van Duijvenbode 2012).

The detection in the field

Although urn burials appear to represent the most important burial mode as to the sandy coastal ridges between Sinnamary and Paramaribo during the LCA, one also finds other types of burials, such as found at Crique Sparouine and Wayabo. However, these sites are situated in the (direct) hinterland of the coastal plains and are located within the habitat, suggesting a coexistence of the living and the dead. Another possibility is that the dead have been buried in abandoned houses, creating a dwelling for the dead and in this matter inferring to an afterlife, as suggested regarding the "boxed" burials (cf. Fig. 7.10).

200 On the cranial deformation among the Callinago, see Breton (1665:145-6).

In contrast to the sober urns of the western French Guiana plains, those found at the Oyapock River often take complex shapes and are beautifully painted. This renders them priced objects of interest to explorers and researchers. The interest in such ceramics, despite the fact that these sites are situated in remote areas, probably frustrated the discovery of other types of burial grounds such as the more modest necropole of AM 41, albeit the fact that this type of urn necropole was already known from the early 20th century at, for example, Caviana Island (Nimuendajú 2004:67–90).

More importantly, burial sites are more easily recognised when human (burnt) bone is detected which is often better preserved in urns placed in rock shelters than in the open air, especially in the Neotropics but there are (always) exceptions to be found in Suriname (Khudabux et al. 1991) and Amapá (Gambim 2012). Furthermore, in order to assure the presence of a (non-marked) burial ground during excavation, an extensive surface needs to be excavated in order to infer the presence of a necropole and a certain spatial organisation within the necropole as the case regarding a burial ground within a habitation ground site. The latter case is most often observed during operations in compliance archaeology, as seen at larger excavations (e.g. BPS 230, BPS 172, Katoury, Eva 2, Crique Sparouine, LPB, CSL, Cimetière paysager Poncel). It is rare to encounter a necropole as they appear to be confined to rather a small or restricted space and are often buried under the forest floor, as pointed out by means of the necropoles of AM 41 and Pointe Morne.

Conclusion

Based on a handful of radiocarbon dates, the contemporaneity of AM 41 and SBE is difficult to apprehend. However, instead of simply stating this site is a Barbakoeba site, we must look further into the varied elements of this large LCA palympcest and reconsidering 250 years of occupation. A range of possibilities is suggested here considering the status of the various sites and possible associations: (a) the AM 41 site represents a stand-alone funerary site and/or is linked to a nearby village, (b) the AM 41 site is a burial ground meant for certain members of society reflecting social stratification as suggested with regard to other "isolated" cemetaries in northeastern Amazonia (Guapindaia 2001), (c) the SBE habitation site represents simultaneously a habitation and funerary site, (d) the SBE habitation site is built on a former burial ground and (e) the SBE habitation site shifts on the sandridge and hence the abandoned part of the village serves as a "village of the dead." In addition, regarding the above-mentioned propositions, it is possible that the SBE habitation site partially serves funerary rites, thus any lamenting, dancing, etc., is performed at the village whereas the actual interment is outside the village (at AM 41?), as for example Father Fauque suggests in 1736 on the Lower Oyapock:

> *J'entrai dans une [c]ase haute, que nous appelons soura en langage galibi; m'entretenant avec ceux qui 1'habitoient, je fus tout à coup saisi d une odeur cadavereuse ; et comme j'en témoignai ma surprise, on me dit qu'on venoit de déterrer les ossemens d'un mort, qu'on devoit transporter dans une autre contrée, et l'on me montra en même temps une espèce d'urne qui renfermoit ce dépôt. Je me ressouvins alors que j'avois vu ici, il y a trois ou quatre ans, deux Palikours, lesquels étoient venus chercher les os d'un de leurs parens qui y étoit mort. Comme*

je ne pensois pas alors à les questionner sur cette pratique, je le fis en cette occasion, et ces sauvages me répondirent que 1'usage de leur nation étoit de transporter les ossemens des morts dans le lieu de leur naissance, qu'ils regardent comme leur unique et véritable patrie. (Fauque 1835:8)

Whatever the case or combination may be, further research in this particular area is required in order to test one or more of the above-mentioned possibilites. Moreover, the series of vessels at the AM 41 necropole differ –when regarding the existing data– from those found at SBE which are again similar to those found at Awala and Yalimapo (Coutet 2011, 2014b; Coutet et al. 2014).

When compared to the eastern part of French Guiana, it is evident that the Late Aristé urns are entirely different, suggesting two mayor (funerary) culture areas to the east and west of Cayenne Island which in turn may be regarded as a transition area (cf. Section 9.8). However, both areas are somehow linked by means of the fact that the presence, or possibly the introduction of urn cemeteries in general is, in both areas, likely to be dated from *c*.900 AD. This suggests the appearance of a shared mode of interment or an "Urn Horizon," in the eastern Guianas as to the (early) LCA.

We must now advocate that AM 41 clearly illustrates that necropoles exist in the western plains of French Guiana which 'Contrairement à l'idée commune, l'existence de cimetières indigènes (antérieurs à la période coloniale) est moins rare qu'on l'a prétendu, et le deviendra probablement encore moins lorsque les nombreux sites archéologiques, notamment en Guyane, auront fait l'objet de fouilles systématiques, ce qui est loin d'être le cas' (Chaumeil 1997:88).

Figure 7.17. Double ceramic deposition F 8 in Pit 3.

Chapter 8

The PK 11 or Rorota site

A Late Ceramic Age site situated at the Pleistocene ridges of Cayenne Island

Two LCA sites excavated on Cayenne Island are presented in this and in the next chapters. The first excavation concerns the well-known Rorota site (No. 97309.010), situated on a Pleistocene sand ridge in the Anse de Rémire at PK 11 (van den Bel et al. 2012a; Annexe 1.5).[201] The second excavation is called Cimetière paysager Poncel (No. 97309.106) and is located on the summit of a small lateritic hillock in the swampy hinterland of these sandy ridges (van den Bel et al. 2013; Annexe 1.6). These sites will be presented separately, but their ceramic assemblages display many similarities, suggesting the same cultural group or population inhabited both sites as to be compared and discussed in the next chapter.

8.1 Introduction

Jérôme Briand carried out the mechanical survey which eventually led to the excavation of a small part of the allotment AP 551 (17,161 m²) at PK 11 Route de Plages in the Municipality of Rémire-Montjoly in May 2008 (Briand et al. 2008). Considering its results, the SA decided that the location of only one building would be excavated, representing a surface of 15.60 x 80 m (1248 m²) that was located in the middle of the allotment (Figs. 8.1-2).

As suspected, Briand demonstrated that the surveyed area was part of an existing site better known as Rorota or Anse de Rémire (No. 97309.010) positioned at the foot of the Rorota hillocks and at the summit of a Pleistocene *chenier*, closing the Rémire bay. This ridge is intersected by means of two creeks which descend from the Mont Mahury: the Rorota Creek in the north and the Hota Creek in the south, hereby approximately marking the extention of the site totalling *c.*10 ha.

The summit of the sand ridge, which almost reaches *c.*8 m above MSL, is marked by means of the ruins of the Prévot rhum distillery as well as by the Master's house. The State has declared both as monuments. This 19th century installation is preceded by other plantations and agricultural fields in the vicinity which have modified the original topography of the ridge and the hinterland. In fact, this bay area, next to the fort at Cayenne, is one of the first sites the French and the Dutch permanently occupied since the beginning of the second half of the 17th century in order to produce sugar (Biet 1664; Lefebvre de la Barre 1666).

201 In 2011, the results of this excavation were presented at the 25th IACA Congress held in Fort-de-France, Martinique (van den Bel et al. 2014).

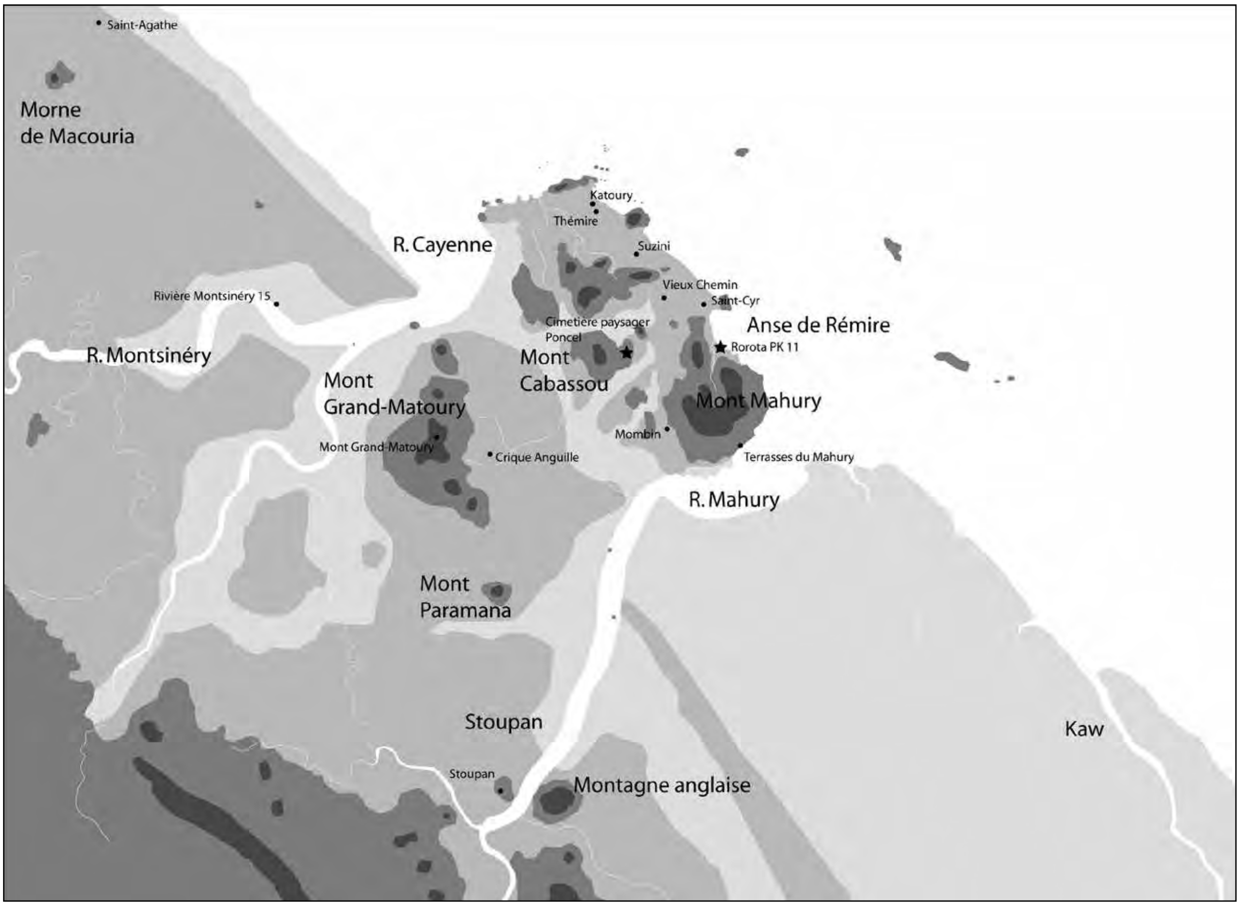

Figure 8.1. A simplified topographic map of Cayenne Island and its surroundings with the sites of Rorota and Poncel are indicated by means of a star.

The seashore still shifts causing much damage to the colonial and prehistoric sites. This ongoing erosion of this highly frequented beach area evoked the first structured investigations of a pre-Columbian habitation site during the early 1970s (Lefèbre 1973, 1975; Turenne 1974; Petitjean Roget and Roy 1976).

The geology

The so-called Island of Cayenne (Fr., *Ile de Cayenne*), or Cayenne Island, is one of the rare places along the Guiana coast where the Precambrian Shield drops directly into the Atlantic Ocean.[202] Here, it consists of large tabular mountains (e.g. Mont Mahury, Cabassou, Paramana, Mont Grand-Matoury) and numerous smaller ones (e.g. Montravel, Montabo, Saint Martin, Baduel, Le Tigre, Bourda). The mountains located along the Cayenne coastline are connected by means of Pleistocene sand ridges whereas the swampy hinterland (several saltponds but mainly savannahs) is drained by means of creeks, representing altogether an appropriate environment for human occupation.[203]

202 Although they do not fall directly into the ocean, the mounts of the Lower Oyapock and the Kourou Rivers are also visible from afar. Therefore the (first) Europeans utilised this area frequently to acquire fresh water and make a rendez-vous.

203 On the possible origins of the reason why the term "island" is used in "Île de Cayenne," see Vincent Huyghues-Belrose (2000).

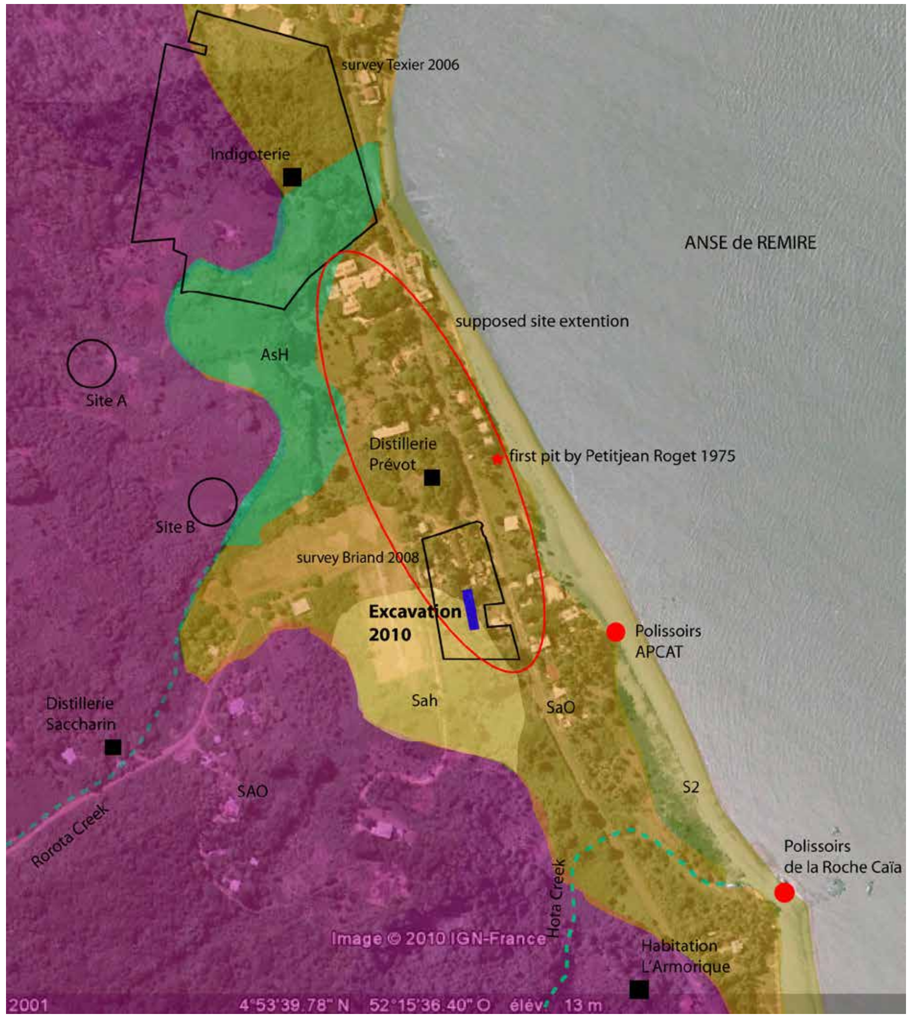

Figure 8.2. An aerial photograph of the Rorota site (estimated size indicated by means of the red oval) featuring the two creeks and various archaeological sites in its vicinity, superimposed on the local geology. The black squares are the colonial sites whereas the red circles mark the Amerindian sites. North of the Rorota Creek, we may observe the mechanical INRAP survey which Pierre Texier (2006) carried out. The geological formations are after J. P. Cautru (1993); S2: sandy beach (Recent Holocene); SaO: fine sand with podzols (Pleistocene, Coswine Formation), or Barres prélittorales (Fr.); Sah: fine sand in hydromorphic soils (Pleistocene, Coswine Formation); Ash: fat clays and temporary hydromrophic environment (Pleistocene, Coswine Formation), and SAO: altered cristallines rocks and undifferentiated cristallophyllines (Precambrian Formation).

At the northwestern foot of the Mont Mahury, the Anse de Rémire is part of the Old Coastal Plain. Here it reaches a maximum height of *c.*8 m above MSL. The specific *chenier* morphology, as Marc Boyé (1979) and Jean-François Turenne (1979) defined, is represented by means of large rectilinear sandbars with some changing topography measuring several meters in height and deposited in a marine and intertidal environment.

These sand bars were deposited on mottled clay which also corresponds to the lower areas where sand bars have not been depostited, hereby separating various bars. During the rainy season these depressions collect pluvial water forming swamps or wet savannahs throughout the year. The Rorota and Hota Creeks drain the flanks of the Mahury and find their way through the sand bar into the sea.

The soils of the sand bars are ferralitic and now and again podzolised. They have a brown to ochre colour containing concretions, such as aluminium silicates (kaolinite), iron oxides, hydroxides (e.g. goethite, hematite), aluminium hydroxides (e.g. gibsite, boehmite) and other amorphic products. These ferralitic soils are preferably situated at the slopes of the bars whereas podzols are mainly found at the higher parts. Thus, hydromorphic soils are recorded at the lowest places (Palvadeau 1999:31). It has to be noted that, at present, the Old Coastal Plain is considered a vast plain consisting of dry grassland savannah dissected by means of bushy islands (outcrops) or stretched forests (ridges), associated with filled up drainages and small creeks respectively (Fig. 8.1). As to Cayenne Island, however, such a landscape is difficult to imagine due to the modern urbanism and historic hydraulic modifications.

The archaeology of Cayenne Island

Although we have presented a short history of archaeology in the Guianas (cf. Chapter 3), we will now focus on Cayenne Island and its surroundings as this part of French Guiana, and notably Mount Mahury, represents the cradle of French Guiana archaeology. In 1902, François Geay and his wife were the first to signal the existence of archaeological vestiges at the northeastern side of Mount Mahury. Geay delivers a description of the rock engravings at Crique Pavé and the well-known Serpent of Pascaud, but he also acquires several potsherds (Geay 1903; Hamy 1903; Abonnenc 1952; Reichelen and Reichlen 1943; Boyé 1974).[204]

As to te first surface collections in the Anse of Rémire, Jean-François Turenne established these in as early as 1972. This same year, these findings inspired Jean-Louis Lefèbre to collect more archaeological material (e.g. pottery, a polished axe, a stone mortar) from the eroded sand ridge at the beach of Anse de Rémire (Lefèbre 1973). After the equinoxe of March 1974, this particular section of the Rémire Bay was washed away. Next Lefèbre collected more material at the eroded escarpment: four complete vessels, another polished axe and numerous potsherds. This fresh section included several strata of which only the upper alluvial layer (60 cm in thickness) contained archaeological material (Lefèbre 1975).

In 1975, Hugues Petitjean Roget and Dominique Roy conducted another pedestrian survey along the beach. They also dug two test pits, measuring 1 m² and 1.30 m in depth, located opposite the crossing of the Rorota road (Petitjean Roget and Roy 1976), collecting *c.*2000 potsherds, three complete vessels and one stone grinder (Fig. 8.3). A geological study, comprising the analysis of various layers in order to obtain mineralogical and chemical signatures, indicated that the layer containg archaeological material was deposited on a sequence of marine sediment deposited during a regression, but locked between two transgressions (cf. Fig. 8.6). This first important geoarchaeological study concluded that this (Demerara) regression must have been active before 1000 BP, making prehistoric occupation possible only after this date (Seurin 1976:12).

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204 Earlier, in 1899, Geay visited the Ouanary Hills where he had also collected several complete ceramic vessels (Geay 1901). For further discoveries at the Crique Pavé and Pascaud sites, see Rostain (1994a:584–589).

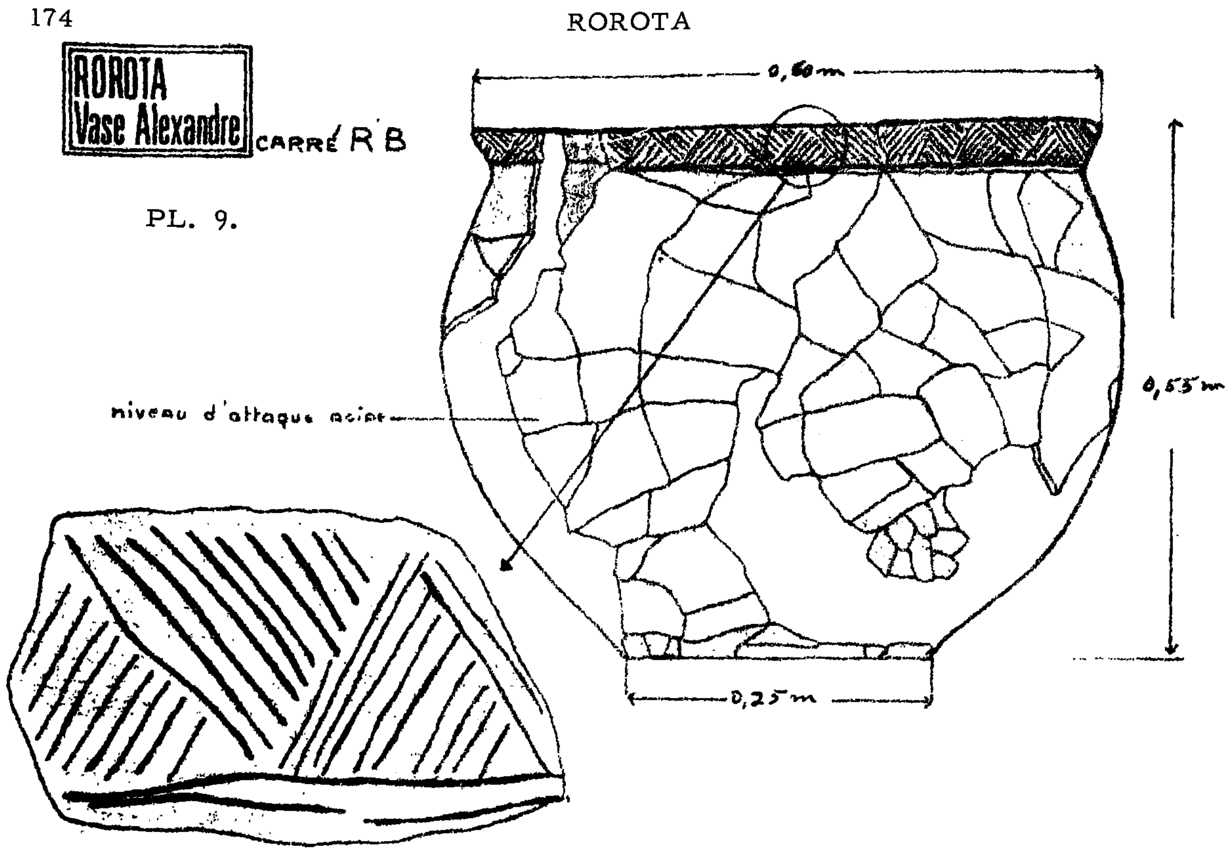


Figure 8.3. The representation of the so-called 'Vase Alexandre' as published by Hugues Petitjean Roget and Dominique Roy (1976:174, Plate 9).

From the 1980s on, Yannick Le Roux instigated pedestrian surveys in order to pinpoint colonial sites of which several were partially excavated, notably in the vicinity of the Mont Mahury (Le Roux 1986, 1987, 1989, 1994). During this period, members of the local archaeological association, the AGAE, as well as volunteers and VAT members carried out multiple rescue operations on Cayenne Island (e.g. Mahury, Vieux Chemin, Montabo, Thémire, Mini-circuit Automobile, Montjoly, Saint-Martin, Glycérias, Almaric, Alamandas) (Rostain 1994a).

These investigations permitted Alain Cornette to establish a first typo-chronology concerning French Guiana as well as Cayenne. He called it the 'Style d'Île de Cayenne' which consisted of the following styles: *Point Gravier incisé*, *Montjoly peints* and *Rémire incisé* (Cornette 1990:200). Rostain, however, did not apply Balfet's method as Cornette did, but introduced the Ford method, proposing the following types instead: *Mahury incisé*, *Cayenne peint* and *Melkior kwep*, thus replacing Cornette's original styles and eventally creating the Thémire complexe of Cayenne (cf. Section 3.4.3.2).

After the creation of the SA in French Guiana in 1992, numerous rescue operations were conducted in the vicinity of Mont Mahury (Briand 1997). In addition, two excavations were programmed on Cayenne Island: (a) the colonial Jesuit site of Loyola (Le Roux et al. 2009) and (b) the pre-Columbian site of Mont Grand-Matoury (Grouard and Tardy 2003). Around the turn of the century and thereafter, the archaeological chart of Cayenne Island was established and updated (Briand 1998; Gassies 2000; Samuelian 2007).

From 2002 on, many sites were (re) detected and sometimes excavated according to the application of the compliance archaeology law, for instance: Montjoly Bar (Cazelles 2002; van den Bel 2007d), Katoury (Jérémie et al. 2002; Mestre et al. 2005; Casagrande 2005; Hildebrand 2007), Cimetière paysager Poncel (Jéremie 2002b; Hildebrand 2004; van den Bel et al. 2013), Saint-Cyr (Hildebrand 2005a; van den Bel 2007c; Delpech 2010a, 2011b), Soula (Mestre 2006a), Route des Plages (Texier 2006), Sainte Agathe (Samuelian 2009), Stoupan Ecolodge (Delpech 2010b), Alamandas/Mombin (Delpech 2011a), Crique Anguille (van den Bel 2012), PK 11 (van den Bel et al. 2012), Montravel (Mestre 2015), etc.

All these investigations on Cayenne Island and adjacent areas guaranteed the acquisition of large quantities of new data enabling the review and adjustment of the existing chrono-cultural framework of Cayenne. First of all, nearly all above-mentioned excavations are dated to the LCA, beginning at *c.*AD 900. Secondly, all above-mentioned investigations indicated that the ceramic assemblages of these sites were rather similar and homogeneous, suggesting a shared style and ceramic wares. Thirdly, the relatively large number of sites for this "Island" may evoke new perceptions on site patterns in combination with ethnic groups vs. the surrounding culture areas.

The excavation methods

As mentioned before, the SA dictated the excavation's perimeter. It represented the location of a future building, officially considered the only place of superficial destruction during the construction works. This excavation is a good example of the difference between programmed and compliance archaeology: the position of the excavation pit is at random, dictated by means of the construction plan and not by scientific reasoning or interest. Unfortunately, the so-called "protected" area was most certainly destroyed by means of mechanical shovels and other machines during the construction of the entire allotment.

The goal of this specific excavation was: (a) to check the hypothesized "double" occupation, projected between AD 900 and 1450 (Briand et al. 2008:33) and (b) to discern the stylistic comparisons by means of a fine spatial analysis of the archaeological features. In order to apprehend these matters a detailed ceramic study is demanded, aiming at coherent typo-chronological series.

Presuming a double occupation, a conditional phase was implemented. Therefore, we initially removed only 40 cm by mechanical means. When working with the shovel, four bands (A-D) were created running from the highest part in the north down to the south. Meanwhile artefacts were collected by hand in squares measuring 4 x 4 m, resulting in an excavation perimeter measuring 16 x 52 m equal to 832 m² (Fig. 8.4).

Next, we decided to test the second "deeper" layer by means of deep, machine-made test pits within the excavation perimeter and requested the intervention of a geomorphologist to attend this stage of the fieldwork (after two days work). Once these test pit sections were cleaned, it was first decided to abandon the collecting of material from the first 40 cm as this superficial layer represented a recent, highly disturbed plough zone, i.e. US 1 and 2 (Fig. 8.5). Consequently, we obtained only hand-picked artefacts in a total of ten sectors, i.e. D1-5, C1-5, B1 and A1.

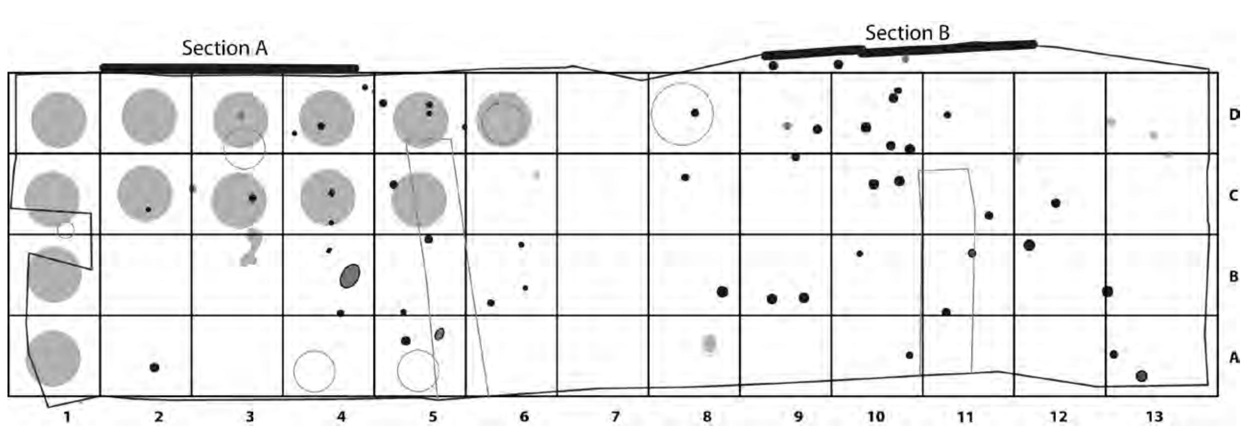
This intervention also demonstrated there was no deeper or second archaeological layer, as proposed after the survey. Observations of the sections revealed that the "deeper" layer, found only at the higher part of the site, surfaced in the site's lower parts. In fact, the first layer at the higher part was a recent artifical layer, possibly created for agricultural purposes (e.g. planting of sugar cane) by means of a bulldozer several decades ago (cf. Section 8.2).

In sum, this meant there was only one (stratigraphic) archaeological layer. Nevertheless, multiple occupations were still possible at a horizontal level. We continued scraping off the archaeological layer as to the entire perimeter, hereby removing the disturbed (on occasion polluted) top soil, heading straight for the feature level at *c*.60 cm in depth and marked by means of light (brownish) yellow sand. At this level we were able to distinguish numerous features, most often marked by the presence of artefacts allowing us to obtain a possible spatial feature distribution. The features were dug by hand, recorded and topographed by *Cabinet Zaepfel* from Mana.

Features are usually marked by means of a darker colour and/or a different texture compared to the subsoil. However, at PK 11 as well as other excavated sites located at the sandy ridges of Cayenne Island (e.g. Saint-Cyr, Katoury), an (organised) concentration of stone blocks and pottery fragments often characterizes the anthropogenic features. It is thought these artefacts are part of the fill of a post hole in which the colouring of the (wooden) post is barely visible in the sandy subsoil. The artefacts served to corner and keep posts in a specific (upright or diagonal) position (Fr., *calage*). This hypothesis is conforted by means of the excavations conducted at Katoury where the deeper post holes actually reached a dark organic layer (representing an ancient tidal creek) in which traces of numerous post holes were found (Mestre et al. 2005).

It is clear that features without any (large) tangible artefacts are difficult to detect causing us to miss several. The disturbances, due treefalls or (recent) soil mangement, may lead to confusion and difficulties in feature interpretation. In a similar way, anomalies related to pedological processes may hamper the identification of anthropogenic features. Of all the features recognised in the field, only three (F 45-7) were not excavated due to heavy rainfall.

Figure 8.4. The collecting units measuring 4x4 m and the outline of the pit.



8.2 The stratigraphy

The stratigraphic observations

Two geological sections were recorded along the northeastern pit wall in order to obtain the stratigraphy at the heighest point of the excavated perimeter (Section A) and at the slope of the sand bar (Section B) (Fig. 8.4). Section A shows the following sequence (Fig. 8.5):

The surface layer (US 1) is *c.*40 cm thick, consists of loose black sand and represents an old plough zone. Below it one encounters a heterogeous brown sand layer with several potsherds (US 2). Then, a greyish brown fairly heterogeneous sand layer (US 3) with potsherds and a lot of charcoal –of which one charcoal particle was dated (POZ-42486, 685 ± 30 BP)– and quartz elements was found. This layer is defined as the occupational or archaeological layer. Below this layer, about 70 to 80 cm in depth, a brown sandy homogeneous layer is observed (US 4). After a transition zone of measuring *c.*20 cm, an ochre coloured, homogeneous sand layer was found (US 5b). Here the clayey fraction increases, providing this layer with a certain compactness.

Section B was taken along the same pit wall, but on the sloping part of the sand bar where it meets the hydromorphic zone. Both sections differ *c.*1.10 m in altitude. The stratigraphic sequence differs below the plough zone because US 2 is lacking here, implying that the archaeological layer (US 3) meets with the ploughzone (US 1). In Section B the US 4 is clayeyer than US 4 and US 5b in Section A. Moreover, another sandy claylayer (US 5a) is clearly visible. Its distinct dark brown colour is related to its humic content.

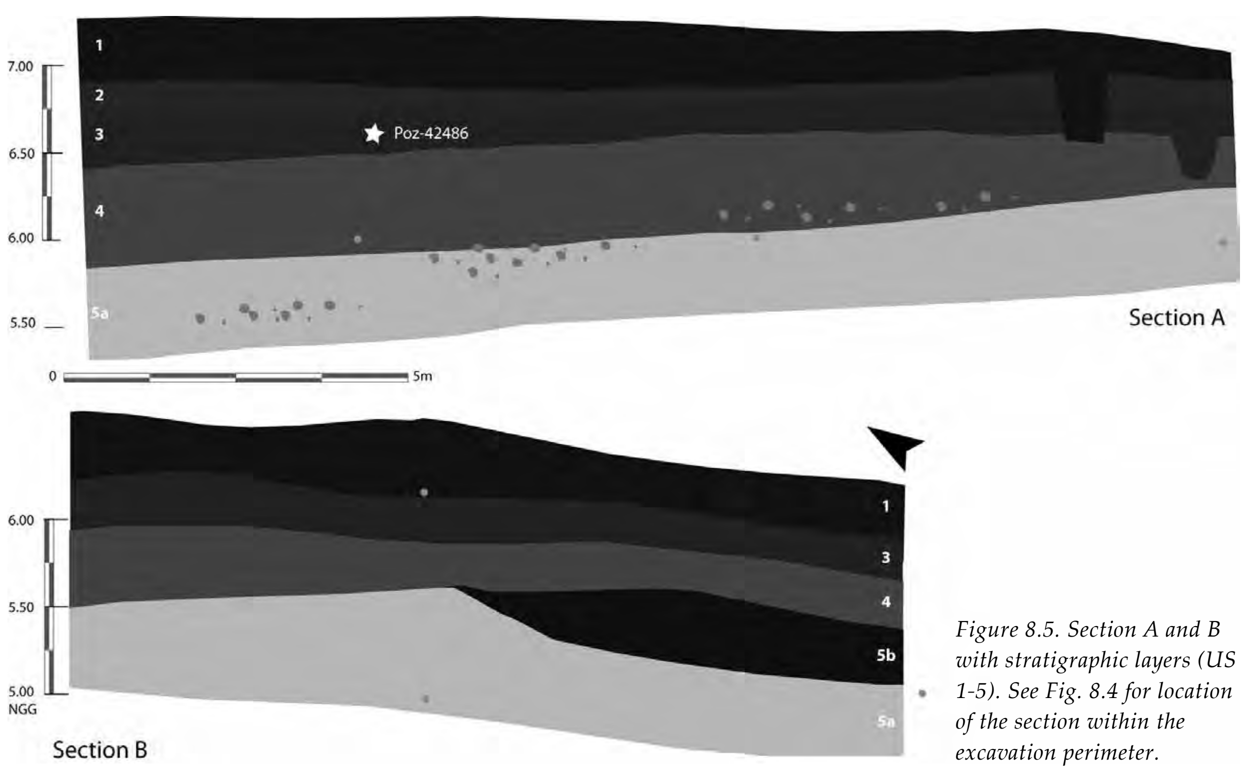


Figure 8.5. Section A and B with stratigraphic layers (US 1-5). See Fig. 8.4 for location of the section within the excavation perimeter.

The interpretations

These sections allow us to distinguish three major geomorphologic events:

a. At the base, we find a sandy clay formation with an ochre to orange colour (US 5). Its texture and colour reveal a B-horizon, enriched by means of clay particles because of leaching from the upper horizons. The iron nodules in the clayey subsoil (US 5b) as well as the humic layer with a slightly greenish colour (US 5a) in Section B reveal the presence oxidation-reduction moments. They are often signs of temporary hydromorphic areas close to the phreatic level. It is presumed this hydromorphic zone is related to the clayey Layer 5 of Phase 3 which, according to Maggy Seurin, represents a swampy (saline) area (cf. Fig. 8.6).

b. This particular horizon, or "pseudo-gley" (Btg), gradually changes in a leached upper level. However, in the hydromorphic area this transition between clays (US 5a) and sands (US 4) is rather brutal. This sharp transition marks an abrupt phenomenon (e.g. violent high seas during the full moon), which covered the clay. One can imagine a filling-up (Fr., *colmatage*) of the lower areas by means of pluvial water descending from Mont Mahury or even from the summit of the sand bar. This phenomenon has not been witnessed at the highest point of the excavation pit, i.e. Section A.[205]

c. After these events, a new sand body is deposited with its own pedogenesis. The origin of this accumulation is most certainly natural, but may have had anthropogenic implications. The dark grey soil (US 3) including archaeological material and charcoal has been observed in the entire excavation pit. It represents an ancient surface, corresponding to the prehistoric occupation of the Anse de Remire site (Schiffer 1975, 1987:17–18). This level is posterior to the morphological changes which have been enriched by means of the human occupation. It can therefore be classified as an anthropogenic soil.

The superior, heterogeneous layer US 2, only present at the higher part of the excavation, does not feature any pedogenesis. It can therefore be identified as a fairly recent accumulation of sediment covering the prehistoric occupation. The submerging archaeological layer was disturbed either by means of recent ploughing and/or accumulation

8.3 The radiocarbon datings

Seven charcoal samples were sent off to be analysed at the Poznán Radiocarbon Laboratory in Poland (cf. Appendix 1). The prehistoric occupation layer (US 3) contained a large quantity of charcoal. However, it was rather difficult to detect a sufficiently large charcoal particle in the fill of the post holes in order to obtain more reliable results. Eventually our choice was based on the presence of several charcoal particles within the excavated features. Our goal was to obtain a chronological frame as to the ceramic assemblage.

205 Interestingly, similar brutal changes or geological truncations have also been observed for the Lower Maroni terrace at CSL (cf. Section 5.2.1) and may perhaps be contemporaneous?

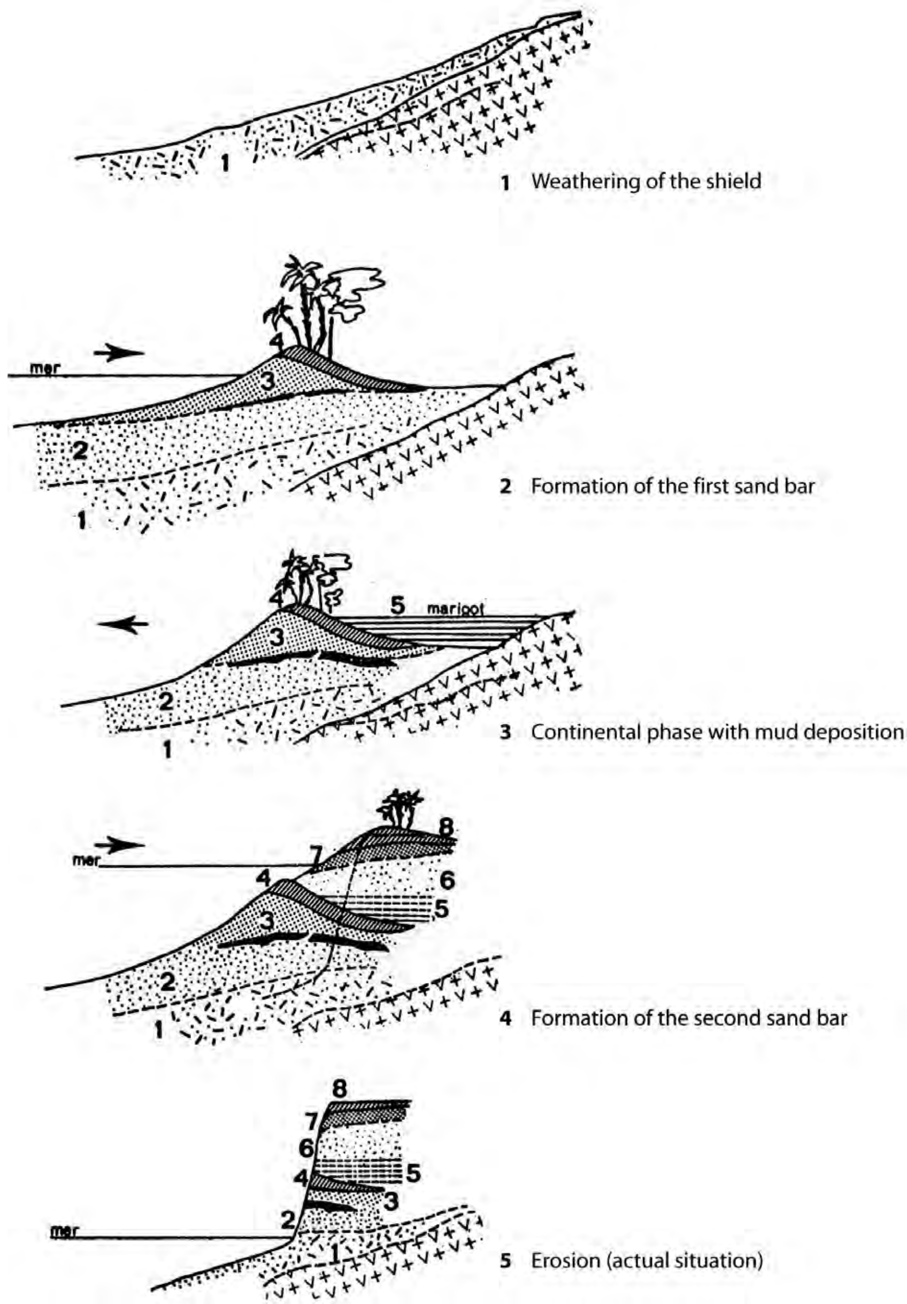


Figure 8.6. The geomorphologic sequence established by M. Seurin (1976:22, Fig. 6).

When looking at Table 8.1, we observe two early results of which POZ-42514 is actually very early, dating back to the end of the Pleistocene era. In fact, both results are estimated too early for the prehistoric occupation of the excavated area. However, it is certainly possible that the dated charcoal is the result of a fire that can be linked to human presence in the vicinity or to a paleofire (Tardy 1998). Aside from these ancient dates, we also consider the result of sample POZ-42515 to be unacceptable as to the excavated occupation material. This result dates to the 18th century and may indeed reflect a recent contamination, knowing that the application of the C^{14} method after *c.*AD 1600 is far less reliable.

Table 8.1. *The radiocarbon dates from PK 11. Atmospheric data from Reimer et al. (2009), calibrated at 2σ with OxCal v4.1.5 Bronk Ramsey (2010).*

Feature	Type	C14 age BP	Cal. 2σ	Prob.	Lab. No.
3	posthole	585 ± 35	AD 1298 - 1372	65.1%	POZ-42484
5	posthole	395 ± 30	AD 1439 - 1523	73.2%	POZ-42485
Section A	layer	685 ± 30	AD 1267 - 1315	63.6%	POZ-42486
30	posthole	910 ± 30	AD 1034 - 1189	92.8%	POZ-42487
32.1	posthole	13.290 ± 60	14.815 - 13.654 BC	95.4%	POZ-42514
32.2	posthole	205 ± 25	AD 1736 - 1805	50.2%	POZ-42515
51	posthole	5030 ± 35	3946 - 3758 BC	87.9%	POZ-42516

Eventually, a total of four results can be retained in order to determine the occupation span of this excavation, which stretches from *c.*AD 1000 to 1500. The most probable date is the earliest date (POZ-42487) found in the fill of post hole F 30. Moreover, the charcoal sample from US 3 in Section A (POZ-42486; see the star in Fig. 8.5) as well as the one from posthole F 3 coincide with the beginning of the 14th century AD. The latest date, attributed to the second half of the 15th century, may reflect the first Europeans reconnoitering the Guiana coast.

It is obvious that more radiocarbon dates are needed in order to establish not only a better insight in the chronology of this site but also the time-depth in between the features. However, it is certainly probable that the occupation encountered in the excavated area started in approximately 11th century AD, which the geological study by Seurin (1976) confirms. It may have lasted until the period of contact with the early voyagers and thus cover *c.*500 years.

The nature or intensity of this occupation, however, remains uncertain. For the time being, we assume that these results do not reflect a single continious occupation at this partiuclar part of the sand bar, but rather a persistant and fluid occupation. Despite these uncertainties, the results generally fit an attribution to the LCA of Cayenne Island and the coastal plains of French Guiana.

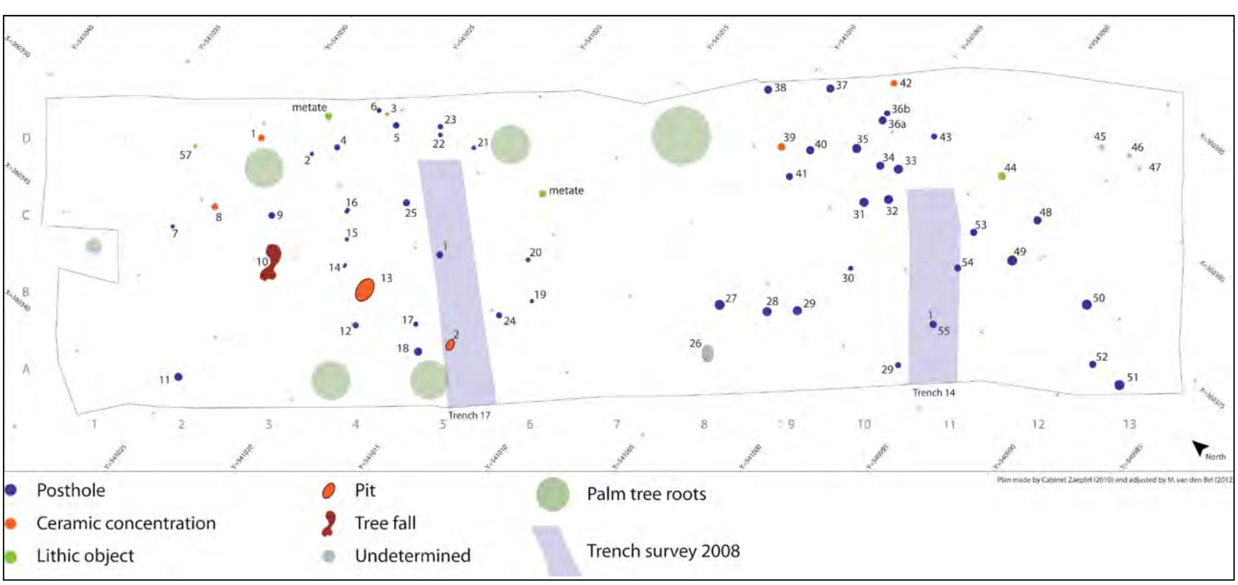


Figure 8.7.The excavation plan.

8.4 The features

In total, 58 features were recorded (Fig. 8.7). Having removed the plough zone by mechanical means, we immediately noticed small concentrations of rocks and pottery. This latter feature is dubbed "crowned post hole" (Fr., *poteau couronné*) after previous experiences at other sites on Cayenne Island (Mestre et al 2005; van den Bel 2007c). This kind of posthole, a large shallow hole containing several large lithic objects and sherds, was identified within the entire perimeter of the excavation, suggesting the site continues in the surrounding environment (Table 8.2). All features were attributed to the pre-Columbian era (Annexe 6.1).

Type	N
Crowned posthole	45
Double posthole	2
Pit	1
Lithic object	2
Ceramic concentration	6
Treefall	2
	58

Table 8.2. The general feature count.

8.4.1 The feature description

The post holes

The only type of postholes identified were the so-called crowned post holes (Fig. 8.8). When excavating such features, a pile of rocks and potsherds marks a diameter of *c.*30 cm. Once cleaned, one can observe either a voluntary deposition or an arrangement of blocks and potsherds in the hole or against the wall. Indeed, it is possible to follow the shape of the hole downwards by means of removing the archaeological material up to *c.*30 cm in depth as, for example, with F 16 or F 41.

In other cases, we reached the bottom of the hole and came across an arrangement of sherds and/or small stones, leaving us with the impression the pre-Columbians wished to obtain a specific position as to the wooden post by means of adding sherds underneath it. Now and again we removed the material in one go (due to the presence of rootlets) and instantly observed the hole's sharp contour. However, we were never able to distinguish a darker fill which may reflect the position or presence of a rotten (wooden) post. Therefore, it is suggested here that the pile of material is a taphonomic process representing the filling up of the hole after the post had been removed or had simply rotten away.

After excavation, 45 crowned post holes and two double ones were recorded. Their orifices at excavation level are circular. The diameters vary between 20 and 50 cm. The fill is difficult to distinguish from the subsoil. Its colour is only slightly darker. Only six similar concentrations of stones and ceramics did not show a hole below it. We can therefore not be entirely certain if these features are indeed postholes.

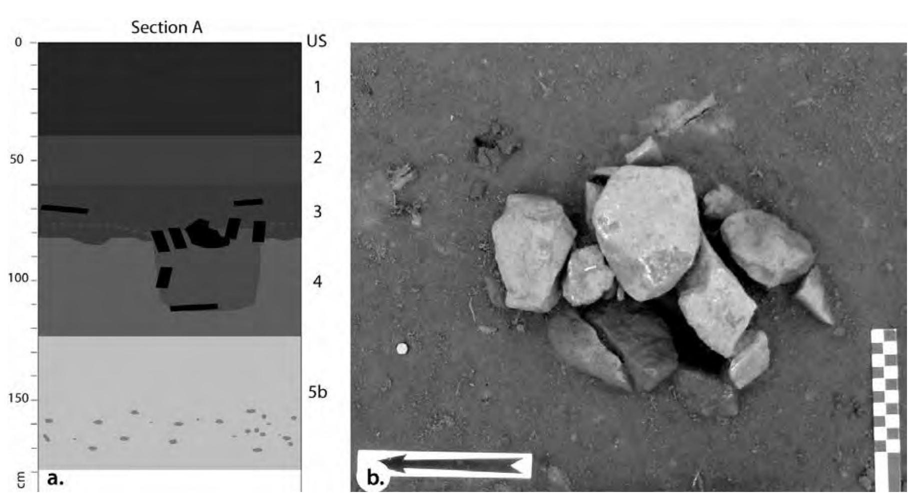


Figure 8.8. A schematic section of a crowned posthole and (b) a zenithal image of crowned posthole F 16.

Pit F 13

Only one pit (F 13) filled with ceramic and stone material was recorded. The contour at excavation level measured *c.*85 x 100 cm. It was quite shallow (*c.*8 cm), suggesting the upper part may have been ploughed away. However, the distribution of the remaining potsherds does evoke it served as a waste pit. Here we must note that the holes left due to treefalls may also have been used as dumps. The survey yielded such a possible feature as can be found in Trench 2 (Briand et al. 2008:10, F 1).

The lithic objects *in situ*

Although these two lithic objects (F 44 and F 56) may have been moved by means of ploughing, their size suggests they may also have been abandoned *in situ*. At present the latter hypothesis is favoured.

8.4.2 The synthesis

The presence of crowned postholes as well as the waste pit represents elements of a habitation site. Similar patterns were found at other sites located at Pleistocene sand bars on Cayenne Island: Katoury (Mestre 2003; Mestre et al. 2005), Vieux Chemin/Glycérias (Cazelles 2002; van den Bel 2007d) and Saint-Cyr (Hildebrand 2005; van den Bel 2007c; Delpech 2010a, 2011b).

These sites evidenced similar crowned postholes. They are probably emblematic as to LCA sites situated on sandy soils (cf. Section 7.2.3). However, the absence of burials –often recognised as rectangular-shaped pits containing pottery debris and depositions (cf. Section 9.4.1)–, ceramic depositions of complete pottery vessels and deep (water) pits, suggest the excavated area may represent a secondary or peripheral habitation zone or annexe of a larger village presumably located on the summit of the ridge.

This hypothesis is comforted when we consider the position of the excavated pit at a larger scale of the entire sand bar. The pit is situated at the sloping, southwestern part of a sandy ridge on the edge of a hydromorphic zone between this sand bar and the Rorota foothills (Fig. 8.9). In addition, at the ridge's summit, large pits were discovered in the course of the mechanical survey (e.g. a very large, standing vessel in Trench 5) (Briand et al. 2008:16). It must be noted here that the surveyed area represents *c.*5% of the expected site surface.

The spatial distribution of the postholes revealed two important areas. At present, however, we are not able to recognise any house plans. Nevertheless, two house locations (HL A and HL B both covering *c.*130 m²) and one posthole alignement (C) were hypothesized as to the excavated area (Fig. 8.9). HL A may have had two central posts, separated *c.*4 m from each other and surrounded by a circle of peripheral posts whereas HL B reveals a squarish plan in which alignment C may play an important role. We must note here that dwellings may also have been built within the hydromorphic zone as stilted houses have also been suggested as to Katoury (Mestre et al 2005). The small number of radiocarbon dates does not permit us to question their contemporaneity. On the contrary, the few dates obtained here suggest two distinguished locations.

To conclude, the supposed peripheral position, the relatively low number of features, and the spaced radiocarbon dates evoke a secondary habitat of a possibly larger site. The hypothesis is that the excavated area represents a very small window

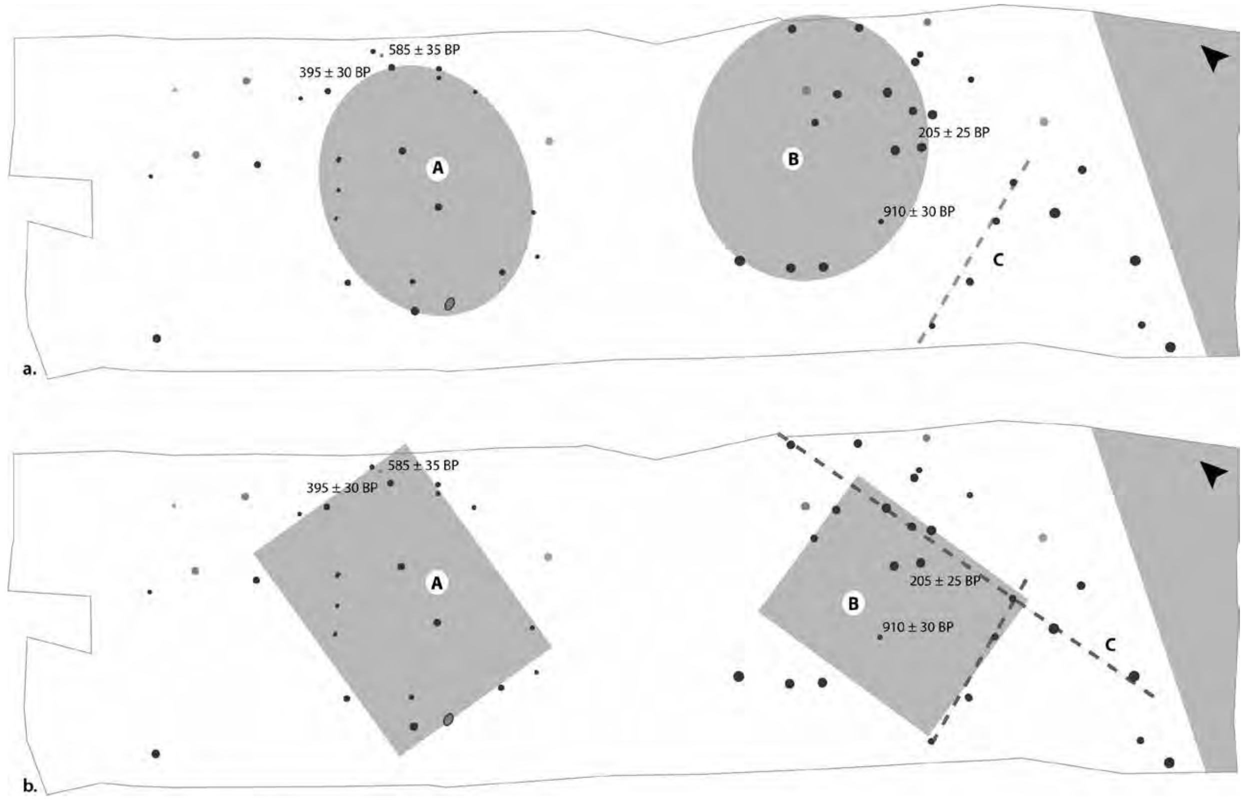


Figure 8.9. The house locations A and B: (a) round house plans and (b) square ones. To the right, the hydromorphic zone is depicted at excavation level.

in a (very) large pre-Columbian settlement of which we have not yet reached the boundaries. Further research is required in order to distinguish the multiple occupations during the LCA with regard to the entire site which can certainly represent an important multicomponent site on Cayenne Island.

8.5 The ceramic study

8.5.1 Introduction

The ceramic assemblage of PK 11 consists of material acquired per square and collected from (anthropogenic) features (Annexe 6.2). The present study focusses on the rim fragments, obtained while excavating the features. We have chosen to exclude the pottery collected per square because their provenance is uncertain (e.g. D1-6, C1-5, B1, A1) or *c.*9 kg in total. However, it may provide additional typological and decorational information. If not disturbed, the collecting per square of residual material may have served to detect dump areas and other features of spatial organisation (see CSL and Crique Sparouine). This study is carried out with the naked eye on sherds larger than 5 cm² (cf. Section 1.3 for methods).

The collection studied here thus only concerns the feature material, comprising 4280 potsherds and weighing *c.*60 kg (Table 8.3) of which pit F 13 contained 28 kg alone. The features F 15, F 24, F 29, F 41, F 45-48 and F 52 did not yield any ceramic material. The disparity between decorated and non-decorated sherds is high: 12.5% of the collection is decorated and *c.*75% of the ECs is decorated, thus attributing a certain importance to this class. This elevated level (over

Total	Plain	Decorated	Weight (gr)	Mean weight
3473	3970	497	59,083	14.8 gr

Table 8.3. The general ceramic count.

			Mode	N
Mineral (2%)	**1**	sand / quartz	11	2
Vegetal (2%)	**2**	charcoal	21	1
		ash	22	1
Mixed (32%)	**3**	charcoal	31	31
		ash and sand	32	16
Grog (64%)	**4**	pounded potsherds	41	92

Table 8.4. The distribution of temper modes.

10%) is similar to other ceramic assemblages found at Cayenne Island, such as Katoury where *c*.13% of the total assemblage is decorated (Mestre et al. 2005:47).

The conservation of the material is rather mediocre which is presumably related to the heavy leaching in sandy soils. Altough the ceramic material extracted from the features is often in a better state than the material extracted from the archaeological layer, the surface finishing and other technological aspects are difficult to apprehend and therefore not included in this inventory.

The one and only technique recorded for this site is the coiling technique. The characteristic marks of each coil, i.e. usually rounded (or hollow) and/or diagonal at the point of attachement, were observed on a large number of sherds. Griddles were manufactured in another manner: by means of superposing two clay cakes. Now and again a thin coil was added to the extremities forming a pronounced rim.

The paste contains non-plastic elements some of which were added as a temper. The type, quantity and origin of this paste are often difficult to establish with the naked eye. The reason for this is that the same EC revealed dissimilar characteristics and quantities at each refreshment of the section. It is presumed that this heterogeneity is related to the rapid malaxation of the temper in the raw clay which was probably not very well cleaned too. One can imagine a badly controlled adding of temper agents or perhaps a careless (assistant) potter. Such traits may demonstrate the possibility of mass production at this site.

Four types of temper were recorded as to the ECs (Table 8.4). We can state that pounded pot sherds are the most frequent temper found at this site, followed by a mixed temper. The latter temper may also contain pounded sherd material. However, its fraction is believed to be too small and has not been considered the paste's dominant non-plastic element as it is for temper No. 41. This is also the case as to the grog tempered sherds in which we often observed sand and charcoal particles. With the naked eye, however, it is very difficult to attribute the various sherds to one of these two types (Nos. 3 or 4). The reason for this is that, as mentioned above, their quantities in the paste varied rendering it problematic to establish a preponderance of a certain agent. It was therefore decided to send ten samples for microscopical analysis (cf. Section 8.5.3). The majority of the griddles contained very, now and again excessively, large fragments of pounded sherds, revealing an even more careless production of this ceramic object. The other types of paste, mineral or vegetal, are anecdotic perhaps even rare. Do they perhaps represent a different occupation or trade ware?

Sample	TS	EC	Feature
A	1	24	17
B	2	25	17
C	3	37	19
D	4	36	19
E	5	8	7
F	6	63	34
G	7	62	34
H	8	138	13
I	9	119	13
J	10	113	13

Table 8.5. The elements for microscopic analysis.

The macroscopical observations on the section concerning the firing technique revealed the following principal colours: (a) red all over, (b) orange/brown all over, (c) dark center (grey/black) with orange/brown sides (surface) and (d) dark coloured (grey/black) all over. The latter two are considered the result of reduced firing (81%) whereas the first represents an oxidizing firing (3%). The remainder corresponds to a combination of the two former firing techniques (16%). The reducing firing technique combined with a grog temper occurs frequently (50%), followed by a mixed temper (29%). Together they represent 75% of the ceramic collection, revealing pertinence as to grog temper and reduced firing. The colour of the exterior surface of this particular ware is bright brown, i.e. 5YR 6/8. This is highly recognisable in a ceramic assemblage and indicates a (technological) cultural marker.

8.5.2 The microscopic analysis

Introduction

Ten sherds were analysed microscopically in order to determine its non-plastic inclusions (Table 8.5). They comprise ten ECs with dissimilar morphologies and decorations in order to assess any possible relationships between the morphologies. Gilles Fronteau (University of Reims, France) carried out this research (in van den Bel et al. 2012a:50–62; Annexe 6.3). This analysis enabled us to also check our own macroscopical analysis.

The microscopic analysis was realised on thin sections with, if possible, perpendicular views of the surface. The sherds were rather fragile and did need to be hardened with resin. The samples were cut, flattened and then rectified and refined at 30 µm, following the standard guidelines of thin sectioning. Several softer fragments were not refined at this thickness, but left unrefined in order to avoid sample damage. Next, the surface of the thin sections was polished without being covered with another glass. This enabled us, if necessary, to apply other methods at a later stage (e.g. SEM, cathodoluminescence).

The petrographic analysis was carried out with an adapted Olympus BX60 microscope connected to a digital Tri CCD camera (QImaging QICAM Color Fast 1394 Cooled). The images were either filed or served instant measuring, i.e. the length of particles, percentages of the “clear” phase (e.g. quartz + porosity).[206]

206 *Saisam* and *Areas* were applied as software (Microvision Instruments).

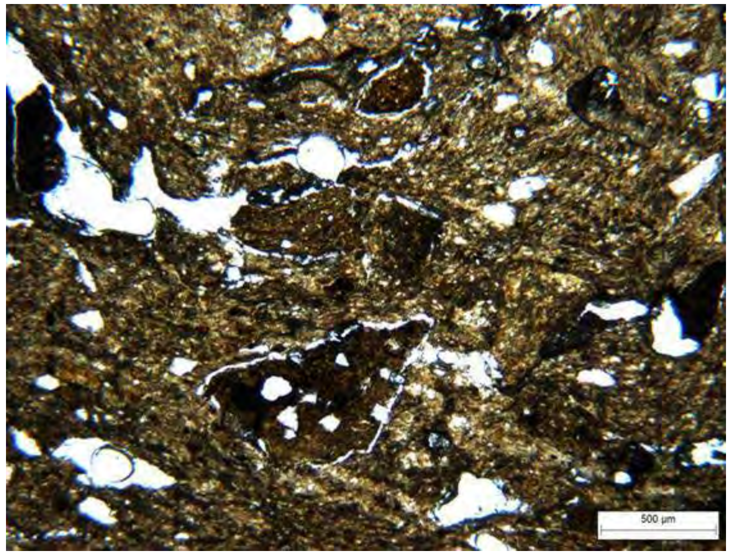


Figure 8.10. A microphotograph 41 (PK11-H) illustrating the heterogeneity of the quartz and the pounded sherd elements (photograph by Gilles Fronteau).

The results

All studied samples contained a significant quantity of pounded potsherds or grog (Fr., *chamotte*).[207] From a petrographic point of view, all sherds belong to one and the same group. Any variation is probably due to the clay treatment, the quantity of the temper and the presence of slip. The inclusions were considered as grog temper *stricto sensu*, because several displayed dissimilar textures when compared to pounded pot sherds. For example, we were able to compare our samples with pounded sherds fragments in the paste when the latter were still sherds with specific morphologies such as rim fragments. These elements are not clay particles, such as dried clay bits or lumps, which may have found their way into the paste while the pottery was working.

Conclusions

All samples contain a sheer abundance of pounded potsherds. In general, their texture is quite similar to the paste of the samples in which they were found. However, several sherds showed grog elements with a heterogeneous texture and colour, i.e. PK11-H (Fig. 8.10).

The pounded potsherd elements often measure between 125 and 500 µm. The largest 0.5 mm fragments are not very abundant which may suggest a screening of the pounded sherd residue. On the other hand, the elimination of large particles by means of handpicking from the pounded material may also be an option. In any case, the largest particles may have been inserted into the griddle paste again.

207 When using the term grog or *chamotte*, Gilles Fronteau presents the following description: 'Les inclusions que nous nommons ici chamottes possèdent fréquemment des angles nets, des contours complexes voir des quelques fois des bords droits. Ce qui montre qu'il s'agit d'un élément dur, possédant une forme spécifique, qui a été cassé ou broyé puis ajouté à la pâte argileuse. Le plus souvent, les microfissures se placent à leur périphérie plutôt qu'elles ne les traversent. Enfin, leur nature est parfois légèrement différente de celle du tesson. Pour toutes ces raisons, nous avons considéré qu'il ne s'agit pas particules argileuses un peu sèches, ajoutées généralement de façon accidentelle à la pâte lors du façonnage de la céramique, mais bel et bien de chamottes au sens strict du terme.'

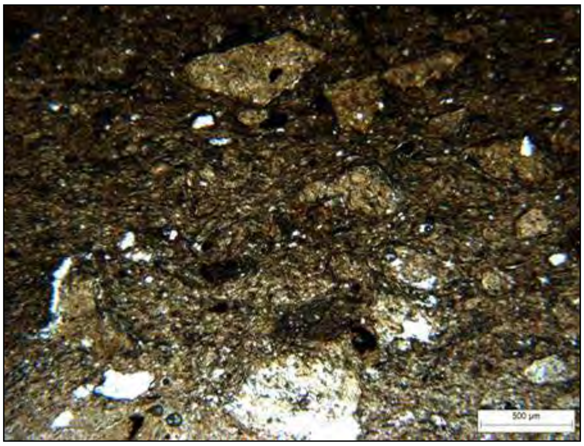


Figure 8.11. The micro-photograph 42 (PK 11-G) illustrating pounded sherd fragments (photograph by Gilles Fronteau).

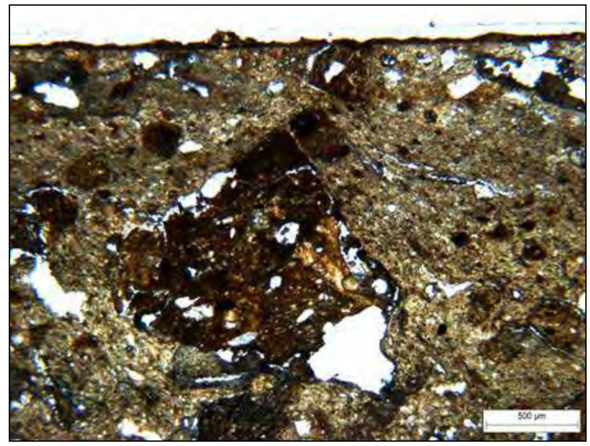


Figure 8.12. The micro-photograph 43 (PK 11-H) illustrating very large and very small inclusions (photograph by Gilles Fronteau).

In general, despite these possibilities, the non-plastics are badly sorted. All sizes measuring between 125 and 500 µm are present in the samples. Moreover, certain sherds in which the temper is clearly distinguished from the clayey matrix –not always the case, as we have mentioned–, include small fragments which may be tiny grog particles, i.e. the samples PK11-G and PK11-H (Figss. 8.11-2).

Similarly the clayey matrix looks on occasion very loamy. Exactly these sherds display larger, rounded elements having the size of quartz sand. We must therefore deal with the following issue: is the addition of sand volontary or is it merely the utilisation of heterogeneous sediments which could be loamy sand and/or clayey loam? However, as minor quantities of sand were identified in our samples, the procuration of raw material in a pedologically heterogeneous clay source is highly probable and thus the idea of volontary adding sand to a rather pure (loamy) clay not so much.

8.5.3 The constituent elements

The catalogue of ECs contains 143 individuals and includes one complete archaeological vessel shape (cf. Annexe 6.2.3). They include 100 rim fragments, 34 bases, and ten griddles. It may be added here that *c.*75% of this constituent register is decorated and that pit F 13 yielded 68 elements (47%), providing excellent, morphological coherent series (Table 8.6).

The rims

The rim collection (excluding griddles) consists of 100 items. The diversity of profiles enabled us to create a morphological distribution consisting of eight modal series (SM I-VIII) (Table 8.6). When conducting this study, we chose to distinguish the following three modes with regard to open and restricted vessels: (a) rectilinear, (b) concave and (c) convex profiles (SM I-VI). However, carination of the vessel wall and/or specific labial treatment for the latter profiles urged us to create subseries, i.e. SM II a-d. Two of the 11 subseries are carinated and two were inflected. The remainder has a specific labial treatment (N=7).

SM		N	Shape	Profile	Lips / Keeled
I	a	5	O	Rectilinear	Rounded
	b	6	O	Rectilinear	Flattened at the interior
	c	6	O	Rectilinear	Inflected
II	a	9	O	Convex	Rounded
	b	7	O	Convex	Flattened
	c	4	O	Convex	Thickened
	d	2	O	Convex	Inflected
III		4	R	Rectilinear	
IV	a	12	R	Rectilinear	Keeled
	b	3	R	Rectilinear	Keeled
V	a	7	R	Convex	
	b	22	R	Convex	Flattened
VI		4	R	Concave	
VII		5	R	Collar	
VIII		4	R	x	
		100			

Table 8.6. The rim series SM I-VIII.

This repartition was enriched by means of measuring the diameter, wall thickness, decoration, while checking its temper. SM VIII (the unique elements) was excluded due to isolated or rare elements. SM VII represents the collars or bottles of which the diameter measures less than 10 cm. This was considered a conclusive element as to the morphological repartition. Remarkably, the latter series was almost exclusively found in pit F 13.

In sum, the series of PK 11 are represented by means of : (a) open vessels (SM I and SM II), restricted vessels (SM III-VI), (c) bottles or jars (SM VII) and (d) unique rims (SM VIII). Series (b) slightly dominates the overall rim collection (52%). SM I-II, SM IV and SM V are the most important series. The others are of minor relevance. A final remark: the unique rims only respresent 4% of the total register and are considered rare elements.

SM V This modal series consists of 29 elements and is the most frequently found within the excavated area. This elevated number refers to the general abundance of restricted vessels. While refitting this type of vessel, we noted that their labial treatment varied constantly along the entire orifice, i.e. pointed, thickened on the inside, rounded. This stresses the factor of hand-made pottery. Thus, the labial treatment is not a very reliable trait, at least with regard to this series. It is therefore suggested to appreciate the general contour of these rims as they also represent boat shaped vessels, i.e. EC 112, EC 113, EC 118.

Despite this apparent haphazardness of lip-finishing techniques, we distinguised only two subseries based on the presence or absence of flattened lips. This mode illustrates a flagrant domination of convex profiles with a flattened or pointed lip (towards the interior) with regard to at least 25% of the ECs. Their wall thickness varies between 6 and 10 mm. Their diameters vary between 22 and 50 cm. Taking the mean diameter (34 cm) of the sum of the most frequented number (N=1.7) as characteristic feature, we observe a higher frequence between 24 and 30 cm and between 38 to 44 cm and an isolated peak at 34 cm.[208] Thus, it is suggested these

208 The diameters over 30 cm have been measured per 2 cm.

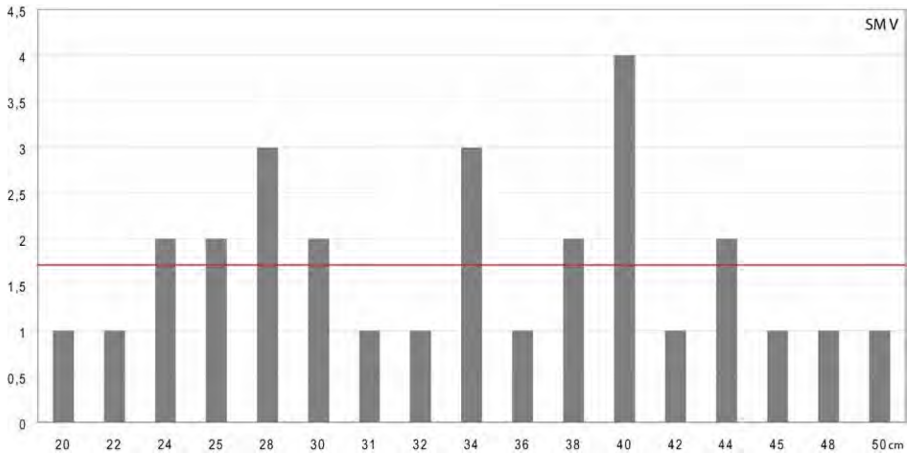


Figure 8.13. The diameter frequency of SM .

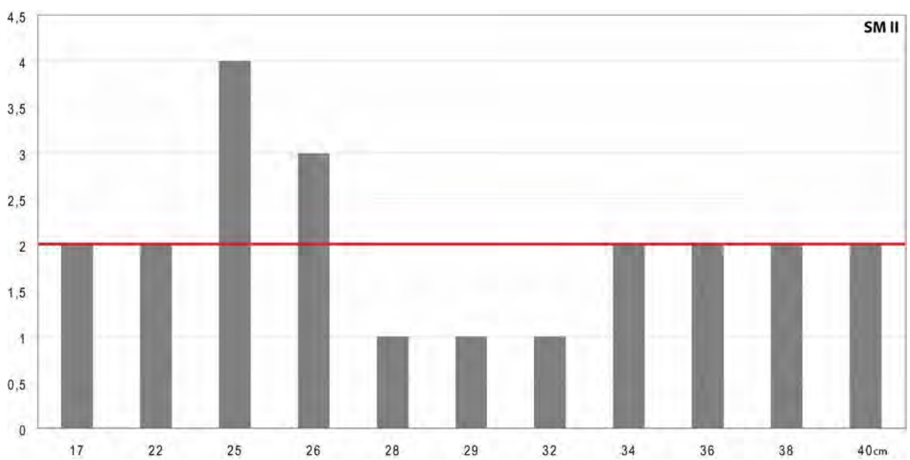


Figure 8.14. The diameter frequency of SM II.

two groups reflect the same vessels, but come in approximately three different sizes (Fig. 8.13).

The preponderance (68%) of pounded potsherd pastes is notable with regard to this series, followed by means of the mixed temper. As stated, the combination of the grog temper and the reducing firing technique is an important element marking this ceramic assemblage and certainly this series.

The presence (83%) of simple, crossed incisions on the exterior of the upper part of the vessel with regard to SM V also represents a clear marker for this series. This abundance may reflect a mass production with regard to this type of decorated vessel. The reason for this is that the incisions appear to be applied loosely or rapidly. Interestingly, *c.*75% of this ware was found in pit F 13, suggesting the repetitive discard of this ware here. This type of incision, albeit to a lesser extent, is associated not only with certain types of modelled appliqués, such as small nubins (single and/or double ones), but also with vertical applied lugs. They were all applied to the outside of the vessel just below the rim and often at the extremities if a boat shaped vessel.

In sum, this series shares a range of similar traits suggesting a homogeneous production: (a) grog (mixed) temper, (b) flattening of the rim, (c) crossed incisions, (d) boat shaped vessels with appliqués and (e) three dominant vessel sizes. This ware ware often features black soot (or remnants hereof) on the surface of the upper part of the outer wall, suggesting a (liquid) content had boiled over and that it had been burnt in or next to an open fire (cf. Section 8.7.2 for starch grain sample PK11-F).

SM II The series SM II (22%) is almost as popular as SM V. Labial treatment enabled us to distinguish four subseries SM IIa-d: (a) rounded (41%), (b) flattened (32%), (c) thickened (18%) and (d) inflected lips (9%). Among these subseries, the rounded and flattened lips are the most frequent. The wall thickness varies between 5 and 10 mm and the diameters between 17 and 40 cm. When the mean diameter (29 cm) of the sum of the most frequented number (N=2) is taken as characteristic feature, the result shows a higher number of vessels with diameters measuring 25 and 26 cm (Fig. 8.14). This concentration reflects a popular diameter for this modal series, but does not correspond to a particular subseries.

As mentioned above, we note not only the preponderance of chamotte pastes but also of reduced firing. As much as 63% of this series is mainly decorated on the exterior face (71%) whereas 29% features an exclusively red slip on its interior. Incisions, generally speaking, are found with regard to SM IIa and b subseries. Red slip is found on the SM IIc bowls of which two fragments have incisions on the lip, i.e. EC 110, and also have an indented or polylobed lip, i.e. EC 62. The latter element represents the only complete recipient.

SM I This, the third most popular modal series, has an open shape with a rectilinear profile (17%). The labial treatment allows us to define three subseries (SM Ia-c): (a) rounded lips (30%), (b) lips flattened at the interior (35%) and (c) inflected lips (35%), all with an equal popularity.

The wall thickness varies between 5 and 9 mm. The rim diameters vary between 22 and 48 cm, with the exceptioin of one goblet measuring 12 cm, i.e. EC 3. All subseries have varied dimensions. Again we can note a preponderance of sherd-pounded pastes and reduced firing techniques. As much as 65% of this series is decorated of which 55% features red slip and 45% includes incisions. We observed an almost exclusive application of a red slip to the interior of the SM Ib subseries.

SM IV The fourth most popular series consists of non-restricted vessels with a keeled profile (15%). This keel, recorded for the upper part of the vessel, may diverge towards the exterior (80%) or the interior (20%). The first trait occurs most frequently. The wall thickness varies between 4 and 14 mm. The rim diameters vary between 16 and 54 cm. One can easily observe the rather thick vessel walls (measuring between 9 and 14 mm) as well as the considerable rim diameters (measuring between 36 and 54 cm) of SM IVa in contrast to the thin vessel walls (measuring between 4 and 5 mm) and the rather small rim diameters (measuring between 16 and 28 cm) of SM IVb. Each subseries has varied dimensions. Yet, again, we note the preponderance of grog and reduced firing.

As much as 80% of this series is decorated by means of incisions applied exclusively between the rim and keel, such as the remarkable wavy-lines. Based on on the specifis shape and decoration modes, this series is homogenous.

SM VII The rims of this series are characterised by means of a rim diameter measuring less than 10 cm. The shape of the neck resembles that of a bottle. It is represented by five items, i.e. 5% of the EC population. EC 142 is considered a miniature exception. The wall thickness varies between 6 and 8 mm. All the elements are tempered with pounded potsherds and fired in a reducing environment. Three fragments have incisions on the exterior of which one has a red slipped "band" around its neck, i.e. EC 93. This series may possibly also feature keels, situated just below the base of the neck and, in this way, can be attributed to SM IV. Notably this entire series was discovered in pit F 13 as was the majority of SM Vb, suggesting contemporaneity of these vessel shapes.

SM III This small modal series is represented by means of rims inclined towards the interior with a rectilinear profile (N=4). The lips are rounded. The wall thickness varies between 8 and 10 mm. The large diameters vary between 38 and 50 cm. Only one item has incisions applied to the exterior.

SM VIII This series regroups all the elements which do not fit into the above-mentioned descriptions (N=4) and do not share any apparent morphological resemblance.

The bases

The base register is composed of 34 items, i.e. 34% of the EC total. These have been divided in four modal series, firstly defined according to shape and secondly to the manner in which the first coil is applied to the pinched base (Table 8.7). Flat bases (SM 1-2) are slightly more frequent (52%) than dimpled bases (SM 3-4, 48%). Pedestalled bases are more or less absent with the exception of one small fragement found in posthole F 10 with a diameter of *c*.6 cm.

Flat bases The series of the flat bases (N=18) was divided according to the rim profile: either a convex (SM 1, 26%) or an appendicular profile (SM 2, 26%). These subdivisions represent two dissimilar techniques in order to apply a coil to the round base. The base thickness varies between 5 and 18 mm. The diameters measure between 5 and 20 cm. We observed that thin bases have rather small diameters whereas the largest diameters dominate the appendicular bases. Two individuals were decorated (22%) with a uniform red slip on the interior (e.g. EC 9, EC 62). As to the rims, the mixed and groggy paste predominates as does the reducing firing technique.

Dimpled bases These bases (N=16) were also subdivided according to the rim morphology of the rims, with either a convex (SM 3, 29%) or an appendicular profile (SM 4, 18%). The thickness varies between 5 and 15 mm. The diameters measure between 6 and 18 cm. As to flat bases, the thin bases are more likely to have small diameters whereas larger diameters are confined to thicker appendicular bases. Again, two individuals were decorated (13%) with a red slip on the interior of which EC 76 displayed a painted geometric design caused by means of the application of a darker red slip (bichrome).

SM	N	Base	Profile
1	9	Flat	Convex
2	9	Flat	Appendicular
3	10	Dimpled	Convex
4	6	Dimpled	Appendicular
	34		

Table 8.7. The base series SM 1-4.

The griddles

The class of the griddles is represented by means of only ten items, i.e. 10% of the EC total. They were subdivided according to the rim morphology: either unmodified (SM A) or modified with regard to the application of a finishing rim coil (SM B-E) which may be pointed, rounded, flattened or appendicular (Table 8.8).

The small quantity and poor quality (rather small fragments) of these griddles at PK 11 provide us with little morphological information. However, the types of rim finishing, thickness (measuring between 11 and 29 mm) and diameters (measuring between 25 and 60 cm) reveal a large variety of griddle types. The temper consists almost exclusively of pounded pot sherds of which certain fragments are larger than 1 cm! Their representativity of 10% as to the entire EC total seems in concordance with other sites, such as Katoury with 13% of its total (Hildebrand in Mestre et al. 2005:53).

8.5.4 The decoration modes

The decorated sherds (N=496 or 12.5%) also represent a modal category of the ceramic collection (Annexe 6.2.4). The decorative repertoire is rather basic and is composed as much as 82% of incisions. The incised mode of decoration (N=405) is by far the most frequent mode when compared to the painted mode (17%).

The incisions

Incisions are, with the exception of two items, solely applied to the exterior face of the upper part of the vessel. With regard to the present study we distinguished four modes: (1) parallel vertical and/or oblique incisions, (2) vertical crossed incisions (Fr., *treilles*), (3) alternated incisions (Fr., *chevrons*), and (4) complex incised motifs often confined to a zone or cartouche. Modes 1 and 2 appear to be applied in a rather quick and sloppy manner as mentioned above with regard to SM V, whereas the other two modes are often much carefully executed.

All the modes of the incised decoration as to Cayenne Island were grouped by Stéphen Rostain and named *Mahury Incisé* (Rostain 1994a:225–230), albeit *Cayenne peint* also features incisions (Rostain 1994a:446). Jean-François Turenne (1974:29) composed however the very first inventory when studying the ceramic assemblage of the Pointe Gravier site near Dégrad Cannes, at the foot of the northeastern slopes of Mont Mahury (Fig. 8.15). Other inventories dealing with Cayenne Island decoration modes Hugues Petitjean Roget and Dominique Roy (1976:172), Alain Cornette (1990:207–208), Stéphen Rostain (1994a:851) and Matthieu Hildebrand (2000:51; Mestre et al. 2005:60) established, evidencing a wide variety of incised motifs.

As to the PK 11 assemblage, vertically crossed, oblique incisions were mainly applied to SM Ic, SM IIa-b and SM Va-b. Carefully applied motifs in a cartouche decorate the keeled series of SM IVa. Among the rim elements of pit F 13 (N=57), we noted that 30% hereof feature simple parallel, vertical incisions on the exterior face of the upper part of the SM V series. Although there are not many complete vessel shapes, we do hold the view that the specific type of incisions on this series can be grouped together with the *treilles* regarding the slightly restricted vessels which we will refer to these vessels as “Form A.” The rim diameters of this form vary between 30 and 50 cm. The vessels may be boat shaped. At the rounded

SM	N	
A	2	Straight
B	3	Pointed
C	1	Rounded
D	2	Flattened
E	2	Appendicular
	10	

Table 8.8. The griddle series SM A-E.

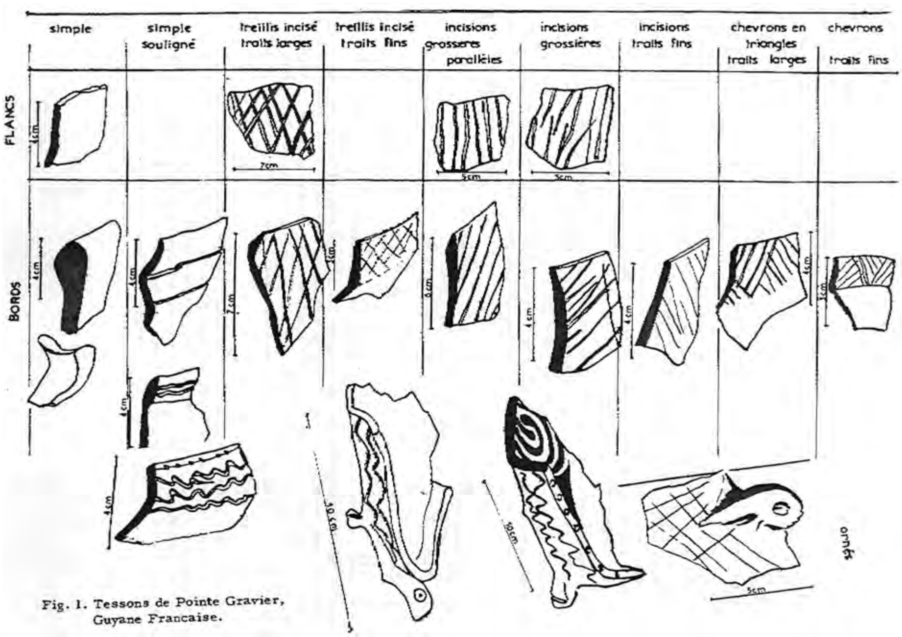


Figure 8.15. The modes of decoation Jean-François Turenne defined as to the Pointe Gravier site (after Turenne 1974:29). This site yielded a single radiocarbon date: 2500 to 1300 BP. However, this date is questionable and probably too early when considering this site's ceramics.

or pointed extremities of the boat shaped specimens we may observe small, modelled appliqués such as nubbins or thin incised clay strips (Fig. 8.16a). We frequently noted black soot attached to the exterior face of the upper vessel wall, but unfortunately did not find a complete vessel of this type or an example which could be refitted (cf. Section 8.7).

Apart from the parallel and crossed incisions, we observed alternated and more complex motifs in a cartouche, i.e. applied between the rim and the keel of SM VIa. All other modes of incision (e.g. wavy-lines, punctations, notches upon the lip) are rare with regard to this assemblage albeit that those wavy-lines represent highly recognisable elements.

The slipping

The slipped ware (N=90) represents *c.*17% of the decorated total. It is often applied to the interior of the vessel (77%) whereas the remainder is applied to the exterior wall. The hue lies between "Red" 7.5R 4/6 (EC 107) and "Dark red" 7.5 R 3/6 (EC 10). Red bichrome painting was observed only once with EC 76. The bifacial application of red, white-on-red, white, black or orange slip was not observed at this excavation, albeit that these painted decoration modes were recorded during the survey (Briand et al. 2008:30).

Interestingly, in certain cases a red slip was applied in a "band" around the bottlenecks of which several featured parallel incisions, punctations or even small appliqués. This morpho-stylisitic combination has been noted with regard to the Katoury site (Mestre et al. 2005:63).

The modelling

We registered a small number of modelled appliqués, representing *c.*1% of the decorated total. These elements (e.g. nubins, small clay strips, a small biomoporphic *adorno*) were all applied to the exterior face. The absence of handles as well as a large, but missing appliqué with EC 25, was recorded for this assemblage.

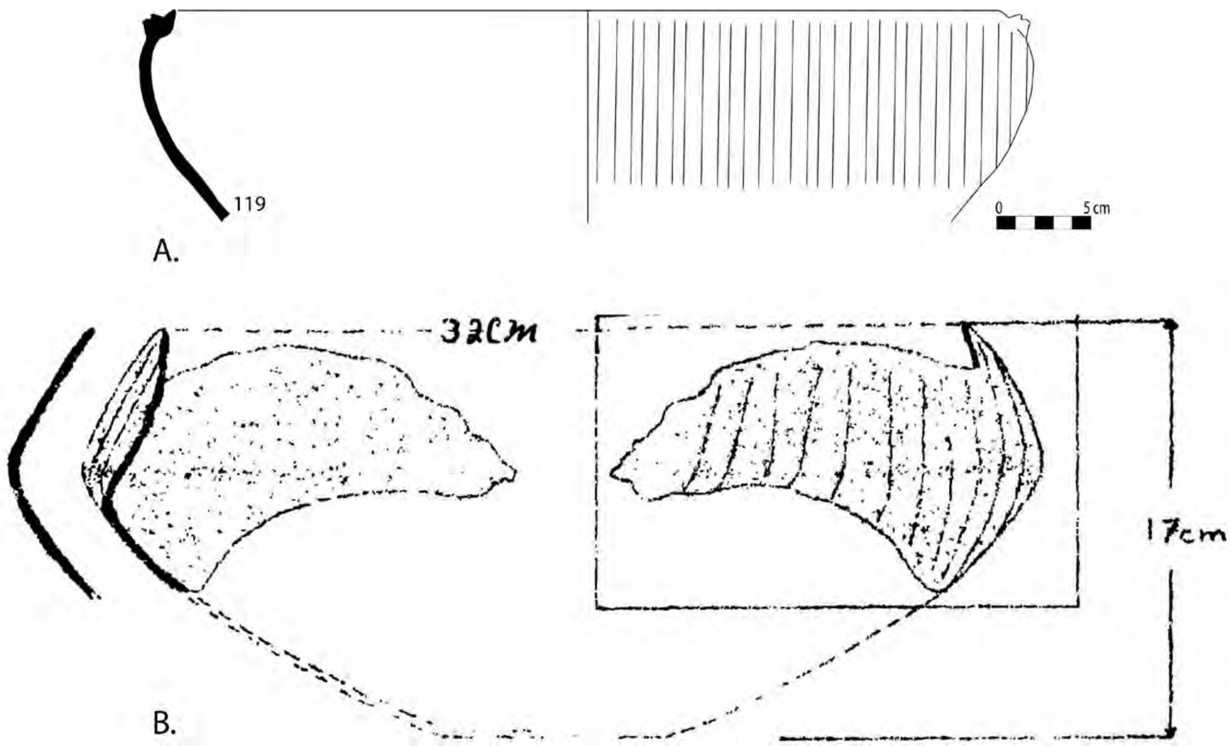


Figure 8.16. Two examples of Form A: (a) EC 119 (SM V) found in pit F 13, (b) Rorota, Carré CB (after Petitjean Roget and Roy 1976:174, Plate 10).

A beautifully modelled leg, i.e. F 23, with a red slip is noteworthy as it may have belonged to a statuette. Another modelled anthropogenic body feature was found in the hydromorphic zone. It consisted of a fragment measuring 6 cm in diameter and represented a human face, featuring only its chin, cheek, and neck. Tiny notches, depicting a stylised beard (?), was delimitated by means of an enclosing incision upon the cheek.[209]

8.5.5 Conclusion

The ceramic series

This synthesis is based on 143 constituent elements as well as associated decoration modes. The morphological rim register (N=100) declines around the SM I-II and SM IV-V (83%) of which SM II and SM IV occur the most frequent, representing 50% of the constituent rim total. The other modal series are a minority series, but do represent specific morphological markers, such as bottlenecks (SM VII).

In addition to these significant morphological series we can note recurrent combinations consisting of morphological shapes and decoration modes. The most frequent recipients are: (a) spheric bowls with vertical incisions, either simple or crossed, placed on the upper part of the exterior of the vessel wall (SM IIa-b and SM V), (b) carenated pots with chevrons (SM IVa), (c) necked pots or jars with a red band and/or incisions (SM VII) and (d) small bowls with a red slip applied to the entire interior of the vessel (SM IIc).

209 These small notches may also represent small white bird feathers which are often applied by Amazonian groups during ceremonies in order to personify a specific (mythical) animal or individual.

Moreover, we must mention the omnipresence of pounded potsherds as a temper which is probably screened. This temper in combination with reduced firing represents characteristic and prevailing production techniques. All in all, these traits allow us to propose a well defined ceramic production not only with possibly standardised stylistic but also with specific cultural parameters regarding the vessel's shape, modes of decoration, firing and paste.

The cultural affiliation

If we wish to establish a chrono-cultural ascription with regard to this ceramic assemblage, we can attibute the PK 11 ceramic assemblage to the type named *Cayenne peint* when considering the grog temper. On the other hand, it can also be attributed to the *Mahury incisé* type when taking the omnipresence of this decoration mode, i.e. incision, into account knowing that both types share incisions as a characteristic element. In both cases, the assemblage is to be attributed to the Thémire ceramic complex of Cayenne, as Rostain defined:

> *Deux types céramiques au moins caractérisent le complexe THEMRE : Le type CAYENNE PEINT (5608 tessons et 23 poteries entières) est dégraissé avec de la chamotte. Il présente beaucoup de plaques, d'assiettes, de plats et de plats creux, quelques pots, des vases-gobelets et des jarres. Le décor, présent sur 21% du matériel, est principalement constitué de peinture rouge et souvent dichromatique rouge et blanche, d'incisions rectilignes, de rangées de ponctuations, d'encoches d'impressions digitales, de brossage, de cordons ponctués appliqués, de bords lobés, d'appliqués simples ou élaborés zoomorphes ou anthropomorphes, de colombins apparents.*
>
> *Le type MAHURY INCISE (2103 tessons et 4 poteries entières) est dégraissé avec du sable quartzeux ou un mélange de sable et de mica noir. I1 présente des plaques, des jattes, des écuelles, des plats creux et des pots. Le décor, présent sur 20% du matériel, est principalement constitué de peinture rouge et souvent dichromatique rouge et blanche, d'incisions rectilignes, de rangées de ponctuations et d'encoches, de peignage, de bords lobés, d'appliqués simples ou élaborés zoomorphes ou anthropomorphes.*
>
> *Un autre type et une catégorie céramiques, moins bien connus, apparaissent également dans certains sites du complexe THEMIRE: La catégorie MONTABO ROUGE (169 tessons) est dégraissée avec du sable quartzeux, la pâte étant d'un rouge caractéristique. Le décor est constitué d'incisions rectilignes, de rangées d'encoches, de peinture rouge et de modelés zoomorphes élaborés. Cette catégorie n'apparait que dans deux sites de l'Ile de Cayenne.*
>
> *Le type MELCHIOR KWEP (231 tessons et 4 poteries entières) est dégraissé avec des écorces brûlées et broyées. Le décor, présent sur 28% du matériel, est principalement constitué de peinture blanche ou rouge, d'incisions rectilignes, de rangées de ponctuations, d'encoches et d'impressions digitales. Si ce type, qui apparaît sur le littoral occidental dans le bas Approuague et dans le bas Oyapock, n'est pas encore sûrement attribué à un complexe culturel, on peut toutefois déjà le rattacher partiellement au complexe KORIABO. La définition de ce type céramique demeure provisoire, puisqu'il représente probablement l'amalgame de deux types proches, que le manque de données empêche encore de distinguer.* (Rostain 1994a:446–447)

Carefully reading this definition of the Thémire complex, we note that each ceramic type is defined according to 'les caractéristiques de la pâte, l'état de surface, la forme et le décor' (Rostain1994a:149). Paste, shape, finishing and decoration modes thus represent the principal criteria for a comparison. Although our modal analysis does not correspond to the results of the Ford-method –if any comparison is allowed– as applied by Rostain, the most relevant difference probably lies in the quality and quantity of both data sets. Scepticism with regard to the Ford-method is justified, as Louis Allaire (1977:128) pointed out: 'typology is useful in classifying surface collections and test excavations, but it fails to provide more detailed information on many other aspects of the pottery.'[210]

The majority of the Thémire ceramics were obtained during pedestrian surveys as well as at several test pits on ten archaeological sites, situated between the Kourou and Mahury Rivers. The PK 11 material however originates from a single site in a "closed" and extensive context.[211] When comparing the PK 11 ceramics with the various types of the Thémire complex, one notes a contradiction between the most frequent series of PK 11 and the type named *Cayenne Peint*. The latter is supposed to feature red and white-on-red paint in abundance whereas the popular series of PK 11 mainly features incised decorations and no white-on-red painting at all, with the exception of a single fragment found during the mechanical survey.

Aside from this example and the difficulty of ascribing the modal series to a specific type, as mentioned above, we can either redefine a type by means of merging aspects of existing types or propose a new complex based on a dissimilar method. Revising the Thémire types represents a more constructive option as Rostain states considering his PhD dissertation (1994b:10, note 2): 'Comme aucune typologie céramique n'avait été définie en Guyane, et comme il n'existe pas de méthodologie encore bien adaptée au matériel amazonien, nous avons adopté une classification préliminaire simplifiée; il sera nécessaire dans le futur de distinguer de nouveaux types et de subdiviser certains de ceux qui existent en plusieurs variétés.'[212]

The excavations at PK 11 as well as numerous other compliance investigations carried out since 2002 by INRAP members as well as other archaeologists on Cayenne Island and its direct vicinity have evidenced a large body of ceramic material enabling us to evaluate the types of the Thémrie complex. The ceramic assemblage of PK 11 allows us to propose a ceramic series: Forms A-D, each with distinct vessel shapes in combination with a specific decoration mode and grog temper. We will now provide an initial description of each of these forms, or series, as well as the references found at other sites. It is important to note here that these series are contemporaneous, as they were also found together in pit F 13 (Fig. 8.17):[213]

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210 For further critique on the sole application of the type-variety classification system, see Culbert and Rands (2007).

211 For further reflection on the adoption of a certain method with regard to the study of ceramics in the Americas, see Coutet (2009:95–99).

212 Rostain states here that no ceramic typology has been defined with regard to French Guiana prior to his publication, hereby entirely ignoring the paper Alain Cornette presented at the 1985 AIAC Congres in Porto Rico which features without doubt a typology for the Island of Cayenne (Cornette 1990). Rostain probably applied the Ford-method in order to compare his data to the results of Meggers and Evans' excavations in the mouth of the Amazon and British Guiana.

213 It must be added here that the present author carried out the ceramic study of PK 11 while studying the ceramic material of the Cimetière paysager Poncel site (CPP) that features the same ceramic complex.

Form A A spheric, slightly restricted bowl which can also be boat shaped. Its vertical or oblique incisions, either parallel or crossed, appear to have been applied on the upper exterior of this vessel hastily. These large bowls may feature small nubbins or vertical lugs. The diameters vary between 30 and 40 cm.

Form A was encountered at Wayabo (Briand 2008:47, Plate 1.3), Soula (Mestre 2006:29), Rorota (Petitjean Roget et Roy 1976:174, Plate 10), Pascaud (Rostain 1994a, Fig. 119.8, 16), Katoury (Mestre et al. 2005:68, Figs. 3, 7; Coutet 2009:255, Type Ia, p. 257–258, Type III), Montabo Sud (Coutet 2009:205–207, Type I-III) and Saint-Cyr (Delpech 2010, Annexe B) and Cimetière paysager Poncel (cf. Section 9.5.4).

Form B A spheric (?), keeled jar with a rim flexed towards the exterior. It often includes alternating and/or composed incisions in a cartouche applied between the lip and the keel. The orifice measures between 35 and 55 cm. This form is coined "Vase d'Alexandre" with regard to the Rorota site (Petitjean Roget et Roy 1976:174, Plate 9 and Fig. 8.16b). This type of jar has further been identified at Katoury (Coutet 2009:259, Type Iva 1, 3), Thémire (Rostain 1994a, Fig. 119.9), Montabo Sud (Coutet 2009:211, Type 7), Saint-Agathe (Samuelian 2009:63, Plate 3a-d) and Cimetière paysager Poncel (cf. Section 9.5.4).

Form C A spheric, necked jar or bottle, of which the orifice measures less than 10 cm. The neck often features a red slipped band applied to the lower part of the collar as well as obliques or composed incisions. These shapes were indentified at Katoury (Mestre et al. 2005, Figs. 4-5; Coutet 2009:260, Type IX), Montabo Sud (Coutet 2009:213, Type IX), Vieux Chemin (van den Bel 2007b:89), Soula (Mestre 2006:29) and Cimetière paysager Poncel (cf. Section 9.5.4).

Form D A bowl with a uniform red slip applied on the interior. Its diameter measures between 15 and 20 cm. An indented, or polylobed, lip may be present as well as darker red motifs (bichromie or duotone) or even white-on-red painting. However, this vessel shape needs further specification as it is found on nearly all other sites (Rostain 1994a, Fig. 110).

Claude Coutet (2009:448) proposes another 'morpho-stylistique récurrente' shape for the Thémire complex, suggesting it: 'consiste en un récipient ouvert dont le bord est engobé en rouge et le corps en blanc. Nous retrouvons ce type de récipient sur l'Ile de Cayenne, à Bois Diable et nous en avons également collecté en surface sur le site de Sainte-Agathe à Macouria (un des sites Thémire localisés entre l'île de Cayenne et le site du Bois Diable). This shape is called Type 4 as to site of Vieux Chemin (Coutet 2009:282). It was not only found during the preliminary research at PK 11 (Briand et al. 2008:31), but also at Sainte-Agathe (Samuelian 2009:61, Plate 1n-p) as well as at the Mont Grand-Matoury (Grouard et al. 1997; Grouard et Tardy 2003; Hildebrand 2000). Further analysis of PK 11 will be presented in combination with the Cimetière paysager Poncel material in Chapter 9.

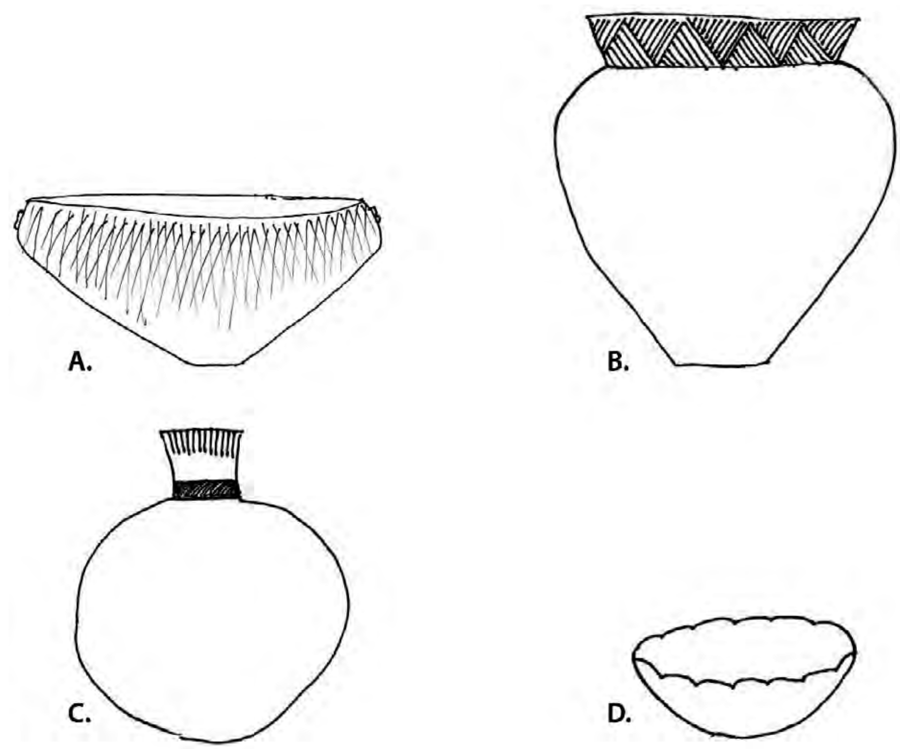

Figure 8.17. The sketches of Forms A-D (not to scale).

8.6 The lithic study

8.6.1 Introduction

The lithic material found at PK11 contains 726 artefacts in total. The material has been collected in 4 x 4 m squares (A1-D1, D2-5 and C6) as well as from features (Figs. 8.4 and 8.7). The analysis of the assemblage has been conducted by Sandrine Delpech (in van den Bel et al. 2012:73–74) (Table 8.9). As mentioned before, US 1 and 2 represent a recent modification implying that the artefacts from this layer are *ex situ* and may not represent the lithic debris of the initial stage (Annexe 6.4). A translated and abridged version is presented here.

8.6.2 The tools

One of the striking features of the assemblage is the low number of worked stone and lithic tools. The latter is only represented by means of 38 items (~5%) (Annexe 6.4.2). Flaked quartz stone is even more rare: only one small non-cortical flake (No. 6, < 2cm), four waste fragments (Nos. 7-8, 16, 19), and two trapezoidal flake cores (Nos. 21 and 26). The latter pair has two striking platforms each measuring 3 cm in length. A possible scraper (No. 23) was made from a quartz bloc and measures 6.8 x 5.0 x 2.3 cm. It possesses large alternating negatives on one side and short ones on the other side.

The passive grinding tools consist of four metates (Nos. 5, 20, 27, 34), varying between 12.4 and 20.8 cm in length. They have been made from different raw materials (e.g. gneiss, dolerite, granite blocs) showing one or two abraded flat or concave sides. One metate was subjected to starch grain analysis (No. 34; cf. Section 8.7.2). The active grinding tools consist of four manos (Nos. 4, 11, 35-37)

		Survey	Excavation
	w	7	1
	Fragment	9	4
	Cores	-	2
	Scrapers	-	1
Tools	Axes	1	1
	Lustering	6	4
	Metate	3	4
	Mano	-	6
	Polishing	-	11
	Undetermined	18	4
	Manuports	72	688
	Total per operation	116	726
			842

Table 8.9. The general lithic count.

represented by means of various pebble fragments (measuring between 5 and 12 cm long and *c.*5 cm in thick), having one or two flat faces caused by means of abrasion.

Four polishing stones (Nos. 1, 12-13, 32) are represented by small, but complete pebbles. They measure between 3.5 and 7.8 cm long and are less than 4 cm in thick. One face is usually flattened. We also recorded ten tools with abraded areas on one side which were classified as polishing tools, including Nos. 2-3, 14-15, 22, 24, 28-29, 31, 33 and 38. These comprise blocks and fragments of granite, dolerite, granodiorite or non-identified, came with various dimensions (measuring between 5.5 and 37.5 cm). As yet their function remains unknown. Five unclassified items form a very heterogeneously shaped group with rare morphologies (Nos. 9-10, 17-18, 30).

8.6.3 The manuports

The manuports represent the large majority of the collected material (N=688, 91.5%) and have served principally as supports for wooden posts (Annexe 6.4.3). They consist mainly of blocks measuring between 5 and 20 cm and have a rather weathered appearance. Raw materials have been identified, including granites and fine-grained granodiorites, fine-grained dolerites, several saccharin quartz blocks, a small number of lateritic pieces as well as many unidentified rocks. The majority of these materials can be found in the vicinity of Mont Mahury, whereas the nearest known quartz veins are found at: (a) Mont Saint-Martin, situated at a distance of approximately 2 km or (b) Anse Chaton to the east of the city of Cayenne.

The distribution of manuports in the postholes illustrates two distinct zones within the excavated area (Fig. 8.18). Despite the identification of these zones, the distribution does not permit us to identify the lay-out of a wooden structure. It only refers to the anthropogenic origin of the feature.

8.6.4 Conclusion

The almost complete absence of quartz debitage and its associated manufacturing tools (e.g. hammerstones, anvils) is a remarkable result of this small excavation. Although the absence of systematic handpicking and screening may be the cause of the recovery of so little quartz flaked stone, it cannot explain a total absence of larger quartz tools, suggesting quartz reduction was of minor importance at the

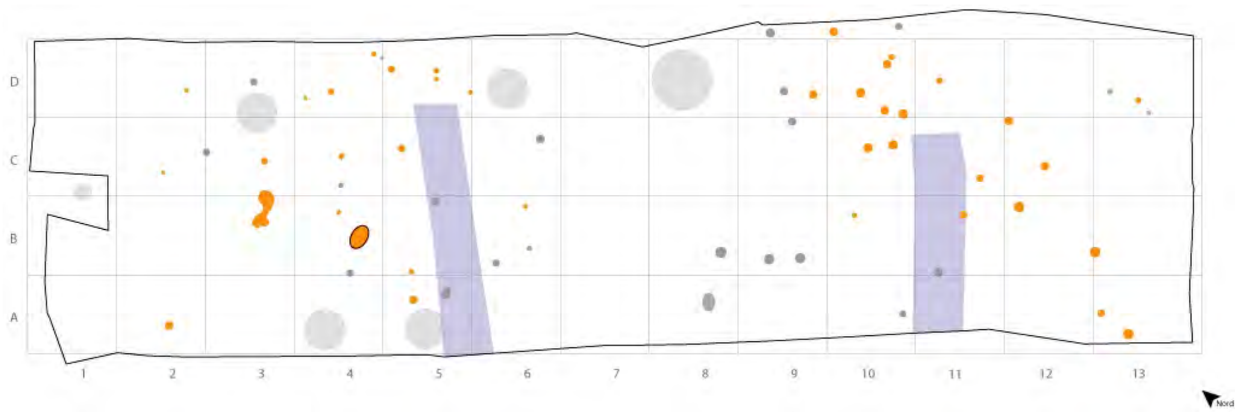

Figure 8.18. The spatial distribution of postholes containing manuports indicated in orange.

site. The high number of manuports can largely be ascribed to the focus on features during the excavation which proved to be rich in these types of rocks. All in all, the current lithic assemblage roughly resembles that of the Katoury site, also a large habitation site on a Pleistocene sand ridge (Delpech in Mestre et al. 2005).

8.7 The starch grain analysis

8.7.1 Introduction

Jaime Pagán Jiménez carried out the starch grain analysis on six artefacts (PK11-A to F): three griddles, two potsherd rims and one milling stone or metate (in van den Bel et al. 2012a:75–83) (Table 8.10). Its goal was to determine the plants utilized by the pre-Columbian population on this site. Only one sediment/residue sample was extracted per artefact. Four artefacts (PK11-A to C and F) were processed in Porto Rico by Jaime Pagán Jiménez. The present author processed the two remaining ones (PK11-D and E) in Cayenne. We removed pinpointed samples from various locations across the used surfaces of the six artefacts. Sample extractions in artefact PK11-F (fragment of a cooking vessel) were guided by means of the collection of pinpoint samples from (a) the interior and (b) the evident charred material attached to the external wall (Annexe 6.5).

8.7.2 The results

Table 8.11 synthesizes the results obtained by means of this study. We will briefly comment on the results of each artefact. It should be noted here that as to Table 8.11, ubiquity (expressed in percentages) combine approximate (cf.) and secure identifications and refers to the occurrence of the identified taxa between the sample spectra. The richness of a species also combines approximate and secure identifications.

Artefact PK11-A

This griddle fragment (EC 6) shows evident signs of heat in the external and internal sections. Heat impact on this artefact could be the result of heating (a) in the course of manufacturing the artefact or (b) caused by the means of the later utilisation of the griddle. The starch grains recovered presumably stem from the

	Sample	Feature	Type
PK11-A	EC 6	1	clay griddle
PK11-B	EC 35	18	clay griddle
PK11-C	EC 38	20	clay griddle
PK11-D	EC 111	13	rim fragment
PK11-E	#34	square D4	milling stone
PK11-F	EC 8	7	rim fragment

Table 8.10. The starch grain samples.

time it served to cook/prepare food with. This premise also applies to the other clay griddle fragments (PK11-B and C) and other ceramic fragments (PK11-D and F) studied here.

Of the 25 individual starch grains recovered here, only four individual starches and one cluster consisting of *c*.90 starches showed clear signs of damage by means of heat. Boiling plant organs and/or cooking of humid masses on the griddle were probably the main reasons for this damage. The remaining 18 singular starch grains did not show any signs of a similar damage, but did display pressure damage. Grinding or pounding the starch grains' plant sources were perhaps the result of a process prior to its integration into the artefact. This suggests these grains could be preserved regardless of any heat factor or that they were integrated into the clay griddle when far away from any heating context. Preserving starch grains in heating contexts has been demonstrated before (Zarrillo et al. 2008) as has the use of griddles as working surfaces for manipulating food derivatives prior to any cooking process (Rodríguez Suárez and Pagán Jiménez 2008). Thus, the starch grains encountered in this griddle support both scenarios. It presumably represents two dissimilar episodes of this artefact's history: (a) being applied as a cooking utentsil and (b) later as a working surface for manipulating food derivatives prior to cooking.

Maize starch grains were securely and tentatively identified in artefact PK11-A (Table 8.11). Almost all these samples displayed clear signs of pressure, matching nicely with the grinding/pounding of seeds prior to the integration into the griddle. No indication of heat damaging was noted as to grains. Other starches originate from *Phaseolus vulgaris/lunatus* seeds and perhaps from other wild legumes. Interestingly, almost all legume starches recovered in this artefact revealed clear signs of heat damaging or a combination of heat and pressure damaging. These observations suggests that a small number of legume seeds were boiled prior to being integrated with the griddle, whereas others were affected by means of heat when part of humid masses and probably cooked over the griddle.

A third single taxon was identified at family level: Marantaceae. This starch grain, with signs of damage due to pressure, was not identified to the genus or species level due to the absence of key indicators required when proposing a specific identity. Nine starches were not identified due to heavy damage caused by heat or pressure impeding any identification.

	PK11-A EC 6 (F1)	PK11-B EC 35 (F18)	PK11-C EC 38 (F20)	PK11-D EC 111 (F13)	PK11-E #34 Secteur D4	PK11-F EC 8 (F7)	Total Starches	Ubiquity (%),Family and/ or Genus level per artefact
	Clay griddle fragment	Clay griddle fragment	Clay griddle fragment	Pot fragment	Milling stone	Pot fragment		
Tubers								
Ipomoea batatas				2			2	50
cf. *Ipomoea batatas*					1	1	2	
Marantaceae	1						1	16.6
Manihot esculenta		1					1	16.6
Seeds								
Zea mays	11	2	1	7	4	2	27	100
cf. *Zea mays*	2	5		1		5	13	
Leguminoseae-Fabaceae	1		1				2	50
Fabaceae					4		4	
Phaseolus vulgaris	1 + ca. 90 (cluster)						ca. 91	33.3
Phaseolus lunatus/vulgaris					2		2	
Not identified (individual starches)	9	5	1	1	7	3	26	----
Not identified (clustered starches)			ca. 185 (3 different clusters)				ca. 185	----
Total starches (individual starches)	25	13	3	11	18	11	81	----
Total starches (individual and clustered)	ca. 115	13	ca. 188	11	18	11	ca. 356	----
Species richness (Family and/or Genus level per artefact)	3	2	2	2	3	2		

Table 8.11. The distribution of recovered starch grains according to sample and plant source.

Artefact PK11-B

Quite a different scenario can be hypothesized regarding this artefact, albeit a griddle fragment with the same heating pattern was described regarding EC 35. Its starch grains also revealed traces of pressure (grinding/pounding) and heat (cooking over the griddle) in a similar proportion, but only two species were identified: maize and manioc (Table 8.11).

The maize starch grains revealed signs of previous grinding. Amongst them we recorded signs of heat damaging in both humid and dry conditions. This suggests various stages of food preparation of maize: firstly the grinding of the seeds and subsequently the cooking of this humid or dry mass over a griddle.

A single manioc starch grain was identified in combination with a specific pattern of pressure facets. The size, shape, hilum and fissure constitute the diagnostic features of this species. This manioc starch only exhibited signs of damage due to pressure (grinding/grating?) and not due to any heating. Five single starch grains were not ascribed to any specific taxon due to heavy damage caused predominantly due to heat, but in several cases also due to pressure. The general scenario depicted above suggests this griddle mainly served cooking purposes.

Artefact PK11-C

As to the third griddle fragment (EC 38), in spite of being subjected to post-excavation cleaning with water, three individual starch grains as well as three clusters composed of *c.*185 starches have been recorded (Table 8.11).

Two of the three recovered starch grains showed pressure traces whereas the third revealed clear signs of heat damage. The plants identified were maize and a non-identified vegetable. One of the single starches was not ascribed to any taxon due to heavy damage caused due to pressure. The three clusters could not be identified due to (a) the damage caused due to heat or (b) the lack of sufficient morphometrical features in order to assure the ascription to any known taxon. Of the three individual starches, the maize as well as the unidentified starch grain was affected by means of pressure (grinding/pounding). The vegetable starch was affected by means of heat in a humid (perhaps liquid) environment (e.g. when boiling the seeds). Interestingly, the only cluster of unidentified starches modified by means of heat displayed several starch grains with damage patterns, i.e. smooth central depression, directly related to boiling.

A possible consistent pattern can be detected with regard to the maize and legume starch grains recovered from the griddles described here. On the one hand, maize seeds were processed by means of grinding/pounding prior to the integration of starches to the griddles. On the other hand, many of the vegetable seeds –including domestic beans– were previously cooked or pre-treated by means of boiling prior to its integration to our griddles. Similar to artefact PK11-A, the observations concerning artefact PK11-C suggest two dissimilar episodes of its history: usage as a cooking implement tool and its later task as a working surface for manipulating food derivatives prior to cooking.

Artefact PK11-D

This artefact is a rim fragment (EC 111). It would be of interest to retrieve its use as part of a cooking bowl, a serving dish or a container for liquids or food stuffs, as it belongs to the the frequently found SM II series, uncovered in pit F 13.

Maize and sweet potato starches were recovered with regard to this artefact (Table 8.11). One starch grain was not identified due to heavy damage caused due to heat and pressure. Of the 11 starch grains extracted, nine showed clear signs of pressure (grinding/pounding). The latter starches contained maize starches whereas the two identified items included sweet potato starches. One maize starch grain as well as the unidentified one presents evidence of heat damage probably produced in a dry environment.

A general impression derived from these results is that this potsherd was presumably part of a container for retaining food stuffs (masses, dough) prior to any cooking process. No charcoal particles were detected during our microscopic analysis.

Artefact PK11-E

The only grinding/milling stone, i.e. No. 34 found in square D4 (Fig. 8.19), analysed here revealed starches derived from the following plant species: maize, domestic bean, wild legume and possibly sweet potato (Table 8.11). Fifteen of the 18 recovered starch grains bore signs of pressure damage (grinding/pounding). Five hereof revealed traces of heat damage. In the latter case, it is expected that many recovered starches may have pressure damage with differential gradations. Excluding the three starches that could not be recorded in detail, all remaining starches were affected due to the grinding/pounding of their plant sources (seeds, tubers).

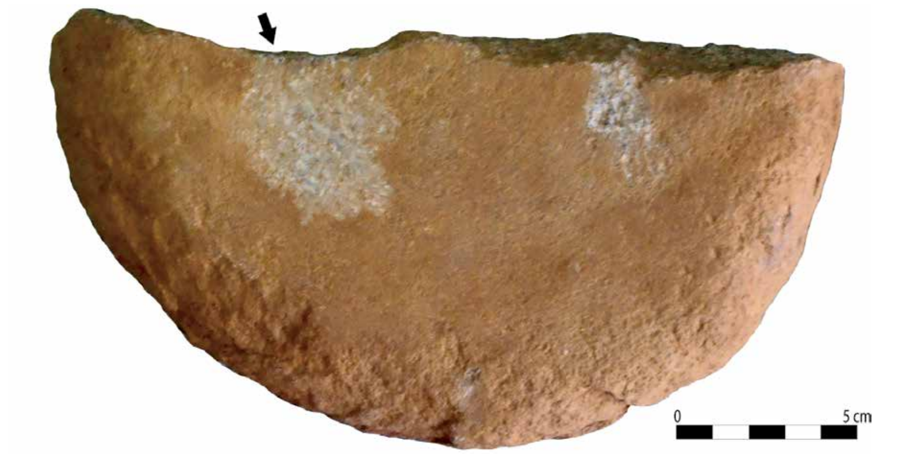

Figure 8.19. A fragment of milling stone No. 34 (Square D4). This object was not washed after excavation; the sample was scraped from the slightly concave face indicated by the black arrow.

An interesting relation must be noted here concerning the observations for those heat affected starches and this passive milling stone: two vegetable starches (both wild and domestic species) may support our above-mentioned interpretation of the boiling or cooking of bean seeds prior to integration into the griddles. The mere recovery of starches previously subjected to heat (e.g. boiling) may suggest the manufacturing of masses derived from cooked bean seeds in order to add or mix them with other non-cooked masses from plants, such as maize and sweet potato.

Artefact PK11-F

This potsherd fragment (EC 8) reveals an interesting scenario regarding its use and function, knowing it represents the most important ceramic series of this site, i.e. Form A (cf. Figs. 8.16a and 8.17). In spite of being washed during post-excavation processes, it was possible to extract starch samples from thin cracks and pores in its interior and exterior sections. Charred material or soot, attached to the exterior section, was added as part of a general sample. Regardless of this charred material, which may reveal its "true nature" as a cooking bowl, it should be clarified later if this fragment is part of a cooking bowl, a serving dish or a container for liquids/food stuffs.

Several maize starch grains were securely identified whereas other starches were ascribed only tentatively ascribed to this species (Table 8.11). A single starch with signs of heat damage in a humid (liquid and/or boiling) environment was tentatively ascribed to the sweet potato. Three other starch grains were not identified due to the heavy damage caused due to pressure and heat.

Tentative identifications of maize were proposed. The reason for this is that they included almost all characteristic features described for maize starch, albeit that some exceded their normal size. However, this is also the case regarding tentative maize identifications in previous samples. In fact, experimental analysis developed for maize seeds derived from hard endosperm landraces has proven that their grinding/pounding could differentially enlarge the starches whenever seeds are green, mature, but not dry seeds (with or without previous soaking). In numerous cases, ground maize starch grains kept their principal morphological features. Nonetheless, they were gradually enlarged depending on the hardness and resistance of the seeds during the breaking process. In this context it was documented that maize starch grains can measure up to 45 µm by means of processing dry seeds (without previous soaking) of the indigenous landraces *Nal-Tel*, *Pollo*, *Pira* and *Confite Puntiagudo*.

Pressure is the predominant damaging element among the recovered starches in this artefact. Based on this fact, it is suggested it could have served, at least in its later life history, in a similar fashion as described with regard to artefact PK11-D, i.e. as part of a container for retaining food stuffs (masses, dough) prior to any cooking process. In spite of the absence of heat damaged starch grains as recorded for the griddles, rim fragments and charred crust attached to vessels in other studies (Zarrillo et al. 2008; Rodríguez Suárez and Pagán Jiménez 2008), the container hypothesis could well be an important interpretation with regard to this artefact, considering the omnipresence of this vessel type.

The charcoal material found attached to its exterior is disposed in the form of particles. Thus, it is highly probable that the large amount of charcoal particles reached this item during a later disposal in a refuse midden associated with a hearth or by means of other post-depositional processes related to buried contexts with a high contents of charcoal and/or ash material such as a supper or dinner.

8.7.3 Final remarks

These results once again demonstrate the usefulness of ancient starch grain analysis with regard to excavations. The interpretations of these results must be contextualized taking the following criteria into account (cf. Section 5.7.3 for further considerations).

a. The limited number of studied samples (N=6) can serve to place the identified plants in the chronological and geographical contexts of the artefacts, but not to infer the economic or cultural importance of one plant over others on the intra or inter-site level. However, the starch analysis of the samples taken from the Cimetière paysager Poncel site (cf. Section 9.7), another LCA site on Cayenne Island, enables us to compare these results as both sites are situated relatively close together and share the same material culture.

b. All artefacts studied here have been interpreted as utensils for manipulating, grinding, and/or cooking food stuffs. However, they were utilised at an unknown rate of intensity. Considering the fact that heat and pressure are two of the main degrading factors with regard to starch grains (Henry et al. 2009), it is expected that the full array of derivates, i.e. pastes, flour, condiments, beverages, made from various plant species are not well represented. As to this last issue, it is also to be expected that plant organs (e.g. seeds, rhizomes, tubers), previously processed by means of grinding, pounding, grating, and scraping with various artefacts, were potentially never baked on griddles or cooked in vessels. The roasting happened either directly in hearths or by means of cooking in earth ovens of varied recipes, notably *tamales* (Sp.) which have been widely documented in many ethnohistoric and ethnographic accounts of the Neotropics.

c. It should also be considered that these artefacts could have served when handling raw food. This interpretation has been suggested, at least partially, for all the ceramic artefacts discussed in the present study. Such possibilities would guarantee a preservation that could have been aided by means of glutinous substances derived from other sources when mixing for instance, fats. The vegetable oil, animal fat, resins and minerals mixed with starch grains in a medium lack intentional exposure to an open flame and could perhaps have provoked an isolating, consolidating environment enabling the starches to survive degradation *in situ*.

d. The manipulation, processing and cooking of food have been identified by means of the starch grains recovered here. However, a more accurate contextual interpretation of the possible foodstuffs prepared in these sampled artefacts was not possible at that time due to the scarcity of the presented samples. Nonetheless, at least general comments can be made on plant availability/procurement and plant processing and cooking concerning the pre-Columbian population that once inhabited (this part of) the site.

e. The plants identified here have been obtained by the inhabitants who utilized the studied artefacts by means of a local production, an exchange and collecting (in the case of wild legumes and other species). In order to gain insight into the assessment of domestic, cultivated and wild plants, a number of examples will be presented here in order to elucidate the exploitation of the environment:

    <u>Maize</u> depends on humans for its reproduction. Therefore propagation seeds must be stored for this purpose which were probably safeguarded with care, i.e. stored inside (closed) vessels or in pits dug inside structures. Although it is generally accepted that maize requires exceptional soils and climatic conditions in order to achieve a successful production, it can be grown in rocky soils and specifically in silty clays, silty sands and slightly plastic clay soils. Large, continuous tracts of land are not required when producing significant quantities of maize, albeit that open or cleared spaces are keys to a successful cultivation. Multiple small open or cleared plots may have been common at the periphery of settlements in addition to gardens located in fertile alluvial river valleys or banks. Water is a delicate aspect of maize production, because the excess or lack hereof easily destroys these crops (Boyer 1982). Such an agricultural pursuit would have required a constant supervision of the cultivated plots (e.g. by means of keeping peccary herds out).

    <u>Manioc</u> can be produced in almost any type of soil. With very little labour, it will produce large yields. Open or cleared plots are required for a successful production. Manioc can also be grown in home gardens underneath a slight cover consisting of dispersed trees and shrubs.

    <u>Arrowroot</u> or Marantaceae thrives in partially open or cleared plots, even under slim canopies on silty sand, silty clay and sandy loam soils (Pagán Jiménez, personal experience, 2011).[214] Arrowroot may have been cultivated in small house gardens situated on the periphery of the habitat in which medicinal plants, herbs, condiments and fruits were also grown. Arrowroot may also have been tended at the edges of nearby forested areas.

214 Interestingly, Pierre Grenand recorded the *Maranta ruiziana* in connection with the Wayãpi slash-and-burn fields (1979:302).

Various degrees of forest management should be developed in order to produce, exchange and harvest all plants identified here. Direct and indirect consequences of this scenario could be: (a) the replacement of plant species (endogenous with exogenous) combined with the eradication of others, (b) the dispersal of plants outside their natural range of distribution, (c) the modification of the topography –in order to construct agricultural mounds, raised fields, terraces– and/or the enhancement of soils, such as dark soils, or *terra preta*. The implications of this anthropogenic scenario regarding other organisms and biophysical elements during lengthy periods of time in the Neotropics have recently been brought to our attention in a detailed scrutiny (Piperno and Pearsall 1998; Versteeg 2008; Rostain 2008a, 2010b; McKey et al. 2010).

Tubers and seeds of all the identified plants were peeled, pounded or grated in order to produce pastes, masses, flour as well as food derivates. They were subsequently manipulated and/or cooked applying the artefacts analyzed in the present study. Indeed, other starchy plants must have been processed, manipulated and/or cooked utilizing the afore-mentioned artefacts, but the differential preservation of starch grains (Haslam 2004) and other degrading biases (e.g. any mechanical damage caused due to the pounding, grinding and cooking), only allowed the recovery and identification of the starches exposed in the above paragraphs.

8.8 The site synthesis

The excavated area is part of a much larger archaeological site, better known as the Rorota site, which was identified at the entire higher Pleistocene sand ridge at the foot of Mont Mahury in the Anse de Rémire. In fact, it was the first archaeological site in French Guiana to be excavated in (arbitrary) stratigraphic levels. The results hereof were presented at the 1975 IACA Congress (Pointe-à-Pitre, Guadeloupe) by Hugues Petitjean Roget, the Godfather of French Guiana archaeology, and Dominique Roy (1976).

The Late Holocene occupation

Just as 40 years ago, the Rémire Bay is still subjected to heavy marine erosion (Fig. 8.20) which probably resulted in the natural reduction of this large site. The geological section created by the sea enabled Maggy Seurin to determine the genesis as well as the evolution of this particular part of the Cayenne Island littoral (cf. Fig. 8.6). Her stratigraphic analysis indicated an intermediate regression situated between two transgressions of which the latter 'se situerait après le Flandrien (alias Demerara), c'est-à-dire il y a quelques siècles vers le Haut Moyen Age' (Seurin 1976:12). This conclusion tallies with the earliest retained radiocarbon date of 910 ± 30 BP (POZ-42487) as to PK 11, obtained from post hole F 30. This date coincides with youngest Holocene marine fluctuations of Suriname (Brinkman and Pons 1968).

Following this scenario, the LCA occupation at Rorota is possibly associated to the end of the Moleson transgression, i.e. 2500-1300 BP (Versteeg 1985:737; Palvadeau 1999:32). As to French Guiana, Eric Palvadeau (1999:86) has demonstrated that the range of sedimentations, called P 4, i.e. Moleson Phase located at the Matiti Savannah to the east of Kourou is situated between *c.*2700 and 500 BP, covering the entire LCA and extending the Moleson Phase as to

French Guiana. Thus, any human occupation at the Pleistocene sandbar of Rorota represents an environment subjected and directed towards the sea. Such an environment in which salt ponds and sea arms play an important role is also witnessed at the Katoury site (Mestre et al. 2005). The latter site was complemented with various mechanical surveys of which the one Fabrice Casagrande conducted in 2005 evidenced a stratigraphic site, positioned next to a deep tidal creek (measuring at least 4 m deep!) and filled up with peaty and humic clay layers (Casagrande 2005). Unfortunately, this creek was not excavated properly and may have provided valuable information on the paleoenvironment of Cayenne Island (Migeon 2012).

Considering the geological situation and the existing radiocarbon dates, we may suggest that the pre-Columbian population favoured the littoral area at *c.*1300 BP, i.e. towards the end of the Moleson transgression in Suriname and French Guiana (Cornette et al. 1992). It is indeed highly possible that the changing marine activities, i.e. the deposition of new sand ridges, from this moment facilitated the permanent settling of villages in the coastal plains. Whatever the reason, the absence of ECA material or radiocarbon dates as to the Young Coastal Plains remains troublesome as does the preponderance of the LCA occupation of the littoral in general. In sum, a certain link exists between the LCA occupation and the Moleson transgression, in such a way that human installation on the Holocene sand ridges in the Guianas is guided by means of the evolution of the littoral. Needless to say, this apparent dichotomy certainly needs further exploration in the future of geological and archaeological nature.

The occupation span of the PK11 site corresponds with the LCA human presence on the French Guiana littoral. This also corresponds with the paleofires of Phase X, stretching from *c.*1000-750 BP, as Christophe Tardy hypothesized with regard to various regions in French Guiana (1998:237, 256). This period, calibrated between AD 1000 and 1250, is recognised all over the South American continent (Colinveau et al. 1985; Ledru 2001:174; Moy et al. 2002; Sifeddine et al. 2001) as well as on the Antilles (Beets et al. 2006; Malaizé et al. 2011). However, there is some controversy, because it is often mistaken for human activities related to fire, according to Tardy (1998:251): 'La pression humaine sur le paysage est de plus en plus importante [Late Holocene] et est parfois susceptible de venir brouiller l'image des environnements naturels.' Regarding PK 11, these paleofires may have been the result of an increase in human activities, suggesting that the pre-Columbian population had started to settle the plains in order to use this space to extend their gardens and settlements. Suggesting that maize was a principal staple food, which requires much water, it is plausible that these sedentary populations modified their environment and notably the lower areas, i.e. the Young Coastal Plains, which became available by the end of and/or after the Moleson Phase. Indeed, the pre-Columbian population chose these lower areas, or 'les marais méridionaux,' according to Rostain (1994a:60) in order to construct their raised fields. Rostain (1994a:142–143) associated the construction of these fields with the presence of an extremely wet period situated between 1300 and 800 BP hereby following the hypothesis Colinveaux et al. (1985) presented for northwestern South America –contrary to Tardy and Ledru who propose a dry period as to the aforementioned period due to higher charcoal concentrations. Moreover, a palynological analysis carried out at the man-made mounds of western Suriname, erected during a period of inundation and in fresh water

Figure 8.20. (a) A view of the coastline opposite the excavation in 2011 and (b) a view of the same coastline destroyed by heavy storms in January 2013. The degree of erosion must have resembled the situation during the 1970s when M. Suerin carried out her fieldwork.

conditions, have confirmed shifts in marine influences rather than climatological ones (Versteeg 1985:663, 737).

This and more recent research (McKey et al. 2010) concerning raised fields in French Guiana did not demonstrate the presence of raised fields on the Island of Cayenne (Rostain 1994a:132, Fig. 69). The closest raised fields are situated east of the village of Tonate, Macouria in the Maillard Savannah (Renard et al.

2010:195). However, the present author observed agricultural beds in the Methon Savannah to the south of the Vieux Chemin Pleistocene sand ridge. They, on the other hand, have been attributed by radiocarbon dating to the Historic Age as the canals of the beds cross-cut the archaeological layer containing LCA ceramic material (van den Bel 2007b:17, Fig. 10).[215] Whatever the case, the presence of any pre-Columbian raised fields at Cayenne Island must either have been destroyed during the post-Columbian period, when large sugar cane fields were developed, or is absent when the LCA Amerindian population acquired their staple foods from other groups through exchange or by means of cultivating the slopes and Pleistocene ridges.

Evaluating the density of LCA as to the French Guiana and Suriname littoral, notwithstanding that this region is the most researched area in both countries, we may compare this situation with the LCA of the Lesser Antilles where similar developments appear to have taken place (Rostain and Versteeg 2004:175). Analogue developments evolved concerning ECA and LCA expansions from the Lower Orinoco River and the Island of Trinidad into the Leeward Lesser Antilles and western Guianas (Boomert 1980a, 1985, 2000, 2010; Rouse and Allaire 1978; Rouse et al. 1984; Versteeg 1985; Rouse 1992; Rostain 1994a; Coutet 2009).[216]

As to the western littoral band of the Guianas, the prevailing hypothesis is that various LCA complexes (e.g. Late Hertenrits, Kwata, Barbakoeba, Thémire) are the product of a population which after a series of Arauquinoid migrations from the Middle Orinoco, took over and/or integrated/replaced their predecessors, notably the Barrancoid population in western Suriname (Versteeg 2008:307–308). As to French Guiana we have little information on any preceding populations, but will be presented in the next chapter (cf. Section 9.5.4). Nonetheless, the Thémire complex represents the most recent and easternmost manifestation of this Arauquinoid migration (Rostain 2008b:286), but the Saladoid–Barancoid–Arauquinoid tripartition is hereby applied to the coastal Guianas as a chrono-cultural framework. However, during the migration of small groups from the mouth of the Orinoco River, having mingled with the local population, they carried their cultural and material baggage with them. They must have left tangible traces and/or characteristic objects at the places visited. In my opinion, this is not unmistakenly the case with the Guianas. The diffusion of cultural traits through time evokes a passive connotation as these travelling populations must surely have been aware of their cultural baggage. I therefore prefer the term "exchange" in order to insist on the bilateral scenario of such encounters.

Furthermore, it is true that, with regard to Cayenne Island or perhaps even for the entire coastal plain of French Guiana, we have little archaeological data on the ECA, i.e. the period prior to the alleged "Arauquinoid arrival." Considering the geomorphological as well as the geological data, it appears that the littoral, notably the Young Coastal Plains, is not very suited for human occupation during the first millennium AD, i.e. Moleson Phase. Nevertheless, it is quite possible that this coastal area was considered suitable for permanent habitation by people dwelling

215 Eventually, one radiocarbon date (KIA-33044, cf. Appendix 1) has been obtained from a peat sample at the base of a canal which also contained imported European material from the late 17th century.

216 Historically, the Guianas and the Lesser Antilles maintain a link embodied by means of the bi-annual IACA Congress. For example, archaeological research conducted in Suriname and French Guiana has since then been presented at this Caribbean Congress (Geijskes 1963). In 2008, the *Primeiro Encontro International d'Arquéologia Amazônica* (EIAA I) held in Belém represents the first regional congress on Amazonian archaeology.

in the interior or tabular mountains –a region barely known to archaeologists. Having presumably frequented this tidal environment on a seasonal basis, they decided to occupy it only when the Moleson Phase had ended, leaving Holocene cheniers for permanent human occupation during the late LCA about AD 1400 (e.g. Bois Diable, Sainte Agathe).

Scientific conservatism and the lack of archaeological research has surely influenced and biased our ideas respectively, but slowly archaeologists have begun to uncover the interior of French Guiana and to reveal first millenium sites in the hinterland of the littoral band, i.e. Malmanoury (Olga), Matiti (Wayabo), Mont Grand-Matoury, Chemin Saint-Louis, Maripa, Favard and Cimetière paysager Poncel. Interestingly, the ECA sites are situated on hilltops, indicating an ECA presence prior to the Arauquinoid arrival. Does this suggest a shift from the interior into the coastal plains at the start of the second millenium AD and not a migration from the Lower Orinoco River? From this point of view, the LCA complexes are merely a regional development of earlier complexes as is the case with the post-Saladoid/Barrancoid period in the Lesser Antilles (Rouse et Allaire 1978:464; Boomert 2010:115; Bright 2011:162)? For a further discussion on the ECA of Cayenne Island, see Chapter 9.

The features

As to the features at PK 11, they consist of numerous postholes with and without supporting rocks. Distributed in two zones and one waste pit filled with ceramics as well as lithics, they probably represent two wooden constructions or house locations. The reconstitution of a house plan remains difficult to conceive as we have little information on the form of their houses. Were they built directly on the surface of the earth or on stilts? (cf. Section 6.2.3).

The number of 54 features with regard to an excavated area of *c.*1000 m² is mediocre. It is a lot more than Cimetière paysager Poncel and less than Crique Sparouine, but fairly minimal when compared to Katoury (Mestre et al. 2005). In order to assess this feature assemblage, one has to not only consider its topographic position, i.e. the excavation perimeter borders on a hydromorphic zone far from the highest or central point of this large sand body, but also to reckon with the absence of important habitation features (e.g. wells), more ceramic depositions and primary or secondairy burials. Despite the absence of the latter, we imagine two wooden structures situated at the limit of a hydromorphic zone at the periphery of a larger village.

The ceramic assemblage

The ceramic assemblage of PK 11 was studied simultaneously with the Cimetière paysager Poncel assemblage. The reason for this is that the latter excavation succeeded the former. Both sites revealed similar styles and were dated to the LCA. We will now summarize the most important traits of the PK 11 assemblage in order to compare it with the Cimetière paysager Poncel assemblage. Chapter 9 will provide us a broader analysis of both ceramic assemblages as well as with a chrono-cultural synthesis of the LCA ceramics on Cayenne Island.

The PK 11 assemblage is characterised by means of seven series (SM I-VII), revealing four dominant vessel shapes in combination with specific decoration modes, to wit Forms A-D (cf. Fig. 8.17). In addition to these shapes, another

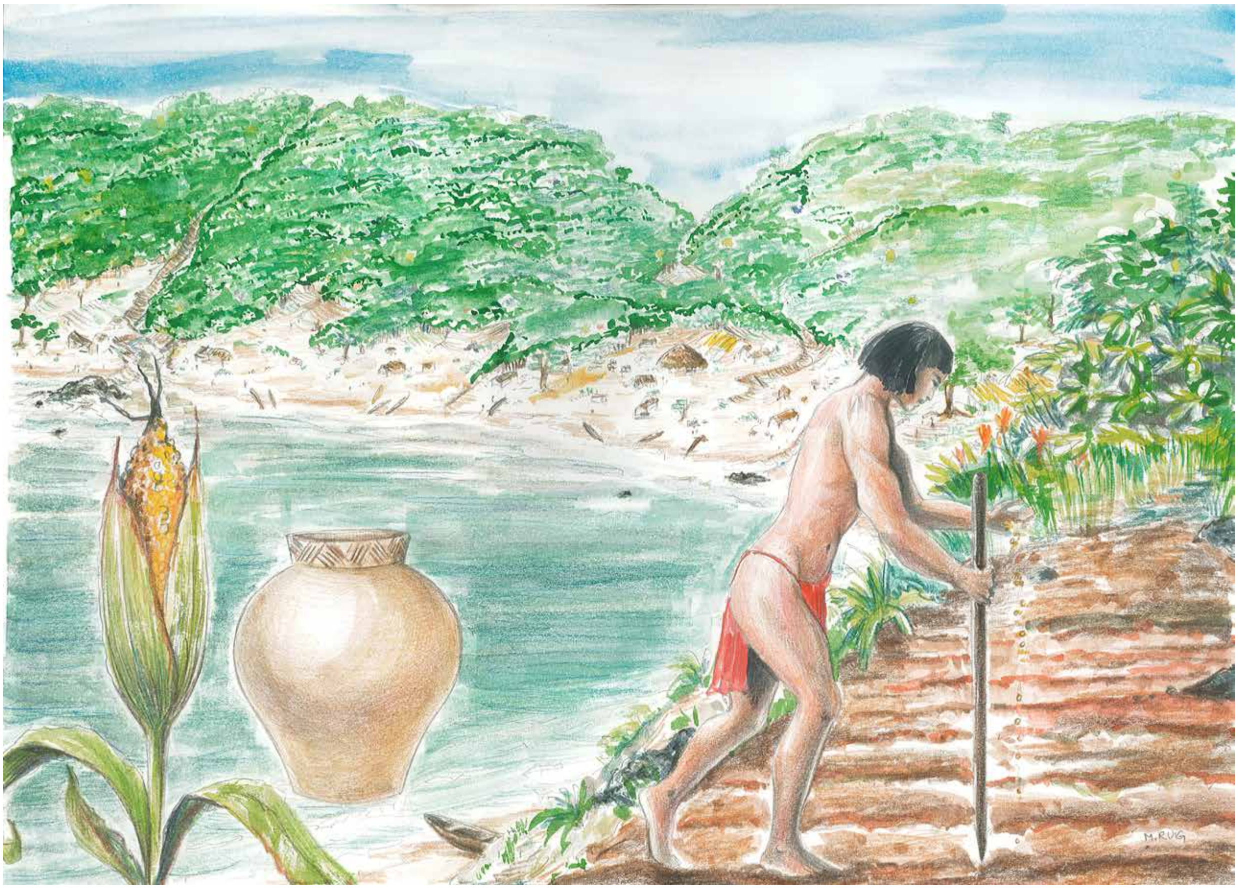

Figure 8.21. The Rorota site as seen from Mont Ravel (drawing by Monique Ruig) (courtesy of Une Saison en Guyane).

important trait of this assemblage has been confirmed microscopically for the first time: the pounded potsherd temper (cf. Section 8.5.3). It is suggested that the pounded residue was screened and added to the rather loamy clay which contained some sand.[217]

The decoration modes are dominated by means of incisions (87%) when compared to painted decoration (17%). These incisions are principally composed of vertical and/or obliques parallel incisions, which can also be crossed in order to form *treilles*, and applied to the exterior upper part of the vessel of which Form A represents an excellent example. Incised wavy-lines and small appliqués are less frequent, but represent highly recognisable accessoires as to this assemblage.

Painting or slipping is less abudant, but is often applied to the vessel's interior or exterior and on occasion as a "red band" around the neck. Associations between both decoration modes are rare at PK 11. However, the latter red band in combination with alternating obliques incisions at the neck (EC 88) is a highly recognisable decorative trait which has been detected at many other sites on Cayenne Island (Mestre et al. 2005).

217 Rostain (1994a, Photographs 11-22) published twelve microscopic photographs taken by Martine Gérard (ORSTOM, Centre Bondy) depicting ceramic types in order to indentify the non-plastic elements in the paste but providing minimal comment. The results and the quantification of twenty-three samples (ibid., p. 27) are not dealt with at all. The pigments of only ten decorated sherds are briefly discussed (ibid., p. 392).

According to Rostain (1994a:446), another characteristic element is a white-on-red painting which we did not record during this excavation, but was only identified during the mechanical survey (Briand et al. 2008:31). This type of decoration, being a part of *Cayenne peint*, has also been recognised at other LCA sites excavated on Cayenne Island and its surroundings, notably at the following sites: Mont Grand-Matoury, Thémire, Bois Diable/La Sablière, and Saint-Agathe (Barone-Visigalli and Prost 1991; Thooris 1994a; Grouard et al. 1997; Hildebrand 2000; Wack 1990b; Coutet 2009; Samuelian 2009). This mode is possibly related to: (a) certain vessel functions, (b) a phase within the PK 11 pottery assemblage and/or even the LCA pottery tradition on Cayenne Island and (c) some other archaeological occupation. This issue will be dealt with in Chapter 9.

In sum, the PK 11 excavation indeed represents a small "window" in a much larger LCA site, commonly known as Rororta. Just as several other LCA sites featuring similar styled ceramics (e.g. Katoury, Vieux Chemin, Suzini, Saint-Cyr) this site is also situated on a Pleistocene sand bar which is unfortunately seriously damaged due to marine erosion.

Chapter 9

The Cimetière paysager Poncel site

A Late Ceramic Age satellite site in the swampy hinterland of the pleistocene ridges

After the presentation of PK 11, we will now discuss the results on the excavation of Cimetière paysager Poncel (No. 97309.106), which is also situated on Cayenne Island. It is located on a small Precambrian hilltop in the swampy hinterland of the Pleistocene sand ridges and shares similar ceramics, revealing a cultural link between both sites (van den Bel et al. 2013; Annexe 1.6).[218]

9.1 Introduction

On Wednesday 19 April 2000, after continuous diluvial rains, the northeastern side of Mont Cabassou slides through the hamlet of Poncel into Crique Cabassou, killing ten people (Fig. 9.1). In the wake of this disaster, the route had to be reconstructed. The subsequent pedestrian survey conducted by Eugène Epailly, Eric Gassies and Alain Gilbert along the future road track, evidenced remnants of the later excavated colonial site: the late 17th century Picard plantation (Mestre 2005).

This discovery launched a mechanical survey led by INRAP members in April 2002. It confirmed the presence of the Picard planation but also led to the detection of a pre-Columbian site at the summit of a hillock located between Poncel and the so-called Brazilian village of BP 134, dubbed *Morne Poncel* (Jérémie 2002b). When the municipality of Rémire-Montjoly unfolded their plans to construct a so-called "landscape cemetery" (Fr., *cimetière paysager*) upon this hillock, another complementary mechanical survey was conducted by Matthieu Hildebrand in order to a gain better insight of this pre-Columbian site (Hildebrand 2004). Eventually, when starting the compliance excavation in 2010, this project provided the CPP acronym symbolizing Cimetière paysager Poncel.

Hildebrand dug mechanically eight trenches on the summit of this hillock and estimated the distribution of the artefacts at a depth of between 20 and 60 cm, for a surface measuring *c.*8000 m². The site presented a rather dark coloured soil. All in all eight features were recorded of which three were considered postholes and one a possible ceramic deposition, i.e. F 6 (Hildebrand 2004, Plate 4). The latter feature also yielded the first radiocarbon date for this site (KIA-25851,

218 In September 2013, the results of the excavations at Cimetière paysager Poncel have been presented by the present author at the *Third Encounter of Amazonian Archaeology* (EIAA III) held in Quito (van den Bel 2014).

Figure 9.1. An aerial photograph of the new Route Nationale, the Cabassou landslide at Poncel (Géoportail 2007). The red rectangle represents the allotment AS 114 of the future cemetery whereas the yellow rectangle represents the 2010 excavation.

985 ± 20 BP). This result corresponded with the ceramic material which shared numerous stylistic elements with the Katoury site (Hildebrand 2004:21).[219]

Having discussed the geology and archaeological history of Cayenne Island in Section 8.1, we will now continue this introduction dealing with the methods and techniques applied in the course of this excavation. Although both sites are dated to the LCA, it must be remembered, however, that CPP is located on the summit of a small hillock in the swampy hinterland of the Pleistocene ridges on which PK 11 is situated (Fig. 9.2).

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219 'L'assemblage se caractérise par une forte distribution des décors plastiques par rapport aux décors peints. On remarque un ensemble basique composé des modes « oblique simple », « oblique alternée » et du genre « treille », rassemblant plus de 50% du mobilier incisé. Les autres modes, beaucoup moins fréquents comme le mode « tiret » ou le mode « vague », apparaissent cependant plus emblématiques, et sont révélateurs d'une production singulière, endémique ou d'échange, que la représentativité du mobilier ne permet pas encore de déterminer. Le genre décoratif incisé est en majeure partie positionné sur la paroi externe des artefacts, les applications internes restant assez rares, à l'exception de quelques bases et du mode « tiret ». La classe décorative peinture a en revanche une répartition plus uniforme. Les aplats sont presque aussi souvent apposés sur les parois externes qu'internes des objets, et plus rarement sur les deux faces. A de rares exceptions le mobilier est recouvert d'un engobe rouge typique appliqué en bandeau sur certains éléments morphologiques mais plus généralement de manière uniforme. Les associations restent assez rares, mais la présence d'un col à bandeau rouge et incisions sub-labiales alternées permet de caler le site sur le même segment chronologique que celui du site Katoury. Un autre élément plus anecdotique, étant donnée la petitesse du fragment présente un mode décoratif typique du mobilier des sites mont Grand-Matoury et Thémire, calés sur une fourchette chronologique semblable: motifs géométriques blancs sur fond rouge.'

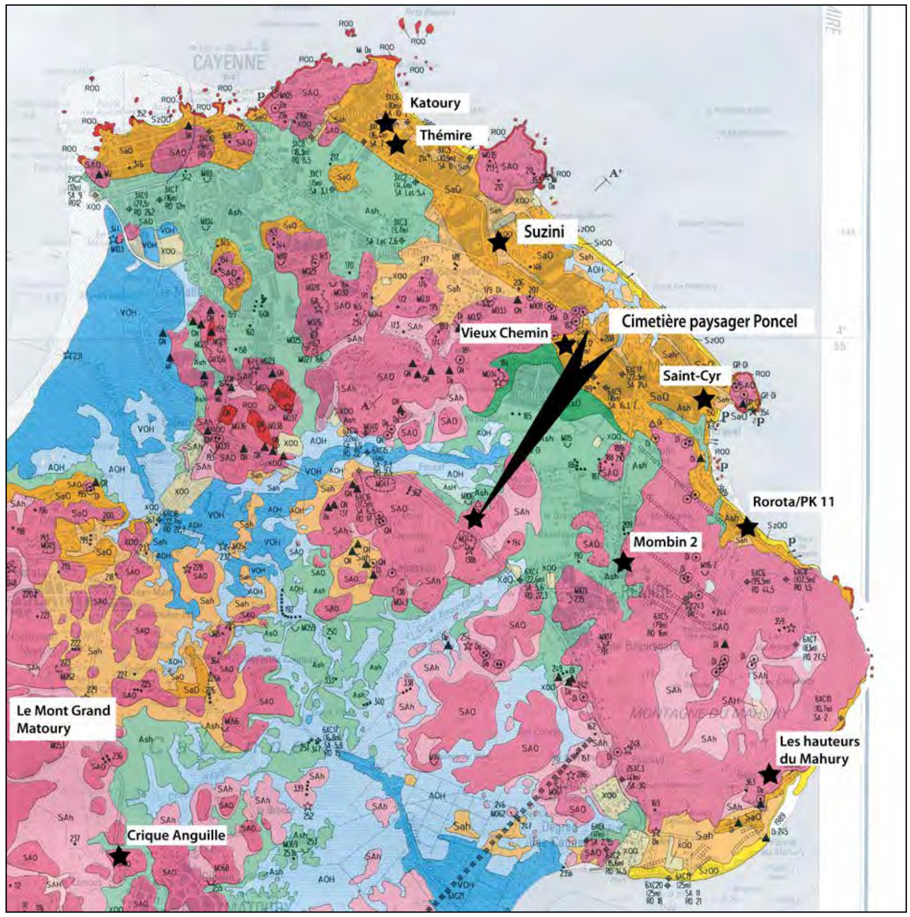

Figure 9.2. A geological map of Cayenne Island (Cautru 1993). Blue (clay) and yellow (sand) represent the Holocene deposits. Orange (sand) and green (clay) represent the Pleistocene deposits. Purple and red represent the Precambrian Shield. The excavated LCA sites are indicated with a black star and Cimetière paysager Poncel by means of an arrow.

The excavation methods

The SA delimited the future excavation area measuring 8000 m² several days before the excavations started. The scientific goals of this excavation had been defined on a single page which can be translated as “get the most out of it.”[220]

Firstly, the summit of the hillock was deforested by mechanical means. Needless to say, archaeologists followed the proceedings at close range in order to protect any large items or artefact depositions. Once the hilltop was deforested we were able to observe its general shape and microrelief. At forehand this was rather difficult due to the dense secondary forest. After several days, however, we were able to set out the topographic grid, axed NNW-SSE, following the sloping hill we had made accessible by means of mechanical shovesl. Now, along this axis, a grid of 5 x 5 m was installed while hammering small wooden sticks into the ground in order to to collect artefacts during the mechanical decapage (Fig. 9.3).

When starting the decapage, we dug two long trenches with a width of 5 m not only in order to explore the artefact density of the dark top soil but also to estimate the potential of any features to be discovered at the summit of the hillock, to wit the Squares G2-M2 and M2-14 (Fig. 9.3). We found very little artefacts in the dark layer which appeared to be either worked or ploughed in

220 For the Scientific Charges or *Cahier des Charges* imposed by the SA for this project, see the field report (van den Bel et al. 2013).

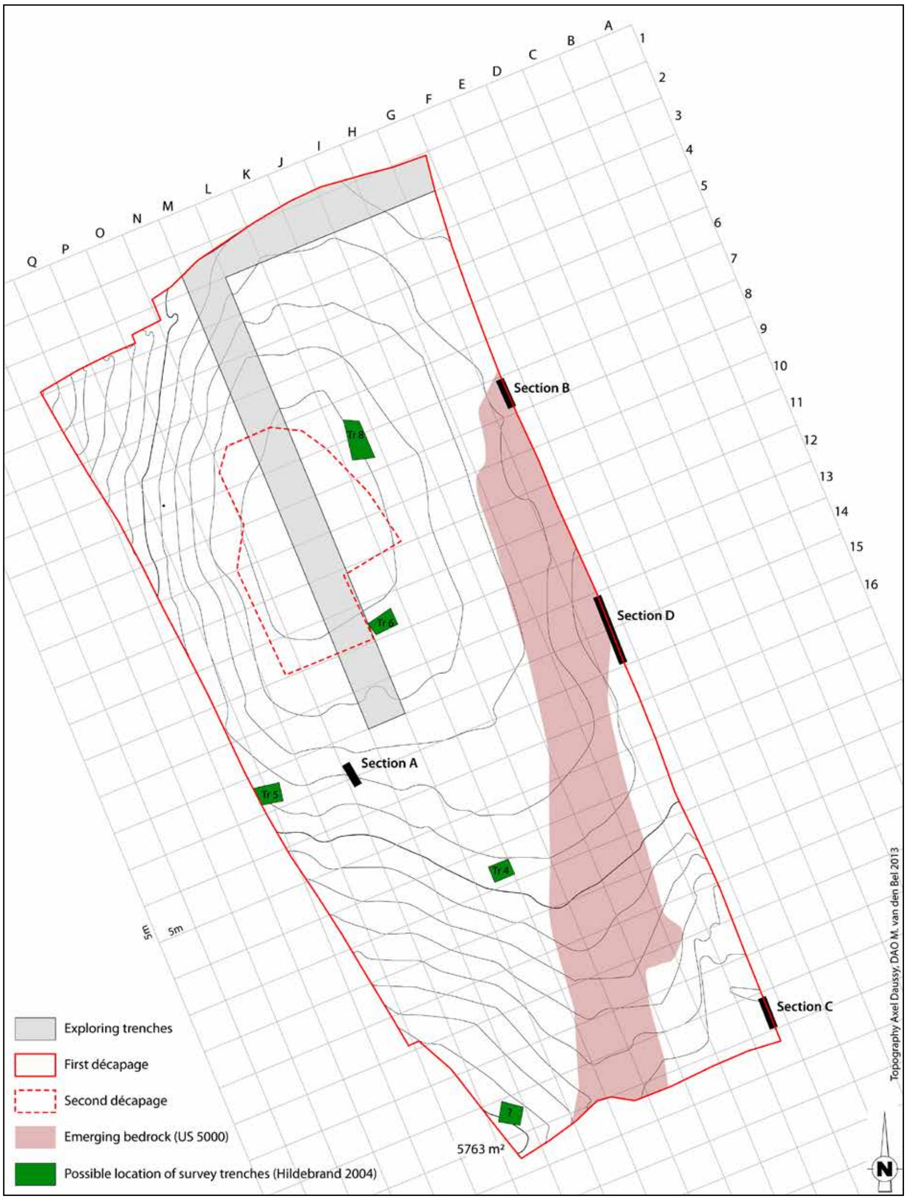

Figure 9.3. A general plan of the CPP excavation. We observed the 5 x 5 m grid, the possible location of the 2004 exploration trenches and the bedrock emerging in the excavation.

relationship with cacao plantations (partially still present at the site), presumably dating from the 18th century on.

Secondly, the low feature density, as predicted in the survey of 2004, caused us to abandon the collecting of material in squares as to the total surface in order to aim at a restricted area with features. Therefore, we continued the decapage with two machines, weighing 22 tonnes, to ultimately cover a surface measuring nearly 0.6 ha (5,763 m^2). However, important (large) artefacts (e.g. querns, milling stones), were collected within the 5 x 5 m grid. Moreover, five recent disturbances within the perimeter of our excavation were detected, probably corresponding to trenches Hildebrand had dug in April 2004 (Fig. 9.3). However, we are not sure as to the numbering of these trenches as they were topographed in a local grid and never attached to the National French grid, i.e. WSG 84, UTM Zone 22N.

The depth of our excavation was guided by means of either the appearance of the sterile, yellow coloured subsoil at *c*.60 cm deep or the sterile, red coloured disintegrating bed rock. The latter lateritic emergence runs N-S across the excavation pit, representing the spine of this hillock. A second excavation level, measuring *c*.550 m², was dug at the summit of this hilltop once the extensive *décapage* had been completed in order to check and/or verify any other or deeper features at this site's dense feature area.

In addition, four deep trenches were dug within the excavation pit by means of a small machine (6 tonnes) in order to get a better grip on the site's geology. For each profile a stratigraphic section description was forwarded by the INRAP geomorphologist, Dominique Todisco (now at the University of Rouen, France). Axel Daussy provided the topography. Soil and charcoal samples were taken in order to undergo a further analysis and will be discussed in the following chapters.

9.2 The geological setting

9.2.1 Introduction

The Morne Poncel represents a foothill of the Mont Cabassou which rises *c.*160 m above MSL. It is part of the earliest Precambrian formations of French Guiana and ascribed to the *Ile de Cayenne* geological series as are: Montagne du Tigre, Mont Saint-Martin, Mont Mahury, Mont Grand-Matoury, etc. (Cautru 1993). The Mont Cabassou is deprived from tidal sediment accretion because of the presence of obstructing Pleistocene ridges situated between Montabo, Mont Bourda, Mont Saint-Martin, Mont Ravel (formerly Montjoly) and Mont Mahury. Therefore the drainage system (Crique Cabassou) surrounding Mont Cabassou leads to the Cayenne and Mahury Rivers. This drainage system disposing of pluvial water is characterised by means of natural depressions which form swampy areas, known as inundated or wet savannahs (cf. Fig. 9.2).

According to the pedological map drawn by Claude Marius (1969), the soil of Morne Poncel is dissimilar to soils from the other hillocks surrounding Mont Cabassou and Morne Coco, situated to the northeast. According to Marius' map this soil is a 'sol ferralitique induré sur une cuirasse de nappe de bas de pente,' i.e. a ferralitic soil on duricrust. At the foot of the morne one encounters the 'sols ferralitiques appauvris modaux,' i.e. poor ferralitic soils (cf. Section 2.2.5). Even lower, hydromorphic soils, such as gley podzols, can be found to the north of Crique Cabassou. However, they belong to the Old Coastal Plain which represents a vast, grassy savannah with forested islands or stretched (palm) forests, corresponding to old filled up canals or active irrigating creeks respectively. One must keep in mind that, when discussing the (paleo)environment of Cayenne, it is often difficult to imagine such landscape considering the rapid urbanism on Cayenne Island, as pointed out with regard to PK 11 (cf. Section 8.1).

9.2.2 The stratigraphic observations

After deforestation, an aligned outcrop of rocks presented itself at surface level, as above-mentioned, reflecting the bedrock or spine of the hillock (US 5000). The disintegration or alteration of these rocks represents a coating layer (US 4000) with spatial variations as to its texture: siltier to the east of the bedrock emergence and clayeyer to the west. Indeed, we observed a smaller inclination at the eastern flank compared to the much steeper western flank. Thus, when rain falls on the hilltop, the excessive water would probably descend towards the east, as evidenced here by means of an eroded area, interpreted as a run-off gully (F 202 and F 203).

Four sections were documented within the perimeter of the excavation of which the first is located at the summit (Section A) and the other three concern the excavation's northeastern wall profile (Sections B-D) (Fig. 9.3). The description of these four sections indicated a similar, relative succession of stratigraphic layers. This enabled us to reduce these sections to a single schematic one, consisting of five stratigraphic units (Fig. 9.4).

The upper part of the profiles measures *c.*40 cm and consists of a humic, sandy silt layer containing artefacts. Its upper part, measuring between *c.*5 and 10 cm in thickness, represents the forest floor (US 1000). The lower part, situated at a depth of between 5 and 40 cm, corresponds to a dark coloured layer which is entirely restructured. In it ceramic material as well as fragments of charcoal were detected (US 2000). Below this first, superficial part, we observe a silt layer (slightly sandy and clayey) measuring between *c.*20 and 30 cm thick which is homogeneous and has a light brown to yellow ochre colour (US 3000). A clay layer corresponding to the alteration of the bedrock (US 4000) emerges as a N-S stretching row of boulders within the excavation's perimeter. The non-altered red coloured bedrock (US 5000) was reached in a number of sections during the excavation (e.g. pit F 158).

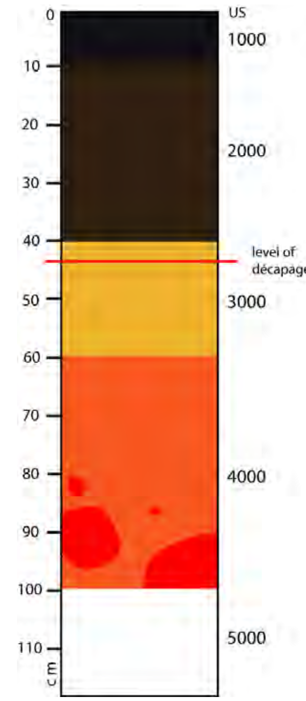

Figure 9.4. A schematic section of the site.

9.2.3 The interpretations

In general, the morphology of the Precambrian hillocks of Cayenne Island are topped or "crowned" with a duricrust (Fr., *cuirasse*). Its hardness and extension vary depending on the formations. The duricrust represents ancient terraces (Gibbs and Baron 1993; de Vletter et al. 1998; Théveniaut and Delor 2004; cf. Section 2.2.1).

All ferralitic soils of Cayenne Island are highly desaturated. The clay fraction consists mainly of kaolinite and iron oxides with some gibsite. The soil of Morne Poncel has been ascribed to 'sols ferralitiques indurés en cuirasse ou carapace.' In majority, they develop on bedrock rich in iron and magnesium (e.g. diorites, dolerites, amphibolites). These soils have a reddish brown colour at the surface as well as a crumbly structure. At a deeper level, we come across a red-ochre colour with a well-developed, fine polyhedral structure and certain concretions (Marius 1969:20–21)

However, our observations during the excavations illustrated that the profiles rather resembled a 'sol ferralitique rajeuni' as found on diorites and dolerites. In fact, Marius described this too with regard to his profile 'L1023' (Marius 1969:22). This specific soil belongs to the same group, but is attributed to another subgroup which fits in better with our observations at Morne Poncel.

The process of *rajeunissement* of the soils explains the emergence of the bedrock at a relatively low depth and can be related to a progressive, slow reputation of material on the flank of a hill, better known as "soil creep," or creeping soil (Heimsath et al 2002). This rather misunderstood process manifests itself on slopes and often consists of a slow movement of matter due to bioturbation and the effect of moistening/desiccation of this matter. Nevertheless, as mentioned above, pluvial water flowing towards the lateral (eastern) edge of the summit can certainly transport material. As to this matter, such a *rajeunissement* may explain why our ferralitic profile is not thicker than *c*.2 m.

Another general distinction can be made between the description by Marius and the CPP profiles concerning the dark colour of the upper or surface layers, i.e. US 1000 and 2000. This darkened colour is probably linked to the earliest human occupation at this site, thus not to the possible influences of the more recent cacao plantations. Its thickness, colour and crumbly structure (bioturbation) appear to be the result or the consequence of human activities, either voluntary or involuntary. A similar discussion was provided with regard on CSL (cf. Section 5.2.4). As to CPP, we were not able to carry out this type of research due to a small budget. In general, soil analysis provides specific pedological or chemical signatures reflecting excrement and waste deposit areas (Oonk et al. 2009; Woods 2003).

9.3 The radiocarbon datings

The Poznán Laboratory in Poland (cf. Appendix 1) analysed 15 charcoal samples. During the excavation we had chosen samples as to future dating from hand-dug anthropogenic features in order to obtain a more reliable association with features and the site's occupation. From all these samples we selected those collected from secure, anthropogenic features found in the entire excavated surface in order to obtain insight into its spatial character. Our main goal was to determine the occupations of this site and to establish a chrono-typology concerning the ceramic series (Table 9.1).

The probability of the calibrated ages at 2σ is rather satisfying with the exception of sample POZ-44836 taken from F 201 which is earlier. All the other results show a range between 100 and 200 years which can be considered too coarse with regard to establishing a ceramic chrono-typology. Despite this inconvenience we can state this site was occupied between *c.*AD 900 and 1400 which corresponds to the LCA.

Table 9.1. The results of the radiocarbon measurements. Atmospheric data from Reimer et al. (2009), calibrated at 2σ with OxCal v4.1.5 Bronk Ramsey (2010).

Feature	Type	C^{14} age BP	Cal. 2σ	Lab. No.
F 10	post hole	645 ± 30	AD 1281 - 1396	POZ-44817
F 18	inhumation pit	1035 ± 35	AD 896 - 1118	POZ-44819
F 54	ceramic deposition	685 ± 35	AD 1264 - 1391	POZ-44820
F 66	pit	655 ± 30	AD 1278 - 1394	POZ-44821
F 85 (EC 54)	pit with ceramics	770 ± 40	AD 1185 - 1289	POZ-44822
F 143 (F 143.1)	inhumation pit	655 ± 25	AD 1281 - 1392	POZ-44823
F 158 (Fill E)	deep pit	1635 ± 30	AD 342 - 535	POZ-44824
F 165	square	675 ± 30	AD 1272 - 1391	POZ-44828
F 192	post hole	355 ± 30	AD 1453 - 1635	POZ-44829
F 193	inhumation pit	895 ± 30	AD 1040 - 1215	POZ-44830
F 197	post hole	965 ± 30	AD 1018 - 1155	POZ-44831
F 199	pit with ceramics	895 ± 35	AD 1039 - 1215	POZ-44832
F 199 (EC 230)	sherd	895 ± 30	AD 1040 - 1215	POZ-44834
F 200	pit	675 ± 30	AD 1272 - 1391	POZ-44835
F 201	inhumation pit	9590 ± 50	9198 - 8792 BC	POZ-44836
F 6 (Survey 2004)	ceramic concentration	985 ± 20	AD 998 - 1156	KIA-25851

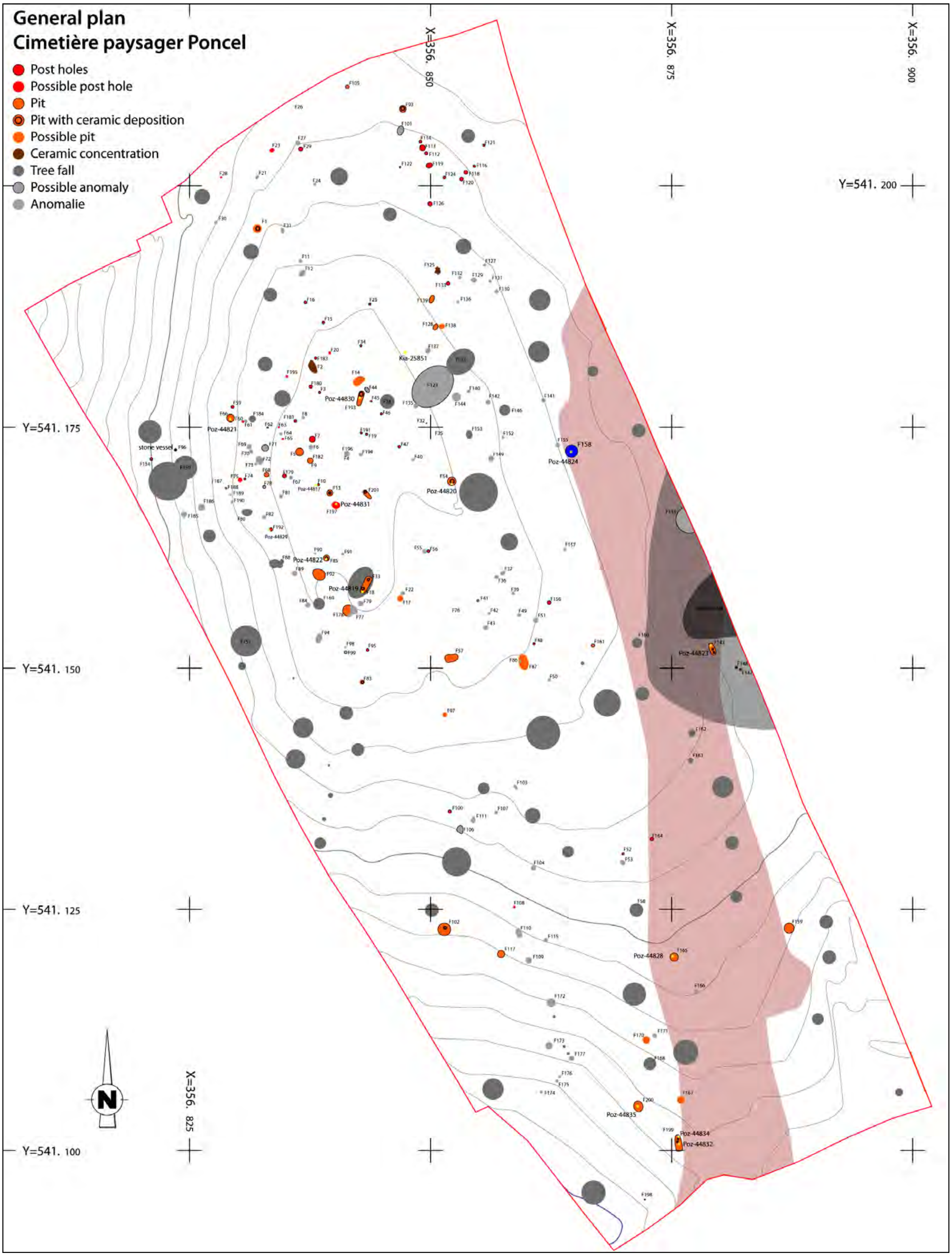

Figure 9.5. The general excavation plan.

The rather small summit of this hillock and the relatively long occupation span for this site evokes the necessity or possibility to divide this time span into two occupation phases at a 2σ range since it is absent at 1σ. The most recent phase (comprising POZ-44817, 20, 21, 23, 28, 35) falls between AD 1260 and 1400 whereas the earliest phase (represented by POZ-44819, 30, 31, 32, 34, 51) ranges between AD 900 and 1220. Two results remain: the date of pit F 85 (POZ-44822) situated between both hypothetical series and the most recent one (POZ-44829) which falls in the period of the European Encounter.

For the moment, we can conclude that this occupation range is common to Cayenne Island. Other sites with a similar range are: Mont Grand-Matoury, PK 11/Rorota, Katoury, Mombin II, Saint-Cyr, Vieux Chemin and Les Hauteurs du Mahury. The majority of these sites share the peculiarity of a possible earlier and a later phase: (a) in *c.*AD 1000 and/or (b) in *c.*AD 1300 respectively (Grouard et al. 1997; Grouard and Tardy 2003; Mestre et al. 2005; Delpech 2013; van den Bel 2007c, 2007d).

Thus, it is to be suspected that these phases reflect two occupations and/or two populations (?), as we have pointed out with regard to Crique Sparouine (cf. Section 6.5). Or, perhaps a third possibility: merely two different moments in time when a more intensified occupation was present at the site. A detailed ceramic analysis may serve to test this hypothesis (Section 9.5). This phenomenon may be the result or the consequence of two climatically dissimilar periods during the LCA in the Guianas as well as the Caribbean, as pointed out above (cf. Section 8.8). Moreover, it may also be possibly related to the worldwide dropping of the mean temperature in *c.*AD 1300, known as the Little Ice Age. This may have had an impact on the pre-Columbian populations in general (Dull et al. 2010).

9.4 The features

Below the dark earth layer (US 2000) numerous dark features were identified, contrasting with the yellowish brown coloured subsoil (US 3000) or reddish, crumbly bedrock (US 4000). Each feature was dug up by hand in order to characterise their origin: all the anthropogenic features were attributed to the pre-Columbian period and represent the remnants of a pre-Columbian hamlet. We did not identify a (large) waste area within the excavated perimeter. As mentioned above, the summit did not yield many artefacts. We therefore presume that, if any waste areas were present, this waste may have been thrown down the slopes of the hillock into the unexcavated area. The small quantity of tangible material observed during the entire decapage was interpreted as residual or erratic material belonging to the occupied area.

In total, 203 features have been identified of which 187 were excavated after the first decapage. Sixteen more were identified after the second decapage at the summit (Table 9.2 and Fig. 9.5). The majority (N=186) of the features were excavated in the US 3000 layer whereas four features were excavated in the dark layer (US 2000) and 13 in US 4000. It is important to emphasise that the second decapage, measuring *c.*550 m², does not correspond with a second occupation layer: the surface of the summit surface was merely excavated at a slightly deeper level, i.e. 10 to 20 cm, in order to make sure that no features were missed during the first decapage. However, three double features were counted in this manner (cf. Annexes 7.1 and 7.5).

Type	N
Post hole	51
Pit	26
Concentrations of ceramics	4
Ceramic deposition	6
Lithic deposition	3
Pit with ceramics	8
Deep pit	1
Run-off	2
Anomalies	102
	203

Table 9.2. The general feature count.

It must be added here that features were recognised mainly by means of a dissimilar colour or texture and the presence of archaeological material. It is certainly possible we have "missed" a number of features unrecognisable to the naked eye, i.e. a similar fill as the subsoil and/or without artefacts. However, we consider the loss of features to be small as we rely on our field expertise which is again the case regarding the interpretations of the features. Despite many efforts to record, characterise and discuss the features during our fieldwork, a large number hereof were called anomalies. This category refers to all natural features (notably treefalls, root and animal holes), but may also contain unidentified features of which we were not able to determine a natural or anthropogenic origin.

9.4.1 The description of the features

The pits

A total of 36 features have been interpreted as pit features. They consist of 26 simple pits containing artefacts, eight with ceramic depositions, and one very deep pit. Their outline at excavation level is round with the exception of five elongated pits. The shape of the latter can be described as rectangular with rounded corners. They contain one or multiple complete ceramic depositions and/or discarded depositions, i.e. F 18+33, F 143, F 193, F 199 and F 201. When excavating this type of large, but relatively shallow features, one can easily define the limits of the pit by means of the dissimilar texture and the fact that sherds are often found in a vertical position against the pit wall. Entire ceramic vessels are placed at either end of the rectangular pit whereas fragments of broken vessels appear to be deposited randomly but in a voluntary way, as they were rather easy to refit at our home base. These pits measure between 120 and 170 cm long and between 40 and 55 cm wide, creating a pit with perhaps the dimensions of a stretched human body. Although we did not find any bone (burnt or unburnt) or other tangible (human) proof, we consider the pit's shape and the deposition of the ceramics to comply with an inhumation grave. Once the pit was emptied, we could certainly imagine an individual –possibly wrapped in a hammock– being placed in such a tomb (Fig. 9.6).

Pit F 199 is probably the best example together with F 143. Here beautiful ceramics were deposited at one end of the pit, presumably at the deceased's feet. Pit F18+33 was first excavated as two different features, but a ceramic analysis indicated that fragments from both pits fit. This caused us to opine that both features belonged to one and the same elongated pit disturbed by a treefall as the second *décapage* confirmed. However, one must not forget the possibility that post-mortem activities may have resulted in the deliberate fragmentation of this pit's content. The majority of these pits were found at the summit of the hillock whereas one was found to the east of the summit and another in the very southern part of the excavation, which at first sight revealed a dispersed distribution.

The other ceramic depositions (N=6) represent complete vessels found locked in the sterile subsoil (US 3000). In fact, the outline of a possible pit was hardly visible. We therefore presume these vessels were deposited in a tight-fitting, rapidly filled pit. Although we did not find any human bone (again) in the content of these vessels (cf. Section 7.2.2), we propose they may represent secondary urn burials or contain material related to specific rituals, i.e. varied objects related to funerary practices or rites de passage.

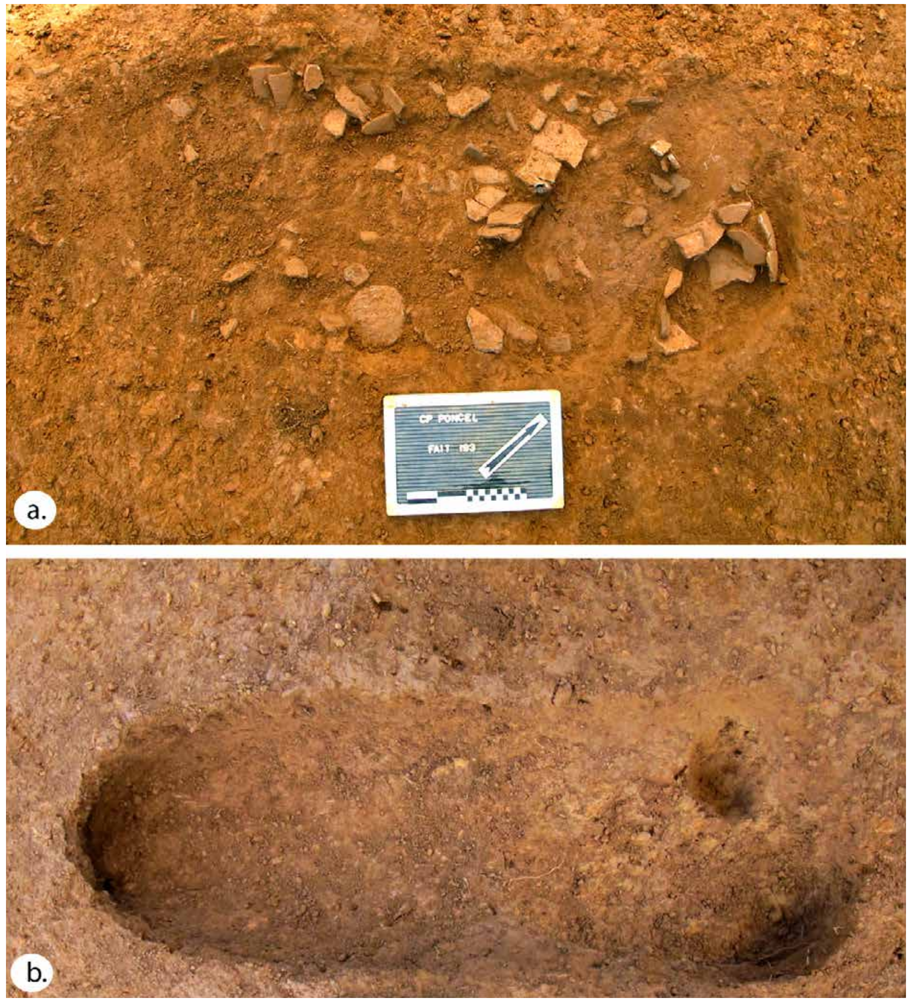

Figure 9.6. Zenith photographs of the elongated pit F 193 at the first and final levels of manual excavation.

It must be noted here that the Amazonian region is not very favourable with regard to the conservation of bone when confronted directly to the climate. As to the Guiana Shield, a small number of scientific references in literature concern inhumations in an archaeological context. If present in such a context, animal and human bones are often found in "protected" environments (e.g. caves, urns) (Goeldi 1900), or in a calcium-rich sediment (e.g. the shell ridges of coastal Suriname) (Tacoma et al. 1991).

In French Guiana, burial pits at habitation sites were often identified as oval, or more or less round, shallow pits measuring *c.*70 cm in diameter yielding bone fragments too small in order to identify their origin (cf. Section 5.4.1). However, test trenches at La Pointe Balaté yielded a primary inhumation burial leaving the fragmented "imprint" of an individual in a flexed or crouched position (van den Bel 2008b). Other indigenous inhumations were encountered at the historic Eva 2 site, including the imprints of human bodies in fœtal or flexed positions (cf. Section 11.3). Although we do not have any solid or tangible proof of human bodies in these more or less round pits, we consider them funerary pits because of analogies with similar pits in Suriname and the Caribbean.

Then again, do the supposed tombs at CPP differ from the oval shaped pits we came across previously? It must be added here that rectangular pits with ceramic depositions were found previously during the survey at the site of Katoury (Jérémie et al. 2002). However, at that time, they were not interpreted as possible burials, rather as dumps (Mickaël Mestre, personal communication 2013). More recently, two sites on Cayenne Island, i.e. Saint-Cyr (Delpech 2010a, 2011b) and Mombin II (Delpech 2011a, 2013), evidenced two concentrations of such elongated pits in which ceramic material was abundant (cf. Fig. 9.2). No human bone was encountered in these pits either. Whatever the case, these elongated or rectangular pits can apparently be seen as markers for LCA sites on Cayenne Island, knowing they do not contain skeletons or any (fragmented or bundled) human bones. Does this imply they were in fact empty or have been emptied, leaving only a mass of ceramics? A first step was taken by means of analysing soil samples taken from these pits in order to identify the presence of paleoparasites, associated with the human stomach (cf. Section 9.4.2).

As to the vessel depositions at habitation sites, small quantities of bone and/or calcinated bone were found at various sites in the interior (Vacher et al. 1998; Briand 2011), but the majority of these possible urns are "empty." Again, human bone is most often found in urn burials kept in caves and deposited in deep boot-shaped pits (P., *poços*) by the pre-Columbian population, as pointed out above (cf. Section 7.4). As suggested with regard to the Maracá urns, it has to be noted that it is difficult to comprehend if they represent either a final destination or temporarily recipients for bones (de Souza et al. 2001).

Concerning the simple pits we distinguish two types: (a) pits with an ovoid, or more ore less round, shape and a sink-shaped base, containing fragments of pottery and (b) pits with an ovoid or squarish shape (rounded corners), a flat base and straight wall profiles (e.g. F 66, F 92, F 117, F 159, F 165, F 200). The latter type has larger dimensions (*c.*80 x 100 cm) when compared to the sink shaped ones. Despite this distinction, the function of these pits remains rather mysterious, but they can be considered to be waste pits or else pits to stock objects or food in. Pits with straight vessel walls can be seen as pits with other functions. Soil analysis is needed in order to gain an insight into this matter.[221] We must outline two pits because of their large dimensions and contents here:

F 123 represents a very large sink shaped pit measuring 3.2 x 2.6 m at the excavation level. It reaches a maximum of 72 cm in depth. Three fills were identified, based on colour and texture. All contained fragments of charcoal, pottery and lithics. The large quantity of material suggests it may represent a waste area or dump. However, its size reflects a rather large treefall, which may indeed have served the inhabitants of this site as a dump.

221 According to Father Ahlbrinck (1931:309), the Kali'na used water-filled pits to soften the fruits of the ité palm or "murisi" (*Mauritia flexuosa*), in order to produce porridge of its pulp: 'Murisi epu-po = de vrucht van den Morisi. Ofschoon de Encycl[opédie] de vruchten niet eetbaar noemt, worden zij toch veel gegeten. De Karaïb graaft ter plaatse, waar hij water verwachten kan, een kleine kuil, werpt in den kuil de harde vruchten. 't In den kuil loopend water weekt de vruchten. Met bladeren dekt hij den kuil toe, opdat de zon de vruchten wederom niet verharde. Binnen drie dagen zijn zij zacht. Hij krabt ze los, vult er soms een geheele kalebas mede, roert er suiker in om en eet ze als een soort stijve pap.' Other fruits or tubers may have been treated in a similar way, but further archaeological research is needed to obtain reliable results.

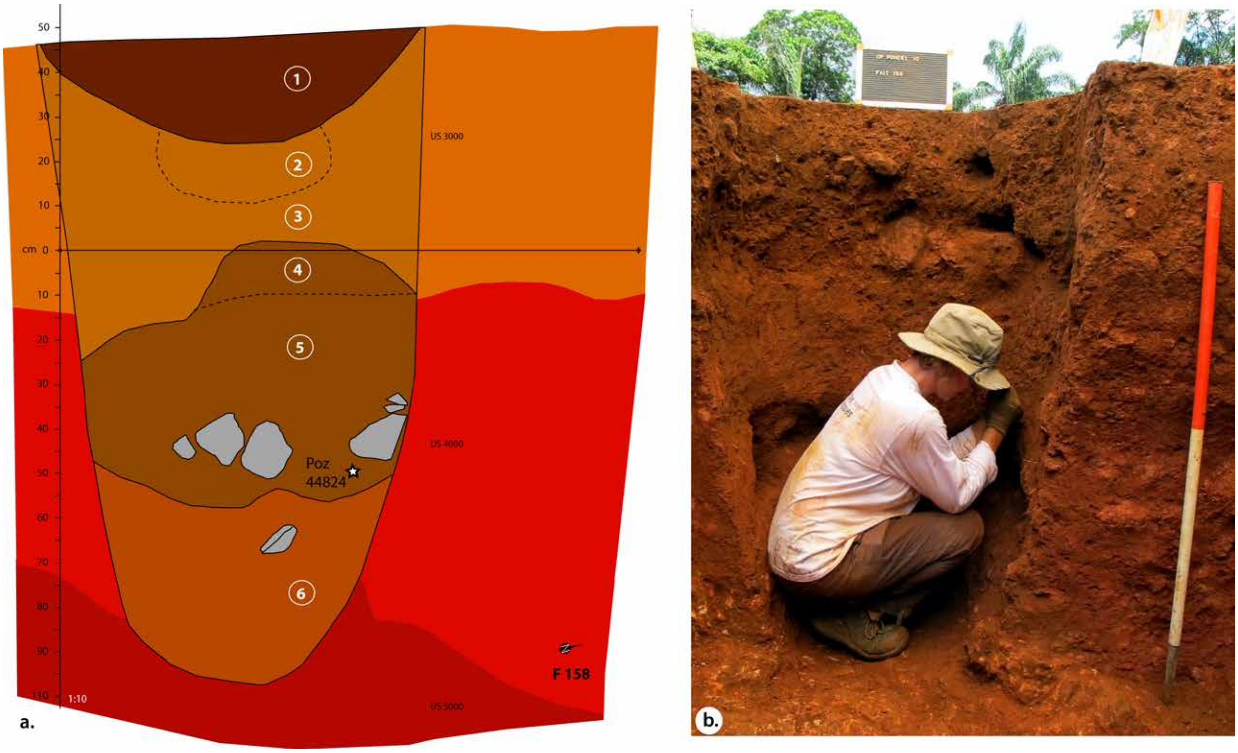

Figure 9.7. (a) A section drawing of the deep pit F 158 and (b) a photograph portraying the excavator in a rather suggestive position. The fill may be described as: (1) sandy silt, dark brown to black with charcoal, large blocs and large ceramic fragments, (2) pocket of loose sediment (roots?), (3) clayey silt with nodules, brownish orange, (4) empty pocket (root?), (5) clayey silt, reddish brown, loose texture with charcoal and (6) silty clay, red to light brown colour.

F 158 represents a very deep cone shaped pit with straight walls and a rounded base. At the excavation level its orifice measures 95 x 71 cm and reaches a depth of 148 cm (Fig. 9.7). If we estimate that *c*.50 cm of the black layer was removed by mechanical means, this pit must reach a depth of *c*.2 m!

At the first level of excavation, this feature contained numerous large pottery fragments which appeared to be related to various rocks, representing the final phase of this pit fill. When excavating the pit, its walls were easily followed by means of our trowels. We distinguished three more fills of which Layer 5 evidenced more large blocks. The bottom of the pit was dug into the bedrock (US 5000), ending in a cuvette. At that instance, we had never excavated a similar deep, cone shaped pit nor had we come across any scientific references in the other Guianas. However, the radiocarbon date (POZ-44824) taken from Layer 5 of 1635 ± 30 BP and the highly distinct ceramic material found only in this pit, may reveal an earlier occupation of this site (cf. Section 9.5 for ceramic analysis).

Generally speaking, this type of pit evokes similarities with funerary pits from eastern French Guiana and the Brazilian State of Amapá. However, the latter often feature lateral chambers and are dated to the LCA and often contain Late Aristé ware (Goeldi 1900; Cabral and Saldanha 2007; Mestre and Hildebrand 2011), ascribed to the Polychrome Tradition of the Lower Amazon.

The postholes

In total, 51 features were interpreted as postholes of which eight are possibly post holes. This ascription was based on the manual excavation of each feature, observing the hole's morphology, dimensions and fill. Although the postholes have varying sizes, the orifice (at the excavation level) is often round or slightly oval shaped with a diameter measuring between 17 and 49 cm for a depth of between 8 and 82 cm. In cross-section, we distinguished straight as well as boot shaped postholes. In the latter case, the orifice is most often wider than deep (e.g. F 7, F 102, F 118, F 183, F 197). The straight postholes can be distinguished in either flat-based or pointed examples.

The fill of these postholes is generally slightly sandier and darker than the surrounding subsoil. A small number also contained ceramics and rocks, i.e. F 84, F 100, F 133. The position of certain artefacts in these postholes has been interpreted as a voluntary position in order to obtain a specific angle when cornering the wooden post in the hole. As we have seen at Crique Sparouine, the spot with a darker sediment marks the position of the rotten post, but the post hole is often much larger. Several deeper postholes reached the reddish, much harder subsoil (US 4000) in which we were able to clearly observe a negative hole. It is presumed that a rather hard tool, e.g, a hardwood stick, has been utilised in order to obtain a hole in this type of sediment.

Regarding the number of postholes, the excavated surface and the estimated occupation of the site, the following remarkable traits can be observed. On the one hand, the majority of the postholes was found at the summit (*c*.800 m²), probably representing one or two houses. However, where one would have expected many more postholes after 400 years of occupation, there are actually very few. On the other hand, the low number of postholes at this site compared to other hilltop sites may somehow reflect its specific function. Perhaps important to mention, solid constructions were never constructed or conceived here. Instead, we suppose there were only rather small "staked" houses, leaving hardly any traces, with only a small number of deeper postholes. Therefore, we could not reconstruct the plan of a pre-Columbian wooden dwelling. Momentarily, we are only able to designate the place a house must have stood, or house location, as explained in previous chapters. We know no archaeological reference plan at all in the Guianas, and if we wish to acquire an idea of LCA dwellings, we can only turn to the historic and modern analogies of Amerindian houses.

The ceramic concentrations and *in situ* objects

We came across four ceramic concentrations and three lithic objects *in situ*. These features were encountered either within layer US 2000 or at the limit with US 3000 when scraping of the dark layers. They represent residual finds and may have been abandoned at the surface. Of particular interest here is the stone bowl (F 96). This exceptional item in the Guianas was found at the northwestern slope of the hillock (Square P7) (cf. Figs. 9.5 and 9.31). The other lithic objects are large milling stones (e.g. F 26, F 76) (cf. Section 9.6.2).

The features 202 and 203

These two features were detected in the eastern profile wall of the excavation when recording the stratigraphic Section D. They represent two large basins or drainage gullies measuring 4 and 3 m wide and 65 and 42 cm deep respectively. Their dimensions and topographic position at the lateral sloping point evokes the idea that pluvial water may have eroded a talweg on this side of the hilltop. However, its flat base does not really support such a hypothesis. Further excavation is required in order to to comprehend the extension and nature of these features. Interestingly, the position of a possible inhumation grave (F 143) in the vicinity of these two large features may present a specific, mutual relationship with these features.

The anomalies

In total, 102 features were interpreted as non-anthropogenic or anomalies. They mainly consisted of root holes and treefalls. The latter were most often (still) visible at the surface and were topographed without a feature number. Their size ranges between 40 cm and 3 m and may reach a depth of 80 cm at the excavation level. They have an irregular outline. The fill of treefalls is most often very sandy and includes many nodules caused by means of erosion. Numerous (recent) tree falls contain archaeological material trapped in these natural pits: the treefalls have not been subjected to excavation by hand, but were scraped and cut by means of a small mechanical shovel.

Root holes may have a similar fill as post holes as well as similar dimensions. Indeed, in this case, a distinction between natural and anthropogenic is difficult to make. We can recall that root holes are more frequently pointed and the fill is (much) looser. Other holes, notably dug by armadillos or iguanas, represent highly confusing characteristics and may be mistaken for a root hole or even a posthole. Therefore it is important to excavate all features in order to present a more considered choice when the final ascription is established.

9.4.2 The paleoparasitological analysis

A paleoparasitological analysis was carried out in order to verify the presence of intestinal parasites in the elongated pits interpreted as pre-Columbian inhumation graves. Two sediment samples were taken from the elongated pit F 199: a rectangular-shaped pit measuring 160 x 45 cm containing a complete ceramic vessel and many pottery fragments (Fig. 9.8). Matthieu Bailly (University of Franche-Comté, France) carried out this analysis.

The samples were prepared according to the standard extraction protocol developed in Besançon (France). It consists of the following sequence: (a) rehydratation, (b) pounding and micro-screening in order to obtain parasite markers, i.e. eggs of parasitic worms, located in the gastrointestinal tract. The eggs are between 30 and 160 µm long and between 15 and 100 µm wide. The observations were carried out by means of a microscope.

Sadly, this analysis did not reveal any parasite markers at all. We only observed charcoal debris, several minerals and pollen. In this case, the absence of parasites may have the following explanations: (a) the absence of a body in the pit, (b) the absence of parasites in the stomach of the individual and (c) an inferior conservation of the eggs in this geological context, i.e. ferralitic soils , and (d) the presence of a secondary burial (e.g. bundle of bones).

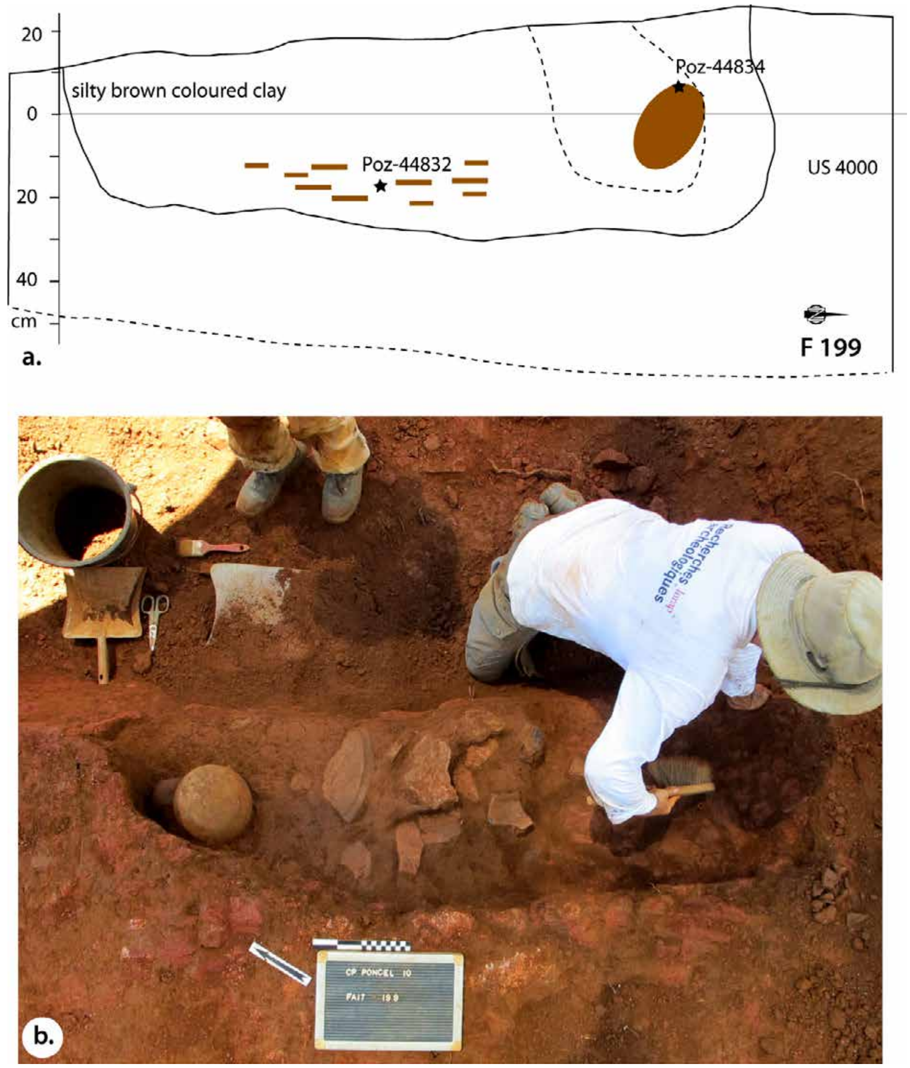

Figure 9.8. A section drawing of the elongated pit F 199 dug in the bedrock (US 4000) and a zenithal photograph of the manual excavation. Two radiocarbon datings were recorded as to this pit. The first was taken next to the complete vessel (EC 223) found upside-down (POZ-44834), the second from inside a sherd (EC 230) found at the bottom of the pit (POZ-44832).

However, this (test) study of two samples from a single pit does not suffice to understand the absence of eggs in this case. A similar analysis carried out on samples taken from highly similar features at the neighbouring Mombin II site on Cayenne Island, did not yield any positive results either (Delpech 2013). In this case, the sandy Pleistocene subsoil may account for the absence of eggs, too. Further analysis is required in order to establish if any eggs are present and if this method is worthwhile to be carried out in the Neotropics. Good results have been obtained with regard to drier regions in South America, such as northeastern Brazil or the coastal zones of Peru and Chili (Araújo et al. 2011).

9.4.3 The feature synthesis

The extensive excavation by mechanical means enabled the acquisition of a large overall view of this site in relatively little time. Despite the large size of excavated area, the boundaries of human occupation were not attained within the excavation perimeter. However, it may be clear now that the summital part of Morne Poncel yielded the majority of the anthropogenic features. Moreover, it had been more intensively occupied than other zones considering the feature distribution

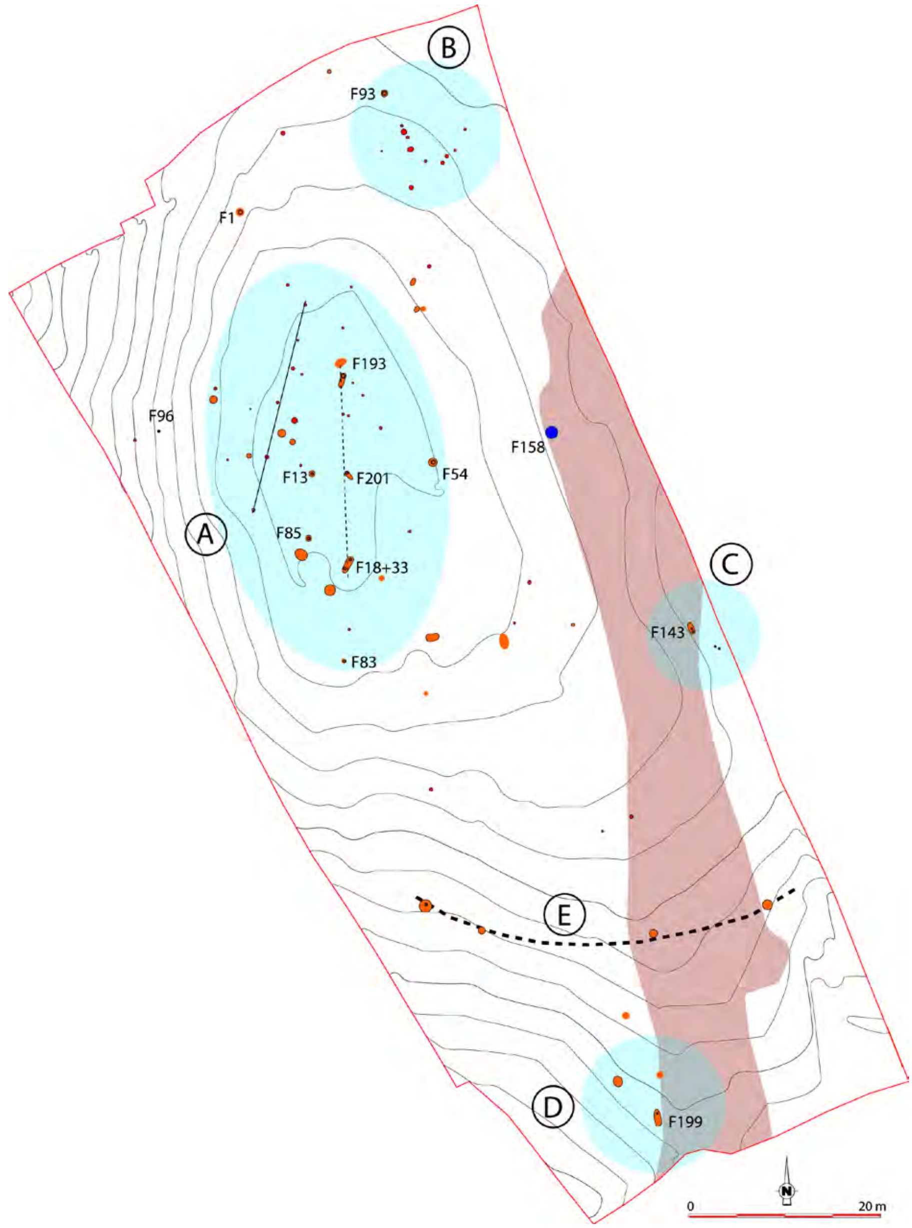

Figure 9.9. An overview of the hypothetical feature concentrations or Zones A-E with the important pit features indicated in yellow and the postholes which vary between 20 and 40 cm in depth and are presented in red.

within the excavation perimeter. As to this matter, we suppose that the latter zones are secondary areas, representing secondary habitats or activity areas. We distinguished five hypothetical features groups or Zones A-E, as presented here in detail (Fig. 9.9):

Zone A

This zone is the largest concentration of features and located upon the flat summit of the morne which measures *c.*45 x 25 m or *c.*800 m². The main elements of this area consist of approximately twenty postholes with a depth varying between 20 and 40 cm, two regular but rather deep pits (F 66 and F 178), a concentration of ceramics (F 2), three elongated inhumation pits (F 18+33, F 201, F 193) as well as four ceramic depositions (F 13, F 54, F 83, F 85). The ceramic deposition F 1 is situated outside this zone.

We may observe an alignment of six postholes, i.e. F 15, F 183, F 179-181, F 192, spaced every 5 m and situated at the western edge of the summit. Almost parallel to this alignment, following the summit's central axis, there is another evident alignment consisting of three elongated pits. The other features do not show any spatial connection. The small quantity of postholes for this "hot spot" is quite troublesome and may reflect a temporary installation or house location in spite of the possible inhumation graves. Notwithstanding this hypothesis, it may also reflect the fact we omitted numerous small and shallow features hidden in the dark layer.

Furthermore, if the postholes reflect a house location or, in this case, a house axis and if the elongated pits are indeed inhumation graves, we can evoke a possible relationship between pre-Columbian burial practices in or in the vicinity of houses. However, we do not know exactly if the inhabitants of Morne Poncel buried their dead in the houses or used the "old" village as a burial place, as pointed out with regard to SBE and Eva 2 (cf. Chapter 7 and 11). This is also hypothesized with regard to LCA sites located in the Lesser Antilles (van den Bel and Romon 2010).

Little can be gained here from radiocarbon dates in order to establish such chronological and functional distinctions as to postholes and burials within this zone as they cover the site's entire occupation period. Nevertheless, in sum, the alignment of the elongated burials at the hillock's highest point does indeed reflect a specifically designed spatial organisation, which has also been recorded at other sites on Cayenne Island, such as Saint-Cyr and Mombin II (see the dotted line in Fig. 9.9).

Zone B

This zone is situated in the northeastern corner of the excavation. In covers *c.*200 m² and consists of six post holes with a depth varying between 20 and 40 cm. Altogether they form a clear V shape accompanied by one ceramic deposition (F 93). This area slopes slightly and is considered to be a secondary habitation or activity area.

Zone C

This zone regroups the large features of F 202 and F 203. It represents the lateral depressions or head of the talweg, accompanied by an elongated pit (F 143) as well as two small ceramic depositions of which one is a very small, complete bowl (F 147). The lack of other features makes this part of the excavation difficult to comprehend. However, we imagine a sole event took place here, maybe an interment, knowing that this ensemble lies on the edge of our excavation.

Zone D

This zone is situated at the sloping, southern part of the excavation and distanced from the previous three zones. It consists of an elongated pit (F 199) and a squarish pit with straight vessel walls (F 200) interpreted as a fire place. The absence of other features in this area as well as the apparent isolated position also evokes a sole funerary event, as proposed for Zone C.

Table 9.3. *The general ceramic count.*

Total	Plain	Decorated	Weight (gr)	Mean weight
5979	5275	704	121,04	20.3 gr

Zone E

This zone represents four pits with straight walls, i.e. F 102, F 117, F 165, F 159. It is situated at the southern slope at approximately the same topographic altitude, forming a semi-circular belt, just below the hilltop. This position and its distance from the summit suggest another secondary area (or areas), probably linked to a certain activity related to this type of pits. Further microscopic and chemical analysis may point to a specific activity.

Compared to other excavations, this site includes a small number of features per 1000 m²: 30 for CPP, 200 for Crique Sparouine and 50 for PK 11, suggesting it represents a secondary habitation site or a special purpose site. On the one hand, the absence of important elements, such as hearth pits (with the exception of F 200) and wells (can fresh water can be found in Crique Cabassou?) confirms this idea. On the other hand, the presence of possible burials on site may suggest it is more important and has a more permanent character, despite the fact that the question concerning elongated pits remains technically unsolved.

9.5 The ceramic study

9.5.1 Introduction

The ceramic assemblage of CPP was hand-collected in exploring squares following the mechanical decapage (6 kg) as well as in features. In total, 5979 sherds were studied, weighing *c.*121 kg (Table 9.3) of which pit F 123 alone contained *c.*23 kg (20%). Fifty-one features without ceramic material were encountered (Annexe 7.2).[222]

The ceramic material collected from the dark layers (US 1000 and US 2000) plays a minor role in this ceramic analysis because its extraction was not continued all over the excavated area (cf. Section 9.1). In this case, the material collected from these squares only serves as an enrichment of the morphological and decoration modes at this site (N=17).[223] The remaining part of the constituent elements (EC) was collected from features (N=248), comprising a total of 23 archaeological vessel shapes.

Other compliance excavations have demonstrated that anthropogenic features yield the majority of the constituent elements, underscoring hereby the important value of this source of information. For example, the grid-collecting at CSL yielded only four archaeological vessel shapes, i.e. 13% of its total whereas the bulk was furnished by means of the features (cf. Section 5.5). Another example was taken from Katoury. Here, the majority (60%) of the ECs was obtained by means of digging features whereas the remainder (40%) was found in the buried surface level (Fr., *paléosol*) (Mestre et al. 2005:50). On the other hand, the residual

222 During the excavation we found but two fragments of imported ceramic ware (molasses pots) despite the close presence of the 17th century Bergrave pottery and Picard Plantation at the foot of the Morne Poncel. When the Poncel hillock was finally mined in early 2014, colonial material was detected on the northern foot of the morne (Eric Gassies, personal communication, 2014).

223 For more information on methodology, cf. Section 1.3.2.

			Mode	N
Mineral	**1**	sand / quartz	11	39
		sand + mica	12	16
		sand + mica + black minerals	13	5
		finely pounded mica	15	4
Vegetal	**2**	charcoal	21	29
Mixed	**3**	minerals and charcoal	31	138
Grog	**4**	pounded sherds	41	34

Table 9.4. The distribution of temper modes.

material plays a significant role in the way in which and where to recognize any dump areas or house locations, as we have seen with regard to Crique Sparouine (cf. Fig. 6.15).

The disparity between decorated and plain sherds as to this assemblage is rather high: 11.7% of the ceramic total is decorated whereas 40% of the ECs is decorated. Therefore, as to this catergory, we can attribute a degree of importance to its decorated ware. This high level of decorated ceramics (more than 10%), is confirmed by means of other LCA ceramic assemblages with regard to Cayenne, such as at Katoury: 13% (Mestre et al. 2005:47) and PK 11: 12% (cf. Table 8.3).

The state of conservation of the ceramic material is mediocre. This is probably related to the tropical climate and soils because the artefacts found in deeper contexts (e.g. pits, postholes) are often in a better state of conservation than those found in the archaeological layer. In the majority of the cases, the common finishing techniques (e.g. polishing, smoothing, burnishing) and (fragile) white-on-red painting, has disappeared from the exterior vessel walls making it difficult to observe these techniques.

The only manufacturing technique observed here is the coiling technique characterised by means of numerous sherds with U and/or N shaped joints. However, the studied griddles consist of two superimposed clay slabs pressed together, often with an additional, usually thinner, coil around its edge in order to form a rim.

The paste's non-plastic elements were recorded with the naked eye in order to classify its composition. Now and again it was difficult to determine their origins –the fragment had been broken several times– in order to obtain an average count of the various particles, notably when distinguishing pounded potsherd, charcoal fragments and sand quantities. This heterogeneity is probably guided by means of a rather quick malaxation of the temper ingredients into the raw material as seen with PK 11 (cf. Section 8.5.1). Again, it is presumed that the latter raw clay was often badly checked for impurities. Perhaps the pottery manufacturing process was generally speaking uncareful. This can be linked to a certain degree of mass production.

Four temper modes were observed for the ECs: (a) mineral (N=64), (b) vegetal (N=29), (c) mixed (N=138) and (d) grog temper (N=34). Mode (c) is the most popular (Table 9.4). It has to be noted here that the mixed temper mode (No. 31) contains all sorts of non-plastics (voluntary or not), such as charcoal, quartz-sand, ashes, grog, mica, etc. The grog temper mode (No. 41) contains pounded potsherds, but may also include charcoal and sand, albeit to a much lesser extent.

The microscopic analysis of the PK 11 temper modes indicates not only that observation with the naked eye is insufficient (cf. Section 8.5.3) but also that grog is probably the most important ingredient of these LCA assemblages, thus revealing a mixed temper with a significant level of grog. Paste modes Nos. 3 and 4 are much alike. As to griddles, the grog temper is higly recognisable. Now and again they contain large sherd fragments measuring up to 2 cm. Apparently, griddles received a less pounded sherd fraction and perhaps only remainders of a pounding session (after screening).

Aside from the mixed mode, the mineral temper is the most popular (24%). The others are minoritary modes. As to the sand-tempered ceramics, we must note here that the examples of pottery found in pit F 158 clearly distinguish themselves from the rest of the assemblage. The reason for this is that their very sandy temper is emphasized by means of the stylistically dissimilar decoration modes as well as an early first millennium radiocarbon date. Two other features, i.e. F 1 and F 200, also have an exclusive sand temper. However, the radiocarbon result for the latter feature is found within the common LCA range.

The macroscopic analysis regarding firing, observed at the newly made fracture of the sherd, revealed four principal colours: (a) red all over, (b) orange to brown all over, (c) dark grey core with lighter coloured walls and (d) dark grey or black all over. The latter two firing modes correspond to a reducing environment (72%).[224] The second corresponds to an oxidising environment (5%) and the remaining mode to a combination of both firing techniques (23%). The reducing firing technique in combination with a mixed temper represents the most popular combination on site (48%).

9.5.2 The constituent elements

The characteristic elements contain 265 individuals of which 23 are reconstructed archaeological vessels (Annexe 7.2.3). We recorded 168 rim fragments, 103 base fragments and 17 griddle fragments. It is recalled here that 106 specimens of the consituent register are decorated (40%), consisting of 84 rims, eight bases and 14 complete vessel shapes.

The rims

The rim diversity allows us to create eight modal series (SM I-VIII) (Table 9.5). We further distinguished three subseries as to rims with rectilinear, concave or convex profiles, as to open forms (SM I-VI). The presence of a carination and/or a specific labial treatment, i.e. an inclination or flexation or the rim, created a further subdivision regarding this series: subseries SM III a-d. In total, seven subseries were established of which four feature keels and three have inflexed lips.

The rim diameter and paste was also recorded with regard to these elements. Seven elements were not attributed to any of the above-mentioned series due to a lack of any morphological repetition. They constituted their own series, namely SM VIII, with unique rims. Another specific series includes the necks or bottles (SM VII) of which the orifice diameter measures less than 10 cm, representing the principal element of discrimination. Remarkably, however, the ECs of the two latter series (N=13) are all decorated, with the exception of one specimen from pit F 123.

224 This reducing firing corresponds to no. 9 and 10 after Rye (1981:116, Fig. 104).

SM		N	Shape	Profile	Lips / Keels
I		15	O	Rectilinear	
II	a	16	O	Concave	
	b	14	O	Concave	Keeled towards the exterior
III	a	22	O	Convex	
	b	17	O	Convex	Inflected lip towards the exterior
	c	19	O	Convex	Inclined lip towards the interior
	d	4	O	Convex	Keeled towards the exterior
IV		4	R	Rectilinear	
V		6	R	Concave	
VI	a	20	R	Convex	
	b	4	R	Convex	Inflected lip towards the extrior
	c	9	R	Convex	Keeled towards the interior
	d	5	R	Convex	Keeled towards the exterior
VII		6	R	Collar	Bottle
VIII		7	x	Unique	
		168			

Table 9.5. The rim series SM I-VIII.

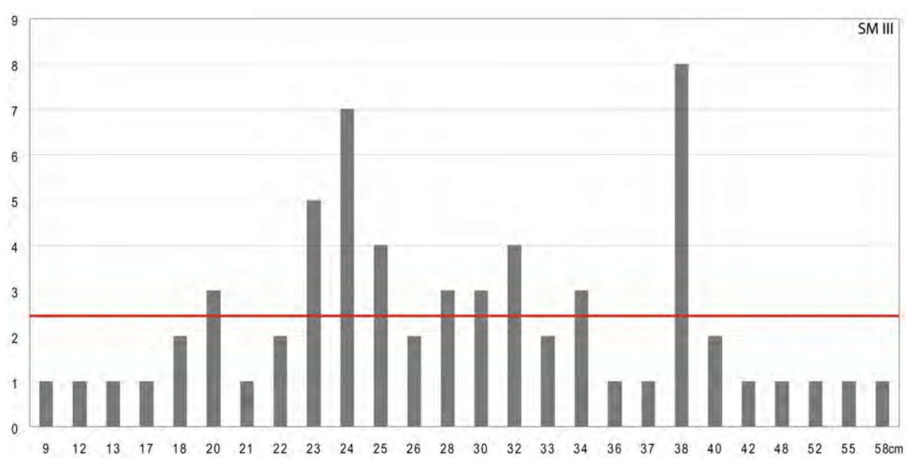

Figure 9.10. The diameter frequency of SM III.

In sum, the CPP series are represented by means of: (a) open vessels (SM I-III), (b) restricted vessels (SM IV-VI), (c) necked vessels (SM VII) and (d) unique vessels (SM VIII). Series (a) represents the most frequent vessel shape (66%). SM I-IV and SM VI represent the most relevant series of which SM III occurs most frequently (37%). The others are considered minoritary series. The unique elements (SM VIII) represent 4% of the EC total and are thus of little value.

SM III This series represent the convex rims and contains 62 elements. It is the most frequent type of rim profile (37%) and thus a common element to this site. This series has been subdivided into rim profiles with: (a) an inflection at the interior of the vessel wall, (b) the lip inclining towards the interior and (c) keels (Table 9.5). The lip shapes are most often flattenend (52%), rounded (26%) or pointed (21%). The wall thickness varies between 4 and 11 mm (with a mean of 7 mm) and the diameters of the orifice range between 9 and 58 cm.[225]

225 From 30 cm on, the diameter was measured with a 2 cm interval.

When the sum of the mean diameter value (29.5 cm) and its frequency number (N=2.4) is taken as a discriminant element regarding the vessel orifices, peaks can be distinguished at 24, 32, and 38 cm (Fig. 9.10). They may reflect different orifices regarding the same vessel shape. However, we cannot attribute an orifice size to each subseries.

The preponderance of mixed pastes is notable with this series (66%). The others represent a minority. As already stated in the previous section, the omnipresence of a mixed temper combined with a reduced firing technique is striking and emphasises the homogeneity of the ceramic production on site.

As much as 50% this series is decorated. Here, red (43%) the most frequent colour, followed by incised decorations, such as vertical or oblique crossed incisions (Fr., *treilles*), small wavy-lines, and a single incised line around the rim (28%) as well as indentations upon the lip (18%). As to the red colouring, the majority was applied to the exterior wall (N=8). Only two elements were painted white on both the inside and outside wall. Incisions were applied exclusively to the exterior of the vessels. We observed only one combination of red paint and incisions (EC 150). The SM IIIc series is associated with the application of small modelled clay balls or lugs (e.g. single or double nubbins) or small indented clay strips applied several centimeters below the rim.

In sum, the convex rims of this series represents a steady production with the following features: (a) a rim profile with an inflexed lip towards the exterior and/or an inclined lip towards the interior, (b) three dominant diameters with regard to the orifices, (c) the application of various types of incisions to the exterior wall, (d) red colourings on the interior and (e) indentations on the lip.

SM VI This modal series is less important than the previous one (23%). It too represents convex rim profiles, but with regard to restricted vessel shapes. The labial treatment and presence of a keel makes it possible to create subseries (SM VIa-d) of which the convex rims with inflected lips towards the exterior (11%) and the carinated examples (36%) are most noteworthy (Table 9.5). However, the simple convex rim remains the most frequent (53%). Most rims have flattened lips (52%), followed by pointed (29%) and rounded rims (19%).

The wall thickness varies between 4 and 11 mm (with a mean value of 6.3 mm). The diameters range from 8 to 55 cm. When the sum of the mean diameter (≈25 cm) and its frequency number (N=1.7) is taken as a discriminant element, one observes the following groups of diameters measuring: (a) between 12 and 20 cm, (b) *c*.24 cm and (c) between 34 and 38 cm (Fig. 9.11). These peaks reflect frequent diameters regarding these series, but do not correspond to a specific subseries, with the exception perhaps of SM VId which appears to favour the smaller vessels. As before, we note the preponderance of mixed pastes (45%) and a reducing firing technique.

As much as 76% of this series was decorated. The majority hereof shows incisions on the exterior wall (90%), followed by three indented ECs and two with a red colouring on the interior. The incisions modes vary but 51% consists of oblique examples, followed by wavy-lines (23%). Seven items have modelled appliqués (e.g. nubbins, lugs). We may note here that oblique incisions are mainly found in the SM VIa subseries. The small wavy-lines can be attributed to the SM VIb and SM VIc subseries. It is highly possible that SM VIa and SM VIc are ovoid or boat shaped vessels.

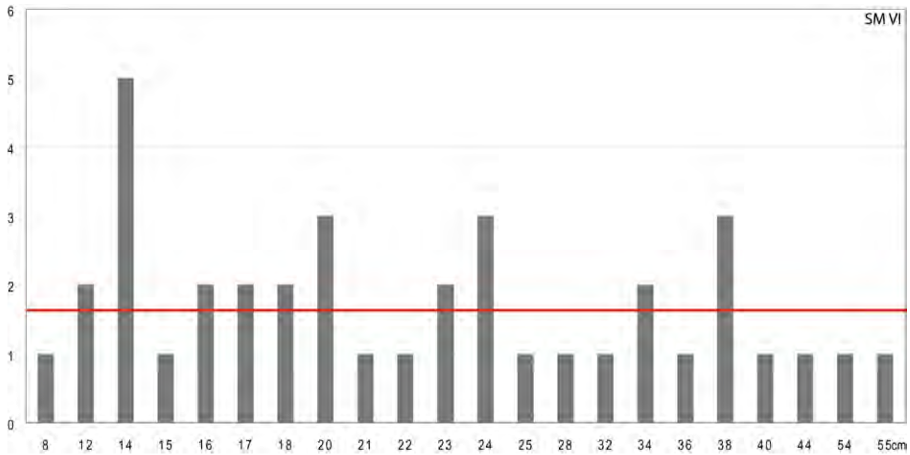

Figure 9.11. The diameter frequency of SM VI.

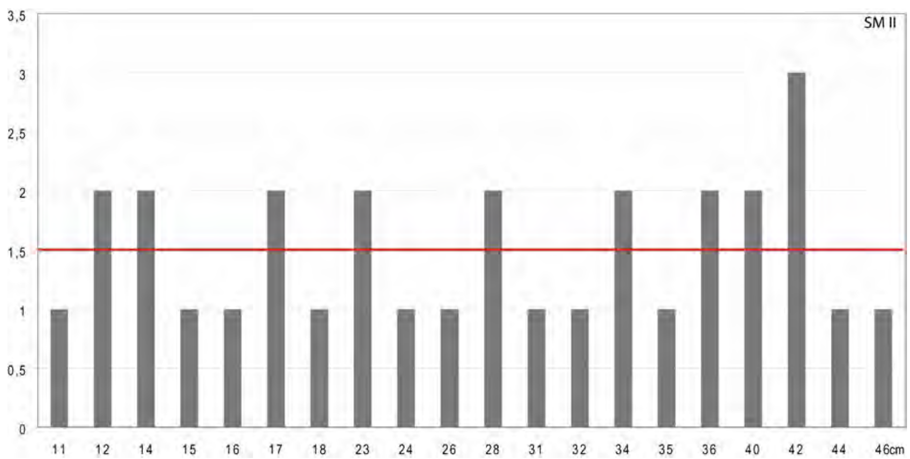

Figure 9.12. The diameter frequency of SM II.

SM II The third most frequent series are the concave rims (18%) of open vessels. The presence of carination and the flaring of the rim towards the exterior enabled us to distinguish another subseries (SM IIb). Up to 43% of the lips are rounded, 33% is flattened, and the rest (24%) is pointed (Table 9.5).

The wall thickness varies between 5 and 12 mm (mean value: 7.7 mm). The diameters measure between 11 and 46 cm. When the sum of the mean diameter (28 cm) and its frequency (N=1.5) is taken as a characteristic element, we observe that large orifices measuring *c.*42 cm predominate this concave series, suggesting a preference for large vessel-shapes (Fig. 9.12). Twenty-two items were found inside (waste) pits. Again we see a reponderance (66%) for mixed pastes as well as for the reducing firing technique (77%).

Only 37%, or 11 indiviuals, of this series is decorated almost exclusively on the outside of the recipient. These decorations consist of six rims with indentations on the lip, six rims with a red colouring and five rims with various types of incisions. The combination of a red band and crossed oblique incisions applied to the neck of SM IIa (N=2) represents a highly recognisable decorative aspect of this series. It also features a complete vessel, found in a small pit or post hole, i.e. EC 154 of F 93, with a regularly indented lip as well as a complex geometric white-on-red dessign added to the interior wall (Fig. 9.13).

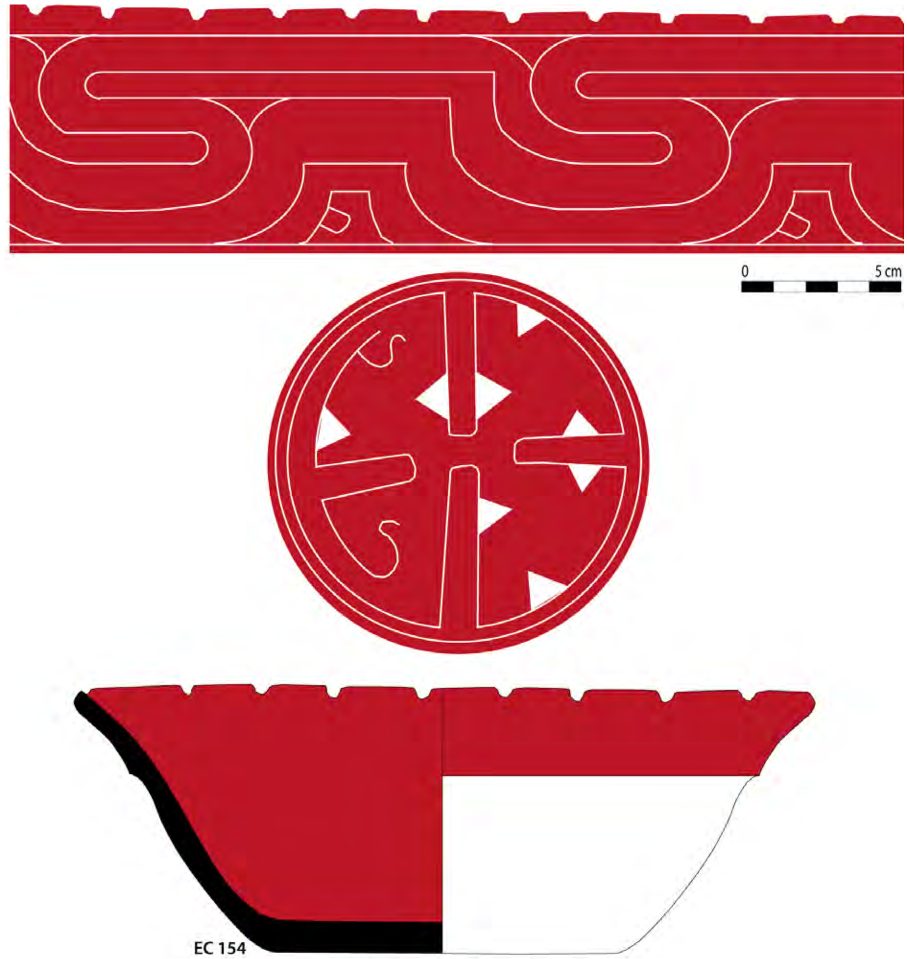

Figure 9.13. EC 154 was found in pit F 93 and has complex white-on-red designs on its interior wall and base. The subdivision of the base into four elements forms a cross that may represent an (abstract) reflection of the cosmovision of the inhabitants at CPP.

SM I The fourth modal series consists of rectilinear rims of open vessels (9%). As much as *c.* 60% of the lips are flattened and 33% is rounded. The wall thickness varies between 6 and 9 mm (mean value: 7.4 mm). The diameters vary between 22 and 56 cm. When the mean value (35 cm) and its frequency number (N=1.4) is taken as a characteristic element, we observe that larger orifices of *c.*38 cm are the most common to this series (Fig. 9.14). Once again we see a concentration of mixed pastes (87%) and reducing firing (80%) with regard to this series. Only four individuals were decorated (27%).

SM VII This series catches the eye because of its restricted orifice measuring less than 10 cm. This morphology reflects the neck of a bottle and consists of six individuals, i.e. 3.6% of the total EC population. The wall thickness varies between 4 and 6 mm. All elements were fired according to the reducing firing technique and have either a vegetal or a grog temper. Moreover, they are decorated with incisions and red banded colouring, with the exception of one merely incised specimen. Two elements also have small lugs. It is possible that this series may have keels at the base of the necks. If so, they may be ascribed to the SM VId subseries. This series is very homogeneous and represents us with a a characteristic ware.

SM V The concave rim profiles of this restricted minority series comprise six individuals. The wall thickness varies between 6 and 10 mm. The diameters measure *c.*24 cm. Three ECs include incisions applied to the interior wall.

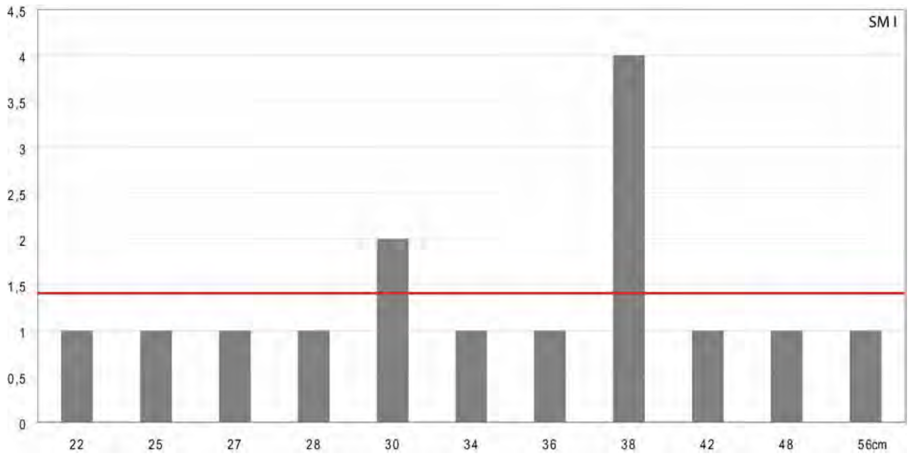

Figure 9.14. The diameter frequency of SM I.

SM IV This modal series comprises rectilinear profiles of restricted vessels (N=4). The wall thickness varies between 7 and 8 mm. The lip shapes are either flattenend or rounded. The diameters vary between 22 and 24 cm. All items are decorated: white-on-red paint/slip and incisions are applied to the exterior walls. As for SM VI, this small series is homogeneous. It has a recognisable morphology and decoration mode rendering it a marker for this assemblage.

SM VIII The SM VIII series (N=7) represent all other rims which do not correspond with the above-mentioned descriptions.

The bases

The register of base fragments comprises 103 individuals, i.e. 39% of the total EC count. Their bases were classified in the following modal series established according to their morphology: (a) flat bases (SM 1), (b) dimpled bases (SM 2) and (c) pedestaled ones (SM 3) as well as two undetermined specimens. The flat bases occur more frequently (55%) than dimpled ones (36%) (Table 9.6). Seven pedestal bases represent a small series (7%) and are very recognisable.

Flat bases (SM 1) The flat bases (N=57) were subdivided according to their profile: (a) rectilinear (SM 1.1, 26%), (b) concave (SM 1.2, 22%), (c) convex (SM 1.3, 26%) and (d) appendicular (SM 1.4, 26%).

The base thickness varies between 4 and 16 cm. However, we note that thinner bases can be ascribed to the SM 1.2 and SM 1.3 subseries whereas the thicker ones can be found in the SM 1.4 subseries. Of the largest examples, the diameters vary between 5 and 25 cm. They were predominantly recorded for the SM 1.4 subseries. In general, we can observe that (a) thinner bases also have smaller diameters and (b) appendicular bases are slightly dominated by means of the larger diameters. Only two elements were decorated (3%), both with a red colour. A quick scan informs us that the repartition of pastes between bases and rims differ (Table 9.7). We noted a predominance of sand temper with regard to bases over rims –in spite of our small sample. This difference is often visible to the naked eye thanks to the consequent quantities of large quartz elements in the base paste (Fig. 9.15). The abundance of quartz/sand for bases is often associated with obtaining better performances out of cooking pots. The reason for this is that this temper conducts heat in a superior manner (Skibo and Schiffer 1995:83).

SM		N	Base	Profil
1	1	15	flat	rectilinear
	2	12	flat	concave
	3	15	flat	convex
	4	15	flat	appendicular
2	1	10	dimpled	rectilinear
	2	4	dimpled	concave
	3	15	dimpled	convex
	4	8	dimpled	appendicular
3		7	pedestalled	
0		2	undetermined	
		103		

Table 9.6. The base series SM 1-3.

Dimpled bases (SM 2) The second most relevant series, i.e. the dimples bases (N=37), were subdivided accordingly: rectilinear (SM 2.1, 27%), concave (SM 2.2, 11%), convex (SM 2.3, 41%) and appendicular (SM 2.4, 21%). Within this series the convex profile occurs by far the most frequently. The base thickness varies between 5 and 18 mm. The diameters vary between 6 and 16 cm. As with flat bases, the thinner ones are associated with smaller diameters. Three elements (8%) were decorated of which two were painted red-on-white and was one incised.

Paste no.	Bases	Rims
11	27	18
12	10	6
13	3	2
15	3	1
21	15	18
31	37	106
41	8	17
	103	**168**

Table 9.7. The repartition of the pastes between rims and bases (cf. Table 9.4 for the paste numbers).

Pedestal bases (SM 3) This series is minoritary (N=7), but features a remarkable morphology. Two items were painted red on the inside (cf. Fig. 9.23a). A third element included a spiral painted on the interior with a darkish brown slip.

The griddles

This category is represented by means of seventeen individuals i.e. 6.4% of the EC total. The griddles were subdivided according to the rim shape: either simple, non-modified (SM A) or modified with a modelled rim (SM B-E). The latter has varied shapes: pointed, rounded, straight or appendicular (Table 9.8).

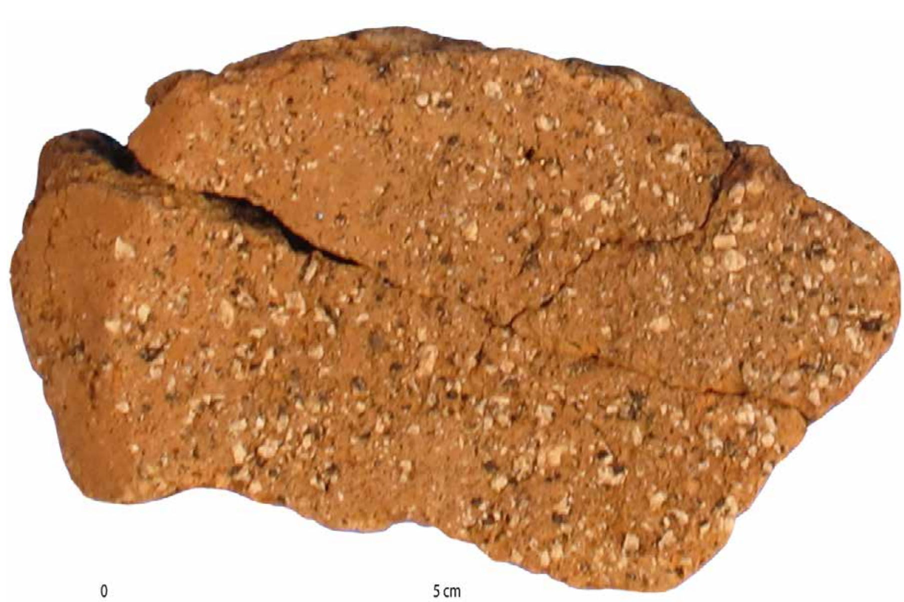

Figure 9.15. A base fragment EC 103 showing a large quantity of coarse mineral material.

The poor quality and relatively small quantity of the small griddle fragments is remarkable, but provides us with little information. On the other hand, the dissimilar finishing modes, thicknesses (measuring between 14 and 24 mm) and the diameters (between 38 and 64 cm) include a large variety of griddles which is difficult to apprehend due to the small quantities. The temper consists almost exclusively of (coarse) pounded sherds, now and again larger than 2 cm! Indeed, its presence of 6% for the entire constituent register is rather low, when compared with other LCA sites, such as Katoury with 13% (Mestre et al. 2005:53) or PK 11 (cf. Section 8.5.3). We may further note that 65% of the griddles were found in the waste pits F 123 and F 151, located at the central part of the site (Zone A).

SM	N	
A	5	simple (straight)
B	5	modified, pointed
C	3	modified, rounded
D	1	modified, straight
E	3	modified, appendicular
	17	

Table 9.8. The griddle series SM A-E.

We may also refer here to a clay ball (F 150) and two pedestalled or footed objects (EC 61 and EC 229). The latter two fragments may represent ceramic stools and/or tablets as found during the survey in Trench 8 (Hildebrand 2004, Plate 4), at Thémire (Rostain 1994a, Fig. 112.8) and Saint-Agathe (Rostain 1994a: Fig. 141.1-5; Samuelian 2009:73).[226]

9.5.3 The decoration modes

The decorated fragments (N=704) represent 11.8% of the total amount of ceramics found at this site. The modes of decorations consist of incisions (51%) and painted ware (38%) (Figs. 9.23-7).

The incisions

The incised decoration mode (N=358) is, with the exception of two specimens, applied on the outside of the recipient. As to this study as well as to PK 11, we distinguished several modes (Modes 1-5): (1) parallel vertical and/or oblique incisions, (2) vertical crossed incisions (Fr., *treilles*), (3) alternated (Fr., *chevrons*), (4) complex incised motifs often in a zone or cartouche and (5) wavy-lines. Modes 1 and 2 together represent the majority of the incised ware, i.e. 83%. This corresponds with *c.*30% of the rentire decorated register (Annexe 7.2.4).

It was difficult to recognise the varied types of decoration as the fragments were on occasion too small to distinguish Modes 1 or 2 or even Mode 3: oblique or vertical, crossed or alternating, etc. In fact, we recorded simple oblique as well as oblique crossed incisions on one and the same vessel! In either case, we chose to lump the modes of decoration into five modes in order to escape a multitude of coapplied modes which would be also too time-consuming with regard to the present study. However, it may of course be relevant to other analyses (cf. Section 8.5.5 for an introduction to Cayenne incised ware).

As to CPP, incised pottery is mainly represented by means of *treilles* applied on the exterior upper part of the recipient, as with PK 11, notably for: SM IIa, SM IIIa, SM IIIc, SM VIa-d and SM VII. Convex profiles such as SM IIIc and SM VIa resemble the afore-mentioned recipients which include *treilles* applied to the upper part of the vessel. The keeled series, i.e. SM VIc-d and the concave series,

226 The present author also noticed incised stool fragments with regard to the Bigiston site on the Lower Maroni River when visiting the depot of *Zorg en Hoop* (Paramaribo) in August 2012 (see note 173). See also Arie Boomert's early contribution in Dutch on the LCA ceramic incised sniffing tablets found in Suriname (1975) and Rostain's inventory of LCA incised tablets in French Guiana (1994a, Fig. 141).

i.e. SM V and SM IIa, display *treilles* right below the lip. Together with the bottle necks (SM VII) we can thus distinguish four modals series with *treilles*.

In addition to these, rather basic, incisions we observed more complex motifs, applied solely to the exterior of the recipient, such as the wavy-lines mainly recorded with regard to SM VI. The latter motif represents *c.*7% of the entire incised repertoire. Furthermore, we note 35 specimens with spaced indentations on the lip (mainly SM IIa and SM IIIa) and six specimens with punctations. We can mention here four rims with a single or double series of thin incisions (fingernails?) on the inside of a flattened or concave lip. They were only found in pit F 158. Two similar rim sherds were found in Trench 8 during the survey, situated in the vicinity of F 158 (Hildebrand 2004, Plate 3).

The slipped/painted ware

The slipped/painted ware comprises 269 elements, i.e. 37% of the total decorated register. As much as 60% had received colouring on the exterior wall and 37% on the inside. The remaining number is bifacial.

The colours "Red" is represented by means of the following chromas 7.5R 4/6-8 (e.g. EC 23, EC 73, EC 66 (Fig. 9.22e), EC 148 (Fig. 9.28f), EC 191) and "Yellowish red" by 2.5 YR 6/8 (EC 52, EC 150), 2.5 YR 5/6 (EC 100) and 5YR 6/8 (EC 155). We may also refer here to one (rare) fragment with duotone red: the application of geometric painted dark red on a lighter red surface, i.e. EC 209 (Fig. 9.20).

The application of white-on-red, black and white painting remains rather rare, representing less than 10% of the total coloured ware. However, 17 fragments were recorded with a red band, applied around the neck (SM VII) or concave rims (SM IIa) of which the majority features *treilles*, incisons and/or wavy-lines with small nubbins. We may recall here that the specific association of red colouring and incisions has been pointed out with regard to Katoury (Mestre et al. 2005:63).

The modelling

This type of decoration (N=48) only represents 6.8% of the decorated total. It consists of small appliqués: nubbins, thin clay strips or lugs, and several (biomorphic) *adornos* (Fig. 9.27), all applied to the upper part of the recipient, near the orifice (lip) or keel/shoulder, notably for the series: SM IIIc-d, SM VIa-d and SM VII.

We also recorded a rare modelled (human?) face. It was found in the superior fill of pit F 158 and may have been part of a statuette or vessel. It features a round headdress (hat?) and has very large hanging ears or earlobes. Handles are rarely encountered (N=2).

9.5.4 The synthesis of the ceramic assemblage

The CPP typology

This typology is based on 265 elements including 23 complete vessel shapes as well as the associated modes of decoration. The morphological rim register of 168 elements declines firstly with regard to the series SM III followed by SM

VI and SM II, representing 77% of the rim total. The other series are clearly less important, but provide characteristic elements concerning their specific morphology and decorative aspects, such as the bottle necks (SM VII).

As to these series and with PK 11 (cf. Section 8.5.6), we observed a number of frequent morphological traits and decorative modes. Three similar forms were identified:

Form A The most significant recipients are most certainly the open or slightly restricted spheric bowls with parallel oblique or vertical incisions. They are most often crossed or in *treilles* and applied at the upper part of the bowl, i.e. SM IIIc and SM Via. They are also grouped as Form A when compared with PK 11 (Fig. 8.17).

Form B Another important combination is the pot with concave rims and a red coloured band often combined with *treilles* or alternated incisons on the neck or shoulder, i.e. SM II and SM V which resemble Form B of PK 11.

Form C A less relevant series consisting of bottles (SM VII). However, the morphology and combination of decoration modes, a red coloured band and *treilles* or alternated incisions, resemble Form C of PK 11.

Aside from the above three similar forms when comparted to PK 11, we identified two new forms with regard to CPP:

Form D A restricted vessel or pot with a thickening or groove just below the lip, i.e. SM IV (Fig. 9.16). These vessels were also found at Sainte-Agathe (Samuelian 2009:61, Plate 1n–p) and at MCA/Vieux Chemin (Coutet 2009:282, Type 4).

Form E Small keeled (ovoid) bowls with incisions, notably wavy-lines or *treilles*, often accompanied by nubbins and lugs, i.e. SM VIc. These bowls were also found at Saint-Cyr (Delpech 2010:27) and at Pointe Gravier (Turenne 1974:29, Fig. 1).

The following remarks must now be made regarding the ceramic series of CPP:

a. The other subseries, i.e. SM I, SM IIb and SM IIIb, play an important role, but did not show a clear association with a certain type of decoration. Nevertheless, we must underscore the fact that these series are popular vessel shapes, too, and a part of the CPP assemblage (Figs. 9.17-20).

b. It is relevant to emphasize the homogeneity of the modal series and the proposed forms in combination with the dominating reducing firing technique and mixed/grog temper. The reason for this is that it may reflect a distinct production with its own style from a technological, morphological and decorative point of view. In fact, the simultaneous ceramic study of both LCA assemblages found on Cayenne Island share a very similar register. This allows us to draw a stylistic comparison and forward a ceramic sequence with regard to Cayenne Island and its surroundings.

c. As to the excavated surface: we did not reach the limits of the occupation, but did manage to delimit various zones and, more importantly, define the principal zone at the summit of the hillock (Zone A). As to this central

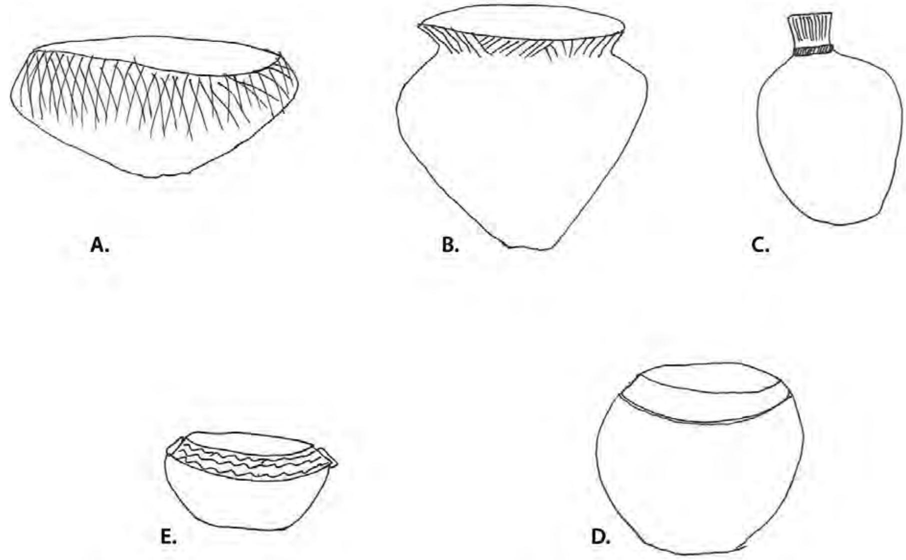

Figure 9.16. The sketches of the recurrent CPP Forms A-E (not to scale).

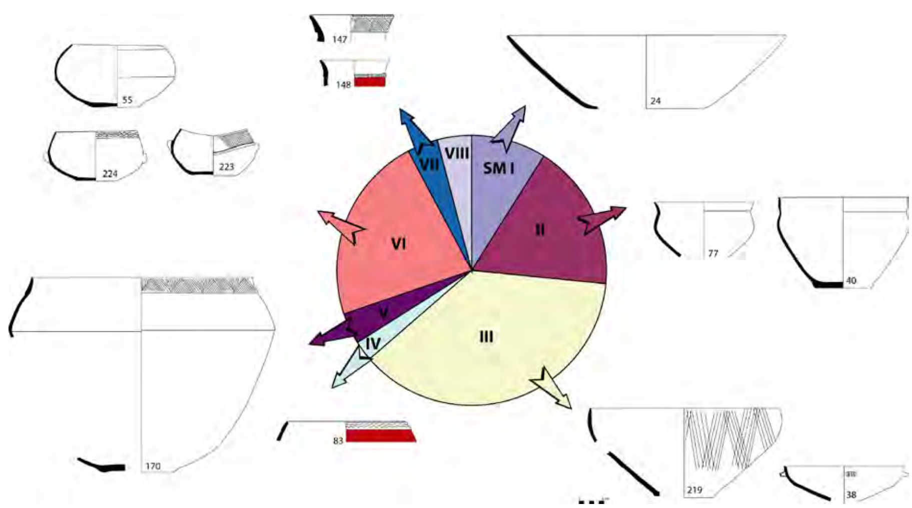

Figure 9.17. An overview of most relevant vessel shapes per modal series.

area (measuring *c.*1000 m²), we excavated the entire surface (at two levels). This may imply we studied *grosso modo* all the ceramics found here, thus representing a closed ensemble.

d. With the exception of the material found in pit F 158, all ceramics were dated between AD 900 and 1400. They can thus be safely attributed to the LCA. The site was not reoccupied during the Historic Age by any other Amerindian groups. Only at the start of the 18th century did this hilltop serve as a plantation.

e. Rare decoration modes found at CPP were also recorded for other sites on Cayenne Island. For example, (almost) identical vessels such as EC 55 and EC 157 (Fig. 9.25e) were discovered during a survey at Chennebras or the Saint-Cyr site (Delpech 2010a:26, Fig. 12).

Recipients found in F 54 (EC 43) and F 85 (EC 56) of Zone A and the elements found in F 102 (Zone E) have yielded open keeled vessels with white and red slips, respectively (see Fig. 9.18). Complex geometric designs in monochrome red,

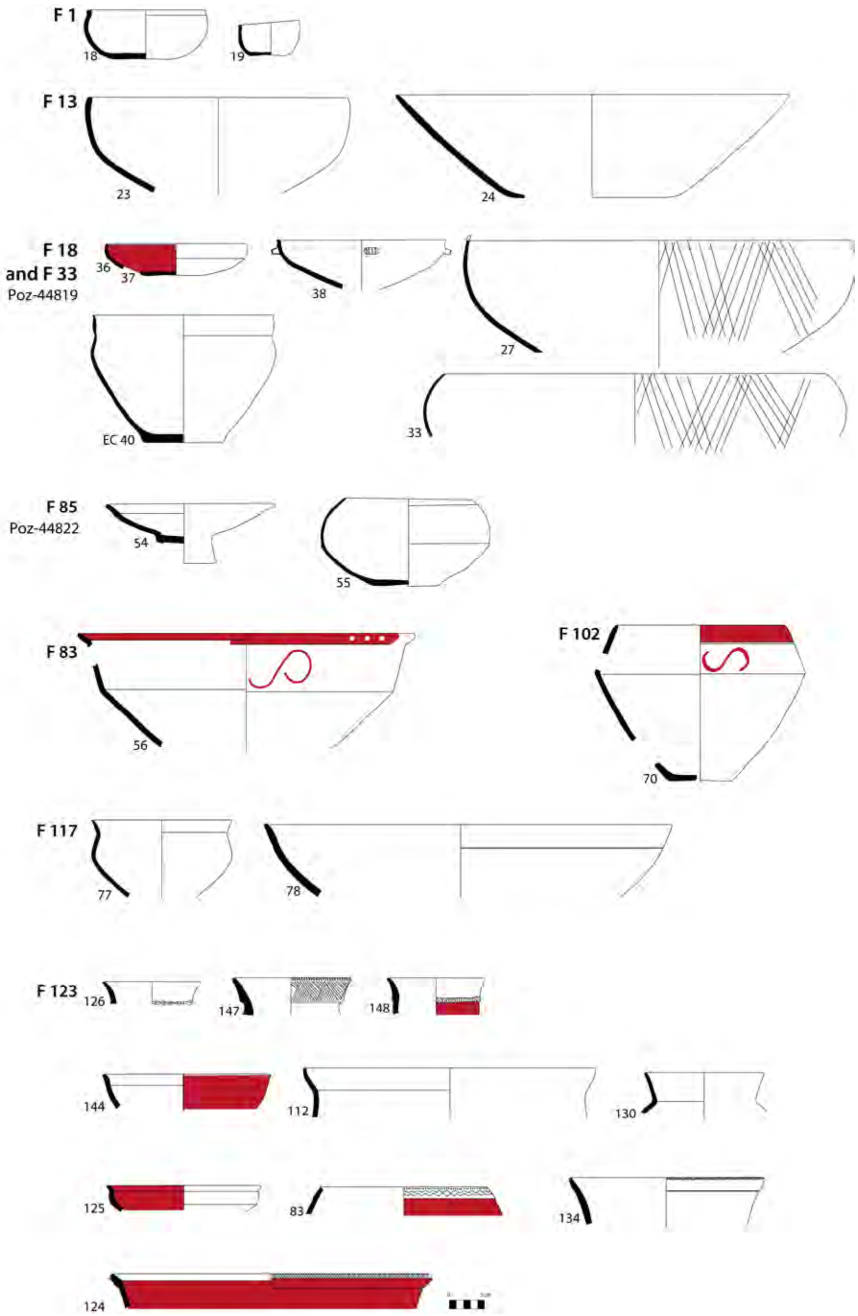

Figure 9.18. The ceramics per feature (1).

white and white-on-red are very common to Cayenne and adjacent areas, to wit: (a) Vieux Chemin (Cazelles 2002, Plate 5; van den Bel 2007b:91, 94), (b) Mini Circuit Automobile (Coutet 2009:288, Type X), (c) Sainte-Agathe (Samuelian 2009: 66, Plate 1a-h, Plate 6a-b) and (d) Mont Grand-Matoury (Hildebrand 2000, Fig. 25).

On their exterior walls we can observe continuous volutes (F 102, EC 70; Fig. 9.18), series of punctations (F 83, EC 56; Fig. 9.18), but also triangles materialised by means of small punctations (F 123, EC 124; Fig. 9.18). We can mention several sherds with visible or apparent coils (Fig. 9.23f) thought to represent a characteristic element of the entire western littoral of French Guiana

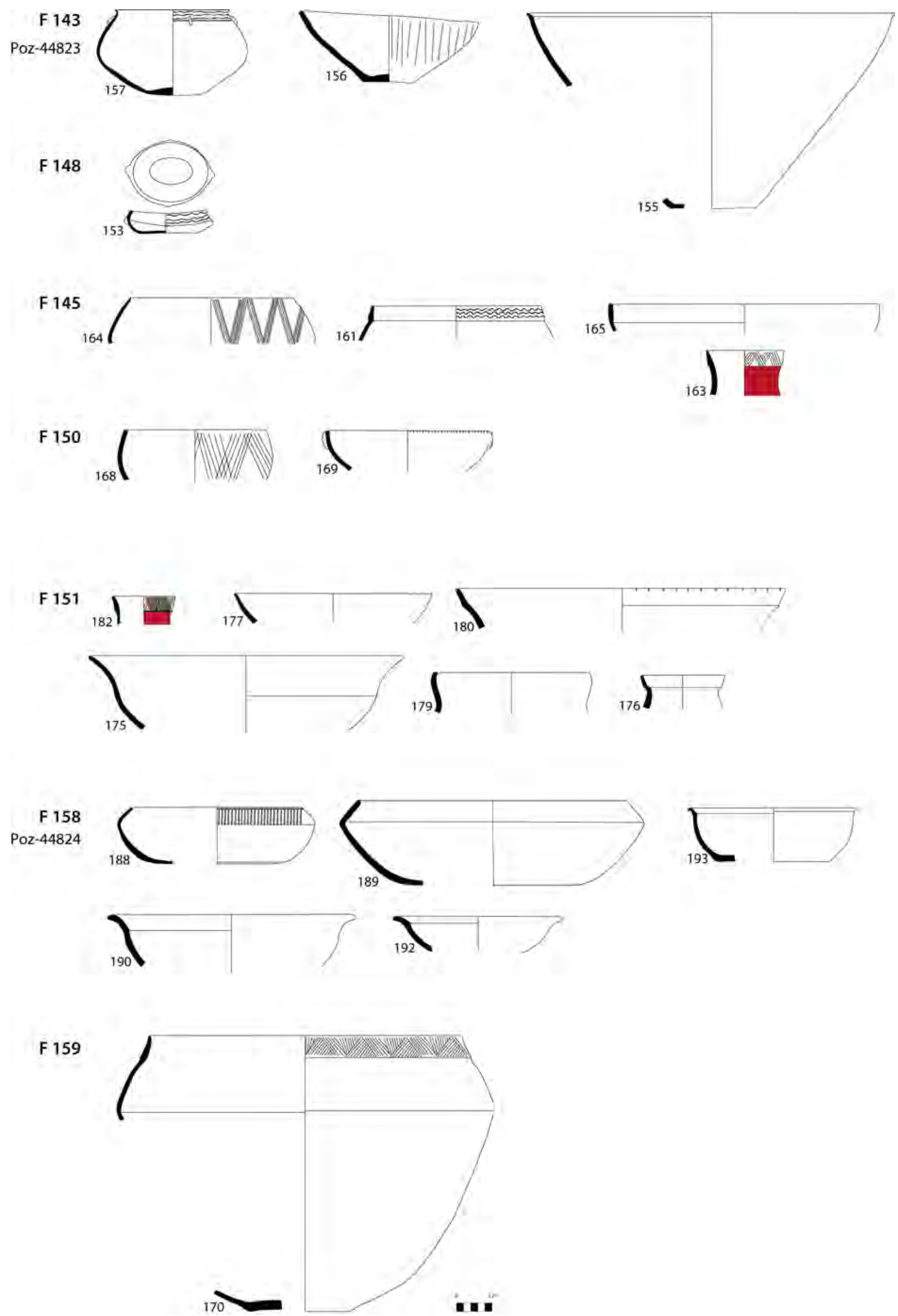

Figure 9.19. The ceramics per feature (2).

and eastern Suriname (Boomert 1993:202; Rostain et al. 2008:37–38; Mestre et al. 2005, Fig. 3; Samuelian 2009:64, Plate 4h; Hildebrand 2000, Fig. 51.8).

When considering the radiocarbon dates of various features (e.g. F 18+33, F 85, F 143, F 165, F 199, F 200) and positioning them next to the ECs found in these features, a chronological sequence is obtained (Fig. 9.21). However, it is appears difficult to propose any detailed developments concerning the pottery production at CPP due to the great morphological diversity (Figs. 9.22-3) and the coarse results of the radiocarbon dates. Nonetheless, a general outline can be suggested here: red paint and incisions remain the constant factors revealing

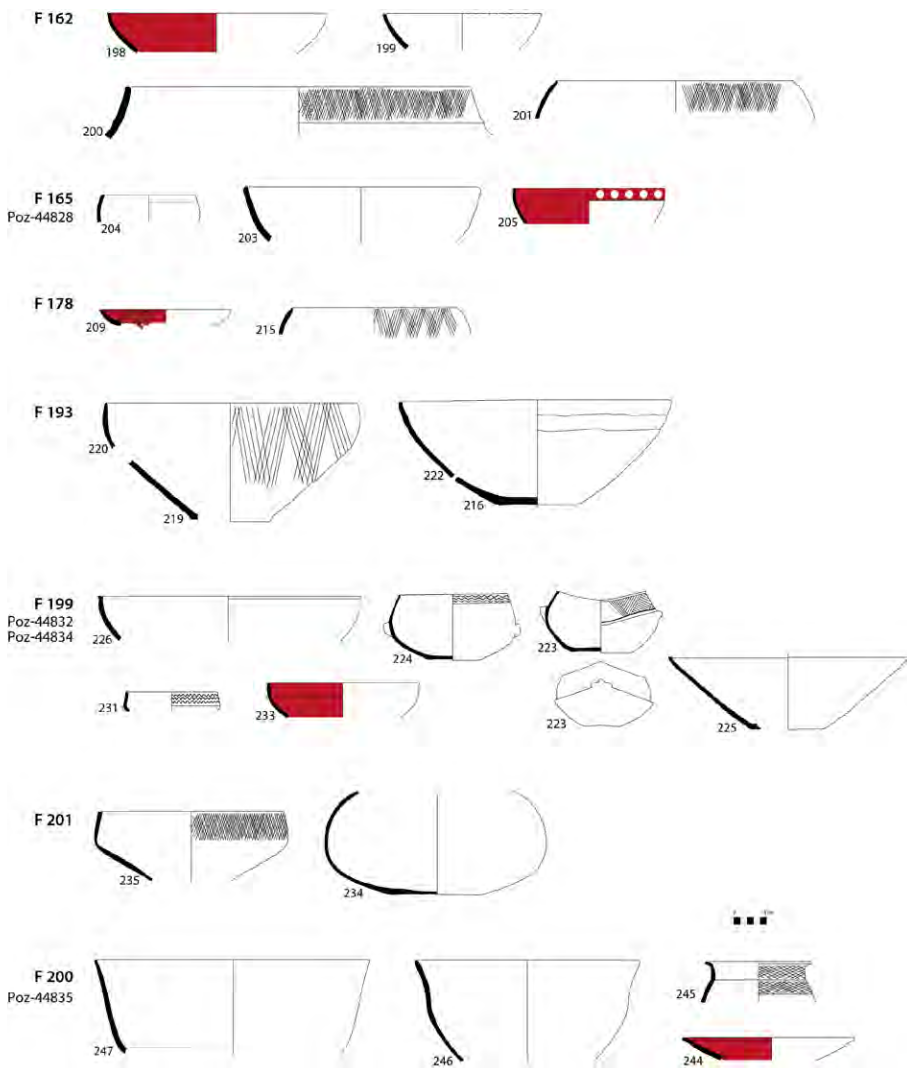

Figure 9.20. The ceramics per feature (3).

a continuous production of notably smaller bowls with red paint, presumably service ware.

We may also point out that bifacial, red painted bowls with white dots, i.e. white-on-red painting (Fig. 9.24c) as well as red-on-white painting (EC 56, EC 70) and red-on-white painting (Fig. 9.24f) related to the ceramic depostitions of the pits F 13, F 54, F 85 and F 200, have the tendency to be ascribed to the second half or the latest part of this occupation, approximately to the 14th century (cf. Fig. 9.24). This also applies to pits F 165 and F 102 of Zone E. From this point of view, shouldered pots with slightly flaring rims, i.e. EC 77, EC 247, represent innovative vessel shapes.

The cultural affiliation

Firstly, it is said that the ceramic assemblages of PK 11 and CPP are very similar when considering the vessel shapes, paste and decoration modes. This is confirmed by means of the radiocarbon dates from both sites. It is very likely that ceramics from these two sites were produced by potters sharing the same pottery tradition, quite possible the same culture, and thus sharing the same style.

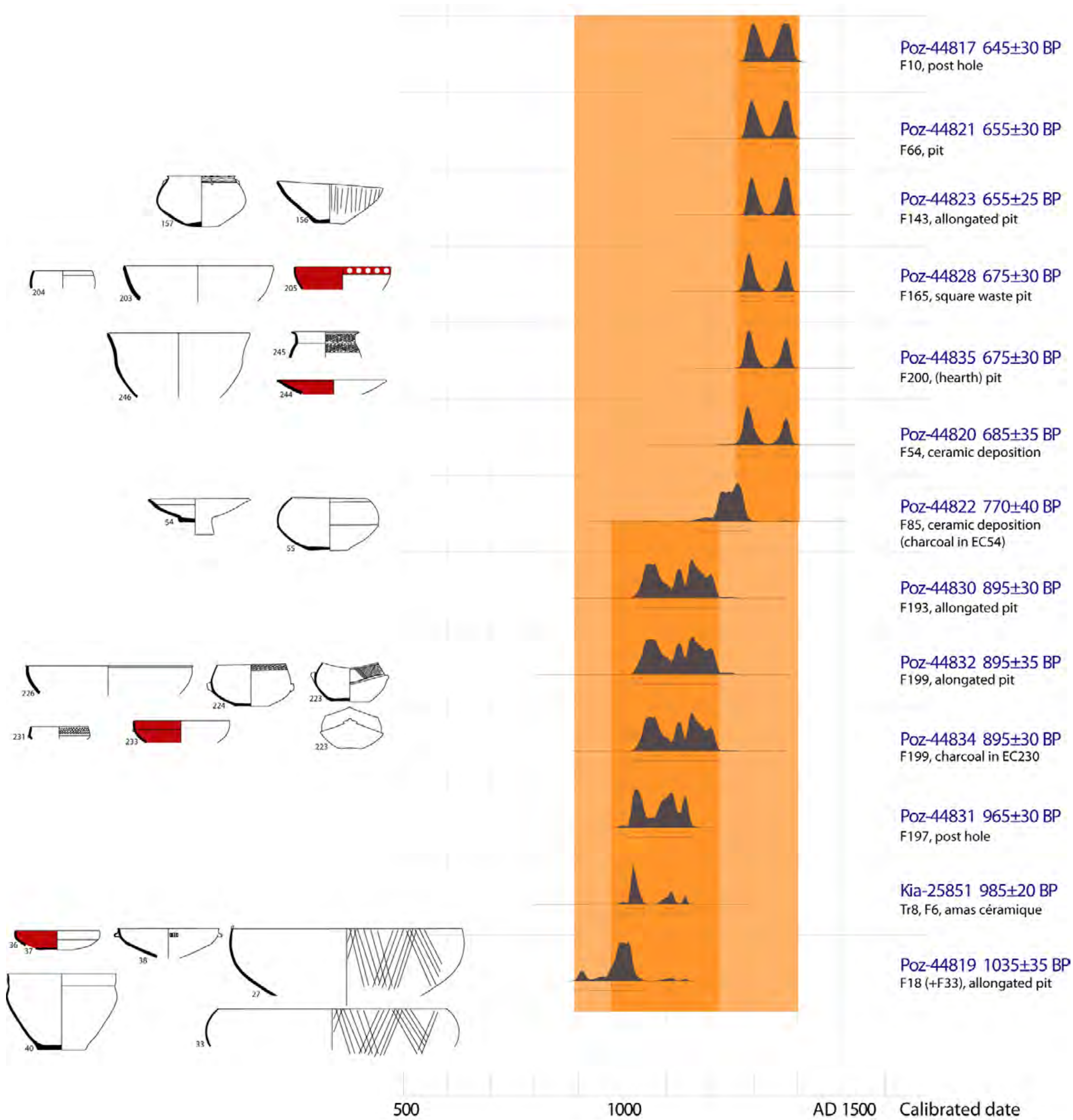

Figure 9.21. The ceramic chrono-typology of CPP. The atmospheric data are from Reimer et al. (2004), calibrated at 2σ with OxCalv3.10 Bronk Ramsey (2005).

Both CPP and PK 11 assemblages can be ascribed to either: (a) *Cayenne peint*, based on the grog temper or (b) *Mahury incisé* when considering the predominance of incised ware over painted ware. In both cases, the assemblages would eventually be ascribed to the Thémire ceramic complex, as Rostain (1994a, 2008) defined. However, as pointed out for PK 11 (cf. Section 8.5.6), this conclusion is not satisfying. The reason for this is that the existing types do not reflect the presented analysis nor do they fit the protohistoric radiocarbon dates regarding Thémire. After 20 years and many excavations, the Thémire complex has become obsolete and needs to be revised as well as adjusted. The types of Thémire are now too heterogeneous and, more importantly, the existing radiocarbon dates concerning

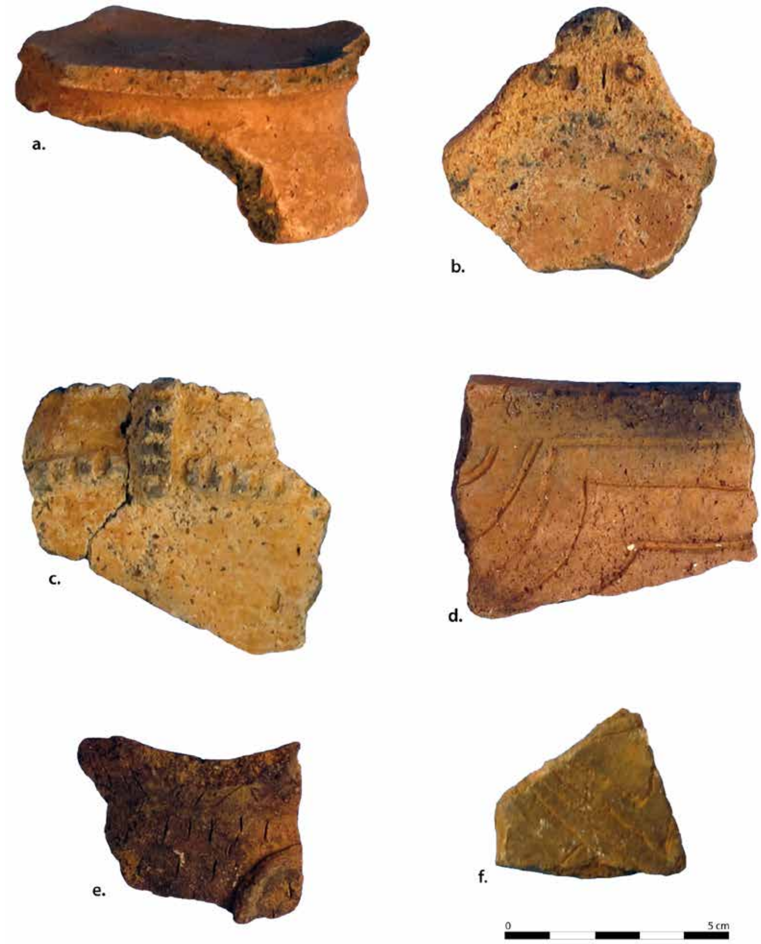

Figure 9.22. Decorated rim fragments (1): (a) EC 100, a pedestalled base, (b) EC 149, a lug fragment, (c) EC 169, indented clay strips, (d) EC 183, complex parallel incisions, (e) F 66, nail indentations and appliqué and (f) F 157, complex vertical incisions.

Thémire are too recent (Rostain 2013:122) when compared with the dates obtained for PK 11 and CPP.

The numerous radiocarbon dates and forms regarding PK 11 as well as CPP suggest an important occupation with regard to Cayenne Island dated between *c.*AD 900 and 1400. This is materialised by means of one pottery style whereas the dated Thémire complex is indeed more recent than the sites presented here. From this point of view, it would be appropriate to propose two successive ceramic complexes for the LCA of Cayenne Island: Early and Late Thémire. Looking into the original Thémire type descriptions (cf. Section 8.5.5), one certainly recognizes elements of both hypothesised Early and Late Thémire ceramic complexes which should be untangled in order to specify the two complexes as such. It is evident that Rostain was getting a grip on the LCA of Cayenne, but that he also lacked numerous radiocarbon dates and further ceramic material collected from a solid archaeological context, i.e. extensive and/or programmed excavations, in order to provide a more detailed description of Thémire. This, however, he affirmed in a later publication (Rostain 1994b:10, note 2), as mentioned in the previous chapter.

In sum, the PK 11 and CPP ceramic series share temper, decoration and, to some extent, vessel shapes with various Thémire types. However, they rather reflect an earlier dated phase of Thémire. This presumably rendered descriptions

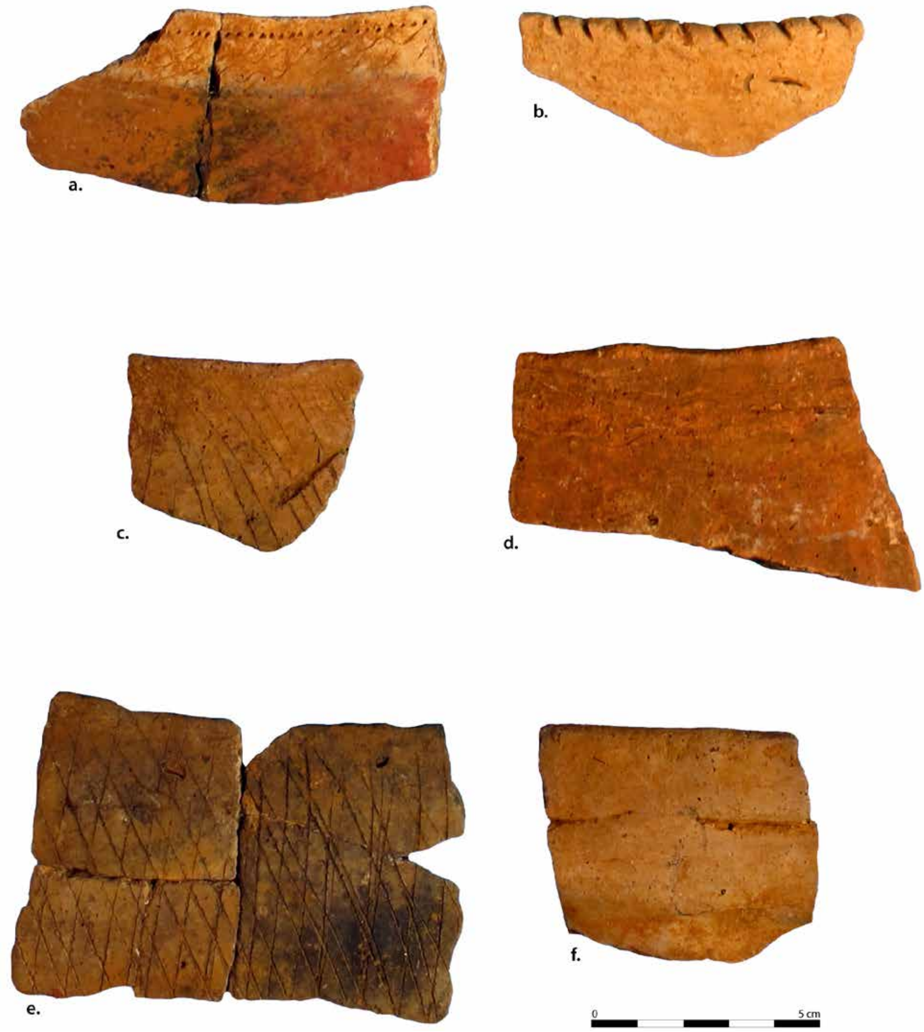

Figure 3.23. Various decorated rim fragments (2): (a) EC 83, a red slip and nail indentations with punctations below the lip, (b) EC 85, nail indentations on the lip, (c) EC 129, oblique parallel incisions, (d) EC 161, wavy-lines, (e) EC 201, obliques incisions, or treilles, and (f) EC 50, visible coils.

of the most important Thémire types too amalgamous and not sufficiently specific in order to confront incoming material.

The type *Cayenne peint* is predominantly defined by means of red and white-on-red painting of which the latter often represents beautiful geometric complex designs (Rostain 1994a, Fig. 113). If white-on-red painting represents a more recent phase, as hypothesised above with regard to CPP, than this type of bichrome painted or Late Thémire ware, as Rostain (2013:122–123) defined, is probably derived from Polychrome influences hailing from the east. For example, when we observe the remarkable white-on-red motifs of the bowl found in F 93 (cf. Fig. 9.13), they do indeed resemble the geometric designs encountered at the sites of eastern French Guiana, called *Enfer polychrome* (Rostain 1994a, Fig. 93.1) or even in the State of Amapá (Goeldi 1900, Plate 3.1 and 3.8). However, its morphology reminds us also of the type *Chaton fantastique* (Rostain 1994a, Fig. 104.18), which is better known as Koriabo and often found in Thémire complexes according to Rostain (1994a:447) who defined it as the type *Melkior kwep*, but only as a 'temporary type.'

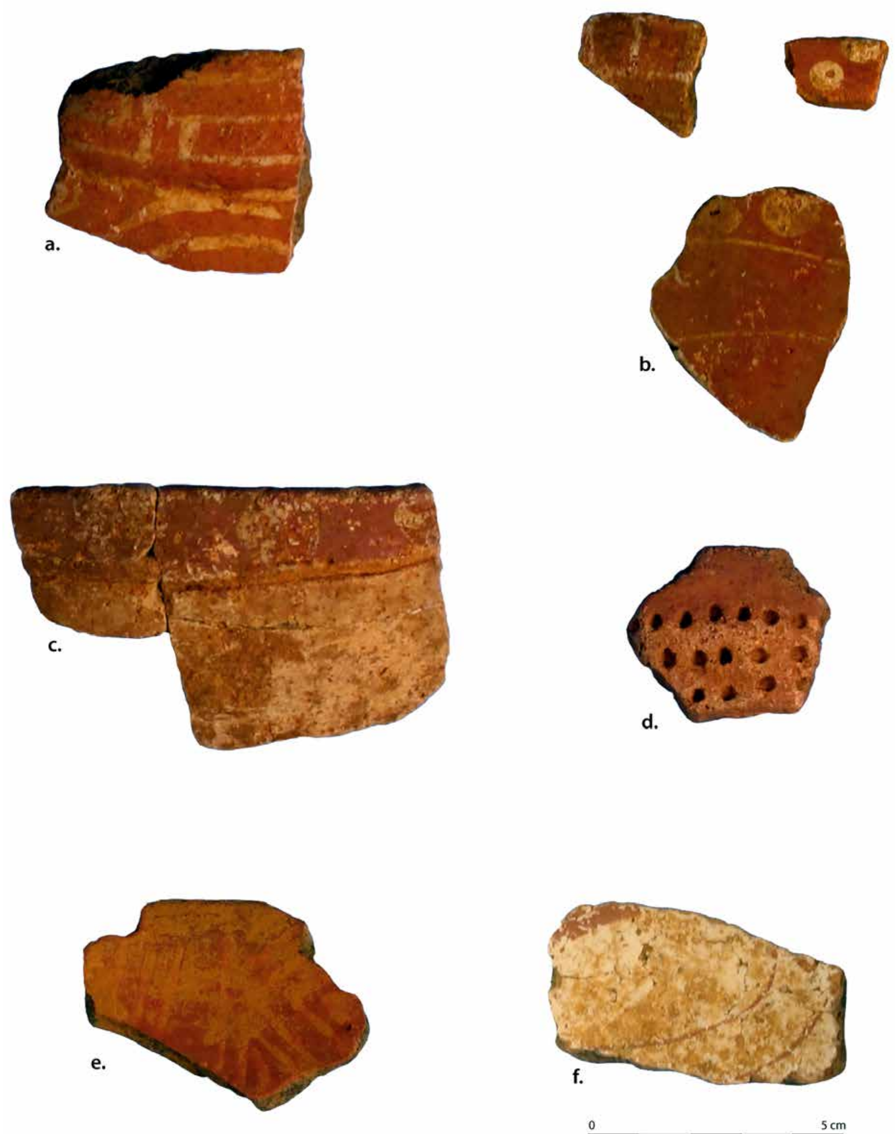

Figure 9.24. Examples of slipped/painted ware: (a) EC 62, a white-on-red complex design on collar, (b) white-on-red fragments (two with white dots on red), (c) EC 205,a rim with red band with white dots with a linear incision, (d) Square H 2, a rim with red band and punctations, (e) EC 209, negative red slipped fragment and (f) F 157, red-on-white painted fragment.

Furthermore, EC 112 and EC 117 of the subseries SM IIb (see Fig. 9.22) share similarities with other painted Koriabo vessel shapes (Boomert 1986:34, Fig. 14.2; Rostain 1994a, Fig. 104.14). These specimens may have been the result of exchange within a larger network or represent a later occupation at the site. Other sites which can be attributed to the latest phase of the LCA are probably Montabo-Sud, Montagne à Colin, Bois Diable/La Sablière and Sainte-Agathe of which the three latter sites have indeed yielded radiocarbon dates belonging to this phase: after *c*.AD 1300/1400 (Wack 1990b; Barone-Visigali and Prost 1991; Rostain 1994a; Casagrande 2005; Migeon 2007, 2012; Coutet 2009; Samuelian 2009).[227]

In any case, the beautiful, geometric duotone (on occasion polychrome) designs of F 93 and F 83 evoke connections with the mouth of the Lower Amazon River (Boomert 2004; Rostain 2008b:293). Notably, archaeological sites on the

227 The present author also came across a polychrome anthropomorphic face related to the LCA Bigiston site on the Lower Maroni River when visiting the depot of *Zorg en Hoop* (Paramaribo) in August 2012.

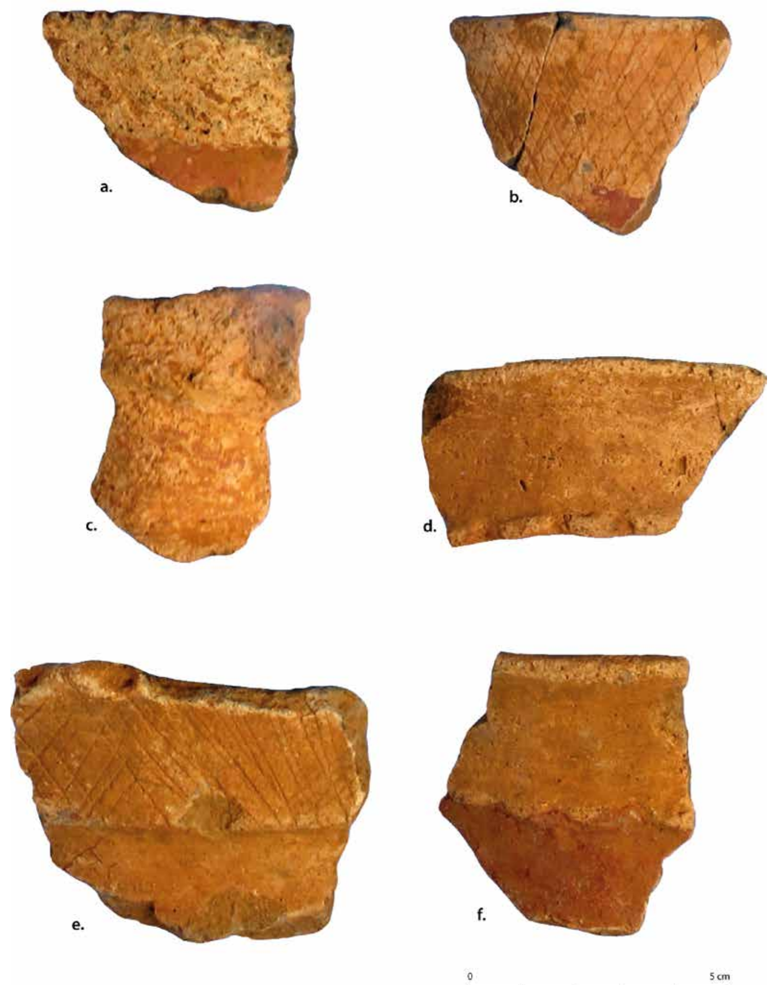

Figure 9.25. Decorated collars (1): (a) EC 26, nail-indented lip with wavy-lines and red slip (band), (b) EC 57, treilles and red slip (band), (c) EC 82, wavy-lines, (d) EC 126, indented clay strip around base of collar, (e) EC 157, hastily applied treilles with finger-indentations on the rim and (f), EC 148, finger-indentations and a red band.

Island of Marajó have yielded polychrome painted ceramics with similar complex designs of which the stylised snake appears to a symbol of importance (Schaan 2004:358). For comparison, compare the spirales found on painted Koriabo ware from Goliath Kreek in Suriname (Boomert 2004:264, Fig. 3b) or 'in a river west of Suriname' (Rostain 2009:49, Fig. 3.8), Rio Camutins (Palmatary 1950:390, Fig. 32c and p. 431, Fig. 73b) or even further afield on the Upper Amazon River (Weber 1975:152a, Fig. 26a–c)[228], with the PK 11 register. In addition to the latter LCA sites, the non-decorated Koriabo vessels, i.e. EC 77, EC 247, reflect morphological similarities with Koriabo pots found not only at Sainte-Agathe, but also at Saut-Saillat and Eva 2, corroborating a very late LCA date (cf. Section 11.6.2).

228 This particular site also yielded vessels with oblique alternating incisions, or chevrons, evoking a certain hair style among these Amerindians (Palmatary 1950:416, Fig. 58a-d). Further interpretation is not discussed here. However, the (stylised) presence of snakes, toads, caymans, monkeys, jaguars, birds and frogs plays an important role in Amerindian myth and society as, for example, Lévi-Strauss states: 'We can no longer doubt that the key to so many heretofore incomprehensible motifs is directly accessible in myths and tales which are still current. One would be mistaken to neglect those means which enable us to gain access into the past. Only the myths can guide us into the labyrinth of monsters and gods, when in the absence of writing, the plastic documentation cannot lead us further' (Lévi-Strauss 1967:267).

Figure 9.26. Decorated collars (2): (a) EC 182, treilles and red slip (band), (b) EC 66, eroded treilles and red slip (band), (c) EC 163, treilles and a red slip (band), (d) EC 200, treilles and finger-indented rim and (e) EC 227, treilles and a red slip (band).

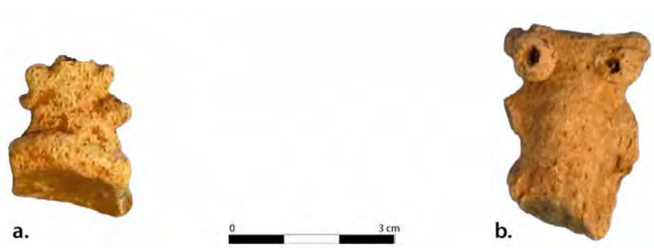

Figure 9.27. Two modelled appliqués or adornos: (a) F 178 and (b) F 165.

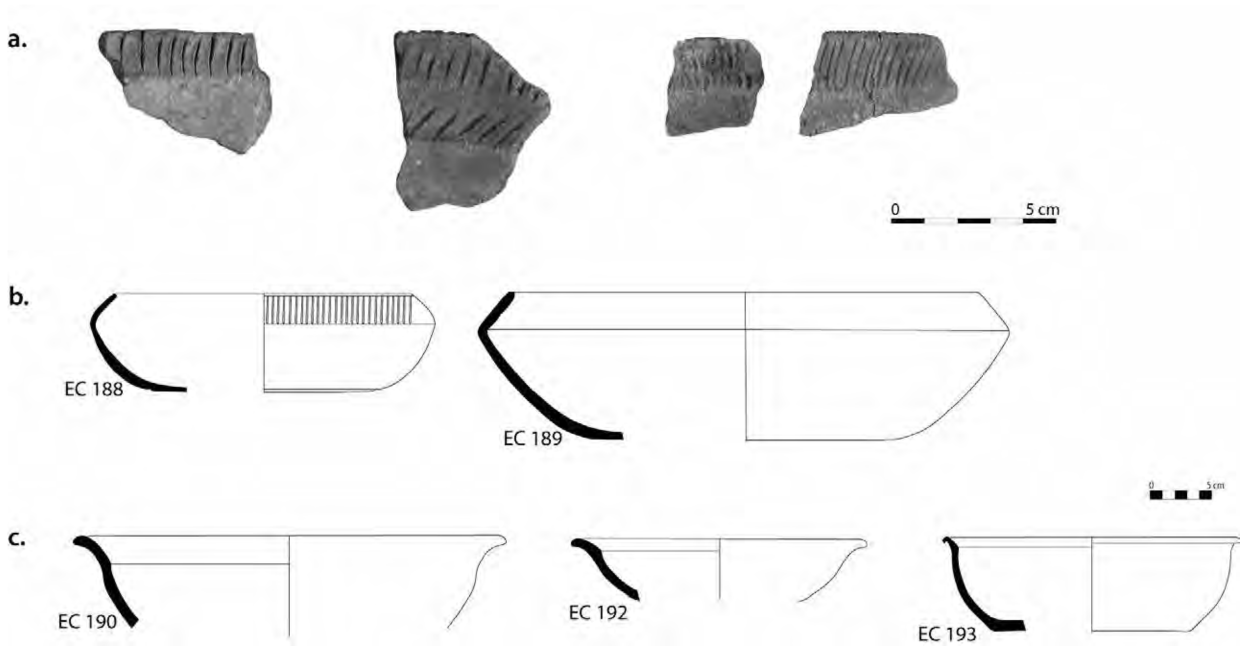

Figure 9.28. The ceramic material found in pit F 158: (a) examples of Ouanary encoché applied on the interior of the lip, (b) restricted vessels and (c) open vessels.

Early Aristé on Cayenne Island?

The radiocarbon date recorded for pit F 158, i.e. 1635 ± 30 BP, is too early for the LCA occupation. Numerous, coherent, more recent dates as well as an entirely dissimilar ceramic ware confirm this. This pit, of which the function as yet remains rather mysterious, yielded a small restricted bowl (EC 188) with regular-spaced and parallel vertical incisions. It differs clearly from the apparently hastily incised, parallel obliques applied to Form A which resembles a specific recipient found in eastern French Guiana and attributed to the style named *Caripo kwep* (Rostain 1994a:820, Fig. 89.11) (Fig. 9.28b). Aside from this bowl, the pit fill also yielded four rims with single or double series of thin, probably fingernail, incisions applied to the inside of a flattened or concave lip that often includes incisions too (Fig. 9.28a). These highly recognisable, decorated rim sherds were found for the first time during excavations at the rock shelter sites of Carbet Mitan and Abri Marcel at the mouth of the Oyapock River and dubbed *Ouanary encoché* by Rostain (1994a:81, 816, Figs. 85.1-9).

It is true that this type of decoration was defined as to eastern French Guiana and recognised even further afield to the east in the northern part of the State of Amapá (João Saldanha, personal communication, 2011). However, it was also recorded for numerous –mostly LCA– sites on Cayenne Island. For instance: (a) including the CPP-survey (Hildebrand 2004, Plate 3, Trench 8), (b) Vieux Chemin (van den Bel 2007d:88), (c) Mont Grand-Matoury (Hildebrand 2000, fig. 48.10), (d) various ring-ditched sites, such as Pointe Maripa at the Comté River, and to east of Cayenne Island and (e) at the first millennium ring-ditched sites of Favard and Blondin (Mestre 1997, 2006b, 2013; SRA 2000).[229]

229 Jérôme Briand recorded the presence of *Ouanary encoché* at the site of Montagne Favard during a quick scan of the ceramic material found in the ditch (Mazière 1996:33). Rostain (1994:421) reported rare Aristé incursions to the west of the Approuague River: 'Nos travaux ont en outre montré clairement quele complexe Aristé ne s'étendait pas au-delà des collines d'Ouanary, à l'exception de quelques rares intrusions sur l'Approuague, l'île de Cayenne et, peut-être, la Montagne de Kaw.'

Site	C^{14} age BP	Lab. No.	Reference
Abri Marcel	1170 ± 30	OBDY-800	Rostain 1994a
Abri Marcel	1310 ± 35	OBDY-797	Rostain 1994a
Abri Marcel	1400 ± 60	OBDY-795	Rostain 1994a
Abri Marcel	1430 ± 30	OBDY-799	Rostain 1994a
Abri Marcel	1470 ± 40	OBDY-798	Rostain 1994a
Abri Marcel	1790 ± 30	UGAMS-4056	Coutet 2009
Carbet Mitan	1340 ± 25	UGAMS-4054	Coutet 2009
Carbet Mitan	1650 ± 40	OBDY-650	Rostain 1994a
Carbet Mitan	2070 ± 45	OBDY-653	Rostain 1994a
Cimetière paysager Poncel	1635 ± 30	POZ-44824	van den Bel et al. 2013
Favard	1750 ± 45	LY-7839	SRA 2000
Mont Grand Matoury	1360 ± 30	LY-7756	Grouard et al. 1997
Mont Grand-Matoury	2055 ± 45	LY-7784	Grouard et al. 1997
Pointe Blondin	1465 ± 25	KIA-30207	Mestre 2006b
Pointe Maripa	1740 ± 25	UGAMS-4048	Gassies and Mestre 2012
Pointe Maripa	1710 ± 25	UGAMS-4049	Gassies and Mestre 2012
Pointe Maripa	1930 ± 25	UGAMS-4050	Gassies and Mestre 2012
Pointe Maripa	1600 ± 25	UGAMS-4051	Gassies and Mestre 2012
Pointe Maripa	2160 ± 30	UGAMS-4052	Gassies and Mestre 2012
Pointe Maripa	1685 ± 45	LY-7696	Mestre 1997
Pointe Maripa	1750 ± 45	LY-7839	Mestre 1997

Figure 9.9. An overview of radiocarbon dates from the first millennium AD taken from sites between Cayenne Island and the Oyapock River associated to Ouanary encoché, knowing these dates do not necessarily refer to this specific type of ceramics. Note that the Abri Marcel measurements were performed on shell.

When compared with the latter sites, the CPP date of pit F 158 is not erroneous at all. It fits well with other ECA-B sites where, how fortunately, *Ouanary encoché* was found too (Table 9.9). Altough these elements may be the result of exchange and/or cultural influences, it may, however, also represent the remnants of a physical presence of an Early Aristé population on Cayenne Island which was blurred by means of the implantation of a LCA population on the same sites.[230] Once again, it was not only demonstrated that archaeological sites have longer occupation spans as one expected but also that archaeological material found in layers must be handled with care if one wants to draw conclusions. Without doubt, it is now clear that *Ouanary encoché* is another ceramic ware requiring further attention as to its chronology and geographical distribution (cf. Section 9.8).

9.6 The lithic study

The lithic assemblage presented here was collected from the Squares G2-Q6 as well as from the various features. It was studied by Sandrine Delpech (in van den Bel et al. 2013:70–76) (Table 9.10) and consists of 211 pieces, subdivided

230 The present author found several rare "ceramic grater" fragments at the summit of Mound Paramana to the southeast of Matoury (van den Bel 2012). Cf. Section 12.5.2 as to such ceramic graters.

	Tools	N
Quartz debitage	Flakes	2
	Fragments	15
	Cores	1
	Milling stones	18
	Polissoirs	11
	Grinding stones	16
	Mortar	1
	Quebra-coco	1
	Lissoirs	8
	Axe	1
	Axe flake	1
Undetermined	Abraded	14
	Abraided fragments	5
	Manuports	116
	Stone vessel	1
		211

Table 9.10. The general lithic count.

into 94 tools, 116 pebbles as well as numerous rocks, undetermined fragments and a single stone vessel (Annexe 7.3.1).[231] A translated and abridged version is presented here.

9.6.1 The raw materials

The quartz

Quartz is one of the predominant rock materials at the site and utilized here in order to denote the macrocrystalline variety of silicium dioxide, one of the main rock forming minerals in the world. This material is very resistant and readily available in French Guiana in the form of blocks from emerging veins or as waterworn pebbles present in riverbeds. At CPP, as we have previously seen, two varieties of quartz have been collected: (a) hyaline, or milky quartz, and (b) saccharin quartz. The former, high quality variety has been applied in the majority of cases (83.5%) whereas the saccharin one, of lesser quality, is less popular.

Quartz flaked stone only represents a very small portion of the lithic collection. Therefore the description of its characteristics remains anecdotic. It includes two flakes, 12 waste fragments and one flake core. The latter is small and measures between 2 and 4 cm. Despite the fact that the collection methodology at the site is to a large extent responsible for the small quantity of quartz flaked stone recovered, the absence of larger sized hammer stones and anvils also reflects that this site was not an important quartz working site.

231 The raw materials from this site have been determined with the aid of geologist David Deliance. Notably in the tropical environment of French Guiana, any heavy weathering of the surface of numerous types of rock resulting in iron patina does not permit a proper classification. In most cases a fresh fracture is necessary in order to see the interior, an often less affected part of the rock. However, such a destructive method is not appropriate for artefacts. For this reason the raw material has not been identified in certain cases.

The magmatic rocks (plutonic and volcanic)

This is the most popular type of rock and consists of (leuco) granites, granodiorites, (micro) diorites, gabbros, dolerites, metatufs and aplites. The granites with an average to coarse mineral grain size are the most popular ones and believed to have served as grinding stones albeit that further microscopic research is certainly necessary. The volcanic rocks with a finer texture, notably metatufs, have been collected as raw material for axe manufacture. As these rocks are exotic to Cayenne Island, it is likely that the Amerindians of CPP travelled some distance in order to collect this rock or else obtained it through exchange with other communities. One very exceptional object is represented by means of a stone vessel (F 96) made of an ultramafic, ingenous rock variety which is poor as to silicium. Its high olivine contents renders it very difficult to exactly determine its igneous rock type as well as its provenance (Fig. 9.31).

The metamorphic rocks

These rocks originally represent magmatic or sedimentary rocks that have changed in mineralogical composition and build-up as a result of high temperature or pressure. Identified rock types include: amphibolite, gneiss and three fragments of quartzite.

Sedimentary rocks

The assemblage includes three sandstone fragments which have served as polishing and sharpening tools. This type of rock is also exotic to the site area and therefore represents another indication of a more distant acquisition of rock materials. One iron-oxyde piece served as an abrader.

9.6.2 The stone tools

The querns or passive grinding stones

These stones are the most important tools found at this site (N=29). They generally consist of flat implements with one or both flat faces smoothly abraded due to repetitive usage. The majority has a rectangular or trapezoidal cross-section. Among the raw materials granite, gneiss, amphibolite and sandstone have been identified.

Based on their shape, they have been divided in two classes. The first class (N=11) corresponds to: (a) relatively small tools measuring between 6.4 and 11.5 cm in length and between 5 and 8 cm in thickness. Moreover, one of two flat faces have served as grinding platforms. Several also feature abraded edges, suggesting they have also been utilized as active tools. The second class (N=18) consists of (b) querns of a much larger size measuring between 12.5 and 51.2 cm in length and between 8 and 19 cm in thickness. Their sheer weight favours an interpretation as passive querns or grinding stones. They show eminent evidence of a prolonged usage across one entire face.

The starch grain analysis of three granite querns, to wit: Nos. L 18.01, O 11.03, M 10.05 (starch grain samples CPP-5 to 7 respectively) illustrate they mainly served when grinding maize (*Zea mays*) and sweet potatoes (*Ipomoea batatas*). This confirms the function of these tools (cf. Section 9.7).

The active grinding stones

Pebbles or fragments of pebbles (N=15) have served as grinding stones or *manos*. Identified raw materials include: dolerite, diorites, amphibolite and aplite. The majority has a circular to oval shape with an ovoid cross-section. These tools measure between 6.8 cm and 10.2 cm in length and 4 to 5 cm in mean thickness. They exhibit abraded used areas on both flat faces and on occasion on their sides. They can be considered as the hand-held implements that were rubbed against quern bases during food processing. One aplite specimen (No. J 04.01) displayed traces of percussion on two sides and may have served as a pestle. An unidentified rock specimen (No. 150.03) included traces of hammering at the centre of each abraded side and was identified as a nutcracker, or quebra coco (Br.), or as pitted anvil. Moreover, it appears that during the final phase of this object, it served as a grinding stone because older hammering traces are blurred due to later abrading. One roundish leucogranite pebble (No. J 4.02) measuring less than 10 cm in diameter has one slightly flattened side and has also been classified as a nutcracker. In the middle of the latter side it features a small percussion hole with a diameter measuring at least 2 cm (Fig. 9.24a).

One dolerite fragment (No. 14.01), measuring 14.2 x 11.3 x 7 cm, has a rounded side or edge and one face has a notable concaveity. This must have been formed due to the simultaneous motion of pounding and rubbing with an active tool (Fig. 9.24b). This concave tool has been interpreted as a mortar. It was probably applied to crush vegetal matter. The above-mentioned aplite pestle may have served as the active counterpart for this grinding stone.

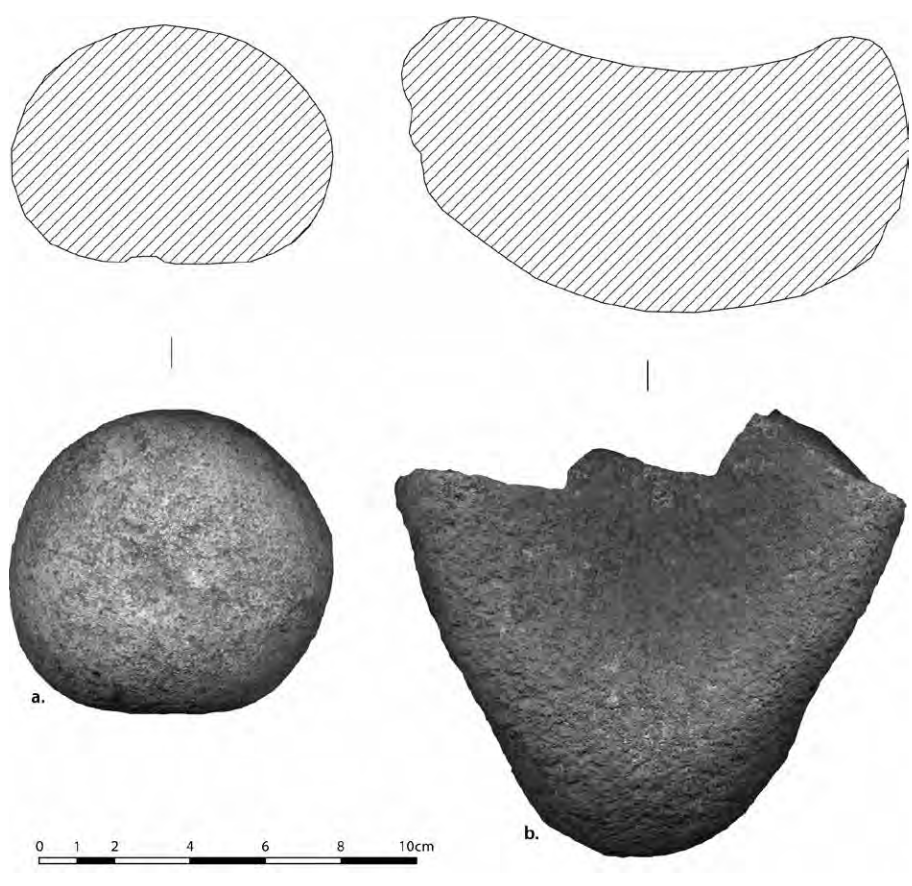

Figure 9.29. (a) J 04.02, a pitted anvil or nutt-cracker and (b) 14.01, the milling stone/mortar made of dolerite (photograph and drawing by Sandrine Delpech).

Eight pebbles consisting of amphibolite, sandstone, microgabbro and unspecified rock have been identified as polishing stones (Fr., *lissoirs*). These tools differ from *manos*, or active abrading stones, because of their smaller size, varying between 3 and 6 cm, as well as their more elongated morphology. The majority has one flat abraded face which is the result of repeated rubbing the pebble against a hard surface (e.g. the exterior of a ceramic vessel).

The stone vessel

Feature 96 represents a stone vessel (No. 96.01) encountered upside-down and fractured in layer US 2000. It is made from an ultramafic rock and has a slighlty ovoid orifice measuring 29 x 24 cm. Its height measures 14.5 cm (Fig. 9.31). In its present state it is a highly weathered piece of rock. Even the fractures exhibit signs of deterioration/erosion. Its roundish shape and ovoid orifice is marked by means of opposed labial, semi-rectangular handles or apexes. The rounded lip of the rim tends to flatten when approaching the apex. The symmetry of this artefact is impressive revealing a remarkable stone object as well as extraordinary craftmanship.

This vessel shows affinity with two other rare objects: a polished diorite recipient found at the Upper Sikini River (Abonnenc 1952:52, Fig. 10) and another found at Rorota (Lefèbre 1973). A sample taken from the interior bottom of this vessel revealed starch grains of maize, suggesting it had either served as a mortar when processing of food for consumption.

The axes

Axes are only represented by means of an incomplete example of an indented axe, missing the edge part (Fig. 9.30a). It measures 6.9 x 6.2 x 2.6 cm and has an ovoid cross-section. Both lateral sides feature an indentation. The rounded heel has been created by means of polishing and features several few traces of hammering. This suggests that, after being used as an axe, the tool had been reutilized as a bifacial polishing tool or *mano*. In addition to this incomplete specimen, one meta-tuff flake (No. 151.08, < 6 cm) has been recognized as being struck from a polished axe.

The manuports

These stones comprise all rocks (N=116 for 24.5 kg) of varying sizes collected during the excavation, but do not exhibit any signs of working or macroscopic use-wear. They include: granites, granodiorites, dolerites, quartzite pebbles, quartz blocks, duricrust fragments as well as several other rocks which cannot be naturally found in the immediate surroundings of the site. These must have been brought to the site for as yet unidentified purposes which left no traces on the material. Several may have served wooden posts.

The unspecified rock

The unclassified pieces include one small block consisting of meta-tuff (No. H 02.01) with a trapezoidal shape of which two sides have been formed by means of flaking. It presumably represents an axe preform or roughout in its initial stage of manufacture. This small object measures 10.3 x 7 x 3.5 cm (Fig. 9.30b).

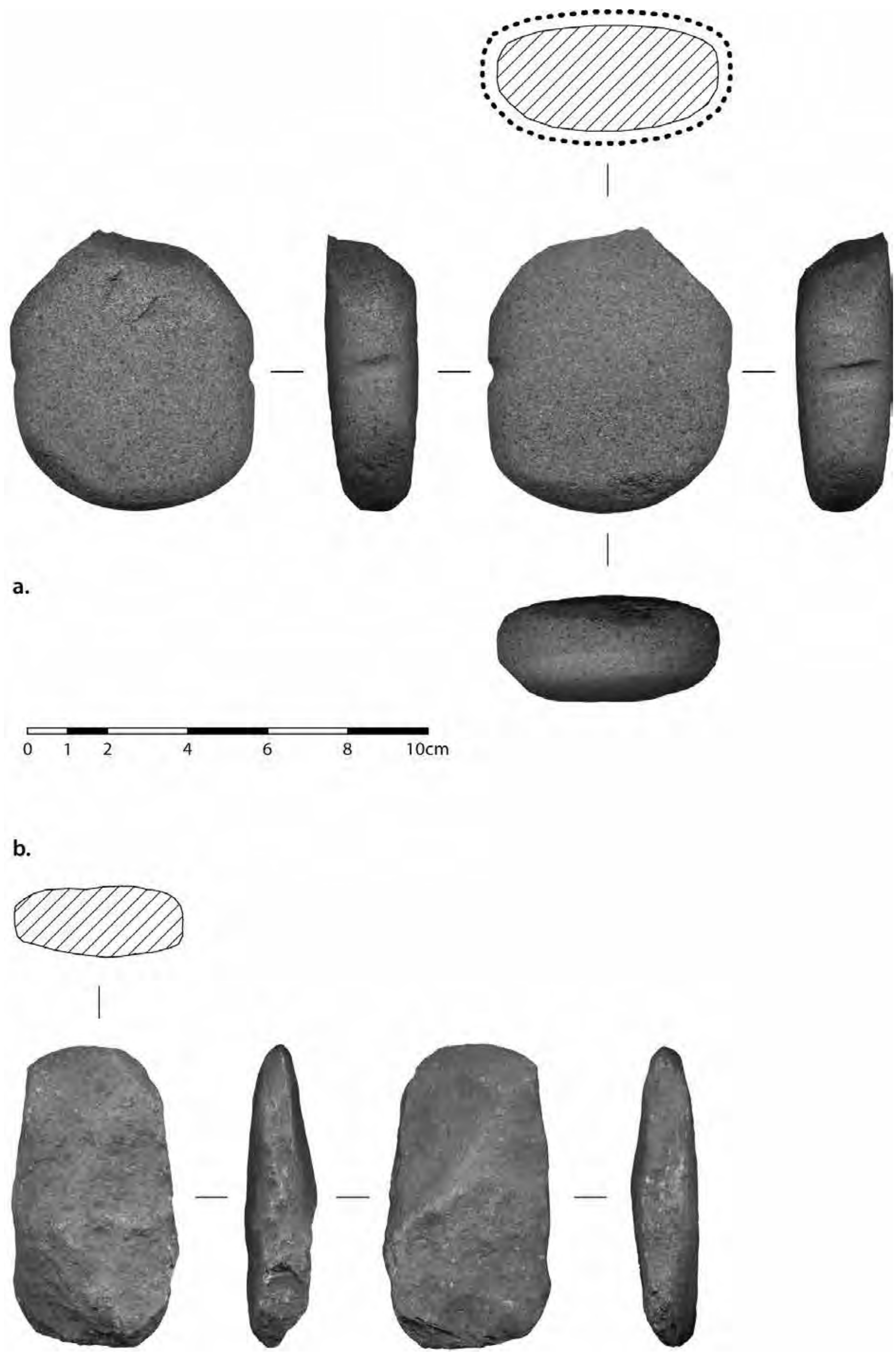

Figure 9.30. (a) K 12.03, an indented axe and (b) H 02.01, undetermined worked tool (photographs and drawing by Sandrine Delpech).

Eighteen other objects include a variety of blocks, pebbles or pebble fragments. Many possess small parts exhibiting signs of being used or worked. Unfortunately, these parts are too small or the pieces too fragmented in order to properly classify them as types of tools or artefacts.

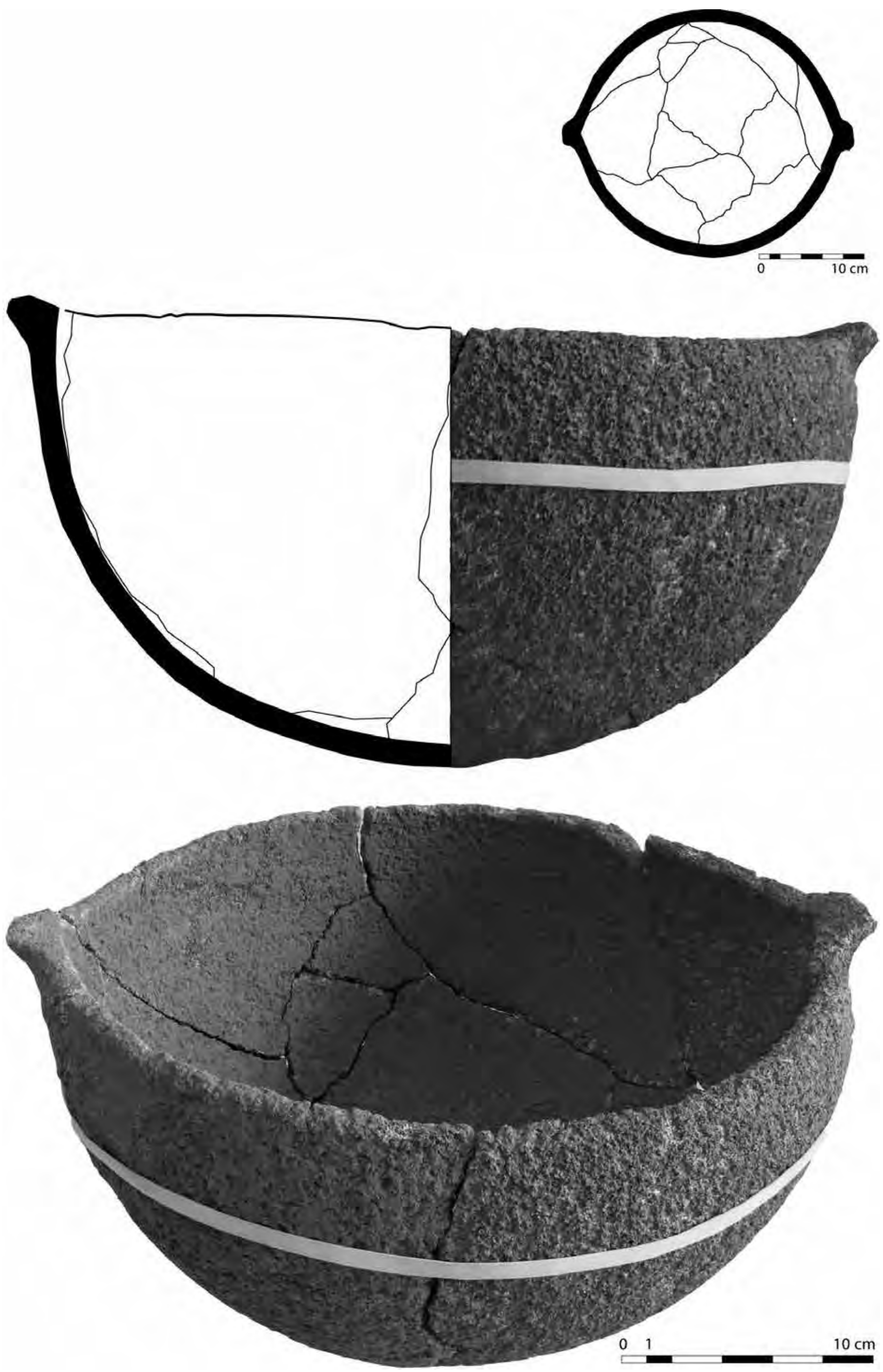

Figure 9.31. The stone vessel F 96 (photographs by Sandrine Delpech).

9.6.3 Final remarks

Considering the size of the excavated area, the total amount of lithic tools recovered can be considered rather small. The production of quartz flakes appears to be almost absent whereas the abundance of querns and related tools is striking, i.e. *c.*58%. These figures suggest that vegetal products, notably maize and sweet potatoes were processed locally at this site.

The majority of lithic raw materials originated from the immediate vicinity of the site, but also from further away (e.g. sandstone). Several unique tools and objects (the stone vessel) may have been obtained from a long distance, most likely, through exchange.

9.7 The starch grain analysis

In total, we took ten artefacts, labelled CPP-1 to CPP-10, destined for starch grain analysis to be carried out by Jaime Pagán Jiménez (in van den Bel et al. 2013:77–88) (Table 9.11, Annexe 7.4). For each of these four lithic and six ceramic objects one sample was acquired: the lithic objects (CPP-4, CPP-8 to 10) were sent to Porto Rico and prepared by Pagán Jiménez. The present author sampled the ceramic artefacts (CPP-1 to 3, CPP-5 to 7) in Cayenne. As to each sample sediment was taken from various spots on the object (pin-pointed samples). Because the artefacts CPP-2 to 4 were considered kitchen tools, it was decided to sample the interior wall of these sherds as they evidenced remarkable carbonised material or soot (cf. Section 1.3.2 for the methods and taxonomy). An abridged version of the original report is presented here.

9.7.1 The results

Table 9.12 presents us with a summary of the results obtained for this study. It should be noted that in this table, ubiquity (expressed in %) comprises approximate ("cf.") as well as secure identifications and that it refers to the occurrence of the identified taxa between the sample spectra. The abundance of species combines both approximate and secure identifications. We will now comment briefly on each artefact.

CPP-1 (F 96, stone vessel)

This artefact only provided three starch grains. Two hereof, however, were identified as maize derived starches whereas the third could not be identified. They all had marks of damage caused due to pressure, probably grinding, at various degrees. Fortunately, the two maize starches retained sufficient morphometrical characteristics in order to ascribe them to a certain species. The third starch grain could not be ascribed to any taxa due to heavy damage.

No.	EC	Feature	Square	Object
CPP-1		96		lithic vessel
CPP-2	67	101		ceramic fragment
CPP-3	77	117		ceramic fragment
CPP-4	230	199		ceramic fragment
CPP-5			L18.01	milling stone
CPP-6			011.03	milling stone
CPP-7			M10.5	milling stone
CPP-8	256	151.2		griddle fragment
CPP-9	257	199		griddle fragment
CPP-10	254	200		griddle fragment

Table 9.11. The starch grain samples and the provenance of artefacts.

	CPP-1	CPP-2	CPP-3	CPP-4	CPP-5	CPP-6	CPP-7	CPP-8	CPP-9	CPP-10	Total	Ubiquité (%), Famille et/ou Genre par artéfact
	Lithic vessel	Sherd	Sherd	Sherd	Milling stone	Milling stone	Milling stone	Griddle	Griddle	Griddle		
Tubers												
cf. *Ipomoea batatas*							2				2	10
cf. *Marantaceae*		1	1								2	20
Calathea sp.							2				2	10
Seeds												
Zea mays	1	14	7	5	28	9	4	3	4	6	81	100
cf. *Zea mays*	1	14	4	2	12	10	6	2	6	9	66	
cf. *Capsicum* sp.			1								1	10
Leguminoseae-Fabaceae						1					1	50
cf. Leguminoseae						1			1		2	
Fabaceae		1		1				1	6		9	
cf. Fabaceae		1		3					2		6	
Phaseolus sp.									2		2	10
cf. *Phaseolus* sp.									1		1	
cf. *Canavalia* sp.						5	2	1			8	30
Zea mays (clustered)					ca. 70						ca. 70	10
cf. *Zea mays* (clustered)					ca. 10						ca. 10	
cf. Arecaceae (clustered)								ca. 150	ca. 35 and ca. 30		ca. 215	20
Not identified (individual starches)	1	3	6	2		1	6	9	3	2	33	----
Not identified (clustered)				ca. 35			ca. 60		ca. 6 and ca. 12		ca. 113	----
Total starches (individual)	3	34	19	13	40	27	22	16	25	17	216	----
Total starches (individual and clustered)	**3**	**34**	**19**	**ca. 48**	**ca. 120**	**27**	**ca. 82**	**ca. 166**	**ca. 108**	**17**	**ca. 624**	**----**
Species richness (Family and/or Genus level) per artifact considering secure and tentative identifications	1	3	3	2	1	3	4	4	4	1		

Table 9.12. The distribution and the identification of the encountered starch grains.

CPP-2 (F 101, EC 67)

This artefact most likely pertained to a cooking vessel, considering the charred crust attached to the inside wall. It is assumed that the kind of charred residue analysed here corresponds with the charred foodstuffs resulting from burned food during the cooking process and that therefore our sampling with regard to a starch grain analysis was guided by means of this black mass.

Interestingly, on the one hand, 34 starch grains were recovered within the charred residue. However, only four revealed apparent signs of damage caused due to heat of which only one revealed exclusive signs of such damaging. On the other hand, 31 starches revealed clear signs of damage due to pressure at various degrees. It was thus revealed that grinding, or a similar processing technique, had been applied to the organ sources of the starches prior to its integration into this bowl. The plants identified for this specific artefact are: (a) maize (secure and tentative identifications), (b) vegetables (Fabaceae, secure and tentative identifications) and (c) Marantaceae (tentative identification). Three individual starches could not be identified.

The majority of the recovered starches were ascribed to maize. Fourteen starches were securely identified whereas the other half was tentatively identified. Secure identifications of maize were established on the basis of shape, size and other incorporated features (e.g. hilum, double border, surface). Certain maize starches revealed signs of damage due to pressure while others did not. The size range of these secure maize identifications oscillates between 15 and 34 μm. Only the heavily altered starch grains reached sizes up to 33 and 34 μm. When excluding these heavily altered maize starches, the common size range varies between 15 and 28 μm.

The tentatively identified maize starches (N=14) showed clear morphometric features characteristic of maize starches. However, in many of these cases, damage due to pressure altered and/or distorted several important features preventing a secure identification. The sizes of these starches ranges between 24 and 34 μm which is consistent with the size ranges of maize starches affected because of pressure (Annexe 7.4, Appendix B; Mickelburgh and Pagán Jiménez 2012).

Two starches were ascribed to legumes at a family level: a secure and a tentative identification. On the basis of its shape and the Maltese cross, together with an elongated central depression, we may presume this starch grain corresponds with a wild species of bean. The other tentatively identified starch grain may well correspond with a wild species of bean too, based on its morphometric characteristics. However, signs of damage due to heat were recorded for this granule which most certainly altered certain important features, e.g. size, surface features such as lamellae, etc., preventing a secure identification to any taxonomic level.

Three starches were not identified due to the absence of a combination of morphometric features which allow a feasible interpretation. Interestingly, one starch grain (Annexe 7.4, Appendix B, Granule 26) revealed combined signs of damage produced due to heat and pressure. Signs of damage due to heat consist here of a "big scoop" located at the centre of the starch which is consistent with damage caused due to boiling. In the same case, radial striations were observed, associated with damage due to pressure. This specific starch grain shares two features (size and shape) with legumes, but it was impossible to detect more combined features enabling us to establish a confident identification.

Artefact CPP-3 (F 117, EC 77)

This second ceramic fragment probably pertains to a cooking vessel. The analysis here was directed at the charred residue attached to the interior wall. However, contrary to the previous artefact, the majority of the starch grains show evident signs of heat damage at various levels, now and again combined with pressure damage. In total, 19 starch grains were recovered. The majority hereof was either securely or tentatively identified as maize (N=11). The others were tentatively identified as a Marantaceae or as chili pepper. Six individual starches were not identified.

The securely identified maize starches (N=7) oscillate in size between 15 and 30 μm although the common size ranges between 18 and 23 μm. They revealed signs of both heat and pressure or of a combination of one of these two damaging factors (Annexe 7.4, Appendix C). Tentative maize identifications (N=4) registered similar size ranges and signs of damage consistent to heat. The tentative identification of chili pepper was established by means of recovery of a single starch grain with three of the main features (e.g. shape, size, distal fissure) referred to as the main key sources for recognizing chili pepper starch grains of domestic species (Perry et al. 2007). The oval to ellipsoidal shape of this starch (observed when rotated), together with its size (30 x 22 μm) and fissure, are features highly consistent with domestic chili pepper starch grains. The only feature without a secure identification was the projection of a bright Maltese cross which was referred to as an element that easily disappears in chili pepper starches after minute damage (e.g. pressure).

A Marantaceae family starch grain was also tentatively identified. The size, shape and the presence of the Maltese cross documented for this grain are known to occur in other Marantaceae specimens (Pagan Jiménez 2007). However, damage apparently produced due to heat, resulted in a rough and "amber" colouring of the surface obscuring the confident identification of other key features (e.g. lamellae).

Six individual starch grains were not identified due to various reasons. Four starches showed clear signs of damage due to heat: changes in surface colour and a scoop presumably produced by boiling, whereas the other two showed signs of pressure. These indicators of damage, together with changes in shape and size derived from this processes, did not enable us to identify these starches.

A general, visual comparison between the starches recovered from the artefact CPP-3 and those from CPP-2 (Annexe 7.4, Appendices B-C), reveal dissimilar states of preservation. In spite of the fact that both starch groups were recovered within a charred residue of two ceramic fragments, only CCP-3 displayed signs of damage related to heat (e.g. rough "crystallized" surfaces with small particles on it and "amber" colouring).

Artefact CPP-4 (F199, EC230)

This artefact, the third potsherd fragment to be analysed, has a charred residue attached to the interior wall. A part hereof was radiocarbon dated 895 ± 30 BP (POZ-44834), creating a direct link between starches and the ceramic sequence. Plants (e.g. maize, legume), were securely and tentatively identified. Two individual starches and a cluster of approximately 35 small starches could not be identified to any taxonomic level. Two of 13 individual starches showed signs of heat damage. The remaining 11 as well as one of the previously mentioned starches registered signs of damage due to pressure at various degrees (Annexe 7.4, Appendix D).

The sizes of secure and tentative maize starch grains (N=7) range between 19 and 33 µm. The largest size was registered in one of the tentative identifications. It also displayed signs of heavy damage due to pressure. However, the common size ranges of maize starches oscillates between 19 and 27 µm. This is consistent with regard to starches of many maize landraces submitted to various degrees of pressure (Annexe 7.4, Table 2).

Other starches (N=4) correspond to legumes (Annexe 7.4, Appendix D). One was securely identified as Fabaceae. Due to evident heat and pressure damage this starch grain has a size probably exceeding normal proportions. Consequently, a precise identification could not be allowed. The other three legume starches were tentatively ascribed to Fabaceae of which one diplayed signs of heat. The other two showed sings of pressure. Two starches, one affected due to heat and the other due to pressure, reached the size of 38 and 34 µm respectively. This is not often encountered with regard to domestic starch legumes (e.g. *Phaseolus* sp.). However, the normal size of these two starches could have been altered by means of the damaging processes as described above. As much as 33% of these tentative identifications correspond in size (28 µm) whereas other morphological features (e.g. shape, lamellae) correspond to the starches produced by wild legumes. Nontheless, important features (e.g. long, linear or asymmetric fissures) are not present preventing a confident identification to the family level.

Unfortunately, a cluster of about 35 starches, trapped in cellulosic tissue, could not be ascribed to any taxa (Annexe 7.4, Appendix D). These starches range in size between 6 and 8 µm and are packed within the tissue. Due to the nature of this tissue, it was not possible to satisfactorily document specific features, such as hilum and shape.

Two other individual starches could not be taxonomically identified despite the fact that both grains show pressure facets resembling maize starches, a Maltese cross and measure between 30 and 41 µm respectively. These maize starches are closer to starches produced in tubers. Their polygonal shapes, when combined with all these features, make it difficult to ascribe them to a specific plant source, but they probably originate from the same plant source.

Artefacts CPP-5, CPP-6 and CPP-7 (L 18.01, O 11.03 and M 10.05 respectively)

These lithic artefacts represent three (non-washed) granite querns or passive grinders. They enabled us to retrieve a large quantity of individual starch grains as well as several clusters of maize starches from quern L 18.01 (CPP-5) (cf. Section 9.6.2, Annexe 7.4, Appendices E-G). The most common starches identified in all these tools originated from maize starches. Two grinding stones presented us with legumes, which probably originate from wild species, including *Canavalia* sp.

Interestingly, one of the querns (CPP-5) yielded only individual and clustered maize starches accounting for a possible exclusive purpose of this artefact: processing maize kernels (Fig. 9.32). This artefact differs from artefacts CPP-6 and CPP-7. The starches were found in its impressively polished surface. The active surface has a highly concave section suggesting that this artefact was heavily utilised when grinding plant organs, namely maize kernels with a *mano*, or that its surface was (pre) worked prior to its use as a grinding tool. The other two querns or milling stone bases have polished, used surfaces attesting little or no intentional modification prior to their integration as grinding tools.

Tentative and secure identifications of the maize starches found in artefact CPP-5 revealed that pressure ranged from little to heavy, affecting them in most cases. At least one starch shows clear signs of heat alteration. The two starch clusters of the same species were found in arrangements characteristic of modern maize starch reference collections. One cluster consists of approximately 70 heavily packed starches. The other one has at least ten starches more. The general size range of all these individual maize starches (secure and tentative identifications) oscillates between 15 and 37.5 µm whereas the common size range falls within 22 and 27 µm. The larger maize starches (larger than 30 µm) coincide with a heavy (pressure) damage observed on them. One cf. *Zea mays* starch grain measures 37.5 µm. It represents a damaged starch grain consistent for pressure and heat (Annexe 7.4, Appendix E).

As to artefact CPP-6, tentative and secure maize starches sizes oscillate between 14 and 33 µm, while the common range falls within 25 to 33 µm. Only two maize starch grains, measuring 14 and 18 µm respectively, revealed no pressure or heat damage at all (Annexe 7.4, Appendix F). The remaining maize starches show various degrees of damage due to pressure. Tentative and secure identifications of maize starches in artefact CPP-7 oscillate in size between 18 to 33 µm whereas the

Figure 9.32. A solid rectangular shaped milling stone base (L 18.01) made of granite, weighing c.32 kg, and measuring 36 x 35 x 15 cm. The sample CPP-5 was taken just above the plastic label, where scraping marks are still visible.

common range falls within 26 and 31 μm. All these maize starches revealed various degrees of pressure damage and in one case, of heat (Annexe 7.4, Appendix G). The shapes, fissures, pressure facets and the presence of a double-border observed on many recorded maize starch grains of these three artefacts, are highly consistent with the key features described in reference collections of this species (Holst et al. 2007; Pagán Jiménez 2007). Thus, both tentative and secure identifications were proposed for a combination of all these morphometric features.

Other recovered starches were ascribed to legumes, to wit Leguminoseae-Fabaceae, cf. *Canavalia* sp., for CPP-6 and CPP-7 and to *Calathea* sp. and cf. *Ipomoea batatas* for CPP-7. Their presence indicates that these milling stone bases served not only to grinde maize kernels, but also to grind seeds, legumes, tubers and rhizomes. The only legume ascription to the genus level occurred with regard to *Canavalia* sp. starch grains. In these cases, starch grains were tentatively identified to this level. Their altered state due to pressure (Annexe 7.4, Appendixes F-G) rendered any further observation and analysis impossible.

Strikingly, two of these *Canavalia* sp. starches also showed signs of damage due to heat regarding CPP-6 (Annexe 7.4, Appendix F) together with a starch judged to Leguminoseae. The general size range of these *Canavalia* sp. starches varies between 32 and 52 µm. Recorded features, such as oval shapes in combination with linear and radiating fissures and conspicuous lamellae (e.g. concentric rings, symmetric circles) are all known elements with regard to *Canavalia* sp. starches producing morphometric characteristics dissimilar to other legumes, such as *Phaseolus vulgaris/lunatus* (Pagán Jiménez 2007; Piperno and Dillehay 2008; Mickleburgh and Pagán Jiménez 2012).

CPP-7 revealed two *Calathea* sp. starches as well as two tentatively identified as *Ipomoea batatas* (Annexe 7.4, Appendix G). The recorded *Calathea* sp. starches have conspicuous shapes (oval to elliptical and spherical), commonly observed in various current species of this genus as well as the Maltese crosses and lamellae (in the case of the spherical one), as characteristically found in the same contemporary references (Pagán Jiménez 2007). In spite of the fact that both starches share the shape and an overall size (33 µm and 45 µm long) with present-day *Calathea allouia* starches, it was impossible to refine this identification due to notable damage (pressure and heat) of their surfaces. Rotation was applied to one of the starches (Annexe 7.4, Appendix G, Granule 11), hereby partially revealing the diagnostic shape and size of a *Calathea allouia* starch, as documented in our current reference collection (Pagán Jiménez 2007, Appendix B).

Tentative identifications of *Ipomoea batatas* as to two recovered starches were proposed by means of the shape in combination with the size, Maltese cross and lamellae (in one case). One starch was affected due to heat and included a central depression or scoop, which commonly emerges when starches (or the organ source) are heated/boiled in a liquid environment.

Among the unidentified starches of all three milling stone bases we came across granules often found in tubers (Granule 21 in CPP-6; Granule 12 in CPP-7) or in seeds which, due to damage or poor mobility during rotation, could not be assigned to any known taxa.

Artefacts CPP-8, CPP-9 and CPP-10 (EC 256, EC 257 and EC 254 respectively)

These artefacts represent three different griddles and may reveal additional information on the process of cooking vegetal foodstuffs. All these yielded maize starch grains (both secure and tentative identifications). Two, i.e. CPP-8, CPP-9, also revealed legume (Fabaceae, *Phaseolus* sp.) as well as palm fruit (cf. Arecaceae) starches. Artefact CPP-8 also produced a single starch tentatively identified as *Canavalia* sp. Out of all the griddle fragments, CPP-10 was the only to produce maize starches (Annexe 7.4, Appendixes H-J).

Starches recovered regarding samples CPP-8 and CPP-9 show clear signs of damage and modifications produced by means of heat and pressure. Heat in a humid to dry environment appears to be the most common damaging vector according to recurrent signs documented for these altered starches. We observed small particles (possibly starch fragments) all over its surface, coinciding with previous results of controlled experiments on starch damage (Henry et al. 2009). This evidence indicates that these two clay griddles served as cooking utensils when producing foodstuffs derived from masses or dough (e.g. flatbread or *tortillas*). Curiously, the majority of the starch grains (from maize and unidentified) recovered in artefact CPP-10 yielded starches visibly affected due to pressure and not due to heat, suggesting that this artefact could have served, at least during its late life history, as a working table when manipulating masses or dough.

The general size range of the maize starches (both tentative and secure identifications) of these three artefacts lies between 15 and 39 µm, while the common size falls between 22 and 29 µm. Larger maize starches of both secure and tentative identifications correspond to the starches previously described. Here the significant enlargement is known to be produced by means of pressure and heat or both (Holst et al. 2007; Mickleburgh and Pagán Jiménez 2012).

Other starches from important plants (e.g. legumes) were tentatively identified to the family level or in some cases securely identified to the genus level of CPP-8 and CPP-9. A small number of starches of the genus commented above are *Phaseolus* sp. from which *P. vulgaris* and *P. lunatus* (in CPP-9) are the best known domestic species. A single and tentative identification of *Canavalia* sp. was also recorded with regard to one of these clay griddles (CPP-8). However, due to significant damage produced mainly due to heat in all the starches originating from CPP-8 and CPP-9, any specific identification to the genus or species level was not obtained.

The artefacts CPP-8 and CPP-9 yielded clusters of small starches tentatively identified as those produced in palm fruits (cf. Arecaceae). One cluster in artefact CPP-8 and two clusters in artefact CPP-9 include groups of starches embedded in a substance, probably cellulosic tissue. Arecaceae starches stored in seed pulp are commonly found within cellulosic tissue. However, general shapes varying between oval to polygonal with size ranges falling between 3 to 9 µm in present-day reference collections, is known to occur in *Acrocomia* sp. rather than in another genus (e.g. *Aiphanes* sp.). Thus, considering the general size ranges and shapes observed in those starch clusters, it is possible to propose that the plant source is a palm fruit, common in the Neotropical indigenous diet (Pagán Jiménez 2012).

9.7.2 Final remarks

The use of artefacts

This study illustrated that the analysed artefacts served various purposes while transforming plant organs into edible foodstuffs. The rare lithic vessel (CPP-1) produced archaeobotanical remains: only two starch grains were identified as maize suggesting that this artefact probably served as a mortar to present or prepare foodstuffs, supposedly during rituals or ceremonies. Beyond this possibility, however, indications of a more specific use of the lithic recipient (quotidian vs. ritual scenario) should be associated with its archaeological context and linked to other objects by means of a further technological and chemical analysis of the artefact itself.

Artefacts CPP-2 to 4 are all fragments of ceramic vessels. They served as cooking pots as determined by means of the presence of charred residues attached to the interior of the vessel walls. In these cases, starch grains were confidently recovered from the charred material, thus indicating that plant residues, such as those of the plants identified here, contributed to the formation of a carbonized mass created during cooking events. More generally, these artefacts were utilized for cooking masses or pastes as a final step prior to consumption (e.g. soups) or as preparation, for instance, of cooking masses later integrated into more complex recipes with further cooking (e.g. *tamales*, *pasteles*).

A distinction should be made regarding CPP-4: numerous starches recovered from the charred material were not clearly affected due to heat suggesting that these starches were probably deposited on or in the charred material during the most recent use of this artefact as a cooking utensil.

Artefacts CPP-5 to 7 are all milling stones bases which definitively served: (a) to grind and (b) to process plant organs (e.g. seeds, tubers, rhizomes). Interestingly, CPP-5 may have served exclusively to grind maize seeds. CPP-6 could have been utilized to process maize and legumes. CPP-7 was used to process maize, legumes, tubers and rhizomes.

Artefacts CPP-8 to 10 are griddles, clearly used when cooking and manipulating plant derivates. The first pair revealed starches heavily affected due to heat. Cooking masses or dough with a minimum level of humidity represents a scenario specifically associated with the baking of flatbread and *tortillas*. Artefact CPP-10, however, revealed starches with little or no signs of heat damage. It was previously suggested that the starch grain conditions of this artefact would attest the use of this griddle as a working table, i.e. as a plain surface for manipulating masses or dough prior to being cooked on another hot clay griddle.

The taxa ubiquity

In short, maize is the most ubiquitous plant among the taxa we identified in all ten samples. Legumes (wild or possibly domestic, including *Phaseolus* sp. and cf. *Canavalia* sp.) were the second taxa of higher ubiquity, followed by cf. Marantaceae (arrowroot or Sp., *lerén* family) and cf. Arecaceae (palm fruits). *Calathea* sp. (*lerén* genus) and possibly sweet potato and chili pepper are taxa with lesser projection among all the samples.

Other important plants for Neotropical economies, such as manioc (*Manihot esculenta* Cranz), cocoyams (*Xanthosoma* sp.) and yams (*Dioscorea* sp./*Rajania* sp.), were not present in the analysed artefacts despite the fact that a variety of tools were considered for this study. Moreover, manioc was not recovered at all in any of the three clay griddles, implements traditionally associated with the preparation of cassava. This scenario suggests that maize, together with legumes, could have played a significant role in the diet of the inhabitants of this site. On the other hand, other well-known plants (e.g. various Marantaceae and palm fruits) were integral parts of what appears to be a mixed vegetal diet in which maize could have been a paramount product. Despite the abundance of maize, it should be noted here that manioc starch grains are difficult to identify when cooked (Chandler-Ezell et al. 2006), perphaps creating a bias. Indeed, caution is recommended when interpreting the results of this study: the samples are part of an apparently persistent occupation, ranging between AD 900 and 1400. In this sense, we cannot be completely sure if, during this period, maize and other plants were this ubiquitous. The reason for this is that each artefact could date from a different occupation moment in this relatively long period spanning approximately five centuries.

For this matter, ubiquity is here a statistical figure. It shows frequency in which any single taxon is present among the sample spectra. Evidently, this should not be extrapolated uncritically when stressing the importance of certain taxa over others. However, regardless of the contextual place of the samples studied here (including those from PK 11), we may suggest that maize and several legume species belonged at least (momentarily) to the most versatile and consistent useful plants during the LCA occupation of this site, because their starches were omnipresent for at least three food processing contexts: (a) in milling stone bases in order to reduce these plants to mass or dough, (b) in cooking vessels in order to prepare single or compound masses and (c) in clay griddles to bake flatbreads or *tortillas*. However, the possibility still exists that legumes, tubers and rhizomes were not only processed but also consumed differently, i.e. without griddles, querns or ceramic bowls. Maize was perhaps also present within a ritual/festive context if one accepts that the lithic vessel is less related to domestic life.

The agricultural production

We will now discuss general examples regarding the cultural and ecological implications of accessing cultivars, domestic and wild species in Neotropical forests by means of applying certain plants we have identified regarding the present study.

Maize depends on humans for its reproduction. Seeds must have been stored for this purpose and were presumably seen to with special care, for example, in containers possibly kept inside structures or stocked 'on platforms along the periphery fo the gardens' as with the contemporary Araweté in Brazil (Viveiros de Castro 1992:94) Although it is generally accepted that maize requires exceptional soils and climatic conditions as to a successful production, it can be grown in rocky soils and specifically in silty clay soils, as pointed out in Chapter 8.

Large, continuous plots of land are not required in order to produce significant quantities of maize, albeit that open or cleared spaces are the key to successful cultivation. Multiple small or larger open plots may have been a common feature of the forest in the vicinity of the Morne Poncel settlement (e.g. Mont Cabassou, Morne Coco, Montagne du Tigre). In addition, the planting of maize in fertile alluvial river valleys or banks, such as Crique Cabassou, is another possibility. Water plays a leading role in maize production because any excess or lack of it easily destroys the plants. A permanent control over the cultivated plots is therefore required. In general, this also applies to other domestic plants, such as common bean (*Phaseolus* sp.) or chili pepper. In the case of other cultivars, to wit arrowroot, sweet potato, *Calathea* sp. and specific chili peppers, it is known (Pagán Jiménez, personal knowledge) that they thrive in partially open or cleared gardens or even under thin canopies upon silty sand, silty clay and sandy loam soils. Arrowroot, sweet potato as well as other edible/medicinal plants of the Marantaceae family may have been cultivated in small or large house gardens, situated at the periphery of the site. It would have also contained medicinal plants, herbs, condiments and fruits. These useful plants could also have been tended at the edges of nearby forested areas.

Wild plants (e.g. palms, Marantaceae) were favoured during collecting trips into the forest, thereby promoting their propagation and dispersal within and beyond the natural habitats. In the latter cases, various ecological habitats could be impacted by harvesting of several of these plants, considering that Marantaceae species (e.g. *Thalia geniculata*) occur along river banks or in wetlands. On the other hand, palm trees and certain "wild arrowroot" species have a wider range of distribution (e.g. slightly covered river banks and/or dense forests). In these latter cases, varied types or degrees of forest management should be developed in order to produce/exchange and harvest any of the plants identified here.

The starch preservation

In terms of the preservation of starch grain, we must note several considerations concerning problematic or destructive artefacts (e.g. ceramic cooking vessels, griddles). The cooking bowls and clay griddle fragments studied here show evidence of having been exposed to heat. In certain cases a charred crust (presumably consisting of food residues) has developed. It has been previously understood that cooking starchy masses or pastes could destroy starches, albeit that recent studies have demonstrated dissimilar levels of starch grain preservation (Henry et al. 2009; Zarrillo et al. 2008; Chandler-Ezell et al. 2006). Nonetheless, the present study has yielded well-preserved and identifiable starch grains together with heavily affected starch grains recovered from the ceramic artefacts related to food preparation or cooking.[232]

It has also been demonstrated that cracks and pores in used surfaces of lithic tools acted as protective spaces with regard to starch grains when exposed to characteristic taphonomical processes in buried contexts (Loy et al. 1992; Pearsall et al. 2004; Piperno and Holst 1998). These cracks and pores also allow the adequate protection of starch grains from those occasionally aggressive processes of washing and curating archaeological materials during field and lab work. Therefore, starch grains trapped in lithic artefacts area easily related to human activities as described in the present study.

9.8 The site synthesis

The pre-Columbian site of Cimetière paysager Poncel is situated on top of a small foothill, located to the northeast of the dominating Mont Cabassou. An important, draining creek runs at the foot of these Cabassou foothills. Rising from the Methon Savannah near Vieux Chemin and flowing towards the Cayenne River, it represents a tidal acces into this swampy hinterland (cf. Figs. 9.1-2).

The Morne Poncel is ascribed to the Precambrian Shield of Cayenne Island which emerges diagonally (NE–SW) within the excavation perimeter (cf. Fig. 9.3). The soil at the summit represents a ferralitic soil *rajeuni*. Soilcreeping has been attested for the site, explaining the reason why the Precambrian bedrock is so close to the surface. In addition to artefacts, ancient human presence is also attested for by means of the dark colouring of the superficial layers, namely US 1000 and notably US 2000. However, we do not know if this can be attributed to the pre-Columbian occupation or to the colonial activities, but the former is highly probable.

The radiocarbon datings

A series of 15 charcoal samples and one taken during the mechanical survey suggest two pre-Columbian occupations within the excavated area. The youngest and most important occupation is dated between AD 900 and 1400 (N=13). Three results do not fall within this range. The most recent occupation (POZ-44829) can be ascribed to the Historic Period. The other two are earlier. POZ-44836 marks the beginning of the Holocene era, as it is too early and does not contain any archaeological material. The other date (POZ-44824), however, was taken from a deep pit associated with specific ceramic ware. It may indeed testify

232 For further reading on this subject, see Rodríguez Suárez and Pagán Jiménez (2008).

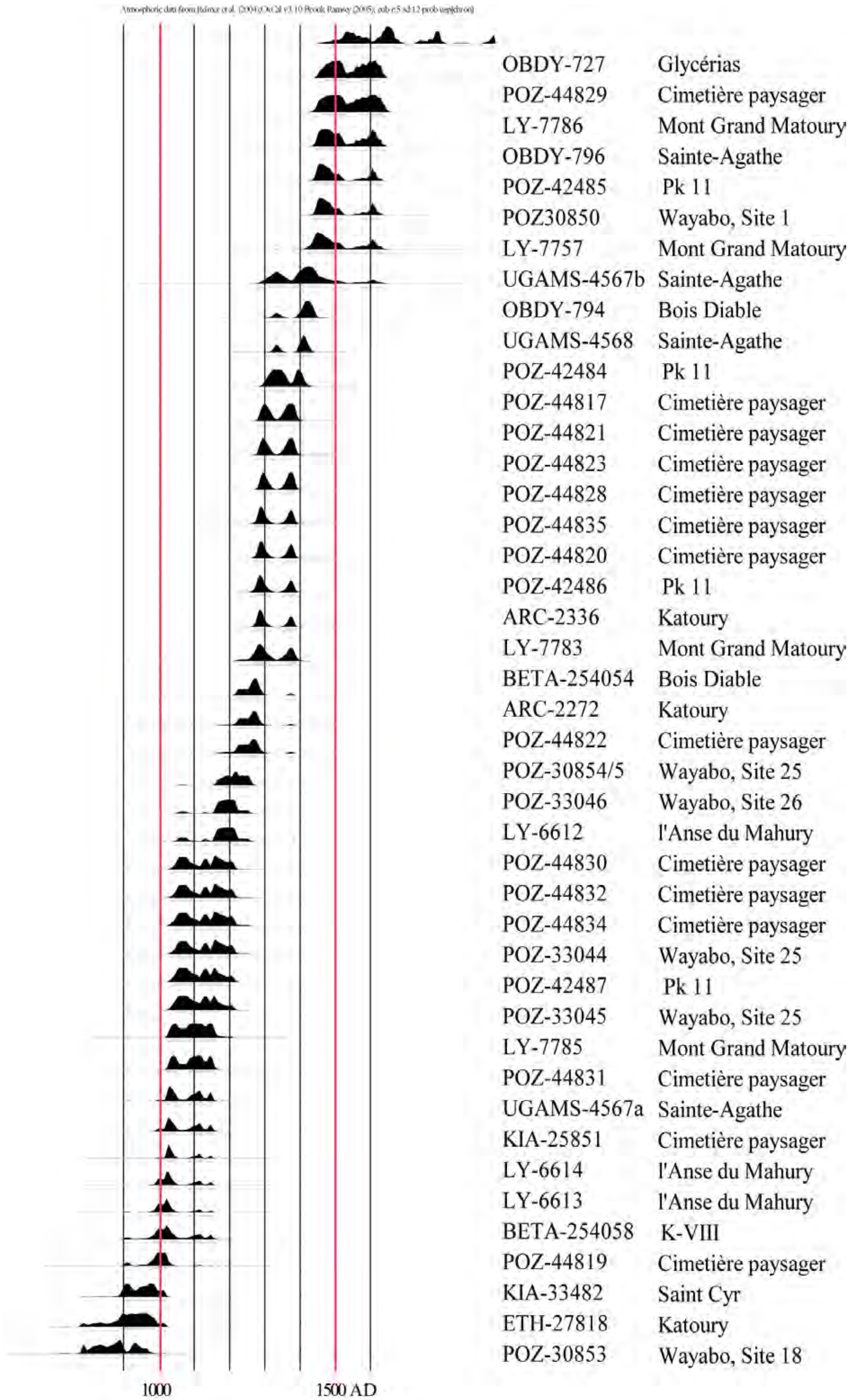

Figure 9.33. The radiocarbon dates related to LCA sites on Cayenne Island and its surroundings (cf .Annexe 1). Atmospheric data from Reimer et al. (2004), calibrated at 2σ with OxCal v3.10 Bronk Ramsey (2005).

an earlier occupation dating approximately to the 4th century AD. An important lesson can be learned here again (cf. Section 5.3): pre-Columbian sites were reoccupied after a (much) earlier abandonement.

When considering the correct radiocarbon dates with regard to the most recent occupation, one may say they refer to the Late Ceramic Age, presently dated between AD 900 and 1500. As we have mentioned previously (cf. Section 8.8), this era is the most frequent age not only for Cayenne Island, but also for the entire western coastal zone of French Guiana (Fig. 9.33).

The occupation of the coastal plains after 1200 BP is often regarded as the result of migration from the west (Rostain 2008b:293) and not as a natural indisponibility of the region because of marine transgressions (van den Bel et al. 2014:213). This implies that a possible occupation of this coastal plain may have been the result of people moving from the interior towards the coast shortly before AD 1000 when the majority of the radiocarbon dates is recorded. The lack of earlier sites for this area and notably Cayenne Island is probably one of the reasons for the popular migration hypothesis.

Aristé on Cayenne Island?

The radiocarbon date of pit F 158 as well as the ceramic content may indeed open innovative perspectives concerning the first, important occupation of CPP and the ECA in general. This large, deep, cylindrical pit yielded ceramics with a very sandy paste, consisting of restricted carenated vessels with precisely executed vertical parallel incisions on the exterior, upper wall and the open bowls with flaring rims. It also features rim fragments with a continuous series of indented fingernail incisions on the inside of the rim and/or on the lip which is defined as the ceramic type *Ouanary encoché* (Rostain 1994a:161–173).

At that time, Rostain proposed a calibrated range for *Ouanary encoché* dated between AD 350 and 850 (Rostain 1994a:173). This corresponds rather well with CPP as it does with the other sites where this specific ware was found. Moreover, *Ouanary encoché* was attributed to the Early Aristé Phase as well as to the Amazonian Incised-and-Punctate Tradition. It goes on to receive Polychrome influences and transforms into the Late Aristé Phase (Rostain 1994a:434–435, 437). Recently, for some reason, Rostain proposed another chronology with regard to Aristé, to wit: (a) Early Aristé (AD 700-1100), (b) Late Aristé (AD 1100-1600) and (c) Final Aristé (AD 1600-1750) (Rostain 2011, 2012:24).[233]

As to Table 9.9, it is suggested here to retain the early dates as to Early Aristé and define *Ouanary encoché* as a ceramic ware predating the polychrome Late Aristé ware. Although further research is required, it may be obvious that these Ouanary sites can be considered as multicomponent sites, when taking the radiocarbon dates into account. Thus, instead of classifying this incised ware to: (a) the predominantly LCA Incised-and-Punctate Tradition and (b) to a Polychrome Tradition, it would be equally appropriate to attach *Ouanary encoché* to the contemporaneous earlier Incised-rim Tradition with regard to numerous stylistic analogies occur (Gomes 2011:280, Fig. 2a).

As a matter of a fact, this ware is found in several other first millennium dated contexts, notably (ring-) ditched sites (e.g. Favard, Pointe Maripa, Blondin) which have been excavated between Cayenne Island and the Oyapock River. This tentative cultural zone is possibly the counterpart of the ECA ware of CSL Phase 2 near the Maroni drainage. The small carenated bowls in both ceramic complexes

233 Remarkably, in a prior publication, Early Aristé starts *at c.*AD 600 (Rostain 2011b:14).

may present a larger Early Ceramic Horizon with regard to the interior of French Guiana (cf. Fig. 3.2). This hypothesis requires further testing in the future.

Nonetheless, it is evident that the ECA slowly, but surely, manifests itself on Cayenne Island. This indicates that whenever any archaeological research makes progress, discoveries can still be made, even in areas thought to be better known than others. Could this be the case with numerous table mountains on Cayenne Island? As demonstrated, Cayenne has apparently earlier ties with eastern French Guiana than merely the late LCA Polychrome influences observed in the Thémire complex as was previously thought (Rostain 2011b:23). CPP also indicates that numerous other sites on Cayenne Island are probably multi-component sites. This makes us aware of the fact to remain open-minded when it comes to unravelling the origins of LCA complexes: an earlier local tradition is present.

The LCA features

The LCA is the dominant occupation of this site. It covers the entire excavated area as attested for by means of the features, similar ceramic wares and radiocarbon dates. The dark earth as well as the various anthropogenic features are presumably the reflection of a site with a central habitation zone situated at the summit and several smaller secondary locations, perhaps activity areas (cf. Fig. 9.9). On the one hand, the numerous radiocarbon dates did not enable us to distinguish a chronological order among the activity areas. On the other hand, the site's surface

Figure 9.34. (a) An elongated pit with ceramic debris as observed during the mechanical survey of Katoury (photograph by Sylvie Jérémie). One easily recognizes Forms A and B; (b) A photograph of a ceramic deposition at the allotment project l'Anse du Mahury (No. 97309.137), taken when the present author visited this site during its destruction. Three radiocarbon dates yielded a calibrated date at 2σ between AD 990 and 1215 as to the excavated area (Briand 2012b:26).

and meager quantity of features suggests a less important occupation. However, the relative abundance of milling stones emphasises the possibility that this site represents a secondary persistent habitat, or satelite site, of a much larger habitation site (e.g. Katoury, Vieux Chemin, Rorota). Apparently, many generations of the same population visited it year after year.

The question of the elongated pits being inhumation pits is of importance to the habitation issue too. Despite the fact that we did not find any eggs of paleoparasites in the pit fill of F 199, this type of pit was found in three distinct areas: Zones A, C and D. Our field observation recorded an elongated pit with rounded corners yielding ceramic debris. This ceramic content consists of complete vessels or voluntary broken ones and depostited vessel fragments, perhaps referring to ritually broken or killed ceramics.[234] The general composition of these features as well as the pit's outline (*c.* 170 x 50 x 30 cm) probably reflects a human body in stretched position, covered with broken potsherds. Next to it, complete vessels were placed at the feet or next to the head. It is suggested here that the ceramics cover the body or help to weigh down the leaves, or any other material, covering the body. The ceramics may also have served as a marker in order to indicate the pit of the deceased in the (abandoned) village as to remembrance, a tradition many Amerindian groups of South America (Métraux 1947; Viveiros de Castro 1995:13) and the Guianas (Roth 1924; Rostain 2011a; cf. Annexe 4) still practice today. The absence of human bones, however, is an issue as to a secure identification. Further microscopic or chemical analysis must be carried out in order to confirm the presence of human bone in these pits.

Despite the lack of bones, we must evoke the significance and large quantity of such elongated pits with numerous ceramics found at other LCA sites on Cayenne Island since the introduction of compliance archaeology. They were recorded for the first time during the mechanical survey conducted at the large habitation site of Katoury (Jérémie et al. 2002) (Fig. 9.34a). We may furthermore note: (a) the habitation site of Saint-Cyr (the survey and programmed excavation at Chennebras as well as the survey at Kreola Parc), (b) the excavated "elongated pit-site" of Mombin II, south of the Mont Mahury and (c) the excavations at Stoupan Ecolodge near the Comté River.[235] Other sites, such as Suzini (construction Conseil Régional) or l'Anse du Mahury (personal observations 2005 and 2007; Briand 2012b) presumably featured similar pits too (cf. Figs. 9.2 and 9.34b). We may conclude that these pits are a recurrent phenomenon on Cayenne Island and that they may certainly represent cultural markers with regard to the LCA of Cayenne.

The programmed excavations at Chennebras as well as compliance excavations at Mombin II showed a specific spatial organisation of these elongated pits. Albeit orientated in various directions, between four and five pits formed a small entity or (burial) group. These groups are perhaps aligned or spatially organised otherwise. At the large habitat sites of Katoury and Saint-Cyr, these pits are probably located at the periphery of large house locations, as a small number of postholes were found near these pit clusters.

234 See also note 180.

235 All operations have been conducted by Sandrine Delpech (2010a, 2010b, 2011a, 2011b) except for the programmed salvage excavation at Chennebras conducted by Fabrice Lavallet in 2012. More recently, the LCA Mombin 3 site at Cayenne Island yielded additional "burial" pits with ceramic debris (Mestre 2015).

At CPP, we can also presume a spatial organisation when designating the N-S alignment of three elongated pits as to Zone A, i.e. F 193, F 201, F 18+33. However, these are single pits and not clusters. This fact may reveal a possible difference in site-function in which the Pleistocene sand bar sites (e.g. Katoury, Vieux Chemin, Suzini, Saint-Cyr) are the larger habitation sites whereas contemporaneous sites (e.g. CPP) are seasonal or satelite villages in view of producing dough or maize flower for example (cf. Section 12.5.2 for a further discussion on this subject). The various ceramic depositions in the same Zone A, i.e. F 13, F 54, F 83, F 85, evoke another burial mode in single or "double" vessels (e.g. funerary or ceremonial). It appears to be contemporaneous, but may constitute diachronic and/or coexisting burial traditions. Indeed, if the white-on-red, keeled vessels represent burial urns, they may refer to a shift or local development in the latter half of the LCA, suggesting the introduction of yet another burial tradition (e.g. Sainte-Agathe).

In addition to a possible secondary burial mode –although we did not come across any (human) bones in these recipients (cf. Section 7.2)– a rite of passage is also possible. For example, among the contemporary Wayana the placenta (*uponpë*) is buried in a small pit (Hurault 1968:54) dug at a small distance from the house. However, if the child-birth takes place during the night, the placenta may be buried next to a posthole of the house (Chapuis 1998:309). Thus, various types of ceremonial burials are imaginable. Another option, i.e. a secondary burial, can be illustrated by means of an example recorded among the early 19th century Palikur who placed the bones of the deceased in a ceramic vessel or urn (Fauque 1835:8, cf. Section 7.4 for this quotation). We repeat that these analogous examples, from a direct historical appraoch (cf. Section 10.5), are forwarded in order to provide alternative perspectives regarding these types of features. Nevertheless, it is assumed that while the LCA various modes of interment coexisted along the coastal of French Guiana at Awala, Iracoubo, Wayabo, Cayenne and the Oyapock, each group or family possibly followed their own mode of burial practices concerning specific occasions reflecting their characteristic cosmovisions concerning death and the afterlife.

The LCA on Cayenne Island

The large majority of the ceramic assemblage can be attributed to the LCA. Only a small portion is much earlier, as pointed out above. Of the CPP ceramic assemblage, at least 51% of the decorated register was incised whereas 38% is (red) coloured and 7% displays modelling. The former consist of parallel, vertical or oblique incisions, often crossed, called *treilles*. In general, the latter incisions are, notably with regard to Form A, applied in a "messy," or less esthetical, manner to the exterior upper part of the vessel. This resonates a quite rapid production of these slightly restricted and mainly boat shaped vessels. Another mode, the alternating incisions, resembling crossed hair, –if we consider vessels to represent humans (personification) and the upper part represents the head–, is often better executed as are the wavy-lines. Both are outstanding markers for this assemblage (Forms B and E). Red colouring is added to the inside and outside of vessel. It may also appear in a zone or red "band" around the neck, often associated with neatly applied *treilles* or alternation of incisions (Form C). All these vessels may include small modelled appliqués, usually nubbins, small clay strips or even small *adornos* on the lip, neck or shoulder.

Considering the radiocarbon sequence and typology (cf. Fig. 9.21), we observe that the dated ECs display a variety in vessel shapes through time. This renders it difficult to interpretate as they stem from dissimilar types of features. On the other hand, the decoration modes are rather persistent, notably the clay-strip applications, the incised wavy-lines and the red paint on the interior of the small bowls. We may suggest the potters have an original style and rich repertoire with regard to vessel shapes. The most common ones as to CPP and PK 11 were recognised, thus providing important elements for an LCA catalogue for Cayenne Island.

As to the LCA occupation of CPP, we proposed five distinct, grog tempered forms (Forms A-E). They were drawn from the eight modals series we recorded for this assemblage (cf. Section 9.5.4). Three of these forms (Forms A-C) are shared with PK 11, revealing in total six forms for both sites. They are contemporaneous, notably during the first half of the LCA, sharing many morphological and decoration traits (cf. Figs. 9.16-7). It is presumed that PK 11 Form D and CPP Form D (featuring polylobed rims and white-on-red painting respectively) are part of the latter half of the LCA occupation at these sites. In fact, the CPP and PK 11 ceramic assemblages share similar modal series and forms. More importantly, they present the same unmistakeable artistic and technological style –hereby following Roosevelt's description of style and tradition (1997:87–88)– as recorded at numerous other sites on Cayenne Island and the adjacent environment since compliance archaeology found its way in French Guiana from 2002 on Cazelles (2002), Jérémie et al. (2002), Hildebrand (2004, 2005a), Casagrande (2005), Mestre et al. (2005), Mestre (2006a), van den Bel (2007c, 2007d), Delpech (2010a, 2010b, 2011a, 2011b), Briand (2012b), Sellier-Segard (2013), Mestre (2014, 2015). Further morphological and technological ceramic comparison has not been conducted by the present author, but is now pursued by Matthieu Hildebrand (INRAP).

In 1985, Alain Cornette dubbed his specific Cayenne Style as 'Style Pointe Gravier' (Cornette 1990:201) as mentioned before (cf. Section 3.4.3.2). Rostain put this term aside and renamed it Thémire complex in his 1994 PhD dissertation. However, the Cayenne Style is easily recognisable in previous publications which include ceramic inventories (Turenne 1974, Petitjean Roget and Roy 1976, Cornettte 1988d, Rostain 1989, 1994a, Wack 1990a, Briand 1997, 1998). However, it has not been associated with radiocarbon dates yet, knowing that the sole Pointe Gravier date is too early. The Thémire complex had been dated to the very late LCA, i.e. AD 1400-1600, with only two shell samples taken outside Cayenne Island, i.e. the Bois Diable site near Kourou located on a Hoclone chenier. The reason for this is that the charcoal samples taken from sites at Cayenne delivered too recent results to be linked to a pre-Columbian age (Rostain 1994a:28, Table 2 and p. 29, Table 3).

The reconnaissance of the Cayenne Style, or Thémire complex, was established here in order to evidence and provide a cultural border with western and eastern French Guiana, notably between the Barbakoeba and Aristé ceramic styles. The Thémire complex is now better radiocarbon dated than 20 years ago. It can now be allocated between AD 900 and 1400, thus prior to the accepted Thémire dates, if we consider red-on-white painting as a main characteristic (Rostain 2013:122). In fact, as pointed out in the Chapter 8, the varied Thémire types are too heterogeneous. They are in need of a revision in order to define a catalogue of grog tempered vessels (*Cayenne peint*), as proposed here for CPP and PK 11.

However, one must not forget that the LCA of Cayenne Island may indeed have two phases, i.e. an early and late LCA phase, as pointed out by means of the radiocarbon dates in combination with possible climate changes (cf. Section 8.8). The radiocarbon dates and ceramic material from other excavated sites, such as the more recent Saint-Agathe and earlier Mombin II sites (Wack 1990b; Rostain 1994a:28; Casagrande 2005; Samuelian 2009; Delpech 2011a, 2013), comfort this hypothesis. The appearance of innovative ceramic series (toric pots and polylobed bowls; PK 11 Form D, CPP Form D), decoration modes (white-on-red painting) and possibly funerary practices (from elongated pits to double urn burials) towards AD 1300/1400, mark the replacement or influences of the earlier LCA ceramic series (Forms A-C from PK 11, Forms A-C and E from CPP), i.e. the mixed Cayenne Style and Thémire ceramic complex, interpreted as the incoming Koriabo style (cf. 12.2.2). Similar changes have also been observed on the Oyapock River where Koriabo is taking over a Late Aristé burial ground (Mestre and Hildebrand 2011).

Chapter 10

The Colonial Event

This chapter is dedicated to the Colonial Event or the "Discovery of Guiana." This moment changed the future of pre-Columbian societies for ever. The Amerindian populations reacted differently to the presence of the Europeans. They either embraced and/or rejected them. In the end, this encounter transformed their lives. In order to assess the archaeology of the Historic Age, an introduction of the most relevant events is provided here. We have chosen to insert this chapter at the correct chronological moment, i.e. after the LCA.

During this Historic Age, the Amerindian societies witnessed: (a) a 16th century encounter in which a new balance of power between the newly arrived Europeans and the Amerindian groups was established, (b) a 17th century encounter that consolidated this incoming socio-economical and political balance ending in numerous wars when the Europeans started to occupy the coastline permanently, (c) an 18th century introduction of missionaries, resulting in a total destruction of the Amerindian society due to diseases and ethnic amalgamation, (d) a 19th century resurrection, or ethnogenesis, of newly formed conglomerations of Amerindian groups and (e) an appropriation of Western traditions and/or an incorporation of Western society and an increase of population numbers.

We will now attempt to describe and trace this process of transformation by means of highlighting the numerous events in French Guiana, Suriname and Amapá which occurred in the course of these Colonial and Modern Times as historians often call it. Archaeologists refer to it as the Historic Age, or Period.

10.1 Introduction

From the European point of view

The first descriptions delivered by the Europeans are fairly similar: they try to understand this New World by classifying it according to their own world, reflective of a Eurocentric point of view (Boomert 1984:125). Although early voyagers provide us with incredible or even fantastic accounts of people with 'eyes in their chests' and of 'people whose feet point backwards' (Ralegh 1848:85), scholars have illustrated that European and indigenous expectations of monstrous races in fact converge in certain key tropes (Mason 1990; Hulme 1992).[236] According to Anthony Pagden, the West European mentality of these early voyagers was based on the conviction that human nature was homogeneous although albeit that certain differences could exist between human groups, such as languages or customs. Hence, every group should adjust itself to the natural guidelines of the human species (Pagden 1986:17). Human behavior was validated by means of an "anthropological classification" of physiological and psychological human traits (e.g. the size of one's head, body length, hair style), geographical location, or even astrological conjunctions. The application of this method in order to classify behaviour also inferred various qualities or levels ascribed to a human group which was not part of the Western world (e.g. beliefs, governing systems, matrimonial rites, laws regarding descent, means of subsistence, how to prepare a meal). These concepts concerning humanity are products of Greco-Roman paganism and evidently not of Medieval Christendom. When the Spaniards arrived in the Americas, all Indians were considered barbarians as they were not Christians. In addition, their races were deemed savage because they lacked any civil behaviour (Lemaire 1988:236–244).[237]

Christopher Columbus presents us with a significant example of such imagery. In his view, Indians were either "good" or "bad" Indians, soon to be translated as Arawak or Carib Indians, respectively (Whitehead 1984:70, 1988). It was evident to Isabella, Queen of Spain, that the man-eating Caribs were to be captured and enslaved, as 'the idolatry of the Indians, their mortal sins, and their human

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236 Robert Schomburgk forwards a reasonable explanation of the origins of such European fantasies in note 2 of his PhD dissertation entitled: *The Discovery of the Large, Rich, and Beatutiful Empire of Guiana by Walter Ralegh* (1848:85): 'The account which Ralegh gives of the Indian tribes who have their eyes in their shoulders and their mouths in the middle of their breasts, has been charged as another proof of his attempt to deal in fables. Such accounts however have existed since the time of Pliny; and when Ralegh reported the wonderful tales, which he sufficiently proves were not the offspring of his own imagination, he merely related the common belief of the natives, not only at the period of his visit but up to this day. How frequently have we heard, in our ramblings, the most circumstantial accounts of the existence of tribes equally absurd in appearance as Ralegh's Ewaipanoma! Ctesias speaks of men with the head of a dog, and Pliny repeats Herodotus' relation of the Acephali, who, if the Libyans may be credited, "have their mouths in their breasts." Sir John Mandeville, speaking of the inhabitants of some southern islands, observes, "Alia insula habet homines aspectu deformes, nihil autem colli aut capitis ostendentes; unde et acephali nuncupantur: oculos autem habent ante ad scapulas, et in loco pectoris os apertum, ad formam ferri quo nostri caballi frænantur." We find therefore that Ralegh had several prototypes, and, as he himself observes, he grounded his belief of the existence of such a people upon the testimony of the natives. We learn from Humboldt's narrative that the forests of Sipapo, where the missionaries place the nation of Rayas who have the mouth at the navel, are altogether unknown (Vol. 5, p. 176). An old Indian, whom the great traveller met at Carichana, boasted of having seen these Acephali with his own eyes; and, absurd as these fables are, Humholdt observes that they have spread as far as the Llanos, 'where you are not always permitted to doubt the existence of the Rays Indians.' It is probable that Shakspeare, having read Ralegh's Guiana voyage, makes use of his account of the Ewaipanoma, which he introduces in his Moor of Venice; and when Othello gave fair Desdemona a relation of the wonders he had seen, he included: "The cannibals, that each other eat, The Anthropophagi, and men whose heads Do grow beneath their shoulders." Oldys supposes that this was done in compliment to Sir Walter Ralegh. Keymis certifies the existence of the headless men. He speaks, in a marginal note, of a sort of people more monstrous, "who have eminent heads like dogs, and live all the day-time in the sea, and they speak the Carib language" (Hakluyt, Vol. iii, p. 677).' See also Whitehead (1997, 2009), Raffles (2002:95–101) and Oldenburg (2008).

237 The Greco-Roman origin can be illustrated by the use of words such as barbarians or savages, terms often adopted to designate the Amerindians. Since Hellenistic times, savages were inferior people, both culturally and mentally. Since Roman times, non-Latin speakers were considered inferior. During the Christian era, non-practitioners of the only true religion, i.e. Christianity, were considered pagans (Pagden 1986:15–26).

sacrifices, provided a sound basis on which to justify the conquest of America' (Delgado as cited and translated in Whitehead 1988:173). The existing rivalry between the so-called Taino (an Arawakan speaking group) of the Greater Antilles and the Caribs (a Cariban speaking group) of the Lesser Antilles was eventually adopted by the Columbus family in order to not only ally with the former Taino but also to exploit their communal enemy and to justify the Carib enslavement.[238]

On the one hand, European sources are prejudiced and thus unreliable with regard to any knowledge of the history of the Amerindian societies. On the other hand, they represent the only written documents to inform us of the Amerindian (pre) history, in addition to Amerindian oral tradition. Next to archaeology, they are often the only way to look back into the proto-historic period in order to obtain any information on pre-Columbian societies (Whitehead 1993:299).[239] It is therefore important to study these Europeans documents and not to discard them *a priori* because of their bias (Santos-Granero 2009b:6–7). As we have very little archaeological data from this early period and due to an incomplete view of history as told in Amerindian oral tradition, these documents constitute another relevant source enabling scholars to gather information on proto-historic subsistence economy and social-political organization as: '… the colonial period of history is a very important arena of debate since the written historical sources permit a complexity of inference that is not available form the archaeological record' (Whitehead 1992a:130).

Indeed, one must be cautious when reading the early historical sources. Authors did not always write down precisely what their guides or interpreters said, often either to their own benefit or else caused by means of misunderstandings. In addition, as mentioned above, the worldview or perception of these voyagers is no longer embraced by historians. The interpretation of their experiences is, however, now and again difficult to grasp. The cultural, political and religious aspects of these Amerindian societies were influenced and/or altered by means of European ideology and economy. It is our task to determine the degree as well as the momentum of this transformation.

According to the sources, Amerindian nations inhabited rather well-structured socio-political territories, similar to countries or provinces in medieval Western Europe. Amerindian groups were evidently not organized as in Western Europe. Nonetheless, they apparently possessed a certain hierarchical structure which voyagers referred to as similar to the social structure they were familiar with. This does not exclude the fact that such a structure existed. Voyagers were not able to investigate any further or did not wish to demonstrate that their organization was similar to his, in order to obtain further (financial) support from Europe in view of trading expeditions.

238 Whitehead (1988:182) further states, following the historian J. C. Salas, that 'the term *canib* was used by the Taino of the Greater Antilles to refer to those Amerindians of the Lesser Antilles [Kalinago] whom they considered as maco,' or (allied) servant population.

239 Whitehead (2003a:ix) also points out that these historical sources are in fact always anchored or situated in the place and time they were written and, above all, reflect the personal trajectories of their authors.

The first encounters

Between the arrival of the first Iberians on the coast of the Guianas in *c*.AD 1500 and the North Europeans almost a century later, we must acknowledge the lack of any historic evidence or archaeological data on Amerindian societies.[240] As Neil Whitehead (1988:53) stated in his PhD dissertation on this 16th century void: 'Moreover, it would thus appear that there is a "hidden" phase in the history

240 For the purpose of this (ethno) historic Chapter, the Guianas or coastal Guianas, encompass the entire coastal zone between the mouth of the Orinoco and Amazon Rivers, as defined by John Gillin for the *Tribes of the Guianas* in the HSAI (1948:799). The origins of the name Guiana or Guayana are still disputed. Reverend James Williams' article (1922) is an outstanding summary of its possible origins. Since the discovery of Guayanas at the mouth of the Orinoco, this term often serves to designate the western part of the Guianas (Whitehead 1988). However, the coastal zone we are now discussing is situated more to the east. It is also known as "The Wild Coast," but historically bears no other (more official) name.

According Jodocus Hondius' map (1599), the area between the Orinoco River and Maracaibo is called *Caribana* while the area between the Essequibo and Orinoco Rivers is called *Epuremei*. The famous Empire of Guiana is located in the interior, around the Parime or Toponowini Lake. It is as large as a sea and sailed by many canoes, as observed by Lawrence Keymis (1890:148). The coastal zone between the Essequibo and Amazon Rivers has no name, except for the probable ethonym *Tisnada* on the left bank of the Amazon below the Equator. These *Tisnada* are probably the inhabitants of the *Provincia de los Negros* with their leader *Arripuna* (Medina 1894:70). Johannes de Laet (1625:461) refers to a large number of rocks resembling 'Swarte Verckens' or Black Pigs, which are thus depicted by Hondius.

Another important map of the Guianas is part of the Leupe Collection kept at the Dutch National Archives (NA_4VEL_2153). *The Kaart van Guiana, van de rivier Marawini tot Arrowen Eyland* probably served Hessel Gerritsz when compiling his map of the Guianas which Johannes de Laet published in 1625 (see Fig. 10.4). This map features the name *Caribana Oriental* for the interior between the Maroni and Oyapock Rivers (see Hulsman 2009:320; Brommer et al. 2011:410), a long forgotten name of the eastern Guianas.

This map also features an inland lake, connected here to the Approuague River. Together with many other rivers (e.g. Amazon, Essequibo, Oyapock) they were thought to lead towards Parimé where El Dorado was King. According to Keymis (1890:152), it took 20 days to reach the city of Manoa from the mouth of the Oyapock River. In reality, you will fall into the Amazon River, the largest river in the world! The wide watersheds of the Middle Amazon and its affluents may have been referred to as lakes, as the Reverend George Edmundson (1906) suggests. He situated the country of the Manáos Indians at the headwaters of the Rio Branco which was called originally Parimé; hence, the lake of El Dorado (in Fritz 1922:42).

The National Library in Paris holds a map (CPL GE DD_2987_9612) of the headwaters of the Essequibo River. It reveals a lake lying in between the Upper Rupununi and Mahó Rivers (affluent of the Parima River which falls in the Rio Negro). This map, entitled *Carte de la Route de Nicolas Horstman, natif d'Hildesheim en Westphalie depuis Rio Esquibe jusqu'à Rio Negro*, was acquited by M. de La Condamine (1778:127–128). It was made after the German Nicolas Horstman's journey in 1740 from the mouth of the Essequibo to the Amazon Rivers (Bolingbroke 1807:154–155). A partial reproduction of this map and Horstman's journal is published in volume 1 of *Storm van 's Gravesande* (Harris and Villiers 1911:167–174). A slightly earlier map depicting the Courantyne River (NL-HaNA_4.VELH_598A) was drawn by Salomon Herman Sanders. He accompanied Gerrit Jacobs on a voyage from Paramaribo to Parime or the Rio Branco River in 1718 (Yzerman 1911; Bos 1985; Hulsman 2011b).

Father Samuel Fritz (1922:60) refers to the Amazons when describing the woman of the Jurimaguas: 'In former days the Jurimaguas had been very warlike and masters of almost the whole River of the Amazons; and their woman (as I heard) fought with arrows, as valiantly as the Indians, such an encounter, it seems to me, was that which Orellana had, which led to this giving to this great river, the name of the Amazons; but now they are much intimidated and wasted by wars and enslavements that they have suffered and suffer form their neighbours in Pará.'

of the Guayanese Amerindians, being the time between the first arrival of the Europeans, when they were largely confined to the immediate area of the coast, and the inception of continuous colonization in the early 17th century.'[241]

During the 16th century, the Guianas were situated between the Portuguese and Spanish realms of the South American continent. Although various *conquistadores* and European adventurers must have visited this region, the Spanish favoured the pearl beds near Cubagua, Coche and Margarita in the vicinity of the Paria Peninsula until their depletion during the 1530s. Next, the Spanish expanded their search for pearls and gold not only towards the west (e.g. Magdalena, Santa Marta, Cartagena, Cabo de la Vela), but also towards Trinidad in the east. Spanish documentation suggests that *Aruacan* and *Carib* powers occupied the Lower Orinoco River and Atlantic coast of northern South America (Whitehead 1992b, 2011b; Sued Badillo 1995). With the arrival of the Europeans, the Carib and Arawak population of the coastal region presumably received greater significance from the Spanish. This region represented a trading post (Fr., *comptoir*) for metal tools and other European goods, hereby controlling this trade spatially (Whitehead 1988:53). The European presence in this region must have changed the local situation among the Amerindians. It may also have influenced the local social-political status of regions situated further away in the interior as well as the status of the Guianas in general.

Aside from the European influence played out on a political and cultural level, the heaviest blow was due to: (a) the introduction of a sugar-based economy during the second half of the 17th century onwards and (b) the missionary works that struck the Amerindian demography (c) together with the spread of Old World diseases (Hemming 1978; Whitehead 1988). In many parts of the Guianas, the lowest number of native peoples was reached towards the end of the 18th century for various reasons (e.g. the actions of the missionaries, internal disputes, disease). For example, only 200 Galibi were still residing on the French Guiana littoral in 1787, according to Hurault (1989:169).

It is obvious that the current situation of small indigenous groups is a weak reflection of the Early Historic situation when the Europeans first arrived. The Amerindians who presently inhabit the littoral of the eastern Guianas (e.g. Kali'na, Lokono, Palikur) were not isolated forest dwellers, as pictured during the period of Enlightenment by Jean-Jacques Rousseau and the myth of *Le bon Sauvage*.[242] The Amerindians were actors of their history and not only victims of a colonial and capitalist empire. For instance, the Amerindians of the littoral played an active role in the economic trading network with regard to the Europeans as distributors of the goods, hereby utilizing their socio-cultural ancestral networks which have survived until today (Rivière 1963, 1984; Butt Colson 1973, 1985; Lathrap 1973; Boomert 1984, 1987; Porro 1985, 1992, 1996; Dreyfuss 1992;

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241 Louis Allaire (2013:98) called it Period II (1515-*c.*1625) or 'a long century of some five generations (the "lost" generations) that is poorly known in historical documents but during which so much would have happened.' See also Jean-Pierre Moreau, *Navigation européenne dans les Petites Antilles aux XVIe et début du XVIIe siècles* (1987:134).

242 The Brazilian poet Oswald de Andrade reckoned that without the Amerindians the French Revolution would have been impossible as he wrote in his *Anthropophagic Manifest*: 'Queremos a Revolução Caraíba. Maior que a revolução Francesa. A unificação de todas as revoltas eficazes na direção do homem. Sem nós a Europa não teria sequer a sua pobre declaração dos direitos do homem' (de Andrade 1928).

Whitehead 1988, 1992a, 1993; Heinen and García-Castro 2000; Gassón 2000; Gallois-Tilkin 2005; Collomb and Dupuy 2009).[243]

In recent decades, the development of archaeology and anthropology, especially in Lowland Amazonia (Smith 1980; Dreyfus 1983-84; Roosevelt 1991; Whitehead 1994, 1998; Porro 1994; Hill 1996; Heckenberger 2005; Heckenberger et al. 1999; Heckenberger and Neves 2009; Balée 2006), has urged scholars to reexamine the early historic material. They have proposed to study the contents more dynamically and not view it as a static mosaic consisting of multiple tribes, introducing the historical perspective of *longue durée*.[244]

In the Guianas, it is thought that the shapes of groups or villages change continuously. The reason for this is the absorption and separation of people, hereby altering the socio-political, geographic situation of a cerain region (Dreyfus 1992; Rivière 1984). Languages played an important role as socio-political identifiers in the Amerindian world. In addition drinking feats during funerary and matrimonial practices, warfare and alliances between varied groups represent other identifiers which, when reading the historical document, are merely moments frozen in time (Whitehead 1994:35, 1995b).[245] However, it is believed that the political alliances between Amerindian groups and Europeans were fluid. Moreover, they were modified according to Amerindian principles of warfare in which the Europeans were just another player during the contact period (Whitehead 1992a) (cf. Appendix 2 for a description of the historic Amerindian coastal groups).

The Historic Period

The following chronological stages can be established with regard to the post-Columbian or Historic Period in the eastern Guianas, representing the general outline of this chapter:[246]

a. The Time of Contact or Proto-historic Period. It stretches from the discovery of the Guianas up to the end of the 16th century and is characterized by means of (i) the implantation of the Spanish and Portuguese colonial powers in

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243 Claudius de Goeje (1932) relates this trade to the tale of the Amazons, women being traditionally the beholders of lapidary skills in Amerindian (pre-Columbian) society. Boomert (1987) elucidates that greenstone items (e.g. nephrite frogs, or *muiraquitãs*) were highly valued items in a huge network located between the waters of the Amazon and Orinoco Rivers. The relationship with the Amazon River can be found in the works of Father João Bettendorf (1910:172, 261) who refers to a noble class, or 'cavaleiros,' differing from the chiefs, which were called 'Maria Moacara' among the Tapajo.

244 This concept that Michael Heckenberger promotes in his *The Ecology of Power* (2005), Renzo Duin applied to the history of the Wayana in his 2009 PhD dissertation. The latter discusses the role of the community house in Cariban speaking peoples of the Guianas while elaborating on the model of regional organization. This issue comes with a discussion constituting of socio-political complexity nourished by mythology, architecture, rituals, social memory, etc. Ethnic groups form geographical regions (territories?) containing various villages each with a different status and exhibiting an exchange of goods and rituals in which the presence of roundhouses is translated as unequal distribution equals ranked regional organization, creating a dynamic sacred landscape of social memory (Duin 2009:25–27). See also note 363.

245 For further reading on the importance of feasting, mortuary rites and public speeches among the historic Amerindian population of the Llanos in Venezuela and regional archaeology, see Gassón (2003).

246 Concerning French Guiana, see P. Grenand and F. Grenand (1997:64).

South America and (ii) Spanish attempts to colonize the Guianas.[247] Although we have little documentation on these events, it is thought the Amerindian populations in the Guianas must have been influenced in some way (red slave raiding?) by means of the distant presence of these new powers;

b. The Colonial Period represents the exploration and permanent implantation of the coastal Guianas by mainly English, French and Dutch flagged colonies. This era can be subdivided into: (i) an early privateering phase including trading posts and (ii) a subsequent permanent phase. Now mainly Dutch and French colonies or trading posts were founded in the central Guianas. This era also provided the first important and satisfying ethnographic descriptions of Amerindian society, albeit perhaps not meant as ethnographic accounts and influenced by European culture.[248] Producing sugar demanded a permanent stronghold and soon Africans were brought into these colonies as slaves. This permanent presence and the introduction of missions at the beginning of the 18th century resulted in a rapidly diminishing demography. This was mainly the result of Old World diseases and slave raids, but also caused by means of a diaspora, reduction and forced re-locations of the Amerindian population;

c. The Modern Period represents the time after the abolition of black slavery as obtained by the majority of the colonies in the Guianas during the second half of the 19th century. The Modern Period can be subdivided into an earlier post-colonial and a later post-W.W. II era when independence was granted to Guyana (16 May 1966) and Suriname (25 November 1975) as well as the declaration of French Guiana as a French Department (19 March 1946).

In the course of the present period we can observe the comeback of the Amerindian populations risen from the ashes of their ancestors, giving birth to "new" indigenous groups, i.e. the Kali'na and the Palikur in French Guiana. It is believed that during the entire Historic Period, the Amerindian population was subjected to 'a continuous reconstruction of ethnic groups by extinction, scission, and absorption' (P. Grenand and F. Grenand 1997:62). Although representing a minority, the indigenous groups nowadays play quite a significant role with regard to the modern post-colonial societies of the Guianas. Of equal importance, corresponding largely to the above-mentioned steps, is the evolution of Amerindian society during the Historic Period, as Peter Kloos (1971:262) suggested.[249] He discusses three stages in which Amerindian village life was: (a) initially part of political alliances, then (b) restrained to isolated villages, to finally (c) become

247 Here, I prefer the following notion that this time of contact 'is not a precise point in time. It is rather a long period characterized by multiple, intermittent, and temporally variable phases of contact, culminating in the conquest of the contacted native peoples and the settlement of their lands' (Santos-Granero 2009b:6).

248 When discussing these early historical sources, they are often not ethnohistorical in nature, i.e. written with the intention of providing information on indigenous culture. In fact, the majority is simply historical in nature but do occasionally contain phrases or paragraphs dedicated to Amerindian ways of life.

249 The evolutionary stages developed by Kloos can also be found in the social structure of Guiana society as Peter Rivière outlines in *Individual and Society in Guiana: A comparative Study of Amerindian Social Organization* (1984). Rivière identified five principles of "settlement," or "house," according to Rival and Whitehead (2001:3): 'A settlement core is constituted through cognatic descent; kinship is expressed by a two-line prescriptive relationship terminology; there is an emphasis on co-residence in ordering relationships, and uxorilocality is the preferred residence rule; finally, settlements are endogamous, small, and impermanent' (Rivière 1984:4).

part of a national state. This model reflects the above-mentioned periods. In addition, it reveals the profound relationship between European influence and changing Amerindian society during the Historic Period. The following sections are provided with quotations from historic documents in order to forward a more detailed image of the way Europeans perceived and described Amerindians.

10.2 The Contact Period (1500-1652)

The Contact Period is subdivided into: (a) an era (1500-*c.*1580) characterized by means of the arrival of the Spanish and Portuguese colonial powers in South America and by several Spanish attempts to colonize the eastern Guianas. It is also thought that North European privateers or freeboaters, may have roamed the coast of the Guianas during the second half of the 16th century, (b) an era (*c.*1580-1621) featuring frequent commercial voyages to the Guianas in order to trade with the Amerindians and (c) an era (*c.*1621-1652) in the course of which further intensification of this commerce occurred by means of more permanent trading posts or colonies.

1500-1580

In 1499, the Spaniards Alonso de Hojeda and Juan de la Cosa touched upon the Guiana coast and travelled on towards Venezuela (Sauer 1966). One year later the Portuguese explorer Vincente Yáñez Pinzón sailed along the Guianas. We have further little information on these first encounters.[250] At around 1530, the Spanish had colonised the Caribbean coasts of Venezuela (Nueva Andalucia), Columbia (Nueva Granada) and possessed a port in Trinidad (Port of Spain). Towards the end of the 16th century, Antonio de Berrio had founded Santo Tomé de Morequito on the Lower Orinoco River.

The Portuguese had settled in Nova Lusitana along the Atlantic coast of Brazil, i.e. Pernambuco and later San Salvador, where they mainly produced sugar. The New World possessions of these two European nations were divided by means of the Treaty of Tordesillas in 1494. Now a longtitudal line was drawn across the globe. The Guianas were positioned between these two Iberian empires and received very little attention. The reason for this is that it constituted the eastern extremity of the Spanish empire and was far less attractive than the richer parts of the New World (e.g. Peru, Columbia, Mexico).[251]

As decreed by Queen Isabella of Spain in 1503, with the support of the Roman Catholic Church and based on Columbus's ethnographic vision, the cannibalistic and therefore savage Caribs were keenly choosen to serve as slaves (Sauer 1966:31–

250 Next to his voyage along the northern part of the Brazilian coast, the mouth of the Amazon and the Guianas, Pinzón's voyage probably also provided information included in Vesconte de Maiollo's 1519 map (see Rio Branco 1899, Map 1a). Besides regular Spanish river names (e.g. Rio Salgado, Rio Verde, Rio de las Canoas), the 'Costa de Paricuria' is mentioned too (F. Grenand and P. Grenand 1987:73). See for example the anonymous Spanish map *c.*1560 in Rio Branco 1899, Map 13, or the Egerton map of South America from 1508 (MS 2803, f. 9; Roukema 1960:29). However, it is with the arrival of the English at the end of the 16th century that the general Spanish hydronyms and toponyms are replaced by more regional examples Keymis (1890:148) illustrates this when stating 'that no sea-card that I have seene at any time, doth in any sort neere a truth, describe this coast,' as quoted by Roukema (1960:31). The latter author presents a detailed description of the early Spanish maps and their hydronyms of the Guiana Coast.

251 The line of Tordesillas is generally considered to be situated to the east of Belém but its position differs through time (Harisse 1897).

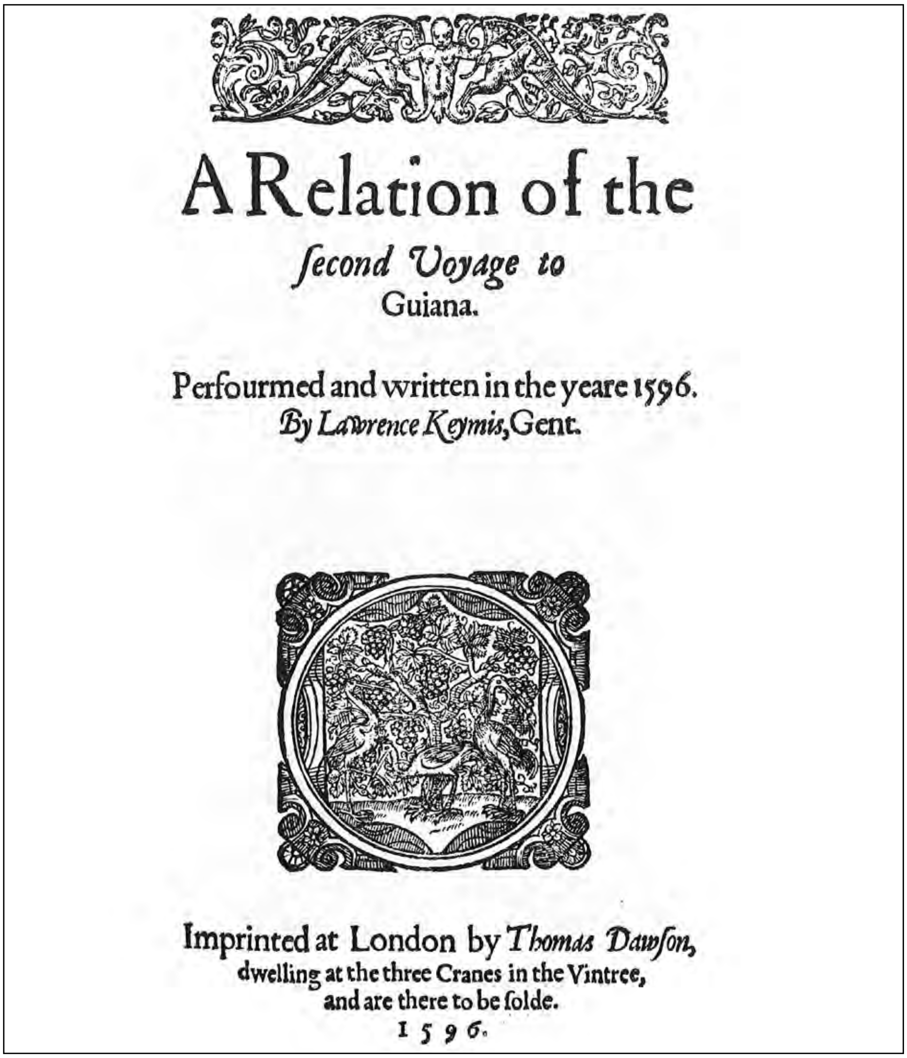
32).[252] The Spanish preferred the less savage *Aruacas* above the savage Caribs. The Spanish allied with the Aruacas and subsequently fought their enemies too. This was the start of an exodus of Amerindian groups towards the upper parts of the river drainages (Whitehead 1988, 1994). Next to the provision of red slaves, the Aruacas provided the first Spanish settlements with food. In 1520, this nation was widely settled to the south of the Orinoco River and along the coast of the western Guianas. According to Rodrigo Pérez de Navarrete (1964:87), the Courantyne River formed the eastern limit of the 'Provincia de Aruacas.' Pérez de Navarrete also stated that the Arawak from the latter region had come from the east and had initially dwelled among the Caribs of the Guiana coast, but eventually they engaged in warfare with each other (ibid., p. 84).[253] The Aruacas were able to supply great quantities of food (maize, cassava), operating as a complex social system (Whitehead 1992b).[254]

The Spanish Crown presented licences and royal titles to conquistadores, for instance to Diego de Ordás in 1531 as well as to Pedro Maraver de Silva and Fernandez de Serpa in 1568. This resulted in the manifestation of *Guayana* or the

252 Later, Portugal imposed an inquisitorial model in 1533 in order to converge on barbarians, Jews, Negroes and heathens forcing them to accept the dominant society (Nirenberg 2009).

253 A similar, possibly copied, description is presented by Juan López de Velasco (1894:153-155) who provides additional information on the rivers inhabited by *Aruacas*: 'Notica de los indios aruacas. La provincia y tierra de los indios Aruacas, contenida en el descubrimiento de Serpa, son como doscientas leguas ó más de costa desde la isla de la Trinidad al levante hacia la boca del rio de las Amazonas, en que hay muchas poblaciones de indios, y en la tierra mucha caza de dantas, puercos y venados, y otros muchos animales y caza de volatería, y grandes tierras llanas para pastos de ganados y tierras de labores; y así estos indios Aruacas son grandes labradores, y tienen sus poblaciones en la costa de la mar. Según la memoria que conservan de sus antepasados, dicen que estos rios y tierras fueron antiguamente poseidos de indios caribes, á quien ellos las quitaron por sus malos usos y costumbres, habiendo venido en unos navios de hacia donde sale el sol; y así traen continuamente guerra con ellos, y los tienen por muy grandes enemigos: son de buena disposición y de rostros nobles; précianse de caballeros y andan desnudos; son de buenas costumbres, aman la virtud, castigan el vicio, y creen que hay en el cielo un gran señor que premia los buenos y castiga los malos, y que las ánimas de los que viven bien van con él; tienen escuelas en que les cuentan las hazañas de sus antepasados, y les enseñan á conocer las estrellas del cielo; son muy amigos de cristianos y grandes trabajadores, y así castigan los ociosos: en el invierno entienden en sus labores, y el verano hacen sus armadas de treinta ó más piraguas, que son unos navios de un madero solo en que caben treinta ó cuarenta hombres, y vánse á buscar las armadas de los indios caribes, con los cuales pelean bravamente, y si pueden los cautivan en la mar y en los pueblos, para servirse de ellos de esclavos. No parece haberse descubierto esta provincia hasta agora, ni haberse dado la conquista dellos á nadie; solo se sabe esto por relación de un morisco de la gente que entró con Diego de Ordáx á la conquista del Dorado, año de 27 [1527], que estuvo entre ellos doce años.
Costa de los Aruacas
Cabo Raso: junto á la isla de la Trinidad, al sur della.
Rio Salado: junto á cabo Raso al poniente.
Rio de Canoas: más al poniente de rio Salado.
Rio Dulce: un rio grande que viene de la tierra adentro y tiene á la boca del una isla.
Rio Fermoso: al oriente del rio Dulce en 5 grados de altura.
Punta Turahaja: al oriente del rio Fermoso.
Rio Salado: al oriente de punta Turabaja.
Arboleda: al oriente de rio Salado.
Rio Bajo: en 4 grados de altura.
Aldea: al oriente de río Bajo.
Fuma: entre Aldea y el río de Pracel.
Rio de Vicente Pinzón: 2 grados y ¾ de altura.
Rio de la Vuelta: al oríente del río de Vicente Pinzón.
Las Planosas: tres isletas pequeñas á la boca de un rio.
Fuma Grande: junto á cabo Blanco, en la entrada y boca del rio de Orellana, á la parte occidental.'

254 A summary of early 16th century Spanish accounts was published in *Timehri* by James Rodway (1895).



A Relation of the
ſecond Voyage to
Guiana.

Perfourmed and written in the yeare 1596.
By Lawrence Keymis, Gent.

Imprinted at London by Thomas Dawſon,
dwelling at the three Cranes in the Vintree,
and are there to be ſolde.
1596.

Figure 10.1. The front page of the 1596 publication by Lawrence Keymis.

Guianas comprising the region positioned between the Orinoco and the Amazon Rivers. Instead of conquering this area, these men were more interested in locating the city of El Dorado or the Last Inca, now supposedly located on the Upper Orinoco River (Hemming 1978).

Remarkably, Mayor John Scott's journal [1667] is probably the only known source to mention Spanish colonies in the Guianas during the 16th century. One colony had been founded by Pedro de Acosta, accompanied by 300 men, at the Paroma River in western Guyana in 1530. Another was founded by Gaspar de Sotelle together with 126 families at Cayenne in 1568. Both failed hopelessly. The colonists were expelled by the hostile *Careebees* and *Paragotoas* population (Harlow 1925:138; Hurault 1989). It was obvious to the Spanish that this region did not possess any valuable resources (e.g. gold, silver or large impressive, indigenous empires) as did Peru or Mexico. On the contrary, the swampy Guiana coastline was invested with mosquitoes and deprived from suitable, natural harbours. Occupied by a hostile indigenous population, the region was soon referred to as *The Wild Coast*, the Land of the Savages or *Wilden* as the Dutch often called them.

It is generally accepted that, from the second half of the 16th century on, Normand, English, and later Dutch privateers, sailed along the Guiana coasts.[255] They penetrated into the Iberian *Mare Clausum* and especially into the Paria Peninsula in order to retrieve contrabande merchandise from the inhabitants (Sp., *vecinos*) of Margarita and Cubagua (Sluiter 1948). On the other hand, Portuguese merchants had contracted Flemish traders, from the beginning of the 16th century on, in order to transport sugar, tobacco and salt from their colonies to European harbours. When Spain closed their European ports for foreign ships and imposed salt embargoes during the early 1590s, Dutch merchants started to retrieve merchandise in the Americas themselves.[256] In addition to salt and sugar, the Dutch and English began to trade metal tools directly with the Amerindians in exchange for dyes, tobacco, wood, hammocks, and victuals. Rapidly, European traders now invested in the Guiana estuaries as well as the mouth of the Amazon River –especially the Northern Amazon Channel or *Canal do Norte* (Br.)– hitherto left unoccupied by the Spanish Crown (Lorimer 1989; den Heijer 2002; Hulsman 2009, 2010).

The early visitors to the Guianas, for instance Lawrence Keymis and Robert Harcourt, noticed the presence of refugee Indians, such as the *Yaios* and *Shebaios*, living in the mouths of various Guiana rivers as well as the Lower Amazon. According to these travellers, the Indians had fled Spanish terror on the island of Trinidad and the Lower Orinoco River (Keymis 1890:144; Harcourt 1906:373). A strong rivalry expressed in successive battles between the *Careebs* of Cayenne and the Yao/Aricouros of the Lower Oyapock River was witnessed by Jean Mocquet [1604], Charles Leigh [1604], John Wilson of Wansteed [1606], Lourens Lourensz [1618], Jan van Rijen [1627], David Pietersz de Vries [1634], Paul Boyer [1643],

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255 Since the second quarter of the 16th century, sailors from Normand ports such as Rouen and Dieppe reconnoitered the Brazilian coasts (Gaffarel 1889:27–28). The French historian Jean-Pierre Moreau (1992:45, note 80) refers to a voyage of Nicolas Guimestre de Fécamp towards Brazil and the 'land of the cannibals.' He notes that the "cannibal land" lies between the Antilles and the Amazon, thus integrating the Guianas as possible destiny of this sailor (Gosselin 1876:143). Somewhat later, French Protestants founded a colony, called *France Antarctique* (1555-1567), in the bay of Rio de Janeiro under the command of Chevalier Nicolas Durand de Villegaignon. The reformed Pastor Jean de Léry describes their establisment and management of the colony in his *Histoire d'un voyage faict en la terre de Brésil* (1580). Interestingly, the Royal cosmographer André Thevet also described the Guiana coast when returning to France when passing through the Caribbean: 'De la riviere susditte jusques au fleuve Doux [Amazon], on compte soixante quatre lieues, & de là vous allez à une autre riviere, qu'on appelle Verte, non pour les herbes & plantes qui y verdoient, quoy qu'il y en ayt assez, mais pour les rochers de pierre, la plus finement verdoyante que l'on sçauroit imaginer : & de là aussi les Sauvages tirent des pierres, avec lesquelles ils se font si beaux enfans, lors qu'ils se percent & joues & levres. Entre ceste riviere verte, & l'isle de la Trinité, gist le Cap de Canoas, qui est ainsi dit, à cause des vaisseaux des Sauvages ainsi appellez, & lesquels font d'ecorce d'arbre, liez & cimentez avec des joncs marins, si proprement, que en sorte aucune ils ne reçoivent point l'eau : Et d'autant que la terre est là fort boscageuse, & qu'ils s'y fournissent de leurs naus grossieres, les premiers qui y ont passé, luy imposerent le nom de Canoas. De ce Cap à celuy qu'on dit Cap hault, ou *Anegado*, on compte soixante & dix lieues, lequel eft au goulphe de Parie.' (Thevet 1575ii:961, c.1587, f. 137r).

256 Citing the Dutch historian van Meteren, Engel Sluiter (1948:169, note 15), mentioned two ships from Veere (Zeeland) that had acquired sugar loafs on the Canary Islands via Spain, which were sold in Antwerp. According to Arjen Poelwijk (2003:52, note 93), Amsterdam merchants imported sugar directly from São Thomé (Canaries Isles) and even from Brazil prior to 1595. Sluiter (1948:170) suggests that Dutch ships had already sailed to Brazilian ports in 1587. Jean Mocquet (1617:147) encountered a Dutch ship loading salt at Cumaná on the 4 June 1604 during his voyage from the mouth of the Amazon to the Antilles. Keymis (in Goldsmid 1890:145) mentions that the French 'loaded Brasil wood at Trinidad that had been traded by Indians from the Guianas.'

Antoine Biet [1652], etc.[257] All this upheaval was probably related to the arrival of those Amerindians who had fled from Trinidad, encroaching themselves in another Amerindian territory. Such a situation has been dubbed the "Tribal-zone": 'the area affected by the proximity of a state, but not under its administration' (Ferguson and Whitehead 1992:3).[258] In sum, this early period cerrtainly represents a void for many historians and archaeologists -further research in the Spanish archives is certainly wanted- but it is generally believed that the implantation of the Spanish in the Circum-Caribbean region provoked changes in the Amerindian geopolitical situation which, from the beginning, obscured and influenced our point view of view concerning pre-Columbian society : '…before the European intrusion, this coastal area was of marginal significance to ancient networks of trade; a notion consistent with the earliest intelligence on the economic opportunities of this region which uniformly indicate that trade to and from the uplands, not trade along the coast, was of the greater significance. However, this aboriginal situation was quickly obscured by the development of European trade since control of the lower reaches of rivers, where the Europeans invariably established themselves, became vital if participation in the exchange of metal goods was to be achieved' (Whitehead 1988:18).

1580-1621

The first Europeans to leave written documents concerning the Amerindians of the Guianas often made landfall upon the *Wiapoko* [Oyapock] and/or the *Caiane* [Cayenne] Rivers. The Island of Cayenne, the Oyapock, but also the Kourou Rivers, were obviously places to call port, or facilitate a *rendez-vous*, for ships after crossing the Atlantic Ocean. The prominent eye catching table mountains in the vicinity of these rivers constitute the only visible landmarks along the flat Guiana coast, as Lawrence Keymis described Cayenne or *Gowateri*, as he called it:[259]

> *To the Westward this Bay hath many good roads under small Islands, whereof the greatest named Gowateri, is inhabited by the Shebaios: and besides the plenty of foule, fish, fruits, wilde porks and deere, which are there to be had, where Caiane falles into the sea, (for it standeth in the mouthes of Wia and Caiane) it yeeldes safe and good harbour in foure and five fathome for ships of great burthen. On all that coast we found not any like it: wee therefore honoured this place by the name of Port Howard.* (Keymis 1890:147)

On his second voyage to Guiana in 1596, Keymis arrived at the South American mainland on *Cape Cecyl* (currently known as Cabo do Norte) at the mouth of the *Ariwarri* (Araguarí) River (Fig. 10.1). He continued his voyage to Trinidad in order to gather information on the whereabouts of Lake Parime: the location of

257 The year of the voyage is placed between square brackets and the year of publication between round brackets.

258 However, this can be considered a continuing battle into colonial times between two local powers. It enflamed due to this influx and can be regarded a relict from the Cariban expansion during Late Prehistoric times (Lathrap 1970:165). See also Santos-Granero (2009b:198).

259 See for *Gowateri* also the sketch map of the Guiana Coastline drawn by Robert Dudley in 1636 (Lorimer 1989:111). According to Brigitte Gullath of the *Bayrische Staatsbibliotheek*, the folio number Joyce Lorimer added to this map includes an error. The actual code of this manuscript map is: Cod. Icon. 139, f. 102v, and according to the old numbering system: no. 52 b v. (B. Gullath, personal communication 2011). Notably Sarah Tyacke had already published the same chart (Tyacke 1980:79, Fig. 4).

Manoa or the city of El Dorado. Earlier that year, *The Discoverie of the Large, Rich, and Bewtiful Empyre of Guiana* had been published by Sir Walter Rale[i]gh. It dealt with his voyage to Trinidad and the Orinoco (Keymis' first voyage) and boosted the North European interest in this part of South America (Ralegh 1596, 1848, 1997; Lorimer 2006).[260] Abraham Cabeliau's statement illustrates his early European interest. In December 1597, the States General of Holland had sent him along the coast of the Guianas officating as a clerk of a reconnoitering expedition (de Jonge 1862:153–160). Having landed on the "Triangle Islands," or Devil Islands (now *Îles du Salut*), they met an Englishman who took them to Cayenne. Two weeks later, they encountered four Dutch ships, evidencing that many privateers frequented this region:

> *On the sixteenth of April the aforesaid Englishman set sail. On the twenty-ninth of the same month two ships from Amsterdam joined us, through our help, whereof the skippers were Dierck Jansz. Roomschkerck and Wouter Syvertsz., and sailed off again on the tenth of May to the island of Margarita. On the third of Juno two ships from Amsterdam joined us, named the Great and Little Sphera Mundi, the skippers whereof were Jan Cornelisz van Leyen and Adriaen Reyndertssoen before mentioned. And we joined forces with them in order to visit together the entire coast as far as the river called Orinoco by the Indians, Raliana by the English, and Rio El Dorado by the Spaniards.* (Cabeliau in Burr 1897, App. 5:17; see also Goslinga 1971:486)

In 1597, Ralegh armoured a third voyage to Guiana under the command of Thomas Masham and Leonard Berry who also landed at Cayenne:

> *Upon Sunday after dinner our Master William Dowle and 6 more went off with our boat to a towne called Aramatto; where they found many inhabitants, and brought victuals and some Tabacco with them, and one Indian named Caprima, who lying aboord all night, the next day being Munday the 14 of March went with our Captaine into Wias, and there traded with the Caribes for such things as they had. And afterward they of Aramatto came off with their canoas to us, and wee went on shoare to them: and from thence our Captaine sent a canoa with seven men, which had every one of them a knife to goe backe to the river of Cawo, and to tell Ritimo captaine of that place, that because wee coulde not come to him, wee would stay at Chiana for him, whither wee intreated him to come to us.*
>
> *So upon Thursday the 17 wee stoode in for Chiana, and came to an anker without in the bay in 3 fathoms that night: and had the Caribes comming continually to us with their canoas, which brought us great store of victuals and some Tabacco, shewing themselves very kinde and loving, and came all from their townes, and dwelt on shoare by us untill Ritimo came: at whose comming they returned all*

260 Joyce Lorimer (1977) forwarded the possibility that Ralegh had already reconnoitered the Orinoco River in 1587 to establish a fortress in collaboration with the French in order to attack Nueva Granada from the Orinoco and Meta Rivers. Ralegh is thought to have sent his trustworthy Capitain Jacob Whiddon towards Trinidad in 1594, a year before his own voyage, in order to reconnoitre the region and to capture Indian guides, thus preparing Ralegh's voyage (Nicholl 1995:51). These Amerindian guides, having received a quick but proper re-education in England, were taken back to the Guianas in order to improve communication with the local Amerindians to assure a succesfull operation (Vaughan 2002). Ralegh left two of his men at the Orinoco River, to wit Hugh Goodwin and Francis Sparrow. The latter returned to England after being taken to El Dorado, according to John Smith (1907ii:185).

up to their townes againe, which was upon the Sunday following. All this day we feasted him and his traine, and the next day we traffiqued with them for such things as they brought, which was principally tobacco. (Masham 1890:187–188)

Soon more private merchants arrived to trade with the Amerindians or even start a small colony or trading posts. The publication of the first exclusive map of the Guianas, the *Nieuwe Caerte van het wonderbaer en goudrijcke landt Guiana* by Jodocus Hondius in 1599, featured the names of the rivers listed by Master William Dowle, Lawrence Keymis, and Thomas Masham (cf. Appendix 2).[261] Interestingly, nearly all these hydronyms still exist today. Keymis further listed the names of the Indian nations, their villages or towns and the leaders or captains per river (see also John Ley in Lorimer 2006:326–331).[262]

Commerce with the Amerindians took place on a private level and depended on the qualities of the merchant and, more importantly, on the mercy of the Amerindians. Lone merchants, such as John Ley and numerous Dutchmen, visited the Amerindian villages and bartered for goods, notably tobacco. The first private Guiana companies, such as the Amsterdam-based *Guiaanse Compagnie*, contracted middlemen, who would sign a two or three year contract with this company in order to built small warehouses or stronghouses in the vicinity of Amerindian villages providing temporary accommodation and facilities to store the trade goods (Hulsman 2009, 2010). These men, also known as factors (D., *leggers*), would seek to obtain a maximum of Amerindians goods which would be shipped to Europe in a charter their patron sent. It is stressed here that these traders were almost fully dependent upon the mercy of the Amerindians if they wanted to stay alive.

The company's patrons, and those of other similar commercial enterprises, needed investors in order to pay traders and the armouring of the ships by means of selling "parts" of a ship's cargo to them. This type of commerce is known in the Netherlands as *partenrederij*. The Dutch had utilized this concept ever since the 15th century (Hulsman 2011a:182). Reverend George Edmundson (1903:643) states 'that the Dutch method of trading was, in cases where no actual settlement was attempted, to leave factors on the various rivers along the coast with supplies of barter goods, the stores being replenished and the product of the traffic conveyed by ships, which paid periodical vistis to the several stations.' These early Dutch barter activities were reported by Charles Leigh (1906:320) (Williamson

261 It is presumed that William Downe, having returned to England in 1596, sold maps illustrating his voyage with Keymis to the Wild Coast (Lorimer 2006:287–288) and that they found their way to Amsterdam.

262 After his imprisonment in the Tower of London (1603-1616), Sir Walter Ralegh returned to the Guianas with Keymis in 1617. All ended catastrophically: he lost his son Wat during the plundering of Santo Tomé and blamed Keymis for his death, who immediately hanged himself. Once Sir Walter had returned to England, the Spanish ambassador in London charged him with the murder of the Governor of Santo Tomé (Harlow 1932).

1923:39), John Wilson of Wansteed (1906:339) and Jean Mocquet (1617:80).[263] It is quite likely that the small circles with a dot, indicated on the maps drawn by Jodocus Hondius (1599) and Hessel Gerritsz (in de Laet 1625:454–455), may indeed concern the location of such trading posts (Fig. 10.2).

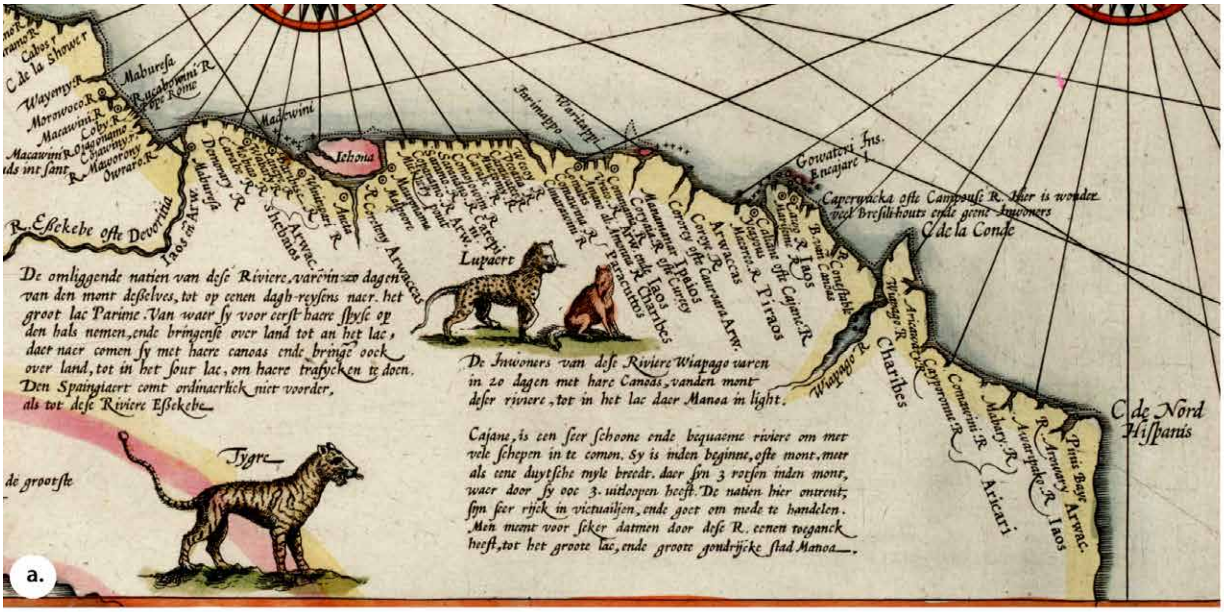
Having arrived at the Oypapock River in May 1609, Robert Harcourt founded a colony. This must have reduced the Dutch activity here as the latter expanded (transferred?) their Guiana trade westward to the Maroni and the Suriname Rivers (van Brakel 1914; Hulsman 2010:303).[264] In 1614, the Spanish managed to destroy a Dutch tobacco colony of 50 'flamencos' having ties with the local Caribs on the Lower Courantyne River (British Guiana Boundary Commission 1898:31–35). In 1616, Dutch traders build another fort, called fort *Kijkoveral*, on the Essequibo River at the confluence with the Cuyuni and Mazaruni Rivers. Moreover, after abandoning the Harcourt and Roe colonies, they also established colonies in Cayenne and on the Oyapock River (Goslinga 1971).

Robert Harcourt's journal is another source of interest in view of the first colonists and their relationship with the Amerindians in the Guianas. Upon arriving in 1609, he installed his company (consisting of 20 boatmen and 30 landmen) in the Amerindian village of Caripo (Ouanary Hills), situated at the mouth of the Oyapock River, of which his guide, Martyn, was Lord:

> *The day following I tooke land, with my companies in armes and colours displayed, and went up unto the Towne, where I found all the women and children standing at their doores to behold us. The principall Indians came out unto me, and invited me into the Captaines house, which untill the returne of Martyn belonged unto his brother, as chiefe Lord in his absence : I went up with them and was friendly feasted with many kindes of their Countrie cates: when I had well eaten and refreshed my selfe, Martyn tooke me by the hand and said, that he had not any thing wherewith to requite my kindenesse towards him, in such manner as he desired ; neither had he such delicate fare, and good lodging for us, as in England heretofore we had beene used unto: but humbly intreated me to accept of his house in good part for my selfe, and the Gentlemen of my company; and the rest should be lodged in other Indian houses adjoyning : and that such provision as the Country yeeldeth, should be provided for us. His speech was approved by the rest of the Indians present, who tooke me by the hand one after another, and after their manner bad me welcome. I gave them many thankes, and some rewards for their kinde entertainment; and then disposed my company in convenient lodgings: but yet I kept a continuall guard, as in time of warre. When I had thus setled*

263 After Father Jean Mocquet (1617:69–160), many French historians consider the arrival of Daniel de la Touche de la Ravardière at Cayenne and Oyapock to be the first French attempt to settle in French Guiana. However, this expedition never counted any settlers. In fact, having reached the mouth of the Amazon River, they sailed along the coast to the Oyapock River and stayed several days in the Oyapock bay in order to trade and take in provisions. They escorted two nephews of the Lord *Anacaiouri* to Cayenne and eventually to France. In Paris, Mocquet met one of these nephews (Yapoco) once again in 1613 (1617:98–100). At Cayenne, they met the Carib Lord Camaria and reconnoitered the Cayenne and Montsinéry Rivers (ibid., p. 111). The party stayed over a month among the Caribes of Cayenne in order to load Brazil wood and other goods. They continued their voyage to Tobago and Saint Lucia in the Antilles (ibid., p. 134) where they took provisions and eventually set off for Cancale, Brittany. Interestingly, this French expedition included not only numerous English crew members (ibid., p. 148) but also an Amerindian interpreter named John, who had been taken by Whiddon and educated by Ralegh (Vaughan 2002:361, note 42).

264 Unton Fischer (in Purchas 1906:409) wrote that the Dutch traded axes for golden objects, such as 'half moons' and 'eagle-shaped' items on the 'Selinama' River. See also Whitehead (1990) and Rivet (1923).



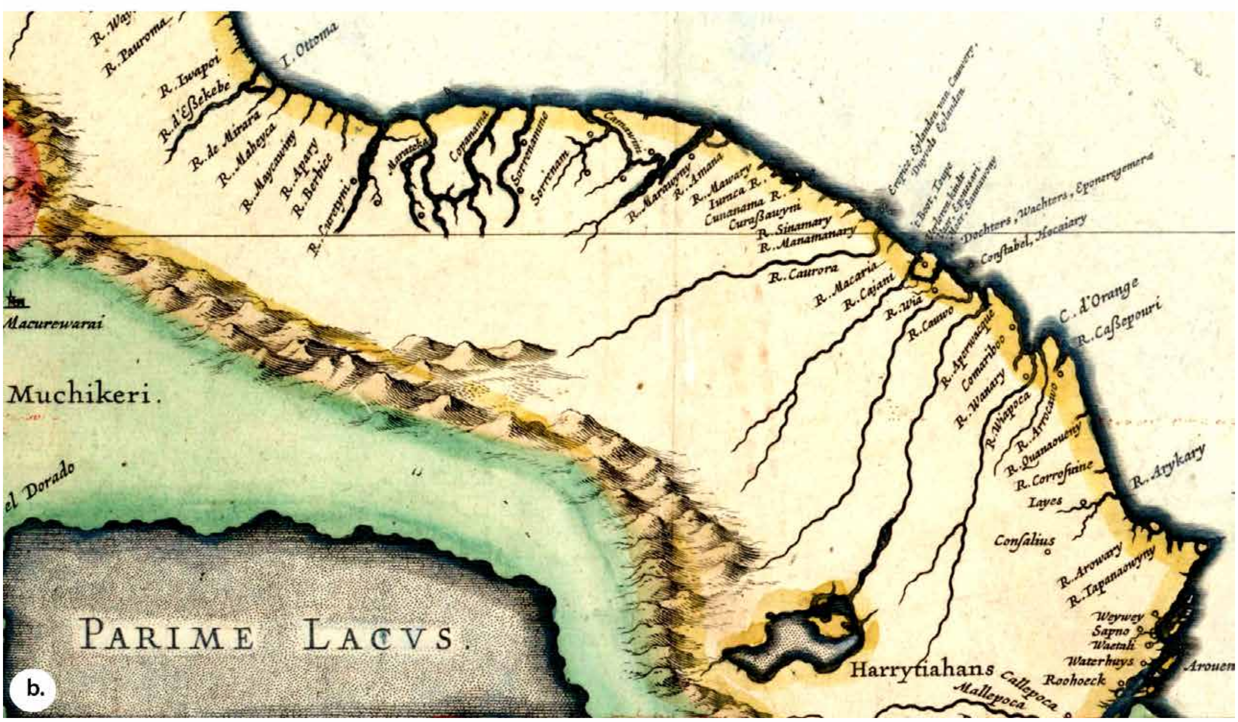


Figure 10.2. Details of two Dutch maps: (a) the map by Jodocus Hondius (1599) entitled Nieuwe Caerte van het wonderbaer ende goudrijcke landt Guiana (Bijzondere Collecties Universiteit van Amsterdam 104.05.04; courtesy of the University of Amsterdam), (b) Hessel Gerrtisz map entitled Gvaiana ofte de Provincien tusschen Rio de las in Amazonas ende Rio de Yviapari ofte Orinoque published by Johannes de Laet his book entitled Nieuwe Wereldt (1625:452–453). It is presumed that the small circles represent Dutch trading posts. A sketch map of the Guiana coast where Dutch factors are mentioned at precisely the same rivers supports this hypothesis (Hulsman 2010:308).

my company at this village, I went out to view the scituation of the place, and the advantages for defence thereof. It is a great rockie Mountaine, not accessable by reason of fast woods, and steepe rockes, but onely in certaine places, which are narrow footepaths, very steepe and easie to be defended: whereby we were lodged as in a Fort, and most conveniently in respect the harbour was so neere, for our Ships did ride at anchor underneath us, over against the foote of the hill. (Harcourt 1906:366–367)

Harcourt also provided an interesting description of this spacious *Empyre*, from a feudal point of view. He presented a geopolitical summary of all nations located between the Orinoco and Amazon Rivers, having claimed this area for his Majesty Lord King James (Whitehead 1994:40; 1997:60–66). According to Harcourt, his *Countrie* was divided into *Provinces* which were again subdivided into local *Signories*, each with their own *Chiefe*. These provinces were inhabited by people of various nations with dissimilar languages. Inhabitants and/or chiefs from *Signories* situated between the Oyapock and Araguarí Rivers were subjugated to *Anakyury*: a Yao and the principal chief, or *cacique*, of the Yao.[265] Each nation (e.g. *Yaios*, *Arawaccas*, *Charibes*) had a principal or chief in every region. The inhabitants of the province of Cayenne were *Charibes*. Their commander was *Arrawicary*, the antagonist of *Anakyury*. According to Harcourt, the *Charibes* of Cayenne were the original inhabitants of that country. However, they were the enemy of all above-mentioned nations as the latter had come from Trinidad (Harcourt 1906:373). Both groups held raids, burned each other's villages down and captured prisoners, notably women.

Remarkably, neither Ralegh nor Harcourt mention any cannibalism among these populations as do Spanish voyagers (Whitehead 1988:178). However, the first mention of cannibalistic rituals on raided enemies is probably presented by Lourens Lourensz. He had been captured by the *Aricouros* of the Lower Cassiporé River and was held as a slave in their village between 1618 and 1625 in their village (Wassenaer 1627:62–65; van den Bel 2009c).[266]

Clearly, the Amerindians tended to view warfare differently than Europeans. This was perhaps related to the abduction of women as future partners as Harcourt stressed (1928:86). Raids were originally held to take men and women as future servants or captives (C., *pëito*; A., *mako*). They would have a specific relationship and perhaps even merge into their new family as brother-in-law of the ruling family (Rivière 1969:77–81; 1977:40; Whitehead 1988:57, 1992a:133, 1994:41,

265 See also note 422.

266 The French anthropologist Pierre Grenand was astonished about this Zeelander's tale referring to cannibalism among the Aricouros. In his view, this is probably the only reference of cannibalism with regard to this historic population and their descendents, the modern Palikur (Pierre Grenand, personal communication 2011). Another particularity about this journal is the passage on the capture and torturing of a "headless" Mayé Indian by the Aricouros. It is quite similar to the description delivered by Antoine Biet (1664:380–384) of the capture and killing of a prisoner. Interestingly, the Mayé remain a tributary group to the Palikur as Father Fauque reported when installed upon the Lower Oyapock River at the Mission of Saint-Louis: 'Ce sont des Indiens qui poussent encore plus loin que les autres sauvages le dénuement de toutes choses. Ils n'ont pas même de plantage; les graines des plantes et des arbres ou le poisson sont leur nourriture ordinaire. La cassaye, qui est un gâteau fait de la racine de manioc, et la boisson ordinaire des sauvages, qui se fait de la même racine, sont pour eux le plus grand régal. Quand ils veulent se le procurer, ils font une pêche abondante et ils portent leurs poissons chez les Palikours, qui leur donnent du manioc en échange. Les Palikours ont pris sur eux un tel ascendant qu'ils en font en quelque sorte leurs esclaves, c'est-à-dire qu'ils s'en servent pour faire leurs abatis, leurs canots, leur pêche, etc; souvent même ils leur enlèvent de forece le peu de traite qu'ils font chez les François, lorsqu'ils travaillent pour eux' (Fauque 1843:27-28).

2011a; Fausto 2001; Carlin and Boven 2002:13; Santos-Granero 2007, 2009a, 2009b; Collomb and Dupuy 2009).[267]

The information gathered in these documents on Amerindians and their environment is not entirely tainted by means of European thought, but probably also by prejudices and visions of the Amerindian guides adopted during their journeys and stays. They belonged to a specific nation, held certain ideas on other nations and probably also tried to benefit from their alliance with the Europeans in providing negative (fantastic or imaginative?) information on other groups. Nonetheless, this information still contains valuable information on non-material beliefs, for example: across the first rapids on the Oyapock River, lived a *Charib* nation known as the *Marachewaccas*. Their ears were extraordinary large and they worshipped a stone idol: 'This idol is placed in a house that was made for it and was attended by the villagers. It was shaped like a man sitting on his heeles and holding open his knees, and resting his elbows upon them, holding up his hands with the palmes forwards, looking upwards, and gaping with his mouth wide open' (Harcourt 1906:388).[268] Having heard of these long eared Indians on the Upper *Marawinni* River, Harcourt was possibly convinced they were all one nation dwelling in the interior of Guiana.[269]

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267 In order to make a difference, Fernando Santo-Granero (2009b:5) coined this type of tropical American slavery as 'captive slavery.' He identified five elements 'to prevent us from characterizing war captives as slaves. First, captives were eventually incorporated through marriage of adoption into the families of their captors. Second, captive labor did not free their masters from their productive obligations and was not crucial to the reproduction of their economic system. Third, slaves were not subjected to systematic exploitation and were generally well treated. Fourth, they were considered to be propert, and thus could not be bought, sold, or traded as chattel. Lastly, their status was not hereditary and, hence, they did not constitute a permanent social class. Indeed, some authors suggest that because certain native terminologies liken the status of so-called slaves to that of potential affines, the Amerindian institution of war captives had a kinship dimension that was alien to slavery as it was practiced by contemporary Europeans' (Santos-Granero 2009b:4). According to Pierre Clastres (1977:46), warfare was not only a side effect of Amerindian society but a goal of primitive societies in general: 'En d'autres termes, la guerre primitive est le moyen d'une fin politique. Se demander par conséquent pourquoi les Sauvages font la guerre, c'est interroger l'être meme de leur société.' Modern ethnography has recognised the importance of the link between commerce and warfare, or trading and raiding, by proposing a 'scheme of reciprocities' (Sahlins 1972).

268 In Amazonia, a seated person is often associated with elite rituals and socio-political power (McEwan 2001:178). Similar artefacts have been encountered in Suriname (Boomert 1977:512; Versteeg 2003:184) in French Guiana at the Saint-Agathe site near Macouria (Samuelian 2009:73) and at the site Bois Diable/La Sablière (Thooris 1994b:20, Fig. 12.1). Both are attributed to the Late Ceramic Age. For Amazonian examples, see the *Pottery of Marajó Island* (Palmatary 1950:383, Plate 25c-e).

269 John Ley had come across Indians with long-ears on the *Marowine* River too during his second voyage to Guiana in 1601: 'Haveinge hard often of the Indyans with longe and Large eares hengeing upon their showlders; At my last jorney beinge in the River of Marowine, where they were said to dwell, I was very Inquisitive of the Indians for those people, who pointed upward, and made us to understande that within eight daies Jorney above Certaine falles they abide and further said that their did divers of those people dwell with them, but nowe they were either gone home or dead' (Ley in Lorimer 2006:322), and 'The next River is Marawen, a greate River Enhabited by the Caribes, their Captaine is Cawpeana, this people have great and wide Ears, soe that a man maie put his fiste in the hole thereof the lower parte of their Eares doth lie upon their showlders' (ibid., p. 329). Long ears may well be a pan-Amazonian feature among Amerindians: 'mais les Anatomistes trouveront peut-être quelques réflexions à faire sur l'extension monstruese du lobe de l'extrémité inférieure de l'oreille de quelques-uns de ces peuples, sans que pour cela son épaisseur en soit diminuée sensiblement. Nous avons été surpris de voir de ces bouts d'oreilles longs de quatre à cinq pouces, percés d'un trou de dix-sept à dix-huit lignes de diamètre, & on nous a assuré que nous n'avions rien vu de singulier en ce genre. Ils inserent d'abord dans le trou un petit cylindre de bois, auquel ils en substituent un plus gros, à mesure que l'ouverture s'aggrandit, jusqu'à ce que le bout de l'oreille leur pende sur les épaules. Leur grande parure est de remplir ce trou d'un gros bouquet, ou d'une touffe d'herbes & de fleurs qui leur sert de pendant d'oreille' (de la Condamine 1778:82–83).

After arriving in the Amerindian village of Caripo (his first temporary installation), Harcourt chose the Comaribo Mountain (now *Montagne d'Argent*) in order to start his colony.[270] This most northern landmark (as seen from the Oyapock River) possessed an excellent soil on which to plant tobacco, maize, cotton and *annatto* trees as well as a vineyard. Harcourt handed this settlement to the Indian Anthony de Canabre as a tenant of the King! His brother, Michael Harcourt, was left behind as chief commander of the young colony accompanied by 20 men and assisted by Captain Harvey and Master Gifford.[271] Harcourt left his colony and set off along the Guiana coast towards the Caribbean with a stop at the *Marawinni* River. Here, he ascended onto the first falls:

> *The next day, and the night following I proceeded Westward with full saile, and passing the Rivers of Manmanury, Sinammara, Oorassowini, Coonannonia, Uracco, and Amanna; I arrived the twentie five day at the River of Marrawini, which openeth a faire River, but is shoale upon the Barre, which lieth two or three leagues off at Sea, having but two fathome water: within the Barre, the Channell is three, foure, five, and sixe fathome deepe. Five leagues within the river we passed by certaine Ilands called Curewapory, not inhabited, for at the rising of the waters they are alwayes over-flowne, of which sort the River hath very many: we lodged that night a little beyond these first Ilands at a Village called Moyemon, on the left hand, the Captaine thereof is called Maperitaka, of the Nation of the Paragotos, a man very loving and faithfull to our Nation, whereof we have had good proofe. The next day wee proceeded up the River three leagues, and stayed at a Towne called Coewynay on the right hand, at the house of Minapa, (the chiefe Charib of that Signiorie) to provide two Canoes to prosecute our journey for the Discoverie of this River.*
>
> *The twentie eight day we went forward passing many Villages and Townes, which I forbeare to name, and having gone about twentie leagues from the Sea, wee found the River in a manner barred up with Rockes, over which the water falleth with great violence, yet notwithstanding we adventured to proceed, and the further wee went, the more dangerous wee found the over-fals, and more in number; but when wee had passed the first Mountaine, towards the high Countrey of Guiana, called Sapparow, and discovered farre off before us other high Mountains called Matawere Moupanana, and had proceeded sixe dayes journey up the River (which was more then fortie leagues) we met with such shoale rockie streame, and great over-fals, that there to our griefe our journey ended.* (Harcourt 1906:393–394)

At the mouth of the Maroni River, Harcourt decided to leave his cousin Unton Fischer and several other men at the *Paragoto* village of *Wia Wia* beach where *Maperitaka* was chief. They stayed in this village he described as 'a great Towne of 20 houses,'[272] in order to wait for a better time [that is the rainy season

270 During the second half of the 19th century, this mountain had been chosen to install a penitentiary which was soon abandoned due to sickness of both the prisoners as well as the personel. The construction of this camp probably destroyed the majority of the pre-Columbian and contact settlements (Amerindian and colonists).

271 Accompanied by sixty Indians, Harcourt sent out his brother Captain Michael Harcourt and Captain Harvey to explore the *Arrawary*, or Araguarí River. They travelled *c.*50 leagues up river where they met Indians who were not willing to trade or did they speak a language their Indians understood (Harcourt 1928:111).

272 A medieval English village is quite small when compared to present-day towns. In medieval times, a town was much smaller and nowadays comparable to a modern hamlet counting between five and ten houses. As a matter of fact, twenty houses is indeed a "great" town!

to ascend the river] and to explore the upper drainage of the Maroni River in search of information on the great city of Manoa.[273] Thus, Fisher was on a quest for El Dorado and may have become familiar with *Maperitaka* who is the most important source on the other nations residing on this river:

> *When the waters of Marrawini were risen, and the River passable, (much differing from the River of Wiapoco, which is not to be travelled, but in the lowest waters.) Hee began his journey for the Discoverie thereof, in company of the Apothecarie, his servant Fisher, the Indian Maperitaka, and eighteene others, and proceeded eleven dayes journey up the River, to a Towne of Charibes, called Taupuramune, distant from the Sea above an hundred leagues; but was foure dayes journey short of Moreshego, which is also a Towne of Charibes, situate upon the River side in the Province of Moreshegoro: the chiefe Captaine thereof is called Areminta: who is a proud and bold Indian, much feared of all those that dwell within his Territories, having a rough skin like unto Buffe Leather, of which kind there be many in those parts; and I suppose proceedeth of some infirmitie of the bodie.*[274]

> *He understood by relation of the Indians of Taupuramune, and also of Areminta, that six dayes journey beyond Moreshego, there are divers mightie Nations of Indians, having holes through their Eares, Cheekes, Nostrils, and neather Lips, which were called Craweanna, Pawmeeanna, Quikeanna, Peewattere, Arameeso, Acawreanno, Acooreo, Tareepeeanna, Corecorickado, Peeauncado, Cocoanno, Itsura, and Waremisso : and were of strength and stature farre exceeding other Indians, having Bowes, and Arrowes foure times as bigge: what the Indians also report of the greatnesse of their eares, I forbeare to mention, untill by experience wee shall discover the truth thereof. Moreover, hee learned that there fall into Marrawini divers great Rivers, called Arrenne, Topannwin, Errewin, Cowomma, Poorakette, Arrova, Arretowenne, Waoune, Anape, Aunime, and Carapio: whereof some he hath seene himselfe, That it was twentie dayes journey, from Taupuramune, to the head of Marrawini, which is inhabited by Arwaccas, Sappaios, Paragotos, and some Yaios: and that a dayes journey from thence to the Land-ward the Countrey is plaine, and Champian ground, with long grasse. Hee passed in this journey above eightie overfals of water, and many of them very dangerous: of some of them I had experience the yeere before. He proceeded no further at that present, being unprovided for so long a journey, supposing that it had beene neerer (then he found it) to the head of the River by a fortnights travell: and so returned backe in sixe dayes space, intending better preparation for a second journey: but his purpose was prevented by an untimely death: for shortly after hee was drowned by misfortune; whereby we see, that man determineth, but God disposeth.* (Harcourt 1906:396–397)

Fischer must have reached England (shortly) after his journey, as Harcourt added the above-mentioned information to his 1613 publication. It was also added to Gabriel Tatton's (*c*.1613) map (Rio Branco 1899, Map 54). The so-called Fisher Report was later published by Samuel Purchas in *His Pilgrims* (1625:1283-

273 The legendary city of Manoa at the Lake of Parimé or *Toponowini* where the Amerindian King or El Dorado reigned had been a death trap for Europeans for ages and probably still is. See also note 313.

274 Scarifications were common practice among Amerindians of the Guianas until the first half of the 20th century (Roth 1924:419; Butt 1957). Keymis (in Goldsmid 1890:146) observed scarification among the Yao in order to distinguish themselves from other groups: 'This our guide is of the Iaos, who doe all marke themselves, thereby to bee knowne from other nations after this maner. With the tooth of a small beast like a Rat, they race some their faces, some their bodies, after divers formes, as if it were with the scratch of a pin, the print of which rasure, can never bee done away againe during life.'

1286) and finally attributed by C. Harris to Harcourt's voyage who added it to his 1928 reissue of Harcourt's voyage. English entrepreneurs such as Charles Leigh and Robert Harcourt tried to occupy a part of the Guianas by means of planting small colonies which collapsed rapidly due to disease (Lorimer 1993).[275]

In sum, reciprocal relationships between the Europeans and Amerindians characterize this contact period. Tobacco, redwood, hardwood (usually called speckled wood; D., *letterhout*) for carpentry, but also Brazil wood and annotto (Fr., *roucou*) in order to produce dye as well as hammocks (cotton) are the most important products exchanged for glass beads, iron tools, clothes and food. Local guides or brokers (Fr., *truchements*) and factors played an important role in this trade, forming alliances between Europeans and Amerindian populations in which the former were often asked to participate in regional Amerindian warfare by raiding other nations. They described the Amerindian society as a fairly organized and as a stratified society ruled by (supra-)regional warlords in times of warfare, albeit this view might be distorted.

1621-1652

This first period is followed by the further development of alliances and more permanent settling on the higher river banks in order to not only gain a better grip on the procurement of local products, but also to grow their own tobacco and annotto. The founding of the Dutch and French West India Companies, in 1621 and 1625 respectively, indicates the national interest in the Antilles and South America. This period is also marked by means of the arrival of more Europeans on the Wild Coast and thus by an intensification of trading. The rivers most relevant to permanent trading were: the Oyapock, Cayenne, Counamama, Maroni, Suriname, Sarramaca, Berbice and Essequibo Rivers.

There is some first-hand (mainly Dutch) documentation on this period: (a) the journal of the voyage of Jesse de Forest (1914), (b) the letters from Jan van Rijen (1627), (c) the journal of Gelein van Stapels (*c.*1630), (d) the journal of David Pietersz de Vries (1655) and (e) various passages in the *Iaerlyck Verhael* by Johannes de Laet (1644).[276] Nevertheless, primary sources remain scant.[277] The majority ost of the early colonies failed due to disease, internal conflicts and, eventually, skirmishes with the local population. In *c.*1630, the Dutch have a permanent stronghold in the western Guianas on the Berbice and Essequibo Rivers. It continued to exist until the beginning of the 19th century (Netscher

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275 The reinforcements for Leigh's colony never reached the Oyapock River but stranded at the Caribbean island of Saint Lucia, as stated in *An Houre Glasse of Indian Newes or A true and tragicall discourse, shewing the most lamentable miseries, and distressed Calamities induried by 67 Englishmen, which were sent for a supply to the planting in Guiana in the yeare 1605*, as written by the survivor John Nicholl (1607). John Wilson reports on the demise of the Leigh colony in a publication entitled: *The Relation of Master John Wilson of Wansteed in Essex, one of the last ten that returned into England from Wiapoco in Guiana 1606* (Wilson 1906:338–351). Robert Harcourt left his Oyapock colony behind and obtained a patent form the English Crown for the Guiana coastline between Essequibo and Wiapoco. In 1626, these rights were were combined with the monopoly of the former Amazon Company, founded by Oliver North in 1619 (Lorimer 1989:85).

276 However, the colony established by Jesse de Forest and Jean Mousnier de la Montagne [1624] is not very characteristic of this region as it was founded on religious grounds. Wishing to settle on the Lower Amazon River, the local situation ultimately drove them towards the Oyapock River.

277 Important information can be found in the European archives, notably in the Netherlands, France and England, but further research is certainly needed. One important source must be mentioned here: *The Calender of State Papers*, edited by Noel Sainsbury (1860).

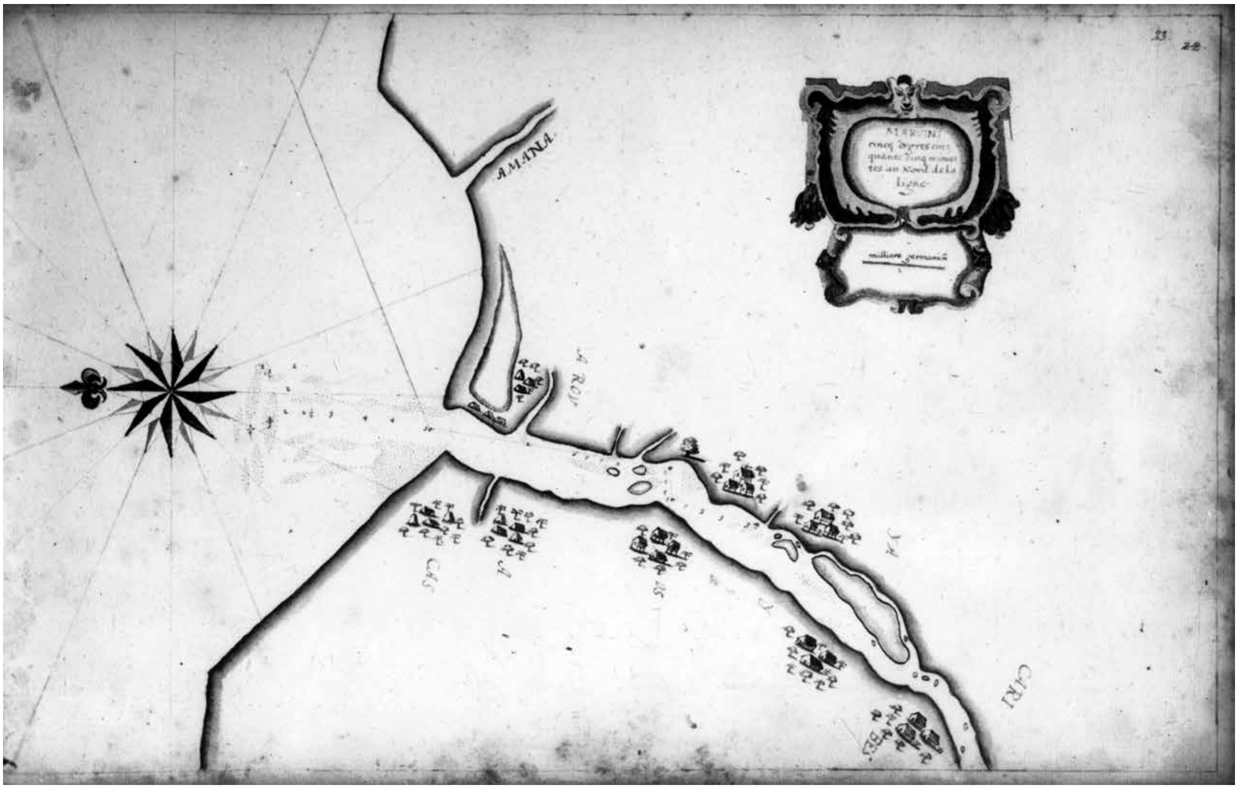

Figure 10.3. A map of the Marvini or Maroni River, c.1625 (MS Sloane 179B, f. 23). Note the names of the various nations on both riversides and the types of houses depicted here. The question arises if this "mixed" pattern is a result of the historic event, i.e. the encroachment of fleeing Arawaks and/or Caribs from Trinidad, or a pre-Columbian settlement pattern? We can further recognize the Arouba Island and the larger Portal Island to the south, accompanied by the smaller present-day Lepers Island. Two villages on both sides of the (supposed) Crique Balaté are situated just north of the latter island (courtesy of the British Library, London).

1888; den Heijer 2002; Hulsman 2009). For example, Jan van Rijen arrived at the *Wiapoco* River with 36 men in order to start a tobacco plantation (de Laet [1644] in L'Honoré Naber 1932:16–19). However, his factory was quickly abandoned once local Indians murdered the settlers, as mentioned in a copy of this letter by van Rijen written at fort Nassau on the Wiapoco River in 1627 (van Rijen 1924:33).

In 1634, David Pietersz de Vries (1655) provided a general description of several Dutch and French colonies when trading along the Guiana coast. On the Island of Cayenne, where he landed 30 planters, he not only found the remnants of a stone (French?) fortress, but also the colonists of a tobacco venture Jan de Moor, a merchant from Zeeland, had begun several years earlier (de Vries in Colenbrander 1911).[278] De Vries further called on the French colony of the Counamama River, under the command of Sieur de Chambaut (Anthiaume

278 Laurent Polidori and Philippe Guyot (2007:189–186) listed the entire European presence in French Guiana, except for settlers placed by de Vries (van den Bel and Gassies 2011). Paul Boyer (1645:75) who accompanied Poncet de Brétigny in 1643 to the island of Cayenne mentions Zeelanders in the vicinity of mound 'Seperoux' during the 1630s.

1918:171; Nardeux 2001),[279] then the first colony of Captain Marshall on the Suriname River. He finally arrived at the WIC fort on the Essequibo River before continuing his voyage to New Amsterdam.[280] De Vries also traded with the Amerindian population of the *Amanna* and *Mariwyne* Rivers:[281]

> *On the 21st October, went with our sloop to the river Mariwyne, and saw at once how deep it was. Found, for the most part, eleven to twelve feet a high-water, till we came at the mouth of the river. We found in the middle of the river a sand-bank, entirely dry at low-water. There was an opening on the east side, very narrow, and about ten feet deep; and also one on the west side, but how deep it was, I do not know. The river stretches to the south-west, and about two miles up are some islands [Arouba Islands], it is hardly a mile wide. Such is its situation, as far as I have been able to discover. About a mile up lies a village where Arwackes live, but they had all gone to Sernama, except one woman, who watched the houses. Many different nations live here; to wit, Caribs, Jaios, Arwackes, Percoren, and many others besides. They promised to furnish us in another year, a full shipload of letterwood. Whilst we were ashore here, a Netherlander came to us, who had left the ship in which he had come, on account of the Indian-pox, and as he is now better, he requested that he might go to Holland with me, and came aboard the ship. Any one who has this disease must be cured here; even though he may have it in Holland, he must return here to be cured; for it is like the Amboyn-pox in the East Indies. Young children of a month old can here be afflicted with it. There came with him to us two Frenchmen, who had run away from Captain Schanbou [Chambon]; they resided at Cunama, and all three lived in an Indian village.* (de Vries in Murphy 1852:93–94)

If these Frenchmen were really runaways from the Counama colony is uncertain, as there probably had been a small French colony or outpost on the banks of the *Moriwona* River (Maroni?) since 1625 (Scott [1667] in Harlow 1925:141).[282] When de Vries anchored in the Saramacca River, he took 150 Indians on board who were afraid of the Caribs. This illustrates that alliances

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279 In 1626, Cardinal Richelieu instigated the foundation of the *Compagnie des îles de l'Amérique* by influential Lords (Du Tertre 1667 i:8–16). This important merchant company incited further permanent colonisation in the Americas where hitherto, private companies and freebooters (Fr., *flibustiers*; D., *vrijbuiter*) were bartering with Amerindians along the Brazilian coast and the Antilles. Also in 1626, a trading company from Rouen founded a small French colony on the banks of the Sinnamary River under the command of Sieur Chantail and his lieutenant Chambaut. Interestingly, Chambaut is also member of the *Compagnie de Saint Christophe* founded by Belain d'Esnambuc in 1626 (Margry 1863:28). Chambaut may have heard of Warner's endeavours at the Oyapock River where the latter had been installed by Roger North of the *Amazon Company* in 1623. However, Warner set off for Saint Christophe to settle and start a tobacco plantation (Williamson 1923:87 after Smith 1907ii:188). Cf. Section 11.7.1.

280 Captain Marshall was an English nobleman and the owner of a plantation on Barbados who made two attempts to settle on Tobago (Boomert 1984:163). According to the Dutch historian Schilder (1973:19), Marshall tried to establish a second colony along the Lower Suriname River (the first being the colony visited by Pietersz de Vries). This second settlement was founded in 1643 and apparently coexisted with a French colony led by Sieur de Noailly who had left the party of Poncet de Brétigny and later settled in Grenada (Du Tertre 1667i:426).

281 De Vries's description (1655:132–133) of his attempt to trade with various Carib villages on the Mana River is probably the first documented voyage up this river.

282 In fact, also in 1625, a French ship was sighted on the *Maruini* River by the fleet of Hendrick Lucifer and Gelein van Stapels, taking the remaining colonists of Jesse the Forest from the Oyapock River to the Lesser Antilles: 'On the 4th of May [June] we arrived at Maruini, where we found a small French ship loading letterwood. [The Master] said he had gone away without speaking because he feared that we would seize his ship, which he thought would be easy as he had only thirteen men on board. We got some letter-wood in this river and much cassava' (R. de Forest 1914:263).

Figure 10.4. A detail of a manuscript map of the Leupe collection depicting Guiana, van de rivier Marawini tot Arrowen Eyland (NL_HaNA_4VEL_2153), dated c.1675. This map features numerous similarities with Hessel Gerritz's 1625 publication (cf. Fig. 10.2). The information recorded on this map was acquired between 1600 and 1630 (Hulsman 2009:80, note 93). The distribution of Amerindian 'populi' on the Lower Maroni River resembles the information recorded on the Maroni and Oyapock maps made by the Walloon Fathers of the de Forest voyage, probably by the surviving Jean Mousnier de la Montagne (cf. Fig. 10.3) (courtesy of the Nationaal Archief, The Hague).

with Europeans had affected the relationships between Amerindian parties: 'The 30th, weighed anchor, and took aboard full a hundred and fifty Indians, men and women, who prayed us to take them to the *Timenare* [Demerara] River. They were of a nation called *Sapaye*, and were apprehensive that the Caribs would kill them' (de Vries in Murphy 1852:96).

In 1633, Cardinal Richelieu sent Sieurs Rosée and Robin, together with their merchant associates from Rouen and Dieppe, to Cayenne Island and the Maroni River. This was part of a region the French called *Cap du Nord* (Anthiaume 1918:172). In 1638, Jacob Bontemps further explored this specific area in order to 'continuer les colonies commencées à l'entrée de la rivière de Cayenne, dans celle de Maroni, vers le Cap de Nord, et s'établir dans tous les pays non habités par aucuns princes chrétiens entre la rivière d'Orénoque, icelle comprise, jusqu'à celle des Amazones, icelle comprise' (Anthiaume 1918:172). This colony and Poncet de

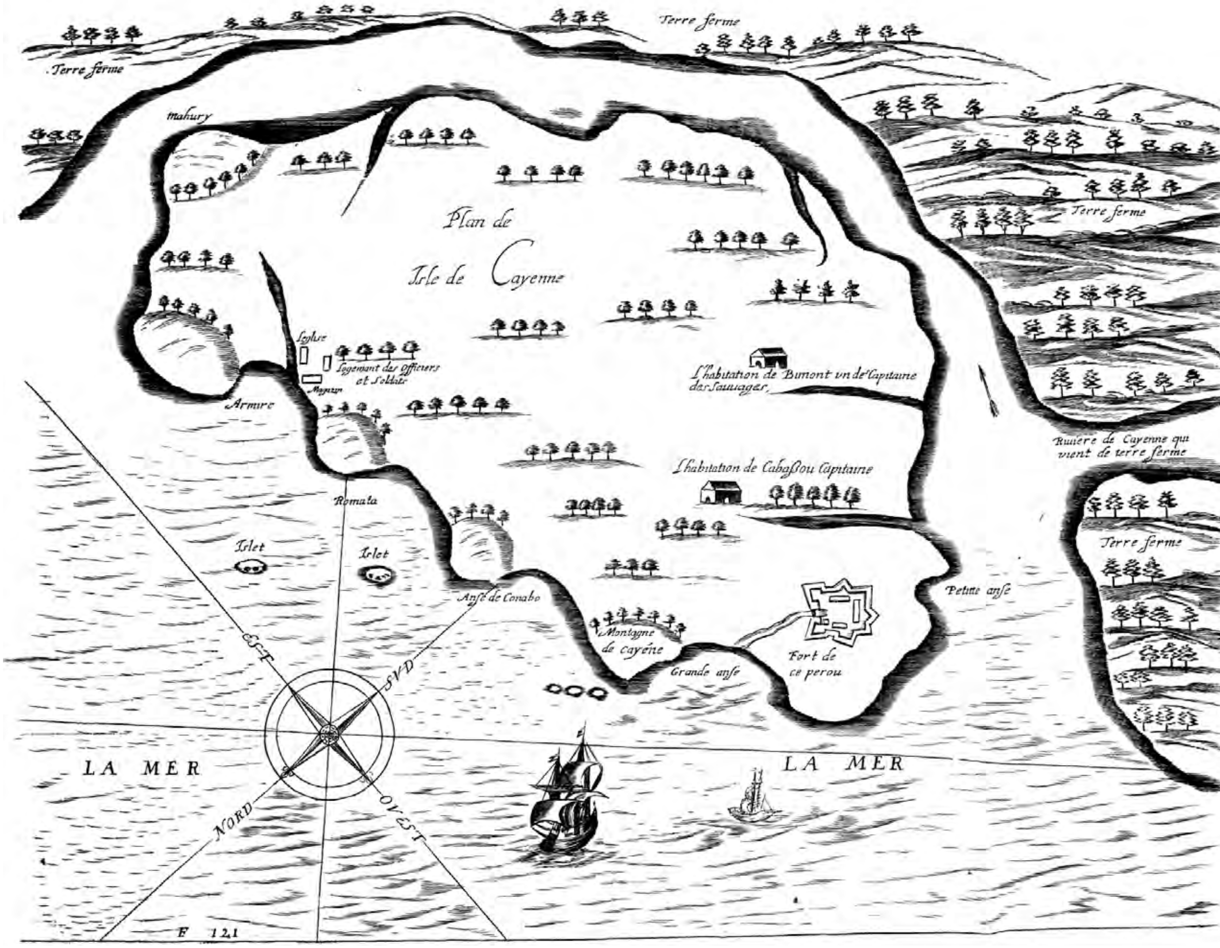

Figure 10.5. A map of Cayenne Island depicting the fort Ceperou and the village or Armire (after Laon Sieur d'Aigremont 1654, after page 120).

Bretigny's subsequent tentative in 1643 all failed due to diseases, internal conflict and hostile Amerindians (Guéritault 1989).[283]

In sum, during this period, the trading activities conducted by various companies gained interest in the Guianas. Moreover, the commercial and political contacts between Europeans and Amerindian had intensified. Small plantations were founded in order to grow desired goods, but trading remained the most important economic interest in this region. Although Amerindians still ruled their territories, they faced a technological revolution with the introduction of iron tools. This not only influenced the Amerindian customs in general, but also their environment. A dissimilar style of horticulture with iron tools revealed a new political balance between nations (Denevan 1992a).

283 Paul Boyer Sieur de Petit-Puy describes the disastrous colonizing attempt by de Brétigny and dedicated it to the councillor of the French King, Colbert. Boyer spent six years among the Amerindians and provided an excellent description of Cayenne and its inhabitants and even published a small Galibi dictionary (Boyer 1654:220–493). Interestingly, Boyer added a final chapter on the disastrous expedition of the Baron de Dormelles to Cayenne (ibid., p. 434–463). In May 1648, they made landfall on the 'Berbiche' (in stead of Cayenne) according to their Captain. They fired their cannon in order to avert the Dutch settlers on this river who did not respond; next, the French launched a search party which never was seen again.

10.3 The Colonial Period (1652-*c.*1950)

This era is subdivided into three stages: (a) the early colonial period (1652-1680) with the introduction of the sugar plantation economy based primarily on the enslavement of Africans, (b) the consolidation of sugar industry in the Guianas (by now Guiana had been subdivided into a British, Dutch and French Guiana) and (c) the period between the abolishment of slavery and the constitutional independence. This last stage differs for each Guiana, but is placed roughly between 1850 and 1950.

1652-1680

This early phase witnessed the introduction of larger permanent plantations in the Essequibo (WIC), Suriname (Lord Willoughby) and Cayenne (Langendijck, David Nassy, Lefebvre de la Barre) colonies, based on a slave laboured sugarcane model imported from Barbados and Brazil respectively. Although this novelty was growing fast, the planters continued to trade with the Amerindians for food, speckled wood, hammocks and annotto (Biet 1664:168).

The Amerindians of the littoral also provided services for the planters. For instance, they acted as guides and translators, conducted transport in canoes and provided middlemen enabling trade with the interior. In addition, by raiding other nations, they provided the plantations with Amerindian slaves to carry out fieldwork and domestic labour (Warren 1667:26). The permanent installation and trade required well-defined economical and political relationships with the Amerindian population in terms of providing the colony with food, trade goods and peace, as required for sugar production. Although the WIC had stated that enslaving Indians was prohibited (Goslinga 1985:561), raiding Amerindians villages in the interior, in order to capture slaves, was only abolished in 1793 (Boven 2006:57).

In April 1652 the Compagnie de Rouen, under the command of Huet de Navarre and member of the Poncet de Brétigny colony, tried to establish a small colony in the Rémire bay for Jacob Bontemps and had re-occupied fort Cépérou (Artur 2002:141–142; Laon Sieur d'Aigremont 1654:68–69) (Fig. 10.5). In September 1652, a second expedition, organized by the Compagnie de Paris and under command of Leroux Royville, took 700 settlers to Cayenne. Both missions failed miserably due to internal conflicts and Amerindian attacks (Artur 2002:149–152).

(Fig. 10.5).[284] In September 1652, a second expedition, organized by the *Compagnie de Paris*, took 700 settlers to Cayenne. Both missions failed miserably due to internal conflicts and Amerindian attacks (Artur 2002:149–152). According to Antoine Biet (1664:243–255), the spiritual father of the second expedition, the French settlers left Cayenne in December 1653 and sailed along the Guiana coast towards the Lesser Antilles (e.g. Barbados, Martinique, Guadeloupe).[285] The latter's book, entitled: *Voyage de la France Equinoxiale en l'isle de Cayenne*, relates

284 Interestingly, this expedition found the remnants of a pallisaded fort at Mound Cépérou of what was once the alleged fort built by de Brétigny (Laon Sieur d'Aigremont 1654:76).

285 Lord Vertaumon did not join the leaving party and left the colony with a few solders in a bark (Artur 2002:168–172).

the expedition and provides us with important descriptions on the early historic Amerindian society.[286]

After these French failures and the loss of Dutch Brazil in 1654, the WIC regained interest in the Guianas and the Lesser Antilles with a view to export the acquired Brazilian plantation model and not only to produce sugar, but also to provide black slaves for its production (Postma 1990). Jan Claes Langendijck and David Nassy from Amsterdam –the latter at the head of a Jewish company– had worked in Recife previously and had obtained patronships for Cayenne and soon introduced the sugarcane industry to this part of the Guianas.[287] Nassy, together with the *Compagnie of Guiana*, had signed a contract with the City of Amsterdam and the WIC to assure the supply of African slaves (Hulsman 2009:146–148; van den Bel and Hulsman 2013).[288] Although Nassy was an adversary of Langendijck, who was installed at fort Nassau (baptised Saint-Michel de Cépérou by the preceding French expedition), the former built a fort, a watermill and a synagogue at *Armire*, located in the present-day Anse de Rémire (Le Roux et al. 2009:47). The Jew "Vermelho" founded a plantation in the close vicinty of the fort ("Le Jambon"). Others were installed at Matoury (Artur 2002:194–195, 203).

In 1663, Quirijn Spranger replaced Langendijk. In 1664, however, the Dutch colony is taken over by a French fleet under the command of Alexandre de Prouville de Tracy and under the flag of the *Compangie des Indes Occidentales*. Lord Lefebvre de La Barre (1666) stood at the head of this new colony. Although both parties signed a peace treaty (Artur 2002:199–201, 226), the Dutch and Jews gradually left Cayenne either for the Lesser Antilles or the Suriname River, leaving their belongings with the French. In Suriname, Lord Willoughby from Barbados had founded an English slave-based colony in 1651 (Goslinga

286 The survivors of this French expedition, having embarked in four Amerindian canoes, finally reached the Suriname River and visited the English fort under Mayor Ruf's command: 'Les Anglois estoient parfaitement bien establis en ce lieu. Il n'y avoit pas pourtant plus de deux ou trois cens arpens de terre défrichez en ce lieu, où ils ont basty leur Fort. Il y a bien cinquante cases ou maisons dressées à la façon de celles des Sauvages, elles ne sont pas par ruës en forme de Ville ou Bourgade, mais çà & là sans ordre ny cymmetrie. Leur Fort, dans lequel il y a une belle maison basse toute de pierre, les tient en asseurance contre les efforts des Sauvages, qui n'ont point de machines de guerre, pour forcer un semblable edifice ; ils n'y ont que faire, pourveu qu'on n'y manque point de vivres. Ils ont fait toutes leurs habitations sur au long de la Riviere; quelques-uns se sont écartez de plus de vingt-cinq lieuës. Ils tiennent-là leur ménage & leurs Esclaves, qui défrichent. Ils n'y font encore que du Tabac, & scient quantité d'ais. Toute cette terre est quasi plate comme nostre France. La Riviere est extrémement poissoneuse. Ils y peschent quantité d'un poisson, qu'on appelle Machoran, fort excellent. Il y en a de si gros, qu'ils pesent cinquante & soixante livres. Ils en mangent en quantité & sans pain; la chasse y est aussi tres bonne. Ils n'y sçauroient plus manquer de rien. Ils n'estoient pas plus de trois cens cinquante Anglois naturels ; mais i'ay appris depuis, qu'ils y sont maintenant plus de quatre mille, bien à leur aise, comme on peut estre dans tous ces païs là, pouveu qu'on s'y prenne de la bonne maniere pour s'y établir. Il n'y a que les commencemens un peu difficiles, lesquels estant surmontez, on y peut mener une vie heureuse, & sans-inquietude' (Biet 1664:266-267).

287 In late 1659, David Nassy left Amsterdam with another expedition led by Baron Gerbier Douvilly. The latter had been given the patent to start a (gold) mine on the Approuague River (de Boer 1903; Hulsman 2009:147–148). This Dutch colony (de la Barre 1666:10, 42), which probably consisted of various plantations at the actual Crique flamand and a fortification at the right bank, were destroyed by de Lézy (a cousin of Lefebvre de la Barre) in 1677, together with fort Orange on the Oyapock River (Anonyme 1678; Muller 2001; van den Bel and Hulsman 2013, 2014).

288 Dutch slave traders continued to call on Cayenne when this colony was abandoned after 1664 in order to sell slaves to the French plantation owners (Jennings 1995).

1971:425).[289] The French also signed a *concordat* with the Amerindians, stating that the latter would leave the Island of Cayenne and settle down at Terra firme (Le Roux et al. 2009:25). Historically, the latter half of this period is marked by a continuous switching of colonies between the French, English and Dutch colonial powers. They successively conquer their (former) colonies until each nation took possession of a certain part of the Guianas. The French settled at Cayenne. At around the end of this century, the Dutch were installed between the Suriname and Pomeroon Rivers.

Concerning the English colony of Suriname, several significant descriptions are available.[290] *An Impartial Description* by George Warren (1667) provides us with an interesting description of the Amerindian daily life in Suriname:[291]

> *Their Houses for the night, are low thatch'd Cottages, with the Eves close to the ground; for the day, they have higher, and open on every side, to defend them from the violence of the Sun's Raies, yet letting in the grateful Coolnes of the Air. Their Houshold Ustensils are curious painted Earthen Pots and Platters, and their Napery is the Leaves of Trees. Their Beds of Hamackoes (which are also used amongst the English) are made of Cotton, square like a Blanket, and so ordered with strings at each end, that being tyed a Convenient distance form one another, it open the full breath. For Bread and Drink, they plant Gardens of Cassader, and the Woods and Rivers are their constant Suppeditories of Flesh and Fish. For ornament they Colour themselves all over into neat works, with a red Paint called Anotto, which grows in cods upon small Trees, and the Juice of certain Weeds; they bore holes also through their Noses, Lips, and Ears, whereat they hang glass Pendants, Pieces of Brass, or any such like Bawbles their Service can procure from the English; they Load their Legs, Necks, and Arms too, with Beads, Shels, of Fishes, & almost any trumpery they can get; they have no Law nor Gouvernment but Oeconomical, living like the Patriachs of old, the whole Kindred in a Family, where the eldest Son always succeeds his Father as the greatest; yet they have some more ordinary persons, who are their Captains, and lead them out to Wars, whose Courage they first prove, by sharply Whipping them with Rods, which if they endure bravely without Crying, or any considerable motion, they are acknowledg'd gallant fellows and honour'd by the less hardy. These Chiefs or heads of Families, have commonly three or four Wives a piece, others but one, who may indeed more properly be term'd their Vassals than Companion, being no less subjected to their Husbands than the meanest Servants amongst us are to their Masters, the Men rarely oppress their Shoulders with a Burthen, the Women carry all, and are so very humble and observant in their Houses, that at Meals, they always wait upon their Husbands, and never eat till they have done, when a Woman is deliverd of her first child, the present goes about her business as before, and the Husband sains himself distempered, and is hang'd up to the Ridge of the*

289 The Jewish/Dutch diaspora from northeastern Brazil to the Guianas and the Lesser Antilles after 1654 meant the introduction of a Brazilian plantation model in the Guianas and French Antilles (e.g. Guadeloupe, Martinique, Grenada) as described by Lafleur (1993:20–35, 2012) and Hulsman and van den Bel (2012). The importance of sugar production during the the 16th and 17th century for northwestern Europe, and especially the United Provinces, is discussed in Poelwijk's PhD dissertation (2003). Further information on the Jews of Cayenne can be found in an article by Zvi Loker (1989).

290 See also note 265.

291 The English manuscripts by William Byam (1667) and Major John Scott (c.1667) have a more historic character. However, a demographic analysis proposed by Neil Whitehead (1988:40) with regard to the Guayana coast revealed that Byam and Scott were probably correct when estimating the Carib population.

House in his Homacko, where he continous certain dayes dieted with the Bread and Water of Affiction, then, being taken down, is stung with Ants (a punishment they usually inflict upon their Women, Dogs, or Children, when they foolish, for that's the term they usually put upon any misdemeanours) and a lusty drinking Bout is made at the Conclusion of the Ceremony. (Warren 1667:24–25)[292]

In this period, the coastal Amerindians started to loose their land as well as a certain degree of their mobility. The permanent European presence claimed Amerindian territory. As the Amerindians groups developed a strong relationship with Europeans, the economy of the former depended somewhat on the commerce with the latter. By now territories as well as alliances were more static. In addition, Amerindian settlements near the sugar plantations became inevitable for Amerindians who wished to keep in contact with the Europeans. For example, when the Caribs of Cayenne sought to defeat the *Palicour* on the Oyapock, they asked the help of the French settlers who had arrived in 1652 in order to persuade the *Aracarets* in southern Amapá to join them.[293]

292 This ant test or *maraké* is still carried out among the Wayana of the Upper Maroni River. The manuscript of Jean-François Artur provided the following description for the Galibi: 'Les Indiens commencent leur année au lever de la Poussinière qu'ils appellent *Girica*. Quelques jours auparavant, ils font un vin dans lequel ils font la cérémonie de se fouetter (ordinairement ils donnent à quelqu'un d'eux la commission de fouetter tous les autres). Ils se mettent des colliers de fourmis flamandes etc. le tout afin d'être adroits, alertes, laborieux et heureux, soit à la chasse et à la pêche, soit à la guerre, pendant l'année qui va bientôt commencer.' (FR_BNP_NAF_2579_f. 176v). De Goeje (1930:490) presents us with another example. He translated a part of a Spanish document written by Antonio Vázquez de Espinosa which was to be published in 1630. A Garina [Kali'na] man who wished to be a *cacique* needed to beat three men to death with his wooden club. Moreover, after having fasted for one year, they had to pass the ant test. The before mentioned whipping of the Captains is also a common feature in Amazonia and often witnessed by Europeans: 'Il n'y a point de village ou de carbet qui n'ait son capitaine, qu'ils élèvent à cette dignité de la sorte. Après avoir fait choix d'un homme qui se soit signalé en guerre contre les ennemis ou qui ait mis à mort quelque bête féroce, ils le font jeûner à la cassave et à l'eau, pendant un mois, l'obligent d'avaler plusieurs fois du jus de petun à pleines écuellées et le fouettent rudement avec de grands fouets qu'ils nomment *macoali*; que s'il endure toutes ces choses avec courage et sans témoigner de douleur, il passe pour capitaine. Ils ont cette créance et cette superstition que s'ils n'usaient de cette cérémonie, ils ne seraient pas heureux à la guerre. Ils font encore le même traitement à plusieurs autres personnes pour les faire réussir en leur état et condition. J'ai peine à croire que tous les capitaines des carbets particuliers s'assujettissent à cette cérémonie ; peut-être n'est-elle ordonnée que pour ceux qui ont charge de conduire les autres à la guerre ; on en pourra découvrir la vérité avec le temps' (Pelleprat 1655ii:56-57). See also Laon Sieur d'Aigrement (1654 :409), van Berkel (1695:25), Fritz (1922:61) or even Breton for testing the stamina of youngsters when they have to pass numerous painful tests: 'J'ay veu dans leur festins des jeunes hommes se planter au milieu du carbet, les mains sur la teste, endurer qu'on leur donnasse des coups avec des fleches, comme des coups de plat d'épée : j'en ay veu d'autres incisez tout recemment par la plus grande partie du corps, qui souffroient que l'on escrasast un mansfœnix, avec quantité de gros poivre entre deux roches, puis qu'on les en frotast par tout (Dieu sçait s'ils avoient chaud apres cela) d'autres hors des vins se tenoient debout en la mesme posture emmy la place, & les vieilles femmes les fustigoient avec des feüilles d'annanas qu'elles tenoient par les pointes, & à contrepoil, en les retirant à soy elles les égratignoent tout, parce que ses feüilles sont commes des scies : mais les dents sont bien plus deliées, asserées, & piquantes.' (Breton 1665:132).

293 De Navarre also participated in a mission between the Galibis of Cayenne, under the command of chief Biraumon, and the Arecarets. The latter Amerindians dwelled beyond Palikour-land –arch-enemies of the Galibis– in the swamps of the Mayacaré River in modern Amapá. The Galibis were awaited by many Arecarets who were armed with swords and rifles which they had bartered with the Dutch for sea cows (Artur 2002:145; Lefebvre de la Barre 1666:20). The Galibis invited the Arecarets to come and live in Cayenne because of the Portuguese threat of slavery which had caused many Arecarets to join the Galibis (as servants?) in Cayenne (ibid., p. 146). Remarkably, the chief of the Aracarets was at that moment a Dutchman called *John vandergoose* (Harlow 1925:242; Hulsman 2009:169).

Figure 10.6. A diorama of a Caraïbenkamp created by Gerrit Schouten in 1832 (Medendorp 2008:110).

In 1686, the Dutch Governor Heinsius, successor of the Zeelander Governor Cornelis van Aerssen Lord van Sommelsdijck, signed a peace treaty with the 'Caribessen, Arowakken en Waraouen' (Oudschans Dentz 1938:78-84; Buve 1966). It is thought that, from the second half of the 17th century on, the history of the Amerindian coastal populations is inevitably associated to the European expansion in the Guianas (Whitehead 1996:34).

1680-1850

During this period the various Amerindians populations in French Guiana and Suriname were not only confronted with further European expansion along the littoral, but also with evangelizing missionaries. We will now discuss Dutch and French Guiana separately because both now represent a permanent colony. However, these two colonies witnessed similar and dissimilar events throughout the following course of their history.

Suriname

Although the protestant Dutch left the Amerindians "alone" after the 1686 peace treaty, the latter were now confronted with runaway slaves, or Maroons, and *bokkenruylders*, who penetrated into their territories, i.e. the Cottica and Maroni River area. These *bokkenruylders*, or litteraly goattraders, were middlemen who were born in the colony. They were often multilingual and traded goods as well as slaves with the Amerindians.[294] In the course of this period, the planters utilised Amerindian trackers in order to find the runaway slaves, who in turn counter-attacked the missions. Maroons and Amerindians now coexisted in the forest, now and again in the vicinity of the plantations. Eventually, this also led to cohabitation, for instance among the Caribs in western Suriname on the Coppename River (Staehelin 1918 ii:22). During the second quarter of the 18th century, the Dutch government admitted Moravian missionaries into their colony and arrived in Suriname in 1735 in order to proselytize the slave community. They were quick to switch to the coastal Amerindians and in particular to the Arawak, inviting them to stay in newly founded missions. This religious venture was doomed to fail due to the easy spreading of diseases and famine, forcing them to leave these missions or to die (Carlin and Boven 2002).

Peter Kloos published an interesting 18th century manuscript in 1973 which Gerard Bos later commented on.[295] According to the latter, the manuscript must be dated *c.*1775. It includes an eyewitness report presented by Johannis Sneebeling who was stationed at the Upper Perica River in eastern Suriname, presumably in order to guard a military outpost for runaway slaves. At about this time, the planters had abandoned that part of Suriname where several *Paragoto* had settled down (Bos 1989:25):

> *Wat hunne verblijfplaatsen aangaat, benevens hunne huizen en dorpen. Die hebben zij op versheide plaatsen, want een partij houden zich aan de Neder Marowijne op, en andere aan de Neder Saramaka en Coppenaam, eenige in de Neder Suriname en Commewijne, zijnde elke partij niet sterker als 60 a 70 stuks mans, vrouwen en kinderen. Daarom bestaan hunne dorpen maar uit 30 a 40 huizen of liever hutten, omdat ze maar van slegt [eenvoudig] rond hout, de posten in den grond geplant, en met zogenaamde wilde banannen bladen of tas gedekt zijn met een pallissade of dikke stoken rondom toegemaakt en teffens met voormelde bladen toegedekt tot de grond toe. De huyzen zijn niet langer dan 20 v[oe]t – 10 a 15 voet breed en 12 a 15 voet hoog, zijnde het dak ovall of boogsgewijze. Aan het geveleynde hebben zij een gat dat 3 voet breed en 4 voet hoog is, waardoor zij in en uitgaan. In deeze hutten slapen de Indianen des nagts met hunne vrouwen en kinderen want elk huishouden heeft zijn huis apart. Ook staat elk huis op een bijzondere plaats, de eene omtrent hondert voeten van den anderen af, zodat elk huishouding zijne vrijheid heeft zonder dat zij in iets van hunne buren gehindert worden.*
>
> *In het midden van hun dorp hebben zij een grote loots van 60 vt lengte, en 30 a 40 vt breedte, 20 a 25 vt hoog. Dit gebouw is van hetzelve soort van hout gemaakt, als hunne huyzen, behalven wat sterker en dikker van posten en balken, en van onderen rondsom open. Dit gebouw wordt door alle de Indianen, die zich op zo een plaats ophouden in compagnie gebouwd, omdat het voor het algemeen dient, die zich op een dorp ophouden, dienende bij dag tot een verblijfplaats.*

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294 In Dutch the word *bokken*, or *bokjes*, is used for a (small) billygoat wich was probably derived from the English "buck." It is a derogatory term referring to the Amerindian population, see for instance van Berkel (1695:9). It is added here that the Moravian missonary Theophilus S. Schumann, who led a mission named Pilgerhut on the Wiruni River, wrote in 1748 that the term *Bockjes* was applied to all members of the indigenous population, such as 'the Carib, Warau and Arawak, who called themselves Lukunu' (Staehelin 1918 ii:9). In French Guiana the *bokkenruylders* were referred to as *traiteurs* (P. Grenand and F. Grenand 1997:64) and in Brazil as *bandeirantes*.

295 General descriptions of Suriname have been published by J. D. Herlein (1718), J. J. Hartsinck (1770), P. Fermin (1770) and D. Nassy (1788). The compilations by Bancroft (1769) and Bolingbroke (1807) include the Dutch colonies in former British Guiana.

Want zodra een Indiaan opstaat bint hij zijn hangmat onder deze loots op, om daar den geheelen dag te verblijven, en zijn arbeid te verrigten, die hij voorheeft. Ook eeten en drinken zij daar. (Sneebeling in Kloos 1973:11)

Sneebeling observed their appearances, main activities, marriage, dances, birth, justice and superstition closely. He provided a detailed description of their funerary practices and, in particular, on the couvade of a chief, ending with his interment in the central hut of the village (cf. Appendix 4). Interestingly, the Arawac, Chareebs, Yaios and Paracotos, whom Sneebeling had met, were present on the Lower Maroni River when Unton Fischer travelled there in 1609. The former two groups still reside here today. The others may have merged with the existing groups or may have become extinct. De Goeje (1943:337) identified the Paragotos to the west of the Maroni River and Frikel did so on the Mapuera River (1957:553). Rivière added that the 'Parucuatos' on de Trombetas River had merged with Wai Wai (Rivière 1963:147).[296]

In 1817, the Roman Catholic Church was admitted in Suriname. It founded mainly missions on the littoral where the residing Caribs had adopted Sranantongo (Vernooij 1989:83). Apart from its missionary activities, the colony's local politics did not interfere with the Amerindians. Contacts with Europeans were mainly with "outsiders," such as August Kappler, founder of the village of Albina on the Maroni River in 1846. Albina is said to be built on the site of a former Kali'na village called *Kuma:ka* (C.).[297] The Kali'na of the Lower Maroni River further had contact with the French metropolitan population of Saint-Laurent du Maroni. In 1857, the latter village was also founded on an Amerindian village (Abbenhuis 1940:52; Kloos 1971:7). It represented the principal Transportation Camp of the *Administraion Pénitentière* or Penal Colony of French Guiana. August Kappler proved to be an excellent observer on Kali'na traditions:

Elk huisgezin heeft zijne eigene hut, waarvan zij zoo lang gebruik maakt, totdat er zich geen plaatsje meer in bevindt, waar de hangmat tegen den regen beveiligd is. Deze hutten worden doelmatig en zeer eenvoudig gebouwd. Twee of drie, ongeveer 8 duim dikke palen van fraai regt hout worden zoo ver van elkander in den grond gegraven, als de lengte der hut zal bedragen. Zij zijn 10-12 voet hoog en dragen eenen zwaren dwarsbalk; deze is zoo lang als het huis en bestemd om het dak te dragen. Vier palen ter hoogte van ongeveer 4 voet zijn op de vier hoeken in den grond geheid, en dragen twee met den middelsten balk evenwijdig loopende en even lange balken. Aan dit lijstwerk wordt een zeker getal ligte staken met touw vastgebonden en in den nok van het huis aan de groote dwarsbalk bevestigd.

De bladen der groote heliconie worden in de middenrib zamengevouwen en met lianen aan elkander geregen. Nadat door het aaneenhechten van vele dezer groote bladen een aanzienlijk stuk van het dak gereed is, wordt dit met sparren en

296 Linguistic analysis of the various indigenous names recorded by Fisher on the Maroni River was proposed by Frikel (1957:541–562), Carlin and Boven (2002:33, Table 1.2), Chapuis (2003:204, Annexe ii), Duin (2009:429, Table 8.4) and Bellardie (2011:117–118).

297 The *kuma:ka* tree (*Ceiba pentandra*) is called *fromager* in French Guiana and *kankantri* in Suriname (P. Grenand et al. 2004:254). According to Raymond Breton (1665:175) the French word *fromager* is derived from Dutch cheese: 'fourmage d'hollande, parceque la hache y entre comme dans du fourmage.' This tree plays a very influential role in the myths and daily life of the various Amerindian populations of not only the Guianas (de Goeje 1948; Whitehead 2003b), but also of the Maroons in Suriname (White 2010).

staken belast, en blijft zoo lang op den vooraf zorgvuldig gereinigden grond liggen, totdat de stijve bladen eenigzins slap geworden zijn en het geheele stuk zich laat oprollen. Daarna maakt men het eene einde aan den grooten dwarsbalk vast, en ontrolt het bekleedsel. Deze stukken zijn juist zoo lang als de bladen breed zijn, ongeveer 7-8 voet, en er worden er dus zoo vele van vervaardigd, als de lengte van het huis vereischt. Een weinig onder het eerste wordt het tweede, en zoo vervolgens elk stuk gelegd, opdat de regen er niet kan indringen. Wanneer beide zijden van het dak op deze wijze belegd zijn, wordt de gevel met kunstig ineengevlochten cumunubladen bedekt. Dit alles wordt met lianen aan het lijstwerk vastgebonden. Hoe ligt deze daken ook zijn, kan de regen er toch niet doordringen. Eene zoodanige hut blijft 2-3 jaren in goeden staat en, wanneer zij niet te zeer aan den wind blootstaat is zij van nog langeren duur. Werkzame Indianen plegen ook nog eene afzonderlijke slaapkamer te bouwen. In dit geval wordt de hut aanmerkelijk hooger, en ongeveer 6 voet boven den bodem worden over de geheele breedte zoogenaamde palissaden gelegd, die den vloer uitmaken. De zijden worden zorgvuldig met palmbladen gesloten, en slechts aan eenen kant wordt eene opening gelaten, die tot ingang dient; deze sluit men des nachts met eene, insgelijks uit palmbladen gevlochten deur. Tot dit slaapvertrek geleidt een, uit eenen boomstam ruw bewerkte trap. Ook hier heeft elk persoon een vuurtje onder zijne hangmat, en het is inderdaad onbegrijpelijk, dat er niet meer brand ontstaat. De palissaden worden tot dit oogmerk met potscherven bedekt, op deze wordt een weinig aarde geschud en daarop het vuur ontstoken. Het hout hiertoe voeren de vrouwen aan; deze zijn insgelijks belast met het aanmaken van het vuur. (Kappler 1854 ii:30–31)

French Guiana

Although the French Capucins had been established in northeastern Brazil since the beginning of the 17th century (d'Abbeville 1614), the Jesuits had only been active in the Antilles and Suriname (Pelleprat 2009) from 1639 on, under the rule of Richelieu.[298] They expanded into Cayenne as late as 1666 where the Company of Jesus founded plantations (Artur 2002:212; Le Roux et al. 2009:44). Although seldom physically present at their habitation sites, the Jesuits roamed the plantations and the surrounding areas between 1667 and 1769 evangelizing and baptizing the local Amerindian population. These early activities in the field were not very successful, but nonetheless yielded interesting journals and reports

298 Towards the end of the 16th century, the French interest in Maranhão had been triggered by merchants from Rouen and Dieppe (e.g. de Villiers and Riffault) who traded along these coasts, according to Ralegh (1848:26). La Ravardière, in the company of Jean Mocquet (1617), briefly reconnoitred the Oyapock River and later the Island of Cayenne during the first half of 1604. The following year La Ravardière received his patent letters from Henry IV, naming his Lieutenant-general 'des contrées de l'Amérique, depuis la rivière des Amazones jusques à l'île de la Trinité' (Anthiaume 1918:169). In 1611, La Ravardière eventually went to Maranhão in order to check on the rumours of the friendly Indiens spread by Chevalier de Vaux (d'Abbeville 1614:13). In 1615, the French were expelled from their colony *La France équinoxiale*, the island of Maranhão (Saint Louis) in northeastern Brazil hereby capturing Daniel de la Touche de la Ravardière. The Portuguese Crown founded the fortification of Feliz Lusitânia (later known as Nossa Senhora de Belém) in 1616. The Portuguese continued to send Jesuit missionaries to the Lower Amazon River (Bettendorf 1910) whereas the Spanish founded missions on the Upper Amazon and Rio Negro (Fritz 1922). From this moment on, the Portuguese started to enslave Amerindian populations on the Amazon and its affluents (Monteiro 1992:108).

on the French colony and in particular on the traditions of Amerindian groups (the Galibi) as Jean Grillet and François Bechamel [1674], Jean de la Mousse [*c.*1690] or Jean Chrétien [1711] report.[299]

From the beginning of the 18th century on, Jesuit missions were founded at the Kourou and Sinnamary Rivers as well as on the Lower and Upper Oyapock River in order to continue evangelizing various Amerindian groups (Froidevaux 1901; cf. Fig. 11.19). According to Jean-Marcel Hurault (1989:55), this resulted in ethnic *reduction* as witnessed on the Lower Amazon River. The reason herefor was: the missionaries were herding all the regional Amerindians groups within the reach of their missions in order to gain control over them. For instance, the mission of Kourou harboured fugitive Amerindian groups from Brazil (e.g. Koussari, Maraone, Aruã) whom Portuguese slave traders hunted down (F. Grenand and P. Grenand 1987).[300] Although Amerindian families fled from these missions – which eventually turned out to be a life saving decision–, the majority succumbed to rampant epidemics after flocking in these missionary posts (Boudehri 2002).[301] At around this time the Approuague River was populated by numerous fugitive bands and families which had once inhabited the Lower Amazon River or the Amapá coast (Grillet and Bechamel 1698:5). The following citations illustrate: (a) the diversity of Amerindians in French Guiana and (b) the Amerindian village of the Kourou Mission:

> *Le grand nombre des nations differentes qu'on connoit dans la Guiane nous fait juger qu'elle étoit autrefois très peuplée mas il faut qu'il se soit detruit bien des gens puisqu'on voit plusieurs de ces nations réduittes jusqu'à rien : une des plus nombreuses qu'il y ait depuis Cayenne jusqu'à l'Orenoc est celle des galibis. Il seroit difficile de marquer a peu pres leur nombre, ils vivent epars ça et la et changent souvent de demeure tantôt meles avec d'autres indiens tantot entiérement séparés de ceux memes de leur nation.* (Chrétien dans d'Harcourt 1957:49)

> *Au milieu était le carbet de ces Indiens. On appelle ainsi une espèce de grande halle couverte de feuilles qui tombent jusqu'à terre et ferment exactement les deux côtés, et un des pignons. L'autre qui est ordinairement tous le vent, reste ouvert dans toute sa longueur du haut en bas. C'est là que les Indiens se rassemblent et passent la plus grande partie de la journée, les hommes à fumer, à travailler, ou à converser ensemble, ce qu'on appelle carbetter, les femmes à filer, ou à faire les autres petits ouvrages dont elles s'occupent. C'est là aussi que les Indiens reçoivent les étrangers qui viennent les visiter.* (Artur in Hurault 1989:57)

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299 The Jesuit documentation of their works in the missions is compiled in the *Lettres Edifiantes et Curieuses* (Collomb 2011). It represents an important, but lengthy, source of information on their work in French Guiana.

300 Portuguese slave hunting in the Lower Amazon region had started as early as the second quarter of the 17th century, see for example Hygino Pereira (1895:292). The Dutch merchant Jan Reeps acknowledged the presence of *Aroasse* or Arua on Cayenne Island when, accompanied by Arua, he visited Cayenne in July 1693: 'ons was oock een canoa met veel Indianen tegen gekomen, Aroasse natie die hier ontrent woonden en vrinden van onse verwelcomden malkander met groote blijtschap' (NL_KB_131C14_f.17).

301 André Sausse (1951:73–85) illustrates that the Amerindian population of the French Guiana littoral declined dramatically between 1720 and 1763 due to the establishment of the Jesuit missions. He estimated that their numbers fell from 20,000 to just over 1000 during this period. Sausse accompanied Hurault on the 1949 geographic mission where they met Raymond Maufrais (2014:107–108) at the golddigger camp Dagobert at the Upper Mana River.

Between 1680 and 1700, the French slave traders purchased a large number of Amerindian slaves from the Portuguese who had taken them from the Amazon River (Hurault 1989:111–112; Acevedo and Gomes 2003; Chambouleyron 2005). In fact, the local Amerindians were officially subjects of the King in Cayenne and could therefore not be traded. They could only be enslaved when crime or rebellion occurred. This explains why there were probably few Amerindian slaves in French Guiana and that Amerindian slaves were rather transported to the Antillean plantations. In Suriname, the coastal Amerindians, such as the Caribs, raided villages in the interior in order to fulfill the demand of the planters who required female Amerindian slaves to carry out domestic tasks (Farage 1991; Dreyfus 1993; Carlin and Boven 2002). From 1718 on, the French Governor Rémy d'Orvilliers signed contracts with the Portuguese in order to hunt down Amerindian slaves. The abolishment of the Amerindian slave trade was proclaimed in 1764, but eventually took place in 1787.

The French and Portuguese had disputed the control of the area located between the Oyapock and Araguarí Rivers since the end of the 17th century. It had been under command of Governor de Férolles since 1688. This large French empire, better known as *La France équinoxiale* or *Cap du Nord,* was handed over to the Portuguese in 1713 as a consequence of the Treaty of Utrecht.[302] The Jesuit missions in this contested area along the Counani and Macari Rivers forced many Amerindians to set off for French Guiana, resulting in an amalgamation of Amerindians populations. Despite the Jesuit missions in Kourou and the disastrous outcome of the Kourou expedition in 1763, under the command of the Duke of Choiseul and Governor Turgot, concerning approximately 12,000 colonists (Froideveaux 1892; Michel 1989; Thibaudault 1995), the western part of French Guiana remained more or less uncolonized and was better known as *Pays indien* (Fr.) or Indian Country.[303]

During the second half of the 18th century, the French Governor Fiedmont decided to acquire further general information on the interior and dispatched three expeditions to the Upper Maroni River drainage.[304] The first hereof, under command of J. B. Patris, encountered the *Wayana* for the first time in 1766. Apparently they had settled down here recently. The French observed that the Oupouloui and Wayana were living together in structured villages of a militaristic nature (Tony 1835; Rivière 1984; Chapuis 1998; Carlin and Boven 2002; Duin 2009).

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302 *La France équinoxiale* is the name the French gave to that part of the South American continent located between the mouth of the Orinoco and Amazon Rivers.

303 When signing the Treaty of Paris in 1763, France lost Louisiana and French Canada to England, and was in need of consolidating its position in the Americas. Brûletout de Préfontaine (1763) dedicated his book *La Maison rustique* to the Duke of Choiseul, the Minister of Warfare, and to the Marine in order to promote French Guiana as a potential option to start a new colony. Having wandered through Guyane from the 1740s on, he proposed to colonize the right bank of the Lower Maroni River by means of fifty plantations, as drawn in his 1762 map (Michel 1989, Fig. 4; Rio Branco 1899, map 33).

304 Sergeant La Haye explored the interior during the first half of the 18th century. Travelling on the Oypaock River, he arrived at the sources of the Yari River in 1729 (de Villiers 1920). Other Frenchmen who visited this region are Claude Courant [1716] who visited the Approuague and Oyapock Rivers as well as Chevalier Audifreddy [1731] at the Oyac and Orapu Rivers (Froidevaux 1895).

Figure 10.7. A drawing by Riou and engraved by Hildebrand depicting the penitentiary Saint-Louis on the Lower Maroni River (Crevaux 1883:9).

Reports on these explorations were the first to mention the presence of the Boni, Maroons from Suriname, residing on French territory at the Middle Maroni River (Moomou 2004; Hoogbergen 2008).[305] Their presence created a political issue with regard to the Kali'na of the Lower Maroni and the *Wayana* of the Upper Maroni Rivers (Boven 2006; Dupuy 2008).[306]

In 1787, according to Hurault (1989:169), only 200 Galibi inhabited the coastal region located between Cayenne Island and the Maroni River. The Amerindian populations of French Guiana and Suriname had been decimated due to disease, enslavement and general misery. They were diversified because of numerous influxes of fleeing, dissimilar ethnic groups from the Lower Amazon and Orinoco Rivers. After the missionary era, the remnants of these indigenous populations clung together or strived at becoming one in order to start the process of restoring cultural affiliation and identity.

This historic event is very much alive among the present-day Palikur and Kali'na, and firmly rooted in their oral tradition. The latter refer to this event as *Epa'kano* and the former as *Naoné* (Collomb and Tiouka 2000; Collomb 2001; F. Grenand and P. Grenand 1987; Passes 2004). This ethnic restoration or *renaissance* is a widely known process in the colonial Guianas and Amazonia. Historians refer to it as "ethnic transformation" or ethnogenesis (Rivière 1984;

305 The history of the Ndjuka and Aluku population of Suriname and French Guiana is not specified here. The reason for this is that it lies beyond the scope of the present introduction.

306 Other explorations into the south of French Guiana revealed the presence of recently arrived Tupi-guaraní speaking groups such as the the Wayãpi (Oyampi) and the Teko (Émerillon) from the Amazonian Basin (Métraux 1927:29–35; P. Grenand 1982). During the second half of the 18th century, the Portuguese armed several Wayãpi raiding parties who entered the contested area between France and Portugal, mainly the Upper Oyapock River and Tumuc-Humac region. These wars would continue until the first quarter of the 19th century (P. Grenand 1971:112–113, 1982; Tilkin-Gallois 1986:121). According to Peter Rivière (1969:27), the Tumuc-Humac 'has been an area of intertribal mixing, and the vital question is how important are these sub-groups or tribal remnants in the present composition of the Trio and whether there is any advantage to be gained in distinguishing them. It is possible to say with assurance that whatever the distinction may have been previously it is now virtually non-existent.'

Whitehead 1993, 1994, 1998; P. Grenand and F. Grenand 1997; Rival and Whitehead 2001; Hornberg 2005; Chapuis 2006; Collomb and Dupuy 2009).[307] This regrouping forms a schism in Amerindian history and is now entering the contemporaneous era of Modern Times as a "new-born" ethnic group growing in numbers throughout the 19th and 20th century (Hurault 1989:169; P. Grenand and F. Grenand 1997:68, 2006).

1850-1950

This period is roughly positioned between: (a) the abolition of black slavery in 1848, (b) the introduction of the punitive system (Fr., *bagne)* in 1852 and (c) the departmentalization of French Guiana in 1947. In Suriname, slavery was abolished in 1863. This colony gained independence in 1975, followed by means of a devastating civil war during the late 1980s and early 1990s. Both countries witnessed an important gold rush in their interior territories between 1870 and 1930. After the political uproar during the 1920s, the French government proclaimed the *Territoire d'Inini* in 1930 in order to gain control of the interior. The Dutch government did little to "protect" the interior of Suriname. Nevertheless, several Dutch-French boundary expeditions set off in order to map the interior.

French Guiana

In 1828, Mother Anne-Marie Javouhey, the foundress of the Sisters of Saint Joseph of Cluny (Paris) commisioned the village of Mana to be built. Although slavery was then legal (slave trade was to be abolished in 1831), she assessed a different status for her emancipated work force (Cornuel 2011). Her small colony was fairly prosperous. In 1838, *c.*700 people were working and living in Mana. In 1843, shortly before her demise, she left the colony. Its prosperity and evangelization attracted many Kali'na and Maroons to the Lower Mana River who settled in the vicinity of Mana (Jolivet 1982; Bruleaux 1989).

After the abolishment of slavery and the adoption of the Transportation Law in 1852, French Guiana was chosen as a final destination for criminal and political adversaries of France. They presented a workforce in order to not only develop the colony but also generate the social re-insertion of delinquents. Numerous colonies were founded, but yellow fever and other diseases soon decimated the population participating in these first attempts (Oyapock, Montagne d'Argent). In 1857, it was decided to start an agricultural colony on the right bank of the Maroni River, just opposite Albina, in order to develop this part of the country (Mallé 2003). In 1858, this village was baptized Saint-Laurent by Governor Baudin. One year later, it was inhabited by *c.*800 prisoners (Fr., *bagnards*).

In 1860, it was decided that the right bank of the Maroni River between Yalimapo (the confluence with the Mana River and the Atlantic Ocean) and the Hermina Rapids[308] was to be dedicated to agricultural exploitation and maintained by means of the recently installed penitentiary colony of the Maroni. This resulted in additional working camps (e.g. Saint-Pierre, Saint-Maurice, Saint-Jean, Saint-Louis). The latter locations all represented prominent sites along the Maroni

307 Ethnogenesis is 'a concept encompassing peoples' simultaneously cultural and political struggles to create enduring indentities in general contexts of radical change and discontinuity (Hill 1996:1).

308 According to Henri Coudreau (1893:20), the toponym Hermina is derived from the Galibi word *arimina*, meaning electric eel (*Gymnotidae* sp).

River. Interestingly, the majority hereof have yielded Amerindian archaeological material (van den Bel 2007b; Mestre 2008).

In 1865, it was inhabited by *c.*3000 convicts and 300 free *bagnards*. Two years later the French also decided to bring in people from other French colonies (e.g. the Antilles, Indochina, islands in the Indian Ocean). In 1891, the Crique Balaté now divided the territory of the right bank of the Maroni River into two zones. Its southern part was devoted to the relegation of which Saint-Jean du Maroni served as headquarters. Its northern part, with Saint-Laurent as its capital, was devoted to transportation. In addition to the various populations entering the colony through the penitentiary system, the discovery of gold along the Maroni River's middle and upper drainage as well as along other rivers in the Guianas attracted fortune seekers from other parts of South America and the Lesser Antilles (e.g. Saint-Lucia, Martinique).[309]

Jules Crevaux's [1878] and Hendri Coudreau's [1887-1891] explorations on the Maroni River evidenced a fairly populated river with actors along each part of the river, as we can still witness today: (a) the Kali'na and Arawak populations along the Lower Maroni River, flanked by small European settlements, (b) the Boni at the Cottica at the Middle Maroni River and eventually higher up the river near Maripasoula and Papaïchton and (c) the Akurio, Trio and Wayana, who fell victim to numerous diseases according to Crevaux (1883:275), beyond the hamlets of Maripasoula and Papaïchton.

Trade between the river's upper and lower parts was a major hinge for varied populations residing along this river. The Amerindians possessed a widespread network. Through it, goods were exchanged between villages as tokens of alliance, generally separated over very long distances and covering the entire Guiana plateau (Butt-Colson 1973; Porro 1985, 1992, 1996; Whitehead 1988; Gallois 2005). These wares included ceramics, manioc graters, trained hunting dogs as well as European kitchen and iron ware, greenstones and gold (Boomert 1987; Roth 1924; Whitehead 1990). It is presumed that this exchange network is a relict from pre-Columbian times and that it was set forth thanks to Amerindian, Maroon and European commercial interaction.

Suriname

Following the explorations of Richard Schomburgk (1845, 1922), Everard Im Thurn (1883), Alfred Wallace (1889), Henri Coudreau (1886, 1893) and Jules Crevaux (1883) into the interior of the Guianas, the Dutch carried out the following expeditions into the interior of Suriname at the start of the 20th century: (a) to the Saramaca and Gonini Rivers (Franssen Herderschee 1905) in 1903 and 1904, (b) to the Tumuc Humac Mountains (de Goeje 1908) in 1907 and (c) to the Upper Courentyne River in 1910 (Kayser 1912). In addition to geographical and geological information, they provided the first ethnographic studies on the Amerindian populations in southern Suriname (e.g. Wayana, Trio, Akurio) located on the Upper Maroni, Palumeu and Oelemari Rivers respectively (de Goeje 1908).

During the time of these expeditions at the start of the 20th century, the (smaller) Amerindian groups of the interior were amalgamating. This process of ethnic transformation "created" the constitution of the Wayana and Trio groups

309 Interestingly, the Jesuits came back to French Guiana after being expelled in 1763 in order to work in the penitentiaries during the second half of the 19th century (Mury 1895).

Figure 10.8. Father Willem Ahlbrinck surrounded by several Wayana at Albina, probably after returning from a 1937 voyage to the headwaters of the Maroni River Lower, see Op zoek naar de Indianen or 'In search of the Indians' (Ahlbrinck 1956). He worked on the Maroni River between 1913 and 1918 and before leaving for Paramaribo was struck by malaria. Here Ahlbrinck continued his work among the Javanese population, returning to Amerindian territory in 1926 (Stahel 1926, 1927) and 1937 (Hoff 1968b) (courtesy of the University of Amsterdam, UBM: HL 94-14, after Schalken 1983:186).

we know today (Carlin and Boven 2002:33). As mentioned, a similar process of ethnogenesis occurred *c.*100 years earlier among the coastal Amerindians. These expeditions illustrated that the distant Tumuc Humac region, consisting of river drainages located between the Maroni and Courentyne Rivers (as well as the Brazilian equivalents of the Paru and Yari Rivers), were inhabited by native populations sharing important relationships (Frikel 1957).[310]

From the 1960s on, North American missions were accepted in Brazil and Suriname. The *Summer Institute of Linguistics* (SIL) is perhaps the most influential. The government of Suriname was not able to control the daily life in the interior, leaving the missionaries to very much follow their own agenda. The onset of the civil war in the 1980s brought an end to this situation. The Amerindians now became a pawn in the struggle for power between the incoming national leader Desiré Delano Bouterse and the Jungle Commando led by Ronnie Brunswijk. Many Amerindians and Maroons sought refuge in either Brazil or French Guiana.

310 Hurault (2000) pointed out that the Tumuc Humac Mountains are not "real," but rather mythical mountains.

In fact, not a single government in Suriname (even during colonial times) had ever created a policy to protect or implement the basic rights of the Amerindians, i.e. the right of land for the indigenous population (D., *inheemse bevolking*).

This issue is very relevant as the interior of Suriname and French Guiana is flooded with legal and illegal gold miners, mainly *garimpeiros* from Brazil. Paramaribo and Cayenne distribute the concessions of governmental land. They do not often question the influences of such activities regarding the local groups in these areas. These haphazardous politics have resulted in disease, the poisoning of staple foods, deformation and miscarriage, prostitution and social disintegration, leaving the indigenous population much on their own.

10.4 The present era

After W.W. II, the Republic of France decided to alter the colonial status of Guadeloupe, Martinique, Guyane, and La Réunion, and to regulate them as national Departments (Fr., *Départments Outre-Mer*, DOM) by law No. 46–451 of 19 March 1946. These territories were separated from the colonial empire, but nonetheless remained under the administration of a representative (Fr., *Préfait*), formerly known as Governor of the Ministry of Internal Affairs, from 1 January 1947 on.

This so-called departmentalisation, created an entire new array of French citizens that needed to be become French, or '*francisés*,' according to Hurault (1989:150). Introducing this process implied the destruction of Amerindian society causing social disorganization due to national benefits (allocations), corruption during elections, alcoholism, suicides, changes in indigenous political organization by the State, separation of family members caused due to army recruiting and intern schools. The most significant loss is the loss of knowledge about aspects of Amerindian daily life (e.g. hunting, fishing, basketry, agricultural tasks) as brought about by means of the introduction of the European school system, promoting integration into Western society as witnessed today.[311]

In 1964, the total Amerindian population of French Guiana consisted of 1200 individuals of whom 800 inhabited the littoral and 400 the interior of this department (Hurault and Frenay 1965:605). In 1970, 700 Kali'na, 200 Lokono and 120 Palikur were counted whereas Suriname was inhabited by 3000 Kali'na and Lokono in total (Fig. 10.9).

The majority of the coastal Amerindians follow the western marriage tradition. However, each group has upheld a socio-political organization based on local kinship –the descendents of founding warrior groups– and the appartenance to a wider regional network of social and cultural affiliation as well as trade goods (Rivière 1984:80). The residential extended Amerindian family consists of nuclear households representing an independent village (Kloos 1971:119–121). It disintegrates when cohabitation becomes too difficult between village members and an individual has to leave to join another village or to found his own village. The village captain (C., *tamusi)* is the founder of the village or has parental links with the founder (Lowie 1948; Oberg 1955).

The village is quite autonomous. Its captain merely has to mediate between households and command communal work. On the littoral, villages represent local groups. All the villages together no longer represent a single supra-political

311 Peter Kloos (1938-2000) considered the policy of Jean-Marcel Hurault 'wholly irrational, if only because that which it seeks to conserve has already been fundamentally changed' (Kloos 1971:264).

power as early voyagers suggest. Apparently, the members of a village or of multiple villages, stood together whenever war was to be waged with a common enemy or another nation. As mentioned, war was a socio-political necessity to reset alliances and nations. It should not so much be seen from a Western point of view: to strive at possessing more land or to steal valuable goods (Clastres 1977; Fausto 2001; Whitehead 1988, 1994; Santos-Granero 2009b).

Regarding contemporary Amerindian societies from both the littoral and interior of French Guiana, it may be evident now that their society has changed radically during the time span between the early voyagers and the present. In modern society, the Amerindians of the Guianas form a minority. They receive very little political attention due to their low numbers (less than 5%) and low social status in Suriname as well as in French Guiana. The indigenous social-political organization of these groups has been altered throughout the colonial era. Western regional and communal templates have caused the most recent changes.

Nevertheless, these modern societies can offer archaeologists a glimpse of earlier pre-Columbian social-political organization when combined with reading historic documents. Recently, certain anthropologists have viewed specific rituals and traditions among the Wayana as remnants of totemic clans and regional supra-powers of historic Amerindian societies (Chapuis 2006; Duin 2009). These aspects have probably survived because of the geographic isolation of the interior. It may even serve as models for the coastal Amerindians who have been subjected longer and more profoundly to European influences.

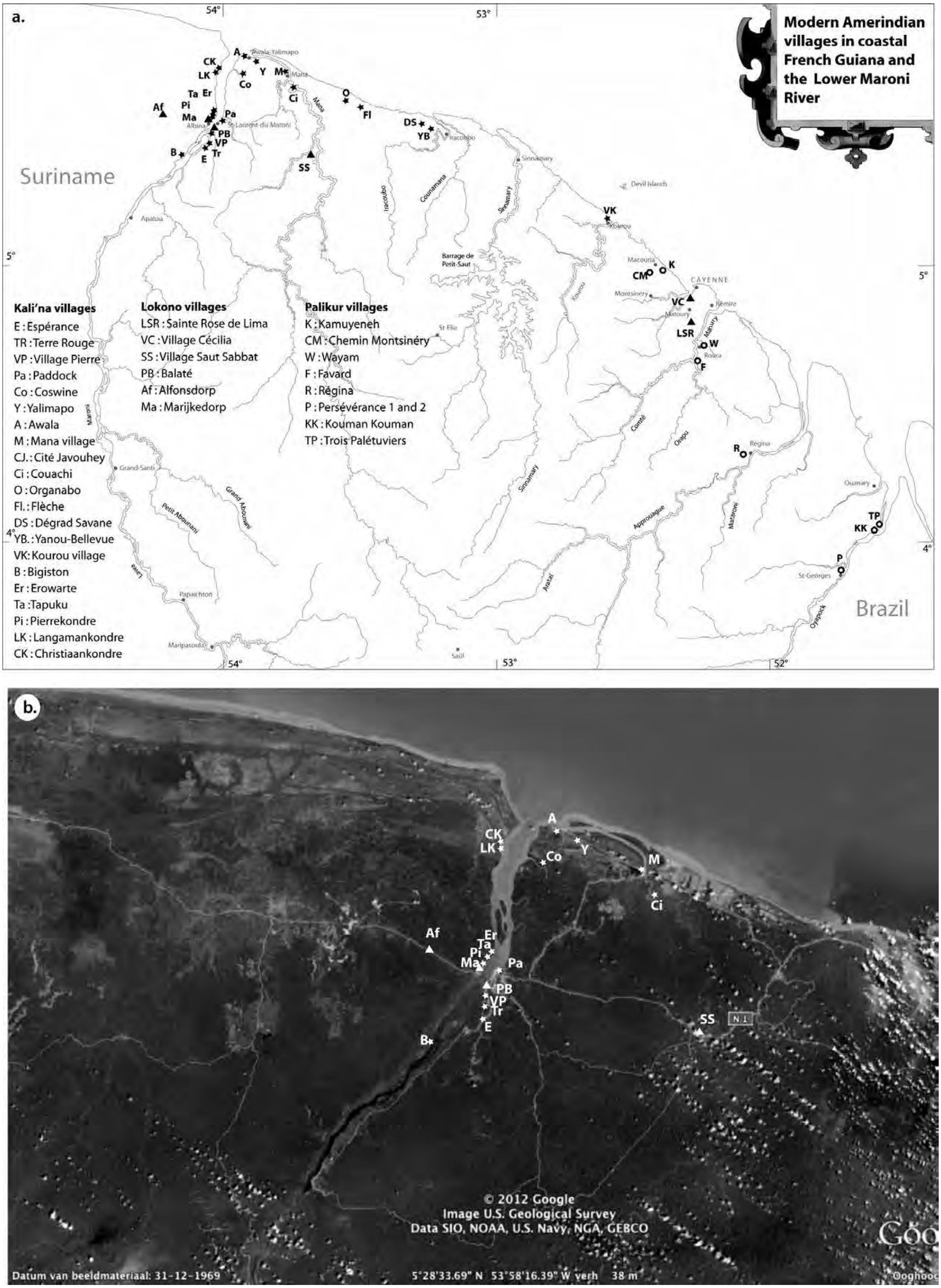
Following the above introduction concerning the historic groups of the coastal zone (cf. Appendix 2), an introduction to the current coastal Amerindian population of French Guiana is now presented.[312]

The Kali'na

The ancestors of the present-day Kali'na of the Cariban speaking linguistic stock, inhabited the coastal zone of the Guianas, roughly between Cayenne and the mouth of the Orinoco. Throughout the Historic Age, European powers have referred to them as *Charibes*, *Caribes* or *Galibi*. The French applied the latter term frquently in the colony of Cayenne (Hoff 1995). The Koriabo ceramics are most often associated with the historic Carib population of the Guianas (P. Grenand and F. Grenand 1997:60; Boomert 1986, 2004; Versteeg and Rostain 2004). The Kali'na currently consist of various influential families sharing a historic moment of birth, or *Epa'kano*, at the end of the 18th century (Collomb and Tiouka 2000; Collomb and Dupuy 2009).

Nowadays the Kali'na are the most significant Amerindian ethnic group in French Guiana. They consist of *c.*3000 Kali'na whereas in the Guianas as a whole they consist of *c.*26,000 (P. Grenand 2000). The majority of the Kali'na villages are situated on the sandy coastal ridges between the Iracoubo and Maroni Rivers as well as on the higher riverbanks of the Lower Maroni River itself. A large Kali'na population had settled on the Lower Mana River. However, this location had been abandoned when Jean Delawarde visited this river during the early 1940s (Delawarde 1966, 1967). The Kali'na and Saramacca villages of Kourou represent a recent implantation as a result of the construction of the European Space Center during the 1950s.

312 For population numbers per group see Yann Reinette and Pierre Grenand (2010:139).


a.
Modern Amerindian villages in coastal French Guiana and the Lower Maroni River
Suriname
Brazil
Kali'na villages
E : Espérance
TR : Terre Rouge
VP : Village Pierre
Pa : Paddock
Co : Coswine
Y : Yalimapo
A : Awala
M : Mana village
CJ. : Cité Javouhey
Ci : Couachi
O : Organabo
Fl. : Flèche
DS : Dégrad Savane
YB. : Yanou-Bellevue
VK: Kourou village
B : Bigiston
Er : Erowarte
Ta : Tapuku
Pi : Pierrekondre
LK : Langamankondre
CK : Christiaankondre
Lokono villages
LSR : Sainte Rose de Lima
VC : Village Cécilia
SS : Village Saut Sabbat
PB : Balaté
Af : Alfonsdorp
Ma : Marijkedorp
Palikur villages
K : Kamuyeneh
CM : Chemin Montsinéry
W : Wayam
F : Favard
R : Régina
P : Persévérance 1 and 2
KK : Kouman Kouman
TP : Trois Palétuviers
CAYENNE
Barrage de Petit-Saut
b.
© 2012 Google
Image U.S. Geological Survey
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Datum van beeldmateriaal: 31-12-1969
5°28'33.69" N 53°58'16.39" W verh 38 m

Founded in 1988, the Kali'na Municipality of Awala-Yalimapo is represented by means of both eponym villages. Lawrence Keymis refers to the latter as 'Iaremapo' during his voyage in 1596. The Kali'na reoccupied this area when the State abandoned the penitentiary of Les Hattes. In 1948 the village of Terre-Rouge, situated south of Saint-Laurent du Maroni on the RN 3 towards Saint-Jean du Maroni, was founded. After several decades, the population expanded rapidly during the Suriname civil war, when a large number of Kali'na fled from the violence in the vicinity of their villages named Bigiston, Christiaan- and Pierrekondre (Kambel and de Jong 2006).

Most Kali'na men have a legal job working for the municipality services or in construction work. However, a rather large number of Kali'na has persued a higher education in the *France métropolitaine*, creating an intellectual segment within the community. They have become very active in the indigenous battle from the second half of the 1980s on. In due course, the *Fédération des organisations amérindiennes de Guyane* (FOAG) was founded in order to defend Amerindian rights on a regional and national level (Collomb 2006b, 2007).[313]

In fact, Kali'na and Lokono men and woman participate actively in the regional politics, representing national political parties during elections. For instance, Brigitte Wyngaard, former capitain, or *chef coutumière* (Fr.), of the Lokono in Balaté, led the French Green Party in the regional elections of 2002. Jean-Paul Ferreira, the Kali'na mayor of the Municipality of Awala-Yalimapo, officiates as Vice-Director of the Department of Culture at the *Région de Guyane* for the French Guiana Socialist Party.[314]

Like the majority of Amerindians in French Guiana and Suriname, the Kali'na, besides Kali'na, also speak some French, Dutch, Creole and/or Sranantongo. The latter is more common along the Maroni River. Despite the economic changes, traditional festivities are still very popular in the Kali'na villages. They represent relevant identity markers as to the Kali'na both in French Guiana and Suriname (Collomb 2000). Albeit less present in present-day society, the shaman (C., *piai*) does play a relatively significant role. Compared to the Palikur community, the degree of evangelization is less significant.

The Palikur

The Palikur language belongs to the Arawakan linguistic stock. The Palikur villages are situated in northwestern Amapá and in northeastern French Guiana (Launey 2000). The most prominent villages in French Guiana are *Kamuyune* and Norino, situated to the east of Tonate-Macouria as well as several villages to the north of the village of Saint-Georges de l'Oyapock. The village of *Kamuyune*, to the east of Tonate, was founded during the 1960s.

The Late Aristé funerary ceramic complex is often associated with the historic Amerindian populations of the Amapá coast which are conceived as the ancestors of the Palikur (P. Hilbert 1957; F. Grenand and P. Grenand 1987; P. Grenand and F. Grenand 1997:60). The historic name of the current Palikur, or *Paykwene* as they call themselves, can be referred to as *Aricourri* or *Aricouros* (F. Grenand and

Figure 10.9 (opposite page). A map of: (a) the present-day Amerindian villages in French Guiana and (b) on the Lower Maroni River.

313 In 1977, the Kali'na from Awala-Yalimapo founded the *Association des Amérindiens de Guyane française* (AAGF), the precursor of the FOAG.

314 Gérard Collomb (2008) includes an analysis of the Kali'na point of view on their history, relationships with the Europeans, Creoles and Maroons.

P. Grenand 1987). The Palikur consist of allied groups or clans and various other (subjugated?) ethnic groups (F. Grenand and P. Grenand 1987; Whitehead 1995a; Passes 2004) who now consider the wetland savannahs of the Urucauá River and the village of *Kumene* to be the centre of their heartland.

In French Guiana, as much as 90% of the Palikur population speaks the Palikur language. All Palikur children go to school. The men live off small legal jobs whereas the women often sell basketry and necklaces to tourists at roadsides. The majority of families tend plots in the distant vicinity of their village mainly in order to produce manioc derived products. As does the majority of the population of French Guiana, the French Palikur benefit from social financial aid. The varied Palikur communities in both French Guiana and Brazil are not isolated, but maintain very close contacts with each other. Exogamic marriages between clans occur, confirming alliances between villages. However, the number of traditional feasts is declining rapidly. This is probably related to the continuous, religious sectarian influences felt during in the last three decades. Members of the SIL, Jehovah's Witnesses and/or Easter Evangelists not only systematically reject traditional practices, but also prohibit the consumption of alcohol (e.g. cassava beer or *wohska*).[315]

The Lokono

The Lokono belong to the Arawakan linguistic stock and reside in Guyana, Suriname, Venezuela and French Guiana. They represent the second largest group in the Guianas (Patte 2002, 2008) but the number of native speakers is estimated much lower (Rybka 2014, Table 1). In French Guiana, the largest villages are Balaté, situated south of the town of Saint-Laurent du Maroni and Sainte-Rose de Lima in the Municipality of Matoury. Smaller villages are located at Larivot near Cayenne (Cécilia village) and Saut Sabbat on the Mana River.

Balaté was founded in 1949 by Lokono from *Papatamkondre*, a Lokono village situated just opposite Balaté on the left bank of the Maroni River (Armanville 2010; Kambel and de Jong 2006).[316] Balaté housed a fairly large number of Lokono and Kali'na refugees who had fled the civil war in Suriname. Other Lokono families travelled farther eastward to build the above-mentioned villages on Cayenne Island (Guyon 2003).

The earliest chroniclers mention the Arawak who seemingly disappeared in French Guiana during the 19th century. It is thought they may have mingled with the Kali'na of Iracoubo whereas other groups dispersed within the rural Creole population. In general, these villages included a church and several small shops. A school has been founded at Balaté. Only members of the older generation can converse in their own language.

10.5 The Historic and present-day Amerindian material culture

Excavations result in large numbers of artefacts and other data demanding further analysis as well as interpretation. Archaeologists often observe present-day Amerindian societies (ethnoarchaeology) and read historic, ethnographic and anthropological literature in order to assist their interpretation of archaeological

315 Today, only a small number of families, notably at the fairly isolated village of Favard, still practice traditional round dancing accompanied by bamboo flutes, drums, chanting and cashiri drinking.

316 Both references represent recent documents on Amerindian landrights in the Lower Maroni area and are compiled in cooperation with and by Lokono and Kali'na inhabiting this region.

data (Politis 2002; Andrea Silva 2009). As demonstrated in the above sections, these analogies must be made with reason and cannot be applied on a one-to-one basis. The application of these formal analogies in the Americas has grown historically. They appear to be a natural step in regions where the descendents of the pre-Columbian cultures are still present.

A "direct historical" approach can be applied when comparing historic and present-day indigenous culture and society (Fagan 1985; Lyman and O'Brian 2001). In this manner, analogies can not only be made between late prehistoric or proto-historic archaeological data but also with regard to historically or contemporaneous observed cultural practices and objects through the readings of historic documents and ethnographic publications (Hulme 1992; Whitehead 1995b ; Deetz 1996). For archaeologists these analogies are an important tool when viewing material traditions and understanding its transformation in order to comprehend the late pre-Columbian pottery traditions, for example, the Koriabo ceramic complex (Boomert 1986, 1995). However, as already mentined in Section 10.1, the historic sources are biased which cannot be neglected, but for the Guianas a certain degree of continuity can be expected too which cannot be ignored either.

Historic and modern Amerindian pottery tradition

In general, ceramics represent the bulk of the artefacts in Guiana archaeology. (Ethno) historic information is a valuable asset in comprehending the manufacturing and usage of current, historic and late prehistoric pottery. Analogies serve to elucidate either certain aspects as well as differences in modern and prehistoric ways of life in the Guianas. By no means are they holy truths. Traditionally archaeologists focus on ceramics what subsequently renders historic descriptions of pottery production of great interest. Father Jean de la Mousse presents us with one of the earliest of such descriptions. During his second voyage in 1684, he visited the Galibi residing in the vicinity of the Lower Sinnamary River, French Guiana (Collomb 2006, cf. Appendix 3a). Earlier mentions of Amerindian pottery do exist, but evoke the mere presence of pottery. They include for example the following information:

> *The women also make drinke of this Cassava bread, which in their Language they call Arepapa, by baking of it blacke, dry, and thinne, then chewing it in their mouthes, they put it into earthen pots narrow in the bottome and broad above, contayning some a Firkin, some a Kilderkin, some a Barrell, set in a small hole in the ground, with fire about them. Being well sod, they put it out into great Jarres of Earth with narrow neckes, and there it will worke a day and a night, and keepe it foure or five dayes till it be stale, and then gathering together an hundred and more, they give themselves to piping, dancing and drinking. They make drinke also of Cassava unchewed, which is small and ordinary in their houses. They use also to make drinke of Potatos which they paire and stampe in a Morter being sod, then putting water to it, drinke it.* (Leigh 1906:314)

Other similar examples are given by the Walloon colonists under command of Jesse de Forest. They encounter an Amerindian burial ground when landing at the red-coloured river banks of *Rooden Hoeck* (Red Point, the present-day city of Macapá at the Lower Amazon) to check for victuals:

Le Lundy vingt septiesme nous vinsmes enchrer deuant roden houc et nous deuala a terre avec force prieres nous trouuasmes un fort beau pays de Campagne parseme de prayrie ou il y auoit de fort bonne terre nous trouuasmes force fruits appelles Gujaves qui sont de la grosseur d'une petite orange dun fort bon goust nous promenant par le pays nous trouuasmes un cymetiere remply de pots de terre de diuerses formes et figures et dans iceux des ossemens de morts. (R. de Forest 1914 ii:232)

Father Antoine Biet provides another short example:

… et plusieurs autres ustensiles de ménage, surtout de la poterie de terre, à laquelle ils sont fort adroits, quoiqu'ils n'aient point de roués comme nos potiers, faisant le tout par addition de parties les unes sur les autres. (Biet 1664:355–356)

Father Pelleprat reports:

Ils ont trouvé semblablement l'invention de metre en ouvrage la terre, de laquelle ils font leur vaisselle, leur baterie de cuisine, leurs pots, leurs plats, & leurs assietes; leurs platines memes pour faire cuire la Cassave, sont de cette manier, aussi bien que leurs Canaris, ou vaisseaux à metre leur boisson, dont I'ay veu quelques uns aussi grands que des Tonneaux de vin. (Pelleprat 1655:70)

George Warren states:

Their Houshold Ustensils are curiously painted Earteh Pots and Platters, and their Napery is the Leaves of Trees. (Warren 1667:24)

Edward Bancroft writes *c.*100 years later:

Their usual ornaments and domestic utensils are two or three small pots, which the mother of each family usually makes from clay, which are afterwards baked over the fire, and then stained with the juice of some particular herbs, which render them black. They have commonly a neck towards the top, for the convenience of holding them. They will last a considerable time, with proper care, and are often used by the Whites as well as Indians. (Bancroft 1769:278)

To sum, all later descriptions of Galibi pottery manufacturing on the littoral until the present, show almost the same sequence: (a) the gathering of fat clay, (b) the women manufacturing pottery, (c) the drying and sieving of the clay, (d) the adding of pounded *kwepi* as temper (e) as well as the coiling technique, (f) the firing and (g) the application of painting and gums, as observed by Herlein (1718), Pisotorius (1763), Sneebeling [*c.*1772], Quandt [1774-1780], Fermin (1770), Kappler (1854), Capitan (1882), Penard and Penard (1907), Ahlbrinck (1931), Delawarde (1967), Cornette (1988, 1990, 1992), Wack (1988), Vredenbregt (2002, 2004a, 2004b), Collomb (2003), de Tricornot (2005, 2007) and Coutet (2009) (cf. Appendix 3).

Among other ethnic groups in the Guianas we can witness a similar sequence as observed by: von Sack (1821 ii:118), Martius (1867:712–716), Schombrugk (Roth 1922:95,132,203–204), Im Thurn 1883:274–278), de Goeje (1906:17), Farabee (1918:24–26, 1924:24), Nimuendajú (1926:42–49), Gillin (1936:46–49), Frikel (1973:139–147, 273), Rostain (1991-92), van den Bel (1995), Duin (2001). The majority of the above-mentioned authors note a general decline in the quality of pottery production since the end of the 19th century as observed among the Maroni

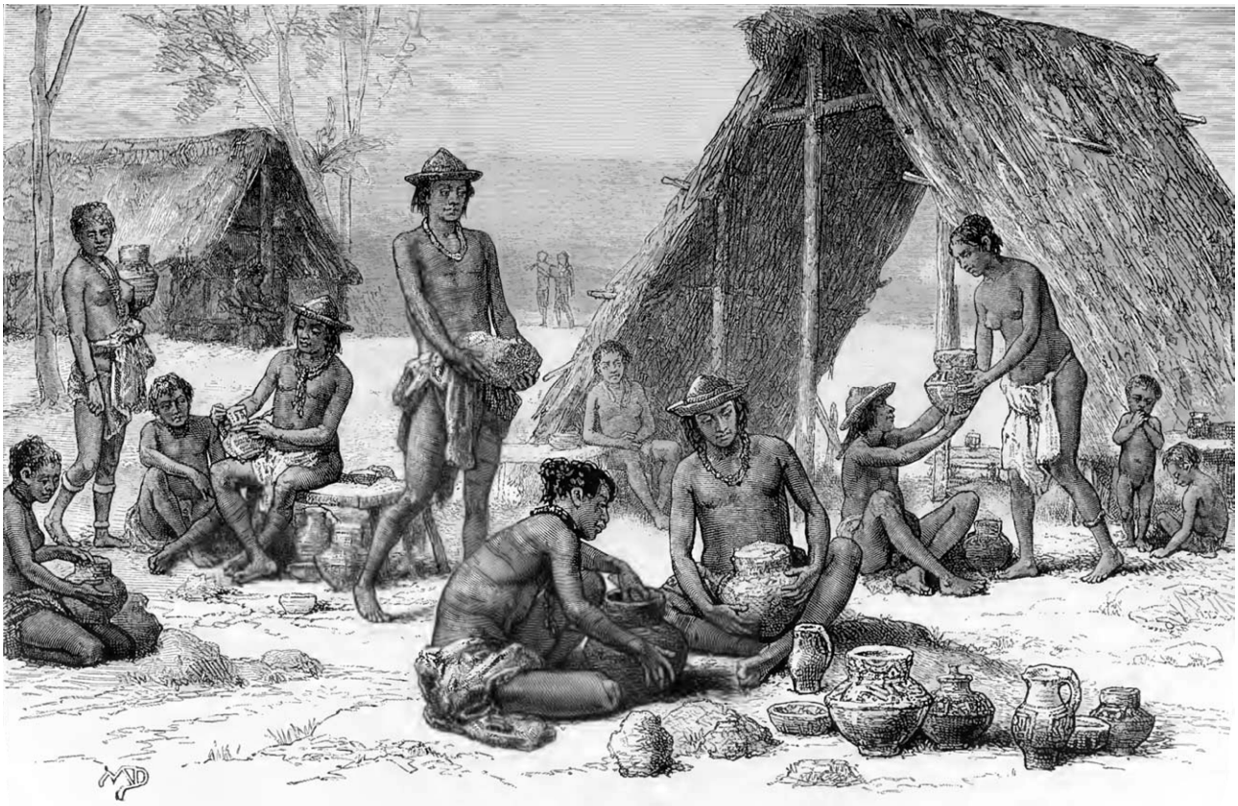
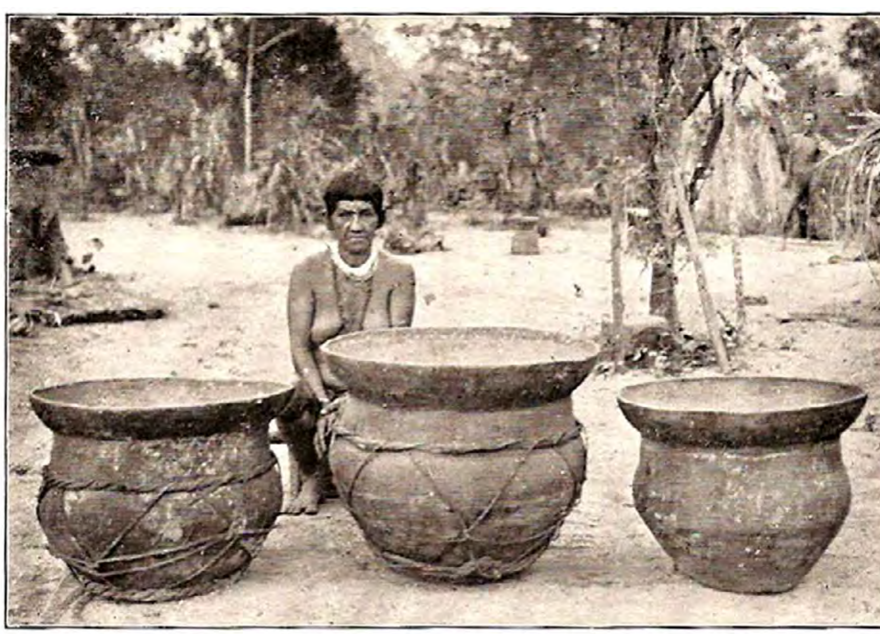


Figure 10.10. A drawing by Riou illustrating the manufacturing of pottery among the Galibi (Crevaux 1883:13).



Vrouw van Lelydorp-weg met 3 potten, *samaku* genaamd. Merk op het vlechtwerk van boschlianen rondom twee der potten. Zie *oriño*. n°. 12, a.

Figure 10.11. A photograph taken by Ahlbrinck (1931:90) depicting a woman at Lelydorp with three samaku pots.

River Caribs: 'Only a few women still make Carib pottery and those who do so often make it largely for commercial purpose, not for personal use' (Kloos 1971:61).[317]

The French anthropologist Gérard Collomb (2003:134) noted a homogenization of domestic pottery prodcution in the Guianas: '… les séries de poteries utilisées au quotidien dans les villages Kali'na du Maroni, telle que l'observe au début du siècle le père Ahlbrinck ([1931] 1956), est assez semblable à celle que l'on trouve décrite par d'autres auteurs, par exemple chez les Palikur de l'Est de la Guyane et du Brésil voisin (Nimuendajú, 1926), chez les Waiwai (Yde, 1965), ou chez les Carib de la rivière Barama en Guyane britannique (Gillin, 1936); de même, cette série n'est guère différente des types de pots fabriqués par les Caraïbes des petites Antilles à l'arrivée des Européens et décrits par le R. P. Breton (Allaire, 1984).'[318]

At present, however, a revival of pottery production can be observed among the Kali'na, Wayana and Palikur of French Guiana. Several decades ago it was clearly disappearing (Cornette 1988:97; Duin 2001; Barone et al. 2002; Coutet 2009; Tricornot 2007). The origins of such survival can be found in the need for Amerindian identity and economic interest. The technology may not have developed much further during the colonial period due to the diminishing frequency in trade among the declining Amerindian population. Nonetheless, the present author observes clearly a stylistic (aesthetic) and morphological difference between the current pottery productions of the various Amerindian ethnic groups. For example, Palikur and Kali'na have their own ceramic style, but also share several similar vessel shapes. Their appearance and notably designs certainly mark a style difference between both pottery productions. Furthermore, it is remarkable that numerous words in both Palikur and Kali'na language are shared. These (technological) terms focus on the production of pottery and basketry, such as *simili*: the transparent glaze and *seyne*: white slip applied on the exterior of recipients (P. Grenand 2006:110; Pierre Grenand, personal communication, 2011).

This final section on material culture has been added as the following chapter delivers a description of artefacts found on an Amerindian site dated to the Historic Period. As discussed above, the colonial period has transformed pre-Columbian society dramatically. This may well be reflected in their material culture and notably pottery. We can therefore attempt to compare these categories of artefacts and check for continuity or discontinuity.

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317 De Goeje (1906:17) refers to an Arawak production at the beginning of the 20th century. However, Father Abbenhuis's informant (1940:64) states that the Arawak had no longer produced pottery for several decades.

318 See also Boomert on this matter (2004, 2013:151). Concerning the Middle Orinoco River, the changes from late pre-Columbian pottery to modern times, consider the analysis by Tarble de Scaramelli and Scaramelli (2011), revealing a homogeneisation of Amerindian wares towards the end of the 19th century.

Chapter 11

The Historic Eva 2 site

A historic Amerindian occupation in the coastal savannah of Malmanoury

The historic Amerindian site of Eva 2, just as its Archaic predecessor (cf. Chapter 4), is located on the top of a white sand hill on the border of the Pleistocene savannah of Malmanoury. Only a small part of this hilltop (5100 m²) was excavated, revealing numerous features and artefacts belonging to an Amerindian village. Multiple postholes, various dump areas, and several graves were uncovered. The artefacts consist of handmade pottery and imported European ware (e.g. iron tools). Eight graves yielded large quantities of European glass beads. The majority hereof was produced after 1817 (van den Bel et al. 2006; cf. Annexe 1.1).

The data collected here allow us to draw a comparison not only with the historic sources, as introduced in Chapter 10, but also with modern Amerindian artefact collections housed in regional and European museums and tentatively with pre-Columbian ceramic assemblages. As we shall see, it is proposed, as least with regard to the coastal plains, to insert a historic archaeological complex between the modern Amerindian ceramic production and the pre-Columbian ceramic traditions, dubbed the "Malmanoury complex".[319]

11.1 Introduction

The present chapter will deal with the archaeological data in a similar way as in all preceding chapters. Here, prior to the the site's general synthesis, we will also provide a local historic context of the region of Malmanoury, located between the Kourou and Sinnamary Rivers. The historic occupation of Eva 2 is situated on the same hilltop as the Archaic occupation (cf. Figs. 4.1 and 11.1). Nineteen mechanical survey trenches were dug around and on top of this hillock in order to delimit this site (Jérémie 2005). The mere presence of domesticated pineapples and other edible fruits confirmed recent human activities. During the mechanical survey, a black layer was detected in the topsoil of the hillock at a depth between 0 and 30 cm. It extended across the entire summit, probably representing the site's habitation area. The mechanical survey of this dark layer yielded *c.*25 kg of ceramics and 10 kg of lithic material as well as several features, revealing possible spatial patterns, notably in Trench 19 and 26 (Jérémie 2005). One radiocarbon dating (KIA-26019, 3025 ± 20 BP), resulting from a charcoal sample taken from the black layer, suggested a possible ancient occupation. However, the imported

319 A condensed version of the results of Level 1 at Eva 2 has been published in the Canadian journal *Recherches amérindiennes au Québec* (van den Bel et al. 2015). Recent archaeological surveys in 2014 and 2015 conducted in quarries for the Ariane 6 launchpath resulted in multiple archaeological sites similar to Eva 2, also yielding Historic and Archaic Age occupations.

Figure 11.1. The location of the Eva 2 site on a late 19th century map by Le Vasseur (after Decoudras 1979, Plate 18). Note the Amerindian villages on the Lower Sinnamary River. Cf. Fig. 4.1 for an aerial photograph of the Malmanoury Savannah and its site location.

colonial artefacts (e.g. glass fragments, iron tools, glass beads, clay pipes) contrasted with this early date. During the excavation of Eva 2 we found out that it was a stratified site: (a) a historic Amerindian occupation at surface level (Level 1) and, (b) at a deeper level (Level 2), a Late Archaic occupation.

As to the excavation, a grand total of nineteen pits or sectors (S) of varied dimensions were excavated mechanically. The archaeological material of the first archaeological level was hand-collected in rectangles measuring 2 x 3 m. Ceramic concentrations and iron tools were topographed by means of a theodolite. The borders of this occupation were not reached within the boundaries of the excavated area. However, we were able to distinguish various waste areas and house locations. Hence, the occupation was interpreted as an Amerindian habitation site. One must remember that the population of Eva 2 had dug into the much earlier Archaic layer by means of postholes and graves. They may have exhumed Archaic material which subsequently became mixed with the more recent artefacts.

11.2 The features

In total, 211 features were attributed to Level 1 or the historic site of which 106 remain unidentified or do not have an anthropogenic character. The anthropogenic features consist of postholes, iron objects, ceramic concentrations,

SM	Description	N
1a	flat with straight profile	12
1b	flat with convex profile	11
1c	flat with concave profile	4
2a	convexe	16
2b	convexe and appendicular	23
3	dimpled	6
4	annular	2
5	unique	1

Table 11.1. The general feature count.

Figure 11.2. The distribution of features and objects. Note that Pit 4 has been omitted. The large feature outlined outlined in orange at the left in Pit 13 represents a very large treefall cut by the survey of Trench 26.

etc. (Table 11.1 and Fig. 11.2; cf. Annexes 8.1 and 2.9). On a deeper excavation level (Level 2) we encountered graves and large blocks (large postholes?) of which the former can most certainly be attributed to the historic occupation whereas the latter are presumably of Archaic origin (cf. Section 4.5.2).

The postholes

In total, 70 postholes were identified. They were filled with dark coloured sand probably representing the rotten (wooden) post. Now and again they contained bits of charcoal and ceramic fragments. Three postholes featured a voluntary arrangement of potsherds in order to keep the post in a desired position. Diameters at excavation level varied between 10 and 45 cm with a mean value of 22 cm. The depths varied between 8 and 50 cm.

The small quantity of postholes (only 70 for 5100 m²) hampers the idea of a large village. However, the leaching of the sandy soil may have washed away any traces of (smaller) postholes and stakes. Nevertheless, in Pits 1, 2 and 6, we observed an alignment of postholes. This may represent either a wall or central axis of a wooden construction. Other possible constructions were not distinguished. The remainder must have been part of a construction as more or less evidenced by means of the distribution of the ceramic and iron artefacts (cf. Section 11.4.1). It has to be said that this site may have known several overlapping site plans throughout its life span measuring *c*.300 years.

The bone and bead concentrations

A number of artefact concentrations were found in the northeastern part of the excavated area: (a) several ceramic concentrations (with complete vessel profiles), notably in Pits 2, 8 and 14 and (b) two concentrations in Pit 1: a burned bone concentration (F 7) and a glass bead concentration (F 20). The calcinated bone fragments were found in a small heap measuring *c*.30 cm in diameter. Its sediment was dark brown, contrasting with the white sand matrix. The bone fragments were identified by Anne Rapp Py-Daniel (now at the Federal University of Western Pará) and Prof. Dr. Lévi Figuti (University of São Paulo) and attributed to a peccary or turtle. Once the bone was removed a posthole measuring *c*.40 cm deep was recorded next to the bone concentration. The other concentration in Pit 1 concerns a batch of glass beads (cf. Section 11.4.2). It may have been part of a *cache* in which at least two necklaces were deposited. The other abandoned objects (e.g. iron and stone objects, ceramic concentrations) will be discussed below.

The undetermined features and treefalls

The other excavated features were treefalls and features of which we were not able to characterise their nature, leaving them unidentified. However, they were most certainly part of the site, either during or after the Amerindian occupation, as the treefall F 39 in Pit 5 indicates which also contained a polished axe.

11.3 The burials

Other relevant features with regard to this site are the human graves. At least regarding French Guiana and perhaps the Neotropics in general, (human) bone has seldomly been found during archaeological excavations within a similar context. As mentioned, fragments of burned and unburned bone material were encountered in urn burials excavated on the Lower Oyapock and Maroni Rivers (Petitjean Roget 1983, 1995a; Cornette 1987; Coutet 2011, 2014b; Coutet et al. 2014). Conditions of bone preservation are often much better in the shell-packed ridges of coastal Suriname (Khudabux et al. 1991; Duijvenbode 2012).

At Eva 2 we came across eight burials positioned along the central axis of the summit (Fig. 11.2, Table 11.2, Annexe 8.2.1). In fact, we are able to "see" primary graves within an archaeological context for the first time in French Guiana. Their adverse preservation is probably linked to the less acidic white sand formation,

Burial	Pit	Feature	Type	Tomb	Position	Glass beads	Ceramics
1	14	7	primary	round pit	flexed	yes	small bowl
2	12	1	primary	oval pit	flexed	yes	no
3	16	2	primary	round pit	flexed	yes	no
4	16	13	primary	oval pit	flexed	no	no
5	16	40	secondary	urn	bundle	yes	no
6	16	42	primary	rectangular pit	stretched	yes	no
7	6	39.1	primary	oval pit	flexed	no	two bowls
8	6	39.2	primary	oval pit	flexed	yes	no

Table 11.2. The general burial count.

when compared to lateritic clays or Pleistocene ridges. More importantly, they are also quite recent, dating from the second half of the 19th century, as we shall see below. Thomas Romon (INRAP) carried out the anthropological research (in van den Bel et al. 2006:52–57).

11.3.1 The general description

The preservation of the bone material is unfavourable. The bones would have been better preserved if protected by an object (e.g. a ceramic vessel as with Burials 5 and 7). However, there is no solid explanation for the rather good preservation of the skull in Burial 1. The teeth are the best preserved parts of the skeleton. However, we often only retrieved the crown and not the root. In general, an individual is identified by means of a "phantom" or silhouette of the body, indicating the deceased's final resting place. Burials 2 and 3 did not feature any bone material at all, only a body print in the sand. In nearly all cases they represent primary burials located in a more or less round to ovoid pit (N=6) or rectangular pit (N=1) serving as a tomb. The only exception is Burial 5: a secondary burial in a large, upright standing ceramic vessel placed vertically in a large pit and covered with another large ceramic vessel positioned upside down on top of the standing vessel.

The deposition of the body is a specific aspect of the mortuary practices recorded in the archaeological context. The primary burials were deposited with flexed legs, with the exeption of Burial 6 in which the body lay in a stretched or extended position. The urn burial contains a single individual and is represented by means of the leg bones, i.e. femurs and tibias. If these bones belong to one and the same person is not known. These long bones were placed in a bundle against the vessel wall. Various teeth were found during the screening of the urn content and may well belong to this individual. The majority of the heads were orientated to the east. Burial 4 was orientated to the southeast and Burial 8 was oriented to the north.

The population at this site consists of adults. Dental use, if one accepts the fact that this may reflect a correlation with age, varies between "without usage" and "pronounced usage." Burial 3, however, may have been an immature individual when observing general size. However, as mentioned above, this burial does not include any bone material at all in order to confirm this hypothesis. Due to the adverse preservation we were not able to determine the gender of each individual. Nor could we observe any pathology or other specific traits.

11.3.2 The inventory of the burials

Burial 1

The bone material preserved with regard to this burial concerns a skull and several axial skeleton fragments (cf. Fig. 1.3). The skull is relatively well-preserved. However, the temporal right and a part of the parietal right side were presumably destroyed during the mechanical decapage. The majority of the teeth were absent with the exception of two premolars. The root of one molar was not preserved. The wear of the teeth was rather pronounced. The rest of the skeleton is only represented by means of the humerus, both femurs and tibias.

This adult individual with undetermined gender rested on its back, the head orientated to the east. The legs are flexed at *c.*45° and positioned to the left side. The arms are flexed with the right hand resting on the abdomen and the left hand on the thorax. The occipital/atlas and atlas/axis connections are weak. The movement of the body is limited to the body mass, i.e. sliding down in the pit, whereas the skull is still in primary position. This primary burial has a more or less round pit, measuring *c.*1 m in diameter. It also contained a very small ceramic recipient and glass beads. An iron nail was found in the fill of the pit.

Burial 2

Not much tangible bone material had remained in this burial. Glass beads were present. The outline of the phantom did not allow us to determine the individual's position.

Burial 3

Not much bone was left inside this burial. Glass beads were found. The outline of the phantom is similar to Burial 8, but was deposited in a much smaller pit, suggesting that this individual is immature. This individual probably rests to the right. The head is orientated to the east. The lower legs are flexed in front of the thorax.

Burial 4

The bone material found in this burial is represented by means of an occipital fragment, several rootless teeth and a heavily eroded, diaphyse femur fragment. The gender of this adult individual has been determined tentatively by Hayley Mickleburgh after dental analysis and estima an age of > 15 years (Annexe 8.2.2).. He or she rests to the right side. The head is orientated to the southeast. The legs are flexed in front of the thorax. The arms are flexed, too, as are the hands positioned on the thorax. The teeth show a slight use-wear as well as a little tartar. This primary burial in an oval shaped pit measuring 110 x 80 cm does not contain any artefacts.

Burial 5

The bone material of this burial is represented by means of the diaphyses of the right femur, a fragment of the left femur diaphysis and a diaphysis of the right tibia. The two molars and one canine tooth include roots. The diaphyses of the two femurs are paired. The right tibia may belong to the same individual.

Figure 11.3. The discovery of secondary Burial 5. Note the outline of the standing vessel on which another vessel was placed upside down. In the course of time it has fallen into the larger standing vessel. This vessel also contained European glass beads, fragments of a German Beardman jug (including the large fragment on the left), an iron axe and a bundle of long bones.

This is a secondary burial: the bone material was found in a bundle planked against the wall of a large, ceramic recipient together with more than 8000 glass beads, an iron axe, and fragments of a single imported grey-ware Rhenisch vessel (Fig. 11.3). The bundle was found in the west quadrant about halfway the vessel in an "unstable" position, suggesting that perishable material was present in this funerary vessel probably holding the long bones in place when they were deposited. Through time, the (perishable) material has deteriorated and the vessel filled up with sand. Another ceramic vessel served as a lid. Once it collapsed, the fragments slided into the standing vessel, hereby protecting the bones.

Several teeth were found in the fill of the vessel which may also have contained a skull and/or mandible which have not been preserved. Remarkably, while screening the sediment, sample bag IV presented us with a large quantity of calcinated bone of which we were not able to determine any origin together with numerous glass beads (cf. Section 11.4.2.1).

Burial 6

The bone material of this feature is represented by means of a right parietal fragment, molars and premolars without roots, a proximal end of a femur fragment as well as coxal fragments. The adult individual with undetermined gender rests flat on his or her back. The head is orientated to the east. The extended legs and arms are in a stretched position. The teeth show heavy wear and a little tartar.

This primary burial in a trapezoidal pit was encountered in an E-W position. It measures 185 x 60 cm in the east (head) and 85 cm in width in the west (feet). More than 25,000 glass beads were counted and found in high concentrations at the ankles as well as the wrists, having perhaps served as adornments. Interestingly, Figure 11.5 portrays a rectangular pit revealing a remarkable similarity with Burial 6, suggesting the burial of a *piai*. Crevaux's description states:

> *J'apprends que Macouipy, en sa qualité de piai, c'est-à-dire de médecin, n'a pas été brûlé comme le reste des mortels. Conduit sur le lieu de la sépulture, je vois une petite hutte au milieu de laquelle se trouve un large trou ayant deux mètres de profondeur ; au fond j'aperçois mon ancien hôte couché dans un hamac où il semble dormir. Le corps desséché, dur comme un parchemin, est complètement peint en rouge. La tète est parée de plumes aux couleurs les plus éclatantes, le front est ceint d'une couronne faite avec des écailles de caïman ; c'est l'emblème de la souveraineté. Au cou il porte une petite flûte en os et plusieurs sachets qui renferment des couleurs; c'est le signe que Macouipy avait un talent particulier pour la peinture. Je vois près de lui un grand vase, mais il est vide; les Roucouyennes ne donnent pas à manger à leurs morts. D'ailleurs le cadavre a sous la main un arc, des flèches et une massue qui pourront lui servir au besoin pour se défendre contre ses ennemis et pourvoir à sa nourriture.* (Crevaux 1883:238)

Burial 7

The bone material is represented by means of the distal end of the left femur, diaphyseal fragments of both femur and tibia, fragments of meta-tars and tars as well as several rootless teeth. We were not able to determine the gender of this adult who rests on the back. The head points to the east. The legs are flexed perpendicularly to the thorax axis. The knees are positioned to the right. The arms are in an extended

Figure 11.4. The paired Burials 7 and 8.

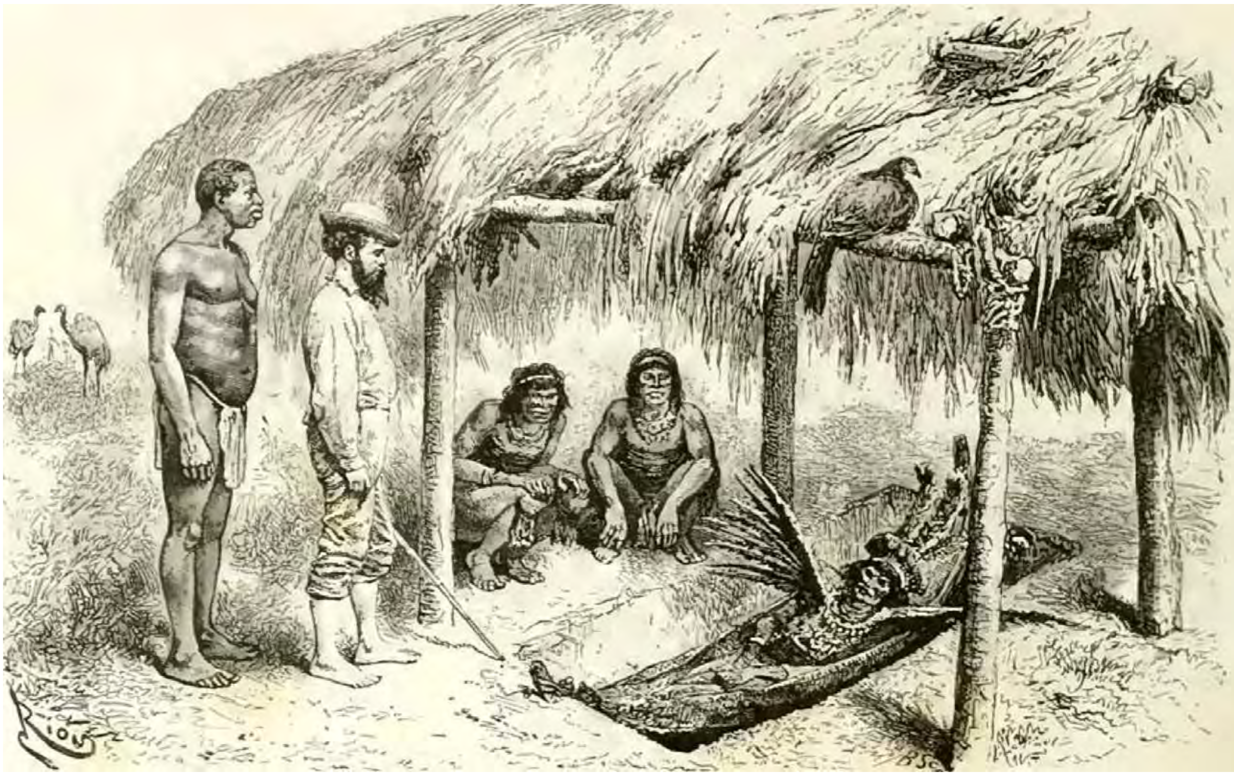

Figure 11.5. A drawing by Riou depicting the interment of a Roucouyenne (Wayana) piai (after Crevaux 1883:238). The rectangular pit in this drawing reveals a remarkable similarity with Burial 6.

position and the right hand is placed in front of the pubis. The left arm is slightly flexed. Its hand rests on the abdomen. The teeth display a slight use-wear and dental analysis suggest an age over 12 years (Annexe 8.2.2)..

This primary burial in an oval shaped pit measures 100 x 65 cm. Two small ceramic bowls, placed upside down, were found inside the tomb: one at the knees and the other at the ankles (EC 219, Fig. 11.12). Glass beads were encountered at the pelvis. Burial 8 dissects this grave. Both certainly form a pair (Fig. 11.4).

Burial 8

The bone material of this burial is only represented by means of several rootless teeth displaying common wear. This adult of undetermined gender rests to the right side and the head is orientated to the north. The legs are flexed in front of the thorax. This primary burial found in an oval shaped pit measures 48 x 72 cm. Numerous glass beads are associated with this burial. Age was tentatively determined between 4 and 9 years (Annexe 8.2.2).

11.3.3 Conclusions

Six out of eight burials share similar inhumation: a primary grave in a more or less round pit with flexed legs, to wit Burials 1-4 and 7-8. In several cases these burials are associated with small ceramic vessels and glass beads found at specific body parts (e.g. hip, wrists, ankles). Only two graves differ: Burials 5 and 6 located at *c.*1.5 m from each another are forming probably a pair. The former concerns a secondary burial in a large ceramic vessel or urn whereas the latter is a primary burial in a stretched position, suggesting the interred have a dissimilar social or religious status.

The urn burial also contains an iron axe, numerous glass beads and an imported grey-ware Beardman jurg, dating from the mid-17th century (cf. Section 11.4.3). The fact that this artefact is much earlier than the glass beads (predominantly the first quarter of the 19th century) may suggest the deposition of a heirloom (van den Bel 2011c). It is presumed that the above German stoneware jug was deposited in the grave of the village leader and/or during ceremonies or the abandonment of the village, but not necessarily at the moment of death. In order to test this hypothesis, the bones and this ceramic vessel should be dated. However, (AMS) radiocarbon dating would fall short as the presumed age probably lies within the range of modern radiocarbon range, i.e. from AD 1600 on. This is considered to no longer be in a natural equilibrium (Bowman 1990:14).

The stretched position and orientation of Burial 6 does indeed remind of Roman Catholic colonial graves. However, the deceased is adorned with glass beads according to Amerindian tradition, suggesting the adult is an Amerindian, perhaps of a certain rank (e.g. a *piai*) (cf. Fig. 11.5).[320] This similarity may be accidental, but further taphononomic data are lacking with regard to the latter idea. We may distinguish three pairs of burials here: (a) Burials 2-3, (b) Burials 5-6 and (c) Burials 7-8. This pattern is believed to represent a volontary act, perhaps evoking social memory of the deceased, i.e. kinship and/or slaves.

11.4 The imported artefacts

Considering all the artefacts found at this site, we will commence with the presentation of the European goods as they reflect the evident dissimilarity between pre and post-Columbian cultures from an archaeological point of view. Albeit not very abundant (with the exception of the glass beads) on site, these artefacts mark the cultural and economic transformation of Amerindian society during this era. Christian Vallet analysed these objects (in van den Bel et al. 2006:107–121).

11.4.1 The metal ware

Only 18 metal elements (M 01-18) were discovered at Eva 2 (Table 11.3). They consisted of iron tools, one copper element and one object made of lead. They were oxydized, with sandy crusts, but in a good condition nonetheless. Remarkably, only a small number of objects were still intact. Moreover, the majority consisted of metal tools almost all of which were heavily used and often related to wood working.

The hardware

The short nails here served to fit tool handles. The longer ones were utilised in carpentry. The pins were either square or rectangular shaped whereas the head was flat. Two flat iron elements show no evidence of wear. Their origin and function remain unclear. This also goes for a flattened iron tube (a tool handle?).

A round, slightly bombed brass button was found in the upper fill of the stretched Burial 6. The U-shape attachment point was welded to the button. This type of button has been utilised from the 15th century on. It was produced in

320 It must be noted here that stretched Amerindian burials were common during the LCA at Cayenne (cf. Section 9.4.1).

Material	Nails	Plaque	Button	Hook	Axe	Knives	Tube	Bell	Cross
Iron	4	2		3	2	3	1		
Brass			1					1	
Lead									1

Table 11.3. The general metal ware count.

England where, towards the end of the 17th century, cloth buttons were forbidden. Thus metal buttons became more common (Whittemore 1993:9).

The Burial 5 yielded a small brass bell, M 11 (Fig. 11.6g). This object was crafted by means of welding two spheric halves together applying melted tin. A point of attachment is visible at the exterior of the bell's upper part. Its interior holds an iron pin which is curved at the end and served as a clapper. It also features a rectangular cut and is finished at both ends with a rounded part. The above-described type of bell is known from North American colonial sites from AD 1800 on. In *c*.1860, they were replaced by bells of which the two halves were set. In *c*.1880, bells were cast in one piece (Hanson 1947:81).

Another interesting object is a small, handmade cross of lead, i.e. M 012 (Fig. 11.6h). It was created by cutting out a cross from a thin leaf of lead. The clearly visible cutting traces present a rather naïve appearance. A small hole is cut into this piece to provide suspension (necklace?). Both sides show "loose" or unorganised incisions which may or may not be volontary.

The iron tools

The following iron tools (e.g. hooks or bills, knives, axes), are associated with wood cutting. They were predominantly found in Pit 15 (cf. Fig. 11.2). The first hook (M 03) has a bolster and curved blade ending in a small hook in the shape of a bird's beak (Fig. 11.6a). A small bump marks the base of the cutting edge in order to protect the hand. The bolster is flat and has a triangular shape allowing it to forcefully be attached to a short handle. This tool either served to carve wood (Seymour 1985:53; MFAC, p. 427) or to cut sugar cane (Diderot 1762-1772: *Economie rustique, Sucrerie*; Plate 1, Fig. 3). A similar tool was found at the late 17th century plantation site of Poncel on Cayenne Island (Mestre 2005:19, Plate 9).[321]

Another type of tool is the pruning hook (M 04a) represented by means of a large part of a rounded socket as well as the base of a blade. The socket is created by way of folding both sides together. The back of the blade is slightly curved. Its triangular section serves as a cutting edge. An iron pin was found next to this object and was probably part of the handle. This tool is also known as *fauchard* (Fr.): a pole weapon or polearm. Its blade often has a crescent shape, i.e. a hook with a socket and a very long handle in order to cut branches in high trees (Seymour 1985:53). A second pruner hook (M 05) included a small socket and a blade fragment.

A complete iron axe (M 06) was found next to the urn Burial 5, probably in the pit's fill (Fig. 11.6b). This axe has a triangular shaped blade with a horizontal end. The cutting edge flares downwards and is double-bevelled. The circular head

321 See the excellent *Creole Lexicon* compiled by Jay Dearbon Edwards and Nicolas Kariouk Pecquet du Bellay de Verton for information concerning pruning hooks (2004:184). For further reading on tools utilised at colonial habitation sites see the above French and English lexicon too. The Encyclopédie by Denis Diderot is on-line: *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers, etc.*, D. Diderot & J. le Rond d'Alembert (eds), University of Chicago: ARTFL Encyclopédie Project (Spring 2013 Edition), Robert Morrissey (ed): http://encyclopedie.uchicago.edu/.

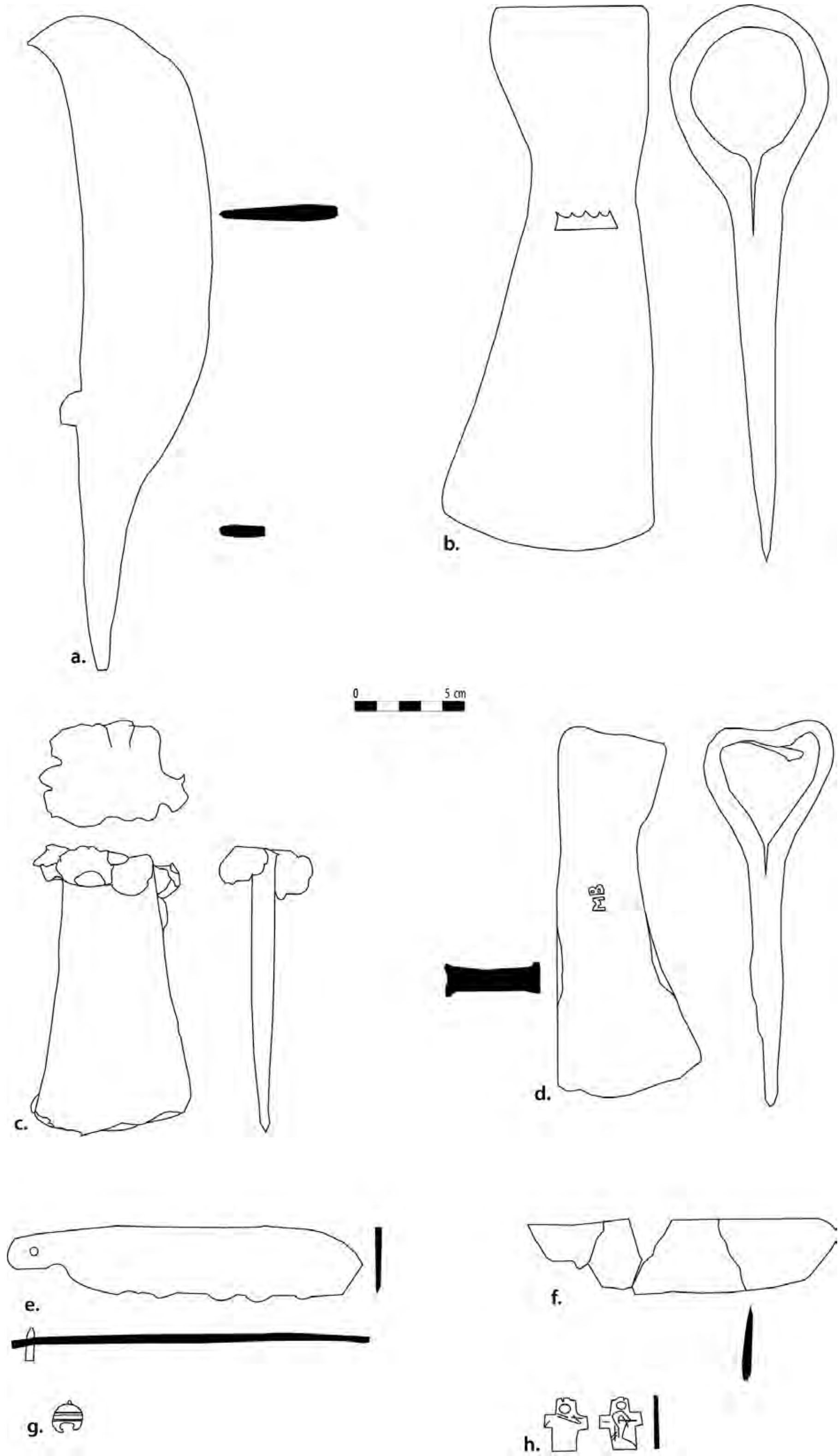

Figure 11.6. Drawings of metal objects: (a) an iron hook (M 03), (b) an iron axe with a "Crown" trademark (M 06), (c) a secondary used iron axe (M 02), (d) an iron axe with a "MB" trademark (M 07), (e) a breadknife (M 08), (f) a knive (M 09), (g) a brass bell (M 11) and (h) a cross of lead (M 12) (redrawn after Christian Vallet).

with round neck has a round eye, or socket, providing a rectilinear shank. On the right side of the blade a blacksmith's trademark is visible depicting a "crown." This object was deposited intact (hardly used?) and probably represents a funerary gift for the deceased. This tool is interesting as it is crafted from one piece bent over a mandril. Because of this specific manufacturing technique, it can be assigned to 17th century production modes (Baldwin 1995:34–35; Hothem 2002:81–110; Boucard 1998; Hanson 1947:55).

Another iron axe (M 07) is complete, but heavly damaged and has a triangular blade with a flat back (Fig. 11.6d). The cutting edge flares down with double bevels. It has a triangular head with a flat neck and upward shanking eye. On the right side of the blade, a trademark is stamped: "MB." This may refer to a Cayenne-based blacksmith known as 'Borda dit Malouin' in 1737 (Polderman 2004:469). The heel is modified towards the right. A fissure in the metal strap is presumably due to violent hammering of its heel. Interestingly, this object shows two different traces of use-wear at both opposite points at the edge of the blade. This sort of modification can be explained as follows. Once the axe is forced into a piece of wood and has become firmly lodged, one would probably use another heavy iron tool in order to remove the axe with force. Furthermore, one would also have to strike the socket in order to drive the axe into the wood before spliting it. A similar repetitive action will flatten the socket and eventually deform it entirely. This axe is again a characteristic product of the 17th century, considering its manufacturing mode. A similar tool was found at Poncel (Mestre 2005:20, Plate 8). And another example was found at Petit-Saut, which was also associated with artefacts dating from the 19th century. However, the latter axe has a triangular socket and a trapezoidal blade (Nowacki-Breczewski and Puaux 1991-92, Plate 7).

The final iron axe served as a wedge, or maul, in order to split wood (Fig. 11.6c). The blade has a rectilinear back and an everting cutting edge. The socket is completely destroyed and compacted due to relentless hammering with a heavy (iron) tool. This type of tool was also found at the Poncel habitation site (Mestre 2005:20, Plate 5).

The knives

Three knives were found at this site: two during the mechanical survey and one during the excavation. The first knife (M 08) has a slighlty curved back and ends in a rounded point (Fig. 11.6e). The bolster is incomplete, but still has the riveting pin of the original (wooden?) handle. Another nail was found next to this blade. This type of knife with a rounded tip is often identified as a bread knife (Nouret 1992:91).

A second blade (M 09) consists of various rusty elements. It has a large blade with a rectilinear back and a rounded tip (Fig. 11.6f). The basal part, close to the handle, is lacking. The third knife (M 10) is also fractured and has a rusty blade. The distal end is absent. Its back is rectilinear. The incomplete bolster still features a riveting hole. The heel marks the junction between the blade and bolster.

Conclusion

The knives, axes and hooks represent objects traded with the Amerindians and shipped in large quantities to the Guianas (Polderman 2004:188–209; Hulsman 2009:335–339 for Dutch freight listings of the 17th century). Since the beginning of the 17th century, the Europeans traded iron tools, as Jean Mocquet stated when he arrived at the Oyapock River in April 1604: 'Nous arrivâmes donc là le lundi au soir, puis le mardi au matin 10 d'avril, voulant savoir ce que nous pourrions profiter en cette terre, nous descendîmes pour troquer serpes, haches, couteaux, patinôtres [perles] de verre de diverses couleurs, et autres choses semblables' (Mocquet 1617:80). In 1674, during the voyage of Jesuit Fathers Grillet and Bechamel into the interior of French Guiana via the Approuague River, metal tools were often presented as gifts to local captains (Grillet and Bechamel 1716:233, 249) as recorded in Father de la Mousse's journals too (Collomb 2006). Knives are equally in demand with the Amerindiens. In 1750, for example, the inhabitants of Cayenne ordered 100 *grosses* of knives with bone handles riveted with five nails (Polderman 2004:461). In fact, they ordered as many as 14,400 knives (one grosse equals 12 dozen). Such large quantities were not for personal use only, but for exchange too. Another example: in 1723, the colony of Cayenne received a ship containing (amongst others) iron objects, to wit 200 axes, 200 (bill) hooks and 200 hoes (Polderman 2004:72).

The cross, perhaps manufactured locally, may have been part of a rosary and served as a gift from the Jesuits to the new Christians or perhaps in order to convert a captain. Brass bells and other metal trinkets were exchanged in large quantities. They may have played a role during the Amerindian ceremonies, when attached to their ankles or their garments. Father Jean de la Mousse provided the following description of the Galibi women:

> *Les femmes outre les grands tabliers de rassades ou de petite okayes qui vont jusqu'aux genoux, ont la nuque du col rehaussé d'un demi pied par le grand nombre de tours de rassade et de petite okaye qui pendent sur la poitrine. Elles ont outre cela de grosses touffes de dés dont cousent les femmes, percés par le bout comme de petites clochettes sans battants; les cordes qui les suspendent sont d'un pied et demi de long et cachés sous des grains de petit cristal. Ces sonnettes jouant sur les épaules dans le mouvement de la danse, et leur tablier garnis de verre, font un bruit assez agréable.* (Collomb 2006:193)

11.4.2 The glass beads

The Eva 2 site, and notably the burials, yielded a large quantity of glass beads (*c.*45,593 items) as well a small number of shell beads. The majority was found during the screening of the burial sediment. The Europeans utilised glass beads and iron tools as a means of exchange with the Amerindians during the entire colonial period. They were placed in numerous Late Aristé and Maracá urns (Goeldi 1900; Guapindaia 2001). As to iron tools, the Amerindians demanded not any kind but specifically coloured beads. For instance, the Arawak of the Berbice River preferred green and yellow examples (van Berkel 1695:20) whereas the Caribs of Cayenne demanded blue and white ones.[322] Glass beads are an exellent means of obtaining absolute dates. Therefore a short introduction of its manufacturing history is presented here (after van der Sleen 1973; Kidd 1979; Deagan 1987:156-183; Dubin 1987).

Initially, beads were manufactured one by one. The craftsman would stretch a glass wire which he wired on an axis and cut on one side in order to produce "wired glass beads." Later, beads were also produced by means of a hollow glass

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322 Lettre de Férolles au Ministre, 30 juin 1694, *Mémoire pour faire la guerre dans la rivière des Amazones* (FR_NA_C14-3, f. 20) : 'Pour les Indiens des rassades bleues et blanches, des couteaux de praisse [?] à manche blanc cloué, de la baouache [?] claire et brune. Des serpes à manches creuses de fer des haches à grosses têtes, des rasoirs et ciseaux de fer. Vingt vêtements de moyenne étoffe rouge pour les capitaines Indiens.'

Burial		bleu powdered opaque	bleu lavander	bleu lavander	dark bleu transluscant	dark bleu transluscant	white matt	white matt	white ivory	black	yellow maize	apple green	emeraude opque	cornelian red and green center	green tubular shaped
	mm	3.5	1.5	3.5	5	3 - 3.5	3	2.5	5	3.5 - 4.5	2.5 - 5	1.5	2	4	4.5
1	sediment	1725	1		3	7	1269								
1	thorax	1					2								
1	coxal	9					88								
1	femur	244	2		697		448								
1	right foot	184			1		302								
2	sediment	3		24		5	1		63	330	355 (52)				
2	upper body									1	2				
2	pelvis	2			1				2	15	30				
3	sediment					33	498	596			16	803	368	1	
5	sediment					5419	2754								
6	sediment					7435	10595								
6	right forearm						143								
6	left forearm						445								
6	pelvis					3530	624							1	2
6	right thigh					31	3								
6	left thigh					9	1								
6	right mollet						143								
6	left mollet						52								
6	right foot						1520								
6	left foot						1315								
8	skull						21				574				
8	legs						47								
8	torso						18								

Table 11.4. The general glass bead count per burial. The diaphaneity of beads is described by means of the terms opaque, transluscent, and transparent. Opaque beads are impenetrable to light except on the thinnest edges. Transluscent specimens transmit, yet diffuse light so that objects viewed through them are indistinct. Items viewed through transparent beads are clearly visible (Karklins 1974:68).

cane, drawn to a desired diameter which was then cut into pieces in order to create beads. The latter examples are known as "drawn beads," or seed beads (Fr., *conterie*). Towards the end of the 17th century, the European bead market was controlled thanks to the production of Venice and Amsterdam. In 1817, Venetian craftsman were finally able to produce not only perfectly round beads but also microbeads measuring less than 1 mm. It is only after AD 1840 that standardised fabrication techniques enabled the production of large quantities of 2 mm beads identical in size, shape and colour. This allows us to date the majority of the glass beads encountered at Eva 2. Other glass material is rare. We came across three glass fragments of which one black example may originate from an onion shaped glass bottle.

11.4.2.1 The burials

Burial 1

This burial yielded 3009 beads. They were divided into five batches (Table 11.4). All their shapes are regular and manufactured correctly. The powdered blue beads were crafted according to the secret recipes of *Établissements Salvadori* in France and date from after AD 1850 (Fig. 11.7).

Burial 2

This burial contained a great variety of beads totalling 1017. Many were acquired during the decapage. The yellow beads were heavily damaged and together with the 5 mm ivory coloured beads most certainly constitute a single necklace. However, it was impossible to establish the use of the other beads or their possible colour combinations.

Burial 3

This burial contained 2315 glass beads.They were characterised by means of apple-green and emerald coloured beads as well as several yellow examples. The sole red bead with a bottle-green core measuring 4 mm is noteworthy. This specific colour is called "Aleppo cornelian red." This type of bead was largely disseminated in North America since the late 17^{th} century (Deagan 1987:168–169).

Burial 5

This urn burial yielded 8173 glass beads with two colours only: dark blue transluscent (N=5419) and white opaque (N=2754) (Fig. 11.8). Their dimensions and diameters are regular. They were found during the screening of the urn

Figure 11.7. The glass beads from Burial 1.

Figure 11.8. All white opaque and dark blue transluscent glass beads from Burial 5.

sediment. The filling up of the urn, once the site was abandoned, had most certainly altered the original position of possible bead ornaments inside the urn. That explains why we found beads everywhere in the fill. The decomposition of other goods may have played an important role here, too, as pointed out above as to this specific burial (cf. Section 11.3.2).

Burial 6

This burial is of special interest as the stretched position may reveal information on the type of adornment the inhumated individual was wearing. However, one must remember that Burial 6 is the only one in this position and may have a unique status. This burial contained 25,342 glass beads of which the majority (N=18,030) was found in the pit fill during screening.

The pelvis yielded a number of interesting beads: one Aleppo cornelian red bead measuring 4 mm and two tube shaped emerald green beads (1 x 1.5 cm) measuring 4.5 mm in diameter. The cluster of discoidal beads, measuring *c.*4 mm, was possibly made of shell (Fig. 11.9).

This type of shell bead is commonly known as *quiripá* in Venezuela. It served as currency and pretigious objects among the historic Orinocan tribes (Morey 1975:113–124; Gassón 2000).[323] Similar shell beads were found in an urn at Awala-Yalilmapo (Coutet 2011, 2014b; Coutet et al. 2014:28–30).[324]

This individual apparently did not wear a necklace, but did adorn the forearms (near the elbow?). This person also carried a belt or a broidered *camisa*, or loincloth. Around the wrists, placed beside the pelvis, bracelets consisting of blue and white beads, were presumably worn. However, the position of the string of shell beads is uncertain, either around the waist (belt) or the wrists. These adornments are depitcted in numerous 19th century drawings, engravings and

323 Father de la Mousse observed these shell bead strings among the Galibi who referred to them as *okayes* (Collomb 2006:153). The Arawak of Berbice called them *orewebbe* (van Berkel 1695: 20).

324 Another example of shell (trade) objects in pre-Columbian times are the Venezuelan (decorated and undecorated) fresh mussel shells (Unionoida) which have been encountered in the Lesser Antilles during the entire Ceramic Age (Serrand and Cummings 2014).

Figure 11.9. The shell beads found at the pelvis of Burial 6.

photographs as well as in 20th century ethnographic monographs and other early anthropologic research.

Burial 8

This burial contained 574 beads positioned around the head of the individual, suggesting the presence of a small necklace consisting of maize-yellow coloured, small drawn beads dating from after 1817. Only 68 beads were found near the legs.

11.4.2.2 The other beads

Pit 1, F 20

This feature represents a concentration of various types of glass beads as well as a facetted pendant (N=2046). We distinguished several batches (Table 11.5). It has to be noted that the white beads were found together with the pendant. As much as 50% of the beads of Batch B were burnt. The transluscent example with white veins (Batch G) is better known as a "gooseberry bead" (Fr., *groseille à maquereau*) and was produced in Venice between 1600 and 1800 (Dubin 1987:337). From its foundation in 1621 on, these beads had served the Dutch West Indian Company as a means of exchange (van der Sleen 1973). This type of bead was also found at the Poncel plantation (Mestre 2005:15, Photo 19).

Another remarkable bead is the transluscent bi-tronconical bead (Batch H). Its surface has been grinded down in alternating, triangular facettes. These beads were produced between 1865 and 1875 in large quantities in view of the fabrication of chandeliers. The transluscent pendant, associated with Batch A, is diamand shaped. It bears a perforation at its tip and ressembles a chandelier's crystal. Interestingly, this feature contains irregular (white) beads dating back to the start of the 18th century as well as more recent regularly shaped, blue coloured

Batch	Type	Size	N
A	transluscant	5 - 11 mm	67
B	white opaque	various	489
C	white matt	3 mm	607
D	bleu lapis	3 mm	844
E	yellow	3 mm	32
F	powdered bleu	1 mm	5
G	transluscant with white veins	7 mm	1
H	facetted cristal bead		1
I	facetted cristal pendant		1

Table 11.5. The glass beads found in F 20.

beads and facetted crystals dating from *c.*1865. Apparently the entire group spans at least two centuries. The earlier beads may have been exchanged with other ethnic groups or represent familiy heirlooms.

Pits 11 and 12

During the excavation of Pit 11 we came across a transluscent, pinkish bead measuring 9 mm in diameter and 10 mm long. The hole's orifice is square, then cylinder shaped and measures 3 mm. Its irregularly polished facettes suggest it might be a biconical paternoster bead (Jargstorf 1995:48). A group of five similar beads was collected in Alaska and dated *c.*1800 (Hothem 2003:21).

All squares of Pit 12 (Level 2) were screened (cf. Section 4.2): (a) Square A3 yielded an oval bead measuring 6 x 4 mm in diameter consisting of white opaque glass and probably part of Burial 2, (b) Square B2 yielded another gooseberry bead. It measures 7 mm in diameter and 5 mm in length (F 20, Pit 1) and (c) Square E1 contained a dark blue transluscent bead with a diameter measuring 3 mm. The presence of these beads at Level 2 in Pit 12 is believed to be the outcome of post-depositional processes.

Conlusion

Produced in large quantities in Europe, glass beads were probably the ultimate exchange objects with the Amerindians. In 1750, for instance, the inhabitants of Cayenne ordered 1000 *rassades* (Fr.) of beads, to wit 300 yellow, 200 green, 300 white and 200 black beads (Polderman 2004:461).[325] Many historical documents and shipping listings can be cited here, but the latter shipment illustrates the colours found at Eva 2. Beads served the Amerindians to produce necklaces, armbands, bracelets, belts, loincloths, Father Raymond Breton reports on the Island Caribs:

325 Glass beads (Fr., *rassade*) are referred to as *kasuru* in Kali'na, but is a Portuguese loanword *casulo* (Collomb and Renault-Lescure 2014:104). Father Biet (1664:427) noted that the Amerindian women were fond of these glass beads: 'Rassade, Les Indiennes aiment grandement la Rassade, *oüali Indiana ciponimé aourleman cassouré*.' According to Hulsman (2009:141, note 182), the Dutch sold glass beads in a bundle, tied into a small whip, called "kwispelgrein" in Dutch. See also Hulsman (2011a:189).

> *Sont petits grains de verre blancs comme des perles ; on l'apporte de Venise, au moins la plus grande partie ; les Sauvages en sont fort curieux, en enfilent en de petites cordes de pitte, puis la tournent au lieu de la jarretière la largeur de trois doigts, autour du bras, entre l'épaule et le coude, au poignet au lieu de bracelet.* (Breton 1665:99–100)

Further research on the value of these glass beads in French Guiana is necessary in order to reveal, for example, how many beads were given in exchange for one hammock, specific quantities of tobacco and annatto, or victuals. Nevertheless, the varying quantities of beads per burial, the possible type of adornments and the type of burial suggest the existence of social stratification and/or gender as to this burial assemblage.

11.4.3 The stone ware

Wheel-thrown ceramics are rare at the site. Only five fragments from four or five vessels, mainly stoneware, were found as were a small number of pipe fragments.

Pit 5

Square A 1: this rim fragment of a platter has a salmon-coloured paste and an orange-coloured glaze on the inside of the rim and its lip. This type can be assigned to the Albisola production centre in Liguria, Italy.

Pit 14

Square B 9 yielded a stoneware foot. Its paste is greyish white and covered in a light brown glaze with darker spots. This slightly flaring foot resembles the specimen found in Burial 5.

Pit 16

This pit yielded various stoneware sherds belonging to a single glazed stoneware jug of which most fragments were found in and around Burial 5 (Fig. 11.10). Its base and neck were found inside the urn. Its greyish white paste is covered in a reddish brown mottled glaze. On its neck, a barbed face was modelled. The shoulder displayed three roses in a pastillage of which one was stamped just under the barb. The other two were stamped slightly lower and spaced. The handle was attached under the rim and on the shoulder. Here it was fixed to the vessel where three finger indentations are visible. The rim included pronounced, parallel grooves which probably served to hold the stopping system. The base features consecutive grooves.

This type of vessel can easily be recognised as a Beardman jug (G., *Bartmannkrüge*) produced in the Lower Rhine area in northwestern Europe. Although this stoneware was manufactured in Cologne and Frechen from the 15th century on (Cushion et al. 1987:137, 207), the pointed nose of the face as well as the size of the beard suggests a date of *c.*1640 (van Hees et al. 2002). Interestingly, Square G3 yielded a small greyware fragment that fits perfectly with the other fragments found in Burial 5. It was discovered at a distance of *c.*25 meters from the burial! Furthermore, the refitting of this vessel indicated it was incomplete. It may have played a role in funerary practices (e.g. breaking or killing of personal belongings) and in the end only partly protected in the urn.

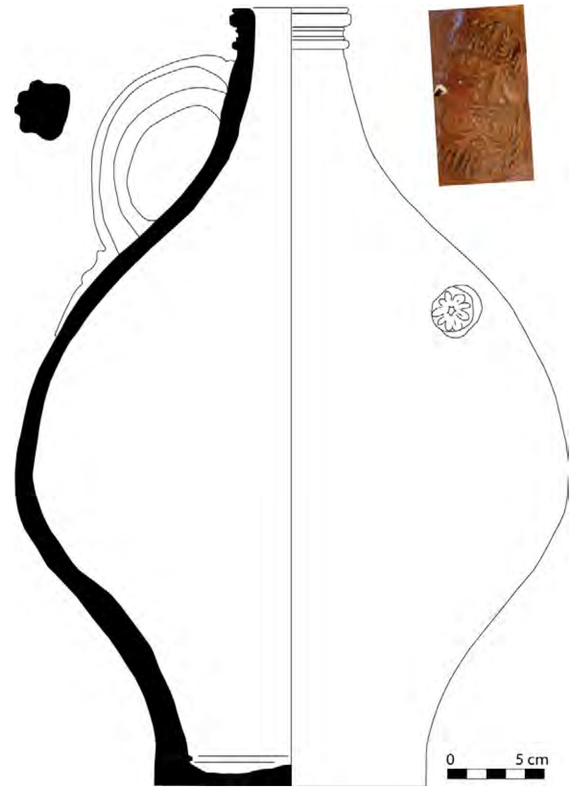

Figure 11.10. The Beardman found in Burial 5 (drawing adapted from Christian Vallet).

Square E 15 yielded a similar stoneware fragment which did not fit the German jug. Square A 2 yielded a stoneware foot belonging to a "pharmacy" vessel. Its base measured 9 cm in diameter, its paste had a white blueish colour and its shape was slighlty appendicular.

The clay pipes

Two fragments of a pipe were excavated of which one presented the heel of the furnace. The hole of the stem was slightly off centre. Its diameter measured less than 2 mm, classifying this specimen to the 18th century (Villié 1987:38–40).

11.4.4 Conclusion

Considering all the imported ware (metal, glass, ceramics) we observe a chronology ranging from the mid-17th to the late 19th century. On the one hand, as to the metal tools (hooks, axes, knives) and ceramics as well as a part of the glass beads, these artefacts can be attributed to the second half of the 17th century and the early 18th century. On the other hand, the majority of the glass beads –often found in the burials– can be attributed to the period after 1817 or even to 1840, suggesting that the burials are much later. Burial 5 did indeed contain artefacts dating from both the early and late historic period, suggesting that the Beardman and possibly certain beads had served as heirlooms or objects of exchange from the 17th century on. Based on these data, one can hypothesize that the site was occupied during the 17th and 18th century and had been utilised as a burial ground in the 19th century.

If the village had been abandoned when the deceased were buried, or if the village remained occupied after the dead had been buried, is unclear. Both scenarios are tenable, knowing that abandoned villages are known to serve as burial grounds by succeeding populations, perhaps to honour their ancestors. Strikingly no burials were found dating from the 17th or 18th century. However, these may be either absent (leaching?) or present at other as yet (unexcavated) parts of the site.

11.5 The lithic material

The arrival of Europeans and the introduction of metal tools have certainly had significant effect on the usage of stone within Amerindian society. However, stone implements remained a true part of every day life as reflected by means of the remarkable presence of lithic material (N=84) within Level 1 of the site. It should, however, also be noted that compared to the 12,000 lithic fragments from the Archaic level, stone material has turned into a rare artefact category (Table 11.6). Furthermore it has to be realized that certain Archaic Age lithic artefacts may have become intermingled with the first level when the historic population was digging their postholes and burials through the buried earlier occupation Level 2.

This assemblage has been analysed by Sandrine Delpech (in van den Bel et al. 2006:92–106). It includes twenty flakes of which 16 were made of quartz, two of flint, one of granite and one from amphibolite (Fig. 11.11a). Fourteen specimens measure less than 1 cm, four between 4 and 10 cm, and one flake measures 11 cm in length. Only four artefacts show use-wear and three flakes have been exposed to heat.

Three quartz flake cores with various morphologies have been found as well. They all have just one striking platform. Five anvils can be added. They are represented by means of large unidentified blocks, measuring between 6 and 14 cm in length, with traces of hammering on one or two sides.

One of the flint flakes is a gunflint made of blond flint from Berry, a village situated to the north of Limoges in the French Departments of Cher et l'Indre. These flintlocks have been produced here since the 18th century (Schleicher 1927; Emy 1978:54–66).

The most important tool category, however, are hammerstones, represented by means of 33 specimens. These include 30 specimens made of quartz, with the exception of two pebbles. All feature use-wear traces. Among them, we also identified seven polishing stones made of small pebbles, measuring between 2.5 and 6.5 cm in diameter, with both sides flattenend by repetitive rubbing or polishing. Other tools include: (a) a pestle measuring 16 cm in length and 4.5 cm in width, with abrasive traces on one side, (b) a grinding stone, or quern, fragment

	Quartz	Other	N
Flakes	14	6	20
Hammerstones	30	3	33
Cores	3	0	3
Anvils	4	1	5
Other	2	7	9
Unidentified	13	1	14

Table 11.6. The general lithic count.

measuring 13.5 by 10 cm, with one concave side as well as hammering traces on the other, (c) a grooved grinding stone made of unidentified rock measuring 7.5 x 6 cm, featuring one abrasive groove in the middle of one of the sides (Fig. 11.11b) and (d) six fragments with traces of abrasion.

In addition to glass beads and stoneware, Burial 5 provided more interesting elements. The presence of a large quantity of stone fragments measuring less than 1 cm and made of an unidentified rock variety. This material has been found during the screening of the fill from Burial 5 (Fig. 11.11c). We were not able to distinguish if these fragments were intentionally broken or if they represent small natural rock fragments. Their angular morphology suggests the former option. This may imply that these small stones represent the contents of a (shamans) rattle, or *maraca* (A.), which may have been presented to the deceased interred in Burial 5 or the lithic remnants of a grater board (Fig. 11.11d).

The spatial distribution of the lithics indicates that the majority of the material was recovered from the central part of the excavation, similar to the location of the iron tools, burials and postholes. In conclusion, the absence of specific stone tools, notably stone axes, is remarkable and may indeed reflect changes, Amerindian society witnessed due to introduction of European metal tools.

Figure 11.11. Various lithic artefacts: (a) a fragment of a blond gunflint (Pit 6, Square D), (b) a calibrator or sharpener (Pit 2, Square C), (c) small flakes (Burial 5) and (d) a drawing of a maraka (after Ahlbrinck 1931:107).

11.6 The Amerindian ceramics

11.6.1 Introduction

The ceramic inventory of Eva 2 comprises *c.*6141 fragments, weighing over 206 kg (Table 11.7; Annexe 8.6).[326] The entire collection consists of pottery retrieved at Levels 1 and 2 of the excavation –the 19th century graves were found at excavation Level 2, just below the Archaic layer, and thus intrusive– as well as the material found during the survey (Jérémie 2005), collected per trench, which was never studied. The ceramic material of the excavation was not only acquired by means of handpicking in 2 x 3 m rectangles, but also from features. The latter yielded very little material, but represented nearly 50% of the total weight of the ceramic assemblage, i.e. Burial 5 and F 8 in Pit 8.

The ceramic analysis presented here is based on 366 constituent elements (EC), comprising 284 rims, 73 bases, nine griddles and seven complete vessel shapes. On the one hand, the disparity between decorated and plain ware is low: only 5.3% of the total ceramic assemblage is decorated. On the other hand, the disparity of the rim-category is remarkably higher as to both the entire ceramic assemblage as well as the EC register, to wit 20%. However, this is rather low when compared to the LCA site of CPP (cf. Section 9.5.1).

The only manufacturing technique observed at this site is the coiling technique albeit that four possible wheel-thrown ceramics may have been recognized, i.e. EC 147-148, 168, 307. In general, paste, finishing techniques and firing modes were identified with the naked eye whereas four fragments were analysed in order to determine the paste's mineral composition. Four general temper modes were distinguished after checking all ECs (Table 11.8). The mixed temper is the most important temper mode (Nos. 31 and 32) of which the latter ash variety dominates the EC register. The difference between mixed and grog temper was on occasion difficult to discern as the potsherds tempered with pounded potsherd or grog also contained low quantities of charcoal, ash or quartz. However, whenever grog was dominant, often breaking the potsherd multiple times, we opted for a grog classification (No. 41). Thus, mixed temper may also contain low quantities of grog, hereby suggesting that mixed temper *sensu latissimo* occurred very frequently. Furthter microscopic analysis is needed in order to determine the precise quantities of the various temper agents in the sherds (see microscopic analysis in Section 8.5.2).

The application of burned, siliceous tree bark particles as a temper, known as *kwepi* or *caraipé*, provides a paste with an alveolic structure, characterizing the appearance of this assemblage.[327] Today, *kwepi* is the most frequent temper among the coastal Amerindians of the Guianas, notably among the Palikur and Kali'na (Ahlbrinck 1931:343; Delawarde 1967:342; Boomert 1986:117–118; Cornette 1988a, 1992:46; Rostain 1995:99–101; van den Bel 1995:76–78; van den Bel et

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326 For the excavation report, Matthieu Hildebrand carried out the ceramic study (in van den Bel et al. 2006:57–76). However, the present author conducted another (second) study of the same material in June 2013. It is presented here and contains several differences, notably concerning the presence of potsherd temper.

327 Boomert (1985:118) has pointed out that the term *caraipé*, often erroneously spelled *cariapé*, is derived from the name of the Amerindian village in which the naturalist Richard Spruce (1817-1893) witnessed the use of *caraipé* as a temper during the late 19th century, according to Linné (1925:38–47). In Cariban, this temper is called *kwepi* and in Arawakan *kauta* (Boomert 1985:117, 1993:20).

Table 11.7. The general ceramic count.

	Plain	Decorated	N	Weight
Features	227	11	238	66503
Surface	5585	318	5903	139850
Total	5812	329	6141	206353
	94.7%	5.3%	100%	gr

Table 11.8. The distribution of the principal temper modes. Although the vegetal particles have not been determined, they are thought to represent the pounded fraction of burnt bark, nowadays referred to as kwepi.

			Mode	N
Mineral (10 %)	**1**	sand / quartz	11	12
		quartz + mica	12	19
		quartz + mica + black minerals	13	4
Vegetal (8%)	**2**	charcoal particles	21	16
		ash	22	13
Mixed (61 %)	**3**	charcoal particles + quartz	31	77
		ash + quartz	32	146
Grog (21%)	**4**	pounded sherd	41	78

al. 1995). The omnipresence of *kwepi* as a temper at Eva 2 is highly remarkable when compared with the LCA sites presented in the previous chapters, with the exceptioin of Phase 3 of CSL and LPB, probably evoking a specific economic and/ or political development during the (late) LCA and protohistoric times.

The sand-tempered ceramics are most often characterised by means of the presence of powdered mica which may have been pounded (together with the quartz particles?) and added to the paste. Mica is rarely found in the mixed pastes and may represent a different clay source or even a different production area (trade ware?). Interestingly, mica is also an important agent in the ceramic pastes of the Crique Sparouine site, situated in the hinterland of the Maroni River.

The mineral analysis of two sherds, i.e. 05-38-03-A (Pit 2, Square E), and 05-38-03-E (Pit 19, Square B 8), present us with an abundance of sand as a temper whereas the former contains higher levels of calcite, corresponding to the addition of crushed shell or (burnt) bone. The latter particles were observed in six ECs, possibly revealing another production area or day source, despite the fact that the concerned vessel shapes adhere to the general repertoire.

The macroscopic analysis of the firing modes was observed with all ECs and determined by means of making a fresh fracture, resulting in four principal colours: (a) red all over, (b) orange to brown all over, (c) dark grey core with lighter coloured walls and (d) dark colour all over. The firing modes (c) and (d) correspond to a reducing environment (51%),mode (b) to an oxidising environment (22%) whereas (a) corresponds to a combination of both firing techniques (27%).[328] The reducing firing technique in combination with a mixed and grog temper represents the most frequent ceramic ware at this site (45%) whereas sandy pastes are hardly fired in a reducing environment, but rather in an oxidising one.

The state of conservation of the ceramic material is mediocre and even worse as to the *kwepi* tempered ware, which is on occasion very crumbly. Any surface finishing and possible painting (if present) is difficult to identify. The mean weight of the ceramic material is 24 gr per shard (total weight vs. total sherds). This is slightly lower than, for example, the site of CPP.

328 This reducing firing corresponds to nos. 9 and 10 after Rye (1981:116, Fig. 104).

11.6.2 The constituent elements

The rims

The rim collection, with exception of the griddles, is represented by means of 290 elements enabling us to distinguish 24 morphological categories regrouped in ten modal series (SM). They are determined according to: (a) inclination, (b) morphology, (c) lip variation and (d) the presence of a collar and/or keel per element (Table 11.9). The most important series are SM I (33%) and SM III (15%) followed directly by SM IV (13%) and SM VII together with SM VIII, both accounting for 11% of the constituent total. The series SM VI (8%), SM V (5%), and SM II (1%) are less popular, but nevertheless relevant. The remaining series, i.e. SM IX and SM X, are anecdotic.

SM I This most frequent series is represented by means of a straight or slightly convex rim profile inclined towards the exterior (N=96). It also comprises five complete vessel shapes, i.e. EC 216-217, EC 219, EC 229-230. The SM I series is subdivided according to the position and finishing of the lip of which the rounded (unmodified) lip (SM Ia) is the most important followed by flattened (square, SM Ib), bevelled (SM If) and lips flattened on the inside (SM Ic).

The wall thickness varies between 5 and 11 mm with an average of 7.8 mm. The diameter varies between 11 and 58 cm, revealing various types of spherical, tronconical and hemispherical bowls in several shapes (cups, bowls, platters and larger basins). Six ECs have diameters smaller than 15 cm and represent (small) conical cups, such as the one found in Burial 1, i.e. EC 217 (Fig. 11.12). Interestingly, the largest diameters measuring more than 50 cm were recorded for the rims consisting of broken keels, i.e. EC 27, EC 220, EC 248, illustrating the recycling of ceramic vessels. Here we may also add the presence of reparation or suspension holes in several rim and body fragments.

Excluding the latter elements (N=9), we acquire a diameter range measuring between 16 and 46 cm with a mean value of 27 cm. The mean diameter value for each subseries shows that each subseries, as a proper value, reveals a possible link between diameter and morphology. Only SM Ia and SM Ic have similar values (Table 11.10). However, the difference between these vessel shapes is evident when considering the lip modification paired to the application of red paint on its interior and, to a lesser extent, the presence of spaced notches on the lip. This entire series is dominated by means of red paint applied to the interior. It represents almost 40% of the SM I total, comprising one bifacial painted element, five notched rims and two small modelled applications. Notches or polylobed rim decoration is the second most popular in this series, representing *c.*15%. SM Id is another remarkable subseries because of its bevelled lip towards the interior, similar diameters and the application of red paint to its interior (100%). Albeit a statistical minority, the general features are striking with regard to this assemblage.

The distribution of temper agents and firing techniques of this series reflects the general tendency of the entire Eva 2 assemblage. The majority of the elements has a mixed temper (N=61) which is either fired in a reductive or oxidized environment. The grog tempered rims (N=22) are predominantly fired in a reductive environment as is the vegetal temper (N=10). Only a small number of rims in this series has a mineral temper (N=5).

SM		Shape	Profile	Lip	N	
I	a	O	Straight or slightly convex	Rounded	33	
	b	O	Straight or slightly convex	Flattened	19	
	c	O	Straight or slightly convex	Flattened on the inside	15	
	d	O	Straight or slightly convex	Beveled towards inside	4	
	e	O	Straight or slightly convex	Thickened	8	
	f	O	Convex	Bevelled towards outside	17	96
II		O	Everted or 'flaring'	Miscellaneous	4	4
III	a	O	Concave	Rounded and tapered	12	
	b	O	Concave or straight and keeled	Rounded and tapered	20	
	c	O	Concave keeled collar	Rounded and tapered	12	44
IV	a	O	Straight or slightly concave collar	Bevelled towards outside	17	
	b	O	Straight or slightly concave keeled collar (toric)	Bevelled towards outside	20	37
V	a	R	Straight	Flattened	8	
	b	R	Straight (keeled) collar	Flattened	8	16
VI	a	R	Convex	Miscellaneous	13	
	b	R	Convex keeled collar or 'eared'	Miscellaneous	11	24
VII	a	R	Straight	Bevelled towards outside	11	
	b	R	Convex	Bevelled towards outside	14	
	c	R	Keeled	Bevelled towards outside	7	32
VIII	a	R	Straight or slightly concave collar	Miscellaneous	12	
	b	R	Straight keeled collar (toric)	Bevelled towards outside	11	
	c	R	Concave keeled collar	Slightly tapered	9	32
IX		R	Straight collar	Rounded	2	2
X		U	Unique		3	3
					290	

Table 11.9. The rim series SM I-X.

SM III The rims of this series are the second most frequent (N=44) and represented by means of concave and straight-keeled collars with predominantly tapered lips (SM IIIb-c). It comprises one complete vessel (EC 223) which sets a good example for this series (Fig. 11.12). It is presumed that the highly concave, tapered rims (SM IIIa) are in fact collars. This is the reason why they were introduced to this series. However, the latter open subseries shares similarities with the restricted subseries of SM VIIIa, constituting 8% (N=24) of the total rim register.

This series also accounts for small cups or miniatures (N=4). With the exception of these elements, the mean wall thickness measures 8 mm. Its diameter measures 28 cm. The diameters of this subseries vary between 16 and 44 cm, revealing keeled pots, bowls, shallow bowls, and basins. Of this carinated series only three elements are decorated: red paint or slip is applied on the inside. Again,

SM	N	M. wall thickness	M. diameter (cm)	Decoration	%
ia	29	7.8	26	8	28
ib	16	8.1	21	8	50
ic	15	7.3	26	12	80
id	4	7.3	22	4	100
ie	8	7.3	23	5	63
if	15	8.3	30	4	27
	87	mm	cm		

Table 11.10. The general characteristics of SM I (without cups and re-used keels).

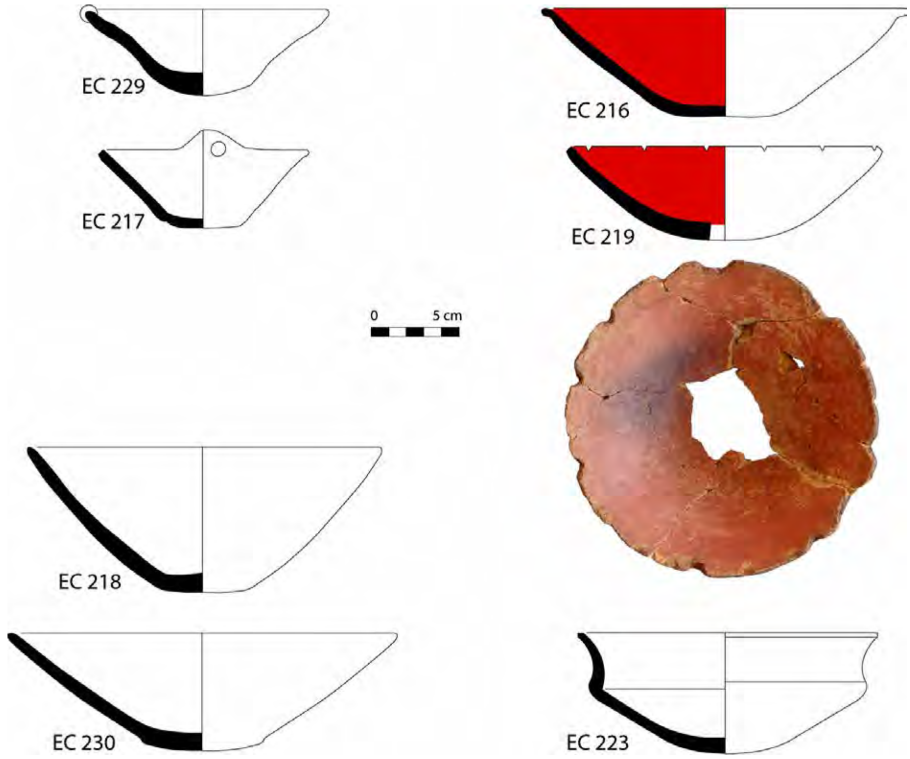

Figure 11.12. The complete vessel shapes (without EC 364 of Burial 5).

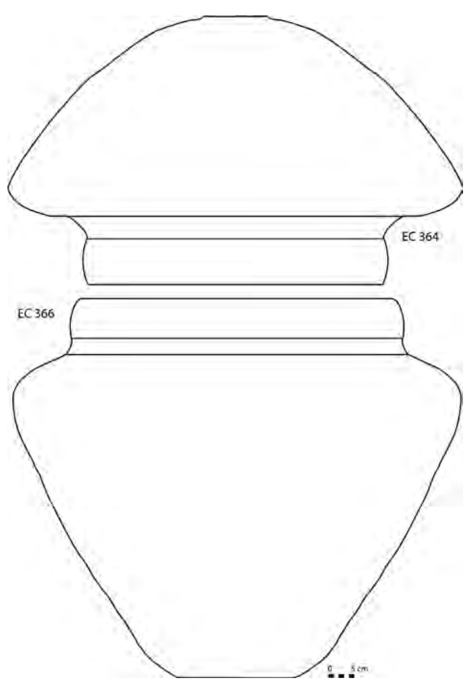

Figure 11.13. The ceramic vessels found in Burial 5 in a funeral position. EC 366 depicts a symmetrical projection of reconstruction (partially redrawn after Hildebrand in van den Bel et al. 2006:72).

the general paste vs. firing mode is reflected here for grog (N=6), mixed (N=29), vegetal (N=6) and mineral (N=3) vs. R, R/O, R and O firing respectively.

SM IV The following relevant series is also a collared vessel and marked by means of straight or slightly concave rims with bevelled lips (N=37), but it does not comprise complete vessel shapes. These series was subdivided by means of a carination of the profile and a "bombed" body below the neck or toric pot (SM IVb).

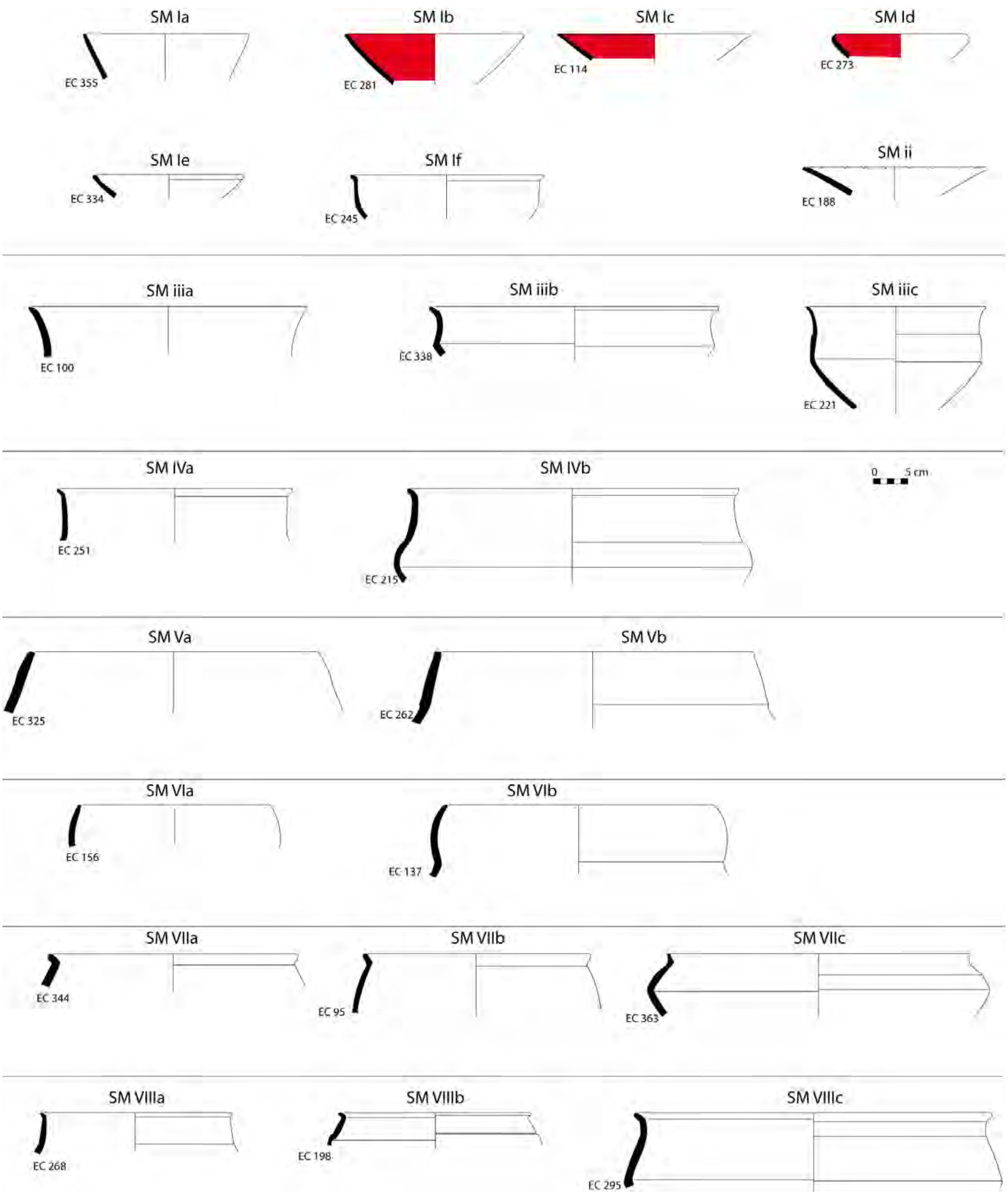

Figure 11.14. The rim series SM I-VIII.

This series also includes miniatures (N=3), ranging from 10 to 12 cm in diameter, stretching its range from 10 to 48 cm. It has a mean wall thickness of 8 cm. When the sum of the mean diameter (29 cm) and the frequency (N=2.4) is taken as characteristic element, one observes that orifices between 26 and 34 cm dominate with a high peak at 30 cm. This suggests a preference for this

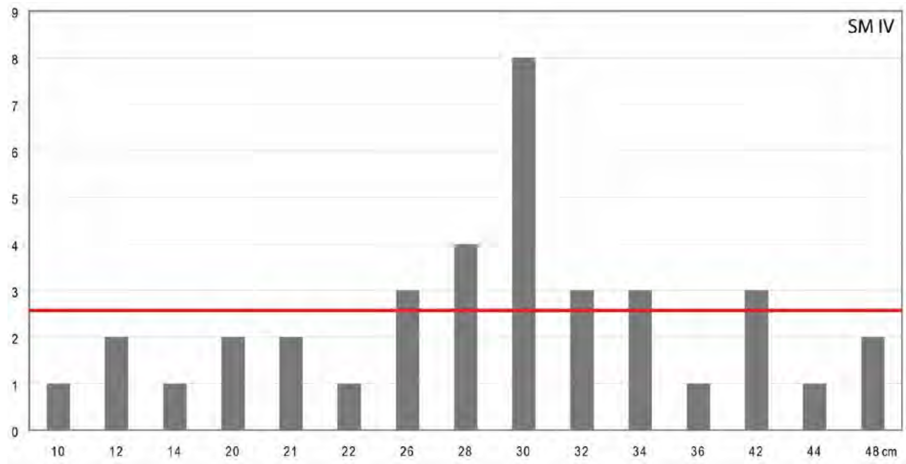

Figure 11.15. The diameter frequency of SM IV.

carinated large pot (Fig. 11.15). Surprisingly, this series is completely without any decoration. Its firing methods resemble the previous series and the assemblage.

SM VIII The following series is just as relevant as SM VII (N=32). However, it is dealt with here first because it represents the restricted version of the previously discussed SM IV. Therefore, this series represent the straight or (slightly) concave, keeled collars (SM VIIIb-c) and the supposed "collared" rims (SM VIIIa), as mentioned previously regarding SM IIIa.

This series represents larger carinated vessels with a mean wall thickness of 8.4 mm. The orifice diameter peaks at 28 cm as to SM VIIIa and at 30 cm as to SM VIIIb of which the latter has a mean average of 36 cm. SM VIIIb peaks at 28 and at 18 cm, suggesting that smaller, notably toric pots are represented here too. Again, this series is entirely without any decoration and includes similar firing methods to the general assemblage.

SM VII This series represents rims inclined towards the inside with bevelled lips. A subdivision was established concerning straight (SM VIIa), convex (SM VIIb) and keeled (SM VIIc) rim profiles of which the convex profile is the most frequent. All series range between 15 and 48 cm with an impressive mean wall thickness of 9 mm. Only SM VIIb peaks at 24-25 cm and 30 cm, suggesting a certain preference for restricted, spheric vessels with outward bevelled lips. Again, this series is entirely without any decoration with the exception of one specimen with complex white-on-red painting on its exterior (EC 304). The distribution of firing methods and temper is similar to the above-described series.

SM VI The following restricted series is represented by means of convex rims with tapered or flattened lips (SM VIa). It also has a keeled collar (SM VIb) with predominantly flattened lips, dubbed "eared vessels." These large vessels have diameters measuring up to 57 cm and a mean diameter of 38 cm whereas the wall thickness measures *c.*1 cm. When the sum of the mean diameter and its frequency (N=1.8) is taken as characteristic element, the orifices measuring between 30 and 32 cm occur frequently too, albeit to a lesser extent. Those even larger measure between 42 and 48 cm, suggesting very large composite vessels (Fig. 11.16). Again, this series is undecorated. The mixed temper is applied the most.

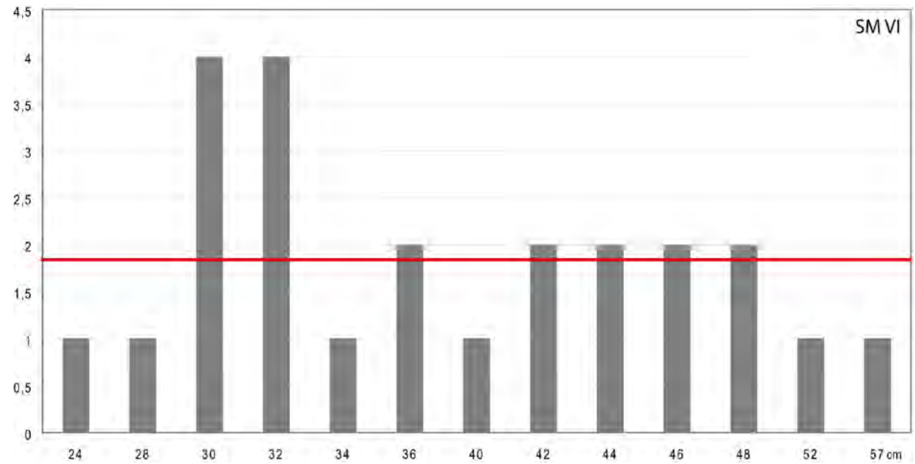

Figure 11.16. The diameter frequency of SM VI.

SM V The following series (N=16) is similar to the previous series, as the profiles are straight with flattened lips. It was subdivided on account of a marked keel (SM Vb) making way to even larger bodies as confirmed by the mean wall thickness measuring 12 mm and the diameter measuring 43 cm. Diameters measuring 32 and 44 cm occurred most frequently in this series which is completely undecorated. Its principal temper is mixed.

SM II This minority series (N=4) is characterised by means of a flaring or everted rim with a flattened lip. The wall thickness measures *c*.8 mm and the diameters vary between 22 and 26 cm. Two rims are polylobed of which one has white slip applied on the inside covered with red painted fine-lined geometric designs. These bowls are fired in a reductive environment and have a grog to a mixed temper.

SM IX and **SM X** This pair contains two and three elements respectively, each representing closed forms. They were not ascribed to any category because of their rareness. Two elements include red painting.

The bases

We counted four times less bases (N=73) than rim elements. The former were divided into five series: flat bases (SM 1), convex bases (SM 2), concave bases (SM 3), annular bases (SM 4) and unique bases (SM 5). The convex bases occur most frequently: 52% (Table 11.11). The majority of the convex bases are characterised by means of an appendicular aspect. The mean thickness measures 12 cm and the diameter 5.6 cm, reflecting rather small pointed bases (Fig. 11.17). The other relevant series have flat bases (N=27) with a larger mean diameter measuring 7 cm and a thickness measuring 11 cm. The dimpled bases as well as the two fragments of annular bases are rare. Base EC 364 of the urn in Burial 5 is unique which can be related to its exceptional size (see Fig. 11.13). As to the base register, only three items have red paint on the inside. The temper is predominantly mixed (N=43).

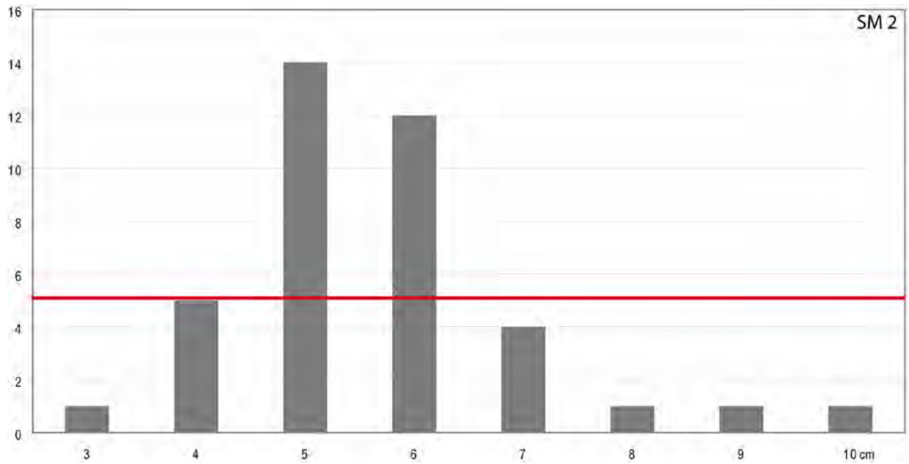

Figure 11.17. The diameter frequency of SM 2.

The griddles

Remarkably, baking plates or griddles represent less than 1% of the total assemblage. We counted nine rim fragments with varied morphologies. Rounded rims appear to be the most common.The mean thickness measures 19 mm and diameter ranges between 28 and 50 cm.

11.6.3 The decoration modes

The decorated material represents only 5.4% of the total Eva 2 assemblage. The repertoire is scant and composed of red paint or slip, corresponding largely to "Dark red" (7.5 R 3.6) of the Munsell© code (77%). This red colouring is applied to the inside (87%), to the outside (11%) and to both sides (2%).

Other modes of decoration are less important. A series of spaced notches on the lip (6%) are associated with red paint, applied to the inside of the small bowls (SM I). Any modeling is rare and represented by means of small nubbins applied to the rim. Ten fragments included two or more colours applied to the outside of the wall: white-on-red, red-on-white or black-yellow-orange on white, revealing sparse polychrome painting.

A mineral analysis is recommended with regard to the determination of the products the Amerindians adopted in order to create these colours. Nowadays red colours are made of red clay (C., *kuli*; Ahlbrinck 1931:232) or vegetal matter, such as annatto or specific tree barks (P. Grenand and Prévost 1994:141–154; Coutet 2009:143–146). A large number of the potsherds (N=13 for the ECs) displayed a brownish coloured film. It had been applied to the vessel wall and may well be the result of a vegetal varnish which the contemporary Kali'na still use. A lump consisting of *simili* resin (Ahlbrinck 1931:234), predominantly extracted from *Hymenaea courbaril*, is heated and rubbed on the vessels in order to obtain this glaze (Delawarde 1967:343; Boomert 1995:27).

11.6.4 The spatial distribution

The ceramic material was found all over the excavated area which represents a former walking surface with abandoned artefacts as various ceramic concentrations suggest (Fig. 11.18a). We can observe four concentrations (Zones A-D): (a) a large concentration in Pits 14 and 15 (Zone A) and three secondary concentrations,

SM	Description	N
1a	flat with straight profile	12
1b	flat with convex profile	11
1c	flat with concave profile	4
2a	convexe	16
2b	convexe and appendicular	23
3	dimpled	6
4	annular	2
5	unique	1

Table 11.11. The base series SM 1-5.

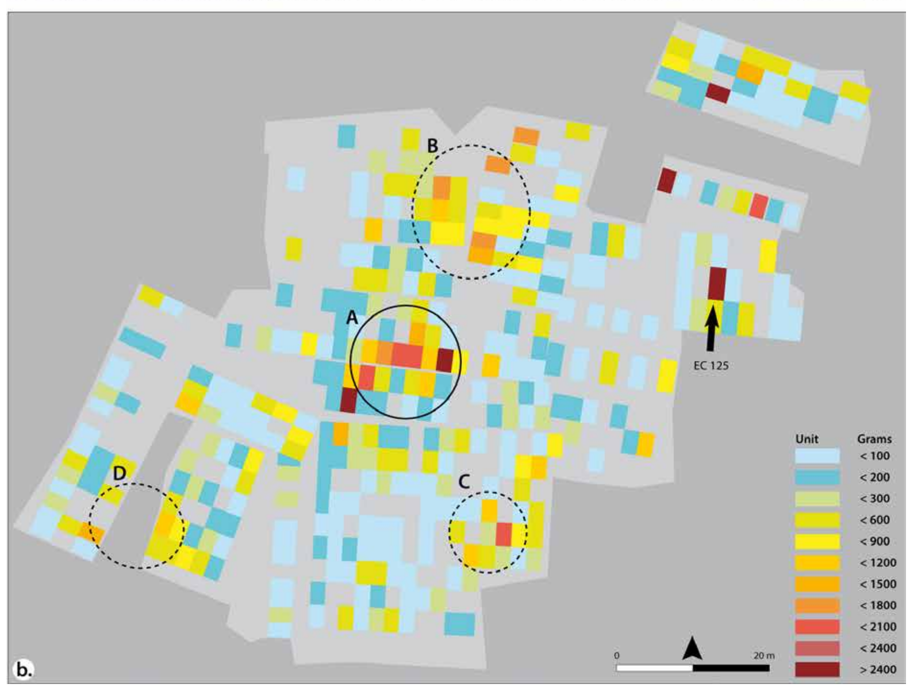

Figure 11.18. The distribution of the principal temper modes. Although the vegetal particles have not been determined, they are thought to represent the pounded fraction of burnt bark, nowadays referred to as kwepi.

(b) one to the north at the boundaries of Pits 5, 11 and 10 (Zone B), (c) one to the southeast in Pit 16 (Zone C) and (d) a minor zone to the southwest in Pit6 (Zone D) (Fig. 11.18b). The principal concentration is probably a waste area created at the periphery of the houses during the most recent occupation. This hypothesis not only attested for by the means of diversity and the quantity of the artefacts (ceramics, iron tools), but also due to the lack of other features in this area, such as postholes (cf. Fig. 11.2). The other concentrations are less important considering the quantity of material. The northern concentation is positioned on top of numerous postholes, suggesting that this possible habitat was abandoned to then serve as a waste area. The other two areas contain even less ceramic material, do not exhibit postholes and may thus represent complementary waste areas.

11.6.5 The synthesis of the ceramic assemblage

The general characteristics

This typological synthesis is based on the study of 366 constituent elements as well as the decoration modes of the entire assemblage. The morphological register declines about three important forms: (a) small bowls (SM I and SM II), (b) keeled pots and basins (SM III-IV and SM VII-VIII) and (c) large collared vessels or jars (SM V-VI).

Only a small number of morphological and decoration combinations recur with regard to this assemblage. This may reflect a certain kind of standardisation regarding the Eva 2 pottery production. SM Ia-c are omnipresent at this site representing small, hemispherical bowls of which elements of the latter (SM Ic) are very often decorated with red paint on the inside, a flattened lip on the inside and regularly have spaced notches on the lip. Notably the red-painted, notched bowl (EC 219) found in Burial 7 is characteristic as to this series. In ethnographic studies, the colour red is most often associated to life and transformation in contemporary Amerindian society, stressing the symbolic connotation of this colour with death (de Goeje 1941:46; Chapuis 1998:141).

As to the undecorated ware, one must refer to the highly recognisable "eared" vessels (SM VI) and straight-collared, composite jars (SM V), but also to toric pots, notably SM IVb and SM VIIIb. Other series are marked by means of the bevelled lip towards the outside, notably SM VII, representing spheric and/or carinated restricted basins. Rounded and (rounded) appendicular bases (SM 2) for small bowls and keeled pots characterized this assemblage.

The cultural affiliation

The handmade ceramics of Eva 2 are rather simple with little elaboration as to the decorative aspects. However, the morphological repertoire reveals some originality in size, shape and lips of which the undecorated toric pots and eared jars are probably the best examples. These vessel shapes are considered important markers for stylistic comparison with other LCA and Historic Age ceramic assemblages. A LCA ceramic assemblage most resembling that of Eva 2 is probably the Koriabo site of Saut Saillat, located on the banks of Crique Serpent, an affluent of the Maroni River and excavated by the INRAP in 2006 (Hildebrand et al. 2008) (cf. Section 6.4.5). This site's morphological register is attributed to the second half of the 15th century. It includes small hemispherical bowls (see SM Ia-c vs. C1–4, D O1), white-painted flower bowls (SM II vs. D1), undecorated carinated pots (SM IIIc vs. G1–4), and undecorated toric pots (SM IVb and SM VIIIb vs. F3-4) amongst others (see Hildebrand et al. 2008, Fig. 24). However, when compared to Eva 2, plastic modeling is abundant at Saut Saillat whereas the importance of red painting of Eva 2 is equivalent to the white painting at Saut Saillat (ibid., p. 41).

The Petit-Saut excavations yielded numerous similar vessels shapes, notably undecorated, carinated and toric pots for LCA sites, such as BPS-13 (Vacher et al. 1998:225, Plate 9.159, 161), BPS-17 (ibid., p. 230, Plates 16.22, 25-26), BPS-172 (ibid., p.236, Plates 25.94, 97-98), BPS-260 (ibid., p. 263, Plates 66.132, 134, 140, 147) which may reveal a cultural link. Other LCA undecorated toric pots were found at CPP, i.e. EC 77 and EC 117, suggesting Koriabo affinities as to Poncel, too (cf. Fig. 9.18).

As we have mentioned before, the Eva 2 site has an ambigious chronology because of: (a) the lack of radio carbon dates and (b) the large chronological range of European goods (e.g. axes, stoneware, glass beads), which can be dated between the mid-17th and late 19th century. Thus, it is assumed that the ceramics found at Eva 2 belong to this range of *c.*250 years (AD *c.*1650-1900). This is shorter than most previously discussed occupation spans of LCA sites in coastal French Guiana, but coincides partially with the protohistoric radiocarbon range of Saut Saillat and its ceramic assemblage.

In addition, the presence of European artefacts, the simplicity or sober style of the ceramics as well as the total lack of incisions evoke a more probable ascription to the Historic Age in the course of which the ceramic tradition is thought to have declined or changed because of European influences and the assimilation of indigenous coastal groups. The loss or change of ceramic, next to the loss of decoration, during this period is also demonstrated by means of the amount of ceramics found at the site: for instance, the LCA site of Katoury yielded 6.3 potsherds per m² whereas Eva 2 only 1.3 per m². Apparently, Amerindian villages produced less ceramics, but also spent less time on decoration. This can be considered as deterioration of the ceramic production in general as well as a diminuation of its general use in daily life.

Nonetheless, the ceramic assemblage of Eva 2 shares numerous links and stylistic traits with the immediate past or most recent LCA traditions on Cayenne Island and the western littoral, as the following indicates:

a. The presence of toric pots found at numerous sites in the Guianas is generally attributed to the LCA and the Koriabo ceramic complex (Boomert 1986, 1995, 2004; Rostain 194a; Vacher et al. 1998). However, the Eva 2 toric pots, albeit perhaps less “bombed” or toric, are entirely without decoration in contrast with the relatively large quantity of highly decorated examples from the LCA. In fact, only one small rim fragment with a Koriabo-style modeling and incision was found on site. It may be intrusive or perhaps a fragment of a heirloom. Thus, if Eva 2 is more recent than most pre-Columbian Koriabo sites, it reveals a shift from decorated to undecorated toric pots. This shift is also partially visible as to the Koriabo related Cayo complex of Saint Vincent (Boomert 1986; Boomert et al. 2013:120–124);

b. Another characteristic Koriabo vessel shape is the flower bowl. It is most often decorated with white slip on the inside and furnished with geometerical red-painted and/or polychrome designs. The latter bowls as well as their scraped or incised counterparts often reveal regularly spaced notches, constituting a polylobed rim (cf. Fig. 6.21). At Eva 2, it may well be the case that the flaring rims of SM II represent flower bowls of which two are notched and one has white slip on the interior;

c. This notched rim trait is also found on Cayenne Island as pointed out for CPP. It is again associated with white-on-red painting, a common trait of the protohistoric Thémire complex and radiocarbon dated *c.*AD 1400-1600 (Rostain 2013:122) (cf. Fig. 9.13). This possibly suggests that the later phase of Thémire, i.e. Late Thémire, has strong Polychrome (Late Aristé?) or perhaps Koriabo influences –which is again affiliated to the Polychrome tradition, according to Boomert (2004:261);

d. Albeit encountered in very small quantities, the polychrome fragments –as with the Koriabo rim sherd– may represent the remnants of earlier pottery that ultimately abandoned on site whereas other fragments may have been pounded into temper. Of more relevance is that this polychrome ware is not only associated with very recent LCA sites (e.g. Saint-Agathe, Montabo Sud, Montagne à Colin), but also with Bigiston and Christiaankondre on the Lower Maroni River. All feature white-on-red and polychrome painting as well as highly decorated Koriabo ware (Samuelian 2009);

e. The small red painted bowls (SM Ia-c) are again found on Cayenne Island (e.g. CPP EC 36, EC 125, EC 205, EC 209, EC 233, EC 244), but also at AM 41 (e.g. EC 3, EC 17, EC 61). Yet again, at the latter site, EC 3 found in burial zone B displays striking similarities with Eva 2's SM Id (cf. Fig. 7.14);

f. The earlier LCA ware of Cayenne Island as found at CPP and PK 11 features a large collared jar (e.g. CPP Form B; cf. EC 170 in Fig. 9.17) similar to SM Vb. However, the collar of this Cayenne jar often has alternating or oblique incisions which Eva 2 lacks. It can be suggested here that the abandonment of incisions may have occurred during the early or proto-historic period;

g. Eared jars are rather common along the Guiana littoral during the LCA and were found at Crique Sparouine (cf. Fig. 6.17, EC 65) and CPP (EC 176 and EC 179) in French Guiana and at Barbakoeba (Boomert 1993:208, Fig. 6.9) in Suriname (Boomert 1986:34, Fig. 14.2), or even further away at Cayo on the island of Saint Vincent in the Lesser Antilles (Boomert 1986:20, Fig. 4B3). Moreover, further on towards the eastern littoral, they were encountered among the Late Aristé funerary vessels where these rims are often furnished with a modelled face (Goeldi 1900; Rostain 1994a; Mestre and Hildebrand 2011);

h. Last, but not least, the dominant application of *kwepi* as a temper agent contrasts the grog-tempered LCA ware of AM 41, LPB and Cayenne Island. Perhaps present in earlier times –further research is needed at this level– the use of *kwepi* as a temper may have received more importance during the early Historic Age, representing a shift in pottery production from mainly grog to *kwepi*. The omnipresence of *kwepi* as a temper during the recent LCA has been pointed out in other regions along the Atlantic coast (Boomert 1985, 2000; Roosevelt 1997; Schaan 2004).

In conclusion, the ceramic assemblage of Eva 2 can be attributed to the 17th and 18th century. It was abandoned in the course of the 19th century as the burials demonstrated. The undecorated toric pots and large eared jars suggest a link with the Koriabo ceramic complex. However, the lack of incisions and their general quality suggest a second phase, or a later development, from pre-Columbian Koriabo to the Koriabo after the Colonial Event, dubbed Koriaban and Aristan Marajoaroid respectively by Boomert (2004:261). Thus, the former Koriabo ware transforms into a simpler ware without much attention to decoration. We will return to this matter after a short historic outline of the site location at Malmanoury and its surroundings.

11.7 A brief history of Malmanoury

Having presented the archaeological evidence we will now provide a more detailed description of the historic events that unfolded between the Sinnamary and Kourou Rivers in order to gain not only a better insight into the Amerindian presence in this particular region but also to evaluate the continuity or discontinuity of pre-Columbian and Historic ceramic traditions. Several important events are repeated from the introductionary Chapter 10. However, more detailed information is added here in order to asses the interactions between Amerindians and Europeans.

11.7.1 The first encounters

Towards the end of the 16th century, the 'Ipaios and Ch[aribes]' inhabit Malmanoury or *Manmanuri* according to Lawrence Keymis, one of the first Europeans to explore this coast. Importantly, he reports that these continental Amerindians speak the same language as the Amerindians on the island of Dominica in the Lesser Antilles, evoking a linguistic and perhaps cultural link between both regions:

> *These speake the language of the Indians of Dominica. They are but few, but very cruel to thier enemies. For they bind, and eat them alive peecemeale. This torment is not comparable to the deadly paine that commeth of hurts, or wounders, made by those arrowes that are invenomed with the juice of ye herbe Wapototo. These Indians because they eate them whome they kill, use no poyson. The sea coast is nowhere populous, for they have much wasted themselves, in mutuall warres. But now in all parts so farre as Orenoque, they live in league and peace.* (Keymis 1596:F4v)

In addition to these Amerindians, the Dutch commissary Abraham Cabeliau encountered the 'Geribus and Jau' (Caribs and Yao) at large off Kourou, when his fleet watered at Devil Island in 1598 (in de Jong 1862:155). Harcourt (1628:132), too, noted the presence of 'Charibs' at Malmanoury who by now were residing between the Sinnamary and Approuague Rivers. As mentioned in Chapter 10, the Guiana Coast had been invested by fleeing Amerindians from Trinidad during the last quarter of the 16th century and notably by 'Yayes, Arwalkes and Suppayes' (Wilson 1625:1263). These incoming groups settled among the local groups of the eastern Guianas, especially the *Charibes* and *Aricouros*. The Yao, under command of Anacaioury, settled firmly along the Oyapock River, even taking over the regional powers in the area by means of teaming up with the *Aricouros* (Collomb and van den Bel 2014).[329]

In the course of this indigenous turmoil on the Guiana Coast, the Europeans bartered goods with Amerindians and started outposts on river banks of notably the Oyapock, Cayenne, Maroni and Suriname Rivers, inhabited by various groups. After La Ravardière's short visit off Cayenne in early 1604, the French, under instigation of Cardinal Richelieu, started to settle in the West Indies, notably on St. Kitts, but also on the banks of the Sinnamary River. In 1626, a private company from Rouen established a colony under the command of Sieur de Chantail and his Lieutenant Sieur Chambaut at the Lower Sinnamary River (Férolles [1688] in Mémoires de Malouet 1814:112; Henri 1989; Artur 2002; Coëta 1992; Nardeux 2001).[330] In 1628, Captain Hautespine left fourteen colonists under the command of Captain Lafleur at the Counamama River. In 1630, this colony was reinforced with 50 colonists and among them several Capucins, who were taken there by Captain LeGrand (Polderman 2004). However, the majority fled to Cayenne in 1634 where a fortification was built (Ternaux-Compans 1843:39). In this light, the voyage of the Dutch Captain David Pietersz de Vries to Cayenne in 1634 –he disembarked some 30 Dutch colonists at Cayenne– is noteworthy: he mentions stone remnants of a fortress which, according to him, had been built by the French (de Vries in Colenbrander 1911:192). Interestingly, de Vries and 'Schanbon' met at the Sinnamary River. Here, Sieur Chambaut maintained a small colony consisting of 12 men and had prepared a shipload of pepper awaiting the arrival of their boat. The Frenchman invited de Vries to dinner and to join him on a hunting party in the vicinity of their village (ibid., p. 203).

How long the Sinnamary colony prospered remains unknown. However, its (former) presence probably convinced the French to built a fort at the Sinnamary River in 1667 after they had taken Cayenne over from the Dutch (Lefebvre de la Barre 1666:41).[331] Between 1633 and 1652, the French aimed at establishing a colony at Cayenne, however, these efforts failed miserably. Nevertheless, they provided interesting journals written by: (a) Paul Boyer Sieur du Petit Puy (1654) describing the disaster concerning Poncet de Brétigny in 1643 and (b) Father Antoine Biet (1664) on the attempt made by Sieur de Royville in 1652. Both journals deliver firsthand information on the *Galibi* or Carib, as the French population of Cayenne and its surroundings say (see Hoff 1995:51–52 regarding this difference). Whatever happened to the other nations is unclear. Perhaps they

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329 Remarkably, the movement of the Yao from Trinidad to the Oyapock Basin in order to encroach in another (cultural) region, under the command of a warleader, ressembles the historic march and implantation of the 18th century Wayana movement under the command of Kailawa from the Lower Amazon River towards the headwaters of the Maroni basin. Wandering profetic war-leaders (T., *caraíba*) appear to be common phenomena in Amerindian society during (early) contact in Lowland Amazonia (Métraux 1927).

330 See note 259. Artur (2002:137–138) stated merchants from Rouen (Lord Henri de Chantail) had founded a colony of twenty-six men upon the Senamary River in 1624. It was reinforced two years later with another expedition of twenty colonists at the adjacent Counamama River. This colony further attracts more colonists who spread along the coast, such as Clément Bargau who left the crowded island of Saint Christophe gouverned by Poincy in order to try his luck in French Guiana. Interestingly, Puaux and Philippe (1997:67, note 1) claim that Chamail and Chambault also 'constructed a fort with five pieces and 80 men' according to documents kept at the National Archives (FR_ANOM_C14_91).

331 This new French colony at Sinnamary was under command of Sieur de Noell (Anthoine de Noël and Samuel Picart) whom the English captured again in 1667, according to Johan Tressry (NL_HaNA_2035_0022 f. 5, 1688).

had become extinct or had merged with the Carib population, which by now occupied the entire coastal region located between the Cayenne and Suriname Rivers (Biet 1664:149–150, 152).

11.7.2 The Jesuit missions in the West

When Lefebvre de la Barre and his cousin Chevalier de Lézy landed at Cayenne in 1664, they introduced the first Jesuits to French Guiana. The Jesuit order, founded by the Castillian Inigo de Loyola and François Xavier and recognized by Pope Paul III in 1540, had set as their principal goal to convert the infidels (e.g. the native population of South America and the Caribbean) inhabiting remote areas. The Jesuits recruited mainly among the middle and higher educated classes. These men were influential fieldworkers, excelling especially in linguistics and adaptation in harsh conditions, hereby baptizing and preaching among indigineous populations by setting the example (Ouellet in Pelleprat 2009:3–4). From 1639 on, the *Compagnie des îles d'Amérique* allows the secularisation of the private colonies of Guadeloupe and Martinique, commanded by Charles Hoüel du Petit-Pré and Jacques Dyel du Parquet, respectively. In fact, numerous religious orders were accepted (e.g. the Carmelites, Franciscans, Capuchins, Dominicans, Jesuits) who settled in the Lesser Antilles (e.g. Saint-Kitts, Guadeloupe, Martinique, Grenada, the Orinoco delta).

With the exception of the Capuchins taken to Counamama by Le Grand in 1630 and the settlers in *Caourou* (Kourou) brought by Poncet de Brétigny in 1643 (Artur 2002:140), the Jesuit order obtains its first acres of land in *Arémire* (Anse de Rémire) in 1666 from the Amsterdam-based Jewish Drago family (Le Roux et al. 2009:49). Rapidly, they built their principal headquarters, named their plantation Loyola (situated in the vicinity of the Quincy and Drago plantations), located at the southwestern foothills of the Mont Mahury (Auger 2012). From Cayenne, the Jesuits undertook numerous journeys to remote Amerindian villages in order to preach and baptise the Amerindians. This is recorded in the journals and letters written by Jean Grillet and François Béchamel, Jean de la Mousse, Pierre-Aimée Lombard, Pierre Labat, etc., who describe many Amerindian villages during their journeys. During the first quarter of the 18th century the Jesuits decided to construct outposts or missions in the western coastal plain at the Karouabao, Kourou and Sinnamary Rivers and, in the course of the second quarter of the 18th century, along the Oyapock River too (Fig. 11.19).

In 1709, the Fathers Lombard and Ramette founded the first mission at *Icaroua* (Karoubao) which was relocated at the mouth of the Kourou River in 1713 (Froideveaux 1901). In 1735, the Jesuits also built a (sugar) plantation at the foot of Mont Xavier (now Montagnes des Pères) as well as an indigo plantation (Guatémala) on the right bank of Kourou River. The majority of the Amerindians in the Kourou mission is Galibi. However, it also housed other Amerindian populations which had escaped the Portuguese missions and/or fled from slave raiders operating on the Lower Amazon River and the coast of Amapá. Of course, the Jesuits welcomed them:

> *J'ai de quatre sortes de nations Indiennes, toutes differentes, partagées en quatre grands carbets avec leurs Chefs. La nation principale & la plus nombreuse, c'est celle des Galibis, dont c'est ici proprement le pays, qui s'étend depuis Cayenne jusqu'à l'Orenoque, au de-dela mêmes ; quoiqu'il y ait quelques aures nation mêlées.*

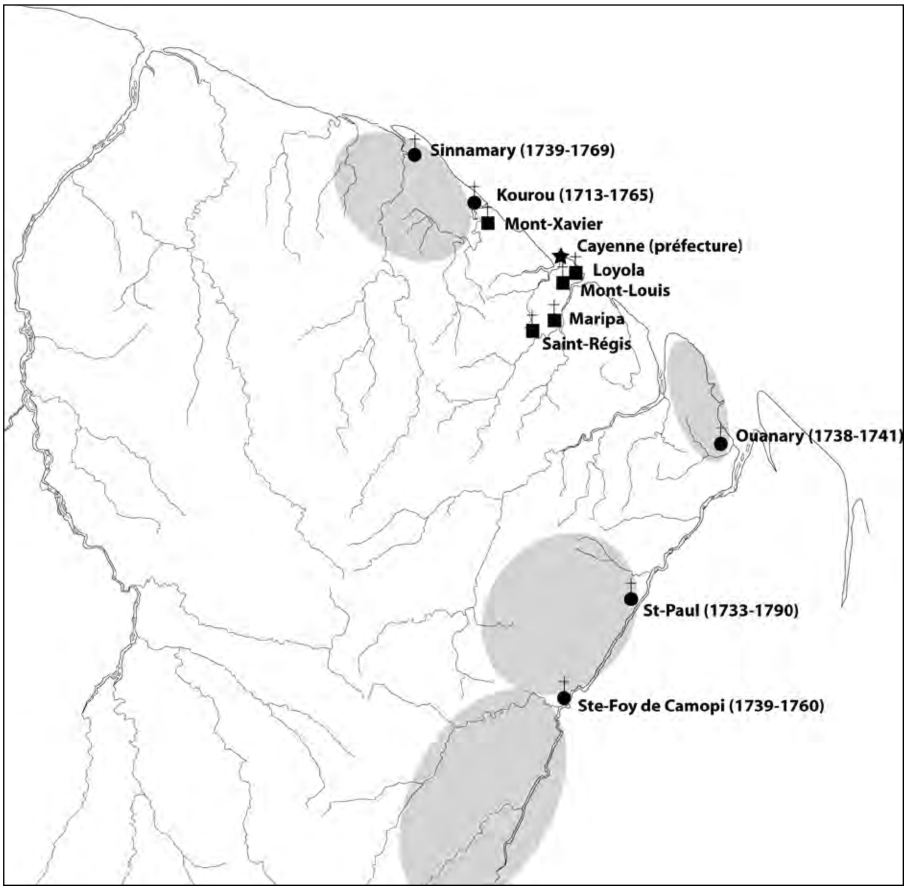

Figure 11.19. The Jesuit presence in French Guiana and Amapá during the 16th and 17th century. The dots represent the missions and the squares the habitation sites (after Le Roux et al. 2009:62).

J'en ai ici deux carbets nombreux, qui ont chacun leur Capitaine, nommés par Mr. Le Gouverneur, & avec brevet de lui. Le plus ancien de ces deux Capitaines, s'appelle Louis Remi Tourappo, celui-là même dont je vous ai déjà parlé. L'autre est tout jeune, & s'appelle Valentin. Il a été mon éleve & a succedé à son oncle, qui mourut, il y a quatre ans dans un voyage qu'il fit aux Amazones. Ces deux carbets peuvent faire peut-être le nombre de deux cens cinquante personnes, & davantage. Un autre carbet est d'une nation qu'on appelle Coussaris, dont le pays est delà d'Yapoc, & qui étant venus ici pour danser, il y a environ huit ans, s'y établirent, & se font faits chrétiens. Ils sont à peu près trente à quarante personnes. Leur langue aproche fort de celle des Galibis ; ainsi ils ont eu bientôt appris celle-ci, & la parlent fort bien actuellement. Une autre nation venue de la rivière des Amazones, s'est encore établie ici par mes soins. On les appelle Maraones. Ils se font aussi tous fait[s] chrétiens. Leur langue est presque aussi la même que celle des Galibis : ils sont environ trente personnes. Mais la plus nombreuse de toutes les nations que j'ai assemblé ici & sans contredit la meilleure, est celle des Arouas. J'ean ai plus de cinquante, & j'en ramasse tous les jours. Ce sont les debris d'une Mission Portugaise, qui se font dispersé çà & là. Ils sont presque tous baptisés & bien instruits. Les vexations continuelles des Portugais les ont obligés à les quitter. Ils se sont venus refugier à Cayenne, où Mr. notre Gouverneur qui a beaucoup de bonté pour toutes sortes d'Indiens, les a reçû favprable & leur a assigné des terres. J'en attire tous les jours quelques uns. Peu à peu j'espere de les avoir tous. Leur langue est assez difficile & n'a nul raport avec celle des Galibis. Il m'a fallu l'apprendre & je commence à l'entendre passablement : je les ai remis dans l'ordre ; j'ai marié selon la forme de l'Eglise ceux qui ne l'étoient pas, &

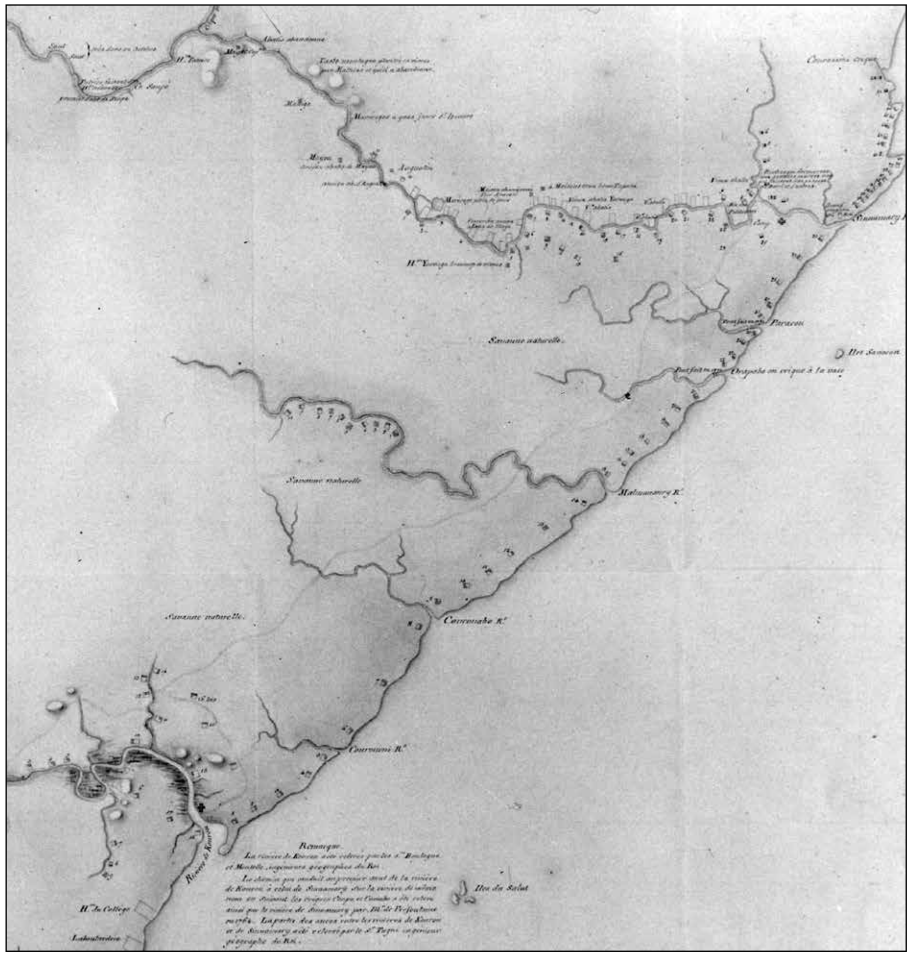

Figure 11.20. A detail of the Brûletout de Préfontaine map after his voyage in 1763 drawn by P. Boulogne in 1764 featuring the Malmanoury Creek with numerous habitations (FR_CAOM_FMSM_F3_289_22).

> *j'ai baptisé tous les enfans qui n'avoient pas encore reçu ce Sacrement. Ce sont au reste de tout autres gens que les Galibis laborieux, actifs & sur tous très bons navigateurs. On les appelle les loups de mer, leur carbet est séparé de celui des Galibis, & ils ont leur Chef particulier nommé par Monsieur le Gouverneur.* (Labat 1730 iv:501–504)

After Kourou, the Jesuits made their way farther towards the west. Father Matthieu Carenave founded a new mission in 1734 on the right bank of the Lower Sinnamary River (Artur in Polderman 2004:244). By now, the colony of Cayenne supported more plantations, notably on the affluents of the Upper Mahury River (e.g. Oyac and Orapu Rivers), the Cayenne and Monsinéry Rivers as well as in the coastal plain between Kourou and Cayenne, as the map drawn by Sieur d'Anville in 1729 illustrates (Rio Branco 1900, Map 19). Interestingly, this map mentions only three Amerindian villages located between Kourou and Sinnamary, to wit the *carbet* of Avaiou on the Malmanoury River and two *carbets* near Sinnamary of Malet and Aroipo, or Sarabia.

In 1747, the Amerindian captain Germain Mayakue (Mayac or Mayac), chief of the Tounoyennes, marries Lucine Mo, a daughter of Gilbert Limousimbo, the captain of Malmanoury (Puaux and Philippe 1997:58–60).[332] Mathias Onouteri is the brother of this captain's father-in-law and was born in Kourou. Finally, the son of Gilbert Wayakue inherits the position of chief of Malmanoury and marries Jeanne (or Anne) Marie Tonaronne in 1756. Several names in this summary are not Cariban and demonstrate the ethnic mingling in this region, as desired by the Jesuits (ibid., p. 35).

The Sinnamary mission was relocated towards the sea and continued to exist until 1769, hereby continuing after the expulsion of the Jesuits from French Guiana. The map entitled *Carte des Rivières de Kourou et de Sinnamari* drawn by Philippe Boulogne in 1763 –the very year of the Jesuit expulsion– still depicts this Jesuit mission. It also features further colonial progess to the west with numerous plantations positioned between Kourou and Sinnamary and beyond (Fig. 11.20).

The degree of influence of these missions is difficult to evaluate by means of the archives. The majority of this documentation is written by the Jesuits themselves and therefore "coloured." In general, it can be stated that, when compared with other regions in South America, these missionaries played an important role among Amerindian groups and most certainly amidst the local Galibi and incoming groups. On the one hand, the Jesuits fought colonial society in order to "protect" the infidels –albeit future Catholics– against the horrors of the plantation economy. On the other hand, by means of centralising their efforts and applying an European model of socio-political hierarchy to their missions –resembling their own hierarchy–, the Jesuits selected absolute Amerindian leaders (both captains and shamans) in order to control the varied indigenous communities. In contrast, the Amerindian organisational model differs, even deemed absent or dissimilar, according to many historical sources. The Jesuits (ab) used their power by imposing another captain or shaman if the present person was too obstinate or subversive, thereby often revealing the former leader's devilish character. In my opinion, it is evident that such imposed rules have profoundly restructured Amerindian political systems (Collomb 2010).

The Portuguese havoc on the Lower Amazon River rendered French Guiana a safe haven for numerous Amerindians fleeing to the Approuague River and Cayenne Island where they had lived together or alongside the local and/or endemic population in the forest and later inside the Jesuit missions (Wack 1991; P. Grenand 2006). For example, the Aruã arrived at Cayenne as early as 1686 to be later relocated in the mission of Kourou where eventually many ethnic groups were gathered (see the quotation above). Existing Amerindian alliances were discontinuied by means of a dispersal of various groups to distant missions, thereby increasing the dependency on and the control of the Jesuits. The concentration of large numbers of Amerindians inside these missions exposed its residents to incurable diseases causing many to succomb in dreadful conditions. Others escaped or fled these missions setting off towards the west (Mana and Maroni) or into the interior and/or perhaps mingled with the colonial society once the Jesuits had left the region in 1763.

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332 The Tounoyennes or Tunayenne is a general name for the Amerindians from the interior given by the coastal population: 'Les Tonayennes habitent au de-là du Fleuve de Coupename, bien avant dans les Montagnes. Ces Sauvages n'avont jamais sur le bord de la mer, parce qu'ils en sont empeschez par les Galibis, contre qui ils ont vue guerre mortelle' (Boyer 1651:245–246).

11.7.3 The Mission of Kourou and its aftermath

In 1763, too, France signed a treaty with the English Crown, hereby losing many colonies in the Americas. It was therefore confronted with important logistic problems concerning the provisioning of their Antillean colonies (Michel 1989). The minister Choiseul conceived a plan to solve this problem by means of appointing the colony of *Guyane* to deliver such resources. This project is better known as the "Mission of Kourou." In addition to providing the Antilles with victuals, it also aimed at creating a stable local colony capable of assembling an army of patriots in case of any armed conflict with their European rivals.

Choiseul's plan was to build a new colony based on a massive and volontary migration of white Europeans. The majority hereof was recruited from outside France (notably Germany and Canada). Not much later *c.*12,000 colonists disembarked at Kourou and Sinnamary, a region where previously only a small number of Jesuits had wandered about. This project turned into a human catastrophy: soon more than half the colonists died due to a lack of food and hygiene and various diseases (e.g. dysentery, typhoïd, yellow fever, malaria). The survivors were shipped home in 1765. Only a small number of colonists decided, against the warnings of the colonial administration, to remain in French Guiana. At around that time the region of Sinnamary accounted for *c.*340 white colonists, the first settlers in this area (Coëta 1992) (Fig. 11.20).

These settlers chose the littoral and notably the sandy ridges in order to found their plantations where the (still existing) Jesuit mission at Sinnamary served as the central point of this western frontier. In 1767, this village included a general store, a hospital, a church and various public builidings, being developped according to an urban plan. As does the Sinnnamary and Kourou Rivers, the Crique Malmanoury features plantations on its upper banks in the savannahs (e.g. Duprés, Cimer, Duchêne, Hebert, Saussiot, Mergle). These plantations represent rather modest socio-economic units based on the herding of cattle for personal consumption and the local market. Only a small number of plantations produce annotto and cotton. Others caught turtles, notably the leatherback sea turtle for its meat, eggs and fat (Coëta 1992).

In 1789 the French Revolution quickly ruins this rather flourishing picture. That event marked the end of the *Ancien Régime* as well as the first abolition of slavery in the French colonies in 1794. Many settlers now left for Cayenne, leaving Sinnamary in utter misery:

> *Sinnamary n'a jamais été qu'un petit hameau, composé d'une douzaine de cases et de quelques petites habitations réparties sur le bord de la mer, distantes l'une de l'autre de cinq, six, et quelques fois huit lieues. Les êtres malheureux qui erraient dans ce désert, se réduisaient à six ou huit, y compris le chirurgien et le garde-magazin : les autres étaient de pauvres colons, vivant du produit de leur chasse et de leur pêche. L'impossibilité de trouver des ressources ailleurs les retenait dans ce misérable pays, sur lequel je ne donne aucuns détails* [...]. (Freytag 1824 ii:23)

The following major event, the second abolition of slavery in 1848, most certainly changed French Guiana society again, releasing *c.*12,000 black slaves of which 462 were accounted for in the quarter of Sinnamary. At that time, the two flourishing plantations, Saint-Léon and Bel-air, were led by Jean-François Martinet, the General Commander of Sinnamary (Coëta 1992:85). These cattle farms were located to the east of the bridge across the Malmanoury Creek and employed respectively 13 and 33 slaves. Significant in this respect were Beau-Séjour at Anse Renner, under the command of the royal *notaire* Raimond Bosquet with 20 slaves and Belle-Étoile at Anse Paracou of the Rémy family with 36 slaves (Fig. 11.21). After the abolition, the freed slaves settled along the main road between the villages of Kourou and Sinnamary. Some remained in the vicinity of their former Masters whereas others left these quarters for good. This pattern provided the base for the rural Creole society in the western savannahs, consisting of dispersed family clusters living in quasi-autarcy (Jolivet 1982:448–449). For instance, members of the Torvic family inhabited the quarters surrounding the hamlet of Malmanoury, occupying a dozen houses built along the RN 1 until their relocation to Sinnamary on order of the French government when the European Space Center (CNES) was established in the savannahs located between Kourou and Malmanoury during the 1950s.

Malmanoury and the Kali'na

The maps discussed above do not feature any Amerindian villages, suggesting that the Amerindian population had entirely abandoned this coastal region. Remarkably, commander Jean-Antoine Brûletout de Préfontaine expressed specific interest in omitting Amerindian villages when prospecting the savannahs in order to bring about the succes of the Kourou mission. Despite this possible bias, Amerindian villages were still to be found at Kourou in 1785:

> [...] *entre Caux et Courou ne se trouve plus d'établissement d'indiens. Le premier qu'on rencontre est placé sur la rivière de Courou, ou il y avait eu autrefois une mission nombreuse, célèbre par le nom du père Lombard. Il n'existe plus aujourd'hui dans ce canton, en y comprenant Carouabo, que 50 personnes de tous âges et sexes, dont 16 hommes faits et trois capitaines.* […] *Les indiens de Sinnamari, où autrefois ils avaient été nombreux et rassemblés en mision, ont également beaucoup diminué. On n'y trouve plus dans les carbets de trois capitaines que 20 hommes en état de porter les armes, en tout 52 personnes de tous âges. Depuis l'arrivée des Blancs dans ce canton les indines se sont éloingés de la missionqui était placée à l'endroit appelé le poste. Elle avait d'ailleurs longtemps demeuré sans missionaire, et ceux qu'on y a fait passer par la suite ont été changé trop fréquemment pour qu'ils eussent pu captiver la confiance des indiens et les faire revenir aurpès d'eux.* (Bessner quoted in Collomb and Tiouka 2000:60)

At present any similar information on Malmanoury is unavailable. However, it may be clear that several Amerindian villages were still present in the vicinity of Malmanoury at the end of the 18th century. Whereas certain Amerindians had left the region of Sinnamary for Iracoubo or beyond, others felt either attracted to this region or had established firm relationships with the colony and the emerging village of Sinnamary, dwelling in its vicinity in a village called *Simapo* (Barbé-Marbois 1834 i:177; Coëta 1992:25; Puaux and Philippe 1997:62).[333] Exactly who inhabited these villages, situated upriver or in the interior immediately behind the littoral, remains unclear considering the myrad of ethnic groups gathered during the Jesuit missions and after a continuous evangelisation, enslavement, general demographic decline, etc.

333 The geological and geographical map of Poirson (1814) after Leblond clearly reveals several Indian villages upon the Lower Sinnamary River (Rio Branco 1899, Map 59).

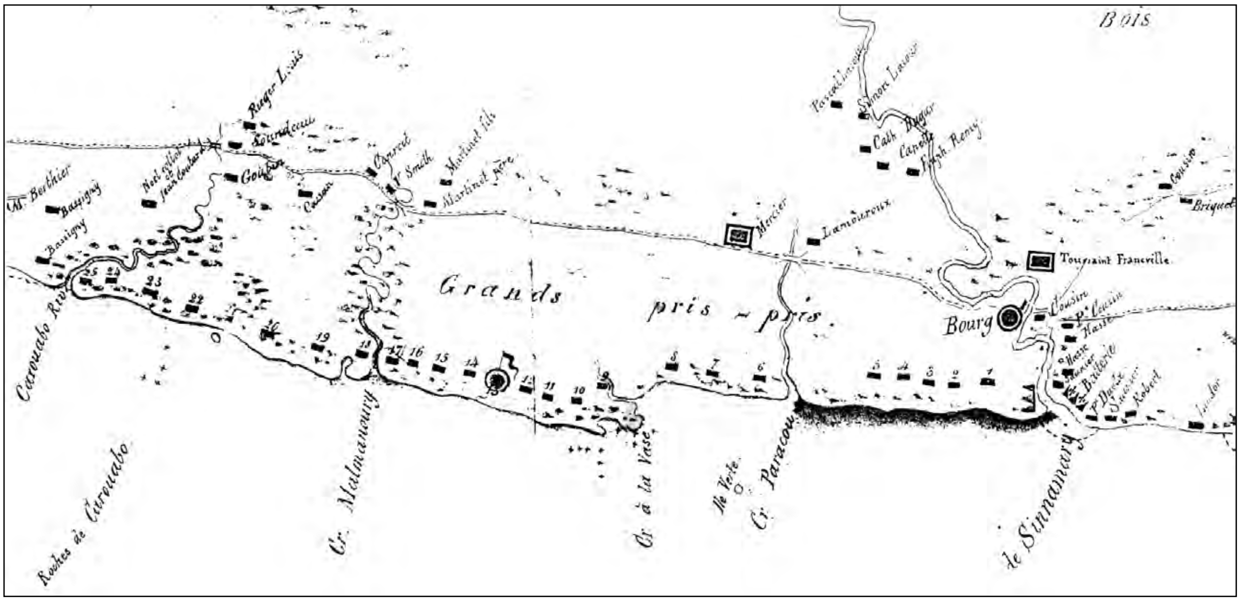


Figure 11.21. A detail of the Charrière map (1847) depicting the area between the Carouabo and Sinnamary Rivers (FR_CAOM_DFC_Guyane 70_983). Note the main road which is still present today.

Barbé-Marbois (1834 i:205) counted 69 Galibi in 1797. A decade earlier, they were estimated to number *c*.400 in the vicinity of Sinnamary. It can be assumed that the endemic and generally better settled Galibi had (again) absorbed these exotic populations according to their own indigenous assimilation processes either as families (clans) or as slaves or *poito* in Cariban (to be sold again?). This new situation certainly favours various levels of cultural mixing, creolisation or hybridization (Fr., *métisage*)[334], often referred to in the Guianas as socio-political recompostion or ethnogenesis (Dreyfus 1992; Whitehead 1993) representing the foundation of the modern Kali'na society and identity. It is better known as the 'The Time of Epa'kano' (Collomb 2000:155). This historic myth tells the founding of the current Kali'na families or founding fathers (Collomb and Tiouka 2000:69–74).

Ultimately, during the course of the 19th century, the last Amerindians may have left Kourou and Sinnamary for Mana, leaving only a small number behind. They wished to stay, having assimilated with the local white and black population, residing in villages on the Middle Sinnamary River. Interestingly, in 1882, several Amerindians from the village of Terre Blanche on the Lower Sinnamary are presented in Paris at an exhibition in the *Jardin d'Acclimatation* (Collomb 1992) (Fig. 11.22). According to senior inhabitants of Malmanoury (M. Torvic, personal communication 2005), the Kali'na of Terre Blanche were nomads and, before settling at Terre Blanche, they had lived at the *Montagne Blanche* in the savannah of Malmanoury (Eva 2?). To the south of the said hill, an 'Indian Trail' had once led to the Sinnamary River, just opposite to Crique Blanche. In sum, the historic site of Eva 2 was probably inhabited by Galibi, according to local oral tradition. They constituted a mixture of numerous, immigrated Amerindian groups that eventually had merged with the local Caribs or Galibi, who had absorbed other incoming groups from Trinidad several centuries earlier (F. Grenand and P. Grenand 1987).

334 Considering the term "hybridity" see Silliman (2015).

Figure 11.22. 'La famille Ka-joe-roe devant sa hutte' in Amserdam in 1883 (after Bonaparte 1884:47). A similar exposition was held in 1882 in Paris in the Jardin d'accilimatation (Collomb and Tiouka 2000:103).

11.8. The site synthesis

The historic and archaeological data presented here confirms that Level 1 of Eva 2 is a historic Amerindian habitation site with good quantities of handmade ceramics, postholes, eight burials and imported European ware (e.g. iron tools, stone ware, glass beads). The site is situated at a low, white sand hilltop on the border of the Pleistocene savannahs and the Precambrian Shield. Two relevant questions are raised here regarding the archaeological and historic data obtained for this site. Firstly concerning its chronology: Are the burials contemporaneous with the rest of the artefacts? Secondly concerning its culture: Are the burials indeed Kali'na burials? Both issues evoke complex subjects, such as ethnic identity and cultural continuity. We shall try to answer them in the following synthesis by means of crossing the archaeological data with the brief description of the historical developments presented above. It is important to point out that historic Amerindian sites have rarely been excavated in French Guiana or the Guianas in general. Although colonial sites may have yielded Amerindian artefacts, Amerindian sites from this period are generally only known from historic sources. As a general reference, we will first introduce historic sites investigated during the archaeological rescue project of Petit-Saut on the Sinnamary River (Puaux and Philippe 1997:35–63).

During pedestrian surveys and by means of checking maps as to geographical correlations (notably Boulogne/Brûletout de Préfontaine 1774) various 18th century sites were located in the Sinnamary basin: Poudoupoudouli (BPS 20), Nouvelle habitation de Maya (BPS 20), Habitation de Maya, Capitaine Indien (BPS 207), Habitation de Marcelin Indien (PBS 208), a part of BPS 230 and

Habitation de Michel Maya Indien (BPS 275).[335] BPS 20 is located on the left bank of the Sinnamary River. Its artefact assemblage resembles that of Eva 2. Six test pits (12 m²) and numerous surface finds yielded 1150 handmade potsherds, three fragments of wheel-thrown ceramic ware, and approximately 30 glass bottles (dated to the beginning of the 19th century), many iron nails, an iron axe and various gunflints.

The anthropogenic features and their spatial distribution

The large scale excavation at Eva 2 enabled us to reveal mainly postholes and burials as well as waste areas (Zones A-D), specific artefact locations and caches, constituting the main elements of an archaeological Amerindian village. Again, we were not able to recognise a house plan, as we had not been able to do at many earlier sites discussed before in the present study. This aspect evidently recurs in French Guiana archaeology: the acid Neotropical soils, the construction of houses utilising perishable materials and the fluidity of the habitat area (reconstruction and superimposition of houses) over a short (or long) period of time, makes it difficult to advance on this matter.

However, a possible house location can be narrowed down by means of matching and crossing the above-mentioned data as seen in Figure 11.23. Numerous hypothetical house locations are visible corresponding to either postholes or burials spatially separated from waste areas, i.e. ceramic and iron tool concentrations. Together these reflect a NE-SW axis with "empty zones" to which the flank of the hill towards the north also belongs. This interpretation indicates dispersed housing and various middens in its vicinity, reflecting an alignment of small *carbets* measuring between *c.*40 and 60 m² as to the surface on the summit of the hillock. The burials are probably located within the houses and mark the interior of a house location, according to the many historic sources (cf. Appendix 4). Thus, we can hypothesize that the village was abandoned after the capitain of the village had died, transforming the habitation site into a burial ground or funerary site.

The burials

Seven of the eight identified graves were preserved as a "phantom" representing primary inhumations of the deceased. They included dark brown imprints, reflecting the body after decomposition and revealing the body's position. A secondary urn burial contained an individual represented by means of the deposition of a bundle of long bones (Burial 5). Six of the phantom burials concern individuals with legs in a flexed position, placed in a more or less circular grave, placed against the wall and probably wrapped in a hammock. Only one phantom inhumation was placed in a stretched position in a trapezoid shaped pit (Burial 6). In four of the primary burials the head was placed in the east. Nearly the entire population was adult, but no gender diagnosis could be carried out.

The position of glass bead concentrations on specific parts of the bodies reveals that the deceased wore Amerindian adornments (e.g. bracelets, necklaces, belts), comparable to many 19th century sources. In addition, the flexed position and

335 This site was initially nameless. The Petit-Saut member Sandra Kayamaré (personal communication 2012) named it *poudoupoudouli*, meaning iron nail in Kali'na.

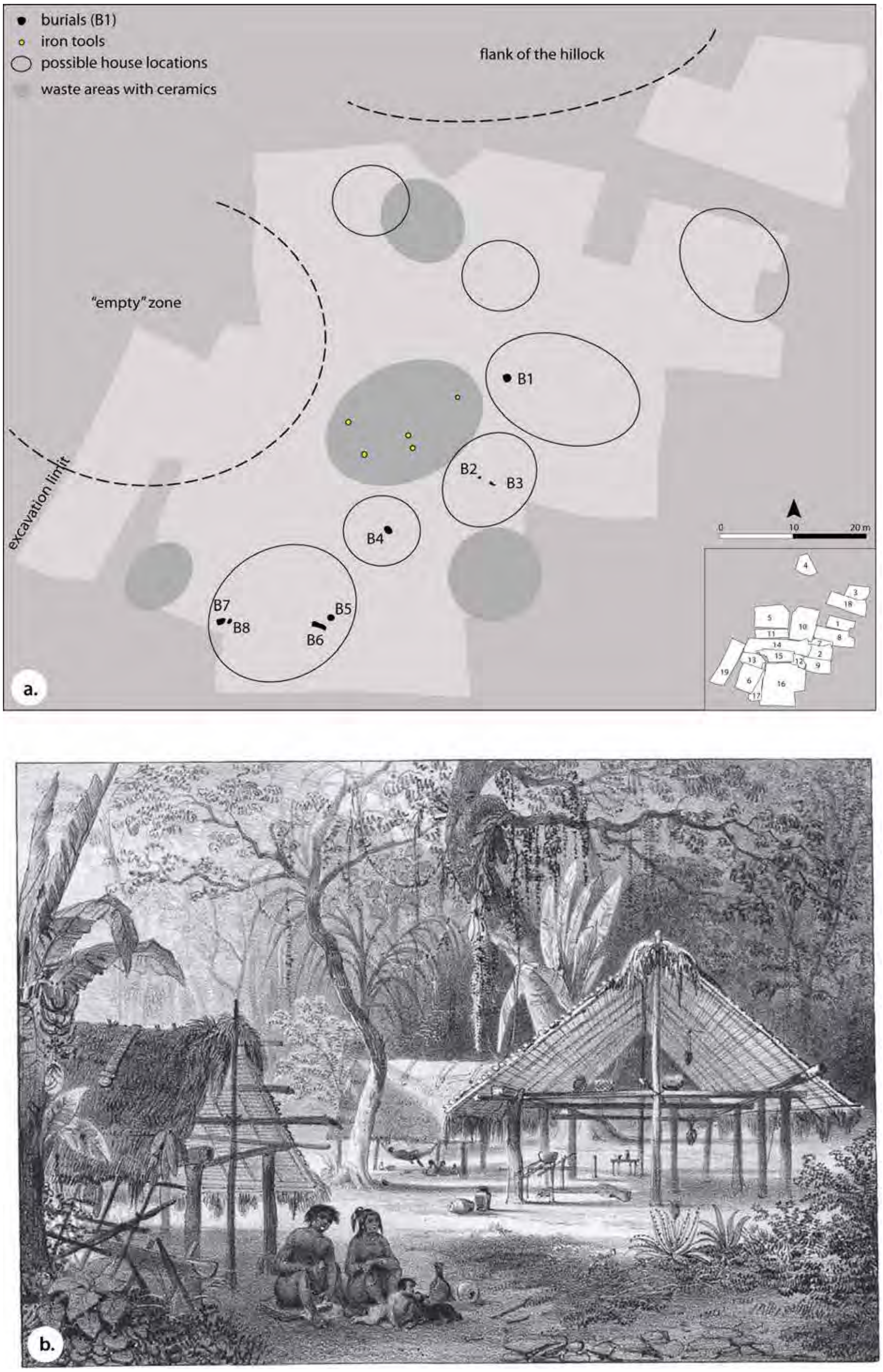


Figure 11.23. (a) An interpretation of the village lay-out and (b) and an engraving of a Kal'ina village (after J. P. Benoit 1839, Plate XXXVI, 76).

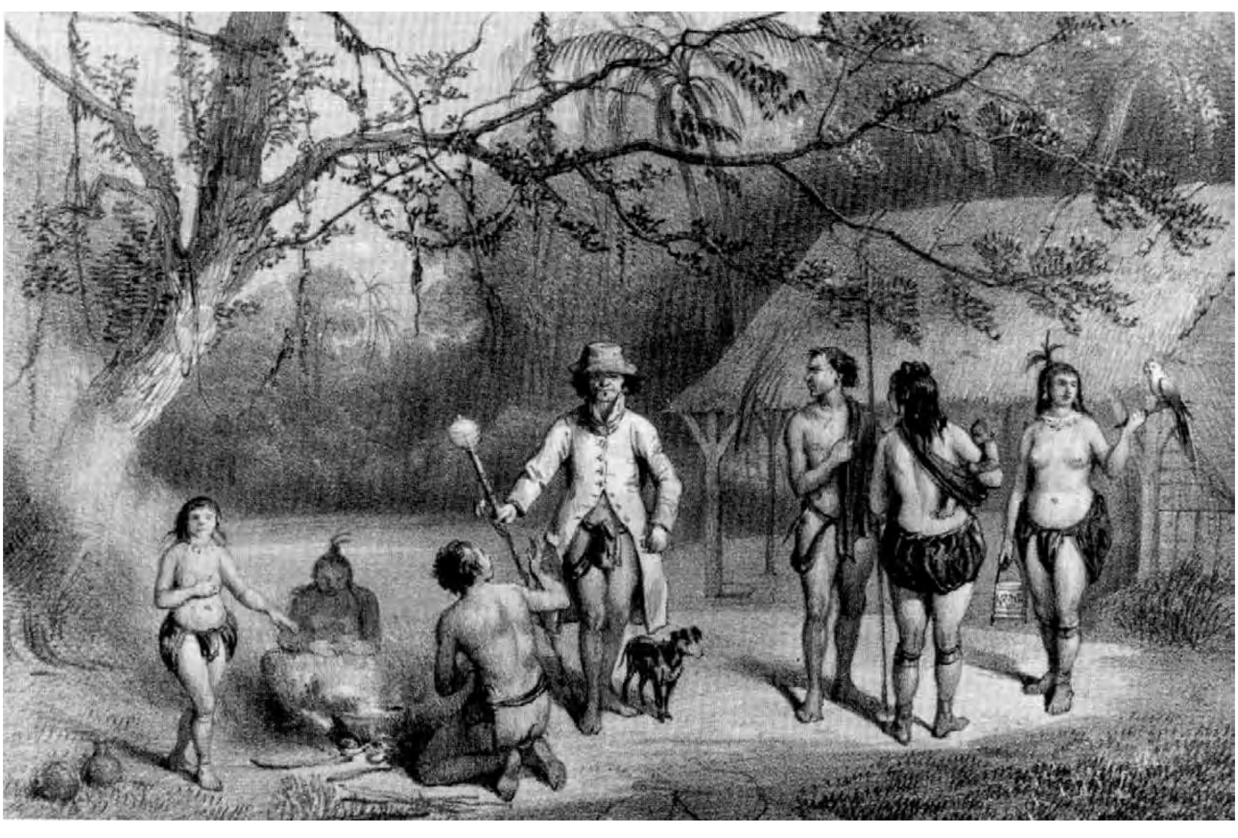
the glass beads, the presence of burial gifts, i.e. Burials 1, 5 and 7, also reveal Amerindian funerary practices as described in historic sources (Appendix 4). They are commonly performed within the village (cf. Section 6.2.3 as to de la Mousse's quotation).

Three burial pairs were pointed out of which two pairs are similar in deposition and one is clearly dissimilar. Burials 5 and 6 possibly reveal a different social status of the deceased in Amerindian society. The rectangular/trapezoidal pit of Burial 6 may refer to Roman Catholic influences, but may also indicate the burial of a shaman (C., *piai*) (cf. Fig. 11.5). The large urn burial containing a bundle of long bones, an iron axe, half a Beardman jug, many glass beads and a brass bell, may indeed reflect the burial of an important person such as the village captain (C., *yopoto*) (Fig. 11.24). According to Father Ahlbrinck (1931:423), the Kali'na buried their dead in the *samaku* or large *cashiri* vessel, which actually resembles the jar of Burial 5, but he did not refer to the status of the interred individual.

The site chronology

The imported artefacts evidenced two relevant moments: (a) an early colonial occupation during the second half of the 17th and 18th century and (b) a more recent occupation during the 19th century. The smaller glass beads (2 mm) provide us with a reliable date for the majority of the graves which represent the end of the Amerindian occupation at this site during the second half of the 19th century. The majority of the iron tools, several glass beads and the Beardman jug refer to an earlier colonial episode. This duality appears to be characteristic of the Historic Age in which the Amerindian society is confronted with European influence and ultimately dominance. On the one hand, absolute dates are unreliable from the 17th century on and cannot provide any decisive data in order to propose two occupations. However, it certainly could exclude a pre-Columbian occupation, but this needs verification. On the other hand, the preservation of 17th century objects, as transmitted for example within the family and finally presented to the deceased, suggests that the earliest objects of this occupation may have been heirlooms.

Figure 11.24. A yopoto or Kali'na chief (after P. J. Benoit 1839, Plate XXXIX, 82). The cane and clothing were presented by the Dutch administration in order to confirm the position of the yopoto as the Head Chief of the village and subsequently their Ambassador. Similar policies were also applied with regard to the Maroons.



The ceramic study shows a homogeneous production of: (a) small, painted bowls, (b) keeled and necked pots and (c) large collared vessels, closely related to the second half of the LCA and in particular to the Koriabo complex, but in a somewhat later, early Historic period, recalling affinities with the Cayo complex of the Leeward Lesser Antilles (Boomert 1986, 1995, 2004).

The ambiguity forwarded by means of the imported objects is not evident as to the entire ceramic assemblage as such. Similar vessel shapes were found in the burials as well as the waste area, i.e. eared jars and red painted/notched bowls, stressing the longer occupation of 250 years and subsequent material and cultural continuity. In fact, the Eva 2 ceramic assemblage shares striking (technical) similarities with the Galibi pottery production as described by the Jesuit Jean de la Mouse describes (in Collomb 2006:52–53; cf. Appendix 3a). Even the sparse adding of pounded potsherds mentioned in his report is comparable to our observations and ceramic data: the use of burnt vegetal matter as non-plastics, conical or appendicular shaped bases (for functional purposes), featuring red, black, yellow and white clay for colouring as well as the use of internal decoration and of a vegetal glaze.

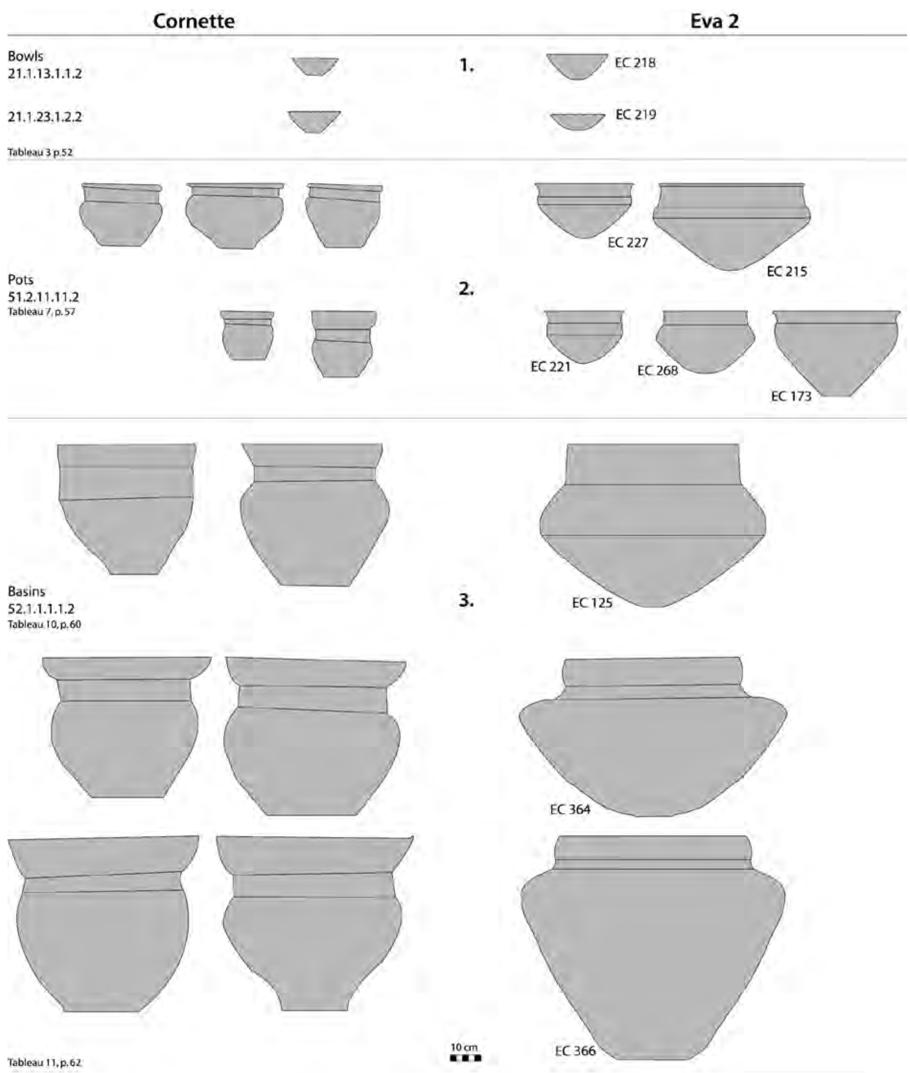
Unfortunately, we have very little detailed information on the morphology of the vessels, although some linguistic and, even less, morphological information has been discussed by scholars during the last decades (Allaire 1980, 1984; Boomert 1986, 2000; Collomb 2003). Nonetheless, that has caused a hiatus between archaeology and history (Boomert 1995). This bias remains difficult to surpass. However, temper and technological aspects may provide further food for thought (see also Coutet 2009 on the latter aspects). Indeed, later descriptions reveal a very similar production pattern. In it glazing and ash temper (notably *kwepi*) appear to be late LCA or protohistoric innovations regarding LCA sites as discussed above. These consistent elements revealed the manifestation of a steady pottery tradition (Ahlbrinck 1931; Delawarde 1967; Cornette 1992; Collomb 2000; Vredenburg 2002; de Tricornot 2007; Coutet 2009).

Interestingly, despite the suspected simplification of the LCA morphological register and possible incipient modifications during early historic times, the Eva 2 ceramic material hardly includes any stylistic resemblances with the ceramic objects acquired during the 19th century as encountered in the collections of regional and European museums, notably in Leiden and Paris, but also in Paramaribo and Cayenne (Wack 1988; Cornette 1988a, 1992; Hagen 1991; Ignace 1997). This comparison, however, is only possible if we suppose, based on its geographical and chronological situation, that the site of Eva 2 was part of the Kali'na realm, as the majority of this museum material is labelled as Kali'na. It represents highly decorated European imitations or modelled animals with duotone and/or polychrome painting. This kind of polychrome pottery is rare in the Eva 2 assemblage and is rather a relict of the most recent pre-Columbian tradition. However, modelled animals and other similar objects have not been found at all at Eva 2. The majority of the museum objects were produced by Amerindian potters in order to sell to tourists or government personnel. Thus, the chronological ambiguity identified as to the European objects in an Amerindian context is also present among the Amerindian ceramic material due to the bias between the Eva 2 and museum ceramic material.

In order to assess this ambiguity, a chrono-cultural tripartition is proposed concerning the historic evolution of the Amerindian ceramic production: (a) during the 16th and 17th century, the late LCA ceramic development slowly stagnated. We also see a simplification of the decorated register due to the abandonment of incision and polychrome painting in favour of red painting, (b) this altered Amerindian register is enlarged with innovative vessel shapes according to European economic demand, for instance, the *watrakan* (Sr.) imitation (D., *waterkan*; E., water can) of the late 17th century onion glass bottle, as pointed out by Gérard Collomb (2003:155) and (c) later, during the late 18th and 19th century, the previous register is enlarged again with highly decorated ceramic objects made especially for tourists and eventually for museums. It has to be noted that the production of domestic ware runs continuously parallel with the tourist ware, but does slowly loose ground throug the centuries during which common or household ware is replaced by means of European ware. However, the coastal Amerindians still produce the former ware, albeit to a lesser extent, notably as ceremonial ware when feasting. Thus, this evolution is first marked by means of stagnation and secondly by the ultimate abandonment of the domestic pottery production for the Amerindian households. It is subsequently enlarged, initially on a parallel level as to the production of local and imitation pottery for the local market. In due course it is taken over by the tourist production of the 20th century.

Interestingly, imitation material nor tourist painting was found during the Eva 2 excavations, leaving us with the following issues: (a) the bulk of the Eva 2 assemblage is earlier than the graves meaning that the double occupation is difficult to distinguish and (b) the local ceramic material for the European market was not utilised nor produced on site and (c) the population of this particular village situated out of the European scope or did it avoid (daily) contact in general? I have opted here for a combination of these issues, focussing on a relatively autonomous village at the periphery of the coastal plantations, but in retreat of the colonial power, only allowing a small number of desired exchange goods to enter their community, hereby favouring perhaps nomadism.

The level of cultural conservation and/or (dis) continuity can be assessed when comparing the Eva 2 material with the late 19th and early 20th century Kali'na utilitarian ware, as classified by Alain Cornette (1992). Figure 11.25 presents the three most important groups of Eva 2 and the selected equivalents in Cornette's classification. We may observe two important elements regarding continuity: (a) the presence and resemblance of the small hemispherical bowls (C., *sapela*) of which several were notched too and (b) morphological differences as to the upper parts of the keeled pots and large jars (C., *samaku*). The necks are longer and more everted whereas the (shoulder) transition of the toric shaped vessels is smoother. In addition to the examples in this figure, we also point out the morphological resemblances between the Kali'na round pots No. 51.1.21.11.2 (Cornette 1992:58) and the ones of SM VII, i.e. globular jars with bevelled lips. We must also note that *kwepi* is by now highly favoured among the Kali'na potters whereas grog has been abandoned (ibid., p. 46). In my opinion, this comparison illustrates a certain degree of continuity and evolution regarding the production of Amerindian pottery along the French Guiana littoral between AD 1650 and 1900, as they belong to the same cultural sphere of interaction (Silliman 2009).



Fingure 11.25. A comparison of selected vessel shapes of Cornette's classification (1992) vs. Eva 2.

Conclusion

The site of Eva 2 consists of an Amerindian village inhabited during the post-Columbian period between *c.*AD 1650 and 1900. Several graves contain glass beads strongly suggesting that it was abandoned during the second half of the 19th century when the bodies were buried. Although this part of the Guiana littoral was inhabited by many Amerindian groups during early historic times, the Galibi eventually managed to predominate the region between Cayenne and Maroni after being pushed farther away towards the west throughout the colonial era (Turenne and Grenand 1979:5, Plate 17; Cornette 1988a:13–17; Collomb 2000). This remote area, beyond the Counamama River, was often called "Indian Country." It was inhabited by Galibi who preferred to stay away from colonisation but nevertheless wished to keep in touch for economic reasons.[336] This western

336 Here we can possibly also refer to the concept of the "Middle Ground" as proposed by Richard White (1991) for common ground between Amerindian and Colonist territory in northeastern North America, knowing that several Amerindian villages were still present within the colonist territory in French Guiana.

part of modern French Guiana was colonised during the second quarter of the 19th century whereas the village of Mana was founded first during the 1820s. The village of Saint-Laurent du Maroni in followed in 1856.

The hamlet of Malmanoury, situated halfway between Kourou and Sinnamary, belonged to a colonial frontier during the first half of the 18th century. It was entirely integrated into the western part of the expanding French colony of Cayenne or Guyane *c.*100 years later. The earliest dates of Eva 2 can be attributed to this first "frontier" part whereas the youngest dates (graves) can be attributed to the second "integrated" part of the colonial era. Thus, this site is situated on the verge of the old and the new, i.e. the transition from the archaeological LCA and Early Historic Age to modern Amerindian society, spanning *c.*300 years. The artefact assemblage at Eva 2 reflects this transition and modification of society. We deduced the abandonment of stone tools in favour of metal tools. Only grinding activities carried out with stone tools, materialised the presence of a (sporadic) grinding stone and a large number of hammer stones. The quasi-absence of any griddles (less than 1%) may reveal the adoption of the metal griddle although we did not find the latter.

Furthermore, despite the possibility that rectangular pits may have pre-Columbian origins (cf. Chapter 9) and/or reveal status, the Eva 2 rectangular pit may also include traces of Roman Catholic burial practices. If so, both the Catholic and "classic" Amerindian burial modes are present at the site of which six burials were found in a paired position (three pairs), revealing social memory of the dead, possibly represented by means of family and/or ancestors. Another change can be seen as to the ceramic production if we accept that Eva 2 pottery is made by (ancestors of) the Kali'na. However, in this case we can observe that the archaeological assemblage does not resemble the ceramic collections in museums at all. On the one hand, the vessel shapes and decorative motifs of the latter collections were not found at Eva 2. This reveals discontinuity but, on the other hand, the comparison with Cornette's classification indicated it is very likely that the characteristic household Kali'na ware might indeed represent slightly modified equivalents of various Eva 2 modal series. This analysis permits us to hypothesize that the majority of the objects stored in museum collections are ceramics produced on demand for the local market which eventually developed into tourist production during the late 19th century. Presumably, this economic demand of European imitations and tourist ware represents an influence hailing from the neighbouring Dutch colony of Suriname. Here, from the second half of the 17th century on, the colonial society was much larger than in French Guiana.

This demand in exchange for European goods alters the Amerindian ceramic production. Innovation was now also coming from outside: the imitation of European vessels as well as the production of specific vessel shapes on a larger scale meant for a colonial society. The manufacture of pottery shifted from a local/regional production for domestic purposes to a production as a means of exchange. Producing their own domestic ware was subsequently less important because of the incoming metal pots and pans, as we have noted with regard to the griddles. However, specific vessels shapes persisted, notably the *samaku* and *waresa*. It is presumed that the persistence of the latter pottery –although the vessel shape changed slightly– is related to their function as recipients during ceremonies (e.g. rites of passage, funerary rites). Here the consumption of *cashiri* was of vital significance during these rites, stressing the cultural identity and continuity (Fig. 10.11).[337]

The gathering of Amerindian groups in the Jesuit missions of French Guiana from the beginning of the 18th century generated a process of ethnic recomposition. This favoured a cultural homogenisation debouching in the present-day culture of the Kali'na or Tɨlewuyu in western French Guiana. This cultural rebirth is still narrated among the Kali'na as the story of Epa'kano (Collomb and Tiouka 2000:73).

The declining Amerindian population, population dispersion, ethnic re-composition, and the growing colonial demand caused a restyling of the historic pottery tradition along the Guiana littoral, generating a ceramic uniformity among the various new nations of the late 19th century, as Collomb has correctly pointed out (2003:134). Similarities between regional pottery productions can be observed when comparing the Kali'na and Palikur pottery production, i.e. the exclusive use of *kwepi* as a temper, the morphology of large *cashiri* jars, the twin vessels, etc. Interestingly, both populations apply similar words for various aspects related to pottery production, evoking (frequent) contact between those groups. Moreover, basketry forms and decoration motifs are also shared among the same present-day Amerindian groups in French Guiana. This conforms to an apparent uniformity in the Kali'na and Palikur material culture (Davy 2007:185–194) as do various tales and myths (L. Green and D. Green 2010:40).[338]

We conclude that the Eva 2 ceramic assemblage is of a rather early colonial date. It still displays many pre-Columbian traits. Therefore the Eva 2 ceramic assemblage can best be compared to the description presented by Jean de le Mousse [*c.*1680]. During the following centuries, the imitation of European vessels and the production for the regional colonial market set innovative standards for the Amerindian potters whereas the domestic production stagnated. It was replaced by iron tools, with the exception of the surviving ceremonial ceramic recipients. In other words, we wish to class this assemblage as the <u>Malmanoury ceramic complex</u>. This historic ceramic complex is situated between pre-Columbian and modern times and affiliated to the historic Carib, or *Galibi*, in French Guiana. The link with the Galibi is evident as described in the historic résumé of the present chapter (cf. Section 11.7). It stresses the historic affinity to this predominant Amerindian population of the western coastal plains of French Guiana from the second half of the 17th century on. Without doubt, this complex finds its roots in the pre-Columbian period. However, it had been influenced by means of the introduction of European goods, hereby deteriorating its daily use. At the same time, the production turns more towards the incoming economic power in their (former) territory. Eventually, it develops a parallel production based on

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337 For example, the anonymous journal of Carpentras signals that drinking feasts or *caouynages* among the Island Caribs, notably with cashiri drink, are organised between villages for all sorts of occasions: 'Et puis une infinité d'autres, qui ne durent qu'environ un jour ou un jour et demi, comme à la naissance de leurs enfants, et au bout du mois qu'il est né,qu'on lui perce le nez, au premier degré d'honneur qu'ils passent, qui est en l'âge de 9 ou 10 ans' (Anonyme de Carpentras 2013 :58-59).

338 Despite the uniformity of basketry shapes in French Guiana, each group has its own style. Davy further concluded that each group (e.g. Kali'na, Palikur, Wayana, Teko, Wayapi) shared at least three similar objects, to wit *tipiti* (manioc press), *matutu*, *pamakai* (footed manioc basket) and *yamatu* or *pagara* (boxes). The latter, in particular, serve as recipients for goods that had to be carried over long distances in networks of exchange within the Guianas, as Lucia van Velthem (2006) reports on basketry. Finally, it must be said here that material culture is a strong identity marker and concerns a group's *ethos*, confirming its identity.

the economic demand featuring a variety of imitations, fantasy objects, adapted decoration motifs and finally a competitive tourist ware. It is noteworthy to add an interesting observation made by Peter Kloos (1971:259–260) concerning the present-day Kali'na culture: 'Reading early sources on the Caribs I was usually struck by two, quite opposed, facts. It appeared that certain sociocultural elements had changed enormously, while other had remained remarkably stable.'

If we wish to ascribe the Malmanoury complex to an existing archaeological framework, it would be Koriabo (Koriaban Marajoaroid) or even the predominantly historic Cayo complex considering the Lesser Antilles. If we wish to ascribe this complex to a contemporary Amerindian population, it would be the (various) ancestors of modern Kali'na. It may be clear that the last 300 years have modified Amerindian society. Nevertheless it has also generated another local and/or regional complex making it difficult to compare them.

However, according to Boomert, modern Kali'na and Palikur pottery can be attributed to the Aristan subseries of the Amazonian Polychrome Tradition (Boomert 1995:30, 2004:260–261).[339] For the record, this presents us with delicate matter: Late Aristé and Koriabo are both affiliated to the Polychrome Tradition, share many stylistic and morphological similarities and coexisted along the eastern Guiana littoral. In fact, the polychrome elements, ascribed to both Koriabo and Late Aristé ceramic complexes, found at Eva 2 are extremely rare. The absence of characteristic incision modes cannot serve in order to ascribe them to one of the Marajoaroid or Polychrome subseries.[340] This leaves us with toric vessel shapes, red paint and notched rims to confort the existing chrono-cultural framework. This appears too coarse for the Eva 2 ceramic assemblage. Hence, the proposition of a Malmanoury ceramic complex. Indeed, Boomert's attribution is probably too bold as it does not account for the many changes and indigenous complexity of the colonial era. The mere existence of pottery production among these populations is no proof of any regional continuity, but rather the result of a surviving population undergoing numerous alterations in their society from the 16th century on. This view also stresses the fact that linguistic affiliation between prehistoric ceramic complexes and historic (or modern) indigenous languages are difficult to demonstrate, especially regarding the homogenisation of ceramic traditions. For this matter, using style instead of language is more appropriate when distinguishing a Kal'ina or Palikur vessel, as Collomb proposed (2003:146).

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339 Interestingly, in the same BAR publication, Rostain and Versteeg (2004:238) attribute certain contemporaneous characteristics of Palikur pottery to the Arauquinoïd Tradition hereby opposing Boomert's analysis, who completely ignores the former hypothesis (Boomert 2004:258, note 10).

340 It may be clear that further archaeological research is needed in order to untangle the Late Aristé and Koriabo stylistic similarities. This is probably beyond the scope of the present study. This future research should be conducted in eastern French Guiana or northern Amapá where both ceramic complexes coexist, focussing on the regional diversity based on a consequent ceramic study of funerary and habitation sites.

Chapter 12

The synthesis and reflections

In this chapter all results of the presented excavations will serve to create a diachronic cultural overview or sequence, regarding the region located between Cayenne Island and the Maroni River, one of the major objectives of this research. The site analysis presented per chapter has revealed a first ascription to a specific Age in time and regional context. These analyses will serve as guideline for this synthesis which remains a proposition, and certainly requires further adaptations in the future whenever new sites are discovered (Table 12.1 and Fig. 12.1).

12.1 The Archaic Age

The existence of Preceramic or Archaic sites had been presumed, but never attested for in French Guiana (Rostain 1994a:411). In 2005, INRAP members detected two Archaic sites, undeniably revealing the presence of Meso-Indians in the eastern Guianas, namely at Plateau des Mines on the Lower Maroni River and at Eva 2 near Malmanoury (Mestre and Delpech 2008; van den Bel et al. 2006). A date of *c.*7000 BP was recorded for the Plateau des Mines site (PDM). Eva 2 was dated slightly earlier than 5000 BP (cf. Table 4.1). PDM also featured much more recent dates of *c.*4000 BP, possibly indicating another later occupation, but still without ceramics, similar to the one accounted for at the Eva 2 site at *c.*3500 BP, which did yield ceramics at a later stage. Interestingly, the early ceramics of the CSL site (Phase 1) share technological aspects with Eva 2. Both sites are contemporaneaous, considering the ceramic occupatioin. In this way, PDM is a true Preceramic site whereas Eva 2 has two components: a Late Preceramic and an Early Ceramic one, rendering the latter site transitional and stressing the importance of this Late Archaic/Early Ceramic Age (Phase A) site. Both Archaic sites share relevant characteristics: (a) the presence of grinding tools, (b) production of short flakes, (c) earth ovens and (d) their implantation on the White Sand Formation, all of which can now be considered important markers for the Late Meso-Indian population of the eastern Guianas.

At the beginning of the Holocene, a technological shift is recorded for these Meso-Indians. It marks the start of the Early Archaic Age and the end of the Lithic Age (Willey 1971). Hunting now focused on a wide variety of small game

Age	Phase	Calibrated date
Lithic		12,000-8000 BC
Archaic	Early	8000-5000
	Late	5000-3000
Ceramic	Early A	3000-0
	Early B	0-AD 900
	Late	900-1500
Historic	Early	1500-1800
	Late	1800-2000

Table 12.1. The archaeological Ages of coastal French Guiana.

and, more importantly, their toolkit was extended by means of grinding and retouched flaked tools. As to the Early Archaic Age, we dispose of a small quantity of data with regard to this phase in the Atlantic Guianas. However, archaeological research in Greater Amazonia has revealed that this population appreciated the consumption of all sorts of roots (notably arrowroot) and palm fruits which they tended during visiting cycles through their territory (Gnecco and Aceituna 2004). The presence of earth ovens appears to be a significant indicator of this transition. Processing tubers and vegetables in earth ovens or cooking pits can be associated with the Archaic Age of Guiana as it is the case in North America (Dering 1999; Thoms 2003, 2009). In fact, these pits represent the intermittent stage of food consumption, i.e. from roasting on an open fire (Lithic Age) to boiling in ceramic containers (Ceramic Age). In this evolution, the earth oven is a relevant innovation as to cooking food and notably tubers, which were previously only roasted. Cooked or steamed tubers, grains or beans can now be manipulated by means of specific grinding tools too in order to obtain masses, i.e. when preparing soups.

In addition to the introduction of elaborate grinding tools (e.g. pestles, mortars, edge grinders, milling stones) the lithic assemblage is marked by means of producing short flakes interpreted as implements for grater boards (Perry 2002a). As Perry pointed out (2001:260), many sorts of edible roots, not only manioc, have been reduced to pulp on these graters (cf. Section 12.5.2 for a further discussion on grater boards). Cooking, grinding, and grating appear to be significant activities in the process of food consumption. Further research is required in order to assess the final products and the way in which the various crops were prepared for consumption. The starch analysis of four milling stones from Eva 2 evidenced the grinding of maize kernels, sweet potatoes, arrowroot and jack beans. It can be suggested that these crops were thus ground and then, for example, steamed as *tamales* in the earth ovens.

Another important trait of the French Guiana sites is their location on the White Sand Formation. Although we have little conclusive evidence concerning the geomorphological origins of this geological formation, the presence of an Archaic occupation level at *c*.1 m deep, is particularly interesting and requires further geo-archaeological research (Vincent Freycon, personal communication, 2013). The detection of such sites is rather difficult without any mechanical means or systematic augering surveys. It may be evident that the discovery of such sites requires a strike of luck when merely field walking. It may partially explain why they were not found earlier, with the exception of individual finds (e.g. the Jorka point) (cf. Fig. 4.21b). The apparent choice of the Archaic population to settle down at the edge of these white sandy hilltops can be linked to the procurement of raw quartz material emerging in veins in the vicinity of Eva 2 or in the small creeks at the foot of the PDM site. It is believed that Archaic sites are certainly present in Suriname and Guyana regarding the White Sand Formation in these countries.

In addition to this environmental preference, the radiocarbon dates propose that these Late Archaic occupations appear at *c*.6000 BP. This suggests a possible link with the flattening out of the MSL and with the onset of the so-called Holocene drought. Interestingly, this particular date of 6000 BP also represents the end of sedimentation of the Phase IV Terraces in the Lower Maroni River. Moreover, it corresponds as well to the earliest radiocarbon dates for the Alaka Phase and Mina sites along the northern South American littoral, with the exception of the Middle Amazon River and the island of Trinidad. However, the latter sites are dominated by means of salt or fresh water shell middens which lack in French Guiana, but the site location is somehow similar: Alaka and Eva 2 are situated upon higher Precambrian hillocks overlooking the swamplands of the Early Holocene Plains (Williams 2003:211–212). It can be presumed, although there is no archaeological evidence, that the earlier Archaic sites were positioned more towards the mouths along river banks of which many may have disappeared due to the Holocene sea rise.

Climatologically, another relevant event coinciding with the end of the MSL –the end of the Mara depositions and beginning of the Wanica transgression in Suriname– and the Late Archaic occupation along the coastal Guianas, is the so-called Holocene drought, placed between 6000 and 4000 BP (cf. Fig. 2.4). In French Guiana, this drier period is marked by means of large quantities of charcoal thought to represent predominantly forest or savannah fires, notably Phases VI and VII according to Christophe Tardy (1998). However, as Tardy has pointed out correctly, these fires may also have an anthropogenic origin revealing an increase in deforestation in order to facilitate horticulture. Instead of collecting or tending crops, people had now started to grow their own crops in patches of cut-and-burned/charred forest and/or along the edges of savannahs, hereby generating large quantities of charcoal.[341] If this agricultural potential was exploited by an increasing population remains an issue to be investigated, but it is evident that successive harvesting needs more (careful) tending, implying a further sedentism for these Late Archaic populations.

The presence of domesticated maize at Eva 2 may have represented a trigger of such cultural changes. Its early date provides fresh data concerning its diffusion in Lowland South America (Freitas and Bustamente 2013; Pagán Jiménez et al. 2015). With the appearance of early ceramics at Eva 2 and CSL in *c*.2500 BC, the changes in food consumption and the process of sedentism now become clearer, notably for the CSL Phase 1b, with the first evidence of pit burials (with complete ceramics), black charcoal pits and large round cooking vessels of which maize, sweet potato, and arrowroot starches have been scraped off from the bottom. It is thought that this early pottery, as elsewhere in South America, is better understood as a social and economic development than as the spread and adaption of a rare invention (Raymond et al. 1998:167).

Although we observe variations in vessel morphology between Eva 2 and CSL ceramics, dubbed the Balaté ceramic complex, both ceramic wares are not only heavily weathered and tempered with pounded quartz, but also have relatively thin vessels walls. This is not crude, experimental ware, but it is certainly not as elaborately decorated as the later Ronquínan or early Saladoid wares from the Middle Orinoco –notwithstanding that the latter series may be dated more recently as William Barse suggests (2000, 2009). In fact, it refers better to the early, grit-tempered La Gruta phase dated between 2500 and 1600 BC (Roosevelt 1997:90). The early French Guiana wares share numerous traits with the incipient Alaka Phase ware and the slightly more recent Hosororo as well as with Kauri Kreek pottery, especially with regard to: (a) temper, (b) the pointed bases and (c) the firing mode yielding a ligth yellowish brown colour. However, the Eva 2 and CSL ceramics do not feature any decoration. The characteristic Kauri Kreek

341 I would like to refer here to Ingold (1996:21) who defines the essence of domestication as the constant human involvement with fast-growing plants.

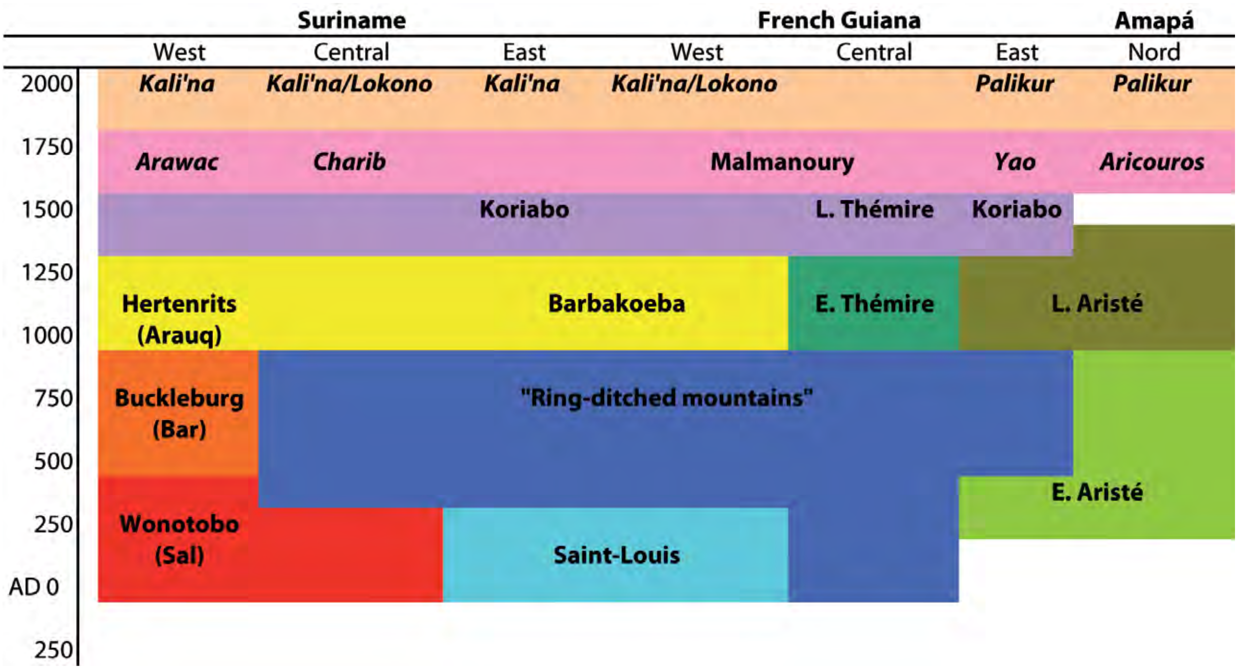

Figure 12.1. A simplified chronological chart of the Early (Phase B) and Late Ceramic Age archaeological complexes in the Central Guianas (cf. Figs. 1.6 and 3.2).

fretwork decoration was perhaps present at CSL as the specific firing colour is shared by both ceramic assemblages. These ceramics may have cultural links with the Mina or Salgado ceramics (Roosevelt 1995; Gaspar and Imazio da Silveira 2000; Williams 1992:243, 2003:251, Table P).

At both sites short quartz flakes predominate the lithic assemblages. These flakes are produced by means of the bipolar technique (Mode 1). However, grinding tools, scrapers and pitted anvils most certainly characterise these sites too. Similar artefacts were encountered at Mina, Alaka and the Trinidadian *sambaquís* sites. Unfortunately, earth ovens were not found at the latter sites, probably due to the absence of extensive excavations. Their geographical position, the *sambaquís* and the large artefact variety, reflect a broad spectrum subsistence economy in the vicinity of mangroves. The pre-Columbians caught shellfish, hunted animals and collected (wild) vegetables. Human burials also occurred at these sites, again revealing similarities with the earliest occupation of CSL.

In conclusion, the Late Archaic site of Eva 2 as well as the early phase of CSL possibly not only share a Preceramic component, but also represent a transition towards the Early Ceramic Age (Phase A). However, these sites did not yield any (late?) Early Archaic material such as the crude pebble choppers as found at PDM or Banwari Trace –although CSL did feature two bi-facial patinated artefacts (Method 2). The large quantity and spatial distribution of clustered earth ovens perhaps reveal a visiting cycle spanning many centuries, reflecting an important station of specific subsistence activities which eventually imposed a more sedentary way of life. This development also enhanced the production of ceramics taking crop cultivation to another level.

12.2 The Ceramic Age

This section discusses the Early Ceramic Age (Phase B) and Late Ceramic Age. The division between the Early Ceramic Age Phases A and B is marked by means of a gap in time lasting *c.*2000 years on which we have very little or no data at all with regard to the eastern Guianas, known in certain regions as the Formative Period. This lack of data may certainly be associated with an absence of archaeological information in general. Nonetheless, an "Early Ceramic Gap" may indeed exist as certain archaeologists suggest (Rouse 1978: 211; Roosevelt 1997:94; Oliver 2001:67). In both cases the discrepancy between Phases A and B is striking, notably as to the quality and morphology of the ceramic material. Another major difference is that ECA Phase B has griddles, apparently demonstrating an innovation in food processing, possibly acquired during the alleged time gap. We will now apply the term Early Ceramic Age for ECA Phase B. Only when mentioned otherwise does it refer to the much earlier Phase A in which ceramic material can be considered as Late Archaic, incipient, initial, or as formative ceramics (Fig. 12.1).

12.2.1 The Early Ceramic Age (Phase B)

The excavations at CSL uncovered a completely new episode with regard to the Lower Maroni River region. It presents the first excavated ECA coastal site located to the west of Cayenne and to the east of Paramaribo. CSL Phase 2 yielded impressive thin-walled and well-finished, carinated and hyperboloid bowls with predominantly red and some white-and-red painting. It included large carinated bell shaped vessels with an occasional ZIC decoration, possibly revealing Early Cedrosan influences and perhaps extending the eastern boundary of the Cedrosan Saladoid interaction sphere from the Courantyne towards the Maroni River Basin (Boomert 2000:217).

The principal CSL repertoire is dominantly sand-tempered. It dates from between 0 and AD 400 (Phases 2b and 2c). Interestingly, several earlier dated vessels (Phase 2a) have even more complex shapes featuring polychrome painting. They may have had a dissimilar function as urns, but may also (a) belong to a distinct earlier occupation or (b) be ascribed to the LCA, despite the fact it contained earlier charcoal. Contact between the Maroni and Amazon Rivers is demonstrated by means of a possible trade sherd (cf. Fig. 5.26e) as well as several individual finds from the Maroni River itself.

CSL Phases 2b-c share general characteristics with other ECA sites of the western Guianas, notably Wonotobo Falls, Kurupukari and Yaou. Contemporaneous sites beyond the Atlantic Guianas and on the Lower Amazon River are generally attributed to the Incised-Rim or Zone-Hachured Traditions. Although scholars consider this terminology as obsolete with regard to the latter region because it no longer fits archaeological data. These traditions were often compared with the Orinocan Barrancoid and Saladoid series, respectively. Fieldwork carried out during the last two decades concerning the Middle and Lower Amazon River point to a rather long Formative Incised-Rim Tradition (Barrancoid), spanning between *c.*3800 and 900 BP, bridging the above-mentioned ECA gap. It may not only represent very early phases, but also much recent ones (Gomes 2011:283, Table 1).

Concerning the western Guianas, the Late Cedrosan sites in Guyana and western Suriname represent the easternmost interaction sphere of the Saladoid series. During the second quarter of the first millennium AD they were 'Barrancoidized'

(Boomert 2000:491). This gradual process resulted in the construction of the first Mabaruma man-made habitation mounds in the western Suriname plains and eastern Guyana (Versteeg 2008:309). Although anthropogenic mounds are unknown in French Guiana to date, two aspects of anthropogenic modification of the landscape took place during the last quarter of the first millennium BC and the first half of the first millennium AD: (a) the construction of ring-ditched mountains and (b) the development of dark earths, or *terra pretas*. The inception of these developments at this point in time appears to be present in Greater Amazonia too. Here the construction of earth works, the presence of *terra preta*, and of high-quality ceramics may even represent a macrotradition or culture horizon in which CSL would, to a certain extent, fit in. By now, in Amazonia, the ECA population is thought to have been fully sedentarized, expressing a cultural complexity and gaining in numbers (Machado 2005; Lima 2008; Neves 2008).

Thus, similar developments were reported as to the western Guianas which can be attributed to supra-regional developments in the Guianas. On the one hand, the ECA in the eastern Guianas is still poorly understood, notably between Cayenne and Paramaribo hampering the discussion on cultural continuity towards the LCA. Nevertheless, the results of the CSL excavations are beginning to fill this gap. On the other hand, areas such as the interior uplands and the eastern littoral of French Guiana plus northern Amapá remain fairly unknown terrain. CSL pottery indicates that certain morphological ceramic features were shared with the 4 ha, ring-ditched site of Yaou on the Upper Maroni River, revealing contact or possibly a cultural link between these sites. Other ring-ditched sites yielded sparse ceramics with ZIC decoration, perhaps trade ware from western Suriname.

In sum, CSL and other French Guiana sites do not feature the Late Cedrosan ware as found in Wonotobo, but have certainly been influenced by it. The French Guiana ECA ensemble represents a distinct regional series, possibly the Orinocan counterweight. Indeed, another ECA region is probably represented by means of the *Ouanary encoché* series in eastern French Guiana, but further research is certainly needed here. The excavations at CPP clearly demonstrated the presence of *Ouanary encoché* on Cayenne Island during the first half of the first millennium AD (cf. Section 9.5.4). This distinct ECA series must be dissociated from Late Aristé. This idea suggests the existence of at least three large ECA (culture) areas positioned between the Orinoco and Araguarí Rivers during the first millennium AD, from west to east: (a) the Wonotobo Falls (Late Cedrosan), (b) Saint-Louis and (c) *Ouanary encoché*. The latter two series possibly share cultural connections with ring-ditched sites (e.g. Yaou, Maripa, Favard, Blondin). At present, I adhere to a more ceremonial function of ring-ditched mountains in which funerary practices and rites of passage in combination with feasts play an important role (Iriarte et al. 2008). It may be evident that this hypothesis needs further research. In addition, it indicates that continuous archaeological research in the entire landscape –not favourising specific locations– as the INRAP carries out in French Guiana, plays an important role within the evolution of archaeological research and hypotheses.

Subsistence patterns

As pointed out above, this part of the ECA features griddles for the first time, representing an important innovation in food processing. Although we do not know if these ceramic artefacts were present in the Guianas prior to the Late Cedrosan episode, they enabled the baking of flatbreads, i.e. *tortillas* (maize) and cassava (manioc), probably being the most commonly consumed products among this Neo-Indian population. Once baked, this bread can be preserved for a long time in a Neotropical environment (and elsewhere).This is a major advantage when compared with other products (e.g. soups and *tamales* made of arrowroot and sweet potatoes) and prepared in ceramic containers. In addition to large quantities of maize and some manioc, starch grain analysis also recorded the presence of beans and chili pepper with regard to Phase 2 at CSL (Tables 5.14-5). This suggests a full control over crops and permanent habitation stressed by means of the large number and overlapping of features.

The continuous habitation at this riverbank between *c*.AD 0 and 400 has modified the site's local topography and soils. Digging pits and postholes as well as the surface erosion due to weathering has flattened out the higher parts of the riverbank. Simultaneously, the lower hydromorphic parts, i.e. the back-fan area, were filled with debris and colluvial sediment identified by means of micro-morphological research. These microscopic cumulative layers probably represent ancient walking surfaces packed with artefacts and measuring up to 60 cm in thickness. Together with the original buried A-horizon, it represented nearly 1 m of dark earth, referred to here as *Guiana Dark Soils* (Brancier et al. 2014).

A multi-element analysis revealed soil enhancement, notably of P and C. In general, the chemical signature is less strong than its Amazonian equivalent, suggesting dissimilar origins or intensity of the enrichment by the coastal Guiana population. This concept of enrichment is primarily based on site erosion due to construction, deposition of organic waste and artefacts and local gardening (Glaser and Birk 2012:49). This theme certainly needs more attention in the future.

Interestingly, oval shaped pits contained complete ceramic vessels. They were interpreted as inhumations and have been acknowledged as to Phase 1a and Phase 2b, displaying little change in various aspects of the mortuary practices (e.g. pit shape and deposition of vessels). They possibly represent a persisting funerary tradition for the entire ECA (Phases A and B) contrasted by the urn burials of the LCA (Boomert 2000:398). Although only a flank of the higher bank was excavated at CSL, the majority of the features of Phase 2 were dispersed around the foot of the levee. Does this suggest the presence of an open area or plaza at the edge of the terrace? This is possible, but the stretched morphology and rather small width of the terrace is not favourable for very large plazas. Nonetheless, such issues need further research in the future and, more importantly, extensive excavations in order to understand the full village lay-out and/or infrastructure at site level.

Applying raw quartz material is still very important at this point in time, notably saccharin quartz (Modes 2 and 3). The population of CSL Phase 2 has diversified their choice in raw material when compared with the Late Archaic people who sought after greenstone, granites, sandstone, igneous rocks and phyllite. Greenstone predominantly serves to craft axes and igneous rocks to produce grinding tools (cf. Table 5.13).

12.2.2 The Late Ceramic Age

Introduction

Whereas Archaic and ECA sites appear to be rather scarce, LCA sites constitute the majority of archaeological sites along the Guiana littoral. Their omnipresence in the latter region is first of all guided by means of the relatively easy access to this region because of (a) the existing infrastructure and (b) the predominantly Holocene context of the landscape despite the presence of Pleistocene ridges and Precambrian outcrops. It is precisely at these outcrops that ECA vestiges were found on Cayenne Island, indicating this "island" was occupied before the LCA started in *c.*AD 900. Unfortunately, we have insufficient data on the littoral of French Guiana as to the second half of the first millennium AD, which may represent another (second) ceramic time gap: the transition from the ECA to LCA. Somehow, at least for the littoral, this lack of data appears to be linked to the Late Holocene marine incursions as is the case in Suriname. The reason for this is that radiocarbon dates related to the above-mentioned gap are available only for (ring-ditched) sites in the interior and other mountaintop sites, located mainly on the Precambrian shield.

As demonstrated for Suriname and French Guiana, human occupation of the Young Coastal Plain was recorded only during the last phases of the transgression, which differs along the coast, when comparing western Suriname and French Guiana, i.e. 1300 and 500 BP respectively (Versteeg 1985:737; Palvadeau 1999:86). For this matter, it is presumed that the earliest LCA occupation are to be found at the higher Pleistocene ridges (e.g. Rorota, Katoury, AM 41) and the Precambrian elevations (CPP) along the littoral of French Guiana. Only later do we encounter archaeological sites on the earliest Holocene sand ridges (e.g. Bois Diable/La Sablière, Sainte Agathe), forming the new coastline consisting of seasonally flooded savannahs. When this occurred is uncertain, but presumably took place during the second half of the LCA.[342]

Christophe Tardy (1998:237, 256) detected another peak of possibly paleofires during the LCA, i.e. Phase X, in various areas of French Guiana. Also present in many other regions in South America and the Antilles, it evokes a global event (cf. Section 8.8). This peak coincides with abundant LCA human activities (e.g. the construction and management of raised fields) located roughly between the Essequibo and Cayenne Rivers. The latter raised fields were associated with more complex societies, called chiefdoms by Rostain (2008a:231; 2010b:345). It can be noted that Versteeg is less decisive and does not adopt this rather fashionable term when discussing the association of raised fields and the man-made Buckleburg habitation mounds (Barrancoid) in the swamps of western Suriname dating from *c.*AD 300 (Versteeg 2008:307).

Phytolith research carried out during the Moundbuilders Project in the coastal savannahs of French Guiana reveals that maize and squash were mainly cultivated by the pre-Columbian population (McKey et al. 2010; Iriarte et al. 2010, 2012). However, their age appears difficult to prove as both charcoal and phytoliths

342 The future multidisciplinary project named *Guiachenier* seeks 'to identify the links between chenier dynamics and patterns of past and historical to modern human colonization of these deposits, through the dating of archeological sites, and determination of Precolombian and modern phases of abandonment as cheniers progressively became isolated from the sea by muddy progradation.'

are represented by dispersed elements in the 30 cm thick savannah A-horizon. Interestingly Iriarte et al. (2012, Fig. 3) stressed the fact that sweet potatoes and manioc were absent in the K-VIII pollen site record which is dominated by maize. They opined that the abandonment of the raised fields is probably related to the post-Columbian population collapse resulting in a decline of agricultural labour (ibid., p. 3). It has been suggested that the radiocarbon dates (N=2) can be associated to the Sable Blanc Est site near Iracoubo which yielded griddles containing maize starches with similar dates (McKey et al. 2010, Table S1). It is opined in the latter publication that Amerindians made the large amount of small heaps (Fr., *buttes*) and that they were subsequently maintained by ants and worms. However, the natural mound-field landscapes (Meggers 2003), such as in the llanos of Surales (Colombia), were built by worms (*Rhinodrilidae*), as McKey et al. (2014) propose. In my opinion, this can also be the other way around, i.e. the small mound-fields in French Guiana were initially made by ants and subsequently exploited by humans. Aerial photographs reveal large stretches of savannahs filled with thousands of small heaps measuring *c.*30 cm in diameter (cf. Rostain 2013:152, Fig. 48) as if created simultaneously. If these heaps represent man-made agricultural fields, one should detect patterns of successive expansion of these fields, revealing criss-cross patterns consisting of numerous patches and irregular canals in varying directions, as witnessed in Suriname (ibid., p. 165, Fig. 43) and parts of French Guiana (ibid., p. 159, Fig. 51) as well as in other wetlands in South America (Lombardo and Prümers 2010:1880, Fig. 6). In the future, a clear distinction should be made between the tapistry of small heaps (a natural phenomenon) and the larger beds of articulated raised-fields, i.e. anthropogenic features.

The often presumed high productivity of raised-field agriculture in the South American wetland areas has never been demonstrated. However, it has been observed that the raised fields in the Bolivian Amazon were built in order to avoid waterlogging during periods of extreme precipitation. It is also stated that these fields do not reveal 'a pre-Columbian green revolution,' but rather a bare means or mitigation strategy in order to adapt and survive in a flooded environment (Lombardo et al. 2011:510). Thus, we must urge caution when presuming that 'well studied regions can be extrapolated to the entire Amazon' (Barlow et al. 2012:48). Indeed, this type of large-picture archaeology obscures local and regional diversity. This is probably also the case regarding not only the Guianas but also many other regions in Amazonia which is eventually best known for its cultural mosaics or patchwork, reflected by an astonishing biodiversity (Neves and Rostain 2012), and appears to be less pristine as many thought 50 years ago.

Raised-field agriculture is often associated with complex societies of which chiefdoms are believed to be emblematic in Amazonia. If there were any chiefdoms in the Guianas, these would have been rather modest ones when compared to the characteristics of the Orinocan, Amazonian and Caribbean examples, according to Anna Roosevelt:

> *The domains of these societies were very large sometimes tens of thousands of square kilometers in size, and these were sometimes unified under paramount chiefs. Populations were densely aggregated, and some settlements held many thousands of people. There was largescale building of earthworks for water control, agriculture, habitation, transport, and defence. Reportedly warlike and expansionist, some societies had hierarchical social organization supported by tribute and subsistence*

based on intensive cropping and foraging. Crafts were highly developed for ceremony and trade and linked by widespread styles emphasizing human images in addition to the traditional animals and geometrics, and there was a widespread cult of worship of the bodies and idols of chiefly ancestors. (Roosevelt 1993:259)

Although some of these elements can certainly be presumed to apply to the Atlantic Guianas, they nevertheless outscale the Guianas by means of the above-mentioned regions. Perhaps Amapá may finally hold the best hand regarding complex societies with the presence of so-called LCA stone henges as large-scale monumental earth and stone works (Cabral and Saldanha 2010). On the other hand, one must not forget the presence of the numerous impressive ring-ditched sites in French Guiana, Suriname and Amapá during the ECA and single ditched or restricted hillocks during the LCA. They may have served multiple functions (e.g. habitation, defence, ceremonial or funerary?) and probably persisted for a long time. It would be interesting to check the number of ring-ditched sites restricted to a specific area, perhaps forming a territory, and/or if these earthworks are situated at the periphery or the centre of a possibly restricted area, such as proposed for the distribution of hierarchical Wayana villages in the Guianas (Duin 2009, 2012), large circular villages in southern Amazonia (Heckenberger 2005) and the (communal) plazas and ball courts in the Greater Anilles (Wilson 1990; Siegel 1999; Oliver 2009).

An element most certainly shared among the pre-Columbian populations of the eastern Guianas is the widespread trade of specific gifts or prestige objects, notably greenstone amulets or *muiraquitãs,* and specific Koriabo vessels. The archaeologists easily detect the latter objects, but organic artefacts (e.g. basketry, wooden stools, shell-bead chains (*quiripá*), feather work, dogs) are more difficult to trace. Unfortunately, we know very little of the origins or sources of these archaeological objects. Did these greenstone pendants or Koriabo pots hail from a specific region or were they only produced by certain groups, as suggested in ethnographic and historic sources (Boomert 1987, 2000; Butt-Colson 1973). Despite the fact that only a small number hereof have been found in excavations, Boomert (1987:43) has demonstrated that various types of raw material were used for the Suriname specimens and that, interestingly, their mode of production differed from that of the Lower Amazonian ones.[343] Further research (e.g. tracing chemical signatures and sources of greenstone and/or nephrite) concerning the discovery of the greenstone material applied by the Amerindians may point at influential production centres. In this light, a stylistic and morphological comparison of typical Koriabo necked vessels may lead to the geographical delimitation of possibly dissimilar regions and populations.

To conclude, the size of this network illustrates the importance and meaning of these objects. Shared by many Amerindian groups in the Guianas, it is the variation or style of these objects that may elude us with regard to the various Amerindian cultures populating the Guianas. As Peter Rivière (1984:8) states, it is 'through variation in language, body ornaments, technical equipments, methods of food processing, funerary rites, and consumption of hallucinogens that the peoples of Guiana mark themselves off from one another.'[344]

343 The West Indies represent another important area where many greenstone pendants are frequently associated with the Saladoid era (Boomert 1987:46), showing a possible cultural link with Suriname.

344 See also Turner (1984).

The cemeteries

Another important theme illustrating dissimilarity from the previous age that can reveal cultural differences at a regional level is the appearance of the "isolated" burial grounds, or necropoles, i.e. cemeteries located far from the habitation site. The excavations at Iracoubo (AM 41) demonstrated this distance between the dead and the living, if we accept that both sites are contemporaneous. The existence of a necropole has also been hypothesised with regard to Awala/Yalimapo in the west of French Guiana. It can also be demonstrated as to the Late Aristé (anthropomorphic) urn sites of eastern French Guiana and northern Amapá and even further towards the mouth of the Amazon River, i.e. Mazagão, Aruã, Maracá, and Marajoará. When aligning all these (basically funerary) ceramic complexes, an urn burial horizon for the LCA in the eastern Guianas arises. This can certainly be considered a cultural marker for that period. The origins of secondary urn burials can be traced back to the Lower Amazon River and notably to Marajó Island. Here impressive mound-building populations developed between AD 400 and 1300 (Roosevelt 1991; Schaan 2004). A possible cultural link between these urn sites is the omnipresence of grog as a temper for all these LCA ceramic complexes.

As to the LCA in the coastal zone of French Guiana, the following types of cemeteries have been suggested in three regions: (a) urn burials in deep pits or depositions in cavities as to the Late Aristé Phase, (b) elongated pits with deposited and discarded complete ceramic vessels on Cayenne Island and (c) concentrations of urns or small urn mounds in the western coastal plains (van den Bel 2009a:145–146). A brief discussion of each region follows now.

Late Aristé The Late Aristé Cunaní necropole in Amapá has been known since the end of the 19th century (Goeldi 1900). Only recently extensive archaeological research has been carried out in eastern French Guiana (Mestre and Hildebrand 2011) and northern Amapá (Cabral and Saldanha 2009) yielding similar cemeteries. These Late Aristé burial sites are often located on overlooking hilltops where erected stone slabs mark the numerous burial pits. The necropole of Pointe Morne on the left bank of the Oyapock River is also identified by means of a restricting ditch which presumably marks the access to the burial ground, hereby constituting an important funerary and/or ceremonial site within the pre-Columbian landscape (Mestre and Hildebrand 2011).

Not only the caves but also the burial pits contain beautifully crafted, grog-tempered composite (anthropomorphic) urns as well as other types of highly decorated ceramics, i.e. square jaguar-print platters and '*ralladores*,' or ceramic graters (P. Hilbert 1957:15). Human bone material was also found inside these urns, suggesting a use as containers of secondary deposition of (long) bones. The foot shaped burial pits were dug into the subsoil (now and again measuring more than 2 m in depth!) in which the urns were placed at the bottom. The pits were probably closed by means of a stone slab in order to cover the entrance of the pit, as recorded in Amapá (Cabral and Saldanha 2009). The complex vessel shapes and the elaborated decorations suggest representations of clothing, body painting, jewellery, tattooing, etc. These attributes possibly reflect the social status of (village and/or war) leaders, shamans, ancestors, cosmological elements, personalities from myths, lineages, etc. This is thought to apply to other burial sites in Amapá (Guapindaia 2001) or Marajó Island (Schaan 2004) too. These vessels are usually referred to as ceremonial ware (Roosevelt 1991:370–371).

As glass beads and other imported European ceramic wares were found in the Late Aristé urns –but also in those of the Aruã and Maracá complexes– it is suggested that this funerary tradition continued into colonial times (Goeldi 1900; Meggers and Evans 1957; Nimuendajú 2004). However, it is also assumed that the local historic population reused these pre-Columbian urns as "sacred" ancestral objects or heirlooms in order to serve again as burial containers, as was common practice among the early 20th century Palikur (Nimuendajú 2004:43–44) and among the latest inhabitants of Eva 2.[345]

Cayenne Island Here, the dead were buried in rectangular or elongated pits, with straight walls as encountered at many LCA sites after the introduction of compliance archaeology in French Guiana. It is hypothesised that once the pit had been dug, a body was placed in the pit in a stretched position and covered with ceramic recipients, either (ritually) broken or complete. It has been suggested that other (personal) objects and/or utensils were placed in the pit of the deceased too, but no such archaeological evidence has been found up to now –with the exception of the possible *maraca* or grater board in Burial 5 of Eva 2– as described in historic sources (cf. Appendix 4).

Furthermore, the CPP site shows an alignment of three burial pits whereas Saint-Cyr and Mombin II show concentrations of numerous burial pits (Delpech 2013). In contrast to Late Aristé cemeteries, these burial grounds are situated within or next to the habitat site. Thus, they are geographically part of it and not separated, but further research is certainly needed here. At present we have no evidence that these burials are marked in the landscape. Interestingly, single and double ceramic depositions (urns?) are to be found distributed among the burials and other features, resembling the ones found at Iracoubo.[346]

Iracoubo The AM 41 site is a true, isolated burial ground. It consists of two urn burial concentrations with approximately 20 ceramic depositions each. They were probably marked by means of a small man-made burial mound (partially?) covering the urns. As with Cayenne Island, the ceramic containers represent domestic ware and do not resemble the fancy ceramics as seen at Late Aristé sites, although several of these vessels may have been manufactured for a specific occasion. We came across: (a) a rather small pit that fits the ceramic container and (b) a rather large rectangular/square or "boxed" pit outlined with ceramics, notably of griddles or very large fragments hereof. Interestingly, the concept of outlining the pit wall with potsherds is also common on Cayenne Island (Delpech 2010a, 2011b, 2013).

The way of placing a single or a set of vessels into the pit may differ: either upright, upside down or else one vessel placed upside down on top of another one. It is presumed that the rectangular pits are associated with people of higher social status, based on: (a) the rarity of this type of pit within the concentration, (b) its central position within the ceramic concentration and (c) the possible mortuary gifts. It is imagined that these pits were reserved for village leaders or shamans whereas their family members (either blood, married or enslaved) were

345 A coffin shaped polychrome painted urn with a flat lid that appears to be a ceramic imitation of an European (Christian) coffin was found in the cavity of Trou Delft, located at Mound Caripo (nowadays named Mont Bruyère) to the east of the modern Ouanary hamlet in the embouchure of the Oyapock River (Petitjean Roget 1993).

346 See also Mont Grand-Matoury for a possible urn burial (Grouard and Tardy 2003, Figs. 8 and 12).

placed around them. Further fieldwork carried out to the northeast of the AM 41 necropole revealed the presence of many more urns, sharing similar features as are mentioned above, notably stacked sherds, double urns and boxes (Briand 2012a). These burials are situated upon the same sandy Pleistocene ridge as the SBE site and show multiple concentrations of urns along the RN 1 for more than 2 km in length. However, in contrast to AM 41, these urns were found within a habitation context, suggesting that both types coexisted, but further radiometric results may prove otherwise. It is hypothesised, drawing upon historic and ethnographic sources, that these burial concentrations are located inside abandoned villages: the new village was founded or shifted further up the same ridge whereas the old village served as a burial ground and garden. In this manner the creation of multicompound, stretched villages emerged on the sandy ridges in the coastal zone of French Guiana during the LCA.

Awala/Yalimapo The restricted spheric urns of Awala/Yalimapo and CSL, on occasion with straight or everted necks, are generally larger than those found at Iracoubo and resemble those found at Kwatta-Tingoholo. These burial grounds are also located on (Holocene) sandy ridges and may be the result of shifting villages as hypothesized with regard to Iracoubo (cf. Section 7.4). On addition to bones, these urns may contain smaller vessels and now and again (strings of) shell beads (Coutet 2011, 2014b:212; Coutet et al. 2014:27–30), such as noticed at Eva 2 too, representing the personal belongings of the deceased. At Kwatta-Tiniholo, in addition to primary and secondary burials, this site featured burials where the body of the deceased, probably wrapped in a hammock, was placed in the urn (Duijvenbode 2012:5), whereas at Awala and Eva 2 the (burnt) debris of the bones revealed a secondary deposition. However, further excavations are needed not only to confirm this idea, but also to obtain more information on their spatial distribution and the contemporaneity of various burial types.

Eva 2 The phantoms of Eva 2 are primary burials as described in historic and ethnographic sources. Apparently, primary urn burials as described above as to Iracoubo and Awala, were abandoned by the historic Amerindian population of Eva 2. Nonetheless, large urn burials were as yet practised during the 19th century despite the Jesuit and other European influences of the 17th and 18th century. They appear to be less influential as aspected from this point of view (Collomb 2010). In fact, the large urn Burial 5 of Eva 2 demonstrates the continuation of urn burial practices during colonial times considering the large, buried vessels of Crique Sparouine (Fig. 6.6c) and Bois Diable/La Sablière (Barone-Visigalli 2007:31, Fig. 5a). They reflect the interment of perhaps an influential individual (e.g. *yopoto*). Of interest here is the spatial organisation of the burials, which are paired (relatives?), presenting a possible linear alignment similar to the alignement of elongated pits at CPP (cf. Fig. 9.9).

The ceramic series

The existing cultural framework of the Guianas is primarily based on the study of pottery. However, the Rousian model suggests a unilinear historical sequence, i.e. the diffusion of the Orinocan evolutionary model or the successive spreading of the Saladoid → Barrancoid → Arauquinoid series from the Middle to the Lower Orinoco River and eventually its distribution into the Antilles and the western Guianas (Rouse et al. 1984) in which Thémire is a final phase of a singular evolutionary trajectory (Rostain 2013). It has to be noted that the deterioration in ceramic production from the Early to Late Ceramic Age, as witnessed in the Orinoco delta and the Caribbean, was not accompanied by means of a cultural decline when considering ethnohistoric sources (Kirchof 1948; Boomert 1984, 1985, 2000; Whitehead 1988).[347] A slightly different development is witnessed as to Marajó Island. Here, for example, the influential Marajoará culture ended in *c.*AD 1300 and succeeded by means of regional centres (Schaan 2004). Although Rouse did most certainly recognize local cultural differences, his framework focused on similarities which effectively homogenized archaeology into "series of peoples and cultures," as much as the Europeans used to describe Amerindian society (Keegan 2013:74). Many archaeologists have applied the above-mentioned tripartite model in order to fit their data as to createing a larger picture of homogeneous culture areas (notably chiefdoms), thereby ignoring specific artefact assemblages and obscuring local differences which form the base for the present research.

The LCA ceramic assemblages studied here belong to various ceramic complexes of the Atlantic Guianas. Indeed, they share several general characteristics to be considered supra-regional markers for the LCA of the French Guiana littoral and possibly beyond. Traditionally, markers serving in order to distinguish larger cultural areas are: (a) temper, (b) vessel shapes and (c) decoration modes. Before discussing the cultural affiliations of the presented ceramic series in more detail, an introduction of these general markers will be provided first in order to asses the alleged homogeneity or "veneer" of the LCA.

Temper We must first point out the general shift from the ECA sand-tempered to the LCA grog-tempered wares. Meggers and Evans (1957:151, 156) had noticed this trend with regard to the Aristé and Mazagão wares. Herein the pounded potsherds serving as a temper agent may have spread to the northwest into the eastern Guianas from Marajó Island, the supposed cradle of the Marajoará ceramic complex belonging to the Polychrome Tradition (Meggers and Evans 1957:385–386; Roosevelt 1991:349–351; Schaan 2004:274–275).[348] The latter tradition started in *c.*AD 400 (Schaan 2008:145). It stands opposite to the sponge-tempered ware –albeit often admixed with other agents (Scaramelli 2006:104)– of the Middle and Lower Orinoco River. This ware was omnipresent during the late prehistoric Incised-and-Punctate Tradition to which the Arauquinoid and/ Camoruco series belong (Roosevelt 1997:160–161) as well as on the Middle Amazon River represented by the Kondori and Paredão occupation (Quinn 2004;

347 Indeed, this supposed cultural back-set observed in LCA ceramic assemblages of the Lesser Antilles is incorrect, according to Peter Drewett. He suggested that, although Saladoid pottery is technically highly accomplished, it is rather dull whereas the later 'pottery of the Suazoid on Barbados is exciting, free flowing and individualistic' (Drewett 2004:215) thus stressing artistic freedom.

348 Denise Schaan (2004:126) states: 'Although the Marajoara phase ceramics as described by Meggers and Evans (1957) are grog-tempered, here Marajoara style vessels were also found tempered with either *caraipé* or a combination of grog and *caraipé*. The caraipé tempered ceramics are predominantly plain, but a small number of decorated sherds did not differentiate from Marajoara phase decorated types. Overall, the *caraipé* plain pottery has higher frequencies among the plain sherds, while grog was the preferred temper material for decorated vessels.' In fact, Meggers and Evans (1957:610) prefered to give *caraipé* a later date (Mazagão), corresponding to their ideas about the Andean origins of the Tropical Forest population: 'By the same token, the absence until later times of caraipé tempering, painted and modeled decoration of pottery, and secondary urn burial indicates that these are late traits and if they are of Amazonian origin, it was not in the eastern part.'

Gomes 2005; Guapindaia 2008; Lima 2008).[349] Consequently, based on the use of temper regarding these LCA ceramic assemblages, we have two potential regions from which the local LCA population of French Guiana may have originated or been influenced.

On the one hand, we observe an omnipresence of potsherd-tempered ware as to the LCA along the littoral of the Guianas, possibly suggesting Amazonian influences with regard to these ceramic series (Meggers and Evans 1957;143, 181, 210, 232, 358, 538; Evans and Meggers 1960:182; Boomert 1980:78, 1993:202; Versteeg 1985:676, 694, 717; Rostain 1994a:213; Thooris 1994a:15). On the other hand, sponge-tempered ware or an alleged Arauquinoid population seems to have reached the island of Trinidad in *c*.AD 600 from the Lower Orinoco. Here it had already mingled with local Barrancoid groups after coming down from the Middle Orinoco, following the downfall of the local Barrancoid series (Harris 1978:47; Voorhies et al. 1983; Rouse et al. 1984:23; Boomert 2010:116).[350] Unfortunately, sponge-tempered ware has as yet never been found at archaeological sites in the Guianas, suggesting no direct migration of Arauquinoid potters from the Lower Orinoco River or Trinidad to the Guianas.

Reconsidering this rather simple perspective –the Arauquinoid ceramic series as identified by means of sponge temper– Arauquinoid pottery has never reached either the eastern or the western Guianas whereas the potsherd temper is physically present in the Guianas, but may have arrived from the opposite direction, i.e. the mouth of the Amazon River. Thus, despite this more coherent point of view, the diffusion of stylistic similarities between the ceramic assemblages of the western Guianas, notably the key site of Hertenrits, and the eastern Venezuelan ceramic complexes as defined by Rouse and Cruxent, i.e. Arauquinoid, Valencioid and other LCA ceramic complexes. For instance, Camoruco and Guarguapo (Roosevelt 1980, 1997) represent the sole basis for a larger cultural interaction sphere synonymous with Lathrap's Fine-Line Incised or Carib expansion (1971:164–170) and the Amazonian Incised-and-Punctate Tradition (PRONAPA 1970:19–20), instead of a more obvious Amazonian basis. This scientific preference for the Orinoco with regard to the Guianas is perhaps a historical development favoured by more recent and structural archaeological fieldwork. The Orinocan model provided a better structure in order to comprehend pre-Columbian cultural development, as it demonstated in the Caribbean (Rouse 1992). For example, archaeologists agree

349 The Early Corozal Tradition is characterised by grit and potsherd-tempered ware. It is slowly taken over by the sponge-tempered wares (Roosevelt1997:156–157) in c.1000 BC just as at the site of Agüerito situated on the Middle Orinoco River (Zucchi et al. 1984). Its origins are still unknown but an Amazonian one seems most likely given the biological presence of sweet water sponges which are rare in the Guianas.

350 The post-Barrancoid period was named Guayabitoid by Arie Boomert (1985:95) after Rouse and Cruxent (1963:125) and was later called Guayabitan Arauquinoid (Boomert 2010:115). The local Bontour complex is thought to be the result of regional dynamism, representing cultural and socio-political restructuring. It is the 'new' Arauquinoid manifestation of the island at the beginning of the LCA. For radiocarbon dates concerning the Bontour complex, see Boomert (1985:101) and Dorst (2007:335). However, only a limited amount of Bontour potsherds (4.3%) contain *cauixí*, suggesting that these vessels were imported from the Lower Orinoco valley (Boomert 1985:107). This complex is followed by the Guayguayare ceramic complex which reveals the presence of *caraipé* as a temper material and belongs to the most recent pre-Columbian and protohistoric period (Boomert 1985). According to Boomert (2010:118), this 'Mayoid pottery shows faint resemblances to the protohistoric Cayo ceramics of the Windward Islands which largely derive from the Koriabo complex of the Guianas.'

that the alleged abrupt changes at the beginning of the second half of the first millennium AD mark the post-Barrancoid period:

> *In contrast to other ceramic developments during the Camoruco tradition, many of the specific traits that link Camoruco to the Arauquinoid series seem to come into use quite suddenly. These traits include maroon paint, complex rectilinear incision, and highly decorated human adornos and effigies. This pattern of change raises the possibility that this particular pottery complex developed elsewhere and then came to influence Parmana region potters. Nevertheless, these new traits seem to come from a complex similar to the early pottery of the Camoruco tradition, rather than from a totally distinct cultural area. They seem, actually, to be a rapid reorientation and intensification of traits present in early Camoruco.* (Roosevelt 1997:163)

It is also generally accepted that LCA complexes of the Atlantic Guianas share a potsherd-temper tradition. Further research is needed here in order to break down this supra-trait, according to the choices that (local) potters had to make when confronted with environmental and social changes (Tite 1999; Arnold 2000). Nonetheless, the potsherd-tempered ceramics presented here illustrate that each site has its own vessel shapes and, to some extent, decoration modes, reflecting artistic and cultural variety while sharing a similar temper tradition. This is a key aspect to the understanding of these LCA societies and reflects various local/regional pottery styles which share a (temper) macro-tradition. The predominance of one temper mode (although minor differences are present) may certainly refer to mass production of ceramics and deterioration of quality in due course. Towards the end of the millennium when the important Marajoará culture headed for downfall (Schaan 2004:145), a similar development subsequent to the Barrancoid period has been accepted as to other regions, such as Marajó Island and the Lesser Antilles (Hofman and Hoogland 2004; Hofman et al. 2007).

Interestingly, grog temper is followed by means of another important temper agent omnipresent among modern Amerindian potters: burnt tree bark also known as *caraipé* or *kwepi* which appears to be more important during the latest phase of the LCA, such as La Pointe de Balaté and Eva 2. The shift towards *kwepi* may have had various reasons. Albeit probably blurred because of the arrival of the Europeans, the options are twofold at present: (a) possible technological advantages (innovation) and/or (b) intrusive pottery production modes (replacement). A similar shift has also been observed at the mouth of the Amazon which, according to Schaan (2004:136), may represent innovation: '… potters probably used the caraipé temper because of some of its properties, and their relation to vessel usage. The use of organic material can be especially advantageous in cooking vessels, because most of the temper burns out during firing, leaving voids that may interrupt cracks caused by thermal stress during usage (Rye 1981:34).' However, technological analysis of *kwepi* as a temper agent among the modern Palikur indicated it does not have significant advantages over other temper agents. It is suggested that the use of *kwepi* may be culturally defined (van den Bel et al. 1995:50).[351]

Vessel shapes In accordance with the Orinoco model, Boomert (1977:508) proposed that the Arauquinoid series diffused into western Suriname, arriving in *c*.AD 700. As to Hertenrits he defined two post-Barrancoid phases: Early and Late Hertenrits. The latter gave rise to other affiliated complexes, such as Peruvia and Barbakoeba (Boomert 1993:207). Following Boomert, Versteeg (1985:708–709) and Versteeg and Rostain (2004:234–235) also suggested two Arauquinoid phases regarding the coastal Guianas, this time including French Guiana: (a) the first "wave" arrived in *c*.AD 600 in western Suriname and mingled with the local Mabaruma (Barrancoid) mound-builders (e.g. Early Hertenrits) and (b) another "wave" in *c*.AD 1000, for which an increase in Arauquinoid sites (from west to east: Hertenrits, Kwatta, Barbakoeba, Thémire) is recorded for the area between the Berbice River and Cayenne Island. It is related to the raised fields of this coastal zone (Boomert 1980; Versteeg 1985, 2003). The LCA occupation of the western coastal plain of French Guiana thus represents an extension of the Orinoco model in which Hertenrits is thought to represent 'the mother of all archaeological excavations in Suriname' (Versteeg 2003:109). However, the latter site is firmly rooted in the Barrancoid (Mabaruma) mound-building tradition, despite the fact that Barrancoid ware is apparently absent with Hertenrits and the first fresh water sedimentation at *c*.1265 ± 60 BP (Versteeg 1985:708, 2008:309). Towards the end of the first millennium it gave way to various, new regional styles attributed to an Arauquinoid migration or influence sphere. According to my understanding of the Hertenrits evidence, I would suggest that the Arauquinoid influence is only present after AD 1000, thus only one "wave." However, further extensive research is certainly required into this site and notably into the chronology of the Barrancoid-Arauquinoid transition.

The Barbakoeba complex is one of the ceramic complexes originating from the Arauquinoid interaction sphere. It has been defined for eastern Suriname and western French Guiana by Boomert (1993) and pushed further to the east by Rostain and Versteeg (2003). In this perspective, the Thémire complex of Cayenne is a spin-off of this regional development. It is believed to represent the easternmost and most recent Arauquinoid manifestation in the Guianas (Rostain 1994c:86–89; 2008b:292). In order to asses this hypothesis, let us return to the source: the Orinocan Arauquinoid series. According to Roosevelt, the incised style is highly diagnostic for Arauquinoid and therefore only present on the Orinoco River:

> *The particular style of Arauquinoid incision has not been found outside the Orinoco, to my knowledge, although other styles of the Incised and Punctate Horizon, such as Santarem, have a vaguely similar style of incision. As mentioned above, the Meillacoid and the Chicoid pottery series of the Greater Antilles also*

351 Denise Schaan (2004:136) suggests that *caraipé* tempered material is restricted to certain areas: 'The differential distribution of the caraipé tempered pottery throughout the site also indicates that these vessels were differentially related to different areas of activities. The use of caraipé did not carry any remarkable innovation in the decoration of the ceramics and did not completely replace the grog as temper.' The last remark is well illustrated by the case of the early 20th century Palikur when Curt Nimuendajú observed that Palikur potters still applied grog as a temper in rare cases whenever there was a shortage of *caraipé*: 'In Ermangelung von Kuepi stösst man Tonscherben als Zusatz.' (Nimuendajú 1926:42).

have a vaguely similar type of incision. Both the Lower Amazon and the Antillean styles of incision show shallower and better executed than the Arauquinoid incision, and they include more curvilinear motifs with the rectilinear. In view of these differences, the general similarity among all these distant styles may possibly derive from an ancient shared concept of iconography and stylization, rather than from contemporary communication of shared concepts about pottery decoration. (Roosevelt 1997:140)[352]

From this point of view, an Arauquinoid migration is considered unlikely as to the western Guianas. The reason for this is that the Arauquinoid pottery tradition has such specific characteristics, i.e. temper and incisions, which have not been found at all within the Guianas. On the other hand, diffusion or cultural influences of a larger Arauquinoid interaction sphere with regard to the western Guianas is thought to be more likely when considering the stylistic affinities between Hertenrits and the Arauquinoid ceramic complexes on the Lower Orinoco River and Trinidad (Boomert 1977, 1980; Versteeg 1985, 2003; Bright 2011). However, if Hertenrits received any Arauquinoid influences they should have modified the Mabaruma styled ceramics produced by the authoctonous population of this floodplain. Unfortunately, as pointed out above, very little ceramic data are available on this first Hertenrits occupation.

Nevertheless, several Late Hertenrits vessels presented by Boomert (1980, Figs. 4-6) provide us with similarities as to vessels found at several LCA sites presented here (e.g. AM 41, Crique Sparouine, LPB, CSL Phase 3). Notably the globular collared vessels (Group B at Crique Sparouine, SM VIIIb of Zone A at AM 41 SMVIIIb and CSL EC 121 vs. Boomert 1980, Fig. 5.12-22) belong to urn burials. Comparable smaller recipients are jars as well as vessels with short keeled and everted rims (Group A at Crique Sparouine, SM IV of Zone B at AM 41 vs. ibid, Figs. 4.22 and 5.4). Numerous unrestricted open vessels include morphological resemblances too. This phenomenon, however, is too general for any possible cultural relationships whereas other Hertenrits vessels probably belong to the earlier phase, as proposed by Versteeg (1985:708) or to the most recent occupation IV (Boomert 1980:100, Table 3), eventually suggesting an ascription to the LCA.

In addition to Hertenrits, the excavations at Petit-Saut yielded a large register of vessel shapes in which globular collared vessels play an important role: (a) BPS-12 (Vacher et al. 1998:218, Plates 2.41, 46-48, 52), (b) BPS-17 (ibid., p. 230: Plate 16.23) and (c) BPS-172 (ibid., p. 235: Plates 24.78-80, 84-85, 95). On Cayenne Island, the LCA ceramics, as studied for CPP and PK 11, display similar affinities between the above-mentioned vessel types, i.e. CPP vessels in F

352 This opinion is shared by Kay Scaramelli who is not convinced of an Arauquinoid presence in French Guiana and prefers a macro tradition point of view (Kay Scaramelli, personal communication, 2013): 'Defined very broadly, it is possible to see stylistic relationships (use of sponge spicule temper, appliqué and incised motifs in rectilinear designs, modelled lugs, varied vessel forms that emphasize bowls, small jugs, large storage vessels, and griddles) in a vast area including the Brazilian, Colombian, and Venezuelan Amazon and Orinoco. Stretching the definition, one can see stylistic influence to the north, in the Valencioid ceramics of northern Venezuela, but no spicule temper; perhaps related to ecological factors. I have seen little evidence for Arauquinoid ceramics in the Antilles, but it does seem that there are clear stylistic relations to some of the Guianas. I would, however, not use the term Arauquinoid for these materials, since the series does have some important defining characteristics that have use for defining a stylistic class. I have seen works citing Arauquinoid presence in French Guiana, looked at the ceramic materials, and not been convinced of the use of the term. Maybe we need to think in terms of some kind of macro tradition that somehow encompasses the different related series.'

123, F 151, for collared or necked bottles and jars. However, this rather general vessel shape is decorated in an individual, or proper, style, differing from the above-mentioned examples with finger-indented clay strips or anthropomorphic appliqué figures. The manufacturing and firing techniques as well as the quality of the presented Cayenne ware is another apparent discrepancy between these assemblages, hereby isolating Cayenne Island as a dissimilar and singular regional style, as confirmed by means of its specific burial mode in rectangular pits.

The Cayenne Style is probably not the same as the existing Thémire ceramic complex. The latter is dated to the last century of the LCA, to wit after AD 1400, whereas the Cayenne Style is dated as early as *c.*AD 850. It thus precedes the original radiocarbon dated Thémire complex which may eventually represent a development out of Cayenne Style or another late LCA ceramic complex affiliated to Late Aristé (*Enfer polychrome*), as Rostain proposed (1994a:223). Subsequently, the following question must be asked: if Thèmire is supposed to be the latest development in the Arauquinoid series in the eastern Guianas, what would be the earliest development? (cf. Section *The Thémire complex* below for a further discussion).

In sum, based on the large variety of vessel shapes of the sites presented here, we must acknowledge many cultural regions, sharing only a small number of common vessel shapes. Therefore, it is proposed here that Crique Sparouine, CSL Phase 3, LPB, AM 41, PK 11 and CPP represent regional ceramic complexes sharing a number of general traits (e.g. grog temper, necked globular jars, large cashiri vessels), probably related to shared supra-sociocultural characteristics.

Decoration modes Next to temper and vessel shapes, numerous analogies are traditionally drawn between modes of decoration as to different regions in order to distinguish cultures or cultural spheres of interaction (Bright 2011). However, modes of decoration alone remain isolated decorative traits which may occur simultaneously in other (distant) regions, as is demonstrated since various 19th century comparative studies (Hartt 1885:95; Panhuys 1898). As suggested here, modes of decoration in combination with vessel shapes reveal more pertinent characteristics per site and help to define the distribution of a series in a specific region, i.e. CPP, CSL Phase 2. They represent a local style, but also can be translated to a larger scale (e.g. the fine-incised ware and necked Koriabo pots).

Far less or undecorated ceramic series, however, are represented by the bulk of the ceramic assemblages, often revealing a large variety of (undecorated) vessels, such as at AM 41. This often, as a counter effect, places therefore too much emphasis on rare decorated elements and/or specific vessel shapes. For instance, according to Rostain et al. (2008:37–38), so-called "visible coils" are relevant, decorative markers for SBE (but no quantification is given) whereas Boomert (1993:202–203) attributed 14.8% to this type of decoration and even more (24.6%) to 'horizontal, vertical or crescent shaped appliqué fillets' with regard to *c.*500 potsherds. In fact, AM 41 and LPB did not feature a single potsherd with apparent coils, only a small number of modelled double-headed Hertenrits-type appliqués and scarce red painting whereas LPB also featured finger-indented appliqué fillets.

It may be evident that more ceramic studies are required as to this part of the littoral in order to define the regional ceramic series before linking them beforehand to any existing ceramic complex, such as Barbakoeba. In fact, despite Boomert's efforts, it remains a very small collection of contextually unreliable artefacts and one single radiocarbon date, but by way of extensive excavations and subsequent comprehensive ceramic analysis, the Barbakoeba complex can be enriched and adapted, as is the case with Thémire. However, the stylistic similarities between the Barbakoeba complex of eastern Suriname vs. AM 41, La Pointe Balaté, Sable Blanc Est and Bois Diable/La Sablière –supposedly its French Guiana equivalent– are difficult to assess, rendering a comparison between the original and new assemblages not without any biases. This is largely due to incipient archaeology in large vacant areas or, as I would call it, "scant archaeology" vs. extensive compliance archaeology. Similar developments have taken place in the Antilles, such as in Puerto Rico. Here 'many of the supposedly style-specific traits are simply the relic of taking snapshots of materials from a very few sites and then broadly applying that information over vast areas of the island' (Espenshade 2013:18). Therefore, ceramic styles based on vessel shapes will yield more pertinent ceramic markers than decorated potsherds alone. Furthermore, the vessel shape and vessel size may also provide information on site function, such as ceremonial or domestic areas when extensive archaeology is conducted (Blitz 1993; Kassabaum 2014).

Reconsidering cultural affiliations

After this introduction on the general aspects of the LCA ceramic tradition, we will discuss the sites presented here as to their chrono-cultural affiliations. Prior hereto, it must be said that each site is different and varies in the way they have been excavated (e.g. excavation methods and techniques), but also in site function. Nonetheless, it is attempted here to apply the existing regional framework in order to tag the presented sites. If discrepancies and similarities are observed in this comparative exercise, we will attempt to focus on them and propose adaptation and/or further research. We will therefore discuss the existing LCA complexes (cf. Section 3.4.3.2) in an attempt to compare them with the analysis of each site presented here. From this point of view we will deal with the following ceramic complexes: (a) Barbakoeba, (b) Thémire, (c) Koriabo and (d) Late Aristé. The ceramic complexes (a) and (b) are generally attributed to the Arauquinoid Tradition (Orinoquia) and the other pair to the Polychrome Tradition (Amazonia).

The Barbakoeba complex Although the Barbakoeba sites were test-pitted during the late 1970s, the complex itself was defined over a decade later.. He attributed it to the Arauquinoid series suggesting a date between AD 650 and 1200 (Boomert 1993:205). The Barbakoeba sites are located on the sandy Holocene ridges in eastern Suriname. They include black earths, or *terra pretas*, measuring between 30 and 40 cm in thickness. The ceramic register of this complex consists of ceramic material collected in 1961, 1964, 1972 and 1975 from three sites: Parmarica Creek-1, Barbakoeba Creek-2 and Boekoe Creek-2.[353] The ceramic material from the first two sites contained *c.*500 sherds in total of which 130 yielded an identifiable morphological profile. Only 61 potsherds were decorated and tempered predominantly with pounded potsherds (Boomert 1993:202).

Phase 3 of CSL and LPB were attributed to the LCA. They mainly yielded *kwepi*-tempered ware. CSL SM IIa resembles Forms 2 and 3 of the Parmarica Creek-1 site (Boomert 1993:204, Fig. 3). However, according to Boomert (personal communication, 2008), the absence of the characteristic necked jars (Form 4; ibid., p. 206, Fig. 5) obstructs a solid affiliation. Decoration is rare,

353 Peter Goethals discovered this site in as early as 1951.

only a small number of finger-indented fillets, positioned at the medial part –and not the neck– of a spheric vessel are recorded for CSL. Visible coils are lacking. The CSL sister site LPB included finger-indented neck-fillets, but no visible coils. Medial finger-indented clay strips and multiple coiled handles were recorded with regard to Crique Sparouine of which the latter were also found at CLS and in Suriname. This type of handle Dirk C. Geijskes (1964:74) described as to Hertenrits. It is illustrated by Versteeg for the Wageningen-1 site (Versteeg 1985:696, Fig. 28k). In French Guiana these handles are known from: (a) Îlet Lézard on the Middle Mana River (depot SA), (b) the Middle Sinnamary River (e.g. the BPS-172, 230 East) (Vacher et al. 1998) and (c) Bois Diable/La Sablière (Rostain 1994a, Fig.114.10), attributed to the *Melchior Kwep* type of Cayenne (ibid., Fig. 123). Horned ceramic pestle-like objects as found at CSL (F 126) are rare, but were recorded as to the Kwatta and Hertenrits sites in Suriname (Versteeg 2003:121, 149, 169). These ceramic objects were attributed to *Cayenne Peint* by Rostain (1994a, Fig. 116).[354]

Another influential site is Crique Jacques, situated between the village of Mana and Saint-Laurent du Maroni. Both Boomert (1993:207) and Rostain (1994a:223, 246) suggested a Barbakoeba affiliation as to the ceramic assemblage found during the 1985 salvage operation carried out by Cornette (1985a-b).[355] The present author visited the site in 2013 and came across a double-headed biomorphic *adorno* on the surface (similar to the one Cornette presented and now missing from the SA depot) which the above-mentioned scholars unmistakenly attributed to Barbakoeba (see front cover). A series of borings and additional chemical analyses evidenced a dark earth of *c.*90 cm in thickness, resembling the one encountered at CSL (cf. Annexe 3.3), suggesting it is probably a muli-component site.

A reconnaissance of the 1985 excavated ceramic material by the present author did not yield any material evidencing morphological or stylistic resemblances between CSL and Crique Jacques.[356] This Crique Jacques material was fired in a reducing environment. It includes grog and/or mixed temper. Vegetal temper (both charcoal and ash) as well as mineral temper (notably sand) were also observed. The thickness of the rims varies between 8 and 10 mm, suggesting rather large vessels shapes. This is confirmed by means of the large diameters of the convex bases, as drawn by Cornette (1985b, Fig. 10). The convergent rim CSL EC 673 (SM VI) can be compared to Type 7 of Crique Jacques (Cornette 1987:91, 93) or Types 1 and 2 as Coutet defined (2009:357–358). We may further note that: (a) less than 1% of the ceramic material is decorated and (b) a fairly large quantity of griddles supports are present (selected field material?). However, rims of necked jars with tapered lips (Form 4 of Boomert 1993:206) were not identified in the Crique

354 Double-headed *adornos* on vessel rims (Versteeg 2003) are thought to be characteristic of the LCA. Interestingly, very similar objects dating to this same period were also found at sites in the Lesser Antilles (Bullen 1965; Bright 2011).

355 The Crique Jacques site is situated on a white sand plateau at the junction of the Holocene floodplain. In 1985, the site was reported to Hugues Petitjean Roget by the Tiouka family of Awala. That same year AGAE members carried out two rescue operations. The Crique Jacques site is known, in the oral tradition of the local Kali'na, as the former village of *Tjo-Tjo Norè* and was abandoned a long time ago (Cornette 1987:83).

356 During this reconnaissance, the present author did recognize a Kwatta rim sherd in Cornette's collection. See also Rostain (2008a:291, Fig. 16.6-2).

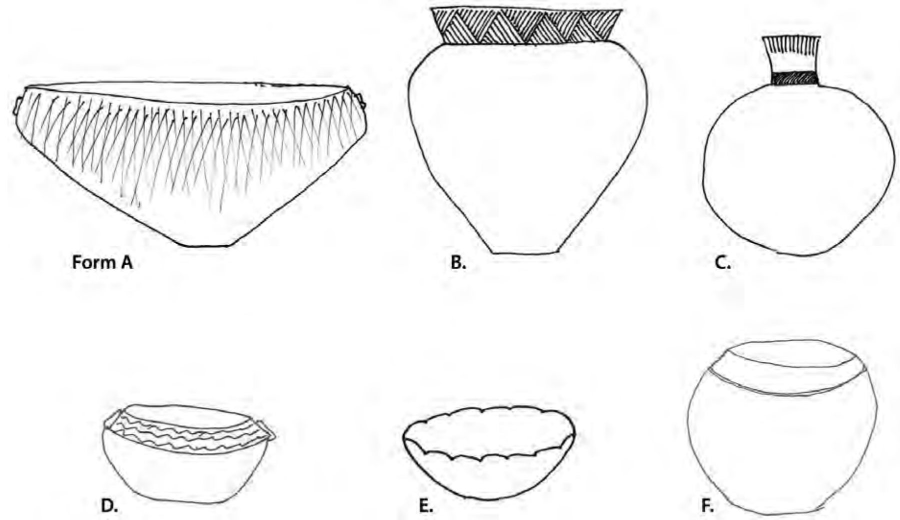

Figure 12.2. The common vessel shapes regarding Cayenne Island (Forms A-F).

Jacques assemblage. Further research at Criques Jacques is certainly needed in order to comprehend the site's extension and complexity.[357]

AM 41 is situated in the supposed Barbakoeba sphere too (Rostain et al. 2008; Rostain 2013:121). This funerary site yielded no necked jars, i.e. Boomert's Form 4, finger-indented strips or visible coils at all, but shares abundant grog-temper with Barbakoeba. However, despite the dissimilar temper, LPB and AM 41 share several vessel shapes, notably the everted rims of (small) open bowls, corresponding to Boomert's decorated Form 3 (1993:204, Fig. 3). The latter shape is rather interesting: this drinking bowl, often decorated with red paint on its interior (and on occasion a polylobed rim), is possibly related to the consumption of maize or manioc beer (C., *cashiri*). It was also recorded for Cayenne Island and the historic site of Eva 2 (cf. Chapters 9 and 11). In conclusion, the original Barbakoeba complex as defined by Boomert is partially present in western French Guiana: it shares various characteristics with various sites studied here, but the latter also feature particularities demonstrating regional styles. The ceramic series of CSL Phase 3, LPB and AM 41 thus represent series which can be added to the Barbakoeba repertoire of western French Guiana. A difference can also be noted as to the region between Kourou/Iracoubo and Mana/Maroni, representing distinct, regional styles of Barbakoeba. Future reseach should focus on this regionality in order to split them off or to keep them lumped to the original eastern Suriname ceramic complex of Barbakoeba. Stylistic similarities between the early LCA ceramic series of the western French Guiana littoral and Cayenne Island, which are presented in this work, can be ignored (see also below).

The Thémire complex The contemporary sites PK 11 and CPP, as well as many other LCA sites discovered during the last decade, yielded many earlier dates for Cayenne Island (cf. Appendix 1), pre-dating the Thémire complex as Rostain (1994a) defined over two decades ago. Stylistic ambiguity is also present in the ceramic types defined by Rostain, as pointed out for PK 11 and CPP. We can attribute the same constituent elements to dissimilar types, demonstrating that the Thémire typology is too heterogeneous and too coarse, probably representing

357 More recently, a mechanical survey at the plateau next to Crique Jacques yielded more dissimilar material, showing the complexity of this very large site (van den Bel in Briand 2015).

	Barbakoeba	Themire	Aristé	Koriabo
Rostain 1994a:495	1000-1750	1300-1650	350-1750	1100-1750
Rostain 1994b:11	500-1650	1300-1650	350-1750	1100-1750
Rostain and Versteeg 2004:235	1000-1400	1000-1600	x	x
Rostain 2008b:281	1000-1650	1000-1650	600-1750	1200-1650
Rostain 2012:17, 24	900-	1300-	700-1750	
Rostain 2013:113-125	1000-	1400-1600	600-1750	750/1100-

Table 12.2. An overview of proposed dates (all AD) for the LCA ceramic complexes of French Guiana during the last two decades.

an amalgamation of wares. When applying Rostain's typology, it tends to lump our data and does not satisfy when compiling a detailed ceramic catalogue. In my opinion, however, the applied method is probably not at stake here (it may be of use in many other cases) as Rostain was certainly "on to something," but rather the quality and quantity of his shaky data base. The ceramic studies of the sites presented here enable us to acquire more details and accurate results, shedding a different light on the existing typology.

Therefore, six popular decorated vessel shapes are proposed here as to Cayenne Island (Forms A-F): four for PK 11 and five for CPP of which four are shared by both sites (Fig. 12.2). These forms as well as a several other characteristics defined for PK 11 and CPP are dated between *c.*AD 900 and 1500. There is a late trend of white-on-red painting towards the late second half of the LCA, as speculated for CPP. The latter part of this hypothesis approaches the radiocarbon dates presented regarding Thémire since the white-on-red painted ware was attributed to the Thémire complex, as Rostain most recently defined (2013:122–125). It is therefore suggested here that the original Thémire complex is the most recent development of a ceramic style present on Cayenne Island and in the adjacent areas since at least AD 900. Therefore an Early and Late Thémire ceramic complex is hypothesised here: a Late Thémire complex (*c.*AD 1400-1600) represents the original Thémire complex as defined by Rostain and the Early Thémire complex (*c.*AD 900-1400) is represented by means of the six forms derived from the ceramic series as defined for PK 11 and CPP. Nonetheless, according to this idea, are these earlier ceramic assemblages: (a) the earliest manifestation of a west-east migration; possibly also Arauquinoid or (b) a local development? Both issues are discussed here in four sections: (a) the earliest manifestation, (b) Arauquinoid or not, (c) Arauquinoid at Cayenne and (d) the possible origins and future research.

(a) The earliest manifestation

Looking at the proposed dates for Thémire between 1994 and 2013 (Table 12.2), Rostain is uncertain about the Thémire chronology. In addition to the amalgamous and coarse definition of this ceramic complex, as pointed out in Sections 8.5.5 and 9.5.4, we must also acknowledge the flagrant lack of any radiocarbon dates on which this complex is based. Only four dates have been attributed to the original Thémire complex of which two have been discarded (too reccent) and the other two were actually taken at: (a) the Bois Diable/La Sablière site west of Kourou, *c.*60 km to the west of Cayenne and (b) Sainte-Agathe near Macouria, *c.*20 km to the west of Cayenne. In fact, the accepted two results date from the 15th century, but were believed too recent when compared with the stylistically similar LCA ceramic complexes of Suriname which start during the second half of the first millennium (Rostain 1994a:448). Subsequently, these two dates were interpreted as the most recent dates of the Thémire complex. It is presumed that Thémire developed parallel to the Arauquinoid ceramic complexes in Suriname, from AD 650 on (Rostain 1994a:224): 'Les datations calibrées, de 1400 à 1600 de notre ère, pour les sites de cordons sableux de Guyane, représentent apparemment les dates les plus récentes du complexe Thémire. En Guyane, il est probable que ce complexe a commence de se développer, parallèlement aux complexes Arauquinoide du Suriname, à partir de 650-700 ans de notre ère.'

Thus, instead of proposing a singular ceramic complex as to Cayenne Island, the results were forced into the existing model from another region, situated *c.*500 km to the west. At that time, this choice is somehow understandable when considering that Rostain's 1994 PhD dissertation is a final chapter to a very productive era in French Guiana archaeology. Cornette, Wack, Petitjean Roget and Rostain had not only acquired a large quantity of archaeological material, but also produced many typographed manuscripts in need of analysis and hypothesis. Together with his own research, Rostain eventually included all this research into one monograph dealing with coastal French Guiana between Mana and the Oyapock Rivers. The cultural ascription of the varied French Guiana ceramic complexes to the existing framework of the neighbouring countries was another step in the completion of this monograph. In this manner, a first milestone was erected for French Guiana which had received several reserved critiques on its cultural framework from the members of the BPS project (Vacher et al. 1998:206–211). The latter team underscored the weakness of Rostain's framework to which they did not wish to adher their results since it did not fit their data, notably the radiocarbon dates.

Fortunately, this lack of radiocarbon dates is somewhat resolved after more than ten years of compliance archaeology, as there are at least 50 radiocarbon dates available related to the LCA of Cayenne Island, ranging from the 10th century to the early historic era. Although Rostain hypothesized a late first millenium inception date regarding Thémire, it remained a <u>late</u> LCA ceramic complex, representing the 'ultimate manifestation of the Arauquinoid Tradition' (Rostain 2008b:292). In addition to various modes of incisions and modelling, a highly characteristic element of this most recent manifestation is white-on-red painting, which is on occasion combined with black paint, representing the introduction of polychrome traits from the Lower Amazon River (Rostain 2013:122). CPP features white-on-red painting, i.e. Forms E-F (Fig. 12.2), as well as ceramic depositions of carinated bell shaped bowls with white-on-red painting, i.e. CPP F 83, F 93, F 102, F 165 vs. Forms 6 and 7 (Boomert 1986, Fig. 12). Interestingly, similarly decorated ceramics also have been identified at Montabo Sud, Montagne à Colin and more recently Sainte-Agathe. They feature white-on-red and polychrome painting, suggesting a late cultural episode as to the LCA on Cayenne Island (Coutet 2009; Migeon 2007, 2012; Samuelian 2009).

Consequently, as stated before, if Thémire is the most recent manifestation of the Arauquinoid series, the question arises: What was the earliest manifestation like? It is suggested here that Forms A-D from PK 11 and Forms A-D from CPP, not sharing the above-mentioned traits for (Late) Thémire, represent this earlier manifestation of Thémire or Early Thémire, i.e. Forms A-D in Figure 12.2. In fact, the majority of the radiocarbon dates range between AD 900 and 1400, thus predating the original Thémire complex or Late Thémire. This proposed divison is also applicable to numerous other dated LCA sites recently excavated on Cayenne Island and adjacent areas (cf. Section 8.9).

As mentioned above, Rostain was certainly "on to something" back in the late 1980s. However, he did not dispose of sufficient radiocarbon dates in order to confirm his hypothesis. All archaeological data from Cayenne Island and adjacent regions (notably to the west of Cayenne) was lumped into two principal, preliminary ceramic types. Hence, it is thought here that Rostain's Thémire types contained both hypothesised LCA phases i.e. Early and Late Thémire, also stressing the fact that the majority of the latter sites may have been occupied during the entire Late Ceramic Age. The creation of a new singular ceramic complex for Cayenne, however, as Matthieu Hildebrand (in Mestre et al. 2005) proposed after his analysis of the Katoury ceramic assemblage, is believed too bold (cf. Section 3.4.3.2). Hildebrand ignored previous research carried out at the neighbouring type-site Thémire, hereby downplaying earlier research, notably pioneering studies carried out two decades ago. He stresses the homogeneity of the studied material, dated between the 10th and 13th century, which is again confirmed by means of the technological analysis by Coutet (2009:266, 427).[358]

In sum, the ceramic material from many sites allows us to compile a ceramic LCA catalogue for Cayenne Island consisting of decorated and undecorated vessel shapes as presented in Figure 12.2. They form a first contribution to this catalogue of Early and Late Thémire, as revised in this section. It must be noted here too that these forms certainly not only require further "polishing" but that this catalogue also should be enriched with other vessel shapes to be discovered in the near future.

(b) Arauquinoid or not?

The Arauquinoid dispersion is embedded in an earlier, much larger scientific debate as to the Carib expansion (Lathrap 1970:164) and that of a population increase around the end of the first millennium AD in adjacent key areas, i.e. the Orinoco River (Roosevelt 1980:218; Sanoja 1979:259), the Lower and Middle Amazon (Roosevelt 1991; Oliver 2008), and the southern Lesser Antilles (Rouse and Allaire 1978). This population increase is often associated with the introduction of (intensive) maize cultivation, notably in Orinoquia (Gassón 2002:255–256, 276). It is believed that, together with manioc, this seed crop was undoubtedly grown on the raised fields, maintained not only by the Hertenrits population of northwestern Suriname (Boomert 1980), but also by the Barbakoeba populations of central and western French Guiana (Rostain 1991; McKey et al. 2010). It is stated that during the the LCA there was a 'population increase, opening up of new trade routes, increased social interaction and development of new subsistence patterns seem to characterize the post-Barrancoid period everywhere in the S Caribbean, in the Antilles as well as on the mainland' (Boomert 1985:111).

The emergence of coastal sites in the western and later the eastern Guianas was associated with the expansion of the Arauquinoid populations from the Middle Orinoco River in *c.*AD 600. It was embodied mainly by coastal sites in Suriname (Boomert 1977, 1978, 1980, 1985, 2000; Rouse et al. 1984; Versteeg 1985, 2003) and later on in western French Guiana (Rostain 1994a, 2008b, 2012, 2013). Following Lathrap, the youngest Arauquinoid phase was associated

358 Claude Coutet (2009:250) observes in her PhD dissertation certain types of which 'the distinct traits are in fact idiosyncratic features which may not have been emphasised sufficiently when the Thémire complex was created.'

with the Incised-and-Punctate Tradition of the Middle and Lower Amazon River. It was subsequently projected across the Maroni River into western French Guiana where it would finally meet the northwestern extremities of the Lower Amazonian Polychrome Tradition near Cayenne Island (Boomert 1985:106, 1993:209; Rostain 1994a, 2013). This type of large scale or big-picture modelling is important, but hampered archaeological discussion due to the lack of sufficient, contextual data in the Guianas. Not only is it believed to be highly speculative, it also ignores possible cultural diversity. Stylistic comparison is often based on temper and decoration modes and, to some extent, morphological features:

> *These vessel shapes, diagnostic of the Arauquinoid series in the Middle Orinoco Valley, the Venezuelan Llanos, Valencia, and the related complexes of the "Incised-and-Punctate" tradition of the Middle and Lower Amazon (Lathrap, 1970:164–170) were replaced by simple <u>ollas</u> with cylindrical or concave upper parts, often showing punctated appliqué fillets at the base of their necks, like those of the Guayabitoid series, Hertenrits, Guarguapo, Apostadero, Mon Repos, Valencia, and Macapaima. Similarly, anthropomorphic face designs on trapezoidal bowl lugs disappeared while naturalistically modelled zoomorphic adornos developed into simple "horned" lugs.* (Boomert 1985:106)

The differences between the "original" homeland styles were "regionalized" in the areas of Arauquinoid expansion or replaced by means of local modes (e.g. as grog for *cauixí* temper).[359] From an archaeological point of view, the migration of people from the Lower Orinoco River should indeed include cultural replacements or the appearance of incoming objects brought by incoming populations. In my view, this pattern is not evident along the coastal Guianas, only revealing a possible contact or exchange, suggesting a possible supra-interaction sphere. The stylistic similarities between the heartland and the distant offshoots are restricted to general features which cannot serve as diagnostic elements on a regional level. The ceramic study of the LCA sites presented here show dissimilar ceramic assemblages sharing only a small number of general characteristics, each representing a local variation of a possibly larger socio-political entity in which the ceramics assemblages may reflect the identity of a specific group during the LCA of coastal Guiana.

This tendency only becomes apparent in coastal French Guiana after AD 900. This is probably the result of biased archaeological research in the coastal plains. However, from the existing point of view, the cultural origins of this development remain obscure when compared to the Early Hertenrits phase –if there is such a thing in French Guiana. In addition, if there were any Arauquinoid migrations or influences in the eastern Guianas, they coincided with the dispersion of the Barbakoeba complex during the Late Hertenrits phase, thus after AD 1000. However, in my opinion, it never enjoyed much popularity among the inhabitants of Cayenne Island. Moreover, the more recently established chrono-cultural framework for the LCA in the Orinoco delta, notably with regard to the Arauquinoid expansion as proposed by Roosevelt (1997:185) or Barse (2000:341), are all in favour of a LCA expansion into the western Guianas towards the end of the first millenium, as Versteeg suggested two decades ago

359 The absence of cauixí in the Arauquinoid wares of Suriname is troublesome (Boomert 1977, 1978, 1980). Rostain (1994a:230) simply states that 'temper is not a discriminating element for the Arauquinoid series' avoiding the issue concerning this important marker of the Arauquinoid series in the Orinoco.

(1985:708–709). In sum, a faint glimpse of Arauquinoid "regionalisation" in Suriname is detectable during the LCA (Late Hertenrits or Barbakoeba), but physical expansion or migration appears too bold and is not sustained by means of pertinent archaeological evidence.

(c) Arauquinoid at Cayenne?

As stated above, the earliest radiocarbon dates go back to the start of the 10th century AD (and possibly slightly earlier). They correspond to: (a) the hypothesis of a second Arauquinoid (Camoruco?) "wave" into the western coastal plains of Suriname (Rostain and Versteeg 2004:235) and to (b) the hypothesized Barbakoeba distribution in eastern Suriname and western French Guiana, both effected in the early LCA (Boomert 1993). In addition, if we consider a "cultural continuum" for Thémire, as Rostain proposes –thus from Early to Late Thémire, as proposed here– the early LCA assemblages of Cayenne Island should demonstrate stylistic similarities with the contemporaneous Barbakoeba assemblages. However, this is not at all the case. For instance, when comparing the early LCA material from AM 41 (cf. Section 7.3), LPB (cf. Section 5.5.7.1) or even Crique Sparouine (cf. Section 6.4) with the PK 11 and Poncel assemblages (cf. Sections 8.5 and 9.5), it is difficult to point out any significant similarities in both vessel shapes and modes of decoration. On the contrary, it indicates that both regions have a style of their own. However, as in many other regions, these two regions do share certain (supra-regional) traits (e.g. potsherd temper, the modelling of nubbins, red paint). However, the latter features are considered too common to both areas and not necessarily point towards an Arauquinoid origin (Hildebrand 1999).

An ascription to the Arauquinoid series firstly represents the usage of the Orinocan tripartition as Boomert (1980) and Versteeg (1985) proposed with regard to Suriname. From the latter region, this well-known model was further applied to the Barbakoeba sites of the eastern plains in Suriname (Boomert 1993) and eventually to the Thémire complex of Cayenne (Rostain 1994a). If the final result of this alleged Arauquinoid migration from the mouth of the Orinoco River towards Cayenne –considering the many cultural encounters *en route*– can be traced back to an original Arauquinoid complex is at least doubtful. Nevertheless, Late Thémire can certainly be integrated into a supra-regional interaction sphere comprising the Lesser Antilles, Trinidad, the Lower Orinoco and the western Guianas (Bright 2011; see also the discussion presented below *The Koriabo complex*).

Secondly, it is also important to look into other cultural aspects of Early Thémire. These sites are related to a highly specific burial mode consisting of elongated pits with pottery debris and constitute different burial modes when compared to eastern and western French Guiana. Thirdly, Cayenne Island does not feature any raised fields (Rostain 1994a:132) which are believed to represent important cultural markers regarding the Arauquinoid tradition (Boomert 1976, 1980, 1993; Versteeg 1985, 2003; Rostain 1994a:61, 2008ab, 2013).[360] They thus represent an aspect not shared with the Barbakoeba sites in western French Guiana. In sum, the Early Thémire complex may certainly have local origins, but

360 The first raised fields are to be found in the Maillard Savannah, c.15 km to the west of the Cayenne River (Renard 2010), but raised fields may have disappeared during colonial times on Cayenne Island.

further research is needed to clarify this matter. As discussed below, in *c.*AD 1400, it integrated duotone and polychrome traits revealing Late Aristé and/ or Koriabo affinities, as reflected in Late Thémire.

(d) The possible origins and future research

In addition to a possible inclusion in the traditionally acclaimed Orinocan cultural interaction sphere concerning the western Guianas, I would like to scale this analysis down to a lower level and point out the possibility that the early LCA ceramic assemblages of Cayenne may also represent a regional complex of its own as suggested above. If we want to ascribe it to a distant culture area, the Amazonian Polychrome Tradition is a fine alternative considering the omnipresent potsherd-temper in both regions. The problem with this option is –as Rostain faced 20 years ago with regard to Thémire– the fact that we have only scant data dealing with the ECA occupation of eastern and central French Guiana. Late Aristé habitation sites are lacking and the latter LCA complex is mainly known for its funerary sites, containing predominantly polychrome (anthropomorphic) urns and other spectacular burial ware.[361] However, in combination with recent and old data, the excavations at CPP suggest the presence of Early Aristé on Cayenne Island (see also Gassies and Mestre 2012). The excavations at CPP revealed a single cylinder shaped pit, measuring at least 2 m deep at surface level (cf. Fig. 9.7). It contained thin, sand-tempered ware completely different from the LCA ware at this particular site and yielded converging, carinated bowls as well as characteristic fingernail indentations applied to the lip and interior rim in a series of open bowls. They were dated to the 4th century AD by means of one radiocarbon date (POZ-44824, 1635 ± 30 BP). Rostain (1994a:161–173) defined the latter type of decoration as *Ouanary encoché*, representing the earliest ceramic series for eastern French Guiana. Although Early Aristé was at first ascribed –correctly as it appears to be– to AD 350 (ibid., p. 495), the inception date was recently changed to AD 700 (Rostain 2012: 17, 24).

The reasons herefor remain unclear, but of the 23 radiocarbon dates attributed to seven sites where *Ouanary encoché* was found, at least 14 indicate it can be ascribed to the first half of the first millennium AD (cf. Table 9.9). The earliest dates are associated with ring-ditched sites, strategically positioned on high plateaus in the mountainous hinterland of the coastal plains (e.g. Blondin, Pointe Maripa, Favard). Interestingly, when reviewing the existing LCA ceramic collections of Cayenne Island, *Ouanary encoché* was found at several other LCA sites, such as Vieux Chemin (van den Bel 2007b:88) and Mont Grand-Matoury (Hildebrand 2000, Fig. 48.10), suggesting an ECA presence. It is presumed these populations prefered higher locations, such as mountain tops. The small amount of archaeological research carried out here (partially) explains the fact that so few ECA sites were found on Cayenne Island and surrounding areas.[362] Although further research is certainly required, notably in the interior concerning ring-ditched mountain sites, *Ouanary encoché* is indeed part of an early first millennium ceramic complex. It is proposed here, it is a distinct ceramic assemblage and

361 In 2009, however, a Late Aristé habitation site was extensively excavated by members of the IEPA, situated opposite the Pointe Morne site on site of the Brazilian bridge head along the Oyapock River to the north of the village of Oiapoque (Silva 2011).

362 The majority of the Cayenne Island table-mountains are classified monuments. Therefore little to no construction is present in these natural reserves.

separated in time from the much more recent Late Aristé complex, based on vessel shapes, temper and (incised) modes of decoration.[363]

Further investigation is also required concerning a possible Late Aristé presence at Cayenne (van den Bel 2012a) in order to obtain a better understanding of the transition from Early to Late Thémire. The difference between both phases may be linked to the Koriabo 'arrival' during the (late) second half of the LCA, as Rostain (1994a:447) proposed two decades ago with regard to the temporary type *Melchior kwep*. In my view, the white-on-red elaborate painting, polylobed rims, incised stools and necked or collared (toric) vessels found in Late Thémire assemblages are strong Koriabo markers. This also suggests that Late Thémire can be ascribed to the Koriabo ceramic complex (or Horizon?) and not to the Arauquinoid series at all. The Early Thémire, lacking the above-mentioned features, as stated above, and with proper morphological and decoration modes, rather should be attributed a local or perhaps an Amazonian origin and not a far-fetched Orinocan one.

In sum, the bias of a small archaeological data set in the past may have favoured a theory of migration from the west to the east. It provided a clean answer to the existing archaeological situation and prevailing theoretical framework. Scientific protectionism dismissed all other possible ideas on rectifying or developing the existent framework. However, during the last decade, continuous compliance archaeological research on Cayenne Island has made it possible to obtain a more detailed image of the LCA, notably the evaluation of the Thémire complex. It has also revealed possibilities for further research into the Early Ceramic Age, hitherto barely brought to light with regard to this region.

The Koriabo complex Evans and Meggers (1960) defined the Koriabo ceramic complex after excavating four sites located in the northwestern coastal area of former British Guiana and proposed five predominantly sand-tempered pottery types of which incised, toric pots and scraped, open bowls are characteristic (Evans and Meggers 1960:133, Fig. 53). As Koriabo ware was only found in connection with the latest Mabaruma phase, they suggested a date between AD 1250 and 1600 as to Koriabo (ibid., p. 147). This was confirmed by means of a single Koriabo trade-sherd at the LCA Apostodero site on the Lower Orinoco (Cruxent and Rouse 1958-59, Plate 103.18). Versteeg (1980b:50, 2003:183) adhered to this range dating to the second half of the LCA and rejected all earlier dates.

Boomert (1986) carried out ground breaking research on Koriabo when demonstrating the LCA ceramic stylistic affinity between the Guianas and the Lesser Antilles by means of comparing archaeological data, i.e. Koriabo ware from Suriname vs. Cayo ware from Saint Vincent. He hereby also confirmed certain historic sources (see the quotation of Keymis in Section 11.7.1) and stressing a (partially) historic age as to this ceramic complex. After discussing the radiocarbon dates of the BPS sites, Boomert (2004:256) proposed a range between AD 750 and 1500 as to the Koriabo complex, subdivided in Early and Late Koriabo. Ever since this definition, Koriabo has been part of a general disccussion on: (a) its chronology and (b) cultural origins (Boomert 2004; Rostain and Versteeg 2004). The studied sites yielding Koriabo material are now discussed in order to elucidate this discussion.

363 If to be attached to a larger Amazonian Tradition, the Incised-Rim Tradition would actually be more appropriate than the Incised-and-Punctate one, as erroneously proposed by Rostain (sic).

(a) The site of Crique Sparouine provides a first significant example. This site yielded two distinct pottery wares and two possible occupations, but only four radiocarbon dates. The analysis indicated either that (a) a local population, producing its traditional ceramics, was in contact with a Koriabo population or (b) that a Koriabo population succeeded the local Sparouine population. A similar conclusion could be proposed with regard to CSL Phase 3 and, to a lesser extent, to LPB in spite of the fact that the latter local ceramic assemblage differs from Crique Sparouine. The neighbouring Saut-Saillat site also yielded decorated and undecorated Koriabo ware dating back to the most recent part of LCA and early Historic Age, suggesting possibly that the most recent radiocarbon dates found at the afore-mentioned sites correspond to the latest radiocarbon range, i.e. Koriabo.

Hildebrand (2008:48) stresses the possibility that the LCA can be divided into two phases based on a higher frequency of sites in relationship with a later, drier period, as Tardy (1998) defines as to French Guiana: (a) a drier phase between AD 1000 and 1250 followed by (b) a less drier phase between AD 1250 and 1500, as Boomert (1993:211) pointed out when drawing from the work of Colinveaux et al. (1985) in northwestern Amazonia. If Koriabo is associated to the drier phase, the CSL Phase 3b and the second occupation of the Crique Sparouine site may indeed refer to the Koriabo pottery at this site. The similarities between the undecorated necked (toric) pots of Saut-Saillat and those found at the historic level of Eva 2 are striking, suggesting that Koriabo along the French Guiana littoral can be dated at least to the second half (or later) of the LCA and early Historic Age. In this manner, the radiocarbon dates obtained for Bigiston, Christiaankondre and Angoulême make sense as to the Koriabo material found at these sites.

According to Rostain (2009:47, 2013:126), the AD 1200 date marks the 'arrival' of the Koriabo people or an invasion of the coastal plains. It took over the existing populations and spread along the coast. Considering Cayenne Island, this alleged arrival is visible by means of the presence of Koriabo material at CPP and other ceramic collections (e.g. Montabo Sud, Montagne à Colin, Mini Circuit Automobile). Interestingly, Koriabo decorated ware (e.g. toric pots, polychrome flower bowls, polylobed rims, incised stools) has not been encountered in Early Thémire sites (e.g. Katoury, Saint-Cyr, Mombin II, CPP) suggesting that this island was not part of the Koriabo interaction sphere during the early LCA (Early Thémire) and that this sphere probably emerged or arrived afterwards. This latter hypothesis is partially confirmed by means of the radiocarbon dates and superposition of Koriabo material found at the Lower Maroni and Oyapock Rivers (cf. Section 6.5). However, this certainly needs further testing as does the manner in which the climate played a decisive role in the rise of Koriabo and the abandonment of earlier occupations.

From this point of view, we should indeed follow Versteeg and Bubberman as to a shorter and later chronology as to Koriabo (1992:45; Versteeg 2003:183). They systematically reject all radiocarbon dates prior to 800 BP associated with Koriabo material, at least for the coastal area. However, numerous Koriabo sites have been encountered in the interior (Reichlen and Reichlen 1943; Evans and Meggers 1960; Groene 1976; Versteeg 1980a; P. Hilbert 1982; Vacher et al. 1998; Jérémie 1998, 2002a; Boomert 1978b, n.d.; Williams 1993; Rostain 1994a; Versteeg 2003; Duin 2009; Mestre 2012; Bellardie 2013) and are in need of further investigation, but the radiocarbon results are miscellaneous. This forced Boomert (2004:256) to extend his first Koriabo chronology to much earlier dates: from AD 750 on into historic times. According to Versteeg (1980b:48), the earlier dates from the interior suggested that the Koriabo people travelled across the Sipaliwini Savannah from the Lower Amazon River and not only along the Atlantic coast, as Boomert (1977:513) had suggested previously. Of course, both routes are tenable as we have insufficient data to support any of them, again revealing a staggering lack of archaeological data as to the Guianas on which theory is based.

The large number of radiocarbon dates as to BPS (N=131) evoked the problem of charcoal contamination, paleofires and multiple occupations (Vacher et al. 1998:81, 209). Archaeological palimpsests, or multiple occupations, stretching for more than 200 years (e.g. CSL, Crique Sparouine, PK 11, CPP) make it rather strenuous to determine (different) occupations, untangle ceramic series, and to attribute the results to the corresponding radiocarbon dates. It may be evident that charcoal samples taken from layers or test pits provide only a very rough indication of a or multiple possible occupations. A dozen radiocarbon dates are at least needed to determine an occupation span. More importantly, it is often more secure to collect charcoal from closed features with ceramic reference material, such as specific vessel shapes or decoration modes, preferably with charred crusts for complementary dating and starch analysis. Although contamination in anthropogenic features is possible, many samples will certainly bring to light the "not relevant" ones. In the future, pits filled with Koriabo material (depositions), such as pit F 278 of Crique Sparouine or the one at Goliath Kreek in Suriname, should yield secure results concerning their chronology and stylistic regionality.

(b) As mentioned above, the cultural ascription of Koriabo is part of a continuous debate. Boomert (1977:513) first proposed an affiliation to the mouth of the Amazon River and later also to the Polychrome Tradition (Boomert 1986:27). This affiliation was based on Meggers and Evans' (1957:158–167) work in Amapá. Here Aristé and Mazagão together represented the offshoots of a common ancestral ceramic complex, i.e. the Ancestral Mazagão-Aristé complex, to which the Koriabo complex and subsequently the Polychrome Tradition belonged (Boomert 2004:258). An affiliation to the Incised-and-Punctate Tradition for Koriabo and Early Aristé as Rostain proposed (1994a:459–463), believed 'untenable' by Boomert (2004:258, note 10).[364]

More recently Rostain acknowledged the complexity of persistent occupation as to many LCA sites. He changed his stance by claiming that Koriabo represents a 'Guianese Tradition' moving from the interior towards the coast and having a cultural affinity with Aristé (Rostain 2013:125–126). Nonetheless, either ascribed to the Polychrome or to the Incised-and-Punctate Tradition, the foundations of the Amazonian nomenclature are completely hypothetical in the opinion of many Amazonian archaeologists (Neves 2008:368–371). Indeed, 'it would be a misunderstanding,' as Boomert (2004:259) pointed out, 'to consider polychrome painting as the only or most diagnostic decorative element of the Polychrome Tradition.' Other techniques (e.g. incision, excision, grooving on plain and red- or white-slipped surfaces and, to a lesser extent, punctation and modelling) are equally characteristic as to polychrome wares. In fact, this variety in techniques and

364 Rostain (1994a:459) attributes the Koriabo to the Amazonian Incised-and-Punctate Tradition based on the absence of excision (Stéphen Rostain, personal communication 2008). However, it is possible to consider the scraping technique Koriabo potters utilised (cf. Fig. 6.18d) in order to create complex geometrical patterns as a form of excision (van den Bel 2010a:87). This is also a dominant decorative element in the LCA Guaritan subseries of the Polychrome Tradition found in the Central Amazon (P. Hilbert 1968; Neves et al. 2003; Lima et al. 2006).

the complexity of the decoration modes is believed to characterise this Polychrome Tradition, as does the presence of specific vessel shapes (PRONAPA 1970:19).

In the end, both theories propose the Lower Amazon River as the heartland of Koriabo. Boomert (2004:260) observes striking similarities between Marajoará, Guarita and Napo vessel shapes, drawing on Weber (1975:400, Table 70). Nevertheless, we must point out here not only the presence of toric vessel bodies – albeit without necks– with polychrome painting, but also various carinated profiles resembling non-decorated Eva 2 carinated pots. In general, the present author would also like to point out the stylistic resemblances of the Koriabo scraped open bowls (cf. Fig. 6.21) and the Guarita scraped ware as well as possibly toric pots (Tamanaha 2012 ii:65) present in Marajoará urns, although the latter have larger dimensions (Magalis 1975:238, Figs. 68-9). Striking stylistic resemblances are also drawn as to the Late Aristé polychrome ware, notably the painted designs on secondary burial urns, as found at Goliath Kreek in Suriname which were also encountered at CPP, i.e. EC 83 (cf. Fig. 9.18). In addition, the Koriabo and Late Aristé ceramic assemblages share pointed bases, eared rims and toric body parts, revealing a close affinity. In sum, Koriabo painted and incised ware as well as undecorated pottery is present in second half of the LCA and continuous to develop during the Early Historic Age, albeit with less decoration, as expressed at Eva 2 and the Lesser Antilles. Although present all over the Guianas, the origins can be found in the eastern Guianas, notably at the mouth of the Amazon River. Important affinities with Late Aristé require further comparative research.

The Aristé complex The Aristé Phase was defined by Evans (1950:80–110) and presented several years later in collaboration with Meggers (Meggers and Evans 1957:103–151). Nearly four decades later Rostain (1994a) presented the first radiocarbon dates associated with Aristé. It was first believed to be a short living pre-contact culture, notably because of the presence of European glass beads in this predominantly funerary ware (Meggers and Evans 1957:167). Four rock shelters located in the Ouanary Hills yielded nine radiocarbon dates ranging from between *c.*2000 and 300 BP. Rostain (2011, 2012, 2013) translated this into three phases based on: (a) the changing burial rites, hereby following Meggers and Evans (Rostain 1994a:111), (b) the pottery types of which the sand-tempered *Ouanary encoché* is attributed to the Early phase, ascribed to the Incised-and-Punctate Tradition (ibid., p. 418) and (c) the grog-tempered *Enfer polychrome*, presumably affiliated to Late Aristé (ibid., p. 419).[365]

Hitherto, *Ouanary encoché* was the earliest defined ceramic subseries for eastern French Guiana and northern Amapá as recently confirmed (cf. Table 9.9). However, its attribution to the Aristé complex (according to Meggers and Evans a LCA complex) and the Incised-and-Punctate Tradition is hypothetical, as Aristé was presumed to change from the latter tradition to the Polychrome Tradition. However, from a chronological point of view, one would rather suggest the contemporaneous Amazonian Rim-Incised Tradition.

As stated above with regard to the possible origins of Early Thémire, temper, modes of decoration, vessel shapes and radiocarbon dates of *Ouanary encoché* or Early Aristé demonstrate a distinct ceramic series. Separated from the Late Aristé phase, it suggests an entirely different complex or even a distinct culture. The association with ring-ditched mountains certainly requires further study. The

365 We must mention other types (e.g. *Caripo kwep* and *Hocco fer*) which are clearly in the minority.

presence of another early first-millennium ceramic complex, in addition to the Saint-Louis complex, is becoming more evident with regard to French Guiana, hereby stressing the importance of the ring-ditched mountains as well as the research bias between the "unknown" interior and the coastal area.

12.4 The chiefdoms

Introduction

The general ceramic markers (temper, vessel shapes, decoration modes) as described above are shared by the above-mentioned LCA complexes, suggesting the presence of one chiefdom in the east (Arauquínoid) and one in the west (Polychrome Tradition) (Rostain 2009:53). The presence of archaeological and/or ethnohistoric chiefdoms as regional polities consisting of subordinate villages under the permanent control of a paramount chief (Carneiro 1981:45) has been a heated debate in Lowland South America and the Antilles during the past three decades (Drennan and Uribe 1987; Redmond 1998).[366]

However, the premature conclusion that coastal LCA societies were chiefdoms distorts the very essence of these societies as dynamic cultures embedded within a much larger interaction sphere. To explain the large picture, neo-evolutionary concepts (processual *New Archaeology*), i.e. hereditary inequality, monumental architecture, complex societies, etc., have masked significant elements of Amerindian society, such as the variability or regional differences of complex society because the latter are 'sophisticated delusions' that 'stand as obstacles' created by anthropologists and not by indigenous people. They 'imply a cultural homogeneity and uniform political structure rather than a plurality and diversity of organisations, identities and historical experiences' (Pauketat 2007:3, 81).

The Amazonian tradition of defining the various types of society (Oberg 1949:52, 1955) can be opposed to Yoffee's (2005) comparative study of developmental sequences as a way to understand diversity and complexity. It appears that "pure" archaeological research must be abandoned and archaeologist need to be more like ethnologists, as Rivière suggests (1984:4): 'It is not sufficient to note that the Trio distinguish themselves both from the Wayana to the east and the Waiwai to the west by means of their hairstyle (amongst other things). It is necessary to know how the choice of a hairstyle, in relationship to other choices, forms a cultural identity.' This ethnographic approach is again fuelled by means of an (etno) historic approach, as Whitehead (1988) promoted as to the Guianas, in which ideological and/or warfare domination appears to be an important factor of Amerindian society and regional florescence. Thus, it seems likely that the post early-contact upheavals and the (socio-political) behaviour of the Amerindian population during the 16th and 17th century, at least partially, are part of earlier patterns of migration, resistance and genesis. Although we cannot underestimate the impact of the European arrival (e.g. diseases, slave trade, warfare, missionization), it seems fair that the Guiana population, including the

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366 Linguistic research carried out during the 1960s and 1970s inspired scholars to define culturally characteristic traits. For instance, Basso (1977) defined eight cultural markers shared by three Carib-speaking groups in the Guianas. These markers suggest a cultural homogeneity of these Carib groups, leaving little space for the origins of these traits, such as warfare, trade and alliances (Dreyfus 1983-84:40).

groups that fled from Trinidad, responded to these social pressures in ways that made sense to them from their point of view and not merely in novel manners. The (ritualised) realm of warfare observed in the early documents was clearly not newly created during the post-contact era (Santos-Granero 2009b).

The ideological aspects of successful warfare could only have deep historical roots in a precontact era, as is often recorded in early historic documents. An achieved status by means of skill in warfare played a key role in determining which men became war leaders and were subsequently entrusted with diplomatic authority. These forms of 'high culture' (Baines and Yoffee 1998:237) or cultural notions of order, legitimacy and status make way to support this culture or 'the consumption of aesthetic items under the control, and for the benefit of, the inner elite' in the Guianas (e.g. greenstone frog pendants, basketry, Koriabo ware).[367] It is the access to and the socio-political importance of these precious goods rather than their intrinsic value that creates status in pre-Columbian and (early) historic Amerindian culture (cf. Section 12.5).[368]

In addition to status and trade, slavery and warfare, particularly war against peoples with dissimilar languages and practices (C., *itoto*; A., *igneri*), represent common cultural traits in the Guianas and the Caribbean.[369] However, it cannot be asserted that warfare was simply about "making slaves" as in a Western notion of acquiring a free labour force by way of applying violent means. The reason for this is the fact that all adult men and the majority of the women were actually killed by the raiders. The loot consisted of products similar to those at home and these items were not accumulated in such large quantities that they could be converted into economic power (Santos-Granero 2009b:197). Therefore, raids were also about expressing regional, political dominance and capturing ritual paraphernalia in order to obtain vital or spiritual energy stocked in idols, bones, teeth, etc. Capturing the "other" (enemy) was vital for the well-being of society on both political and religious levels. Instead of pigeon-holing on ceramics, Guiana archaeologists should draw upon anthropology as, for example, Duin (2009:25–27, 2012) pointed out with regard to the concept of the Wayana community house by means of elaborating on the model of regional organization nourished by means of socio-politicalities, rituals, architecture and social memory. Indeed, late pre-Columbian and early historic Amerindian societies were highly dynamic (Ingold 1993:154) in which villages with dissimilar status exchange goods and vital energy or potency. Although we have little archaeological evidence, Duin opts for a multiscalar, regional approach regarding the interior of French Guiana,

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367 Yoffee's high culture draws on Lévi Strauss' rigid 'house' concept (Lévi Strauss 1979:47). In it a moral person, keeper of a domain composed of material, owns immaterial property. It perpetuates itself by the transmission of its name, fortune and titles in a real or fictive line thought to be legitimate on the sole condition that this continuity can express itself in the language of kinship or of alliance or preferably both. See S. Hugh-Jones (1995) and *The Durable House: House Society Models in Archaeology,* R. Beck (ed.), (2007).

368 It is important to point out that (trade) objects have a different value from the European perspective as pointed out by Catherine V. Howard in her PhD dissertation on Waiwai identity (2001:234-235): 'Ogilvie's observations underscore a point that is key to understanding the regional exchange system: it is the *movement* of exchange items that is fundamental, not their stasis; their value is constituted not in possession, but in the *process* of acquiring them and giving them away. Contact with other societies should not be measured in terms of the accumulation of goods, but rather, analyzed in terms of how these goods flowed through the exchange network and how their meanings were transformed through such channels. '

369 Breton (1665:223).

drawing heavily on Heckenberger's research (2005) on the Amazonian circular plazas embodying permanent central agencies.[370]

However, we must take care when transplanting such models on apparent similar regions: this model was designed for southern Amazonia. On the other hand, the Wayana are recent intruders into the interior of the Atlantic Guianas and not descendants of the coastal population, if we want to apply the Amazonian model of circular plazas. Projection into the past can be dangerous as Amerindian cultures have changed over time and were heavily impacted by means of European influences (cf. Chapters 10 and 11). Moreover, we must not underestimate the opposite danger of 'archaeological perversion' (Viveiros de Castro 1996:193). However, this kind of projection may also claim an eye opening effect as to research in the Guianas, as it did for the Middle Amazon area (Heckenberger et al. 1999; Petersen et al. 2001).

Guiana complexity

Village leaders and shamans exercise political power in Amazonian societies. They are able to control their position not only by means of commissioning festivities, ceremonies and games, but also by maintaining large networks. Herein the exchange of prestige objects secures socio-political alliances as the distribution of Koriabo ceramics and greenstone objects exemplify. Despite the fact that the Guianas feature several large earthwork sites related to the indications of population control and central power (Roosevelt 1991; Schaan 2004; Rostain 2013), they are in fact not present in large quantites, but rather pinpointed in a small number of regions (e.g. the man-built mounds in western Suriname, the stonehenges in northern Amapá), with the exception of the ECA ring-ditched mountain sites which apparently occur in large parts of the entire Guiana interior. As mentioned above, these features do not necessarily reflect the central power from an indigenous point of view, but rather from a European point of view. Regional ceremonies (e.g. commemoration of alliances, celebration of deceased village leaders, ancestor worship and perhaps calendrical ceremonies) are possibly materialized archaeologically at stonehenges, ball games and ring-ditched sites.

At the moment, cemeteries are principally identified with regard to the LCA along the Atlantic coast of the Guianas whereas ceremonies at village level are more difficult to detect. The latter are possibly reflected by means of ceramic depositions, fragments of stools/tablets and statuettes, suggesting the presence of shamanic and/or village leaders' power. In addition to these artefacts, we come across ceramic modelling and complex painted designs in which mythic animals (e.g. jaguars, anacondas, birds (vultures, fishermen, woodpeckers), caymans) as

370 Although we have very little archaeological evidence regarding circular villages, i.e. a southern Amazonian concept (Wüst and Barreto 1999; Heckenberger 2005), in the Guianas, there is also little evidence concerning communal huts or central buildings. The latter concept is inspired on historic and ethnographic documentation (Bos 1973). Currently, central ring villages and plazas are often encountered in southern Amazonia (Wüst and Barreto 1999). In the Guianas the concept of a "men's house," or central public building (Kali'na, *tapoui*; Wayana, *tukusipan*), are more frequently found. The utility of the multiscalar approach (both temporal and spatial) as an important aspect of regional and network analyses has become quite popular among North American archaeologists. They range from Braudel's (1972) tripartite divisions of social time into individual events, conjunctures, and the *longue durée* (Knapp 1992), to the concepts of "time perspectivism" (Bailey 1983, 2007; Holdaway and Wandsnider (2008) and "big histories" (Robb and Pauketat 2013). See Brightman (2007) on Amerindian leadership in the Guianas.

well as possibly cosmographic and status symbols play important roles. These elements and artefacts provide information on how political power is executed in the Guianas. This differs from western ideas on chiefdoms or authority guided by means of control, submission and the coercion of people. Power is guided by means of the control of ancestral, cosmographic knowledge embedded in oral tradition or myth which eventually guides communal life and politics.

Modern Amerindian settlements are thought to be self-sufficient in techno-economic terms (Kloos 1971; Rivière 2000). Duin (2009:42–43, 2012), however, proposes for the Guianas the following theoretical framework for Amerindian villages: (a) a more complex or inter-village organisation based on ritual economy, as defined by Wells and Davis-Salazar (2007), (b) social ranking, as defined by Goldman (2004:44) and (c) symbolic capital, as defined by Bourdieu (1990:112–121). No doubt, this hypothesis is possible with regard to pre-Columbian society when considering the LCA archaeological database. However, a step beyond everyday economic activities (e.g. fishing, agriculture, pottery production) is currently perhaps far-fetched. Even if political centralisation, divine chiefs, mound building, and status ascription is present, then pottery, lithic material, possible house forms, starch grains, earthworks, dark earths and religious symbols are the only tangible proof available.

Thus, when browsing the studied sites, the relevant literature and the early historic sources, we may indeed propose a certain level of complexity as to the LCA in French Guiana expressing itself modestly when compared to other regions, notably the Lower Orinoco and Amazon Rivers (Rostain 2010a:189).

Wishing to recognize chiefdoms in the pre-Columbian Guianas, we must not only adapt Roosevelt's (1993) propositions with regard to a more complex society located in the area of the mouth of the Amazon, but also Heckenberger's southern Amazonian model extrapolated to the Atlantic Guianas. I would now like to propose a number of socio-political traits concerning pre-Columbian societies in coastal French Guiana:

(a) Large archaeological sites are found in French Guiana. However, the actual size of a village at a given moment in time is still difficult to determine. It is hypothesized here that: (i) archaeological sites on sand ridges shift across them in time, (ii) they may thus contain the remnants of earlier sites, as seen at CSL, (iii) the principal functions of the studied sites are: habitation villages (PK 11), satellite or activity (seasonal) villages (CPP), and funerary sites (AM 41) and (iv) the majority of the sites studied here were occupied longer than two or three centuries leaving behind large quantities of material and features, suggesting either a large population or just a small number of families residing here over a long period, which is presumably the case.

(b) At present, any direct archaeological proof as to village unification and the presence of paramount chiefs is absent. Central buildings perhaps reflecting a ranked society drawn on historic and ethnographic analogies have not been found yet. Further extensive and large-scale excavations are needed to draw such conclusions on site level. However, aerial or satellite imaging has not revealed very large villages or extensive earthworks or geoglyphs as in the Brazilian State of Acre (Saunaluoma 2012) or Bolivia (Lombardo and Prümers 2010;

Prümers 2014), although recent LIDAR images in eastern French Guiana have shown more variation in ring-ditched sites (Laurent Delacroix (ONF), personal communication, 2014).

The presence of raised fields and habitation mounds in the Central Guianas, notably Suriname and French Guiana have been known for decades (Boomert 1976, 1978; Versteeg 1985; Rostain 1991). Although there is momentarily no archaeological evidence as to habitation mounds in the coastal plain of French Guiana, the LCA *chenier* villages are associated with the raised fields in these plains (Rostain 2008a, 2010b; McKey et al. 2010). In my opinion, further research is needed not only to confirm the proposed idea of shifting villages (Meggers 2011:155), but also to obtain more radiocarbon datings as to the raised field complexes to check contemporaneity as well as their alleged significant fertility over higher (Pleistocene or Precambrian) grounds. Notably the extensive "organised" tapestries of small heaps and the canals or "roads" in the coastal savannah of French Guiana deserve more attention since they may actually represent 'a natural organised landscape' (Renard et al. 2010; McKey et al. 2014:93).[371] Thus, high culture or hierarchical social organization is not proven as to the coastal area and currently merely a hypothesis to be tested. If these raised fields were indeed developed in order to produce a surplus for redistribution in a village network controlled by a paramount chief, is still to be seen.

Furthermore, if ring-ditched sites were fortified villages of (paramount) chiefs, as among the Tupinamba of southeastern Brazil, has not been demonstrated yet (Petitjean Roget 1991). Further fieldwork is required in order to comprehend the function of these ring-ditched sites in French Guiana.. Radiocarbon dates have indicated that their implantation in the Guianas began at the end of the first millennium BC, proving a long tradition of these man-made sites, even predating the man-made mounds of the western Suriname coastal plains and possibly of Marajó.

(c) There is no evidence whatsoever concerning warfare or expansionism at the sites studied here despite the fact that the early historic accounts report relentlessly on the warfare going on in this area and Amazonia in general (Santos-Granero 2009b). This warfare was not simply about the Western concept of obtaining a cheap labour force or of destroying the other. It is rather concerned with 'the social

371 Today, the Kali'na of eastern Venezuela apply a certain ditching system. Its origins remain unknown: 'The [ditching] system has been adopted by local criollo farmers; however, there is no evidence for it elsewhere in tropical South America, now or in the past. The Karinya ditched fields are one more example of man's ingenuity for utilizing marginal habitats for food production when and where the need arises' (Denevan and Schwerin 1978:59). This also suggests that this Karinya system may have colonial origins. According to the hypothesis of P. Grenand (1981:25), the modern Palikur no longer utilise raised fields, but apparently did so until the end of the 19th century: 'Pour compenser l'usure des terres, il semble qu'ils avaient mis au point des techniques de cultures sur buttes tout d'abord considérables, bien que l'on manque encore de preuves archéologiques solides, puis, à mesure que l'ethnie et ses voisines s'amenuisaient, réduites des mottes circulaires (*imukwi hipatip*) de 80 cm de diamètre sur 30 à 40 cm de haut, ou mieux à des billons (*iinukwi kiawilnir*) de 2 m de long sur 50 cm de large. Mottes ou billons étaient entourés d'une dépression assurant l'irrigation. Cette mise en façon du sol était réservée au manioc amer et secondairement aux ignames (*Dioscoreu trifida*). De telles techniques supposaient évidemment une mise en culture de plusieurs anées. En l'absence d'observations précises au cours des XVIIIe et XIXe siècles, il est impossible d'apprécier diachroniquement les différentes phases d'appauvrissement de ces techniques agricoles. En 1925, Curt Nimuendajú (1926) trouve déjà plus que des abattis comparables à ceux des populations de terre ferme. Cependant, le simple fait que les Palikur actuels aient pu nous décrire, me sommairement cette agriculture ancienne, nous laisse supposer qu'elle survivait encore à la fin du siècle dernier.'

reproduction of people through the other,' as the anthropologist Fausto (2000) put it. From this point of view, cemeteries (e.g. AM 41) or organised burials at habitation sites (e.g. LPB, CPP) may furnish evidence of ancestor worship and hereditary lineages. The pillaging of cemeteries (e.g. Pointe Morne, CPP pit F 157?) or the depletion of caves in order to obtain long bones and other sacred powerful objects may support a warfare hypothesis, but remains momentarily a case of wishful thinking.

(d) Aesthetic ceramic and lithic artefacts display craftsmanship within an archaeological context, notably by means of lavishly decorated and high quality ceramics as well as artistically shaped lithic objects: stone axes, shell beads, greenstone pendants and ceramic figurines. Unfortunately, featherwork, basketry, wooden banks, war clubs and other status/ceremonial objects made of perishable materials were not found in an archaeological context, but must certainly have been part of a wide trade network in the Guianas, stretching from the Amazon River and the Atlantic Ocean and from the mouth of the Amazon River to the Lesser Antilles (Boomert 1987). Alas, only a small number of objects are known as to archaeological contexts whereas the majority consists of individual finds dredged from river beds to be found in private collections (Migeon 2010:733, Fig. 6).

However, anthropomorphic urns, statuettes and so-called stools or tablets constitute significant ceremonial items, but these objects are relatively rare finds at the sites excavated in the French Guiana coastal zone. Each excavation only yielded a small number of fragments, such as a leg fragment from PK 11, a stone bowl from CPP, incised stools from Saint-Agathe, the muiraquitã from Saut-Saillat, a polychrome rim fragment with a modelled human face from Bigiston (Late Aristé?), a polychrome painted vessel from the Suriname River (Rostain 2009:49, Fig. 3.8) and the deposition F 278 with highly decorated ceramics at Crique Sparouine. Craftsmanship is obvious, but rare. It is not necessarily part of a specific craft specialisation of a certain group (Rostain 2006), but rather a means of exchange among many groups, as suggested with regard to historic Venezuelan Guiana:

> *Surpluses, being modest, were not the result of a specialized production by ethnic groups, nor did they obey a territorial division determined by the presence or absence of raw materials. Some of the surplus items that could have become significant exchange "markers" (for instance fish, curare, quiripá) never were produced exclusively by a single group, nor was their circulation due to a lack of knowledge on the part of the receptor societies about how to manufacture them. We believe that this restricted exchange was in reality a deliberate cultural strategy developed by Orinoco polities to induce interaction between ethnic or local groups.* (Arvelo-Jiménez and Biord 1994:57)

(e) Recurring symbols possibly referring to status, ethnicity, religion, animals, cosmos, myth, etc. can be found on decorated ceramics. The interpretation of these symbols remains difficult, but certainly provides another dimension to material culture studies, notably activities (Pfaffenberger 2001). Ceramic iconography is somehow less employed or developed in the western Guianas than, for example, at the mouth of Amazon, presumably due to the large quantities of highly decorated

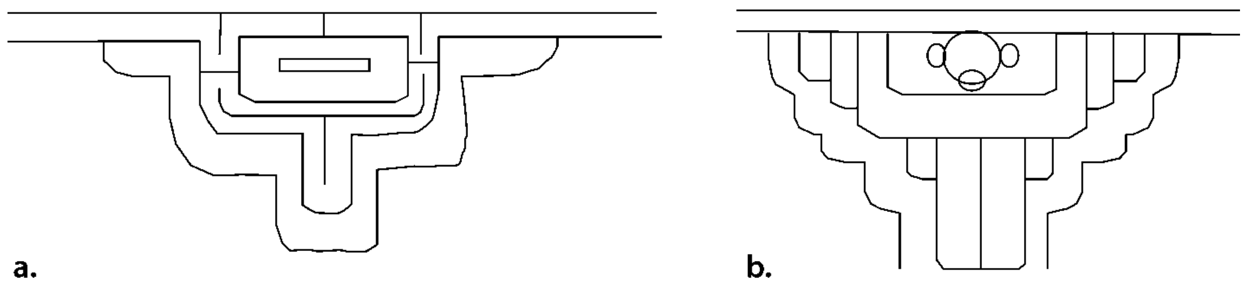

Figure 12.3. (a) A detail of a polychrome painted Marajoará tanga sharing a stylistic affinity with Tupi polychrome designs (after Schaan 2007:86, Fig. 3e) vs. (b) a detail of EC 73 incised toric pot from Crique Sparouine

ceramic materials in the latter area, notably anthropomorphic urns (Palmatary 1950; Magalis 1975; Roosevelt 1991; Schaan 1996, 2001; Guapindaia 2001; Nimuendajú 2004; Barreto 2008).

Here we may point out the scraped spirals of Crique Sparouine (cf. Fig. 6.21) and the white-on-red vessels found at CPP (cf. Fig. 9.13). The former is perhaps a seated person or animal (cayman?) whereas the latter may represent a stylistic snake or anaconda. It contains striking similarities with LCA polychrome-painted ware from Amapá and Marajó and the Upper Amazon River (Weber 1975:103, Fig. 103). The fourfold partition painted at the base of CPP EC 154 is a geometric element that also recurs on incised Koriabo toric pots. These pots usually have four ribbed body parts and an incised triangular design furnished with a small plastic appliqué head (cf. Figs. 12.3b and 6.18a). Interestingly, we see striking stylistic similarities as to decoration motifs between Tupi and Marajoará ceramic complexes according Tamanaha (2012) and Schaan (2007:85), drawing from Brochado (1984:333) and Noelli (1998:654), which are also possibly present in Koriabo ware, as the present author proposes in Figure 12.3.[372] Tupi speaking groups are known to inhabit the Lower Amazon since the 17th century (Métraux 1927, 1948) of which the Mercioux or Teko, inhabited French Guiana during the 17th century (P. Grenand 2006:113–114). Further research on this matter is certainly required in order to confirm a LCA Tupi presence in French Guiana, potentially coexisting with Koriabo. Linguistic research demonstrated and intimate link between the Tupian and Cariban languages of lowland Amazonia (de Goeje 1909:1–2; Rodrigues 1985:393–397).

In order to complete this survey of the possible existence of chiefdoms in the Guianas, Rostain (2008:279) suggests a population decline after AD 1300, comprising the fall of the coastal (Arauquinoid) chiefdoms of which the original Thémire is a final offspring.[373] According to Schaan (2004:145), this specific date is associated with the decline of the Marajoará complex (Phase IV) between AD 1100 and 1300. However, 'this period has not been adequately documented' and 'this "decline" is not yet completely understood':

> *The possible multiplication of smaller sites located far from the regional centers and without much investment in ceremonial activities can be seen as indicating reduced concern with social differentiation and decrease of regional integration. New ceramic styles and ceramic technology are timidly introduced in this period, which may reflect the loss of religious and political hegemony and, at the same*

372 Historic links between the mouth of the Amazon and/or northeastern Brazil and the Antilles have been demonstrated by means of comparative linguistic research (Hoff 1995:53, note 14). It may nevertheless be 'the product of the French ethnography' (Whitehead 1995a:93, note 4).

373 If the Little Ice Age played a role here is presently under debate (Dull et al. 2010).

time, more autonomy for local villages. It should be noticed that this period is equated with the emergence of complex societies in the lower and central Amazon, which were part of a supra-regional prestige goods economy. (Schaan 2004:145)

From this point of view, we may finally want to point out the emergence of Koriabo in the Guianas. It refers to a supra-regional distribution of Koriabo ceramics which can again be associated with the wide distribution of *muiraquitãs* and stools, stretching between the Lesser Antilles and the mouth of the Amazon River. Further research is required in order to establish if the Koriabo emergence in the Guianas is related to the Lower Amazonian area where Koriabo sites have been found more recently (Saldanha and Cabral 2012), expanding this culture in northern Amazonia.[374] In sum, the Amerindians whom the first Europeans came across in the Guianas shared numerous cultural traits as the pan-Guiana Koriabo archaeological complex suggests. On the other hand, these Amerindians also represented various ethnic and linguistic groups, inhabiting territories in a close and fluid relationship as became more evident during the subsequent Historic Age.

12.5 The Historic Age

The Guianas were discovered towards the end of the 15th century. Situated between the Portuguese and Spanish realms, this part of South America was left unsettled during the 16th century. The Iberian powers had expressed more interest in eastern Brazil, Mexico and Peru, respectively. The islands of Margarita and later Trinidad were the most eastern outposts of the Spanish American empire, thereby leaving the region between the mouths of the Orinoco and Amazon Rivers as a buffer area with regard to the Portuguese colony of Brazil. This turned the Guianas into a "No-man's land" stretching from northeastern Brazil towards the mouth of the Orinoco River which was called 'Intermediate area' (Vidal de la Blache 1902:61). Towards the end of the 16th century, the Spanish were loosing control due to continuous privateering by notably English and French ships. At the turn of the 16th and 17th century this left many regions unguarded, enabling European merchants to barter with the indigenous population.

At this pivotal moment small coastal trade reached its peak with the regular passage of Dutch, English and French ships. At the same time, settlement projects were established as to produce cash crops, i.e. tobacco, annatto and sugar, around the middle of the 17th century. This European intrusion in the Guianas and the demographic collapse it caused, not only adversely affected the native populations throughout the region, but also upset the time-honoured social, economic and warfare relationships which linked these Amerindian groups (Butt Colson 1973; Latrap 1973; Gallois 2005). This led to the creation and reinforcement of new ethnic frontiers as an adaptive response to the occurring changes (Whitehead 1993; Collomb and Dupuy 2009). From this moment on, the history and the territorial inscription of these peoples settled on the Guiana coast thus became inseparable from European colonial expansion.

374 Interestingly, the AD 1300 date is also traceable at the Lower Orinoco with regard to the latest Camoruco phase as well as in the Lesser Antilles where the Suazan Troumassoid is now clearly present.

In the following section, an Amerindian point of view is provided as to the European-Amerindian relationships during the late 16th and early 17th century through early documents –briefly presented in Section 10.2– in order to address the impact of the colonial encounter on Amerindian society and the way in which they dealt with it, notably with regard to the following discussion on the introduction of iron tools and changing material culture in general.

12.5.1 The Colonial Encounter[375]

The first confrontation

Despite the fact that Francisco de Orellana had almost circumvoyaged the Guianas in 1542, only a small number of Spanish documents report on this region, i.e. the eastern border of their official possessions. Spanish intelligence concerning the Guianas, and especially the allied *Aruaca* nation, is to be obtained by means of the writings of Figueroa (*c.*1520) and Rodrigo de Navarrete (*c.*1570).[376] Not having visited this area in person, they acquired Amerindian information on its population from *Aruaca* residing on or visiting Trinidad or Margarita. They reported a polarized image of friends (*guatiao*) and enemies (*caribe*) to the Spanish Crown. As to the Lower Orinoco River, the Spanish considered the eastern and western Guianas vast supply areas of victuals and slaves to be exploited in combined Spanish/*Aruaca* raids.

According to one of Navarrete's informants, the *Aruaca* inhabited the rivers of *Bermeji* (Berbice), *Curetuy* (Courantyne), *Dumaruni* (Demerara), *Desguixo* (Essequibo), *Baorome* (Pomeroon) and *Moraca* (Moruca), i.e. the western Guianas, which were previously inhabited by the *Caribes*.[377] At first they lived in peace, but eventually began to fight each other as is evidenced by means of the seasonal warfare including large raiding parties in order to procure slaves, marked by means of cutting their hair short.[378] English explorers (e.g. John Burgh, Jacob Whiddon, Robert Dudley, Walter Ralegh) arrived towards the end of the 16th century. [379]

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375 I am indebted to Gérard Collomb for reading this section that represented a draft of our paper entitled: *"Beyond the Falls": Amerindian stance towards new encounters along the Guiana coast (1595-1627)*, presented at the session "Beyond the Village" organized by Renzo S. Duin during the 54th International Congress of Americanists (15-20 July 2012 in Vienna). It also served as the Introduction of our publication *Entre deux mondes* on the early encounters between Amerindians and Europeans in French Guiana (Collomb and van den Bel 2014:7–25).

376 Neil Whitehead has translated the writings of Figueroa and Navarrete into English; see his publication on Antillean ethnohistory entitled *Of Cannibals and Kings* (2011b).

377 An anonymous Spanish map of *c.*1560 (Schuller 1916) mentions Guiana rivers in the native tongue, i.e. Rios Cureti, Beruesica, Magnay, Mirari, Capaname, Duce, Baruma, Moruca, Guaynj, Guayanepe, Barimea, which Ralegh copied for his map, see Harlow (1925) or Whitehead (1997:105, Fig. 8) for this map. The Spanish map indicates, following Navarrete's interpreter, that Aruacas resided along the coast and Caribes in the interior. It also reports that *cacique* Yayua and several Spanish tried to reach the Amazon by ascending the Essequibo River in 1553.

378 According to Nicolás de Cardona [1613], the Callinago of Grenada kept captured Christians as slaves, named *cacona* who were subsequently fed and lodged. He also mentioned that the ears of two captured Negroes were cut off and their noses pierced (de Cardona 1989:26).

379 The prelude of Ralegh's arrival in the Orinoco is most certainly inspired by the Spanish quest for El Dorado. It was either transmitted by de Gamboa during the 1580s and/or by the captured letters written by Domingo de Vera y Ibarguën or by George Popham, Ralegh's personal privateer. Lorimer (1977) suggests that Ralegh may have visited Trinidad in 1587.

They were thus confronted with an indigenous population trying to establish a confederation in order to fight the allied forces of the *Aruaca* and Spanish.[380]

It may be evident that the socio-political situation of pre-Columbian times, albeit infused with warfare between distinct nations, had been altered due to the impetus of other influentual players, notably the Spanish, but also the English, French and Dutch, usurped by regional indigenous politics to whom the leaders had to adapt eventually. Ralegh (1596:5–6) even suggests that this new political situation had changed the status of the Amerindian Lords, or *caciqui*. They 'are called in their own language *Acarewana*' equal to the European naval term of *Capitaynes*, revealing a possible adoption of the Amerindian elite to European status.[381]

The second confrontation

Arriving at Trinidad, Ralegh instantly took San José de Oruña and as well as its commander Antonio de Berrio. His Virginian experiences and the information acquired from de Berrio caused Ralegh to quickly understand that the key to success to locate *El Dorado* was to have the local Amerindian elite on his side. However, he also bore in mind that the Spanish were too strong to be conquered – due to his dreadful defeat at Cumaná. Moreover, he had better look for other ways to get to El Dorado and not sail up the Orinoco River and its affluent the *Caroli* River in order to reach the lake named *Parimé*. Once back in England, he sent for *A Second Voyage to Guiana* under the command of Lawrence Keymis. In the company of William Downe, Keymis searched the entire Guiana coast not only for possible Spanish settlements, but also to obtain intelligence on other rivers that may lead to El Dorado. This voyage, taking *c.*6 months, was followed by a third voyage under the command of Thomas Masham accompanied by Leonard Berry. It served the same interests as Keymis's second voyage, but this time the Courantyne River was carefully explored.[382]

On April 20 1597, they encountered the *John of London* under the command of John Leigh (John Ley) with whom they teamed up in order to explore the upper reaches of this river. It would join the *Desekebe* River 'within a dayes journey of the lake called *Perima*, whereupon *Manoa* is supposed to stand' (Masham 1890:190). Next to English merchants such as John Ley, several Dutch merchants, lured by the writings of Ralegh about mines, began to appear along the Guiana coast (Cabeliau 1862 [1599]; Netscher 1888:32).[383] However, instead of investing in the construction of expensive (gold) mines in the hostile regions of the Lower

380 'The sea coast is nowhere populous, for they have much wasted themselves, in mutuall warres. But now in all parts so farre as Orenoque, they live in league and peace' (Keymis 1596:Gr).

381 See also the relation of Francis Sparrey (1625:1247): 'The chiefest of the Indians, I meane the Kings and Lords of the Lands in times past, named themselves Acarewanas, but now Captaines.'

382 William Downe or Dolwe was also present during this third voyage (Masham 1890:186) up the Oyapock, Counamama and Courantyne Rivers because Downe had already been there! William Downe is controversial and considered either a *cretin* or a good entrepreneur. At any rate, he embodies the characteristic individual adventurer of his era in the Americas. It is notable that his ship was "lost" at sea from the very start just as with others including Maarten Willemsz who accompanied Ooms and Cabeliau (1862:154). Sarah Tyacke (1980:75) suggests that Downe had made an "Indian Carde" of his voyage selling it directly after his arrival in England, according to a letter by Hariot to Cecil (Lorimer 2006:lxxxv).

383 The Dutch trafficking salt from Punta de Araia into Spanish territory relied on English intelligence when calling on ports for barter along the Guiana Coast, i.e. Johan Meysinge of London (Cabeliau 1862:155).

Orinoco, private Dutch merchant companies started to install trading posts in and near Amerindian villages, frequently situated on the lower reaches of rivers in order to procure local goods in exchange for European ware (Hulsman 2010).[384] At the start of the 17th century, multiple Dutch companies traded with the Amerindian population of the Guianas and the Lower Amazon. They acted on a regular basis as can be witnessed on Hessel Gerritsz' map of *Guaiana*, published by Johannes de Laet (1625:452–453).

As for the Dutch, English assistance along the Guianas was also accounted for the French voyage to the *Wiapoco* and *Caliana* Rivers, as recorded by Jean Mocquet. In 1604, this expedition, under the command of Daniel de la Touche de la Ravardière, set sail towards the Guiana coast in order to check for goods to be procured among the local Amerindians. Remarkably, a large part of this crew and even the captain were Englishmen (Mocquet 1617:148). The Amerindian guide had once belonged to 'milord *Ralle[gh]*' who was 'the son of a King from the Island of Trinidad' (ibid., p. 97).[385]

Since the first Spanish attempts, Cayenne Island and the Kourou and Oyapock Rivers were landmarked as the most important ports of call for trade with the Amerindians. The mouths of these rivers were easily recognisable along the coast of the Guianas thanks to the large table mountains descending directly into the Atlantic Ocean. Especially the Oyapock River was soon targeted as a relevant river for European implantation considering the known, but failing colonies of the Leigh brothers [1604-1606], Robert Harcourt [1608-1613], Jan Pietersz [1615], Lourens Lourensz [1618-1626], Jesse de Forest [1624-1625] and Jan van Rijen [1627]. Their accounts not only allow us to establish a list of the numerous groups dwelling on this river, but also to reconstruct one of the earliest episodes in post-Columbian ethnohistory concerning the first stance and changing politics towards any European influence and the arrival of the first European settlers and fleeing Amerindian groups of the Oyapock River (Collomb and van den Bel 2014) (cf. Appendix 2).[386]

As William Downe had sailed ahead of Keymis during the second voyage to find only empty houses at Mount Caripo (known today as Montagne Bruyère), Masham did not encounter any local people either when sailing up the Oyapock River until the first waterfalls (known today as Saut Maripa) because he too had been preceded by another sailor, probably John Ley. Finally, Keymis met the fugitive Yao captain named *Wareo* at *Cawo* (Kaw) whereas Masham met the Carib Captain named *Ritimo* at *Chiana* (Cayenne). Having met Keymis, the Yao, who had fled from the Moruga River, feared they were Spanish whereas the Caribs asked Masham to join forces in order to attack the Spanish on the Orinoco River. Although Keymis did not meet anyone on the Oyapock, it is possible he acquired

384 The "reluctant go-between" John Ley apparently also had a trading post on the Oyapock River prior to the foundation of the Leigh colony. He died during Charles's stay on the Oyapock (Leigh 1625:1255).

385 Keymis (1596:F4r) reports earlier French visits to Guiana. They may be related to the French colony at Maranhão, Brazil.

386 It must be remembered that, for this early period, the Oyapock River is presumably the best documented river on the eastern Guiana coast. Moreover, these accounts only reflect a very small part of the many (now and again unknown) colonisation attempts by possible trading companies and individuals on this river.

this information from Downe who told him he sailed up the Wiapoco until the first falls when they eventually met near the Orinoco delta (Keymis 1596:D4v).[387]

The Yao were apparently firmly established on the Kaw and Oyapock Rivers at the start of the 17th century. According to John Ley: 'The nation of Iyaos, have two Rivers, Caow and Wayapowpa, the Captaines of Iyayes, at Caow are Anakayo and Mawkeyin And the Capitaine of them, At Wayapowpa is Ayarow who is brother to them' (in Lorimer 2006:326). He does not mention any other nations on this river such as suggested by Keymis and, later on, by Leigh. It appears that the Yao had promoted themselves to be the one nation with whom the English had to trade on this part of the Guiana coast. Ley does not mention any other people on this river, who may have arrived some time later, nor does he report the presence of any (autochthonous) local groups with the exceptioin of the *Morowonow* of the *Arowcoa* (Urucauá) the affluent of the Oyapock River in its mouth, facing Mount Caripo.

After these English coastal surveys, their publications and subsequent translations in other languages, a large number of English, Dutch and French entrepreneurs frequented the Guiana coast in order to trade with the Amerindians, notably Dutch private companies such as the *Compagnie op Guiane en de Wiapoco* (Hulsman 2009:61, 2010). These trading posts housed a small number of factors who lived among the Amerindians and built strong-houses in order to secure the import and export of merchandise. The local population sustained the Europeans because they exchanged European objects with them, especially iron tools, in exchange for Amerindian wares merchandise and victuals. Frequently, perhaps every six months or once a year, the European companies sent a ship to the trading post in order to bring back the traded goods and to deliver another stock of barter goods.

In around 1610, various companies traded along the Guiana coast as well as the along the Lower Amazon River. This implied a fairly large number of European ships calling on the trading posts as described in the published journals written by Jean Mocquet (1617:80), Charles Leigh (1625:1254), John Wilson (1625:1262, 1264), Robert Harcourt (1625:1277)[388] and Unton Fischer (in Harcourt 1928:181). According to Wilson, the Dutch factors were very well equipped for their tasks, a pitiful contrast with their own failing colony, according to John Wilson of Wansteed:

> *Neither had we any store of commodities to trade up in the Maine, as the two Hollanders hath which are there, and were left there at our comming from thence by John Sims, Master of a Ship called the Hope of Amsterdam, of the burthen of one hundred tuns Fraughted by the Merchants of Amsterdam, and by their Charter partie was bound to lye in the River of Wiapoco, and of Caliane six moneths time.* (Wilson 1625:1264)

These trading posts entirely depended on their relationship with the Amerindians, not only for their work, but also for their lives. Intimate relationships occurred between members of the indigenous population and inhabitants of the

387 The absence of Amerindian nations on the Oyapock River is illustrated by the mere presence of *Charibes* on the right bank of the *Wiapogo* River as mapped on the 1599 *Nieuwe Caerte van het wonderbaer ende goudrijcke landt Guiana* by Jodocus Hondius making use of the information on Ralegh's voyages to Guiana.

388 *'Mr Henry Houenaer*, a Dutch-man, who in the yeere of our Lord 1610 performed a voiage to *Guiana*, to the places where our Company was seated, and now abideth in Thames-streete, neere unto Cole-harbour.'

trading posts as illustrated by means of the post scriptum of Lourens Lourensz stay among the *Aricouros*, explaining that the wife of an Amerindian captain gave birth to a daughter fathered by a Dutchman (Wassenaer 1627: 64v).[389] It is also evident that when the local population was discontent with the presence of a certain colony or individual, an untimely death would most certainly be the case.

After the observations of Keymis (or Downe) and Ley on the Oyapock River, the French set foot on this land as reported by Jean Mocquet, but they only refer to the *Caripous* of Yapoco.[390] Mocquet further states that the King of Yapoco is a certain A*nacaioury* engaged in warfare with the Caribs of Cayenne, their eternal enemies (Mocquet 1617:81).[391] Although other Europeans do not mention Caripous, *Anacaioury* is met by other Europeans. He is an emblematic personality of the Oyapock River and chief of a larger geographical area, as esteemed by Robert Harcourt:

> *Beyond the Country of Morrownia to the Southward bordering the River of Arwy, is the Province of Norrak; the people thereof are Charibes, and enemies both to the Morrowinnes, the inhabitants of Morrownia, and to the Wiapocoories; who are also under the subjection of Anaky-u-ry, the Principall and greatest Lord, or Cassique of all the Yaios in those Provinces, bordering upon the Sea betwixt the Amazones, South-eastward, and Dessequebe North-westward.* (Harcourt 1625:1271)

It is most interesting to investigate how this fugitive *Anacaioury* and foreign warleader acquired such an influential position on the Oyapock, in so little time.[392]

The Yao connection

Six weeks after the French sojourn of five days at the Wiapogo, Charles Leigh arrived at the same river to found his colony. He stated that:

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389 The present author provided a first English translation of Lourens Lourensz' journal (van den Bel 2009c).

390 According to F. Grenand and P. Grenand (1987:10), *Caripous* is considered 'a new bourgeon for the old word Charib-Karipuna.' Whitehead (in Ralegh 1997:62) states that the term *caripou* is 'a garbled attempt to render "Palicour" since the substitution of 'p' for 'b' and 'r' for 'l' is common in European transcriptions of native American languages' and that the Caripou described by Mocquet are actually the Yao described in the English documents. It must also be added here that Mocquet (1617:133) remarks 'qu'il y en a de plusieurs sortes, et celle des Caripous est aucunement différente de celle des Caribes, et ont assez de peine à s'entendre, encore qu'ils ne saient pas fort éloignés les uns des autres,' suggesting that the *Caripous* and *Charibe* language are not the same. However, if the Caripou are the alleged Yao, as various authors suggest, these Amerindians must have been able to understand each other better, as the Yao language is presumed to be of Cariban stock (Taylor 1977). This argument favours an interpretation of *Caripou* as Amerindian idiom for social or political status instead of a group name. The answer is perhaps given *c.*60 years later by Father Antoine Biet (1664:371). He identifies the Palicours as those who 'Monsieur Mocquet calls *Caribous*.' A list of Yao words can be found in de Johannes de Laet's *Novus Orbis* (1633:642–643).

391 Interestingly, the dominating *Charib* presence on Cayenne Island may be fairly recent as Keymis signals *Shebaios* upon *Gowateri* (Keymis 1596:B4r), whereas Thomas Masham, the following year, only met with Caribs at *Wias* and *Chiana* (Masham 1890:186).

392 Harcourt's outline of the socio-political indigenous organisation of the Lower Oyapock and adjacent areas probably includes the framework advanced by Ralegh and reflects European feudal hierarchy. In anthropology, however, this reflection has a mimetic and symbiotic character of cultural convergence, according to Whitehead (1997:34).

> *The Indians which doe inhabit this River are about one thousand five hundred men, women, and children, and they are of three Nations, viz. Yaioas, Arwarkas, and Sapayoas, which beeing chased from other Rivers, by the Caribes have combined themselves together in this place for their better defence, and are now at deadly warres with the Caribes.* (Leigh 1625:1253)

His observations represent relevant ethnographic data as it was acquired during a relatively long stay among the Amerindians on this and adjacent rivers. This is confirmed by a fellow colonist named John Wilson of Wansteed and by means of the information given by Robert Harcourt and Jesse de Forest during the first quarter of the 17th century. Whereas the passage of Keymis and Downe revealed that the (fled) Amerindians feared the Spanish, it is believed that the subsequent encounters did not reveal any fear, but rather a positive attitude towards the English, Dutch and French, considering them highly valued partners in the war against the Spanish. For the Amerindians on the Oyapock River another, perhaps more significant, war was waged against other indigenous groups, eternal enemies or even disobedient groups to which iron guns were advantageous as certified by means of the contents in the above-mentioned journals. It is suggested here that the Yao presented themselves as absolute partners of the English, leaning on their early contacts with Ralegh and their role as guides, hereby controlling the flux of European and Amerindian goods in the Oyapock Basin. Condoning the installation and local production of tobacco, annatto and cotton, the Yao also accounted for sufficient quantities of valuable wood species and victuals which the Yao or their allies from "above the falls," provided. A similar construction can be proposed for the *Charibes* of Cayenne representing the premier trading partner for the European nations in this part of the Guianas. In this manner, these two Amerindian powers created a mutual trading ground or *zone franche* in which they controlled the import and export of trade goods and secured its defence.[393]

Hence, it can be opined that the deadlock war between Cayenne and the Oyapock reflected an elite-war for prestige as to who will eventually possess all trading privileges with the Europeans. The Yao dominance is well illustrated by means of the arrival of a French ship from Saint Malo causing John Wilson to marvel at 'strange Indians' now coming down the river for that occasion:

> *The same day the Hollander departed, which was the one and twentieth of May [1605], came unto us a French ship of Saint Mallors, who dealt very kindly with us, wherefore wee did suffer him to trade with the Indians, who did remayne there some two moneths, unto whom many strange Indians did bring their commodities.* (Wilson 1625:1262)

Wilson reported this French-Amerindian encounter, suggesting these "strangers" did not resemble the Amerindians he often saw during his two-year stay at the mouth of the Oyapock River. It is therefore possible that these other Amerindians represent a privileged trading partner of the French. In addition, it stresses that the access to European goods was of great importance as to many Amerindian groups, including Amerindians from the interior.

393 By applying this term, we wish to insist on the economic aspects creating such a zone. Other terms, such as the *Tribal Zone* (Ferguson and Whitehead 1992) or the *Contact Zone* (Pratt 1992), stress the socio-political, cultural and geographical aspects, respectively.

"Beyond the falls"

Despite of some archaeological evidence, the interior of the Guianas remains *terra incognita* when compared to the coastal zone, as it has been the case at the start of the 17th century too. Nevertheless, several observations have shed light on the complex processes linking the native societies, embedded in large socio-political, cultural spaces throughout the coastal Guianas and riverine Amazonia. In this regard, it is worth to pay attention to the social and commercial networks, which operated at a much larger scale than the space in which the local groups can be placed. The above-mentioned Amerindian groups and many others were part of a larger network, in which alliances, warfare, and trade were opportunities for periodical socio-political and economic meetings between the various groups. These relations were based on ties forged between trade partners, i.e. *pawana* or *banaré*, sometimes separated by means of great distances and articulated along trade routes throughout the interior of the Guianas, from the Orinoco and the Rio Negro to the Amazon Rivers and the Atlantic coast (Butt-Colson 1973, 1985; Lathrap 1973; Whitehead 1988, 1992; Dreyfus 1992; Dupuy 2008).

The European goods that arrived in large quantities on the coast were exchanged for local goods by Amerindian middlemen or brokers who traded them within these extensive networks. It is sufficient to note that Wilson (1625:1262) awes at the fact that the Amerindians of the Lower Oyapock River were aware of the future arrival of European ships as three Dutch ships, according to Amerindian intelligence, had sailed up the Amazon River, hereby revealing a possible land route between these river basins.[394] One can also recall Father Cristóbal de Acuña's well-known observation on the presence of iron arms and tools among the various groups on the Rio Branco River. They informed him they traded with other groups living near the sea, who had bartered these items with Dutch merchants residing in the Essequibo delta (Acuña 1641:30v–31r).[395] Another example of land routes is given by the Irishman Bernard O'Brian (Mathews 1970:92) who carried out a crossing of the Guiana interior accompanied by Amerindians (Aruã?) from the Lower Amazon in 1625, by ascending the Rio Parú (tentatively) and descending the Suriname River towards the ocean.

Such networks remained active until at least the late 19th century as Richard Schomburgk (1922) and Roth (1924) witnessed in Guyana. The products of certain groups, apparently specialized in certain trading objects, such as trained dogs for hunting, cassava graters, ceramics and other manufactured products, circulated within these networks. Moreover, valuable trade assets (e.g. small greenstone sculpted objects produced in Guyana or the Lower Amazon River) (de Goeje 1932; Boomert 1987; Lima da Silva 2010) and gold ornaments from the interior of Guyana or Andean foothills, reached the Guiana coast through these networks (Roth 1924; Whitehead 1990).[396] Celebrations accompanied

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394 It may be added here that the high frequency of these trading vessels along the Guiana coast suggests they were 'touring' the Guianas in order to supply the trading posts and pick up the goods.

395 This can be seen as the first evidence of a native commercial route joining the Essequibo and deeper Guiana, utilizing the "Pirara portage" in the Rupununi area (Edmundson 1904:10–13).

396 Everard im Thurn observed: 'To interchange their manufacture the Indians make long journeys. The Wapianas, visit the countries of the Tarumas and the Woyowais, carrying with them canoes, cotton hammocks, an now very frequently knives, beads, and other European goods; and, leaving their canoes and other merchandise, they walk back, carrying with them a supply of cassava-graters, and leading hunting dogs-all which things they have received in exchange for the things which they took. [...]. In this way, travellers with goods and with news constantly pass from district to district' (Im Thurn 1883:273).

these exchanges during long-distance and sometimes and on occasion lengthy visits. They were transformed or modified as a result of contact with the arrival of European goods and especially by means of the shifting of the most important trade centres now situated upon the coast, where new goods were arriving.

Although archaeological research in these remote areas is scarce, large quantities of European trade goods were neither found in the coastal area or the interior. However, an important indication of their whereabouts can be found in the sole context in which they often occur: Amerindian (urn) burials. The deceased are buried in anthropomorphic urns as known from the Late Aristé, Mazagão, Maracá and Aruã ceramic complexes, attributed to the LCA and Contact Period as European trade items were found inside these urns (Goeldi 1900; P. Hilbert 1957; Meggers and Evans 1957; Petitjean Roget 1995; Guapindaia 2001; Nimuendajú 2004). These objects consist primarily of glass beads whereas iron tools are rare. It is difficult to imagine that from the end of the 16th century on literally tons of European barter goods (e.g. glass beads, jew-trumps, bells, fish hooks, axes, hatchets, knives, needles, pins, mirrors, nails) were dispatched and distributed in the Guianas of which only a handful has been retrieved by means of archaeological research. It is to be presumed that the majority hereof were traded into the interior. Not much trade material has been found in the early regions of contact where considerable archaeological research is carried out, such as on Cayenne Island.[397] The fact that these items were found in a burial context suggests they were sufficiently important to be presented to the dead. Following Amerindian burial practices, this may reveal political hierarchy and/or social stratification, as the first historic documents on the eastern Guianas and Lower Amazon River confirm. The Europeans goods were thus esteemed of similar value as local goods, i.e. spleen stones (*muiraquitãs*), crescent shaped golden plates (*caracolis*), strings of shell beads (*quiripá*) and integrated in the local funerary practices and trade system. Apparently, they also served as gifts, money, status symbols and heirlooms among the groups of the Guianas (cf. Section 11.4.2.1).

In sum, the vastness of this early colonial trading network is thus evidenced by means of the geographical distribution of similar important indigenous objects as well as by specific decoration techniques and vessel shapes attributed to Koriabo pottery (Boomert 1987, 2004; Rostain 1994a; van den Bel 2010a; Cabral 2011). The latter ceramic ware is found between the mouths of the Orinoco and Amazon Rivers as well as in the Guiana Highlands and the Tumuc Humac Mountains, displaying a very large distribution of these goods within this enormous area. However, further research is required in order to locate a possible original heartland or to discern regional production centres, which apparently shared interregional production codes.

"A kinde of people without heads"

Beyond the falls refers to the *terra incognita* that lies behind the first major falls of numerous important Guiana rivers. Here its interior is obscured and somehow protected by its vastness inhabited by strange people as recorded by early voyagers,

397 The other way around it may be evident that little is left of the large quantities of tobacco and annatto balls, valuable wood as well as golden objects and spleen stones shipped to the other side of the Atlantic Ocean. Only a small number (personal) trade objects are as yet to be found in European museums.

such as John Ley: 'Esparicur: A kinde of people without heads, haveinge their Eies nose and mouth in their breastes [...].'[398] Unton Fisher, Robert Harcourt's cousin, was sent by the latter to explore the upper reaches of the *Marawinni* River and find a way towards the city of Manoa. He is guided by the Parawagoto chief named Maperitaka from Wia Wia, a mixed Yao and Parawagoto village located on the left bank of the Lower Maroni River (Harcourt 1928:118–119). Although Fisher travelled *c.*40 leagues up this river, we may assume the information Fisher gathered in his journal is mainly drawn from Maperitaka's knowledge of this region –knowing that Maperitaka was a Parawagoto, also representing recent intruders on the Guiana coast. It reveals an influential Amerindian image of the population of this river both from a Parawagoto and "coastal" point of view.

Captain Maperitaka presented a clear vision of the infrastructure of this region and political status of the populations, recalling all the names of the rivers, villages, Amerindian groups and their headmen to be found along this river and the adjacent areas. This sheer abundance of ethnographic data reflects Maperitaka's world vision while Fisher is constantly occupied with his mission, focussing on the possible sources of gold and precious stones. In his journal, however, Fisher does not mention any "strange Indians" when visiting this river. Harcourt interpreted Fisher's report and stated:

> *He [Fisher] understood by relation of the Indians of Taupuramune, and also or Areminta, that six daies iourney beyond Moreshego, there are divers mighty Nations of Indians, having holes through their eares, cheekes, nostrils, and nether lippes, which were called Craweanna, Pawmeeanna, Quikeanna, Peewattere, Arameeso, Acawreanno, Acooreo, Tareepeeanna, Corecorickado, Peeauncado, Cocoanno, Itsura, and Waremisso: and were of strength and stature farre exceeding other Indians, having Bowes, and Arrowes foure times as bigge: what the Indians also report of the greatnesse of their eares, I forbeare to mention, untill by experience we shall discover the truth thereof.* (Harcourt 1928:120)

During his voyage on the Maroni, Fisher was probably informed directly by Maperitaka. He did not rely on possible hearsay or personal interpretations (as did Ley and Harcourt for example) when discussing the population of the interior:

> *... there is a Nation of Charibes having great eares of an extraordinarie bignesse, hard to bee beleeved, whom hee called Marashewaccas: amongst these people (as Comarian reporteth) there is an Idoll of stone, which they worship as their God; they have placed it a house made of purpose for the greater honour of it, which they keepe very deane and handsome. This Idole is fashioned like a man sitting upon his heeles, holding open his knees, and resting his elbowes upon them, holding up his hands with the palmes forwards, looking upwards, and gaping with his mouth wide open. The meaning of this proportion he could not declare,*

398 'There eares somewhat towards their showlders; they are stronge of bodie and make warr with their Enimies stouttlie, but otherwise are tractable and familiar people; my Indian affirmeth still that when he was a boie, They of Wyapoga brought one of them from the Highe Countrie: And he dwelt with him in one howse, almost fower yeres And then the Esparicur died. He had Armes hands, legs, feete, with the rest of His bodie well shaped and handsome, his Condicions good and pleasant He wold singe often both by daie and night. Sleepe verie little: He fed onlie uppon Tobacco, and did drinck thereof but his feadinge was verie spareinge, and used to drink seldom, as yt seemed because he had not such Provision as he Lyed by in his owne Countrie. He ware a Chaine of spleene stones which he fastened uppon a little knob which stood above his face and showlders.' (Ley in Lorimer 2006:323). Apparently the *Wyapoga* Indians targeted the *Esparicur* for slaves as were the *Mayé* for Aricouros on the Cassiporé River targeted the 'Headless Nation' (Whitehead 2009:299).

although he had beene many times amongst them, and hath often seene it. What other Nations were beyond these he did not know, having never travelled so farre, but he sayth, they be Charibes, and also enemies unto them. It seemeth there bee many Nations of those great eared people: for in the River of Marrawini, I heard also the like, who dwell farre up towards the high Land, as hereafter you shall heare, and I suppose, by the trending of the Rivers of Wiapoco, and Marrawini, are all one people. (Harcourt 1625:1277–1278)[399]

As mentioned before, European descriptions of Amerindian people were strongly predefined by means of ideas dating back to Antiquity (Pagden 1986). Ironically the more fantastic, or imaginative, parts of their descriptions are undeniably Amerindian and apparently (too) difficult to understand for Europeans, as Whitehead pointed out (1997:42). The Europeans reflected their society to Amerindian society for the largest part because native politics and economics were also concerned with similar issues, but structured according to a proper philosophy or cosmology. In this case, the Amazons, the People With A Face In Their Stomach, the People with Dog Heads, Cannibals, Manoa and the Gilded One did (and still do) exist in Amerindian oral tradition. They are part and parcel of their world vision, but require further anthropological analysis in order to be understood by Europeans. Certain Amerindian groups of the interior (see Harcourt's citation) are "extinct" by now, but nevertheless exist as historically incorporated and/or conquered clans for the present-day Amerindian population of the Tumuc Humac Highlands (Frikel 1957; Rivière 1963, 1984; Carlin and Boven 2002; Duin 2009) and other regions populated nowadays by Amerindians in the Guianas.

Conclusion

Although fearing and fleeing the Spanish, the arrival of other Europeans did not frighten the Amerindian population of the Guianas. On the contrary, they profited while establishing relationships with them in order to gain direct access to European goods or ware otherwise obtained through barter with the Aruacas or the Spanish. Moreover, alliances were established, often by means of exchanging children or guides, in order to wage war with the Spanish or their allies as well as with their longtime foes in regional (pre-colonial?) politics. The fleeing Yao who settled along the Oyapock River (and other rivers) presented themselves as the absolute European trade partners. Subsequently, they supervised the steady flow of goods within the free zone, controlling the interior by means of presenting themselves as middlemen.

Towards the end of the 1620s, this form of trade was abandoned on the Oyapock after skirmishes between inhabitants of trading posts and Amerindians had taken place (van Rijen 1924 [1627]; de Laet 1932 ii:16–18) and apparently had the Yao "disappear" around the second half of the 17th century (Lefebvre de la Barre 1666:16). This social pressure was presumably caused by the European demand to strive at more permanent and larger settlements hereby intruding more aggressively into Amerindian territory and creating a less controllable situation for the ruling Amerindian group. The English and Dutch traders who fled the

399 Stone idols are extremely rare in Guiana archaeology. Nevertheless anthropomorphic figurines and urns representing a human figure in a seated position are fairly common in Amazonia and express power in both rulership and shamanism (McEwan 2001).

Portuguese attacks on the Lower Amazon River settled in other regions, leaving the Oyapock aside (Williamson 1923; Lorimer 1989, 1993). Cayenne Island however remained a major goal with regard to Dutch and French settlements (Colenbrander 1911:190–202; Ternaux-Compans 1848:38–39). Nonetheless colonies such as Berbice (van Pere family), Suriname (Rowse, Marshall), Sinnamary and Counamama (Chantail, Hautepine) provided new, permanent and more successful colonies on this part of the coast. This was again based on trade with the Amerindians in which the *Arawaccas* and *Charibes* played again important political and economical roles. Towards the second half of the 1630s, the Dutch had swept the Caribbean free from Spanish ships. This also permitted the Europeans to settle the Lesser Antilles more permanently (Lorimer 1989:101). A long stretch of coast, situated roughly between Cayenne Island and the Greater Antilles, was now not only to be explored further, but also to be exploited by the Europeans. At the start of the second half of the 17th century, they introduced larger, permanent settlements. A sugar economy based on African slaves started to develop in the European colonies, generating Amerindian warfare due to the loss of their land which they had hitherto controlled so well.

12.5.2 The introduction and use of iron tools[400]

Introduction

As observed not only seen with regard to PK 11 and CPP, but also with other regions along the Atlantic coast (Perry 2001; McKey et al. 2010; Iriarte et al. 2010; Iriarte and Dickau 2012; Oliver 2014) and in the Caribbean (Righter et al. 2002; Bonzani and Oyuela-Caycedo 2006; Harris 2006; Lane et al. 2008; Mickleburgh and Pagán Jiménez 2012; Figueredo 2012; Rostain 2013), maize is omnipresent in black soot on LCA ceramic bowls, in fissures of ceramic bowls, griddles and grinding tools. The importance of maize for pre-Columbian populations, notably during the pre-contact period, is emphasised by Roosevelt (1980, 1997) and Perry (2002a, 2004, 2005) for the Lower Orinoco River as well as by Iriarte et al. (2012) for the early Historic Age in French Guiana.

Interestingly, the quasi-absence of manioc and the omnipresence of maize starch in the fissures of griddles nowadays unmistakenly related to the production of cassava or manioc cakes, is striking. It draws attention to the application of griddles in pre-Columbian and notably during historic times, as pointed out in the renowned 'cautionary' note by Warren DeBoer (1975). Fortunately, the historic period provides numerous descriptions of the preparation and consumption of manioc and maize. This enables us to trace the consumption of these products through time, as witnessed during the 17th century by Mauricio de Heriarte (1964:44) on the Lower Tapajos River: 'que sam de grandes milharadas, e ser osen sustento, que nam uzam tanto et mandioca para farinha como os mais nações.'[401]

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400 A Portuguese version of this section has been published in *Revista Amazônica* (van den Bel 2015).

401 As we shall see, maize (*Zea mays*) is written and referred to in numerous ways and notably by its Spanish (e.g. *mil, milho, millet*), but also as Indian or Turkish wheat (*Triticum vulgare*). In the Carib language, we come across terms for maize: *aoüaßi* (Biet 1664:421), *aüossy* (Boyer du Petit-Puy 1654:396), *aoussi* (Brûletout de Préfontaine 1763:79) and *awasi* (Ahlbrinck 1931:125). Interestingly, the historic and modern Tupian word for maize is very similar. See also note 376.

Nowadays, products made of bitter manioc tubers such as cassava, tapioca, *cashiri* (C.) and *couac* (F.), or *farinha* (Br.), represent the starchy food basis for a large part of the inhabitants of the Guianas (e.g. Amerindians, Marroons and, to a lesser extent, the Creole population). These tubers are grown in slash-and-burn fields or gardens which are abandoned after between three to five years (P. Grenand 1979; Balée 1989, 1992; Arroyo-Kalin 2012). This contemporary or early 20th century image of semi-permanent (independent) Amerindian villages consuming manioc is widely distributed in the Guianas (Gillin 1936, 1948; Kloos 1971; Rivière 1969, 1984). It represents also an image projected into the past by researchers as far as ancient pre-Columbian times, as if nothing has changed ever since (Heckenberger et al. 2001). However, this contemporary image is believed to be the result of the many changes at various levels in the Amerindian society during colonial times (cf. Chapters 10-11). For example, the introduction of the iron axe is thought to have changed the horticulture of the Amerindian society profoundly, even suggesting that 'shifting cultivation, as an ancient practice in Amazonia, seems to be a myth' (Denevan 1992:161). In this light, it is explored here that the present consumption of manioc is the result of a historic adaptive process in the course of which the coastal population of the eastern Guianas favoured manioc over maize during historic times. Moreover, it is hypothesized that the modern, wooden rectangular shaped grater boards, inserted with small stone chips, are Amerindians copies of the European metal (copper) graters sheets. The latter sheets were nailed on wooden boards and traded during the 17th century. They represent another factor, in addition to metal axes, abandonment of raised field agriculture and population decline in proto and early historic times (Iriarte et al. 2012, Fig. 3), contributing to the present-day image of a predominantly manioc based subsistence economy.

The archaeological perspective

Domesticated maize has been identified as to two LCA sites on Cayenne Island whereas manioc is almost entirely absent from our samples (only a single starch grain!) (cf. Sections 8.7 and 9.7). Although manioc tubers may simply not have been prepared nor consumed at both sites, the absence of manioc starch in our samples can also be related to the sampled tools, i.e. ceramic griddles, variedly shaped and used milling stones, ceramic cooking and drinking containers, apparently not used for manioc-derived products. In addition, the process of obtaining manioc pulp as we know it today which the earliest chroniclers of the Guianas describe so well, aims to extract the poison from the tuber by means of separating the poisonous juice from the pounded pulp, hence obtaining a starch-poor half-product. This implies there is less chance of coming across starch granules in this pulp and its food derivatives. It is also known that damaged manioc starches (heated or pounded) are more difficult to identify (Chandler-Ezell et al. 2006) as pointed out in the starch analysis of the studied sites. Even if the manioc starches have been missed during this research, it is still fascinating to observe how maize was "lost" during the historic period. The reason for this is that it was almost or no longer consumed in large quantities by the late historic and modern population of coastal French Guiana according to recent historic sources and early ethnography.

However, the latter ethnographic documents represented the source for the interpretation of small stone flakes as grater board flakes. Under influence of New Archaeology, Jeffery B. Walker (1980) suggested about three decades ago that microliths, or stone chips, were inserted into wooden boards by the pre-Columbian population of Saint Kitts, representing grater boards. The interpretation of archaeological microliths as grater teeth, based on ethnographic analogy, is the topic of debate during the last two decades (Barse 1989, 2008; Perry 2001, 2002a, 2000b, 2004). The introduction of innovative microscopic techniques (e.g. SEM, starch and phytolith analysis) made it possible to gain further insights into lithic tools hitherto difficult to assess. Use-wear analysis has proven to be an important means to determine the function of a certain tool by means of experimentally testing the relationship between types of lithic tools and movement. However, grating teeth or chips, perhaps because they are so small, as yet receive little attention in Amazonia with only few exceptions (Crock and Bartone 1998; Nieuwenhuis 2002; Perry 2005; Knippenberg 2012). This research is also struggling because the majority of the supposed grater chips are made of quartz material and difficult to analyse with the naked eye (Mourre 1996:213–214, 2004; van Gijn 2014). Any use-wear analysis often results in traces 'similar in form to those used for the scraping of relatively soft materials (e.g. animal hides) in experimental studies' (Perry 2005:419).[402]

Another technique involving the determination of tool function is the analysis of starch grains Linda Perry (2001) carried out with regard to small flakes. She extracted starch grains attached to small flakes from the Pozo Azul site situated on the Upper Orinoco River which William Barse (2008) excavated. In agreement with the latter, it is highly speculative to attribute the presence of starch granules retrieved from unwashed flakes to the activity of grating on grating boards. Perry's conclusions should at least be verified by means of numerous other samples, preferably those with tar attached to it. For example, when drawing on ethnographic analogies, this tar served to fix the teeth in the boards among the Macusi of Guyana (Farabee 1924:20–21) and should provide a better context to extract starches.[403] As Harris pointed out, Perry's 'results do not falsify the assumption that ceramic graters armed with microliths were used in prehistoric times to process bitter manioc, but they do reveal that these artefacts have been used to process a wider variety of starch-yielding plants, including maize, and that archaeological evidence of them should no longer be uncritically regarded as a proxy indicator of manioc cultivation' (Harris 2006:s68). This is also the conclusion of Debert and Sheriff (2007:1895–1899) who analysed the so-called '*raspaditas*' from the Santa Isabel site in Nicaragua, represented by means of small 'pointy' flakes.

402 Whether small flakes have been inserted into boards applied when grating food has been tested for example by André Prous by creating a grater board (Prous et al. 2010:213–214).

403 The Macusi grater board was made 'by driving small sharp stones of porphyry into a soft board' (Farabee 1924:20). Farabee remarks: 'An enterprising Taruma trader living among the Wapishanas married a Waiwai gril who is a good grater maker and through her industry he supplies a large market' (ibid., p. 21). See Roth (1924:278–280) for a description of the fabrication of a Taruma grater board (by a Waiwai girl?). Notably Barse (2008) and Perry (2005) do not correctly refer to Roth's publication, as is the case for Farabee in Barse's reply to Perry.

Figure 12.4. Women on Hispaniola making dough (left) in order to prepare flatbread (centre) and tamales (right) (after Benzoni 1857:84).

The historic perspective

As mentioned above, the ongoing debate about grater boards originates from ethnographic analogies. But first let's have a look at historical documents, notably those concerning the 16th and 17th century regarding the Guianas and the Antilles in order to identify grater boards applying the "direct historical approach" (cf. Section 10.5). When reading those early documents one notes that the majority of the Amerindians do not use rectangular wooden grater boards inserted with stone chips or covered with a perforated metal sheet as mentioned in the ethnographic documents (Schomburgk [1840-1844] 1922:30; Brett 1868:30, note 1; Crevaux 1883:119; Im Thurn 1883: 260; Wallace 1889:336; Coudreau 1893:435; Penard e Penard 1907i:109; Farabee 1918:21, 1924:20; Gillin 1936, Plate 7b; Delawarde 1966:524). In fact, the earliest voyagers rather state that manioc tubers are rubbed or pounded on a stone (Masham 1890:194; Leigh 1906:313–314; Mocquet 1617:82; Harcourt 1906:378–379) as Roth pointed out (1924:277) (cf. Appendix 5).

It can be noticed that the descriptions of manioc processing in those early documents are often rather lengthy and detailed. In additin to the fact they were apparently intrigued by means of this sophisticated method to extract deadly poison, it also shows an interest in manioc in general and notably in cassava (C., *arepa)*. Maize or Guinea weed,[404] on the other hand, receives little attention (Anonymous 1996, f. 13v; Masham 1890:189; Leigh 1906:310; Mocquet 1617:90; de la Mousse in Collomb 2006:221) for this seed crop is grown and consumed in

404 See note 373.

16th century southern Europe (Anghera 1912; Dubreuil et al. 2006:281).[405] For the chroniclers, manioc processing was often related to the production of cassava and eventually the preparation of manioc beer. Robert Harcourt (1906:378–379) compared cassava to oat cakes esteeming the latter to be consumed by poor farmers in isolated rural areas, such as Peake and Staffordshire in England, whereas beer was considered a more noble product of which manioc beer could be kept the longest in very large jars for *c*.10 days (cf. Appendix 5d). Other edible (starch) products did not attract much of the voyagers' attention. This can be related to their (cultural) culinary backgrounds and to economic interests. One was familiar with maize as in maize soup or stew (Biet 1664:377; Stedman I 1796:407–408),[406] as flat bread, or *tortillas* (Herlein 1718:143), or even as *tamales* (Hartsinck 1770:25) as is beautifully illustrated by Guillaume Coppier in his *Histoire et voyage des Indes occidentales* among the *Callinago* or Island Caribs (Fig. 12.4):

> *Ils ont encor[e] du Maïs, ou Miio, que nous appellons icy bled de Turquie, qu'ils pilent bien fort dans des roches, ou pierres creuses, espece de mortiers; lequel pilé, ils le roulent en forme de saucisses, & l'enveloppent dans des feüilles de Balliris, qu'ils font en apres cuire dan de l'eau boüillante, ce par apres servant de pain, qui (Dieu graces) substante tres-bien.* (Coppier 1645:79)[407]

A historic approach

As mentioned, the goal of the early voyages to Guiana was to trade with the Amerindians for local products. This merchandise would be resold in the Caribbean, the North American colonies, and in the homeland. Notably during the first half of the 17th century, before the implantation of large European colonies along the Guiana coast, these ships also required a sufficient amount of victuals in order to continue their privateering activities in the Caribbean. Therefore, they demanded from the Amerindian population large quantities of salted fish, fruit, smoked or salted meat (mostly sea cow) and many piles of cassava: all products

405 Pedro Martyr d'Anghera (1912 i:64) mentions on the population of Hispaniola: 'Another root which they eat they call *yucca*; and of this they make bread. They eat the ages either roasted or boiled, or made into bread. They cut the yucca, which is very juicy, into pieces, mashing and kneading it and then baking it in the form of cakes. It is a singular thing that they consider the juice of the yucca to be more poisonous than that of the aconite, and upon drinking it, death immediately follows. On the other hand, bread made from this paste is very appetising and wholesome: all the Spaniards have tried it. The islanders also easily make bread with a kind of millet, similar to that which exists plenteously amongst the Milanese and Andalusians. This millet is a little more than a palm in length, ending in a point, and is about the thickness of the upper part of a man's arm. The grains are about the form and size of peas. While they are growing, they are white, but become black when ripe. When ground they are whiter than snow. This kind of grain is called *maiz*.' Interestingly, Jospeh d'Acosta (1590:236) already stated by the end of the 16th century that the Amerindian population of the Greater Antilles had abandoned the consumption of maize: 'De las Islas de Barlovento que son Cuba, la Española, Iamayca, San Iuan no se que se usasse antiguame[nt]e el Mayz, oy dia usan mas la Yuca, y Caçavi, de que luego dire.'

406 Interestingly, the maize beverages are also called *avati* in Tupian (de Léry in Lestringuant 2008:247).

407 See also Father Breton on manioc wrapped in leaves (1665:429). The Dutch historian Jan Jacob Hartsinck (1770:25) discusses maize corn wrapped in palm leaves: 'De *Chica*, is een soort van Bier, gemaakt uit verscheide Graanen of Fruiten, maar gemeenlyk van Maïz of Turksche Tarw: na dat zy dit Graan hebben fyn gestooten, maaken hunne Vrouwen er Brood af, het welke zy in Palmite bladen bewinden, en dan in een Pot met Water laaten kooken.'

that would last during the next voyage.[408] Maize-derived products (e.g. the above-mentioned *tamales* and possibly *tortillas*) did not fall into this category. However, cassava certainly did as the Europeans purchased or traded large stocks of it.

Thus, cassava was praised as long lasting bread. Maize was, however, reputed for its impressive crops as it could be harvested up to two or three times a year while a single ear of maize produced more than 1000 seeds (Harcourt 1906:379; Lefebvre de la Barre 1666:33–34) and thus an interesting commodity for European settlements. Nonetheless, the consumption and production of cassava eventually caught on, mainly among the English, Dutch and French visitors, as illustrated by the French colonists who settled Cayenne in 1652:

> *… il n'y a dans cette Isle aucune beste venimeuse, plusieurs bonnes racines s'y rencontrent, comme patattes, et manioque duquel l'on fait du pain que l'on appelle cassave en cette forte; L'on grege cette racine sans estre sechée, puis l'on met ce qui est gregé dans vn petit sac de grosse toille, que l'on presse, afin d'en faire sortir le ius, qui est du poison, et en suitte on met le marc par poignée sur vne platine de fer, de la grandeur de nos platines de cuivre à empeser sur du feu, et le pain se fait incontinent sans autre façon, ce pain semble d'abord choquer l'esprit de ceux qui n'en ont point mangé, mais ie puis assurer que ie l'aimerois mieux que le pain chalant de Paris. Il faut neuf mois entiers pour estre en maturité, et dans les Isles il faut vn an et quinze mois, mais pour toutes sortes de legumes, toutes racines, et tous autres fruits ils viennent en maturité trois fois l'année, et le bled de Turquie, autrement du mil, meurit en deux mois.* (Laon Sieur d'Aigremont 1654:109–110)

The above extract is highly interesting because it refers to the application of an iron plate to bake their flat bread, demonstrating the adaptation and integration of European artefacts in the alimentary processes among the Amerindians as early as in *c.*1640 (Hulsman 2009).[409]

The introduction of iron tools

The metal manioc grater as we know it today is a wooden plank attached to a large metal leaf in which hundreds of holes have been made by means of a sharp object (e.g. nail). The Dutch introduced this kind of graters during the 17th century (Hulsman 2009:185, 2011:188). The Dutch historian Hartsinck (1770:23)

408 According to Father Ahlbrinck (1931:509), the ancient Kali'na extracted salt from the bark of the *wasei* (C.) or palmito tree (Euterpe sp.): 'In den ouden tijd leverde deze palm het zont. Stukken prasara [Sr. palmito], ter grootte van een mensch, werden op elkaar gestapeld en in brand gestoken. De asch deed men in mandjes. Men liet water door de mandjes loopen. Beneden ving men het water weer op. Dit opgevangen water liet men een tijd staan. 't Kreeg een bezinksel, het zout namelijk.'

409 In the Lesser Antilles, the Callinago also used an iron plate to bake their cassava: 'Pour les accomoder et réduire en pain qu nous appelons cassava, on les nettoie et gratte comme on fait les raves, puis on les râpe comme une muscade ou pain de sucre dessu une pièce de fer blanc percée de même que nos râpes, et cette râpure qui est blanche est mise dans un sac [tipiti], qu'on prese pour en faire sortir la liqueur semblable à du lait, qui est mortelle à qui en boirait. Pluis étant ainsi épurée de jus mortifière , on trouve la râpure subtile et déliée comme de la farine, qu'on met sur une platine de fer et non de cuivre avec du feu dessous pour la cuire, et en fait-on une galette de l'épaisseur de demi-doigt, laquelle étant à demi-cuire d'un côté, on la retourne de l'autre et puis on la met au soleil pour l'achever de cuire. Ce pain est de telle substance que bien facilement nos Français s'y accoutument' (Anonymous de Saint-Christophe [c.1640] 2013:124). Adriaan van Berkel also observed an iron baking plate among the Arawak living in the vicinity of the Dutch Berbice colony in *c.*1670 (van Berkel 1695:70). Remarkably, the Anonymous de Carpentras (2013:55) still observed ceramic griddles or toucqué.

Figure 12.5. A metal grater purchased by the present author in 2012 at Oiapoque, Brazil.

decribed them as follows: 'The graters used for that purpose are made of copper, fifteen to eighteen inches long, and ten to twelve inches wide, nailed to a plank of three and a half feet long and one feet wide in the middle'[410] (Fig. 11.5). In fact, *c.*120 years earlier, Father Antoine Biet observed the same metal graters among the Galibi of Cayenne:

> *Le pain se fait en cette sorte : l'on ratisse cette racine comme un fait un navet, on la rape avec une rapoire de fer ou de cuivre, que l'on appelle une greige dans le pais, après estre rappée on la met dans des sacs, que l'on met dans une presse pour en tirer le suc, on passe cette farine, l'on en prend dans un plat que l'on étend sur une platine de fer épaisse d'un doigt, que l'on met sur un petit feu, laquelle estante cuite d'un costé, on la tourne de l'autre, cela est incontinent cuit, une personne en peut faire cuire pour le moins soixante en un jour.* (Biet 1664:336)

The incorporation by the Amerindians of iron tools (e.g. axes, chisels, baking plates, knifes, needles, graters) related to horticulture and food production was rather swift. It is presumed that towards the second half of the 17th century all tools were replaced by means of iron equivalents, as the majority of the historic documents for the littoral population suggest. These new tools are believed to have altered the way of food production in a similar way with regard to the introduction of the iron axe. It may have even increased the production of cassava which the Europeans calling at the Guiana coast, ordering them in large quantities. They preferred cassava as the cakes resembled their oat cakes and were rather tasty when fresh. However, more importantly, they could be stored for a long time during their travels, thus locally creating a large demand of this manioc product. On the other hand, the Amerindians demanded iron novelties and commodities which were supplied by the Europeans who were again eager to do so to assure a large cassava production, thus somehow assuring the profit of their voyage.

In order to exploit these demands, the Europeans, and notably the Dutch, also manufactured iron replicas of Amerindian tools (e.g. axes, baking plates or griddles, chisels, hoes, graters) as the Dutch historian Lodewijk Hulsman explains (2009, 2011).[411] For example, if we take into account Leigh's observations (cf.

410 Cf. Appendix 5g. Concerning the Lesser Antilles, see also Jean-Baptiste du Tertre (1654:182) or Hyacinthe de Caen (2014:167).

411 An exemplary shipping list or 'cargasoen' for the Essequibo colony can be found in the proceedings of the WIC Zeeland Chamber dated 30 June 1642, revealing the presence of '50 lb thin, yellow [coloured] copper plates' (British Guiana Boundary Commission 1898:129–130).

Appendix 5b) that manioc tubers were pounded or grated on a stone by women 'in an earthen panne against certaine grates of stone' we acknowledge that these Amerindians did not use a wooden grater board as we know it today. It is presumed here that the Europeans (and notably the Dutch) exported and even designed the metal graters in order to fit the processing of manioc tubers. In this manner, the Dutch created an economic dependence in order to control the local market.

This hypothesis may also imply that they restricted in this manner the production of other crop foods, such as maize-derived products which were eventually becoming less popular among the coastal population. From this point of view, it can be opined that modern grater boards with iron nails are replicas or a local adaptation of the plate metal graters the Dutch exported during the 17th and 18th century. If this is the case, it can subsequently be suggested that wooden boards with stone-chip implements are down-the-line copies of metal graters, emphasizing an innovative development of grating instead of pounding (manioc) tubers during the Early Historic Age.

However, this conclusion does not necessarily imply that proto-historic Amerindians or pre-Columbians did not grate their food stuffs at all. They may also have inserted small flakes into grating sticks and/or ceramic platters as well as other grating devices. Grating and pounding did most certainly coexist and both activities have been applied in order to produce food. It is stressed here that the way of mashing tubers by means of pounding and/or grating may have changed in early historic times with the introduction of metal graters. Various 16th century descriptions of graters are available as to the Tupinamba of southeastern Brazil as presented by Jean de Léry (1587:132). They ressemble the much smaller European nutmeg grater to make their *farinha*: 'First, after having dried them [tubers] on a boucan fire, as I will describe elsewhere, or sometimes taking them wholly green, by grating them on small pointy stones, arranged and stuck on a piece of flat wood (just as we grate cheese and nutmeg), they reduce them in flower which is as white as snow.'[412] Concerning the Guianas, Hartsinck (1770:24) pointed out that before the colonization the Amerindians grated their cassava on pieces of wood called *samarie* inserted with small sharp stones (Appendix 5g).[413] Another example is taken from the *Callinago* of the Lesser Antilles in *c.*1620 which is made of gunflint flakes, also a European introduction:

> *Elles ratissent fort la racine avec un couteau ou coquille, qui est fort propre à cela à celle fin de la dépouiller de sa pelure, qui est quasi semblable et s'enlève comme celle d'un cerisier. Après ils la lavent fort et raclent sur un ais qu'ils nomment chimali, qui est environ quatre pieds de long et deux de large, au milieu duquel il y a environ un pied et demi de petits cailloux à fusil si bien enchâssés qu'il est difficile de les retirer, et là-dessus elles ratissent leur racine en cette posture. Elles dressent leur dit chimali et mettent le bout d'en bas dans un petit baquet, pour recueillir ce qui tombe de ratissé, et appuient l'estomac sur l'autre bout d'en haut*

412 'Premierement apres les avoir seicher au feu sur le boucan, tel que je le descriray ailleurs, ou bien quelques fois les prenans toutes vertes, à force de les raper sur certaines petites pierres pointues, fischees & arrengees sur une piece de bois plate (toute ainsi que nous raclons & ratissons les fromages & noix muscades) elle les reduisent en farine, laquelle est aussi blanche que neige.'

413 See also Quandt (1807:189) and Kappler (1854ii:41) who both noted that grater boards, or *simari*, were traded with the Macusi. At present, a grater is called *shumarli* in Makusi (Siravo 2009:16). Ahlbrinck (1931:423) suggests that *samariapo* is cedar wood (*Cedrela odorata*) in Kali'na.

en s'abaissant un peu, ratissant après avec les mains, et ce qui tombe dans le susdit baquet est comme de la pâte fort blanche à cause du suc qui est dans ladite racine qui est blanc comme lait. (Anonymous de Carpentras 2013:54)

Strikingly, the introduction of graters boards by the Europeans in Africa shows a similar pattern. Once the Portuguese had discovered and settled in Brazil, they shipped maize and manioc to their trading places in Africa where the local populations started to produce and consume these new products too (Jones 1959; Gaulme 2003). At first, the Africans just peeled and boiled the manioc tubers or dried them in the sun, as they probably had learnt from the Portuguese who had copied it from the Tupinamba, as the German Samuel Brun witnessed along the Slave Coast of western Africa in *c.*1620: 'Among them grow the tubers as big as the thickest part of the male leg, which they Casavy, pound them and dry them in the sun, becoming as white as the best flower' (Brun [1624] 1913:6).[414] After *c.*1650, however, metal graters had been introduced and the local population started to prepare pulp instead of boiled down tubers (ibid., pp. 62–63). On the island of San Thomé, for example, it is said that *mandihoka* (Br.) flower is obtained just as in Brazil (Dapper 1668b:77) whereas in the southern parts of Ethiopia a metal grater is used (Dapper 1668a:601–602). In sum, these African examples confirm a preparation of manioc tubers without graters, which also appears to be a European introduction, as in the Guianas.

The Amerindian oral tradition

The introduction of metal tools is remembered by the (coastal) Amerindian population of the Guianas. For example, the Palikur oral tradition tells us that the *Sauyune* or "People of the Otter," now an extinct tribe incorporated in the modern englobing Palikur nation (Passes 2004), introduced the metal grater to the Palikur (F. Grenand and P. Grenand 1987:34, 40). From this indigenous perspective, it is somehow striking to Europeans that Amerindians –thus not Europeans– introduced iron tools to (other) Amerindians. This can be explained by the way of reading and interpreting early documents dealing with the Oyapock River and the acceptance of a powerful Palikur oral tradition which goes back at least 400 years.

When doing so, it is thought that the *Sauyune* represent the historic Yao population who, at the start of the 17th century, had settled at the mouth of the Oyapock River (P. Grenand 2006:111). However, these Yao were refugees who had fled from the Island of Trinidad where they had been maltreated by the Spanish and their allies, the *Arawaccas* (Keymis 1890; Mocquet 1617; Leigh 1906). Under command of their (war) leader *Anacaioury*, the Yao left Trinidad to get hold of the Lower Oyapock River and position themselves as the middlemen for the Europeans and the surrounding autochthonous groups. According to Harcourt (1906:368), the latter were tributary to *Anacaioury* and shared a large network extending to the east and south. It is suggested here that, in addition to intrusion and warfare, *Anacaioury* occupied an important position. The reason for this is that he controlled the trade with the English and Dutch and thus, as a middleman, introduced iron tools to the Amerindians in the Oyapock region (see previous section).

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414 'Bey ihnen wachsen Wurtzeln so grosz, alsz eines Mannsbein am dicksten, welche wurtzen sie Casavy nennen, stampffen dieselbig, und dörren sie an der Sonnen, werden so weisz als das beste Mal.'

Paulo Noriño, a former spiritual leader of the Palikur, once told the present author that the ancient Palikur utilised ceramic graters (*tymah* or teeth) in order to produce manioc pulp (van den Bel 1995:80).[415] Nimuendajú confirmed this information (1926:47). He found fragments of discarded ceramic manioc graters at various abandoned Palikur sites: 'Another product of Palikur Pottery [are] the flat, grooved platters, in which one grated the Mandioca, which is found today only in fragments at the former dwelling places and cemeteries of these tribes and has been replaced by the rectangular grating board in which irons nails have been inserted.'[416] The Brazilian archaeologist Peter Paul Hilbert (1957:10–14, 18–24) found similar objects during excavations at a cave site near Vila Velha, situated on the left bank of the Cassiporé River in the present-day State of Amapá. He opined (ibid., p. 15, Fig. 5; ibid., p. 33) that these objects were 'alguidaros rasos em forma de ralo' and attributed them to the (Late) Aristé ceramic complex (cf. Section 12.2.2). Remarkably, similar objects called *ralladores* (Sp.) are also known from the Mojos region in Bolivia (Nordenskiöld 1913; Walker 2011:124). Further starch analysis is required in order to confirm both the ethnographic and archaeological graters. This may possibly illustrate that other types of graters were utilised among the coastal Guiana population.

A regional adaptation

It is evident that manioc did not replace maize as we do not have sufficient archaeological data to support such a hypothesis, but it certainly lost ground and possibly (cultural) importance during the course of the Historic Age. Despite this development, maize beverages were consumed among the Kali'na of Suriname at the start of the 20th century:

> *Awasi ai-curu = Beverage made of corn. When the corn has dried out well in the sun, the boys and girls are gathered to pound down the maize kernels in 8 wooden mortars. The pounded corn is thrown then in a boat (…). A calabash of "chewn" maize is also added as kamira (see this word) [fermentation]. The boat is filled up with water and subsequently covered [with leaves]. After one night standing, the beverage is drained. The samaku in which one captures the beverage during sifting is again covered. After another night of fermentation, the beverage is ready.* (Ahlbrink 1931:125)[417]

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415 Note the same linguistic root in the Palikur *tymah* and the Cariban *chimali* is mentioned in the Anonymous de Carpentras (2013:54) as cited above. A similar word is recorded by Breton (1665:156). The latter also gives a description of a wooden grater inserted with small stones: 'Grager veut autant dire, que moudre par deça : les moulins des sauvages sont des planches garnies de petites pierres pointuës, qui y sont enchassées, (parmy nous sont des rapes posees sur une planche, ou appliquées autour d'une rouë) apres le souper toutes femmes ratissent leur racines de magnoc, qui sont seullement necessaires pour le iour suivant (…) qu'elles lavent, gragent & reduisent en farine sur la rape…' (Breton 1665:139).

416 'Ein andres Produkt der Palikur-Töpferei, [sind] die flache, geriffelte Schüssel, in der man die Mandioca rieb, findet heute nur noch in Bruchstücken auf den alten Wohnplätzen und Friedhöfen dieses Stammes und ist durch ein rechteckiges Reibbrett mit eingesetzten eisernen Topfsplittern ersetzt worden.' Cf. Appendix 5k.

417 *'Awasi ai-curu* = Drank uit mais getrokken. Wanneer de mais goed uitgedroogd is in de zon, roept men de jongens en meisjes bijeen om in een 8-tal houten vijzels de maiskorrels fijn te stampen. De fijngestampte mais werpt men vervolgens in de boot (…). Een kalabas "gekauwde" mais gaat er eveneens in als *kamira* (zie dit woord) [fermentation]. De boot wordt van water voorzien, vervolgens zorgvuldig toegedekt. Na een nacht gestaan te hebben wordt de drank gezeefd. De samaku, waarin men bij het zeven den drank opvangt, wordt wederom toegedekt. Na nog een nacht te hebben gestaan is de drank klaar.' See also Farabee (1924:20).

The (slow) abandonment of maize in favour of manioc reflects the changes or adaptation to another socio-political situation in which identity and ethnogenesis plays an important role (Wilk 1999; Garth 2013). The apparent recent introduction of *couac* (Fr.) or *farinha* (Br.) in French Guiana is therefore believed emblematic.[418] The Amerindians and Portuguese from the Lower Amazon River introduced *couac* to French Guiana towards the end of the 17th century (Barrère 1743:55).[419] Indeed, this manioc product reinforced the production and demand of manioc derived products, but it also diminished the daily importance of cassava, which now became restricted to beer fermentation and, in a lesser extent, the pepper pot (C., *kasilipo*). On the other hand, *couac* rapidly obtained an important role (identity) in the daily dishes of the Creole, Maroon and Amerindian population.

The Colonial Encounter in the eastern Guianas no doubt provoked changes as to the Amerindian modes of agriculture and tending (Balée 2006; Denevan 2001, 2006). This can not only be related to the economic demand of Europeans for specific types of alimentation but also to the subsequent introduction of iron tools. The (coastal) Amerindians adapted their local production to the European demand of certain consumable goods, notably those made of manioc (cassava) and, to a much lesser extent, consumables consisting of maize.

In addition to these technological advantages of iron tools, the cultivation of maize is (slowly) abandoned due to the reorganisation of the early historic Amerindian socio-political situation from the second half of the 16th century on. The Spanish and their *Aruac* allies demanded victuals and slaves. The same applies later to the North Europeans and their Yao allies when they contested the existing Amerindian alliances together. Now many tribes fled from the "dangerous" colonial regions to settle elsewhere along the coast or to travel up the rivers and take refuge. Continuous warfare, slave raids, but also religious missions (S., *reducciones*) from the second half of the 17th century on, caused numerous groups to abandon their sedentary life style associated with maize agriculture and to adopt a nomadic or a far less sedentary life for which the cultivation of manioc is much more appropriate. A successful maize crop highly depends on human care (e.g. tending, irrigation, protection against animals and insects) whereas manioc needs far less to no attention at all. Aided by means of iron axes when creating small gardens, the Amerindians developed a more nomadic life style, retreating from further European contact into the deep forest, but now facing confrontations with the Amerindian population of the interior.

In addition to adapting to a more nomadic life style, a subsequent issue must be taken into consideration when discussing the consumption of maize in relation to feasting. Consuming maize is often related to (specific) ceremonial activities which may have been abandoned during later historic times as is illustrated for example by the Xavante of Brazil: 'An interesting aspect of Xavante use of maize is that this, perhaps the most completely domesticated of all crops, was the primary food during periods of aggregation when its symbolic role was to reinforce the solidarity of the community through ceremonial redistribution. In contrast, tubers which are found in wild, domesticated, and semi-domesticated forms, were their staple during periods of nomadism' (Flowers 1994:254).

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418 *Couac* or *farinha* is a manioc based product, historically a common staple food among the Tupi population of eastern Coastal Brazil (de Léry in Lestringuant 2008:238).

419 It has to be added here that the Kali'na continued to produce cassava and only recently "switched" to couac (Gérard Collomb, personal communication, 2014).

The missionaries oppressed ceremonial life and feasting by means of deculturation. The indigenous traditions diminished towards the end of 18th century due to a population decline as a result of diseases, the interdiction of shamanism and the appointment of village captains by the missionaries in Venezuela, Brazil, and the Guianas (Whitehead 1988, 1993; Collomb and Tiouka 2000; Collomb 2011; Santos-Granero 2011).[420] Notably cassava beer drinking combined with ceremonies represent the social agent of Amerindian society (Dietler and Hayden 2001; Erickson 2006) or 'le ciment de la vie collective' according to the French anthropologist Pierre Grenand (1980:61). However, more generally, it can be said that changes in the socio-political systems, hierarchy, trading networks, when caused by the above-mentioned factors, reduced the large scale (inter-regional) feasts and food consumption to a smaller village or even to family level. These changes asked for fresh identities, thus creating a firm base for ethnogenesis in the Guianas as we know it today (Whitehead 1996; Dietler 1996; Hastorf 2006; Collomb and Dupuy 2009).

In sum, this historic approach regarding the link between archaeological and present-day ethnographic data shows that maize as a staple product has slowly been loosing terrain due to various factors, such as the European demand for cassava, the convenience of iron graters, the general dependence on iron tools, a decreasing demography, the adaption to a more nomadic life style of smaller groups becoming more mobile to which, eventually, the production of manioc is better adapted than that of maize.

12.5.3 Final remarks

This analysis of the early records demonstrates that archaeological research must be aware of rapid adaptation, socio-political fluidity and multiethnicity all present in one specific region, but also of the extensive trade networks maintained by various populations. It is not the possession of, but the access to certain goods that represents the greatest prestige (power) for Amerindian captains. During the 16th century, the Spanish colonies in the Caribbean depended largely on Amerindian labour and provisions, therefore creating allies and enemies in order to serve this purpose. The Guianas were exploited by their alliances with the *Aruacas*. In turn, the latter installed a new socio-political balance in the region which was not only again subjected to further alliance, but also to resistance. It is presumed that the mechanisms of adaptation (e.g. warfare, encroachment, alliance) to this type of change were entirely based on an Amerindian (pre-Columbian) framework.

420 Despite many Jesuit missions, the Amerindians still continued to live without Christianity, according to the manuscript of La Croix in the late 18th century, expressing a slightly romantic image of this pitiful population: 'A l'égard de la religion, ils n'en ont aucune, leur âme est enveloppée du voile de l'idolâtrie la plus bornée. Les tentatives qui ont été faites sur ces peuples sauvages par un nombre infini de Jésuites missionnaires, pour tâcher de leur insinuer des sentiments chrétiens ont été vaines et infructueuses jusqu'à présent. Les Indiens les plus susceptibles de comprendre ce qu'on leur objectait à propos du christianisme ne purent jamais se décider à adopter des maximes qui exigeaient d'eux le sacrifice de leurs passions et souvent même de leurs besoins, le pardon des injures, l'amour pour leurs ennemis, et qui leur étaient proposées par des hommes avides de leurs biens, plus occupés à les asservir, à les immoler à leur avarice, qu'à les éclairer et les convertir. D'ailleurs leur attachement pour un genre de vie facile, qui répond à leur indolence, leurs goûts et surtout leur peu d'intelligence et de pénétration, offrent encore des obstacles aussi considérables pour les convaincre des vérités de notre religion. Comme ils ne réfléchissent point et que leur indolence les rend peu susceptibles d'admiration, leur cœur et leur esprit indifférents et tranquilles jouissent des merveilles qu'offre le spectacle de la nature sans émotion, sans y donner même aucune attention' (Marcel 1904:142–143).

However, it is only after the permanent presence of Europeans (colonies) in combination with the production of sugar (occupation of land) in *c*.AD 1650 that these mechanisms started to fade to be gradually replaced by means of a diminished, dispersed, and dependent population in the coastal area as well as more remote and nomadic population of the interior, as Kloos pointed out (1971:262).

Let us look into these stages of evolution in Amerindian society during colonial times, as Kloos suggested, namely: (a) villages as part of political alliances, (b) isolated villages and (c) villages as part of a national state, as a guideline for the site of Eva 2. Can these stages be identified for the material culture of the latter site? The analysis proposed in Section 11.8 illustrates that the ceramic assemblage of Eva 2 (to be ascribed to the 17th and 18th century) includes changes, notably the diminishing of decoration modes (e.g. incision, polychrome painting). In addition the ceramic repertoire is not only simplified and partially replaced by means of European equivalents, but also imitates European vessel shapes. Eventually, an entirely innovative repertoire of tourist ware is added to the latter, responding to the growing tourist market of the 19th century. Next to these stages of socio-political development, it appears that material culture is homogenized in the Guianas, as pointed out with regard to the ceramic production (Collomb 2003; Coutet and Losier 2014). Notably the omnipresence of *kwepi* as a temper among the Guiana Amerindians during colonial times confirms this process, as Kay Scaramelli remarked regarding the Orinoco River (Scaramelli 2006:268): 'Caraipe temper replaced cauixí, sherd and sand temper throughout the region, and pottery seems to have lost its role as a distinctive marker of ethnicity in the Republican period.'

Thus, after an era of warfare, diseases and dispersion a kind of deculturation was created along the Guiana littoral (Santos-Granero 2011). The subsequent ethnogenesis among the Palikur and Kali'na in French Guiana is reflected by means of a new social order. It is expressed, notably among the Palikur, in explicit decoration modes, referring to the various (new) clans (P. Hilbert 1957:34; van den Bel 1995, 2009b; Passes 2004). The Kali'na, on the other hand, favoured a more abundant mode of decoration, based on natural elements (Wack 1988; Hagen 1991; Cornette 1992; Vredenbregt 2002).

Fortunately, we can observe that the ceramic production of the Kali'na as well as of the Palikur, while acknowledging the loss of this tradition among the Arawak (Abbenhuis 1940:64), is still present and alive today. These pragmatic populations found a way to adapt to colonisation by means of incorporating innovative elements, such as vessel shapes, developing a parallel market with the colonisers. The more recent revival of the tourist production has developed a style of its own. In my view, it is quite easy to distinguish the current products of Palikur, Kali'na and Wayana potters. However, the domestic use of ceramics has clearly lost ground. At present it has been completely replaced by means of iron equivalents, with the exception of festivities, i.e. cashiri jars and small drinking bowls often painted red. They represent objects which have travelled through time.

12.6 Research questions answered

The present study is an ambitious work and aims to provide an update of the state of affairs in the archaeology of French Guiana as well as to fill the hiatus of the earlier periods, notably the Late Archaic and Early Ceramic Age what is showcased in Table 12.1. The results of this multidisciplinary archaeological research presented in the previous chapters (cf. Chapters 4-9 and 11) certainly provided input concerning the development of settlement patterns, subsistence economies, funerary practices and sociopolitical organization along the French Guiana littoral from the Late Archaic to modern times between Cayenne Island and the Maroni River. A synthesis of the pre-Columbian population that once inhabited this coastal region and reflections on pre-Columbian aspects of Amerindian society as well as historic and modern Amerindian communities has been provided in the previous sections of Chapter 12. This final section attempts to answer the research questions raised in Chapter 1. As you can see, the answers to these questions are sometimes both yes and no.

(1a) Which kind of (material) cultural change does the analysis of the ceramic and lithic assemblages as well as of excavated settlement patterns reveal?

The answer to this question is threefold:

i. A general development in ceramic manufacturing can be suggested from the Early Ceramic Age (Phase A) to the present. The earliest pottery in French Guiana was found at Eva 2 and CSL (cf. Chapters 4-5). It is represented by means of small and large spheric bowls with a heavy pounded quartz temper. Any decoration was not recorded. However, the paste and the use of small pointed bases are similar to those of other early ceramic wares, such as Kauri Kreek. After a time gap, we observe high-quality ware in the Maroni Basin towards the end of the first millennium BC at CSL (Early Ceramic Age Phase B). This hard, thin sand-tempered ware highlights hyperboloid bowls and bell shaped vessels. If decorated, the smaller vessels have red and white-on-red painting whereas the larger ones include cross-hatching and *piquétage*. Another ECA ware was found at CPP (cf. Chapter 9). It is also hard and sand-tempered, featuring open bowls with notches and composite restricted examples with (vertical) incisions. Further research on the latter series is needed. The pottery of the LCA series is predominantly tempered with pounded potsherds. It can be subdivided according to regions and burial modes, revealing the following possible culture areas: (a) the Oyapock Basin, (b) on Cayenne Island, (c) Iracoubo and (d) Mana/Maroni. The latter two areas share a similar pottery tradition, often referred to as the Barbakoeba complex (cf. Chapters 5-9). The historic assemblage of Eva 2 suggests that: (a) the LCA tradition to the west of Kourou is affiliated to the dominant Koriabo complex and (b) the latter has developed specific traits that suggest an adaptation of the population to the events of the colonial encounter. Amerindian potters have started to produce imitations of European ware, but have also replaced their ceramic domestic ware with European equivalents. Eventually, their pottery production is aimed at a tourist market. They merely produce ceramic drinking bowls and *cashiri* vessels for specific ceremonies (cf. Chapter 11).

ii. Another development can be suggested with regard to the lithic technology from the Late Archaic to the present, too. The CSL site presumably presents us with the best example to demonstrate this (cf. Chapter 5). This site included three reduction modes associated to specific quartz varieties and related to three occupations. The earliest flakes, perhaps even blades, were found at CSL (Method 2). They can be ascribed to the (Early) Archaic way of life, whereas the bifacial reduction of small milky quartz pebbles (Mode 1) is associated to the Late Archaic and ECA (Phase A) occupation of this site (Eva 2 and PDM). Modes 2 and 3 are predominantly associated with the saccharin quartz varieties and reflect a much more opportunistic debitage, attributed to the ECA-B and LCA (Method 1).

iii. Concerning the settlement patterns, a general pattern of persistency prevails with regard to the Late Archaic, ECA and LCA (cf. Chapters 4-9). The studied sites, but also ring-ditch sites, provide radiocarbon sequences suggesting lengthy occupations ranging between *c.*200 and 500 years. However, the intensity of human occupation is now and again difficult to catch, but notably Phase 2b-c of CSL reveals material homogeneity for at least 400 years spreading across the site, whereas the Phase 1b occupation is probably much shorter and less important. Another type of occupation is attested for by means of the distribution of earth ovens at Eva 2. It is suggested that the earth ovens found here were used by the Amerindians who frequented this place in order to prepare whatever they had gathered or caught in the vicinity. The coastal sites, notably those situated on the sandy ridges (Holocene or Pleistocene), were occupied for a lengthy period too. However, it is suggested that these sites represent shifting villages were relocated on the ridges through time, eventually resulting in very large, stretched sites.

(1b) Can we recognize persistent elements such as pottery wares and styles, the use of specific lithic tools or the presence of certain features throughout various periods?

No, but we can recognize remarkable or characteristic elements referring to a certain period or even place, for instance: (a) the earth ovens of the (Late) Archaic Age (cf. Chapter 4), (b) the bifacial reduction mode of milky quartz pebbles (cf. Chapter 5), (c) the hyperboloid bowls (cf. Chapter 5), (d) the elongated burial pits on Cayenne Island (cf. Chapter 9) and (e) the red slipped drinking bowls (cf. Chapters 7, 9 and 11).

(2a) Is it possible to identify a pre-Columbian ceramic complex culturally related to a present-day Amerindian community?

No, there is no direct relationship as the process of ethnogenesis has reshaped the present ethnic groups (cf. Chapters 10-11). However, their historic ancestors (e.g. the Galibi) are most likely to be associated with the ceramics and site of Eva 2 (cf. Chapter 11).

(2b) Can we follow any ceramic development through post-Columbian times to the present?

Yes, vessel shapes, decoration modes and temper represent relevant traits (cf. Chapters 4-9 and 11). These elements change or adapt during the Colonial Encounter and represent important markers for this period, for instance: (a) *kwepi* temper, (b) necked or shouldered pots (e.g. Koriabo toric pots) and (c) red slipped and/or notched bowls (cf. Fig. 12.2e).

(3a) Can we determine cultural affiliations with other areas by means of material culture alone and did these affiliations change through time?

Yes, certain elements such as (a) ceramic stools and/or tablets (anthropomorphic and spheric), (b) urns, (c) toric pots and (d) greenstone objects (e.g. *muiraquitãs*, greenstone polished tools) are shared by the LCA population of the Guianas, the Lower Amazon River and the Lesser Antiles. The Colonial Event provoked changes concerning the use of these objects among the Amerindian population, notably due to deculturation (e.g. population decline and amalgamation) and change in the socio-political balance of the Amerindian society (e.g. leadership, ceremonies).

(3b) To which extent does this imply a change in social networks within the wider region during colonial times?

Although current Amerindian groups maintain (long-distance) networks, the ratios are somewhat smaller and less intensive during colonial times due to a decrease in population and the deflation of Amerindian leadership. However, new trading partners and innovative objects have been added to these networks (e.g. iron tools, beads) whereas others have disappeared, emphasizing the fluidity of these networks (Chapters 11-12).

(3c) If so, to which degree can we speak of cultural continuity or discontinuity?

There is continuity as the foundations of these networks (e.g. the social relationships, importance of prestige) have not changed. Only the objects and individuals have changed. Moreover, the presence of red painted drinking bowls among the present-day Kali'na (C. *sapera*), utilised for consumption of *cahsiri* during numerous ceremonies, show clear affinities with the pre-Columbian ones (Chapters 7-9), insisting on the preservation of these objects and reflecting persistence, or continuity, of specific socio-cultural practices of Amerindian society. Perhaps in another form after the process of ethnogenesis but still incarnating larger Amerindian concepts (e.g. cosmovision, social organization, afterlife).

12.7 Conclusions

Stratigraphic archaeological research in French Guiana is barely 50 years old and has been conducted primarily in the coastal zone, stretching approximately between 5 and 50 kilometres from the Atlantic coast to the Precambrian Shield. This bias, mainly caused by means of modern infrastructure, has sketched an archaeological record concerning pre-Columbian French Guiana focussing on the Late Ceramic Age (AD 900-1500) of Cayenne Island as well as the western Holocene coastal plains. The present study contains the results of six archaeological investigations, conducted from a compliance archaeological perspective, in order to enhance our knowledge of the afore-mentioned coastal area. It not only presents us with fresh archaeological data on the (Late) Archaic and Early Ceramic Age, a hiatus that is now partially fill up, but also sheds new light on the Late Ceramic Age of this specific region concerning funerary rites, ceramic series and subsistence.

After dealing with research-related issues and a providing a brief introduction to the history of archaeology and geology of French Guiana and Suriname, the investigated sites are discussed in a chronological order. Firstly the preceramic and the early ceramic occupation of Eva 2 are presented and analysed proving firsly the usage of Late Archaic polished tools, quartz *débitage* and earthovens of a site located on the border of the Pleistocene savannahs of Malmanoury between the Kourou and Sinnamary Rivers. Secondly, it reveals the processing of sweet potatoes and maize in as early as 2500 BC, which falls in with the Archaic Littoral Tradition of northern South America. Thirdly, the presence of incipient ceramics in *c.*2200 BC indicates a change in food processing, i.e., from steaming in earth ovens to boiling in ceramic recipients. This ensemble is defined as the Early Ceramic Age (Phase A) Balaté ceramic complex, contemporaneous with the Alaka Phase ceramics of north-western Guyana and the Mina Tradition in Pará, Brazil.

These incipient ceramics are also encountered during the first occupation phase of Chemin Saint-Louis (CSL). This multi-compound site, positioned on the Holocene terraces of the Maroni River, includes charcoal pits and possibly oval-shaped inhumation graves. The presence of maize and sweet potatoes as to these early ceramic containers is once again demonstrated. The second phase of Chemin Saint-Louis is attributed to another phase (Phase B) of the Early Ceramic Age, dated to the first half of the first millennium AD. It discloses unknown ceramic series as to the Lower Maroni Basin with characteristic hyperboloid bowls and bell-shaped vessels, dubbed the Saint-Louis ceramic complex. This occupation is also materialised by means of a thick, dark earth layer defined as the accumulation of cultural debris and colluviums during the second phase occupation of the site. Possible links with the Upper Maroni River and the Lower Amazon River are identified suggesting an extended pan-Amazonian development during Saladoid/Barrancoid times as previously thought. Another neighbouring site, called La Pointe de Balaté, shares its third phase with Chemin Saint-Louis (dated to the Late Ceramic Age) as well as its stylistic affinities with two other investigated Late Ceramic Age sites, e.g., Crique Sparouine located in the hinterland of the Maroni River and AM 41, a cemetery near Iracoubo. Although these ceramic assemblages display cultural ties with the Barbakoeba ceramic complex from eastern Suriname, they represent regional entities, revealing (a) the regional diversity of the latter complex and (b) the need for further, detailed study in order to improve the identification of this vast complex.

Oval-shaped pits with pottery depositions as well as single pottery depositions found at the investigated sites of the Maroni River have been interpreted as inhumations (primary or secondary burials) and secondary burials respectively. This stands in contrast with the cemetery of AM 41, situated on the edges of the Pleistocene sand ridges overlooking the Holocene plains. Here two concentrations of urns were excavated, disclosing various burial modes and possibly revealing an ancestor cult, indicated by means of "boxed" burials around which numerous urns were deposited. This model again differs from the results of the organised inhumation graves on Cayenne Island where rectangular pits filled with voluntarily deposited ceramic debris and vessels mark the presence of the deceased. In addition, the excavations at PK 11 and Cimetière paysager Poncel (CPP) provided fresh data allowing us to revise the existing ceramic series of Cayenne Island, or the Thémire ceramic complex. An original early phase (Early Thémire) and a redefining of the later phase, as to which Koriabo plays an important innovative role (Late Thémire), is hereby proposed. The origins of the early phase are questioned when referring to fresh data on the early ceramic occupation of Cayenne Island as evidenced by means of the presence of *Ouanary encoché* which appears to be another original complex which must be detached from (Late) Aristé.

The excavations at Eva 2 yielded the most recent occupation of the proposed cultural sequence which has been attributed to the Historic Age and features two distinct occupations: (a) a 17th and 18th century occupation reveals the suite of undecorated Koriabo pottery as well as (b) a 19th century burial site with paired inhumation graves and one urn burial, presumably of a chief. A morphological comparison with examples of the recent Kali'na pottery tradition, housed in numerous European and regional museums, enabled us to define the historic ceramic complex of Malmanoury. This intermediate manifestation of the pre-Columbian and modern ceramic traditions is distinguishable because of the impact of the colonial event. However, they do share several attributes which have stood the test of colonial times not only by means of absorbing and recreating novelties but also by reinventing a cultural identity based on shared and different concepts (ethnogenesis) of which the red painted drinking bowl, still utilized among the present-day Kali'na during ceremonies, is an excellent marker of cultural continuity and resistance in its broadest sense.

Epilogue

'Archaeology is not rocket-science; we need more large-scale dirt archaeology… Academics in ivory towers promoting evolutionist models of societies, instead of rolling up their sleeves and documenting the many varied histories in the myriad of ancient places, are unwittingly complicit in this endgame' (Pauketat 2009:128). Indeed, relevant issues require large-scale excavations at various sites for a longer period of time (notably habitation sites concerning village organization). Compliance archaeology can provide such data at site level not only by means of continuously documenting features, depositions, large amounts of ceramics and their spatial distribution but also by means of obtaining more radiocarbon dates in order to break down the archaeology of a certain region. In the past ten years or so, archaeological research has rocketed because of the increase of compliance archaeological operations in French Guiana. Mechanical surveys and excavations have revealed a great number of sites in areas of which until recently very little archaeological data were known. Large-scale excavations enable the investigation of large sized areas as well as the analysis of large amounts of artefacts. These benefits are unknown in the adjacent countries and/or previously in French Guiana. This quantity of archaeological data is in most cases (with all due respect) qualitatively and statistically more pertinent than the database on which the actual cultural framework of the Guianas has been built.

It can be said that the introduction of compliance archaeology to French Guiana has enlarged the archaeological database, notably concerning feature research and ceramic analysis:

a. The systematic collection of large quantities of archaeological material during large-scale research enables us to create a statistically reliable sample of the assemblage needed for the quantification and spatial distribution of (popular) vessel shapes and lithic modes;

b. The majority of diagnostic ceramic materials (e.g. rim, base, keels), is predominantly found in features and not in the archaeological layer (van den Bel 2012b). However, ceramic material from features tends to be biased at decoration and morphological levels, often yielding a larger variety of vessel shapes and decoration modes. Notably burial pits and/or depositions often provide more decorated material whereas waste pits yield less decorated material, possibly related to daily tasks;

c. The selection of charcoal samples from corresponding features further enhances the quality of ceramic assemblage. When extracted from features, these samples will provide a more reliable affiliation with the ceramic material found in that particular feature;

d. Compliance archaeology takes archaeological research to often seemingly uninteresting areas where prehistoric occupation is subsequently a revelation once detected (e.g. the White sand Formation for Archaic Age occupation). Notably backyard areas in the periphery of urban zones or hostile areas near swamps often yield highly interesting and unsuspected archaeologically finds and features, taking archaeology in northern Lowland South America off the trodden paths and self-fulfilling prophecies.

The Appendices

1. The listing of discussed radiocarbon dates
2. An introduction to the historical Amerindian populations in the eastern Guianas (with Table)
3. The historic references to Amerindian pottery production in the Guianas
4. The historic references to burial rites in the eastern Guianas
5. The historic references to maize in the Guianas

Appendix 1

The radiocarbon dates

Municipality	Site number	Site	Lab. No.	C14 conv. age BP	Dev.	Reference
Awala	97361.004	Tukuwali (dec1997)	PA-1945	865	40	Janin 2002
Awala	97361.040	Alatou 1	ETH-40724	805	30	Coutet 2011
Awala	97361.042	Alatou 2	ETH-41721	885	40	Coutet 2011
Awala	97361.042	Alatou 3	ETH-41722	130	35	Coutet 2011
Awala	97361.042	Alatou 3	ETH-41721	170	60	Coutet 2011
Cayenne	97302.078	Katoury	ARC-2272	755	45	Mestre et al. 2005
Cayenne	97302.078	Katoury	ETH-27818	1120	45	Mestre et al. 2005
Cayenne	97302.078	Katoury	ETH-27817	1130	50	Mestre et al. 2005
Cayenne	97302.078	Katoury	ARC-2336	690	50	Mestre et al. 2005
Cayenne	97302.001	Route Montabo	OBDY-523	170	170	Rostain 1994a
Iracoubo	97303.061	AM 41	KIA-33862	1000	35	van den Bel 2009a
Iracoubo	97303.060	Sable Blanc Est	LY-4961	825	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4960	880	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4959	900	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4960*	920	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4958	925	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4956	955	30	McKey et al. 2010
Iracoubo	97303.060	Sable Blanc Est	LY-4958	990	30	McKey et al. 2010
Kourou	97304.006	Bois Diable	BETA-254054	750	40	McKey et al. 2010
Kourou	97304.006	Bois Diable	OBDY-794	510	40	Rostain 1994a
Kourou		K-VIII	BETA-254058	1010	40	McKey et al. 2010
Kourou	97304.091	Wayabo, Site 1	POZ-30850	395	30	Briand 2011
Kourou	97304.108	Wayabo, Site 18	POZ-30853	1160	30	Briand 2011
Kourou	97304.115	Wayabo, Site 25	POZ-30854/5	830	30	Briand 2011
Kourou	97304.115	Wayabo, Site 25	POZ-33044	905	30	Briand 2011
Kourou	97304.115	Wayabo, Site 25	POZ-33045	935	30	Briand 2011
Kourou	97304.116	Wayabo, Site 26	POZ-33046	860	30	Briand 2011
Kourou	97304.099	Wayabo, Site 9	POZ-30852	2035	35	Briand 2011
Macouria	97305.044	Sainte-Agathe	OBDY-796	380	35	Rostain 1994a
Macouria	97305.044	Sainte-Agathe	UGAMS-4568	540	25	Samuelian 2009
Macouria	97305.044	Sainte-Agathe	UGAMS-4567a	980	25	Samuelian 2009
Macouria	97305.044	Sainte-Agathe	UGAMS-4567b	505	80	Samuelian 2009
Mana	97306.005	Montagne Trinité (BPS 21)	ARC-718	3680	150	Nowacki and Puaux 1992
Mana	97306.003	Angoulême	LY-4949	440	30	Gassies and Dauphin 2013
Maripasoula	97353.001	Yaou	ARC-859	1955	70	Mazière and Mazière 1993
Maripasoula	97353.001	Yaou	ARC-860	1985	50	Mazière and Mazière 1993
Maripasoula	97353.001	Yaou	KIA-36192	1680	30	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36191	1975	80	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36190	1650	30	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36189	990	30	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36188	1900	30	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36187	1780	30	Mestre et al. 2013
Maripasoula	97353.001	Yaou	KIA-36186	1695	30	Mestre et al. 2013

Municipality	Site number	Site	Lab. No.	C14 conv. age BP	Dev.	Reference
Maripasoula	97353.002	Yaou	ETH-46371	1800	30	info SA 2013
Matoury	97307.008	Mont Grand-Matoury	LY-7756	1360	50	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7782	220	40	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7783	740	40	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7784	2055	45	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7785	950	45	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7786	360	45	Grouard et al. 1997
Matoury	97307.008	Mont Grand-Matoury	LY-7757	415	45	Grouard et al. 1997
Ouanary	97314.054	Piton Remarquable	GIF-7551	780	60	Rostain 1994a
Ouanary	97314.015	Abri Marcel	OBDY-798	1470	40	Rostain 1994a
Ouanary	97314.015	Abri Marcel	OBDY-799	1430	30	Rostain 1994a
Ouanary	97314.015	Abri Marcel	OBDY-795	1400	60	Rostain 1994a
Ouanary	97314.015	Abri Marcel	OBDY-797	1310	35	Rostain 1994a
Ouanary	97314.015	Abri Marcel	OBDY-800	1170	30	Rostain 1994a
Ouanary	97314.015	Abri Marcel	UGAMS-4056	1790	30	Coutet 2009
Ouanary	97314.040	Carbet Mitan	OBDY-653	2070	45	Rostain 1994a
Ouanary	97314.040	Carbet Mitan	OBDY-650	1650	40	Rostain 1994a
Ouanary	97314.033	Trou AGAE	OBDY-732	310	110	Rostain 1994a
Ouanary	97308.010	Trou Réliquaire	GIF 7200	6660	80	Petitjean Roget 1995a
Ouanary	97308.010	Trou Réliquaire	PA-413	530	60	Rostain 1994a
Ouanary	97314.040	Carbet Mitan	UGAMS-4054	1340	25	Coutet 2009
Ouanary	97314.033	Trou AGAE	UGAMS-4055	320	25	Coutet 2009
Ouanary	97308.222	Roches Savane	ETH-49958	985	27	info SA 2013
Ouanary	97308.222	Roches Savane	ETH-49959	948	26	info SA 2013
Ouanary	97308.222	Roches Savane	ETH-49960	5540	30	info SA 2013
Régina	97301.052	Favard	LY-7839	1750	45	BSRG 1997 (2000:20)
Régina	97301.086	Mapaou	OBDY-728	240	50	Rostain 1994a
Régina	97301.088	Saut Mapaou	GIF-6956	410	60	Rostain 1994a
Régina	97301.130	MC87	POZ-32474	1570	30	van den Bel et al. 2012b
Régina	97301.130	MC87	POZ-32475	1225	30	van den Bel et al. 2012b
Régina	97301.130	MC87	POZ-32476	970	30	van den Bel et al. 2012b
Régina	97301.130	MC87	POZ-32477	1260	30	van den Bel et al. 2012b
Régina	97301.131	MC88	POZ-32479	810	25	van den Bel et al. 2012b
Régina	97301.131	MC88	POZ-32480	1355	30	van den Bel et al. 2012b
Régina	97301.134	Montagne Tortue (Costa)	POZ-36001	1040	30	van den Bel et al. 2012b
Régina	97301.134	Montagne Tortue (Costa)	POZ-36002	1015	30	van den Bel et al. 2012b
Régina	97301.134	Montagne Tortue (Costa)	POZ-36003	5650	40	van den Bel et al. 2012b
Régina	97301.134	Montagne Tortue (Costa)	POZ-36004	905	30	van den Bel et al. 2012b
Rémire	97309.006	Pointe Gravier	X	3500	0	Rostain 1994a
Rémire	97309.106	Cimetière paysager	KIA-25851	985	20	Hildebrand 2004
Rémire	97309.106	Cimetière paysager	POZ-44817	645	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44819	1035	35	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44820	685	35	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44821	655	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44822	770	40	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44823	655	25	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44824	1635	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44828	675	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44829	355	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44830	895	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44831	965	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44832	895	35	van den Bel et al. 2013

Municipality	Site number	Site	Lab. No.	C14 conv. age BP	Dev.	Reference
Rémire	97309.106	Cimetière paysager	POZ-44834	895	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44835	675	30	van den Bel et al. 2013
Rémire	97309.106	Cimetière paysager	POZ-44836	9590	50	van den Bel et al. 2013
Rémire	97309.035	Glycérias	OBDY-727	260	50	Rostain 1994a
Rémire	97309.035	Glycérias	OBDY-717	80	70	Rostain 1994a
Rémire	97309.035	Lycée Professionnel	KIA-33044	195	20	van den Bel 2007d
Rémire	97309.010	PK 11	POZ-42484	585	35	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42485	395	30	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42486	685	30	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42487	910	30	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42514	13290	60	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42515	205	25	van den Bel et al. 2012a
Rémire	97309.010	PK 11	POZ-42516	5030	35	van den Bel et al. 2012a
Rémire	97309.112	Saint-Cyr	KIA-33482	1090	35	van den Bel 2007c
Rémire	97309.137	l'Anse du Mahury	LY-6612	895	30	Briand 2012b
Rémire	97309.137	l'Anse du Mahury	LY-6613	1010	30	Briand 2012b
Rémire	97309.137	l'Anse du Mahury	LY-6614	1000	30	Briand 2012b
Roura	97310.026	Camp Caïman	ARC-1954	1120	40	Briand 2002
Roura	97310.073	Camp Caïman	KIA-26023	4435	35	van den Bel 2007a
Roura	97310.011	Pointe Maripa	LY-7839	1750	45	Mestre 1997
Roura	97310.011	Pointe Maripa	LY-7696	1685	45	Mestre 1997
Roura	97310.011	Pointe Maripa	UGAMS-4048	1740	25	Gassies and Mestre 2012
Roura	97310.011	Pointe Maripa	UGAMS-4049	1710	25	Gassies and Mestre 2012
Roura	97310.011	Pointe Maripa	UGAMS-4050	1930	25	Gassies and Mestre 2012
Roura	97310.011	Pointe Maripa	UGAMS-4051	1600	25	Gassies and Mestre 2012
Roura	97310.011	Pointe Maripa	UGAMS-4052	2160	30	Gassies and Mestre 2012
Saint-Georges	97308.180	Pointe Blondin	KIA-30207	1465	25	Mestre 2006b
Saint-Laurent	97311.119	Carrière des Ananas	KIA-27194	6190	30	Delpech 2005
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36925	730	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30945	885	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30957	1020	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36929	1050	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30954	1710	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30939	1755	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30946	1770	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30952	1780	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36923	1805	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36922	1820	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30953	1890	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36926	1915	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30950	1920	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30940	2000	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30942	2000	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36924	2100	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30943	2145	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30947	2150	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30960	2515	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30961	3110	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30951	3525	30	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30949	3840	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30956	3840	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30959	4340	35	van den Bel et al. 2011

Municipality	Site number	Site	Lab. No.	C14 conv. age BP	Dev.	Reference
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30955	4470	35	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-30941	29800	260	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	POZ-36928	31500	300	van den Bel et al. 2011
Saint-Laurent	97311.121	Chemin Saint-Louis	KIA-35514	1875	30	van den Bel 2008a
Saint-Laurent	97311.121	Chemin Saint-Louis	KIA-35513	4520	30	van den Bel 2008a
Saint-Laurent	97311.110	Crique Sparouine	KIA-32394	585	25	van den Bel 2007b
Saint-Laurent	97311.110	Crique Sparouine	KIA-32396	750	25	van den Bel 2007b
Saint-Laurent	97311.110	Crique Sparouine	KIA-32395	905	25	van den Bel 2007b
Saint-Laurent	97311.110	Crique Sparouine	KIA-33555	1045	20	van den Bel 2007b
Saint-Laurent	97311.102	Plateau des Mines	KIA-33565	4135	25	Mestre and Delpech 2008
Saint-Laurent	97311.102	Plateau des Mines	KIA-33566	4480	25	Mestre and Delpech 2008
Saint-Laurent	97311.102	Plateau des Mines	KIA-33567	6020	30	Mestre and Delpech 2008
Saint-Laurent	97311.102	Plateau des Mines	A05010401 TL	5000	1200	Mestre 2004
Saint-Laurent	97311.102	Plateau des Mines	KIA-26155	6095	30	Mestre 2004
Saint-Laurent	97311.102	Plateau des Mines	KIA-26153	6180	25	Mestre 2004
Saint-Laurent	97311.102	Plateau des Mines	ETH-30438	6190	60	Mestre 2004
Saint-Laurent	97311.102	Plateau des Mines	KIA-26154	6200	30	Mestre 2004
Saint-Laurent	97311.120	Pointe Balaté	POZ-35845	130	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35841	195	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35840	420	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35842	780	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35847	825	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35846	835	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35844	905	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35848	1616	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	POZ-35843	2075	30	Briand et al. 2015
Saint-Laurent	97311.120	Pointe Balaté	KIA-36134.2	325	25	info Kiel 2009 (sherd)
Saint-Laurent	97311.120	Pointe Balaté	KIA-36135.2	2325	25	info Kiel 2009 (sherd)
Saint-Laurent	97311.120	Pointe Balaté	KIA-36134.1	55	35	van den Bel 2008b
Saint-Laurent	97311.120	Pointe Balaté	KIA-36136	795	25	van den Bel 2008b
Saint-Laurent	97311.120	Pointe Balaté	KIA-36137	835	35	van den Bel 2008b
Saint-Laurent	97311.120	Pointe Balaté	KIA-36135.1	5030	130	van den Bel 2008b
Saint-Laurent	97311.104	Saut Saillat/Crique Serpent	KIA-31239	360	25	Hildebrand 2008
Saint-Laurent	97311.104	Saut Saillat/Crique Serpent	KIA-31242	390	20	Hildebrand 2008
Saint-Laurent	97311.104	Saut Saillat/Crique Serpent	KIA-31240	425	20	Hildebrand 2008
Sinnamary	97312.014	Cœur Maroni (BPS 17)	ARC-585	1120	50	Vacher et al. 1998
Sinnamary	97312.014	Cœur Maroni (BPS 17)	ARC-596	940	110	Vacher et al. 1998
Sinnamary	97312.014	Cœur Maroni (BPS 17)	ARC-597	885	50	Vacher et al. 1998
Sinnamary	97312.171	Eva 2	KIA- 26019	3025	20	van den Bel et al. 2006
Sinnamary	97312.171	Eva 2	KIA- 27630	3690	25	van den Bel et al. 2006
Sinnamary	97312.171	Eva 2	ETH 31229	5125	50	van den Bel et al. 2006
Sinnamary	97312.171	Eva 2	ETH 31228	5150	55	van den Bel et al. 2006
Sinnamary	97312.172	Eva 2	ETH 31230	1775	45	van den Bel et al. 2006
Sinnamary	97312.167	Olga	KIA-26024	1795	25	van den Bel 2004
Sinnamary	97312.168	Tania, Malmanoury	KIA-26022	410	20	van den Bel 2004
Sinnamary	97312.168	Tania, Malmanoury	KIA-26021	675	75	van den Bel 2004
Sinnamary	97312.168	Tania, Malmanoury	KIA-26020	1535	25	van den Bel 2004
Sinnamary	97312.015	Orino (BPS 18)	ARC-724	930	65	Vacher et al. 1998
Sinnamary	97312.007	Topu (BPS 15)	ARC-722	3020	50	Vacher et al. 1998
Sinnamary	97312.017	Wewe (BPS 16)	ARC-710	1875	80	Vacher et al. 1998
Sinnamary	97312.017	Wewe (BPS 16)	ARC-709	1480	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1222	600	50	Vacher et al. 1998

Municipality	Site number	Site	Lab. No.	C14 conv. age BP	Dev.	Reference
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1248	750	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1280	850	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1354	930	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	ARC-969	965	60	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1339	430	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1414	490	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1328	540	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1411	620	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1369	670	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1399	750	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1262	880	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1335	880	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1311	900	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1264	930	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1257	940	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1313	970	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1321	1040	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1368	1060	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1337	1070	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1330	1130	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1408	1170	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1334	1230	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1316	1270	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	ARC-934	1290	50	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1361	1420	40	Vacher et al. 1998
Saint Elie	97358.174	Saut l'Autel (BPS 172)	OBDY-1317	1430	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1350	730	60	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1412	790	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1324	800	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1326	840	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1227	850	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1224	1260	40	Vacher et al. 1998
Saint Elie	97358.201	Roche génipa (BPS 230)	OBDY-1229	510	40	Vacher et al. 1998
Saint Elie	97358.202	Roche génipa (BPS 230)	ARC-1058	4465	50	info SA 2013
Saint Elie	97358.197	BPS 260	OBDY-1269	1520	40	Vacher et al. 1998
Saint Elie	97358.197	BPS 260	OBDY-1259	1580	40	Vacher et al. 1998

* This is a double Lab. Number

Appendix 2

The description of historic Amerindian groups on the coast of French Guiana

This short description of the historic groups that once inhabited the coastal region of the Guianas is also a short ethnohistory of these coastal groups. It has been mentioned that: (a) the Guianas were left aside by the Iberian powers and (b) the Amerindian society had been affected by means of migration of fleeing and raiding populations from the Orinoco delta as well as by the introduction of European goods, and more importantly metal objects, evoking a technological revolution. We also assume that French (mostly Normands), English and Dutch privateers frequented the Amerindian populations of the Guianas. However, during the last decade of the 16th century, the Amerindian society witnessed an intensification of northern European interest within their territories (Moreau 1992).

Prior to the installation of larger permanent colonies from *c.*1650 onwards, we dispose of several earlier documents containing scant information of their numbers, subsistence economy, housing, religion and socio-political structure (Whitehead 1988). The Europeans who visited Amerindian villages report that they consisted of several hundred inhabitants living in large longhouses (de Forest 1914) or smaller villages inhabited by between 50 and 100 individuals living in ten houses with a central house or *carbet* (de la Mousse 2006).[421] Each village (consisting of families belonging to one or more clans) had a chief (Sp., *cacique)* and related to other villages forming a nation.[422] Various (subjugated) nations in turn formed a confederation (perhaps including various ethnic groups and languages) which was ruled by a paramount chief (Harcourt 1928). Warfare and feasts between villages, nations or confederations can be interpreted as a ceremonial way of socio-political interaction and subsistence. However, the abduction of women for marriage was one of the most influential aspects of warfare as was the enslavement and anthropophagic practices among certain groups, mainly of prisoners of war (Santos-Granero 2009b).[423]

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421 The central house (carbet) is used 'to carbet' among the Galibi of Cayenne, according to I. de Laon, Sieur d'Aigremont (1654:88): 'Carbetter, est parler un iargon qu'ils ont entre eux different de leur langue.'

422 The owner of the central, or first house, of a village is referred to as a *cacique* or the person 'with [ka] the house [sikua]' (Arrom in Pané 1999:8). Raymond Breton gives a detailed description of the central carbet (C., *taboui*), or menshouse: '… Carbet, qui est la sale, la hale, l'ouvroir, le reservoir, le refectoir, le dortoir, & la case communale des Sauvages. Il est a peu pres comme un berceau en ovale sur sa hauteur, & longueur qui à 60 pieds sur vingt de largeur, bâti d'une manière rustique, mais aussi delicatement & à profit que l'on se le puisse imaginer. On y entre par quatre trous diametrallement opposées sur le centre de l'ovale qui n'ont que quatre pieds de hauteur sans autres portes, ny fenestres, sans chevilles ny clouds, sans etages ny chambres & sans autres separations ny embarras qui empesche de s'y pourmener douze personnes de front : seulement à la hauteur de sept pieds il y à des travers sur dix de longueur pour y suspendre cent ou 120 lit de coton où ils reposent paisiblement avec une intelligence tres parfaite sans querelle & sans bruit, les femmes ny entrant que rarement & encore pour les y server' (Breton 1665:476-477).

423 'They keepe no order of marriage: but have as many wives as they can buy, or win by force of their enemies, which principally is the cause of all their warres' (Masham 1890:194).

As ro the coastal zone of the eastern Guianas, we can evoke two larger Amerindian territories or two confederations at war.[424] The headquarters of the Charibes is established on Cayenne Island and the headquarters of the *Yao* in the Oyapock River. According to the Palikur oral tradition, the presence of *Charibes* or *Galibi* at Cayenne is supposed to be a Proto or Early Historic migration coming from the west, whereas the Arawak tell they came from the east (P. Grenand 2006:110; Navarette 1964:84). European contact halted these (pre-Columbian?) migrations and started to influence Amerindian socio-politics, i.e. the formation of an Amerindian confederation command by the *Aricouros* and the recently arrived *Yao* from Trinidad on the Oyapock.

Feasts would often go on for several days as would the consumption of large quantities of fermented manioc, potato or maize beer. Maize and tubers such as manioc, sweet potatoes, and ignames were tended in plots in the vicinity of their village. Fishing, game hunting, gathering and trade are the other modes of subsistence. The introduction of iron tools changed these modes. However, the access to these tools not only changed the socio-political balance in the region, but also the existing trading networks.[425]

During the second half of the 17th century, the downsized Amerindian groups either intermingled or remained in the vicinity of the European settlements, or withdrew into the interior and to remote areas deprived from any European settlements, such as the Maroni River. Historic Amerindian nations, or groups, encountered in the coastal zone during the late 16th and 17th century belong to the Arawakan and Carib linguistic stock. The Tupi-Guarani speakers may have inhabited the interior of the Guianas but it is believed they entered French Guiana during the 18th century (P. Grenand 1982). Grenand counted 74 ethnonyms for French Guiana and Amapá and further states that this number includes many synonyms and misspellings (P. Grenand 2006:109). Ethnohistoric research in the Guianas has indicated that group names can also represent subgroups, clans or nicknames used by other groups (Frikel 1957, 1958; Rivière 1963, 1969; Boomert 1984; Tilkin-Gallois 1986, 1993; F. Grenand and P. Grenand 1987; Wack 1991; Collomb 2000; Chapuis and Rivière 2003).

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424 Whitehead (1992b) evokes an Arawak confederation or 'Provincia de Aruacas' in the western Guianas where the Courantyne represented the most eastern border, according to the account of Rodrigo de Navarrete [*c.*1560-1575]. These Spanish accounts also mentioned the migration of Arawakan groups along the coast coming from the East. They settled in Carib territory which they managed to chase out after a long and bloody war, in cooperation with the Europeans. The Arawak confederation probably consisted of (ethnic and linguistic) groups of which Keymis encountered the *Shebaios* (1890:147) on the Island of Gowateri or Cayenne and the Charibes on the Wia River [Mahury]. However, a year later, Masham (ibid., p. 186–187) only spoke of the Charibes of Wia and did not mention the Shebaios who may have left, or been killed or subjugated. One year later again, Cabeliau (de Jonge 1862:155–156) bartered goods with the Indians of Cayenne after having boarded two Yao from the Kaw River. Apparently the island was inhabited by *Charibes* only when Mocquet (1617:111) visited Cayenne in 1604.

425 A well known example is the alliance between the Nepoio headman Carapana of Trinidad and Antonio de Berrío. Their friendship affected the hegemony of the Arauacay of the Lower Orinoco during the 1590s. Lawrence Keymis stated that Carapana was originally 'a Lord of no other than ordinarie power,' and that within several years the latter had become an important headman because of his alliance with the Spanish. Many Indians in the region joined the Nepoio and went to live in Carapana's village in order to profit from his relationship with de Berrio (Keymis 1890:150–163).

We will now present a number of historic and coastal Amerindian groups known from the end of the 16th century.[426] Interestingly, they have been recorded until the end of the 17th century and that, approximately at that time numerous other groups appear on the maps but higher up the Maroni River.

a. Caribes/Charibes/Galibi[427]

When the Europeans arrived during the late 16th century, the *Charibes* resided in the coastal zone of the western Guianas and the Caribs in the southern Lesser Antilles.[428] All the Amerindians practicing cannibalism were automatically considered non-humans and thus enemies, who consequently preyed upon the Spanish enslavement in the *encomienda* system (Hemming 1978; Whitehead 1988). According to Lawrence Keymis, the *Charibes* were well established between Kourou and Maroni Rivers but went on to dominate Cayenne Island at the start of the 17th century. Although the Charibes may have arrived fairly recently, as well with other nations such as the Paragotos and Yao, they soon occupied a dominant position with the Europeans at Cayenne.

However, on the Maroni River they lived together with the Aroucas and Yayos (R. de Forest 1914, ii). With the continuing colonisation from Cayenne towards the West, the Galibi are pushed towards the Maroni River, subsequently leaving the lower reaches of the Kourou and Sinnamary Rivers. The *Karaïben* (D.) in Suriname fall back towards the Upper Suriname, Coppename, and Maroni Rivers. The Coppename Caribs mingled with runaway slaves to form *murato* Indians (Sr., *Karboegers*). They are considered to differ from the Maroni River or eastern Caribs, who currently call themselves *Tïlewuyu* (Ahlbrinck 1931:192–194; Hoff 1968b:26).[429]

Once peace was signed towards the end of the 17th century, the Caribs were considered agents of the colonisation: they were hired as guides, retrieved runaway slaves, provided victuals for the plantations, etc. The Carib language or Cariban served as a *lingua franca* among colonists and Amerindians (de Gomberville as cited by de Goeje 1934:464–466). The Galibi incorporated many other groups now extinct but also absorbed various cultural European and African influences throughout the 18th century and finally reestablished the modern Kali'na culture

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426 Peter Rivière's master thesis (1963) reported an important inventory of Amerindian tribes residing in the interior of the Guianas. It was preluded by the works of Claudius de Goeje (1943) and Protasio Frikel (1958). Further ethnohistoric synthesis on Amerindian populations in the interior of the Eastern Guianas is documented in the PhD dissertations presented by Jean Chapuis (1998) and Renzo Duin (2009) respectively.

427 On the etymologie of the word Charib, Carib, Galibi, Kali'na and Karinya see Berend Hof in Carlin (2002:53).

428 The origin of the name Carib remains mysterious and is certainly not the name of this ethnic group when the Spanish arrived. There has been considerable debate on the meaning of Caribes or Cannibals as they were called by the Taíno and Columbus respectively. It suffices to say that Cannibales may derive from Great Khan, as Columbus thought he had reached. As to Caribes, it may refer to Ceyri/Cayo/Cairi meaning Island (in Arawakan), thus simply meaning "Islanders" for the Taíno (Allaire 2013:97).

429 The difference between the Cariban words *Telewuyu* and *Tirewuyu*, provoked by the alveolar flap, is orthographically represented by the 'l' in French and by 'r' in Dutch literature. The Kali'na of the interior are referred to as Tayra, although the Tayra have also been encountered in the coastal zone (Barrère 1743:25–26; Roth 1924:675; Lombard 1928:141–143; Carlin and Boven 2002:45, note 33). Berend Hoff (1968b:336) remarks that the Caribs of the Lower Maroni River apply the word *Ito'to* to 'all the upland people with long hair,' of which the Trio were often hunted for slaves (on Amerindian slave-raiding see also P. Grenand 2006).

(Collomb and Tiouka 2000). We cannot confuse the current Kali'na with the historic Galibi as they represent a remarkable synthetic group in western coastal French Guiana and Suriname with an important linguistic influence on groups in the eastern Guianas, notably the Palikur (P. Grenand 2006:110; Vidal 2001).

b. Paragoto/Paragoti/Paracutto

The Paragoto were a Cariban-speaking group which, along with the *Palenque* and *Aruacay* were located on the Peninsula of Paria (Venezuela) to the west of Trinidad (Kirchoff 1948: 483). According to Mayor John Scott, the *Paracoatos* and *Careebs* expelled the Spanish under the command of Gaspar de Sotelle from Cayenne Island in 1573 (Harlow 1925:138; Bos 1989:17).[430] The Paragotos were encountered by Lawrence Keymis [1596] and Unton Fisher [1609] at the mouth of the Maroni River, but not by John Ley [1598], Jesse de Forest [1625], and David Pietersz de Vries [1634]. If these geographically separated groups are the same is difficult to decide but they continue to be mentioned on the Lower Maroni River from *c.*1650 on until the end of the 18th century, as Gerard Bos suggests (1989). He also attributed the Schneebeling manuscript to the Paragoto of the Perica River in eastern Suriname (Kloos 1973). During the 19th century the Paragoto apparently disappeared and may have merged with the Kali'na and Arawak of the Lower Maroni River.

Françoise and Pierre Grenand consider Paragoto a generic term (1987:12–14). According to Palikur and Kali'na oral tradition, Paragoto means "People of the Sea" (see also Nimuendajú 2004:95). Although many seafaring nations may have been labelled in this manner, Keymis observed that the Paragoto shared a language called *tivitiva* with the Arikari and Aruã populations inhabiting the mouth of the Araguarí and Amazon Rivers. The latter explorer applies the term *tivitiva* in order to designate the foraging population of the Orinico and Essequibo delta, also known as the Warau (Boomert 1984:129; Heinen and Garcia-Castro 2000).[431]

A possible Orinocan origin is not only confirmed by means of their language but also by a specific shaved hairdress as the Palikur oral tradition stated that the Parauyune are: 'à l'origine, ces gens n'étaient pas des Palikur. Ils ne parlaient pas notre langue. Ils venaient du fond de la mer [d'une île ou d'un rivage lointain?] et portaient leurs cheveux rasés sur le devant avec simplement une rangée derrière [selon les uns et longs derrière selon les autres]' (F. Grenand and P. Grenand 1987:13). Although such a hairdress refers to the Tupinamba, the latter anthropologists connected this information to the observations Alexander von Humboldt [1852-1853] recorded among the Carib residing on the Lower Orinoco. It was concluded that the Paragoto represented an ethnic group very close to the western Caribs who were to migrate to the east during the second half of the 16th century as many other groups that fled the Spanish, as Robert Harcourt suggests (1928:86).

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430 Folio 31b of the renowned Sloane MSS 3662 document written by Mayor John Scott was first published by Frederik Oudeschans Dentz in *Bijdragen en Mededelingen van het Historisch Genootschap* (1918:176–187) and later by Vincent Harlow (1925:132–148). Interestingly, it contains the sole mention of a Spanish attempt to colonise Cayenne Island, but is in need of verification in the Spanish archives.

431 Rivière refers to the Warao as a fairly unique group for the Guianas perhaps more linked to the Orinoco delta and Trinidad: 'Warao social organization is characterized by an idol-temple cult reminiscent of the Circum-Caribbean region, a Hawaiian relationship terminology and a subsistence economy based on the moriche palm.' (Rivière 1984:2).

c. Yaio/Yao/Jajos/Hyayes

In 1594, Dudley and Wyatt encountered the Yao at the village of Paracoa, or Parico, on western Trinidad (Warner 1899:70). Their language belonged to the Cariban stock. The list of Yao words published by the Laet (1633:642–643) includes many similarities when compared with the Carib language (Boomert 1984:147). During the last quarter of the 16th century, the Yao moved from the western towards the eastern Guianas, where they subsequently met the early European explorers in the Maroni and Oyapock Rivers. Although they may have been immigrants as Keymis (1890:144) suggests, they rapidly manifested themselves in the intertribal affaires of these regions.

The seafaring Yao had been in contact with the Spaniards at least since 1530. They were fierce opponents of the Carib. According to Palikur oral tradition, they also introduced European tools in this area (P. Grenand 2006:111). They may have gained their regional position over the local population because of their trading knowledge. Soon their leader Anakayouri founded an influential "confederation" on the Oyapock River with the local populations (Harcourt 1928; de Forest 1914; Biet 1664). Interestingly, the English transferred members of the Yao population to Europe to teach them about European standards and languages (Vaughn 2002).[432] Once the confederation of the Oyapock had ended, the Yao became extinct during the second half of the 17th century. However, several families may have mingled with the other groups of the Approuague and Oyapock (de la Barre 1666:35).

d. Arouacas/Arawak/Arawacca/Supayes/Shebaii/Sapaye

The Spanish West Indian chroniclers refer to the Aruacas as an Amerindian group that inhabited Trinidad, the Lower Orinoco Basin and the coastal Guianas during 16th and 17th century (Nimuendajú 1926; Abbenhuis 1940; Boomert 1984; Whitehead 1992b). The present Arawak call themselves Lokono. They live in the coastal parts of the western Guianas, interspersed with Kali'na villages such as on the Lower Maroni River. They converse in a subdivision of the Maipurean branch of the Arawakan languages spoken in South America and the Antilles (Kingsley-Noble 1965:82–84; van Baarle et al. 1989; Patte 2002, 2008; de Goeje 2009).[433] Throughout the 16th century the Aruac were the allies of the Spanish. During the first decades of the 17th century, they changed sides in order to become an ally of the Dutch in the western Guianas (e.g. Berbice, Pomeroon, Essequibo) (Whitehead 1992b).

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432 It is imaginable that Ralegh had founded an alliance with the Yao Captain Carapana of Trinidad in order to break the Spanish hegemony and to utilise the Yao network in the Guianas that was expanding into this area. Neil Whitehead (1998:157–158) referred to newly formed ethnohistoric chiefdoms created during the second half of the 16th-century after the first Spanish impact on the regional populations of Orinoquia.

433 The first list of *Aroaca* words was compiled by Captain Wyatt and/or Robert Dudley (Warner 1899:65–66, 78–79) and another by Johannes de Laet in *Novus Orbis* (1633:642). It may be added here that most Guiana hydronyms are of Arawakan origin. Rivers (e.g. Corantyne, Maroni, Cusewine) include the Lokono suffix for water (–uni, –wini, or –eni), whereas rivers (e.g. Coppename, Suriname) include the suffix –nama, meaning mouth in Lokono (Boomert 1984:131). According to Father Abbenhuis's (1940:17) Arawak informant J. Baptiste, the Marowijne River can be translated as Endless River in Arawakken; mara = 'without borders' and –uni = water. Walter Ralegh's map [1595] (in Harlow 1925) and Lawrence Keymis's journal (1596) mention the name Marawini for the first time, whereas Hondius's map (1599) does not feature this name, albeit based on both sources. On the Spanish maps, the Maroni may well be the Rio Baxo or Low River (de Goeje 1934:55).

Another Amerindian group that fled away from Trinidad into the Guianas as far as the Island of Gowateri (Cayenne) was the Shebaios (Keymis 1890:147). Grenand (2006:111) ascribed the Shebaio or Sapaye to the Arawak population since the former are considered to have integrated into Arawak-Lokono descendants as a clan called the Sabayo.

Keymis 1596	Masham 1597	Ley 1598	Hondius 1599	Fischer 1609	Tatton 1615	de Forest 1625	Gerrtisz 1625	NA_4VEL_2153	Dudley 1636	Paul Boyer 1643
Paracuttos			Paracuttos	Paragotos						Paracotes
		Sappayos		Sappaios					Sebaos	Sapayes
	Arwaccawes		Arwaccas	Arawaccas		Arouacas		Arowacas	Arwaccas	Aroüagues
Charibes	Caribes	Caribes	Charibes			Caribes		Caribes		Galibis
			Iaios	Yaios		Yayos		Iaios	Jaos	Hyayes
				Arameeso						
Amanna		*Captain Cawpeana*						3 outposts	Lorimer 1989:111	1654:242-245
Tivitivis								"Marras"		

N. Sanson 1656	de la Barre 1666	Duval 1677	G. Sanson 1680	Delisle 1703	Ottens 1718	Buache 1775
Paragoti / Parcotti		Paragotes	Paracotis	Paracotes	Paragotos	
Shebaii		Sapayes	Sapayes	Supayes	Supayes	
Arwaccae					Aravacas	
Caribes	Galibis	Galibis	Galibis	Galibis		Galibis
			Mercioux	Mercioux	Mercioux	Mercioux
			Acoquas	Acoquas	Acoquas	
				Pirios	Pirios	
Iayo		Hyayes	Yayes		Iayos	
			Aramisas	Aramisas	Aramisas	
				Moroux	Moroux	
				Armagotes		
		Ciparicotes				Kirikiriscotos

Overview of ethonyms upon the Maroni River from the 16th century to mid 18th century according to various European maps and documents.

Appendix 3

Miscellaneous descriptions of pottery manufacturing in the Guianas

a. Père Jean de la Mousse (*c.*1680s), Galibis, Sinnamary River, French Guiana

'Ce fut dans ce carbet où je vis pour la première fois travailler en poterie; toutes les femmes y travaillent, et les plus âgées sont ordinairement les plus habiles et celles qui conduisent les ouvrages des grands vases qui tiennent près d'une barrique où se met la boisson, les autres font des pots et des plats d'usage ordinaire. Elles mêlent la cendre d'une écorce nommée canopi [*kwepi*] avec l'argile dont elles veulent faire les pots qui se mettent au feu, et ajoutent encore des morceaux de vieux pots cassés [chamotte] qu'lles pilent bien menus. Je n'ai point vu qu'elles battent la terre comme les potiers de France. Pour faire un pot, elles aplatissent en rond un peu d'argile, de la largeur de trois doigts ou un peu moins; tous leurs pots sont un peu pointus pour s'enfoncer dans le sable, ou pour se poser sur trois pierres qui servent de foyer. Autour de ce petit rond, elles appliquent un long boyau d'argile qu'elles ont roulé sur un ais [planchette de support], et l'entortillent l'un sur l'autre, à peu près comme sont les tissus de paille dont on couvre les bouteilles en France. Le secret est de bien unir ces torties, cela se fait avec le coton ou duvet d'un épi de mil, appelé bled de Turquie en France [le maïs], après quoi elles passent un morceau de calebasse par l'endroit qui est uni avec un peu d'eau. Leurs peintures se trouvent sur le bord des rivières, ce sont des craies rouges, blanches, noires et jaunes.[434] Elles font des pinceaux avec des plumes qu'elles enchâssent dans de petits tuyaux. Leur serpe leur sert d'ordinaire de palette, c'est là dessus qu'elles délaient leur craie dure en la trempant dans du jus de manioc. Ces couleurs se mettent avant la cuisson et ne se peuvent mettre que d'un côté, parce que lorsque le pot ou le plat est cuit, il faut mettre du feu d'un côté pour passer une gomme sur l'autre qui fait le vernis. Cette gomme s'appelle chimeri [simili, *Hymenea courbaril*], elle est de la nature de toutes celles que j'ai vues en l'Amérique, c'est-à-dire qu'elle fond au feu et durcit à l'eau. Il y en a une nommée bourgome dont les Indens calfatent très proprement leurs pirangues [pirougues].' (de la Mousse in Collomb 2006a:52–53)

b. Thomas Pistorius (1763), Karaiben, Suriname

'Wat hunne Vrouwen betreft, die doorgaans, zo wel als de Mannen, of geheel nakend gaan, of slegts hunne Vrouwelijkheid met een klein Schortje, van eenige groente gevlochten, of van 't een of ander ruig Diere-Vel sierlyk toegemaakt, eenigzints bedekken. Bestaat hunne voornaamste beezigheid niet alleen in de Huishoudinge waar te neemen, maar ook boven dien nog andere noodwendigheden te verrigten;

434 Nowadays, the Kali'na potters use three types of *engobe*: the most important is *kuli*, a red *engobe* made of red clay mixed with water, an orange *engobe*, or *kaweyu*, made of orange clay mixed with manioc juice, and finally a white *engobe tawa* made off kaolinitic clay (Vredenbregt 2002).

als onder anderen allerhande zoort van Potten, Kommen, Schotels, Borden en diergelyke nuttige Instrumenten voor het Huishouden te maken en te bakken; waaromtrent zy dus te werk gaan: hunne Specie daar toe is wel principalyk den bast van een Boom die zy *Kweepie* noemen; dezelve word eerst hard gedroogd, en als dan tot Koolen en Asch verbrand zynde, in een houte Morier fyn gestooten, door een Zift gedaan, en met goede Klei vermengt; van welk mengzel, na dat het alvorens door lang kneeden en rollen, leenig en [19] bekwaam gemaak is, zy hunne Potten, Kommen, enz. fatzoeneeren; na dat dezelve in den Wind eerst hard gedroogd zyn bakken ze die byna op dezelve wyze, gelyk als in Holland en elders geschied. Onder het bakken schrapen ze den Bast van zeekere Boom in een Calbas, en mengen het schraapzel met wat water; deeze compositie sprengen zy met een struik van Beesemkruit tegens het Aardewerk, waar door het eenige couleur verkrygt. Ook hebben ze een zoort van Verglazel, dat zy maken van de Gom *Simirie*, die zeer wel naar den Harst gelykt en een vrucht is van den *Lokus* Boom, waarmede zy het zelve verglazen.' (Pistorius 1763:18-19)

c. Philip Fermin (1770), Suriname

'Het vaatwerk, by dit volk, bestaat uit allerleie aarden potten, schotels, kommen, die byna zo sterk en duurzaam zyn als van koper, en op de volgendewyze gemaakt worden. De vrouwen (want dezen houden zich, gelyk ik boven gezegd heb, hier mede bezig) neemen eene zekere hoeveelheid afsche van den bast van eenen boom, in deze landstreek onder den naam van Kweepie bekend, welke zy in een houten mortier stooten, door eene fyne zeef ziften, en vervolgens met goede klei mengen, om 'er alle de bovengemelde gereedschappen van te maaken, die zy terstond, in den wind laaten droogen, waarna zy dezelven in den oven bakken, en ze, met een soort van vernis, verglaazen.

De water potten, welken door dezelve gemaakt worden, zyn van eene ongemeene grootte; want men vindt 'er, die tusschen de vier en vyf ankers houden. In de Stad, of op de plantagiën, is geen huis, daar 'er niet, ten minste, drie of vier zyn, om het regenwater welk men dagelyksch drinkt, te bewaaren. Deze potten zuiveren het water, en houden het zo koel, als of het uit een yskelder kwam.' (Fermin 1770:55–56)

d. Johannis Sneebeling (1770s), Paragoto, Perica River, Suriname

'Aangaande het werk der Indiaansche wijven: die oud en afgeleeft zijn spinnen catoen om hangmatten te maken. Andere weeven hangmatten, in een langwerpig raam. Andere vormen potten en schotels van blaauwe kleygrond, waaraan zij de rondte en fatsoen zo wel weeten te geven, als de beste pottebakker, en dat met de blote hand, daar zij anders geen gereedschappen toe van node hebben. Zij kunnen ze ook zo wel en hard branden, dat zij klinken als klokken, hebben van binnen een lofwerk [versiering], en een soor tvan verglazing van koperrood dat zij eenige dagen inde zon laten drogen.

Dan zetten zij een heele partij potten en schotels digt bij elkanderen in de opene lugt, waar bovenop en rondsom zij de bast en bladeren van de mompee boom leggen, twelk zij in de brand steken, dat als zwavel brand, wijl dat hout een zoort van gom bij zich heeft. Dat vuur maken zij hoe langer hoe groten en werpen daar al meer van die bast in. Als dat vuur nu drie uuren gebrand heeft, dan laten zij het uitgaan. De potten en schotels die dan onder den asch begraven leggen haalden zij daar uit, en wrijven dezelve af met een zoort gomwater, waarvan de potten en schotels een heldren glans bekomen en goed zijn om eeten in te koken. Zij kunnen vuur wel zo wel verdragen, als de beste stoofpan.' (Sneebeling in Kloos 1973:12)

e. Christlieb Quandt (1770s), Suriname

'Die Weiber sind bey den Indianern auch die Töpfer, und ihre Behandlung dieser Arbeit verdient einer Erwähnung.

Es giebt dort einen Baum, dessen Rinde wie ein Sandstein ist. Diese Rinde brennen sie, stampfen die Koblen zu einem feinen Pulver, welches dem feinen Sande ganz gleich kommt, und mengen es unter ihren Thon. Wenn sie einen Topf anfangen, machen sie erst von dem Thone eine runde Platte, ohngefähr 4 Zoll im Durchmesser, die allemal bey großen Töpfen als Fußboden sehr klein ist. Hierauf werden von dem nämlichen Thone kleine Würste eines Fingers dick gemacht, und an die Platte oder untere Scheibe angeklebt und mit den Fingern platt gedrückt. So fahren sie fort, bis der Topf seine gehörige Größe und Gestalt hat.

Eben so machen sie auch ihre Schüsseln, die oft so dünn sind, daß man sich wundern muß, wie sie dieses mit den bloßen Händen zu Stande bringen und doch ihren Gefäßen eine so regelmäßig runde Form geben können. Mährend der Arbeit poliren sie den etwas trockenwerdenden Thon mit einem glatten Steine oder glatten Muschel.

Die Form ihrer Kochtöpfe und Schüsseln ist allemal, wie Tab. I. 11. und 12. abgebildet ist. Sie stehen daher gewöhnlich nicht gut, worauf aber bey ihnen nichts ankommt, weil ihr Fußboden gemeiniglich Sand und zugleich ihr Tisch ist. Sie machen auch so große Wassertöpfe, daß sie hier ein Töpfer auf seiner Scheibe nicht leicht so groß würde machen können. Die größten können oft weit mehr als einen Dresdner Scheffel fassen. Ihre Form ist gemeiniglich wie Nr. 9. und 10. Tab I. Diese großen Töpfe brauchen sie zum Baiwar bey ihren Trinkgelagen, und in Paramaribo, wo man nur Regenwasser aus den gemauerten Zisternen zum Kochen und Trinken hat, werden sie gar sehr gesucht, weil sich das Wasser in denselben sehr gut abklärt und kühl erhält. Überhaupt kaufen die Europäer die indianischen Kochtöpfe gern, weil sie dauerhafter sind, als die dahin gebrachten europäischen.

Die Arawacken und Warauen machen die besten Kochtöpfe, und die Karaiben bunte Schüsseln, die man auch als Trinkgefäße braucht. Wenn der Topf hinlänglich ausgetrocknet ist, machen sie, sonderlich zu den großen Töpfen, eine Vertiefung in den Sand, und legen leichtbrennendes Holz oder Reißig unter und um den Topf herum, und auch etwas weniges, wenn der Topf dick ist, inwendig hinein. Je nachdem nun der Topf heiß wird, verstärken sie das Feuer und brennen sie recht gut.

Zur Glasur nehmen sie, wenn der Topf geschwärzt oder bunt bemahlt ist, eine harzige Rinde, bestreichen mit derselben den Topf, und lassen das Harz an einem gelinden Feuer zergehen. Diese Glasur hält ziemlich lang, doch kann sie dem heissen Wasser nicht widerstehen.' (Quandt 1807:233–235)

f. Laffon-Labebat (1797), Galibi, Sinnamary River, French Guiana

'Les Indiennes font ces vases avec une espèce d'argile gris de fer, qui est assez abondante dans le pays. Elles les font à la main ; elles les peignent ensuite avec du roucou, ou avec d'autres couleurs que leur fournissent quelques plantes ou quelques arbres, et, pour rendre ces couleurs solides, elles les mêles avec de la gomme de *Chimiri* qu'elles extraient d'un arbre appelé *Kroubari*. Elles appellent la terre dont elles se ervent pour faire ces vases : *Orinan*' (Laffon-Ladebat 1912:189).

g. Albert von Sack (1805), Arawak, Suriname

'Sie nehmen die Rinde des Kweepie Baumes, verbrennen sie, pülvern den Rückstand und mengen denselben miet einem feinen Thon. Aus dieser Zusamensetzung machen sie erst enen flachen Boden, nach Verhältnis der Grösse des Gefäses. Von der übrigen Masse bilden sie mit der Hand Stücke welche wie Würste gestalted sind, die se legen sie eine über die andere um den gebildeten Boden, drücken sie mit den Fingern flach un geben ihnen die verhältnissmässige Gestalt.

Nachdem das Gefäss einige Tage an der Luft getrocknet worden, brennen sie es in einer Grube bei einem langsamen Feuer. Zuweilen bemahlen sie es mit verschiedenen Farben un geben ihm nachmals einen Ueberzug von Gummi Copal, der sehr dauerhaft ist, allein kein kochendes Wasser verträgt. Da jedoch die Warauns selten in die Colonie kommen, so kaufen die Einwohner diese Krüge von den Arrowouken und Caribben, welche sie eben so gut machen.' (Von Sack 1821 ii:118)

h. August Kappler (1854), Galibi, Maroni River, Suriname

'De vrouwen en dochters der Caraïben zijn zeer bekwaam in het vervaardigen van kruiken, potten en groote troggen, waarin casiri en tapana gebrouwen wordt. Eveneens bezitten zij eene groote bekwaamheid in het vervaardigen van hangmatten. De potten worden met eenen graauwen of roodachtigen, zeer vetten leem gemaakt, dien zij meestal van zeer ver afhalen. De leem wordt eerst van alle onreinheden gezuiverd en met het poeder van den tot kool verbranden bast van den kwepieboom vermengd en daarna met de handen zoo lang gekneed, totdat zich alles gelijkmatig vermengd heeft. De werktuigen voor dit pottebakkerswerk zijn zeer eenvoudig en bestaan alleen uit een plankje, waarop men hetgeen vervaardigd zal worden plaatst; uit eenige stukken van kalebassen, die de gedaante van eenen lepel of spatel hebben en tot het afkrabben van den overtolligen leem dienen, alsmede tot het glad maken van het werk, en eindelijk uit eene kalebas met water om het werk te bevochtigen.

Den leem rolt men tot dunne, lange reepen uit; op het plankje vervaardigt men den bodem, waaraan deze repen vastgekleefd en aanhoudend in de rondte met den spatel bewerkt worden. Is het werk gereed, dan zet men het op eene luchtige plaats om te droogen. De schotels worden vervolgens van binnen met roucou en eene soort van vernis van copal bestreken, na vooraf met eenen rooden, naar jaspis gelijkenden steen, die in den Corantyn of den Maho gevonden wordt, gepolijst te zijn. Wanneer de potten of kruiken droog genoeg zijn, legt men er een vuur rondom aan, en beschildert ze vervolgens, indien zij zich gunstig aan het oog moeten voordoen, met het vocht van zekeren kever, waardoor zij bruin gekleurd worden. Deze waterkruiken zijn in de geheele kolonie in gebruik, en het water blijft er ook zeer koel in, omdat zij poreus zijn en altijd zweeten.' (Kappler 1854 ii:31–32)

i. L. Capitan (1882), Galibi, Sinnamary River, Paris

'La seule personne de la troupe qui fabriqât des vases était la vieille dame, mere du chef. Son outillage était des plus simples: quelques planchettes pour poser les vases, et un seul instrument, consistant en un morceau de calebasse mince, large environ comme la paume de la main, et don't les bords présentent une série de petites encoches régulières leur donnant l'aspect d'une scie à dnets mousses. Enfin un morceau d'os arrondie à l'extrémité, veritable lissoir, complétait l'outillage. La matière première était une argile en tout semblable à l'argile plastique bigarrée des environs de Paris. La forme la plus ordinaire des vases fabriqués par cette vieille femme était celle d'une petite bouteille de 7 à 8 centimètres de diameter sur 12 et 15 centimètres de hauteur, a pense régulière et à goulot un peu allongé, terminé par un petit bord évasé et recouvert d'un bouchon à base conique, surmonté d'une partie aplatie et arrondie.

L'argile étant preparée, malaxée et ayant la consistence nécessaire, se présente avec une coloration gris violacé foncé. Lorsqu'elle veut fabriquer un vase, la vieille femme prend une assez grosse boulette de terre, la prétrit dans la paume de la main, l'aplatit et la pose sur une planchette de bois, puis avec son unique outil elle amincit la surface et regularise les bords de manière à lui donner une forme assez exactement circulaire: ce sera le fond du vase. Prenant alors une nouvelle quantité d'argile, elle en forme, en la pétrissant dans ses mains un gros boudin, qu'elle allonge en le roulant avec le paume de la main sur sa planchette. Elle obtient ainsi un boudin de 1 centimètre et demi environ de diameter et long à peu près de 50 centimètres. Elle pose alros ce boudin sur le fond de terre en suivant exactement le contour; lorsque le sdeux extrémités sont au contact, elle les soude, puis appuyant légèrement elle fait adherer l'anneau d'argile ainsi obtenu sur le fond des vases. Elle continue alors et pose un second anneau sur le premier. Elle en superpose ainsi quatre ou cinq alros avec son instrument elle grate avec force l'intérieur et l'extérieur de manière à faire disparaître les saillies et les creux et elle finit par obtenir un cylinder régulier et d'une assez faible épaisseur –4 à 6 millimètres environ.

Elle continue alors à superposer des anneaux d'argile, mais en les faisant beaucoup plus petits, de manière à obtenir l'ébauche du goulot. Elle regularise cette ébauche de la même façon que la panes du vase, puis avec les doigts obtient la forme évasée de l'extrémité supérieure du goulot. Elle frotte alors la surface de faire disparaître les petites rainures don't elle est sillonnée, rainures tenant à la forme en dents de scie des bords de son ébauchoir et elle obtient ainsi une surface parfaitement lisse. Elle laisse alors sécher le vase au soleil. Lorsqu'il commence à être assez sec, elle badigeonne toute la surface extérieure, moins le desous du fond, avec une argile très ocreuse diluée dans l'eau. Le vase est ensuite remis de nouveau à sécher quelque temps à l'air. Avant que la mince couche ocreuse soit complètement sèche, elle lustre toute la surface du vase avec un lissoir en os. Le vase est alors terminé, très régulier, lisse et brilliant, de couleur ocre rouge. Lorsqu'il a encore séché pendant quelque temps, on le cuit de la façon suivante:

La vieille *potière* nettoie avec soin une petite surface du sol, de manière à constituer une petite aire; elle l'entoure de briques posées de champs, puis y fait feu assez vif avec des bois blancs, oisier, peuplier, etc. Lorsque le feu a brûlé pendant 20 mintues environ, elle enlève les debris carbonises et la cendre et la place les vases dans le fond, puis elle les recouvre de nouvelles branches posées sur les briques et qu'elle allume. Quand ce nouveau feu a brûlé pendant 25 minutes environ, elle retire les vases des cendres: ils sont alors cuit et complètement terminés.' (Capitan 1882:649–651)

j. Frederic and Arthur Penard (1907), Galibi, Maroni River, Suriname

'Het aardewerk bij onze Indianen in gebruik wordt bijna uitsluitend door de Caraïbische vrouwen vervaardigd. Als grondstof gebruiken zij een soort klei *alinjo* die vooral in de savannestreek te vinden is en in zonderheid bij nieuwe of volle maan vergaderd wordt. Van onreinheden gezuiverd, wordt deze klei tezamen met den verbranden bast van den *kroepi* (*Couepia guianensis*), a[rowaks] *kawta* met de handen tot een deeg gekneed.

De bewerkster begint met op haar knie te plaatsen een plankje, waarop de bodem van het te vervaardigen aardewerk in den vorm van een ronde schijf van het gekneede deeg komt te liggen. Vervolgens rolt zij lange worsten van klei, die spiraalsgewijze aan de randen van de schijf worden omhoog gewerkt en glad gemaakt met een spatel van kalebas.

Na de vorming wordt het aardewerk op een koele plaats gedroogd en daaana gepolijst met een stuk kwartsteen of roode aarde, doch vooral een door het water afgeronden z.g. *Marowinitopoe* of Marowijne-steen, die alleen aan de Boven-Marowijne zou te vinden zijn.

De beschildering van het gedroogde aardewerk geschiedt met de gewone Indiaansche verven, nl. *koesoewee*, *tapoeloepa* of *taproepa* a. *lana*, gewoon roet enz. De figuren zijn dezelfde als bij het vlechtwerk in gebruik, doch veel minder fraai en symetrisch.

Het bakken geschiedt langzaam nabij een vuurtje, dat niet te heet mag zijn, anders barst het aardewerk. Is de bakkerij afgeloopen, dan wordt alles nog eens gepolijst en gevernist met het sap van den *Cachou* (*Anacardium occidentale*) en den *Kroponie*. Kapler meldt tevens dat men hiertoe het vocht van sommige kevers gebruikt wat een bruine kleur geeft.

Indiaansch aardewerk is vrij algemeen in de kolonie in gebruik Men heeft groote kommen, *prapi* a. *samaloe* z.g. koorsepatoe (keulsche potten) met breede halzen, *takowari*, djogos met nauwe halzen, car[aïbs]. *potusa* a. *kana*; verder groote kassavepotten, *samakoe* kasiripotten met vlechtwerk er om heen *alinjato* waarin *kasiri* bewaard wordt enz. Zeer eigenaardig is het, dat noch Caraiben noch Arowakken, een oorspronkelijken naam bezitten voor z.g. waterkannen of koelkruiken, doch deze, evenals de negers *watrakan* noemen.

Een typische waterkan heeft een bolronden vorm, eindigende in een hals van zelden meer dan 4 cm in doorsnede; de inhoud bedraagt doorgaans minder dan 8 liter. Zij is een imitatie van de papa godo *Kolo*, de houtachtige, soms 80 cm in doorsnede metende schaal van een vrucht, die groeit als de pompoen.

De roodbruine kleur en vorm van waterkan en kolo komen geheel met elkander overeen; alleen bezit de kruik een rechten hals. Om echter de gelijkenis toch te bewaren wordt de *tapoe* (stopper van de koelkruik) van een kromme verhooging voorzien. Vooral was dit vroeger het geval. Maar tegenwoordig vervaardigen de Indianen sierlijker gevormde waterkannen met dwarsplaatjes boven aan de stoppers.

Ook phantasie-aardewerk ontbreekt niet. Men heeft dubbele, drie- of vier aan elkander verbonden waterkannen, die evenwel niet veel gebruikt worden, wijl een kakkerlak er zoo gemakkelijk inkruipt, doch zich moeielijk weer laat verwijderen. Verder langwerpig gevormde, andere weer als dieren, vogels, padden enz.

Kinderen, hunne moeders navolgende, vervaardigen dikwijls potjes, diertjes enz. hoewel veel van dit kinderspeelgoed ook als aardigheden in de stad te koop wordt aangeboden.

Het Indiaansch aardewerk laat wat sierlijkheid en symetrie aangaat niets te wenschen over. Toch moet in vroeger eeuwen Guiana tot woonplaats hebben gestrekt van Roodhuiden, die nog beter aardewerk konden vervaardigen.' (Penard and Penard 1907/1908:127–129)

k. Curt Nimuendajú (1920s), Palikur, Urucauá River, Brazil

'Wenn man die Graburnen und den Perlentopf der alten Palikur mit den keramischen Leistungen der heutigen vergleicht, so kann man nicht umhin, den Verfall der Töpferie und besonders die Verrohung der Ornamentik zu bedauern. Und auch das Wenige, was die jetzigen Palikur noch an Keramik anfertigen, ist offenbar im Absterben. Trotzdem hat die Töpferei der Palikur eine gewisse Bedeutung, denn wenn diese Indianer darin heute schon wenig leisten, so leisten ihre Nachbarn, die Uaçá-Indianer, die Brasilianer des Curipy und die Kreolen des Oyapock überhaupt gar nichts auf diesem Gebiete und kaufen begierig auf, was immer die Palikur zum Verfkauf bringen. Als kochgeschirr benutzen diese letzteren heute fast nur noch französische Eisentöpfe (soluyéro), selten selbstgefertigte Tontöpfe, die dann in der Form un den Henkeln jene europäische Ware kopieren. Tontöpfe vom Typus von Fig. 12 dienen zum Aufbewahren von Mais und dgl., sind aber ziemlich selten. Eine Nachahmung europäischer Modelle scheint mir auch die flache länglische Schüssel zu sein, doch machen die 4 kleinen Wülste, welche dem Rand aufgesetzt sind, einen indianischen Eindruck.

Im Verschwinden sind die Kaširí-Trinkgefässe, sowohl die einfachen (wanamiú) mit sonderbarm Ringfuss, von denen ich die letzten drei vorhandenen (Fig. 13). Erwarb, asl auch die besonders originellen, auf einem flachen Tonstreifen montierten Doppelgefässe (tukutuku), deren beide Teile durch ein Tonrohr in Verbindung stehen, durch das beim Trinken der Kaširí glucksend aus dem einen Teil in den andern überfliesst. Das einzige vorhandene war schon stark beschädigt (Fig. 14); ein zweites, das ich herstellen liess, hat zwar die richtige Form, doch fehlt ihm die Bemalung.

Röstpfannen für Mandiocamehl warden nogh gelegentlich hergestellt, doch verzendet man statt ihrer gewöhnlich runde, europäischer Eisenplatten, denen man eine Rand aus Lehm oder einen gürtelartigen Reifen aus biegsamen Holzstreifen aufsetzt.

Beid den Palikur wohnte ich der ersten Phase der Herstellung einer tönernen Röstpfanne (xíheilí) bei: Der graugelbe Töpferton wurde durch Tauchen vom Boot aus vom Grund eines flachen Sees in der Savane heraufgeholt und in einer Anajá-Schale aufbewahrt. Dann wurde die Rinde eines Kuëpi (brasilianische Caraipé) genannten Baumes zu Asche gebrannt, diese gesiebt und dem Töpferton beigemischt, wodurch er eine blaugraue Farbe erhielt. In Ermangelung von Kuepi stösst man Tonscherben als Zusatz. Der gebrauchfertige Töpferton lag in einem Klumpen auf einer alten Röstpfanne. Nun reinigte die Töpferin eine Stelle am Boden, legte frische Heliconia-Blätter darauf und beschwerte deren Ränder mit Erdbrocken. Auf diese Unterlage legte sie hierauf parallel und dicht nebeneinander eine Anzahl van 3-4 cm dicken und etwa 15 cm langen Tonwülsten, die sie auf der alten Röstpfanne ausgerollt hatte. Diese wurden zuerst mit den Fingerspitzen, dann mit der flachen Hand zu einer Platte verdrückt: rechwinklig dazu wurden andre angesetzt und ebenso behandelt. Nachdem so der ganze Boden der Röstpfanne fertig geformt war, wurde er mit der nassen Konvexseite eines rechteckigen Cuyascherbens (keihetet) geglättet. Die Arbeiterin schnitt einen Radius aus einem Blattstiel, steckte ein Hölzchen in die Mitte der Tonplatte und mass mit dem Radius rund herum, den Abstand vom Mittelpunkt bezeichnend; der überstehende Ton wurde mit dem Messer Abgeschnitten. Auch stellte sie durch Einstechen eines dünnen Hölzchens die Dicke der Platte fest und Kratzte das überschüssige Material mit dem gezahnten Schaber (kalan) aus einem Cuyascherben ab. Indem dann die Arbeiterin den äusseren Rand dieser Tonplatte zwischen Daumen und Zeigefinger bearbeitete, schuf sie, den letzteren eindrückend, eine rundum laufende flache Rinne. In diese Rinne wurde dann ein aus mehreren Stücken zusammengesetzter, zolldicker Tonring gelegt und dieser zwischen Daumen und Zeigefinger dünn gedrückt. Dann wurde aussen um diese Tonrolle eine zweite um gelegt und an die erste festgedrückt, worauf beide zusammen als Wandung schräg in die Höhe getrieben wurden. Auf den oberen Rand der so begonnenen Wandung wurde dann ein neues Paar von Tonringen, ein innerer und ein äusserer, aufgesetzt u.s.w., bis die Wandung die gewünschte Höhe erreicht hatte.

Eine andre Art der Herstellung besteht darin, dass man eine Vertiefung von der Grösse und Form der Röstpfanne in den Boden gräbt und diese mit Blättern auslegt, wodurch der Abdruck derselben nicht nur auf dem Boden, sondern auch auf den Seitenwänden der Röstpfanne sichtbar wird.

Aus dieser Technick, die Tongefässe in einer entsprechend geformten und ausgelegten Vertiefung im Boden zu modellieren, ist es also zu erklären, wenn man, wie dies bei Monte Alegre und am gegeüberliegenden Amazonasufer der Fall ist, Bruchstücke von Seitenwänden von Gefässen findet, die den Abdruck grober Gewebe aufweisen.

Ubrigens ist es sehr schwer, nicht nur für mich, sondern auch für die Palikur, nach dem Abdruck zu unterscheiden, ob Heliconia- oder Musa-Blätter als Unterlage bei der Herstellung gedient hatten. Als ich den Indianern einen Scherben mit dem Abdruck der Blätterunterlage vorlegte und wissen wollte, von welcher Pflanze die Blätter benutzt worden seien, verliessen sie sich jedenfalls nicht auf den Augenschein, sondern fragten bei der Töpferin an, ob sie sich niet besinnen könne, was für Blätter sie damals verwendet habe, als sie das fragliche Stück anfertigte. Aus derartigen Blattabdrücken, wenn ihre Hekunft von Bananenblättern nicht über jeden Zweifel erhaben ist, auf postkolumbianische Keramik zu schliessen, kann also auch manchmal ein Irrtum sein.

Das wichtigste keramische Produkt der Palikur sind gegenwärtig noch die grossen Kaširítöpfe. Am Uaçá, Curipy oder Oyapock gibs e skein derartiges Gefäss, das nicht von den Palikur stammt. Manche sind wahre Ungetüme von 1 m Durchmesser un 1 m Höhe. Sie haben stets dieselbe Kreiselform un den mächtigen, trichter-förmigen Rand. Da ihre Standfläche sehr klein ist, so werden sie durch Hin- und Herdrehen etwas in die Erde eingegraben. In der Einschnürung ist gewöhnlich ein starker Cipógürtel umgelegt mit zwei aus demselben Material geflochtenen Henkeln, um das Gefäss forttragen zu können. Ein kleiner Kaširítöpf (Fig. 15) wurde für mich auf Bestellung angefertigt, und ich wohnte der ersten Herstellungsphase bei: Die Töpferin legte ein Brett (Bootbank) auf einen grossen, alten Tierschemel, un richtete es druch Unterschieben von Hölzchen gut wagrecht aus. Dann rollte sie eine 5 cm dicke Tonkugel, legte diese auf das Brett und drückte sie flach, so das Bodenstück (nipũha) formend. Darauf rollte sie sorgfältig einen fingerdicken, langen Tonwulst aus und setzte ihn auf den Rand des Bodenstückes auf, nicht spiralig, sondern so, dass er einen vollständigen, geschlossenen Ring bildete. Nun wurde ein zweiter solcher Tonring inne in den ersten hineingelegt und der äussere Ansatz mit dem Daumen, der innere mit der konvexe n Seite des rechtekkigen Cuyascherbens verstrichen und beide zusammen als Anfang der Wandung in die Höhe getrieben. Die Töpferin legte zwei Pfeilrohrstücke als Lineale an diametral entgegengesetzten Punkten an die Aussenseite der Wandlung, um die Symmetrie des Steigungswinkels festzustellen, auch trat sie bisweilen einige Schritte zurück und prüfte das Werk aus die Entfernung. Nach sorgfältiger Verarbeitung den ersten Ringpaares wurden dann zuerst aussen ein bleistiftdicker Wulst 3 cm über den Boden aufgesetzt und dann erest ein zweites Paar Tonringe auf das erste gelegt u. s. w. Das Gefäss wird vor den Brennen bemalt, doch sind die grossen Kaširítöpfe gewöhnlich unverziert. Bisweilen ist ihre Mündung mit einem rundne Holzdeckel verschlossen, in dessen Mitte ein kurzer Pflock als Griff eingesetzt ist. Wenn mann gerade beim Töpfern ist, so stellt man auch Tonpfeifen (makuku = *Nictybius grandis*, Fig. 16), Tonpuppen (Fig. 17) un Tierfiguren, mit Vorliebe Schildkröten (Fig. 18) als Spielzeug für die Kinder her, und die kleinen Mädchen versuche sich eifrig und mit Hingabe in der Töpferkunst.

Ein andres Produkt der Palikur-Töpferei, die flache, geriffelte Schüssel, in der man die Mandioca riebt, findet sich heute nur noch in Bruchstücken auf den alten Wohnplätzen und Friedhöfen dieses Stammes und ist durch ein rechteckiges Reibbrett miet eingesetzten eisernen Topfsplitteren ersetzt worden.' (Nimuendajú 1924:41-47)

l. Karl von Martius (1860s), Tapuyo, Brazil

'Ein anderer Industriezweig, in dem sie gegenwärtig über ihre primitiven Fertigkeiten hinausgeben, ist die Töpferei. Den plastischen Thon (Tyjuca, Tauá, wenn von weisser Farbe Tabatinga), dessen Bänke im Amazonasthale von der Küste bis weit jenseits der brasilianischen Grenze an vielen Orten zu Tag liegen und Ton den Gewässern aufgeschlossen werden, ke[n]tet man jetzt nicht blos mit den Händen, sondern er wird auch geschlemmt, um daraus die Gefässe (Reru) für den gewöhnlichen Haushalt: Schüsseln (Nhaempepo), mit oder ohne Deckel (Çokendapaba), Pfannen (Perirysaba), Krüge (Camotim, Camocy), mit oder ohne Handhabe (Nambi), die oft drei Fuss hoben Töpfe (Igaçaba) für die Gährung und die Platten (Japuna) auf den Beiju-Ofen zu fabrisiren. Das Formen geschieht bei allen rohen Stämmen durch Aneinanderlegung dünner Thoncylinder um ein gemeinschaftliches Centrum, die dann zusammengestrichen und innig mit einander verbunden werden. Unter die Europäer versetzt, hat der Indianer nun auch die Anwendung der Drehscheibe (Guataca baboba) kennen gelernt, und statt der ursprünglich sehr plumpen und dickwandigen Geschirre macht er nun leichtere und dauerhaftere. Dem Material für die Küchengeschirre wird, um grössere Festigkeit zu erreichen, die Asche von der Rinde des Caraipé-Baumes, Moquilea (oder Licania) utilis und Turiuva, beigemengt. In den östlichen Niederungen des Amazonenlandes, besonders nahe am Ocean, schürft der indianische Töpfer wohl auch auf eine, unter der tiefen Humusschicht nicht selten vorkommende Schicht von Porzellan-Erde (Kaolin), und er modifizirt danach den Process des Brennens. Die noch weiche Irdenwaare wird zuerst an der Sonne etwas ausgetrocknet, denn in

Erdgruben gesetzt und gebrannt, indem man über ihr leichte Holzarten entzündet. Für feines Geschirre [p. 713] aus edleren, manchmal fast weissen Thonarten erbaut der Indianer schon Steingruben oder Oefen. Die Formen gewinnen zunehmende Verbesserung; neben den sonst allgemeinen halbkugeligen Schüsseln mit einem Ausschnitte gleich den Barbierbecken sieht man jetzt schon Krüge und Pokale von edleren Verhältnissen, die Deckel nicht selten mit glücklichen Nachbildungen von Menschen- und Thierköpfen, Schlangen u. s. w. verziert. Unverkennbar tritt hier eine gewisse Aehnlichkeit mit den Typen im Geschirre der alten Peruaner und Mexikaner, und mit den Zeichnungen auf den Scherben aus nordamerikanischen Grabhügeln hervor, so dass der eingeborne amerikanische Formentrieb im Ganzen unbehülflich zum Barocken und zum schwermüthig Ernsten hintreibend, sich selbst hier, obgleich ohne directe Tradition, in gewissen, der Raçe eigentümlichen Gestaltungen thätig erweist. Auch in Heiligenbildern, die der civilisirte Indianer manchmal aus Wachs versucht, sind Anklänge an jenen Kunsttypus der amerikanischen Vorzeit vernehmlich; und es ist diess um so eher erklärlich, als er in den Kirchen nur äusserst selten einem christlichen Kunstwerke begegnet, das bildend auf seine ohnehin trübe und unbewegliche Phantasie einzuwirken vermöchte. Einen Maassstab vom plastischen Vermögen des ungebildeten Tapuyo gewähren die Figuren aus der Guarana - Paste, die jetzt manchmal aus den Maué-Dörfern in den Handel kommen, und die noch weniger gelungenen Gestalten aus Thon, die bisweilen als Modell für das elastische Gummi angewendet werden. Wir haben aus diesen Substanzen geformte Figuren von Crocodilen, Chamäleonen, Schildkröten, Adlern, Schlangen, Fischen, Früchten von Ananas, Anona, Acaju u. dgl. gesehen, die zwar den wesentlichen Naturcharakter, zugleich aber auch eine grosse Unbehülflichkeit in feinerer Modellirung erkennen liessen. [p. 714]

Mehr noch als in der Plastik tritt die Eigenart des indianischen Kunsttriebes in der Malerei (Tupi: aimoúm) hervor. Diese strebt grësstmögliche Buntfärbigkeit an und bemüht sich besonders um die Verzierung der erwähnten Thongeschirre. Auf die innere, selten die äussere Oberfläche von Schüsseln, Waschbecken, Kannen, Pokalen u. s. w. werden mancherlei gerade und krumme bunte Linien su Schnörkeln (…) oder über das ganse Gefässe zu einer abgeschlossenen Arabeske verbunden, das wischen Blumen und Thierfiguren mit Sorgfalt und nicht ohne Farbensinn aufgetragen. [p. 715]

Gleichen Schritt mit dieser Thonmalerei hast die Färbung und Bemalung von Wassergefässen, die aus Früchten des Cuité-Baumes (Crescentia Cujete) und aus Flaschenkürbissen geschnitten werden. Der gemeine Tapuyo gebraucht diese Früchte, wie sie vom Baume kommen, nach seinen Bedürfnissen zu Trinkschalen, Cuias (bei den Callinago Cuáicu, und bei deren Weibern Atagle) oder Flaschen (Cabaçú) zugeschnitten, gereinigt und einfach getrocknet. So findet man diess Gerähte bei den rohesten Stämmen. Ein Schritt weiter ist, wenn Innen oder auch Aussen ein lackartiger Ueberzug angebracht wird, und dieser dient endlich als Untergrund für ähnliche Malereien wie bei den Irdenwaaren in den verschiedensten, oft sehr reinen und lebhaften Farben. Diese Industrie ist am Nordufer des Amazonas, in Oitéiro, Prainha und Monte Alegre am [p. 716] meisten entwickelt, und der feinere Theil des Geschäftes in den Händen der Indianerinnen.' (Martius 1867:712–716)

Appendix 4

European descriptions of Amerindian burial rites and interments in the Guianas

Many descriptions are readily available and only a small number of examples are presented here. Further reading can be found in Métraux's *Mourning Rites and Burial forms of South American Indians* (1947) and *La mort amérindienne* (Rostain 1994a:637–668, Annexe 3) or a similar shorter version *La mort amérindienne en Amazonie* (Rostain 2011a).

a. Antonio Vázquez de Espinosa (*c.*1630), Aruaca

'*Capitulo XVI: De los ritos, ceremonias y costumbres de esta nacion Aruaca.*

Esta nacion Aruaca tiene por costumbre quando en la guerra le matan el marido a la muger, en teniendo la nueua de la muerte, se corta el cabello, que lo tiene mui largo, por no tener otro vestido mas que aquel que le dio la naturaleza, y quantas ollas y vasijas tiene las quiebra, y los sibucanes, que son vnos artificios hechos de caña, de hechura y modo de vna manga de vn braco, ó de vna media, que les sirue como de vna prensa, con que benefician su pan, que hazen de Yuca, conque la aprietan y exprimen para sacarle el çumo y jugo, que es mortal veneno, y el pan (sacado este çumo) es sabroso, sano y bueno, quema tambien por luto los dichos sibucanes; y si tenia alguna hazienda de Españoles, como son hachas, machetes, cuchillos y otras cosas que les embiauan para rescatar con ellas esclauos, hamacas, cazabe, miel y otras cosas de la tierra, que el difunto marido tenia a su cargo, lo guardauan las mugeres, para dar dello cuenta a sus dueños.

Y auiendo quebrado y quemado todos sus bienes, por el sentimiento de la muerte de su marido, las labranças y sembrados que tiene de yuca, sus parientes la cogen, benefician y cuezen en vnos hornillos que llaman budales [budares], hasta que el pan que se haze de la yuca se tuesta mui bien, luego todo este pan lo echan en agua hiruiendo y lo bueluen à poner en los sibucanes, que siruen de prensas, y todo lo que và distilando van echando en tinajas que para esto tienen, hasta que hierue como el vino, y lo menean con vnos palos para que hierua y cuezga por igual, con que queda hecho su vino, que llaman Guero, que es del mismo color que el nuestro, aunque mas fuerte, y en menguando las tinajas es senal que esta hecho.

Despues, se juntan todos los parientes, amigos y vezinos a celebrar las obsequias del difunto, llorando y cantando las proëzas, hazañas y valentias, con solene borrachera, bebiendo valientemente, hasta que todos quedan borrachos, y consumen la hazienda del difunto que la viuda tenia, sin que le quede cosa, y ella no assiste a estas obsequias y borrachera, sino se està retirada en su aposento: y en acabando en el modo referido las obsequias y de consumir lo que auia, tratan luego los parientes de casar la viuda, y proponiendole algun nouio le pregunta ella si serà para sustentarla como su marido el muerto, y si el nouio viene con las condiciones que ella le propone, se acuesta en vna jamaca, que es su cama, y el pariente mas cercano que ella tiene la lleua de la mano mui al descuido por donde el que ha de ser su marido està acostado en su jamaca, y estando con mucho cuidado, quando passa por junto a èl, la ase, y se la quita al pariente, que la lleua de la mano, y bregando con ella la acuesta en su cama y duerme con ella; y antes que amanezca se và ella al monte auergonçada, donde està tres dias, sin que el nueuo marido la vea, ni sepa de ella, ni lo pregunta, y a los tres dias se juntan los parientes de ambas partes, y Ie dizen al nouio: Vamos por tu muger; y van todos donde los parientes saben està, y alli se abraçan, y entonces quedan casados de todo punto: y ella le dize: Aduierte, que tengo tal hazienda, ó tantas hachas, ó cuchillos de tal ó tales Españoles, y el otro mi marido las recibio, y hizieron confianca dèl, y no las ha pagado, que tu has de acudir al beneficio desta hazienda, assi por el descargo de la conciencia de mi marido, como por la buena correspondencia: y el mismo marido lo aceta todo, y acude con mucho cuidado y puntualidad, satisfaziendo a sus dueños con buena correspondencia y verdad.

Los principales y Caziques tienen a seis y a ocho mugeres, y cada Luna duerme con la suya y aunque todas tienen cuidado de darle de comer, el plato principal y preferido es de la que duerme con èl aquella Luna. Los Indios ordinarios tienen a dos y a tres mugeres. A la muger llaman soco, al hijo, dadite, y al padre, dajuna, y al amigo, dabuquei, ó tapane.' (Antonio Vázquez de Espinosa [*c.*1630] in Upton 1948:66–67; in de Goeje 1930:487–489)

b. Johannis Sneebeling (1770s), Paragotos, Suriname

'Zijn graf dolven zij op zijde van de loots, waarin zij eene partij groene bladeren deden en begroeven hem dien zelve agtermiddag na alvorens bitterlijk gehuyld te hebben, hem veel geluk op zijn reys wenschende, en hem met verscheyde commissien belastende, om voor hun in de andere wereld te verrigten; en verzogten hem de groetenisse te doen aan hunnen voorouders, broeders en susters en verdere familie. Waarna alle indianen een zoopje dronken, hem nogmaals een behouden reys wenschende, bedekkende hem met een grote partij groene bannanan bladen. Zijn pijl en boog legden zij ook in het graf alsmede een bottel dram, opdat hij een zoopje zoude kunne drinken, als hij daar trek toe mogt krijgen. Daarna smeten zij het graf met aarde toe en de wijven van den overlede bragten alle de schotels glazen kommen die hij gebruikt had bij het graf en smeeten ze allemaal in stukken. En alle de Indianen dansten nog een uur lang rondom het graf. Hiermede eindigde de begrafenis, waarna een ieder na zijn hut ging om te slapen. Zij waren vermoeid van hetgeen zij den vorigen nagt bij den overlede verrigt hadden. De ses wijven van den overlede sneeden alle haare haaren kaal af, leyden dezelve in een klein pagaal, dolven een gat naast het graf van de overlede, en begroeven het daarin. Daarna gingen zij zich in de rivier wasschen en gingen ook slapen.' (Sneebeling in Kloos 1973:25)

A similar but more extensive description is presented by J. D. Herlein (1718:165–168) on the couvade of Caribs near Paramaribo. It is probably a copy from Van Berkel (see below).

c. Anoine Biet (1652), Galibi, Cayenne

'Pour revenir au deffunct, quand ils ont tous bien pleuré, en dansant & en chantant quelque chose de lugubre autour du mort, on luy prepare un bucher, sur lequel on le met avec tous les ustensiles & armes dont il s'est servy. Ils y mettent le feu, le faisant brusler entierement, pendant lequel temps isl font toûjours leurs postures, sans oublier un moment à boire.' (Biet 1664:391)

d. Goupy de Marets (1690), Galibi, Cayenne, French Guiana

'Espèce de lit de terre assez long et assez large pour y metre le défunt, et au dessus ils y faisoient un berceau qu'ils couvroient de feuilles, ensuite de quoi ils apportoient le corps pare comme je l'ai marquee quand ils vont en céremonie aiant soin de lui metre ce qu'ils a de plus beau et de plus rare; le corps étant aisis ils le couchoient dans ce berceau ou il resoit quelque fois six semaines pendant lequel temps ils apportoient à boire, à manger et à fumer ce corps, comme s'il en eut besoin, et étoit gardé par plusieurs qui hurloient jour et nuit comme des loups et récitoient la vie du défunt comme nos prêtres font l'oraison funèbre d'un grand seigneur en France, mais le temps qu'ils ont decide étant fini ils font un bucher autour du berceau, ou ils mettent le feu, brulent le corps du défunt avec ce qu'il avoit à lui de sorte que le corps et les biens finissoient tous ensemble, et faisoient si bien tout bruler qu'il ne resoit que les cendres qu'ils laissoient quelque fois là, ou bien ils les mettoient dans un pot et les renfermoient dans un trou et aussi quelque fois ils les jettoient à l'eau.' (Panhuys et al. 1934:28)

e. Father Jean de la Mousse (1680s), Galibi, Sinnamary River, French Guiana

'La veille de mon départ, je vis venir de grand matin un Indien du voisinage qui venait prier le piaie du carbet de venir voir son fils qui était malade. Je m'informai de lui de quelle taille était son fils, car personne ne sait son âge, les Indiens ne sachant pas compter; il me fit concevoir qu'il avait environ vingt ans. Le lendemain je devais l'aller voir, mais son beau-frère me dit qu'il était mort, ce qui m'affligea fort, et je partis avec un grand nombre d'hommes et de femmes qui allaient pleurer le mort. Quand nous en approchâmes, je fus saisis de frayeur entendant leurs hurlements. Je trouvai le mort dans son hamac caché de tous côtés. Sa sœur et une autre femme dansaient autour du mort à cloche-pied. Sa sœur portait un panier où étaient les petits meubles du mort, comme sa rassade, son couteau etc... L'autre femme avait un paquet de flèches liées avec ses tours de plumes au haut, et en battait la cadence. Le père et la mère étaient accroupis et avaient mutuellement les bras sur leur col et pleuraient de toutes leurs forces; ceux qui les consolaient frappaient tout doucement sur les épaules des affligés. Je fus extrêmement touché de ces spectacles, pas un seul de la famille ne me dit un seul mot tant ils étaient pénétrés de douleur. Je priai néanmoins le beau-frère du défunt de me venir montrer le chemin, ce qu'il fit volontiers me priant d'avertir ceux du carbet où j'allai qu'ils vinssent pleurer le mort.' (in Collomb 2006:54–56)

f. See **George Warren** (1667:27) for a similar ritual of breaking personal belongings, when the deceased is cremated: 'They burn the Dead Body, and with it, all the Goods she was Master of in the World, which are combustible, and what is not, (as Iron-work) they'll destroy by some other means.'

g. Similar customs were witnessed by **Jules Crevaux** (1880s) among the Roucouyennes or **Wayana** upon the Upper Maroni River:

'Le défunt est revêtu de ses plus jolies parures, il porte sur la tête une couronne de plumes aux couleurs éclatantes; à son cou sont attachés ses colliers, son poigne on bois et ses (lûtes en tibias de biche; les bras et les jambes sont recouverts de bracelets. Pendant qu'on s'occupe de celte exhibition, la veuve éplorée jette par terre toutes les poteries dont se servait son mari. Son désespoir n'épargne rien. Tout ce qui appartenait à celui qu'elle aimait est immédiatement détruit.' (Crevaux 1883:121–122)

h. Similar rituals have been witnessed among the Waiwai (Farabee 1924:172), the Makuci (Im Thurn 1883:225) in Guyana and the **Jumanas** of Brazil:

'Der Leichnam wird mit zusammengebogenen Extremitäten, das Antlitz gegen Sonnenaufgang, zugleich mit den zerbrochenen Waffen und einigen, in den Schooss gelegten Früchten, in einem grossen irdenen Topfe begraben. Auf das Grab legen sie, unter Heulen und Tanzen, Früchte und die Kleider (den Federschmuck) des Verstorbenen, welche nach einigen Tagen weggenommen und den unterlassenen übergeben oder verbrannt werden. Ein Trinkgelage schliesst die Ceremonie. Das Grab machen sie von aussen unkenntlich damit es nicht von Feinden bestohlen werde.' (Martius 1867:485)

i. During the 1670s, the family members of the deceased among the **Arawak** population of the Lower Berbice do not wear their customary jewellery during the time of mourning:

'Als de dood iemand van hunne Bloed verwanten heeft weggerukt, leggen zy hunne Kleinoodien af, en gaan voor een korten tijd gantsch naakt; zijnde dit de manier van over d'afgestorven rouw te draagen.' (van Berkel 1695:20–21)

We read that Van Berkel (1695:25) is sent to Essequibo and stays at the plantation *Den Berg* of Master de Feer. His Indian escort asked permission to visit the village of Abari, because of a funerary ceremony held that night in honour of an important chief who had passed away several weeks earlier:

'… dat er ter gemelde plaatse over drie a vier weeken een Capitein was komen te sterven, van wien, om zijne dapperheid, volgens gewoonte eenige beentjes waren gehouden, welk nu verbrand zouden worden. Deze beentjes van deze of geene afgesneden ledemaaten, 't zijn vingers, toonen, enz. welke, na dat er het vleesch schoon afgeschrapt is, drie a vier weeken boven in het dak van 't huis te droogen worden gehangen. Dit is het eenigste, 't geen ze zo lang behouden, wordende anders alles, 't geen den overleeden heeft nagelaten, als bijl, kapmes, mes, houweel, E[t]c. Te gelijk met hem in het graf gesmeten: alzo ze zich inbeelden, dat hy het op de reis van nooden zal hebben. Als men nu de gemelde beentjes zal verbranden, word man en Maagd genoodigd om deze plechtigheid by te woonen. Hier is dan overvloed van drank, by d'Indiaanen *Bassia*, en by ons *Pernou* geheeten.'

Finally, Van Berkel leaves the plantation together with the Indians to witness this feast, described on the following page. An English translation of Van Berkel's *American Voyages* has been provided by Walter Edmund Roth in *The Daily Chronicle* (1948).

j. Father E. Fauque (1736), Palikur, Oyapock River, French Guiana

'J'entrai dans une [c]ase haute, que nous appelons soura en langage galibi; m'entretenant avec ceux qui l'habitoient, je fus tout à coup saisi d'une odeur cadavereuse; et comme j'en témoignai ma surprise, on me dit qu'on venoit de déterrer les ossemens d'un mort, qu'on devoit transporter dans une autre contrée, et l'on me montra en même temps une espèce d'urne qui renfermoit ce dépôt. Je me ressouvins alors que j'avois vu ici, il y a trois ou quatre ans, deux Palikours, lesquels étoient venus chercher les os d'un de leurs parens qui y étoit mort. Comme je ne pensois pas alors à les questionner sur cette pratique, je le fis en cette occasion, et ces sauvages me répondirent que 1'usage de leur nation étoit de transporter les ossemens des morts dans le lieu de leur naissance, qu'ils regardent comme leur unique et véritable patrie.' (Fauque 1835:8)

k. Interestingly, among the **Tupinamba** of northeastern Brazil, we account for similar practices according to Father **Claude d'Abbeville** (1614:329):

'Quand quelqu'un vient à mourir, ils s'assemblent & le pleurent comme il a esté dit, racontant ses loüanges: puis ils le parent de tous ses attours & ornements qu'il avoit, & ayant faict une fosse toute ronde, profonde environ de quatre ou cinq pieds, ils courbent le corps en rond les pieds vers la teste & le mettent en la fosse: en fin redoublant leurs cris lamentables, ils le couvrent & le laissent ainsi enterré.'

l. Mummification and the burning of a corps among the **Tapajó** of the Lower Amazon River was recorded by Father **João Bettendorf** (1910:353–354):

'Estava o Padre Antonio Pereira por então missionario de Gurupatyba e Tapajoz, onde fez uma coisa digna de seu grande [354] zelo e foi esta: que, guardando os indios Tapajoz o corpo mirrado de um de seus antepassados, que cha mavan Monhangarypy, quer dizer primeiro pae, lhe iam fazendo suas honras com suas offertas e dansas já desde muitissimos annos, tendo-o pendurado debaixo da cumieira de uma casa, como a um tumulo a modo de caixão, buscou traça de lh'o tirar para tirar juntamente o intoleravel abuso com que o honravam, em descredito de Nossa Santa Fé. Consultada Maria Moacara, principaleza da aldêa, com alguns de mór nobreza e christandade sobre o negocio, bem queriam que tirasse aquelle escandalo, mas receiavam que os indios se amotinassem contra o Padre e se seguisse algum inconveniente maior; porém elle, confiado em Deus que o havia de ajudar, mandou uma noite botar o fogo á casa onde estava guardado, com que ficou queimado e reduzido en cinza. Sentiram os indios Tapajoz isso por extremo, porém vendo que já não tinha remedio, aquietaram-se por medo dos brancos, que conheciam tomar em bem o que o Padre missionario tinha obrado. Folguei eu muito quando me chegou a noticia daquella tão generosa acção, porque desde o anno de 1661, em que eu tinha sido missionario, primeiro, entre os Tapajoz e feito sabedor daquelle corpo mirrado, sempre tive desejo de consumil-o, e não o fiz, porém por não ter tempo commodo de o poder executar, pois estava por então aquelle aldêa povoadissima de indios, que não convinha alterar logo em aquelles primeiros principios. Era essa gloria reservada ao Padre Antonio Pereira.'

Appendix 5

The descriptions of the preparation and consumption of maize and manioc

a. John Masham (1597)

'For bread there is infinite store of casaui, which is as good bread as a man need to eate, and better then we can cary any thither. We spent not a bit of our owne all the while we were vpon the coast. It is made of a root so called; which they take and scrape, and crush all the iuyce out, being poison; and when it is drie it is as fine floure as our white meale maketh: which drie as it is, without any moisture, they strew vpon a round stone, hauing a still fire vnder it, and so it congealeth to a cake; and when it commeth new off, it eateth like to our new white bread. Besides there is great store of Guiny-Wheat (whereof they make passing good drinke) which after it is once sowed, if you cut off the eare, on the same stalke groweth another [maiz].' (Masham in Goldsmid 1890:194)

b. Olive Leigh (1604)

'Their bread they make of Cassavia, a white Roble commonly a span long, and almost so thicke, which the women grate in an earthen panne against certaine grates of stone, and grate three or foure busshels in a day: The juyce thereof they crush out most carefully beeing ranke poyson raw, in a hose of withe, which they hang up upon an hooke, and afterward with a weightie logge which they- hang at the other end they squeeze out the water into an earthen pan or piece of a Gourd, and then seethe the same juice with their red Pepper whereby it becommeth holesome, and if they will have it sweete, they will seethe it but ordinary, if they will have it sowre, they will seethe it extraordinarily, and use it in manner of sawce, and when they be sicke they eat the same and bread only.

The women also make drinke of this Cassava bread, which in their Language they call Arepapa, by baking of it blacke, dry, and thinne, then chewing it in their mouthes, they put it into earthen pots narrow in the bottome and broad above, contayning some a Firkin, some a Kilderkin, some a Barrell, set in a small hole in the ground, with fire about them. Being well sod, they put it out into great Jarres of Earth with narrow neckes, and there it will worke a day and a night, and keepe it foure or five dayes till it be stale, and then gathering together an hundred and more, they give themselves to piping, dancing and drinking. They make drinke also of Cassava unchewed, which is small and ordinary in their houses. They use also to make drinke of Potatos which they paire and stampe in a Morter being sod, then putting water to it, drinke it.' (Leigh in Purchas 1906:313–314)

c. Jean Mocquet (1604)

'Entre autres, ils aisoient d'vn certain vin ou boisson de fruicts qui enyure comme de la biere ou du citre, & en font de plusieurs couleurs. Ils maschent vne certaine racine, puis la font boüillir fort long temps auec de l'eau, & apres la coulent, qui est la premier façon. Car il y en a d'autres plus espais qui se fo[n]t auec des fruicts de palmes, gros comme vn orenge ; car la noix ne leur sert de rien, puis la font boüillir & passer: & c'est la seconde façon. Il y en a d'vne autre sorte que l'on diroit estre laict-clair meslé auec fourmage mol. I'eus enuie d'en sçauoir le goust, aussi qu'estant prié par eux d'en boire, iene les voulus pas refuser, de peur qu'ils ne pensassent que ie leur loulusse mal : de sorte qu'ils furent fort contents de m'en voir boire.' (Mocquet 1617:82)

d. Robert Harcourt (1609)

'The provisions of this Countrey for victuals, are many: First, of the roote of a tree, called Cassavi, they make their Bread, in manner following; they grate the roote upon a stone, and presse out the juice thereof, which being rawe is poyson, but boiled with Guinea Pepper, whereof they have abundance, it maketh an excellent and wholesome sawce, then they drie the grated roote, and bake it upon a stone, as we bake our Oaten cakes in England. This bread is very excellent, much like, but farre better then our great Oaten cakes, a finger thicke, which are used in the Moorelands, and the Peake in Staffordshire and Darbyshire.

There is a kinde of great Wheat, called Maix, of some it is called Guinea Wheat, which graine is a singular provision in those Countries, and yeeldeth admirable increase, even a thousand or fifteene hundred for one, and many times much more. It maketh excellent meale, or flower for Bread; and very good Malt for Beere or Ale, and serveth well for sundry other necessary uses for the reliefe of man. Of the aforesaid Cassavi bread, and this Wheate the Indians make drinke, which they call Passiaw : it will not keepe long, but must be spent within foure or five dayes : they make another kinde of drinke of Cassavi, called Parranow, very good and strong, much like unto our best March beere in England, and that kinde of drinke will keepe ten dayes ; many sorts they have which I have tasted, some strong, some small, some thicke, some thin, but all good, being well made, as commonly they were amongst the Yaios, and Arwaccas, which are the denliest people of all those Nations.' (Harcourt in Purchas 1906:378-379)

e. Jean Chrétien (1725)

'Nos galibis au contraire habitent de bonnes terres qu'ils cultivent un ou deux ans après quoy ils font de nouveaux défrichés pour s'épargner la peine de sarcler les anciens; ils se réunissent par troupes pour faire ces abbatis un pour chacun en particulier et chacun a aussy soin de régaler la troupe d'un grand vin, ainsy les vins servent de monoye pour les payements et cette monoye a grands cours dans le pays, c'est la leur centre c'est la surtout qu'on rit de bon coeur, c'est la qu'ils paroissent si peu timides qu'il est icy passé en proverbe être hardy comme un indien dans un grand vin. Tout y boit hommes et femmes vieillards et enfans et ce qui est honteux on s'ennyvre jusqu'a rendre tripes et boyeux. Le magnoc est la plante qu'ils cultivent le plus comme la plus necessaire, puisque c'est de sa racine qu'ils font leur pain et leur vin.

Elle ressemble asses a celle de la pastenade (sorte de panais) mais elle multiplie si fort en terre qu'une pièce de magnoc qui nourrit six personnes n'en nourriroit pas plus d'une si elle étoit ensemencée de froment ; apres auoir raclé cette racine pour en emporter la peau on la rappe on la presse afin d'en exprimer un suc qui est un poison si puissant qu'en moins de rien il tue tout animal qui en a bu. La forme qui sort de la presse est fort blanche on la fait un peu boucanner on la passe par le tamis et sans la detremper auec de l'eau on la jette sur une platine qui est au feu ; dans l'espace d'un bon *miserere* vous avez un grand gateau cuit d'un côté, vous le tournez de l'autre pour le faire cuire de l'autre, et la cassave ainsy faitte s'expose au soleil afin de la durcir et la conserver si vous voulez plusieurs mois. Elle est beaucoup meilleure fraiche et ceux qui y sont accoutumés la trouvent aussy bonne que notre pain lorsqu'elle est fine et cuitte à propos. Pour ratisser la racine de magnoc on se sert d'une grage qui est une espece de rape faite avec des petits éclats de pierre aigus en saillie et enfoncés avec art dans un bois mol ou ils tiennent bien et pour exprimer le suc mortel du magnoc gragé, c'est le terme, on met cette pate dans une espece de chausse appellée couleuvre industrieusement travaillée auec l'écorce d'un jonc pliant.

On fait auec du magnoc ou auec de la cassave cinq ou six sortes de boissons, ce qu'il y a d'admirable c'est que le magnoc gragé sans qu'on en oit [ait] exprimé le suc venimeux sert à faire une des meilleurs boissons indiennes, ce suc perdant dans la cuisson tout ce qu'il auait de mauvais ; de ce suc meme ils font une moutarde qui est asses bonne y ajoutant quelques piments ; pour les boissons tantot on met a tremper dans l'eau de la cassave toutte chaude et un peu brulée apres l'auoir ecroutée, tantot on luy donne une espece de chancissure (moisissure) rouge par la fraicheur et par l'humidité ; ce sont de differentes boissons ; pour en auoir de garde on fait de la cassaue une pâte que l'on detrempe ensuite dans de l'eau. Cette liqueur est rafraichissante et blanche comme une amande, ordinairement la cassave est pure et sans aucun mélange quelquefois aussy on y mêle certaines autres racines et graines pour faire la boisson, mais il n'y en a jamais de bonne sans la mastication, il faut macher de la cassaue et la cracher dans le canari afin de donner un levain ou un ferment au corps de la boisson et la rendre par la plus piquante et plus forte mais c'est aussy ce qui rend ces boissons si degoutantes à tout autre qu'a un indien lors qu'on ny est pas fait ; c'est cependant leur faire un affront et de la peine de refuser d'en boire pour cette raison, ils sont bien eloignés d'auoir eux mêmes du degout pour le vin, ils le trouvent fort bon mais ils aiment encore mieux le tafia ou la guildive, eau de vie qu'on fait avec les cannes ou avec les syrops du sucre, elle n'est pas si malfaisante que notre eau de vie de france sans quoy il creveroit icy bien du monde.

Ce sont les femmes qui font la cassave et la boisson ou pour mieux dire tout le gros travail ; apres que les hommes ont brûlé l'abbatis c'est aux femmes à le planter et à en tirer les racines, a grager le manioc et a le préparer en tant de sauces, outre le detail du menage qui les regarde uniquement ; aussy sont elles fort laborieuses toujours sur pied et jamais sans travail auec de la souplesse obeissantes fort douces, on diroit qu'elles sont moins les compagnes que d'honnetes servantes de leurs maris, elles ne sont point admises à leur table et ne mangent qu'apres eux et a la caze particulière ou elles font leur tripotage, mais c'est le deffaut des indiennes aussy bien que des autres femmes de parler beaucoup, cependant ce seul deffaut sera quelquefois cause que leurs maris les quitteront ; si les missionaires n'avaient pas plus de patience et de charitté ils auroient bien plus de raison de se rebutter de leur entetement par mille superstitions dont elles sont infatuées.' (Chrétien in d'Harcourt 1957:63–65)

f. Pierre Barrère (early 18th century)

'Les Créoles préferent encore, au meilleur Pain du monde, la Cassave, qu'elles mangent rarement sèche ; car elles la font toujours tremper dans l'eau, ou dans quelque sauce : C'est, sans doute, cette nourriture qui leur donne cette couleur pâle, & qui fait qu'elles n'ont point de coloris. On ne mange que très-rarement à Cayenne, ou, pour mieux dire, presque jamais, de la *Coaque*, qui est la nourriture ordinaire des Portugais de Para, du Maragnan, & des peuples qui sont sur les rivages du fleuve des Amazones. La Coaque n'est autre chose que la farine de Maniok, qu'on étend sur une platine de fer, ou de terre, au-dessous de laquelle on fait du feu, de même que si on vouloit faire de la Cassave. On a soin de remuer cette farine, lorsque la chaleur commence à la pénétrer, afin d'empêcher qu'elle ne se lie; & on la réduit ordinairement en manière de dragées. Les Indiens Portugais, quand ils veulent prendre leurs repas, ils mettent une Coaque sur dans le creux de la main, qui leur sert d'assiette ; & de-là ils la font sauter adroitement dans la bouche; l'on boit par-dessus une bonne coüye d'eau & de boisson: & voilà leur repas pris. C'est la maniere ordinaire de se nourrir, non-seulement chez les Sauvages, mais encore chez les Portugais limitrophes des Amazones. Ils sont faits à cette vie frugale: aussi sont-ils très-propres pour la découverte des terres, & pour les longs voyages, où il faut se charger le moins qu'on peut, & ne porter avec soi, que les choses les plus néceissaires. La Coacque a un avantage par-dessus la Cassave; c'est que celle-là se conserve à merveilles, pourvû qu'elle soit à couvert de l'eau: au- lieu que l'autre ne sçauroit être gardée long-tems, sans se gâter. Les vaisseaux Portugais, qui vont traffiquer dans ces quartiers-là, ne manquent pas d'en faire provision pour leur usage, surtout quand l'Equipage se trouve court de vivres.

Il seroit inutile de décrire ici le *Maniok*, & la maniere de faire la Cassave. Cela est trop connu aujourd'hui, & se trouve dans un trop grand nombre de Rélations, pour m'y arrêter. Je dirai seulement deux mots sur la culture de cette Plante.

On distingue d'abord le Maniok en plusieurs especes ; sçavoir en bois branchu, ou bois maillé, bois d'oziers, bois blanc, bois gris, & bois ronge, ainsi appellé, à cause de la couleur de la tige au de la racine.

Toutes sortes de Maniok, qui sont celles qui sont connuës aux habitants du pays, se plantent à-peu-près de la même manière : sçavoir, dans les terrains élevés, on fait des trous, dans lesquels on met un peu en pente un ou deux morceaux de bois d'environ demi pied de long, qu'on a soin de couvrir ensuite d'un peu de terre.

Dans les terres basses & plattes, afin d'empêcher le Maniok de pourrir, on fait des grosses mottes, dans lesquel-les on plante ordinairement quatre bouts de bois. On a coûtume de faire ces trous asssez près les uns des antres ; & il n'y a que le bois qu'on appelle branchu, parce qu'il s'étend beaucoup à la ronde, qui demande d'être planté à quatre pieds de distance. La meilleure de toutes ces espèces de Maniok est le bois maillé, ainsi nommé du nom des Indiens d'où il a été apporté. Le bois d'oziers, qui ne se plante pour l'ordinaire que dans un terrain sabloneux, vient d'une grosseur extraordinaire. Ses racines, de même que celles des autres espèces, sont ramassées en maniere de grosses carottes, chacune desquelles a quelquefois plus d'un pied & demi de long, sur trois ou quatre pouces de gosseur. Enfin le Maniok, de même que certains fruits, devient plus ou moins gros, selon la qualité du terrain où il a été planté. Il se multiplie beaucoup mieux de bouture, que de graine. Le tems, auquel on a coûtume de l'arracher, est quinze ou dix-huit mois après qu'il a été planté, après lequel il devient *Mapou* ; c'est-à-dire, il sèche entièrement dans la terre. Les habitans qui se trouvent courts de vivres, n'attendent pas que le Maniok aïe dix-huit mois ; ils l'arrachent avant même qu'il n'aïe qu'un an.

Le Maniok est un poison mortel, non-seulement à l'homme, mais encore aux animaux, & surtout aux bêtes de somme, quoiqu'elles en mangent les feüilles & la racine avec beaucoup d'avidité, sans en être sensiblement incommodées. Il est surprenant qu'une racine, dont deux onces du suc donnent la mort à l'homme & à tous les autres animaux, même jusu'aux insectes, serve pourtant de nourriture à un nombre innombrable de nations répanduës dans le vaste continent de l'Amérique. La racine cruë n'est point du tout dangereuse aux animaux ; au contraire, elle les affriande si fort, & principalement les Biches, qu'elles gâtent des pièces entieres de Maniok, capables de nourrir un grand nombre d'esclaves. Il y a encore des insectes qui désolent cette plante, quand elle commende à pousser, au point qu'on a vû arriver des disettes de vivres. On est quelquefois obligé d'abandonner certains quartiers, quoiqu'excellens, à cause des fourmilières, qui ruinent entièrement tous les plantages.' (Barrère 1743:55–60)

g. Jacob Jan Hartsinck (early 18th century)

'*Beschryving van hunne Levensmiddelen*

Hun dagelyks Voedsel bestaat in Vleesch van allerhande Wildbraad en Gediertes, als Harten, Woudezels, Varkens, verscheidene soorten van Aapen, Cabritten, en wat het Land voortbrengt; als ook in verscheidene zo Zee- als Rivier-Visschen, gelyk Zeekoeyen, Schildpadden, vooral Krabben enz.; en in Vruchten en Wortelen.

Het Vleesch braaden of droogen zy meestentyds op een Berbecot; of zy kooken het zelve met Visch, Wortelen en alles onder een, in hunnen Peperpot, met Atty of Spaansche Peper, die zy overal by gebruiken en eeten.

Hun Brood maak en zy van zekeren Wortel, die by de Arowakken *Kalliedallie* of Broodwortel, en by de Europeërs en Indiaanen gemeenlyk *Cassave* genaamd wordt, en waar van wy in't vervolg nader zullen spreeken.

Zy raspen deezen Wortel raauw zynde en schoon gewasschen, zo fyn als Zaagzel: de Raspen daar toe gebruikt wordende zyn gemaakt van Kooper, vyftien of achttien Duim lang, en tien tot twaalf Duim breed, gespykerd op een Plank van drie en een half Voet lang en één Voet in 't midden breed: de Negerrin, die de Wortelen raspt, maakt het eene end vast in een Houten Bak, en het andere end tegen haar Borst houdende, en heeft naast haar staan een Mandje met de schoon gemaakte Wortelen, waar van zy in ieder Hand één neemt, en dezelve op die wyze fyn raspt: dan neemt men dit Raspsel om het in de Pers, *Jouri* genaamd, te doen, en 'er het Sap uit te drukken, waar na het bekwaam is om 'er Brood van te bakken. Sommigen maaken de voor- [p. 24] noemde Pers van een Houten Bak, die doorboorende met kleine gaatjes, daar zy een Mat of Zeef van dunne Takjes in plaatsen, en het Meel boven op liggen, het zelve bedekkende met een Plank, welke met zwaare Steenen wordt belegt, om het dus door deeze klemming styf uit te perssen: anderen doen het Meel in Zakken, van groene Tienen gemaakt, met Planken van elkander gescheiden, welke toegeparst worden door middel van een zwaar Hout of Stok, wiens eene einde in den Stam van een Boom is vast gehecht, en aan wiens ander einde een zwaare Steen is gebonden, en dus door deezen Hef boom wordt uitgeperst; of zy hangen deeze Zakken aan den Tak van een Boom, en onder aan een zwaaren Steen, wiens zwaarte de Zak uitrekkende, dezelve vernaauwd en dus het Sap uitdrukt: uitgedrukt zynde worden de Stukken op een Berbecot gedroogd, en vervolgens door een *Manarie*, zynde een Zeef van Iteriet-Bladeren, gezift, dat in een *Habba* of Mand valt. De Indiaanen, voor dat de Europeaanen hen bekend waren, raspten hunne Cassave op Stukken Hout, *Samarie* genaamd, met kleine scherpe Steenen; of op scherpe Klipsteenen, die boven in de Rivieren gevonden worden; en bakten de Koeken op Pannen van Klei gemaakt.

Voorts hebben zy overvloed van *James, Patates*, Wortelen, Vruchten en Boomgewassen, die wy nader zullen beschryven.

De Dronkenschap is een algemeen gebrek by de Indiaanen: zy hebben geen Saamenkomsten of Feesten daar zy zich niet te buiten gaan in hunne sterke en beminde Dranken; waar uit dikwyls twisten en vechteryen ontstaan; schoon de Salivas, een Volk aan de Oronoque, roemen, met Oordeel te drinken, wyl zy beschonken zynde, nooit twisten of vechten zullen.

Hunne Dranken bestaan in *Graab*, een mengsel van Syroop en Water, het welk drie of vier Dagen gestaan hebbende, sterk genoeg is, om iemand dronken te maaken. *Beltier* wordt gemaakt van Cassave-Brood, dat zy breeken, of, volgens het zeggen van anderen, door oude Wyven laaten kaauwen, en in Water weeken tot dat het een dikke Pap word, die zy dan tusschen Bladeren laaten droogen, en als zy die gebruiken willen, met Water mengen; zo dat men genoodzaakt is, dezelve drinkende, de Tanden op malkanderen te sluiten, om niet in de Brokken te stikken. De *Payewari* wordt byna op dezelve wyze bereid, [p. 25] doch moet maar één nacht staan, waar door ze een scherpe en aangenaame Smaak krygt; doch diende mede wel, om de Brokken, door een Doek gegooten te worden. De *Cassyry* en *Maby*, is een Drank van roode James, Patates, Cassave Brood en Suiker, insgelyks toegemaakt; welke twee of of drie dagen te gesten word gezet, waar naar ze een kleur en kracht van ligte roode Wyn krygt, zynde zeer aangenaam om te drinken. De *Chica*, is een soort van Bier, gemaakt uit verscheide Graanen of Fruiten, maar gemeenlyk van Maïz of Turksche Tarw': na dat zy dit Graan hebben fyn gestooten, maaken hunne Vrouwen 'er Brood af, het welke zy in Palmite bladen bewinden, en dan in een Pot met Water laaten kooken; als dit Brood versch is, kruimelen zy het fyn, en mengen het met warm Water, voorts neemen zy vyf Brooden, die zy *Sibery* noemen, welke beschimmeld zyn, en maaken dezelve zo fyn als Meel, het welke zy met de voornoemde Pap of vocht mengen, en in Potten laaten gesten, geduurende drie dagen, wanneer het een goed en met maate gebruikt, gezond Bier maakt. De *Chica* die zy van de Cassave of Manioc wortel maaken, is nog gezonder: zy neemen eenigen van die Koeken, welke zy, nog warm zynde, op elkander liggen, met Palmite bladen bedekken, en, na dat zy gegist hebben, in warm Water uitweeken en in Potten doen, om verder uit te gisten. Deezen Drank noemen zy *Pernou* of *Berria*, naar de Berri of Cassave waar van dezelve gemaakt wordt.' (Hartsinck 1770:23–25)

Bibliography

Abbenhuis, M. F.
1940 *Arawakken in Suriname. Enquête-materiaal voor een volkenkundige studie,* R.K. Missie. Paramaribo: Drukkerij Leo-Victor

Abbeville, C., de
1614 *Histoire de la Mission des Peres Capucins en l'isle de Maragnon et terres circonvoynes* […]. Paris: Chez François Huby

Abonnenc, E.
1952 Inventaire et distribution des sites archéologiques en Guyane française, *Journal de la Société des Américanistes* 61:43-63

Acevedo, R. E. Marin, F. Gomes,
2003 Reconfigurações coloniais: tráfico de indígenas, fugitivos e fronteiras no Grão-Pará e Guiana Francesa (séculos XVII e XVIII), *Revista de História* 149(2):69-107

Acosta, J., de
1590 *Historia Natural y Moral de las Indias* […], Sevilla: Juan de Leon

Acuña, C., d'
1641 *Descubrimiento del Gran Rio de las Amazonas* […], Madrid: Imprenta del Reyno

1698 *The First up the River of Amazzons to Quito in Peru, and back again to Brazil, perform'd at the Command of the King of Spain*, Voyages and discoveries in South America. London: Samuel Buckley

Adams, W., D. van Gerven, R. Levy
1987 The Retreat from Migrationism, *Ann. Rev. Anthropol.* 7:483-542

Ahlbrinck, W.
1927 *Vijf maanden in het oerwoud*. Rotterdam: E. de Bont & Zoon

1931 *Encyclopaedie der Karaïben. Behelzend Taal, Zeden en Gewoonten Dezer Indianen. Geïllustreerd door E. La Rose, Teekenaar bij den Opnemingsdienst te Paramaribo.* In: Verhandelingen der Koninklijke Akademie van Wetenschappen te Amsterdam, Afdeeling Letterkunde, Nieuwe Reeks 27(1). Amsterdam: Koninklijke Akademie van Wetenschappen

1956 Op zoek naar de indianen, Verslag van een expeditie naar de zuidgrens van Suriname ter opsporing en bestudering van twee onbekende Indianenstammen: de Wama's en de Wajanikoele's, *Mededelingen Koninklijk Instituut van de Tropen* 118, Amsterdam

Almeida, F. O., de
2008 *O complexo Tupi da Amazônia Oriental*, Master Thesis, University of São Paulo, ms

Allaire, L.
1977 *Later Prehistory in Martinique and the Island Caribs: Problems in Ethnic Identification*, PhD Dissertation Yale University, ms

1980 On the Historicity of Carib Migrations in the Lesser Antilles, *American Antiquity* 45(2):238-245

1984 A reconstruction of early historical Island Carib pottery, *Southeastern Archaeology* 3 (2):121-133

2013 Ethnohistory of the Caribs, *The Oxford Handbook of Caribbean Archaeology*, W. F. Keegan, C. L. Hofman, R. Rodríguez Ramos (eds.), 97-108. Oxford: Oxford University Press

Allorge, L., B. Bordenave, M. Hoff
2001 L'exploration botanique en Guyane française, *L'exploration naturaliste des Antilles et de la Guyane*, J.-L. d'Hondt, J. Lorenz (eds.), 159-172. In: Actes 123^{e} Congrès national des Sociétés historiques et scientifiques. Paris: Éditions CTHS

Altena, E.
2007 The burials of the San I site at Manzanilla, eastern Trinidad: a preliminary study on reconstructing funerary behaviour of the Late Pale Seco and Arauquinoid inhabitants, *Proceedings of the XXIth Congress of the International Association for Caribbean Archaeology, Trinidad 2005*, B. Reid, H. Petitjean Roget, A. Curet (eds.), Vol. 1, 306-314. University of the West Indies

Andrade, O., de

1928 Manifesto Antropófago. *Revista de Antropofagia* 1(1)

Anghera, P. Martyr

1912 *De Orbe Novo*, The Eight Decades of Peter Martyr d'Anhera, Translated from the Latin with Notes and Introduction by F. A. MacNutt, 2 Vols. New York/ London: G. P. Putnam's Sons

Anonymous

1678 *Relation de la prise des Ifles de Gorée au Cap-Vert & de Tabago, dans l'Amérique, sur les Hollandois, par l'Escadre des Vaisseaux du Roy, commandée par le Comte d'Estreées, Vice-Amiral de France* […], 141-151

Anonymous

1996 *Histoire naturelle des Indes. The Drake Manuscript in The Pierpont Morgan Library.* New York: W.W. Norton & Company

Anonymous de Carpentras

2013 Relation d'un voyage infortuné fait aux Indes occidentales, *Voyageurs anonymes aux Antilles*, B. Grunberg, B. Roux, J. Grunberg (eds.), 17-111, In: Corpus Antillais 4, Collection de sources sur les Indiens caraïbes. Paris : L'Harmattan

Anonymous de Saint-Christophe

2013 Relatin des îles de Sainct Christofle, Gardelouppe et la Martinique, *Voyageurs anonymes aux Antilles*, B. Grunberg, B. Roux, J. Grunberg (eds.), 113-132, In: Corpus Antillais 4, Collection de sources sur les Indiens caraïbes. Paris : L'Harmattan

Anthiaume, A.

1916 *Cartes marines, constructions navales, voyages de découverte chez les Normands, 1500-1650*, Volume II. Paris: Ernest Dumont

Araújo, A. K. Reinhard, D. Leles, L. Sianto, A. Iñiguez, M. Fugassa, B. Arriaza, N. Orellana, L. F. Ferreira

2011 Paleoepidemiology of intestinal parasites and lice in pre-Columbian South-America, *Revista de Antropología Chilena* 43(2):303-313

Arvelo-Jiménez, N., H. Biord

1994 The Impact of Conquest on Contemporary Indigeneous Peoplesof the Guiana Shield: The System of Orinoco Regional Interdependence, *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*, A. Roosevelt (ed.), 55-78. Tucson: The University of Arizona Press

Andel, T., van

1967 The Orinoco Delta, *Journal of Sedimentary Petrology* 37(2):97-130

Andrea, F., Silva

2009 A etnoarqueologia na Amazônia: contribuições e perspectivas, *Boletim do Museu Paraense Emílio Goeldi*, Ciências Humanas 4(1):27-37

Arends, J.

2002 The history of the Surinamese Creoles I, A sociohistorical survey, *Atlas of the Languages of Suriname*, E. Carlin, J. Arends (eds.), 115-130. In: KITLV Caribbean Series 22. Leiden: KITLV Press

Armanville, F.

2010 *Washiba, Zone de Droits d'Usage Collectifs arawak-lokono, Un exemple de réappropriation du territoire par une ethnie amérindienne en Guyane française,* Master 1, University of Toulouse-Le Mirail, ms

Arnold, D. E.

1985 *Ceramic theory and cultural process*. Cambridge: Cambridge University Press

2000 Does the Standardization of Ceramic Pastes Really Mean Specialization? *Journal of Archaeological Method and Theory* 7(4):333-375

Arroyo, M., L. Blanco, E. Wagner

1999 *El arte préhispanico de Venezuela*. Caracas: Fundacion Galeria de Arte Nacional

Arroyo-Kalin, M.

2008 *Steps towards and Ecology of Landscape: a Geoarchaeological Approach of the Study of Anthropogenic Dark Earths in the Central Amazon Region, Brazil*, PhD Dissertation University of Cambridge, ms

2010 The Amazonian Formative: Crop Domestication and Anthropogenic Soils, *Diversity* 2(4):473-504

2012 Slash-burn-and-churn: Landscape history and crop cultivation in pre-Columbian Amazonia, *Quaternary International* 249:4-18

2014 Amazonian Dark Earths: Geoarchaeology, *Encyclopaedia of Global Archaeology*, C. Smith (ed.), 168-178. New York: Springer

Artur, J. F.

*c.*1680 *Mémoires pour servir à l'histoire générale des découvertes et des établissements des différentes nations de l'Europe. Dans la Guyane par M. Artur (1498-1680),* Bibliothèque Nationale de Paris, Nouvelles Acquisitions Françaises 2579, microfilm 7959, ms

2002 *Histoire des Colonies françoises de la Guianne*, Transcription établie, présentée et annotée par Marie Polderman. Matoury: Éditions Ibis Rouge

Aruajo, A., W. Neves, L. Pilo, J. Atui

2005 Holocene dryness and human occupation in Brazil during the "Archaic Gap", *Quaternary Research* 64:298-307

Arvelo-Jiménez, N.

1977 A Study of the Process of Village Formation in Ye'cuana Society, *Carib-Speaking Indians*, E. Basso (ed.), 106-113. In: Anthropological Papers of the University of Arizona 28. Tucson: University of Arizona Press

Atchison, J., R. Fullagar

1998 Starch Residues on Pounding Implements from Jinmium Rock-shelter, *A Closer Look.Recent Australian Studies of Stone Tools*, R. Fullagar (ed.), 109-126. In: Sydney University Archaeological Methods Series 6. Sydney

Atlas Illustré de la Guyane

2004 Sous la direction de Jacques Barret, Laboratoire de Cartographie de la Guyane, Institut d'Enseignement Supérieur de Guyane

Auger, R.

2012 Quincy, Rémire-Montjoly, *Bilan scientifique Guyane* 2006:36-40

Augustinus, P.

1980 Actual development of the chenier coast of Suriname (South America), *Sedimentary Geology* 26:91-113

Baarle, P., van, M. Sabayo, G. van der Stap

1989 *Arhwaka Lokonong Djang: Arowakse Taalkursus en Woordenboek*, Amsterdam: Instituut voor Algemene Taalwetenschap en Sociaal-culturele vereniging Ikyoshie

Babot, M. P., del

2003 Starch grain damage as an indicator of food processing, *Phytolith and Starch Research in the Australian-Pacific-Asian Regions:The State of the Art*, D. M. Hart, L. A. Wallis (eds.), 69-81. In: Terra Australis 19, Pandanus Books for the Centre for Archaeological Research and the Department of Archaeological and Natural History. Canberra: The Australian National University

Bailey, G.

1983 Concepts of Time in Quaternary Prehistory, *Annual Review of Anthropology* 12:165-192

2007 Time Perspectives: Palimpsests and the Archaeology of Time, *Journal of Anthropological Archaeology* 26:198-223

Baines, J., N. Yoffee

1998 Order, Legitimacy, and Wealth in Ancient Egypt and Mesopotamia, *Archaic States*, G. M. Feinman, J. Marcus (eds.), 199-260. Santa Fe: School of American Research Press

Baldwin, J.

1995 *Tomahawks, Pipe axes of the American frontier*. In: Of the American Frontier, Early American Artistry-Trading Company

Balée, W.

1989 The Culture of Amazonian Forests, *Advances in Economic Botany* 7:1-21

1992 People of the fallow: A historical ecology of foraging in lowland South America. *Conservation of Neotropical Forests: Building on Traditional Resource Use*, K. H. Redford, C. Padoch (eds.), 35-57. New York: Colombia University Press

1998 Historical ecology: Premises and postulates. *Advances in Historical Ecology*, W. Balée (ed.), 13-29. New York: Columbia University Press

2006 The research program of historical ecology, *Annu. Rev. Anthropol.* 35:5-98

2010 Amazonian Dark Earths, *Tipití: Journal of the Society for the Anthropology of Lowland South America* 8(1), 3: http://digitalcommons.trinity.edu/tipiti/vol8/iss1/3

Balfet, H., M. F., Fauvet-Berthelot, S. Monzon
1983 *Pour la normalisation de la description des poteries,* Musée de l'Homme, Laboratoire d'Ethnologie, Département de Technologie Comparée. Paris: Éditions CNRS

1989 *Lexique et typologie des poteries,* Paris: Presse du CNRS

Bancroft, E.
1769 *An Essay on the Natural History of Guiana, In South America. Containing A Description of many Curious Productions in the Animal and Vegetable Systems of that Country* […]. London: T. Becket & P. A. De Hondt

Bandeira, A., Marques
2009 Pesquisa Arqueológica no sambaqui do Bacanga, São Luís, Maranhão: reflexões sobre a ocorrência de cerâmica em sambaquis do litoral equatorial amazônico, *Revista Amazônica* 1(2):484-511

2010 Ocupações pré-historicas de pescadores-colectores-caçadores e ceramistas no Litoral Equatorial Amazônico: a antiguidade cerâmica em foco, *Arquéologia Amazonica 2*, E. Pereira, V. Guapindaia (eds.), 655-680. Belém: MPEG/IPHAN/ SECULT

Banks, W., C. Greenwood
1975 *Starch and Its Components*. Edinburgh: Edinburgh University Press

Barbé-Marbois,
1834 *Journal d'un député non-jugé en violation de la Loi*, 2 Tomes, Paris: Firmin Didot Frères

Barlow, J., T. A. Gardner, A. C. Lees, L. Parry, C. A. Peres
2012 How pristine are tropical forests? An ecological perspective on the pre-Columbian human footprint in Amazonia and implications for contemporary conservation, *Biological Conservation* 151:45-49

Barone E., K. Sarge, D. Massemin
2000 *La tradition céramique amérindienne : pratiques techniques et symboliques pour une valorisation artisanale au sein du futur parc*. EMC² Guyane/MEDD, ms

Barone-Visigalli, E.
2007 Mémoires archéologique et modes d'occupation du territoire guyanais. *Comprendre la Guyane d'aujourd'hui. Un department français dans la region des Guyanes*, S. Mam Lam Fouck (ed.), 23-49. Matoury: Ibis Rouge Éditions

Barone-Visigalli, E., M. T. Prost
1991 *Modalités d'occupation des sites amérindiens en Guyane: le cas de la Sablière, à Kourou*, Direction des Antiquités, ms

Barton, H., R. Torrence, R. Fullagar
1998 Clues to Stone Tool Function Re-examined: Comparing Starch Grain Frequencies on Used and Unused Obsidian Artefacts, *Journal of Archaeological Science* 25:1231-1238

Barre, Lefebvre, de la, J.-A.
1666 *Description de la France Equinoctiale, cy-devant appellee Gvyanne, et par les Espagnols El Dorado* […]. Paris: Jean Ribov

Barrère, P.
1743 *Nouvelle relation de la France Equinoxiale, contenant la description des côtes de la Guiane, de l'isle de Cayenne, le commerce de cette colonie, les divers changements arrivés dans ce pays, et les moeurs et coûtumes des différents peuples sauvages qui l'habitent* […]. Paris: Piget, Damonneville et Durand

Barreto, C.
1998 Brazilian Archaeology from a Brazilian Perspective, *Antiquity* 72(277):573-581

2008 *Meios misticos de reprodução social: arte e estilo na cerâmica funerária da Amazônia antiga*, PhD Dissertation University of São Paulo, ms

Barreto, M., Vianna
1992 História da pesquisa arqueológica no Museu Paranese Emílio Goeldi, *Boletim do Museu Paraense Emílio Goeldi*, Antropologia 8(2):203-294

Barse, W. P.
1989 *A preliminary archeological sequence in the Upper Orinoco Valley, Territorio Federal Amazonas, Venezuela,* PhD Dissertation Catholic Univeristy of America, ms

1990 Preceramic Occupations in the Orinoco River Valley, *Science* 250:1388-1390

1995 El Período arcaico en el Orinoco y su contexto en el Norte de Sud América, *Ambito y Ocupaciones tempranas de la América tropical*, I. Cavelier, S. Mora (eds.), 99-113. Bogotá: Instituto colombiano de Antropologia

2000 Ronquin, AMS Dates, and the Middle Orinoco Sequence, *Interciencia* 25(7):337-341

2008 Grater flakes, The Pozo Azul Norte Site and Orinocan Subsistence Practices, *International Journal of South American Archaeology* 3:37-44

2009 The Early Ronquin Paleosol and Orinocan Ceramic Sequence, *Bulletin of the Peabody Museum of Natural History* 50(1):85-98

Barthe, S.
2012 *Signatures de transitions démographiques des arbres de la Forêt Tropicale Humide du plateau des Guyanes*, PhD Dissertation Universtiy of Antilles et de la Guyane, ms

Basso, E. B.
1977 Introduction: The Status of Carib Ethnography, *Carib-speaking Indians; Society, Culture, and language*, E. Basso (ed.), 9-22. In: Anthropological Papers of the University of Arizona. Tuscon: University of Arizona Press

Bastos, E., D. Kern
2011 *Arqueologia Preventiva nas áreas de intervenção da UHE Santo Antonio do Jari, AP/PA, Relatório Parcial 3: Resgate de Campo do Sítio Monte Dourado 1*, Scientia Consultoria científica Ltda, ms

Bastos, R. Lopez, P. Funari
2008 Public Archaeology and Management of the Brazilian Archaeological-Cultural Heritage, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 1127-1133. New York: Springer

Beaune, S. A., de
1989a Essai de classification typologique des galets et plaquettes utilisés au Paléolithique, *Gallia Préhistoire* 31:7-64

1989b Exemple ethnographique de l'usage pluri-fonctionnel d'un galet de quartz, *Bulletin de la Société Préhistorique Française* 86(2):1-64

1997 Les galets utilisés au Paléolithique supérieur, *Gallia Préhistoire,* Supp. 32. Paris: CNRS

Beausoleil, J., M. Poirier
2006-7 *Un alignement de fours à pierres chauffées du premier âge du Fer: la ligne de feux d'Eyrien (Corrèze)*. In: Documents d'archéologie méridionale 29-30, 75-111. SDARCHETIS/CNRS, Université de Provence

Beck, R., Jr (ed.)
2007 *The Durable House: House Society Models in Archaeology*. Carbondale: Illinois University

Beck, W., R. Torrence
2006 Starch pathways, *Ancient Starch Research*, R. Torrence, H. Barton (eds.), 53-74. Walnut Creek: Left Coast Press

Beets, J. C., S. R. Troelstra, P. M. Grootes, M.-J. Nadeau, K. van der Borg, A. F. M. de Jong, C. L. Hofman, M. L. P. Hoogland
2006 Climate and Pre-Columbian Settlement at Anse à la Gourde, Guadeloupe, Northeastern Caribbean, *Geoarchaeology* 21(3):271-280

Bel, M., van den
1995 *Kamuyune: The Palikur Potters of French Guiana*, Master Thesis University of Leiden, ms

2004 *Sinnamary. Carrières Soyouz Natacha, Olga, Tania et Irina (Guyane française),* Rapport de diagnostic INRAP, ms

2006 *Parcelle Am 43 à Iracoubo, Sable Blanc Est, Commune d'Iracoubo*, Rapport de diagnostic INRAP, ms

2007a Results of the 2004 archaeological survey of the Southern part of the Caïman Mining Permit at the Lee side of the Kaw Mountains (Eastern French-Guiana), *Proceedings of the XXIth Congress of the International Association for Caribbean Archaeology, Trinidad 2005*, B. Reid, H. Petitjean Roget, A. Curet (eds.), Vol. 1, 117-127. University of the West Indies

2007b *Crique Sparouine: un site amérindien de hauteur dans l'arrière pays du Bas Maroni, Saint Laurent du Maroni Guyane française*, Rapport de fouille INRAP, ms

2007c *Les Clos de Saint-Cyr, Commune de Rémire-Montjoly, Guyane française*, Rapport de diagnostic INRAP, ms

2007d *Lycée professionnel de Rémire-Montjoly,* Rapport de diagnostic INRAP, ms

2008a *Chemin Saint-Louis, Commune de Saint-Laurent-du-Maroni,* Rapport de diagnostic INRAP, ms

2008b *Balaté, Commune de Saint-Laurent-du-Maroni*, Rapport de diagnostic INRAP, ms

2009a Les dépôts funéraires d'Iracoubo: Les résultats d'une fouille préventive d'une nécropole précolombienne de Guyane française, *Revista Amazônica* 1(1):30-49

2009b The Palikur Potters: an ethnoarchaeological casestudy on the Palikur pottery tradition of French-Guiana and Amapá, Brazil, *Boletim do Museu Paraense Emílio Goeldi*, Ciêncas Humanas 4(1):9-56

2009c The journal of Lourens Lourenszoon (1618-1625) and his stay among the Arocouros on the Lower Cassiporé River, Amapá (Brazil), *Boletim do Museu Paraense Emílio Goeldi*, Ciêncas Humanas 4(2):303-317

2010a A Koriabo site on the Lower Maroni River: Results of the preventive archaeological excavation at Crique Sparouine, French-Guiana, *Arquéologia Amazônica 1*, E. Pereira, V. Guapindaia (eds.), 61-93. Belém: MPEG/IPHAN/SECULT

2010b Late Archaic cooking pits in coastal French-Guiana, Results of a preventive archaeological excavation at the junction of the coastal Pleistocene savannahs and the Precambrian shield, *Revista do Arquéologia* 23(1):60-71

2010c Grès rhénan dans une tombe guyanaise, *Archéopages* 28:98-99

2012a *Crique Anguille, Matoury (DOM Guyane),* Rapport d'opération diagnostic archéologique INRAP, ms

2012b Archaeological Investigations at the Saint-Louis on the Lower Maroni River: The Early Ceramic Series, *Journal of the Walter Roth Museum of Archaeology and Anthropology* 17(2):1-52

2014 Excavations at Poncel: An update of the Late Ceramic Age of Cayenne, *Antes de Orellana. Actas del 3er Encuentro Internacional de Arquéologia Amazônia*, Stéphen Rostain (ed.), pp. 75-88. In: Actes & Mémoires de l'Institut Français d'Etudes Andines 37. Quito: IFEA

2015 Uma nota sobre a introdução de raladores de metal e sobre a produção e consumo da mandioca e do milho na zona costeira das Guianas, durante o século XVII, *Revista Amazônica* 7(1):100-132

Bel, M., van den, E. Narciso
1995 Palikur Myths from French-Guiana, *Yumtzilob, Tijdschrift over de Americas* 7(4): 276-304

Bel, M., van den, G. Hamburg, L. Jacobs
1995 The use of kwep as a temper for clay among the Palikur in French-Guiana, *Newsletter, Department of Pottery Technology* 13:42-51

Bel, M., van den, M. Hildebrand, S. Delpech, T. Romon, C. Vallet
2006 *Les occupations amérindiennes du site Eva 2, Chantier Soyouz du CSG, Malmanoury. Commune de Sinnamary, Guyane Française*, Rapport de fouille INRAP, ms

Bel, M., van den, T. Romon
2010 A Troumassoid site at Trois-Rivières, Guadeloupe, Results of a preventive archaeological excavation at La Pointe de Grande Anse, *Journal of Caribbean Archaeology* 9(1):1-17

Bel, M., van den, N. Serrand, L. Bruxelles, P. Verdin, J. Pagán Jimenez, J. Brancier, C. Cammas, J. Birk, B. Glazer, S. Knippenberg
2011 *Chemin Saint-Louis*, Rapport de fouille INRAP, 2 Vols., ms (revised October 2012)

Bel, M., van den, S. Delpech, G. Fronteau, J. Pagán Jimenez, D. Todisco
2012a *"Le retour au Rorota" Site néoindien récent sur le littoral de l'île de Cayenne*, Rapport d'opération de fouille archéologique INRAP, ms

Bel, M., van den, M. Mestre, M. Hildebrand
2012b *Rapport de prospection archéologique du Programme Couac*, ms

Bel, M., van den, S. Delpech, G. Fronteau, J. Pagán Jimenez, D. Todisco
2013 *Cimetière paysager Poncel. Le morne Poncel: Un site néoindien récent dans l'arrière pays marécageux de l'île de Cayenne*, Rapport d'opération de fouille archéologique INRAP, ms

Bel, M., van den, E. Gassies
2011 Le passage de David Pietersz de Vries sur la côte des Guyanes en 1634. Avec une brève introduction à ce récit de la présence néerlandaise en Guyane française entre 1598-1677, *La Guyane au temps de l'esclavage. Discours, Pratiques et Représentations, Actes du colloque 16 au 18 novembre 2010 à Cayenne,* J.-P. Bacot, J. Zonzon (eds.), 67-104. Matoury: Ibis Rouge Edition

Bel, M. van den, L. Hulsman
2013 Une colonie néerlandaise sur l'Approuague au début de la deuxième moitié du XVIIe siècle, *Bulletin de la société d'histoire de la Guadeloupe* 164:5-15

2014 Le fort Orange sur la Wiapoca, *Bulletin de la société d'histoire de la Guadeloupe* 166-167:103-116

Bel, M., van den, J. Pagan-Jiménez & G. Fronteau,
2014 Le Rorota revisité: résultats des fouilles préventives à PK 11, Route des Plages, Île de Cayenne (Guyane française), *Archéologie caraïbe*, B. Bérard, C. Losier (eds.), pp. 37-76, Leiden: Sidestone Press

Bel, M., van den, L. Hulsman, L. Wagenaar
2014 *The Voyages of Adriaan van Berkel to Guiana: Amerindian-Dutch relationships in 17th century Guyana.* Leiden: Sidestone Press

Bel, M., van den, T. Romon, C. Vallet, S. Delpech
2015 Un village « galibi » en Guyane française ; le cas du site archéologique d'Eva 2, *Recherches amérindiennes au Québec* 45(1):xx-xx

Bellardie, T.
2011 Maroni, l'Eldorado abandonné (1596-1789), *La Guyane au temps de l'esclavage. Discours, Pratiques et Représentations, Actes du colloque 16 au 18 novembre 2010 à Cayenne,* J.-P. Bacot, J. Zonzon (eds.), 105-131. Matoury: Ibis Rouge Éditions

2013 Site du Club de canoe-kayak, Maripasoula, *Bilan scientifique Guyane* 2011:18-20

Benoît, P. J.
1839 *Voyage à Surinam, Description des possessions néerlandaises dans la Guyane*, Société des Beaux-Arts. Bruxelles: De Wasme & Laurent

Benzoni, G.
1857 *History of the New World, by Girolamo Benzoni, of Milan. Shewing his Travels in America, from A.D. 1541 to 1556: with some Particulars of the Island of Canary*. In: Works issued by the Hakluyt Society 21, First Series. London: The Hakluyt Society

Bérard, B.
2004 *Les premières occupations agricoles de l'arc antillais, migration et insularité. Le cas de l'occupation saladoïde ancienne de la Martinique*, PhD Dissertation Université de Paris I-Sorbonne. In: BAR International Series 1299, Paris Monographs in American Archaeology. Oxford: Archaeopress

2011 À la recherche des Caraïbes archéologiques, *Les Indiens des Petites Antille, des premiers peuplements aux débuts de la colonisation européenne*, B. Grunberg (ed.), 27-36. In: Cahier d'Histoire de l'Amérique coloniale 5. Paris: L'Harmattan

Berkel, A., van
1695 *Amerikaansche Voyagien, Behelzende een Reis na Rio de Berbice, Gelegen op het vaste Land van Guiana, Aan de Wilde-Kust van America, Mitsgaders een andere na de Colonie van Suriname, Gelegen in het Noorder Deel van het gemelde Landschap Guiana* […], Amsterdam: Johan ten Hoorn

1948 *Adriaan van Berkel's Travels in South America between the Berbice and Essequibo Rivers and in Surinam 1670-1689*, translated and edited by Walter Edmund Roth (1925), published by *The Daily Chronicle*, Georgetown: The Guiana Edition 2

Betendorf, J. F.
1910 Chronico da Missão dos Padres da Companhia de jesus no Estado do Maranhão, *Revista do Instituto Historico e Geographico Brazileiro* 72(1)

Biet, A.
1664 *Voyage de la France Eqvinoxiale en l'Isle de Cayenne, entrepis par les françois en l'année MDCLII.* Paris: François Clovzier

Bigarella, J. J., A. M. M. Ferreira
1985 Amazonian geology and the Pleistocene and Cenozoic environments and paleoclimates, *Key Environments: Amazonia*, G. Prance, T. Lovejoy (eds.), 49-71. Oxford: Oxford University Press

Binford, L. R.
1965 Archaeological systematics and the study of culture process, *American Antiquity* 31(2):203-210

2001 *Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building Using Hunter-Gatherer and Environmental Data Sets*, Berkeley: University of California Press

Blancaneaux, Ph.
1981 *Essai sur le milieu naturel de la Guyane française*. In: Travaux et Documents de l'Orstom 137. Paris: ORSTOM

2004 Pédologie. *Atlas illustré de la Guyane*, directed by J. Barret and edited by the Laboratoire de Cartographie de la Guyane, 50-51. Institut d'Enseignement Supérieur de Guyane and Agence Régional d'Urbanisme et d'Aménagement de la Guyane

Blancaneaux, Ph., J. L. Thiais, G. Laplanche, J. J. Rostan, St. J. Bergrave
1973 Podzols et sols ferralitiques dans le Nord-Ouest de la Guyane française, *Cahier ORSTOM, Série Pédologie* 11(2):121-154

Blitz, J,
1993 Big Pots for Big Shots: Feasting and Storage in a Mississipian Community, *American Antiquity* 58:80-96

Blume, H. P., B. Deller, R. Leschber, A. Paetz, S. Schmidt, B. M. Wilke
2000ff *Handbuch der Bodenuntersuchung*, Section 3.1.3.1a and b. Berlin: Beuth

Boer, M. W. H., de
1970 Report of a contact with stone-age Indians in southern Surinam, *Nieuwe West-Indische Gids* 47(3):249-276

1972 *Landforms and soils in eastern Surinam (South America),* PhD Dissertation University of Wageningen (1971). In: Agricultural Research Rapports 771, Department of Tropical Soil Science. Wageningen: Agricultural University of Wageningen

Boer, M., de
1903 Een Nederlandsche goudzoeker, Een bijdrage tot de geschiedenis onzer nederzettingen aan de Wilde Kust, *Tijdschrift voor Geschiedenis, Land- en Volkenkunde* 18:1-18

Boer, M., de, R. Schuiling
1899 Een Nederlandsche nederzetting aan de Oyapock (1677), *Tijdschrift voor Geschiedenis, Land- en Volkenkunde* 14:321-342

Bolingbroke, H.
1807 *A Voyage to the Demerary, containing a statistical account of the Settlements there, and of those of the Essequibo, the Berbice, and other contiguous Rivers of Guyana*. Norwich: Richard Philips

Bonaparte, Prince R.
1884 *Les Habitants de Suriname à Amsterdam. Notes recuillies à l'Exposition coloniale d'Amsterdam en 1883.* Paris: A. Quantin

Bonnissent, D.
2008 *Archéologie précolombienne de l'Ile de Saint-Martin, Petites Antilles (3300 BC-1600 AD)*, PhD Dissertation University of Aix-Marseille I, ms (edited in 2010 by Éditions universitaires européennes, Paris)

Bonzani, R. M.
1995 *Seasonality, predictability, and plant use strategies at San Jacinto 1, northern Colombia*, PhD Dissertation University of Pittsburgh, ms

Bonzani, R. M., A. Oyuela-Caycedo
2006 The Gift of the Variation and Dispersion of Maize. Social and Technological Context in Amerindian Societies, *Histories of Maize: Multidisciplinary Approaches to the Prehistory, Linguistics, Biogeography, Domestication, and Evolution of Maize*, J. Staller, R. Tykot, B. Benz (eds.), 343-356. New York: Academic Press

Boomert, A.
nd *The Koriabo sites of Surinam*, ms (in possession of the present author)

1975 Prehistorie, *Mededelingenblad Vrienden van de Nederlandse Ceramiek* 77(1):27- 32

1976 Pre-Columbian raised-fields in Coastal Surinam, *Proceedings of the Sixth International Congress for the Study of pre-Columbian Cultures of the Lesser Antilles, Point-à-Pitre 1975*, R. P. Bullen (ed.), 134-144. Département d'Histoire et d'Archéologie, Société d'Histoire de la Guadeloupe et la Municipalité de Pointe à Pitre

1977 Prehistorie, *Encyclopedie van Suriname*, C. F. A. Bruijning, J. Voorhoeve (eds.), 506-517. Amsterdam: Elsevier

1978a Prehistoric habitation mounds in the Canje River area? *Journal of Archaeology and Anthropology* 1(1):44-51

1978b Report on ceramic samples from Itabru, Berbice River, *Journal of the Walter Roth Museum of Archaeology and Anthropology* 2(1):79-86

1979 The prehistoric stone axes of the guianas: a typological classification, *Journal of Archaeology and Anthropology* 2(2):99-124

1980a Hertenrits: an Arauquinoid Complex in North West Surinam, *Journal of Archaeology and Anthropology* 3(1):68-104

1980b The Sipaliwini archaeological complex of Surinam, *Nieuwe West-Indische Gids* 54(2):94-107

1983 The Saladoid Occupation of Wonotobo Falls, Western Surinam, *Proceedings of the Ninth International Congress for the Study of the pre-Columbian Cultures of the Lesser Antilles, Santo Domingo 1981*, L. Allaire, F.-M. Mayer (eds.), 97-120, Centre des Recherches Caraïbes, Université de Montréal

1984 The Arawak Indians of Trinidad and Coastal Guiana, ca 1500-1650, *Journal of Caribbean History* 19:123-188

1985 The Guayabitoid and Mayoid Series: Amerindian Culture History in Trinidad during Late Prehistoric and Protohistoric Times, *Proceedings of the Tenth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles, Fort-de-France 1983*, L. Allaire, F.-M. Mayer (eds.), 93-148. Centre de Recherches Caraïbes, Université de Montréal

1986 The Cayo Complex of Saint-Vincent: ethnohistorical and archaeological aspects of the Island Carib problem, *Antropológica* 66:3-68

1987 Gifts of the Amazons: 'greenstone' pendants and beads as items of ceremonial exchange in Amazonia and the Caribbean, *Antropológica* 67:33-54

1993 The Barbakoeba Archaeological Complex of Northeast Surinam, *OSO Tijdschrift voor Surinamistiek* 12(2):98-222

1995 Island Carib Archaeology, *Wolves from the Sea: Readings in the Anthropology of the Native Caribbean*, N. L. Whitehead (ed.), 23-35. In: Caribbean Series 14. Leiden: KITLV Press

2000 *Trinidad, Tobago and the Lower Orinoco Interaction Sphere, An archaeological/ethnohistorical study*, PhD Dissertation University of Leiden. Alkmaar: Cairi Publications

2001 Saladoid socio-political organisation, *Proceedings of the XVIIIth International Congress for Caribbean Archaeology, Grenada 1999*, 55-77. Association Internationale d'Archéologie de la Caraïbe Région Guadeloupe

2004 Koriabo and the Polychrome Tradition: the Late-Prehistoric era between the Orinoco and Amazon mouths, *Late Ceramic Age Societies in the Eastern Caribbean*, A. Delpuech, C. Hofman (eds.), 251-266. In: BAR International Series 1273, Paris Monographs in American Archaeology 14. London: Archaeopress

2009 Between the Mainland and the Islands: The Amerindian Cultural Geography of Trinidad, *Bulletin of the Peabody Museum* 50(1):63-73

2010 Crossing the Galleons' Passage: Amerindian Interaction and Culture (Dis) Continuity between Trinidad and Tobago, *Journal of Caribbean Archaeology*, Special Publication 3:106-121

2011 From Cayo to Kalinago, Aspects of Island Carib Archaeology, *Les Indiens des Petites Antille, des premiers peuplements aux débuts de la colonisation européenne*, B. Grunberg (ed.), 291-306. In: Cahier d'Histoire de l'Amérique coloniale 5. Paris: L'Harmattan

2012 A short history of archaeological research in the Caribbean archipelago, *The End of the Fifth Decade*, C. Bakels, H. Kamermans (eds.), 37-50. In: Analecta Praehistorica Leidensia 43-44. Leiden: Leiden University Press

2013 Gateway to the Mainland, Trinidad and Tobago, *The Oxford Handbook of Caribbean Archaeology*, William F. Keegan, Corinne L. Hofman & Reniel Rodriguez Ramos (eds.), 141-154. Oxford: Oxford Univeristy Press

Boomert, A., S. Kroonenberg
1977 Manufacture and trade of stone artefacts in prehistoric Surinam, *Ex Horreo, IPP 1951-1976*, B. van Beek, R. Brandt, W. Groenman-van Waateringe (eds.), 8-47. In: Cingula 4. Amsterdam

Boomert, A., B. Faber-Morse, I. B. Rouse
2013 *The 1946 and 1953 Yale University Excavations in Trinidad. With contributions by D. Isendoorn and A. Silver.* In: Yale University Publications in Anthropology 92, New Haven: Yale University Press

Bos, G.
1973 Communale hutten bij de Trio Indianen, *Nieuwe West-Indische Gids* 49(1):143-173

1985 Atorai, Trio, Tunayana and Wai Wai in Early Eighteenth Century Records, *Folk* 27:5-16

1989 Cariben (Paragotos) aan de Perica, *Bijdragen tot de Taal-, Land en Volkenkunde, Rituals and Socio-Cosmic Order in Eastern Indonesian Societies; Part I Nusa Tenggara* 145(1):8-29

Boucard, D.
1998 *Les haches*. Paris: Éditions Jean-Cyrille Godefroy

Boudehri, N.
2002 *Epidémies en quête d'histoire, conséquences des épidémies dues à la Rencontre coloniale sur les Palikur de Guyane française*, PhD Dissertation University of Bordeaux II, ms

Bourdieu, P.
1990 *The Logic of Practice*, Stanford: Stanford University Press

Boven, K.
2006 *Overleven in een grensgebied, Veranderingsprocessen bij de Wayana in Suriname en Frans-Guyana*, PhD Dissertation, University of Utrecht. In: Bronnen voor de Studie van Suriname 26. Utrecht: IBS Rozenberg Publishers

Bowman, S.
1990 *Radio Carbon Dating*. Berkeley: University of California Press

Bowser, B. J.
2002 *The Perceptive Potter: An Ethnoarchaeological Study of Pottery, Ethnicity, and Political Action in Amazonia*, PhD Dissertation, University of California, ms

Boxer, C. R.
1957 *The Dutch in Brazil (1624-1654)*. Oxford: Clarendon Press

Boyé, M.
1961 New data on the coastal sedimentary formations in French Guiana, *Proceedings of the Fifth Inter-Guiana geological Conference, Georgetown 1959*, 145-160. Georgetown: Geological Survey Department

1963 *La géologie des plaines basses entre Organabo et le Maroni (Guyane française)*, Ministère de l'industrie, Mémoires pour servir à l'explication de la carte géologique détaillée de la France. Département de la Guyane française, Paris

1974 Etude du Serpent de Pascaud, *Connaissance de la Guyane* 1:5-12

1979 Géomorphologie, *Atlas des Départements Français d'Outre-Mer, Volume 4. La Guyane*, G. Lasserre, G. Sautter, M. Boyé, G. Brasseur (eds.), Planche 5. Paris: CEGET/ORSTOM

Boyer, J. S.
1982 Plant productivity and environment, *Science* 218:443-448

Boyer, P., Sieur du Petit-Puy
1654 *Véritable relation de tout ce qui s'est passé au voyage que monsieur de Bretigny fit à l'Amérique occidentale* […]. Paris: Chez Pierre Rocolet

Bradburry, A. P., P. J. Carr
1995 Flake typologies and alternative approaches: an experimental assessment, *Lithic Technology* 20:100-115

Brakel, S., van
1914 Een Amsterdamsche factorij te Paramaribo 1613, *Bijdragen van het Historisch Genootschap* 35:83-86

Brancier, J.
2009 *Géoarchéologie des terres noires guyanaises: approche bibliographique et premières données analytiques sur le site de Chemin Saint Louis (Saint-Laurent-du-Maroni, Guyane française)*, Master Thesis University of Paris I, 2 Vols, ms

Brancier, J., C. Cammas, D. Todisco, E. Fouache
2014 A Micromorphological Assessment of Anthropogenic Features in Pre-Columbian French Guiana Dark Soils (FGDS): First Results, *Zeitschrift für Geomorphologie, Supplementary Issue*: DOI: 10.1127/0372-8854/2014/S-00159

Braudel, F.
1972 History and the Social Sciences. *Economy and Society in Early Modern Europe: Essays from Annales,* P. Burke (ed.), 11-42. New York: Harper

Breton, R.
1665 *Dictionaire Caraibe-François, meslé de quantité de Remarques historiques pour l'éclaircissement de la Langue*. Auxerre: Gilles Bouquet

Brett, W. H.
1868 *The Indian Tribes of Guiana; their condition and habits*. London: Bell & Daldy

Briand, J.
1997 *Crique pavé*, Rapport de fouille préventive AFAN, ms

1998 *Extension du Chemin du Rorota. Prospection et inventaire archéologique du Massif du Mahury,* Document final de synthèse, DRAC Guyane/SRA, ms

2002 Roura, Camp Caïman, *Bilan scientifique Guyane* 1998:20-21

2011 *Wayabo. Kourou, Guyane*, Rapport de diagnostic INRAP, ms

2012a *Redressement RN 1, Phase III, Iracoubo Guyane*, Rapport de diagnostic INRAP, ms

2012b Terrasses du Mahury, Rémire Montjoly, *Bilan scientifique* 2008:25-26

2015 *La Pointe de Balaté, Saint-Laurent du Maroni*, Rapport de fouille INRAP, ms

Briand, J., M. Hildebrand, V. Arrighi, S. Delpech
2008 *PK 11, Route des Plages, Rémire (Guyane française)*, Rapport de diagnostic INRAP, ms

Briels, I.
2004 *Use-wear analysis on the Archaic flint assemblage of Plum Piece, Saba. A pilot study,* Master thesis, Leiden University, ms

Bright, A.
2011 *Blood is thicker than water: Amerindian occupation and the intra- and inter-insular relationships in the Windward Islands*, PhD Dissertation University of Leiden, Leiden: Sidestone Press

Brightman, M.
2007 *Amerindian leadership in Guianese Amazonia*, PhD Dissertation University of Cambridge, ms

Brinkman, R., L. Pons
1968 *A pedo-geomorphological classification and map of the Holocene sediments in the coastal plain of the three Guianas*. In: Soil Survey Papers 4, Wageningen: NSSI

British Guiana Boundary Commission
1898 *Arbitration with the United States of Venezuela, Appendix to the case on behalf of the Government of Her Britannic Majesty*, Vol. I. (1593-1723). London: Foreign Office

Brochado, J. J. J., Proenza
1984 *An ecological model of the spread of pottery and agriculture into eastern South America*, PhD Dissertation, University of Illinois at Urbana-Champaign, ms

Brommer, B., H. den Heijer
2011 *Grote Altlas van de West-Indische Compagnie*, *Comprehensive Atlas of the Dutch West India Company, Vol. I: De oude WIC 1621-1674*. The old WIC 1621-1674. Met bijdragen van J. Jacobs, A. Bick, M. van Wallenburg. Voorburg: Asia Maior

Bruleaux, A. M.
1989 Mana, 1819-1851, *Histoire de la Guyane*, V. Huyghues-Belrose (ed.), 142-151. In: La Grande Encyclopédie de la Caraïbe, Vol. 7. Pointe-à-Pitre: Sanoli

1992 Les plans de colonisation de la Guyane, *Voyage aux Iles d'Amérique*, 157-168. Catalogue de l'exposition aux Archives nationales, Paris

Brûletout de Préfontaine, J. A.
1763 *Maison rustique, à l'usage des Habitans de la partie de la France équinoxiale, connue sous le nom de Cayenne*. Paris: Chez J. B. Bauche

Brun, S.
1913 *Samuel Brun, des Wundartzet und Burgers su Basel, Schiffarten: Welche er in etliche newe Länder und Insulen, zu fünff underschiedlichen malen, mit Gottes Hülff, gethan* […], Basel: Johan Jacob Genath, 1624, S. P. L'Honoré Naber (ed.), In: Werken uitgegeven door de Linschoten Vereniging 6, Den Haag: Martinus Nijhoff

Bubberman, F. C.
1973 Rotstekeningen in de Sipaliwini savanne, *Nieuwe West Indische Gids* 49(3):129-142

Bueno, L. Melo Reis
2007 *Variabilidade Tecnologica nos Sitios Liticos da Regiao do Lajeado, Médio Rio Tocantins*, PhD Dissertation Universtiy of São Paulo. In: Revista do Museu de Arqueologia e Etnologia Supp. 4, São Paulo

Bueno, L. Melo Reis, A. Isnardis (eds,)
2007 *Das Pedras aos Homens, Tecnologia litica na Arquelogia Brasileira*. Belo Horizonte: Argumentum

Bullen, R. P.
1962 *Ceramic Periods of St. Thomas and St. Johns Islands, Virgin Islands*. In: American Studies 4. The William L. Bryant Foundation

1965 Archaeological Chronology of Grenada, *American Antiquity* 31(2-1):237-242

Burr, G. L. (ed.)
1897 Extracts from Dutch Archives, *Report and accompanying papers of the commission appointed by the President of the United States to investigate and report upon the true divisional line between the Republic of Venezuela and British Guiana*, Vol. 2, Washington

Bürst, M.
2011 *Impacts des occupations amérindiennes anciennes sur la diversité des forêts et sur les propriétés des sols de la frange côtière guyanaise*, Mémoire de stage University of Nancy, ms

Bush, M. B., P. E. Oliveira
2006 The rise and fall of the Refugial Hypothesis of Amazonian speciation: a paleoecological perspective, *Biota Neotrop* 6(1), bn00106012006

Bush, M. B., D. Piperno, P. Colinvaux
1989 A 6,000 year History of Maize Cultivation, *Nature* 340:303-305

Bush, M. B., P. Colinvaux, M. Wieman, D. Piperno, K. Liu
1990 Late Pleistocene temperature depression and vegetation change in Ecuadorian Amazonia, *Quaternary Research* 23:330-345

Bush, M. B., M. Silman, C. McMichael, S. Saatchi
2008 Fire, climate change and biodiversity in Amazonia Late-Holocene perspective, *Philosophical Transactions of the Royal Society B: Biological Sciences* 363:1795-1802

Butt, A. J.
1957 The Mazaruni Scorpion (A study of the Symbolic Significance of Tattoo Patterns among the Akawaio), *Timehri* 36:40-54

Butt-Colson, A. J.
1973 Inter-tribal trade in the Guiana Highlands, *Antropológica* 34:1-70

1985 Routes of Knowledge: An Aspect of Regional Integration in the Circum-Roraima Area of the Guiana Highlands, *Antropológica* 63-64:103-149

Buve, R.
1966 Gouverneur Johannes Heinsius, De rol van van Aerssen's voorganger in de Surinaamse Indianenoorlog, *Nieuwe West-Indische Gids* 45:14-26

Byam, W.
nd *Williams Byam Journal of Guiana*, British Library, Mss 3662, ff. 27-37

Cabeliau, A.
1862 *Verclaringe van de onbekende ende onbeseylde voiage van America, beginnende van de Riviere Amasoms tot het Eylant van de Trinidad toe* [1599]. In: Opkomst van het Nederlansche gezag in Oost-Indie (1596-1616), Verzameling van onuitgegeven stukken uit het Oud-kolonial archief, J. K. J. de Jonge (ed.), Part I, 153-160, Den Haag: Martinus Nijhoff

Cabral, M., Petry
2011 Juntando Cacos: uma reflexão sobre a classificação da Fase Koriabo no Amapá, *Revista Amazônica* 3(1):88-106

2014 *No tempo das pedras moles: arqueologia e simetria na floresta*, PhD Dissertation Federal University of Pará, ms

Cabral, M., Petry, J. Darcy Saldanha
2007 *Projeto de Investigação arqueollogica na Bacia do Rio Calçoene e seu Entorno, Amapá*, Instituto de Pesquisas Cientificas e Tecnologicas do Estado do Amapá, ms

2009 Note sur des structures mégalithiques en Guyane brésilienne, Amapá, *Journal de la Société des Américanistes* 95(1):97-110

2010 Ocupaçoes pré-coloniais no setor Costeiro Atlantico do Amapá, *Arquéologia Amazonica* 1, E. Pereira, V. Guapindaia (eds.), Vol. 1, 49-60. Belém: MPEG/ IPHAN/SECULT

Caen, H., de
2014 Relation des îles de Sainct-Christophle, Gardelouppe et la Martinicque, gisantes par les 15 degrés au-deçà de l'Équateur (c.1640). *La Colonisation des Antilles. Textes français du XVIIe siècle*, R. Ouellet (ed.), Vol. I, 150-179. Paris: Éditions Hermann

Cammas, C.
2004 *Les Terres noires urbaines du nord de la France: Première typologie pédo-sédimentaire, Terres Noires-Dark Earth*, L. Verslype, R. Brulet (eds.), 43-55. Leuven: University of Leuven Press

Cano, N. F., R. B. Ribeiro, C. S. Munita, S. Watanabe, E. Góes Neves, E. K. Tamanaha
2014 Dating and determination of firing temperature of ancient potteries from São Paulo II archaeological site, Brazil by TL and EPR techniques, Journal of Cultural Heritage: http://dx.doi.org/10.1016/j.culher.2014.05.010

Capiberibe, A.
2007 *Batismo de fogo: Os Palikur e o Cristianismo*, Master Thesis University of São Paulo. São Paulo: Annablume/FAPESP/NuTI

Capitan, L.
1882 Sur les procédés qu'emploient les Galibis pour la fabrication de la poterie, Bulletins et mémoires de la Société d'Anthropologie 5(3):649-651

Cardona, N. de
1989 *Descripciones geograficas e hidrograficas de muchas tierras y mares del norte y sur, en las Indias en especial del descubrimiento del Reino de California* [1632]. Estudio preliminar de Pilar Hernandez Aparicio. Madrid: Turner

Carlin, E. B.
2002 Patterns of language, patterns of thought, The Cariban languages, *Atlas of the Languages of Suriname*, E. Carlin, J. Arends (eds.), 47-81. In: KITLV Caribbean Series 22. Leiden: KITLV Press

Carlin, E., M. Boven
2002 The native population, Migration and identities, *Atlas of the Languages of Suriname*, E. Carlin, J. Arends (eds.), 11-45. In: KITLV Caribbean Series 22. Leiden: KITLV Press

Carling, G., L. Eriksen, A. Holmer, J. van de Weijer
2013 Comparing Approaches to Measuring Linguistic Differences, *Apporaches to measuring linguistic differences*, L. Borin, A. Saxena (eds.), 29-56. Berlin: Mouton de Gruyter

Carcaillet, C., H. Almquist, H. Asnong, R.H. W. Bradshaw, J.S. Carrioon, M-J. Gaillard, K. Gajewski, J.N. Haas, S. G. Haberle, P. Hadorn, S. D. Müller, P. J. H. Richard, I. Richoz, M. Rösch, M. F. S. Saanchez Gooni, H. von Stedingk, A. C. Stevenson, B. Talon, C. Tardy, W. Tinner, E. Tryterud, L. Wick, K. J. Willis
2002 Holocene Biomass burning and global dynamics of the carbon cycle, *Chemosphere* 49:845-863

Carneiro, R. L.
1981 The chiefdom: Precursor of the state, *The transition to statehood in the New World*, G. Jones, R. Kautz (eds.), 37-79. London: Cambridge University Press

1998 What happened at the flashpoint? Conjectures on Chiefdom Formation at the very moment of conception, *Chiefdoms and Chieftaincy in the Americas*, E. Redmond (ed.), 18-42. Gainesville: University Press of Florida

Carvajal, G., de
1894 *Descubrimiento del Río de las Amazonas, según la relación hasta ahora inédita de Fr. Gaspar de Caravajal con otros documentos referentes à Franciso de Orellana y sus compañeros* […], edited and introduced by J. T. Medina. Sevilla: Imprenta de E. Rasco

Carozza, L., C. Georjon, A. Vignaud
2005 *La fin du Néolithique et les débuts de la métallurgie en Languedoc central,* Les habitats de la colline du Puech Haut à Paulhan. In: Recherches en Archéologie Préventives 3, Centre d'Anthropologie et INRAP. Toulouse: Hérault

Casagrande, F.
2005 *Montabo Sud, Cayenne*, Rapport de diagnostic INRAP, ms

Cazelles, N.
2002 *Commune de Rémire-Montjoly (97309). Montjoly Bar, n° opération: 4123000601, site 97309105*, Rapport de diagnostic INRAP, ms

Cautru, J. P.
1993 Lithologie des formations superficielles, feuille Cayenne N-O, BRGM, Orléans

1994 Feuille Kourou NO (Sinnamary) à 1:50.000, Rapport du BRGM R38353, Orléans

Chambouleyron, R. I.
2005 *Portuguese colonization of the Amazon region, 1640-1706*, PhD Dissertation, Univeristy of Cambridge, ms

Chandler-Ezell, K., D. M. Pearsall, J. A. Zeidler
2006 Root and Tuber Phytoliths and Starch Grains Document Manioc *(Manihot Esculenta)*, Arrowroot *(Maranta Arundinacea)*, and *Llerén (Calathea sp.)* at the Real Alto Site, Ecuador, *Economic Botany* 60(2):103-120

Chapuis, J.
1998 *La personne wayana entre sang et ciel*, PhD Dissertation University of Aix-Marseille. Lille: Presses universitaires du Septentrion (2000)

2003 Le sens de l'histoire chez les Indiens Wayana de Guyane, Une géographie historique du processus de « civilisation », *Journal de la Société des Américanistes* 89(1):187-209

2006 For a dynamic approach to the social organization of the Carib of inner Eastern French Guiana: an overview of Wayana ethnogenesis, *Ethnohistory* 53(3):507-542

Chapuis, J., H. Rivière
2003 *Wayana Eitoponpë: (Une) Histoire (Orale) des Indiens Wayana*. Matoury: Éditions Ibis Rouge

Charles-Dominique, P., P. Blanc, D. Larpin, M. P. Ledru, B. Riéra, C. Sarthou, M. Servant, C. Tardy
1998 Forest perturbations and biodiversity during the last ten thousand years in French Guiana, *Acta Oecologica* 1:295-302

Chaumeil, J-P.
1997 Les os, les flûtes, les morts: mémoire et traitement funéraire en Amazonie, *Journal de la Société des Américanistes* 83:83-110

Choubert, B.
1974 *Le Précambrien des Guyanes*. In: Mémoires du Bureau des recherches géologiques et minières 81. Paris: Éditions BRGM

1979 Géologie, *Atlas des Départements Français d'Outre-Mer, Vol. 4. La Guyane*, G. Lasserre, G. Sautter, M. Boyé, G. Brasseur (eds.), Planche 4:1-2. Paris: CEGET/ ORSTOM

Choubert, B., J. Barruol, P. Coudert, R. Leenhardt, M. Robert
1958 *Feuille 4B de Kourou*, Carte Géologique détaillée de la France, Département de la Guyane à l'échelle du 1:100.000. Ministère de l'industrie et du commerce, Paris

Chrétien, J.
1957 Mœurs et coutumes des Galibis d'après une lettre inédite écrite en 1725, Présentation par R. d'Harcourt, *Journal de la Société des Américanistes* 46(1):45-66

Chmyz, I. (ed.)
1976 *Projeto Arquelogico Itaipu, Primeiro Relatorio des Pesquisas realizadas na Area de Itaipu (1975-1976)*, ms

Clastres, P.
1974 *La Société contre l'état*. Paris: Minuit

1977 *Archéologie de la violence. La guerre dans les sociétés primitives*, Re-edition de l'Aube (2010)

Clement, C.
1999 1492 and the loss of crop genetic resources: Crop biogeography at contact, *Econ. Bot.* 53(2):203-216

2006 Fruit trees and the transition to food production in the Amazon, *Time and Complexity in Historical Ecology: Studies from the Neotropical Lowlands*, W. Balée, C. Erickson (eds.), 165-185. New York: Columbia University Press

Coëta, R.C.
1992 *Sinnamary (1624-1848). Une citée et des hommes*. Paris: Éditions L'Harmattan

Cognat, A.
1989 *J'ai choisi d'être indien*. Paris: Éditions L'Harmattan (Second Edition)

Colenbrander, H. T.
1911 *Korte Historiael ende Journaels Aenteykeninge van verscheyden Voyagiens in de Vier Deelen des Wereldsronde, als Europa, Africa, Asia, ende Amerika gedaen door David Pietersz. De Vries*. In: Werken van de Linschoten Vereniging 3, Den Haag: Martinus Nijhoff

Colinveaux, P. A., M. C. Miller, K. Liu, M. Steinitz-Kannou, I. Frost
1985 Discovery of permanent Amazon lakes and hydraulic disturbance in the Upper Amazon Basin, *Nature* 313:311-325

Collins, M. B.
1975 Lithic technology as a means of processual Inference, *Lithic Technology*, E. Swanson (ed.), 15- 34. The Hague: Mouton Publishers

Collomb, G.
1992 *Kaliña. Des Amérinidens à Paris. Photographie du prince Roland Bonaparte*. Paris: Éditions Créaphis

2000 Identité et territoire chez les Kalina. À propos d'un récit du retour des morts, *Journal de la Société des Américanistes* 86(1):149-168

2003 Réflexion sur un style ethnique: la céramique Kalina du littoral oriental des Guyanes, *Journal de la Société des Américanistes* 89(1):129-160

2006a *Les Indiens de la Sinnamary. Journal du père Jean de la Mousse en Guyane (1684-1691)*. Paris: Éditions Chandeigne

2006b Disputing Aboriginality: French Amerindians in European Guiana, *Indigenous Resurgence in the Contemporary Caribbean,* M. Forte (ed.), 197-212. New York: Peter Lang

2007 Amérindiens en Guyane: l'entrée en politique, *Comprendre la Guyane d'aujourd'hui. Un department français dans la region des Guyanes*, S. Mam Lam Fouck (ed.), 657-667. Matoury: Ibis Rouge Éditions

2008 Chroniques interculturelles en Guyane, Un « point de vue » Kalina, *Histoire, identités et logiques ethniques. Amérindiens, Créoles et Noirs Marrons en Guyane*, G. Collomb, M.-J. Jolivet (ed.), p. 45-75. In: Le regard de l'ethnologue 18. Paris: Éditions du CTHS

2011 Missionnaires ou chamanes? Malentendus et traduction culturelle dans les missions jésuites en Guyane, *La Guyane au temps de l'esclavage. Discours, Pratiques et Représentations, Actes du colloque 16 au 18 novembre 2010 à Cayenne,* J.-P. Bacot, J. Zonzon (eds.), 435-456. Matoury: Edition Ibis Rouge

Collomb, G., F. Tiouka
2000 *Na'na Kali'na, histoire des Kali'na de Guyane*. Matoury: Éditions Ibis Rouge

Collomb, G., F. Dupuy
2009 Imaging group, living territory: a Kalina and Wayana view of history, *Anthropologies of Guayana, Cultural Spaces in Northeastern Amazonia,* N. Whitehead, S. Aleman (eds.), 113-123, Tucson: University of Arizona Press

Collomb, G., O. Renault-Lescure
2014 Setting up Frontiers, Crossing the Border: The Making of the *Kari'na Tyrewuju*, *In and Out of Suriname. Language, Mobility and Identity*, E. B. Carlin, I. Léglise, B. Migge, P. B. Tjon Sie Fat (eds.), 101-116. Leiden: Brill

Collomb, G., M. van den Bel
2014 *Entre deux mondes: Amérindiens & Européens sur les côtes des Guyane avant la Colonie (1560-1627).* In: La Librairie des Cultures 6. Paris: Éditions du CTHS

Conte, E.
1988 *L'exploitation traditionnelle des resources marines à Napuka (Tuamotu-Polynésie française)*, 2 Vols. Te Anavaharau: Centre Polynésien des Sciences Humaines

Condamine, C. M., de la
1745 *Relation abrégrée d'un voyage fait dans l'intérieur de l'Amérique méridional, depuis la côte de la mer du Sud jusqu'aux côtes du Brésil et de la Guyane* […]. Paris: Veuve Pissot, Reprint with additions by H. Minguet. Paris: Éditions La Découverte (2004)

1778 *Relation abrégée d'un voyage fait dans l'intérieur de l'Amérique méridionale, depuis la Côte de la Mer du Sud, jusqu'aux Côtes du Brésil & de la Guyane, en descendant la Rivière des Amazones* […]. Maestricht: Jean-Edme Dufour & Philippe Roux

Coppier, G.
1645 *Histoire et Voyage des Indes occidentales, et plusieurs autres Regions maritimes, & esloignées*. Lyon: Jean Huguetan

Cormier, L. A.

2006 Between the Ship and the Bulldozer, Historical Ecology of Guajá Subsistence, Sociality, and Symbolism after 1500, *Time and Complexity in Historical Ecology*, W. Balée, C. Erickson (eds.), 341-363. New York: Columbia University Press

Cornette, A.

1985a *Site Archéologique de Crique Jacques (Mana, Guyane française). Premier rapport, Mission AGAE 4-5/5/85 et une visite le 8-9/6/85*, Rapport de Mission archéologique, ms

1985b *Site archéologique de Crique Jacques (Mana, Guyane). Deuxième rapport, Mission AGAE du 9 à 14 septembre 1985,* Rapport de mission archéologique, ms

1987 Quelques données sur l'occupation amérindienne dans la région basse Mana, bas Maroni, d'après les sources ethno-archéologiques, *Equinoxe, Revue de sciences humaines* 24:70-99

1988a *La céramique Galibi comme unité de référence. Étude morpho-stylistique et technique; comparaison avec la céramique de quelques sites archéologiques de la basse Mana et de l'Ile de Cayenne*, Programme Cordet: Technologies humaines et évolution du littoral dans la Caraïbe francophone, Cordet 6, ms

1988b *Note sur le site de Coswine, Crique Coswine*, Circonscription archéologique de la Guyane, ms

1988c *Les amérindiens en Guyane. Aspects de la vie matérielle*, CDDP, Cayenne

1988d *Sauvetage urgent, site des Alamandas, Rémire, Guyane*, ms

1990 La céramique amérindienne de Guyane, *Proceedings of the 11th Congress of the International Association for Caribbean Archaeology at Puerto Rico 1985*, A. Tekakis, I. Vargas Arenas, M. Sanjo Obediente (eds.), 196-213. The Foundation of Archaeology, Anthropology and History of Puerto Rico

1992 Etude morpho-stylistique et technique de la céramique Galibi en Guyane française, *Caribena* 2:41-101

Cornette, A., Ph. Nowacki-Breczewski, O. Puaux, E. Barone-Visigalli

1992 Archéologie et géomorphologie: exemples d'études de sites littoraux, *Evolutions des Littoraux de Guyane et de la zone caraïbe méridionale pendant le Quaternaire,* M.-T. Prost (ed.), 93-106. Paris: Éditions de l'ORSTOM

Cornuel, P.

2011 Mère Javouhey et l'esclavage, *La Guyane au temps de l'esclavage. Discours, Pratiques et Représentations, Actes du colloque 16 au 18 novembre 2010 à Cayenne,* J.-P. Bacot, J. Zonzon (eds.), 419-434. Matoury: Éditions Ibis Rouge

Corrêa, C. G., M. F. Simões

1971 Pesquisas arquelogicas nas regiao do Salgado. A fase Aeao do litoral de Marapanim, *Boletim do Museu Paraense Emílio Goeldi*, Antropologia 48:10-30

Costa, F. W., da Silva

2009 *Arquélogia das Campinaranas do baixo Rio Negro: busca dos pré-cermaistas nos areais da Amazônia Central*, PhD Dissertation, University of São Paulo, ms

Coudreau, H.

1886 *La France Equinoxiale, Etudes sur les Guyanes et l'Amazonie*. Paris: Challamel Ainé

1893 *Chez nos Indiens, Quatre années dans la Guyane française (1887-1891)*. Paris: Hachette

Coutet, C.

2009 *Archéologie du Littoral de Guyane française. Une approche ethnoarchéologique des techniques céramiques amérindiennes*, PhD Dissertation University of Paris I Panthéon-Sorbonne, ms (edited in 2011 by Presses Universitaires Européennes, Paris)

2011 *Prospections Awala-Yalimapo*, Rapport DRAC/SRA, ms

2014a La caractérisation techno-stylistique de la céramique de la Tradition arauquinoïde en Guyane: une approche ethnoarchéologique de la céramique amérindienne, *Karapa* 3:6-20

2014b Un an de prospection à Awala-Yalimapo, Guyane: le site funéraire de yalimapo. *Archéologie caraïbe*, B. Bérard, C. Losier (eds.), 201-222. In: Collection Tabouï 2. Leiden: Sidestone Press, Leiden

Coutet, C. T. Romon, N. Serrand
2014 Ossements et perles en coquillage des sépultures précolombiennes de Yalimapo (Awala-Yalimapo), *Karapa* 3:21-34

Coutet, C., C. Losier
2014 Céramiques métissées : Témoignages d'interactions culturelles dans la société guyanaise du XVII[e] et du XVIII[e] siècle, *Archéologie caraïbe*, B. Bérard, C. Losier (eds.), 167-194. In: Collection Tabouï 2. Leiden: Sidestone Press

Cremers, G., M. Hoff
1993 Inventaire taxonomique des plantes de la Guyane française, III-Les Cyperaceae et les Poaceae. In: Collection Patrimoines Naturlas 11, Série Patrimoine Génétique. Secretariat de la Faune et de la Flore. Paris: Muséum National d'Histoire Naturelle

Crevaux, J.
1883 *Voyages dans l'Amérique du Sud*. Paris: Hachette

Crock, J.G., R. N. Bartone
1998 Archaeology of Trants, Montserrat (Part 4), Flaked stone and stone bead industries, *Annals of Carnegie Museum* 67:197-224

Cross, A. F., W. H. Schlessinger
1995 A literature review and evaluation of the Hedley fractionation: applications to the biogeochemical cycle of phosphorus in natural ecosystems, *Geoderma* 64:197-214

Crumley, C. L.
1995 Heterarchy and the Analysis of Complex Societies, *Archaeological Papers of the American Anthropological Association* 6(1):1-5

1996 Historical ecology, *Encylopedia of Cultural Anthropology 2*, D. Levinson, M. Ember (eds.), New York: Henry Holt

1999 Complex Polities in the Ancient Tropical World, *Archaeological Papers of the American Anthropological Association* 9:13-33

Cruxent, J. M.
1971 Apuntes sobre arquelogia Venezolana, *Arte Prehispanico de Venezuela*, M. G. Arroyo, J. M. Cruxent, S. Pérez Soto de Atencio Mendoza (eds.), 18-59, Caracas

1972 Tupuquén: Un yacimiento con lítica de tipo Paleo-Indio. *Acta Científica Venezolana* 23 (1):17

Cruxent, J. M., I. B. Rouse
1958 *An archaeological chronology of Venezuela, Vol. 1*. In: Social Science Monographs 6. Washington: Pan American Union (Spanish edition 1961)

1959 *An archaeological chronology of Venezuela, Vol. 2*. In: Social Science Monographs 6. Washington: Pan American Union (Spanish edition 1961)

Culbert, P. T., R. L. Rands
2007 Multiple Classifications: An Alternative Approach to the Investigation of Maya Ceramics, *Latin American Antiquity* 18(2):181-190

Curet, L. A.
1992 *The development of chiefdoms in the Greater Antilles: a regional study of the valley of Maunabo, Puerto Rico*, PhD Dissertation, Arizona State University, ms

Curet, L. A., J. Oliver
1998 Mortuary Practices, Social Development, and Ideology in Precolombian Puerto Rico, *Latin American Antiquity* 9(3):217-239

Curet, L. A., L. M. Stringer
2010 *Tibes: People, Power, and Ritual at the Center of the Cosmos*. Tuscaloosa: University of Alabama Press

Cushion, J. P., J. Giacomotti, A. Faÿ-Hallé
1987 *Manuel de la céramique européenne: faïences, faïences fines, grès, terres cuites*. Freiburg: Bibliothèque d'Arts

Czaja, A. Th.
1978 Structure of Starch Grains and the Classification of Vascular Plant Families, *Taxon* 27(5-6):463-470

Dapper, O.
1668a *Naukeurige Beschrijvinge der Afrikaensche Gewesten van Egypten, Barbaryen, Libyen, Biledulgerid, Negroslant, Guinea, Ethiopiën, Abyssinie* […]. Amsterdam: Jacob van Meurs

1668b *Naukeurige Beschrijvinge der Afrikaensche Eylanden als Madagaskar, of Sant Laurens, Sant Thomee, d'eilanden van Kanarien, Kaep de Verd, Malta, en andere* […]. Amsterdam: Jacob van Meurs

Davies, W.
1906 A Description and Discovery of the River of Amazons, by William Davies Barber Surgeon of London, In: *Hakuytus Posthumus or Purchas His Pilgrimes, Contayning a History of the World in Sea Voyages and Lande Travells by Englishmen and others,* S. Purchas (ed.), Vol. 16, 413-416. Glasgow: James MacLehose & Sons

Davy, D.
2007 *Vannerie et vanniers. Approche ethnologique d'une activité artisanale en Guyane française*, PhD Dissertation University of Orléans, ms

Deagan, K. A.
1987 *Artifacts of the Spanish Colonies in Florida and the Caribbean, 1500-1800. Volume 1: Ceramics, Glassware, and Beads*. Washington DC: Smithsonian Institution Press

Dearbon, J. E., N. Kariouk Pecquet du Bellay de Verton
2004 *A Creole Lexicon: architecture, landscape, people*. Baton Rouge: Louisiana State University Press

Debert, J., B. L. Sheriff
2007 Raspadita: a new lithic tool from the Isthmus of Rivas, Nicaragua, *Journal of Archaeological Science* 34:1889-1901

Debet, B., M. Py
1975 *Classification de la céramique non tournée protohistorique du Languedoc Méditerranéen*. In: Revue archéologique de Narbonnaise, Supplément 4. Paris : CNRS/Université de Montpellier III

DeBoer, W.
1975 The Archaeological Evidence for Manioc Cultivation: A Cautionary Note, *American Antiquity* 40(4):419-433

Deetz, J.
1996 *In Small Things Forgotten. An Archaeology of Early American Life (expanded and revised)*. New York: Anchor Books [1977]

DeFilipps, S. Maina, J. Crepin (eds.)
2004 *Medicinal Plants of the Guianas (Guyana, Surinam and French Guiana)*. Washington D. C.: National Museum of Natural History

Delawarde, J. B.
1966 Activités des Indiens Galibi de la Mana et d'Iracoubo, (Guyane française), *Journal de la Société des Américanistes* 55(2):511-524

1967 Les Galibi de la Mana et d'Iracoubo, (Guyane française), *Journal de la Société des Américanistes* 56(2):333-388

Delor, C., E. Egal, D. Lahondere, P. Marteau
2001 *Carte géologique de la Guyane 1/500.000*, Orléans: Éditions BRGM (Second Edition)

Delor, C., E. W. F. de Roever, J-M. Lafon, D. Lahondére, Ph. Rossi, A. Cocherie, C. Guerrot, A. Potrel
2003 La ceinture de granulites d'ultra-haute température des Monts Bakhuis (Suriname): II. Implications en termes d'étirement crustal tardi-transamazonien argumenté dans le cadre d'un schéma structural révisé du Bouclier guyanais, *Géologie de la France* 2-3-4:207-230

Delpech, S.
2005 *Saint-Laurent-du-Maroni, Carrière des Ananas (Guyane)*, Rapport de diagnostic INRAP, ms

2010a *Chennebras-Avenue Saint-Cyr*, Rapport final d'opération diagnostic archéologique, ms

2010b *Stoupan Ecolodge, Stoupan, Matoury*, Rapport final d'opération diagnostic archéologique, ms

2011a *Mombin, Rémire-Montjoly, Guyane*, Rapport final d'opération diagnostic archéologique, ms

2011b *Kreola Park, Rémire-Montjoly, Guyane*, Rapport final d'opération diagnostic archéologique, ms

2013 *La fouille de Mombin II: Un nouveau mode d'inhumation dans la Guyane française*. Paper presented at the 25th International Congress of Caribbean Archaeology, 15-20 July, San Juan (Puerto Rico), ms

Denevan, W. M.
1992a The pristine myth: the landscape of the Americas in 1492, *Annals of the Association of American Geographers* 82:654-668

1992b Stone vs. metal axes: the ambiguity of shifting cultivation in prehistoric Amazonia, *Journal of the Steward Anthropological Society* 20:153-165

2001 *Cultivated Landscapes of Native Amazonia and the Andes*, Oxford: Oxford University Press

2004 Semi-intensive Pre-European Cultivation and the Origins of Anthropogenic Dark Earths in Amazonia, *Amazonian Dark Earth: Exploration in Space and Time*, B. Glaser, W. Woods (eds.), 135-143. New York: Springer

2006 Pre-European forest cultivation in Amazonia, *Time and Complexity in Historical Ecology: Studies in the Neotropical Lowlands*, W. Balée, C. Erickson (eds.), 153-163. New York: Colombia University Press

2014 Estimating Amazonian Indian numbers in 1492. *Journal of Latin American Geography* 13(2):207-221

Denevan, W. M., K. H. Schwerin
1978 Adaptive Strategies in Karinya Subsistence, Venezuelan Llanos, *Antropológica* 50:3-91

Dering, P.
1999 Earth-oven plant processing in Archaic Period economies: an example from a semiarid savannah in South-Central North America, *American Antiquity* 64(4):659-674

Descola, Ph.
1988 La chefferie amérindienne dans l'anthropologie politique, *Revue française de Science politique* 38(5):818-827

Dietler, M.
1996 Feasts and Commensal Politics in the Political Economy: Food, Power, and Status in Prehistoric Europe, *Food and the Status Quest: An Interdisciplinary Perspective*, P. Wiessner, W. Schiefenhövel (eds.), 87-125, Oxford: Berghahn

Dietler, M., I. Herbich
1994 Ceramics and ethnic identity: ethnoarchaeological observations on the distribution of pottery styles and the relationship between the social context of production and consumption, *Terre cuite et Société, La céramique, Document technique, économique et culturel*, F. Audouze, D. Binder (eds.), 459-472, Juan-les-Pins: APDCA Éditions

Dietler, M., B. Hayden (eds.)
2001 *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*. Washington: Smithsonian Press

Diderot, D., J. le Rond d'Alembert
1762 *L'encyclopédie ou dictionnaire raisonné des sciences, des arts et des metiers, par une société de gens de lettres,* 17 Vols. Paris: Chez Briasson, David, Le Breton & Durand

Dillehay, T.
2008 Profiles in Pleistocene History; *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 29-43. New York: Springer

Dorst, M.
2007 The SAN-1 site at Manzanilla: creating a site-scale pottery classification at a multi-component Ceramic Age site in Trindiad, *Proceedings of the XXI Congress of the International Association for Caribbean Archaeology, Trinidad 2005*, B. Reid, H. Petitjean Roget, A. Curet (eds.), Vol. 1, 328-337, University of the West Indies

Drennan, R. O.
1995 Chiefdoms in northern South America, *Journal of World Prehistory* 9(3):301-340

Drennan, R. O., C. A. Uribe (eds.)
1987 *Chiefdoms in the Americas*. Lanham: University Press of America

Drewett, P.
2004 Post-Saladoi society on Barbados, *Late Ceramic Age Societies in the Eastern Caribbean*, A. Delpuech, C. Hofman (eds.), 215-230. In: BAR International Series 1273, Paris Monographs in American Archaeology 14. London: Archaeopress

Dreyfus, S.
1983-4 Historical and Political Anthropological Interconnections: The Multilinguistic Indigenous Polity of the "Carib" Islands and Mainland Coast from the 16th to the 18th Century, *Antropológica* 59-62:39-55

1992 Les réseaux politiques indigènes en Guyane occidentale et leurs transformations aux XVIIe et XVIIIe siècles, *L'Homme* 122(32):75-98

1993 Os Empreendimentos Coloniais e os Espaços Políticos Indígenas no interior da Guiana Ocidental (entre Orenoco e o Corentino) de 1613 a 1796. *Amazônia, Ethnologia e História Indígena*, E. Viveiros de Castro, M. Carneiro da Cunha (eds.), 19-42. São Paulo: NHII-USP/FAPESP

Dubin, S. Sherr
1987 *Le livre des perles*, Paris: Éditions de La Martinière

Dubreuil, P., M. Warburton, M. Chastanet, D. Hoisington, A. Charcosset
2006 More on the introduction of temperate maize into Europe: large-scale bulk SSR genotyping and new historical elements, *Maydica* 51:281-291

Duchaufour, Ph.
1991 Pédologie: sol, végétation, environnement. Paris: Masson (Third Edition)

Dull, R. A., R. J. Nevle, W. I. Woods, D. K. Bird, S. Avnery, W. M. Denevan
2010 The Columbian Encounter and the Little Ice Age: Abrupt Land Use Change, Fire, and Greenhouse Forcing, *Annals of the Association of American Geographers* 100(4):755-771

Duijvenbode, A., van
2012 A Reappraisal of Intentional Cranial Modification among the Indigenous Inhabitants of Surinam in Prehistoric and Historic Times, *Caribbean Connections, Publications of the Fieldresearch Centre* 2(1) http://journal.fieldresearchcentre.org/Journal_Home.html

Duin, R. S.
2001 A Wayana Potter in the Tropical Rainforest of French Guiana/Surinam, *Newsletter* 18-19:45-57

2009 *Wayana Socio-political landscapes: multi-scalar regionality and temporality in Guiana*, PhD Dissertation, University of Florida, ms

2012 Ritual Economy: Dynamic Multi-Scalar Processes of Socio-Political Landscapes in the Eastern Guiana Highlands, *Antropológica* 117-118:127-174

Dugas, L., H. Rollins
2003 *Late Archaic Shellfish use at the East Steubenville Site*, Paper presented at the Annual Meeting of the West-Virginia Archaeological Society, ms

Dupuy, F.
2008 Wayana et Aluku: les jeux de l'altérité dans le haut Maroni, *Histoire, identités et logiques ethniques, Amérindiens, Créoles et Noirs Marrons en Guyane*, G. Collomb, M.-J. Jolivet (eds.), 165-201. In: Le regard de l'ethnologue 18. Paris: Éditions du CTHS

Earle, T. K.
1997 *How Chiefs come to Power: The Political Economy in Prehistory*. Stanford: Stanford University Press

Edmundson, G., Reverend
1903 The Dutch on the Amazon and Negro in the seventeenth century, Part 1: Dutch trade on the Amazon, *The English Historical Review* 18:642-663

1904 The Dutch on the Amazon and Negro in the Seventeenth Century, Part 2: Dutch trade in the basin of the Rio Negro, *The English Historical Review* 73:1-25

1906 Early relations of the Manoas with the Dutch, 1606-1732, *The English Historical Review* 21:229-253

Emy, J.
1978 *Histoire de la pierre à fusil. Avec la collaboration de Bernard de Tinguy*. Blois : Société d'Exploitation de l'Imprimerie Alleaume

Erickson, C. L.
2000 An artificial landscape-scale fishery in the Bolivian Amazon, *Nature* 408:190-193

2008 Amazonia: the historical ecology of a domesticated landscape, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 157-183. New York: Springer

2010 The Transformation of Environment into Landscape: The Historical Ecology of Monumental Earthwork Construction in the Bolivian Amazon, *Diversity* 2(4):618-652

Eriksen, L.
2011 *Nature and Culture in Prehistoric Amazonia. Using GIS to reconstruct ancient ethnogenetic processes from archaeology, linguistics, geography, and ethnohistory*, PhD Disserstation University of Lund, ms

Erikson, Ph. (ed.)
2006 La pirogue ivre. Bières réunis et présentés par Philippe Erikson, *Exposition Bières traditionnelles d'Amazonie*, 28 mai-24 aout 2004. Musée Fr. de la Brasserie, Sts Nicolas-de-Port

Espenshade, C. T.
2013 Late Pottery of the Jácana Site (PO-29), South-Central Puerto Rico, *Caribbean Connections* 3(1):10-29

Espinosa, A. Vázquez de
1948 *Compendio y Descripción de las Indias occidentales.* Transcrito del manuscrito original por C. Upson Clark (ed.). In: Smithsonian Missellaneous Collections 108. Washington: Smithsonian Institute

Etrich, C., P. Bertran, G. Chancerel, P. Fouéré, F. Honoré, C. Stouvenot
2003 *Le Site de L'Allée Dumanoir, Déviation de la RN1, Capesterre-Belle-Eau (Guadeloupe 97)*, Rapport final AFAN, ms

Eva, H. D., O. Huber (eds.)
2005 *A Proposal for defining the geographical boundaries of Amazonia.* Synthesis of the results from an Expert Consultation Workshop organized by the European Commission in collaboration with the Amazon Cooperation Treaty Organization- JRC Ispra, 7-8 June, Office for Official Publications of the European Communites, Luxembourg

Evans, C.
1950 *The Archaeology of the Territory of Amapá, Brazil (Brazilian Guiana)*, PhD Dissertation University of Columbia, ms

1955 A *Ceramic Study of Virginia Archaeology, With Appendix, An Analysis of Projectile Points and Large Blades by C. G. Holland.* In: Smithsonian Institution, Bulletin Bureau of American Ethnology 160. Washington: United States Government Printing Office

Evans, C., B. J. Meggers
1960 *Archaeological investigations in British Guiana*. In: Smithsonian Institution, Bulletin Bureau of American Ethnology 177. Washington DC: United States Government Printing Office

Évreux, Y., de, S. Michellet
1864 *Voyage dans le Nord du Brésil, fait durant les années 1613 et 1614 par le Père Yves d'Évreux,* publié, d'après l'exemplaire unique conservé à la Bibliothèque impériale de Paris, avec une introduction et des notes par M. Ferdinand Denis, Collections d'ouvrages inédits ou rares sur l'Amérique. Paris: Librairie A. Franck

Fagan, B.M.
1985 *In the Beginning: an introduction to archaeology*. Boston: Little, Brown & Co

Farabee, W. C.
1918 *The Central Arawaks*, In: University Museum, Anthropological Publications 9. Philadelphia: University of Pennsylvania

1924 *The Central Caribs*, In: University Museum, Anthropological Publications 10. Philadelphia: University of Pennsylvania

Farage, N.
1991 *As* Muralhas *dos sertões: os povos indígenas no rio Branco e a colonização*. São Paulo: Editora Paz e Terra

Fauque, P.
1835 Lettre du Père Fauque, missionnaire de la Compagnie de Jésus, au Père de la Neuville, A Ouyapoc, le 20 septembre 1736, *Choix des Lettres Edifiantes, écrites des missions étrangères* […], Missions de l'Amérique, Tome 7, 1-13. Paris: Imprimerie Casimir

1843 *Lettre du Père Fauque, missionaire de la Compagnie de Jésus, au Père de la Neuville, A Ouapoc, le 20 septembre 1736*, In: Lettres édifiantes et curieuses concernant l'Asie, l'Afrique et l'Amérique […], Tome 2, M. L. Aimé-Martin (ed.), 24-29. Paris: Société du Panthéon littéraire

Fausto, C.
2000 Of Enemies and Pets: Warfare and Shamanism in Amazonia, *American Ethnologist* 26(4):933-956

2001 *Inimigos fiéis: história, guerra e xamanismo na Amazônia*. São Paulo: USP

2007 Feasting on People: Eating Animals and Humans in Amazonia, *Current Anthropology* 48(4):497-530

Favelac, P. M.
1980 *Poteries rustique*. Paris: Edition Ch. Massin

Ferguson, B. R., N. L. Whitehead
1992 The Violent Edge of Empire, *War in the Tribal Zone: Expanding States and Indigenous Warfare*, B. Ferguson, N. Whitehead (eds.), 1-30. Santa Fe: School of American Research Press

Fermin, P.
1769 *Description générale, historique géographique et physique de la colonie de Surinam*, 2 Vols., Amsterdam

1770 *Nieuwe algemeene beschryving van de colonie van Suriname. Behelzende al het merkwaardige van dezelve, met betrekkinge tot de historie, aardryks- en natuurkunde.* Harlingen: V. van der Plaats Jr.

Feriz, H.
1957 *Verslag van een korte archeologische studiereis naar Suriname in het voorjaar van 1957*. Amsterdam: Koninklijk Instituut voor de Tropen

Fisher, U.
1625 A Relation of the habitation and other Obervations of the River of Marwin, and adioyning Regions, In: *Hakluytus posthumus, or Purchas his Pilgrimes. Contayning a history of the world, in sea voyages, & lande-travells, by Englishmen and others* […], S. Purchas (ed), Vol. 4, 1283-1286. London: H. Fetherston

Figueredo, A. E.
2012 *Manioc Dethroned and Maize Triumphant: Interpretations on the Ethnohistory and Archaeology of the Bahamas (with Sundry Notes on Relations of Production)*. Paper presented at the Society for American Archaeology 77th Annual Meeting, 18-22 April, Memphis (Tennessee), ms

Findlay, D. G. A.
2011 *Trio en Wayana Indianen in Suriname*. Paramaribo: Overdrukken uit de West [1970]

Fleury, M., D. Davy, P. Grenand
2014 Des palmiers et des hommes, *Guide des palmiers de Guyane*, J-J. de Granville, M. Gayot (eds.), 50-81. Cayenne: Office National des Forêts.

Flowers, N. M.
1994 Subsistence strategy, Social Organization, and Warfare in Central Brazil in the Context of European Penetration. *Amazonian Indians from Prehistory to the Present, Anthropological Perspectives*, A. Roosevelt (ed.), 249-267. Tucson: University of Arizona Press

Fouéré, P., A. Chancerel
2006 Le matériel lithique de la phase précéramique, *Les gisements précolombiens de la Baie Orientale, occupations précéramiques et postsaladoïde. Île de Saint-Martin, Petites Antilles*, D. Bonnissent (ed.), 137-197, Project for publication 2006, ms

Ford, J.
1962 A *quantitative method for deriving cultural chronology,* Technical Manual 1. Washington: Pan American Union

Forest, J., de
c.1625 *Journal du voyage faict par les peres de familles evnoyegs par Mrs les Directeurs de la Compagnie des Indes occidentales pour visiter la coste de Guyane*, Ms Sloane 179B. London: British Library

Forest, R., de
1914 *A Walloon Family in America. Lockwood de Forest and his Forbears 1500-1848, Together with a Voyage to Guiana being the Journal of Jesse de Forest and his Colonists 1623-1625*, 2 Vols. Boston & New York: Houghton Mifflin Company

Franssen Herderschee, A.
1905 Verslag van de Gonini-expeditie, *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap* 22:1-159, 847-991

Freitas, F. O., P. G. Bustamante
2013 Amazonian Maize: Diversity, Spatial Distribution and Historical-Cultural Diffusion, *Tipití: Journal of the Society for the Anthropology of Lowland South America* 11(2):60-65. Available at: http://digitalcommons.trinity.edu/tipiti/vol11/iss2/7

Freytag, J. D.
1824 *Mémoires du Général J. D. Freytag, ancien commandant de Sinnamary et de Conamama, dans la Guyane française* […], accompagnés de notes historiques, topographiques et critiques par Mr C de B., 2 Tomes. Paris: Nepveu

Frikel, P.
1957 Zur linguistisch-ethnologischen Gliederungen der Indianerstämme von Nord-Pará (Brasilien) und den anliegenden Gebieten, *Anthropos* 52:509-563

1958 Classificação lingüistico-ethnologica das tribos indigenas do Para setentrional e zonas adjacentes, *Revista de Anthropologia* 6(2):138-188

1973 *Os Tiriyó, seu sistema adaptativo.* In: Völkerkundliche Abhandlungen 5, H. Becher (ed.). Hannover: Kommissionsverlag Münstermann-Druck KG

Fritz, S.
1922 *Journal of the Travels and Labours of Father Samuel Fritz in the River of the Amazons between 1686 and 1723*, Translated from the Evora Ms and edited by the Rev. Dr. George Edmundson. In: Works issued by The Hakluyt Society, Second Series 51. London: Hakluyt Society

Froger, S.
1698 *Relation du voyage de M. De Gennes au détroit de Magellan, Brésil, Cayenne et isles Antilles* […]. Paris: Michel Brunet

Froidevaux, H.
1892 Une mission géographique et militaire à la Guyane en 1762, *Annales de Géographie* 1(2):218-231

1895 Explorations françaises à l'intérieur de la Guyane pendant le second quart du XVIII[e] siècle (1720-1742), *Bulletin de la Société de Géographie Historique et Descriptive* 1894:3-88

1901 Les « Lettres Edifiantes » et la Description du Mission de Kourou, *Journal de Société des Américanistes* 3(3-2):177-185

Gaffarel, P.
1889 Jean Ango, *Extrait du Bulletin de la Société normande de Géographie*. Rouen: Imprimerie Espérance Cagniard

Gallois-Tilkin, D.
1986 *Migração, guerra e comércio: os Waiãpi na Guiana*, In: Série Antropologia 15. São Paulo: FFLCH/USP

1993 Jane karakuri: o ouro dos Waiãpi. A experiência de um garimpo indígena, *Sociedades indígenas e trasformações ambientais*, A. C. Magalhães (ed.). Belém: NUMA/UFPA

Gallois-Tilkin, D. (ed.)
2005 *Redes de relações nas Guianas*. São Paulo: Associação Editorial Humanitas

Gambim, A., Jr
2012 *3° Relatório trimestral de atividades realizadas no núcleo de pesquisa arqueológica IEPA:* Estudos dos vestígios Funerários Humanos de Coleções Osteológicas Humanas do laboratório Peter Hilbert, Documento interno IEPA, ms

Garth, H. (ed.)
2013 *Food and Identity in the Caribbean*. London: Bloomsbury Academic

Gaspar, M. D., M. Imazio da Silveira
2000 Os pescadores-coletores-caçadores do litoral Norte brasileiro, *Pré-história da Terra Brasilis*, M. C. Tenório (ed.), 247-256, Rio de Janeiro

Gassies, E.
2000 *Carte communale des sites archéologiques de Rémire-Montjoly*, DRAC Guyane-SRA, ms

2004 Archéologie. L'Histoire et les Hommes, *Atlas illustré de la Guyane*, J. Barret (ed.), 20-25. Laboratoire de Cartographie de la Guyane, Institut d'Enseignement Supérieur de Guyane and Agence Régional d'Urbanisme et d'Aménagement de la Guyane

Gassies, E., G. Lemaire
2005a *Rapport d'intervention*, DRAC Guyane/SRA, ms

Gassies, E., M. Mestre
2012 Pointe Maripa, Roura, *Bilan scientifique Guyane* 2008:27-29

Gassies, E., G. Dauphin
2013 Angloulême, Mana, *Bilan scientifique Guyane* 2011:17-18

Gassies, E., S. Jérémie, S. Kayamaré
2002 *Carte archéologique de la commune d'Iracoubo*, DFS DRAC Guyane/SRA, ms

Gassón, R. A.
2000 Quirípia and Mostacillas: The Evolution of Shell Beads as a Medium of Exchange in Northern South America, *Ethnohistory* 47(3-4):581-609

2002 Orinoquia: The Archaeology of the Orinoco River Basin, *Journal of World Prehistory* 16(3):237-311

2003 Ceremonial feasting in the Colombian and Venezuelan Llanos, Some Remarks on Its Sociopolitical and Historical Significance, *Histories and Historicities in Amazonia*, Neil L. Whitehead (ed.), 179-201. Lincoln & London: University of Nebraska Press

Gaulme, F.
2003 Le manioc et son traitement: De l'Amérique à l'Afrique équatoriale: La diffusion de la farinha, *Peuplements anciens et actuels des forêts tropicales*, A. Froment, J. Guffroy (eds.), 249-254. Montpellier: IRD Éditions

Geay, F.
1901 Compte rendu de deux missions scientifiques dans l'Amérique équatoriale, *Bulletin du Muséum d'histoire naturelle* 8:148-158

1903 Gravures rupestres de la Table du Mahury, près de Cayenne, *Journal de la Société des Américanistes* 4(2):244-246

Géraud, M.-O.
2000 *Regards sur les Hmong de Guyane française: Les détours d'une tradition*, Paris : L'Harmattan

German, L.
2004 Ecological praxis and blackwater ecosystems: a case study from the Brazilian Amazon, *Human Ecology* 32:653-683

Geijskes, D. C.
1961a A History of Archaeological Investigations in Surinam, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 10-11:70-78

1961b Archeologische vondsten van de Zandritsen bij de Commetawane Kreek (District Commewijne) in Suriname, *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 10-11:95-124

1963 Les Arawaks dans la Préhistoire de Surinam, *Full texts of all communications and debates of the First International Convention for the Study of pre-Columbian culture in the Lesser Antilles, Fort-de-France 1961*, R. P. Bullen (ed.), 71-78. Societé d'Histoire de la Martinique

Gibbs, A., C. Barron
1993 *Geology of the Guiana Shield*. In: Oxford Monographs on Geology and Geophysics 22. Oxford: Oxford University Press

Gijn, A., van
1990 *The wear and tear of flint: Principles of functional analysis applied to Dutch Neolithic assemblages*, PhD Dissertation University of Leiden. In: Analecta Praehistorica Leidensia 22. Leiden: Leiden University Press

Gilbert, A.
1996 Saint-Laurent-du-Maroni, *Bilan Scientifique de la Région Guyane* 1996:41-43

Gijn, A. L., van
2014 Science and Interpretation in microwear studies, *Journal of Archaeological Science* 48:166-169

Gillin, J.
1936 *The Barama River Caribs of British Guiana*. In: Papers of the Peabody Museum of Archaeology and Ethnology 14 (2), Cambridge: The Museum

1948 Tribes of the Guianas. *Handbook of South-American Indians*, J. Steward (ed.), Vol. 3, 799-860. In: Smithsonian Institution, Bulletin Bureau of American Ethnology 143. Washington: United States Government Printing Office

Glaser, B.
1999 *Eigenschaften und Stabilität des Humuskörpers der "Indianerschwarzerden" Amazoniens*, PhD Dissertation University of Bayreuth, ms

2007 Prehistorically modified soils of central Amazonia: a model for sustainable agriculture in the twenty-first century, *Philosophical Transactions of the Royal Society* 362:187-196

Glaser, B., J. Birk
2012 State of the scientific knowledge on properties and genesis of Anthropogenic Dark Earths in Central Amazonia (terra preta do Indio), *Geochimica et Cosmochimica Acta* 82:39-51

Glaser, B., L. Haumaier, G. Guggenberg, W. Zech
1998 Black carbon in soils: the use of benzenecarboxylic acids as specific markers, *Org Geochem* 29:811-819

Glaser, B., W. Zech, W. Woods
2004 History, Current Knowledge and Future Perspective of Geological Research Concerning the Origin of Amazonian Anthropogenic Dark Earths (Terra Preta), *Amazonian Dark Earth: Exploration en Space and Time*, B. Glaser, W. Woods (eds.), 9-17. New York: Springer

Gnecco, C., S. Mora
1997 Late Pleistocene/early Holocene Tropical forest occupations at San Isidro and Peña Roja, Columbia, *Antiquity* 71:683-690

Gnecco, C., J. Aceituno
2004 Poblamento tempra y espacios antropologénicos en el norte de Suramérica, *Complutum* 15:151-164

Godelier, M., M. Strathern (eds.)
1991 *Big-Men and Great-Men: Personifications of Power in Melanesia*, Cambridge: Cambridge University Press

Goeje, C., de
1906 Een bijdrage tot de ethnographie der Surinaamsche Indianen, *Supplement zum Internationales Archiv für Ethnographie* XVII. Leiden: Brill

1908 *Verslag van de Teomoekhoemak-Expeditie (Tumuc-Humac-Expeditie).* Brill: Leiden

1909 Études linguistiques caraïbes. Verhandelingen der Koninklijke Akademie van Wetenschappen te Amsterdam, Nieuw Reeks 10 (3). Amsterdam: Koninklijke Akademie van Wetenschappen

1930 Een oud bericht over Arawakken en Karaïben, *West-Indische Gids* 12:485-491

1932 Op Zoek naar de Amazonen, *West Indische Gids* 13:449-482, 498-530

1934 Suriname ontdekt, *Tijdschrift van het Nederlandsch Aardrijkskundig Genootschap* 1934:51-89

1941 De Oayana-Indianen, *Bijdragen tot de Taal-, Land- en Volkenkunde van Nederlandsch-Indië* 100:70-125

1943 Neolitische Indianen in Suriname (met gegevens der expeditie-Ahlbrinck 1938, *Tijdschrift van het Nederlandsch Aardrijkskundig Genootschap* 60(3):334-374

1948 Zondvloed en zondeval bij de Indianen van West-Indië, *Mededelingen Koninklijk Vereniging Indisch Instituut* 79, Afdeling Volkenkunde 28, Leiden

2009 *The Arawak Language of Guiana*. Cambridge: Cambridge University Press (1928)

Goeldi, E.
1900 *Excavações archeologicas en 1895. Executadas pelo Museu Paranese no Littoral da Guyana Brazileira entre Oyapock e Amazonas. Primera Parte. As cavernas funerarias artificiaes de Indios hoje extinctos no Rio Cunany (Goanany) e sua ceramica,* Memorias do Museu Paraense de Historia Natural e Ethnographia, Pará

Goethals, P. R.
1953 *An Archaeological Reconnaissance of Coastal Surinam*, ms

Goldman, I.
2004 *Cubeo Hehénewa: Religious thought*. New York: Columbia University Press

Gomes, D. M. Cavalcante
2005 *Análise Arqueològica dos Padrões de Organização Comunitária no Baixo Tapajòs*, PhD Dissertation University of São Paulo, ms

2007 The Diversity of Social Forms in Pre-Colonial Amazonia, *Revista de Arqueologia Americana* 25:189-225

2008 *Cotidiano e Poder na Amazônia Pré-colonial*, São Paulo: Editoria da Universidade de São Paulo

2011 Cronologia e conexões culturais na Amazônia: as sociedades formativas da região de Santarém-Pa, *Revista de Anthropologia* 54(1):269-314

Goslinga, C.
1971 *The Dutch in the Caribbean and on the Wild-Coast (1580-1680)*. Groningen: Van Gorcum

1986 *The Dutch in the Caribbean and the Guianas 1680-1691*. Assen: Van Gorcum

Gosselin, E. H.
1876 *Documents authentiques et indédits pour servir à l'histoire de la marine normande et du commerce Rouennais pendant les XVIe et XVIIe siècles*. Rouen: Imprimerie Henri Boissel

Gosselain, O. P.
2002 *Poteries du Cameroun méridional: styles techniques et rapport à l'identité*. In: Collection de Recherches Archéologiques 26. Paris: Éditions CNRS

2012 D'une histoire à l'autre. Retour sur une théorie des liens entre langues et techniques en Afrique. *La préhistoire des autres. Perspectives archéologiques et anthropologiques*, N. Schlanger, A-Ch. Taylor (eds.), 83-98. Paris: La Découverte

Gosselain, O. P., A. Livingstone Smith
1995 The 'Ceramic and society project' : an ethnographical and experimental approach to technological choices. *The aim of laboratory analyses of ceramics in archaeology*, H. Lindhal, O. Stilborg (eds.), 147-160. Kungl. Vitterhets Historie och Antikvitets Akademien Konferenser 34, Stockholm

Gott, B., H. Barton, D. Samuel, R. Torrence
2006 Biology of Starch, *Ancient Starch Research*, R. Torrence, H. Barton (eds.), 35-45, Walnut Creek: Left Coast Press

Granville, J. J., de
1992 Les formations végétales actuelles des zones côtière et subcôtière des Guyanes, *Evolutions des Littoraux de Guyane et de la zone caraïbe méridionale pendant le Quaternaire, Symposium PICG 274/ ORSTOM Cayenne (Guyane) 1990*, M.-T. Prost (ed.), 231-249. Paris: Éditions de l'ORSTOM

Green, L., D. Green
2010 The Rain Stars, the World's River, the Horizon and the Sun's Path: Astronomy along the Rio Urucauá, Amapá, Brazil, *Tipití: Journal of the Society for the Anthropology of Lowland South America* 8(2), http://digitalcommons.trinity.edu/tipiti/vol8/iss2/3

Green, L., D. Green, E. Góes Neves
2003 Indigenous knowledge and archaeological science: The challenges of public archaeology in Reserva Uaça, *Journal of Social Archaeology* 3(3):365-397

Grenand, F., P. Grenand
1987 La côte d'Amapá, de la bouche de l'Amazone à la baie d'Oyapock, à travers la tradition orale Palikur, *Boletim do Museu Paraense Emílio Goeldi*, Anthropologia 3(1):1-77

Grenand, P.
1971 *Les Relations intertribales en Haute Guyane du XVIIIe siècle à nos jours*, Master Thesis, University EHSS, ms

1979 Commentaires à propos d'un abattis wayapi (Guyane française*), Cahier ORSTOM Série Sciences Humaines* 16(4):299-303

1980 *Introduction à l'étude de l'Univers Wayãpi, Etnoécologie des Indiens du Haut-Oyapock (Guyane française).* In: Langues et Civilisations à Traditions orales 40, Société d'Etudes linguistiques et anthropologiques de France. Paris: CNRS/ ORSTOM

1981 Agriculture sur brulis et changements culturels: le cas des Indiens Wayapi et Palikur de Guyane, *Journal d'Agriculture Traditionelle et de Botanique Appliquée* 28(1):23-31

1982 *Ainsi parlaient nos ancêtres. Essai d'ethnohistoire Wayãpi.* In: Travaux et Documents de l'ORSTOM 148. Paris: Éditions ORSTOM

2006 Que sont devenus les Amérindiens de l'Approuague? Réflexions autour d'une histoire peu documentée, *L'histoire de la Guyane, depuis les civilisations amérindiennes*, S. Mam Lam Fouck, J. Zonzon (eds.), 105-126, Matoury: Éditions Ibis Rouge

Grenand, P., F. Grenand
1979 Les Amérindiens de Guyane française aujourd'hui, Elements de compréhension, *Journal de la Société des Américanistes* 66(1):361-382

1992 II y a encore des Sauvages en Amérique ? *Journal de la Société des Américanistes* 78 (1):99-113

1997 L'occupation amérindienne: ethnoarchéologie, ethnohistoire, *L'archéologie en Guyane*, G. Mazière, M. Mazière (eds.), 57-71. Cayenne: APPAAG

Grenand, P., M. T. Prévost
1985 La question amérindienne en Guyane française: Eléments de synthèse, *Ethnies, Droits de l'Homme et Peuples authoctones* 1(1-2):54-58

Grenand, P., M. T. Prévost
1994 Les plantes colorantes utilisées en Guyane française, *Journal d'Agriculture Traditionnelle et de Botanique Appliquée*, n.s. 36(1):139-172

Grenand, P., C. Moretti, H. Jacquemin, M. T. Prévost
2004 *Pharmacopées traditionnelles en Guyane, Créoles, Wayapi, Palikur*. Paris: Éditions IRD

Grillet, J., F. Bechamel
1698 *Travels of John Grillet and Francis Bechamel into Guiana in the Year 1674* […], Voyages and discoveries in South America, London: Samuel Buckley

1716 Journal du Voyage, que les Peres Jean Grillet & François Bechamel, de la Compagnie de Jesus, ont fait dan la Goyane en 1674, *Voyage autour du Monde commencé en 1708 & fini en 1711 par le Capitaine Woodes Rogers*, Tome II, 201-246. Amsterdam: Chez le Veuve de Paul Marret

Groene, D.

1976 Note sur le site de Kormontibo, *Proceedings of the Sixth International Congress for the Study of Pre-Colombian Cultures of the Lesser Antilles, Pointe-à-Pitre 1975*, Ripley P. Bullen (ed.), 158-164. Société d'Histoire de la Guadeloupe et la Municipalité de Pointe-à-Pitre

Grouard, S., J. Briand, N. Fedoroff, M. Jarry, C. Tardy

1997 *Un site d'habitat de hauteur amérindien précolombien sur l'Ile de Cayenne. Mont Grand-Matoury, 97307.008 (Guyane française),* DFS de fouille préventive AFAN/ SRA, ms

Grouad, S., E. Pellé

2002 *Rapport préliminaire: Les Vertébrés associés* à *une sépulture humaine-Awala-Yalimapo-Guyane française site no 97361004 P*, ms

Grouard, S., C. Tardy

2003 Un site d'habitat de hauteur sur le mont Grand-Matoury, Île de Cayenne-Guyane française, *Archéologie précolombienne et coloniale des Caraïbes*, A. Delpuech, J.-P. Giraud, A. Hesse (eds.), 197-223. In: Actes 123e Congrès national des sociétés historiques et scientifiques, Antilles-Guyane 1998. Paris: Éditions du CTHS

Guapindaia, V.

2001 Encountering the Ancestors: The Maracá urns, *Unknown Amazon. Culture and Nature in Ancient Brazil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 156-173. London: British Museum Press

2008 *Além da margem do rio -a occupacção Konduri e Pocó na região de Porto Trombetas, PA*, PhD Dissertation, University of São Paulo, ms

Guapindaia, V. L. Calandrini, J. Aires da Fonseca Jr

2013 Metodologia de delimitação no sítio arqueológico Cipoal do Araticum na região do Rio Trombetas, Pará, Brasil, *Boletim do Museu Paraense Emílio Goeldi*, Ciências Humanas 8(3):657-673

Guéritault, Ph.

1989 Les Huguenots de la fin du XVIe à la moitié du XVIIe siècle, *Histoire de la Guyane,* V. Huyghues-Belrose (ed.), 12-21. In: La Grande Encyclopédie de la Caraïbe Vol. 7. Pointe-à-Pitre: Sanoli

Guix, J. C.

2005 An old European Object found at the Confluence of the Caurés and Rio Negro rivers, NW Amazonia, *Revista d'Arquélogia de Ponent* 15:341-346

Guss, D. A.

1989 *To Weave and Sing: art symbol and narrative in the South America rainforest*. Berkeley: University of California Press

Guyana Shield Conservation Priorities

2003 *Consensus 2002*, O. Huber, M. Foster (eds.), Washington: Conservation International

Guyon, S.

2003 *Coutume et mobilisation, L'entrée en politique d'un village amérindien de Guyane,* Article de DEA ENS/EHESS, ms

Haag, W. G.

1965 Pottery Typology in Certain Lesser Antilles, *American Antiquity* 31:242-245

Haffer, J.

1969 Speciation in Amazonian Forest Birds, *Science* 165:131-137

Hagen, J. F.

1991 *Orihno nï-karè: Sprekend aardewerk*, Master Thesis University of Leiden, ms

Hammen, T., van der

1974 The Pleistocene changes of vegetation and climate in tropical South America, *Journal of Biogeography* 1:1-36

Hamy, E. J. T.

1903 *Les serpents du Mahury.* Mémoires d'Archéologie et d'Ethnographie américaines, Décades 5 et 6, édité par Ernest Hamy, 114-118. In: Décades américæ. Paris: Ernest Leroux

Hanson, J. A.

1947 *Metal weapons, tools & ornaments of the Teton Dakota Indians: Catalog of the Museum of the fur trade*. Chadron: Museum of the Fur Trade

Harcourt, R.

1625 *A Relation of A Voyage to Guiana* […]. In: Purchas his Pilgrimes in Five Books. The Fourth Part, Chapter XII, 1267-1282, London: Henrie Fetherstone

1906 *A Relation of a voyage to Guiana performed by Robert Harcourt of Stanton Harcourt in the Countie of Oxford Esquier*. In: Hakuytus Posthumus or Purchas His Pilgrimes, Contayning a History of the World in Sea Voyages and Lande Travells by Englishmen and others, S. Purchas (ed.), Vol. 16, 358-402. Glasgow: James MacLehose & Sons

1928 *Relation of a voyage to Guiana 1613. With Purchas's Transcript of a Report made at Harcourt's instance on the Marawini District*, A. C. Harris (ed.). In: Works issued by The Hakluyt Society, Second Series 60. London: The Hakluyt Society

Hardy, M.
2008 *Saladoid economy and complexity on the Arawakan Frontier*, PhD Dissertation Florida State University, ms

Harlow, V. T.
1925 *Colonising expeditions to the West-Indies and Guiana, 1623-1667*. In: Works issued by The Hakluyt Society, Second Series 56. London: The Hakluyt Society

1932 *Ralegh's last voyage: being an account drawn out of contemporary letters and relations, both Spanish and English of which the most part are now for the first time made public,* […]. London: Argonaut Press

Harris, C. A., J. A. J. de Villiers
1911 *Storm van 's Gravesande, The Rise of British Guiana,* Vol. 1. In: Works issued by The Hakluyt Society, Second Series 26, London: Hakluyt Society

Harris, D. R.
2006 The Interplay of Ethnographic and Archaeological Knowledge in the Study of past Human Subsistence in the Tropics, *Journal of the Royal Anthropological Institute,* Special Issue 'Ethnobiology and the Science of Mankind' 12:63-78

Harris, E., M. Brown, G. Brown
1993 *Practices of archaeological stratigraphy.* London: Academic Press

Harris, P. B.
1973 Preliminary Report on Banwari Trace, a Preceramic Site in Trindad, *Proceedings of the Fourth International Congress for the Study of pre-Columbian cultures of the Lesser Antilles, Saint-Lucia 1971*, R. P. Bullen (ed.), 115-125. Castries: Saint Lucia Archaeological and Historical Society

1978 A Revised Chronological Framework for Ceramic Trinidad and Tobago, *Proceedings of the Seventh International Congress for the Study of the Pre-Columbian Cultures of the Lesser Antilles*, Caracas 1977, J. Benoist, F.-M. Mayer (eds.), 47-63. Montréal: Centre de recherches caraibes

Harisse, H.
1897 *The Diplomatic History of America. Its first chapter 1452, 1493, 1494*. London: B. F. Stevens

Hartsinck, J. J.
1770 *Beschrijving van Guiana, of de Wilde Kust, in Zuid-America* […]. Amsterdam: Gerrit Tieleburg

Hartt, C. F.
1871 Brazilian Rock Inscriptions, *American Naturalist* 5(3):139-147

1885 Contribuições para a Ethnologia do Valle do Amazonas, *Archivos do Museu Nacional do Rio de Janeiro* 6

Haslam, M.
2004 The Decomposition of Starch Grains in Soils: Implications for Archaeological Residue Analyses, *Journal of Archaeological Science* 31(12):1715-1734

2009 Mountains and Molehills: Sample Size in Archaeological Microscopic Stone-Tool Residue Analysis, *Archaeological Science under a Microscope. Studies in Residue and Ancient DNA Analysis in Honour of Thomas H. Loy*, M. Haslam, G. Robertson, A. Crowther, S. Nugent, L. Kirkwood (eds.), 47-79. Canberra: The Australian National University Press

Hastorf, Ch.
2006 Domesticated Food and Society in Early Coastal Peru, *Time and Complexity in Historical Ecology: Studies in the Neotropical Lowlands*, W. Balée, C. Erickson (eds.), 87-126. New York: Columbia University Press

Harsema, O.
1979 *Handmolens. Maalstenen en handmolens in Drenthe van het neolithicum tot ca. 1300 A.D*. Assen

Hecht, S. B.
2003 Indigenous soil management and the creation of Amazonian dark earths: implications of Kayapó practices, *Amazonian Dark Earths: Origin, Properties, Management*, J. Lehmann, D. C. Kern, B. Glaser, W. Woods (eds.), 355-372. Dordrecht: Kluwer Academic Publishers

Heckenberger, M.
1998 Manioc agriculture and sedentism in Amazonia: the Upper Xingu example, *Antiquity* 72:633-648

2005 *The Ecology of Power: Culture, Place and Personhood in Southern Amazonia, AD 1000-2000*. London: Routledge

Heckenberger, M., J. Petersen, E. Góes Neves
1999 Village Size and Permanence in Amazonia: Two Archaeological Examples from Brazil, *Latin American Antiquity* 10(4):353-376

2001 Of Lost Civilizations and Primitive Tribes, Amazonia: Reply to Meggers, *Latin American Antiquity* 12(3):328-333

Heckenberger M. J., A. Kuikuro, U. T. Kuikuro, J. C. Russell, M. Schmidt
2003 Amazonia 1492: pristine forest or cultural parkland? *Science* 301:1710-1714

Heckenberger, M. J., E. Góes Neves
2009 Amazonian Archaeology, *Annu. Rev. Anthropol.* 38:251-266

Hees, C., van, J. J. Heij, M. S. Thomas
2002 *Baardmannen en Puntneuzen, Vorm, gebruik en betekenis van gezichtskruiken, 1500-1700*. Zwolle: Waanders

Heide, J., van der
1973 De Hertenrits. Een bodemkundig/ archeologisch onderzoek, *Dienst Bodemkartering Suriname* 43. Paramaribo: Departement voor Opbouw

Heimsath, A. M., J. Chappell, N. A. Spooner, D. G. Questiaux
2002 Creeping soil, *Geology* 30:111-114

Heijer, H., den
2002 *De geschiedenis van de WIC.* Zutphen: Walburg Pers

Heinen, D. H., A. García-Castro
2000 The Multitechnic Network of the Lower Orinoco in Early Colonial Times, *Ethnohistory* 47(3-4):561-579

Helman, A.
1982 *Avonturen aan de Wilde Kust: De geschiedenis van Suriname met zijn buurlanden*. Paramaribo: VACO

Hemming, J.
1978 *Red Gold: the Conquest of the Brazilian Indians.* London: Macmillan

Henri, A.
1989 *La Guyane. Son Histoire 1604-1946*. Cayenne: Guyane Presse Diffusion

Henry, A.G., H.F. Hudson, D. Piperno
2009 Changes in starch grain morphology from cooking, *Journal of Archaeological Science* 36:915-922

Heriarte, M., de
1964 *Descriçam do Estado do Maranham-Para-Corupa Rio das Amazonas*, Faksimile-Ausgabe aus den MSS 5880 und 5879 der Osterreichischen National-Biblithek, Wien: Einleitung K. A. Nowotny. Graz: Akademische Druck und Verlagsanstalt

Herlein, J. D.
1718 *Beschryvinge van de Volk-Plantinge Zuriname* […], Leeuwarden: Meindert Injema

Heusch, L., de
2002 L'ennemi ethnique, *Raisons politiques* 1(5):53-67

Hewitt, C. D.
2000 *A study of the mechanisms of climate change at the last glacial maximum*, PhD Dissertation University of Reading, ms

Hilbert, K.
1990 Current reserach, *American Archaeology* 55(1):169

1991 Current reserach, *American Archaeology* 56(1):150-151

Hilbert, P.
1955 *A cerâmica arqueol̀ogica da região de Oriximiná*, Belém: Instituto de Antropologia e Etnologia deo Pará

1957 Contribuçao à Arquelogia do Amapá, *Boletim do Museu Paraense Emílio Goeldi*, Nova Série 1:1-39

1968 *Archäologische Untersuchungen am Mitteleren Amazonas*. In: Marburger Studien zur Volkerkunde 1. Berlin: Dietrich Reimer Verlag

1982 Pottery from the Cuminá River, Brazil and its Affiliations with the Koriabo Phase of Guyana, *Journal of the Walter Roth Museum Archaeology and Anthropology* 5(2): 74-81

Hilbert, P., K. Hilbert
1980 Resultados preliminares da pesquisa arqueologica nos rios Nhamunda e Trombetas, Baixo Amazonas, *Boletim do Museu Paraense Emílio Goeldi*, Nova Série 75:1-15

Hildebrand, M.
1999 *L'ensemble arauquinoïde: tradition ou complexe culturel? Essai d'analyse d'un ensemble culturel de la zone Orénoquo-guyanaise*, Bachelor Thesis, University of Paris I Panthéon-Sorbonne, ms

2000 *Essai de comparaison typologique du matériel céramique de deux sites de Guyane française,* Master Thesis University Paris I Panthéon-Sorbonne, ms

2002a *Commune de Mana, Prospection-inventaire et carte archéologique de la commune de Mana,* DFS DRAC Guyane/SRA, ms

2002b *Commune de Saint-Laurent du Maroni. Prospection-inventaire et carte archéologique de la commune de Saint-Laurent du Maroni*, DFS, DRAC Guyane/SRA, ms

2004 *Cimetière paysager Poncel*, Rapport de diagnostic INRAP, ms

2005a *Rémire-Montjoly. Avenue Saint-Cyr*, Rapport de diagnostic INRAP, ms

2005b *Pas de tir Soyouz*, Rapport de diagnostic INRAP, ms

2007 *Lycée Melkior-Garré, commune de Cayenne,* Rapport de diagnostic INRAP, ms

2008 *Saut-Saillat: une occupation diachronique de Berge Haute, Saint-Laurent du Maroni (Guyane française)*, Rapport de fouille INRAP, ms

Hill, J. (ed.)
1996 *History, Power, and Identity: Ethnogenesis in the Americas 1492-1992*. Iowa City: University of Iowa Press

Holst, I., J. Moreno, D. Piperno
2007 Identification of teosinte, maize, and *Tripsacum* in Mesoamerica by using pollen, starch grains, and phytoliths, *Proceedings of the National Academy of Sciences* 104(45):17608-17613

Hoff, B. J.
1968a *The Carib language, Phonology, morphophonology, morphology, texts and word index.* Den Haag: Nijhoff Publishers

1968b Pater W. G. Ahlbrinck 1885-1966, *Nieuwe West-Indische Gids* 46(1):188-291

1995 Language contact, war, and Amerindian historical tradition: The special case of the Island Carib, *Wolves from the Sea: Readings in the Anthropology of the Native Caribbean*, Neil L. Whitehead (ed.), 37-59. In: Caribbean Series 14, Leiden: KITLV Press

Hofman, C. L.
1993 *In search of the Native population of Pre-Columbian Saba*, *Part 1. Pottery styles and their interpretations,* PhD Dissertation University of Leiden, ms

Hofman, C. L., M. Hoogland
2003 Plum Piece: Evidence of Archaic seasonal occupation on Saba, Northern Lesser Antilles around 3300 BP, *Journal of Caribbean Archaeology* 4:12-27

2004 Social dynamics and Change in the Northern Lesser Antilles, *Late Ceramic Age Societies in the Eastern Caribbean*, A. Delpech, C. Hofman (eds.), 33-44. In: BAR International Series 1273, Paris Monographs in American Archaeology 14. Oxford: Archaeopress

Hofman, C. L., A. Bright, A. Boomert, S. Knippenberg
2007 Island Rhythms: The Web of Social Relationships and Interaction Networks in the Lesser Antillean Archipelago between 400 BC and AD 1492, *Latin American Antiquity* 18(3):243-268

Holdaway, S., L. Wandsnider (eds.)
2008 *Time in Archaeology: Time Perspectivism Revisited*. Salt Lake City: University of Utah Press

Hoogbergen, W.
2008 Frères et ennemies. Aluku et Ndjuka de 1710 à 1860, *Histoire, identités et logiques ethniques. Amérindiens, Créoles et Noirs Marrons en Guyane*, G. Collomb, M.-J. Jolivet (eds.), 107-142. In: Le regard de l'ethnologue 18. Paris: Éditions du CHTS

Hoogland, M. L. P.
1996 *In search of the native population of Pre-Columbian Saba, part two*, PhD Dissertation, University of Leiden, ms

Hoogland, M. L. P., C. L. Hofman
2013 From Corpse Taphonoy to Mortuary Behavior in the Caribbean: A Case Study from the Lesser Antilles, *The Oxford Handbook of Caribbean Archaeology*, W. F. Keegan, C. L. Hofman, R. Rodriguez Ramos (eds.), 452-469, Oxford: Oxford University Press

Hoopes, J. W.
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*, Phoenix (Arizona) April 17-May 1, ms

1994 Ford Revisited: A Critical Review of the Chronology and Relationships of the Earliest Ceramic Complexes in the New World, 6000-1500 BC, *Journal of World Prehistory* 8(1):1-49

Hornberg, A.
2005 Ethnogenesis, Regional Integration and Ecology in Prehistoric Amazonia: Toward a system perspective, *Current Anthropology* 46(4):589-619

Horrocks, M.
2006 Box 5.2: Starch Residues in Coprolites, *Ancient Starch Research*, R. Torrence, H. Barton (eds.), 78, Walnut Creek: Left Coast Press

Hothem, L.
2002 *Indian trade relics: identification and values*. Paducah: Collector Books

Hothem, L.
2005 Some pestles types, *Indian Artefact Magazine* 24(3):73-75

Howard, C. V.
2001 *Wrought Identities: The Waiwai Expeditions in Search of the "Unseen Tribes" of Northern Amazonia,* PhD Dissertation, University of Chicago, ms

Hugh-Jones, S.
1993 Clear Descent or Ambiguous Houses? A Re-Examination of Tukanoan Social Organisation, *L'Homme* 126-128:95-120

1995 Inside-out and back-to-front: the Androgynous House in northwest Amazonia, *About the House: Lévi-Strauss and Beyond*, J. Carsten, S. Hugh-Jones (eds.), 226-254, Cambridge: Cambridge Univesity Press

Hulme, P.
1992 *Colonial Encounters: Europe and the Native Caribbean 1492-1797*. London: Routledge

Hulsman, L. A. H. C.
2009 *Nederlands Amazonia. Handel met indianen tussen 1580 en 1680*, PhD Dissertation University of Amsterdam, ms

2010 De Guiaansche Compagnie: Nederlanders in Suriname in de periode 1604-1617, *OSO Tijdschrift voor Surinamistiek en het Caraïbisch gebied* 29(2):300-314

2011a Swaerooch: o comércio holandês com índios no Amapá, *Revista Estudos Amazônicas* 6(1):178-202

2011b Routes of the Guianas: a voyage from Suriname to the Rio Branco in 1718, *Dos Caminhos hist ricos aos processos culturais entre Brasil e Guyana*, R. Gomes de Oliveira, M. Ifill (eds.), 45-66. Boa Vista: EDUFFR

Hulsman, L., M. van den Bel
2012 Recherches en archives sur la famille Sweerts, *Bulletin de la société d'histoire de la Guadeloupe* 163:45-58

Hurault, J. M.
1965 L'exploration du bassin de l'Oyapock par Jean-Baptiste Leblond (1789) d'après des documents inédits, *Journal de la Société des Américanistes* 54(1):9-22

1968 *Les Indiens Wayana de la Guyane française: structure sociale et coutume familiale*, Paris: Éditions ORSTOM

1989 *Français et Indiens en Guyane 1604-1972*, Cayenne: Guyane Press Diffusion (Second Edition)

1992 Fransen en Indianen in Frans Guyana: Eerste kolonisatiepogingen aan het eind van de achtiende eeuw, *Indianen in de Guyana's*, J. Menke, B. Scholtens, J. Wekker (eds.), SWI Forum 9 (1-2):25-69

2000 Montagnes mythiques: les Tumuc Humac, *Cahiers de l'Outre-Mer* 53(212):367-392

Hurault, J. M., A. Sausse
1949 *Mission Astrogéodésique du Maroni (Guyane française), Juillet à Décembre 1948. Rapport de fin de Mission*. Ministère des Travaux Publics, des Transports et du Tourisme, ms

Huyghues-Belrose, V.
2000 Iles et Ilets du littoral de la Guyane française, une enquete de géographie historique, *L'extraordinaire et le quotidien, Variations anthropologiques*, C. Allibert, N. Rajaonarimanana (eds.), 115-134. Paris: Éditions Karthala

Hygino, J. Pereira
1895 Relatorios e cartas de Gedeon Morris de Jonge no tempo do dominio Holandez no Brazil, *Revista trimensal do Instituto Historico e Geographico brazileiro* 58(1):237-319

Ignace, P.
1997 *Les collections de Guyane dans les musées de France*, Master Thesis University of Paris I Panthéon-Sorbonne, ms

Imazio, da Silveira, M.
1994 *Estudo sobre estratégias de subsistência de caçadores-coletores pré-históricos do sítio Gruta do Gavião, Carajás (Pará).* Unpublished Master Thesis, University of São Paulo, ms

Imazio, da Silveira M., D. Schaan
2005 Onde a Amazonia encontra o Mar: estudando os sambaquis do Pará, *Revista d'Arqueológia* 18:67-79

Im Thurn, E. F.
1883 *Among the Indians of Guiana, Being sketches chiefly anthropologic from the interior of British Guiana*. London: Kegan Paul, Trench & Co

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

1996 Growing plants and rasising animals: An anthropological perspective on domestication, *The Origins and Spread of Agriculture and Pastoralism in Eurasia*, D. Harris (ed.), 12-24. London: University of London Press

Iriarte, J.
2006 Vegetation and climate change since 14,810 C yr B.P. in southeastern Uruguay and implications for the rise of early Formative societies, *Quaternary Research* 65:20-32

Iriarte, J., R. Dickau
2012 ¿Las Culturas del Maíz? Arqueobotanica de las Sociedades hidraulicas de las Tierras bajas sudamericanas, *Amazônica* 4(1): 30-58

Iriarte, J., C. Gillam, O. Marozzi
2008 Monumental burials and memorial feasting: an example from the southern Brazilian highlands, *Antiquity* 82 (318):947-961

Iriarte, J., B. Glaser, J. Watling, A.Wainwright, J. J. Birk, D. Renard, S. Rostain, D. McKey
2010 Late Holocene Neotropical agricultural landscapes: phytolith and stable carbon isotope analysis of raised fields from French Guianan coastal savannahs, *Journal of Archaeological Science* 37:2984-2992

Iriarte, J., M. J. Power, S. Rostain, F. E. Mayle, H. Jones, J. Watling, B. S. Whitney, D. McKey
2012 Fire-free land use in pre-1492 Amazonian savannas, *Proceedings of the United States National Academy of Science* (Early Edition): www.pnas.org/cgi/doi/10.1073/pnas.1201461109

Jargstorf, S.
1995 *Glass beads from Europe*. A Schiffer book for collectors

Janin, Th.
2002 Awala Yalimapo. Etude anthropologique de l'urne funéraire, *Bilan Scientifique de la Guyane* 1999:41

Jennings, W.
1995 The first generation of a creole society, Cayenne 1660-1700, *From contact to creole and beyond*, P. Baker (ed.), 21-40. London: University of Westminster Press

Jérémie, S.
1996 Régina, Saint-Georges-de-l'Oyapock, Route Nationale 2, *Bilan Scientifique de la Région Guyane* 1996:44-47

1997 Archéologie préventive et sites amérindiens. Quelques méthodes et résultats liminaires à travers les exemples de Petit-Saut et de la RN2, *L'archéologie en Guyane*, G. Mazière, M. Mazière (eds.), 73-86. Cayenne: APPAAG

1998 *Résultats de la prospection de la RN 2 entre Régina et Saint-Georges de l'Oyapock*, Rapport AFAN, ms

2002a Régina, Saint-Georges-de-l'Oyapock, Route Nationale 2, *Bilan Scientifique de Guyane* 1998:16-17

2002b *Commune de Rémire-Montjoly (97309). RN3 Poncel, n° opération 4023020201, Site 97309.104*, Rapport de diagnostic INRAP, ms

2003 La recherche archéologique en Guyane, *Archéologie précolombienne et coloniale des Caraïbes,* A. Delpech, J.-P. Giraud, A. Hesse (eds.), 37-49. In: Actes 123e Congrès nationaux des Sociétés historiques et scientifiques Antilles Guyane. Paris: Éditions CTHS

2005 *Sinnamary « Carrière Katia et Eva » (Guyane Française)*, Rapport de Diagnostic INRAP, ms

2007 La connaissance du peuplement de la Guyane et de la Caraïbe. L'archéologie préventive dans le monde, *Apports de l'archéologie préventive à la connaissance du passé,* J-P. Demoule (ed.), 247-257. Paris: Éditions La Découverte

Jérémie, S., S. Kayamaré
2001 *Commune d'Iracoubo et Sinnamary*, Document Final Synthèse de Prospection-inventaire AFAN/SRA, ms

Jérémie, S., E. Dambrine
2009 *Impact des occupations amérindiennes anciennes sur les propriétés des sols et la diversité des forêts de la frange côtière guyanaise,* Projet Couac, CNRS-Amazonie 2008-2011, Rapport d'intérim INRAP/INRA, ms

2010 Impacts des occupations amérindiennes anciennes sur les propriétés des sols et la biodiversité des forêts guyanaises, *Amazonie. Une aventure scientifique et humaine du CNRS*, A. Pavé, G. Fornet (eds.), 136-138. Paris: Galaade Éditions

Jérémie, S., M. Mestre, N. Cazelles
2002 *Lotissement Katoury, n° opération: 2002-23-0001, site 97302078, Commune de Cayenne (97302)*, Rapport de diagnostic INRAP, ms

Jolivet, M. J.
1982 *La question créole, Essai de sociologie sur la Guyane française*. In: Collection Mémoire 96. Paris: Éditions ORSTOM

1997 La créolisation en Guyane, *Cahier d'études africaines* 37(148):813-837

Jonge, J. K. J., de
1862 *De Opkomst van het Nederlandsch Gezag in Oost-Indië,* Deel 1. Den Haag: Martinus Nijhoff

1890 *De Opkomst van het Nederlandsch Gezag in Oost-Indië. Verzameling van onuitgegeven stukken uit het Oud-Koloniaal Archief,* Tweede Serie 1. Den Haag: Martinus Nijhoff

Jones, W. O.
1959 *Manioc in Africa*. Stanford: Stanford University Press

Jørgensen, K., O. Järvinen, P. Sainio, J. Salminen, A. M. Suortti
2005 Quantification of Soil Contamination, *Monitoring and Assessing Soil Bioremediation Margesin 5*, R. Schinner, F. Jørgensen, K. Järvinen, O. Sainio, P. Salminen, A. M. Suortti (eds.), 97-119. Berlin: Springer

Kabata-Pendias, A., H. Pendias
2001 *Trace Elements in Soils and Plants*. Boca Raton: CRC Press

Kambel, E. R., C. de Jong
2006 *Marauny Na'na Emandobo. Lokono Shikwabana ("Marowijne-Ons Grondgebied"). Traditioneel gebruik en beheer van het Beneden-Marowijne gebied door de Kalina en Lokono. Een Surinaamse case study in het kader van artikel 10(c) van het Biodiversiteitsverdrag,* I. Rogal S.A.

Kappler, A.
1854 *Zes Jaren in Suriname. Schetsen en tafereelen uit het maatschappelijke en militaire leven in deze kolonie,* 2 Vols. Utrecht: W. F. Dannenfelser

Karklins, K.
1974 Seventeenth Century Dutch Beads, *Historical Archaeology* 8:64-82

Kawa, N. C., A. Oyuela-Caycedo
2008 Amazonian Dark Earth: A Model of Sustainable Agriculture of the Past and Future? *International Journal of Environmental, Cultural, Economic and Social Sustainability* 4:1-8

Kassabaum, M. C.
2014 *Feasting and Communal Ritual in the Lower Mississippi Valley, AD 700-1000*, PhD Dissertation University of North Carolina, ms

Kayamaré, S.
1997 *Opération "Basse Mana-Carte communale" Commune de Mana, Guyane 973*, Document Final AFAN, ms

2000 Prospection-Inventaire, Mana, *Bilan scientifique de la Région Guyane* 1997:13-14

Kayser, C. C.
1912 *Verslag der Corantijn-expeditie (19 Juli 1910-1 April 1911)*. Leiden: Brill

Keegan, W. F.
1994 West Indian archaeology, 1, Overview and foragers, *Journal of Archaeological Research* 2:255-284

Keeley, L. H.
1980 *Experimental determination of stone tool wear. A microwear analysis*, Chicago: Universtiy of Chicago Press

Kern, D. C.
1996 *Geoquímica e pedogeoquímica em sitios arquelógicos com Terra Preta na Floresta Nacional de Caxiuanã (Portel-Pará),* PhD Dissertation, Federal University of Pará, Belém, ms

Kern, C., M. da Costa, F. Frazao
2004 Evolution of the Scientific Knowledge Regarding Archeological Black Earths of Amazonia, *Amazonian Dark Earths: Exploration en Space and Time*, B. Glaser, W. Woods (eds.), 19-28. New York: Springer

Keymis, L.
1596 *A Relation of the second Voyage to Guiana* […], In: The English Experience 65, Theaturm Orbis Terrarum, New York & Amsterdam: Da Capo Press (1968)

1890 A Relation of the second Voyage to Guiana, performed and written in the yeere 1596 by Lawrence Keymis Gent. In: *The Voyages of the English Nation to America, collected by Richard Hakluyt*, Edmund Goldsmid (ed.), Vol. 4, 132-182. Edinburgh: E. & G. Goldsmid

Kidd, K. H.
1979 *Bead-making from the Middle Age to the Early 19th Century*. In: History and Archaeology Serie 30. Ottawa

Kidder, A. V.
1962 *An Introduction to the Study of Southwestern archaeology with a preliminary account of the excavations at Pecos. With a summary of southwestern archaeology today by I. B. Rouse.* New Haven and London: Yale University Press

Kingsley-Noble, G.
1965 *Proto-Arawakan and its Descendants*. In: Indiana University Publications in Anthropology and Linguistics 38. Bloomington

Kipnis, R.
1998 Early hunter-gatherers in the Americas: perspectives from central Brazil, *Antiquity* 72:581-592

Kirchhoff, P.
1948 The Tribes North of the Orinoco River, *Handbook of South-American Indians*, J. Steward (ed.), Vol. 4, 481-493. In: Smithsonian Institution, Bulletin Bureau of American Ethnology 143. Washington: United States Government Printing Office

Khudabux, M., M. Maat, A. Versteeg
1991 The remains of prehistoric Amerindians of the "Tingi Holo Ridge" in Surinam, A physical anthropological investigation of the "Versteeg Collection", *Proceedings of the Twelfth International Congress of Caribbean Archaeology Cayenne 1987*, Linda S. Robinson (ed.), 135-151. Association Internationale d'Archéologie de la Caraïbe, Martinique

Klein, W. A. H.
1966 Antieke gebruiksflessen in Suriname, *Nieuwe West-Indische Gids* 45(1):121-136

Kloos, P.
1971 *The Maroni River Caribs of Surinam*. Assen: Van Gorcum

1973 Johannis Sneebeling over Surinaamse Indianen. Een manuscript uit de 18e eeuw, *Mededelingen Stichting Surinaams Museum* 10:5-39

Knapp, B. A. (ed.)
1992 *Archaeology, Annales, and Ethnohistory*. Cambridge: Cambridge University Press

Knippenberg, S.
2006 *Stone artefact production and exchange among the Lesser Antilles*, PhD Dissertation University of Leiden. In: Archaeological Studies Leiden University 14. Leiden: Leiden University Press

2012 Archaeological Investigations at the Saint-Louis on the Lower Maroni River: The Lithic Study, *Journal of the Walter Roth Museum of Archaeology and Anthropology* 17(2):53-77

Koeman, C. (ed.)
1973 *Links with the Past: The History of the cartography of Surinam 1500-1971.* Amsterdam: Theatrum Orbis Terrarum

Krook, L., J. Zonneveld
1998 Geomorphological investigations in the Interior of Surinam, *The history of earth sciences in Surinam*, Th. Wong, D. de Vletter, L. Krook, J. Zonneveld, A. van Loon (eds.), 101-118. Amsterdam: Koninklijke Nederlandse Akademische Wetenschappen/Nederlands Instituut voor Toegepaste Geowetenschappen (TNO)

Labat, J.-B.
1730 *Voyage du Chevalier Des Marchais en Guinée, islesvoisines, et à Cayenne, fait en 1725, 1726 et 1727*, 4 Tomes. Paris: Chez Saugrain

Laet, J., de
1625 *Nieuwve Wereldt ofte Beschrijvinghe van West-Indien* […]. Leiden: Elzevier

1630 *Beschrijvinghe van de West-Indien* […], Leiden: Elzevier

1633 *Novus Orbis, seu Descriptio Indiae Occidentialis* […]. Lugdunum Batavorum: Elzevirios

1644 *Historie of iaerlijck verhael van de verrichtinghen der geoctroyeerde West-Indische Compagnie, zedert haer begin, tot het eynde van 't jaer sesttien-hondert ses-en dertich* […]. Leiden: Elzevier. In: Werken van de Linschoten Vereniging 37, 4 Vols. (1931-1937), S. P. L'Honoré Naber, J. C. M. Warnsinck (eds.). Den Haag: Martinus Nijhoff

Laffon-Ladebat,
1912 *Journal de ma déportation à la Guyane française*, Publié d'après les manuscrits inédits avec une introduction par Frédéric Masson, Société d'Éditions littéraries et artistiques. Paris: Librairie Paul Ollendorf

Lafleur, G.
1993 *Saint-Claude. Histoire d'une commune de Guadeloupe*, Paris: Editons Karthala

2012 Familles hollandaises en Guadeloupe aux XVIIIe et XVIIIe siècles, *Bulletin de la société d'histoire de la Guadeloupe* 163:59-75

Laming-Emperaire, A.
1967 *Guia para o estudo das industrias liticas da America do Sul*. In: Manuais d'Arqueologia 2, Centro d'Ensino e Pesquisas Arqueologicas

Lammers, Y. M. J.
2008 *Tracing traces from present to past. A functional analysis of pre-Columbian artefacts from Anse à la Gourde and Morel, Guadeloupe, FWI*, PhD Dissertation University of Leiden. In: Archaeological Studies Leiden University 15. Leiden: Leiden University Press

Lane, C. S, S. Horn, K. H. Orvis, C. I. Mora
2008 Earliest Evidence of Ostionoid Maize Agriculture from the Interior of Hispaniola, *Caribbean Journal of Science* 44(1):43-52

Laon, J., Sieur d'Aigremont
1654 *Relation du Voyage des Francois Fait au Cap de Nord en Amerique, par les soings de la Compagnie establie à Paris, & sous la conduite de Monsieur de Royville leur General* […]. Paris: Chez Edme Pepingue

Lathrap, D. W.
1964 An Alternative Seriation of the Mabaruma Phase, Northwestern British Guiana, *American Antiquity* 29(3):353-359

1966 The Mabaruma Phase: A Return to the More Probable Interpretation, *American Antiquity* 31(4):558-566

1970 *The Upper Amazon.* In: Ancient Peoples and Places, G. Daniel (ed.). New York: Praeger Publishers

1973 The Antiquity and Importance of Long-distance Trade Relationships in the Moist Tropics of Pre-Columbian South America, *World Archaeology* 5(2):170-186

Lathrap, D., J. Oliver
1987 Agüerito: el complejo polícromo mas antiguo de América en la confluencia del Apure y el Orinoco (Venezuela), *Interciencia* 12:274-289

Lavallée, D.
2005 Néolithisations en Amérique: des prédateurs semi-nomades aux sociétés complexes, *Annales, Histoire, Sciences sociales* 60 (5):1035-1067

Ledru, M. P.
1993 Late Quaternary Environmental and Climatic Changes in Central Brazil, *Quaternary Research* 39:90-98

2001 Late Holocene Rainforest disturbance in French Guiana, *Review of Paleobotany and Palynology* 115:161-176

Lee, R. B., R. Daly
1999 Introduction: Foragers and others, *The Cambridge Encyclopedia of Hunters and Gatherers*, R. Lee, R. Daly (eds.), 1-19. Cambridge: Cambridge University Press

Lehmann, J., D. C. Kern, L. A. German, J. McCann, G. C. Martins, A. Moreira
2003 Soil fertility and production potential, *Amazonian Dark Earths: Origin, properties, management*, J. Lehmann, D. C. Kern, B. Glaser, W. I. Woods (eds.), 105-132. Dordrecht: Kluwer Academic Publishers

Leigh, C.
1625 *Captaine Charles Leigh his voyage to Guiana and plantation there*. In: Purchas his Pilgrimes in Five Books. The Fourth Part, Chapter XII, 1250-1255. London: Henrie Fetherstone

1906 *Capitaine Charles Leigh his voyage to Guiana and plantation there*. In: Hakuytus Posthumus or Purchas His Pilgrimes. Contayning a History of the World in Sea Voyages and Lande Travells by Englishmen and others, S. Purchas (ed.), Vol. 16, 309-323. Glasgow: James MacLehose & Sons

Lefèbre, G.
1973 *Compte-rendu des travaux de la Circonscription archéologique de la Guyane*, ms

1975 Le gisement de l'Anse de Rémire-Montjoly, *Connaissance de la Guyane, Revue Culturelle Départementale de l'Education Nationale en Guyane* 2:33-38

Lemaire, T.
1988 *Binnenwegen: essays en excursies*. Baarn: Ambo

Lemonnier, P.
1986 The study of material culture today: toward an anthropology of technical systems, *Journal of Anthropological Archaeology* 5:147-186

1993 Introduction, *Technological Choices: Transformation in material cultures since the Neolithic*, P. Lemonnier (ed.), 1-35, London: Routledge

Leroi-Gourhan, A.
1964 *Le geste et la parole*. In: La mémoire et les rythmes 2, Sciences d'aujourd'hui. Paris: Albin Michel

Leroi-Gourhan, A., M. Bresillon
1966 L'habitation magdalénienne n° 1 de Pincevent (Seine-et-Marne), *Gallia-Préhistoire* 9(2):263-385

Le Roux, Y.
1986 *L'habitation Poulain à Rémire*, Diplôme de l'EHESS, ms

1987 *La poterie Bergrave, un atelier colonial en Guyane française sous l'Ancien Régime*, Mémoire de DEA, EHESS, ms

1989 La Famille Poulain (1685-1795), *Histoire de la Guyane*, V. Huyghues-Belrose (ed.), 40-55. In: La Grande Encyclopédie de la Caraïbe, Vol. 7, Pointe-à-Pitre: Sanoli

1994 *L'Habitation guyanaise sous l'Ancien Régime, Etude de la culture matérielle*, 3 Vols., PhD Dissertation l'Ecole des Hautes Etudes et Sciences Sociales, Paris, ms

Le Roux, Y., R. Auger, N. Cazelles
2009 *Les jésuites et l'esclavage Loyola: l'habitation des jésuites de Rémire en Guyane française*. Québec: Presses de l'Université du Québec

Léry, J., de
1578 *Histoire d'un voyage fait en la terre du Bresil, autrement dite Amerique* [...]. La Rochelle: Antoine Chuppin

2008 *Histoire d'un voyage faict en la terre du Brésil 1578* (2ème edition 1580), Texte établi, présenté et annoté par F. Lestringant. Librairie Générale Française: Paris [1992]

Lescure, J.
2001 Les voyageurs et les naturalistes français aux Antilles (XVIIe-XIXe siècle), *L'exploration naturaliste des Antilles et de la Guyane*, J.-L. d'Hondt, J. Lorenz (eds.), 105-133. In: Actes 123e Congrès national des Sociétés historiques et scientifiques. Paris: CTHS

Lévi-Strauss, C.
1967 *Structural Anthropology*. New York: Doubleday & Co.

1979 Noble savages, *Mélanges en l'Honneur de Charles Morazé, Culture, Science et Développement: Contribution à une histoire de l'Homme*, C. Morazé, R. Aron (eds.), 44-55. Toulouse: Pivat

1993 Un autre regard, *L'Homme* 33(126-128):7-10

Lézy, E.
2000 *Guyane, Guyanes: une géographie "sauvage" de l'Orénoque à l'Amazone*, PhD Dissertation University Paris X Nanterre (1998), In: Mappemonde. Paris: Éditions Belin

Lima, H. Pinto
2008 *Historia das Caretas. A Tradição Borda Incisa na Amazônia Central*, PhD Dissertation University of São Paulo, ms

2010 A "longue durée" e uma antiga história na Amazônia Central, *Arquéologia Amazonica 2*, E. Pereira, V. Guapindaia (eds.), 605-627, Belém: MPEG/ IPHAN/ SECULT

Lima, H. Pinto, E. Góes Neves, J. Petersen
2006 La Fase Açutuba: um novo complexo cerâmico na Amazônia Central, *Arquelogia Suramericana 2*, C. Gnecco, A. Haber (eds.), Vol. 1, 26-52, Bogota: Universidad del Cuaca

Lima, A., da Silva
2010 Pedras verdes, Piedras hijadas ou Spleen stones: o comércio de pedras na Amazônia indigena sob o olhar dos Européos, *Amazônica* 2(2): 298-313

Lindeman, J. C.
1955 *The Vegetation of the Coastal Region of Surinam*. Amsterdam: Van Eedenfonds

Linderholm, J., E. Lundberg
1994 Chemical Characterization of Various Archaeological Soil Samples using Main and Trace Elements determined by Inductively Coupled Plasma Atomic Emission Spectrometry, *Journal of Archaeological Science* 21(3):303-314

Linné, S.
1925 The Technique of South American Ceramics, *Göteborgs Kungl. Vetenskapoch Vitterhets-Samhälles Handlingar* 29(5)

1928 Les Recherches archéologiques de Nimuendajú au Brasil, *Journal de la Société des Américanistes* 20:71-91

Loker, Z.
1989 Les Juifs à Cayenne, 1660-1696. *Histoire de la Guyane*, V. Huyghues-Belrose (ed.), 22-27. In: La Grande Encyclopédie de la Caraïbe, Vol. 7, Pointe-à-Pitre: Sanoli

Lombard, J.
1928 Recherches sur les Tribus indiennes qui occupaient le Territoire de la Guyane française vers 1730 (d'après les documents de l'époque), *Journal de la Société des Américanistes* 20(1):121-155

Lombardo, U., H. Prümers
2010 Pre-Columbian human occupation patterns in the eastern plains of the Llanos de Moxos, Bolivian Amazonia, *Journal of Archaeological Science* 37:1875-1885

Lombardo, U., E. Canal-Beeby, S. Fehr, H. Veit
2011 Raised fields in the Bolivian Amazonia: a prehistoric green revolution or a flood risk mitigation strategy? *Journal of Archaeological Science* 38(3):502-512

López de Velasco, J.
1894 *Geografia y Descripción universal de las Indias, recopilada por le Cosmógrafo-cronista Juan López de Velasco desde el año de 1571 al de 1574, publicada por primera vez en el Boletín de la sociedad geográfica de Madrid, con adiciones é ilustraciones Don Justo Zaragoza*. Madrid: Establecimiento tiopráfico de Fortanet

Lorimer, J.
1977 Ralegh's First Reconnaissance of Guiana? An English Survey of the Orinoco in 1587, *Terrae Incognitae* 9:7-21

1989 *English and Irish Settlement on the River Amazon 1550-1646*. In: Works issued by The Hakluyt Society, Second Series 171, London: The Hakluyt Society

1993 The failure of the English Guiana ventures 1595-1667 and James I's foreign policy, *The Journal of Imperial and Commonwealth History* 21(1):1-30

2006 *Sir Walter Ralegh's Discoverie of Guiana*. In: Works issued by The Hakluyt Society, Third Series 15, Cambridge

Lowie, R.
1948 Some aspects of political organizaion among the American aborigines, *Comparative Political Systems, Studies in the Politics of Pre-industrial Societies*, R. Cohen, J. Middleton (eds.), 63-87. Austin: University of Texas Press

Loy, T., M. Spriggs, S. Wickler
1992 Direct Evidence for Human Use of Plants 28,000 Years Ago: Starch Residues on Stone Artefacts from the Northern Solomon Islands, *Antiquity* 66:898-912

Lu, H., X. Yang, M. Ye, K. B. Liu, Z. Xia, X. Ren, L. Cai, N. Wu, T. S. Liu
2005 Culinary Archaeology: Millet Noodles in Late Neolithic China, *Nature* 437(13):967-968

Lyman, R. L., M. J. O'Brien
2001 The direct historical approach, analogical reasoning, and theory in American archaeology, *Journal of Archaeological Method and Theory* 8(4):303-342

Machado, J., Salles
2005 *Monticulos Artificais na Amazônia Central: um estudo de caso do sitio Hatahara,* PhD Dissertation University of São Paulo, ms

Magalis, J. E.
1975 *A seriation of some Marajoara painted anthropomorphic urns*, PhD Dissertation University of Illinois (Urbana-Champaign), ms

Magid, J., H. Tiessen, H., L. M. Condron
1996 Dynamics of organic phosphorus in soils under natural and agricultural ecosystems, *Humic Substances in Terrestrial Ecosystems*, A. Piccolo (ed.), 429-466. Amsterdam: Elsevier

Malaizé, B., P. Bertran, P. Carbonel, D. Bonnissent, K. Charlier, D. Galop, D. Imbert, N. Serrand, C. Stouvenot, C. Pujol
2011 Hurricanes and climate in the Caribbean during the past 3700 years BP, *The Holocene*, DOI: 10.1177/0959683611400198.

Mallé, P. M.
2003 *Saint Laurent du Maroni, Commune pénitentiaire*, Cayenne: Éditions Aïmara

Malouet, V. P.
1814 *Collection de Mémoires et Correspondances officielles sur l'administration des Colonies, et notamment sur la Guiane française et hollandaise*, 3 Tomes. Germain: Baudouin

Mans, J.
2012 *Amotopoan Trails: A recent archaeology of Trio movements*, PhD Dissertation University of Leiden. In: Mededelingen van het Rijksmuseum voor Volkenkunde 41. Leiden: Sidestone Press

Marcel, G.
1904 Un texte ethnographique inédit du XVIIIe siècle. *Journal de la Société des Américanistes*, Nouvelle Série 1(2):133-151

Margry,
1863 *Belain d'Esnambuc et les Normands aux Antilles*. Paris: Achille Faure

Marius, C.
1969 *Notice explicative n° 37. Carte Pédologique Cayenne à 1:50000e,* Office de la recherche scientifique et technique outre-mer. Paris: Centre ORSTOM de Cayenne

Martius, K. F. P., von
1867 *Beiträge zur Ethnographie und Sprachenkunde Amerikas zumal Brasiliens*, Vol. I, Zur Ethnographie. Leipzig: Friedrich Fleischer

Masham, T.
1890 *The thirde voyage set forth by Sir Walter Ralegh to Guiana, with a pinnesse called the Watte, in the yeere 1596, written by M. Thomas Masham a gentleman of the companie*. In: The Voyages of the English Nation to America, E. Goldsmid (ed.), Vol. 4, 182-194. Edinburgh: E. & G. Goldsmid

Mason, P.
1990 *Deconstructing America: Representations of the Other.* London: Routledge

Mathews, A. J., A. J. Woods, C. Oliver
1991 Spots before your eyes: new comparison charts to visual percentage estimation in archaeological material, *Recent developments in ceramic petrology*, A. P. Middleton, I. C. Freestone (eds.), 211-263. In: British Museum Occasional Paper 81. London

Mathews, T. G.
1970 Memorial Autobiografico de Bernardo O'Brian, *Caribbean Studies* 10:89-106

Maufrais, R.
2014 *Aventures en Guyane. Journal d'un explorateur disparu*. Paris: Éditions Julliard [1952]

Mayle, F.
2004 Assessment of the Neotropical dry forest refugia hypothesis in the light of palaeooecological data and vegetation model simulations, *Journal of Quaternary Science* 19(7):713-720

Mayle, F., M. Power
2008 Impact of a drier Early Mid-Holocene climate upon Amazonian forests, *Philosophical Transactions of the Royal Society B: Biological Sciences.* 363(1498):1829-1838

Mazéas, J. P.
1961 *Carte géologique de la Guyane* à l'échelle du 1/100.000ième, Feuille d'Iracoubo et notice explicative. Paris: Imprimerie nationale

Mazière, G.
1996 Montagne Favard, Régina-Kaw, *Bilan Scientifique de la Région Guyane* 1996:30-33

Mazière, M.
1996 Ouanary, Montagne d'Argent, *Bilan Scientifique de la Région Guyane* 1996:28-29

Mazière, M., G. Mazière
1993a Kourou, La Carapa, *Bilan Scientifique de la Région Guyane* 1992:16-19

1993b Maripasoula, Montagne couronnée de Yaou, *Bilan Scientifique de la Région Guyane* 1992:21-23

1997 La recherché archéologique en Guyane, *L'archéologie en Guyane*, G. Mazière, M. Mazière (eds.), 25-54. Cayenne: APPAAG

Mazière, M., J. P. Pascual-Gaborit
1994 Saut Léssé Dédé, Grand Santi, *Bilan Scientifique de la Région Guyane* 1993:13

McCormac F. G, A. G. Hogg, P. G. Blackwell, C. E. Buck, T. F. G. Higham, P. J. Reimer
2004 SHCal04 Southern Hemisphere Calibration 0-1000 cal BP, *Radiocarbon* 46:1087-1092

McEwan, C.
2001 Seats of Power: axiality and access to invisible worlds, *Unknown Amazon: Culture and Nature in Ancient Brasil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 176-197. London: British Museum Press

McKey, D., S. Rostain
2010 Les champs surélevés précolombiens, *Amazonie. Une aventure scientifique et humaine du CNRS*, A. Pavé and G. Fornet (eds.), 132-134. Paris: Galaade Éditions

McKey, D., S. Rostain, J. Iriarte, B. Glaser, J. Birk, I. Holst, D. Renard
2010 Pre-Columbian Agricultural Landscapes, Ecosystem Engineers, and Self-Organized Patchiness in Amazonia, *Proceedings of the National Academy of Sciences* 107(17):7823-7828

McKey, D. M. Ducréu, A. Solibiéda, Ch. Raimond, K. Lorena Adame Montoya, J. Iriarte, D. Renard, L. Elena Suarez Jiménez, Stéphen Rostain, A. Zangerlé
2014 New approaches to pre-Columbian raised-field agriculture: ecology of seasonally flooded savannas, and living raised fields in Africa, as windows on the past and the futures, *Amazonía. Memorias de las Conferencias Magistrales del 3er Encuentro Internacional de Arqueología Amazónica*, S. Rostain (ed.), 91-136. Quito: EIAA/IKIAM/SNESCTI

Medendorp, C.
2008 *Kijkkasten uit Suriname. De dioramas van Gerrit Schouten*, Amsterdam: KIT Publishers

Meggers, B. J.
1954 Environmental Limitation on the Development of Culture, *American Anthropologist* New Series 25(5)1:801-824

1971 *Amazonia, Man and Culture in a counterfeit paradise*. In: Worlds of Man, Studies in Cultural Ecology, W. Goldschmidt (ed.), University of California. Chicago: Aldine Publishing Company

2001 The continuing quest for El Dorado: round two, *Latin American Antiquity* 12:304-325

2003 Natural versus anthropogenic sources of Amazonian biodiversity: the continuing quest for El Dorado, *How Landscapes Change*, G. A. Bradshaw, P. A. Marquet, 89-107. Berlin: Springer

2010 Revisiting the Upper Essequibo: New Perspectives on the Taruma Phase, *Archaeology and Anthropology* 16(2):1-28

2011 Review of the Handbook of South American Archaeology edited by H. Silverman and W. Isbell. Springer, New York, 2008, *Chungara, Revista de Antropologia Chilena* 43(1):147-157

Meggers, B. J., C. Evans
1957 *Archaeological Investigations at the Mouth of the Amazon*. In: Smithsonian Institution, Bulletin of the Bureau of American Ethnology 167 Washington: United States Government Printing Office

1961 An experimental Formulation of Horizon Styles in the Tropical Forest Area of South America, *Essays in Pre-Columbian Art and Archaeology*, S. Lothrop (ed.), 372-388, Cambridge: Harvard Universtiy Press

1969 *Como interpretar el lenguage de los tiestos: Manual para arqueologos*, Traducido por Victor A. Nunez Regueiro e dibujos humoristicos por George Robert Lewis. Washington: Smithsonian Institution, ms

1978 Lowland South American and the Antilles, *Ancient Native Americans*, Jesse D. Jennings (ed.), 543-591. Washington: W. H. Feeman & Company

Meggers, B. J., O. F. Dias, E. Th. Miller, C. Perota
1988 Implications of archeological distributions in Amazonia*, Proceedings of a Workshop on Neotropical Distribution Patterns held in 1987*, P. E. Vanzolini, W. R. Heyer (eds.), 275-294, Rio de Janeiro: Academia Brasileira de Ciências

Menguet, P.
1993 Les Frontières de la chefferie: Remarques sur le système politique du haut Xingu (Brésil), *L'Homme* 126-128:59-76

Mercader, J., T. Bennett, M. Raja
2008 Middle Stone Age Starch Acquisition in the Niassa Rift, Mozambique, *Quaternary Research* 70:283-300

Mestre, M.
1997 *Les sites à fossés de Guyane Française,* Master Thesis, University of Toulouse-Le-Mirail, ms

2003 Quelques données préliminaires sur le site de Katoury (Commune de Cayenne, Guyane), *Journal de la Société des Américanistes* 89(1):177-185

2004 *Saint-Laurent du Maroni et Apatou. Liaison routière de Saint-Laurent du Maroni-Apatou (Guyane française),* Rapport final de diagnostic INRAP, ms

2005 *RN3 Poncel, Rémire Montjoly, Guyane française,* Rapport final de fouille INRAP, ms.

2006a *ZAC de Soula (Guyane française),* Rapport de diagnostic INRAP, ms

2006b *Saint-Georges de l'Oyapock. Piste provisoire du Pont de l'Oyapock (Guyane-française),* Rapport de diagnostic INRAP, ms

2008 *Saint-Laurent-du-Maroni. Les Hauts de Balaté (Guyane française),* Rapport de diagnostic INRAP, ms

2013 Pointe Blondin, Saint-Georges de l'Oyapock, *Bilan scientifique Guyane* 2011:45-51

Mestre, M., S. Delpech
2008 *Saint-Laurent du Maroni. Plateau des Mines*, Rapport de fouille INRAP, ms

2014 Colline de Montravel, *Rémire-Montjoly, Guyane*, Rapport d'opération diagnostic archéologique, ms

2015 Mombin 3, *Rémire-Montjoly, Guyane*, Rapport d'opération diagnostic archéologique, ms

Mestre, M., M. Hildebrand
2011 Pointe Morne: la rencontre de deux mondes amérindiens, *Un Pont sur l'Oyapock*, guide de l'exposition, G. Migeon (ed.), 10-13. Cayenne: MEEDT/DRAC/DEAL

2015 *Pointe Morne*, Rapport de fouille INRAP (to appear)

Mestre, M., M. Hildebrand, S. Delpech
2005 *Katoury, Cayenne, Guyane française*, Rapport final de fouille INRAP, ms

2007 Le site de Katoury, *Proceedings of the XXIth Congress of the International Association for Caribbean Archaeology, Trinidad 2005*, B. Reid, H. Petitjean Roget, A. Curet (eds.), Vol. 1, 409-420. University of the West Indies

2013 *Yaou,* Rapport final d'opération INRAP, ms

Métraux, A.
1927 Migrations historiques des Tupi-guaraní, *Journal de la Société des Américanistes* 19:1-45

1947 Mourning Rites and Burial Forms of the South American Indians, *América Indígena* 7(1):8-44

1948 The Tupinamba, *Handbook of South American Indians*, J. Steward (ed.), Vol. 3, 95-134. In: Smithsonian Institution, Bulletin of the Bureau of American Ethnology 143. Washington: United States Government Printing Office

Métraux, A., P. Kirchhoff
1948 The Northeastern extension of Andean Culture, *Handbook of South American Indians*, J. Steward (ed.), Vol. 4, 349-368. In: Smithsonian Institution, Bulletin of the Bureau of American Ethnology 143. Washington: United States Government Printing Office

Michel, J.
1989 *La Guyane sous l'Ancien Régime. Le désastre de Kourou et ses scandaleuses suites judiciaires*. Paris: L'Harmattan

Mickleburgh, H., J. R. Pagán Jiménez
2012 New insights into the consumption of maize and other food plants in the pre-Columbian Caribbean from starch grains trapped in human dental calculus, *Journal of Archaeological Science* 39:2468-2478

Middleton, W. D.
2004 Identifying chemical activity residues on prehistoric house floors: A methodology and rationale for multi-elemental characterization of a mild acid extract of anthropogenic sediments, *Archaeometry* 46:47-65

Migeon, G.
2006 L'occupation amérindienne ancienne de la Guyane, de l'holocène à la Conquête: état de la question et données nouvelles, *L'histoire de la Guyane, depuis les civilisations amérindiennes*, S. Mam Lam Fouck, J. Zonzon (eds,), 31-86. Matoury: Ibis Rouge Éditions

2007 Montagne à Colin, Rémire-Montjoly, *Bilan scientifique Guyane* 2004-2005:58-59

2010 La Guyana francesa y sus relaciones con las regiones vecinas en los tiempos pre-cabralianos, *Arquéologia Amazonica 2*, E. Pereira, V. Guapindaia (eds.), 713-739. Belém: MPEG/IPHAN/SECULT

2012 Montabo Sud, Cayenne, *Bilan scientifique Guyane* 2006:16-23

Migeon, G., M. Mestre
2004 *Commune d'Iracoubo,* DFS de Prospection-Inventaire SRA, ms

Migeon, G., C. Coutet, D. Davy, P. Grenand, D. Hanriot
2010 *Amerindiens de Guyane. Entre les fleuves Approuague et Oyapock, des cultures millénaires*. Régina: MAN/EMAK/DRAC

Milhau, A.
1732 *Histoire de l'isle de Cayenne et province de Guianne enrichie de plusieurs cartes et figures* […], 3 Tomes. Bibliothèque Méjeanne, Aix-en-Provence, MSS 430

Mocquet, J.
1617 *Voyage en Afrique, Asie, Indes Orientales et Occidentales. Fait par Iean Mocquet, Garde du Cabinet des Singularitez du Roi, aux Tuilleries* […]. Paris: Iean de Heucqueville

Monteiro, J.
1992 O Escravo Indio, esse Desconhecido, *Indios no Brasil,* L. Grupioni (ed.), 105-120, São Paulo: Global Edition (2005)

Montoya, E., V. Rull, N. D. Stansell, B. W. Bird, S. Nogué, T. Vegas-Vilarrúbia, M. B. Abbott, W. A. Díaz
2011 Vegetation changes in the Neotropical Gran Sabana (Venezuela) around the Younger Dryas, *Journal of Quaternary Science* 26:207-218

Moomou, J.
2004 *Le monde des Marrons du Maroni en Guyane (1772-1860). Naissance d'un peuple, les Boni*, PhD Dissertation University Paris IV. Matoury: Ibis Rouge Éditions

Moreau, J. P.
1987 Navigation européenne dans les Petites Antilles aux XVIe et début du XVIIe siècles: Sources documentaires, approche archéologique, *Revue française d'histoire d'outre-mer* 74 (275):129-148

1992 *Les Petits-Antilles de Christophe Colomb à Richelieu (1493-1635)*. Paris: Éditions Karthala

Mora, S.
2001 *Early inhabitants of the Amazonian tropical rain forest: A study of humans and environmental dynamics*, PhD Dissertation University of Calgary, ms

Mora, S., L. F. Herrera, I. Cavelier, C. Rodríguez Ramírez
1991 *Cultivars, anthropic soils and stability: a preliminary report of archaeological research in Araracuara, Colombian Amazonia*. In: University of Pittsburgh Latin American Archaeology Reports 2. Pittsburgh

Moraes, C.
2006 *Arqueologia na Amazônia Central, Vista de uma Perspectiva da Região do Lago de Limão*, Master Thesis University of São Paulo, ms

Morey, N.
1975 *Ethnohistory of the Colombian and Venezuelan llanos*, PhD Dissertatoin University of Utah, ms

Morsink, J.
2006 *(Re-) Constructing Constructions: Quotidian life and social practice at Anse à la Gourde*, Master Thesis University of Leiden, ms

Mourre, V.
1996 Les industries en quartz au Paléolithique: terminologie, methodologie et technologie, *Paleo* 8:205-223

2004 Le débitage sur enclume au Paléolithique moyen dans le Sud-Ouest de la France, Session 5: Paléolithique moyen, *Proceedings of the 14th UISPP Congress 2001*, P. van Peer, D. Bonjean, P. Semal (eds.), 29-38. In: BAR International Series 239. Oxford: Archaeopress

Moy, C. M., G. O. Seltzer, D. T. Rodbell, D. M., Berson
2002 Variability of El Nino/Southern Oscillation activity at millennial timescales during the Holocene epoch, *Nature* 420:162-164

Muller, K. I.
2001 *Elisabeth van der Woude, Memorije van 't geen bij mijn tijt is voorgevallen. Met het opzienbarende verslag van haar reis naar de Wilde Kust 1676-1677.* Amsterdam: Terra Incognita

Munsell© Soil Color Charts
1990 *Munsell Soil Color Charts*, Macbeth Division of Kollmorgen Instruments Corporation (Revised Edition). Baltimore

Murphy, J.
1853 *Voyages from Holland to Amercia, AD 1632-1644 by David Pieterson de Vries*. New York

Mury, P. S. J.
1895 *Les Jésuites à Cayenne. Histoire d'une mission de vingt-deux ans dans les pénitentiers de la Guyane*. Paris : V. Retaux & Fils

Myers, T. P.
1973 Toward the Reconstruction of Prehistoric Community Patterns in the Amazon Basin, *Variation in Anthropology*, D. Lathrap, J. Douglas (eds.), 233-252. Urbana: Illinois Archaeological Survey

Myers, D. L.
2004 Subtle Shift and Radical Transformations in Hunter-gatherer Research in American Anthropology: Julian Steward's Contributions and Archievements, *Hunter-gatherers in History, Archaeology and Anthropoloy,* A. Barnard (ed.), 175-186. New York: Berg

Nardeux, A.
2001 L'expédition aventureuse en Guyane de trois gentilhommes normands et de leurs vingt-six compagnons (1626-1630), *Les Normands et l'outre-mer, Annales de Normandie CRHQ* 6, J.-P. Hervieux, G. Désiré dit Gosset, E. Barré (eds.), 299-304. Université de Caen: Caen

Nassy, D.
1788 *Geschiedenis der kolonie van Suriname*, Amsterdam: S. Emmering [1974]

Navarrete, R. Pérez de
1964 Relación de las provincias y naciones que los indios llamados aruacas […], *Relaciones geográficas de Venezuela* 70, Antonio Arellano Moreno (ed.), 83-87. Caracas: Bibliotheca Nacional de la Historia

Netscher, P. M.
1888 *Geschiedenis van de Koloniën Essequebo, Demerary en Berbice, van de vestiging der Nederlanders aldaar tot op onze tijd*Den Haag: Martinus Nijhoff

Neufeld, H.
1998 *Land-use Effects on Soil Chemical and Physical Properties of Cerrado Oxisols*, PhD Dissertation University of Bayreuth, ms

Neves, E. Góes
1998 *Paths in Dark Waters: Archaeology as Indigenous History in the Upper Rio Negro Basin, Northwest Amazon*, PhD Dissertation University of Indiana, ms

1999 Changing Perspectives in Amazonian Archaeology, *Archaeology in Latin America*, G. Politis, B. Alberti (eds.), 216-243. London: Routledge

2008 Ecology, Ceramic Chronology and Distribution, Long-term History and Political Change in the Amazonian Floodplain, *Handbook of South-American Archaeology*, H. Silverman, W. Isbell (eds.), 359-379. New York: Springer

Neves, E. Góes, J. Petersen
2006 Political economy and Pre-Columbian Amazonia, *Time and Complexity in Historical Ecology: Studies from the Neotropical Lowlands*, W. Balée, C. Erickson (eds.), 279-309. New York: Columbia University Press

Neves, E. Góes, S. Rostain
2012 Diversité linguistique et agrobiologie dans le passé amazonien, *La préhistoire des autres. Perspectives archéologiques et anthropologiques*, N. Schlanger, A-Ch. Taylor (eds.), 119-136. Paris: La Découverte

Neves, E. Góes, J. B. Petersen, R. Batone, C. Augusto da Silva
2003 Historical and socio-cultural origins of Amazonian Dark Earths. *Amazonian Dark Earths: Origin, Properties, Management*, J. Lehmann, D. Kern, B. Glaser, W. Woods (eds.), 1-45. Dordrecht: Kluwer

Neves, E. Góes, V. L. Guapindaia, H. Pinto Lima, B. L. S. Costa, J. Gomes
2014 A tradição Pocó-Açutuba e os primeros sinais visíveis de modificações de paisagens na calha do Amazonas, *Amazonía. Memorias de las Conferencias Magistrales del 3er Encuentro Internacional de Arqueología Amazónica*, S. Rostain (ed.), 137-158. Quito: EIAA/IKIAM/SNESCTI

Neves, W. Alves, L. Beethoven Piló
2008 *Povo de Luzia: em busca dos primeiros americanos*. São Paulo: Editora Globo

Newsom, L. A.
2008 Caribbean Paleoethnobotany: Present Status and New Horizons, *Crossing the Borders: New Methods and Techniques in the Study of Archaeological Materials from the Caribbean*, C. Hofman, M. Hoogland, A. van Gijn (eds.), 173-194. Tuscaloosa: University of Alabama Press

Nicholl, J.
1607 *An Houre Glasse of Indian Newes or A true and tragicall discourse, shewing the most lamentable miseries, and distressed Calamities induried by 67 Englishmen, which were sent for a supply to the planting in Guiana in the yeare 1605* […]. London: Nathaniell Butter

Nicholl, C.
1995 *The Creature in the Map, A Journey to El Dorado.* Chicago: University of Chicago Press

Nieuwenhuis, C. J.
2002 *Traces on tropical tools. A functional study of chert artefacts from preceramic sites in Colombia*, PhD Dissertation, University of Leiden. In: Archaeological Studies Leiden University 9, Leiden: Leiden Univeristy Press

Nimuendajú, C.
1926 Die Palikur-Indianer und ihre Nachbarn, *Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälles Handlingar* 31(2)

1949 Os Tapajó, *Boletim Paraense do Museu Emílio Goeldi* 10:93-106

2001 Excursões pela Amazônia, *Revista de Antropologia* 44(1):189-200

2004 *In Pursuit of a Past Amazon. Archaeological Researches in the Brazilian Guyana and in the Amazon Region*, translated by S. Rydén and P. Stenborg; P. Stenborg, J. Sandahl (eds). In: Etnologiska Studier 45. Göteborg

Nirenberg, D.
2009 Was there race before modernity? The example of the "Jewish" blood in the late medieval Spain, *The Origins of Racism in the West*, M. Eliav-Feldon, B. Isaac, J. Ziegler (eds.), 232-264. Cambridge: Cambridge University Press

Noelli, F., Silva
1998 The Tupi: explaining origin and expansions in terms of archaeology and of historical linguistics, *Antiquity* 72:648-663

Nogué, S., V. Rull, E. Montoya, O. Huber, T. Vegas-Vilarrúbia
2009 Paleoecology of the Guayana Highlands (northern South America): Holocene pollen record from the Eruoda-tepui, in the Chimantá massif, *Paleogeography, Paleoclimatology, Paleoecology* 281:165-173

Nordenskiöld, E.
1913 *Urnengrâber und Mounds im bolivianischen Flachlande*, Baessler-Archiv, Band III. Berlin

Nota, D.
1971 Morphology and sediments off the Marowijne River, eastern Surinam shelf, *Hydrographie Newsletter*, Special Publication 6:31-36

Nouret, J. N.
1992 *L'univers des couteaux*. Paris: Éditions Solar

Nowacki-Breczewski, P., O. Puaux
1991-2 *Sauvetage Archéologique de Petit Saut,* Rapport de fouille AFAN, ms

Nowacki-Breczewski, P., O. Puaux, S. Rostain
1990 *PK 9,3 Sauvetage archéologique urgent 1988-1990*, Rapport sous la Direction des Antiquités Préhistoriques et Historiques de la Guyane et l'ORSTOM de Cayenne, ms

Nowacki-Breczewski, P., O. Puaux
1992 Sinnamary. La Montagne de la Trinité, *Bilan Scientifique de la Guyane* 1991:48-49

Oberg, K.
1949 *The Terena and the Caduveo of Southern Mato Grosso, Brazil*. In: Smithsonian Institution, Institute of Social Anthropology 9. Washington: United States Government Printing Office.

1955 Types of Social Structure among the Lowland Tribes of South and Central America, *American Anthropologist*, New Series 57(3):472-487

Oldenberg, S.
2008 Headless in America: The Imperial Logic of Acephalim, *The Mysterious and the Foreign in Early Modern England*, H. Ostovich, M. Silcox, G. Roebuck (eds.), 39-57. Cranbury: Associated University Presses

Oliveira, W., Charles de
2007 *Caçadores coletores na Amazônia: eles existem,* PhD Dissertation University of São Paulo, ms

Oliver, J. R.
1995 A Prehistoric Longhouse Structure (FAL-7), in Maticora Valley, Western Venezuela, *Proceedings of the 16th International Congress for Caribbean Archaeology, Basse-Terre 1995*, 143-157. Conseil Régional de la Guadeloupe

2001 The Archaeology of Forest Foraging and Agriculture in Amazonia, *Unknown Amazon: Culture and Nature in Ancient Brasil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 50-85. London: British Museum Press

2005 The Proto-Taino Monumental Cemís of Caguana: A Political-Religious 'Manifesto', *Ancient Borinquen: Archaeology and Ethnohistory of Native Puerto Rico*, P. E. Siegel (ed.), 230-284. Tuscaloosa: University of Alabama Press

2008 The archaeology of agriculture in ancient Amazonia, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 185-216. New York: Springer

2009 *Caciques and Cemi Idols: The Web Spun by Taino Rulers between Hispaniola and Puerto Rico*, Tuscaloosa: University of Alabama Press

2014 Nuevos aportes a la arqueologiq des sitio El Saladern, bajo Orinoco, Venezuela, *Antes de Orellana. Actas del 3er Encuentro Internacional de Arquéologia*

Amazônia, Stéphen Rostain (ed.), pp. 97-112. In: Actes & Mémoires de l'Institut Français d'Etudes Andines 37. Quito: IFEA

Ollagnier, C., M. Schvoerer, C. Ney, V. Mosca, N. Groué, H. Petitjean Roget, G. Mazière,

2011 *Contribution aux recherches de provenance et de chronologie, de perles en verre bleu trouvées en Guyane française, dans des sépultures à Ouanary (Trou Reliquaire et Trou Delft): Etude physique préliminaire*, Paper presented at the 24th IACA Congres, 25-30 July, Fort-de-France, Martinique, ms

Olsen, K. M., B. A. Schaal

2006 DNA Sequence Data and Inferences on Cassava's Origin of Domestication. *Documenting Domestication: New Genetic and Archaeological Paradigms*, M. Zeder, D. Bradley, E. Emshwiller, B. Smith (eds.), 123-133, Berkeley: University of California Press

Oonk, S., C. P. Slomp, D. J. Huisman

2009 Geochemistry as an aid in archaeological prospection and site interpretation: current issues and research directions, *Archaeological Prospection* 16(1):35-51

Orton, O., P. Tyers, A. Vince.

1993 *Pottery in archaeology*, Cambridge Manuals in archaeology. Cambridge: Cambridge University Press

Osgood, C.

1946 *British Guiana Archeology to 1945*. In: Yale University Publications in Anthropology 36, New Haven: Yale University Press

Ostapkowicz, J., A. Wiedenhoeft, C. Bronk Ramsey, E. Ribechini, S. Wilson, F. Brock, T. Higham

2011 'Treasures… of black wood, brillantly polished': five examples of Taino sculpture from the tenth-sixteenth century Caribbean, *Antiquity* 85:942-959

Overing, J.

1983-4 Elementary structures of reciprocity: a comparative note on Guianese, Central Brazilian, and North-West Amazon socio-political thought, *Antropólogica* 59-62:331-348

1986 Images of cannibalism, death and domination in a "non violent" society, *Journal de la Société des Américanistes* 72:133-156

Oudeschans Dentz, F.

1918 Suriname vóór de verovering door Abraham Crynssen, *Bijdragen en Mededelingen van het Historisch Genootschap* 39:173-213

1938 *Cornelis van Aerssen van Sommelsdijck*. Amsterdam: van Kampen

Oyuela-Caycedo, A.

1993 *Sedentism, food production and pottery origins in the tropics: The case of San Jacinto 1, Colombia*, PhD Dissertation University of Pittsburgh, ms

1995 Rock versus clay: the evolution of pottery technology in the case of San Jacinto 1, Colombia, *The Emergence of Pottery: Technology and Innovation in Ancient Societies*, W. Barnett, J. Hoopes (eds.), 133-144. Washington: Smithsonian Institution Press

1996 The Study of Collector Variability in the Transition to Sedentary Food Producers in Northern Colombia, *Journal of World Prehistory* 10(1):49-93

2006 El contexto economico de la alfaféria temprana en el caso de San Jacinto 1, *Boletin de Arqueologia PUCP* 10:285-304

Oyuela-Caycedo, A., R. Bonzani

2005 *San Jacinto 1, A Historical Ecological Approach to an Archaic site in Colombia*. Tuscaloosa: University of Alabama Press

Pagán Jiménez, J. R.

2005 *Estudio interpretativo de la cultura botánica de dos comunidades precolombinas antillanas. La Hueca y Punta Candelero, Puerto Rico*, PhD Dissertation, University Nacional Autónoma de México (UNAM), ms

2007 *De antiguos pueblos y culturas botánicas en el Puerto Rico indígena. El archipiélago borincano y la llegada de los primeros pobladores agroceramistas*, PhD Dissertation National Autonomous University of Mexico (UNAM). In: BAR International Series 1687, Paris Monographs in American Archaeology 18. Oxford: Archaeopress

2011 Early phytocultural processes in the pre-Colonial Antilles, *Communities in Contact, Essays in archaeology, ethnohistory & ethnography of the Amerindian Circum-Caribbean*, C. Hofman, A. van Duijvenbode (eds.), 87-116. Leiden: Sidestone Press

2012 Early use of maize and other food crops among Early Ceramic and later Neoindian traditions of northeastern Amazonia revealed by ancient starch grains from ceramic and lithic artefacts of the Chemin Saint-Louis archaeological site, French Guiana, *Journal of the Walther Roth Museum of Archaeology and Anthropology* 17(2):78-107

2013 Human-plant dynamics in the precolonial Antilles: A synthetic update, *The Oxford Handbook of Caribbean Archaeology*, W. F. Keegan, C. L. Hofman, R. Rodríguez Ramos (eds.), 391-406. Oxford: Oxford University Press

Pagán Jiménez, J. R., M. A. Rodríguez López, L. A. Chanlatte Baik, Y. Narganes Storde

2005 La temprana introducción y uso de algunas plantas domésticas, silvestres y cultivos en Las Antillas precolombinas. Una primera revaloración desde la perspectiva del "Arcaico" de Vieques y Puerto Rico, *Diálogo Antropológico* 3(10):7-33

Pagán Jiménez, J. R., J. R. Oliver

2008 Starch Residues on Lithic Artefacts from Two Contrasting Contexts in Northwestern Puerto Rico: Los Muertos Cave and Vega de Nelo Vargas Farmstead, *Crossing the Borders: New Methods and Techniques in the Study of Archaeological Materials from the Caribbean*, C. Hofman, M. Hoogland, A. van Gijn (eds.), 137-158. Tuscaloosa: University of Alabama Press

Pagán Jiménez, J. R., R. Rodríguez-Ramos, B. Reid, M. van den Bel, Corinne L. Hofman

2015 Early dispersals of maize and other food plants into the Southern Caribbean and Northeastern South America, *Quatarnary Science Review* 123:231-246

Pagden, A.

1986 *The Fall of Natural Man: The American Indian and the Origins of Comparative Ethnology,* Cambridge: Cambridge University Press

Palmatary, H. C.

1950 *The Pottery of Marajó Island, Brazil.* In: Transactions of the American Philosophical Society held at Philadelphia for promoting useful knowledge 1949, New Series 39(3):260-470. The American Historical Society of Philadelphia

Palvadeau, E.

1999 *Géodynamique quaternaire de la Guyane française*, PhD Dissertation, University Bretagne Occidentale. In: Documents du BRGM 287. Orléans: Éditions BRGM

Pané, R.

1999 *An Account of the Antiquities of the Indians*. Durham: Duke University Press

Panhuys, L. C.

1898 Proeve eener verklaring van de ornamentiek van de indianen in Guyana, *Internationales Archiv für Ethnografie* 11:51-72

Panhuys, L. C., van, M. J. Herskovits, A. Mordini

1934 Un manuscrit de 1690 sur la Guyane Française par le Jonkheer L. C. van Panhuys (Gorinchem-Pays Bas, le Prof. Dr. M. J. Herskovits (Evanston Ill., USA), le Nob. A. Mordini (Barga, Italie). *Verhandlungen des XXIV Internationalen Amerikanisten-Kongresses Hamburg, 7 bis 13 September 1930*, Prof. Dr. R. Grossman, Dr. G. Antze (eds.), 26-31. Hamburg: Friederichsen, De Gruyter & Co. Mbh

Parnell, J. J., R. E. Terry

2002 Soil chemical analysis applied as an interpretive tool for ancient human activities in Piedras Negras, Guatemala, *Journal of Archaeological Science* 29(4):379-404

Passes, A.

2002 Both Omphalos and Margin: On how the Pa'ikwené (Palikur) see themselves to be at the center and on the edge at the same time, *Comparative Arawakan Histories: Rethinking language family and culture area in Amazonia*, J. D. Hill, F. Santos-Granero (eds.), 171-195. Chicago: University of Illinois Press

2004 The gathering of the Clans: The Making of the Palikur Naoné, *Ethnohistory* 51(2): 257-291

Patte, M. F.

2002 The Arawak language, *Atlas of the Languages of Suriname*, E. Carlin, J. Arends (eds.), 82-112. In: KITLV Caribbean Series 22. Leiden: KITLV Press

2008 *Parlons Arawak, Une langue amérindienne d'Amazonie*. Paris: L'Harmattan

2011 *La langue arawak de Guyane: Présentation historique et dictionnaires arawak-français et français-arawak*, In: Collection didactiques. Marseille: IRD Éditions

Patterson, T. C.
1991 Early Colonial Encounters and Identities in the Caribbean: A Rewiew of Some Recent Works and Their Implications, *Dialectical Anthropology* 16:1-13

Pauketat, T.
2007 *Chiefdoms and Other Archaeological Delusions*. Lanham: Alta Mira Press

2009 My Delusions, *Native South* 2:126-132

Pearsall, D.
1989 *Paleoethnobotany,* San Diego: Academic Press

2008 Plant Domestication. *Encyclopedia of Archaeology*, D. Pearsall (ed.), 1822-1842. San Diego: Academic Press

Pearsall, D., K. Chandler-Ezell, J. A. Zeidler
2004 Maize in Ancient Ecuador: Results of Residue Analysis of Stone Tools from the Real Alto Site, *Journal of Archaeological Science* 31(4):423-442

Pelleprat, P.
1655 *Relations des missions des PP. de la Ccompagnie de Iesus dans les Isles, & dans la terre ferme de l'Amérique* […], 2 Vols. Paris: Chez Sebatien et Gabriel Cramoisy

2009 *Relations des missions des Pères de la Compagnie de Jésus dans les Iles et dans la Terre Ferme de l'Amérique méridionale*, Transcribed by R. Oullet and introduced by M. A. Bernier, R. Ouellet, G. Pizzorusso, A. Saunier. Québec: Les Presses de l'University Laval

Penard, F. P., A. P. Penard
1907-8 *De menschetende Aanbidders der Zonneslang,* 2 Vols., Paramaribo: H. B. Heyde

Perry, L.
2001 *Prehispanic Subsistence in the Middle Orinoco Basin: Starch Analysis Yield New Evidence,* PhD Dissertation, University of Southern Illinois, ms

2002a Starch Analyses Reveal Multiple Functions of Quartz "Manioc" Grater Flakes from the Orinoco Basin, Venezuela, *Interciencia* 27(11):635-639

2002b Starch Granule Size and the Domestication of Manioc (Manihot esculenta) and Sweet Potato (Ipomoea batatas), *Economic Botany* 56(4):335-349

2004 Starch Analyses Reveal the Relationship between Tool Type and Function: An Example from the Orinoco Valley of Venezuela, *Journal of Archaeological Science* 31(8):1069-1081

2005 Reassessing the Traditional Interpretation of "Manioc" Artefacts in the Orinoco Valley of Venezuela, *Latin American Antiquity* 16(4):409-426

Perry, L., D. Sandweiss, D. Piperno, K. Rademaker, M. Malpass, A. Umire, P. de la Vera
2006 Early Maize Agriculture and Interzonal Interaction in Southern Peru, *Nature* 440:76-79

Perry, L., R. Dickau, S. Zarrillo, I. Holst, D. Pearsall, D. Piperno, M. J. Berman, R. G. Cooke, K. Rademaker, A. J. Ranere, J. Scott Raymond, D. H. Sandweiss, F. Scaramelli, K. Tarble, J. A. Zeidler
2007 Starch Fossils and the Domestication and Dispersal of Chili Peppers (Capsicum spp.) in the Americas, *Science* 315:986-988

Petersen, J., E. Góes Neves, M. Heckenberger
2001 Gift from the Past: Terra Preta and Prehistoric Amerindian Occupation in Amazonia, *Unknown Amazon: Culture and Nature in Ancient Brasil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 86-105. London: British Museum Press

Petersen, J., C. L. Hofman, L. A. Curet
2004 Time and Culture: Chronology and Taxonomy in the Eastern Caribbean and the Guianas, *Late Ceramic Age Societies in the Eastern Caribbean*, A. Delpech, C. Hofman (ed.), 17-32. In: BAR International Series 1273, Paris Monographs in American Archaeology 14. London: Archaeopress

Pétrequin, P., A. M. Pétrequin
1993 *Ecologie d'un outil: la hache de pierre en Irian Jaya (Indonésie)*, avec la collaboration de J. Coras, H. Dartevelle, A. Maître, M. Rossy. In: Monographie du Centre de Recherches Archéologiques 12. Paris: CNRS Éditions

Petitjean Roget, H.
1983 Evolution et décadence de l'art funéraire des sites pré et post-colombiens de la baïe de l'Oyapock, *Proceedings of the Ninth Internatinal Congress for the Study of the pre-Columbian Cultures of the Lesser Antilles,*

Santo Domingo 1981, L. Allaire, F. M. Mayer (eds.), 183-200. Centre des Recherches Caraïbes, Université de Montréal

1991 50 sites de montagne en Guyane française: contribution à l'inventaire archéologique d'Emile Abonnenc, *Proceedings of the Twelfth Congress of the International Association of Caribbean Archaeology, Cayenne 1987*, L. Sickler Robinson (ed.), 241-258. International Association Caribbean Archaeology, Martinique

1995a Fouille de sauvetage urgent, Site n° 97112314.16, Trou Delft: un site funéraire post-colombien sur l'Oyapock en Guyane française, *Proceedings of the XVth Congress of the International Association of Caribbean Archaeology, San Juan de Puerto Rico 1993*, R. Alegría, M. Rodríguez (eds.), 377-392. Centro de Estudios Avanzados de Puerto Rico y el Caribe, San Juan de Porto Rico

1995b *Prospection archéologique de la zone côtière. Sondages sur le site de la Pointe Brigandin, Commune de Sinnamary, Guyane*, ms

Petitjean Roget, H., D. Roy
1976 Site archéologique du Rorota, Guyane, *Proceedings of the 6th Congress of the International Association for Caribbean Archaeology, Pointe-à-Pitre 1975*, R. P. Bullen (ed.), 165-174. Société d'Histoire de la Guadeloupe et la Municipalité de Pointe-à-Pitre

Petot, J.
1993 *Histoire contemporaine de l'or de Guyane (1947-1982),* Paris: L'Harmattan

Petrullo, V.
1939 *Archeology of Arauquin*. In: Smithsonian Institution, Bulletin of Bureau of American Ethnology 123:293-295, Anthropogical Papers 12. Washington: United States Government Printing Office

Pfaffenberger, B.
2001 Symbols do not create Meanings – Activities Do: Or, Why Symbolic Anthropology Needs the Anthropology of technology. *Anthropological Perspectives on Technology*, M. B. Schiffer (ed.), 77-86. Albuquerque: University of New Mexico Press

Pistorius, T.
1763 *Korte en zakelijke beschrijvinge van de Colonie van Zuriname* […], Amsterdam: Theodorus Crajenschot

Piperno, D.
2006a *Phytoliths, A comprehensive guide for archaeologists and paleoecologists.* Altamira Press: Oxford

2006b The Origins of Plant Cultivation and Domestication in the Neotropics, *Behavioral Ecoloy and the Transition to Agriculture,* D. Kennett, B. Winterhalder (eds.), 137-166. Berkeley: University of California Press

Piperno, D., T. Dillehay
2008 Starch Grains on Human Teeth Reveal Early Broad Crop Diet in Northern Peru, *Proceedings of the National Academy of Science of the United States of America* 105(50):19622-19627

Piperno, D., I. Holst
1998 The Presence of Starch Grain on Prehistoric Stone Tools from the Humid Neotropics: Indications of Early Tuber Use and Agriculture in Panama, *Journal of Archaeological Science* 25:765-776

Piperno, D., D. Pearsall
1998 *The Origins of Agriculture in the Lowland Neotropics.* San Diego: Academic Press

Piperno, D., M. Blake
1999 The origins and development of food production in Pacific Panama, *Pacific Latin America in Prehistory: the evolution of archaic and formative cultures*, M. Blake (ed.), 123-133. Washington: Washington University Press

Piperno, D., A. J. Ranere, I. Holst, P. Hansell
2000 Starch Grains Reveal Early Root Crop Horticulture in the Panamanian Tropical Forest, *Nature* 407:894-897

Piperno, D., A. J. Ranere, I. Holst, J. Iriarte, R. Dickau
2009 Starch grain and phytolith evidence for early ninth millennium B.P. maize from the Central Balsas River Valley, Mexico, *Proceedings of the National Academy of Science* 106(13):5019-5024

Philips, P., G. Willey
1953 Method and Theory in American Archaeology: An Operational Basis for Culture-historical Integration, *American Anthropologist* 55(5)1:615-633

Planquette, P., P. Keith, P.-Y. Le Bail
1996 *Atlas des poissons d'eau douce de Guyane*, Tome 1. In: Collection du Patrimoine Naturel 22. Paris: IEGB/MNHN/INRA/CSP

Plew, M. G.
2005 *The Archaeology of Guyana*. In: BAR International Series 1400. Oxford: Archaeopress

Poelwijk, A. H.
2003 *In dienste vant suyckerbacken, De Amsterdamse suikernijverheid en haar ondernemers, 1580-1630*, PhD Dissertation, University of Amsterdam. In: Amsterdam Historische Reeks 31. Hilversum: Uitgeverij Verloren

Polderman, M.
2004 *La Guyane française 1676-1763. Mise en place et évolution de la société coloniale, tensions et métissage*, Collections Espace Outre-Mer. Matoury: Ibis Rouge Éditions

Polidori, L., P. Guyot
2007 La connaissance du territoire guyanais: du temps des conquêtes coloniales à l'ère départementale. *Comprendre la Guyane d'aujourd'hui. Un département français dans la région des Guyanes*, Serge Mam Lam Fouck (ed.), 177-200. Matoury: Ibis Rouge Éditions

Politis, G.
1996 Moving to produce: Nukak mobility and settlement patterns in Amazonia, *World Archaeology* 27(3):492-511

2001 Foragers of the Amazon: the last to survive or the first to succeed, *Unknown Amazon. Culture and Nature in Ancient Brazil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 27-49. London: British Museum Press

2002 Acerca de la ethnoarquelogía en Amércia del Sur, *Horizontes Anthropológicos* 18:61-91

Popper, V. S., C. A. Hastorf
1988 Introduction, *Current Paleoethnobotany: Analytical Methods and Cultural Interpretation of Archaeological Plant Remains*, C. Hastorf, C. Popper (eds.), 1-16. Chicago: Universtiy of Chicago Press

Porro, A.
1985 Mercadorias e rotas de comércio intertribal na Amazônia, *Revista do Museu Paulista, Nova Série* 30:7-13

1992 História indígena do alto e médio Amazonas, Séculos XVI a XVIII, *História dos Indios no Brasil*, Manuela Carneiro da Cunha (ed.), 175-196. São Paulo: Companhia das Letras/Secretaria Municipal de Cultura/FAPESP

1994 Social Organization and Political Power in the Amazon Floodplain: The Ethnohistorical Sources, *Amazonian Indians from Prehistory to the Present, Anthropological Perspectives*, A. Roosevelt (ed.), 79-94. Tucson: University of Arizona Press

1996 *O Povo das Aguas: Ensaios de etno-historia amazônica*. Petrópolis: Vozes

Postma, J. M.
1990 *The Dutch in the Atlantic slave trade, 1600-1815*. Cambridge: Cambridge University Press

PRONAPA
1970 Brazilian Archaeology in 1968: An Interim Report on the National Program of Archaeological Research, *American Antiquity* 35(1):1-23

Pratt, M. L.
1992 *Imperial Eyes: Travel Writing and Transculturation.* London: Routledge

Prost, M. T.
1989 Coastal dynamics and chenier sands in French Guiana, *Marine Geology* 90:259-267

1992 Sédimentation côtière et formation de cheniers en Guyane: la zone de Cayenne, *Evolutions des Littoraux de Guyane et de la zone caraïbe méridionale pendant le Quaternaire, Symposium PICG 274/ORSTOM Cayenne (Guyane), 1990*, Marie-Thérèse Prost (ed.), 397-414. Paris: Éditions de l'ORSTOM

Prous, A.
1990a Os artefatos liticos, elementos descritivos classificatorios, *Arquivos do Museu de Historia natural* 11:1-90

1990b A tecnologia de debitagem do quartzo no centro de Minas Gerais: lascamento bipolar, *Arquivos do Museu de Historia natural* 11:91-114

1991 Os instrumentos lascados, *Arquivos do Museu de Historia natural* 12:229-274

1992 *Arqueologia brasileira*. Brasilia: Editora Universidade de Brasilia

Prous, A., M. T. Moura, M. A. Lima
1991 Materias primas, *Arquivos do Museu de Historia natural* 12:187-198

Prous, A., M. Alonso, G. Neves de Souza, A. Pessoa Lima, F. Amoreli

2010 La place et les caractéristiques du débitage sur enclume (« polaire ») dans les industries brésiliennes, *Paléo,* Numéro Spécial, V. Mourre, M. Jarry (eds.), 201-220, « Entre le Marteau et l'Enclume », Actes de la table ronde de Toulouse, 15-17 mars 2004, http://paleo.revues,org/1996

Prümers, H.

2014 Sitios prehispánicos con zanjas en Bella Vista, Provincia Iténez, Bolivia. *Amazonía. Memorias de las Conferencias Magistrales del 3er Encuentro Internacional de Arqueología Amazónica*, S. Rostain (ed.), 73-89. Quito: EIAA/IKIAM/SNESCTI

Puaux, O., M. Philippe (eds.)

1997 *Archéologique et histoire du Sinnamary du 18*ème *au 20*ème *siècle*. In*:* Documents d'Archéologie Française 60. Paris: Éditions de la Maison des sciences de l'homme

Puchelt, H.

1978 Barium, II, Animals, *Handbook of Geochemistry*, K. H. Wedepohl, C. W. Correns, D. M. Shaw, K. K. Turekian, J. Zemann (eds.), 56-L-2-3. Berlin: Springer

Quandt, C.

1807 *Nachtricht von Suriname und seinen Einwohnern*. Görlitz

Quinn, E. R.

2004 *Excavating "Tapajo" Ceramics at Santarém: Their Age and Archaeological Context*, PhD Dissertation, University of Chicago, Illinois, ms

Raffles, H.

2002 *In Amazonia: A Natural History*, Princeton & Oxford: Princeton University Press

Ralegh, W.

1596 *The Discoverie of the Large, Rich and Bewtiful Empyre of Guiana* […]. London: Robert Robinson

1848 *The Discovery of the Large, Rich, and Beautiful Empire of Guiana, with a relation of the Great and Golden City of Manoa (which the Spaniards call El Dorado), etc., Performed in the year 1595 by Sir. W. Ralegh, Knt,* Sir Robert H. Schomburghk (ed.). In: Works issued by The Hakluyt Society, First Series 3. London: Hakluyt Society

1997 *The Discoverie of the Large, Rich, and Bewtiful Empyre of Guiana,* Transcribed, annotated and introduced by Neil L. Whitehead., In: The American Exploration and Travel Series 77. Norman: University of Oklahoma Press

Ranere, A. J.

1980 Preceramic shelters in the Talamancan range, *Adaptive Radiations in prehistoric Panamá*, O. F. Linares, A. J. Ranere (eds.), 16-43. In: Peabody Museum Monographs 5. Cambridge: Harvard University Press

Rapp Py-Daniel, A.

2009 *Arqueologia da morto no sítio Hatahara Durant a Fase Paredão*, Master Thesis, University of São Paolo, ms

2010 O que o contexto funerário nos diz sobre populações passadas: o sítio Hatahara, *Arquéologia Amazonica* 2, E. Pereira, V. Guapindaia (eds.), 629-650. Belém: MPEG/IPHAN/SECULT

2015 *Os contextos funerários na arqueologia da calha do Rio Amazonas*. Unpublished PhD Dissertation University of São Paulo, ms

Raymond, J. S.

2005 From potsherds to pots: a first step in constructing cultural context from tropical forest archaeology, *Archaeology in the Lowland American Tropics: current analytical methods and applications*, P. Stahl (ed.), 224-242. Cambridge: Cambridge University Press

Raymond, J. S., A. Oyuela-Caycedo, P. H. Carmichael

1998 The Earliest Ceramic Technologies of the Northern Andes: A Comparative Analysis, *Andean Ceramics: Technology, Organization, and Approaches*, Izumi Shimada (ed.), 153-172. In: MASCA Research Papers in Science and Archaeology, Supplement 15. Philadelphia: University of Pennsylvania Museum of Archaeology

Rebellato, L.

2007 *Interpretando a Variabilidade Cerâmica e as Assinaturas Quimicas e Fisicos do Solo no Sitio Arquéologico Hatahara (Am),* Master Thesis University of São Paulo, ms

Rice, P. M.

1987 *Pottery Analysis. A sourcebook*. Washington: University of Chicago Press

Rios, M., R. C. V. Martins da Silva, C. Sabogal, J. Martins, R. N. Silva, R. R. Brito, I.M. Brito, M. F. C. Brito, J. R. Silva, R. T. Ribeiro
2001 *Benefícios das plantas da capoeira para a comunidade de Benjamin Constant, Pará, Amazônia Bra Atmospheric data from Reimer et al. (2004), OxCalv3.10 Bronk Ramsey (2005)sileira*. Belém: CIFOR

Redmond, E. (ed)
1998 *Chiefdoms and Chieftaincy in the Americas*, Gainesville: University Press of Florida

Redmond, E., C. Spencer
1994 The Cacicazgo: An indigenous design. *Caciques and their people: A volume in honour of Ronald Spores*, J. Marcus, J. Zeitlin (eds.), 189-225. In: Anthropological Papers 89, Museum of Anthropology. Ann Arbor: University of Michigan

Reeuwijk, L. P., van (ed.)
2002 *Procedures for soil analysis*. Wageningen, International Soil Reference Information Center (ISRIC), Food and Agriculture Organization of the United Nations (FAO)

Reichel-Domatoff, G.
1965 Excavaciones arquelogicas en Puerto Hormiga (Departamento de Bolivar), *Antropológica* 2:5-60

Reichert, E. T.
1913 *The Differentiation and Specificity of Starches in Relation to Genera, Species, Etc*. Washington: Carnegie Institution of Washington

Reichlen, H., P. Reichlen
1943 Contribution à l'archéologie de la Guyane française, *Journal de la Société des Américanistes* 35:2-26

Reid, B. A.
2011 Interim Report on the St John archaeological project, *Journal of the Walther Roth Museum of Archaeology and Anthropology* 17(1):39-54

Reimer P.J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, C. Bertrand, P. G. Blackwell, C. E. Buck, G. Burr, K. B. Cutler, P. E. Damon, R. L. Edwards, R. G. Fairbanks, M. Friedrich, T. P. Guilderson, K. A. Hughen, B. Kromer, F. G. McCormac, S. Manning, C. Bronk Ramsey, R. W. Reimer, S. Remmele, J. R. Southon, M. Stuiver, S. Talamo, F. W. Taylor, J. van der Plicht, C. E. Weyhenmeyer
2004 Residual delta 14C around 1000 year moving average of IntCal04, *Radiocarbon* 46:1029-1058

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P. G. Blackwell, C. Bronk- Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R., Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer
2009 IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP, *Radiocarbon* 51(4):1111-1150

Reinette, Y., P. Grenand
2010 L'espace de la Grande Amazonie face au recrû démographique des populations indigènes: nouvelles données, nouveaux enjeux, *Amaz'hommes: Sciences de l'homme et sciences de la Nature en Amazonie*, E. Barone-Visigalli, A. Roosevelt (eds.), 131-148. Matoury: Ibis Rouge Éditions

Renard, D.
2010 *Histoire et écologie des complexes de champs surélevés dans les savanes côtières de Guyane française*, PhD Dissertation University of Montpellier 2, ms

Renard, D., B. Schatz, D. McKey
2010 Ant nest architecture and seed burial depth: Implications for seed fate and germination success in a myrmecochorous savanna shrub, *Ecoscience* 17(2):194-202

Renfrew, C., P. Bahn
1996 *Archaeology: Theories, Methods, and Practice*. London: Thames and Hudson

Ribeiro, B. G.
1989 *Indigenous art, Visual language.* São Paulo: Editora da Universidade de São Paulo

Righter, E. (ed.)
2002 *The Tutu Archaeological village site: a multidisciplinary case study in human adaptation*. London: Routledge

Rine, J. M., R. N. Ginsburg
1985 Depositional facies of a mud shoreface in Surinam, South-America, A mud analogue to sandy, shallow-marine deposits, *Journal of Sedimentary Research* 55:633-652

Rio Branco
1899 Atlas, *Frontières entre le Brésil et la Guyane française, Second Mémoire présenté par les Etats-Unis du Brésil au Gouvernement de la Conféderation suisse, abritre* Choisi selon les stipulations du Traité conclu à Rio-de-Janeiro, le 10 Avril 1897*, entre le Brésil et la France*, Tome VI. Paris: A. Lahure

1900 *Frontières entre le Brésil et la Guyane française, Atlas contenant un choix de cartes antérieures au Traité conclu à Utrecht le 11 avril 1713 etnre Portugal et la France, Annexe au Mémoire présenté par les Etats-Unis du Brésil au Governement de la Confédération suisse arbitre* choisi selon les stipulations du Traité conclu à Rio-de-Janeiro, le 10 Avril 1897*, entre le Brésil et la France*. Paris: A. Lahure

Rival, L.
1998 Domestication as a historical and symbolic process: Wild gardens and cultivated forests in the Ecuadorian Amazon, *Advances in Histoircal Ecology*, W. Balée (ed.), 232-250, New York: Colombia University Press

2006 Amazonian historical ecologies, *Journal of the Royal Anthropological Institute,* Special issue 'Ethnobiology and the Science of Mankind' 12:79-94

Rival, L., N. Whitehead
2001 Forty years of Amazonian Anthropology: The contribution of Peter Rivière, *Beyond the Visible and the Material: The Amerindinazation of Society in the Work of Peter Rivière*, L. Rival, N. Whitehead (eds.), 57-81, Oxford: Oxford University Press

Rivet, P.
1923 L'Orfèvrerie précolombienne des Antilles, des Guyanes et du Venezuela, *Journal de la Société des Américanistes* 15:182-213

Rivière, P.
1963 *An Ethnographic Survey of the Indians on the Divide of the Guianese and Amazonian River Systems*, Master Thesis University of Oxford, ms

1969 *Marriage among the Trio, a principle of social organization*. Oxford: Clarendon Press

1977 Some problems in the comparative study of Carib societies, *Carib-speaking Indians; Society, Culture, and language*, E. Basso (ed.), 39-42. In: Anthropological Papers of the University of Arizona. Tucson: University of Arizona Press

1984 *Individual and Society in Guiana: A comparative Study of Amerindian Social Organization.* Cambridge: Cambridge University Press

1995 Houses, Places and People: Community and Continuity in Guiana, *About the House: Lévi-Strauss and Beyond*, J. Carsten, S. Hugh-Jones (eds.), 189-205. Cambridge: Cambridge Univesity Press

2000 The More we are Together …, *The Anthropology of Love and Anger: The Aesthetics of Conviviality in Native Amazonia*, J. Overing, A. Passes (eds.), 252-267. London: Routledge

Robb, J., T. R. Pauketat (eds.)
2013 *Big Histories, Human Lives: Tackling Problems of Scale in Archaeology*. Santa Fé: SAR Press

Rocque, C., E. Vartanian
2007 *Chronologies des cultures amérindiennes de Guyane. Contribution de la datation par thermoluminescence: une mise en garde contre des pratiques abusives*, ms

Rodrigues, D., Ayron
1985 Evidence for Tupi-Carib Relationships. *South American Indian languages: retrospect and prospect*, H. Klein, L. Stark (eds.):371-404. Austin: University of Texas Press

Rodríguez, R., Ramos
2001 *Lithic reduction trajectories at La Hueca and Punta Candelero sites, Puerto Rico*. Master Thesis, University of Texas, ms

2005 The function of the edge ground cobble put to the test, an initial assessement, *Journal of Caribbean Archaeology* 5:1-22

Rodríguez, R. Ramos, R., E. Babilonia, A. Curet, J. Ulloa
2008 The pre-Arawak pottery Horizon in the Antilles: A New Approximation, *Latin American Antiquity* 19(1):47-63

Rodríguez, R. Suárez and J. Pagán Jiménez
2008 The burén in precolonial cuban archaeology, New information regarding the use of plants and ceramic griddles during the Late Ceramic Age of eastern Cuba gathered through starch analysis, *Crossing the Borders: New Methods and Techniques in the Study of Archaeological Materials from the Caribbean*, C. Hofman, M. Hoogland, A. van Gijn (eds.), 159-172. Tuscaloosa: University of Alabama Press

Rodway, J.
1895 Some Spanish Accounts of Guiana, *Timehri 9* New Series 189:1-20

Roe, P. G.
1980 Art and residence among the Shipibo Indians of Peru: a study in microacculturation, *American Anthropologist* 82(1):42-71

1985 *The cosmic zygote: Cosmology in the Amazon Basin*. New York: Rutgers University Press

1987 *Village Spatial Organisation in the South Amerindian Lowlands: evidence from ethnoarchaeology*, Paper presented at the symposium, 'Site Structure and Spatial Organization of Sedentary Communities', 52nd Annual Meeting of the Society of Amercian Archaeology, May 8, 1987, Toronto, Canada, ms

Roeleveld, W.
1969 Pollen analysis of two sections in the Young Coastal Plain of Surinam, *Geologie en Mijnbouw* 48(2):215-224

Roeleveld, W., A. J. van Loon
1979 The Holocene development of the Young Coastal Plain of Surinam, *Geologie en Mijnbouw* 58(1):21-28

Rohr, A.
1959 Pesquisas Paleo-etnográficas na Ilha de Santa Catarina. A Jazida da Base Aérea de Florinopolis, *Instituto Anchietano de Pesquisas, Pesquisas Separata* 3:199-264

Roosevelt, A. C.
1980 *Parmana: Prehistoric Maize and Manioc Subsistence along the Amazon and Orinoco*. In: Studies in Archaeology. New York: Academic Press

1987 Chiefdoms in the Amazon and Orinoco, *Chiefdoms in the Americas*, R. Drennan, C. Uribe (eds.), 153-185. Lanham: University Presses of America

1991 *Moundbuilders of the Amazon: Geophysical Archaeology on Marajó Island, Brazil.* In: Studies in Archaeology. San Diego: Academic Press

1993 The rise and fall of Amazonian Chiefdoms, *L'Homme* 33(2-4):255-282

1995 Early Pottery in the Amazon. Twenty years of Scholarly Obscurity, *The Emergence of Pottery, Technology and Innovation in Ancient Societies*, W. Barnett, J. Hoopes (eds.), 115-131, Washington: Smithsonian Institution Press

1998 Ancient and Modern Hunter-Gatherers of Lowland South America: An Evolutionary Problem, *Advances in Historical Ecology*, W. Balée (ed.), 190-212. New York: Columbia University Press

1997 *The Excavations at Corozal, Venezuela: Stratigraphy and Ceramic Seriation*. In: Yale University Publications in Anthropology 83, New Haven: Yale University Press

1999 The Development of Prehistoric Complex Societies: Amazonia, A Tropical Forest, *Complex Societies in the Ancient Tropical World*, E. Bacus, L. Lucero (eds.), 13-34. In: Archaeological Papers of the American Anthropological Association 9. Arlington

Roosevelt, A. C., R. A. Housley, M. Imazio, S. Maranca, R. Johnson
1991 Eighth millennium pottery from a shell midden in the Brazilian Amazon, *Science* 254(1):621-624

Roosevelt, A. C., M. Lima da Costa, C. Lopes Machado, M. Michab, N. Mercier, H. Valladas, J. Feathers, W. Barnett, M. Imazio da Silveira, A. Henderson, J. Sliva, B. Chernoff, D. S. Reese, J. A. Holman, N. Toth, K. Schick
1996 Paleoindian Cave Dwellers in the Amazon: The Peopling of the Americas, *Science* 272(5260):373-384.

Roosevelt, A. C., J. Douglas, A. Marci Amaral, M. Imazio da Silveira, C. Palheta Barbosa, M. Barreto, W. Souza da Silva, L. Brown
2009 Early Hunter-gatherers in the Terra Firme Rainforest: Stemmed Projectile Points from the Curuá Goldmines, *Revista Amazônica* 1(2):442-483

Rostain, S.
1989 *Le site archéologique de Thémire, Sauvetage urgent, Rapport intermédiaire*, ms

1991 *Les Champs Surélevés Amérindiens de la Guyane*. In: Collection La Nature et l'Homme, Cayenne: ORSTOM

1992 L'occupation amérindienne ancienne du littoral de la Guyane, *Evolutions des Littoraux de Guyane et de la zone caraïbe méridionale pendant le Quaternaire,* Marie-Thérèse Prost (ed.), 481-505. Paris: Éditions de l'ORSTOM

1994a *L'occupation amérindienne ancienne du littoral de Guyane*, PhD Dissertation University Paris I-Panthéon-Sorbonne, 2 Vols., In: Travaux et Documents Microfiches 129. Paris: Éditions de l'ORSTOM (1995)

1994b Archéologie du littoral de Guyane. Une région charnière entre les influences culturelles de l'Orénoque et de l'Amazone, *Journal de la Société des Américanistes* 80:9-46

1994c The French Guiana coast: a key area in prehistory between the Orinoco and Amazon rivers, *Between St. Eustatius and the Guianas*, A. H. Versteeg (ed.), 53-100. Publications of the St. Eustatius Historical Foundation 3

1995 La céramique amérindienne de Guyane française, *Schweizerische Amerikanisten-Gesellschaft, Société Suisses des Américanistes* 55-56:93-127

2006 Spécialisation et commerce dans les Guyanes amérindiennes, *Techniques & Culture* 46-47:139-174

2007 Histoire de la recherche archéologique dans les Guyanes côtières, *Les Nouvelles de l'archéologie* 108-109:36-56

2008a Agricultural Earthworks on the French Guisana Coast, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 217-234. New York: Springer

2008b The Archaeology of the Guianas. An Overview, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 279-302. New York: Springer

2009 Between Orinoco and Amazon: The Ceramic Age in the Guianas, *Anthropologies of Guayana: Cultural Spaces in Northeastern Amazonia*, Neil L. Whitehead, S. Aléman (eds.), 36-54. Tucson: Arizona University Press

2010a Cacicazgos guyanenses: mito o realidad? *Arquéologia Amazonica* 1, E. Pereira, V. Guapindaia (eds.), 167-192. Belém: MPEG/IPHAN/SECULT

2010b Pre-Columbian Earthworks in Coastal Amazonia, *Diversity* 2:331-352

2010c Archéologie de l'ouest guyanais: le site de Sable Blanc, *Amaz'hommes. Sciences de l'homme et sciences de la Nature* en Amazonie, E. Barone-Visigalli, A. Roosevelt (eds.), 59-81, Matoury: Ibis Rouge Éditions

2011a La mort amérindienne en Amazonie, *Les Indiens des Petites Antille, des premiers peuplements aux débuts de la colonisation européenne*, B. Grunberg (ed.), 221-254. In: Cahier d'Histoire de l'Amérique coloniale 5. Paris: L'Harmattan

2011b Que hay de Nuevo al norte. Apuntes sobre el Aristé, *Revista de Arquelogia* 24 (1):10-31

2012 Where the Amazon River meets the Orinoco River: Archaeology of the Guianas, *Revista Amazônica* 4(1):10-28

2013 *Islands in the rainforest: landscape management in pré-Columbian Amazonia*, Translated by M. Eliott. In: New frontiers in historical ecology 4. Walnut Creek: Left Coast Press

Rostain, S., Y. Wack

1987 Haches et herminettes en pierre de Guyane française, *Journal de la Société des Américanistes* 73:107-138

Rostain, S., A. H. Versteeg

2003 Recherche sur l'archéologie de la côte occidentale de Guyane, *Journal de la Société des Américanistes* 98(1):161-175

2004 The Arauquinoid Tradition in the Guianas, *Late Ceramic Age Societies in the Eastern Caribbean*, A. Delpech, C. Hofman (eds.), 223-250. In: BAR International Series 1273, Paris Monographs in American Archaeology 14. London: Archaeopress

Rostain, S., N. Gentil, L. Clerc

2008 *Sable Blanc Est. Rapport de la fouille programmée,* ms

Rostain, S., L. Déodat, L. Clerc

2009 *Bois Diable, Rapport de Campagne de la fouille programmée 2008,* ms

Rostain, S., L. Déodat, L. Clerc, N. Gentil

2010 *Bois Diable, Rapport de Campagne 2009,* ms

Roth, W. E.
1924 *An introductory study of the Arts, Crafts, and Customs ofthe Guiana Indians*. In: Thirty Eighth annual report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution 1916-1917. Washington: United States Government Printing Office

Roukema, E.
1960 The Coasts of North-East Brazil and the Guianas in the Egerton MS 2803, *Imago Mundi* 15:27-31

Rouse, I. B.
1939 *Prehistory in Haiti: A study in Method*. In: Yale University Publications in Anthropology 21, New Haven: Yale University Press

1948 Part 3. The West Indies, *Handbook of South American Indians*, J. Steward (ed.), Vol.ume 4, 495-567. In: Smithsonian Institution, Bulletin Bureau of American Ethnology 143. Washington: United States Government Printing Office

1951 Areas and Periods of Culture in the Greater Antilles, *Southwestern Journal of Anthropology* 3(4):248-265

1953 The Circum-Caribbean Theory: An Archaeological Test, *American Anthropologist,* New Series 55(2):188-200

1960 The classification of artefacts in archaeology, *American Antiquity* 25(3):313-323

1961 Archaeology in Lowland South America and the Caribbean 1935-60, *American Antiquity* 27(1):56-62

1964 Prehistory of the West Indies, *Science* 144:499-513

1965 Caribbean ceramics: a study of method and theory. *Ceramics and Man*, F. R. Matson (ed.), 88-103. In: Viking Fund Publications in Anthropology 41. New York: Wenner-Gren Foundation for anthropological research

1972 *An introduction to prehistory: A systematic approach*. New York: McGraw Hill

1978 The La Gruta sequence and its implications. *Unidad y Variedad: Ensayos en Homenaje a José M. Cruxent*, E. Wagner, A. Zucchi (eds.), 203-229. Caracas: Instituto Venezolano de Investigationes Científicas

1983 Diffusion and interaction in the Orinoco Valley and on the Coast, *Proceedings of the Ninth Internatinal Congress for the Study of the pre-Columbian Cultures of the Lesser Antilles, Santo Domingo 1981*, L. Allaire, F. M. Mayer (eds.), 3-13. Centre des Recherches Caraïbes, Université de Montréal

1986 *Migrations in Prehistory. Inferring population movement from cultural remains,* New Haven: Yale University Press

1992 *The Tainos. Rise and decline of the people who greeted Columbus*. New Haven: Yale University Press

Rouse, I. B., J. M. Cruxent
1963 *Venezuelan Archaeology*. New York: Yale University Press

Rouse, I. B., L. Allaire
1978 Caribbean, *Chronologies in New World Archaeology*, R. E. Taylor, C. W. Meighan (eds.), 432-482. New York: Academic Press

Rouse, I. B., R. E. Alegría
1990 *Excavations at María de la Cruz cave and Hacienda Grande Village site, Loiza, Puerto Rico*. In: Yale University Publications in Anthropology 80. New Haven: Yale University Press

Rouse, I. B., B. Morse
1999 *Excavations at the Indian Creek Site, Antigua, West Indies*. In: Yale University Publications in Anthropology 82. New Haven: Yale University Press

Rouse, I. B., L. Allaire, A. Boomert
1984 *Eastern Venezuela, the Guianas and the West Indies*, Chronologies in South American Archaeology, C. W. Meighan (ed.), Los Angeles: Department of Anthropology, Universtity of California, ms

Rybka, K.
2014 State-of-the-art in the development of the Lokono language, Paper presented at the 20th Biennial Conference of the Society for Caribbean Linguistics held on Aruba, 5-8 August 2014, *Language Documentation and Conservation*, in press

Rye, O. S.

1981 *Pottery Technology: Principles and Reconstruction*. Washington: Taraxacum

Rijen, J., van

1924 Brief van Jan van Rijen aan de Directeuren van de Kamer van Zeeland van de WIC Fort Nassau, Wiapoco, April 25, 1625 [1627?] *Documents relating to New Netherland 1624-1626.* In: The Henry E. Huntington Library, Translated and edited by A. J. F. van Laer, Document B, 21-33 and 256-258. San Marino: The Henry E. Huntington Library and Art Gallery

Sack, A. von,

1821 *Beschreibung einer Reise nach Surinam und des Ausenthaltes daselbst in den Jahren 1805, 1806, 1807 so wie von des Verfassers Rückkehr nach Europa über Nord-Amerika*, 2 Vols., Berlin: In der Haude un Spenerschen Buchhandlung

Sahlins, M.

1972 *Stone Age economics*. London: Tavistock Press

Sainsbury W. N. (ed.)

1860 *Calendar of State Papers, Colonial Series, 1574-1660*. London: Longman, Green, Longman & Roberts

Saldanha, J. Darcy and M. Petry Cabral

2008 *Projeto de Levantamento e Rescate Arquélogico na Area da Mina do Projeto do Ferro Amapá (MMX),* Segondo Relatorio Semestral, Documento do IEPA/IPHAN, ms

2009 *Relatório preliminar de resgate do sítio arqueológico Laranjal do Jari I*, Documento do IEPA/IPHAN, ms

2010 Arquelogia do Amapá: reacaliação e novas perspectivas, *Arquéologia Amazonica 1*, E. Pereira, V. Guapindaia (eds.), 95-112. Belém: MPEG/IPHAN/SECULT

2011a *Primeiro relatório de resgate do sítio arqueológico Laranjal do Jari II*, Documento do IEPA, ms

2011b Diagnóstico arqueo*lógico na Area do Programma Luz Para Todos, Blocos I, II, III e IV-Amapá,* Documento do IEPA, ms

2012 *Projeto de Resgate Arqueológico na Cerâmica João de Barro, Macapá, AP. imeiro relatório de resgate do sítio arqueológico Laranjal do Jari II*, Documento do IEPA/IPHAN, ms

Salminen, R., M. J. Batista, M. Bidovec, A. Demetriades, B. De Vivo, W. de Vos, M. Duris, A. Gilucis, V. Gregorauskiene, J. Halamic, P. Heitzmann, A. Lima, G. Jordan, G. Klaver, P. Klein, J. Lis, J. Locutura, K. Marsina, A. Mazreku, P. J. O'Connor, S.Å. Olsson, R-T. Ottesen, V. Petersell, J. A. Plant, S. Reeder, I. Salpeteur, H. Sandström, U. Siewers, A. Steenfelt, T. Tarvainen

2005 *Geochemical Atlas of Europe, Part 1: Background Information, Methodology and Maps*. Geological Survey of Finland, Espoo

Samson, A. V. M.

2010 *Renewing the House: Trajectories of social life in the yucayeque(community of El Cabo, Higüey, Dominican Republic, AD 800 to 1504*, PhD Dissertation Leiden University. Leiden: Sidestone Press

Samuelian, C.

2007 *DFS de Prospection-Inventaire sur le Plateau du Mahury*, DRAC Guyane/SRA, ms

2009 *Lieu dite Sainte Agathe, Macouria (Guyane 973)*, Rapport diagnostic INRAP, ms

Sanoja, M. Obediente, I. Vargas-Arenas

1983 New light on the Prehistory of Eastern Venezuela, *Advances in World Archaeology* 2, F. Wendorf, A. Close (eds.), 205-244. New York

2006 Las sociedades arcaicas del bajo Orinoco, *Pueblos y Paisajes antiguos de la selva Amazónica*, G. Morcote Ríos, S. Mora Camargo, C. Franky Calvo (eds.), 63-80. Bogotá: Universidad Nacional de Colombia

Santallier, D., V. Caron, J-L. Gisclon, E. Jautée, S. Rantsordas

2002 Les qualités mécaniques des matériaux lithiques utilisés pour la confection du matériel de broyage et de mouture. Réflexions préliminaires,*Moudre et Broyer. L'interpration fonctionelle de l'outillage de mouture et de broyage dans la Préhistoire et l'Antiquité*, H. Procopiou, R. Treuil (eds.), 15-29. Paris: CTHS

Santos-Granero, F.

1993 From Prisoner of the Group to Darling of the Gods: An Approach to the Issue of Power in Lowland South America, *L'Homme* 126-128:213-230

2002 The Arawakan matrix: ethos, language, and history in native South America, *Comparative Arawakan histories, rethinking language family and culture area in Amazonia*, J. D. Hill, F. Santos-Granero (eds.), 25-50. Chicago: University of Illinois Press

2007 Of fear and friendship: Amazonian sociality beyond kinship and affinity, *Journal of the Royal Anthropological Institute* 13(1):1-18

2009a Amerindians Constructional Views of the World, *The Occult Life of Things. Native Amazonian Theories of Materiality and Personhood*, F. Santos-Granero (ed.), 1-29. Tucson: University of Arizona Press

2009b *Vital Enemies: Slavery, Predation, and the American Political Economy of Life*. Austin: University of Texas Press

2011 Captive Identities, or the Genesis of Subordinate Quasi-Ethnic Collectivities in the American Tropics, *Ethnicity in Ancient Amazonia: Reconstructing Past Identities from Archaeology, Linguistics, and Ethnohistory*, A. Hornberg, J. Hill (eds.), 335-348. Boulder: University Press of Colorado

Sauer, C. O.
1952 *Agricultural Origins and Dispersals*. New York: American Geographical Society

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

Sausse, A.
1951 *Populations primitives du Maroni (Guyane française).* Institute Géographique National (IGN), Paris: Larose

Saunaluoma, S
2012 Geometric Earthworks in the State of Acre, Brazil: Excavations at the Fazenda Atlântica and Quiauá Sites, *Latin American Antiquity* 23(4):565-583

Scaramelli, K. L.
2006 *Picking up the pieces: Ceramic production and consumption on the Middle Orinoco Colonial Frontier*, PhD Dissertation University of Chicago, ms

Schaan, D. P.
1996 *A Linguagem iconográfcia da cerâmica Marajoara*, Master Thesis Catholic University of Rio Grande, ms

2001 Into the Labyrinths of Marajoara Pottery: Status and Cultural Identity in an Amazonian Complex Society, *Unknown Amazon: Nature in Culture in Ancient Brazil*, C. McEwan, C. Barreto, E. Góes Neves (eds.), 108-133, London: British Museum Press

2004 *The Camutins Chiefdom: Rise and Development of Social Complexity on Marajo Island, Brazilian Amazon,* PhD Dissertation University of Pittsburgh, ms

2007 Uma janela para a Historia Pré-colonial da Amazônia: Olhando Além -e apesar- das Fases e Tradiçoes, *Boletim do museu Paraense Emílio Goeldi*, Ciências Humanas 2(1):77-89

2008 The non-agricultural chiefdoms of Marajó, *Handbook of South American Archaeology,* H. Silverman, W. Isbell (eds.), 339-357. New York: Springer

Schaan, D., V. Guapindaia, W. da Veiga e Silva, J. Aires Fonseca
2005 *Diagnostico sobre o potential arquéologico nas areas de influencia direta e indireta do empreendimento, LT 138 KV-Calçoene/Oiapoque (AP)*, Documento do Museu Paraense de Emílio Goeldi, ms

Schalken, A. C.
1983 *Historische foto's van de R.K. Gemeente in Suriname*. Paramaribo: Leo Victor

Schiffer, M. B.
1975 Archaeology as Behavioral Science, *American Anthropologist* 74(4):836-848

1987 *Formation Processes of the Archaeological Record*, University of New Mexico Press: Albuquerque

Schilder, G.
1973 Een historisch overzicht van de ontdekking van Suriname tot 1667, *Links with the past. The history of the cartography of Surinam 1500-1971*, C. Koeman (ed.), 1-35. Amsterdam: Theatrum Orbis Terrarum

Schleicher, Ch.
1927 Une Industrie qui disparait: la taille des silex modernes (Pierres à fusil et à briquet), *Bulletin de la Société préhistorique de France* 24(10):367-369

Schmidt, M. J.
2010 *Reconstructing Tropical Nautre: Prehistoric and Modern Atnrhosols (Terra Preta) in the Amazon Rainforest, Upper Xingu River, Brazil*, PhD Dissertation University of Florida, ms

Schmitz, P. I.
1987 Prehistoric hunters and gatherers of Brazil, *Journal of World Prehistory* 1(1):53-126

Schomburgk, R. H.
1845 Journal of an expedition from Pirara to the Upper Corentyne, and from thence to Demerara, *Journal of the Royal Geographical Society* 15:1-104

1922 *Richard Schomburgk's Travels in British Guiana, 1840-1844*, translated and edited with Geographical and General Indices, and Route Maps by Walter E. Roth. Georgetown: Daily Chronicle

Schuller, R.
1916 *The Ordáz and Dortal Expeditions in Search of El-Dorado, as Described on Sixteenth Century Maps*. In: Smithsonian Miscellaneous Collections 66(4). Washington DC: Smithsonian Institution

Scott, J.
*c.*1667 *The Discription of Guyana,* British Library MSS no. 3662, Folios 37v-42v

Seda, P.
2001 Muito mais de 500: desenvolvimento cultural na pré-historia brasileira, breve panorama, *Boletim do Instituto d'Arqueológia Brasileira* 11

Sellier-Segard, N.
2013 Saint-Ange Méthon BL 15 et 20c, Rémire Montjoly, *Bilan scientifique Guyane* 2011:26-28

Serrand, N., K. S. Cummings
2014 Occurrences of exogenous freshwater mussel shells (Bivalvia : Unionida) during the precolumbian ceramic age of the lesser Antilles. *Archaeomalacology: Shells in the Archaeological Record*, K. Szabó, C. Dupont, V. Dimitrijević, L. Gómez Gastélum, N. Serrand (eds.), 65-76. In: BAR International Series 2666. Oxford: Archaeopress

Service Réginoal d'Archéologie (SRA)
2000 Montagne Favard, Régina, *Bilan scientifique Guyane* 1997:20

Service, E. R.
1962 *Primitive Social Organization, An Evolutionary Perspective*. New York: Random House

Seurin, M.
1976 Etude d'un cordon littoral à l'Anse de Rémire (Guyane), *Connaissance de la Guyane* 3:6-22

Seymour, J.
1985 *Métiers oubliés, métiers d'autrefois*. Paris: Éditions du Chêne

Shepard, A.
1956 *Ceramics for the archaeologist*..In: Carnegie Institution of Washington 609. Washington

Shott, M. J.
1996 Stage versus continuum in the debris assemblage from production of a fluted biface, *Lithic Technology* 21:6-22

Siegel, P. E.
1989 Site structure, demography and social complexity in the early ceramic age of the Caribbean, *Early ceramic lifeways and adaptive strategies in the Caribbean*, P. Siegel (ed.), 193-247. In: BAR International Series 506. London: Archaeopress

1992 *Ideology Power and Socia Complexity in Prehistoric Puerto Rico*, PhD Dissertation State University of New York, ms

1996a An interview with Irving Rouse, *Current Anthropology* 37(4):671-689

1996b Ideology and Culture Change in Prehistoric Puerto Rico: A view from the Community, *Journal of Field Archaeology* 23(3):313-333.

1999 Constested Places and Places of Contest: The Evolution of Social Power and Ceremonial Space in Prehistoric Puerto Rico, *Latin American Antiquity* 10(3):209-238

2011 Competitive Polities and Territorial Expansion in the Caribbean, *Islands at the Crossroads: Migration, Seafaring, and Interacation in the Caribbean*, L. A. Curet, M. W. Hauser (eds.), 193-218. Tuscaloosa: University of Alabama Press

Sifeddine, A., L. Martin, B. Turcq, C. Volkmer-Ribeiro, F. Soubiès, R. Campello Crodeiro, K. Suguio
2001 Variations of the Amazonian rainforest environment: a sedimentological record covering 30,000 years, *Paleogeography, Paleoclimatology, Paleoecology* 168:221-235

Silliman, S.
2009 Change and Continuity, Practice and Memory: Native American Persistence in Colonial New England, *American Antiquity* 74(2):211-230

2015 A requiem for hybridity? The problem with Frankensteins, purées, and mules, *Journal of Social Archaeology*: DOI: 10.1177/1469605315574791

Silva, F. A.
2007 O significado da variabilidade artefatual: a cerâmica dos Asurini do Xingú e a plumária dos Kayapo-Xikrin do Cateté, *Boletim do Museu Paraense Emílio Goeldi*, Ciências humanas 2(1):91-103

2008 Ceramic technology of the Asurini, Xingu, Brazil: an ethnoarchaeological study of artefact variability, *Journal Archaeological Method Theory* 15:217-265

Silva, F. A., L. Rebellato
2004 Use of space and formation of Terra Preta: the Asuriní do Xingu case study, Amazonian Dark Earths: Explorations in Space and Time, B. Glaser, W. Woods (eds.), 159-167. Berlin: Springer

Silva, M. Bueno Flores
2011 *Análise tipológica e espacial do sítio arqueológico AP-OI-06, extremo norte do Amapá*, Master Thesis State University of Amapá, ms

Simões, M. F.
1981 Coletores-pescadores ceramistas do litoral do Salgado (Pará). Nota Preliminar, *Boletim do Museu Paraense Emílio Goeldi*, Antropologia 78:1-32

1982 A Pré-História da Bacia Amazônica: Uma tentative de reonstituição, *Cultura Indígena, textos e catálogo*, 5-21, Semana do Indio, Museu Goeldi, Belém

Siravo, B. A.
2009 Beyond the natural: Indigenous women's contribution to making the world, *Archaeology and Anthropology, Journal of the Walter Roth Museum of Anthropology* 16(1):1-29

Skibo, J. M., M. B. Schiffer
1995 The clay cooking pot. An exploration of Women's Technology, *Expanding Archaeology,* J. Skibo, W. Walker, A. Nielsen (eds.), 80-91. Salt Lake City: University of Utah Press

Sleen, W. G. N., van der
1973 *A Handbook of Beads*. York: Liberty Cap Books (1967)

Sluiter, E.
1948 Dutch-Spanish Rivalry in the Caribbean Area, 1594-1609, *The Hispanic American Historical Review* 28(2):165-196

Smith, J.
1907 *The Generall Histoire of Virginia, New England & The Summer Isles, Together with The True Travels, Adventures and Observations, and A Sea Grammar,* 2 Vols. Glasgow: James MacLehose & Sons

Smith, N.
1980 Anthrosols and Human Carrying Capacity in Amazonia, *Annals of the Association of American Geographers* 70:553-566

Sombroek, W. G.
1966 *Amazon soils: a reconnaissance of the soils of the Brazilian Amazon Region*, PhD Dissertation University of Wageningen. In: Agricultural Research Rapports 672. Wageningen: Center for Agricultural Publications and Documentation

Sombroek, W., D. C. Kern, T. Rodrigues, M. Cravo, T. C. Jarbas, W. I. Woods, B. Glaser
2002 *Terra Preta and Terra Mulata: Pre-Columbian Amazon kitchen middens and agricultural fields, their sustainability and their replication*, Paper no. 1935, Symposium 18-Anthropogenic Factors of Soil Formation, 17th WCSS 14-21 August, Bangkok, Thailand

Sombroek, W. G., M. L. Ruivo, P. M. Fearnside, B. Glaser, J. Lehmann
2003 Amazonian Dark Earths as Carbon Stores and Sinks, *Amazonian Dark Earths: Origins, Properties, Management*, J. Lehmann. D. C. Kern, B. Glaser, W. I. Woods (eds.), 125-139. Dordrecht: Kluwer Academic Press

Sousa, M. O., Cruz, L.A.H.C. Hulsman (eds.)
2014 *A Brief Political History of the Guianas; From Tordesillas to Vienna*, with collaboration of R. Gomes de Oliveira. Boa Vista: EDUFFR

Souza, S. Mendoça de, V. Guapindaia, C. Rodriguez-Carvalho
2001 A Necrópole Maracá e os Problemas interpretativos em um Cemitério sem Enterramentos, *Boletim do Museu Paraense Emílio Goeldi*, Anthropologia 17(2):479-520

Sparrow, F.
1625 *The Description of the Ile of Trinidad, the rich Countrey of Guiana, and the mightie River of Orenoco, written by Francis Sparrey, left there by Sir Walter Raileigh, 1595., in the end taken by the Spaniards and sent Prisoner into Spaine, and after long Captivitie got into England by great sute*. In: Purchas his Pilgrimes in Five Books. The Fourth Part, Chapter XI, 1247-1250. London: Henrie Fetherstone

Sponsel, L. E.
1986 Amazon ecology and adaptation, *Ann. Rev. Anthropol.* 15:67-97

Staehelin, F.
1913-9 *Die Mission der Brüdergemeine in Suriname und Berbice im achtzehntenJahrhundert:eine Missionsgeschichte hauptsächlich in Auszügen aus Briefen und Originalberichten*, 3 Vols. Paramaribo: Herrnhut

Stahel, G.
1926 De expeditie naar het Wilhemina gebergte (Suriname) in 1926, *Koninklijk Nederlandsch Aardrijkskundig Genootschap*, Tweede Serie XLIII:757-779

1927 De expeditie naar het Wilhemina gebergte (Suriname) in 1926, *Koninklijk Nederlandsch Aardrijkskundig Genootschap*, Tweede Serie XLIV:383-392

Stahl, P. W., A. Oyuela-Caycedo
2007 Early prehistoric sedentism and seasonal animal exploitation in the Caribbean lowlands of Colombia, *Journal of Anthropological Archaeology* 26:329-349

Stapels, G., van
*c.*1630 *Jornael van onse viiasij begonnen in den iarre 1629 den 24 iannevaries met het schiep den iager en iacht denortsterre nar de amsones en andre kūsten godt verlen ons behoūden rese*, 35 folios NL-NaZA MS_182. Zeeuws Archief, Middelburg

Stanton, T. W., M. K. Brown, J. B. Pagliaro
2008 Garbage of the Gods? Squatters, Refuse Disposal, and Termination Rituals Among the Ancient Maya, *Latin American Antiquity* 19(3):227-247

Stedman, J. G.
1796 *Narrative of five years' expedition against the revolted Negroes of Surinam in Guiana, on the Wild Coast of South America* […], 2 Vols. London: J. Johnson & J. Edwards

Steward, J.
1948 Culture Areas of the Tropical Forests, *Handbook of South-American Indians*, J. Steward (ed.), Vol. 3, 883-899. In: Smithsonian Institution, Bulletin of the Bureau of American Ethnology 143. Washington: United States Government Printing Office

Stolze Lima, T.
1995 *A parte do cauim: etnografia juruna*, PhD Dissertation University of Rio de Janeiro, Rio de Janeiro: Museu Nacional, UFRJ

2006 *Um peixe olhou para mim: O povo Yudjá e a perspectiva*. São Paulo: Editora Unesp, ISA, NuTi

Stothert, K. E.
1985 The preceramic Las Vegas Culture of Coastal Equador, *American Antiquity* 50(3):613-637

Stuiver, M., P.J. Reimer, E. Bard, J. Beck, G. Burr, K. Hughen, B. Kromer, G. McCormac, J. van der Plicht, M. Spurk
1998 Intcal98, Radio carbon Age Calibration, 24,000-0 BP, *Radiocarbon* 40(3):1041-1083

Sturtevant, W.
1998 Tupinambá Chiefdoms? *Chiefdoms and Chieftaincy in the Americas*, E. Redmond (ed.), 138-149. Gainesville: University Press of Florida

Sztutman, R.
2005 Sobre a ação xâmanica, *Redes de relações nas Guianas*, Dominique Tilkin Gallois (ed.), 151-226. São Paulo: Associação Editorial Humanitas

Sued-Badillo, J.
1995 The Island Caribs: New approaches to the question of ethnicity in the early colonial Caribbean, *Wolves from the Sea: Readings in the Anthropology of the Native Caribbean*, Neil. L. Whitehead (ed.), 61-89. In: Caribbean Series 14, Leiden: KITLV Press

Tacoma, J., D. Geijskes, G. Maat, G. van Vark
1991 *On "Amazondi". Precolumbian skeletal remains and associated Archaeology from Surinam*. In: Publication of the Foundation for Scientific Research in the Caribbean Region 127. Amsterdam

Tamanaha, E. Kazuo
2012 *Ocupação polícroma no baixo e médio Rio Solimões, Estado do Amazonas*, PhD Dissertation University of São Paulo, 2 Vols., ms

Tamanaha, E. Kazuo, E. Góes Neves
2013 800 anos de ocupação da Tradição Polícroma da Amazônia: um panorama histórico no Baixo Rio Solimões, *Anuário Antropológico* 39 (2):45-67

Tarble, K.
1985 Un nuevo modelo de expansión caribe para la época prehispánica, *Antropológica* 63-64:45-82

Tarble de Scaramelli, K., F. Scaramelli
2011 Generic Pots and Generic Indians: The Archaeology of Ethnogenesis in the Middle Orinoco, *Ethnicity in Ancient Amazonia, Reconstructing Past Identities from Archaeology, Linguistics, and Ethnohistory*, A. Hornberg, J. Hill (eds.), 99-127. Boulder: University Press of Colorado

Tardy, C.
1998 *Paleoincendies naturels, feux anthropiques et environnements forestiers de Guyane française du Tardiglaciaire à l'Holocène récent. Approches chronologique et anthracologique*, PhD Dissertation, University of Montpellier II, ms

Tardy, C., M. Mestre, J. Jérémie, J. Briand
2010 Réflexions sur la dynamique à long terme des écosystèmes amazoniens. Paléoincendies naturels, feux anthropiques et occupations humaines, *Amaz'hommes: Sciences de l'homme et sciences de la Nature en Amazonie*, E. Barone-Visigalli, A. Roosevelt (eds.), 105-108. Matoury: Ibis Rouge Éditions

Taylor, A. C.
1985 L'art de la reduction: la guerre et les mécanismes de la différentiation tribale dans la culture Jivaro, *Journal de la Société des Américanistes* 71:159-173

1991 Ethnie, *Dictionnaire de l'ethnologie et de l'anthropologie,* P. Bonte, M. Izard (eds.), 242-244. Paris: Presses Universitaires de France

Taylor, D.,
1977 *Languages of the West Indies*, Baltimore: The John Hopkins University Press

Ternaux-Compans, H.
1843 *Note historique sur la Guyane française*. Paris: Chez Firmin Didot Frères

Tertre, J-B., du
1667 *Histoire génerale des Antilles, habitué es par les François, divisée en deux tomes, et enrichie de Cartes & de Figures*, 3 Tomes. Paris: Chez Thomas Jolly

1654 *Histoire générale des isles de S. Christophe, de la Guadeloupe, de la Martinique, et autres dans l'Amérique* […], Paris: Chez Iacques Langlois

Texier, P.
2006 *Rémire-Montjoly « Route des Plages », Etablissement Prévot, Guyane,* Rapport de diagnostic INRAP, ms.

Théveniaut, H.
2005 *Les Amérindiens et la pierre en Guyane. Etude du matériel lithique des collections du musée des Cultures Guyanaises et du Service Régional de l'Archéologie,* BRGM/ RP54021FR, ms

Théveniaut, H., C. Delor
2004 *Histoire géologique de la Guyane*, Rapport du BRGM 53342, Orléans

Thevet, A.
1575 *Cosmografia universelle d'André Thevet, Cosmographe du Roy* […], 2 Tomes. Paris : Chez Guillaume Chaudire

*c.*1587 *Second voyage d'André Thévet dans les Terres australes et occidentales*, Bibliothèque National de Paris, ms 15454

Thibaudault, P.
1995 *Echec de la démesure en Guyane. Autour de l'expédition de Kourou ou une tentative européenne de réforme des conceptions coloniales sous Choiseul*, Conseil Regional de Guyane/DRAC, ms

Thomas, J.
2002 Awala-Yalimapo. Village et abords, *Bilan Scientifique de la Région Guyane* 1998:15

Thoms, A.V.
2003 Cook-Stone Technology in North America: Evolutionary Changes in Domestic Fire Structures during the Holocene, *Le Feu Domestique et Ses Structures au Neolithic aux Auges des Metaux*, M.-C. Frere-Sautot (ed.), 87-96. In: Collection Préhistoires 9. Paris: Éditions Monique Mergoil

2009 Rocks of Ages: Propagation of Hot-rock Cookery in Western North America, *Journal of Archaeological Science* 36(3):573-591

Thooris, C.
1994a *Kourou, La Sablière du Bois Diable, Site amérindien de plein air*, ms

1994b Kourou, Sablière de Bois de Diable, *Bilan Scientifique de la Guyane* 1993:19-20

Tissoti, C., M. Djuwansai, C. Marius
1988 Evolution de la mangrove en Guyane au cours de l'Holocène Etude palynologique, *Institut français Pondichéry TSST* 25:125-137

Tite, M. S.
1999 Pottery Production, Distribution, and Consumption – The Contribution of the Physical Sciences, *Journal of Archaeological Method and Theory* 6(3):181-233

Tony, C.
1835 *Voyage dans l'intérieur du continent de la Guyane, chez les Indiens Rocouyens par Claude Tony; mulâtre libre d'Aprouague, en 1769*. In: Journal d'un Déporté, non jugé ou Déportation en Violation des Lois […], Vol. 2, 301-320. Paris: Chatelet

Torrence, R.
1986 *Production and exchange of stone tools,* Cambridge: Cambridge University Press

Torrence, R., H. Barton (eds.)
2006 *Ancient Starch Research*. Walnut Creek: Left Coast Press

Torres, J. M.
2013 Rethinking Chiefdoms in the Caribbean, *The Oxford Handbook of Caribbean Archaeology*, W. Keegan, C. Hofman, R. Rodríguez Ramos (eds.), 347-362. Oxford: Oxford Univeristy Press

Trease, G. E., W. C. Evans
1986 *Farmacognosia*, CECSA, Mexico

Tricornot, M. Ch., de
2005 Art céramique Kalina, *La revue de la céramique et du verre* 145:16-21

2007 *L'art céramique des Kalina*. Paris: Vents d'ailleurs, La Roque d'Anthéron

Trigger, B. G.
1980 Archaeology and the Image of the American Indian, *American Antiquity* 45(4):662-676

Tringham, R., G. Cooper, B. Voytek, A. Whitman
1974 Experimentation in the formation of edge damage. A new approach to lithic analysis, *Journal of Field Archaeology* 1:171-196

Turenne, J. F.
1974 Le gisement de Pointe Gravier, Guyane française, *Proceedings of the 5th Internatinal Congress for the Study of Pre-Colombian Cultures of the Lesser Antilles, Antigua 1973*, R. P. Bulllen (ed.), 28-34. Antigua Archaeologial Society

1979 Sédimentologie (plaines côtières), *Atlas des Départements Français d'Outre-Mer, Volume 4. La Guyane*, G. Lasserre, G. Sautter, M. Boyé, G. Brasseur (eds.), Planche 6. Paris: CEGET/ORSTOM

Turenne, J. F., P. Grenand
1979 Archéologie – Histoire des Amérindiens, *Atlas des Départements Français d'Outre-Mer, Volume 4. La Guyane*, G. Lasserre, G. Sautter, M. Boyé, G. Brasseur (eds.), Planche 17:1-5. Paris: CEGET/ORSTOM

Turner, T.
1984 Dual Opposition, Hierarchy, and Value: Moiety Structure and Symbolic Polarity in Central Brazil and Elsewhere, *Différences, Valeurs, Hiérarchie: Textes offerts à Louis Dumont*, J. C. Galey (ed.), 335-370. Paris: Éditions EHHS

Tyacke, S.
1980 English charting of the River Amazon, c. 1595-c. 1630, *Imago Mundi* 32:73-89

Ugent, D., S. Pozorski, T. Pozorski
1986 Archaeological Manioc (*Manihot*) from Coastal Peru, *Economic Botany* 40(1):78-102

Vacher, S., S. Jérémie, J. Briand
1998 *Amérindiens du Sinnamary (Guyane): archéologie en forêt équatoriale.* In: Document d'Archéologie française 70. Paris: Éditions de la Maison des sciences de l'homme

Van Velthem, L. H.
2006 *Coleções etnograficas: instrumentos para o conhecimento das redes de troca nas Guianas*. Guiana amerindia historia e etnologia, Belém

Vaughan, A. T.
2002 Sir Walter Ralegh's Indian Interpreters, 1584-1618, *The William and Mary Quarterly* 59(2):341-376

Veen, A., S. Slager, A. Jongmans
1971 A micromorphological study of four Pleistocene alluvial soils of Surinam, *Geoderma* 6:81-100

Verhagen, Ph., J. W. H.
2007 *Case studies in archaeological predictive modelling*. PhD Dissertation Leiden University, In: Archaeological Studies Leiden University 14. Leiden: Leiden University Press

Vernooij, J.
1989 *Indianen en kerken in Suriname. Identiteit en autonomie in het binnenland*. Stichting Wetenschappelijke Informatie, Paramaribo

Versteeg, A. H.
1978 A distinctive kind of pottery in western Surinam, *Mededelingen Stiching Surinaams Museum* 23-24:15-26

1980a Archaeological investigations at Kwamalasamoetoe (South-West Surinam), *Mededelingen Stichting Surinaams Museum* 30:22-46

1980b C^{14} dateringen van archeologische vindplaatsen in Suriname, *Mededelingen Stichting Surinaams Museum* 32:38-56

1981 A fortified pre-Columbian village in East Surinam? *Mededelingen Stichting Surinaams Museum* 33:38-49

1985 *The Prehistory of the Young Coastal Plain of West Suriname,* PhD Dissertation, University of Leiden. In: Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek 35:653-750

1992 Environment and man in the Young Coastal Plain of West Surinam, *Evolutions des Littoraux de Guyane et de la zone caraïbe méridionale pendant le Quaternaire,* Marie-Thérèse Prost (ed.), 531-578. Paris: Éditions de l'ORSTOM

1998 The history of archaeological research in Surinam, *The history of earth sciences in Surinam*, Th. Wong, D. R. de Vletter, L. Krook, J. Zonneveld, A.J. van Loon (eds.), 203-234, Amsterdam: Koninklijke Nederlandse Academie der Wetenschappen & Nederlands Instituut voor Toegepaste Geowetenschappen TNO

2003 *Surinam before Columbus*, Libri Musei Surinamensis 1. Paramaribo: Stichting Surinaams Museum

2008 Barrancoid and Arauquinoid Mound Builders in Coastal Surinam, *Handbook of South American Archaeology*, H. Silverman, W. Isbell (eds.), 303-318. New York: Springer

Versteeg, A., F. Bubberman
1992 Surinam before Columbus, *Mededelingen van de Stichting Surinaams Museum* 49a

Versteeg, A., K. Schinkel (eds.)
1992 *The Archaeology of St. Eustatius. The Golden Rock Site.* In: Publication of the Foundation of Scientific Research in the Caribbean Region 131

Vescelius, G. S.
1980 A Cultural Taxonomy of West Indian Archaeology, *Journal of the Virgin Islands Archaeological Society* 10:36-39

Vialou, A. Vilhena
2006 A indústria lítica de Ferraz Egreja, *Pré-história do Mato Grosso*, Vol. 2, Cidade de Pedra, Agueda Vilhena Vialou (ed.), 169-183. São Paulo: Editoria Universidade de São Paulo

Vidal, P., de la Blache
1902 *La rivière de Vincent Pinzon, Etude sur la cartographie de la Guyane*, Paris: Félix Alcan

Vidal, L., Boelitz
2001 Mito, História e Cosmologia: as differentes versões da geurra dos Palikur contra os Galibi entre os povos indígenas da Bacia do Uaçá, Oiapoque, Amapá, *Revista de Antropologia* 44(1):117-147

Villié, P.
1987 Les pipes en terre cuite, *Magazine, plongée et chasse sous marine* 10

Villiers, M., de
1920 Journal inédit du voyage du sergent La Haye de Cayenne aux chutes du Yari, 1728-1729, *Journal de la Société des Américanistes* 12(1):115-126

Viscarra Rossel ,R. A., D. J. J. Walvoort, A. B. McBratney, L. J. Janik, J. O. Skjemstad
2006 Visible, near infrafred or combined diffuse reflectance spectroscopy for simultaneous assessement of various soil properties, *Geoderma* 131(1-2):59-75

Viveiros de Castro, E.
1992 *From the Enemy's Point of View, Humanity and Divinity in an Amazonian Society*, PhD Dissertation, Federal Universtiy of Rio de Janeiro (1986), Translated by C. V. Howard. Chicago: The University of Chicago Press

1995 Pensando o parentesco ameríndio, *Antropologia do Parentesco: Estudos Ameríndios*. A. Viveiros de Castro (ed.): 7-24. Rio de Janeiro: Editoria UFRJ.

1996 Images of Nature and Society in Amazonian Ethnology, *Annual Review of Anthropology* 25(1):179-200

1998 Cosmological deixis and Amerindian perspectivism, *Journal of the Royal Anthropological Institute* 4(3):468-488

2002 *A inconstância da alma selvagem e outros ensaios de anthropologia*. São Paulo: Cosac & Naify

2004 Exchanging Perspectives: The Transformation of Objects into Subjects in Amerindian Ontologies, *Common Knowledge* 10:463-484

Vletter, D., de, G. Aleva, S. Kroonenberg
1998 Research into the Precambrian of Surinam. *The history of earth sciences in Surinam*, Th. Wong, D. de Vletter, L. Krook, J. Zonneveld, A. van Loon (eds.), 15-64, Amsterdam: Koninklijke Nederlandse Akademie voor Wetenschap & Nederlands Instituut voor Toegepaste Geowetetnschappen (TNO)

Vogel, J. C., J. C. Lerman
1969 Groningen radiocarbon dates VIII, *Radiocarbon* 11(2):351-390

Voorhies, B., E. Wagner, L. Arvelo
1981 Mora : un yacimiento arqueológico en el Bajo Delta del Orinoco, Venezuela, *Anthropologica* 55:31-50

Vredenbregt, A. L.
2002 *Ori:no ka:nan wena:po. The Symbolic Content of Kari'na Materiel Culture; an Ethnoarchaeological Case Study*, Master Thesis, University of Leiden, ms

2004a From Myth to Matter: The Ceramic Tradition of the Kari'na of northeast Surinam, *Leiden Journal of Pottery Studies* 20:75-96

2004b Cultuur in teken. Materiële cultuur en symboliek bij de Kari'na, *OSO Tijdschrift voor Surinamistiek* 2004(2):291-304

Vries, D., Pietersz, de
1655 *Korte Historiael ende Journaels Aenteykeninge van verscheyden Voyagiens in de Vier Deeles des Wereldsronde, als Europa, Africa, Asia, ende Amerika gedaen* […]. Brekegeest: Symon Cornelisz

Wack, Y.
1988 *La céramique Galibi du Musée Franconie. Recherche sur la genèse d'une expression artistique*, ms

1989 *Le site archéologique de Mont Fortunat-Capiri (Bassin de l'Approuague, Observations préliminaires),* ms

1990a *Dégrad-des-Cannes – Dégrad amérindien, note sur les vestiges archéologiques entre la crique Pavée et la crique Fouillée*, ms

1990b *Petit atlas des formes et décors céramiques du gisement amérindien de Tonate-Sainte-Agathe*, ms

1991 Recherches sur l'histoire amérindienne de la Comté et de l'Approuague des contacts à l'extinction, *Caribena* 1:61-91

Walker, J.
2011 Ceramic assemblages and landscape in the mid-1st millennium de Mojos, Beni, Bolivia, *Journal of Field Archaeology* 36 (2):119-131

Walker, J. B.
1980 Analysis and replication of lithic artefacts from the Sugar Factory Pier site, St. Kitts, *Proceedings of the Eighth International Congress for the Study of Pre-Columbian Cultures of the Lesser Antilles* held at Saint Kitts 30 July 1979, S. M. Lewenstein (ed.), 69-79, In: Anthropological Research Papers 22, Arizona State University

Wallace, A. R.
1889 *A Narrative of Travels on the Amazon and Rio Negro, with an account of the Native Tribes* […]. London: Ward, Lock & Co

Wallenburg, M., van, A. Bright, L. Hulsman, M. van den Bel
2015 The Voyage of Gelein van Stapels to the Amazon River, the Guianas and the Caribbean, 1629-1630, *The Journal of the Hakluyt Society: http://www.hakluyt.com/journal_index.htm*

Warner, G. F.
1899 *The Voyage of Robert Dudley to the West-Indies 1594-1595*. In: Works issued by The Hakluyt Society, Second Series 3. London: Hakluyt Society

Warren, G.
1667 *An impartial description of Surinam upon the Continent of Guiana in America. With a History of several strange Beasts, Birds, Fishes, Serpents, Insects, and Customs of the Colony*. London: William Godbid

Wassenaer, N.
1627 Twaelfde deel of 't vervolgh van het Historisch Verhael aller gedenckwaerdiger geschiedenissen die in Europa […], *Historisch Verhael aller gedenckwaerdiger geschiedenissen*, 17 Vols. (1622-1630). Amsterdam: Jan Jansen

Waters, M. R.
1992 *Principles of Geoarcheology: a North American Perspective*. Tucson: University Press Arizona

Wattez, J., C. Cammas
2009 Micromorphologie des sols: l'homme acteur de la pédogenèse, *Manuel d'Archéologie Médiévale et Moderne*, J. Burnouf, D. Arribet-Deroin, B. Desachy, F. Journot, A. Nissen-Jaubert (eds.), 80-82, Paris: Armand Colins

Weber, R. L.
1975 *Caimito: An Analysis of the Late Prehistoric Culture of the Central Ucayali, Eastern Peru*, PhD Dissertation, University of Illinois, ms

Wells, E. Ch., K. L. Davis-Salazar
2007 Mesoamerican Ritual Economy: Materialization as Ritual and Economic Process, *Mesoamerican Ritual Economy*, C. Wells, K. L. Davis-Salazar (eds.), 1-26. Boulder: University Press of Colorado

White, C.
2010 Kumako: a place of convergence for Maroons and Amerindians in Surinam (SA), *Antiquity* 84:467-479

White, R.
1991 *The Middle Ground, Indians, Emires, and Republics in the Great Lakes Region 1650-1815*. In: Cambridge studies in North American Indian history, Cambridge: Cambridge University Press

Whitehead, N. L.
1984 Carib Cannibalism: The Historical evidence, *Journal de la Société des Américanistes* 70(1):69-87

1988 *Lords of the Tiger Spirit: A History of the Caribs in Colonial Venezuela and Guyana 1498-1820*, PhD Dissertation, University of Oxford (1984). In: KITLV Caribbean Series 1. Dordrecht: Foris Publishers

1990 The Mazaruni pectoral: A golden artefact discovered in Guyana and the historical sources concerning native metallurgy in the Caribbean, Orinoco, and Amazonia, *Archaeology and Anthropology* 7:19-38

1992a Tribes Make States and States Make Tribes, Warfare and the Creation of Colonial Tribes and States in Northeastern South America, *War in the Tribal Zone: Expanding States and Indigenous Warfare,* B. Ferguson, N. L. Whitehead (eds.), 127-150. Washington: University of Washington Press

1992b Transformation of Native Surinam, 1499-1681. Paper proposed for the publication, *Indianen van Suriname*, P. Kloos (ed.), ms

1993 Ethnic transformation and historical discontinuity in native Amazonia and Guyana, 1500-1900, *L'Homme* 126-128:285-307

1994 The Ancient Amerindian Polities of the Amazon, the Orinoco, and the Atlantic Coast: A Preliminary Analysis of Their Passage from Antiquity to Extinction, *Amazonian Indians from Prehistory to the Present, Anthropological Perspectives*, A. Roosevelt (ed.), 33-78, Tucson: University of Arizona Press

1995a Ethnic plurality and cultural continuity in the native Caribbean: Remarks and uncertainties as to data and theory, *Wolves from the Sea: Readings in the Anthropology of the Native Caribbean*, N. L. Whitehead (ed.), 91-111. In: Caribbean Series 14. Leiden: KITLV Press

1995b The historical anthropology of text: The interpretation of Raleigh's Discoveries of Guiana, *Current Anthropology* 36(1):53-74

1996 Ethnogenesis and Ethnocide in the settlement of Surinam, *History, Power and Identity, Ethnogenesis in the Americas 1492-1992*, J. Hill (ed.), 20-35. Iowa City: University of Iowa Press

1997 Monstrosity and marvel: symbolic convergence and mimetic elaboration in trans-cultural representation: an anthropological reading of Ralegh's discoverie, *Studies in Travel Writing* 1(1):72-95

1998 Colonial Chieftains of the Lower Orinoco and Guyana Coast, *Chiefdoms and Chieftaincy in the Americas*, E. Redmond (ed.), 150-163, Gainesville: University Press of Florida

2003a Introduction, *Histories and Historicities in Amazonia*, N. L. Whitehead (ed.), vii-xx. Lincoln & London: University of Nebraska Press

2003b Three Patamuna Trees: Landscape and History in the Guyana Highlands, *Histories and Historiciies in Amazonia*, N. L. Whitehead (ed.), 59-77. University of Nebraska Press: Lincoln & London

2009 Commentary on the journal of Lourens Lourenszoon (1618-1625) and his stay among the Arocouros on the Lower Cassiporé River, Amapá (Brazil), *Boletim do Museu Paraense Emílio Goeldi*, Ciêncas Humanas 4(2):297-301

2011a *Indigenous Slavery in South America, 1492-1820, The Cambridge World History of Slavery*: Vol. 3, AD 1420-AD 1804, K. Bradley, S. Engerman, P. Cartledge, D. Eltis (eds.), 248-274. Cambridge: Cambridge University Press

2011b *Of Cannibals and Kings: Primal Anthropology in the Americas*, Latin American Originals 7. Pennsylvania: The Pennsylvania State University Press

Whitehead, N. L., M. J. Heckenberger, G. Simon
2010 Materializing the Past among the Lokono (Arawak) of the Berbice River, Guyana, *Antropológica* 114:87-127

Whittemore, J.
1993 *Le livre des boutons*. Paris: Éditions Solar

Wijmstra, T. A., T. van der Hammen
1966 Palynological data on the history of tropical savannas in northern South America, *Leidse Geologische Mededelingen* 38:71-90

Wilbert, J.
1975 Warao basketry: form and function, *Occasional papers of the Museum of cultural History* 3:1-85

Wilk, R. R.
1999 "Real Belizean Food": Building Local Identity in the Transnational Caribbean, *American Anthropologist*, n.s. 101(2):244-255

Willey, G.
1971 *An Introduction to American Archaeology, Volume 2: South America*. New Jersey: Englewood Cliffs Prentice Hall, Princeton

Willey, G., P. Philips
1958 *Method and Theory in American Archaeology*. Chicago: University of Chicago Press

1974 *A history of American archaeology*. San Francisco: W. H. Freeman

Williams, D.
1982 Some subsistence implications of Holocene climatic change in Northwestern Guyana, *Journal of Archaeology and Anthropology* 5(2):82-93

1985 *Ancient Guyana*. Georgetown: Ministry of Education, Social Development & Culture

1992 El arcaico en el noroest de Guyana y los comienzos de la horticultura, *Prehistoria sudamericana: nuevas perspectivas. Ponencias presentatdas al Segundo Simposio conmemorando el Quinto Centenario, National Museum of Natural History, Smithsonian Institution, Washington D.C., 1-4 de octubre de 1988*, B. Meggers (ed.), 233-251. Washington: Taraxacum

1993 The forms of the shamanic sign in the prehistoric Guianas, *Archaeology and Anthropology* 2:3-21

1996 The Origin, Characterization and Chronology of the Mabaruma subseries of the Barrancoid Tradition, *Journal Archaeology and Anthropology* 11:3-53

1997 Early Pottery in the Amazon: A Correction, *American Antiquity* 62(2):342-352

1998 The Archaic Colonization of the Western Guiana Littoral and its Aftermath, *Journal of Archaeology and Anthropology* 12:22-41

2003 *Prehistoric Guiana*. Kingston/Miami: Ian Randle Publishers

Williams, J.
1922 The name "Guiana", *Journal de la Société des Américanistes* 14-15:19-34

Williamson, J. A.
1923 *English colonies in Guiana and on the Amazon, 1604-1668*. Oxford: Clarendon Press

Wilson, C. A., M. S. Cresser, D. A. Davidson
2006 Sequential element extraction of soils from abandoned farms: an investigation of the partitioning of anthropogenic element inputs from historic land use, *Journal of Environmental Monitoring* 8:439-444

Wilson, J., of Wansteed
1625 *The Relation of Master John of Wansteed in Essex, one of the last ten that returned into England from Wiapoco in Guiana 1606, Purchas His Pilgrimes: In Five Bookes: The First, Contayning the Voyages … Made by Ancient Kings, …, Others, to and thorow the Remoter Parts of the Knowne World, etc.*, Part 4, Chapter 14, 1260-1265. London: W. Stansby for H. Fetherstone

1906 *The Relation of Master John of Wansteed in Essex, one of the last ten that returned into England from Wiapoco in Guiana 1606*. In: Hakuytus Posthumus or Purchas His Pilgrimes, Contayning a History of the World in Sea Voyages and Lande Travells by Englishmen and others, S. Purchas (ed.), Vol. 16, 338-352. Glasgow: James MacLehose & Sons

Wilson, S. M.
1990 *Hispaniola: The Chiefdoms of the Caribbean in the Early Years of European Contact*. Tuscaloosa: University of Alabama Press

Wing, E. S., A. B. Brown
1979 *Paleonutrition: Method and theory in prehistoric foodways*. San Diego: Academic Press

Wing, E. S., E. J. Reitz
1982 Prehistoric fishing economies of the Caribbean, *Journal of New World Archaeology* 5(2):13-32

Wong, Th., L. Krook, J. Zonneveld
1998 Investigations in the coastal plain and offshore area of Surinam, *The history of earth sciences in Surinam*, Th. Wong, D. de Vletter, L. Krook, J. Zonneveld, A. van Loon (eds.), 73-100. Koninklijke Nederlanse Akademie voor Wetenschap & Nederlands Instituut voor Toegepaste Geowetenschappen (TNO)

Woods, W. I.
2003 Development of anthrosol research, *Amazonian Dark Earths: Origin, Properties, Management*, J. Lehmann, D. C. Kern, B. Glaser, W. I. Woods (eds.), 3-14. Dordrecht: Kluwer Academic Publishers

Woods, W., J. McCann
1999 The anthropogenic origin and persistence of Amazonian Dark Earth, *Yearbook of Conf. Latin American Geography* 25:7-14

Woods, W., G. Texeira, J. Lehman, C. Steiner, A. WinklerPrins, L. Rebellato (eds.)
2009 *Amazonian Dark Earths; Wim Sombroek's Vision.* Berlin: Springer

Wüst, I., C. Barreto
1999 The Ring Villages of Central Brazil: A Challenge for Amazonian Archaeology, *Latin American Antiquity* 10(1):3-23

Yde, J.
1965 *Material culture of the Wai-Wai*, Copenhagen: The National Museum of Copenhagen

Yoffee, N.
2005 *Myths of the Archaic State: Evolution of the Earliest Cities, States, and Civilizations*. Cambridge: Cambridge University Press

Yzerman, J. W.
1911 Twee reizen van Paramaribo, een naar de Parima in 1718 en een naar de Boven-Corantijn in 1720, *Tijdschrift Koninklijk Nederlands Aardrijkskundig Genootschap* 28:648-661

Zarrillo, S., D. Pearsall, J. Scott Raymond, M. A. Tisdale, D. J. Quon
2008 Directly dated starch residues document early formative maize (Zea mays L.) in tropical Ecuador, *Proceedings of the National Academy of Science* 105(13):5006-5011

Zech, W., L. Haumeier, R. Hempfling

1990 Ecological aspects of soil organic matter in tropical land use. Humic substances in soil and crop sciences: selected readings, *American Society of Agronomy and Soil Science Society of America*, P. McCarthy, C. Clapp, R. Malcolm, P. Bloom (eds.), 187-202. Madison

Zucchi, A.

1985a Recent evidence for Pre-Columbian water management systems in the Western Llanos of Venezuela, *Prehistoric Intensive Agriculture in the Tropics*, I. Farrington (ed.), 167-180. In: BAR International Series 232. Oxford: Archaeopress

1985b Evidencias arqueológicas sobre posibles grupos de lenguas Caribe, *Antropológica* 63-64:23-44

1988 El Orinoco Medio: Su importancia para explicar la relacion entre el juego de pelota de los Otomaco, de las Antillas y Mesoamerica, *Boletin de la Academia Nacional de la Historia* 71(282):443-477

1991 Prehispanic Connections between the Orinoco, the Amazon, and the Caribbean Area, *Proceedings of the the Thirteenth International Congress for Caribbean Archaeology, Curaçao, Netherlands Antilles 1991*, E. N. Ayubi, J. B. Haviser (eds.),202-220. In: Reports of the Archaeological-Anthropological Institute of the Netherlands Antilles 9, 2 Vols. Curaçao

Zucchi, A., K. Tarble, E. Vaz

1984 The Ceramic Sequence and New TL and C^{14} Dates for the Agüerito Site of the Middle Orinoco, Venezuela, *Journal of Field Archaeology* 11(2):155-180

Annexes (on-line)

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- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:2729

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- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:36411

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- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:7813

1.4 Iracoubo AM 41
- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:2728

1.5 PK 11 Route des Plages (Rorota)
- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:36338

1.6 Cimetière paysager Poncel
- http://dolia.inrap.fr/inrapgestdoc/jsp/index_view_direct.jsp?record=default:UNIMARC:32599

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  Table 3 The constituent elements : http://dx.doi.org/10.17026/dans-x9k-ptuu
  Table 4 The decoration modes : http://dx.doi.org/10.17026/dans-x9k-ptuu

About the author

I acquired my first experience with the archaeology of the Guianas during a short fieldwork in 1994. It consisted of an archaeological compliance operation at the *Barrage de Petit-Saut* (BPS) on the Upper Sinnamary River in French Guiana. In fact, it was my intention to continue to study the ceramic material we had excavated the year before at the site of Hope Estate, Saint-Martin (Sint Maarten) in the Leeward Islands of the Lesser Antilles; a cooperation of the University of Leiden and DAC Guadeloupe. One month before departing for the Antilles, the archaeological project was abandoned and I travelled to French Guiana in search of "living" ceramic traditions.

Together with my fellow student and friend Richard Janssen, we carried out a few site surveys on the Upper Courçibo River (an affluent of the Upper Sinnamary River) after which each of us set off for a modern Amerindian village in order to experience Amerindian village life. I ended up in the Palikur village of *Kamuyuneh* where Elvira Îoîo, still manufactured pottery for festive occasions. Her husband, Paulo Orlando Norino (†), was of great help in translating her explanations into French or Portuguese, since she only spoke *Paykweneh*.[1] I learned that the modern Palikur apply pictograms such as "snake" or "turtle," as decoration motifs on pottery and basketry. This phenomenon is fairly common among the Amerindians in the Guianas, but the Palikur also apply pictograms in order to refer to their lineages or clans, such as the *Wakapuyene* (People of the Wacapou Trees) or the *Kawakyuyene* (People of the Pineapples) which still exist today (van den Bel 1995; Passes 2004). These discussions took me on a voyage into Palikur oral tradition and inspired us to collaborate on the recording of stories (van den Bel 1995, 2009b; van den Bel and Narciso 1995).

During the following years I worked in the Netherlands as a field archaeologist for the Rijksdienst voor het Oudheidkundig Bodemonderzoek (ROB, Hogevaart A27) and Archol BV (Hardinxveld and de Bruin, Giessendam). My savings allowed the return to French Guiana in order to continue the recording of the Palikur oral traditions. I also kept contact with Sylvie Jérémie and Sandra Kayamaré who were members of the *Association des fouilles archéologiques nationales* (AFAN) and now the *Institut national de recherches archéologiques préventives* (INRAP). Together we realized several archaeological surveys several of which were very important to me, for instance, a pedestrian survey upon the Lower Mana River. This archaeological research was almost entirely based on the memory of Kali'na who had lived in the now abandoned village of Couachi (Kayamaré 1997, 2000). Another pedestrian survey on the future national road transect (RN 2) between Régina and Saint-Georges represented solid field walking with Palikur guides and the botanist Dénis Loubry in beautiful canopy forest far away from any modern communities (Jérémie 1996, 1998, 2002). All these experiences combined kindled my desire to return to French Guiana and the Guianas in general.

1 For more information about Paulo Norino also known as 'O tradutor de mundos,' see Artionka Capiberibe's Master thesis (2007:179–183).

Since the very beginning of my studies in Leiden, I had also started to gather historic material on the first European contacts and the further colonisation of the Guianas. The Dutch presence in the Guianas was especially of interest to me –these explorers were trading principally on the Lower Amazon and Oyapock Rivers (Hulsman 2009, 2010). On the latter river and the Cassiporé River, they met the Aricouros, believed to be the ancestors of the actual Palikur (F. Grenand and P. Grenand 1987). In fact, most Dutch historians focussed on the former Dutch colonies of Suriname, Essequibo, Demerara and Berbice and show no interest in, sometimes earlier, Dutch involvement with the eastern Guianas. At any rate, this urged me to transcribe, translate and annotate Dutch documents into English and French as the Dutch language is still poorly understood among (non-Dutch speaking) historians (van den Bel 2009c; van den Bel and Gassies 2011; van den Bel and Hulsman 2013, 2014; Collomb and van den Bel 2014; van den Bel et al. 2014; van Wallenburg et al. 2015).

In June 2004, after being offered my first contract for the INRAP as a project leader in French Guiana, my wife and I left the Netherlands to reside in Cayenne. Numerous projects followed. After finishing a report I often contacted Arie Boomert by e-mail with the request if he had seen certain sherds, vessel shapes or whether he would have any references on specific subjects etc. In the summer of 2009, he offered to serve as a co-superviser with Corinne Hofman as supervisor. Well, as we say in Dutch, "You don't look a gifted horse in the mouth." Next we started to write a proposal for the University of Leiden and the Scientific Committee of INRAP headquarters in Paris. The goal of this project was to establish a chronology for the Lower Maroni River area. I had conducted most substantial archaeological research on the right bank of this river and in the western part of French Guiana (roughly between Cayenne Island and the Maroni River). In addition, I preferred this region on a more personal level because of its close relationship with Suriname. This enabled not only the combination of archaeological data from both countries but also the inclusion of Arie's knowledge on eastern Suriname. Eventually, we integrated the Island of Cayenne, where I had conducted two excavations in order to obtain a clear cultural boundary with Cayenne and the eastern Guianas. This dissertation thus presents the work of five years of excavation and analysis and four years of contemplation.

La traduction des conclusions

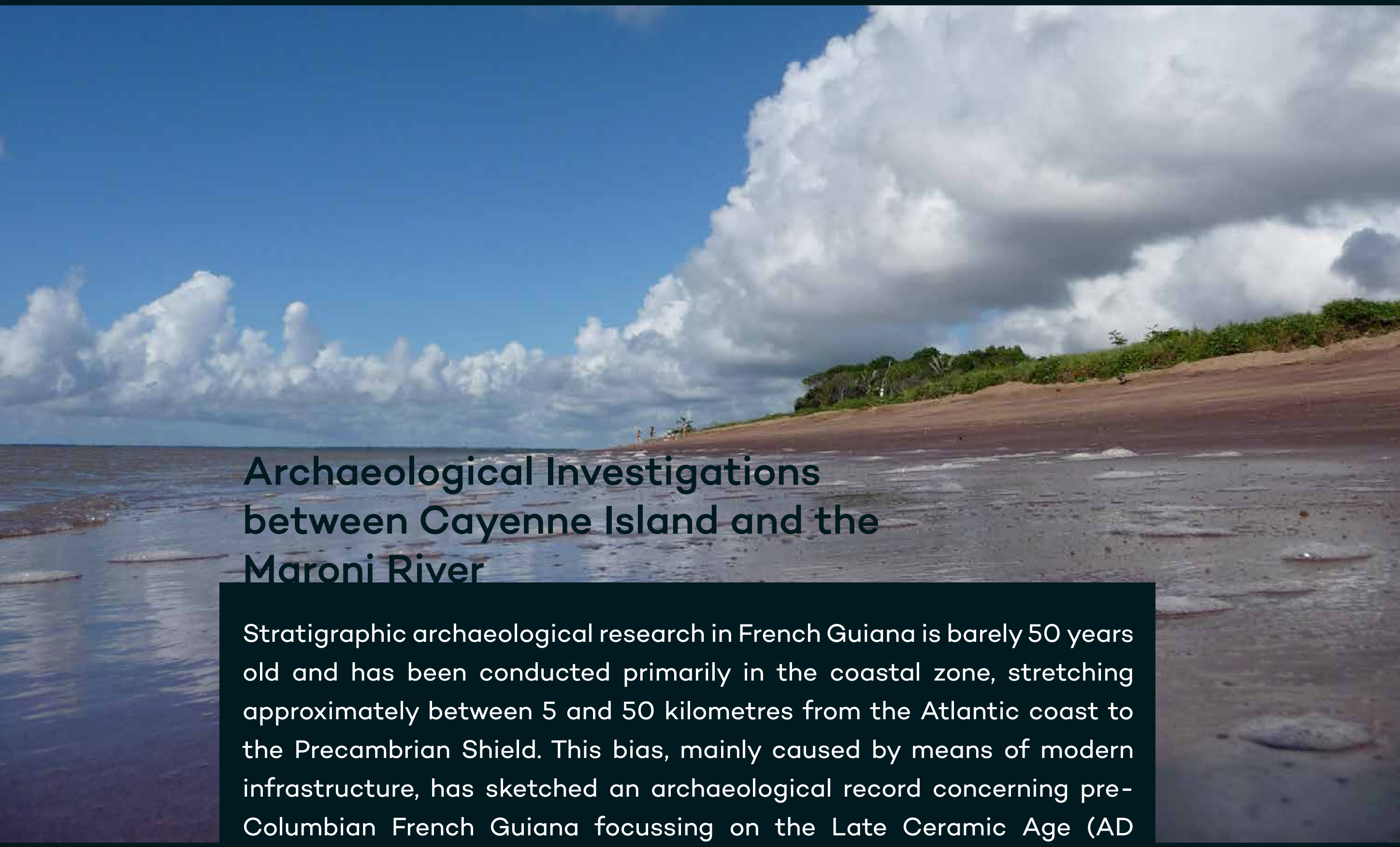
En Guyane française, la prescription de recherches archéologiques ne date que du début des années 1970. Elles ont été menées principalement sur le littoral qui s'étend entre 5 et 50 kilomètres depuis la côte atlantique vers l'intérieur des terres. Cette connaissance biaisée, essentiellement corrélée au développement des infrastructures modernes, a constitué une base de données archéologique qui concerne surtout l'Île de Cayenne et la plaine holocène pour l'Âge céramique tardif (AD 900-1500). Cette étude présente les résultats de six fouilles archéologiques préventives afin d'étoffer nos connaissances sur ce département. Au même titre, de nouvelles données sur l'Âge archaïque et céramique ancien, une période inconnue, sont présentées. Elles viennent combler un hiatus chronologique. Ensuite, on propose également de nouvelles perspectives et pistes pour l'Âge céramique tardif concernant les pratiques funéraires, les complexes céramiques et l'alimentation des Amérindiens.

Après la présentation du but recherché et des questions soulevées, de brèves introductions sur l'histoire, l'archéologie et la géologie de la Guyane et du Surinam sont présentées. Ensuite, les résultats et les analyses de chaque fouille sont présentés par ordre chronologique. En premier, le site Eva 2 qui se trouve en limite de la savane pléistocène de Malmanoury, entre Kourou et Sinnamary. À l'origine, c'est un site précéramique qui a ensuite livré de la céramique ancienne ainsi que des pierres polies, du débitage sur enclume de quartz et des fours en cuvette à blocs de pierres. De plus, les analyses d'amidon réalisées sur plusieurs meules ont démontré la préparation de patates douces et du maïs à partir de 2500 BC environ. L'ensemble du mobilier lithique du site Eva 2 correspond à la Tradition littorale et archaïque du nord de l'Amérique du Sud. On avance l'hypothèse que la présence de la céramique ancienne à partir d'environ 2200 BC indique un changement en ce qui concerne la préparation de la nourriture (c.-à-d., de la cuisson à la vapeur dans les fours à la cuisson dans des récipients en céramique). L'ensemble céramique a été défini en tant que complexe céramique de Balaté et attribué à l'Âge céramique ancien (Phase A), contemporain d'autres complexes céramiques, comme ceux du Guyana (Phase Alaka) et du Pará, au Brésil (Tradition Mina).

Des céramiques contemporaines ont été également trouvées pendant la première occupation du site de Chemin Saint-Louis (CSL). Ce site stratifié, positionné sur les terrasses holocènes du fleuve Maroni, a aussi livré des fosses à charbon et vraisemblablement des inhumations avec des dépôts de vases en céramique. Au même titre que sur le site Eva 2, la présence de patates douces et de maïs a été avérée, cette fois dans les vacuoles de la céramique ancienne. La deuxième phase de CSL a été attribuée à la Phase B de l'Âge céramique ancien, datée des premiers siècles du premier millénaire AD. Elle a fourni des séries céramiques inédites pour le Bas Maroni comme témoignent les bols hyperboloïdes et les jattes campaniformes, ce qui a été nommé le complexe céramique de Saint-Louis. Cette occupation est également matérialisée par une couche épaisse de terre noire, laquelle représente le résultat d'une accumulation (volontaire et/ou involontaire) de débris anthropiques et de sédiment (colluvion) pendant cette phase d'occupation. Il s'avère que les habitants de ce site ont noué des liens avec des populations du Haut Maroni et probablement du Bas Amazone. Il est possible que CSL fasse partie d'un développement pan-Amazonien pendant la période saladoïde/barrancoïde de la partie septentrionale de l'Amérique du Sud. La troisième phase de CSL est associée au site voisin, appelé La Pointe Balaté. Elle appartient à l'Âge céramique tardif. La céramique de ces sites partage des affinités avec d'autres sites contemporains et présentés lors de cette étude, p. ex., Crique Sparouine, situé dans l'arrière-pays du Maroni et AM 41, une nécropole située à l'ouest du bourg d'Iracoubo. Les assemblages démontrent des liens avec le complexe Barbakoeba du Suriname et présentent désormais des ensembles régionaux. Ils montrent la diversité du complexe Barbakoeba mais ils évoquent surtout le besoin d'étoffer les études céramiques afin de mieux définir ce complexe important du littoral des Guyanes centrales.

Les trois sites du Maroni ont livré des inhumations primaires (ou secondaires) ainsi que des dépôts secondaires en urne ce qui diffère de la nécropole d'AM 41. Cette dernière a livré deux concentrations d'urnes qui montrent différents modes de sépulture. Ils témoignent probablement d'un culte du chef ou ancêtre fondateur entouré des membres de la famille ou du clan, matérialisé par une sépulture principale "en coffre" encerclée par des dizaines de dépôts d'urnes. Ce modèle hypothétique diffère des sépultures présumées des sites de l'Île de Cayenne où des fosses rectangulaires, remplies de poteries entières et de débris de vases marquant le corps du défunt, sont creusées de façon organisée. De plus, les nouvelles datations radiocarbones et l'interprétation issue de l'étude céramique des sites PK 11 et Cimetière paysager Poncel (CPP) ont permis de réviser la typo-chronologie de l'Île de Cayenne, en l'occurrence le complexe de Thémire. D'abord, on propose une phase ancienne et originale suivie d'une phase tardive redéfinissant le complexe Thémire pour laquelle le complexe Koriabo joue un rôle novateur. Les origines culturelles de la phase ancienne seront discutées à partir des données inédites concernant l'occupation de l'Âge céramique ancien de l'Île de Cayenne qui se manifestait par la céramique dite Ouanary encoché. Elle se présente maintenant plutôt comme un complexe céramique à part entière, certainement détachée de l'Aristé (tardif).

Les fouilles préventives sur le site d'Eva 2 ont mis au jour également l'occupation la plus récente de la séquence chrono-culturelle. Elle a été attribuée à l'Age historique et se présente comme deux occupations distinctes : (a) une première occupation aux XVII^{e} et XVIII^{e} siècles qui montre une série de formes céramiques Koriabo non-décorées et (b) un site funéraire du XIX^{e} siècle matérialisé par des inhumations par paires et une sépulture en urne, vraisemblablement celle du chef. Une comparaison morphologique avec les vases récents kali'nas, présents dans les collections européennes et régionales, a permis de définir le complexe céramique et historique de Malmanoury. Il s'agit d'un complexe intermédiaire entre les traditions précolombiennes et modernes, impacté par les apports coloniaux. Cependant, ces complexes se partagent des attributs qui ont traversé le temps par l'absorption et la réinvention des nouveautés. Ce phénomène s'inscrit dans un processus d'ethnogenèse qui favorise la renaissance d'une identité culturelle basée sur des concepts partagés parmi les différents groupes amérindiens du littoral. Le bol peint en rouge, encore utilisé aujourd'hui par les Kali'na du littoral lors des cérémonies, est l'objet par excellence de cette continuité culturelle et résistance amérindienne en Guyane française.



Archaeological Investigations between Cayenne Island and the Maroni River

Stratigraphic archaeological research in French Guiana is barely 50 years old and has been conducted primarily in the coastal zone, stretching approximately between 5 and 50 kilometres from the Atlantic coast to the Precambrian Shield. This bias, mainly caused by means of modern infrastructure, has sketched an archaeological record concerning pre-Columbian French Guiana focussing on the Late Ceramic Age (AD 900-1500) of Cayenne Island as well as the western Holocene coastal plains. The present study contains the results of six archaeological investigations, conducted from a compliance archaeological perspective, in order to enhance our knowledge of the afore-mentioned coastal area. It not only presents us with fresh archaeological data on the (Late) Archaic and Early Ceramic Age, a hiatus that is now partially filled up, but also sheds new light on the Late Ceramic Age of this specific region concerning funerary rites, ceramic series and subsistence economy.

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