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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 I present not only the data but also analyse all the data per site as well as an analysis of the historical documents in order to provide a synthesis of the pre-Columbian population that once inhabited this coastal region and reflections on pre-Columbian society as well as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 (Jérémié 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 m². 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

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 Municipality 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 préventive,” without any linguistic 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...

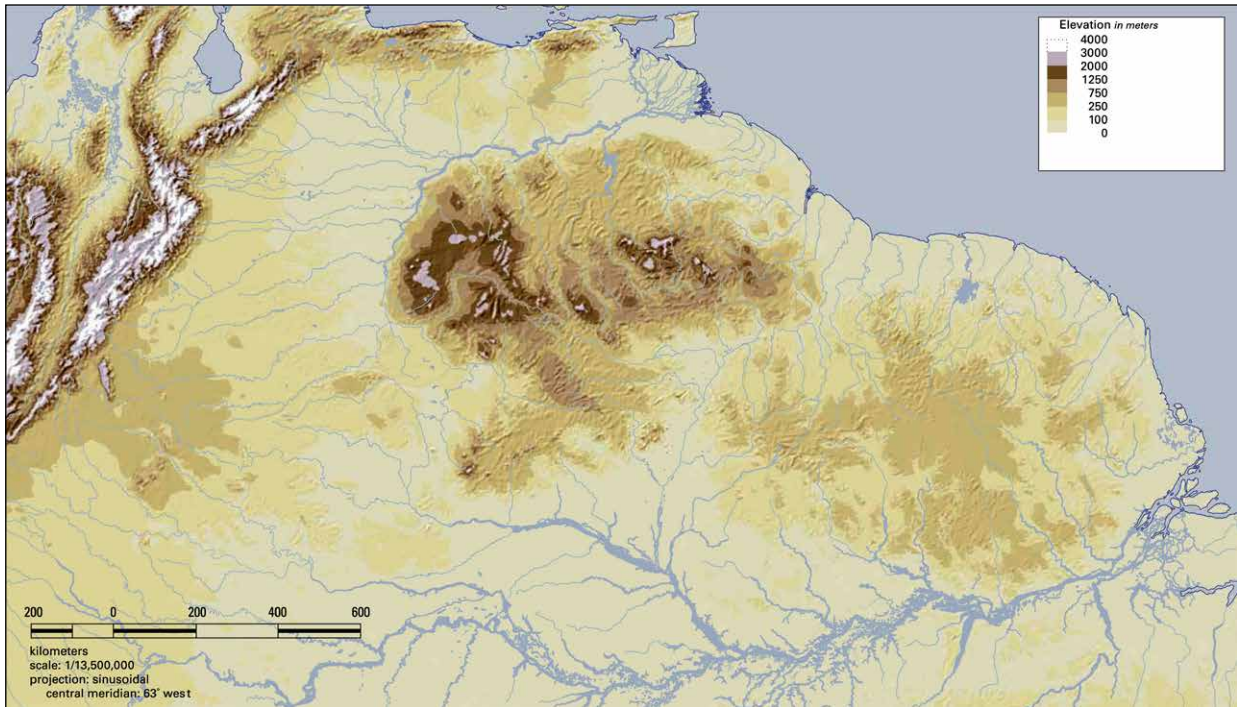


Figure 1.1. A topographic map of the Guiana Plateau (adapted from *Guyana Shield Conservation Priorities 2002 Consensus* 2003:76).

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 implementation 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 preta*, 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

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 legislation 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 applied techniques and methods.

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 introductory 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 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.

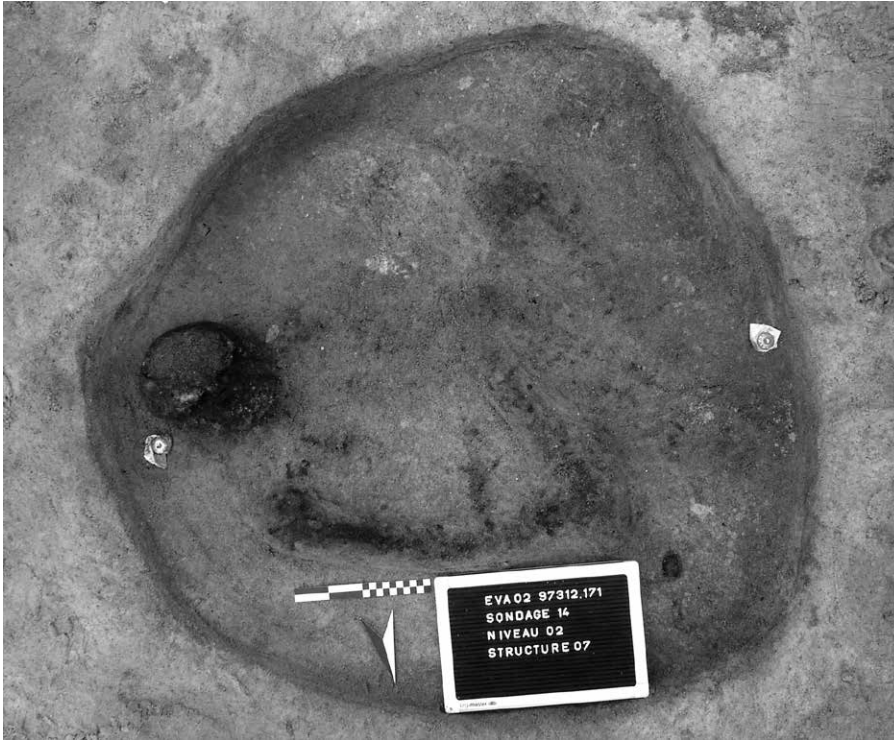


Figure 1.3. The Burial 1 at Eva 2. The shape of the burial pit and the outline of the body are recognisable in the white sand. In general, (human) bones do not survive in a Neotropical climate (photograph by Sandrine Delpech).

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 identified 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 H el ene Balf et 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 (J er ome Briand, personal communication, 2012). Further discordance 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.

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 aesthetic 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.

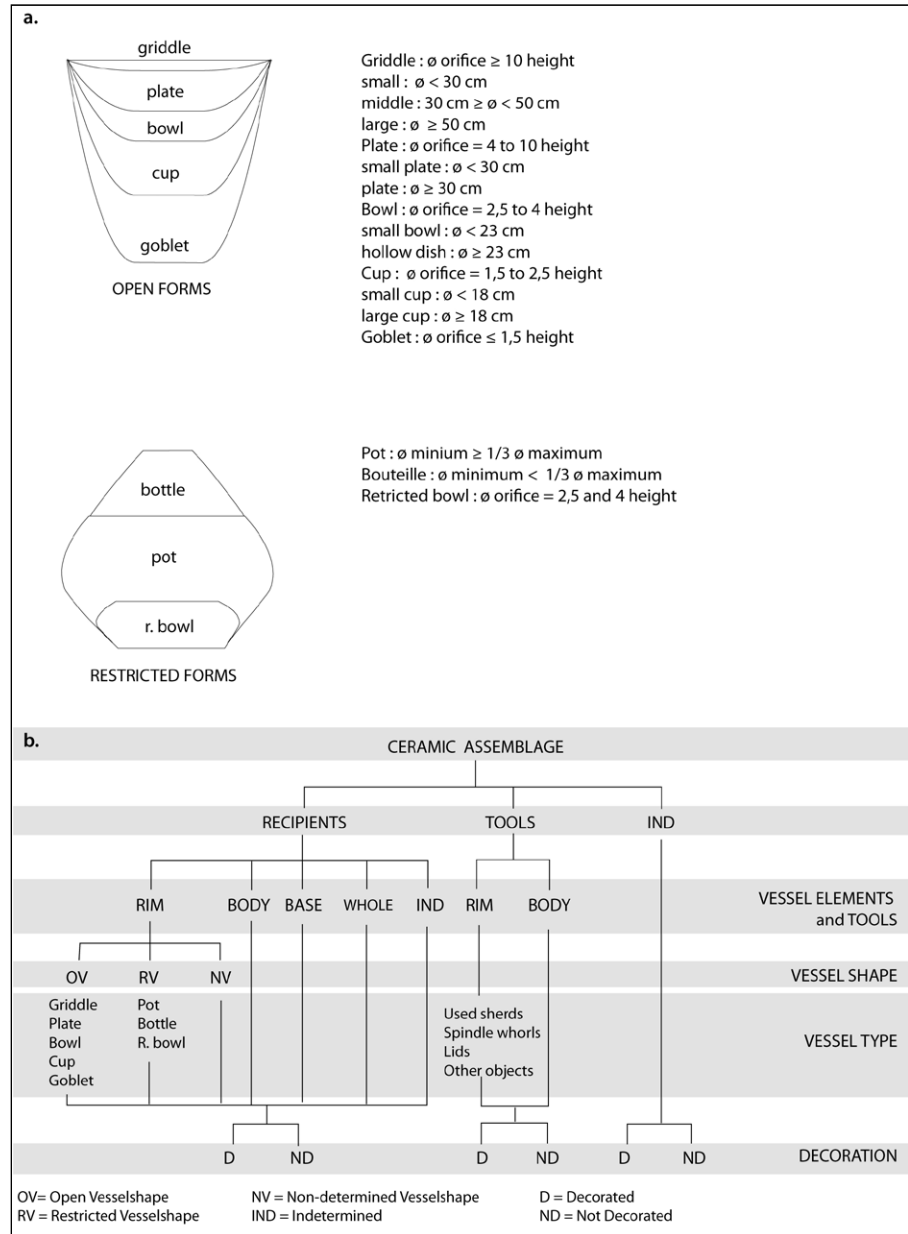


Figure 1.4. (a) The classification of vessel shapes (after Balfet et al. 1989:9), (b) the quantification procedure of a ceramic assemblage (adapted from Bonnissent 2008 ii, Fig. 14).

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; Vredendregt 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.’

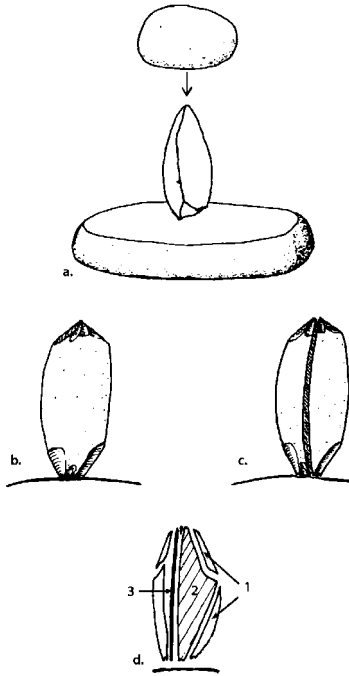


Figure 1.5. Core reduction: (a) the position of the core and direction of the blows, (b) the stabilization scars, (c) the splitting and (d) the products of bipolar reduction, to wit: (1) the marginal bipolar flakes, (2) the bipolar core (*nucléiforme*) and (3) the complete bipolar flake with counter-blow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

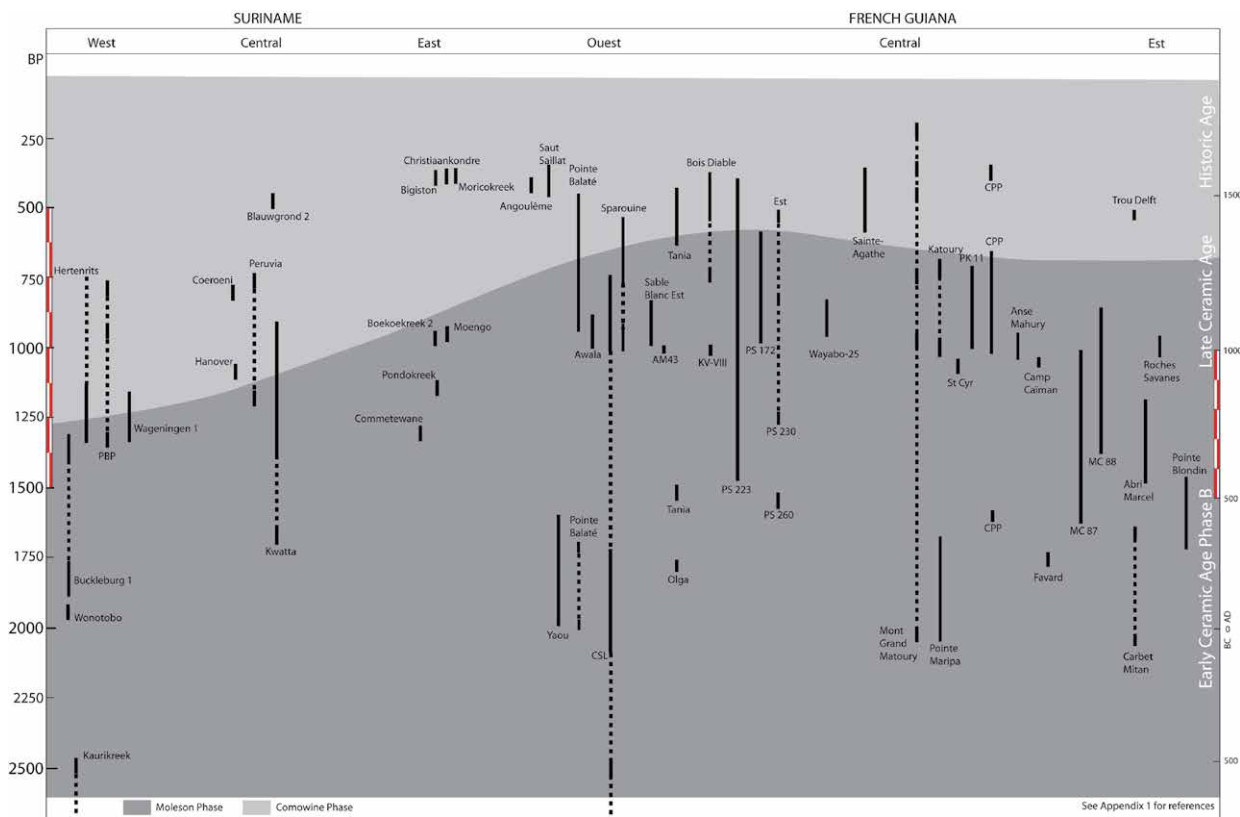
The taxonomic ascription of the recovered starch grains

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 Cruext 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 occurring 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).

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 Orinocoan 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).