THE CAMUTINS CHIEFDOM:

RISE AND DEVELOPMENT OF SOCIAL COMPLEXITY

ON MARAJÓ ISLAND, BRAZILIAN AMAZON

by

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The emergence and development of complex societies in the Amazonian lowlands has been historically debated as a function of the relationships between human populations and the natural environment. Culture ecology on one hand, and historical ecology, on the other hand, have offered different views on cultural development, without providing compelling archaeological testing.

The present study proposes an ecological-economic model to account for the emergence of social complexity on Marajó Island. This model predicts that in areas of abundant aquatic resources, communal cooperation for the construction of river dams and ponds allowed for the development of a highly productive fishing economy with low labor investment. The production of surpluses created opportunities for kin group leaders to compete for the administration of the water-management systems, leading to control over resources and surplus flow. The differential access to resources created social stratification, and the development of a complex religious-ideological system in order to legitimize the political economy. Focusing on one of the Marajoara chiefdoms, a group of 34 mounds located along the Camutins River, the study demonstrates that the location of ceremonial mounds in highly productive areas was related to control over aquaculture systems.

The study suggests that the existence of similar ecological conditions in several other locations on the Island led to the multiplication of small chiefdoms, which, once in place, competed for labor, prestige, and power. Based also on data provided by other researchers, this

study proposes a chronology for the emergence and demise of complex societies on Marajó Island, as well as defining the main periods within Marajoara phase.

FOREWORD

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Finally I would like to dedicate this Dissertation to my father, whose dedication to his own profession, perseverance, and constant motivation for learning have always been a source of inspiration.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION: THE MARAJOARA CHIEFDOM

The emergence and development of social complexity on Marajó Island has historically fascinated scholars interested in the nature and scale of Amazonian societies at the eve of the European contact. This concern has two related agendas, both within the mainstream of the academic debate and among the modern Brazilian society. On one hand, it has implications for the study of other social formations in the area (thus providing comparative material for anthropological studies), as well as for the reconstruction of the history of indigenous peoples, who still struggle for their place in the national society. On the other hand, the study of the development of complex societies in the tropical lowlands represents an important contribution to the debate on the relationship between ecology and human populations, with significant implications for current policies on sustainable development.

While it is not a surprise that Marajoara has received more attention than other archaeological societies in the Brazilian Amazon, only a few archaeological projects have been carried out on the Island. Although significant, previous research has neither provided a comprehensive account of the mechanisms that fueled the emergence of social complexity nor described the sociopolitical institutions created by Marajoara populations to expand throughout the Island and to maintain, for centuries, complex sociopolitical systems.

Regional, administratively autonomous societies, which can be referred to as "simple chiefdoms" emerged and flourished on Marajó Island between A.D. 400 and 1300. Sociopolitical complexity is suggested by regional aggregation of mound sites, site size hierarchy, elaborate ceremonial ceramics, ancestor worship, differential treatment of the dead, and the presence of long distance exchange items. Focusing on one of these societies, the present study demonstrates how landscape management led to forms of economic, symbolic and political control of food resources and people, institutionalizing social hierarchy and inequality. The political economy as described for the Camutins chiefdom is suggested as a model for other Marajoara chiefdoms

yet to be studied. A complete account of the interactions between those chiefdoms, however, although tentatively discussed here in the form of a hypothesis, is beyond the scope of this project.

This study has obvious implications for the investigation of social complexity in the Amazonian lowlands as a whole. It is hoped that the ecological model used to explain the emergence of social complexity on Marajó Island will be tested in other parts of the basin, while taking into account local ecological conditions. Indeed, it is predicted that while landscape management was likely decisive in the intensification of systems of food production, generating surplus and promoting social complexity, different social formations may have emerged elsewhere, due to the variety of ecosystems and ethnic groups present in Amazonia.

Ecological factors have been historically in the center of debate on social complexity in the Amazonian lowlands, and they remain important for the arguments developed here. However, they are seen neither as constraining nor as facilitating the economic exploitation of natural resources. It is argued that the emergence of chiefdoms is the climax of a long-term process of interaction between human populations and their immediate environment. Therefore, the very moment of its formation was possible when population levels and knowledge of the environment made it possible for particular social groups to maximize food production and control optimal ecological areas. It happened despite some of the restrictions, and because of some of the special conditions offered by the natural environment.

This study tested a model that predicts that water control systems for management of aquatic resources triggered the emergence of complex societies. According to this model, small chiefdoms emerged at headwaters of rivers that drain the savanna grasslands, where water-management was necessary to guarantee year round water supplies and to control aquatic resources. This water management system was comprised of a series of interconnected earthworks, such as fishponds, canals, weirs, mounds and causeways. Ceremonial mounds were

identified next to the main reservoirs of fish, implying religious and political control of the subsistence system, surplus flow, and labor. It is proposed that the political and symbolic control over particularly productive resources, however, never entailed chiefs to claim individual property rights nor to constitute themselves into a caste or class that rose economically over the general population. In this sense, the Marajoara chiefdom may find parallels in African kingdoms or in Hawaiian simple chiefdoms, although it is distinctive in its overall constitution; in the relation between its ecological and cultural basis and its political structure.

The data presented here was primarily collected by the author during five years of fieldwork in sites located in the Anajás River basin, center of Marajó Island. Data from other investigations, however, are also included to better reconstruct prehistoric settlement patterns and subsistence strategies.

The Dissertation is organized in eight sections. The following chapter briefly reviews the academic debate on the relationship between ecology and cultural development by focusing on four related topics, such as (1) the occurrence of chiefdoms in Amazonia, (2) the ecological basis for social complexity, (3) the indigenous development of social complexity and (4) the size and permanence of Amazonian settlements. These are the subjects upon which scholars have concentrated most of their disagreements, thus it is important to make different viewpoints clear in order to advance the discussion. In addition, reference is made to recent archaeological research in Amazonia, so as to place the present project within this context and contrast Marajoara to other social formations. A theoretical approach to the study of chiefdoms is delineated, in which the importance of looking for the circumstances and processes behind the emergence of social complexity is highlighted. It is argued that by focusing on the "transcending of local autonomy" (Carneiro 1981: 37), the advent of political centralization at the regional level, and the production and control over surplus flow (Saitta and Keene 1990), the new economic and sociopolitical institutions can be better understood. Finally, an ecological-economic model that

accounts for the emergence of social complexity on Marajó is proposed. According to this model, social complexity emerged on Marajó Island as local kin groups obtained control over the surplus produced by an intensified fishing economy.

Chapter 2 analyzes Marajó Island ecological characteristics focusing on the eastern savannas, where Marajoara phase sites are located. The effects of the climate on soils, vegetation, and resources available for human populations are emphasized. Possible sources of protein and carbohydrates are discussed. Practices of landscape management and food production in place during colonial times and among modern peasant populations (*caboclos*) are examined in order to model prehistoric subsistence strategies. Based on local ecological conditions, current subsistence systems and archaeological data, it is proposed that the location of archaeological sites is consistent with an intensive exploitation of aquatic resources, which is proposed as the economic basis for the development of social complexity.

In the third Chapter, previous archaeological research conducted on Marajó Island is summarized and discussed, pointing to the main research problems that emerged from those projects. Based on earlier data, cultural change and problems related to chronology are debated.

Chapters 4 through 6 include most of the new data produced by research conducted by the author from 1998 to 2002. Research at nine archaeological sites located along the Upper Anajás River was conducted within the scope of a salvage archaeology project, funded by a governmental agency in Brazil from 1998 to 2000. This project gave the author the opportunity to investigate a range of sites that predate, postdate as well as are contemporary to Marajoara societies, thus allowing for the study of a process of long-term cultural change. The description and the main accomplishments of that research are discussed in Chapter 4. Based on the results of the Anajás project and also based on data from previous research, a hypothetical chronology for cultural change is proposed, encompassing the rise and development of social complexity, and the final demise of Marajoara societies.

From 2000 to 2002, financial support from the Earthwatch Institute, University of Pittsburgh, and National Science Foundation made it possible for the author to expand the research, surveying and excavating the Camutins site, comprised of 34 mounds located along a 10-km stretch of the Camutins River, a tributary of the upper Anajás River. Chapter 5 describes and discusses the results of that research in the light of the ecological model offered for the emergence of social complexity in the area. Research carried out in two mounds, which constitute the ceremonial and political core, provides a perspective for the understanding of the political economy. Chapter 6 focuses on the study of material items examining evidence for ceramic production, food processing, ritual, and feasting.

Marajoara iconography as displayed in the ceramics recovered from the Camutins site is discussed in Chapter 7, emphasizing its importance for the understanding of religious symbolism and social boundaries, with implications for the study of the political economy. The existence of corporate descent groups which claim rights to resources is discussed on the basis of funerary patterns and iconography. It is proposed that the segregation of certain pottery styles within the Island, together with archaeological data on regional settlement patterns, is important for the identification of the various chiefdoms. In local settings, the production and ownership of certain objects provide clues on the use of material items for the ideological control over labor and resources, which may have contributed for the permanence and stability of the sociopolitical institutions.

Chapter 8 concludes this study describing the process of cultural evolution on Marajó Island, focusing on the conditions and mechanisms that fueled the emergence of social complexity, describing sociopolitical institutions and hypothesizing about the relationships between the chiefdoms. It is argued that landscape management with consequent maximization of food production by means of an aquaculture system (reservoirs of fish) led to economic and sociopolitical control over optimal ecological areas located along the Camutins River. Symbolic

control over the fisheries, assuring the availability of these resources by ritual, enabled some social groups to claim privileges such as restricted access to prestige items, privileged access to the supernatural world, and access to labor. Accordingly, the availability of food resources would eventually fuel population growth, providing more support in terms of labor for the rising elite.

Although Marajoara political economy was successful in providing resources for the growing population, at the same time reinforcing its symbolic systems of control, the ecological conditions found along the Camutins River were not unique, allowing for the reproduction of similar practices elsewhere on the Island. In the archaeological record, the observed proliferation of similar settlement patterns and dispersion of elaborated material items throughout the Island created at the first glimpse an illusion of a large chiefdom, which, however, lacked an identifiable political center. In fact, the existence of similar ecological conditions in various environments may have encouraged local hierarchical groups to expand and control circumscribed areas, which produced, at the regional level, the appearance of a "heterarchical" (as propose by Roosevelt 1999) type of social organization. The careful examination of one of the Marajoara chiefdoms, however, as this study demonstrates, shows that Marajoara societies were in fact hierarchical, although the structures of power were in many aspects segmented.

This Dissertation provides an account of cultural development on prehistoric Marajó Island, based on archaeological data. Research among surviving indigenous populations have proven useful in providing information on cultural systems and subsistence strategies that are considered when investigating the past. However, the enormous disruption caused by the European domination along the Amazon River, largely documented, sets limits to the inferences that can be drawn from ethnography when applied to precolonial peoples. For this reason the (pre)history of Amazonian populations, as they existed before the European conquest, is still to be written on the basis of independent archaeological data.

Chapter 1

THE ARCHAEOLOGY OF SOCIAL COMPLEXITY IN AMAZONIA

THE ACADEMIC DEBATE

For many decades, the debate on the development of complex societies in Amazonia had to rely on ethnographic analogy and ethnohistorical accounts, due to either the lack or the inadequacy of the archaeological data. The origin and in many instances the very existence of complex societies over most of the tropical forest have also been under dispute. Departing from the fact that those societies were only described ethnohistorically, and considering all the bias embedded in 16th and 17th century reports, scholars were left with little option but to put together bits of information gathered from different sources and, inspired by artifact assemblages, try to reconstruct aboriginal life. These reconstructions frequently resulted in descriptions of social formations that were frozen in time, which could not provide an account of processes of long-term cultural change, only possible through archaeological research (Drennan 1992).

Attempts to synthesize Amazonian culture history and hypothesize the evolution of its social systems were made mainly by Donald Lathrap (1970b; 1972; 1973; 1985), Robert Carneiro (1970a; 1970b; 1981; 1995), Betty Meggers (1985a; 1988; 1992b; Meggers and Evans 1957) and Anna Roosevelt (1980; 1987; 1991a; 1991b), fueling a long-standing academic debate that has been extensively discussed and summarized in several other publications (Carneiro 2000; Gomes 2002; Heckenberger 1996; Neves 1998; Roosevelt 1980; Viveiros de Castro 1996). The polemic has been supported by ethnological, ethnohistorical, ecological, and archaeological data. Some of the models that were produced have also been tested with archaeological data (DeBoer, et al. 1996; Evans and Meggers 1968; Heckenberger 1996; Heckenberger, et al. 2003; Lima 2003; Meggers 1982, 1985b, 1994a; Meggers and Danon 1988; Roosevelt 1980, 1991b, 1999; Simões 1977). Rather than revisiting that debate in detail, this chapter will present a summary of the

main issues related to the study of origin and development of social complexity in Amazonia, as well as a discussion on their relevance in generating hypothesis for future work.

Scholars have historically focused on dichotomous positions over topics such as: (1) the occurrence of chiefdoms in the Amazon basin; (2) the ecological basis for the development of social complexity; (3) the possibility of indigenous development of social complexity; and (4) the size and permanence of Amazonian settlements. Although interconnected, these issues will be separately discussed and reviewed in some detail below.

The Occurrence of Chiefdoms in Amazonia

Ethnohistorical accounts suggest the existence of chiefdom societies in several locations in the Amazon River basin at the time of the European contact (Acuña 1859; Carneiro 1970a; Carvajal 1934; Porro 1992, 1994; Whitehead 1994). Aparia, Omágua, Manao, Aisuari, Yurimaguas, Tapajós and Conduris provinces, located from the Lower Napo to the Mouth of the Tapajós River exhibited most of the traits compatible with social complexity: dense settlements, settlement hierarchy and central place, geographical boundaries coincident with political jurisdiction of a principal or *cacique*, specialization, trade, and surplus production (Porro 1994). Although most scholars tend to consider the 16th and 17th century reports as credible in indicating considerable differences in social organization between ethnohistorical and ethnographic societies, Meggers (1995a) argues, based on several inconsistencies of the sources, as well as on the absence of archaeological evidence, that the ethnohistorical observations are unreliable.

In fact, to date, there is no archaeological data to support the existence of chiefdoms in all the areas mentioned by the chronicles. Archaeological research, however, undertaken on the seasonally inundated savannas of Marajó Island (Meggers and Evans 1957; Roosevelt 1991b; Schaan 2001b, 2002) and in the Bolivian Llanos de Mojos (Erickson 1980, 2000, 2001) demonstrated the existence of earthworks and landscape management, which, together with other

traits, suggest the existence of complex, regionally organized societies. Although scholars may not totally agree on the origin and nature of social complexity in these two areas, the existence of chiefdoms there is not contested.

On the other hand, recent investigations on upland areas (Upper Xingu River and Upper Rio Negro), as well as in an area located at the confluence of the Solimões and Negro Rivers, west of Manaus, have identified large, dense settlements, associated with earthworks and several features indicating landscape management (Heckenberger 1996; Heckenberger, et al. 2003; Lima, et al. 2003; Machado 2003; Neves 2003). Nevertheless, the authors have been cautious in calling those societies chiefdoms, due to the lack of a central place (Heckenberger 1996) or insufficient data on regional settlement patterns and investigation of possible political centers (Neves, Pers. Communication 2003). Complex societies in Amazonia, therefore, although widely debated, have been insufficiently described and studied.

Ecological Basis for the Development of Social Complexity

Limitations to Cultural Evolution: The Tropical Forest Tribes

Understanding that cultural evolution was limited by ecological factors and that ethnographic societies represented successful adaptation to Amazonian ecology, Steward (1948b) believed that social complexity would never evolve in the tropical forest environment. According to the description that Robert Lowie provided of the tropical forest tribes in the introduction of the Handbook of South American Indians (Steward 1948b:1-56), the lowland tropical forest had the largest number of simple, semi-sedentary societies, characterized by the "swidden cultivation of bitter manioc, mastery in navigation, use of hammocks, and manufacture of pottery". These cultural traits were described in terms of ecological adaptation to an environment where intensive cultivation of seed crops was not possible and protein had to be obtained from limited wild animal resources. In this sense, the tropical forest tribes were mostly defined in contrast to other

social formations that displayed more advanced technology and more developed subsistence systems, such as the Andean civilizations.

Between these two cultural types (tribal and state societies) on this scale of cultural evolution, Steward (1948a) accounted for an intermediate stage, represented by the Circum-Caribbean tribes, which he described as chiefdom societies, although not using the term at that time (Carneiro 1981: 40). Steward acknowledged that riverine populations in the Amazon Basin tended to be larger than the ones in the interfluves, due to the concentration of resources and ease of navigation along the major rivers. However, he did not see that as an ecological advantage powerful enough to trigger change in subsistence systems and to promote cultural evolution. The evidence for social complexity in the Bolivian lowlands was incorporated in the model by the adoption of a diffusionist explanation (Steward and Faron 1959). Therefore, the authors admitted that complex societies could have reached the tropical forest, but would not find there adequate conditions to maintain their original economies (Steward 1948). This type of situation would cause a decrease in social complexity through time.

Carrying Capacity and Climate Change as Limiting Factors

Evaluating ecological factors as well as the subsistence systems developed by ethnographic indigenous populations, Meggers uses, as does Steward, an independent assessment of the carrying capacity of Amazonian ecosystems in determining levels of cultural development. Meggers evaluates carrying capacity by verifying levels of productivity obtained by indigenous subsistence systems, vis-à-vis the drawbacks caused by fluctuations of rainfall, climatic change and consequent changes of vegetation and availability of resources (Meggers 1992b). Arguing that the ability of developing intensive agricultural systems was handicapped by ecological factors, Meggers proposed that the level of cultural development attained by present indigenous populations would represent the best adaptation possible to the tropical environment. She points

out that in the *várzea* (the major river's floodplains) populations could be larger and settle more permanently than in *terra firme* (upland areas, not subjected to seasonal inundations) (Meggers 1971). Populations in the *várzea* would exhibit differential features such as more complex ceramic styles with greater diversification in vessel shapes.

Even so, Meggers was impressed by the uniformity of cultural features over the whole Amazon region, despite differences in soils and resource availability (Meggers 1995a:107). She explains that, besides the limitations offered by the tropical soils, the catastrophic impacts of periodic droughts caused by the El Niño Southern Oscillation (ENSO) could have shaped settlement behavior, subsistence strategies, exchange patterns, and risk avoidance practices that are still observable in present-day populations (Meggers 1985a, 1994a, 1995a, c; Meggers and Danon 1988). Again following Steward, Meggers (Meggers 2001b; Meggers and Evans 1957) has used diffusion as an explanation for the appearance of Marajoara phase, an anomalous culture on Marajó Island, which is assumed to have its origins in the Andean highlands.

More recently, puzzled by the unexpected endurance of social complexity on Marajó, Meggers (2001b) has proposed that intensive exploitation of palm starch might have constituted a reliable source of calories for aboriginal inhabitants. Due to the absence of intensive agriculture that in other parts of the world have sustained dense and sedentary populations, Meggers turns to wild food resources as a possible explanation. Although palm starch may have been important, this economy could not explain (and Meggers does not intend it to) the rise of social complexity, but only account for a somewhat steady food source during the long term span of Marajoara existence.

Although Meggers and her colleagues have, for over half a century, insisted on the limitations that nutrient-poor soils and periodic climate changes have posed to the development of intensive and reliable subsistence systems, their researches have been criticized in many aspects. For example, scholars have offered evidence of important ecological diversity in the lowlands,

initially relying on a *várzea/ terra-firme* dichotomy (Carneiro 1961, 1970a; Gross 1975; Lathrap 1970b, 1973; Meggers 1971, 1992d, 1994b; Roosevelt 1980, 1989), but later showing how different habitats both in the *várzea* and *terra-firme* areas could allow for diverse subsistence systems with contrasting levels of productivity, questioning the previously assumed superiority of the várzea (Carneiro 1961; Denevan 2001; Heckenberger 1998; Morán 1995). More importantly, scholars have become suspicious of analyses of carrying capacity and assessment of productivity of environments that do not account for techniques of management of soils and strategies of risk minimization that prehistoric populations may have employed (Denevan 1966, 2001; Smith 1980, 1995, 2001). Critiques of Meggers' model, however, have come from different fields and cannot be grouped together, because they display different assessments of Amazonian environments, as well as different views on human adaptation and cultural development.

The Tropical Forest as Locus for Innovation

Lathrap's contribution was unique in combining ideas of ecological adaptation with diffusion of ceramic styles and languages. He suggested that the origins of the New World agriculture and ceramic styles were to be sought in the tropical forest, influencing a whole generation of archaeologists. Lathrap (1977) believed that domestication of wild plants in the New World began in the Amazonian lowlands, and that the cultivation of bitter manioc and other minor plants, together with wild food resources constituted the indispensable subsistence basis for the development and spread of Amazonian cultures. He drew important distinctions between the riverine and forest habitats, stating that along the floodplains agriculture would be more efficient, attracting more population and generating conflict. Lathrap envisioned that resulting population pressure and warfare would lead to the dispersion of cultural groups away from a center of origin, replicating the same subsistence systems when available and suitable land was found.

Lathrap was much more concerned with the spread of subsistence systems, technology and ideas than with the development of sociopolitical systems. For this reason, he failed to contribute to our understanding of the eventual rise of social complexity (Roosevelt 1980: 48-49). Although his model was inefficient in explaining sociocultural change, Lathrap's ability in providing original explanations for the spread of ceramic styles and distribution of languages in the Amazon has been appealing to a number of scholars who eventually expanded his work to other areas and/or sought to test his hypothesis (see, for example, Brochado 1980, 1984; Lima 2003; Neves 1998; Noelli 1996).

Productivity of Amazonian Subsistence Systems

Studying practices of manioc cultivation among the Kuikuro populations of the upper Xingu River, Carneiro (1961) pointed out that slash-and-burn agriculture could support dense, sedentary societies, challenging Steward's and Meggers' evaluations of the productivity of subsistence strategies practiced by ethnographic societies. According to Carneiro (1960), manioc cultivation could make sedentism possible for *terra-firme* villages inhabited by a population of up to 2,000 persons. This economy could be supplemented by fish and game. Especially along the floodplains, he points out that the availability of fish and riverine mammals could provide all the protein that is necessary and could not be obtained from manioc products. In fact, Carneiro (1970b: 245) emphasizes that the abundance of aquatic resources would allow riverine peoples to "become more sedentary, embrace agriculture more fully, and develop larger villages". For him, the *várzea* was an ecologically desirable area due to the availability of aquatic resources, not because of agriculture. Due to the unpredictable range and timing of the seasonal flooding, he argues, agriculture there would be uncertain and risky (Carneiro 1995).

In challenging Meggers (1954) evaluation of the carrying capacity of Amazonian subsistence systems, Carneiro (1960; 1995), nevertheless, does not deny the importance of

ecological factors in shaping social evolution. His model for the development of chiefdoms considers ecological factors (such as productive land, geographical circumscription, competition over resources) as necessary conditions in the process that lead to social stratification (Carneiro 1970a, 1998). However, warfare, and not control over the economy, is seen as the critical mechanism for the emergence of permanent leaders.

Agricultural Potential and Maize Cultivation

Roosevelt (1980, 1987) also emphasized the importance of ecological factors in the development of chiefdoms, defending the hypothesis that intensive cultivation of maize could have generated surplus to support social stratification both in the Amazon and Orinoco Basins. She endorses Meggers' characterization of *terra-firme* as unproductive, and agrees that manioc, the ethnographic crop, would not have sustained dense, sedentary, and regionally organized societies (Roosevelt 1980: 251). Roosevelt proposed that ideal conditions would exist in the Amazon inundated *várzeas*, where she identifies rich alluvial soils, a requirement for the development of highly productive agriculture, as long as maize was incorporated into the subsistence pattern. The emergence of chiefdoms, then, would result from the establishment of the new subsistence system and the need for its management (ibid: 253).

Roosevelt considers Marajó Island as part of the lower Amazon *várzea*. Accordingly, its inundated *campo* (considered floodplain) would have highly fertile, nutrient-rich soils (Roosevelt 1991b: 8-11, 404), a perfect scenario for agriculture intensification and chiefdom formation. Contrary to her initial expectations, however, Roosevelt was faced with the lack of evidence for intensive maize cultivation in an in-depth archaeological investigation of a Marajoara mound. She concluded that maize, if cultivated, was only an "accessory crop, perhaps used for making beer for ceremonies" (ibid.: 377). The data suggested that "Marajoara subsistence was based on

annual cropping of seed crops, plant collection, and intensive seasonal fishing" (ibid.: 405), a diet "supplemented by tree fruits and seeds and occasional game" (ibid.: 26).

The work on Marajó led Roosevelt to review her model of chiefdom formation, at the same time that new data on subsistence systems motivated her to reexamine aspects of Marajoara sociopolitical organization. In a 1999 article entitled "The Development of Prehistoric Complex Societies: Amazonia, a Tropical Forest", Roosevelt criticizes what she calls ecological and functionalist approaches, apparently revisiting her positions in "Parmana" (1980) and "Moundbuilders of the Amazon" (1991b). In doing so, she states that, contrary to ecological models that see environment limiting the development of complex cultural systems, different subsistence systems relate to different forms of sociopolitical organization. For example, since Marajoara subsistence systems were characterized by a mix of cultivation and foraging, and the archaeological record did not attest to settlement hierarchy and evident political center, the society was not hierarchical and centralized. As a consequence, Roosevelt believes that the concept of heterarchy (Crumley and Marquardt 1990) would be more adequate to describe the Marajoara sociopolitical system. Crumley (1995) defines heterarchy as flexible relations between elements that can be unranked or potentially ranked in different ways, depending on the temporal and spatial dimensions of the analysis. According to Roosevelt (1999: 15-16), a heterarchical system would account for the indicators of social complexity exhibit by Marajoara society, such as specialized production, fine art, public works and ritual facilities.

On the basis of that argument lies the idea that the development of centralized, hierarchical social systems depends on a subsistence basis that supports a tributary economy (such as maize cultivation), which would be absent on Marajó. Accordingly, a mixed foraging-horticulture economy could not generate social stratification and centralization, then providing the basis for a heterarchical sociopolitical system (Roosevelt 1999: 28). In contrast, her data on

the Tapajós chiefdom (Santarém), not yet published, would attest to intensive maize cultivation and the development of a warfare oriented, centralized chiefdom.

In considering intensive agriculture as a necessary requirement for chiefdom emergence, Roosevelt downplays the importance of the intensive fishing economy she herself identified on Marajó as a possible economic basis for surplus production, competition, population growth, and rise of centralized sociopolitical systems. Moreover, her heterarchical model ignores the type of variability existent between Marajoara phase sites, which previous research (Hilbert 1952; Meggers and Evans 1957; Simões 1967; Simões and Figueiredo 1965) had already demonstrated were part of hierarchical settlement systems.

The Historical Ecology Critique

A more recent critique to ecological determinism comes from the field of historical ecology and is embraced by a number of archaeologists and ethnologists. In fact the critique in itself is not new, since William Denevan and Nigel Smith have long questioned the "carrying capacity" approach, as well as independent evaluations of ecological factors, arguing that human societies can consciously improve soils and change the landscape (Denevan 1966; 2001; Smith 1980, 1995, 2001). According to this view, which can be considered a paradigm shift in Amazonian studies, indigenous societies transformed their immediate environments, overcoming ecological factors in a variety of ways. The very concept of "nature" is challenged, when part of the biodiversity and geographical features are taken as created by human action (Balée 1989a, 1993; Denevan and Zucchi 1978; Erickson 1980, 2000). This paradigm shift calls for the review of the ecological adaptation approach, according to which culture and environment are seen as two independent variables.

As a pioneer in this approach in Amazonia, Denevan (1966; 2001:301) specifically challenges Meggers' concept of carrying capacity, considering that it does not take into account human action in controlling variables such as land boundaries, work time, and standards of living. He argues that in using available technology, and managing labor, energy and resources, human populations can increase productivity and overcome environmental limitations. One example of that are the highly fertile Amazonian dark soils (*terra preta*), found consistently associated with prehistoric settlements (Denevan 2001; Kern and Kampf 1989; Lehmann, et al. 2003; Neves, et al. 2003; Smith 1980; Sombroek 1966; Woods, et al. 2000).

The fact that indigenous practices that produced the *terra preta* soils are missing among present populations would attest to different strategies for cultivation. Denevan suggests that Amazonian populations might have built raised fields, modified the landscape, improved soils, and managed natural resources in a variety of ways in order to maximize food production. Following this view, a number of scholars have contributed with data on vegetation and animal resource management, landscape modifications, as well as emphasizing the variability and specificities of lowland ecosystems (Balée 1993; Morán 1995; Politis 2001; Posey 1985; Posey and Balée 1989; Smith 2001, 2002).

The Need for Archaeological Testing

Although Meggers views on the carrying capacity of the tropical forest have been repeatedly criticized by geographers, ethnobiologists, ethnologists and anthropologists, her appraisal of Amazonian subsistence systems, as well as her analysis on the effects of ecology and climate in social systems in the long-term still needs to be evaluated by means of archaeological research. While Carneiro has challenged Meggers' assessment of the productivity of the aboriginal subsistence systems in their capacity to generate surplus, we still do not have an accurate archaeological description of just how complex prehistoric societies were. Meggers and

her colleagues from the National Research Program for the Archaeology of the Amazon Basin (PRONAPABA) have provided archeological data that would empirically support their views, but the suitability of that data to test the model has also been under dispute (this is discussed later in this chapter).

In the evolution of the debate on the relations between ecology and cultural development, Amazonian scholars have at times polarized the discussion over simplistic arguments that have overemphasized either the limitations imposed by the soils and climate or the unlikely abundance of means and resources. The contributions from the fields of human ecology, human geography, ethnoecology, and ethnoarchaeology have brought awareness of the diversity of the Amazonian ecosystems and the diversity of strategies employed by human populations for overcoming the ecological and climatic limitations.

Recognizing that human populations actively changed the landscape and manipulated useful plants does not invalidate the fact that ecological surroundings do set limits to human choices. It is not prudent to exchange environmental determinism with unlimited human agency. As archaeological research advances, it will become clearer that indigenous populations interacted in creative ways with various ecological settings, elaborating a number of different responses to limitations and taking advantage of favorable conditions for exploitation of natural resources in selected areas. While the various points of views and arguments reviewed above represent an essential debate, it is imperative to consider that any model that evaluates the emergence and development of complex social formations must still be evaluated through archaeological research.

Indigenous Development of Social Complexity

Lathrap was an advocate of the primacy of the cultural development in the Amazon basin, in overt opposition to several scholars who believed that the tropical forest was, conversely, the

receptacle for innovations. He suggested that the origin of the Chavín and Olmec-Maya culture could be found in the tropical lowlands, based initially on stylistic and iconographic analysis, but also implying that the tropical forest contained a "mother culture" whose "economic, technological and religious patterns" were at the basis of cultural developments elsewhere (Lathrap 1970a, 1973).

Different from Steward and Meggers, Lathrap's concept of tropical forest culture took adaptation as a successful historical accomplishment of tropical forest societies, which developed an agricultural technology in tune with the ecological and botanical diversity (Raymond 1994). Lathrap believed that it was along the floodplains of the major rivers that fishing and agricultural people attained cultural complexity. Population pressure in these areas caused periodic migrations and diffusion of cultural innovations. In his model he seeks to explain the distribution of ceramic styles as waves of Arawak, Carib and Tupi groups expanded throughout the region. It is along the Amazon, that Lathrap (1970b) identifies the subsistence foundation for the rise of social complexity.

Lathrap's hypotheses were in part proven correct with the discovery of early pottery in the Lower Amazon, (Roosevelt, et al. 1991), even though multiple centers of pottery invention are certainly possible. Although complex societies were a late development in the Amazonian lowlands, compared to other areas, most scholars agree that chiefdoms developed independently in the Amazon Basin (Carneiro n.d.; Lathrap 1970b; Roosevelt 1987). An opposite view is that complex societies originated elsewhere, and diffused into the Amazon lowlands (Meggers and Evans 1957, 1973). Meggers arguments are ecological in essence, as outlined in the previous section. She feels that complex societies could not develop based on the technological level and ecological factors imposed by the tropical forest environment.

The understanding of the chiefdom formation as a process of sociopolitical evolution implies that a "chiefdom must grow in place" (Carneiro n.d.: 41). In fact, in most studies

archaeologists have constructed cultural sequences in which chiefdoms evolved from previous social formations (Steponaitis 1991: 194). Although this appears to be the most obvious process, the connections between the chiefdoms and earlier societies in Amazonia have to be demonstrated by the analysis of archaeological data.

Size and Permanence of Amazonian Settlements

The academic debate over settlement patterns of aboriginal societies has been related to the limited agricultural potential of Amazonian soils. Most scholars would agree that the majority of Amazonian soils are, in fact, nutrient poor, therefore limiting agricultural practices. The cultivation of several varieties of bitter manioc and other plants, as Lathrap (1977) and Carneiro (n.d.:54) have demonstrated, was the indigenous response to these limitations, together with the intensive exploitation of aquatic resources and generalized collection of wild food (Carneiro 1961, n.d.; Erickson 2000, 2001). Ethnographic societies display subsistence practices that are thought to have developed in prehistoric times. It is necessary to ask, however, whether that was the dominant subsistence strategy developed in the past, and whether present settlement behaviors are in fact correlated to aboriginal subsistence systems or are the result of the European colonization process.

Present indigenous populations switch cultivated fields regularly, reportedly due to soil exhaustion (Meggers 1971). This pattern is reported as causing repeated episodes of village relocation. Meggers argues that interruption in seriated sequences of pottery types, observed in archaeological assemblages, can only be explained by similar behavior (Meggers 2001a). Although acknowledging that present indigenous populations have suffered the effects of the colonization process, she feels that their overall settlement patterns and subsistence strategies mirror those of aboriginal communities (Meggers 1985a, 1992b, 1995a, 1996).

Meggers and Evans' survey of the mouth of the Amazon and subsequent research carried out by Brazilian scholars in various parts of the basin (Meggers and Evans 1957; Simões 1977) aimed at confirming the model, obtaining data that consisted of measuring the extent and depth of the archaeological deposits and collecting pottery samples from stratigraphic test-pits and site surfaces. According to Meggers, the seriated sequences of pottery types shows interruptions even within sites, and comparison among sites in the same area shows discontinuities that account for abandonment and reoccupation of settlements, often by the same groups (Meggers 1985b, 1995a, 2001a). Large sites are interpreted as multiple episodes of reoccupation. Concentration of sites in a region may then cause the illusion of density, thus obscuring the fact that they were not all contemporaneous. Typical sites would have two or three houses, but most of the sites would only have one communal house. Therefore, according to Meggers (1995a) population levels were low and in accordance with carrying capacity.

Several scholars have disputed Meggers' methods of archaeological investigation as well as the interpretation of the archaeological data that is presented to confirm her model. It is argued that the published data lacks an analysis of the internal variability and complexity of the cultural deposits, where only seriated sequences are shown, while detailed maps, stratigraphic profiles, radiocarbon dates and other associated features are missing (Heckenberger 1996: 18). In fact, although excavators frequently recorded in their field notes and preliminary reports observations on stratigraphy and cultural features, those observations were not further evaluated or published (Schaan 2001e).

Warren DeBoer, Keith Kintigh and Arthur Rostoker (DeBoer, et al. 1996) argue that the quantitative method of ceramic seriation used by Meggers is ambiguous and can be challenged by ethnoarchaeological data. According to their experiments, contemporary ceramic assemblages may contain variability of the type proposed by Meggers' seriation sequences and erroneously interpreted as chronological variation. DeBoer and his colleagues (ibid) feel that the ceramic

seriation cannot unequivocally prove that large sites represent episodes of reoccupation before the complexity of the site formation process is better understood.

Wüst and Barreto (1999) argue that the societies of Central Brazil, which occupied areas with even poorer soils than those in *várzea* and *terra-firme*, had developed large and relatively dense communities, and that their relocation (in general over short distances) do not relate to soil depletion but to cultural factors and warfare. Carneiro (1961) discusses other factors that might be involved in settlement relocation, such as estimation of the costs of building new houses versus walking longer distances in order to cultivate a new plot. Denevan (2003) argues that the effort involved in cleaning plots using stone axes would be a factor favoring continuous cultivation of the same plots, by investing more time in weeding and developing techniques for soil improvement, for example. According to Denevan, semi-intensive agricultural practices could explain the large prehistoric settlements found in several areas of the Amazon. With the adoption of steel axes, during the historical period, however, settlement behavior would have changed, since the ease of clearing fields would make settlement movement less costly (ibid.).

Frechione (1990) shows how changing settlement behavior among an indigenous community could be explained by a combination of factors such as availability of resources, defensive strategies, and human choice. He proposes that other factors being equal, small settlements would be preferred. Therefore, the reasons behind population aggregation in large sites would have to be explained, rather than assumed as logical behavior.

Archaeological research in the upper Xingu River was designed to demonstrate that prehistoric populations were denser and more permanently settled than ethnographic societies. Archaeological data in that area shows that aboriginal societies (dated to A.D. 1200 - 1600) constructed bridges, roads, plazas, river obstructions and ponds, as well as earthen defensive structures, intentionally managing the landscape (Heckenberger, et al. 2003). In the study area, large villages would have had an estimated population of 2,500 to 5,000 people, placing

population density figures around 6 to 12.5 persons per square kilometer (ibid.:1711). This is considerably higher than the average density of 0.3 person per square kilometer suggested by Meggers (1992b: 203) for the whole basin.

The size and permanence of Amazonian settlements was recently debated in Latin American Antiquity (Barreto 1992a; DeBoer, et al. 1996, 2001; Heckenberger, et al. 1999, 2001; Meggers 2001a), and remains one of the main problems being presently investigated both in the Central Amazon and in the Upper Xingu River regions. Although Meggers methods and arguments have been challenged and refuted by scholars working in the area, data showing long sequences of occupation of the same areas have not unequivocally demonstrated that her conclusions are all together unacceptable. Detailed analysis of long sequences of cultural development, accompanied by radiocarbon dates, are still necessary for an adequate assessment of ancient settlement patterns. Due to the variety of ecosystems present in Amazonia and different cultural trajectories followed by the hundreds of ethnic groups that occupied the area, it is plausible to assume that large and small, permanent and impermanent sites, and a wide range of variation in terms of complexity of settlements will be identified.

Recent Archaeological Research

Recent archaeological research in Amazonia, conducted by Brazilian scholars and graduate students, has differed methodologically from the earlier culture history approach, while being mainly exploratory-inductive in scope (see also Politis 2003). Prehistoric settlements are still mostly described in terms of their ceramic contents, which are classified either in relation to the ceramic complexes described by Lathrap (1970b) or to the phases and traditions established under the PRONAPABA, which dominated the archaeological research in the area from the 1960s to the 1980s. Nevertheless, they have contributed with a significant body of data to our knowledge on the aboriginal occupation, incorporating a more descriptive analysis of

stratigraphic structures, as well as conducting specialized analysis of soils, human remains, botanical remains, and artifacts, which were absent in earlier research. There is the concern of exploring the data quantitatively and qualitatively, making use of geophysical surveys, bioanthropology, geochemical analysis, and working together with interdisciplinary teams. This new development in Amazonian archaeology is represented in eastern Amazonia by the research conducted by scholars associated with the Museu Paraense Emílio Goeldi, in Belém (especially within CRM projects that are in high demand), as well as by the work in the central Amazon coordinated by Eduardo Neves, professor of the Museu de Arqueologia e Etnologia of the Universidade de São Paulo.

The *Amazonia Central* project, which since 1995 has investigated prehistoric settlements in an area limited on the east by the confluence of the Solimões and Negro Rivers, near the city of Manaus, has identified pre-ceramic occupations that may date back to 7,000 B.P., as well as ceramic occupations dated from 2,000 to 500 B.P. (Lima, et al. 2003). In this research area, sites found in *terra firme* are smaller compared to those in the *várzea*; here, by A.D. 1, large areas of *terra preta* soils, representing consistent accumulation of biological debris have been identified. The formation of these soils is usually associated with dense populations, change in subsistence patterns, and possibly intentional soil management (McCann and Woods 2000; Neves, et al. 2003; Petersen, et al. 2001). At about 900 A.D. the excavators identified the onset of social complexity, when in the Açutuba site, Guarita polychrome pottery was associated with the construction of excavated ditches, as well as earthen mounds built on top of primary and secondary burials (Heckenberger, et al. 1999; Machado 2003).

The Guarita ceramics in the area are mainly represented by funerary and ceremonial vessels, being contemporary to other stylistically similar polychrome complexes, such as Zebu (Colombia), Napo (Ecuador) and Caimito (Peru), dated between A.D. 1000 and 1500 (Heckenberger, et al. 1998). In this research area, the larger sites in the *várzea* appear to relate to

smaller upland sites, which the researchers suggest may represent population growth and control of two different ecosystems by the same social groups (Lima, et al. 2003). In this context, larger sites with burial structures may represent political and ceremonial centers. The regional societies in the Manaus area, although not extensively investigated, developed about 500 years later than the Marajó Island chiefdoms. The causes for their late development, as well as the processes behind their emergence are not yet understood.

In northern Amazonia, in the Maracá River basin, Vera Guapindaia (2001) has studied cemeteries containing unburied anthropomorphic funerary urns inside of caves and natural rock formations. These cemeteries contain both female and male individuals, with few or no personal items, indicating the absence of both wealth and marked gender differentiation. The habitation sites are located far apart and have not been extensively investigated to date. Although the analysis of bioanthropological aspects has been done (Mendonça de Souza, et al. 2001), there is not yet a report on social organization and subsistence systems. The location of the cemeteries in far-reach areas may be related rather to protection of the deceased than with claims over resources, although this hypothesis has not been investigated. The Maracá society was partially contemporary to the European occupation, thus representing a later development at the mouth of the Amazon River.

Complex societies emerged in Amazonia at different periods in time and in response to different cultural and environmental circumstances. Although most of the research is still exploratory, since archaeologists have taken advantage of contract archaeology projects to explore areas where little or no research existed (Edithe Pereira, personal communication 2004), the research that has developed in the area in the last few years represents an advance towards a better understanding of the prehistoric occupation of Amazonia.

INVESTIGATING CHIEFDOMS IN AMAZONIA

> "The most significant factor about chiefdoms … is that they represent the first transcending of local autonomy in human history. With chiefdoms, multicommunity political units emerged for the first time" (Carneiro 1981: 37).

The Emergence of the Regional Polity

A quick look on the specialized literature reveals that "chiefdom" is used today more as an umbrella concept than as a descriptive category aimed at defining a particular social formation. In this sense, after Karlevo Oberg's (1973 [1955]: 206) definition of "politically organized chiefdoms", scholars have used the term to name societies that exhibit a regional organization, subsuming a number of political units under some sort of centralized, permanent rule (Carneiro 1981, 1998; Spencer 1987). This minimal concept, however, based exclusively on political features, has not passed without some scrutiny. In fact, it has been criticized for its emphasis on hierarchy and an unilateralist "chiefship" (McIntosh 1999: 2), argued as being inadequate to account for a variety of complex, but not centralized or hierarchical social formations (Crumley 1995; Ehrenreich, et al. 1995; but see Brumfiel 1995 for a critique). Nonetheless, especially in Amazonia, the term is useful to characterize regional, hierarchical societies reported by ethnohistorical chroniclers, as well as to make sense of archaeological indications of conspicuous settlement hierarchy and rank distinctions. As it has been observed, defining chiefdoms may not be a productive endeavor, but recognizing them is a good starting point (Drennan 1995a; Drennan and Uribe 1987b).

Identifying such a society, however, is not as important as being able to explain how such a novel sociopolitical system developed out of relatively independent, politically autonomous, and apparently egalitarian societies (Carneiro 1981, 1998; Drennan 1992; Renfrew 1984). This

"transcending of local autonomy" is a historical novelty that happened over and over in many parts of the world (Carneiro 1981:37; 1998), and has been extensively debated from the point of view of the emergence of chiefdoms and the political institutions that are created to maintain them (Carneiro 1991, 1998; Clark and Blake 1994; Drennan 1992, 1995a; Drennan and Uribe 1987a; Earle 1991a, b, c, 1997; Feinman 2000; Gilman 1991; Kirch 1984; Kirch 1991; Roscoe 2000; Service 1975; Spencer 1987, 1993; Steponaitis 1981).

Yet, the emergence of regional societies and the consequent evolution of their sociopolitical institutions, although part of the same historical process, should not be mistaken as being the same phenomenon. The process that led to the emergence of regional, centralized societies represented a structural, qualitative change (Isaac 1975; Kristiansen 1991: 140) that cannot be explained by conjunctural factors, such as the need for a managerial government, competition between aspiring leaders, and the political strategies that chiefs employ to maintain their power (Drennan 1991, 1995a; Gilman 1991). In fact, even the extent to which the machinery of the resultant social formation still conforms to the original structure that produced it in the first place should be analyzed under concrete historical situations.

An emphasis on the chiefdom's sociopolitical organization as a historical innovation, although important, has diverted our attention from the material conditions (land, access to natural resources, foodstuffs, and goods) that sustained warfare, social inequality, and specialization. The production of surplus, in the form of foodstuffs and goods above the subsistence level of a given population, is understood as critical in sustaining a social stratum (comprised of the ruling caste, warriors, priests, and specialists) that is not directly involved in daily subsistence activities (Earle 1987; Feinman 1991; Flannery 1972; Isaac 1975, 1988b; Meggers 1954; Netting 1990; Peebles and Kus 1977; Renfrew 1982; Spencer 1987; Spencer, et al. 1994; Steponaitis 1981). It is acknowledged, however, that autonomous villages and small-

scale societies produce and store provisions beyond their immediate needs as either buffer strategies or in order to support communal feasts (Carneiro 1983; Meggers 1985a).

Surplus production then, in and by itself, neither leads to nor creates inequality (Isaac 1975: 135). Control over surplus flow, however, entails some groups to rise above the community on a permanent basis, consolidating the unequal distribution of resources (Gilman 1991; Isaac 1988a; Stanish 2004). When a fraction of the population acquires the right to dispose of the surplus according to their own interests (Earle 1987: 293-94) (despite political claims to the contrary), a fundamental change has occured in the society. This change does not solely lie on the authority of rank distinctions, productivity of subsistence systems, or effectiveness of warfare apparatus. Its source can be sought in the institutionalization of social inequality, based on differential access to strategic resources (Fried 1967). Control over surplus might be possible under the advent of a new economic situation, providing "opportunities for long-term, stable exploitation by leaders of their followers", making it possible the rise and legitimacy of ascribed status (Gilman 1991: 148).

This focus on the material basis of chiefly authority may mistakenly picture a centralized government that organizes and controls the economy with absolute power. This has not been supported by case-studies, however. It has been argued that in many chiefdoms and even in early states, important economic decisions were still made at the household level (Henderson 2003; Sahlins 1963), and that incorporation in regional polities does not always affect domestic organization (Bermann 1994). But it is important, here, to realize that families' choices are now constrained by new realities. In this sense, "their economic behavior cannot be understood apart from the local communities and regional polities that contain them" (Johnson and Earle 2000: 247).

Even though several studies have downplayed the role that the (relative) control over economy, accumulation of wealth and prestige items may have had in supporting chiefdom

emergence, it may be difficult to demonstrate that ideological control could have existed independent of any form of appropriation of material goods. In the balance of variables, scholars have debated whether control over either economy or ideology was critical in supporting social inequality and centralized rule (Drennan and Quattrin 1995; Earle 1977, 1991b; Gilman 1991; Roscoe 2000). At the empirical level, it is worth asking whether some studies may have been exploring a dichotomy between economy and ideology that in fact may not exist (DeMarrais, et al. 1996; Godelier 1978a, b). Gods, kings, chiefs, and shamans are often believed to have the power to control rainfall, to fertilize agricultural fields and even to manage wild resources, thus assuring the material conditions of existence through religion, ties to ancestors, and personal power (Carneiro 2000: 91; Godelier 1978a: 7).

Although there may be some disagreement on the causes of chiefdom emergence, subsistence strategies are seen as critical in meeting the conditions for surplus production. Particularly in Amazonia, ecology has been historically taken as key in accounting for the development of social complexity, because of its fundamental role in the development of productive subsistence systems.

Before the onset of social complexity, small communities whose economies were based on horticulture and exploitation of wild food resources were settled and apparently well-adapted to a variety of environments, such as the uplands, riverine floodplains, savannas, estuaries, and mangroves. After millennia of interaction with the tropical environment, human populations had apparently reached a level of homeostasis that is identified in ethnographic examples (Descola 1994; Meggers 1971).

Ethnographic societies, considering the dramatic effects of post-European conquest and colonization process, may display living conditions similar to those of autonomous villages of the Formative (Roosevelt 1989). In this sense, accounting for the sociopolitical and demographic changes that happened by the first millennium rests on explaining both the transformation of

subsistence economies (technological innovations and/or intensification), and especially, given the existence of an immense territory, the emergence of mechanisms that prevented generalized access to basic resources, thus supporting social stratification. The environmental conditions for such structural change were already indicated by both Lathrap (1970b; 1972) and Carneiro (1970a; 1981; 1998), although they envisioned different trajectories. Accordingly, population pressure in areas where subsistence systems could be far more productive, because of resource concentration (Carneiro's environmental circumscription) would generate competition and, consequently, trigger cultural change.

Amazonian chiefdoms probably emerged through similar processes, due to similarities in local ecology and cultural matrixes. Without aiming at essentializing those societies, especially because they are yet to be described, it is useful to think of them as part of a historical process that encompassed a long-term interaction between human populations and their immediate environment. This environment, in its complexity, was managed by social groups in order to acquire the necessary material means to make subsistence and community life possible. Differential productivity of Amazonian ecosystems, however, caused populations to converge on optimal areas, as several scholars have already suggested (Carneiro 1970a; Lathrap 1970b; Meggers 1971; Roosevelt 1980). Through time, differential access to limited resources and the means to reproduce them came to establish enduring social distinctions.

The Subsistence Basis of Amazonian Chiefdoms

In examining the subsistence systems that may have supported social stratification in the Amazon Basin, scholars have often assumed that agriculture intensification had to be the necessary step for cultural change. As discussed in the first part of this chapter, the debate tended to rely on the analysis of Amazonian soil's productivity. Some scholars who based their analysis on ecological factors left little room for human management and improvement; conversely, others

who defended the possibility of intensified agriculture tended to overlook the actual limitations. In fact, in seeking to prove one or the other, both views were based on traditional models of the emergence of social stratification, while ignoring available analysis on Amazonian subsistence systems that have proven more adaptive and more coherent with the tropical ecology. Lathrap (1970b; 1973) and Carneiro (1961; 1983; n.d.), for example, have long defended that Amazonian societies cultivated several varieties of bitter manioc and largely exploited aquatic resources, which would have provided the necessary caloric and protein intakes to support dense, permanently settled populations and generate surplus.

Although less common, there are examples of chiefdom societies that evolved on a foraging economy (see Johnson and Earle 2000: 262-3), especially exploitation of abundant aquatic resources (Arnold 1996a, 2001; Erickson 2000; Goggin and Sturtevant 1964, quoted by Carneiro 1981: 49; Isaac 1988b; Moseley 1974; Widmer 1988). In this case, instead of requiring the payment of tribute from communities who are cultivating their own neighboring fields, the rulers may have controlled the facilities that allow intensification. Leaders might require the population to work in building and maintaining the facilities (such as fish weirs, boats, drying and storage places) in exchange for food and protection (Johnson and Earle 2000). Having the ability to produce surplus to sustain the ruling elite, the chiefs, at the same time, guarantee their followers the security of having food supplies (due to storage facilities and technology) year round. That may be especially attractive in places where wild resources are abundant, but seasonal, requiring both management and storage capabilities.

The intensive exploitation of aquatic resources, usually seen as a foraging economy, follows in fact the logic of agricultural systems (Isaac 1975; Widmer 1988). According to Widmer (op. cit.: 280-1), the fact that inshore fishing adaptation requires management and its inception derives from ecology, demography, technology, risk, and competition, require us to understand it as a process similar to agriculture intensification, not to typical coastal adaptations.

Isaac (1975: 139) observes that "we have tended to think of agriculture in terms of its potential for creating large food surpluses…whereas it is entirely possible that the major importance of agriculture, at least in its early stages of development, is merely that it concentrates resources". He agrees with Carneiro (1970a) that the relation between resource scarcity and dense population in areas where resources are clustered cause the type of pressure that is necessary for cultural evolution. "In areas where wild resources were already tightly clustered, sociocultural evolution easily could have proceeded to the chiefdom level in the absence of agriculture" (Isaac 1975: 139). Isaac is talking about the economies of the Pacific Northwest Coast of the United States, where a fishing economy generated the amounts of surpluses that are commonly associated with agricultural economies elsewhere (op.cit.: 132). Carneiro (n.d.) points out that in areas where aquatic resources are highly productive, agriculture intensification is dispensable. Indeed, investment of time and resources in order to intensify fishing may not be a matter of lack of choice, but rather of cost-benefit reasoning.

Meggers (2001b) has recently suggested that Marajoara subsistence economy could have been based on intensive exploitation of palm starch. Although it is very likely that palm starch was used, it is difficult to envision how the exploitation of palm products could have led to the emergence of social complexity (see Chapter 2). Meggers does not suggest that palm starch supported the rise of Marajoara culture, but that Marajoara societies, arriving on the Island with an advanced cultural system, found in the palm starch the means to survive and maintain their sociopolitical institutions and social complexity.

In order for the exploitation of palms to trigger social complexity, it would be necessary for the resources to be concentrated and allow the exploitation by one group at the expenses of others. This is very unlikely. Palms are scattered throughout the Island, and it is advantageous to have them this way as a buffer strategy. Moreover, the location of Marajoara mounds does not relate to the location of palms. Palms are more often found in forested areas and their collection

requires expeditions in search of the trees that are ready for harvest. So, it is unlikely that a scattered, largely available resource would have generated competition and led to the rise of social complexity.

In Amazonia, it is very likely that complex societies emerged on the basis of intensified exploitation of aquatic resources. Here, it is clear that a process of long-term interaction between populations and environment may have led to opportunities for intensive exploitation with relatively simple management strategies. However, the emphasis on the ecological aspects of the process that led to the emergence of regional societies is not to be taken as absolute and inevitable. Social groups do make choices about their subsistence systems, at the same time that historical, cultural and environmental factors constrain or facilitate these choices. There is no evidence that previous small-scale, communally oriented societies were at the edge of starvation, or that they needed a managerial government in order to organize production before they became regional. However, at a certain point in time, within historical trajectories, regional formations appear as social groups take control over the reproduction of material resources, either by force or by ideological justification. As regional societies multiplied and areas of resource concentration happened to be limited, being part of a regional system becomes the best or only option for most of the population (Carneiro 1981, 1998).

Sociopolitical Centralization and its Archaeological Correlates

> "Perhaps we have been too long accustomed to perceive rank and rule from the standpoint of the individuals involved, rather than from the perspective of the total society, as if the secret of the subordination of man to man lay in the personal satisfactions of power" (Sahlins 1963:300).

In the study of chiefdoms, the investigation of sociopolitical forms becomes critical, once their primary recognition relies on the acknowledgement of its regional structure, as compared to previously autonomous villages. Chiefdoms are, for this reason, commonly equated with a centralized sociopolitical structure. Despite the variety of approaches and variability among chiefdoms, they are generally considered political units, with a structure that involves political centralization, institutionalized social hierarchy, and specialization (Earle 1991a).

The archaeological correlates of such a political structure are, therefore, indicated by: 1) settlement hierarchy, with, for example, a larger and architecturally differentiated center, exhibiting monumental construction for the residence of the chief and ceremonial facilities; 2) residential segregation according to rank and division of labor; and 3) mortuary segregation, replicating in mortuary contexts social differences that existed during life (Earle 1991b; Peebles and Kus 1977; Renfrew 1977; Service 1962; Wright 1984).

A basic characteristic of the political power in chiefdoms, which differs from previous situations of authority and leadership, is the fact that the ruler receives their position by birth-right. Power then, "resides in the office" (Sahlins 1963:295), it is not a matter of individual achievement. In fact, several authors have considered hereditary rule and institutionalized social hierarchy as inherent to chiefdoms (Renfrew 1979; Sahlins 1958; Service 1962; Spencer 1987).

Although there are different ideas on how the ascribed status originated (e.g. achieved status transforming into ascribed status or ascribed status as being previously part of the cultural system) the fact is that there are now economic and ideological mechanisms that support it. It is more likely that previous hierarchical structures, embedded in kinship systems, would be used to justify the right of the elite to rule when the material conditions for the exercise of power are present. Individuals who belong to certain social categories or social groups are then elevated to a position of authority and power by inheritance. The novelty, therefore, is not hierarchy, but its institutionalization (Spencer 1987), such as the stabilization of authority by "strict rules of hereditary succession" (Service 1962: 151), justified by kinship structures and religious ideology.

As discussed earlier, it is difficult to distinguish the limits between economic power and religious authority in chiefdoms, especially because power inequality is frequently justified as the natural order of things. It often assumes the form of sacred authority, where the chief's lineage is related to ancestors or gods through kinship lines (Helms 1998; Sanders and Webster 1978; Service 1962). In this sense, the institutionalization of social inequality may be easily accomplished in societies that are already ranked, in which the position of individuals depend on their relation to ancestors (Sahlins 1963).

Some Amazonian societies, such as the Kuikuro of the Upper Xingu, although not showing economic stratification, have status distinctions embedded in their social systems, where their positions are determined by birth, consisting of two distinct social strata – the chiefs lineage and the commoners (Heckenberger 1996, 1999). Among Tupinambá groups, however, status depended on personal characteristics and achievements, which included genealogy, age, abilities in performing subsistence tasks (agriculture, hunting, fishing), and performance in the war (Fernandes 1989: 266-7). Preexisting cultural systems in Amazonia, though, may have been important in providing structural conditions for the development of social stratification and formation of centralized societies, when other conditions were satisfied.

The sociopolitical structure in chiefdoms is also characterized by the emergence of a social stratum comprised of a number of persons, whose functions are not immediately related to food production, thus including priests, craft specialists, warriors, the chief's family and possibly other managers. The maintenance of these elite individuals is provided by the mobilization of surplus. Authors have argued that this can be done in more than one way, generating different sociopolitical institutions. In one mode leaders may mobilize surplus by requiring from households and producers the payment of tribute in the form of foodstuffs. This has been called "staple finance" (D'Altroy and Earle 1985). Another form would be to receive tribute in the form of prestige items, generating the circulation of valuables, a type of currency that could be exchanged in regional markets, constituting a "wealth finance" system (Brumfiel and Earle 1987; D'Altroy and Earle 1985). The latter is more commonly found in state societies. These two different systems of financing the elite may relate to different sociopolitical structures, which Blanton et. al. (1996) have named "corporate" (staple finance) and "network" (wealth finance) strategies.

According to Blanton et al. (op.cit.), in the corporate mode, power is more diffuse, segmentary, tending to be more local and concerned with maintaining local cohesion and solidarity. Ritual and symbolic powers are important; communal representations, communal monuments and collective cemeteries, without much individual differentiation, are reinforced. On the other hand, in the network mode, power is more exclusive, centralized and individualized. Individual prestige and power is linked to a network of prestige goods exchange, so regional alliances and manipulations of the exchange systems are important. Archaeological correlates would be individual graves and monuments, associated with prestige items.

These do not have to be, however, mutually exclusive modes of articulation of a political economy, but can be seen, as some studies have shown, as strategies that may change over time or coexist in different proportions (McIntosh 1999: 18). The use of a prestige goods economy to

reinforce internal differences and seek outside support for the maintenance of power is indeed found in most chiefdoms (Hastorf 1990; Shennan 1982a; Spencer 1993). Spencer (op.cit.) has argued that a balance between internal and external support is necessary for the emergence of chiefly societies and maintenance of power in the long-term.

In late Amazonian prehistory, ethnohistorical evidence indicates that a system of regional markets was well-developed and included exchange of ordinary goods and food items over considerable distances (Lathrap 1973; Porro 1994; Whitehead 1994). Movements of peoples and goods are also thought to have allowed for the flow of esoteric knowledge (Colson 1985; Helms 1979), leading to the sharing of cultural beliefs and values that are visible in the material items. Problems of preservation in the tropical forest, however, bias the archaeological indicators of exchange networks towards more durable items represented by stone axes, nephrite pendants, and other lithic adornments, frequently found in areas that lack both the raw materials and remains of their production. These items are found associated with individual burials, thus marking social differentiation, differential access to exchange networks, alliances between elites and, ultimately, sociopolitical power.

On the other hand, the archaeological record does not show conspicuous signs of individualized power within Amazonian societies. Although burials are individualized and differentiated, funerary urns are constantly buried in groups, and burial monuments are collective (Guapindaia 2001; Machado 2003; Meggers and Evans 1957; Palmatary 1950). Funerary iconography also appears to emphasize lineages rather than individuals (Roosevelt 1991b; Schaan 2001b; 2003c, see also Chapter 7). On Marajó, monuments and burials point to a corporate strategy, while the presence of long-distance items makes the case for alliances between elites on trade that exceeded the limits of the Island. It may well be the case that the possession of prestige items was important in the balance of power between Marajoara chiefdoms, forging alliances and stimulating competition.

AN ECOLOGICAL MODEL FOR THE EMERGENCE OF SOCIAL COMPLEXITY

> "A glimpse of the trial and error process that led to successful adaptation to the várzea is provided by Marajoara Phase. Although the Island lies in the mouth of the Amazon, it is inundated by local rainfall and does not receive a rejuvenating layer of sediment every year. The result is a combination of relatively rich aquatic resources and soils unsuitable for long-term cultivation" (Meggers 1985a: 326).

The emergence of regional societies on Marajó Island is believed to have occurred some time around A.D. 400 (Roosevelt 1991b), although some thermoluminescence dates indicate pottery samples to be even 300 years older (Meggers and Danon 1988: 248). Prehistoric occupation of the Island, however, dates back to 1460 B.C. (op.cit.:248), when small villages of horticulturalists occupied a variety of environments, more often in the forest, close to the limits of *campo*, and sometimes away from a navigable stream (Meggers and Evans 1957: 193, 221)[1].

Meggers and Evans pointed out that while Ananatuba villages were more often close to the campo and away from a navigable stream, Mangueiras population preferred to count on a closer source of water and availability of transportation. They both settled in naturally elevated areas not seasonally inundated by flood waters. These two populations, which were differentiated by their pottery industry (Ananatuba and Mangueiras phases) had some level of social interaction, indicated by the sharing of a similar ceramic technology and decoration techniques, besides having eventually occupied the same sites simultaneously (Meggers and Evans 1957: 221-222).

From 920 B.C. to A.D. 10, Meggers and Danon (1988, see also Meggers 1994a) identify a period of hiatus in the archaeological record, which they correlate to an arid episode that would have impacted local subsistence systems and dispersed population. After that period, the Island is

[1] A full discussion on the cultural development, encompassing pre Marajoara phases, is provided in Chapter 3.

again occupied by small, autonomous settlements, associated with a similar but distinct ceramic style that was named Formiga (Meggers and Evans 1957: 222-241). Formiga phase sites, which are dated from A.D. 10 to A.D. 837 (Meggers and Danon 1988), are located on the campo, frequently in the vicinity of a small stream. On the southeastern Marajó savannas, Formiga mounds were found geographically and chronologically associated with Marajoara phase sites (Figueiredo and Simões 1963; Simões 1967, 1969; Simões and Figueiredo 1965).

Formiga phase settlement patterns already displayed some features that would largely characterize the Marajoara phase, such as ellipsoid shapes, intentional mound building, and location close to small streams in areas subjected to seasonal flooding (Myers 1973). It can be assumed, therefore, that drastic changes in settlement patterns observed during Marajoara phase were being practiced by Formiga phase settlers. The development of a new subsistence system or at least its intensification requires knowledge of the environment and a time frame in which to develop new strategies. The construction of mounds, as a visible and striking new feature of the settlement pattern, cannot be seen primarily as a strategy to escape from the seasonal floods. Only a portion of the Island is affected by the rise of water during the winter months. In non-inundated areas, horticulture, fishing and hunting were possible, as is attested by both Ananatuba and Mangueiras occupations. Therefore, the preference for flooded areas on the *campo* during the Formiga and Marajoara phases requires another explanation.

Besides its predominant location on the *campo*, Marajoara populations also favored areas next to lakes and the headwaters of rivers. These are not areas where navigation is possible and water supplies are available year round. Different from their predecessors, Marajoara populations did not look for permanent water courses, but chose to live in areas where the effects of the annual droughts would be more dramatic. Many of the places where Marajoara mounds are located are today uninhabitable for humans. In relative isolation and with little or no water from

August to December, Marajoara societies, however, managed to develop a complex sociopolitical system. How would that be possible?

Understanding the emergence and development of social complexity on Marajó Island, more than in any other part of the basin, depends not only on a correct assessment of its ecology and climate, but especially on an understanding of how these factors affect both population dynamics and subsistence systems. Traditional ecological analysis of the Island ecosystems frequently relied on mistaken notions of the savanna (locally called *campo*) environment as being inundated "*várzea"*, then assuming that intensive crop cultivation was possible and the area could have supported large, complex societies, as well as a tributary economy. However, a number of studies have shown that the Marajoara savannas in fact have clayed, nutrient-poor soils, which are seasonally exposed to either torrential rains or unbearable equatorial heat. As this study intends to demonstrate, the Island ecology can be described as constraining the development of large, complex sedentary societies, unless such societies are capable of managing the ecological factors for their advantage. Although these factors will be described and analyzed in detail in the next chapter, a preliminary brief description is necessary.

On Marajó, as in other parts of the Amazon basin, seasonal rainfall determines the existence of two distinct seasons: a rainy winter and a dry summer. Here, however, these differences are more dramatic than in other areas of the Amazon basin. During the rainy season, rivers rise up to four meters above their normal level, and a large area of 23,046 m² in the center of the Island may remain underwater for up to five months, forming large, seasonal lakes. This facilitates navigation by connecting a large number of rivers through temporary canals. It drastically reduces the available land for cultivation while favoring game, since animals tend to get trapped in reduced areas. On the other hand, it reduces the availability of fish that spread out over the flooded savannas.

Conversely, during the dry season, small streams and temporary lakes and canals dry out, to the point of making life nearly impossible away from the large rivers. Terrestrial animals have again the chance to spread over the dry land, but hunting is facilitated when they come to the rivers in search of water. The reduction of the available water courses, on the other hand, reduces the mobility of the aquatic animals, which are trapped in deeper sections of rivers, canals or lakes. The absence of canals between rivers restricts aquatic transportation for humans, separating areas that otherwise would be easily reached.

Aboriginal populations were aware of the dramatic seasonal fluctuations of resources. As present populations still do, they would have built dams and ponds in order to retain water on the *campo* at the beginning of the summer. Observing that large amounts of fish were usually found trapped due to the rapid descent of waters, they would have built dams and ponds in optimal areas in order to intensify and optimize aquatic resource capture. These optimal areas consisted of the headwaters of rivers and streams, where fish converge during the rainy season to spawn. These are also the areas where, not by coincidence, Marajoara mounds are located.

On Marajó Island, aboriginal landscape management was closely related to the development of complex societies. It basically consisted of the construction of weirs, dams and ponds for managing massive amounts of fish that reproduced in the headwaters and over the *campo*, where they fed of the floating meadows and the flooded forest each year. Part of the fine silt removed during the excavation of ponds was used for building the dams, but most of it was used to build elevated villages, ceremonial mounds, and eventually causeways to connect them.

Landscape management and construction of fisheries have been identified at the Llanos de Mojos, in Bolivia (Erickson 2000; 2001), while massive harvesting of aquatic fauna, together with storage practices have been reported by ethnohistorical and ethnographic accounts in several locations of the Amazon basin, including Marajó (see Chapter 2). The use of such subsistence strategies by aboriginal societies would not be possible without an intimate knowledge of the

environment. Aboriginal populations may have seasonally moved to optimal areas in order to harvest fish, drying and storing it for future consumption. Families or communities could have cooperated initially by building dams when the waters started to recede. As the population grew, competition over these areas arose and claims over the right to exploit the resources may have divided groups and caused conflict. In this context, preexisting social hierarchies would have had an economic basis to support their claim for power and control. Either by force or by ideological means, certain groups controlled the fisheries, establishing rules for access to resources. Through time, especially the ability to control those resources in a symbolic way was critical in determining the constitution and the stability of the Marajoara chiefdoms. Even if Marajoara elite could not control the fisheries by force, it could control the fish reproduction by monopolizing the access to the supernatural world.

Although this model follows Carneiro's (1970a; 1981; 1998) predictions of the primary conditions for chiefdom formation in Amazonia, it differs in respect to the mechanisms and processes that produced social stratification. According to Carneiro, human populations would be attracted to areas where resources were concentrated, generating population pressure through time. Environmental circumscription is key to understand the timing of chiefdom formation, and may explain why, in the Amazonian lowlands, chiefdoms emerged first on Marajó (Carneiro n.d.: 64). Population pressure in these ecologically circumscribed areas would cause competition, and consequent warfare, with absorption of one group by another. Carneiro envisions that the defeated group would have either to pay tribute or be incorporated as slaves. Social circumscription (caused by high population density) would constrain mobility and finally coerce the defeated groups to stay (ibid.). Their land would be then incorporated into the victorious and growing regional polity (Carneiro 1991:207).

In Carneiro's model, social stratification emerges as the outcome of military conflict, and the surplus problem is left aside, at least as an initial condition (Isaac 1975: 127). In the model

that is being proposed by this research, stratification emerges when the economic rules related to surplus production, distribution, consumption and exchange finally modify.

On Marajó, the headwaters and lakes were the ecologically favorable areas, to which population converged. However, they did not necessarily allow for permanent residence and intensive fishing unless some management took place, requiring cooperation and coordination (see Isaac 1975; Stanish 2004 for a discussion of cooperation as a basis for economic intensification). There, competition for resources finally resulted in the appropriation of the area by one social group. Spencer (1993: 51) has observed a similar process in the Tehuacan Valley. The archaeological evidence suggests that the first dam built during the early Santa Maria phase probably did not require much effort and coordination. However, after the facility was in place and more people were benefiting from it, some groups took political control and restricted the access to water. For encompassing coordination, cooperation, and management, water systems tend to favor centralized decision-making (Scarborough 2003: 11), thus providing opportunities for centralized leadership and stratification.

On Marajó, the control over surplus produced by the fisheries could have taken place initially either by force or by ideological claim over the territory, as well as by religious claims over the ability to reproduce natural resources. Carneiro's model leaves room for non-coercive process of chiefdom formation, in which villages "may be coerced by the threat of force rather than its exercise" (Carneiro, 1981: 64). Those who did not accept the new arrangement had to look for other places to either replicate the same system of resource exploitation or to survive on extensive, non-specialized subsistence systems as they had before. At a certain point, people had to affiliate themselves with one ruler or another for protection and access to resources.

This model, as many others do (see for example Earle 2001), considers the control over surplus flow as critical in supporting the emergence of the ruling elite (Isaac 1975, 1988a; Saitta and Keene 1990; Stanish 2004). The intensification of food production and the ability to store

animal protein in the form of dry fish would have attracted populations that sought stable resources and protection. The ideological control over the reproduction of these resources, reinforced by the construction of monumental ceremonial mounds close to the dams and fish ponds, established the "ownership" or the right to manage production. The elite, in assuring abundance of protein resources through ideological control, could take advantage of labor not only for exploiting these resources but also for reinforcing their power, through the construction of mounds for elite residences, ceremonies, and feasting.

The role that warfare may have played in the process of chiefdom formation is unclear. Conflicts over land and resources may have been settled by some social groups moving away, and re-establishing in other ecologically favorable areas. As chiefdoms were formed in other parts of the Island and chiefs were able to attract populations, maintaining their domains would have become critical, both in terms of assuring their rights over the resources as well as having access to labor. At this point, chiefdoms might have become competitive, which is archaeologically identifiable by the generalized effort in building higher mounds and producing elaborate ceremonial pottery in order to display power and prestige.

The hypothesis that guides this study is that social complexity emerged on Marajó Island as local kin groups obtained control over the surplus produced by an intensified fishing economy. In order to test this hypothesis, the study will demonstrate: 1) the existence of a regional settlement system associated with fish farming earthworks; 2) the existence of ceremonial / elite mounds containing evidence for ancestor worship and feasting next to the fish-farming systems, indicating control over access to resources (as a measure of stratification, after Fried 1967), as well as ideological justification for social stratification; 3) lack of evidence for surplus production at house-mound sites located away from ceremonial mounds.

Throughout the following chapters, the archaeological correlates of this model will be presented and discussed, through ecological and archaeological data related to the Camutins

chiefdom, from the standpoint of its core and periphery. The process of landscape management that was responsible for the rise of complex society was critical in defining its size and sociopolitical structure. As Service (1962: 141) has pointed out, "once chiefdoms are in existence, new chiefdoms can arise as a result of their influence". Since the development of fisheries was possible in many other areas, other chiefdoms arose, causing population growth and competition. When taken all together, the absence of a clear settlement hierarchy among chiefdoms indicates that a permanent, supraregional system of control was never achieved.

Due to the cultural matrix that enabled social groups to control the fisheries, status and social distinctions were likely based on lineage, not in individual persons. Although individuals certainly represented their lineages in particular positions of power, the lineage, as a corporate group, was in fact in power, a political strategy that scholars have observed in a number of complex societies (Blanton, et al. 1996; Earle 2001; Johnson and Earle 2000; McIntosh 1999). This may have accounted for the relative stability and permanence of Marajoara chiefdoms. By investigating the Camutins chiefdom, this study provides a comprehensive account of the subsistence system, sociopolitical organization, specialization, and ideological mechanisms that characterized that social formation.

Chapter 2

THE ECOLOGY OF MARAJOARA CHIEFDOMS

Marajó is the largest fluvial-maritime island in the world, with an area of 49,606 square kilometers. It is part of a large archipelago located at the Amazon River estuary, receiving, on its west coast, part of the enormous discharge of muddy, nutrient-rich sediments that are carried all the way through the Atlantic Ocean. A belt of small forested islands bordering Marajó western coasts split the Amazon River into two main channels. The North Channel flows along the State of Amapá coast, while the south channel flows along Marajó northwest coast. Still a south branch of the river flows eastwards, entering the Rio Pará system through a multitude of channels or *furos*. Depositional processes along Marajó southern and eastern coast are slow, because there Rio Pará is met by clear black water tributaries that come from the south, such as the Anapú, the Tocantins and Rio Guamá, diluting the Amazon sediments (Archer n.d.; Smith 2002: 3-6).

Differences in topography, soil, and vegetation between the southwestern and the northeastern portions of the Island are due to both tectonic movements related to the opening of the Atlantic passage to the Amazon during the Cretaceous period and processes of sedimentation during the Quaternary. Paleochannels of an ancient Marajó basin, and tectonic faults oriented in the southeast-northwest axis are consistent with the diverse geography of the Island. While the southwestern portion received high amounts of sediments from the Amazon River during the Pleistocene, the northeastern part of the Island is a shoreline of emergence, developed in Holocene deposits, with a much lower rate of sedimentation (Franzinelli 1990).

Some 17,400 years ago, sea level was at the continental shelf break, 80 to 90 m below the present level. After that, sea levels began to rise, causing erosion of the coastal plateau, and eventually submerging part of the Island, which is confirmed by paleodunes and beach ridges representing ancient coastlines (Teixeira and Costa 1992). These features are consistent with

information on shell middens located in areas that today are in the center of the Island (Ferreira Penna 1876; Lage 1944). Finally, when sea level fluctuations were minor, a muddy progradation of the coastline seaward caused the formation of mangrove environments on the north Atlantic coast (Souza Filho 2000).

Marajó is formed by the *Barreiras* group sediments, a Cenozoic formation consisting of sands, clays and conglomerates with well-rounded quartz pebbles. Clay Holocene deposits, such as the yellow latosol, cover the Barreiras group. The Island has no rocks, but a pseudo sandstone (Grés do Pará), which was formed on top of the *Barreiras* group, due to the migration of iron to the surface (Ackermann 1969: 25, 36). This pseudo rock is specially visible on the eastern portion of the Island, where it eventually emerges in the bed of the Arari River at the town of Cachoeira (waterfall), at low tide, forming a small rapid (Meggers and Evans 1957: 169).

The usual geographical division of Marajó Island into two broad distinct regions, e.g. the southwestern forest and the northeastern *campo* (flat grasslands), reflects the different geologic history of these two areas, but does not do justice to the diversity of ecosystems that can be found there. Marajó has patches of upland (*terra firme*) forest, floodplain forest, flooded forests, upland and lowland savannas, as well as mangroves (Figure 1). These ecosystems are subjected to differential rainfall, species diversity, drainage systems, soil productivity, as well as have been exploited in different ways by human populations.

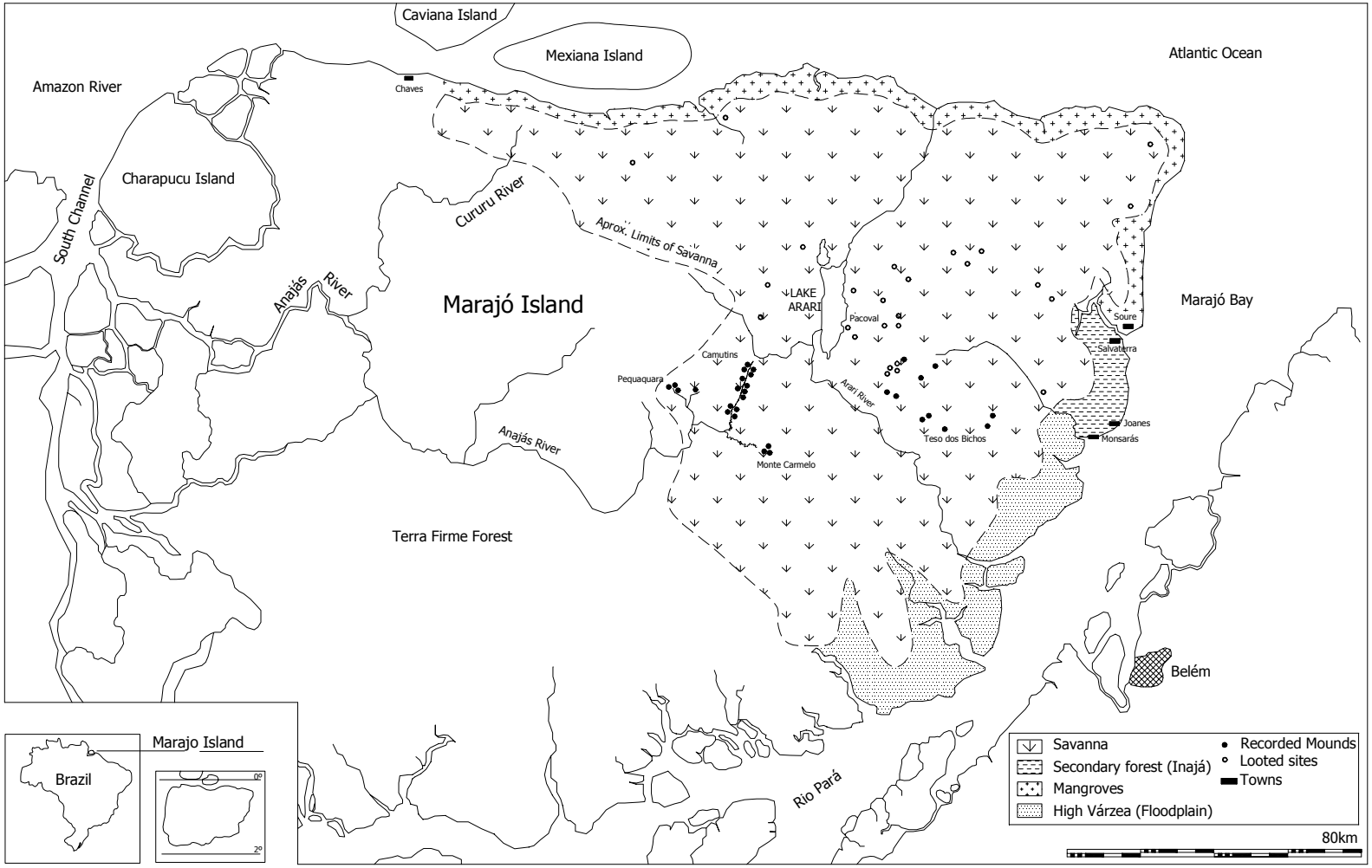

Figure 1 – Vegetation patterns, sites and towns on northeastern Marajó Island

The northeastern savanna, which is the area of interest for this research, is bordered by mangroves and patches of floodplain forest along its northern and eastern coasts. Gallery forests frame the rivers, and "islands of forest" can be found here and there on the predominantly grassy landscape. The highest elevation, of about 6 m, is found at the east coast, in the town of Joanes. From there, the land flattens westwards, which inspired Ackerman (1963: 121) to compare the Island to a large plate with rising edges. Especially during the rainy season, rain water accumulates on the deepest center of the "plate", when about 70% of the savannas remain waterlogged for several months (OEA 1974: xiv).

The savannas are poorly drained by an immature hydrological system, formed by a number of major ephemeral, tidal rivers. These are Anabiju, Arari and Camará Rivers, which flow into Marajó Bay. The Paracauari and Cambu Rivers flow into the Atlantic Ocean. Other smaller rivers such the Goiapi, the Marajó-Açu and the Camará complete the drainage system of the *campos*. The area of transition between the savanna and the forest as well as part of the forest is drained by the Anajás and Cururu Rivers (Neto 1993: 29-32). Some permanent lakes are also part of the hydrological system, with the Arari the largest one, situated roughly in the center of the area with major concentration of archaeological sites.

THE SAVANNAS OF THE ESTUARY

The largest extent of savannas in the estuary is located on Marajó Island, where they comprise 23,046 square kilometers. Extensive areas of savannas are also found in Caviana and Mexiana, the northern islands. These are poorly drained savannas covered with grasses and eventually dotted by some "island of forests" and shrubs. These flat, grassy areas are locally called *campo*.

Although the term savanna is frequently associated with certain types of vegetation (mostly grasses and occasionally shrubs and scattered small trees) (Sombroek 1966: 56), some scientists understand that savannas should be defined by their climate (annual average temperature and length of the dry season) (Harris 1980: 3). In both systems of classification, the Marajó *campos* are a typical example of low, grassy savannas.

Both the predominance of *graminea* grasses and the half-year long submersion are points of similarity between the lowland savannas and the lower Amazon floodplain, or *várzea*. But the similarities end here. The *campos* of eastern Marajó are flooded by rain water, while the Amazon lower floodplain is invaded by the river overflow (Sombroek 1966). As Morán (1995: 77) has pointed out, the differential influence of oceanic tides (twice daily on Marajó and once a year in the lower Amazon) also produce a very different ecology on each area as well as require diverse adaptive responses. Marajó, as part of the Amazon River estuary, is characterized by species dominance, instead of biodiversity such as the remaining basin. Especially the predominance of palms used by indigenous populations for a wide range of products, from food to craft production, indicates long-term manipulation of the environment by populations that were likely attracted to that area by the abundance of aquatic resources (Morán 1995: 77; Smith 2001).

CLIMATE

Marajó Island climate is characterized by two well-defined seasons: a rainy and hot winter, and a dry and cool summer. Although this is true for most of the Amazon region, rainfall on Marajó is far more intense (from 2,800 to 3,400 mm per year) and the showers concentrate in a

period of 5 to 6 months, from January to June. The summer, on the other hand, is bone dry, with only a few localized showers falling from August to December[1].

Average temperature is 27º C year round and can reach 32º C during the day, especially during the rainy season. The lack of rainfall during the summer brings trade winds and cooler, pleasant temperatures of around 26º C during the day and 22º C during the night.

Difference in precipitation between the rainy winter and the dry summer translate into dramatic landscape transformations on the savannas. The intense rainfall causes river and lakes levels to rise up to four m. The impermeable clay soils of the *campos* are covered by rain water and so remain for most of the season. Conversely, during the summer months, the lack of precipitation and the impermanent nature of most water sources cause severe desiccation of soils and vegetation. This situation is particularly critical at the rivers headwaters, which depend on occasional rain showers to maintain a minimal flow. Since the rivers are regulated by tides, twice in a 24 hour period the waters move back towards the headwaters, but the currents and volume of water in general are not enough to replenish water throughout. Life along the main rivers, on the other hand, is less affected, because water is available year round.

The impact of the fluctuation of water resources on the lowland savannas cannot be overemphasized. Locals often refer to the seasons - *cheia* (flood) and *seca* (drought) – to explain their way of life, because the environmental conditions determine availability of resources and different strategies for their exploitation.

Since local economies depend so much of the timing and intensity of the seasons, it is likely that climatic fluctuations in the past also impacted aboriginal societies. Although palynological data is limited, and restricted to marginal areas of Amazonia, changes in vegetation can be correlated to severely dry periods that may have greatly affected ancient subsistence

[1] While this Dissertation fieldwork was being conducted in 2002, it rained only three times from August to early December, and showers did not last more than 45 minutes.

systems, and perhaps destabilized political economies. The only available data for Marajó comes from a pollen profile from the Lake Arari that indicates an expansion of savannas around 2,600 B.P., probably correlated with an arid episode (Meggers and Danon 1988: 249-50). This date is associated with the pre-Marajoara period.

During the historical period, extended droughts or extensive rainfalls and inundations were reported (Carvalho 1874: 364). The great inundation of 1859, for example, decimated up to 80% of the livestock in the lower floodplain of the Amazon (Ferreira Penna 1973: 305). In 1872, a severe flood also greatly affected the cattle economy on Marajó (Palmatary 1950: 266). Climatic changes associated with the El Niño Southern Oscillation were noticed in Amazonia on several occasions in the last two centuries. In 1912 and 1926 prolonged droughts in Orinoco River and Rio Negro were associated with large fires. Serious decrease in precipitation was also reported in 1983, affecting river water levels in several locations. Decline of certain types of vegetation associated with wet conditions was noticed in Panama following that episode (Meggers 1992d: 212).

Severe El Niño episodes have been correlated to Pre-Columbian cultural change in Peru, affecting early coastal economies as well as expansionist empires. For example, beach ridges formed on the northwest coast from 1000 to 700 B.C. are interpreted as enormous rainfall events that may have washed out irrigation systems and caused economic stress. Richardson (1994: 88-9) suggests that a collapse of the agricultural economy could "have prompted the coastal societies to forsake the religion that did not protect them from this disaster".

It is possible that environmental changes caused by excessive rains or periods of prolonged droughts may have affected aboriginal subsistence strategies on Marajó, as Meggers (1979; 1985a; 1994a) has suggested, causing economic crisis that could have distressed already unstable sociopolitical systems. Our ability to detect such episodes, however, would require a better understanding of local subsistence systems, in order to identify archaeological correlates

for socioeconomic stress, as well as having the possibility of comparing such classes of data to other archaeological areas of the basin.

SOILS AND AGRICULTURE POTENTIAL

Savanna soils are in general infertile, due to the combination of poor mineral content and intense leaching during the rainy season, removing nutrients from the upper horizon (Harris 1980:12). As most savanna environments, the Marajó *campos* are characterized by a fine-textured, clayey soil, with limited infiltration capacity, which has the tendency to become waterlogged during the rainy season and to dry out excessively during the period without precipitation. In areas where the soil is all day long exposed to the equatorial heat, the earth cracks deeply, sometimes forming rounded grassy bumps. This desiccated soil is locally called "*terroada*".

Agriculture productivity in Amazonia is known to be greatly affected by rainfall and extension of the dry season (Sombroek 1999). Especially lack of water or flooding, conditions that exist in most tropical savannas, can create problems for long-term cultivation (Harris 1980: 10). A study undertaken on Marajó Island by the Organization of American States characterized the "Type III" soils of Marajó coast as restricted for agriculture. The savanna soils were characterized as "Type IV", or unsuitable for cultivation. The study concluded that under present conditions (poor soils and inadequate drainage systems), the area was not appropriate for cultivation (OEA 1974: xv).

Another study, undertaken by Chomitz and Thomas (2000), compared several areas of Amazonia regarding crop production. Areas in which precipitation is higher than 2,800 mm have yielded the production of manioc, bananas and pineapple, while maize has been produced only in areas where local rainfall is between 1,400 and 1,600 mm. The study has also demonstrated that the proportion of agricultural land tends to decrease with increased precipitation.

Even among the savanna soils, however, there are some differences between lowland and upland savannas. The different topography of these two habitats translates into variable rates of flooding, which in turn greatly affect soil conditions. Overall soil chemical composition, in part caused by continuous submergence and leaching, influences vegetation patterns, as Sombroek (1966: 226) explains: "soils with a predominance of NA+ and Mg++, which often are the most deeply submerged by rain water lack even shrubs in their vegetation cover (*campo limpo*). The soils with more regular ratios of exchangeable cations and shallow submergence have coverage of savannah in which shrubs have a scattered occurrence, and Buriti palms (*Mauritia flexuosa*) may be present in fairly high quantities".

Intentional management, such as construction of raised fields, drainage systems, and soil mulching, might overcome the adverse conditions to cultivation observed in environments such as poorly drained savannas (see Denevan 1966, 2001; Erickson 1980). However, to date there is no evidence that such management took place on Marajó Island. The anthropogenic mounds have small areas, and are full of cultural remains, which indicate they were primarily used as habitation and cemetery sites. In addition, the anthropogenic dark earth (*terra preta*) soils found in some archaeological sites have varied horizontal and vertical distribution associated with abundant cultural materials, indicating they result from anthropogenic activities, not from intentional mulching for cultivation.

FOOD RESOURCES

Data on diet during Marajoara phase is very limited and come mainly from the preliminary results of Roosevelt's research in Teso dos Bichos mound, as well as skeletal and dental analysis performed in the scope of this and previous research.

Carbonized plant remains recovered by Roosevelt in Teso dos Bichos site were comprised mainly of seeds, wood and fronds of palms. Açaí (*Euterpe olearacea*), tucumã (*Astrocaryum*

vulgare), ingá (*Inga sp*), muruci (*Byrsonima crassifola*) and taperebá (*Spondias lutea*) are among the species that were identified (Roosevelt 1991b: 375). Tapereba and tucumã, besides being consumed by humans, are also an important part of the diet for several fish species. Smith (2002: 187-8) reports that in Cachoeira do Arari, on Marajó, fisherman mix manioc flour with the orange flesh of tucumã to produce bait balls.

Studies of bone chemistry and dental analysis in specimens in museum collections indicated staple consumption of plant protein, particularly seeds (Roosevelt 1991b: 377). In several samples, specialists have identified dental wear consistent with the consumption of gritty food, which had caused heavy dental abrasion, even in youngsters (Meggers and Evans 1957; Roosevelt 1991b: 377; see also Chapter 5). Given the rarity of maize in bone chemistry, Roosevelt considered it an accessory crop, maybe used for producing beverages.

Analysis of faunal remains recovered from Teso dos Bichos soil flotation samples show an almost complete absence of terrestrial fauna, and an abundance of small fish. Large fish, such as pirarucu (*Arapaina gigas)* and aruana (*Osteoglossum bicirrhosum*) were recovered only from pits and caches. Mammals and birds were rare and present only in one of the excavations. Small aquatic fauna, including small shells of mussuã turtle (*Kinosternon scorpioides*), teeth of piranha (*Serrasalmus sp*.), bones of traíra (*Hoplias malabaricus*) and tamoatá (an armored catfish, *Hoplosternum littorale*) comprised the bulk of the assemblage recovered from garbage and hearths. The specialists concluded that the assemblage patterns were consistent with massive capture in fishponds (Roosevelt 1991b: 379-83). Roosevelt considers that fish, a highly seasonal resource, would be the staple food during the dry season, when shrunken ponds and streams could be poisoned. She proposes that during the winter, protein would be obtained from agriculture or game (op.cit.:382-3).

In several areas of the Amazon, including the estuary, ethnographers, ethnobotanists, and geographers have identified domesticated and semi-domesticated plants that are believed to be the

result of centuries or even millennia of intentional human management (Balée 1989a, b, 1993; Posey 1985; Posey and Balée 1989; Smith 1995, 2001, 2002). On Marajó, the dominance of certain plant species such as palms (especially *buriti* and *açaí*), wild cotton, and several fruits, including a wild variety of pineapple, may indicate that prehistoric populations cultivated these plants for their consumption (Smith 1999, 2002). Based on ethnographic analogy and a study of the Island's ecology, Brochado (1980) has suggested that Marajoara populations had relied heavily on fish and manioc, although he also suggested the consumption of wild rice. Meggers (2001b), on the other hand, has suggested that a staple source of starch could have been provided by palms. Likely sources of protein and starch are evaluated and discussed below.

Protein Rich Resources

Aquatic Resources

Aquatic resources are abundant on Marajó, but vary with the geography and the season. For example, the existence of mangroves makes coastal fisheries especially productive (Smith 2002:19). During the colonial period, fishing companies (*pesqueiros reais*) employing *caboclos* (non-Indians natives), militia, and Indians, were established by the crown in a few places of the lower Amazon. The objective was to exploit highly productive riverine and coastal areas (Furtado, et al. 2002: 15).

In 1692 one of these companies was established in the town of Joanes, on Marajó eastern coast (see Figure 1), in order to fish tainha (*Mugil brasiliensis*) and gurijuba (*Tachysurus luniscutis*) (Furtado, et al. 2002: 15; Lopes 1999; Reis 1940: 98). Although the documents do not give many details, tainhas were likely caught in poisoned fenced streams, were they went to spawn in early August. Colonial accounting documents dated to the second half of the 18th century indicate that thousands of dried fish (especially tainhas), turtles, manatees, crabs, as well as turtle butter, among other goods, were being sent from Joanes (Vila de Monforte), Salvaterra

and Monsarás periodically to Belém. For example, between September 18 and October 12, 1767, the towns of Monsarás and Monforte provided 48,500 tainhas and 21 baskets of fish (Furtado, et al. 2002: 20). Considering that the tainhas would weigh 4 kg in average, it means a production of 194,000 kg of dried tainhas in 24 days, or 8,083 kg a day.

The flooded savannas, on the other hand, are known to be generous in aquatic resources. At the beginning of the rainy season, after the first rains, fish move to the rivers headwaters, looking for a place to reproduce away from their predators. From there, they spread out over the flooded savannas, feeding off the riparian forest and floating meadows (Gallo 1996; Smith 2002). At the end of the rainy season, seasonal and permanent lakes shrink, fish density increases, being more available to humans. It is during the period of transition between the two seasons that fish harvesting can be very productive, if managed correctly. Similar ecological conditions were observed in the region of Baures, in the Bolivian Llanos de Mojos, where Erickson (2000; 2001) identified a complex system of hydraulic earthworks designed for massive fish capture.

Current fishing practices on Marajó are comprised of very simple, cost-effective strategies. At small streams, *caboclos* place removable fences or build temporary earth and wood dams at the high tide. At low tides, fish that had entered the streams are trapped behind the fences and can be harvested easily with nets or poison (Smith 2002: 9-10). This practice has yielded greater returns at the headwaters of rivers on the savanna, causing seasonal movement of fisherman to work in these areas during the peak of the fishing season, beginning in July. Since these areas are often owned by ranchers, serious conflicts have been reported among *caboclos* and landowners, both aiming at selling the fish to the *geleiras* (refrigerated boats that transport the fish to the Belém market) (Gallo 1996). Competition over the best fishing areas and eagerness for fast cash return has led *caboclos* to practice predatory fishing, using inappropriate net size, and consequently discarding small fish, which has no market value.

The decrease of both fish biodiversity and size has been noticed since the 1950s (Hilbert 1952), and references to decrease in fishing productivity are abundant in the literature (Brochado 1980). For instance, Gallo (1996: 187) pointed out that the São Pedro festival, which was normally celebrated in November during the 1970s was transferred to October and then to September, because of fish scarcity. In Salvaterra, a town located on the east coast, community fisheries used to yield abundant fish resources for the entire town, but currently, the *pesca de arrastão* (seine nets) have jeopardized fish reproduction (Silva 1999: 165).

It is possible that in pre-Cabralian times, better management strategies would stretch the availability of aquatic resources throughout the dry season and well into the first months of the rainy season. Ability to store dry fish and retain live turtles would account for the provision of protein during the remaining of the year.

Açaí Palm

"As a staff of life, few palms around the world rival açaí" (Smith 2002: 78). It is difficult to exaggerate the economic, nutritive, and cultural importance of this palm in Amazonia. Together with manioc flour and fish, the açaí (*Euterpe oleracea*) juice constitutes the staple meal of thousands of riverine populations. The current exploitation of açaí palm constitutes one of the most important economic activities on Marajó Island.

Every açaí palm yields several fruit stalks, containing about a thousand small fruits each (Smith 2002: 82). These blueberry-sized fruits consist of a hard seed surrounded by a thin (1-2 mm) layer of purple pulp. The pulp represents from 5 to 15% of the fruit's volume (Rogez 2000: 68). After released from the stalk, the fruits are washed and soaked in water for a while in order to soften the pulp. The fruits are then kneaded by hand over a sieve, while water is added. This is done several times until all the pulp has been extracted and diluted in water, producing a thick purple juice of high caloric value and exquisite taste. Five kilos of fruit are necessary to prepare,

on average, 3 liters of juice (Rogez 2000: 108). One liter of prepared açaí juice has 2.6 grams of protein, representing 25 to 30% of the daily protein need (Rogez 2000: 173).

A comparative study on the aminoacid content of açaí, indicated a profile similar to the chicken egg (ibid.: 174-5). The same study also compared açaí to castanha-do pará (Brazilian Nut) and palmito (heart of palm) indicating that castanha-do pará and açaí can complement each other, although both castanha and palmito show some deficiencies in several necessary aminoacids. The açaí is also rich in lipids, fibers, iron, as well as vitamins A and B.

When cut at the base, the açaí sprouts again; therefore a rational exploitation can yield both heart palms and fruit for several years (Smith, et al. 1992: 308). Industries in the State of Pará have developed technologies for exporting the juice in a dry or frozen form. In markets such as São Paulo and Rio de Janeiro it is sold as an energy drink for people concerned about their healthy lifestyles and fitness. In Amazonia, it is common lore that the consumption of açaí juice creates psychosomatic dependence. It is an allusion to the fact that adult and children often refuse to have dinner if there is not açaí on the table. Drinking the juice in fact creates a sense of satisfaction because of its high (52.6%) lipid content (Rogez 2000: 88).

Studies have indicated that açaí palms are adapted to soils with poor levels of P, N, Ca and Mg, due to two main mechanisms. One is the presence of bacteria that fix the N on the aerial surface of their roots. In addition, due to the large amount of roots, the palm is able to extract nutrients from a large volume of soil (Rogez 2000: 52). Açaí trees in general occur together with other trees, especially because young trees need protection from the sun. For this reason, açaí trees are usually found associated with *buriti*, another palm (ibid).

Three years after planting, the açaí fruits can be harvested, but the maximum production occurs in five to six year-old trees. Eighty percent of the production is obtained in three months, although it produces from four to six months. The period of harvesting vary according to climatic conditions, humidity and cultural practices, but in general occurs twice a year, with peaks in

January and July (Rogez 2000: 69). At the Anajás River basin, the period of maximum productivity is between January and May.

The consumption of açaí in Amazonia was reported by early travelers, as well as was by colonial documents (Smith 2002: 78-9). Açaí seeds and bark were identified during the excavations at the Belém mound (M-17), indicating it was consumed at the site since at least A.D. 700 (see Chapter 5).

Sources of Carbohydrates

Three possible sources of starch (palm, manioc, and rice) for Marajoara populations have been suggested in the specialized literature. Based on the available data, it is neither possible to evaluate which one of these options was in fact in use, nor to assess their relative importance in the diet. The ceramic assemblages, however, seem to indicate that a major source of starch was used. The presence of griddles may indicate both baking of *beiju* (flat manioc bread) and roasting of the sieved dough to produce crunchy flour. The abundance of mortars is consistent with grinding of shredded palm pith or manioc (see Chapter 6).

Buriti Palm

Considering the unsuitability of the low savannas for agriculture and the need to envision a staple food resource for Marajoara populations, Meggers (2001b) has proposed that prehistoric populations may have used palms for starch. The use of palms for starch has been recorded mainly among foragers, probably because sedentary populations would have to travel constantly in search of palms. In spite of the availability of palms in South America tropical forests, it is unclear why palm starch is not widely used among ethnographic societies. Piperno and Pearsall (1998: 58) point out that it may well be related to historical factors or availability of other forms of starch.

The utility of palms for human populations in the tropics cannot be overemphasized. These are trees that propagate by seeds naturally, and can also be planted. They require humid soils; for this reason they are well-adapted to flooded areas. Buriti (*Mauritia flexuosa*) is one of the most useful palms in the Amazon. The leaves can be used in roofs and weaving, producing hammocks, baskets, and *tipitis* (a tube used to press squeeze water out of manioc dough) (Smith 2002: 102-03, 140-41). The sap can be used to prepare brown sugar, alcoholic beverages, and yeast. The starch can be transformed into flour, starch pearls (like tapioca), and bread. The kernel of the nut yield oil similar to food oils. The larva that grown in felled trunks is collected and eaten (Hill and Gurven n.d.). The vitamin A and C rich fruits are used to produce soft drinks and alcohol.

Extracting and processing starch from buriti can be very time consuming, but rewarding. Yet a few indigenous groups use the starch of buriti as a staple source of carbohydrates, among them the Warao of the Orinoco delta, in Venezuela, and the Ache of Paraguay (Hill and Gurven n.d.; Meggers 2001b; Roth 1929). There is no information on the prehistoric uses, but there is ethnohistorical information that the Aruã who inhabited the mouth of the Amazon at the time of contact used buriti starch to make bread and its fruit to make juice (Smith 2002: 102). According to Balick (1988), the use of palms among native populations has decreased proportionally to the degree of acculturation, caused by the adoption of the cultivation of modern crops.

The buriti starch can be extracted year round, but the Warao concentrate this activity during the dry season, and the products are stored for extended consumption. The advantage of the use of buriti for starch is its productivity, because the pith is present in similar proportions along the entire length of the trunk, while in many palms it is concentrated in the upper part of the stem. A single tree may yield 2 to 50 kg of wet starch, correlating to up to 30 kg of dry product (Cecil n.d.). The extraction of starch consists of cutting the tree, opening the trunk and chopping the pith. The pith is carried to the village, where it is beaten or grinded to remove the starch and

wood flakes. Then it is mixed with water, kneaded and washed, in order to clean the starch from impurities. The clean starch is let dry in the sun or over a hot griddle.

Buriti palms are widely present on Marajó Island, especially on the northern coast and northwest of Lake Arari (Nigel Smith, personal communication 2004).

Manioc

A large body of evidence indicates that manioc *(Manihot esculenta* Crantz), in the form of its many sub products, constituted the basis of the indigenous diet in the Amazon basin (Acuña 1859; Carvajal 1934; Reis 1940: 94; Schmidt: 61) as it does today among native Indian and non-Indian (c*aboclo)* populations. Cultivation and processing methods observed ethnographically are believed to replicate prehistoric ones, although a great degree of variability should be expected, as observed also among living indigenous populations (Carneiro 1961, 1983; Chernela 1997a; Heckenberger 1998; Meggers 1971).

Basically the preparation of the plot for planting manioc tubers consists of cutting the trees, frequently leaving the large trees standing in order to protect the young crops from the sun's heat. The vegetation is left to dry and it is later burnt. The preparation of the plot and planting occurs in general at the end of the rainy season. The tubers will grow throughout the dry season and can be harvested in 8 to 12 months, although they may remain in the soil and still be good for another year.

Manioc can be planted continuously during the dry season, instead of in cycles, meaning that at the time a tuber is harvested, some cuttings from the stems can be replanted right away in the same garden (Carneiro 1983: 89; Lathrap 1973: 174; Schmidt 1974: 68). A plot can be cultivated for 2 to 3 years before shifting to another field. It is also a good strategy for a family to

keep more then one garden producing, as a buffer strategy against predators, as well as to have the cultigens always available (Carneiro 1983).

If the manioc is planted during the dry season, it will not be harvested before the next dry season. Manioc can grow even in low nutrient soils, but requires good drainage. For this reason, it is better adapted to the *terra firme* than to *várzea* environments (Morán 1989: 23; Piperno and Pearsall 1998: 124-25).

Aboriginal groups cultivated hundreds of different varieties of manioc, and frequently developed new types, keeping a variety in the same garden (Carneiro 1983: 81). This genetic diversity guarantees productivity in face of a diversity of habitats and potential environmental conditions (Carneiro 1983; Chernela 1997b; Smith 1999). Bitter manioc was preferred, although its processing is more time-consuming than the sweet variety, because of the need to remove the toxic cyanide before consumption. Scholars believe that the bitter variety was favored for several reasons, including (1) the quality and quantity of starch that could be obtained, allowing for storage and facilitating transportation (Lathrap 1973: 173-75; Piperno and Pearsall 1998: 124); (2) the higher productivity obtained with bitter manioc, because the cyanide content acted as a barrier against herbivores (Moran 1995; Wilson 1997); and (3) it is a crop that grows in soils that are inadequate for other crops, and can resist climatic fluctuations, as long as there is good drainage (Piperno and Pearsall 1998: 125-25).

Carneiro (1983: 93) observed that, among the Kuikuro of the upper Xingu, harvesting was more intense during the dry season, when much work would be invested in processing manioc into flour, in order to store for the winter months. While the sweet variety can be easily consumed boiled or baked (like potatoes), the bitter manioc requires a more complex and time-consuming process. Initially the tubers are peeled and either soaked in water for several days or grated, and crushed in a mortar. The resulting dough or shredded paste is squeezed through a basketry tube made out of palm fibers (*tipiti*) in order to remove the poisonous juice. The dough

is sieved and roasted on a large griddle to produce *farinha* (flour). The *tucupi* juice that is squeezed out of the manioc paste can be boiled to evaporate the acid and used as a sauce for other dishes. A fine starch that is produced by the decantation of the *tucupi* is also used in other dishes or transformed in flat pancakes (*beiju*) (Carneiro 1983; Meggers 1971: 126; Roth 1929: 216; Smith 2002: 140).

Manioc leaves (*maniva*) can also be processed and eaten. The method consists of cooking them for several days to remove the acid, after which they are seasoned with meat or fish. The *maniçoba*, an exquisite dark green stew prepared with various dry, smoked and fresh meats as well as *maniva* is highly desired among modern Amazonian populations.

Traditionally, the archaeological identification of manioc consumption was on the basis of the presence of material culture related to its processing. Accordingly, stone grater teeth or large flat pottery griddles (Lathrap 1973: 175) were commonly taken as indicating manioc processing. However, this may not always be the case. A study carried out on lithic remains of grating boards collected from a site of the middle Orinoco basin dated to the eighth century tells a different story. Starch remains on flake lithic tools that were once part of a grating board showed the presence of many other starchy roots, such as arrowroot, guapo, yam, ginger, and seeds, among them maize and palm, indicating multiple uses for the board (Perry 2002). Although it is not completely clear for the author why manioc starch was not present, Perry considers that the simple presence of such tools cannot be confidently associated with manioc processing. The same observations can be extended to griddles as well, which could have been used for either maize or manioc (see DeBoer 1975 for a full discussion).

Marajó Island economy has been directed, since the colonial period, to cattle ranching and extraction of natural products, which has inhibited any attempts at cultivation. Although some pockets of cultivation can be found in several locations on the periphery of the savannas, it exists on a very modest scale, and only on a temporary basis (Neto 1993; Smith 2002). Sweet and bitter

varieties of manioc are presently cultivated in the Anajás river area, although its production is restricted to a few small plots in the gallery forest along rivers.

Cultivation on the western portion of the Island, on the other hand, in patches of *terra firme* forest was more productive and common (Carvalho 1874: 364). Nevertheless, Nigel Smith (personal communication 2004) believes that manioc could have been cultivated on Marajó campos, especially short-cycle varieties that could be harvested before the return of the wet season. Moreover, practices observed for the várzea agriculture, such as establishing schedules for planting and harvesting and reburying tubers in pits on non-flooded areas before the inundation (Meggers 1984: 643), could also have been used on Marajó. In any case, cultivation on the savannas would have to have been on raised fields and in the presence of shady trees in order to protect the new plants from the sun's heat.

Rice

Self-pollinating species of wild rice (*Oryza glumaepatula*) are found in open habitats, usually swamps and marshes or even open ditches and pools next to rivers, with a distribution that extends from Mexico to central Brazil. Genetic studies demonstrated that gene diversities increase from the upper to the lower Amazon basin, indicating that gene flow had been proceeding in a one-way direction. This species was also found in areas of the estuary near Marajó (Akimoto, et al. 1995).

Several species of wild rice have been observed along the Amazon *várzea*, used by native populations to produce wine or bread (Meggers 1984: 639), suggesting that rice could have been either exploited or cultivated intentionally centuries ago (Brochado 1980: 66; Meggers: op.cit.). Patches of wild rice were observed in the vicinities of Lake Arari, on Marajó, at the end of the 19th century (Steere 1927), and more recently in other locations of the *campos elevados* (Neto 1968).

During the 18th century, the Portuguese introduced the Carolinas' rice (*Orzya sativa*) prohibiting the cultivation of native rice in favor of the Asian variety, which was considered more productive under the colonial methods of processing (Smith 2002: 145). However, patches of wild rice in the estuary continued to grow even without proper management. Recently, a Marajó rice variety was reportedly grown by a farmer on a floodplain area along the lower Xingu river (Smith 2002: 146).

In sum, evidence indicates that wild rice was available to indigenous populations prior to the cultivation of the Asian variety for commercial purposes during the colonial period. Ecological conditions may have favored rice cultivation, but, as colonial documents report, manioc was preferred among aboriginal populations, who cultivated it for their own consumption (Reis 1940: 94).

DISCUSSION

In order to model and study aboriginal subsistence strategies in Amazonia, scholars have historically relied on ethnographic studies of surviving indigenous groups, which despite the population losses and displacement suffered in the last five hundred years, still represent a living testimony of human adaptation to tropical forest ecosystems. Research among *caboclo* populations are also regarded as important in providing information on strategies of food production, since their household economies are organized around traditional practices such as hunting, fishing, foraging and slash-and-burn cultivation. Although the *caboclo* communities tend to rely both on conventional forest products and industrialized goods obtained from the city markets, they maintain some traditional knowledge that is in fact instructive on the relations between human societies and the tropical forest environment (see, for example, Frechione, et al. 1989; Morán 1995: 76; Murrieta, et al. 1999; Smith 1995).

Aquatic resources are considered to have been a major protein source for aboriginal Amazonians, favoring sedentary settlements, population growth, and the development of complex social systems (Carneiro 1970b, n.d.; Lathrap 1970b; Meggers 1984; Moran 1993; Roosevelt 1980). Often, a combination of aquatic resources and agriculture has been emphasized. Carneiro (1970b: 245) points out that the availability of aquatic resources encouraged sedentary life, agricultural development, and population growth.

Although scholars are ready to accept that the exploitation of aquatic resources favored sedentary life and population growth, they are reluctant in considering those resources as a staple food source that could also generate surplus. Seasonal fluctuations in water levels in the várzea and flooded savannas, for example, have been regarded as a major limitation of such a subsistence system (Meggers 1984: 643; Roosevelt 1991b: 20). Meggers (1994b: 411; 1995b: 73) has pointed out, however, that seasonality could be mitigated by exchange between neighboring groups, who occupied environments with different productivity levels.

Beckerman (1994), instead, points out that although water levels and fish migratory patterns may be factors that affect seasonal availability of aquatic resources, fishing is still a very reliable source of protein in Amazonia if compared to other foods. In fact, aquatic mammals can yield as much protein as large terrestrial animals. Turtles and reptiles can be kept alive in pens. Fish availability can be predicted on the basis of spawning and feeding behavior, allowing for mass capture in optimal areas where they are isolated in shallow water and ponds. Aquatic resources allow for a type of management and consumption patterns that could be more accurately described as husbandry or farming, instead of the traditional comparison with hunting.

Ethnohistoric and ethnographic evidence suggest that aboriginal population developed an array of different techniques for the capture and storage of aquatic resources, in the face of diverse geographic and seasonal conditions. Reported methods include spearing, angling, netting, trapping and poisoning. Use of traps, dams and weirs are also reported and may include more

permanent facilities. In shallow waters and small streams, the use of poison obtained from either wild or cultivated plants is widely disseminated in Amazonia (Bates 1979 [1876]; Beckerman 1994; Chernela 1989; Heizer 1997; Jackson 1983; Meggers 1971, 1984; Roth 1929; Vickers 1989). High productivity in fishing is obtained when there is territorial control, especially since some permanent devices, such as traps and dams, require periodical maintenance (Moran 1995). In the upper Uaupés, for example, access and control of the most productive fisheries has established patterns of hierarchy, mirrored in the kinship system (Chernela 1997b).

Techniques for storage of aquatic resources have also been observed. The Siona and Secoyas, a Tukano group living at the Aguarico River, a tributary of the Rio Napo, smoked turtle eggs in order to keep them edible for months (Vickers 1989: 127). Fish and meat could also be preserved in manatee fat or turtle oil (Meggers 1984: 641). Early chronicles reported that fish and turtles were kept in corrals and pens to be eaten when needed, while dried fish was also used for trade (Acuña 1859; Carvajal 1934; Ferreira 1974; Porro 1994; Whitehead 1994). Aboriginal populations were also concerned with the preservation of fisheries. The Tukano, for example, have restricted rules regarding the preservation of the riparian forest, which is an essential source of food for aquatic animals (Chernela 1989). The literature on Amazonian ecosystems (Goulding, et al. 1996; Sternberg 1995) emphasizes the abundance of aquatic life, even today, when logging, cattle ranching and fires have greatly reduced the flooded forests necessary for the reproduction and sustainability of fisheries.

In order to maintain large, dense, permanent settlements, and generate surplus, aboriginal subsistence strategies must have involved intensification of production of foodstuffs that could be stored. If past societies relied in some measure in foraging, such an economy would be only supplemental, unless resources were so abundant and the use of effective and sustainable ways of obtain them in large quantities was so efficient as to produce food in levels frequently only attained by agricultural economies.

Marajoara mounds are located in areas highly affected by seasonal variation in water levels. These areas are known to islanders to provide abundant aquatic resources when the waters subside and natural ponds and pools retain aquatic animals that cannot return to the rivers. This natural reflux of water and biological behavior of aquatic species is in some measure managed today, through simple techniques such as damming small streams and poisoning ponds. Although poorly managed, these resources are still highly productive. Practices of water-management at ranches located at open savannas, such as the construction of *rampas* (ponds to retain rain water) and the damming of streams, indicate that timing of flood and drought requires administration in order to guarantee the survival of people and livestock in those locations. It is indeed unconceivable that aboriginal population would not practice some type of water management, given the location of their settlements. For this reason, verifying whether aboriginal peoples managed water in order to intensify the gathering of aquatic resources, or perhaps to develop some form of irrigation for agriculture, awaits further archaeological investigation.

Hypotheses about the nature of aboriginal subsistence systems on Marajó Island were often constructed over mistaken assumptions that the savannas, that dominate the eastern part of the Island, were in fact an enlarged Amazon *várzea* (Brochado 1980: 50; Roosevelt 1991b: 8). This assumed ecological analogy was employed to propose that intensive systems of cultivation had developed there, supporting the level of social complexity observed for Marajoara Phase. This ecological argument was not based on any actual evidence for intensive cultivation, but it was in fact founded on a tautological assumption. The reasoning, without archaeological evidence, was as simple as follows: (1) Marajoara was complex; (2) complex societies developed on the basis of intensive agriculture, therefore (3) Marajoara societies had developed intensive agriculture.

There is no evidence, to date, that intensive systems of crop production once developed on Marajó Island savannas. Such an enterprise would require the use of raised fields, water

drainage systems and the use of short-cycle crops. This economy would be at serious risk due to the unpredictability of the timing of the seasons. A severe summer, a delayed or an intense winter are uncontrolled situations that greatly affect agricultural production in this type of environment. In any case, had the Marajoara improved the soil through addition of nutrients and created raised fields in order to deal with the flood water, these earthworks should be visible. If they are not, it may well be the case that ancient raised fields are covered with vegetation and have been overlooked by previous research. In Llanos de Mojos, for example, raised fields were first seen from the air, and the study of landscape management in that region is still done with the use of aerial survey and aerial photograph in order to improve archaeological visibility (Denevan 1966; Erickson 2000).

On Marajó, hypotheses on ancient subsistence systems must be built both on the basis of the local ecology and the archaeological evidence. Local ecological conditions and preliminary archaeological evidence point to a focus on intensified fishing instead of agriculture. The interpretation effort here may have to shift from denying that intensive agriculture could have ever developed, to explaining why agriculture did not develop. Particularly, it is necessary to evaluate the ecological environment correctly in order to understand why intensive exploitation of aquatic resources was eventually the chosen strategy.

Here, it is not denied that Marajoara peoples could have practiced some form of cultivation. Ethnographic research have demonstrated that indigenous populations have employed several expedients in order to improve soil conditions, such as the use of dried fish as fertilizer, and building raised fields with soil removed from swampy areas (Posey 1989; Schmidt 1974: 64-5). Although these techniques are usually restricted to gardens and small fields, there is also evidence that manioc cultivation can be highly productive, even in poor soils (Carneiro 1961). For this reason, would not be totally impossible that aboriginal populations had developed

some type of technology to improve their soils and intensify crop production. But there still remains one important question. Did they?

Acquainted with both soil studies and a first hand knowledge of Marajoara environment, it is not surprising that Betty Meggers spent good part of her career puzzled by the fact that "the most complex representative of the Polychrome Tradition occupies the region with the least favorable conditions for agriculture" (Meggers 2001b: 423). In an article suggestively entitled "The Mystery of Marajoara", Meggers (op.cit.) presented the interesting hypothesis that Marajoara populations could have subsisted on palm starch.

The use of palm starch among a few indigenous groups, such as the Warao and the Aché, the antiquity of palm exploitation, the geographic distribution of populations that use palms for starch, as well as the availability of palms on the Island, especially on the southwestern area, were proposed as circumstantial evidence to support this hypothesis (Meggers 2001b: 427). Other arguments presented by Meggers (ibid) are: 1) the similarity between the "stoves" found by Roosevelt in Teso dos Bichos mound and ethnographic wooden troughs used for starch processing; 2) stone tools that could have been used to shred the fibers; 3) the vulnerability of palms to climatic changes, which could explain subsistence stress and the demise of Marajoara.

The proposition and the arguments above deserve close scrutiny. Although the exploitation of palms for starch has been observed ethnographically, it is curious that an economy that existed for about one thousand years would not have survived to historical times, especially if we consider the abundance of palms on the Island and the widespread use of their sub products throughout the colonial times and among modern-day societies. Another problem is the fact that palms are more abundant in the western part of the Island, while the archaeological sites are located on the east. Populations could travel to gather the starch, but would it not make more sense to Marajoara populations to live closer to their resources instead? It appears that if palm starch was used, its exploitation was not the economic basis of the society. Palm starch could

have certainly been a major source of calories for Marajoara populations in a diet that had fish and açaí as its main protein intake.

In accepting that a wild food basis could have supported the development of social complexity, it is important to emphasize that this economy would not consist of seasonal fishing and gathering in the way foragers or simple horticulturalists do, but of intentional landscape management in order to maximize production, much in the fashion that farming populations do. By constructing fish reservoirs and managing wild plant species in optimal areas for their reproduction, aboriginal populations would have taken advantage of an ecosystem that, although poorly suited for agriculture, was highly productive in wild food resources.

Archaeologists still know little about complex social systems that have arisen on a wild food basis. However, considering that as a possibility will certainly improve the chances of correctly assessing ancient subsistence systems, as well as opening new opportunities for understanding complex societies whose political economies differ from models with which archaeologists are more acquainted.

Chapter 3

PREVIOUS INVESTIGATIONS AND RESEARCH PROBLEMS

The known distribution of archaeological sites on Marajó Island is biased by localized surveys, as well as scattered references provided by naturalists, geologists, travelers, and looters throughout the years. While the eight to 12 m high ceremonial mounds are easily located both by their contrast to the otherwise flat landscape and the abundance of decorated pottery sherds on eroded banks, less monumental sites both on the savannas and on the forest have been inadequately documented. Even mounds located in less populated and remote areas, such as headwaters of small rivers, although known by the local population, have not been referred to in publications.

Until the mid-20th century, only the Marajoara culture was known to Marajó Island. The present knowledge of occupation predating Marajoara phase is credited to the pioneering work of Meggers and Evans in 1948-9, and Hilbert in 1950-1, as well as surveys conducted by Simões and his colleagues during the 1960s. Meggers and Evans demonstrated that pre Marajoara populations occupied diverse environments on the north and center of the Island, while Simões, Corrêa and Figueiredo expanded that research to the southeast, providing data on the coexistence of different phases in the same environment, with overlapping chronological periods.

Although scholars have denied continuity between Marajoara and the previous phases, data produced by previous research is the only available material with which to hypothesize such a link. Since complex societies are expected to evolve from previous social formations (Carneiro n.d.; Steponaitis 1991), an acquaintance with the cultural development before the advent of Marajoara Phase is important for understanding the rise of Marajoara culture, as well as its quick spread throughout the Island and the social institutions that then developed.

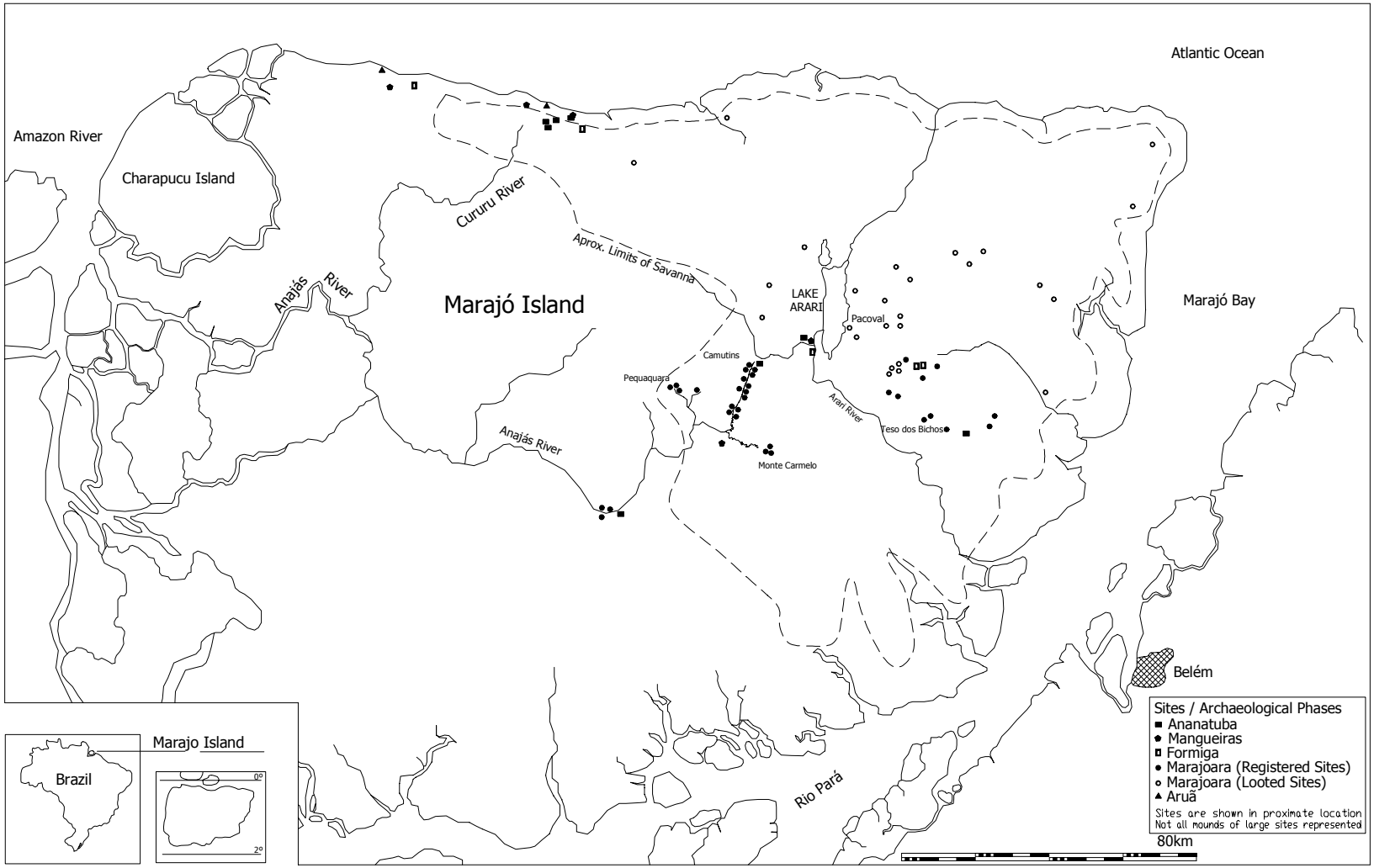

Figure 2 – Location of archaeological sites on Marajó Island

In this chapter, previous research is first reviewed in chronological perspective. After that, the results of that work are summarized and discussed. Figure 2 shows the location of sites here mentioned.

PREVIOUS RESEARCH ON A CHRONOLOGICAL PERSPECTIVE

The existence of ancient cemetery mounds on the Marajó Island savannas was being reported by scientists and government personnel by the late 19th century. In a context of widespread scholarly interest on preserving "primitive" culture, by bringing ethnographic and archaeological artifacts to museums, occasional expeditions to the mounds generated the first bits of information about Marajoara culture and its environment, published in the form of short articles in multidisciplinary journals (Derby 1879, 1898; Hartt 1871, 1876; Marajó 1895; Netto 1885; Ferreira Penna 1879, 1885).

Through surface collections, site measurements, and non-professional excavations, the pioneers provided information that, for decades, constituted all the knowledge available about Marajoara societies (see Barreto 1992b; Palmatary 1950 for reviews). The 19th century scholars reported the existence of domestic and funerary structures intermeshed in a complex stratigraphy, which included burial groups distributed in up to three different levels. They described the existence of both primary and secondary burial, as well as cremation, pointing to possible chronological variability in funerary practices. The mortuary furniture, constituted mostly of ceramic objects, such as stools, plates, bowls, figurines, *tangas* (feminine pubic covering), and a few stone objects was suggested to vary according to social status and gender.

Differences in pottery styles and decoration techniques between Pacoval and Camutins mounds were often emphasized. Hypotheses about the origins of such complex society and their religious and symbolic systems were debated. The iconography was also explored and compared

to other areas. By the end of the 19th century, not many more than a dozen mounds or mound groups had been reported. However, the published reports represented only a small portion of all the expeditions, since, by this time, looting was already a problem. Ferreira Penna, who founded the Museu Paraense, was very concerned with the preservation of the archaeological sites, but unfortunately his proposed preservation laws did not find supporters (Cunha 1989: 28).

During the early 20th century, the investigations continued, with increasing participation of American and European scholars who performed more extensive excavations (Farabee 1921; Holdridge 1939; Lange 1914; Mordini 1936, 1947), without, however, significant advances in the knowledge of the prehistoric occupation. Field notes were scanty and in general failed to associate particular artifacts to archaeological contexts. Ending up in either museums or private collections, the polychrome ceramics were often separated from the information about their site of provenience. Moreover, as looting increased throughout the 20th century, locals had no interest in reporting the origin of the objects, since ceramics were often stolen without the consent of landowners.

The increased availability of Marajoara ceramics in museums also generated interest in the study of collections. Since the beginnings, some short publications appeared, focusing either on specific artifacts, such as tangas (Figueiredo 1956; Hartt 1876; Mordini 1929), or iconographic themes or collections (Netto 1885; Torres 1940). On the other hand, two major works, written by Betty Meggers (1945) and Helen Palmatary (1950) provided summaries of early work, and described pottery manufacture, vessel forms, decorative styles, and established systems of classifications.

Palmatary's work was important for making available the previously unpublished fieldwork notes of William Farabee and Antonio Mordini, in an amazingly well-illustrated book. Her system of classification, however, is complicated and not very useful (see also Meggers and Evans 1951). Meggers publication, on the other hand, focused on pottery collected by Steere

from Pacoval and Teso dos Bichos mounds in 1871, presents a better system of description for the ceramics, as well as discusses the archaeology of the mouth of the Amazon in a broader context. It was significant for she became familiar with the complexity of Marajoara ceramics, thus setting the foundation for her future work.

The "exploratory phase" of Marajó Island archaeology came to an end with the extensive work conducted by Betty Meggers and Clifford Evans (then Ph.D. students of the Columbia University) at the mouth of the Amazon in 1948-9 (Meggers and Evans 1957). On Marajó, their research concentrated both in the area around the city of Chaves, located on the northern coast, and in the Anajás River headwaters, where the sites of Monte Carmelo and Camutins are located (Figures 1 and 2). As a result of their research, the knowledge of the prehistoric occupation expanded, encompassing also cultures that predated and postdated the mound builders.

Meggers and Evans identified six different ceramic complexes or phases on the islands (Mexiana, Caviana and Marajó), which they defined as populations that succeeded one another, although they coexisted for certain time periods, occasionally in the same sites. Ananatuba, Mangueiras, Acauan, Formiga and Aruã phases were conceptualized as tropical forest phases, and described as small groups of hunters-gatherers-horticulturalists, who systematically moved their settlements as a function of resource exhaustion.

The fifth phase, Marajoara, was described as socially complex, bearing traits of the Circum-Caribbean chiefdoms. They suggested that Marajoara populations had migrated from areas where agriculture intensification was possible and could support dense, sedentary populations, division of labor, and development of complex sociopolitical systems.

A ceramic typology created by Meggers and Evans was used to investigate chronological trends, following the Ford method of ceramic seriation. Relative frequencies of two major plain types, which differed from one another by their core color, were observed to change through time in all the studied phases. This was used to establish a relative chronology between sites of a same

phase. The use of this methodology was based on the assumption that refuse accumulation did not represent continuous occupations, but several repeated episodes of abandonment and reoccupation.

Meggers and Evans (1957:423) concluded that the ceramic cultures were not indigenous to Marajó Island, and represented successive waves of migrants that most likely came from the North. A relative chronology between the phases was developed based either on contact or lack of contact between the phases. A tentative absolute chronology was suggested based on rates of sherd refuse accumulation, and considering the Aruã phase as partially contemporary with the European occupation. According to their hypothesis, the Ananatuba phase began at circa A.D. 700 and lasted to about A.D. 1070. Mangueiras phase was partially contemporary with Ananatuba, existing from A.D. 850 to A.D. 1180. Although they did not find direct evidence of contact of between Formiga and the previous phases, Formiga was assumed to have appeared at the end of Mangueiras. The Formiga phase had a short duration of about 75 years and witnessed the arrival of Marajoara populations at about A.D. 1250. Marajoara would last until A.D. 1450 and had some contact with the Aruã (Meggers and Evans 1957: 421-423).

The Aruã phase is thought to have been introduced to northern Marajó Island just before contact, coming from the Amapá and settling first on Caviana and Mexiana Islands. Meggers and Evans saw cultural affiliations between the archaeological Aruã and the Arawak of Greater Antilles. The Aruã occupation, therefore, would reflect a minor migration to the Guianas and from there to Amapá and the islands (op. cit.: 555).

During the survey at the upper Anajás River, Meggers and Evans were assisted by Peter Paul Hilbert, ethnologist of the Goeldi Museum. A year later, together with Harald Shultz and Myrthes Nogueira, from the Museu Paulista, Hilbert went back to the Camutins area, recording other 17 mounds and areas with ceramic sherds along the riverbanks. He also excavated Cuieiras (M-30) and Furinho (M-34), cemetery mounds of the upper Camutins River (see Chapter 5 and

Appendix B). Additionally, Hilbert visited and collected surface material from Pacoval site, and located another Mangueiras site (Flor do Anajás) (Hilbert 1952). In 1951 Hilbert visited Caratatéua, Pacoval dos Mello, Teso dos China and Teso do Severino, all mound groups located east of Lake Arari. The data was incorporated in Meggers and Evans 1957 publication. Meggers and Evans work filled in a gap in the archaeological knowledge of the area, providing an exhaustive corpus of data on settlement patterns and ceramic industries. Their work, however, generated some criticism from scholars who did not agree with their methods or their theoretical assumptions.

The period that followed Meggers and Evans investigations at the Amazon delta was characterized by an intensification of looting, despite legislation protecting the archaeological patrimony and regulating the study of archaeological sites, published in 1961 (http://www.iphan.gov.br/legislac/lei3924.htm). In 1962, Mário Simões, then in charge of the Division of Archaeology of the Museu Paraense Emílio Goeldi, together with Napoleão Figueiredo, professor of the Universidade Federal do Pará, and Conceição Corrêa, a student, initiated the Marajó Project, surveying a large area between the Camará and Goiapi Rivers headwaters, on the southeastern portion of the savannas (Simões and Figueiredo 1965).

The research was conducted according to Meggers and Evans methodology, and under the same assumptions that guided their previous work, classifying the newly discovered sites according to the known phases (see Schaan 2001e for a review of that work). From this area, only Fortaleza and Teso dos Bichos mounds were known from previous researches. But in the same area, Simões and Figueiredo identified five other ceremonial and three habitation Marajoara phase mounds. Additionally, a group of seven Formiga phase mounds was recorded, as well as sites showing contact between Formiga and Marajoara phases. The Castanheira site, on the other hand, showed contact between Ananatuba and Mangueiras phases (Figueiredo and Simões 1963; Simões 1967, 1969) (Figure 4).

The published data of the Marajó Project did not add much to the previous work. As Simões pointed out, since the prehistoric sequence was already known, there was only the need to identify new sites and collect ceramics for seriation (Simões 1967: 213). The dating of charcoal samples from two sites was seen, therefore, as their main contribution. It was now possible to place the prehistoric sequence within an absolute chronological scheme.

The absolute dates demonstrated that the prehistoric occupation had begun much earlier than previously thought. At the Castanheira site, a period of contact between Ananatuba and Mangueiras phase was dated to 980 ± 200 BC (Simões 1969). The time span of Marajoara phase, formerly estimated by Meggers and Evans as two hundred years, had also to be revised, due to the early dates (A.D. 480 ± 200 and A.D. 580 ± 200) obtained for the Marajoara phase at Frei Luis mound (Simões 1971).

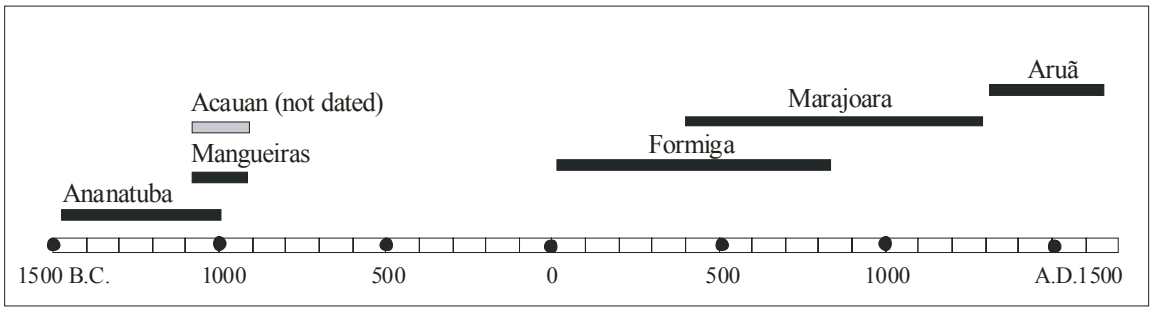

Figure 3 – Chronology of the archaeological phases

Some other comments have to be made regarding the Marajó Project. It is unfortunate that Meggers and Evans' assumptions were followed so uncritically, obscuring important data that was not even mentioned in the publications. For example, laboratory notes indicated the consistent presence of both Marajoara and Mangueiras ceramics in 40 cm of deposits and surface collection of Ilha da Ponta mound. Additionally, a different ceramic industry, as well as burials identified at Ilha Pauxis site were not mentioned (Schaan 2001e).

Although no new fieldwork research would take place on Marajó Island for two decades, Donald Lathrap encouraged some of his students to study Marajó Island archaeological data. Their work represented the first critiques specifically directed to Marajó data, since the reconstruction of the prehistoric way of life proposed by Meggers and Evans was at that time widely accepted, at least among Brazilian scholars.

As part of this group, Thomas Myers (1973) analyzed data on site size and location in order to evaluate settlement pattern evolution. He observed that there was a shift in site shape, size and location through time. Oval shaped settlements in Ananatuba and Mangueiras phases turn into lineal mounds in Formiga and Marajoara phases. Size also increases. At the same time, intentional mound building starts during Formiga phase. Myers tries to correlate this data with population figures and levels of social organization. He suggests that there was a continuum between Marajoara and the previous phases, both in ceramic technology and mound building practices (ibid.).

Another important, but rarely cited work is Joanne Magalis' Doctoral Dissertation on a seriation of Marajoara ceramics. Magalis criticized Meggers and Evans methods of ceramic seriation, which established that the Pacoval site was earlier than the Camutins site. Magalis suggested that the different frequencies of potsherds belonging to the two plain types, which were used to establish the relative chronology, might be caused by geographical and environmental variation instead of chronological change. Accordingly, use of different types of clays, as well as fuel materials could cause the type of variation in core color that was used to demonstrate temporal differences in firing techniques (Magalis 1975:13).

Magalis proposed a seriation based on features observed on anthropomorphic funerary urns, correlating this seriation with other phases of the Polychrome Tradition. According to her study, the Pacoval variant of Marajoara style shares more features with other late phases of the lower Amazon (see Chapter 7). In this sense, Camutins sites would be earlier than Pacoval and

other sites located on the eastern floodplains, inverting the chronological position of sites proposed by Meggers and Evans.

Another of Lathrap's students, José Brochado, also criticized Meggers and Evans work, based on a different understanding of Marajó Island's ecology. In his 1980 Master's Thesis, entitled "The Social Ecology of Marajoara Culture", he developed an evaluation of subsistence systems that would later influence Roosevelt's research.

Despite the criticisms, Meggers and Evans maintained throughout the years that their understanding of Amazonian prehistoric cultures were accurate, seeking support in ecological, ethnographic and archaeological data (Meggers 1971, 1982, 1985a, b; Meggers and Evans 1973). Although Meggers did not return to excavate on Marajó, she has continuously elaborated on her theories of cultural development in the tropical forest.

In a 1988 article, Meggers and Danon (1988) discussed environmental data that might relate to the duration and demise of the tropical forest phases, as well as Marajoara phase. The study provided several thermoluminescence dates for sites investigated during the late 1940s and the 1960s. Meggers and Danon proposed that the savannas and gallery forests along the rivers were occupied during two separate episodes. During the first one, from at least 3500 B.P until 2800 B.P., Ananatuba and Mangueiras populations were present. The Formiga phase appeared after an arid episode (between 2800 and 2000 B.P.), documented in a pollen core collected at the Lake Arari. They suggested that climatic fluctuations, causing a shortage of food resources, would have caused population movements. The thermoluminescence dates also established that Formiga phase dated to A.D. 1 to A.D. 835, overlapping Marajoara Phase (A.D. 400 – 1350) for about 400 years. Other documented arid episodes (1500 B.P., 1200 B.P. and 700 B.P.) are suggested to relate to the beginning of Marajoara phase and the arrival of the Aruã (Meggers and Danon 1988: 250).

Research on archaeological sites was resumed during the 1970s, by José Alencar Alves and José Seixas Lourenço, who were pioneers in employing geophysics at archaeological sites in Brazil. One of the sites chosen for their research was Teso dos Bichos, already studied by Steere in 1871 and by Simões and Figueiredo in the 1960s. Using electroresistivity and magnetometry, the authors elaborated on the relationship between geophysical anomalies and cultural features (Alves and Lourenço 1981).

Lourenço later encouraged Anna Roosevelt, who was studying ceramic collections at the Goeldi Museum in 1982, to further explore geophysical survey in Teso dos Bichos. Counting on local support and previous knowledge of the potential of geophysics applied to the study of that mound, Roosevelt then developed a research project in which geophysics played a central role. From 1983 to 1985, Roosevelt carried out a geophysical survey, and investigated a sample of the anomalies through excavations, uncovering mostly garbage fills and stoves, related to domestic structures. Roosevelt's research focused on the study of features related to the domestic and community life, suggesting that Teso dos Bichos could be used as a model for other mounds, which would have similar features and spatial organization.

Roosevelt's critiques of Meggers and Evans methods of research permeate all her work. She was criticized herself, however, for not publishing the research results in their entirety, for exaggerating the level of sociopolitical development during Marajoara phase and for extrapolating too much from the geophysics, among other things (Barse 1993; Meggers 1992a; Meggers 1992c). Between 1987 and 1988 Roosevelt conducted similar research on the Guajará mound, located at the Anajás River headwaters (Bevan and Roosevelt 2003), and reportedly made surface collections in several sites located on the savannas (Roosevelt 1991: 186-7).

THE FIRST SETTLERS

Evidence for early occupation of the Marajó Island *campos* comes from incomplete geological, environmental and archaeological data. It is likely that the first populations relied on shellfish and occupied an area that extends from Lake Arari to the Marajó Bay, where the existence of shell middens (locally called *sambaquis*) was reported during the late 19th and early 20th century (Ferreira Penna 1876; Lage 1944). A mixture of shells and sand used as construction material in a 17th century church located on the coastal town of Joanes (Lopes 1999) also suggests that shell middens once existed nearby. Unfortunately, such sites were destroyed by lime industries before being studied.

Investigations on *sambaquis* located in the mainland, on the geological similar coast of the State of Pará, were dated from 4000 to 2800 B.P. At the sambaqui da Taperinha, in the lower Amazon, the occupation was dated much earlier, to 7000 - 8000 B.P. (Roosevelt, et al. 1991). It is possible that fluctuations of sea levels during the Holocene (Meggers 1979), have submerged equally earlier sites on the coast, as proposed for other parts of South America (Richardson III 1998). In this sense, it is possible that very early adaptations to aquatic resources were also present at the river delta.

Ananatuba Phase

The earliest archaeological evidence for human settlements comes from sites related to the Ananatuba phase. Ananatuba sites were identified on the north, but away from the coast (sites PA-JO-7: Sipó, PA-JO-8: Maguari, PA-JO-9: Ananatuba, and PA-JO-10: Sororoco), in the center, at the upper courses of Camutins (PA-JO-20) and Arari (PA-JO-19) rivers as well as at the middle Camará river, on the southeast (PA-JO-26: Castanheira). All the sites are comprised of a single elevation, with the exception of Sipó, where two connected small mounds represent a single occupation. The site areas range from 314 m² to 7,850 m². The heights, representing natural

refuse accumulation, range from 0.5 to 1 m. The Castanheira site, where Mangueiras phase ceramics were found on the upper levels, was 1.8 m high. The Ananatuba settlers chose to live in the forest, close to the edge of *campo* and near water, although a navigable stream did not appear to be important (Meggers and Evans 1957: 193).

Pottery sherds were abundant in most of the sites, and the diagnostic feature was a decorated sherd (Sipó incised) characterized by bands of incised lines and cross-hatched areas. For this reason, the phase was assigned to the Zoned Hachure Tradition (Meggers and Evans 1961). Brushing was also another very popular technique of decoration, while red painting was less used. Lumps of clay with twig impressions suggested the use of clay for house construction. Other pottery artifacts included eight small cylindrical objects (2.4 to 4.3 cm in length) found in Ananatuba and Castanheira sites, which could have been ear plugs; five reworked rounded sherds (one from Sipó and four from Castanheira site) that could have been used as spindle whorls; and a small stone flake (from Castanheira site) that could have been used as a scraper (Meggers and Evans 1957; Simões 1969). No evidence for patterns of disposal of the dead was found.

A charcoal sample collected from a hearth at the 40-50 cm level in Castanheira site, representing contact between Ananatuba and Mangueiras phases was dated to 2930 ± 200 B.P. or 980 B.C. (SI-385) (Simões 1969). Thermoluminescence dates for Castanheira and Sipó sites extended the occupation even further back, from 1110 to 1460 B.C. (Meggers and Danon 1988).

Mangueiras Phase

Mangueiras phase was identified in sites located along rivers not far from the northern Marajó coast (PA-JO-5: Croari, PA-JO-7: Sipó, PA-JO-13: Bacuri), southern Caviana Island (PA-CA-3: Porto Real), central (PA-JO-16: Canivete, and PA-JO-17: Flor do Anajás), and southeast Marajó (PA-JO-26: Castanheira) (Meggers and Evans 1957; Simões 1969). The sites typically comprise one to three mounds, with a maximum height of 2.5 m. There is no evidence for

artificial construction and the heights likely resulted from anthropogenic refuse accumulation. Areas vary from 118 m² to 4,710 m². Sites are located in the forest, on non-flooded areas, and proximity to a navigable stream or river was probably important (Meggers and Evans, op.cit.: 221).

Ceramic analysis defined two plain types (with either gray or orange core) that were used for seriation. Decorated ceramics were abundant, but surface treatment consisted mostly of scraping and brushing. An incised type that has a discrete temporal and geographical distribution was found to be very similar in design and execution to the Ananatuba Sipó Incised, although here it is executed on Mangueiras phase paste. Due to the similarity to the Ananatuba material, this pottery type was called Pseudo-Sipó Incised. Its presence in the assemblages was believed to mark post-Ananatuba sites (Meggers and Evans 1957: 215).

A few sherds with more elaborate decoration (excision, punctuate, incision and corrugation) were identified, but not classified into types, due to their low frequency. Some of these sherds were very similar to ceramics from Marajoara and Acauan phases. However, based on the seriation established by the plain types (gray cored Mangueiras Plain decreased through time, while the orange cored Anjos Plain proportionally increased), Meggers and Evans concluded that the decorative techniques that resemble both Acauan and Marajoara phases were present only in early sites. This conclusion implies that Acauan would be contemporaneous with early Mangueiras sites and the resemblance with Marajoara would be only coincidental, since effective contact was not established.

Given that radiocarbon and thermoluminescence dates indicate that Mangueiras Phase was much earlier than Marajoara (1090 to 920 B.C.), ceramic evidence for contact between the two phases is intriguing. For example, Marajoara phase red tanga fragments were found by Hilbert on the surface and upper levels of PA-JO-17: Flor do Anajás, a Mangueiras phase site. The problem is that historical material was also found there, attesting to the disturbed nature of

the deposits (Hilbert 1952; Meggers and Evans 1957: 220). Meggers and Evans (ibid.) pointed out that if the "exceedingly thick and gross red-slipped tangas" found at Flor do Anajás represented contact with Marajoara phase, the chronology would have to be reviewed. Another evidence for contact between Mangueiras and Marajoara phases was identified at PA-JO-23: Ilha da Ponta, a Marajoara mound excavated by Simões and Figueiredo: data shows an initial occupation by Magueiras phase populations and the rapid introduction of Marajoara material that eventually replaced Mangueiras. Both ceramic assemblages coexisted for 40 centimeters of deposits, but this fact was not reported in the publications (Schaan 2001e). Meggers (personal communication 2004) has suggested that Mangueiras sherds might have been introduced during mound construction.

A number of questions remain unanswered regarding Mangueiras occupation. The variability in decorated types among sites, as well as inconsistencies in the trends of relative proportions of the two plain types used for relative chronology may indicate that geographical isolation was an important cause of variability, rather than chronology. The presence of crude tangas at the Flor do Anajás site surface and upper deposits, as well as presence of Mangueiras ceramics at Ilha da Ponta mound may indicate contact with Marajoara phase populations. Accepting that Mangueiras and Marajoara could have been partially contemporaneous would imply a longer period for Mangueiras, as well as revising the proposed hiatus between 2800 and 2000 B.P. If Meggers and Evans proposed chronology is inverted, late sites would have tanga fragments and sherds with more complex decoration, implying that Mangueiras ceramics were not only showing contact, but also the development of decorative techniques that would be important during Marajoara phase.

Apart from pottery sherds, several other ceramic objects were found at PA-JO-5: Croari, such as one figurine head, one figurine body, a miniature jar, a complete and a fragmented tubular pipe, as well as a short cylindrical object that could be a labret. From the Caviana site objects

such as a labret, a broken pipe stem and an unidentified biconical small object were also recovered (Meggers and Evans 1957: 197-8).

Acauan Phase

Elaborate ceramic material identified on one site on Mexiana Island, as well as sparse archaeological material found on Mexiana and Marajó Islands were used to define this phase. On Marajó, sherds were found at the bed of Jurupucu River, which runs parallel to the northern coast, but inland. Meggers and Evans explained that the site was probably destroyed by the river.

The Acauan material showed unusually high proportions (about 30%) of decorated types and similarities in both techniques and motifs to Marajoara phase ceramics. Especially the Acauan Excised type is strikingly similar in many of its details to the Marajoara phase Arari Plain Excised type. Acauan ceramics, however, lack the slips present in other Marajoara excised types (Meggers and Evans 1957: 540-2). Although Meggers and Evans envisioned that similarities between Acauan and Marajoara could be explained by tracing both back to a common origin from which they developed separately, affiliation between the two may be a more plausible answer. In fact, Acauan is a good candidate for an ancestor of the Marajoara phase, since it is possible to visualize some evolution in decorative techniques. Another point in common is the similarity in vessel forms between Acauan and Marajoara assemblages.

Other objects collected during the excavations and surface collections included anthropomorphic and zoomorphic adornos, two figurine heads, a pottery stamp, and a globular spindle whorl (ibid.: 434-8).

Acauan Phase was not dated by absolute methods. Absence of contact between Acauan and the protohistoric Aruã sites on Mexiana were seen as an indication that Acauan phase was earlier than Aruã. Also, a number of similarities between Mangueiras and Acauan material were

considered an indication that Acauan and Mangueiras were at least partially contemporary (Meggers and Evans 1957:540). Since the sherds that suggested contact were found in Mangueiras "early" sites (it implies accepting the seriation based on plain sherds), Acauan was also considered an early phase.

However, if Meggers and Evans seriation is questioned, it is possible that two ceramic complexes, Acauan and Mangueiras, were developing decorative techniques and vessel forms that would fully flourish during Marajoara phase.

SOCIAL COMPLEXITY: THE INITIAL PERIOD

Formiga Phase

While Acauan and Mangueiras phases have not been securely dated to the period immediately before or contemporaneous to Marajoara, the Formiga phase is clearly part of the initial period of development of regional societies.

Formiga phase villages consisted mainly of small mound groups, located on the *campo*, both close to a water source and patches of forest. A total of seven sites were identified, comprised of one to seven mounds each. The areas of these mounds vary from 79 m² to 3,356 m², and their heights range from 0.5 to 1.25 m. Evidence for artificial construction of an earthen platform prior to the occupational levels was found at PA-JO-18: Coroca, and PA-JO-4: Mucajá. At the latter, remnants of a well were also identified

Mucajá is a group of two large and four small mounds, located at the upper reaches of a small stream. Since the stream would probably not retain enough water during the summer months, the well was necessary. The thin layer of occupation (10 cm) attests to the short occupation, which, again, may be due to difficulties in water supplies and resources.

Longer occupations were identified on other sites where the deposits typically range from 0.5 to 1 m in depth. Artifacts consisted of ceramic sherds, most of them plain, with no outstanding decorated types. A seriation was performed using changes in the popularity of three plain types. Although changes through time were observed, the seriation indicated that the sites were all contemporaneous. As in the other phases, there is a trend for the increase in oxidized ware through time, which Meggers and Evans (1957: 240) here correlated with changes in the ratio of jars to bowls. The data showed that the proportion of jars increased through time, as did a more oxidized pottery.

Most of the decorated ceramics were considered unclassifiable, and the most popular decorative technique was brushing, which did not differ much from the brushing in the other phases. Also, an incised type resembled the Ananatuba phase Sipó Incised type. Both vessel shapes and decorated sherds had a clear spatial distribution, which Meggers and Evans (op.cit.: 241) considered an indication that Formiga phase sites were "more isolated and perhaps also less receptive to ceramic innovations than were those of the Mangueiras phase".

Contact with Marajoara phase was evident on trade sherds (Arari Excised and Guajará Incised types) found on PA-JO-6: Formiga site surface. Marajoara ceramics were also found on the surface and upper levels of PA-JO-33: São Leão. Eroded Formiga ceramics were also present in PA-JO-28: Ilha do Fogo, a Marajoara mound (Schaan 2001e). Meggers and Evans (op.cit.: 240) even considered that one of the Formiga plain types (Catarina Plain), which occurs in smaller proportions, might actually be "eroded Inajá Plain", the Marajoara phase gray cored type.

Two reworked rounded sherds with center holes (probably used as spindle whorls) were the only other artifacts identified. Burnt bones, without associated grave goods, were found at the PA-JO-6: Formiga site.

The beginning and duration of Formiga phase was dated by the thermoluminescence method on pottery sherds excavated by Simões from mounds located on the southeast (A.D. 10 to

A.D. 400) and on sherds from the northern Marajó PA-JO-6: Formiga (A.D. 610 to A.D. 837), collected by Meggers and Evans (Meggers and Danon 1988).

MARAJOARA PHASE: REVIEW OF PREVIOUS INVESTIGATIONS

Upper Anajás River

Monte Carmelo Site

At the end of the 1949 rainy season, Meggers and Evans investigated the Monte Carmelo site, a group of three mounds located at the Anajás river headwaters, on the Campo Limpo Ranch. Mound 1 (Guajará) and Mound 2 (Monte Carmelo) are located on the south bank of the river, while Mound 3 (Bacatal) is located on the opposite side of the river.

At the point of the Guajará highest elevation, a 1.5 m² pit revealed a large burial group, of at least 15 vessels, distributed in different levels along 3 m of deposits. The excavation is reported in detail by Meggers and Evans (1957: 259-79), so it will be briefly summarized here. Burials on the upper levels were typically smaller and contained ashes and burnt bones. In the lower levels, larger urn burials contained bones in different states of preservation, associated with plates and vessels, and eventually tangas (feminine pubic coverings). The funerary vessels were either plain or decorated with painted designs on a white slipped surface (Joanes Painted type). Some of the vessels had lids, in general inverted bowls, plates or broken basins. The lids were either plain or decorated with incised or excised designs.

Of particular interest is the description of a large anthropomorphic vessel (Jar L), which contained the skeletal remains of a gracile individual and an orange slipped tanga. A Joanes Painted bowl was inverted on top of the vessel as a lid. The vessel's base rested on top of a broken bowl, which contained the remains of another individual and a red tanga. Outside there were also poorly preserved remains of another individual and a red tanga. Jar L was flanked by

two other plain jars, indicating they were buried together. One of the jars contained the skeletal remains of an adult male. The femur showed traces of red paint. Teeth showed intensive wear. The other jar contained the remains of two individuals, two plain bowls, as well as bone remains of rodents and birds. Both the human and animal bones showed traces of red paint. Analysis of the human remains indicated that one of the individuals was a male over 26 years of age, whose skull displayed patterns consisting of intentional frontal deformation. The other individual was an 18-26 years old female, whose teeth showed wear patterns consistent with extremely gritty food. A red tanga was placed inside the vessel.

Jar L, without a doubt, contained the remains of an important individual. The vessel was carefully decorated with painted designs depicting a female (Meggers and Evans 1957: 271-2; Schaan 2001b: 117-9). Although the analysis of the skeletal remains was not conclusive about the sex of the deceased, the presence of a tanga likely indicates it was a female. A total of six tangas were associated with the burials, five of them red; only the one found inside Jar L was orange.

Funerary practices as observed at the Guajará mound indicate social differences in the treatment of the dead. These differences are reflected in the use of funerary vessels to bury some individuals, while others were buried in the ground. The choice between decorated and undecorated vessels may imply variation in status, age or gender of the deceased. Vessels and plates associated with the burials and placed either inside or outside the vessels may have contained food. Either the presence or absence of tanga may relate to both status and gender.

The other two mounds of the Monte Carmelo group are smaller in area and size. These mounds were not excavated. At the peak of the rainy season, they measured 2 m high, which mean they could be 4 to 5 m high during the dry season. M-2 (Monte Carmelo) was interpreted as a cemetery mound, due to the abundance of broken funerary vessels on the surface (Meggers

and Evans 1957:278). Bacatal had few decorated sherds on the surface, but eight fragments of red tangas were recovered during the surface collection.

In 1987 and 1988 Roosevelt investigated the Guajará mound using a combination of several geophysical methods and conducting test pit excavations. Roosevelt (1991b:31) reported that seismic refraction tests had indicated that the Guajará mound had been built in the middle of the stream bed.

Results of that work were summarized in a 2003 article written by Bevan and Roosevelt. This mound was described as 6 m tall and 140 m long, with archaeological deposits similar to those identified at Teso dos Bichos. These deposits included prepared floors containing fired clay hearth groups, deposits of terra preta soil garbage, and urn cemeteries (Bevan and Roosevelt 2003: 290).

The interpretation of the magnetic, conductivity, and resistivity surveys indicated the presence of at least two occupational strata containing fired clay structures, separated by 3 m of building materials. These occupational layers were located at about 8 m and 5 m deep (in relation to datum) (ibid.: 313-14). Bevan and Roosevelt concluded that most of the magnetic anomalies were caused by groups of fired clay hearths, instead of urn burials (ibid.: 304). The excavation of 10 test pits revealed a first layer of black soil, which in some cases extended to 65 cm deep. Small urns filled with sediments were found within this layer, and interpreted as cremation urns. Below this layer they found trough shaped fired-clay structures (ibid.: 315). In some of the test pits these decayed structures were found underneath buried vessels. Based on the magnetic map and results of the excavation, Bevan and Roosevelt (op.cit.: 329) estimated the existence of 2200 hearths for the 700 years of occupation of the mound. Ethnographic information was used to estimate the life cycle of a hearth, as well as family size, yielding a population estimation of 78 to 156 people.

Carbonized seed and wood associated with features, collected from levels 70 to 109 cm deep were dated to A.D. 1275, A.D. 890, and A.D. 615 (Roosevelt 1991: 314, Table 5.1). The dates were interpreted as marking two distinct phases. The early date was assigned to Roosevelt's "Camutins subphase" (A.D. 400 – 700) and the two later ones to the "Guajará subphase" (A.D. 700 – 1100). A later phase represented by the upper layer of black soil and small urns was not named (Bevan and Roosevelt 2003: 325).

Camutins Site

Meggers and Evans survey along the Camutins River resulted in the identification and description of 20 mounds. Test-pit excavations were conducted in Mounds 1, 14 and 17. At M-1, a burial group was excavated. Results of that research are further presented and discussed in Chapter 5. Although burials were not found at M-17, this was also considered a cemetery mound, due to the higher proportions of decorated sherds and tanga fragments found (Meggers and Evans 1957:294). A test pit was also excavated in M-14, a habitation mound. Meggers and Evans considered that the deposits of M-1 and M-17 were somewhat disturbed and could not provide a reliable basis for seriation. For this reason, the sherds excavated from the well-stratified M-14 were used to provide a basis for a relative chronology. The relative frequency of two plain wares, Camutins Plain and Inajá Plain, varied throughout the excavated levels. Camutins Plain sherds increased, while Inajá Plain sherds decreased through time. This trend was considered significant enough to establish that similar situation would be expected at other sites (Meggers and Evans 1957: 385).

On the basis of the results provided by M-14 seriation, pottery sherds recovered from excavations at M-1 and M-17, as well as surface collections from other Camutins mounds were used to establish a relative chronology. The seriation of habitation mounds suggested that they were all contemporaneous. Sherd assemblages from Monte Carmelo site were used for

comparison. From that site, Guajará mound was considered to be contemporary to the Camutins mounds. Sherd assemblages from 12 sites located east of the Lake Arari, were also used for the seriation (Meggers and Evans 1957: 388). The results indicated that sites located to the east were earlier than the sites located at the Anajás River basin. This would suggest a movement from the flooded savannas to the forest.

Another comparison between sites located on the east and west side of the Lake Arari was conducted solely on the basis of decorated sherds (op.cit.: 394, Fig.143). The study showed that vessels displaying more complex decoration are present at the Pacoval and Fortaleza sites. Since the seriation based on the paste indicated these were earlier sites, Meggers and Evans (1957: 389-395) concluded that there was a decrease in the amount of time and technical skill required to produce ceramics, suggesting a decline in social complexity through time. According to this same logic, the use of stools, "spoons" (Hilbert 1992 identified them as snuffers, see Chapter 6, Figure 135), hollow rims, and anthropomorphic and zoomorphic adornos would decrease through time. The chronological scheme placed Pacoval as the earliest site, followed by Fortaleza, which preceded Camutins and Monte Carmelo. This data was used to reinforce the thesis that Marajoara societies had declined due to the limitations that the tropical forest environment posed to the development and maintenance of complex cultural systems (Meggers and Evans 1957: 404).

Eastern Savannas

The only information on settlement patterns on the eastern savannas come from data produced by the Marajó Project. The area investigated by that research was the upper courses of the Camará and Goiapi rivers. Both rivers are formed by a multitude of small streams, locally called "igarapés". This 450 km² area is a flat savanna dotted by "islands" of forest, most of them archaeological mounds (Figure 4). Research at those sites was limited, excluding Teso dos Bichos and Fortaleza, which were excavated more intensively in the past.

The investigations under the Marajó Project consisted of locating, measuring site area and elevation, collecting sherds and artifacts from the surface, and excavating a limited number of stratigraphic test-pits. The research identified sites belonging to Marajoara and Formiga phases. Contact between the two phases was established based on a few Marajoara phase pottery sherds found in the upper levels of Formiga mounds. Ceramic data was used to establish relative chronologies, following Meggers and Evans seriation system (Simões 1967, 1969). The reports (Figueiredo 1963; Figueiredo and Simões 1962; Simões and Figueiredo 1965) are laconic as far as cultural features and stratigraphy are concerned. No effort was made in order to understand the distribution of mounds and the relationships between them from a regional perspective.

Examining data produced by that research, it is possible to conclude the following: (1) ceremonial mounds are usually associated with two or more habitation mounds; (2) ceremonial mounds tend to be located at stream shorelines, close to their delta at the main river, instead of along the river itself; (3) the Formiga phase mound cluster is flanked by two Marajoara phase ceremonial mounds; (4) some mounds were built in the stream bed (Parapará, Salitre and Teso dos Bichos mounds) suggesting they functioned as fish weirs.

The largest cluster of mounds in the area is represented by the Fortaleza site. Some of the 14 Fortaleza mounds were excavated by Hartt (1871) and Farabee (1921). They reported that only one of the mounds had burials, while the others were used for habitation. The descriptions of the stratigraphy and funerary structures show similarities with other known ceremonial mounds in the literature. According to Farabee, funerary practices included secondary inhumation as well as cremation. Few items were included inside the vessels. Tangas were occasionally found, but more often they were placed outside, together with pottery plates (Meggers and Evans 1957: 306).

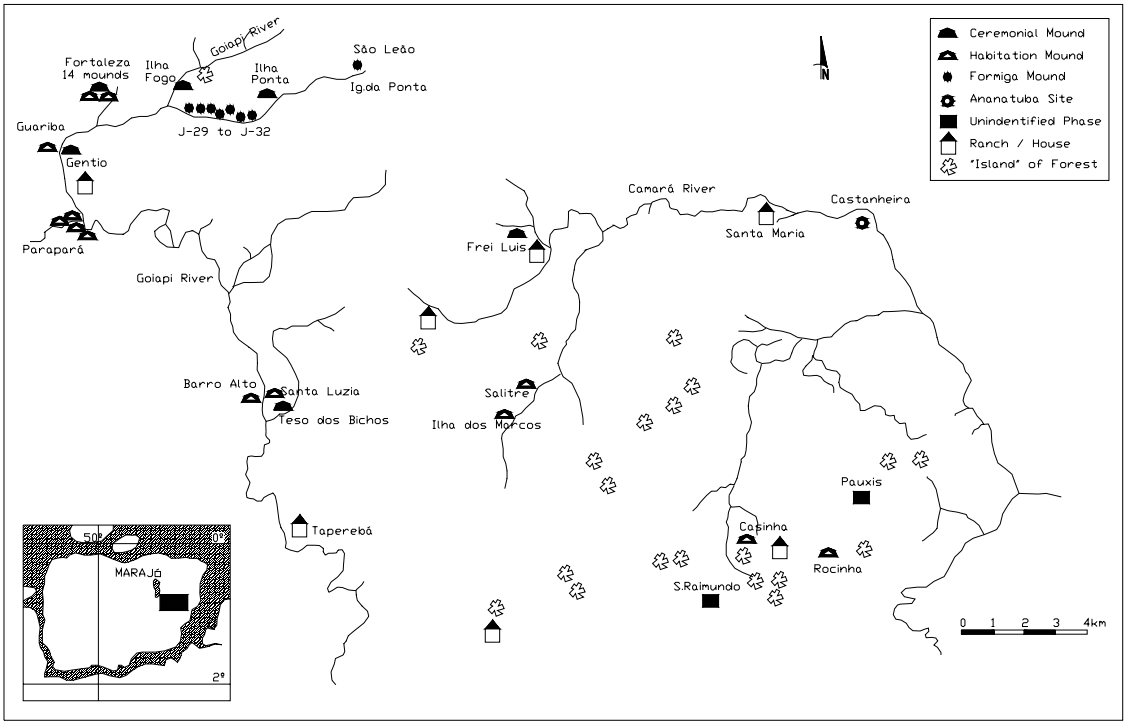

Figure 4 – Sites investigated by Simões and Figueiredo (after Simões 1965)

Absolute dates for the Marajoara occupation in the area come from Frei Luis mound. Frei Luis is a small mound, 75 by 60 m, with a maximum height of one meter. It is located at the Frei Luis stream, a tributary of the upper Camará River. A test pit excavation on the top of the mound indicated that the deposits were 60 cm deep. Below that level, a burial comprised of abundant large sherds and a small jar was uncovered. Human bone fragments and charcoal samples were collected (Simões and Figueiredo 1965), dating the feature to A.D. 480 and A.D. 580. A TL date from the same site indicated that the beginning of the Marajoara phase occupation may date back to A.D. 220 (Meggers and Danon 1988).

The data produced by the Marajó Project indicated population aggregation at the headwaters of both the Goiapi and Camará rivers, the former with most of the mounds. The ceramic evidence indicates that Formiga occupation is earlier in the area. As Marajoara pottery appears in the archaeological record, as observed in Ilha do Fogo mound, it became increasingly

popular, finally substituting Formiga vessels (Schaan 2001e). Observing the distribution of Marajoara phase mounds over the area, it is apparent there is some sort of regional sociopolitical system, although hierarchical patterns are not self-evident. The larger concentration of population represented by the Fortaleza site, for example, might have had some importance in the settlement system.

Teso dos Bichos Site

One of the most famous archaeological sites of the Marajoara Culture, Teso dos Bichos has been largely explored since the 19th century. The site was first excavated in 1871, by J. Steere, an Italian naturalist. He collected jars, pots and many ceramic objects that were sent to the Museum of Anthropology, University of Michigan (Meggers 1945). Steere reported to have excavated funerary urns, containing deteriorated bones and tangas, covered by upside down flat bowls. He noted that the deposits were constituted of three different strata. At least two were separated by a layer of burnt clay, charcoal, ashes and broken pottery. He also stressed that the urns showed differences in the decoration between the strata, suggesting that they belonged to three different occupations or cultural periods (Palmatary 1950: 271). This pattern was confirmed by Ferreira Penna (1877) who dug up a collection for the National Museum, Rio de Janeiro.

A number of anonymous looters explored the site after Steere and Ferreira Penna. The constant trampling of cattle over the mound caused the erosion of its flanks and looted trenches, which, together with the seasonal rainfall, led to the reduction of its original height. In two dry seasons, in 1962 and 1964, Teso dos Bichos was again excavated, by Goeldi Museum archaeologists (Corrêa, et al. 1964; Figueiredo and Simões 1962). In 1962, a 2 m deep test pit uncovered layers of baked clay, sand, and charcoal. Besides potsherds, a pottery stool and a zoomorphic snuffer were recovered. In 1964, an excavation was taken to 3.5 m deep, revealing at

least 10 different strata, including layers of baked clay, sterile sand and charcoal. An axe was found 35 cm below surface. The mound was reported to be 4 to 5 m high.

In 1977, Alves and Lourenço (1981), from the Pará Federal University carried out a geophysical survey on Teso dos Bichos, applying the magnetic and the electroresistivity methods. They surveyed the entire site, also exceeding the natural limits of the mound, totaling 140 by 120 m. The measurements outside the mound revealed no anomalies, which indicated that anomalies found in the site could be related to anthropogenic activities. Alves and Lourenço (op. cit.) also investigated the sources of anomalies, excavating two stratigraphic units. A set of six stoves, distributed in different levels, were found in the first pit. In the second unit they found a funerary urn containing bones, located under a thick layer of burnt clay, as well as a ceramic stove similar to the previous ones. The excavations also produced tanga fragments, pottery stools, vessels, and a variety of pottery sherds.

The electroresistivity method made it possible to identify the occupational strata on the vertical plan, since it presented a different signature if compared to the geologically natural strata of the surroundings. The magnetic method, on the other hand, allowed them to identify the extension of the occupation along the horizontal level, as well as to identify spots where the anomalies were more intense (Alves and Lourenço 1981).

Alves and Lourenço (ibid.:8), however, point out that not all the anomalies with similar pattern in the geophysical map were created by stoves (which they called kilns): “we found out that many of the anomalies that we believed were produced by kilns were, in fact, cavities filled with humus rich material". They also emphasized the fact that the magnetometer may assign similar measurements to different types of anomalies: “The amplitude of magnetic anomalies depend on the depth and extension of the source. A narrow anomaly is originated from a superficial source, but a large anomaly can be generated by a deep source as well as a source that, even superficial, has a large horizontal extension” (ibid.:14).

Between 1983 and 1985, in two seasons, Roosevelt and her multidisciplinary team carried out an intensive geophysical survey that covered the whole 2 hectare[2] surface of the Teso dos Bichos site, investigating archaeological and geological features using four different geophysical methods. According to Roosevelt, the geophysical methods provided complementary information: the magnetometers were able to detect the fired stoves and the resistivity survey provided more information on the stratigraphy (Roosevelt 1991b: 193).

Baked clay stoves, earthworks and garbage fill deposits were the main archaeological features found. According to Roosevelt (ibid.: 211), the most intense magnetic anomalies were located in an oval area on the center of the site. The differences in intensity between geophysical anomalies were reportedly due to the number and depth of stoves, not to the type of feature. The hearths were reportedly grouped in sets of 6 to 12 stoves. Their east-west orientation was believed to indicate a similar orientation for the houses.

Roosevelt also identified different kinds of garbage refuse related to domestic activities. She states that some primary deposits could be identified: "It can consist of a thin layer of ash and carbonized plant remains that were blown from a hearth by the wind and came to rest on a house floor. Another kinds of primary deposit consisted of the layers of spent fuel, bones, and offal possibly left over after a feast". "Caches of broken ceremonial pottery and tools buried under minor earthworks" were other reported types of primary garbage (Roosevelt 1991b: 237).

While no entire house floor was excavated, Roosevelt identified some features related to houses, as decomposed adobe and post molds or post holes. However, in defining walls archaeologically as a linear sequence of post holes or post molds, she says that no such structure was found. The post holes were, on the contrary, found as single units, which could have acted as structural posts in the house instead of walls. "Most of the post features excavated near hearths at Teso dos Bichos seem to have been roof or rack supports rather then walls" (ibid: 239).

[2] Area according to Simões (1965).

The more discernible feature identified by Roosevelt are the stoves. These are described as "U-shaped troughs, built of hand-plastered, ceramic quality clay into prepared pit or ditches, with the stove walls projecting above the ground about 10-20 cm or more" (Roosevelt 1991b: 254). All the stoves reportedly belonged to the Pacoval Subphase (ca. A.D. 700 - 1100), which comprised the middle 2 m deposits of the mound[3], in which the major magnetic anomalies were detected. These anomalies were groups of stoves lying between 0.5 to 1.5 m below the surface (ibid.: 242-43). Criticisms of Roosevelt's interpretation of the stoves (Barse 1993; Meggers 1992c) rely primarily on the fact that she calculates the number and size of the houses from the number and location of anomalies that were neither investigated in their entirety nor were all contemporaneous.

Based on the stoves orientation and number, Roosevelt states that the village was composed of 20 or more multifamily elongated houses. The communal houses would be inhabited by 25 people on average, leading to a population for the site of 1,000 people. The houses would be located around an open plaza (Roosevelt 1991b: 401).

In discussing the study of ceramic assemblages collected from Teso dos Bichos, Roosevelt used the type-variety classification as well as modal-stylistic analysis, the former to compare with previous work and the latter to build a relative chronology. However, anyone acquainted with Marajoara ceramics will find it difficult to follow her system of classification (Meggers 1992c; see Roosevelt 1991b: 351-3). The main reason resides in the fact that the basic terminology created by Meggers and Evans is used with rather different meanings, and the new types or modes created are not clearly defined. It is not clear, for example, how she defines the Pacoval Joanes Painted variety.

[3] Roosevelt concluded that circa 2 m of the upper deposits that would belong to the Teso subphase (ca. A.D. 1000 - 1300) were already eroded away before she started the investigation. It would explain the fact that early investigators (in Palmatary 1950) reported that the site was 7 m tall.

A seriation using the modes Goiapi Scraped, Pacoval Joanes Painted, and Finger Grooving determined the existence of two subphases (Pacoval and Teso), as well as a division within the Pacoval subphase in early, middle and late periods. It is not explained, however, what exactly these subphases mean in terms of major cultural changes and whether the seriation is valid for other sites.

Based on several radiocarbon dates, Roosevelt estimated that Pacoval subphase lasted from A.D. 700 to A.D. 1100 while Teso subphase was dated from A.D. 1100 to 1300. The period of main occupation is dated from A.D. 800 to 1100.

ARUÃ PHASE

The Aruã Phase was defined by Meggers and Evans on the basis of sites found in the State of Amapá, Caviana and Mexiana islands, as well as northern Marajó Island. There is good indication that the presence of the Aruã on Marajó was late and represents a migration of Arawak populations to the island (Meggers and Evans 1957: 548-555). The Aruã settlement patterns and material culture is very different from the Marajoara Phase, which prevents us from establishing any type of connection between the two. However, the presence of Aruã settlements on the northern Marajó coast, apparently at the same time that the Marajoara regional organization was collapsing indicate that Aruã populations may have contributed to that collapse (Schaan 2001d). Nevertheless, absence of Aruã material in Marajoara mounds indicates that their presence was restricted to the coast. Since the Aruã occupation is not immediately relevant for the present study, it will not be discussed in detail.

SUMMARY AND DISCUSSION

Previous research has demonstrated that the aboriginal occupation of Marajó Island dates back to 3500 years before present. The first settlers, Ananatuba populations, consisted of small groups of hunter-gatherer-horticulturalists that were adapted to non-flooded areas not far from the open savanna. Although small villages were dispersed over a large area, similarities in ceramic style and technology indicate some level of interaction, probably related to a common ethnic background. Settlements were not integrated in any noticeable regional system, and the absence of stone tools also indicates lack of access to long distance exchange networks.

Two different groups are identified in the following period. Mangueiras phase populations were located on Caviana and Marajó Islands. Acauan phase populations were settled both on Mexiana and Marajó Islands. Their geographical distribution may indicate that these groups migrated from the north into Marajó. Ceramic evidence suggests that they were contemporaneous. Acauan ceramics bear traits that will be fully developed during Marajoara phase, but other Acauan sites on Marajó have not been identified. The presence of figurines, labrets, and a pottery stamp indicate the existence of rituals and a concern with body adornment. Although these are traits present in most simple societies, perishable materials are more often used, thus the production of such pottery items may have cultural significance.

Mangueiras and Acauan phases have not been adequately dated. Two Mangueiras sites were dated from 1090 to 920 B.C. For this reason, the presence of Mangueiras ceramics in Marajoara phase sites remains a mystery. It would indicate that Mangueiras occupation lasted for over a millennium, which is unusual, especially due to the low number of sites recorded. It would also imply that the hiatus in human occupation supposedly caused by an arid episode during the last millennium B.C. will have to be reviewed. This problem can only be solved when larger surveys are conducted and more sites are dated.

By A.D. 10, Formiga phase populations are found established along rivers on the flooded savannas. The intentional building of earthen mounds starts during this period, but the earthworks are minor. Attempts to adapt to flooded areas were not always successful, probably due to the lack of water during the dry months. However, it is possible that Formiga phase populations were exploring abundant fish resources at rivers headwaters, testing strategies that would be fully developed during the Marajoara phase.

Formiga phase ceramics do not show traits of complexity. Formiga and Marajoara ceramic industries apparently maintained independence, even when coexisting in the same sites. Among all the phases, however, there are consistent similarities in ceramic technology (e.g. crushed sherd tempering, same basic vessel shapes, techniques of decoration), indicating that they had influenced each other.

Important transformations occurred around A.D. 400. Flooded areas at rivers headwaters are occupied by mound building populations. Mounds are at times built in the river bed, indicating that some system of water management was in place. The mounds are several meters higher than necessary to escape from the floods, thus other reasons were involved in their construction. Warfare and / or competition are suggested to be the reasons behind such an effort (Roosevelt 1991b; Schaan 2001b). The abundance of elaborated funerary and ceremonial pottery indicates the existence of complex rituals.

Mound groups are usually comprised of a few ceremonial and several habitation mounds, indicating functional differences and hierarchical patterns. Differences in mortuary treatment also indicate hierarchy, not related to gender and age. Regional differences in pottery styles have been taken as indicating chronologically distinct phases, but probably indicate spatial variability. Previous research has failed to identify hierarchy between mound groups, since the ceremonial mounds in every group display similar features, such as prepared floors, funerary structures, layers indicative of mound construction, hearths and stoves.

Research on ceremonial mounds has indicated changes through time, due to the practice of cremation and use of smaller urns in upper levels (Meggers and Evans 1957; Palmatary 1950). Meggers and Evans (op.cit.), as well as Palmatary (op.cit.) referred to this change as "decline".

A few authors have proposed a link between Marajoara culture and previous occupations (Carneiro n.d.; Myers 1973; Roosevelt 1991b; Schaan 2001e). Roosevelt (op.cit.:27) points out that the Marajoara phase was part of a long sequence of occupation. Roosevelt also suggests that the ceramics assigned to Mangueiras and Formiga phases might be either utilitarian Marajoara vessels used by farming-fishing populations that live far away from the mounds, or represent short-term occupations (ibid.:73). Although this is an interesting hypothesis, accumulated data indicates that the people that produced the Mangueiras and Formiga ceramics were sedentary for centuries, some living very close to the mounds (see Figure 4); moreover, their vessels were gradually replaced by Marajoara utilitarian pottery (Schaan 2001e).

While it is believed that Marajoara culture evolved from previous social formations, a large scale survey program would be necessary to establish a more reliable chronological sequence, based on a larger and representative sample of sites. This survey could also be used to refine the chronology between Marajoara mounds, which has been solely established on the basis of pottery seriation. Available radiocarbon dates currently suggest that the mounds were contemporaneous, which could invalidate the seriation.

As mentioned, the Meggers and Evans seriation between mounds was based on ceramic samples collected from the Camutins, Guajará, Pacoval and Fortaleza sites. These sites are likely to represent very distinct occupations, because they are geographically separated and display important differences in decorative types and vessel forms. Meggers and Evans data demonstrated that ceramic assemblages from Camutins and Guajará are more similar, which makes sense due to their geographical proximity. Fortaleza and Pacoval, on the other hand,

located on the eastern savannas, have ceramic assemblages that have points of similarity but also show differences that demonstrate the development of local styles and preferences.

A closer examination of data gathered by previous research suggests that early populations (Formiga phase) were learning to interact with the changing and challenging Marajó Island environment, first occupying the most secure areas in the forest and the border of savannas, and later venturing onto the flooded areas. The consistent presence of Marajoara phase settlements at headwaters of rivers and next to lakes indicates adaptation to the dramatic changes brought about by the alternation of yearly inundations and droughts. Previous research, however, did not provide data on landscape modifications and regional settlement patterns that would allow for an independent evaluation of processes of cultural change. For this reason, only a research with a focus on landscape management can begin to elucidate the development of social complexity, as well as demonstrate a clear sequence of occupation.

Chapter 4

CULTURAL CHANGE: A CHRONOLOGY

THE ANAJÁS PROJECT

From 1997 to 1999, several surveys and excavations were conducted along the upper Anajás River and Igarapé Anajás Mirim, as part of a Salvage Archaeology Program, funded by AHIMOR (Administração das Hidrovias da Amazônia Oriental), a Brazilian Governmental Agency (Schaan 2001f). In 2000, as part of the "Lost Civilizations of the Amazon" Project, funded by the Earthwatch Institute, one of the sites partially studied during the salvage archaeology program (Casinha Site) was the focus of a more in-depth investigation (Schaan 2001c). Both investigations were developed under the umbrella of the Anajás Project, which received legal permission from the Instituto do Patrimônio Artístico e Histórico Nacional - IPHAN to study the prehistoric occupation of the area from a regional perspective (Schaan 2001g).

The research showed that the nine sites investigated belonged to different archaeological phases and chronological periods, ranging from A.D. 300 to 1650. Of these, seven sites were excavated. A geophysical survey preceded the excavations at four of them. Additionally, geochemical analysis were performed on samples collected from two sites (Schaan, et al. 2001). The research identified an Ananatuba Phase occupation (two sites, not dated), a pre-Marajoara period (one site, A.D.300 to 600), a classic Marajoara period (three sites, A.D. 600 – 1200) and a post-Marajoara period (Cacoal Phase, three sites, A.D. 1250 – 1650).

The location of non-mound Marajoara settlements at that stretch of the river (Figure 5) suggests an expansion of Marajoara culture away from its usual environment, the seasonally flooded savannas next to lakes and rivers headwaters. Therefore, the research provided a different perspective on the distribution of traits related to Marajoara Phase. In addition, the

identification of Marajoara artifacts at post-Marajoara sites needs to be evaluated in the context of collapse of the regional societies.

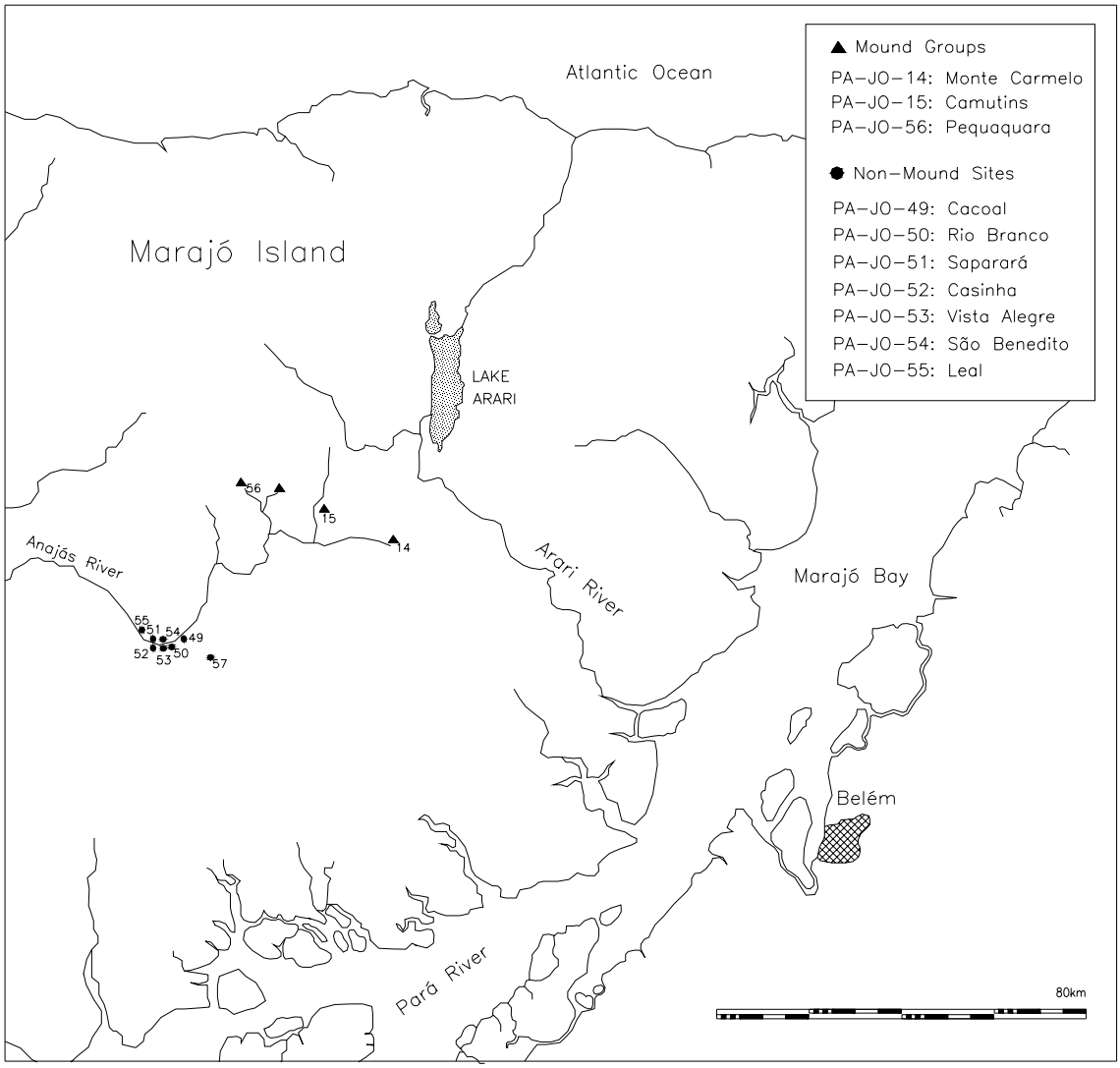

Figure 5 – Anajás Project research area

EARLY OCCUPATION: ANANATUBA PHASE SITES

Analysis of ceramic remains recovered at both PA-JO-50: Rio Branco and PA-JO-57: Açaizal sites indicated their affiliation to the Ananatuba phase, which represent the earliest known ceramic occupation on the Island (Meggers and Evans 1957: 174-93). Previous research had established a chronology for Ananatuba Phase ranging from circa 1480 to 980 B.C. (Meggers and Danon 1988; Simões 1969).

Site PA-JO-50: Rio Branco

The Rio Branco site was investigated in 1999. Since the site is level with the surrounding terrain, the extent of the prehistoric occupation (approximately 0.4 hectare) was determined by shovel testing, verifying the distribution of cultural remains and anthropogenic soil in subsurface. The southern portion of the site was covered with banana trees. The owner indicated that part of the land had been used for cultivation in the past.

This ear shaped site is located at the narrow Igarapé do Rio Branco (White River Creek) margins, about 100 m inland from its mouth at the Anajás River. Numerous sherds were observed on the eroded river banks, mixed in the whitish clay substratum. Low frequencies of sherds were observed in the top 20 cm of deposits.

João Carlos Barradas carried out a geophysical survey, employing a magnetometer of proton precession and ground penetrating radar (Schaan 2001f) over a 90 by 80 m area. The survey indicated the existence of a number of anomalies in the subsurface, concentrated on a central area of the site. In order to investigate those features and other areas of the site, 17 units, ranging from 1 to 4 m², were excavated, summing up 18.25 m² (Figure 6). One of the units was excavated on eroded banks of the Igarapé do Rio Branco.

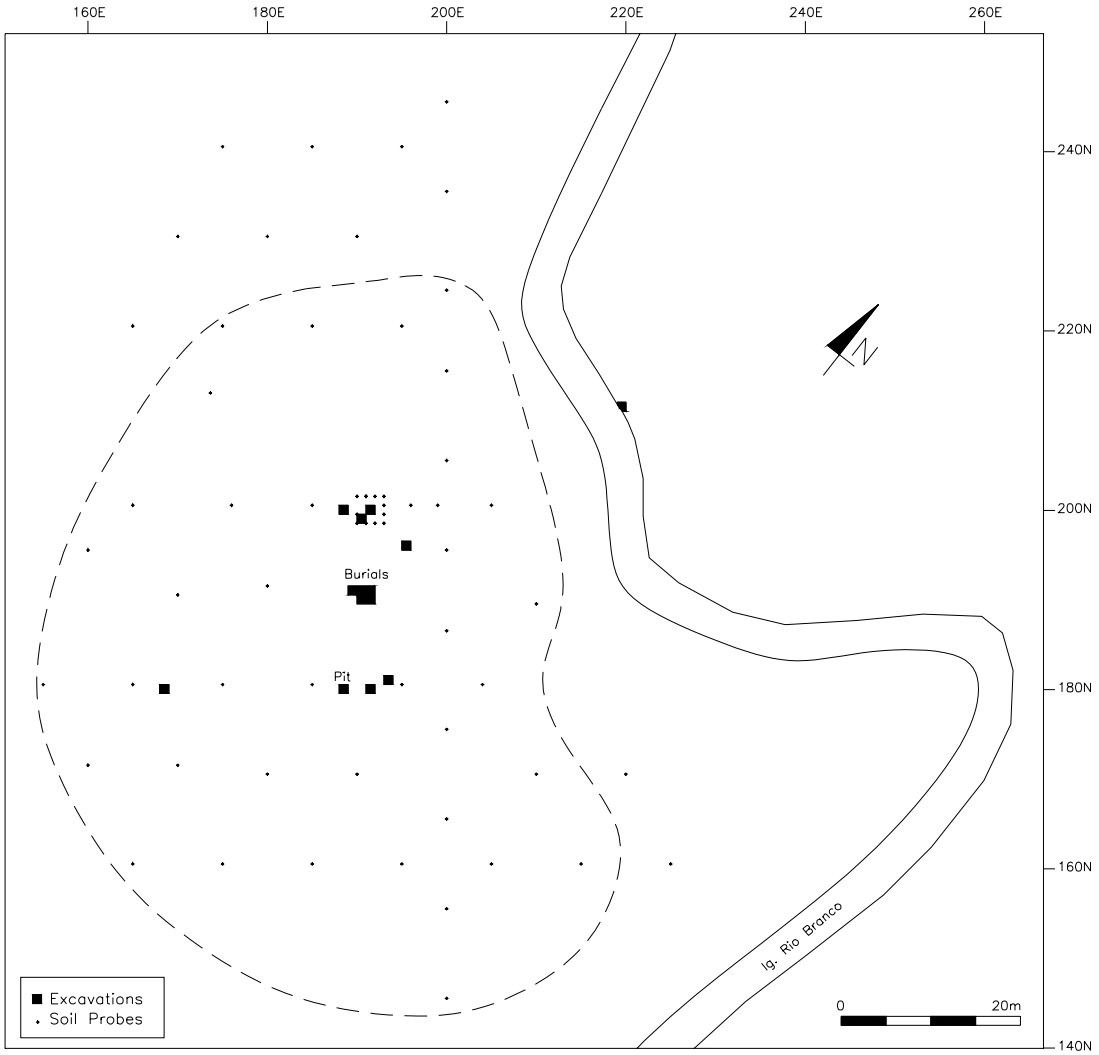

Figure 6 –Rio Branco site map

The features indicated by the geophysical survey were two fragmented buried vessels, clusters of ceramic sherds on ancient surfaces, and a storage pit. In most of the excavations, the cultural stratum extended for 60 cm below surface. On a central 2 by 2 m area, abundant ceramic sherds were found clustered between the 30 and 50 cm levels below surface (Feature 1). Under that layer, 10 cm of sediments covered two broken vessels containing fragments of decomposed bones. Their bases rested over the 70-80 cm level (Figure 7). It is not clear whether the sherds

were placed on top of the burials on purpose or they represent a later episode, since they do not cover the burials and are separated from them by another layer of sediment.

A storage pit was located some 10 m southeast from the burial area. Both the storage pit and the burials might be contemporary, according to their stratigraphic position. No other significant features were identified at the site. The period of more intense occupation is represented by a slightly darker soil between the 15 and 40 cm levels over the entire site, where most of the artifacts occur.

Geochemical analysis indicated higher levels of phosphorus in both the burial and storage pit excavations, which relate to the disposal of organic material. Highest levels were found inside the pit. It is interesting to note that high organic content was not related to soil color in this site, where the usual black anthropogenic soil does not occur (Schaan, et al. 2001).

The excavations produced 26,357 ceramic sherds that were sorted according to temper, surface treatment and decoration (Table 6)[1]. The grog-tempered potsherds were classified according to Meggers and Evans (1957:179-88) typology. The majority of the sherds (73.21%) were plain, belonging to the Ananatuba Plain and Sororoco Plain types. Decorated sherds comprised 24.7% of all fragments, and consisted predominantly of the Sipó Incised type, while other Ananatuba decorated types were virtually absent. The high percentage of decorated sherds is explained by the high concentration of sherds recovered from the layer above the burials, where the percentage of decorated reached 30%. That was probably the area where ceremonial activities and feasting took place.

[1] All the tables mentioned in this chapter are in Appendix 1.

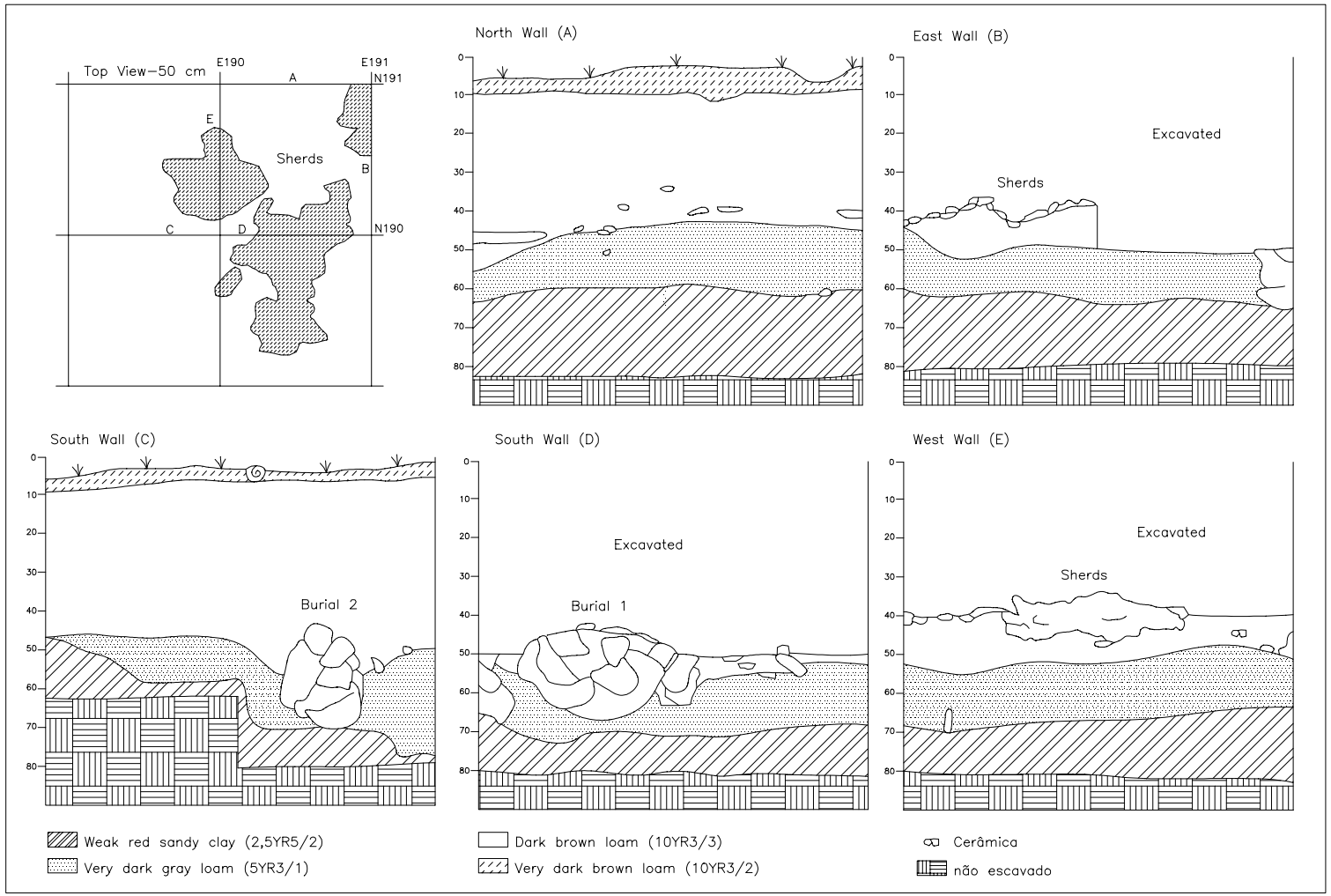

Figure 7 – Rio Branco site burials

About 2% of the sherds were tempered with the ashes of a tree bark, known as caraipé, and their distribution is restricted to both the upper levels and the layer of sherds on top of the burials, where they are probably intrusive. Charred wood recovered from 30 - 40cm (sample no. 1) and 40 - 47 cm levels (sample no. 5), related to Feature 1 (the sherd layer on top of the burials) dated those layers respectively to 530 ± 100 BP (Beta 146214; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), and 190 ± 40 BP (Beta 146215; wood charcoal; $\delta^{13}C$ = -25.8 $^{o}/_{oo}$). These dates are not accepted as dating the Ananatuba occupation. Probably the banana trees roots planted on that area moved down sediments and sherds, which would explain the recent radiocarbon dates.

It is possible to envision two different periods of occupation of the site. The first period corresponds to an undated Ananatuba phase occupation, but due to its material culture similarities to other sites (Meggers and Danon 1988; Simões 1969) it likely dates to a period from 1200 to 900 B.C. After a period of abandonment, the site was occupied by populations that used caraipé-tempered ceramics, who may relate to the Cacoal Phase, discussed later in this chapter.

Site PA-JO-57: Açaizal

Açaizal, as the name indicates, is an area characterized by abundance of açaí palm trees. The site is located in the transition zone between forest and savanna, some 7 km inland southeast of the Rio Branco site. It was visited at the beginning of the dry season, in 1999, when most of the journey had to be done by foot in muddy terrain. The area is also located 2 km from the Lago Grande (Grand Lake), a large temporary shallow lake that is formed during the rainy season.

This roughly circular (50 to 70 m in diameter) site is located on an elevated portion of land, covered by dense vegetation, including tall trees, which made it impossible to obtain a GPS reading. Few sherds were collected from the surface. An excavation, partially filled with sediment, was interpreted as an ancient well. Due to the particular ecological conditions of the

area, this was probably a campsite, used seasonally for hunting, fishing and foraging. The 38 potsherds collected showed affiliation to the Ananatuba phase.

PRE-MARAJOARA PERIOD

Site PA-JO-54: São Benedito

This site is located on the Anajás River right bank, on an open grassy area (Figure 8). The terrain is about 3 m high in relation to the river. Soil probes indicated the absence of *terra preta*[2] soil. Artifacts were found sparsely distributed in the subsurface (present in only 30% of the soil probes) over an area of 60 my 200 m, parallel to the river. The cultural strata varied from 20 to 50 cm in depth.

Three test-pits and one profile on an eroded bank resulted in 4.5 m² of excavated areas, selected on the basis of the preliminary subsurface testing results. In Excavation 3 no sherds were found in the 20-30 cm level, which may indicate a period of abandonment of the site. Just below this level, a charcoal sample was collected from a layer of dark soil, containing sherds and sparse charcoal. This pit like feature extended from 30 to 65 cm below surface. The top of that feature was dated to 1580 ± 60 B.P. (Beta 146220; wood charcoal; $\delta^{13}C = -25.0$ $^{o}/_{oo}$), cal A.D. 370 to 620.

The excavations indicated that the site was either seasonally occupied as a campsite or/and that it was occupied in different periods for short periods of time. Discontinuities along the horizontal level, as well as lack of evidence for organic residue accumulation also attest to discontinuous presence of small houses or temporary shelters.

[2] It is being called ADE (Amazonian Dark Earth) (Lehmann, et al. 2003) in the literature, while among Brazilian scholars it is known as "terra preta" (black soil) (Kern 1988; Smith 1980). It consists of black, anthropogenic soil that is indicative of human habitation. ADEs have been interpreted as indicating dense settlements, although scholars are not yet sure about the processes underlying the formation of these soils (Neves, et al. 2003; Petersen, et al. 2001).

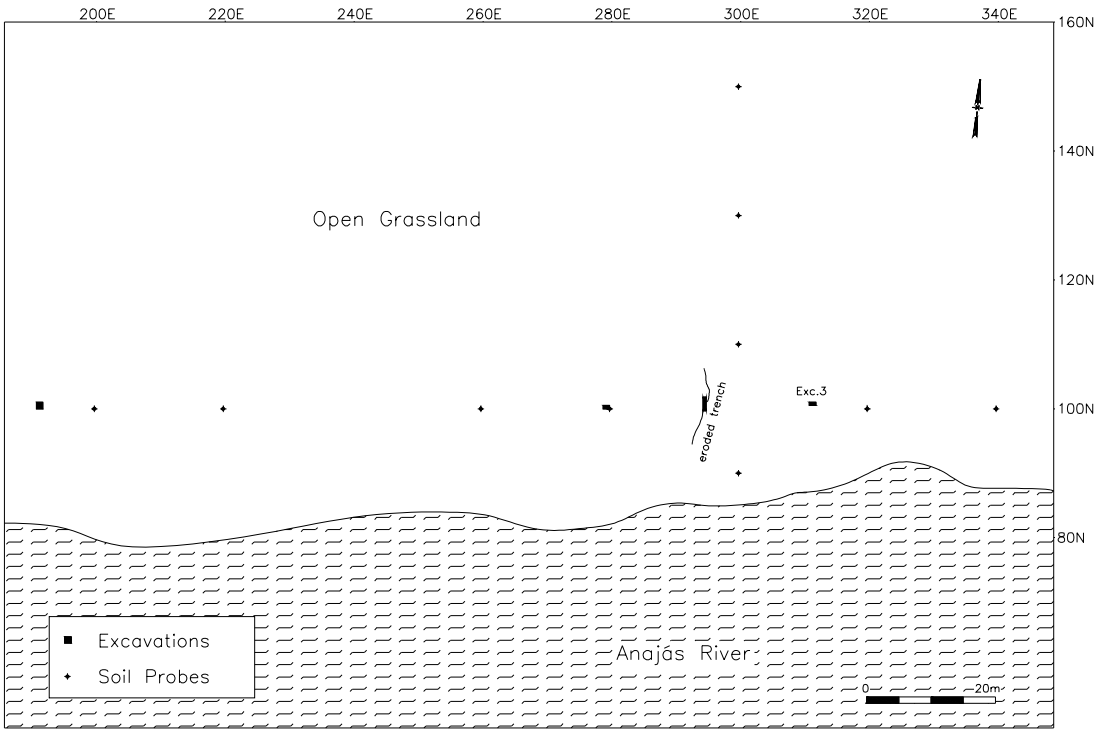

Figure 8 – São Benedito site map

A total of 451 sherds were collected and classified according to temper and decoration (Table 7). Sherds from Mangueiras and Marajoara phases were identified, as well as caraipé tempered sherds that relate to the Cacoal Phase occupation. Caraipé tempered sherds comprised 55.21% of the sherds and occurred in all levels, but increased through time (Table 8). A combination of caraipé and grog as temper was identified in 5.98% of the sherds. Decoration on grog tempered sherds consisted mostly of white slip, red slip and incision. Caraipé tempered decorated sherds are 2.2% of the total, and include incised decoration, eventually on a red slipped surface. All decorated sherds comprise 13.5% of the total.

Although the excavations did not produce large amounts of cultural materials and significant features, it is possible to assume the occurrence of at least three different occupations for the site. In a first episode, it was occupied by Mangueiras Phase populations (not dated). In a

second episode, it was occupied by early Marajoara phase populations (A.D. 400 to 600). In a third episode it was occupied by post-Marajoara phase populations (not dated).

MARAJOARA PHASE OCCUPATION

The Marajoara phase occupation in the research area is represented by the sites PA-JO-52: Casinha, PA-JO-51: Saparará, and PA-JO-56: Pequaquara. Located on opposite sides of the same stretch of the Anajás River, Casinha and Saparará were considered affiliated to Marajoara phase due to their funerary patterns and pottery style, in spite of not being characterized by mound construction. In addition, marked differences in funerary vessel styles between the two sites suggest that the populations of each site belonged to different kin groups.

The Pequaquara site is a group of three mounds located at the upper Igarapé do Pequaquara. There, both settlement patterns and material culture show close similarity to the Camutins site.

Site PA-JO-52: Casinha

The Casinha site is situated at the confluence of the Anajás River and a tributary of its left bank, the Igarapé do Saparará. The site is positioned on a naturally elevated terrain, some 4 m high in relation to the river, without abrupt changes in topography. The anthropogenic soil and artifact remains extend over an area of 400 m in length and no more than 50 m in width, roughly totaling 1.2 hectares. Over this area the cultural stratum is typically 30 to 45 cm deep, but reaches 85 cm in some locations.

In 1999 the site was mapped, and three areas for excavation were selected on the basis of the occurrence of anthropogenic soil and high artifact densities, indicated by soil probes. A profile was cleaned and excavated at the Saparará riverbanks, where the top of a buried vessel

was spotted on the surface. At the slope, the bottoms of other three rounded, undecorated buried vessels were found (Figure 9).

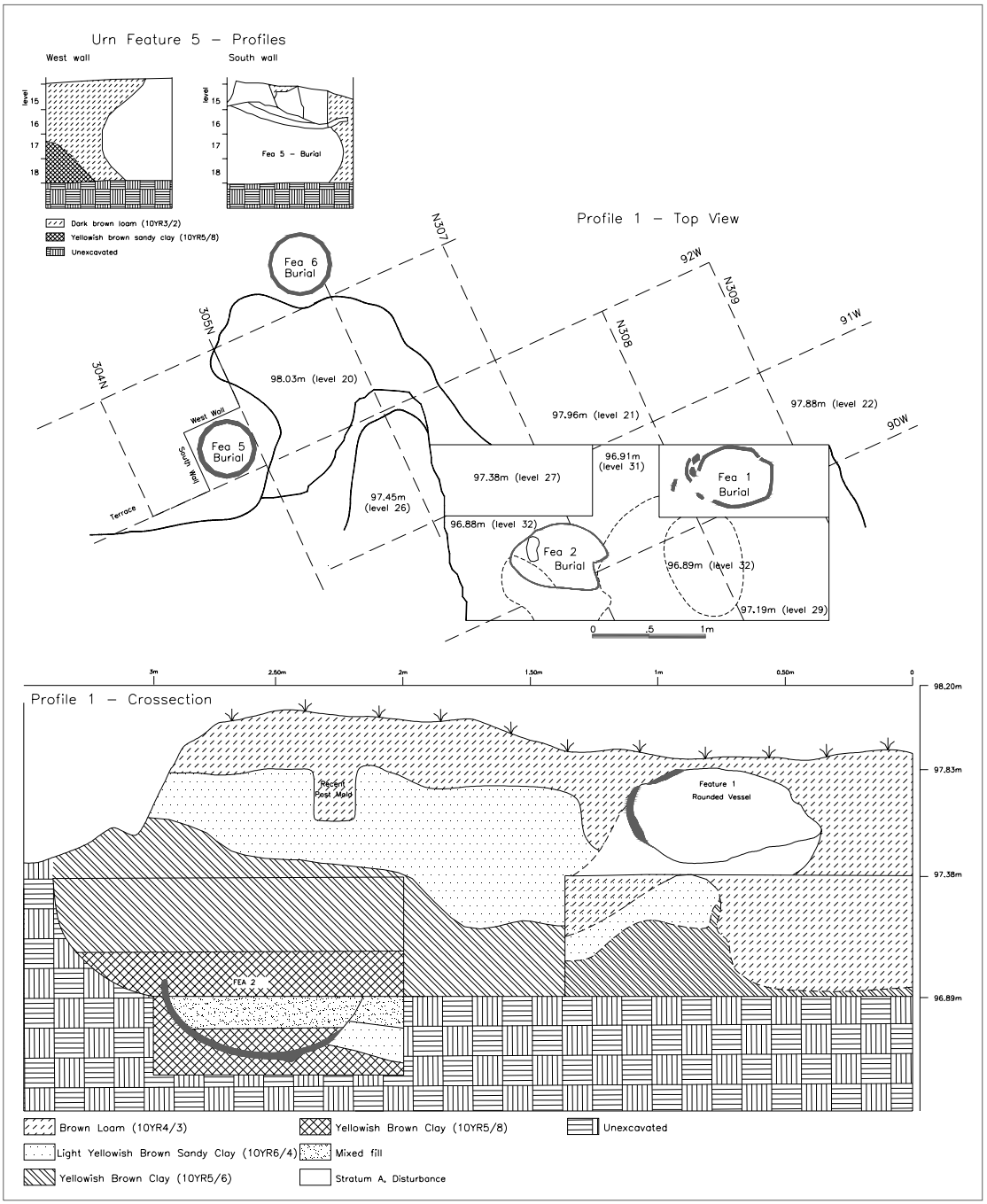

Figure 9 – Casinha site, profile 1

The rim of burial 5 was at the surface level. It was a globular red slipped vessel, whose vertical neck was decorated with delicate excised designs. It contained the skeletal remains of one individual and a small fragmented basalt axe. A fragmented cylindrical red excised vessel was placed outside, next to the urn's neck. The stratigraphic position indicates that the urn was buried up to its neck and the small vessel had remained on the ancient surface. A charcoal sample collected from inside the urn was dated to 890 ± 100 B.P. (Beta 146216; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 980 – 1290. That is assumed to be the date just before the abandonment of the site, since the burial was at the present surface level.

In the same season, another lidded urn (Feature 4) was excavated some 30 m southwest from the profile (Figure 10) (Schaan 2000)[3]. This was a large Joanes Painted urn, with a carinated bowl inverted on its top as a lid. In this case, the stratigraphy also indicated that the urn was partially buried inside of a roofed structure, since the top of the vessel remained at the ground level. There was a small red excised plate associated with the urn, next to its neck.

In 2000, a geophysical survey was conducted over a 32 by 56 m area, whose eastern limits were bounded by Profile 1, excavated in the first season. That was believed to be the area of more intense occupation. A sample of the anomalous areas indicated by the magnetometer readings over a 4m-grid revealed clusters of ceramic sherds over ancient surfaces, burials, a hearth, a storage pit, and disturbed deposits. The areas initially excavated ranged from 1 by 1 m to 2 by 2 m, but were further extended, resulting in units of 2 to 4 m². A total of seventeen features were uncovered (Figure 11).

The geophysical survey proved to be a powerful tool in revealing subsurface cultural features. Two main types of anomalies were indicated by the magnetometer. One type was the result of baked clay layers (hearths, concentration of ceramic sherds or buried ceramic vessels)

[3] A photograph of that burial was published in Antiquity, but the complete results of the research remain unpublished.

and the other one was caused by inversion of natural layers, due to ancient pit excavations. The sediment that filled both pits and buried vessels carried materials with different magnetic fields, which resulted in the anomalous readings.

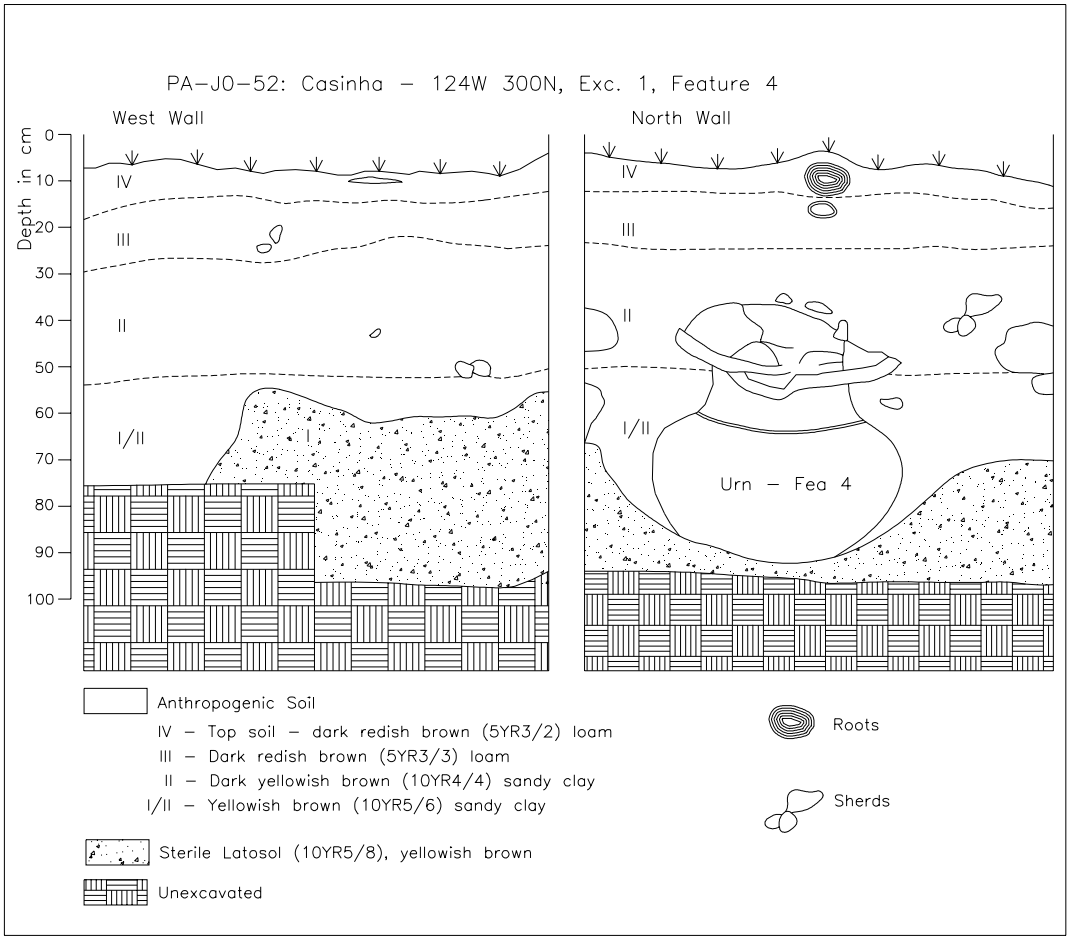

Figure 10 – Casinha site, burial feature 4

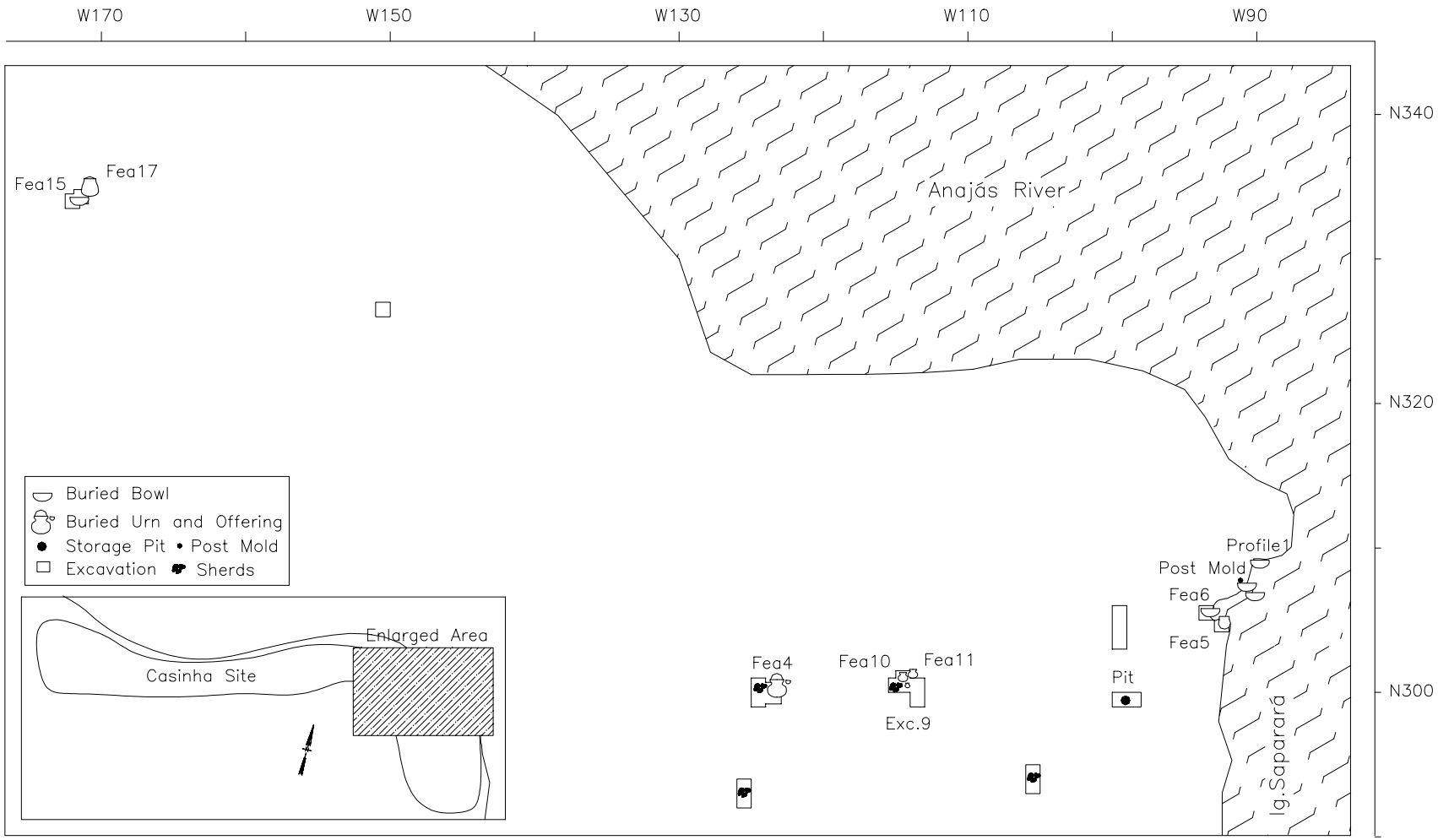

Figure 11 – Casinha site map

A number of interrelated features were found in the 4 m² excavation 9 that reached the archaeologically sterile substratum 50 cm below surface (Figure 12). The features included a large pocket of very dark soil with charcoal, between the 30 and 50 cm levels, containing numerous potsherds, and the remains of what could have been a stove.

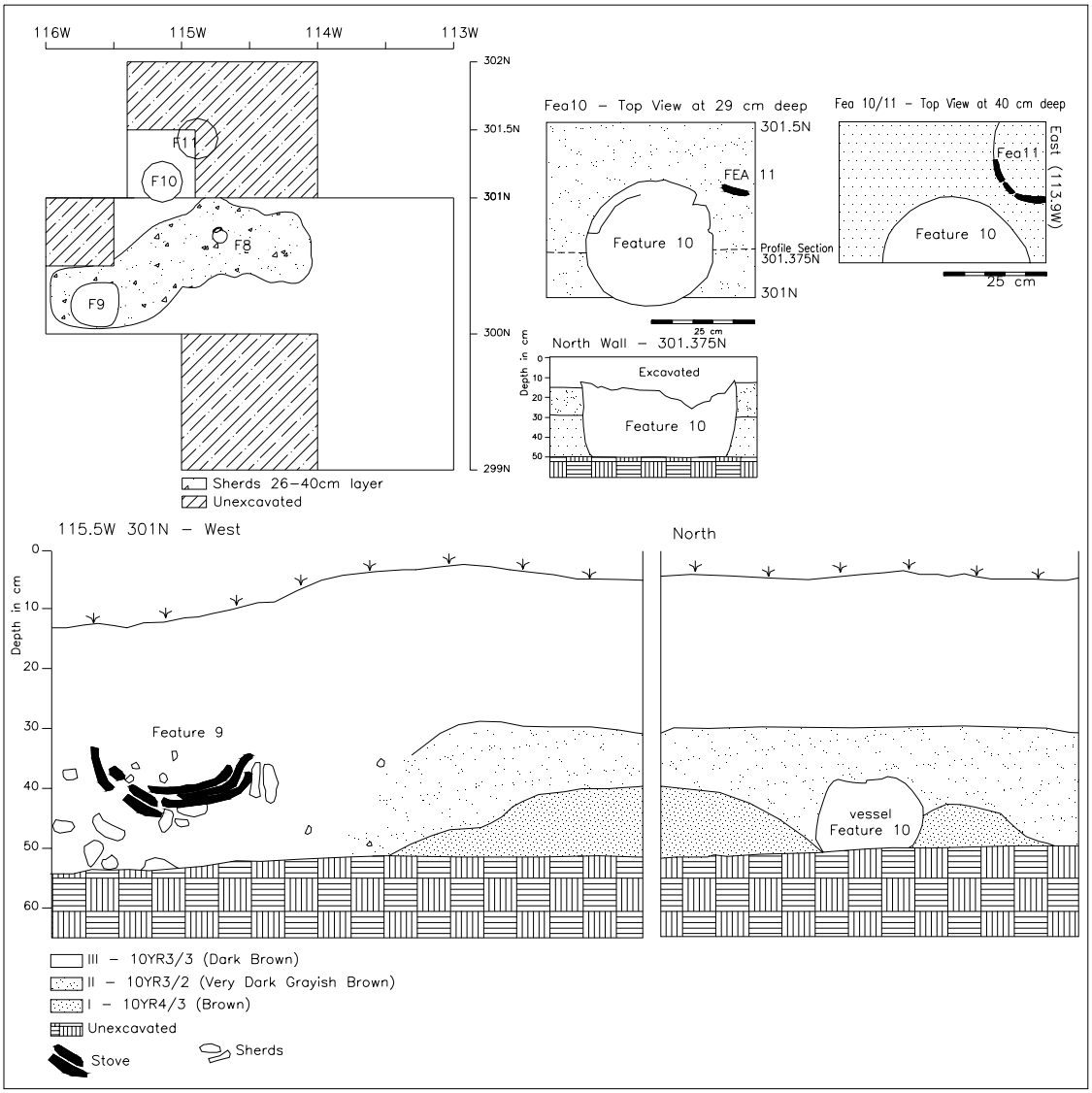

Figure 12 – Casinha site, domestic area

A small rounded pot, similar to the ones that accompanied burials in M-17 (see Chapter 6, Figure108) was lying on the bottom of the excavation, below the layers of dark, charcoal rich sediment. In the same unit, two small buried vessels were found. Vessel Feature 10 was a 40 cm wide rounded, unlidded vessel, grog and caraipé tempered, with excised decoration on a red slipped surface. Feature 11 was an underfired vessel of similar size, which could not be completely recovered because it was crumbling to touch. Both vessels contained humid dark soil, but no bone remains. The buried vessels were related to an occupation level at 30 cm below surface.

Numerous chunks of worked, sun baked clay with stick impressions, recovered from that excavation, were interpreted as wall remains. It appears that, above the level where the burials were found, the area was once used as a kitchen and later for the disposal of broken pottery. The presence of a vessel support for cooking (ethnographically known as *trempe*) also suggests domestic activities.

Profile 2 was another vertical cut at the river banks. It uncovered another burial (Feature 6) and a 20 cm diameter post mold, which extended for 1.5 m reaching the sterile soil (Figure 13). Burial Feature 6 (Figure 9) was a fragmented rounded red slipped vessel, 40 to 50 cm in diameter, whose broken rim was 20 cm below surface. It was probably contemporary with burial Feature 5, and, like that one, also contained a fragmented basalt axe.

The configuration of the burials and the post mold on the eroded river bank (profiles 1 and 2) indicate that the site extended over that area in the past, and that the erosion had taken a considerable area of occupation. Since the burials were likely placed inside of a dwelling, this post hole can be interpreted as an interior post in the house structure. Adjacent areas were investigated in search of more post molds, since the existence of either a wall or palisade was hypothesized, but nothing else was found. The river bank had eroded significantly, thus the site probably extended further in an easterly direction.

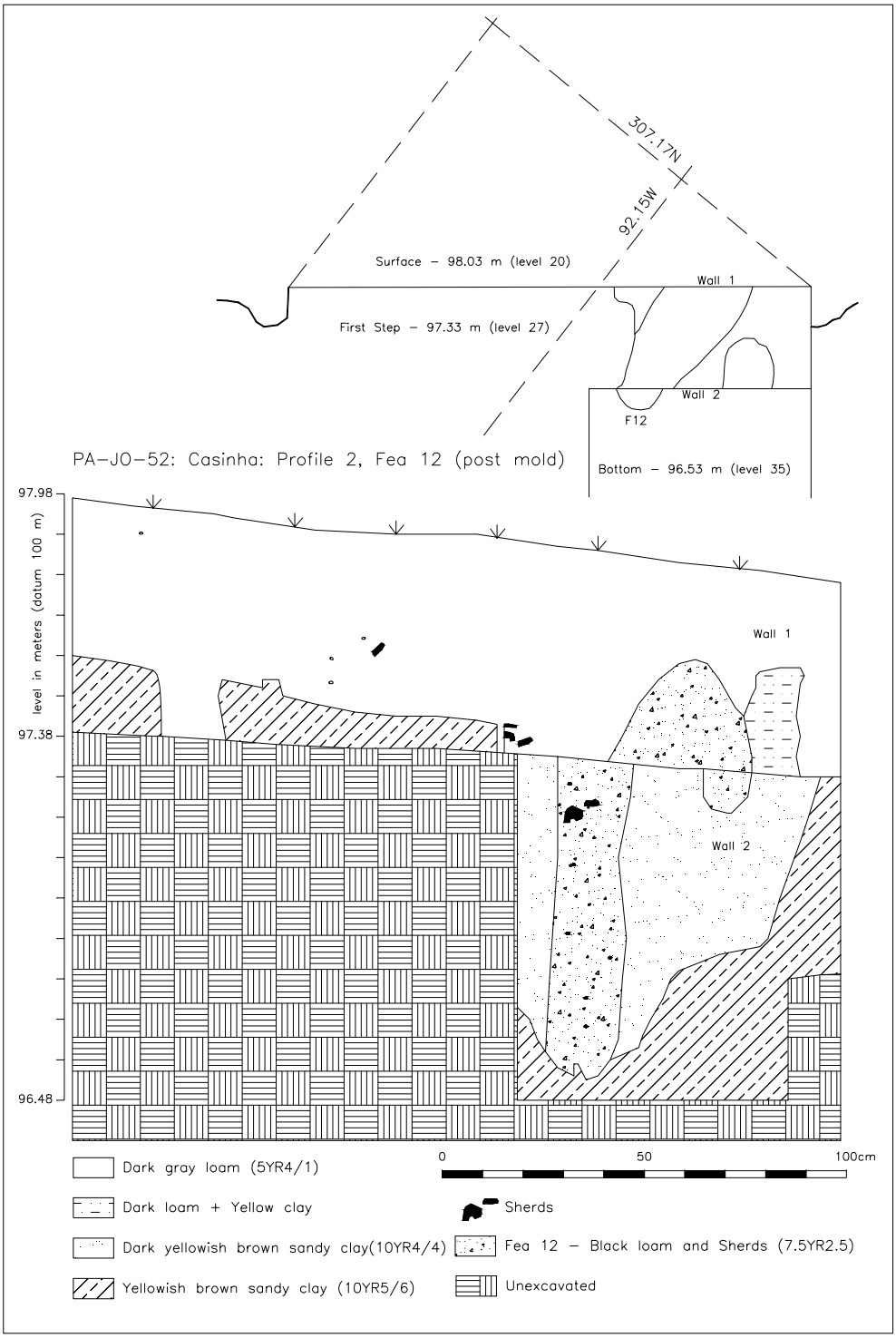

Figure 13 – Casinha site, profile 2

An excavation outside the range of the geophysical survey, where many decorated sherds were visible on the surface, located two other burials (Features 15 and 17, Figure 14). Burial Feature 15 was completely excavated. It consisted of the lower body of a rounded vessel, containing dark, humic sediment, without traces of human bones. A charcoal sample collected from inside the vessel was dated to 1280 ± 50 B.P. (Beta 146217; wood charcoal; $\delta^{13}C$ = -28.6 $^{o}/_{oo}$), cal AD 660 to 880. Since the pit for the burial was dug into the sterile orange clay substratum, this date may represent the initial occupation of the site. A frog-shaped ceramic pendant was found in layers above the burial. When the excavation was expanded to the northeast direction, for the complete removal of the burial, another vessel appeared on the north wall. Burial Feature 17 consisted of a lidded Pacoval Incised vessel. This vessel type is rare in the area; it indicates contact with sites located on the eastern floodplains.

It was observed that the burials were placed in clusters. It is evident that the urns were buried or partially buried inside dwellings. Therefore, the occurrence of burials in at least three separate areas of the site indicates the existence of at least three houses that could have been contemporaneous. No other evidence for houses, such as house floors or post molds, was identified in other excavations.

The spread of dark earth soil along the river banks indicates accumulation of biological remains related to domestic activities. Many activities related to food-processing and basketry, for example, which involve palms and other organic materials, often take place inside and around the houses, leaving residues nearby (Kern and Kampf 1989). Areas where sherds are concentrated, on the other hand, were interpreted as peripheral areas characterized by the accumulation of broken vessels due to constant sweeping (DeBoer and Lathrap 1979:128).

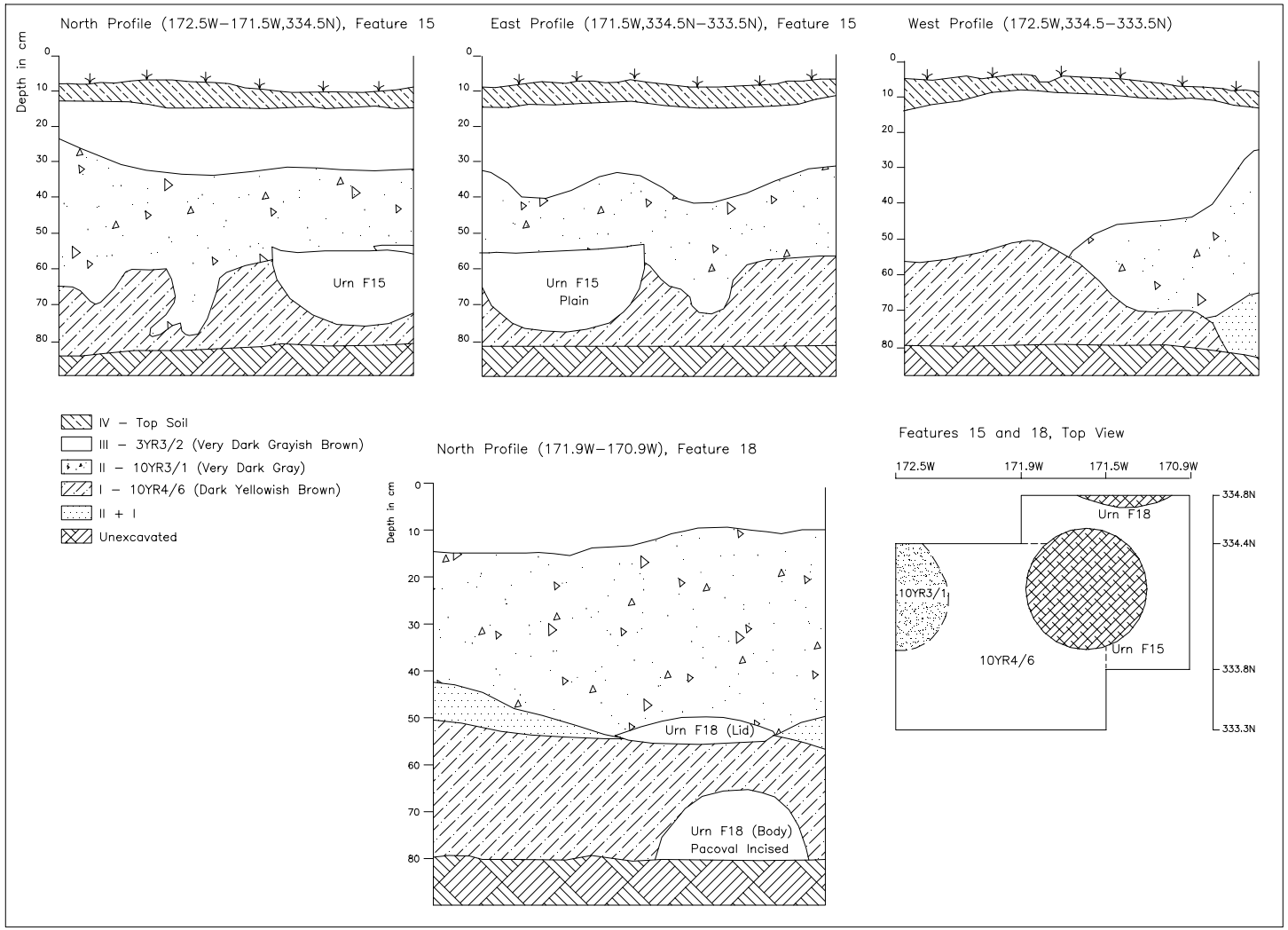

Figure 14 – Casinha site, burials features 15 and 17

The excavations produced a total of 19,852 sherds, which were sorted according to temper and decoration (Table 9). The temper materials identified were grog, caraipé, and combination of both grog and caraipé, as well as other combinations that included sand, shell and charcoal which were classified as "other". Although the Marajoara phase ceramics as described by Meggers and Evans (1957) are grog-tempered, here Marajoara style vessels were also found tempered with either caraipé or a combination of grog and caraipé. The caraipé tempered ceramics was predominantly plain, but a few decorated sherds did not differentiate from Marajoara phase decorated types. Overall, the caraipé plain pottery has higher frequencies among the plain sherds, while grog was the preferred temper material for decorated vessels.

The decorated ceramics are predominantly Marajoara (in style and temper), and comprise 12% of the sherds. The decorated pottery is characterized by the predominance of the use of white slip, red slip, painted (Joanes Painted type) and excised decoration, often over a red slipped background. Particularly the vessels associated with burials were decorated with red slip and excised designs (types Red Excised, Double Slipped Excised, Plain Excised and Carmelo Red[4]). The caraipé tempered ceramics consist mostly of plain vessels. Overall, percentages of caraipé (32.65%) and grog tempered (29.29%) plain vessels are similar.

A few lithic objects were recovered from the excavations and consisted of chips of basalt axes, as well as the fragmented axes found inside of burials 4 and 6. The radiocarbon dates suggest that the site was occupied for about 400 years, between approximately A.D. 750 and 1150.

[4] According to pottery typology developed by Meggers and Evans (1957: 324-70)

Site PA-JO-51: Saparará

This site was found quite destroyed by erosion and leaching, due to human activities and disturbance caused by wild and domestic animals. Açaí palms surrounded the *caboclo* pile-dwelling built on top of the site. Over the years the archaeological sediment was washed out and the broken rims of funerary urns were exposed. Funerary vessels were found along the eroded river banks and under the house. The posts placed during the construction of the house damaged some of the vessels. A total of six funerary urns were excavated from the hard clay soil (Figure 15). The unlidded vessels were filled with light sandy clay, and no bones or other objects were associated. One of the vessels was an anthropomorphic, Joanes Painted type, similar to funerary vessels found at the Camutins and Monte Carmelo sites.

A test pit, excavated in an area besides the house provided only four archaeological fragments, as well as historical materials, such as glass, nails, and plastic. Due to the disturbed conditions, it was not possible to estimate the original site size.

None of the excavated urns were dated, since no charcoal was associated with them. The pottery style suggests the site was occupied sometime between A.D. 600 and 1200.

Another site, also disturbed by human habitation, was identified some 8 km upriver, on the right margin. In that locality, known as Santa Cruz, a *caboclo* house was built on top of a slightly elevated *terra preta* area. During the 1999 visit, two funerary urns, similar to those found at the Saparará were seen under the house. The owner did not permit any interference, such as surface collection or mapping. One single soil probe attested that the anthropogenic stratum was 40 cm deep.

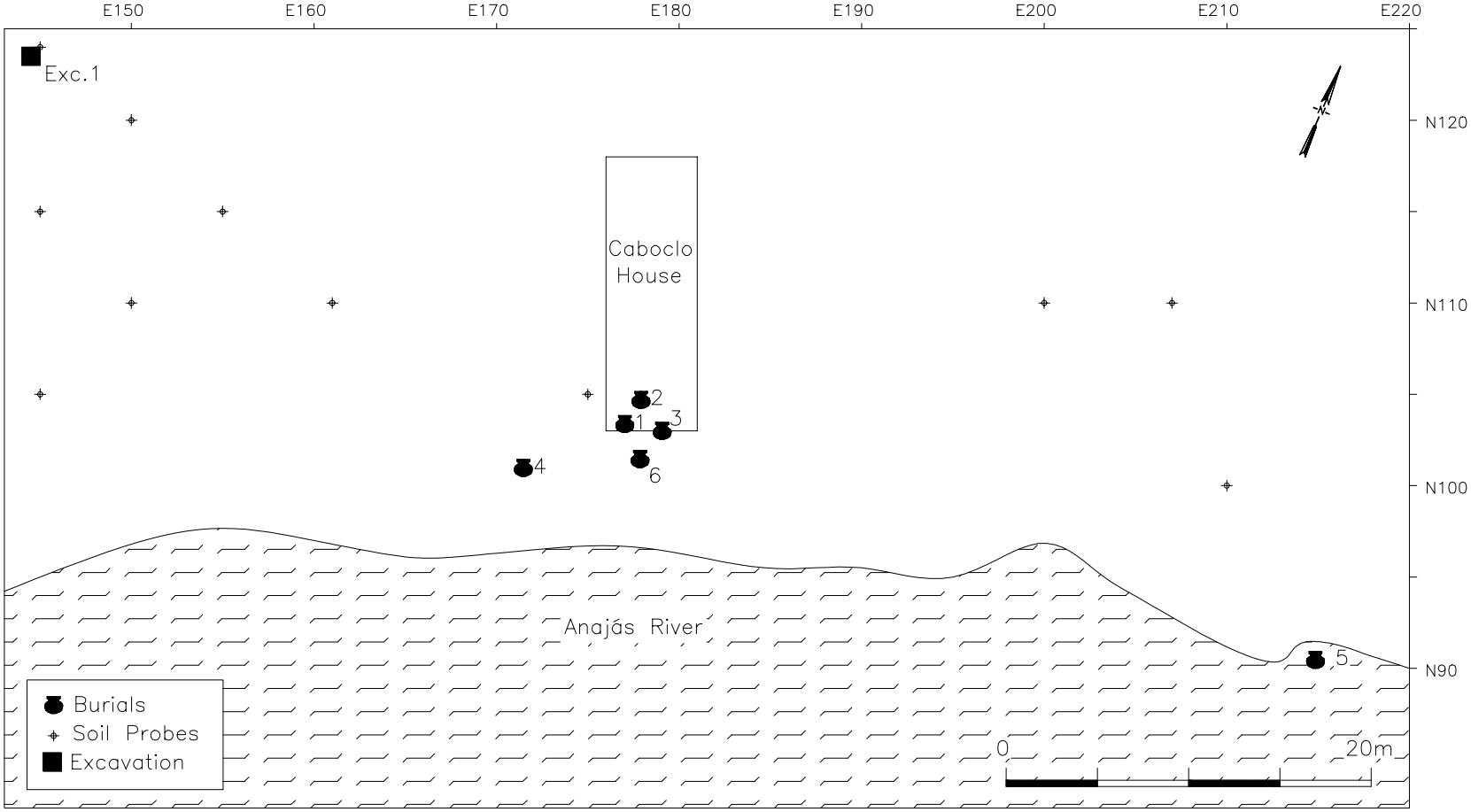

Figure 15 - Saparará site map

Site PA-JO-56: Pequaquara

This site is comprised of three mounds of different sizes (around 8, 5 and 3 m high, circumferences not measured) located next to each other at the upper reaches of the Igarapé do Pequaquara. The site was visit in the end of July 1999, when the igarapé was already very shallow. The smaller mound is seasonally inhabited by a *caboclo* family who moves down river during the summer due to the shortage of water at the headwaters.

The higher mound was found partially looted, both by locals in search of containers for water, as well as by merchants from the city, who reportedly offered a number of modern utensils in exchange for the archaeological pottery. Two meter high trenches on top of the mound exposed the stratigraphy, similar to that observed at M-1 and M-17 (see Chapter 5).

Abundant decorated sherds, fragments of tangas and figurines, as well as broken vessels and stools were found and collected from the surface. From the 228 tanga fragments collected, 71% were red slipped, and the remaining were decorated with red designs on a white slipped surface. The fragments and vessels collected (Figure 16) do not markedly differ from the material found at the Camutins mounds.

According to local informants, one or two other mounds also exist at the Igarapé do Moleque headwaters, a black water tributary of the left bank of the Pequaquara, which is found not far from its mouth at the Anajás River.

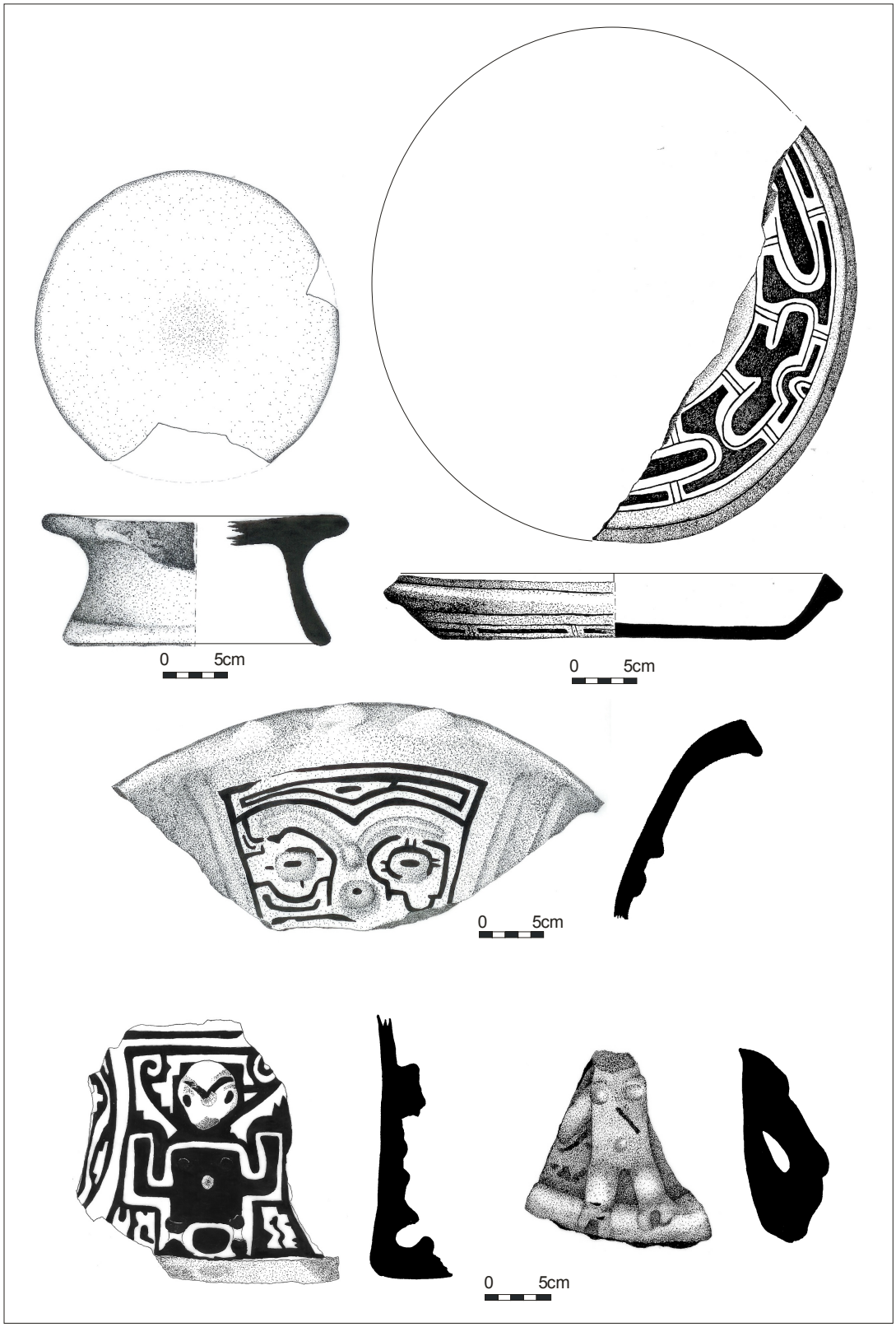

Figure 16 – Pequaquara site, ceramics from surface collection

POST- MARAJOARA OCCUPATION, THE CACOAL PHASE

Site PA-JO-49: Cacoal[5]

The Cacoal Site was 100 m wide, extending for about 300 m along the Anajás River left bank, some 75 km down river from the Camutins mound group. Shovel testing provided information on the depth of the anthropogenic soil and density of artifacts, attesting to a more intense and probably earlier occupation near the river banks, with a maximum depth of 55 cm.

In December 1998, the site was excavated, preceded by a geophysical survey, performed with a magnetometer over an area of 150 by 70 m on the center of the site. Ground-penetrating radar was also used, producing profiles that covered partially the magnetic readings and were oriented North-South according to the same grid (Barradas, et al. 1999). The geophysical map indicated four areas with major anomalies, and stratigraphic excavations investigated two of them. A total of five discrete areas of the site were excavated, ranging from 1.5 to 4 m² each (Figure 17).

Excavation 1, located on the center of the site, uncovered a layer of decorated pottery sherds, between 20 and 40 cm levels, which was responsible for one of the anomalous readings. Charred wood collected from underneath (40 cm level), the middle (30-35 cm level) and the top (20-25 cm level) of that feature dated those layers respectively to 690 ± 60 B.P. (Beta 129412; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1205 to 1415, 420 ± 60 B.P. (Beta 129411; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1410 to 1635, and 370 ± 40 B.P. (Beta 129410; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1435 to 1530 and cal A.D.1545 to 1635.

[5] See Schaan 1999-2000 for a complete report and discussion of the research at the Cacoal site.

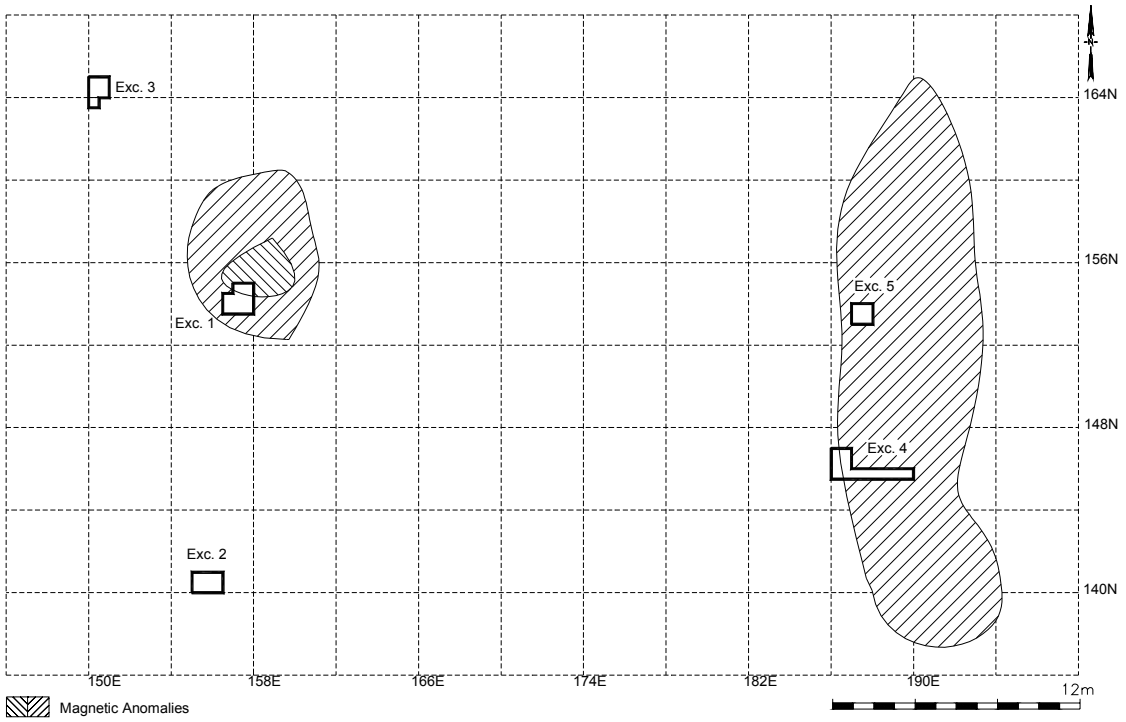

Figure 17 – Cacoal site, location of magnetic anomalies and excavations

The presence of thick and large sherds was interpreted as an area of *secondary refuse* accumulation (Schiffer 1972), to where the sherds were swept as a result of cleaning activities (DeBoer and Lathrap 1979).

In contrast, excavations 3 and 5, next to the river banks, were interpreted as toss areas of intense biological refuse accumulation. In these areas, a 30 cm layer of very dark soil (*terra preta*), between 20 and 50 cm levels indicated the disposal of organic garbage, of animal and vegetal origin. Proportions of sherds per layer as well as the stratigraphy are very similar between the two excavations, separated from each other by 30 m. A charred seed collected from the bottom of Excavation 5 (45-50 cm level), was dated to 350 ± 80 B.P. (Beta 129414; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1420 to 1670. Charred wood collected from the bottom of

Excavation 3 (50 cm level) was dated to 240 ± 40 B.P. (Beta 129415; wood charcoal; $\delta^{13}C$ = -24.2 $^{o}/_{oo}$), cal A.D. 1635 to 1685.

Excavation 3 produced a number of unusual artifacts, such as 22 fragments of tangas, 2 fragments of spindle whorls and 1 cylindrical nephrite bead, recovered from the strata I and II (*terra preta*). The occurrence of these items only in the lower levels might mean that their usage was discontinued towards the end of the period of occupation of the site.

Although there is no direct evidence to establish the location of the houses, excavations 3 and 5 were likely areas adjacent to the houses, consistent with patterns observed for small settlements in which the garbage is customarily thrown away near the residence (DeBoer and Lathrap 1979: 128-29). The lack of evidence for prepared floors indicates the use of pile-dwellings.

Another anomaly indicated by the geophysics was investigated by Excavation 4, which uncovered three small (less than 30 cm in diameter) partially broken vessels, found at 40 cm below surface, and placed along an east-west axis. Two of the vessels contained abundant charcoal and ashes, but no bones were found. Two of the burials consisted of two incomplete vessels each, one inside of another, also containing broken pottery. A charcoal sample recovered from the bottom of one of the vessels was dated to 550 ± 40 B.P. (Beta 129417; wood charcoal; $\delta^{13}C$ = -28.6 $^{o}/_{oo}$), cal A.D. 1290 to 1415 and cal A.D. 1290 to 1415.

Excavation 2 revealed a storage pit covered with a layer of tree bark and soil. The good preservation of the biological material indicated the pit was recent, but the feature was not dated. A flake of a polished green basalt axe was found on top of this excavation. The flake was retouched, indicating it was likely used as a scraper or knife.

The artifact assemblage recovered was mostly constituted by pottery sherds, including some broken pieces of red slipped tangas, spindle whorls and supports for cooking. The presence

of many clay chunks may also indicate that ceramic production took place in the site. The presence of Marajoara Phase ceremonial ceramic sherds indicates that ceremonial life in Cacoal site had followed Marajoara Culture patterns.

The 10,106 sherds collected in the site were sorted on the basis of the temper material and presence or absence of surface decoration. The analysis was conducted in order to investigate the relationship between temper material and other variables such as decoration, vessel form, size, and wall thickness. The hypothesis that guided the research was that the variability in the use of temper material observed in the assemblage was related to vessel function. Accordingly, temper material would be differentially employed depending on vessel form.

The potsherds were classified on the basis of temper material in Type 1 (grog tempered) and Type 2 (caraipé tempered). A number of potsherds also presented a combination of grog and caraipé as temper, which was called Type 3. Type 3 sherds present proportions around 10% in all areas of the site. The quantitative analysis showed that Type 1 ceramics are prevalent in Excavation 1 (central area), while Type 2 sherds are prevalent in all other excavations (Table 10).

The massive presence of Type 1 pottery (49.64%) in the central area represented by Excavation 1 can be understood as the predominance of the typical Marajoara phase material culture in the communal space. On the other hand, the higher proportions of Type 2 in excavations 3 and 5, interpreted as toss areas close to dwellings attest to a more intense use of caraipé pottery in domestic contexts.

Grog was used as temper more frequently in both small and large open vessels, with a tendency for both very light and thick walls. The hypothetical reconstruction of vessel forms (Figure 18, after Schaan 1999-2000), however, shows that there is no direct correlation between the two variables. Shallow small bowls may have very thick walls.

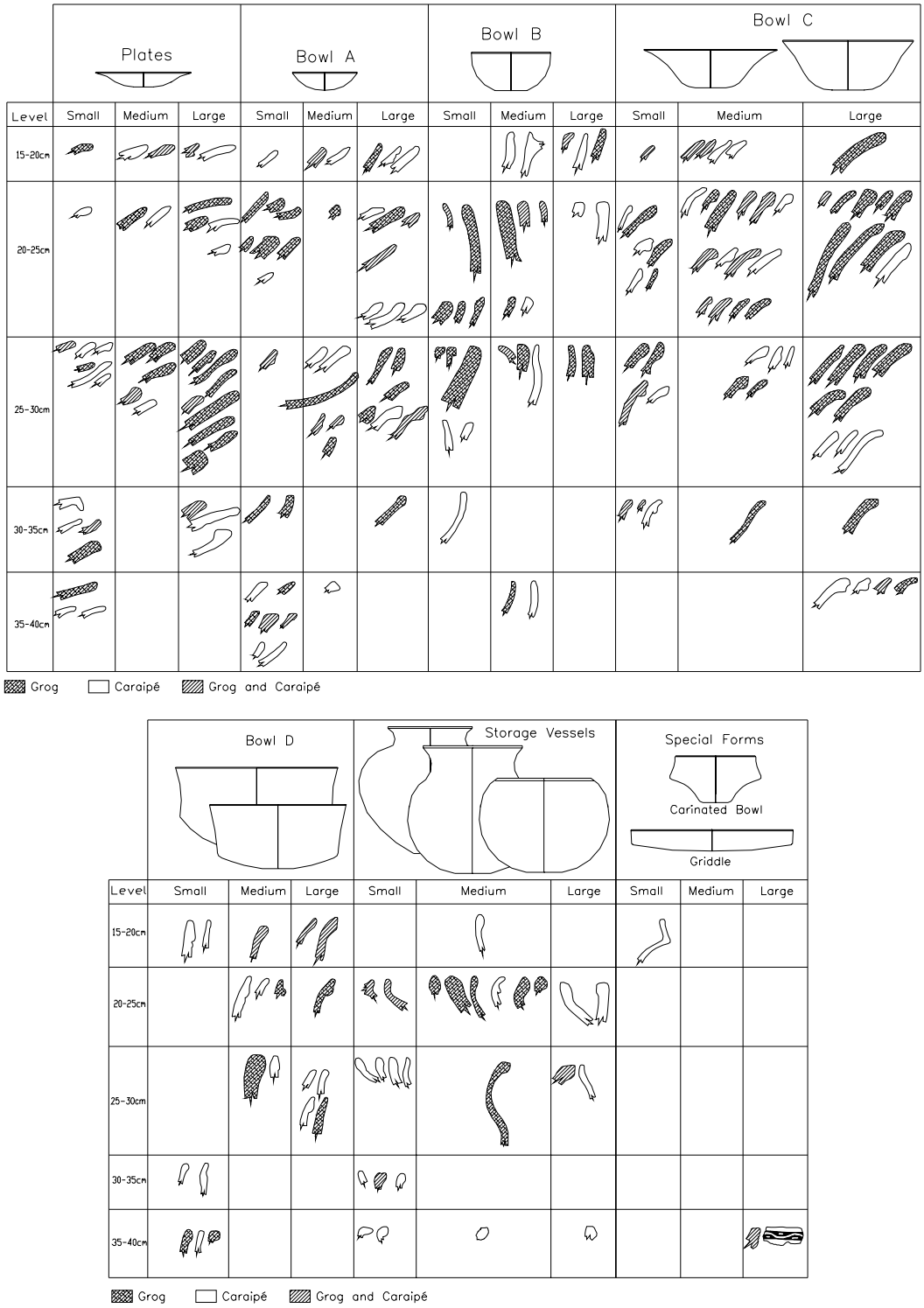

Figure 18 – Cacoal site, hypothetical reconstruction of vessel forms

On the other hand, there is a clear pattern for the employment of caraipé as temper for medium vessels (food-processing bowls) and medium wall thickness. This form of bowl is more frequently used for many kinds of activities related to food processing and are, in general, more present in the archaeological record because they have a short life-cycle (DeBoer and Lathrap 1979: 127-28).

Although a direct relation between temper and vessel form is absent, since vessels are produced with the two kinds of temper or their combination independent of vessel form, there are some trends that suggest that Cacoal potters were in fact selecting temper materials according to vessel form. Advantages that the temper material could provide depending on the vessel usage were probably taken into account during production. It is likely that some relationship between decorated pottery and grog temper material was reinforced, but it was not so strict, due to the use of Marajoara pottery decoration style with paste Types 2 and 3. Decorative techniques such as incision, excision, red and white slip, as well as painting were used regardless of the temper material.

Cacoal potters probably used the caraipé temper because of some of its properties, and their relation to vessel usage. The use of organic material can be especially advantageous in cooking vessels, because most of the temper burns out during firing, leaving voids that may interrupt cracks caused by thermal stress during usage (Rye 1981: 34). The differential distribution of the caraipé tempered pottery throughout the site also indicates that these vessels were differentially related to different areas of activities. The use of caraipé did not carry any remarkable innovation in the decoration of the ceramics and did not completely replace the grog as temper.

The Cacoal site is considered a post-Marajoara phase site due to the modest occurrence of Marajoara ceremonial pottery and the absence of elaborate burials, as well as the late dates (circa

A.D. 1300 – 1650), partially contemporary with the European conquest. The Cacoal phase was defined on the basis of this and other sites with similar characteristics.

Site PA-JO-55: Leal

This site is a 0.2-hectare *terra preta* circular area located on an elevated bank of the Anajás River (Figure 19). The archaeological site itself was covered with secondary vegetation (mostly cocoa trees). The area had been used for agriculture some time ago, but had since been abandoned, which is attested by the dense vegetation.

The site is only a small part of a much larger grassy area where two houses and a small church are located. Due to the presence of scattered sherds in a few locations, including the bed of a small creek that cuts the lot between the two houses, a geophysical survey was performed over lines that crossed the whole property. However, anthropogenic soil and mild anomalies were only found in the cocoa trees area. There, 13 non-contiguous square meters were excavated. The main features identified were clusters of pottery sherds, a fire pit and a post mold. Additionally, the excavation of a trench revealed a charcoal layer 10 cm below surface which may have resulted from a large fire, probably for agricultural purposes. The archaeological deposits were 40 to 50 cm in depth.

Soil samples were collected from all the excavations, and control samples were collected from a profile excavated outside the site. The samples were tested for levels of P_2O_5, Zn e Mn. Both the presence of *terra preta* (ADE) soil between the 20 and 40 cm levels and the high levels of phosphorus, zinc and magnesium in those levels indicate there a more intense disposal of organic matter, related to denser occupations (Neves, et al. 2003; Petersen, et al. 2001). While at the Rio Branco site the high values of phosphorus were found in discrete locations at the site, at the Leal site the data shows a more even distribution of organic matter, which may indicate that activity areas were loosely defined here (Schaan, et al. 2001).

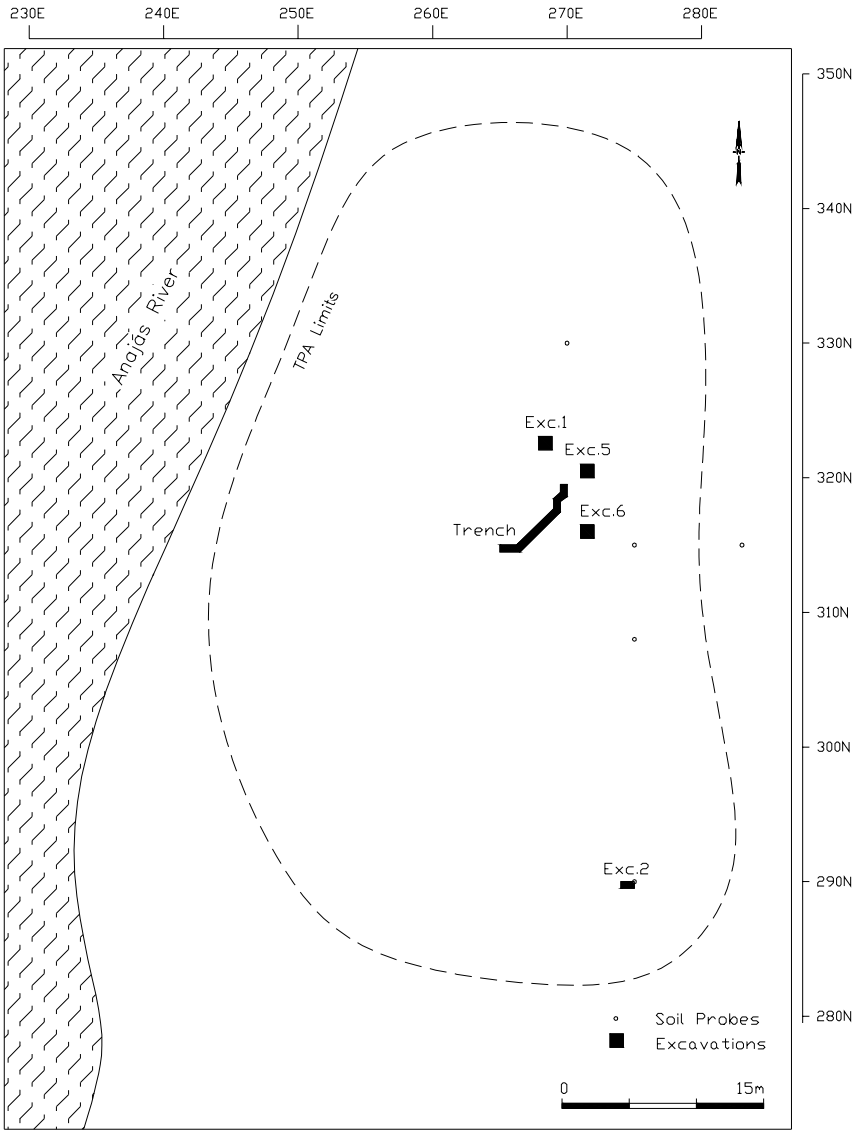

Figure 19 – Leal site map

The 7,242 sherds collected during the excavations were sorted according to temper and decoration (Table 11). The analysis showed that 93.25% of the sherds were undecorated. Caraipé predominated as temper material comprising 58.46% of the sherds. The sole use of grog as temper was verified in 25.41% of the sherds and a combination of both tempers was identified in about 16% of the assemblages. Grog tempered sherds comprised about 70% of all the

decorated pottery. The most common decorated types are Anajás Plain Incised and White Slip, with and without painting (Joanes Painted)[6]. Modeled decoration and nubbins on rims were also present.

Observing changes in the use of pottery through time, it is clear that caraipé becomes increasingly more popular as temper material, at the expense of the grog tempered pottery. Decorated pottery is more frequent in the lower levels (Table 12), which equates with the more intense occupation of the site according to the geochemical data.

Lithic objects found at the site consisted of chips from basalt tools (probably axes), found between the 10 and 40 cm levels, during the excavation of the trench.

A charcoal sample collected from the trench between the 30 and 40 cm levels was dated to 730 ± 80 B.P. (Beta 146221; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1170 to 1400. This date relates to the initial occupation of the site, which makes it contemporaneous to Cacoal site.

Site PA-JO-53: Vista Alegre

This site is situated across the river from São Benedito site. As in that site, it does not present *terra preta* soil or constant artifact densities in either the vertical or the horizontal dimensions. Soil probes and small excavations determined that three areas of the site were occupied for short periods of time (Figure 20). Low artifact densities indicate that the population levels were low, consistent with a camp site or one house in a short-lived settlement.

[6] In Meggers and Evans' (1957) typology, Joanes Painted is a decorative type characterized by painted red and/or black designs on a white slipped surface. Since the painting is applied after firing, many sherds show either only traces or no painted designs at all. For this reason, Meggers and Evans considered all white slipped sherds as Joanes Painted. In this research, the previous existence of painting is not assumed; therefore, sherds are classified either as White Slipped or Joanes Painted, depending on the occurrence of traces of painted designs.

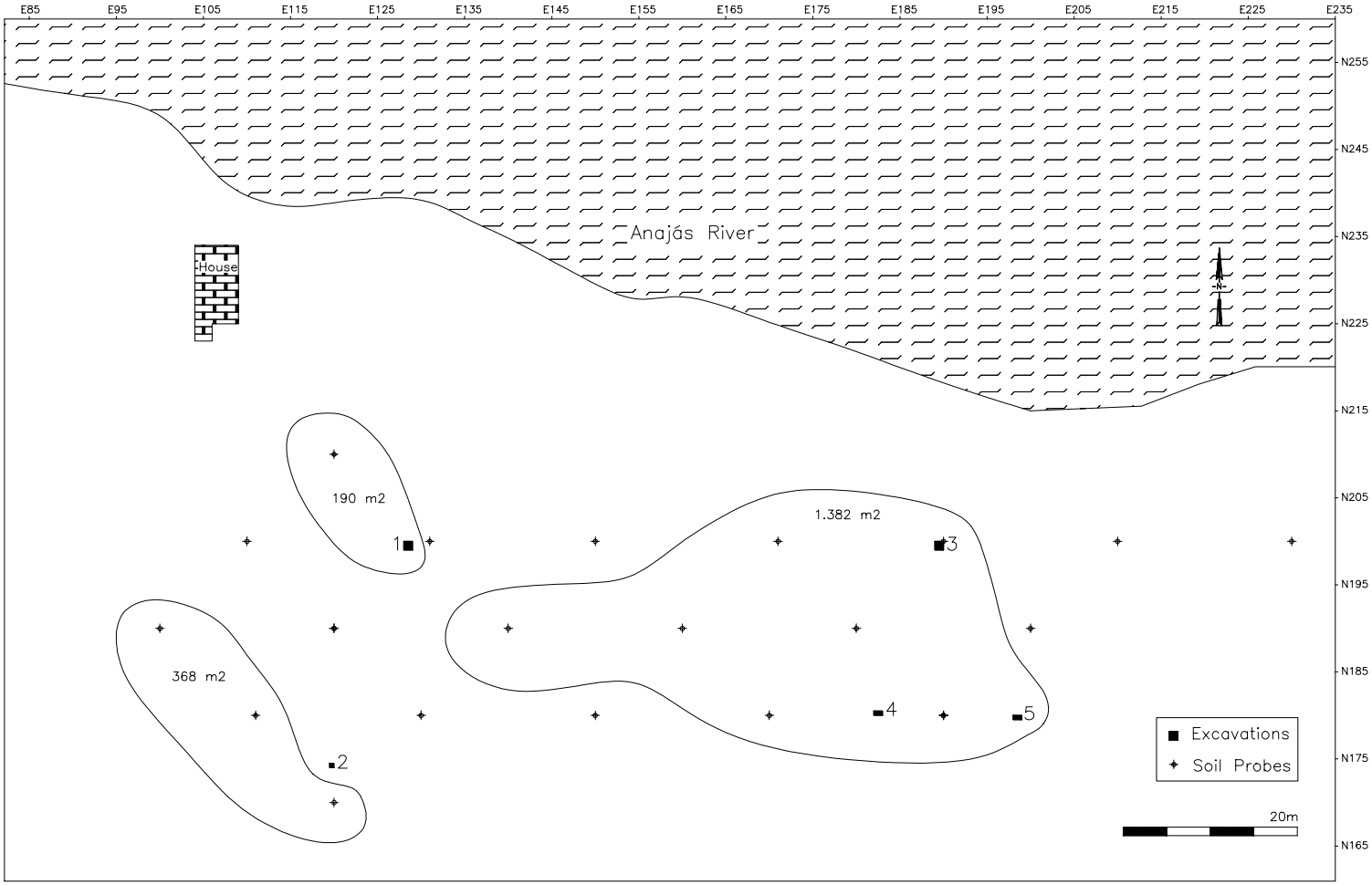

Figure 20 – Vista Alegre site map

The site is located on an open, grassy area, 4 m high in relation to the river. The archaeological stratum varied from 30 to 60 cm in depth. In the five stratigraphic excavations, averaging 1 m² each, the presence of sherds was discontinuous, indicating eventual abandonment after a short period of occupation. In Excavation 4, a charcoal sample collected from a darker pocket of sediment, probably the remnants of a fire, was dated to 330 ± 100 B.P. (Beta 146219; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 1420 to 1690 and cal A.D. 1730 to 1810 and cal A.D. 1920 to 1950.

The excavations produced only 430 potsherds. Of these, 90.47% were from plain vessels (Table 13). Grog tempered pottery is predominant (52.10%), but caraipé alone or in combination with grog is also present. Marajoara decorated pottery (Anajás Plain Incised and White Slip) predominate among the decorated types. A fragmented undecorated platter-bowl, similar to the ones found at M-1 and M-17 (Chapter 6, Figures 104 and 105) was found in one of the excavations.

Site PA-JO-46: Joanes

Joanes is a small town located on Marajó Island east coast (see Figure 1). It was the first colonial settlement on the Island, founded in the 17th century. A Jesuit mission was build on top of an indigenous village (reportedly belonging to the Sacaca Indians). The archaeological site today is comprised by the ruins of the mission, as well as an early 20th century church and a number of modern houses distributed around a large square plaza. Investigations carried out in the area by Costa Neto in 1986 and Lopes in 1998 established the extent of the historical and prehistoric occupations, and described artifact remains collected from a garbage pit. The analysis of the artifacts traced the occupation back to the precolonial period (Costa Neto 1986; Lopes 1999). Ethnohistorical sources helped to reconstruct the history of the historic occupation of the site, but the prehistoric occupation remains little known.

The prehistoric potsherds collected at the site suggest that the Sacaca Indians occupation was contemporaneous with the Cacoal phase. Most of the potsherds are plain, caraipé tempered, and a few have decorations in the form of nubbins, white slip and polychrome painting, showing influence of both Marajoara and Aruã phases ceramics (Lopes 1999). The presence of a Marajoara style pottery stool is probably an attempt to emulate Marajoara culture.

A CHRONOLOGY OF CULTURAL CHANGE

Based on the data gathered by the Anajás project, as well as research conducted by other scholars (discussed in Chapter 3), it is possible to envision a long-term process of cultural change on Marajó Island, encompassing the rise of complex societies and their demise before the European conquest. According to this hypothesis, four major chronological periods, related to marked changes in sociopolitical organization, are proposed: 1) Marajoara I - Incipient Period; 2) Marajoara II - Expansionist Period; 3) Marajoara III - Classic Period; 4) Marajoara IV - Decline; and 5) Cacoal Phase. The proposed timeline agrees with the chronology offered by Roosevelt (Camutins subphase A.D. 400-700; Guajará and Pacoval subphases A.D. 700 – 1100; and Teso subphase A.D. 1100 – 1300). The present chronology, however, is defined in a rather different way. It focuses on processes of cultural change, not on geographical and chronological distinctions between sites.

Marajoara I - Incipient Period (70 B.C. – A.D. 400)

The incipient period is characterized by population growth, mainly on the floodplains, and the initial construction of mounds (four Formiga mounds in the Southeast, Figure 4). The classic Marajoara pottery style appears during this period, but it coexists with other pottery styles (Formiga phase). There is no evidence for long-distance trade and political hierarchy, although

the production of figurines, and spindle whorls by Formiga potters suggest the existence of rituals, and production of cloth. There is no evidence for the use of urns for secondary burial.

Marajoara II - Expansionist Period (A.D. 400 – 700)

This period is characterized by the emergence of social complexity and institutionalized social hierarchy. This is evident in change of settlement patterns (every group of mounds is associated with at least one ceremonial mound), differential treatment of the dead not related to gender and age (cranial deformation in some skulls, and association with prestige items), and elaborate ceramic style. There is greater involvement of people and resources in pottery production for feasting, rituals and funerals. Moreover, there is a change in house structure, at least on the mounds, switching from pile-dwellings to dirt-floored houses (Meggers and Evans 1957: 399).

There is no available information on where mound building first started, but it seems that mounds quickly spread throughout the Island, built in areas that favored the exploitation of aquatic resources. The co-existence with Formiga ceramics in sites located in the southeastern savannas indicates that there is no complete dominance of Marajoara material culture. Therefore, although a regional ceramic style was spreading together with the mound building, there was also room for local production, demonstrating that not all the settlements were perfectly integrated under the new sociopolitical system.

Marajoara III - Classic Period (A.D. 700 – 1100)

During this period, the expansion of Marajoara populations reaches its maximum. Mound groups spread over an area of at least 20,000 square kilometers area on the center of the Island, establishing small, competitive chiefdoms. Non-mound sites spread along the Anajás River, and

probably other rivers, in locations sometimes far away from the ceremonial mounds, but replicating there social ranks and ceremonial life. A distinctive ceramic style dominated all the settlements, with local variation in the ceramic wares produced for feasting and burials. Geographical distance from the ceremonial centers appears to be directly proportional to the political and religious influence that the centers could exert over the periphery. For this reason, sites located far away from the ceremonial mounds exhibit greater variation in settlement patterns and material culture.

Differences in iconographic themes, vessel forms, and proportions of decorated types between mound groups indicate that some level of differentiation in material culture was reinforced, as a sign of local diversity and autonomy. The exchange of ceremonial objects and sharing of symbols though, indicate the existence of a system of alliances and political integration among relatively independent settlement systems. Settlement hierarchy existed *within* regional groups, but no clear vertical pattern can be seen *between* regional settlement systems, what, together with the evidence provided by ceramics may account for the existence of "horizontal integration" (after Johnson 1982; Schaan 1997a).

Accordingly, regional centers likely competed for prestige and power, and strong social differentiation is seen in elaborate burials accompanied by prestige goods, and possible sacrifice of slaves (Meggers and Evans 1957: 401). Similar funerary urns were probably used to bury individuals that belonged to the same social group, but individual differences in ranks and status were marked through size of urns, time spent in decoration, and the prestige items associated. A widespread prestige goods economy is clear during this period, and regional elites had access to nephrite beads and pendants, and stone axes, brought from distant regions. Boomert (1987) points out that the famous nephrite pendants, called *Muiraquitãs*, found over a large area, from the lower Amazon to the Caribbean Islands, were gifts carried by women as part of an inter elite

marriage system. Although nephrite pendants on Marajó are rare, they indicate participation in such networks.

Marajoara IV - Decline (A.D. 1100 – 1300)

This period has not been adequately documented. Some authors have reported changes in burial patterns, with the use of smaller and more modest urns, as well as increased use of cremation (Farabee 1921, Palmatary 1950, Meggers and Evans 1957). The abandonment of both the Casinha site and the Belém mound (Chapter 5) around A.D. 1100 attest to this "decline" for reasons not yet completely understood.

The possible multiplication of smaller sites located far from the regional centers and without much investment in ceremonial activities can be seen as indicating reduced concern with social differentiation and decrease of regional integration. New ceramic styles and ceramic technology are timidly introduced in this period, which may reflect the loss of religious and political hegemony and, at the same time, more autonomy for local villages. It should be noticed that this period is equated with the emergence of complex societies in the lower and central Amazon, which were part of a supra regional prestige goods economy. Future research may want to investigate whether economic fluctuations caused by participation in external trade may have played a role in local economies.

Cacoal Phase (A.D. 1300 – 1600)

This period is characterized by the abandonment of the mound groups as economic and religious centers, and the fragmentation of Marajoara regional organization. Settlements are likely to be small, dispersed, and autonomous, with is reflected in considerable variability in settlement patterns and material culture. New pottery styles emerge and the use of caraipé as

tempering material (largely used in the lower Amazon in other polychrome pottery styles) is largely adopted. Marajoara ceremonial pottery is still present, but intermixed with local pottery styles and techniques. This persistence may be seen as either emulation or survival of ceremonies and traditions of the previous period. Remnants of Marajoara Phase lithic tools, such as basalt axes and nephrite beads may eventually be found fragmented and recycled. Burials in urns are less common and less elaborated, with preference for cremation. Social hierarchy and site size hierarchy are absent between sites of this phase.

This period is also marked by the arrival of Arawak populations (Aruã Phase) from the northern islands and Amapá coast. Thermoluminescence dates indicate that Aruã sites were established on Marajó northern coast around A.D. 1300 (Meggers and Danon 1988). It is not totally impossible that the arrival of the Aruã had played some role on the breakdown of the Marajoara political economy. Climate change, causing subsistence stress, might also have been a cause for cultural change, as Meggers (1979; 1994a; 1995c; Meggers and Danon 1988) has suggested.

Ethnohistorical information about the populations that inhabited Marajó Island at the eve of European contact is consistent with the archaeological record for the terminal Marajoara period or Cacoal phase. Colonial documents indicate that several "unrelated" Indian Nations, generically known as *Nheengaíbas,* inhabited the "islands" [mounds] on the savannas. Those nations were reportedly extremely bellicose, and organized in up to 29 distinct social groups, each one led by a warrior chief (Ferreira 1974). The existence of several distinct Indian nations is consistent with the existence of several chiefdoms, which later became decentralized but probably still would aggregate around a leader in times of war.

When the Portuguese launched offensive expeditions for enslavement and “pacification” of the *Nheengaíbas,* the Indians reportedly abandoned their settlements and spread over the territory (Antônio Vieira letters I, p.556-58, 462 in Leite 1950). Their resistance was so efficient

that they were never defeated in their own land, which explains the total absence of colonial descriptions of their villages and way of life. A peace treaty in 1659 put an end to the conflict. By the end of the 18th century, the remaining population had been relocated to missions in the lower Amazon (Meggers and Evans 1957: 559). Available evidence suggests that the *Nheengaíbas* were the ethnohistorical counterpart of the Marajoara societies in their last period (Schaan 1999-2000).

Chapter 5

INVESTIGATIONS ALONG THE CAMUTINS RIVER

SELECTION OF THE CAMUTINS SITE

The Camutins site is comprised of groups of mounds located along the *Igarapé dos Camutins*[1], a right bank tributary of the Upper Anajás River. This is the largest mound group on the Island. Despite the fact that its geographical circumscription suggests autonomy, the site cannot be fully understood within its own boundaries. For example, similarities in funerary practices and pottery styles between Camutins mounds and other sites located along the Anajás River and its tributaries suggest that the area of influence of the Camutins chiefdom extended throughout the basin (Figure 21).

Between 1960 and the 1980's, the Camutins mounds were intensively looted by land owners, who invested considerable time and resources in collecting archaeological ceramics for sale. Although there is no available estimate to the extent of the looting, it is likely that not less than three thousand ceramic and lithic objects were incorporated into private collections in Brazil, United States and Europe. Today most of the artifacts that remained in Brazil are at museums in Belém and São Paulo[2]. Nonetheless, decades of intense looting, trampling of cattle and erosion have caused extensive damage to the mounds. As a consequence, with the exception of the Belém mound (M-17), which was preserved by the land owner, the ceremonial mounds have lost between 40 and 80% of their archaeological deposits.

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[1] The expression "Igarapé dos Camutins" has a Tupian origin. *Igarapé* designates a small river, stream or creek, while *Camotin* is a funerary vessel, also locally called *igaçaba*. Both words have been incorporated to the local Portuguese dialect. Since the Camutins has small tributaries itself, it is often called a river, or, in Portuguese, *Rio Camutins*.

[2] Collection Fazenda São Marcos, at the Museu Paraense Emílio Goeldi (Belém), and collections Luís Otávio and Graciette, at the Instituto Banco Santos (São Paulo).

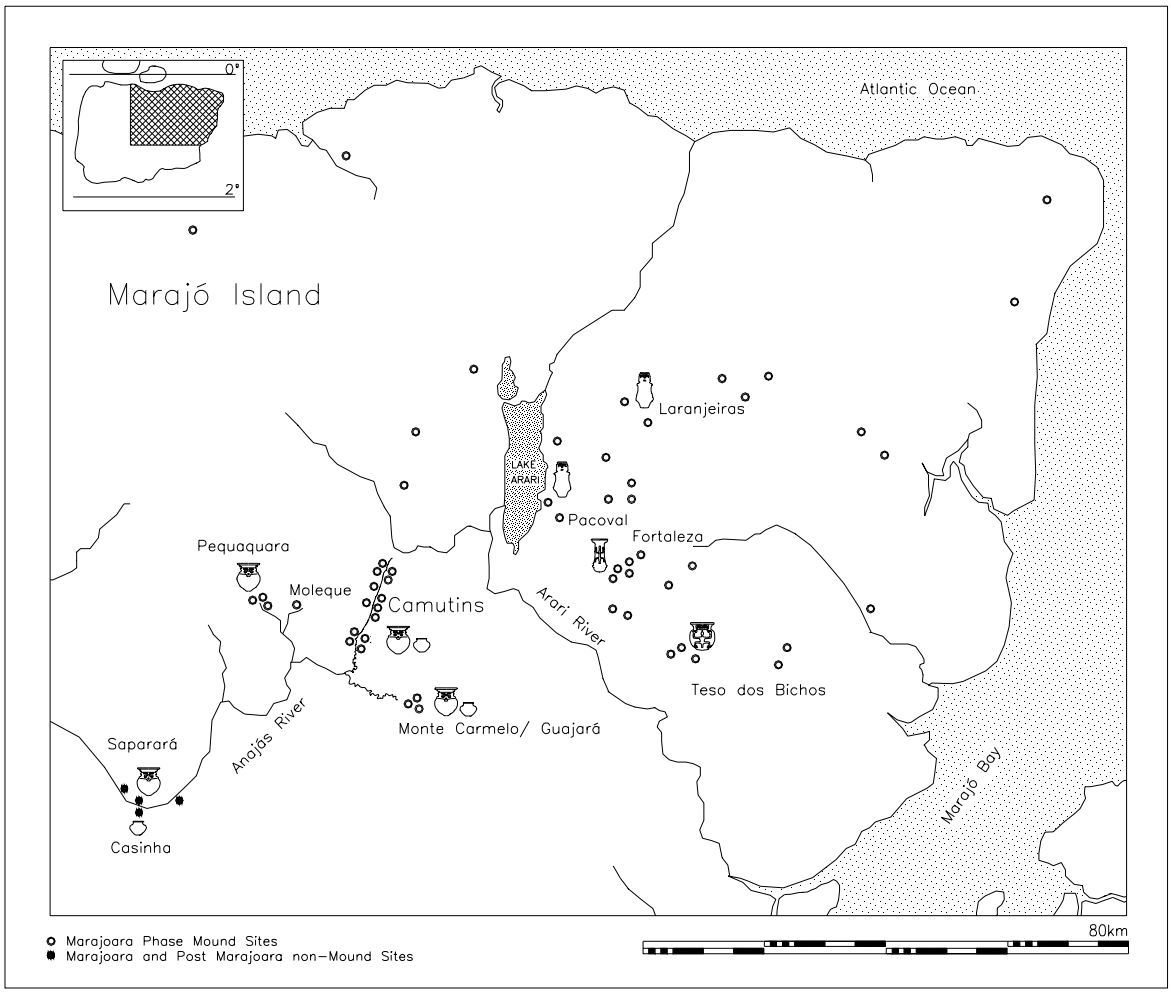

Figure 21 – Spatial distribution of funerary iconography on Marajó Island

Despite site preservation issues, both the importance of the Camutins chiefdom in the prehistory of Marajó Island (given its monumentality and range of influence), and the possible loss of the remaining archaeological patrimony in the next decade or so were carefully considered during planning stages of this research. A number of other factors contributed to the final decision to excavate at this location, such as: (1) knowledge of the area and support from ranch owners, due to previous research conducted by the author in sites along the Anajás river; (2) possibility of relating the study of Camutins site to sites along the Anajás River, in order to understand the site's regional interaction; (3) state of preservation of M-17, thought to be an

important elite mound; and (4) data from previous research, conducted by Meggers and Evans (1957) and Hilbert (1952), that could be used for comparison.

RESEARCH HYPOTHESIS AND OBJECTIVES

Previous scholars were puzzled by the development and permanence of Marajoara complex societies in an environment not particularly suited for intensive agriculture. In examining the Camutins chiefdom and its impact on the landscape, this study demonstrates that ecological conditions were crucial for the development of social complexity on a non-agricultural basis.

According to the model of chiefdom formation that is proposed here, mound building and other earth moving activities were conducted in order to manage water, aquatic resources, and ultimately to establish restricted access to these facilities. Manipulation of religion and esoteric knowledge justified privilege to few kin groups, who, in regulating access to resources, were able to mobilize labor and extend their power even beyond the limits of their immediate area of control. In order to test this model, the archaeological research is expected to demonstrate the following:

1) Location of elite mounds close to resources – in several complex societies, the building of mounds and megalithic structures close to resources are understood as claims over these resources (Dillehay 1995; Drennan 1995b; Renfrew 1976; Sahlins 1961). Mobilization of surplus in chiefdom societies not necessarily occurs by direct control over production. Surplus can be mobilized in the form of tribute especially if there is no centralized control over production and villagers manage their own economies. On Marajó, however, it is proposed that the location of ceremonial mounds close to the fishponds implies control over the access to basic resources, providing a measure of social stratification (Fried 1967: 52). The ability of the elite to mobilize

surplus is also attested by the earthworks (including the construction of elite residence and ceremonial space), which indicate access to labor (Steponaitis 1991: 227);

2) Hierarchical settlement patterns – site-size hierarchy and functional differences between settlements are believed to reflect political and administrative decision-making hierarchy (Drennan and Uribe 1987b; Flannery 1972; Peebles and Kus 1977; Steponaitis 1978; Wright 1984). Previous research (Meggers and Evans 1957) reported the existence of two functionally distinctive types of mounds at Camutins site, based on cultural features and artifact remains: cemetery (here called ceremonial or elite mounds) and habitation mounds. It is expected, therefore, that ceremonial mounds will be located next to the fishponds, and exhibit ceremonial facilities and remains of feasting. Habitation sites would be located at peripheral areas, would lack ceremonial facilities and outnumber the ceremonial mounds as expected for hierarchical settlement systems (Flannery 1976b: 174; Johnson 1977);

3) Ancestor worship and centralization of the ceremonial space – scholars working in Amazonia have emphasized the importance of initiation rites and ceremonies in reinforcing and reproducing social hierarchies, as well as in conveying messages about group membership and appropriate social roles (Clastres 1989; Descola 1994 [1986]; Heckenberger 1996, 1999). In chiefdoms, elites want to demonstrate their proximity to ancestors in order to legitimize their power as "natural" (Earle 1991b: 6; Fried 1967: 116; Kristiansen 1991; McAnany 1995; Sahlins 1958). In the archaeological record, the coincidence between ceremonial space, elite burials and evidence for feasting shows control over religion and ideology, which is especially important in a context of competition for followers and power (Drennan 1991; Drennan and Quattrin 1995; Feinman 1991; Steponaitis 1991).

4) Craft production under the elite control – the production of valuable crafts in an elite setting or under elite control indicates an strategy to control symbols of status, and justify the social order (Steponaitis 1991: 214). In chiefdoms, part-time specialists are expected to be found

"removed from household contexts", producing goods that would be trade or consumed by the elite (Peebles and Kus 1977: 432).

In order to identify the above indicators, the fieldwork consisted of both a regional settlement pattern study and a more in-depth investigation of the two larger mounds, M-1 and M-17, which represent the core of the political and ceremonial center. Due to the better preservation of its deposits, M-17 was the focus of a more detailed study, which allowed for the investigation of funerary practices, household activities, craft production, and ceremonial life.

The investigation of the two major mounds also had the objective of establishing their similarities and differences in terms of household and ceremonial areas, mound building episodes, artifacts, presence of prestige items and chronological occupation. This investigation ultimately is aimed at establishing the hierarchical positions of these two mounds and their role in the political economy.

The following pages describe, analyze and discuss the data collected by the author during fieldwork and laboratory analysis conducted between March 1999 and February 2003.

SETTLEMENT PATTERN STUDY

The Environment

The Anajás River has its headwaters on the western limits of the *campo*, and, as it flows southwest, meets areas of forest. Most of the right tributaries of its upper course (Igarapé dos Camutins included) drain intermixed areas of both forest and *campo* vegetation. The area drained by the Camutins River, for instance, is characterized by *campos* (especially in its upper course) and some patches of gallery forest. The mounds, located along the river banks, are covered with the typical vegetation found at Amazonian archaeological sites, such as palms, and various fruit trees.

As discussed in Chapter 2, the hydrology of Marajó Island is very dynamic, with marked daily and seasonal water level fluctuations. The changes are more dramatic, however, on the savannas, especially near the center of the Island due to its unusual low elevation. The striking differences in rainfall between the rainy and hot winter and the dry and cool summer drastically affects both the level and quality of river water, with consequences for vegetation, farming, hunting, fishing, and transportation. The environment, then, has to be described according to the two main seasons and their effects on the hydrography.

The Igarapé dos Camutins is the first tributary of the right bank of the Anajás River. It runs almost as a straight line from north to south, with more pronounced curves in its lower course, between the area where the higher ceremonial mounds are located, and the delta in the Anajás River, three kilometers below. The permanent connection between the Camutins and the Anajás River, even during the dry season, makes it the main route for contact between populations living along the Camutins River and other sites in the Anajás River basin.

During the peak of the rainy season (from March to May), the water levels typically rise up to four meters above normal. As a consequence, the Camutins shoreline disappears, and no visible limits remain between the river bed and the flooded campo, forming a huge lake that spreads as far as the eye can see. Above this shallow body of water, only islands of forest (mostly the mounds) are visible.

Due to the overflow of rivers and the accumulation of rain water, a multitude of small canals and water courses are formed everywhere, linking several large and small rivers that are not usually connected. From February to July, the upper course of the Camutins, which normally remains isolated, finds a connection to other rivers through a narrow, shallow canal known as Igarapé do Urubu, located on its left bank. The Igarapé do Urubu provides a transportation route from the Camutins to the Anajás-Mirim, and eventually to the Arari River, one of the largest rivers of the Island, which flows into the Marajó Bay. In the past, this route provided an

important aquatic connection between the Camutins and other chiefdoms located on the eastern *campos*.

The Camutins River, as with rivers of the Island, does not have a permanent water source; therefore the volume of water dramatically and quickly decreases at the end of June, which marks the beginning of the dry season. Nowadays, the receding waters, especially in the upper course, require prompt management in order to guarantee the survival of the local population and livestock. The area is sparsely inhabited; a few local cowboys and their families run ranches for landowners who prefer to live in Belém. Each year, a number of earth dams are rebuilt in several locations along the river. These small dams (*barragens*) are constructed at different times of the year, depending on the local needs as the season progresses. The work consists of filling the riverbed with sandy clay excavated from the river margins. During the dry season, when parts of the riverbed are exposed, it is possible to observe water management features that attest to a long history of water control that likely dates back to prehistoric times. As soon as the dams are built, narrow, elongated lakes filled with shallow and stagnated water are formed. Frequently by the end of the season (November or December), malnourished buffaloes find themselves trapped in the muddy shores, eventually dying and contaminating the water. The situation is especially dramatic along the upper course, where poor management, trampling by buffaloes and erosion have obstructed the river and caused even drier conditions early in the season. According to Hilbert's informants in 1950, the river had in the past a deeper bed and it flowed constantly even during the summer months. Fish were abundant, and included large species (Hilbert 1952:16-17) which have all but disappeared.

In the lower course, dry conditions arrive late in the summer, but problems with navigation begin as early as August. A *tapagem* (wall dam)[3] is rebuilt yearly some 500 m

[3] There is a difference between *tapagem* and *barragem* that has also been observed by Smith (2002:50). Both are intended to block the water, and are temporary. The barragem is a small earthen ramp which works well for small watercourses and requires less effort. The *tapagem*, on the other hand, consists of two

upstream from the river delta. It retains water from that point to some 2.5-3 km up river, thus reaching the mounds located at the lower course. In this stretch of the river, abundant fish are preserved for at least three to four months (July to October). Nevertheless, the situation changes from year to year depending on management and the severity of the season. For example, by the end of the very dry 2002 summer, the riverbed in front of M-1 and M-17 was exposed. An emergency dam was then built just below M-16 to retain water for cattle.

Although in recent times the environment has suffered enormously due to buffalo and cattle ranching (causing obstruction of the river and erosion of riverbanks and mounds), seasonal variations in water levels surely affected aboriginal populations as well. Indeed, current problems may well contrast with ancient strategies of landscape management that were in place to guarantee availability of water and abundant fish resources.

Location of Mounds and other Landscape Features

Field Methodology

The survey along the Igarapé dos Camutins was conducted in three field stages, in March 1999, July 2001, and September and November 2002. In 2002, the exposure of the *campo* and parts of the river bed allowed for the observation of features such as pond excavation, earthen bridges, and wells that are not visible during the rainy season. The survey consisted of locating mounds reported by earlier researches, in addition to identifying significant landscape features. All of the mounds and features were located with GPS, and most of the mounds were mapped using a transit. Some mounds and features were also mapped using GPS. Additionally, the river itself was mapped with GPS, since the available maps are not accurate.

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parallel wooden fences, filled in between with sediment. According to Smith (op.cit.), the population uses poles of cecropia (embaúba), which rots quickly and is easily swept away by the raising water in the beginning of the rainy season, allowing for the migration of fish and passage of boats.

Field Results

The surveys located 18 of the 20 mounds[4] described by Meggers and Evans (1957: 279-295), all the eight mounds[5] reported by Hilbert (1952:10-15), and six other previously unreported habitation mounds. It also located: (1) artificial excavations of ponds or pools used for fish-farming and water management adjacent to ten of the mounds (M-2, 5, 7, 9, 10, 13, 16, 18, 24 and 25), whose areas ranged from 18 m² to 13,576 m². The largest one represents the removal of at least some 27,000 m³ of sediments; (2) four sources of spring water or natural wells (close to M-1, 14, 18, 27); (3) five canals or streams; (4) five modern dams (one *tapagem* and four *barragens*). Three main groups of mounds were identified, along the lower, middle and upper courses of the river (Figure 22), attesting to a hierarchical pattern, according to geographical, ecological, and cultural variables.

Mounds located along the upper course of the Igarapé dos Camutins (especially M-30, M-31 and M-34), were found in poor condition, due to looting and erosion. M-14 was flattened in order to build a dam and a landing strip, and M-19 was flooded by the resulting lake. Data gathered from research conducted in 1949-50 (Hilbert 1952; also reported by Meggers and Evans 1957) was incorporated in order to expand the database and better understand the settlement structure. Data on area, height, location, function, and condition of the mounds is summarized in Table 1.

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[4] M-19 was flooded by an artificial lake built in 2000, and M-20 was eroded away.

[5] Mounds that comprise two elevations connected by an earthen bridge are considered by Hilbert as two separate mounds. In this research, composite mounds are considered just one for counting purposes. Therefore, the 12 new mounds located by Hilbert are considered as eight.

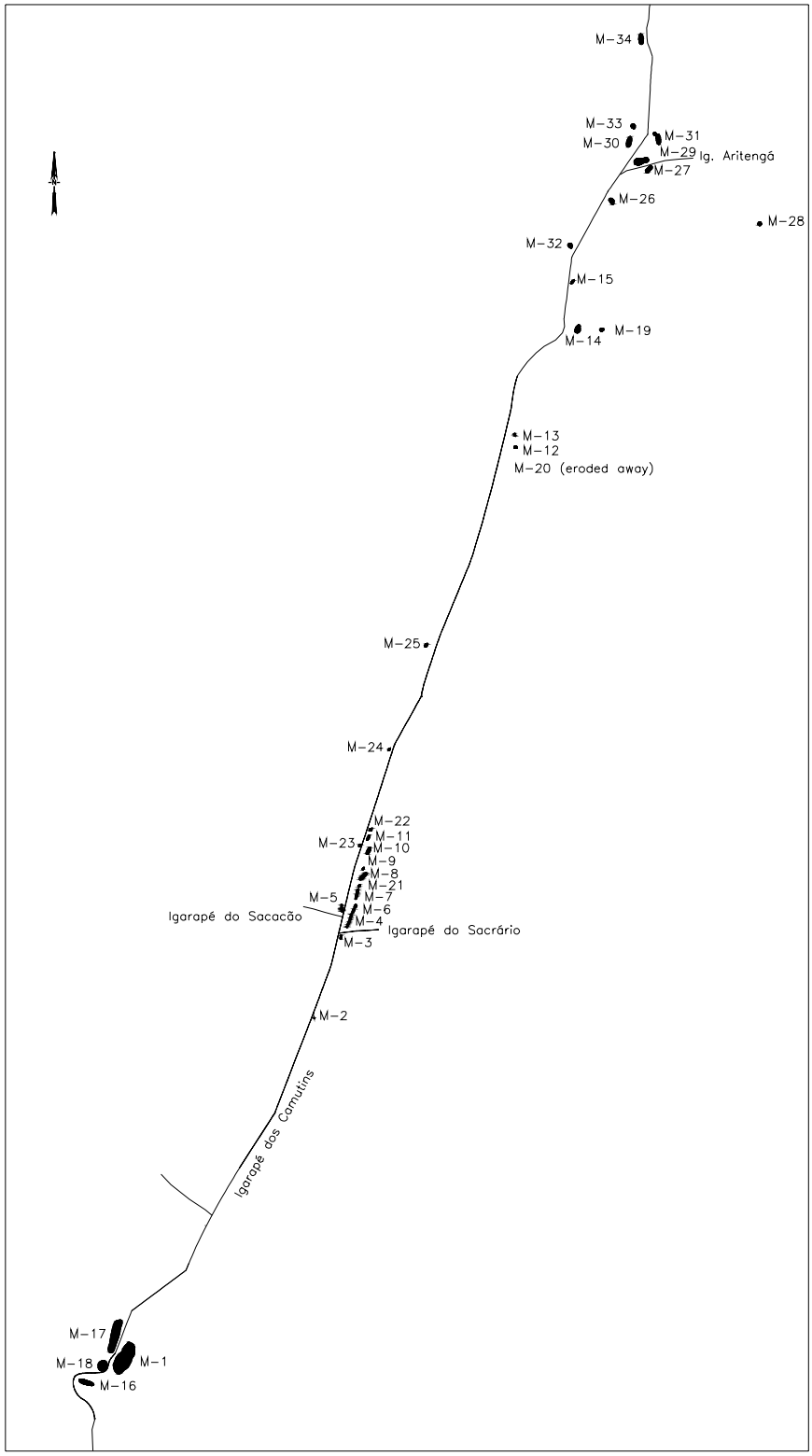

Figure 22 - Location of mounds along the Camutins River

Table 1 – Size, function and integrity of Camutins mounds

No.	Name	Area (m²)	Height (m)	Function	Condition
M-01	Camutins	13,493	11	ceremonial	Looted
M-02	Tesinho	17	2	habitation	Some Erosion
M-03	Jatobá	234	3	habitation	Good
M-04	Sacrário	762	2.8	habitation	Good
M-05	Sacacão	312	3	habitation	Some Erosion
M-06	-	543	5.5	habitation	Good
M-07	São Bento	620	5.38	habitation	Good
M-08	-	959	5.44	habitation	Good
M-09	-	129	5	habitation	Good
M-10	-	714	3.24	habitation	Good
M-11	-	364	5.21	habitation	Good
M-12	Carmo	203	2	habitation	Some Erosion
M-13	-	141	2	habitation	Good
M-14	Inajasal	1,160	7	habitation	Flattened
M-15	Pau d'Arco	269	6	habitation	Some Erosion
M-16	Camutinzinho	1,902	3.2	ceremonial	Looted
M-17	Belém	6,000	6.4	ceremonial	Good
M-18	Arraial	2,559	3.2	ceremonial	Good
M-19	-	490	1.5	habitation	Flooded
M-20	-	17	1	habitation	Eroded Away
M-21	-	150	3	habitation	Some Erosion
M-22	-	245	4.54	habitation	Some Erosion
M-23	-	200	2	habitation	Some Erosion
M-24	-	150	1.5	habitation	Some Erosion
M-25	-	200	2	habitation	Some Erosion
M-26	-	765	2	habitation	Badly Eroded
M-27	-	974	3	habitation	Badly Eroded
M-28	Roçado	600	1.5	habitation	Cultivated
M-29	Aritengá	2,576	2.5	habitation	Some Erosion
M-30	Cuieiras	1,360	3	ceremonial	Looted/Flattened
M-31	Urubu	1,785	2	ceremonial	Looted/Flattened
M-32	São Marcos	596	3.5	habitation	Badly Eroded
M-33	Tucumeira	600	2	habitation	Badly Eroded
M-34	Furinho	1,360	3	ceremonial	Looted/Flattened

Seasonal variations of water levels that may have caused a discrepancy in measurements as well as processes of erosion and looting that have led to sediment losses were considered in establishing mound area and height. Therefore, the information attempts to approximate, as close as possible, the prehistoric conditions of the mounds. Such information was used to perform spatial analysis using GIS methods, which is discussed in the section on settlement structure.

Description of Mounds

A detailed description of the mound's location, size, internal features, and relation to landscape features, produced by this and previous research is available in Appendix B. The description observes the actual spatial arrangement of the settlement units, preserving the original number and name given by Meggers and Evans (1957) and assigning new number for mounds located by Hilbert (1952) and the present research.

Ceremonial Center: Lower River Course

A group of four mounds is located at the lower river course. M-1, M-16 and M-17 contained burials and decorated ceramics, while M-18 contained only plain sherds. Mound area and height suggest a rank-size hierarchy between them, according to which M-1 would be the most important, M-17 would be the second one, and M-16 and M-18, for being smaller and located next to the other two, would be third and fourth in the hierarchy (Figure 23).

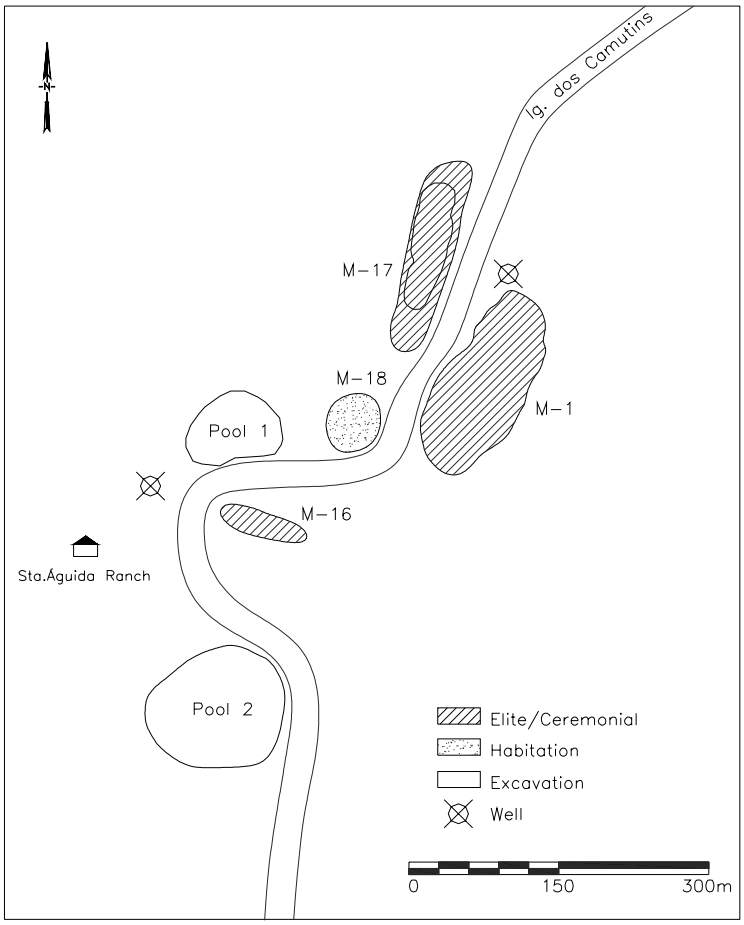

Figure 23 – Lower Camutins River mounds

Habitation Group: Middle River Course

Fifteen mounds are located in the middle river course, with heights varying from 1.5 to 5.44 m and areas ranging from 17 to 959 m². Four of the mounds were on the west bank, while the majority was on the left bank. Small pond excavations were identified next to mounds M-2, 7, 9, 10, 24 and M-25 (Figure 25). Surface collection produced mostly plain sherds, in general from coarse finished, thick walled vessels.

Many of the mounds have different elevations, indicating that there were originally platforms in different levels. Some were in fact two separate mounds linked by an earthen causeway, frequently lower than the mounds themselves (Figure 24).

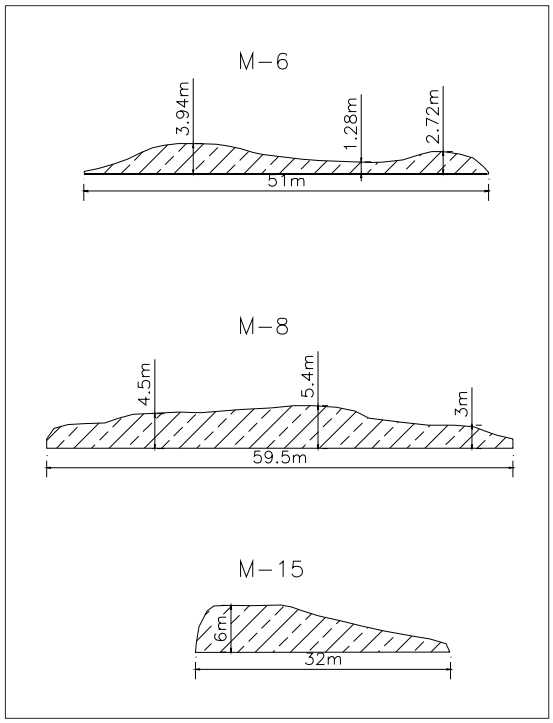

Figure 24 – Cross-section plans of M-6, M-8 and M-15

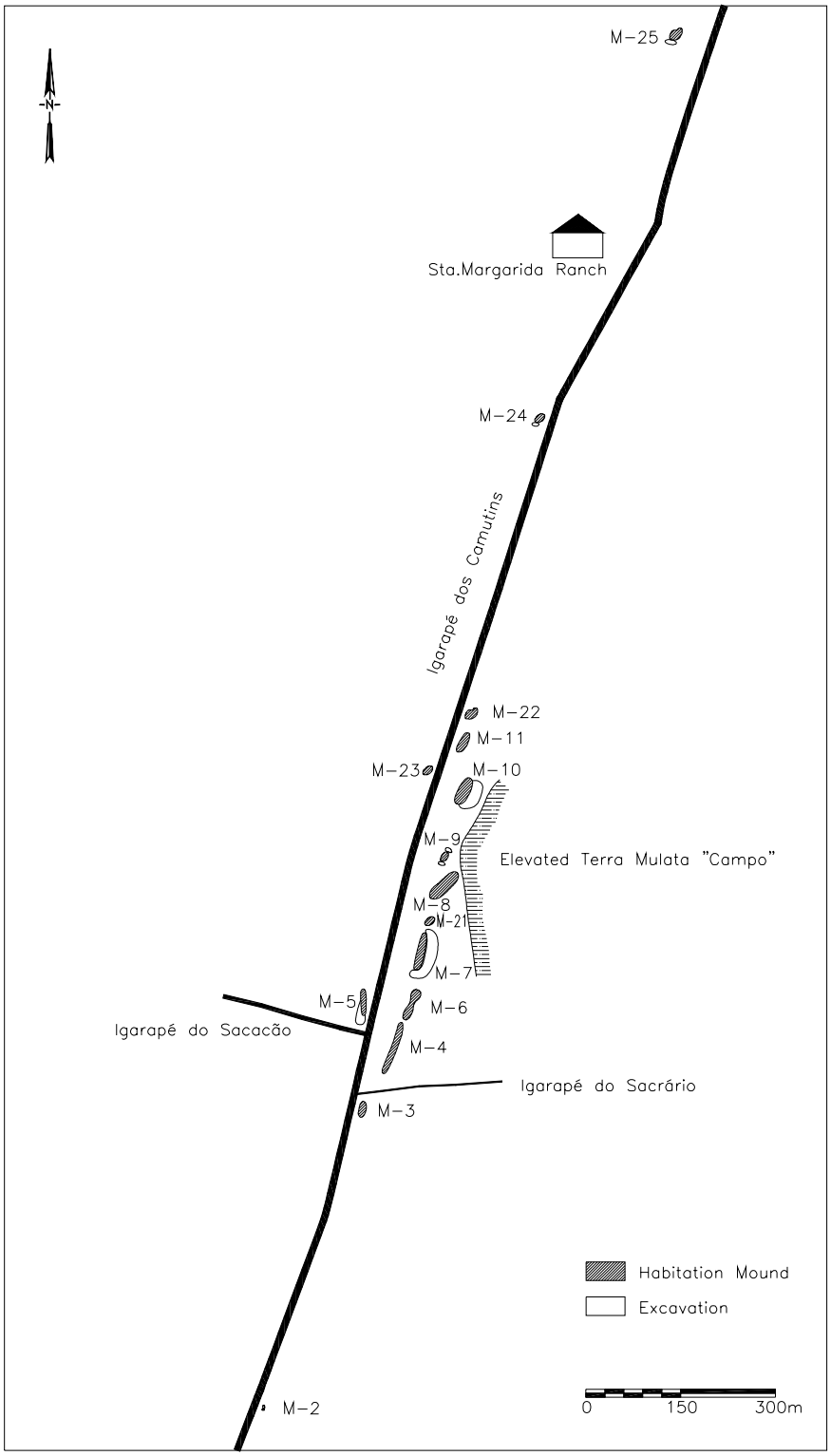

Figure 25 – Habitation mounds of the middle Camutins River

Elite/ Habitation Mound Group: Upper River Course

The fifteen mounds located along the upper course of the Igarapé dos Camutins (Figure 26) were more intensively affected by looting, erosion, and trampling of buffaloes. These mounds were not as high as the ones in the middle course, which may suggest that they were occupied later in the sequence. Hilbert (1952) observed that most of the mounds he visited remained underwater during the winter, which he credited to ecological changes caused by buffalo ranching. In fact, the situation has only worsened since then, since some of the mounds Hilbert described do not exist anymore.

Three elite and 12 habitation mounds were identified. The elite mounds have areas ranging from 600 to 1,360 m². They may have been originally 2 to 3 m high. They are now flattened by looting and erosion. The habitation mounds are not smaller in area, ranging from 17 to 2,576 m². Their heights range from 1 to 7 m. The habitation mounds differ from the elite mounds in the type and proportions of artifact remains, as well as cultural features. Mounds with burials and high proportions of decorated sherds were considered elite mounds, while mounds without burials and few or none decorated sherds were interpreted as habitation mounds for the non elite population.

A single pond excavation was identified next to M-13. M-26 is located in the riverbed, suggesting it was originally a weir. A source of spring water was identified next to M-27 and M-29.

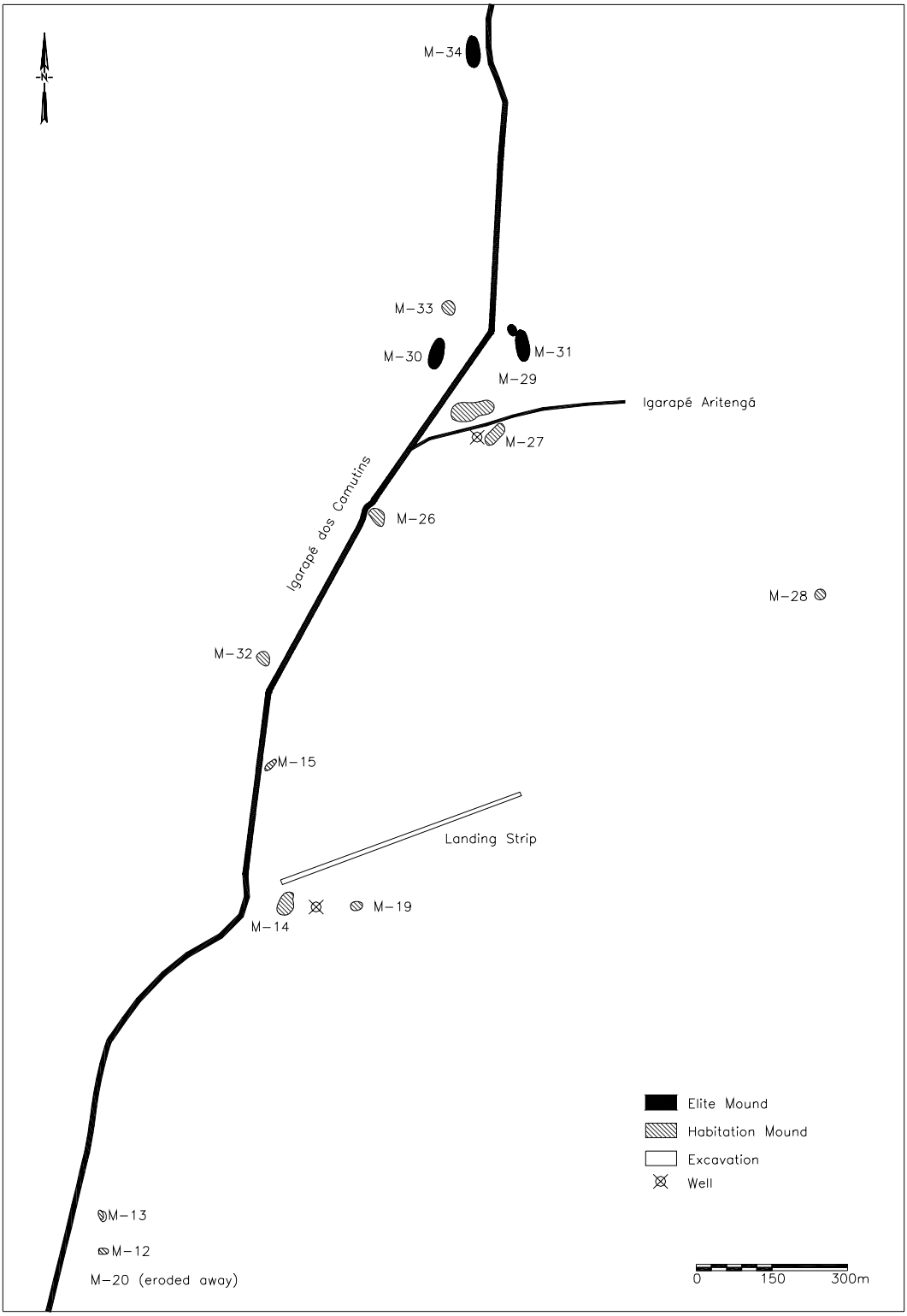

Figure 26 – Elite and habitation mounds of the upper Camutins River

Landscape Management

Due to the dynamic nature of the Island's hydrography, and constant rebuilding, it is difficult to determine which dams could have had a prehistoric origin. It is likely that aboriginal strategies of landscape management have survived, being replicated by modern populations, as Smith (2002) has also observed. However, small earthworks, such as seasonal *barragens*, cannot be assured to have a prehistoric origin without further studies.

Excavations found next to a number of mounds are clearly related both to the removal of sediments for mound construction and water management. These excavations can be characterized as pools, because they were connected to the river during part of the year. Wooden and earthen dams might have been used in conjunction with the pools, channeling fish into these deeper bodies of water, which would eventually be separated from the river at the low tide. There, aquatic fauna would be trapped and be easily harvested (Figure 27).

Two large pools (5,300 and 13,400 m² in area respectively) were found next to the lower course mounds. These pools have been partially filled with sediment deposited by the river during the rainy season, but they are still some 2 m deep in relation to the surrounding terrain. Below the fine silt that fills the pools, there is a 50 to 70 cm thick clay substratum, indicating that the pools were at least 2 to 3 m deep originally.

It is possible that M-16 was originally a weir, used in conjunction with the pools for water management. Using removable fences, the passage of aquatic fauna between the river and pools could have been managed, thus conserving live protein for consumption throughout the summer months. At the peak of the dry season, the pools would be completely isolated from the river.

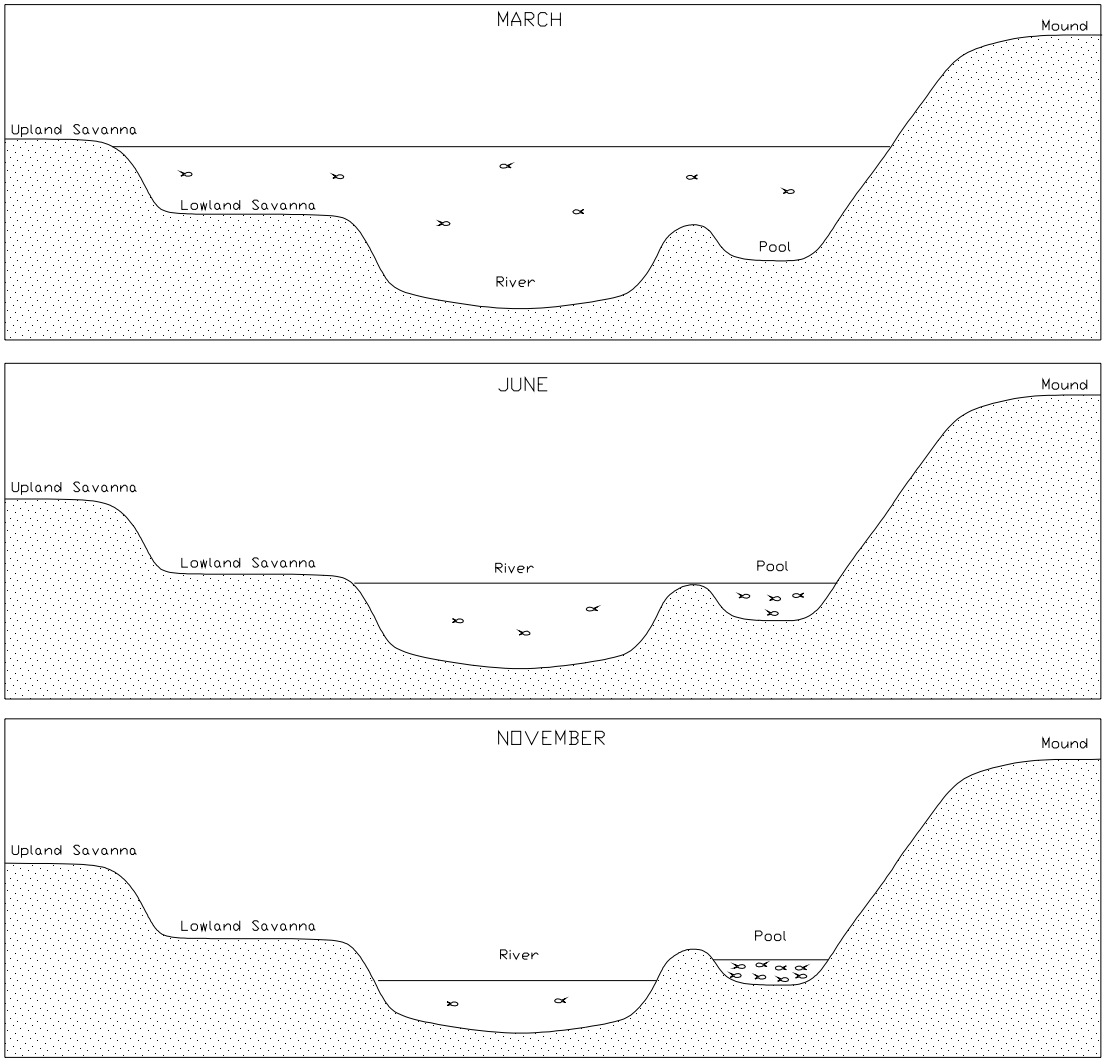

Figure 27 – Hypothetical model for resource management

This system would require annual maintenance, in order to remove sediments deposited in the pools by the annual floodwater. The removal of sediment to nearby areas explains the mound construction. As far as earthmoving activities are concerned, the initial construction of the two pools likely required a communal effort over a short period of time, maybe one or a few years. Routine maintenance, on the other hand, would be seasonal and require less labor investment. In any case, the mobilization of labor is relative. If small pools were excavated in the beginning, their present size may represent work done over several decades or centuries.

A measure for the rate of excavation is provided by the study of mound construction. Thick layers of silt added over extensive areas of the mounds are related to more intensive excavations for the aquaculture system. Conversely, discrete episodes of mound building, with thin layers of silt between occupation layers correlate to seasonal maintenance of the fisheries. While the chronology of pool excavation cannot be measured, episodes of mound construction are a testimony of earthmoving activities and can provide a chronology for water management and mobilization of labor.

Perhaps similar construction took place in the upper course of the river, but due to the dramatic impact that modern land management has inflicted on the area it was difficult to discern landscape features there. The location of M-26 in the river bed indicates it was a weir or a dam. It is located some 300 m downriver from two ceremonial mounds. However, a pool excavation could not be positively identified.

Artifact Analysis

During the surveys, sherds were collected from the surface of several mounds, when the conditions (visibility and transportation of materials) permitted. In 2002, the decision to concentrate people and resources in the excavation of M-17 prevented the expansion of surface

collections to other mounds. Transportation by boat or canoe along the river was impossible, since the water levels were too low and the dams interrupted the flow of water. Given that the crew was based at the lower course of the river, gathering artifacts from mounds located on the middle and upper courses would involve traveling distances from 4 to 10 km one way, carrying heavy bags of sherds. Despite the difficulties, in September, three such expeditions were conducted, in order to complete the mapping and location of some mounds in the upper course as well as to collect samples. Unfortunately problems of visibility made it difficult to obtain good samples.

As a result, the amounts of samples collected were limited. Nevertheless, they were analyzed and classified according to the pottery types proposed by Meggers and Evans (1957: 324-370), allowing for comparison with the assemblages previously gathered during their research. All of the information on surface collection from both investigations is combined in Table 14, Appendix A. The analysis of artifacts from M-1 and M-17 is presented and discussed in Chapter 6.

The artifact analysis indicated the existence of two functionally distinct types of mounds, here called habitation and ceremonial or elite housing mounds (Meggers and Evans distinguished them as habitation and cemetery). Habitation mounds typically have a low proportion of decorated pottery types. Ceremonial mounds tend to have higher proportions and more diversity of decorated pottery types. Considering the mounds from which surface collection provided at least one hundred fragments, habitation sites either do not have decorated sherds (M-6 and M-13) or have less than 5.9% (M-18) of decorated sherds. M-14 also presented low percentages of decorated sherds per level, although its stratigraphy can be compared to the ceremonial mounds of the lower course, M-1 and M-17 (see M-14 description, Appendix B).

Surface collection from M-16, combining the samples collected during the 1949 and 2002 surveys, produced 309 sherds, of which about 30% were decorated. This places M-16 among the

elite mounds, contrary to its previous classification as a habitation mound (Meggers and Evans 1957: 390). Concluding, the artifact analysis allowed for the identification of two major types of mounds (habitation and ceremonial/elite), confirming conclusions drawn by Meggers and Evans' study.

Settlement Structure

The study showed that the settlement system is comprised of three discrete groups of mounds, located at the lower, middle, and upper courses of the river. The ceremonial core, located at the lower course, is comprised of three elite mounds (M-1, M-17, and M-16) and one habitation mound (M-18). Differences between the mounds in area and height may indicate a hierarchical pattern. In the middle course, there are 15 habitation mounds. In the upper course there are 12 habitation mounds and three elite mounds. Besides differences between the mounds in terms of the proportions of decorated pottery, they also vary significantly in shape, size and height.

Data collected during the surveys allowed for the assessment of the distinctive settlement pattern displayed by the Camutins site. The spatial location of the mounds is interpreted as reflecting social distance, differential access to natural resources, access to exchange routes, and defense strategies.

Mound Building

The settlement is comprised basically of earthen mounds, which were built with sterile sediment excavated from pools and ponds, several of which were identified during the survey. At most of the sites, an initial layer of sediment was laid down to build a higher platform for habitation (Meggers and Evans 1957: 399). Additional layers were naturally deposited during the

occupation, but eventually other layers would be added either as a result of the disposal of sediment removed from pools and ponds or to intentionally raise the elevation of these platforms.

Although the intensity of the mound building activities varied through time, episodes of mound construction were most often seasonal and consisted of adding layers to discrete areas of the mound, not to its entire surface. This is confirmed by the existence of platforms at different heights observed in some mounds, as well as by analysis of M-1 and M-17 mound building episodes, which were supported by radiocarbon dates. Another characteristic is the fact that some units are actually composed of two mounds, linked by an earthen causeway. It may mean that when the population grew new habitation units were added, thus requiring the construction of a secondary mound that would typically be smaller and lower than the initial one (see Figure 24).

Village Structure, House Size, and Population Estimation

The mounds' morphology only allows for the layout of lineal villages, with houses placed along the riverbanks, as is common among riverine populations dependent upon fishing. Lineal villages were reported among the contemporary *Karajá*, and the ethnohistorical *Omágua* (Costa and Malhano 1986: 30), among others. In these types of villages, the houses are usually rectangular or oval.

Most of the mounds have a top area not wider than 20 m, which would suggest the existence of long houses not larger than 15-20 m wide and 25-30 m long. On the basis of the excavation of stove groups at Teso dos Bichos site, as well as study of magnetic anomalies that were interpreted as stoves, although not all excavated, Roosevelt (1991b: 336) suggests the existence of communal long houses, similar to the ethnographic *maloca*. Although Roosevelt (op.cit.: 335) considers that a final determination of the "shape, size and orientations of the dwellings" requires further excavations, she suggests that the houses measured 30 by 20 m.

This research has not excavated a complete house floor nor found post molds in such a structure that would point to house shape and size. Moreover, this research has concentrated on ceremonial mounds, and there is very limited knowledge on the structure of habitation mounds. For these reasons, house size estimates will be solely based upon the available flat surface on the habitation mounds, and the assumption that they were all used for habitation. Accordingly, the following scenarios would be possible:

(1) Fourteen mounds (2, 3, 8, 9, 11, 12, 13, 19, 20, 21, 22, 26, 32 and 33) could have supported not more than one single house;

(2) Six mounds (15, 18, 23, 24, 25, and 28) could have supported one or two houses;

(3) Seven mounds (4, 5, 6, 7, 10, 14, and 27) could have supported up to two houses; and

(4) One mound (29) could have supported up to three houses.

At any given moment, if all the mounds were contemporaneous, these figures would indicate a minimum of 28 and a maximum of 43 houses.

Population figures are even more difficult to estimate. Although the present study does not have an adequate database for estimating population, an attempt will be made in order to compare with previous estimates. Roosevelt has estimated a population of 1,000 people for Teso dos Bichos site, and 78 – 156 people for the Guajará mound, these being the only available references on population for Marajoara sites. For this reason, this study will also offer an estimate, thus these numbers can be used in the future to build hypothesis on aboriginal demography.

Ethnographic analogy suggests that communal 20 by 30 m *malocas* were inhabited by three to 12 nuclear families (Costa and Malhano 1986; Jackson 1994). Roosevelt (1991b: 342) estimates that these dwellings would house from 35 to 60 people, with an average of 40 people. For the purposes of estimating also within a conservative perspective, seems adequate to use

population figures for each house as ranging from 12 to 60 people. Therefore, based on mound area and on ethnographic information of the average number of inhabitants per house, it is possible to estimate the population (for the 28 habitation mounds) as follows.

A conservative estimation for both the number of houses (one house per mound X 28 mounds) and population per house (12 persons) would indicate a total population of 336 people. A conservative estimation for the number of houses (28 houses) and a maximum population of 60 people per house would indicate a total population of 1,680 people. On the other hand, a non-conservative estimation for the number of houses, considering the maximum number possible on each of the mounds (43 houses) and the maximum number of 60 people per house would increase the population figures to 2,520.

A more practical estimation, however, is proposed as follows. Considering 50 people a good estimate for every first house and 15 people a good estimate for every second or third house in the same mound (assuming that the second house is built when the first one becomes too small for the growing population), that would estimate the total population in the habitation mounds as 1,660 persons.

The estimation for the elite mounds has to follow a different set of rules. M-17, for example, had two houses, although it is not clear whether both were fully inhabited, as it will be discussed later. Due to the fact that elite mounds also had ceremonial areas, mortuary temples and areas reserved for craft production and other outside activities, they most likely did not have a large number of houses. It seems reasonable to estimate a population of 80 people for M-1 and 60 people for each one of the other five elite mounds. It would account for an elite population of 380 people, which seems realistic in light of the overall non-elite population of 1,660. According to this estimate, and assuming that all the mounds were occupied at the same time during a given period, the Camutins chiefdom would have no more than 2,000 inhabitants at any point in time.

Spatial Analysis

In order to evaluate the spatial distribution of settlement units, data on mound location, area, height and function (Table 1) was used to perform spatial analysis using Arc View GIS 3.2. Figure 28 shows the distribution of mounds according to function. The mounds are found grouped into three clusters, in the lower, middle and upper course of the river. Elite mounds are located at the lower and upper courses, in a triangular pattern, enclosing the settlement, as the last mounds of each group. Therefore, it can be said that habitation mounds are disposed in a lineal pattern, within an area flanked by elite mounds.

Flannery (1976b:180), discussing rules for linear settlement systems along rivers, proposed that villages would be founded away from a center both symmetrically upstream and downstream, while new daughter communities would be created in the spaces between them. This is not exactly what occurred here. Variables such as resource proximity, social distance, administrative functions and political control will be examined in order to account for settlement location and the relation between settlement units.

Specifically, the questions are: (1) just how hierarchical is this settlement system? (2) why are the mounds placed preferentially on the east bank of the river? (3) why are there three clusters? What determines the distances between them? what do they represent? And (4) what were the processes affecting the evolution of the settlement system?

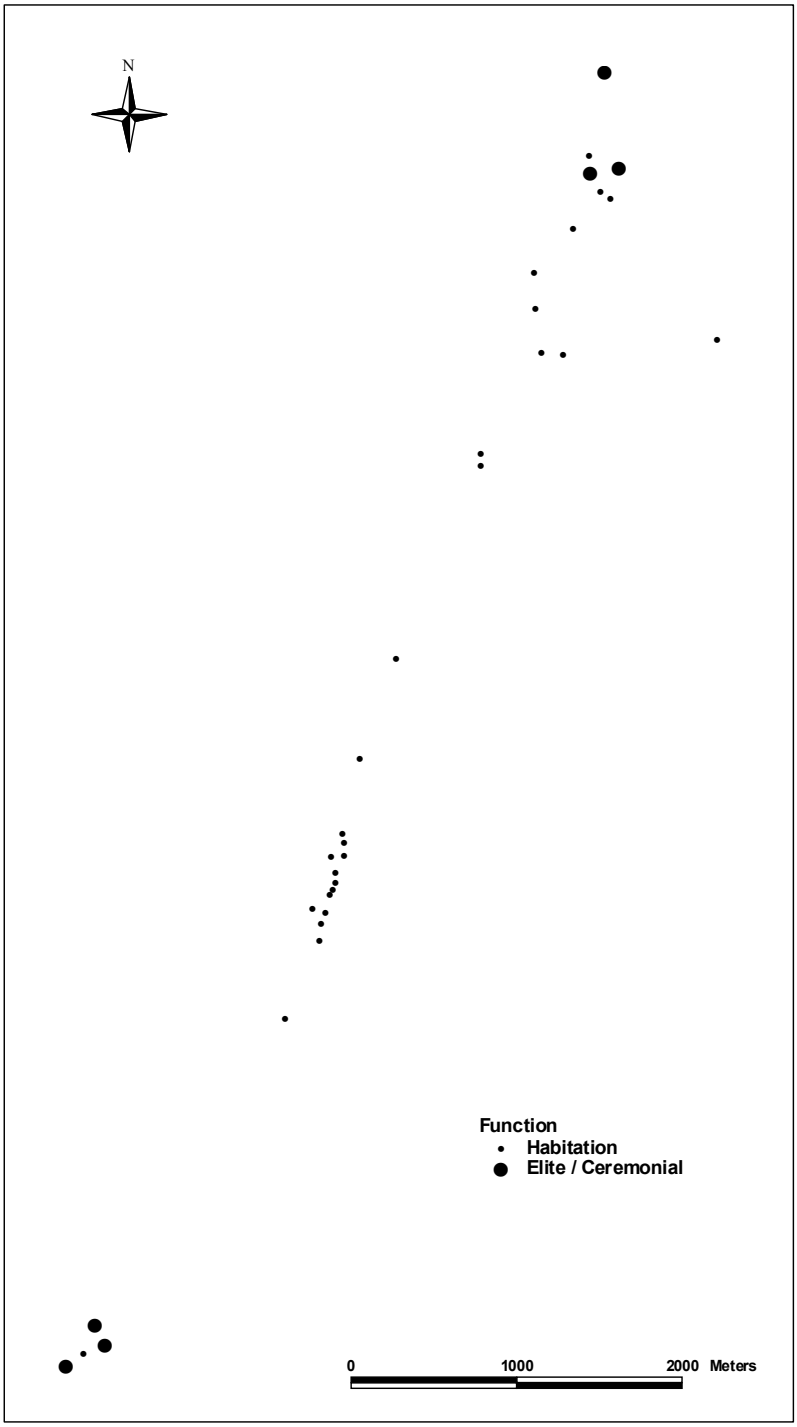

Figure 28 – Spatial distribution of mounds, normalized by function

In order to begin answering these questions, another graphic of distribution of settlement units according to area is provided (Figure 29). By normalizing mound area according to one standard deviation, it is possible to discern that the larger mounds are located at both the extremities of the settlement. The two largest mounds (M-1 and M-17), however, are located at the lower course. The larger mound of the settlement (M-1) has an area of three standard deviations above the mean. The second larger (M-17) has an area between one and two standard deviations above the mean. The third mound size, of up to one standard deviation above the mean is represented by six mounds (M-16, 18, 29, 30, 31 and 34). The fourth category, below the mean, comprises the remaining mounds. It is important to observe that the first category is significantly larger than the second. The third category includes not only elite, but also two habitation mounds, although geographical distance shows they are associated with elite mounds. In order words, habitation mounds can be large, but only when they are associated with elite mounds.

There are, consequently, four major settlement types, as follows: Type 1 - M-1, political and ceremonial center, lower course; Type 2 - M-17, elite and ceremonial mound, lower course; Type 3 - elite or habitation mound (associated with elite mound), two on the lower course and four on the upper course; and Type 4 - habitation mound, located on the middle and upper courses. Therefore, the settlement type distribution reflects the structure below.

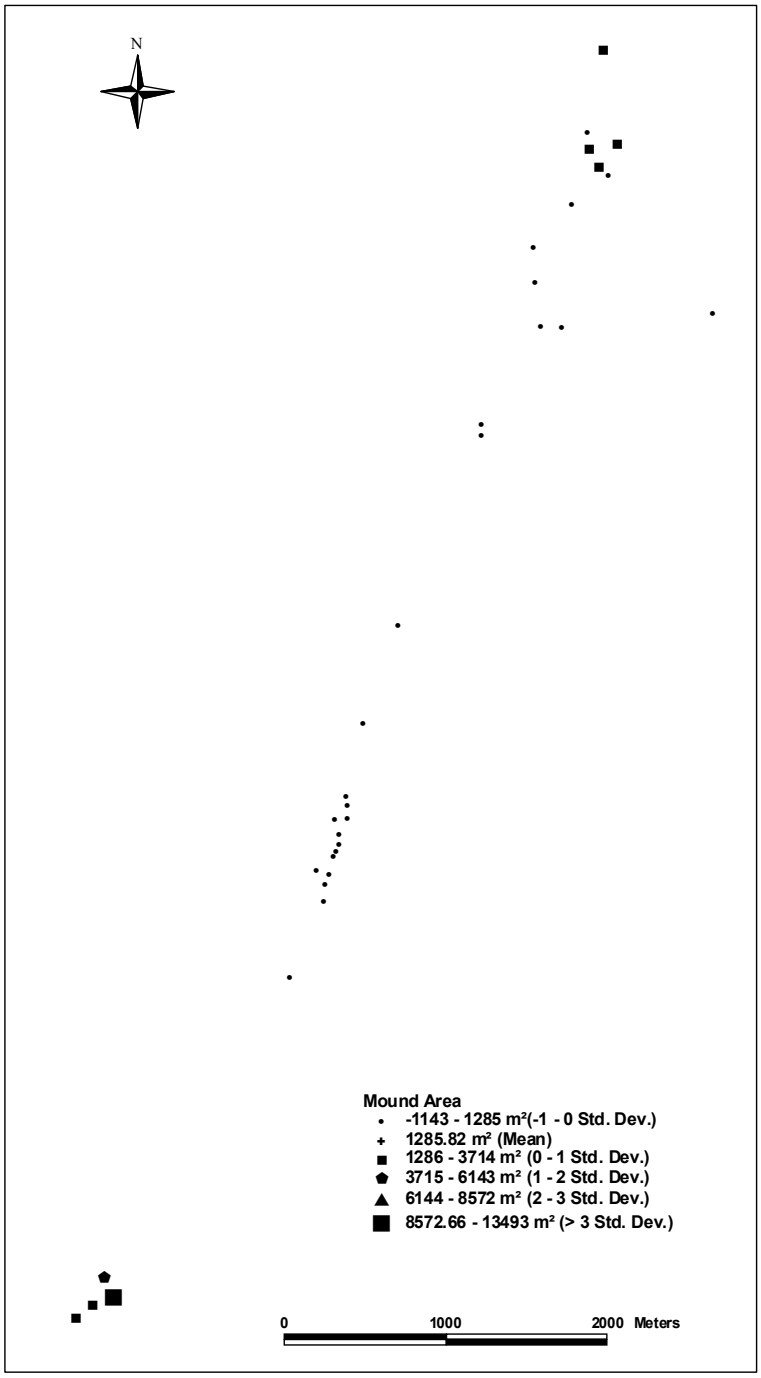

Figure 29 – Spatial distribution of mounds, normalized by area

Thus the settlement is clearly hierarchical, exhibiting: (1) a political, ceremonial, and administrative core; (2) secondary and tertiary settlements with ceremonial structures; (3) village group without ceremonial facilities. Also, it could have followed Flannery's prediction of evolution for linear settlement systems, according to which secondary villages would be placed away from the center in the first stage of expansion, while in a second stage, the gap between them would be filled according to rules of social spacing (Flannery 1976b:180). Yet, the habitation mound village, according to the Camutins data, is placed evenly in between the ceremonial group and the elite "daughter"[6] mounds. However, it cannot be assumed that the habitation group of the middle course was created after some mounds were built at the upper course before those mounds are studied.

The tendency for the mounds of the middle course to be located on the east side of the river can most likely be explained by the proximity to the open campo. Based on settlement system rules for Formative Mesoamerica, Flannery (op.cit.: 174) suggests that "local factors being equal, the side of the river chosen by a town may depend on where its more distant sustaining hinterland is located". It is not clear at this point what exactly the east side offered in terms of resources, but cultivation remains a possibility, although that area is not presently suitable for agriculture. Manioc agriculture is favored in partially forested areas, so the plants are not totally exposed to the equatorial heat and sun. However, the location of a slightly elevated area of *terra mulata*[7] soil next to the habitation mounds (Figure 25) may indicate that agriculture was accomplished there, since the vegetation may have changed since prehistoric times. Possibly this side of the river was also better suited for foraging and hunting.

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[6] Flannery (1976:168-9) explains that in complex settlement systems the political centers are in general the oldest sites, where seniors of higher rank tend to remain while lineages of lower rank would found newer sites, or "daughter communities".

[7] Following Woods & McCann (1999) and Sombroek's (1966) term for dark brown soil not associated with cultural artifacts that may have been used in the past for cultivation.

Another possible reason for the east side location of the mounds is the fact that it would be possible to walk between all of the mounds which were located on the same bank of the river, which would minimize effort in movement (Johnson 1972, 1977). That is particularly important if it is considered that the construction of dams could have severed aquatic communication between groups of mounds over periods of time. A more important reason, however, seems to be the one highlighted by Farabee (1921): spring water sources are concentrated on the east side of the river.

Examining the distribution of mounds according to height, a distinctive pattern appears that does not completely agree with the rules of organization that the classification by function and area seem to imply. One reason is the fact that the elite mounds of the upper course are not particularly high. It means that if height is considered important, habitation mounds of the middle course are higher than elite mounds of the upper course. Therefore there is no correlation between height and function. For this reason, only the habitation mounds were plotted and classified according to height (Figure 30).

The graph indicates that the higher mounds tend to be situated in the middle of each cluster, suggesting that each cluster was growing internally from the center to the periphery. That would imply an internal dynamic, especially within the habitation cluster of the middle course of both expanding up and down the river building new mounds and at the same time increasing mound height from the center to the periphery.

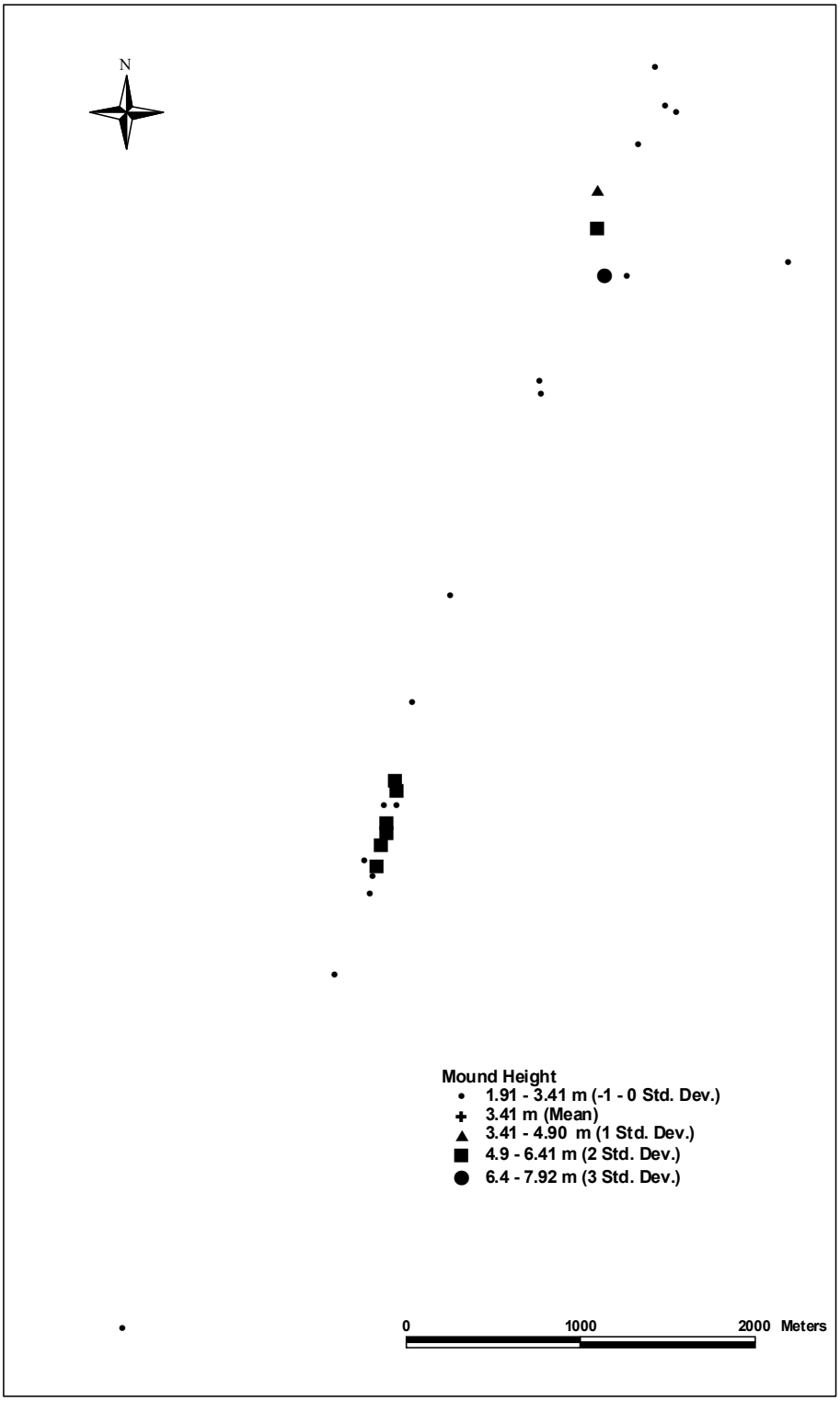


Figure 30 – Spatial distribution of habitation mounds, normalized by height

In sum, the settlement system seems to display a set of rules that may explain settlement evolution. Accordingly, the Camutins community could have evolved from a preliminary colonization of the lower course of the river, when some communal work was involved in excavating a pool and constructing a weir, probably where M-16 is located, initiating the fish farming system. Since that was an area under the control of the kin group founders, commoners who worked in the construction would have settled up the river within a distance that would guarantee proximity, but, at the same time, a culturally expected social distance. As the population increased, new hamlets would be constructed away from the elite core, thus expanding settlement up the river. The fact that the major water control system would preserve aquatic resources and water from the ceremonial center upstream indicates that upstream locations for new units would be more adequate.

As elite population also grew, new elite residences had to be built. That involved the creation of two other elite ramifications. One that would still stay close to the ceremonial core, but due to matters of space and/or importance could not live in the same area (thus the construction and occupation of M-17 and M-16); and another that would locate away from the core, on the upper limits of the settlement. The distance in this case may relate to both the genealogical distance (Service 1962) and the need for administrative control of the upper course, where new hamlets were expanding as well. That area was critical, because control of water on that location could undermine the elite control of the lower course. The placement of an arm of the elite on the upper course, therefore, was a matter of geopolitics and defense, following a clear administrative and political function.

The fact that the elite mounds of the upper course do not have the monumentality of those of the lower course is explained by the fact that ceremonies and feasting would be concentrated in the lower course, where the fisheries were located. At the upper course, however, members of the local elite would be buried and rituals would be performed, in order to justify through religion

their claim to the territory. In controlling strategic areas of the landscape, the elite secured their access to resources and mobilization of labor.

INVESTIGATIONS AT M-1

Field Methods

The fieldwork at M-1 took place in two stages. It comprised of a preliminary assessment of the conditions for the investigation in 1999, when a profile was cleaned on an eroded trench, and a subsequent 15 day-investigations in 2001, when other profiles were studied and selected areas were excavated.

In 1999 M-1 had several looted trenches through which rain water had spread sherds and sediments to the eastern and southern plain. According to the information provided by the landowner, Mr. Boulhosa, he himself, his wife and workers had excavated the mound extensively for a period of twenty years, searching for ceramic vessels and objects. It is estimated that the mound has lost about 50% of its deposits, together with practically all of the burials that it contained. The west slope of the mound, facing the river, was the only part still left intact. This is confirmed by the fact that there the trees are older, in comparison to the secondary vegetation that covers the rest of the mound.

Due to adverse conditions, the investigation included the cleaning of profiles in looted trenches and excavation of selected areas on the western slope. M-1 was mapped using a transit, establishing a system of north-east geographic coordinates, as well as a system of elevations measured in relation to a datum (100 m) established about 1 m above the mound's surface. The topographic map (Figure 31) reflects only partially the destruction of the deposits, since the resolution is not accurate enough to record the abrupt changes in elevation caused by eroded ditches.

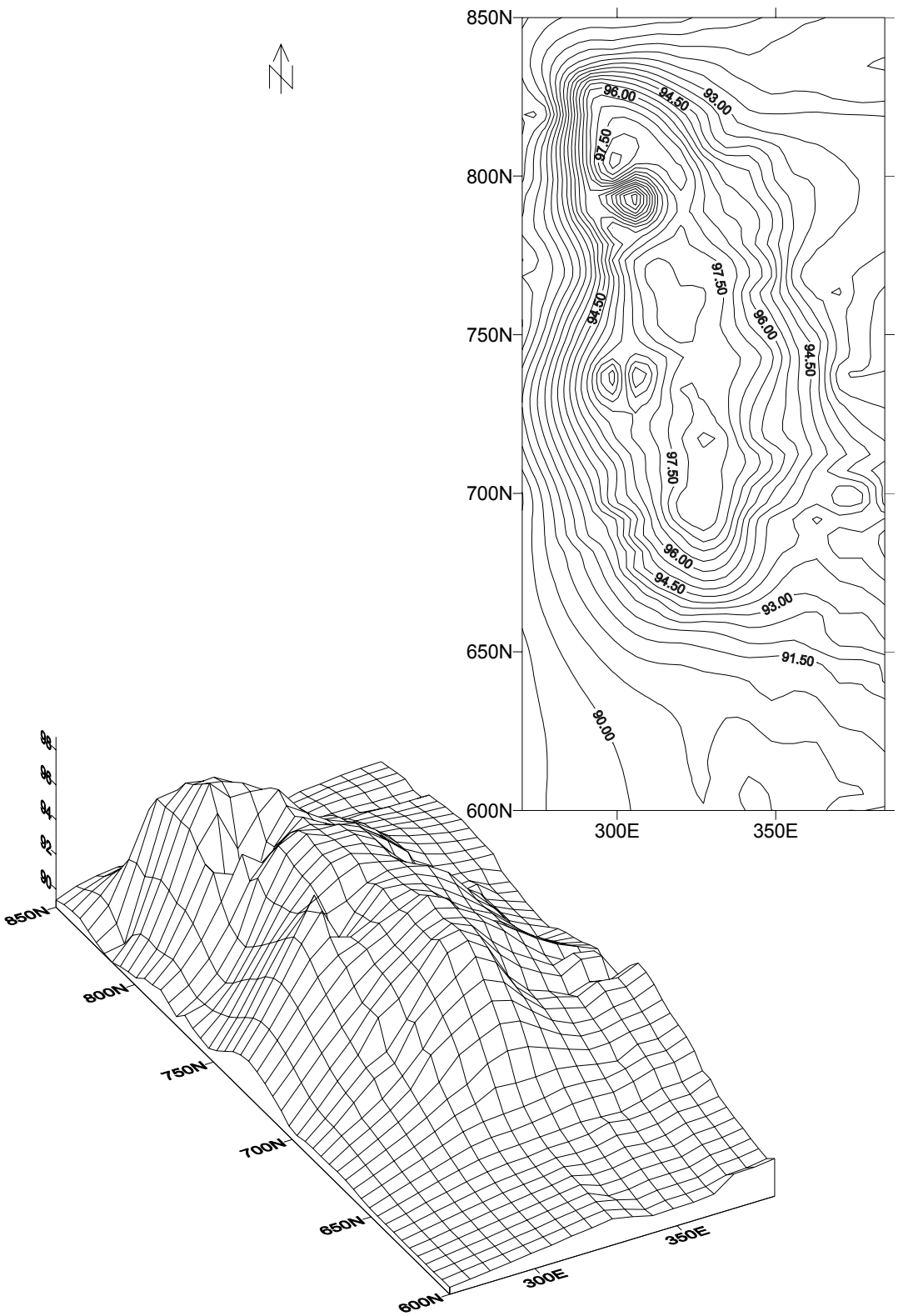


Figure 31 – M-1 topographic map

The profiles were cleaned and recorded through photographs and drawings. Charcoal samples were collected from discrete layers for radiocarbon dating. After the initial exposure of profiles, the investigation continued through the excavation of lower deposits adjacent to the profiles. In this stage, excavations followed the natural strata, and artifacts were recovered at various levels. Three 2 by 2 m stratigraphic units were excavated in the preserved western slope (Figure 32).

Field Results

Profile 1

A sequence of thick layers of light brownish gray silt followed by thin layers of charcoal, orange baked clay and light greenwish gray sand characterizes the mound's stratigraphy, as observed in this profile. The thick layers represent massive episodes of mound construction, through the addition of silt brought from nearby areas. The thin layers represent discrete episodes of occupation. Hard clay surfaces may have resulted either from intentional firing in order to hardening the surface or as a result of hearths built on top of clayed sediment. Thin black layers are full of charcoal, probably residues of firing and sweeping (Figure 33).

Two charcoal samples, collected from Profile 1, were dated (see Table 3). Sample no. 1 was collected from a charcoal layer located 115 cm below the surface (97.93 m level), dating that layer to 1140 ± 40 B.P. (Beta 134537; wood charcoal; $\delta^{13}C$ = -25.4 $^{o}/_{oo}$), cal A.D. 785 - 995. Sample no. 2 was collected from a charcoal layer located 210-213 cm below surface (96.9 m level), dating that layer to 1290 ± 60 B.P. (Beta 134538; wood charcoal; $\delta^{13}C$ = -25.2 $^{o}/_{oo}$), cal A.D. 645 – 880. The dates imply that one meter of sediments, in the highest area of the mound, was added over a period of roughly 130 years.

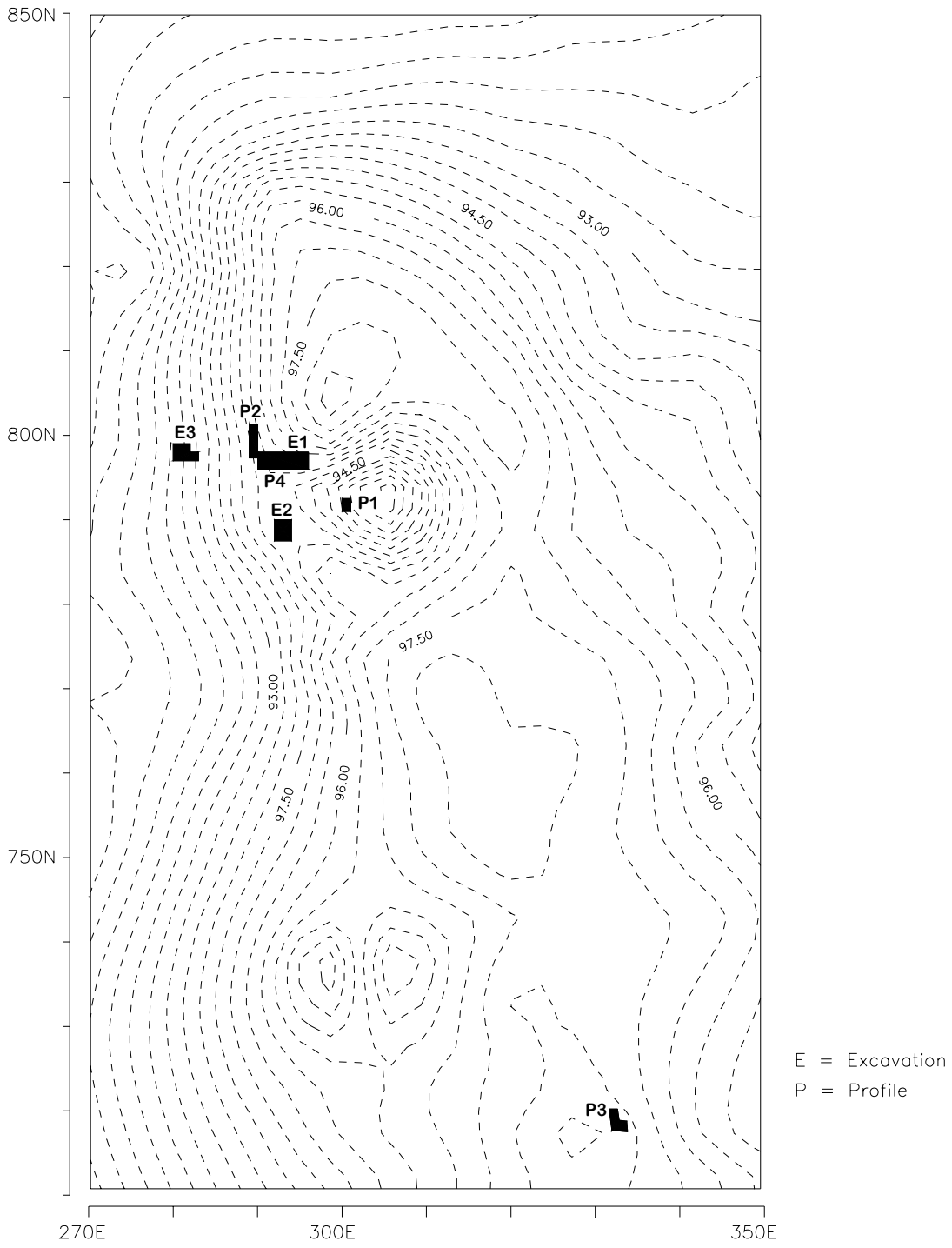


Figure 32 – M-1, location of excavations on the topographic map

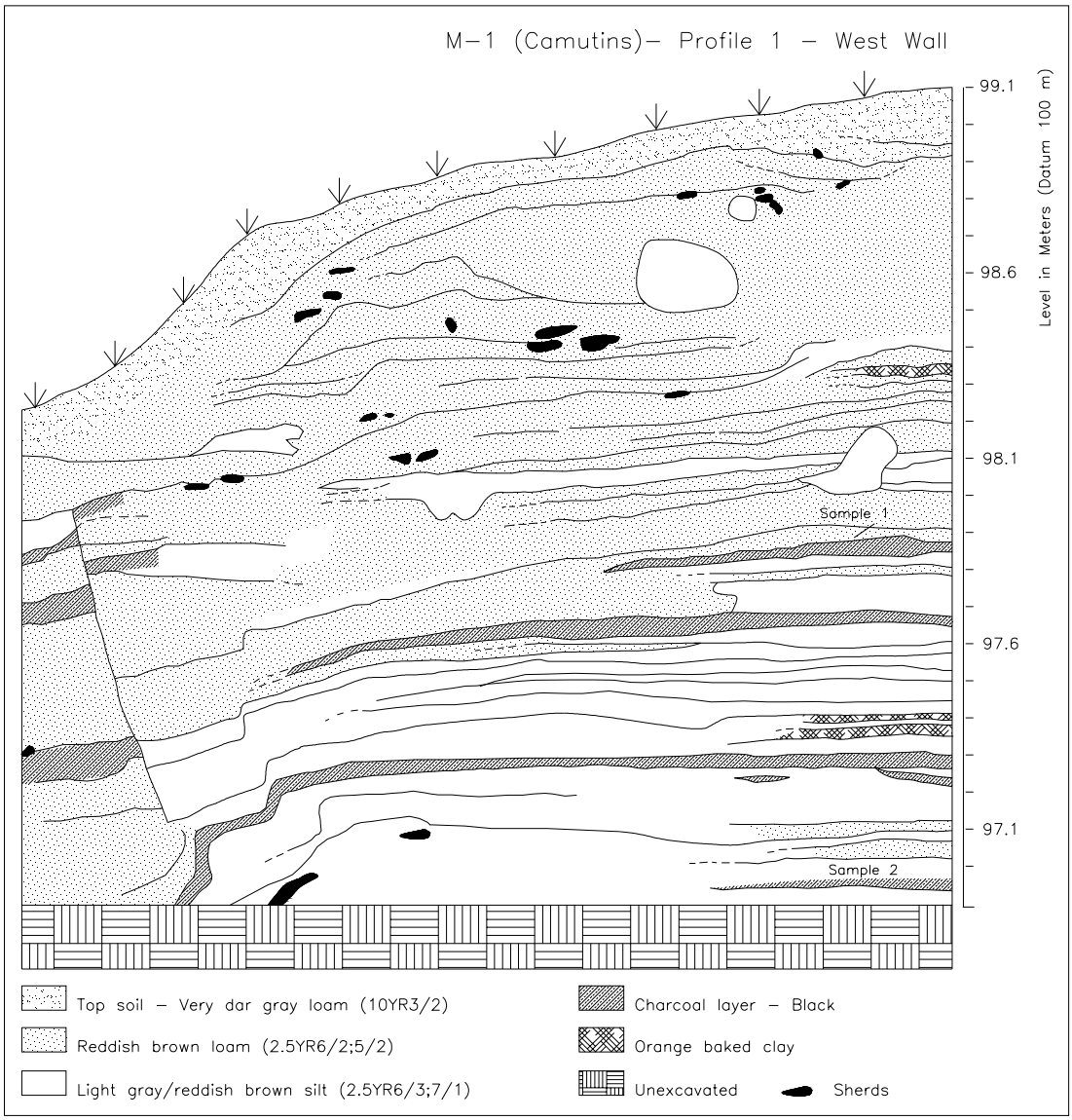


Figure 33 – M-1 profile 1

The cleaned profile reached a depth of 1.94 m below surface, after which the excavation continued by natural layers, uncovering very thin strata of red clay, charcoal and light sand. At 1.8 m below surface (97.28 m level), the remains of badly fragmented inverted pots (two or three) were found in a cluster. The reddish ceramic crumbled to the touch. Initially it was thought that the vessels were probably fired on that location and there abandoned. But in M-17, a similar bed

of broken vessels was identified below a funerary urn, which may mean that such arrangement had a ceremonial significance.

In 2001, excavations were conducted on the western slope (Excavations 1, 2 and 3), and profiles (Profiles 2, 3 and 4) were cleaned in eroded trenches or pronounced slopes (Figure 34).

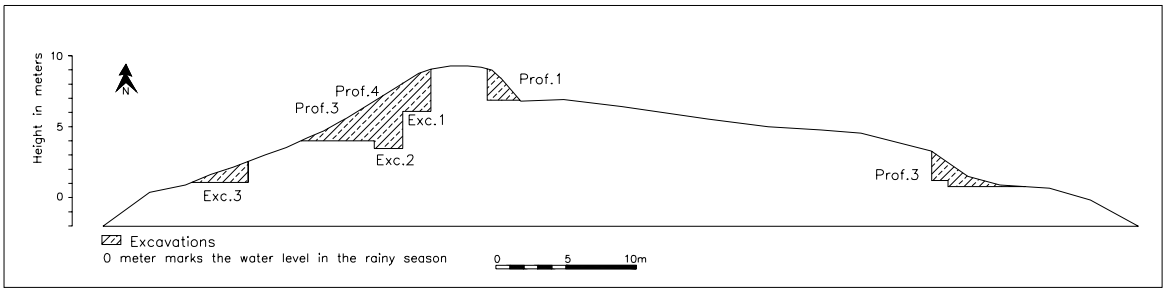


Figure 34 – West-east cross-section of M-1

Excavation 1

This 2 by 2 m unit was begun close to the summit (97.2 m level). After excavating to a depth of 90 cm, removing very disturbed deposits, it became clear that the sediments consisted of looters fill, due to the amount of broken pottery and recent materials (nails, china, bottles, and plastic) that were recovered. A rounded pottery disk, a small globular plain vessel, and fragments of large ceramic plaques with leaf impressions, were among the prehistoric remains. The plaques are believed to have served as a basis for pottery manufacture.

Excavation 2

This 2 by 2 m unit was begun at about midway between the top and base of the mound, on a very steep slope. For this reason, the pit walls were higher on the east and northern sides. The first 50 cm of excavation removed the entire disturbed fill, which was restricted to the northeast

corner. The excavation continued by up to 10-cm artificial levels within cultural strata. Successive layers of light gray silt, burnt clay and charcoal were found, following the stratigraphic pattern observed on Profile 1. However, a thick stratum of baked clay, 40 cm wide and 2.5 m long, extending along the south – north axis, appeared at the 95.14-m level. This hard, flat orange clay surface was built with clay and thick sherds, some of them with a partially vitrified external surface, indicating the use of high temperatures. Along the structure, curbs were 2 cm elevated and 8-10 cm wide. It was parallel both to the excavated wall and the river.

A fire pit, containing sherds, burnt clay, and charcoal, was embedded in this sidewalk look-alike structure (Figure 35). The function of such a pit is not fully understood, but it is possible it was used for firing small pottery vessels, as some ethnographic examples may imply (see Rye 1981: 99).

After exposing the floor, a north section was excavated and the profile at the northern wall was exposed (Figure 36). Overall only small sherds were recovered from Excavation 2; cultural remains were rarer in light gray sand layers, than in the orange and black layers, indicating that light sand layers represent episodes of mound construction while the others represent occupational strata. Even there, however, sherds were not abundant, which is indicative of constant cleaning. A fragmented stone axe, which had been used as a burnishing tool was recovered from the surface next to the excavation.

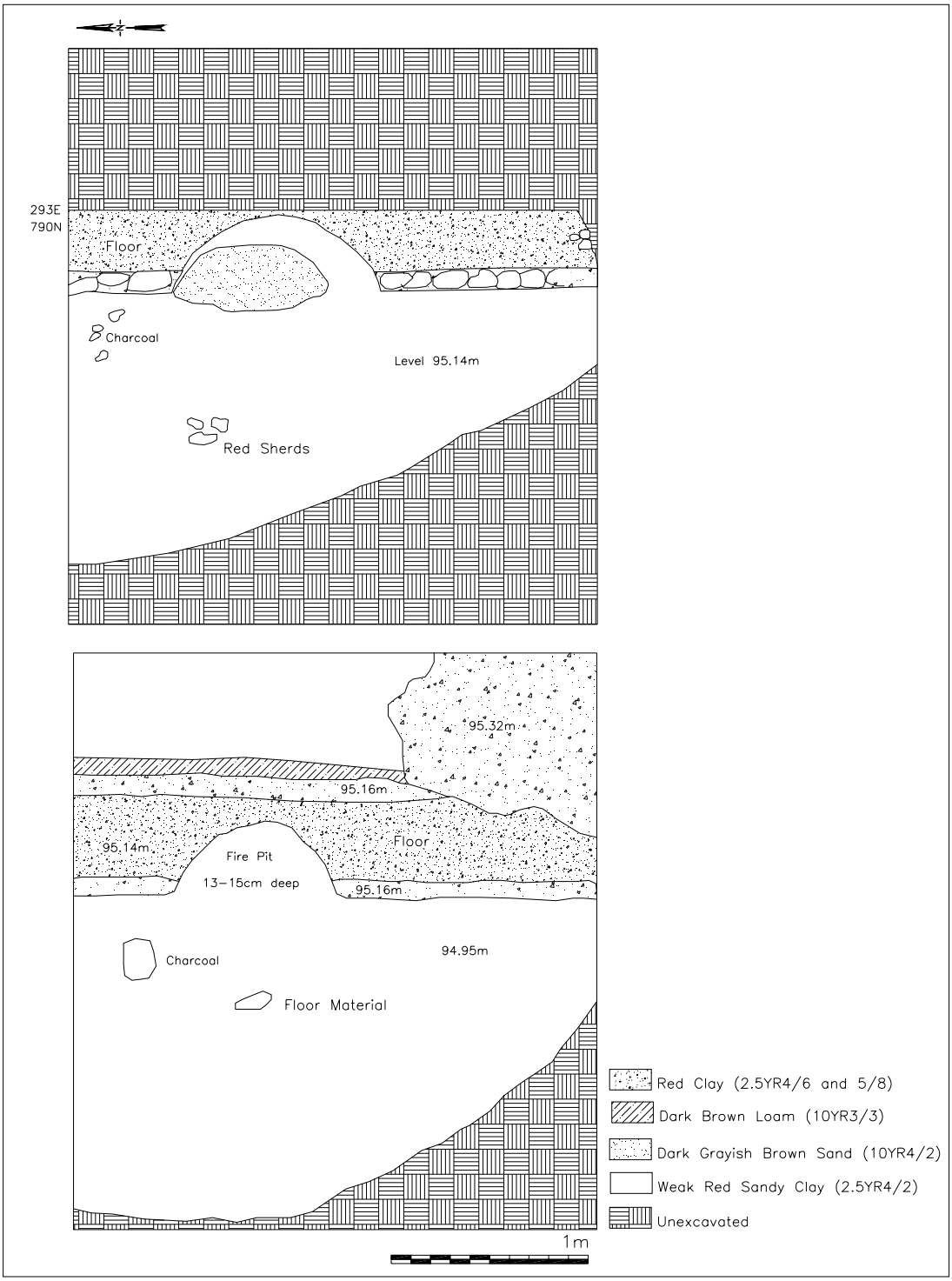


Figure 35 – Top views of clay floor in M-1 excavation 2

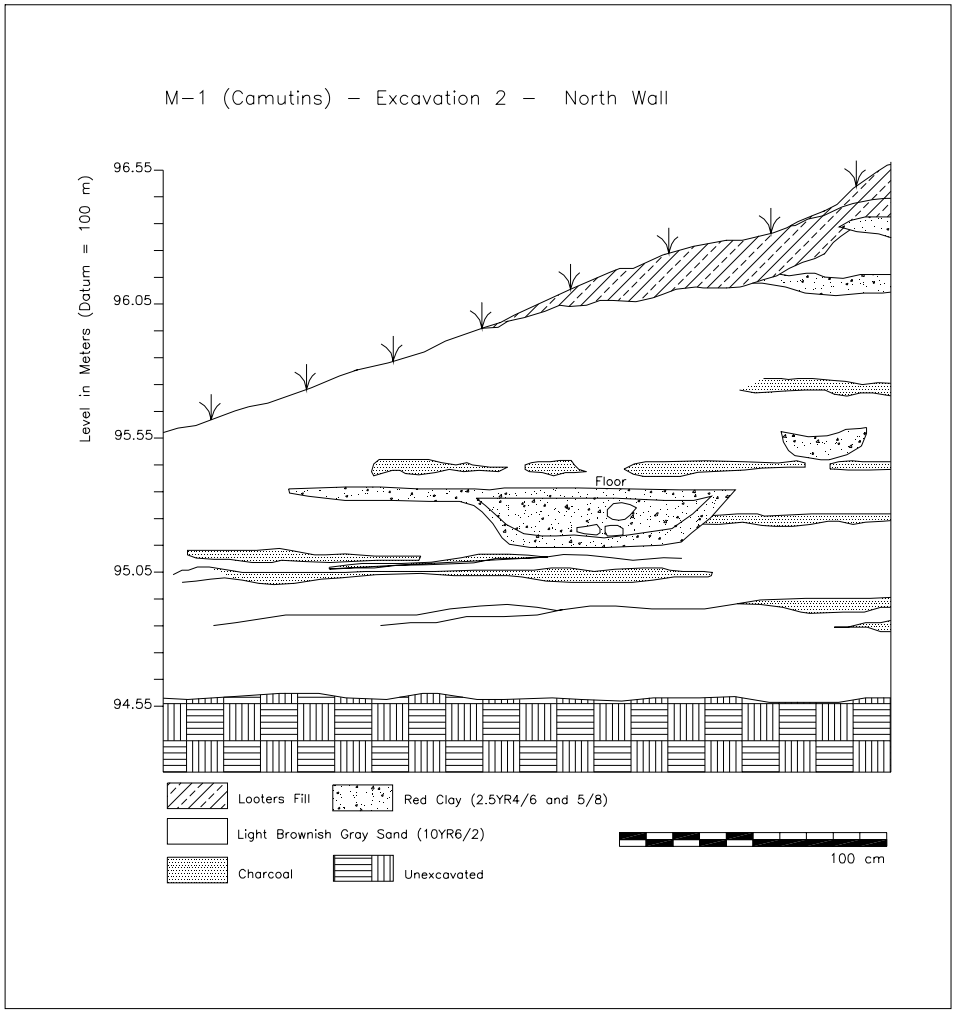


Figure 36 – Baked clay floor profile, north wall

Excavation 3

This 2 m² unit was also on the west slope, but on a lower elevation (92.2 m). There, the excavators found amazing amounts of sherds that were redeposited by gravity, consisting mostly of looters fill. The first meter of excavation encountered piles of sherds in moist, dark gray soil. Dark grayish brown sandy clay, with a yellowish appearance, containing fewer sherds was underneath the disturbed fill at the 91.2 m level. The excavation was then expanded another meter to the east, towards the center of the mound, but no significant cultural features were identified.

Profile 2

This profile was begun with the vertical cut of a steep slope located north of Excavation 2 (Figure 37). Dark soil, abundant sherds, and broken vessels constituted the thick top stratum, which was also looters fill. Below that, 17 strata were recorded along the 1.8 m deep deposits (located between the 95.63 m and 93.83 m levels), varying from light brownish gray sand to black, charcoal rich loam. Of special interest is stratum 10, which consisted of a concave 10 to 20 cm thick layer of large ceramic sherds and clay, which stretched from a northern lower elevation to a southern higher elevation, encapsulating the light, sandy clay soil that constituted the mound. This was interpreted as a retaining wall, which was comprised of a mixture of sherds and clay solidified in place by fire, likely added in order to provide protection from erosion.

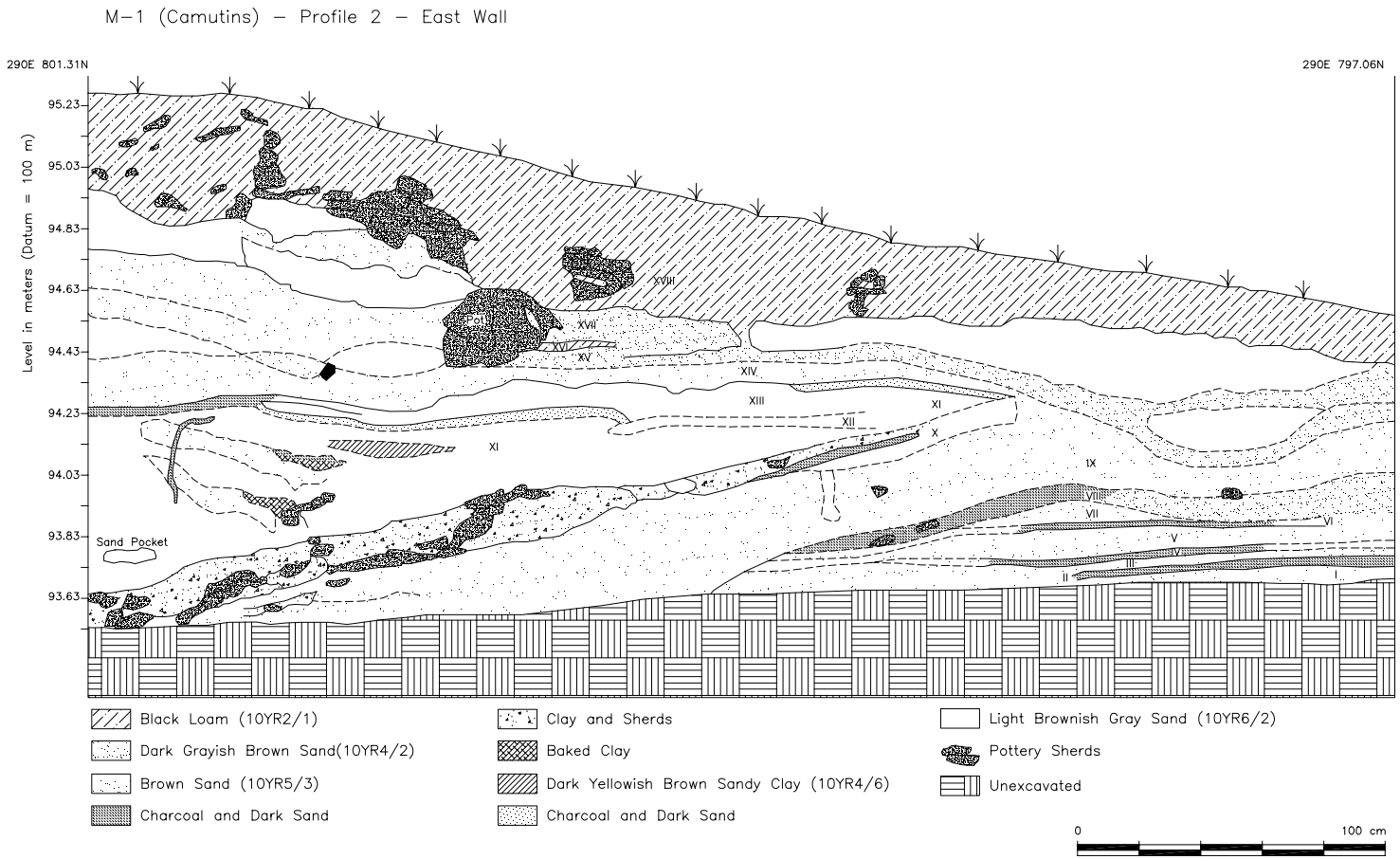


Figure 37 – M-1, profile 2, east wall

Profile 3

This profile was obtained by the cleaning of a looted trench in the southeastern portion of the mound, exposing a retaining wall similar to that of profile 2. It consisted of a 20 cm thick layer of very dark gray, clayed sand and numerous thick sherds forming a capsule on top of light sand sterile strata. The sherds were deposited together with charcoal and clay, and solidified by fire (Figure 38).

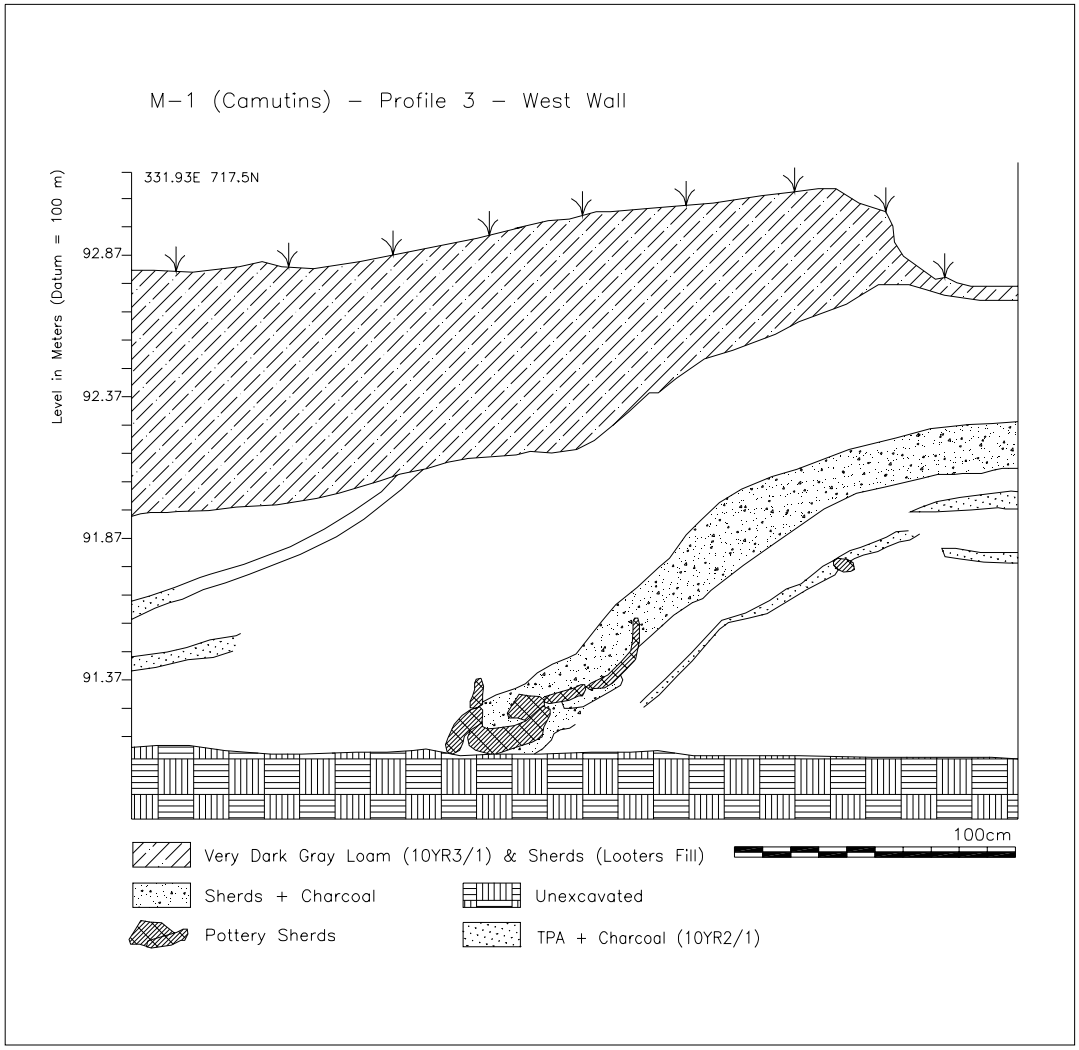


Figure 38 – M-1 profile 3, west wall

The cleaned profile resulted in a 2.5 m high wall, below which the surface was prepared for photographic documentation. In doing so, the top of a vessel was identified on the ground, about 2 m south of the profile, and subsequently excavated. It consisted of the lower bottom of a globular vessel, containing sherds, dark soil, and charcoal. No human remains were found.

A charcoal sample collected from inside the buried pot yielded the radiocarbon date of 1140 ± 60 B. P. (Beta 160717; wood charcoal; $\delta^{13}C$ = -27.1 $^{o}/_{oo}$), cal A.D. 790 – 1030. Considering the differences in elevation between the pot (91 m level) and the layer where the upper sample of profile 1 was collected (97.9 m level), as well as the fact that the samples provided roughly the same dates, it was concluded that the mound had platforms at different levels.

Profile 4

This profile was produced by excavating the area between profile 2 and excavation 1, which was made in order to investigate whether feature 1 (the baked clay floor of excavation 2) extended further north. The stratigraphy (Figure 39) was similar to that of profile 1 and excavation 2, but it revealed that the orange floor did not extend to that location. Wood charcoal collected from 93.83 m level was dated to 1300 ± 40 B. P. (Beta 160716; wood charcoal; $\delta^{13}C$ = -25.2 $^{o}/_{oo}$), cal A.D. 660 – 790. The proximity between profile 4 and profile 1, as well as the stratigraphic similarity make it possible to consider both as part of the same episodes of mound construction. Based on this understanding and the fact that the 93.83 m level in profile 4 is technically contemporary in radiocarbon years (10 years difference according to the conventional radiocarbon age) to the 96.98 m level of profile 1, it is possible to conclude that the 3.15 m difference between the levels represent sediment that was added to the mound in a very short period. It consisted of some 3,600 m^3 of sediment added over an area of at least 20 m wide and

60 m long. It implies that major efforts for mound construction took place in the first half of A.D. 700.

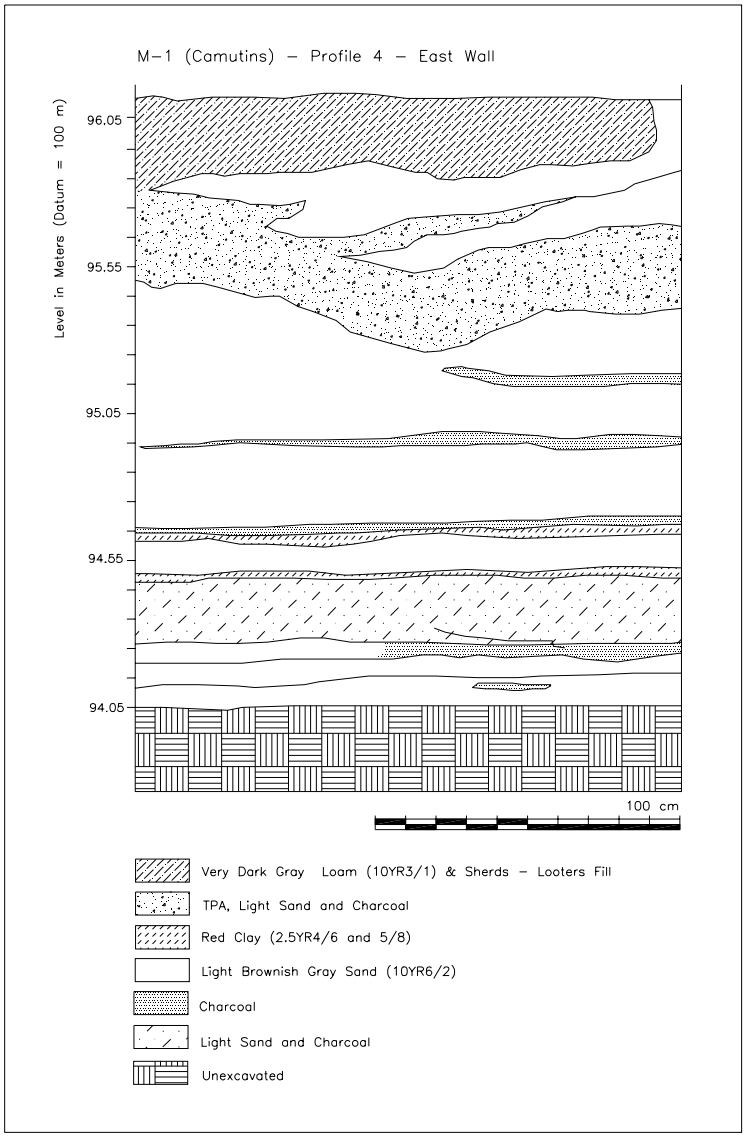


Figure 39 – M-1 profile 4, east wall

Mound Structure and Mobilization of Labor

As a result of the investigation, it became clear that the mound was built through the substantial addition of layers of silt brought from areas located 50 to 300 m away. Two such areas were identified across the river, interpreted as part of a hydraulic system aimed at intensifying fish harvesting. Periods of more intense excavation for the aquaculture system as well as seasonal maintenance are thought to have provided enough silt for building the four mounds that constitute the ceremonial center. Between layers of sediment, thin (0.5 cm in some instances) layers of clay were laid to even and harden the surface, which, along with the use of fire, created superimposed orange and black layers. These thin layers represent very short episodes, since no other significant cultural features are related to them.

More extensive construction took place only on the northeastern portion of the mound, as suggested by both the excavations and radiocarbon dates. On the edges of this area, as shown on profiles 2 and 3, uneven layers of broken sherds and clay were added as retaining walls, in order to assure stability of the construction. As the mound was built, eventually some platforms were constructed, in order to both provide stability and create an even, hard surface, as seen in excavation 2.

Radiocarbon dates and the stratigraphy, as argued above, indicate that the mound was built in different episodes, involving coordination. Earthmoving activities per se do not imply mobilization of large labor forces, unless it can be demonstrated that the work was done in a short period of time involving a large number of people. According to the available data, four major stages of construction can be identified, suggesting different rates of construction (Figure 40).

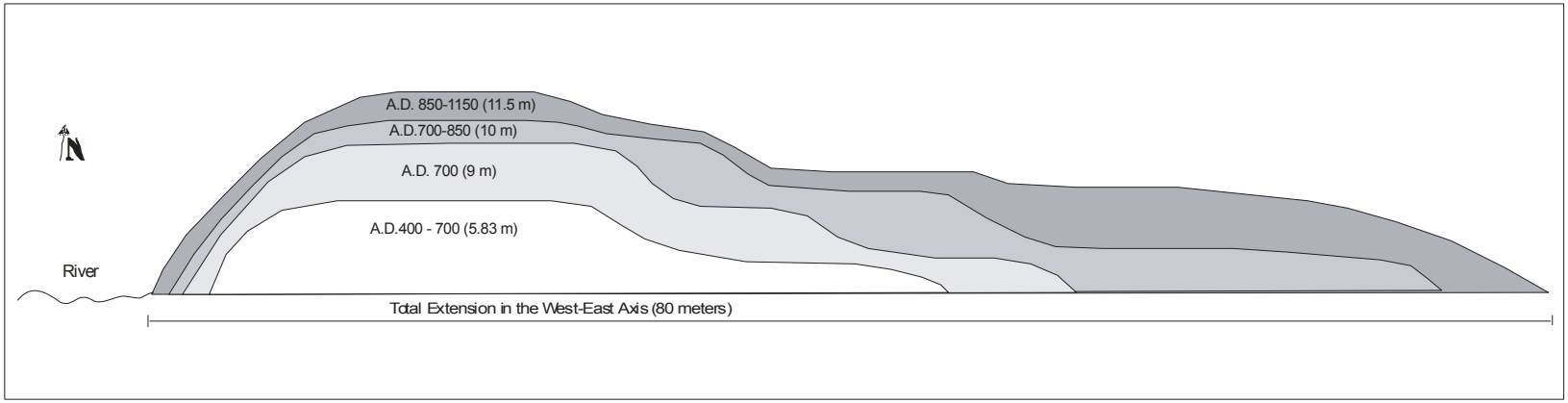


Figure 40 – Major episodes of mound construction

Considering that the terrain may have had some elevation before the initial construction, it is estimated that the mound reached a height of 5.83 m around A.D. 700, suggesting that between A.D. 400 and A.D. 700 an area of 50 m wide and 80 m long was occupied. The maximum height would be attained only on one part of the mound, in an area of 20-25 by 35-60 m. After that period, the highest platform was elevated by about 3 m in a very short period. This rate of construction would indicate the transportation and displacement of nearly 3,600 m^3 of sediment, which was probably carried in baskets. Sources for fill were located nearby, not farther than 300 m away, where the two pools are located. The transportation was likely accomplished using canoes, since the sources of fill were located across the river.

In calculating the amount of people necessary for such an effort, a number of variables have to be taken into consideration, such as number of working hours in a day and the number and size of loads that each person can carry over that period of time. Considering that a person could transport one cubic meter of fill per day (or 23 baskets of silt), it would have taken 3,600 person days for the entire period of construction. Considering that excavation of pools and mound construction was a seasonal activity (3 to 4 months a year), that part of the mound could have been built by 40 people in only one season. Since the layers indicate the existence of short intervals (perhaps years) in between layers of added silt, and considering that probably other mounds were being built at the same time, it is unlikely that a work force of more than 50 people was really necessary at any point.

After a period of more intensive labor mobilization, construction may have continued in other parts of the mound, while it was less intense in the higher platforms. For example, the difference between the two dates obtained from Profile 1 is 130 years, related to the building of only one meter. Between A.D. 700 and 850 then, the mound increased in elevation at the river side, while platforms may have been added at other levels and locations. A maximum height of 11 or 11.5 m would have been attained only at its abandonment, circa A.D. 1150-1320. Dates for

the beginning of the occupation (A.D. 400), as well as for the abandonment (A.D. 1320) are assumed based on available data from earlier research (Meggers and Danon 1988: 248).

Assuming that mound construction was mostly related to hydraulic works, it is reasonable to assume that by A.D. 700 an aquaculture system, with the excavation of at least one fish pool and the construction of a weir was already in place. After that, the less intense mound building activities indicate seasonal maintenance of the fishing facilities. It is unlikely that the initial excavation of the pools and final implementation of an operating and successful aquaculture system engaged a huge labor force, unless it was accomplished in a very short period of time. In any case, these activities most likely involved centralized coordination.

Funerary Patterns

Since M-1 had been extensively looted, only one burial was found during the excavations. The lower body of the globular, plain vessel was found buried adjacent to profile 3, resting on the 90.7 m level. It did not contain human remains or other objects, but only wet dark soil, flecks of charcoal, and sherds.

Information on M-1 funerary patterns is limited to that provided by Meggers and Evans' research. They excavated three 1.5 m² test-pits on the summit of the mound, finding buried vessels in two of these cuts (no. 1 and 3). Additionally, they excavated two other areas (named Burial groups 1 and 2) where *caboclos* had already removed large funerary vessels (Meggers and Evans 1957: 281-6). The excavation produced information on nine funerary vessels, which is summarized in Table 2.

Table 2 - Characteristics of M-1 burials excavated by Meggers and Evans (1957)

Prov./No.		Height	Decoration	Content/Bones	Features
Cut 1- Jar A		38 cm	Red Excised	Wet Soil	Lid: white slip bowl; burial associated with small 10 cm tall rounded vessel
Cut 3 - Jar		50 cm	Camutins Plain	Red Slipped Tanga	Sherds of a small anthropomorphic jar in the same level
Burial Group 1	Jar 1	70 cm	Joanes Painted	Red Slipped Tanga	
	Jar 2	36 cm	Low relief snake	No information	Resting on the neck of Jar 1
	Jar 3	30 cm	Inajá Plain	Black ash, cremation	Close to Jar 1
	Jar 4	70 cm	Joanes Painted	Red on White tanga, bone and teeth from a (12-18 years-old) female	North of Jar 1; Lid: shallow, excised bowl
	Jar 5	38 cm	White Incised, Pacoval style	Adult human bones; caiman bones	Between and above Jars 1 and 4
Burial Group 2	Jar A	26 cm	Inajá Plain	Wet Soil	
	Jar B	38 cm	Joanes Painted	Wet Soil	2 m north of Jar A

A number of conclusions can be drawn on the basis of the available data: (1) the treatment of the corpse involved both secondary inhumation and cremation. The presence of only a few or none skeletal remains in the vessels is most likely due to funerary practices (secondary burial, eventual removal of the bones) than to problems of preservation; (2) proximity between the vessels indicate the use of same area for internments over a period of time, or the existence of a formal "cemetery". It may also indicate that some vessels were buried together; (3) at least three of the nine burials belonged to females; (4) non-perishable objects associated with the vessels were limited to tangas (inside) and small vessels (outside) in a few cases; (5) some vessels were covered with lids, which were found in the fill; broken rims may indicate that the upper part of the vessels was kept over ground; (6) vessels vary greatly in shape, size, and decoration.

Long-Distance Exchange Items

The investigations at M-1 produced only three stone objects, which are considered long distance exchange items, since they do not belong to the geological formation of the Island. These broken, recycled stone tools (Figure 41) are described below:

a) Hammer (Cat. 2606-7) – this rounded dark veined white gabbro, with a maximum diameter of 5 cm, was probably originally an axe, but was being used as a hammer or grinding stone. Surface collection.

b) Burnishing tool (Cat. 2471-52) – this is an axe of a variety of opal, fragmented along the 8.9 cm long axis, being 2.7 cm thick. The polished surface of the butt had wear marks, comprised of multiple fine grooves, which were identified as marks caused by pottery burnishing. It was found on the surface, next to excavation 2.

c) Rock fragment (Cat. 2471-24) – this ferrous sandstone, measuring 2.6 by 5.9 cm was found in a charcoal layer, at the 95.12 m level, excavation 2.

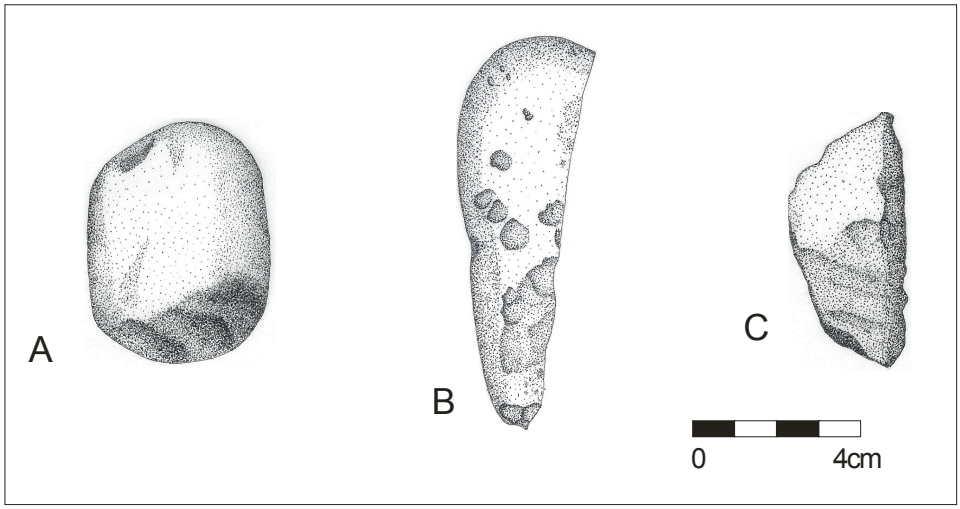


Figure 41 – M-1 lithic tools

The presence of these stone items indicates long-distance trade with regions that could be located as far as southern Amazonia, northeastern and central Brazil, and northwestern South America. Since there is no available data on prehistoric trade of stone objects, a more specific account of the external trading relations cannot be established at this time. It seems reasonable to state, however, that the trade existed and that the stone goods were highly valued. The recycling of the tools for other uses also establishes their rarity and the multiple uses that they could have had, not only as prestige items, but also in daily, household activities.

Chronology

The chronology of occupation of M-1 is provided by four radiocarbon dates obtained from stratified layers in the upper part of the mound (about 4 m of deposits), and from a burial located on a peripheral lower elevation (about 4 m below the upper deposits). The significance of these dates for understanding the rate of mound construction, as well as the existence of different platforms at different elevations was discussed earlier in this chapter. Although the dates do not cover the initial occupation or the abandonment of the mound, it is possible to estimate the chronology of occupation on the basis of the available data.

Table 3 - Radiocarbon dates from M-1

Sample No. Level	Lab. No.	Conventional Radiocarbon Age	13C/12C Ratio	Calendar Age Range (2 Sigma Calibrated)
No. 1 97.9 m	Beta 134537	1140 ± 40	-25.4 0/00	A.D. 785 - 995 (B.P. 1165 to 955)
No. 2 96.9 m	Beta 134538	1290 ± 60		A.D. 645 - 880 (B.P. 1305 – 1070)
No. 23 93.83 m	Beta 160716	1300 ± 40	-25.2 o/oo	A.D. 660 – 790 (B.P. 1290 – 1160)
No. 27 91 m	Beta 160717	1140 ± 60	-27.1 o/oo	A.D. 790 - 1030 (B.P. 1160 – 920)

Profile 1 yielded two radiocarbon dates, the first one related to a charcoal layer 1.15 m below surface (sample No.1) and the second one to another charcoal layer 2.2 m below surface (Sample No. 2). Based on the two dates, it is reasonable to estimate that the mound in that particular area grew one meter over a period of 130 years. One meter of disturbed deposits (looters fill) was found on top of the layer dated by sample No. 1, which makes it difficult to estimate a date for the abandonment of the mound. A large and tall Samauma (*Eriodendron samauma*) tree, located about 25 m north of profile 1 may indicate that the original mound top was not much higher (maybe half meter to a meter) than the present one. So it seems that the mound would have had up to two meters of deposits on top of the last dated stratum.

When Meggers and Evans (1957: 281-4) excavated the top of the mound, they found a top layer of dark soil about 50 cm thick, below which light gray soil with charcoal, and burnt clay layers appeared. Therefore, it is likely that above the last dated stratum there was another meter of intentional mound building and occupational floors, likely adding other 150 years to the history of occupation. Considering a date of A.D. 890 for sample no. 1, it is reasonable to estimate that mound building continued at least until A.D. 1040. Therefore, it is possible that the mound was abandoned even before A.D. 1300, the date that is usually assumed for the end of Marajoara phase.

Dates for the beginning of the occupation are difficult to estimate, based on the available data. The date of A.D. 400 suggested by Roosevelt (1991b: 314) for the beginning of Marajoara Phase seems reasonable to account for some 4 m of deposits below the 93.83 m level, which was dated to A.D. 660-790.

INVESTIGATIONS AT M-17

Field Methods

M-17 was investigated during a 25-day period in September and a 15 day-period in November 2003. The objective was to study the range of activities performed at the site in order to assess its function in the settlement system, as well as to determine its chronological position. Initially the mound was mapped with a transit, establishing a system of north-east coordinates (Figure 42). A datum (marking a 10-m elevation) was established on top of the mound in order to measure elevations for the topographic map as well as to control the excavations' levels. Five areas were selected for excavation on the basis of a stratified random sampling procedure. The final location of each excavation, however, was determined according to the conditions offered by the topography and vegetation.

The excavation units measured initially 2.4 to 4 m², and were expanded as necessary. The method for excavation varied according to the areas and cultural features being investigated. Sediments were removed by natural layers or artificial 10 cm levels. In some contexts, such as the excavation of whitish sand layers with little or no artifacts, sediment was removed by 20 cm levels. Funerary urns were excavated both inside and outside to prevent breakage. Soil samples related to significant features were collected for future chemical analysis. Skeletal remains were collected with the surrounding soil and stored in plastic containers. Charred organic material was collected from discrete, stratified deposits, in association with cultural features. Profiles and features were photographed and sketched for documentation.

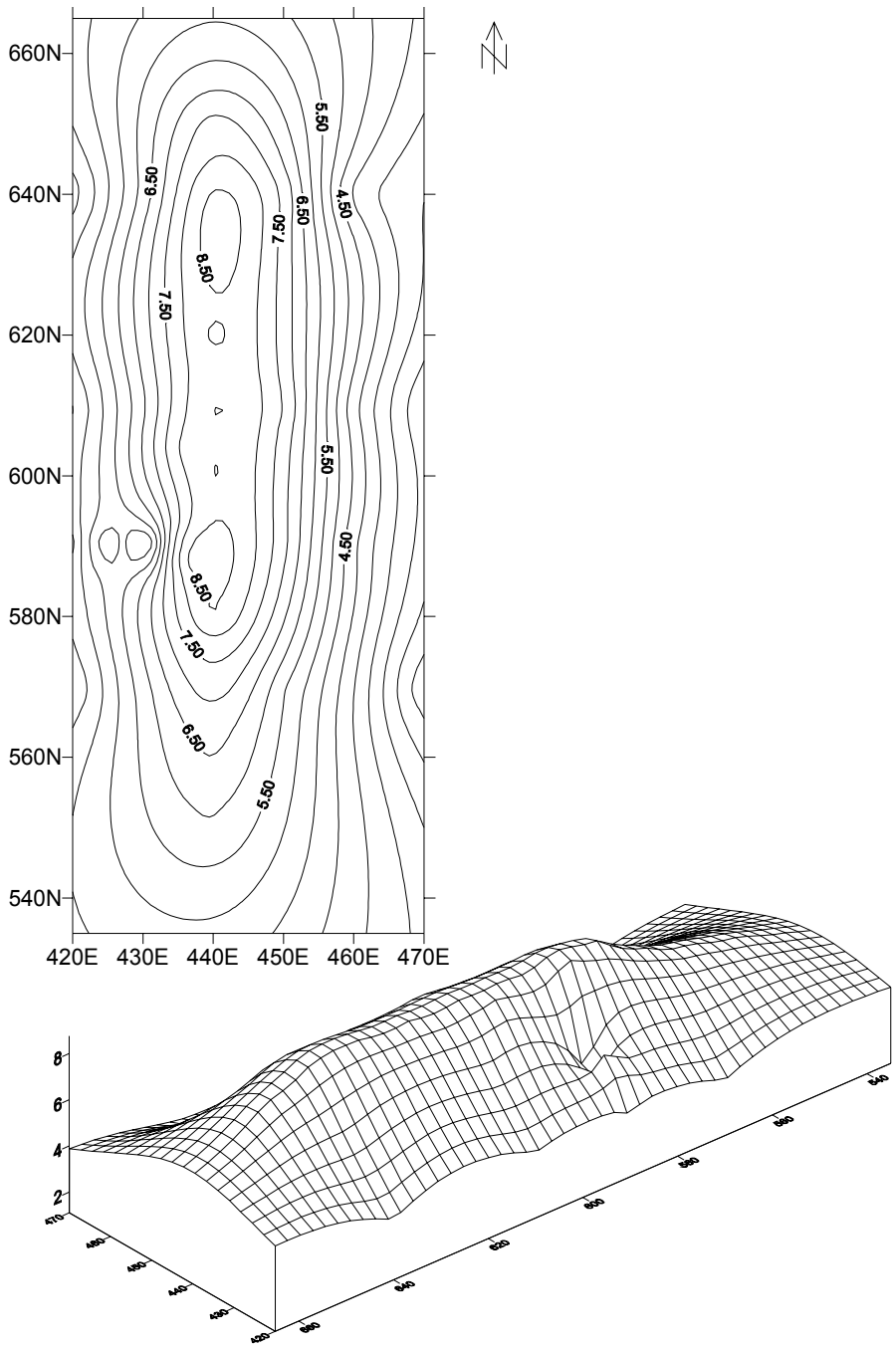


Figure 42 – M-17 topographic map

During the first stage, excavations 1 through 5 provided a good sample of household, cemetery, workshop, and open areas (Figure 43). In order to continue the study of the cemetery area (excavation 5), during the second field stage that area was enlarged, reaching about 25 m², which was called excavation 6.

Field Results

Excavation 1 (Open, Central Area)

This 2 by 1.2 m unit was begun near the center of the mound's top at an elevation of 8 m. The first 40 cm of the excavation produced a loose dark gray sandy loam, saturated with sherds. Light gray sandy clay appear at 20 cm deep as intrusive pockets, and replace the dark soil in most of the cut at 40 cm deep (Figure 44). The dark and light gray layers were frequently intermixed, but sherds from each stratum were saved separately. Clusters of large fragments, numerous clay chunks, tanga fragments, small objects, and a stool were found during the excavation. The abundance of cultural remains is explained by the proximity of the unit to the west slope of the mound, a place that concentrated sherds rolled or swept off the top. The absence of prepared floors or hearths, and the abundance of remains of pottery production and female objects (fragments of tangas) suggest that this was an open area, where pottery production took place. The excavation was terminated at the 6.78 m level.

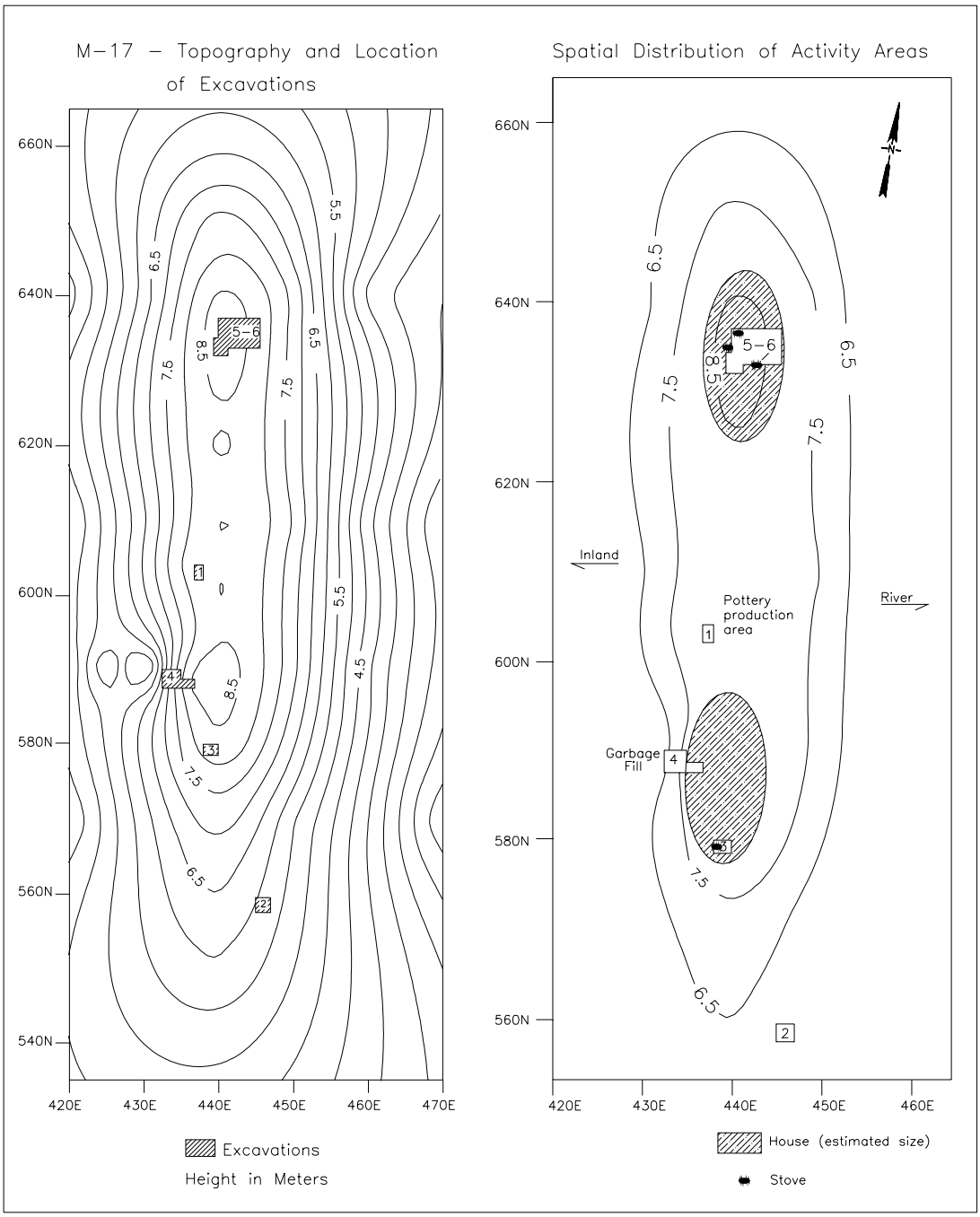


Figure 43 – Location of excavations and activity areas on M-17

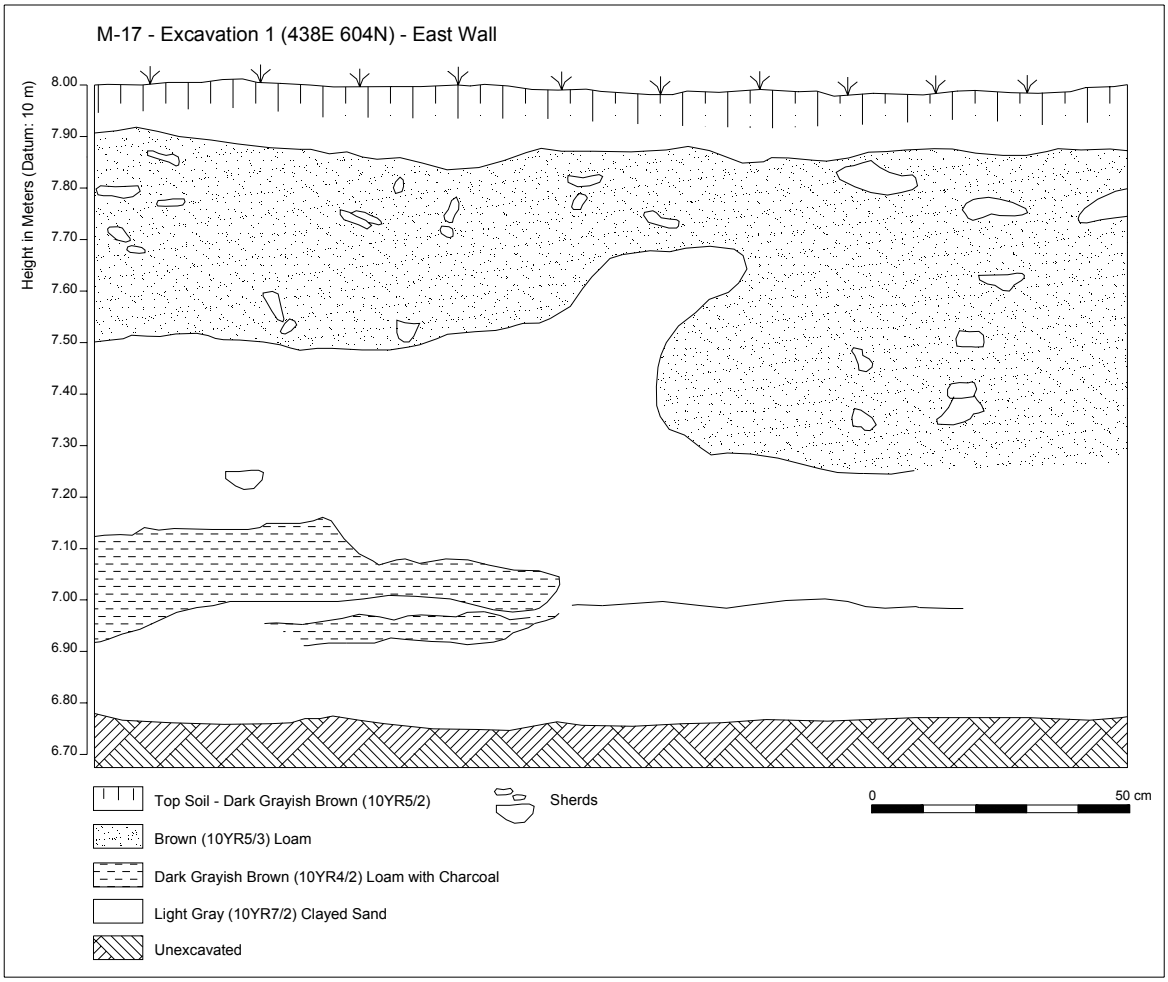


Figure 44 – M-17 excavation 1, east wall

Excavation 2 (Peripheral Area)

This 2 by 2 m unit was placed on a slope facing the river, on the southeast part of the mound, at a lower elevation (5.11 m). Through the first 30 cm, a yellowish brown, loose sandy soil was encountered, together with many cultural remains. The abundance of large fragments clustered on the northeastern slope indicated secondary deposition, due mainly to gravity. The second stratum of light gray sand appeared at about 70 cm below surface (Figures 45 and 46). This stratum had fewer fragments than the previous one, which also contributed to understand it

as a product of intentional construction. Due to the low elevation, and the absence of either floors or other features, this location was considered to be a peripheral, unroofed area. The excavation was continued to a depth of 110 cm below surface, and was terminated at the 3.91 m elevation.

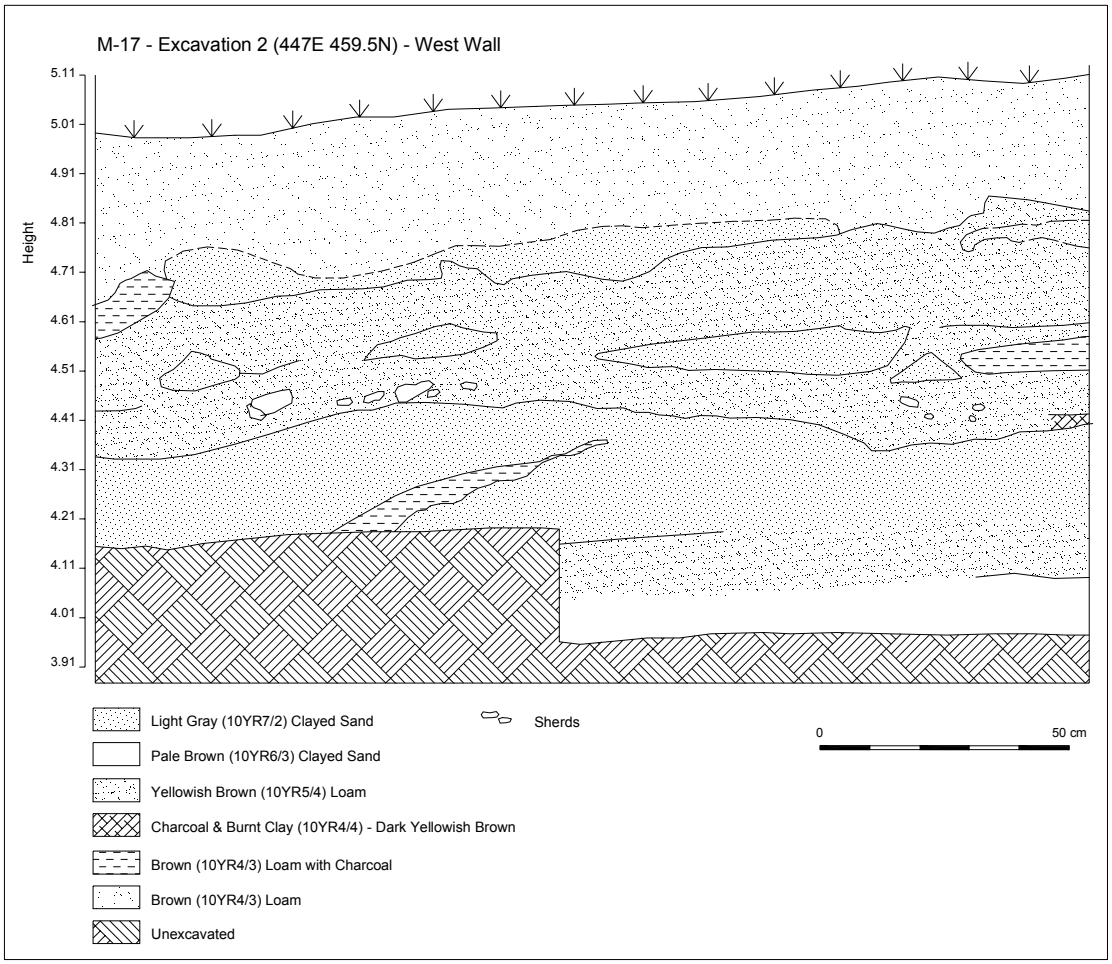


Figure 45 – M-17 excavation 2, west wall

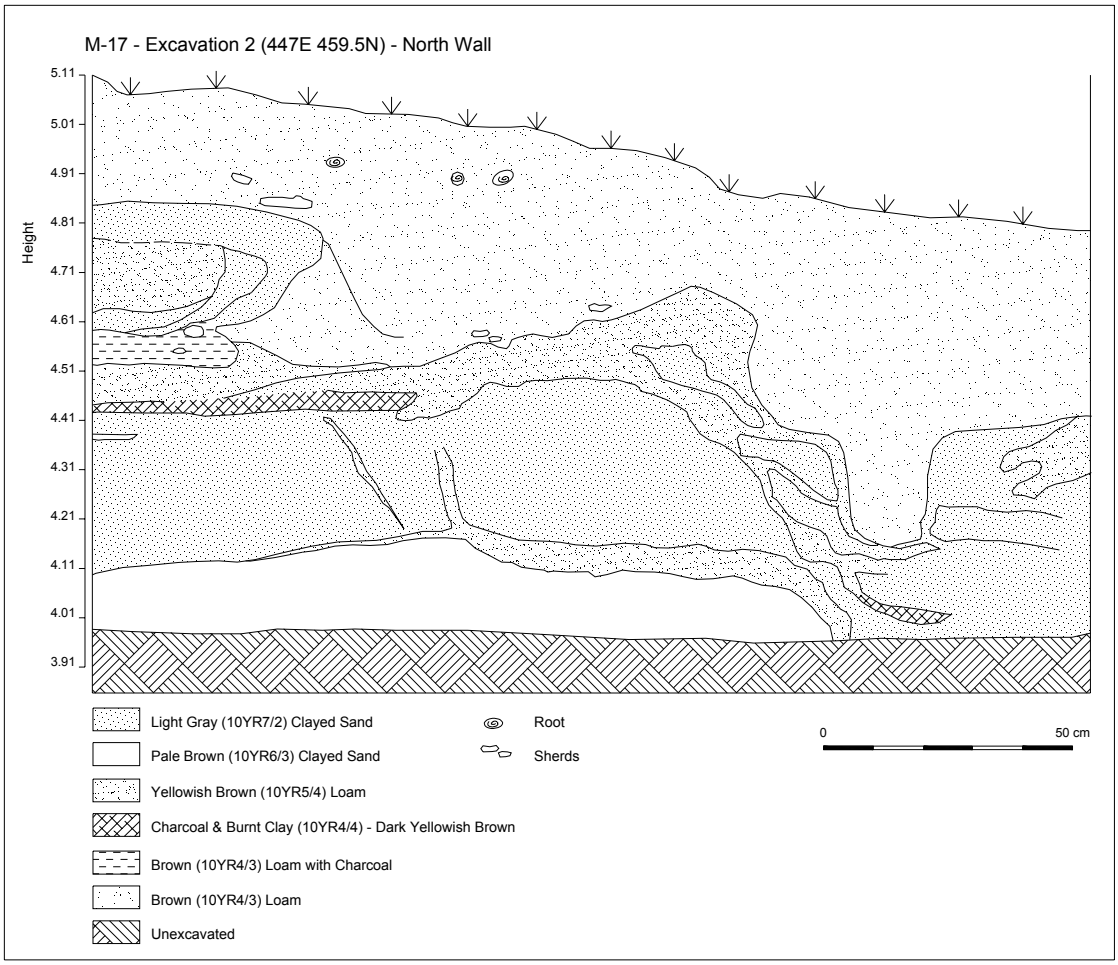


Figure 46 – M-17 excavation 2, north wall

Excavation 3 (Household)

This unit, measuring 1.2 by 2 m, was begun on the south side of the summit at 8.46 m elevation. Through the first 40 cm of excavation, the soil was a dark, moist loam. It was then replaced by light brownish gray sandy clay, with intrusive pockets of burnt clay. The burnt clay on the west wall (Figure 47) consisted of the remains of two parallel ridges that were named Feature 1 (Figure 48). It could be the remains of a stove, although it differs from other stoves found in the mound, which are smaller (see descriptions of excavations 5 and 6). The two parallel baked clay walls (some 25 cm apart) were 10 cm wide and about one meter long each.

This structure resembles the hearths found by Bevan and Roosevelt (2003: 318, fig. 15) at the Guajará mound. Below that feature, a charcoal layer (Figure 49) was dated 1200 ± 60 B.P. (Beta 180942; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo}$), cal A.D. 680 – 980 (Sample no. 12, Table 5).

The next 2 m of excavation uncovered a very complex stratigraphy, comprised of alternate thick layers of light sterile sand and thin layers of occupational floors (Figures 47 and 49). The composition of these layers was similar to those identified at M-1 (excavation 2, and profiles 1 and 4). Most of the layers were compact with few sherds. As it was observed in M-1, the thin occupational layers were uneven and discontinuous. Typically, they consisted of light brownish gray sand, charcoal and burnt clay. The complexity and unevenness of the occupational layers is probably due to modification of the light sandy soil composition by biological debris (original light gray sand acquires a darker color), and use of fire (producing orange hard clay and charcoal layers).

The composition of the thick layers of light sand, on the other hand, was not always uniform. Frequently, there was a repeated succession of light gray sand and light brownish gray sand, which could not be reproduced here in the profiles. It is possible that the darker layers mark intervals in between added layers of silt.

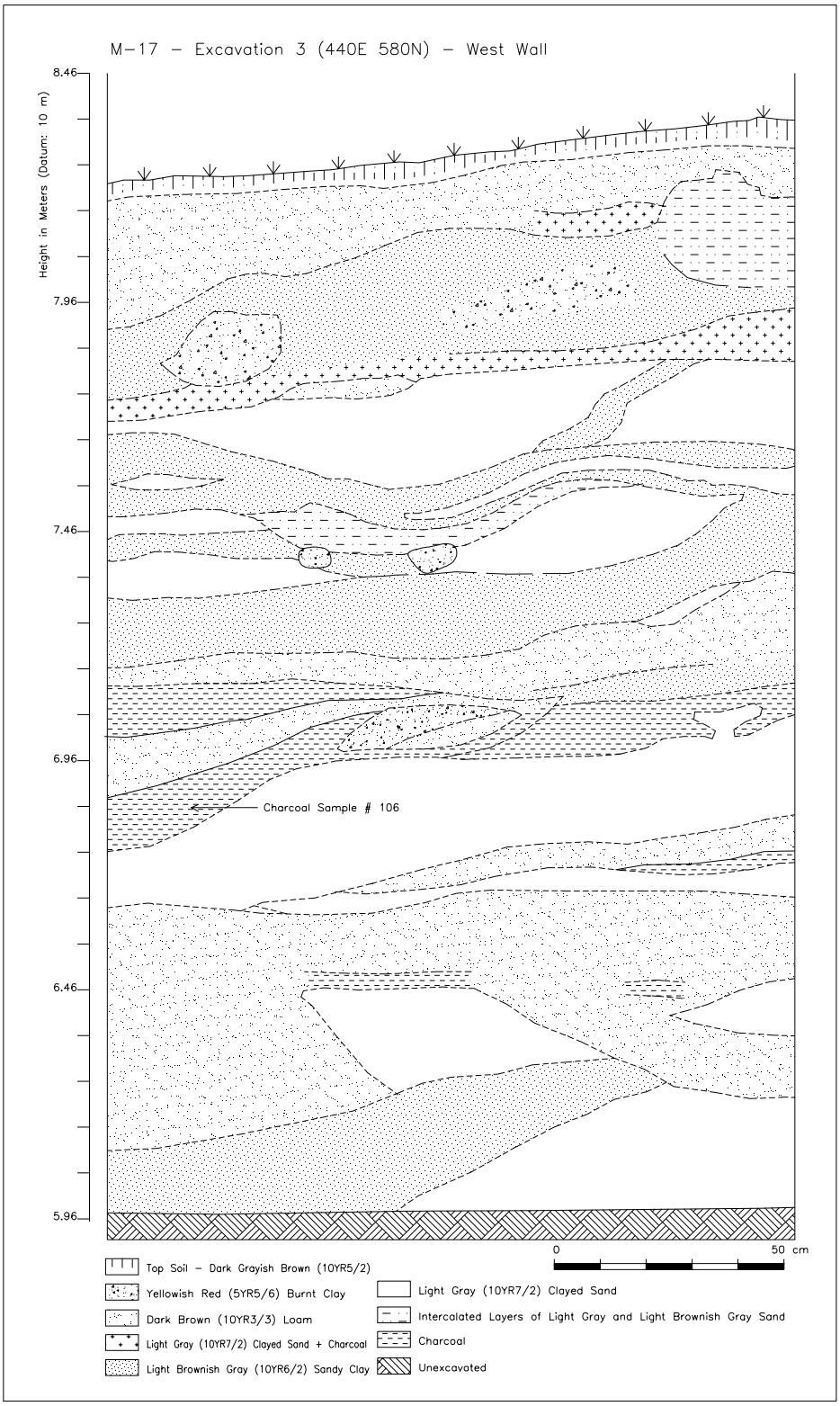


Figure 47 - M-17 excavation 3, west wall

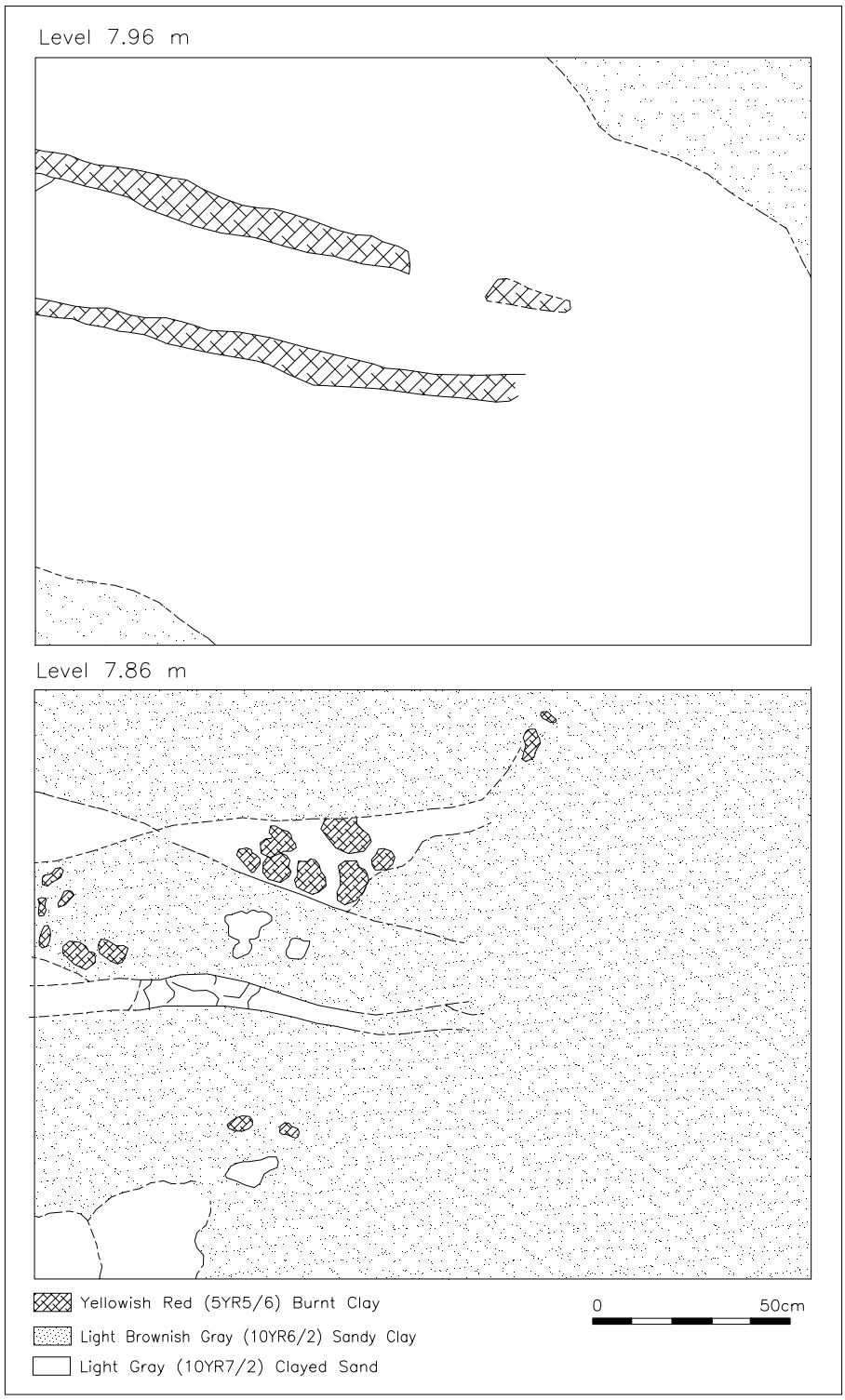


Figure 48 – M-17 excavation 3, baked clay ridges

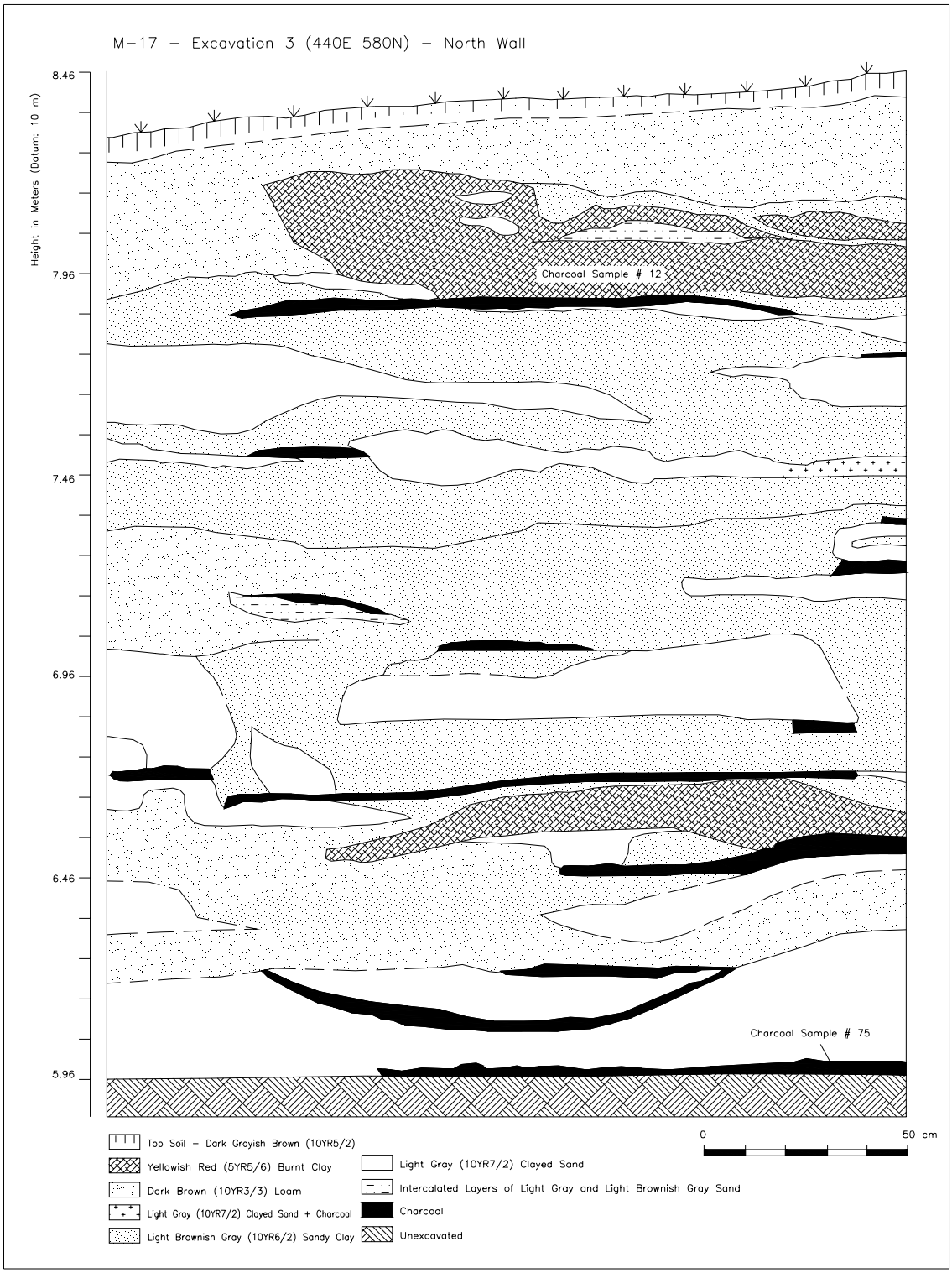


Figure 49 – M-17 excavation 3, north wall

Two other charcoal layers were dated, at 160-170 cm deep (1250 ± 60 B.P. – Beta 179075; wood charcoal; $\delta^{13}C$ = -25.0 $^{o}/_{oo,}$ cal A.D. 660 to 900), and at 250 cm deep (1190 ± 40 B.P. – Beta 185013; wood charcoal; $\delta^{13}C$ = -27.3 $^{o}/_{oo,}$ cal A.D. 720 to 740 and cal A.D. 760 to 960). Figures 47 and 49 show the stratigraphic position of these samples. From a few charcoal layers, fibrous charred wood was identified by Mário Jardim (Department of Botany, Museu Paraense Emílio Goeldi) as palm tree bark. During the excavations, local workers identified them as *açaí*. Several of the burnt seeds were also identified by Mário Jardim as açaí.

The excavation was taken to a depth of 2.5 m. The integrity of the deposits and the presence of the baked clay structure indicated that was an area protected by a roofed structure, most likely a house, although post molds were not found. This is also consistent with its location, on the flat top of the mound, not far from the garbage fill identified during excavation 4.

Excavation 4 (Household)

This 2.5 by 2.5 m excavation was begun on the central west slope, about 2 m from the flat summit. The top layers of the excavation consisted of *terra preta* soil, containing numerous large sherds and fragmented vessels. *Terra preta* soils are believed to have resulted from the decomposition of biological debris (Kern and Kampf 1989; Smith 1980). For this reason they signalize the presence of organic garbage fill. Due to the nature of the deposits and the artifacts they contained, this was considered a toss area, where not only broken vessels but also organic matter was discarded. It is likely that this was the back of a house (Figure 50).

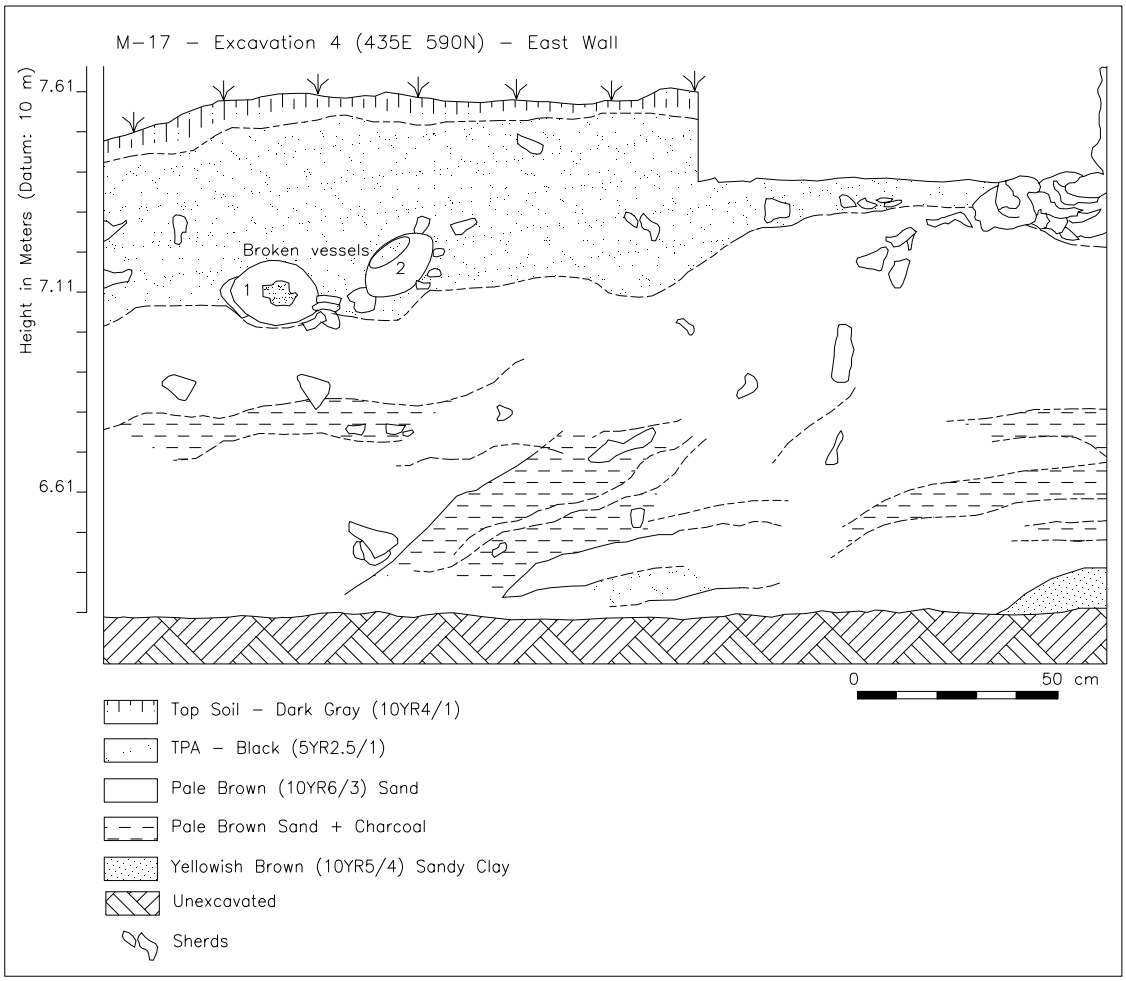


Figure 50 – M-17 excavation 4, east wall

Underneath the *terra preta* stratum, layers of yellowish brown sandy clay, interspersed with layers of dark brown loam and charcoal, indicated mound construction. These layers, however, were not flat surfaces, which is in part a consequence of the location of the excavation. The pit was then extended two more meters towards the center of the mound, where the top surface was flat. At the top, the *terra preta* soil was present only in the first 20 cm. Beneath that layer there was the light gray sand characteristic of mound construction (Figure 51).

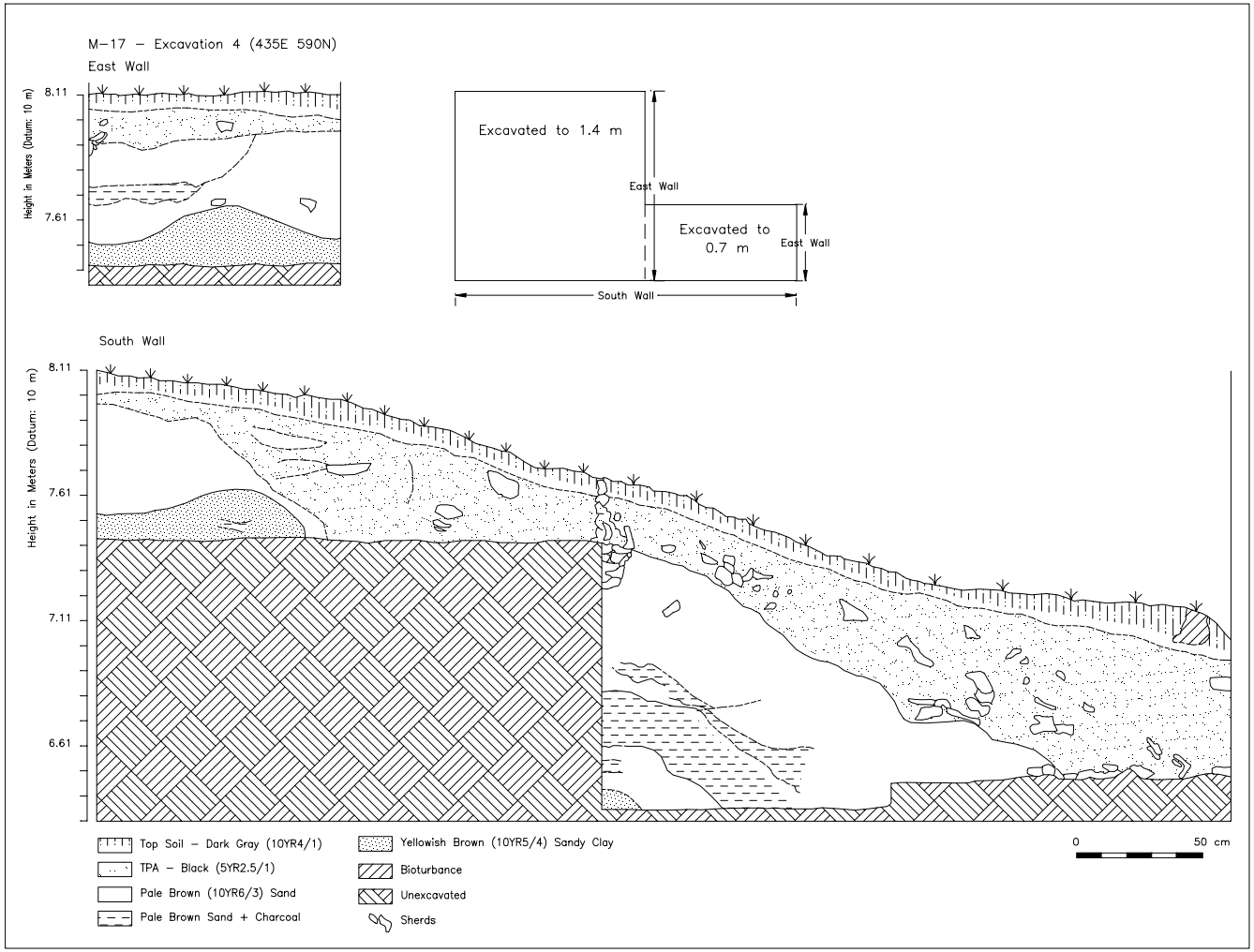


Figure 51 – M-17, excavation 4, east and south walls

The artifacts found in the garbage fill included numerous sherds and two broken vessels containing wet, dark soil and bone fragments, which were respectively called feature 2 and feature 3. Feature 2 consisted of the vertical half of a rounded vessel, found at the 6.81 m elevation. Both inside and around the vessel, the wet soil contained charcoal and very small bone fragments. Feature 3, also found in the garbage fill, but at a lower level (6.51 m), consisted of a broken vessel which contained bone fragments and teeth. It seems that both vessels had been tossed from the mound top, due to their position and the fact that their contents had spilled or fallen out.

Feature 3 was considered to be a secondary inhumation in a domestic setting. In this type of funerary practice, observed among ethnographic peoples, the human remains are kept in a vessel inside of the residence, instead of buried under the floor or kept in a mortuary temple (Morales-Chocano 2000: 86-7; Schiffer 1987: 83-4). The fact that the vessel was not buried, but discarded in the toss area may indicate it was contemporary to burials located in the cemetery area that were vandalized during the third period of occupation (see "History of the Cemetery Area").

Artifacts found during excavation 4 included a fragmented seated figurine, two small undecorated bowls, abundant fragments of red and painted tangas, and a fragmented pot stand. Charred wood collected from a layer located 85 cm below the surface was identified as *açaí* palm.

Excavation 5 (Burial Area)

Excavation 5 was a 1 by 4 m trench opened on the north summit, on the area of highest elevation (8.76 m). On that point, the flat top extended farther on the west-east axis than on other parts of the mound. For the first 20 cm the soil was brown sandy topsoil, with many decorated

sherds. Continuing through the excavation, pockets of baked clay appeared on the west side of the trench. The west side had a more complex stratigraphy throughout the cut while the sediment excavated from the eastern portion of the unit was darker and more uniform.

At about 60 cm deep it became clear that that was a burial area, which likely contained most of the burials in the site. As the first vessels were uncovered, they were numbered in sequence. At the level where the rims of urns 1 and 3 were exposed (70 to 80 cm below the surface), clusters of large broken vessels were found on the eastern limits of the excavation (Figure 52).

The archaeological deposits in this area were very complex, due to the existence of burial pits and spread of large fragments of funerary vessels. Urns 2 and 3 had their rims missing, but urn 1, a small globular vessel, was complete and had most of the rim fragments in place. Urn 3 was topped by a decorated fragment (depicting an anthropomorphic face) of another large vessel.

Throughout the excavation, chunks of baked clay and pockets of charcoal were consistently encountered on the west side. These were the remains of two stoves, which could be better visualized on the west wall. This was called feature 4 (Figure 53). The two stoves were located on different levels (at about 60 and 80 cm below surface). They consisted of concave structures of baked clay, filled with charcoal.

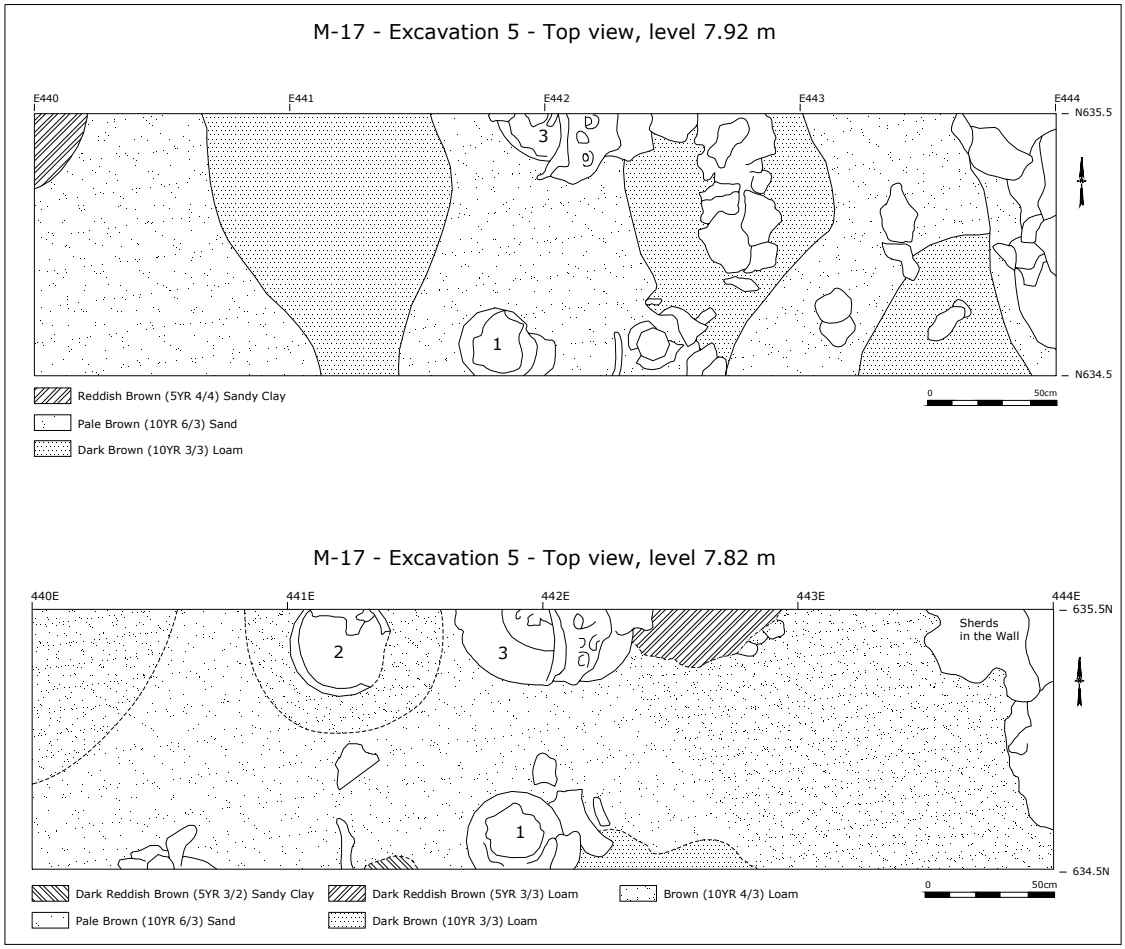


Figure 52 – M-17 excavation 5, top views

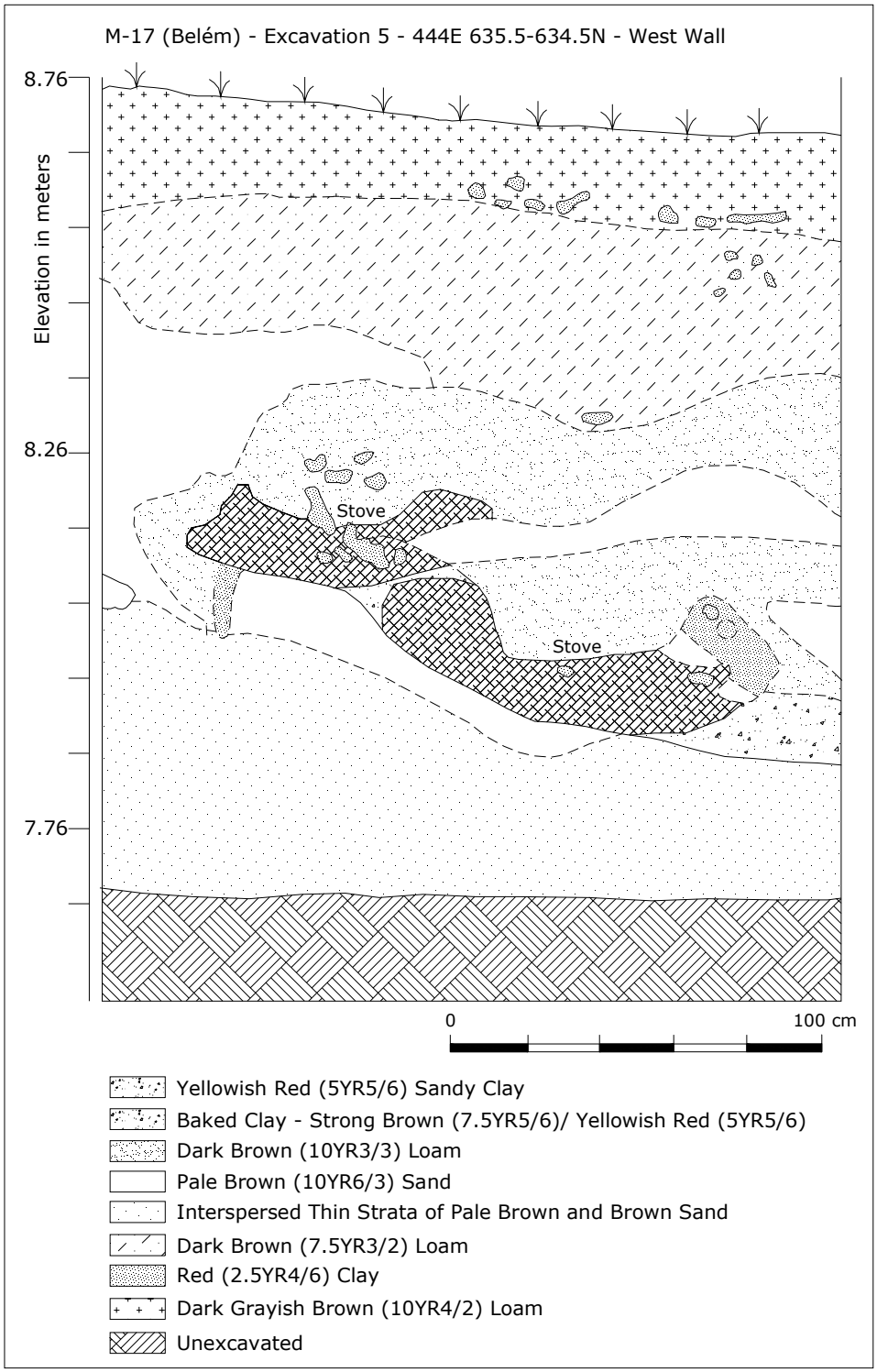


Figure 53 – Superimposed stoves, excavation 5, west wall

Vessels and large sherds found in excavation 5 were partially attached to the walls. In order to study these features, the excavation was expanded to the north, south and east directions, roughly doubling its original size (Figure 54). After excavating the new open area to a depth of 30 cm, the profiles of the south (Figure 55) and north (Figure 56) walls were recorded, in order to identify the stratigraphic positions of urns 1, 2 and 3. It is possible to visualize that the sediment surrounding the urns' bodies is different from that around their rims, indicating that the vessels were only partially buried, while their tops remained above ground. That would explain the broken and missing rims.

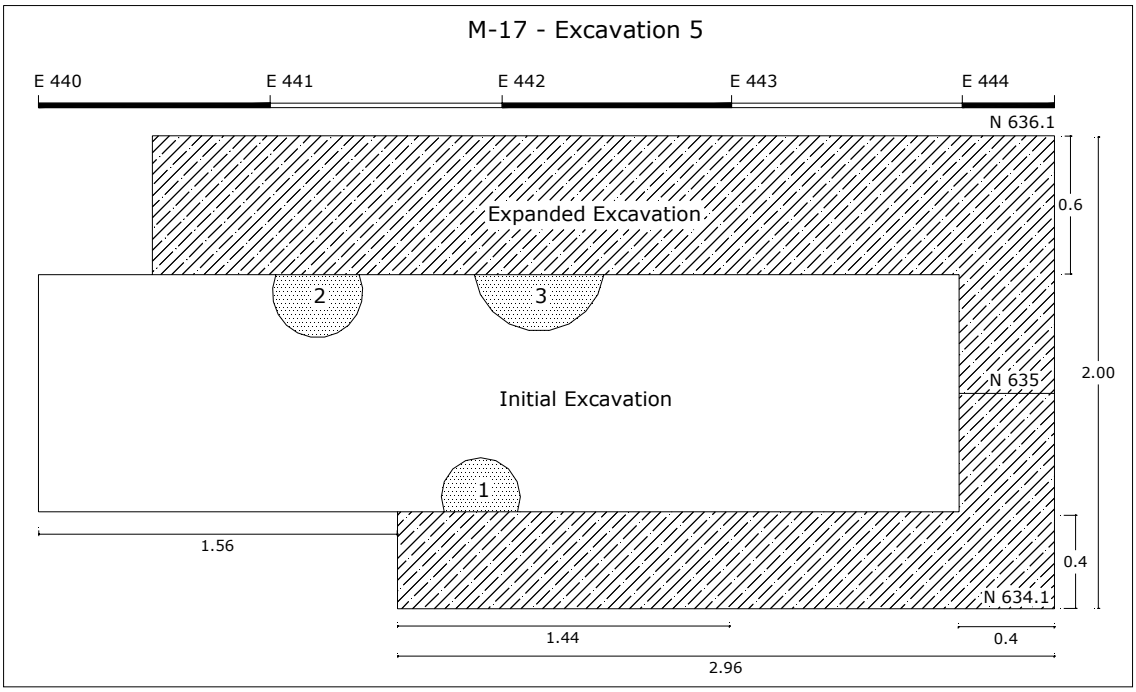


Figure 54 – M-17 excavation 5, plan view

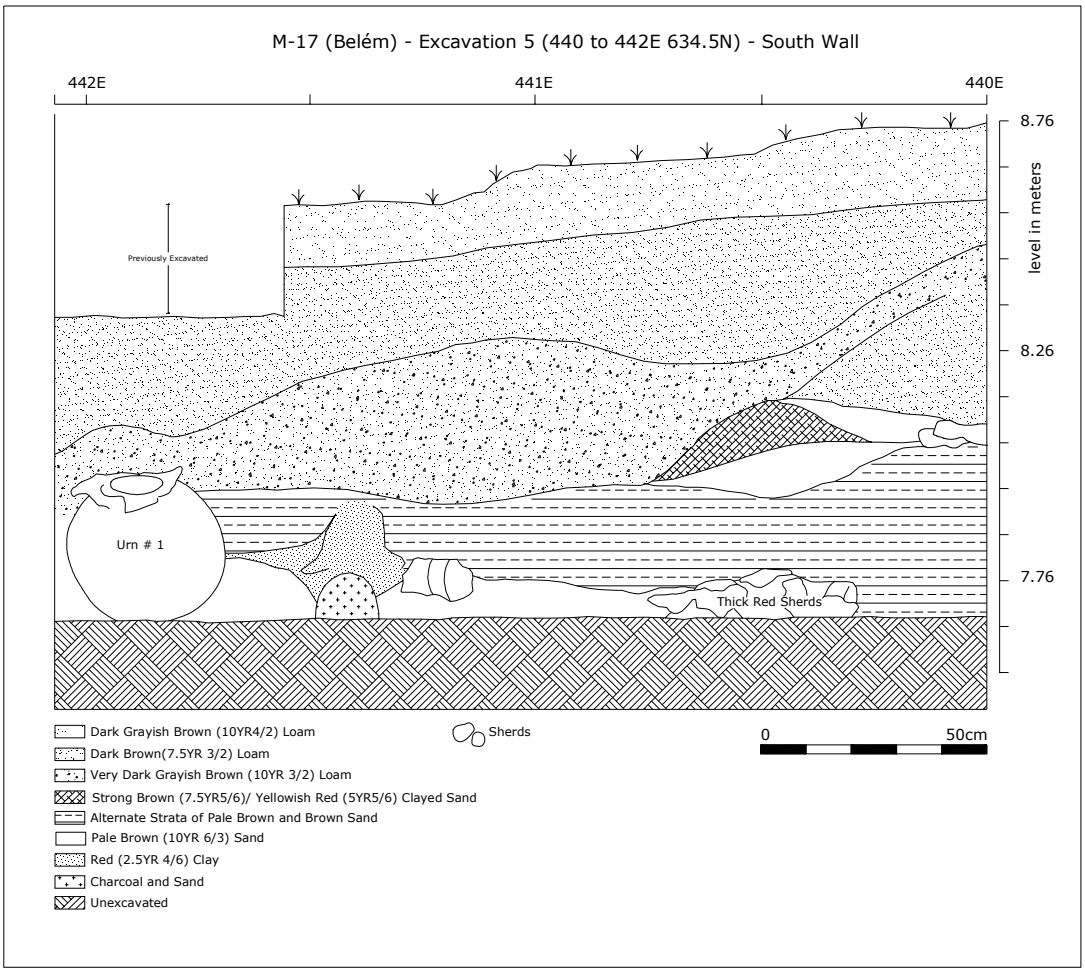


Figure 55 – M-17 excavation 5, south wall

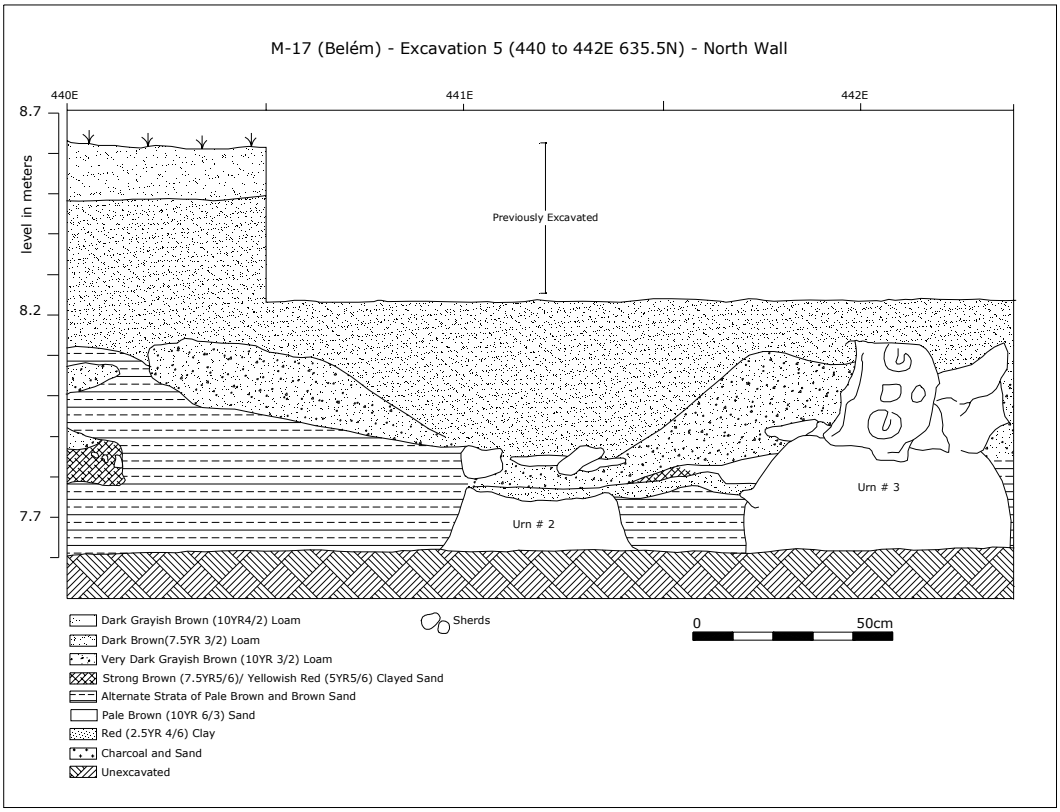


Figure 56 - M-17 excavation 5, north wall

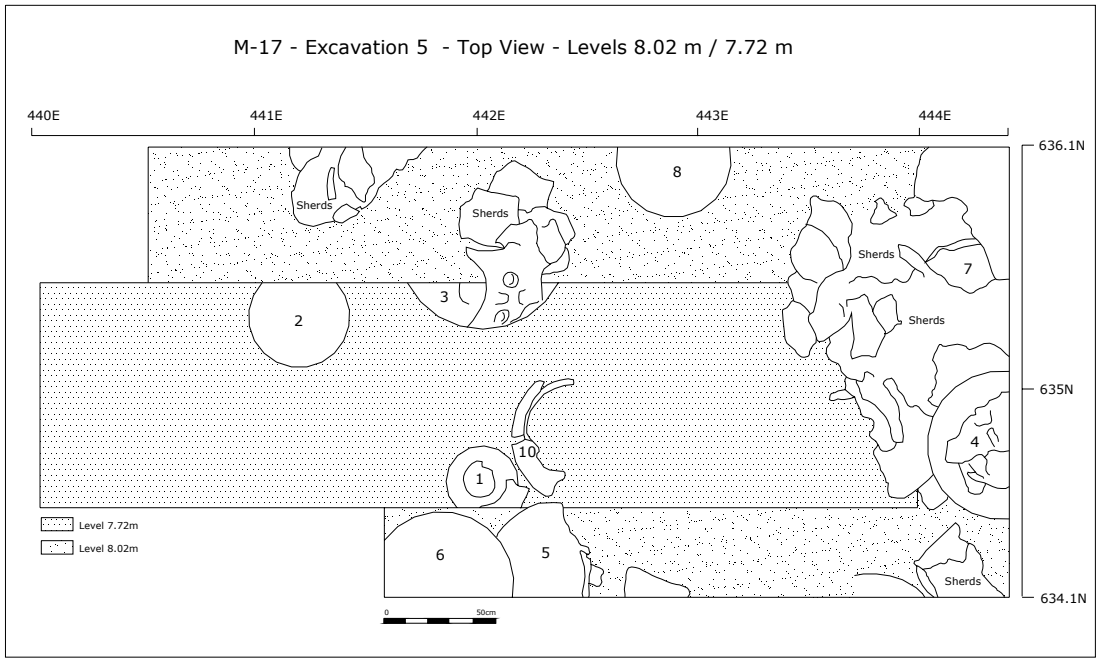


Figure 57 – M-17 excavation 5, top views at 8.02 and 7.72 m levels

The excavation continued around the initial trench, whose depth was still 94 cm below surface (7.72 m level). Remains of one skeleton were found on the fragmented bottom of urn 7, which was surrounded by a large cluster of broken funerary vessels piled on the east side at the 8.02 m level (Figure 57). Other broken urns (Nos. 4, 5 and 6) were still in their original position, although their rims were missing. Urn 8, a large globular vessel, was partially inside the north wall. It seems that these vessels were intentionally broken and dispersed, and the area later abandoned, before other post-depositional processes took place.

Urn 1 was removed when the excavation reached the same level of the initial trench. The rim of urn 10 was near its base. Urns 4, 5, 6 and 9, attached to the walls, were excavated inside. The broken pieces of urns 4 and 5 were collected, and tangas were found on their bottoms. Urns 2, 3, 10 and 11 could be completely excavated because they were located on the center of the pit (Figure 58). The rim of urn 12 was encountered east of urn 8, some levels below. The lidded mouth of urn 13 was on the bottom of the pit, partially inside the south wall.

Most of the urns in upper levels of excavation 5 were surrounded by a dark brown soil, while in the lower levels they were placed in light gray sand. A layer of burnt clay was the base for both urns 2 and 10. Another similar layer, at a higher level, was the base for urn 11. The urns typically had their upper necks broken and did not have lids, suggesting that they were not entirely buried and that post-depositional processes caused the breakage. The stratigraphy indicates that urn 8, found in a horizontal position, was unburied (see Figure 59).

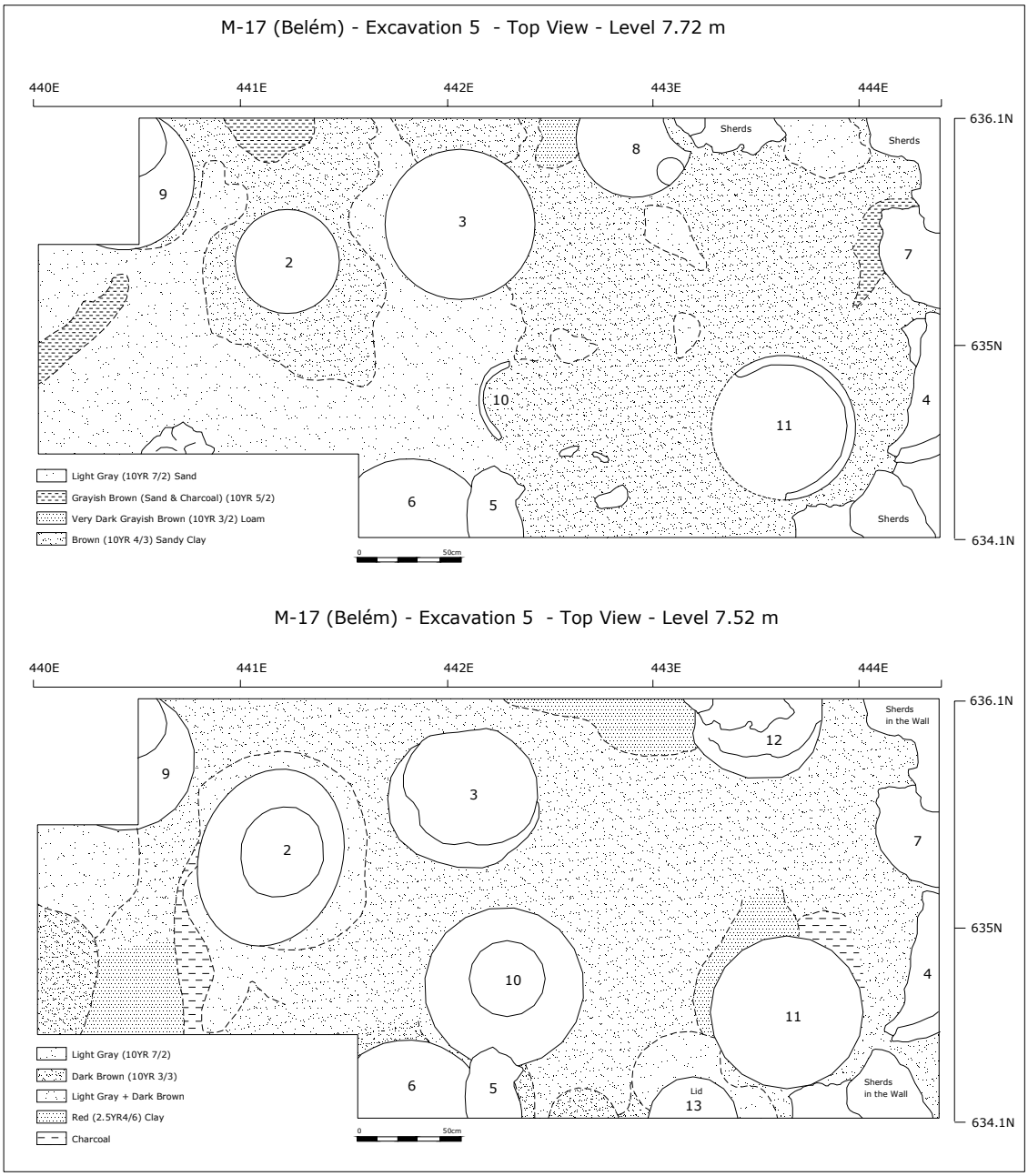


Figure 58 – M-17 excavation 5, top views at 7.72 and 7.52 m levels

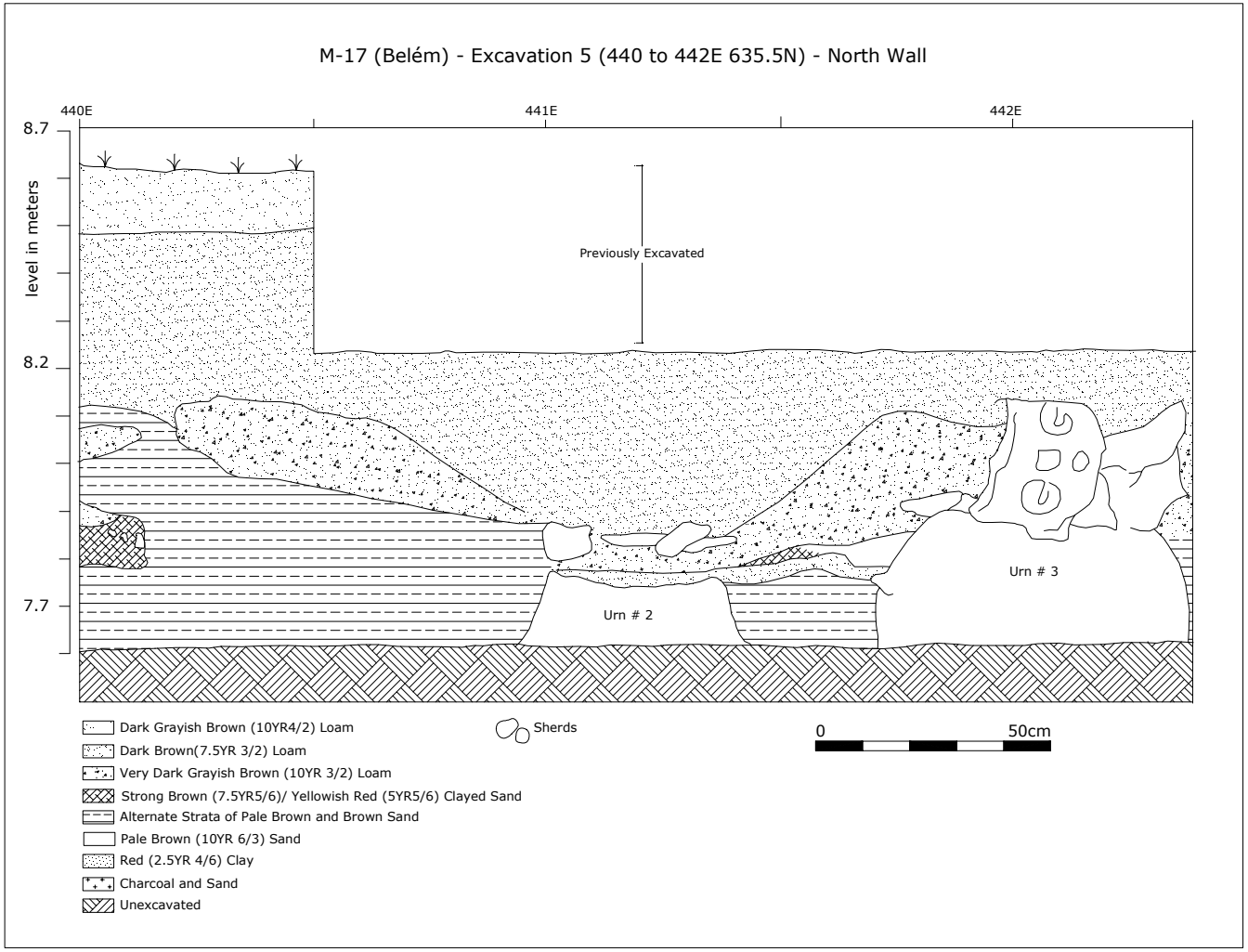


Figure 59 - M-17, excavation 5, north wall

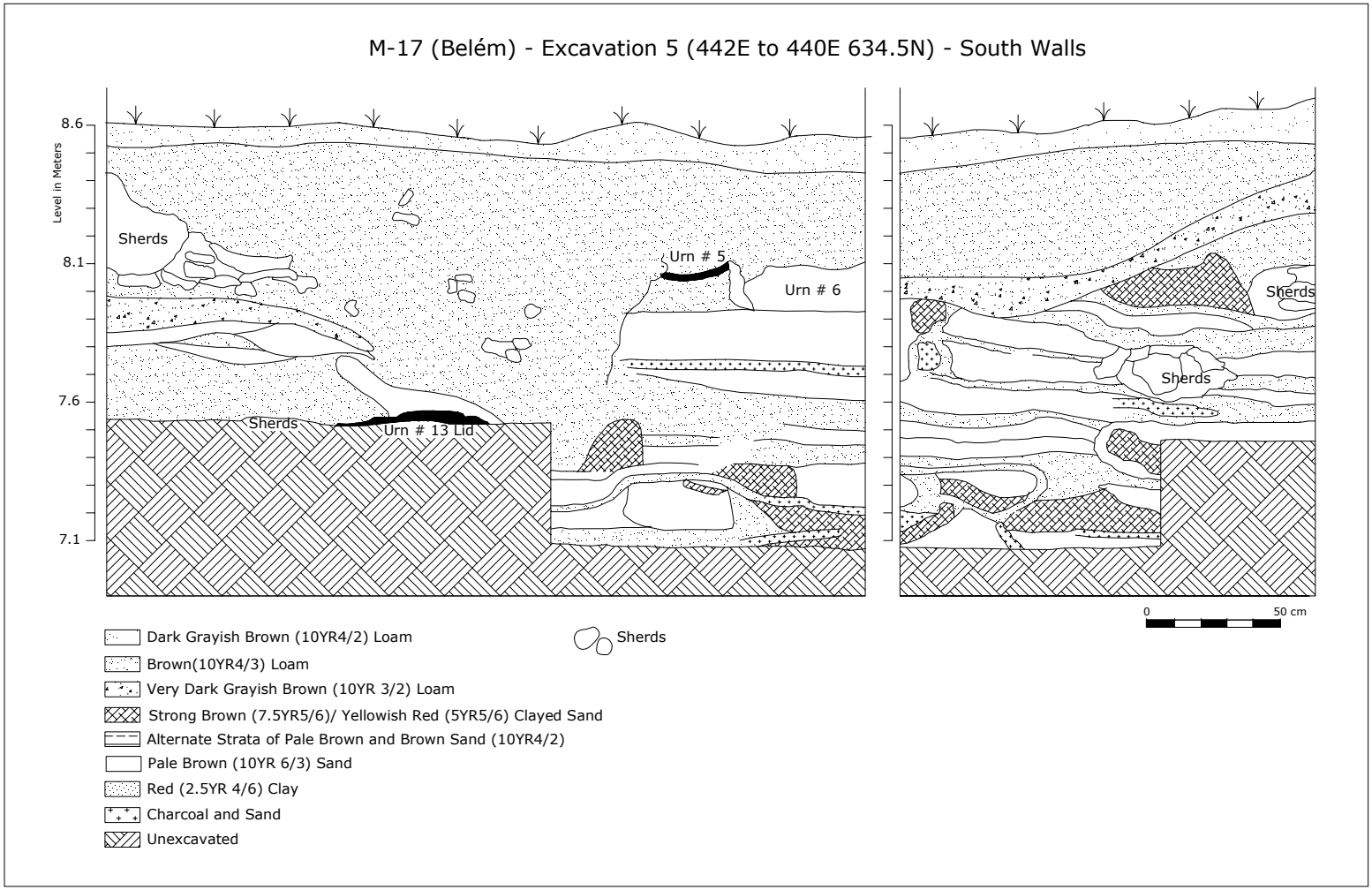


Figure 60 - M-17, excavation 5, south walls

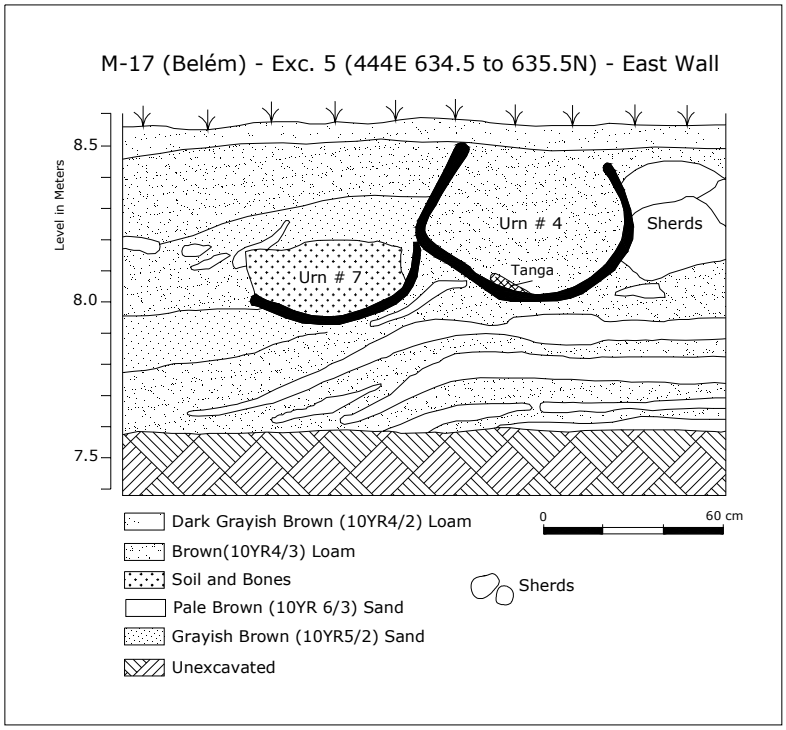


Figure 61 – M-17 excavation 5, east wall

The rounded body of urn 21 appeared in the north wall (Figure 59) suggesting that many other burials were yet to be found in that area. The pit profiles (Figures 59, 60 and 61) demonstrate that, below the layer where the broken vessels were found, the stratified deposits are similar to those identified for excavation 3, showing alternating layers of light gray silt and dark loam occupational surfaces.

Among the artifacts found at the excavation that could not be related to any particular burial are a snuffer (50 cm below surface, south side), and a fragmented decorated tanga (95 cm below surface, northeast side). At 1.5 m deep (7.72 m level) urns 2, 3, 10 and 11 were removed. The burials and pit were protected with plastic and filled back with sediment.

Excavation 6 (Burial Area)

After removing the dirt used to cover Excavation 5 after the first field stage, the limits of the pit were extended again, reaching a final area of approximate 25 m². On the southwest corner the lidded tops of urns 18, 15 and 16 were encountered 20 to 30 cm below the dark brown topsoil (Figure 155, Appendix C). A 10 cm wide globular vessel was encountered north of urn 18, next to its lid. Urn 18 was a 33 cm tall white slipped vessel globular vessel, placed at west of urns 15 and 16, at their neck's level. Urn 16 was a 70 cm wide globular vessel, with excised decoration on its neck. A small globular vessel and a tanga were found inside. Urn 15 was an 85 cm tall anthropomorphic vessel, placed some 30 cm away from urn 16, tilted about 20 degrees to the south direction. Urn 15 also contained a tanga. A large root trespassed both vessels, causing the fragmentation of their lids and rims. Urn 17 was a fragmented 80 cm wide globular vessel encountered east of the group. It is possible that the top of these vessels were still visible when the site was finally abandoned. Charred wood collected from inside urn 18 was dated to 1060 ± 40 B.P. (Beta 188991; wood charcoal; $\delta^{13}C$ = -25.9 $^{o}/_{oo}$), cal A.D. 900 – 1030. This dates the period just before the abandonment of the site.

On the extreme east side of the pit, urn 14 was flanking urn 4, both badly broken. Their proximity indicates they were buried together.

The excavation continued down by 10-cm levels, as the top views demonstrate (Figures 155 through 164, Appendix C). Many large sherds appeared in the northern and southeastern parts of the excavation at 50 cm below the surface (Figure 156). The upside down broken base of bowl 1 was found near the southeast corner. The broken rims of urns 5 and 6 (found during excavation 5) were completely uncovered at 60 cm below the surface (Figure 157). Urn 5 rested on top of the fragmented body of urn 6. Missing parts of the vessels were not found in the fill. bowl 2, also broken and upside down, was found west of bowl 1. The remaining of urn 7 was uncovered north of urn 4.

Large sherds were encountered in three more subsequent levels, particularly on the eastern side. The broken rim of urn 9, which was found partially inside the eastern wall during excavation 5, was uncovered at 70 cm below the surface. A fragmented red tanga was in its bottom. The stratigraphic position and the breakage pattern of urns 5, 6, 7, 8, and 9, as well as bowls 1 and 2 suggest they were contemporaneous (Figures 158 and 159). Skeletal remains were found dispersed in the fill between urns 7 and 8. The *terra preta* soil that was formed around the broken vessels was possibly due to the dispersal of human remains.

On the other side of the pit, burials did not show the same pattern of disturbance. In this same level (8.06 m), the soil around urns 15 thru 19 is brown clayish sand. Both the sediment around the vessels and their state of preservation indicate that these burials belong to a different period. The fragmented torso of a painted figurine found in that area (between the levels 8.1 and 8.2 m) was not associated with any particular vessel.

A U-shaped baked clay structure, containing dark soil and charcoal was found next to the northwestern corner (Figure 158) and interpreted as a stove (feature 5). The whole structure was about 70 cm long and 35 cm wide, smaller than the baked clay structure in excavation 3. The solid upper body of a small painted figurine was found among the sherds in the fill in the area where the stove was located.

At 90 cm below the surface (7.86 m level), the stove and several vessels were removed (Figure 160). Bone remains were encountered on the northeastern area, but due to their position, they are not believed to have constituted a primary burial. A group of three sediment filled cylindrical vessels were underneath urn 16 (Figures 161 and 162). These plain vessels had been placed on a bed of thick orange sherds. Urn 22, another broken vessel, was found south of urn 6. Bowls 3 and 4 were dirt filled broken bases, found on the southeast side of the pit. Bowl 3 was partially inside the south wall. The broken rim of bowl 5 appeared in the next level, some 20 cm to the east, also inside the wall.

As the excavation continued and reached the level where excavation 5 was terminated (Figure 162), all the upper vessels were removed, and other vessels were found. The broken rim of urn 21, an 89 cm wide red-on-white globular vessel was uncovered on the north side. Fragments of the rim and lid were found inside. A 20 cm tall crude vessel, with a flat base and outsloping, straight walls was encountered next to urn 21.

The broken rim of urn 20, a 75 cm tall large vessel, was encountered next to the south wall, west of bowl 5. A 22 cm tall, white slipped globular vessel, with a constricted mouth was inside urn 20, at its neck level. Urns 13 and 24 were located to the east between urns 12 and 20. Fragments of pottery attached to the rim of urn 24 were part of its lid. Other fragments were also found in the interior fill. A primary burial and a fragmented stone axe were at the bottom, which were later excavated in the laboratory. A complete red tanga and skeletal remains were found inside urn 12, a 48 cm tall globular vessel. The excavation continued only in the area where these large vessels were present. Portions of the west and east sides of the pit were left unexcavated (Figures 163 and 164).

Between 7.11 and 7.61 m levels, another stove (feature 6) was identified on the south / west pit walls, next to urn 20 (Figure 62). Its structure was similar to stoves features 4 and 5 found in the same area. This stove (feature 6) may have been contemporaneous with the older burials, since its top was at about 90 cm below surface (7.86 m level). Its stratigraphic position places it as the older stove of the group.

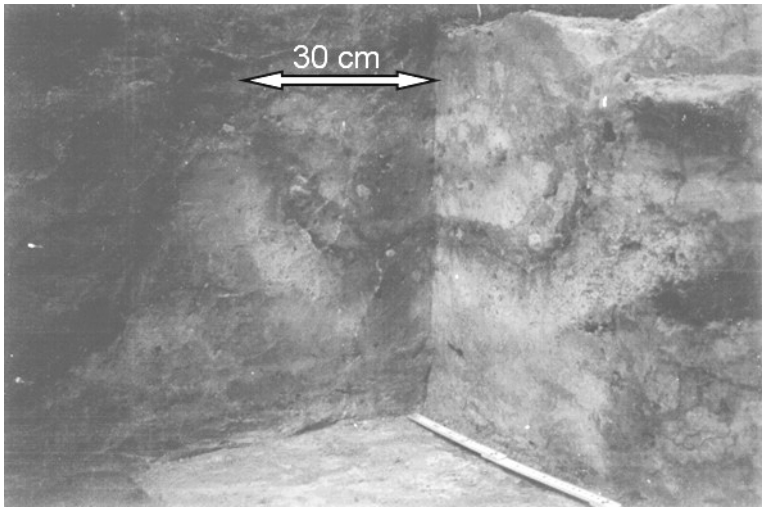


Figure 62 – M-17 feature 6 (stove)

The top of urn 23 was encountered east of urn 13, after urns 12, 20 and 21 had been removed. Urn 23 had also been completely buried in sterile light gray sandy clay. The fact that the lids of urns 13, 23, 24 were found relatively well-preserved indicates they were once totally buried, unlike other vessels that were only partially buried. Below 7.1 m level, only the southeastern portion of the pit was excavated, in order to recover the burials (Figure 164). Just below the inverted plate that covered urn 23 another shallow bowl was found. Although both plates were well-preserved, the urn itself was very fragile, crumbling to the touch. Urn 23 was a red slipped large vessel, similar in shape to urn 24. It contained a human skeleton in the bottom, which was later identified as a child. Twelve white stone beads were aligned below the maxilla. A small stone axe was northeast of the skull.

Excavations 5 and 6 uncovered 24 funerary urns and five broken vessels (bowls 1 through 5), which were probably also used for the disposal of human remains. Seven urns had lids (urns 13, 16, 18, 19, 21, 23 and 24); six urns had one or more vessels associated with them, totaling 10 vessels (urns 16, 18, 19, 21, 23, and 24). Six complete tangas were found inside urns 4, 5, 9, 12, 15 and 16. Three fragmented figurines found in the burial area were not associated with any

particular burial. Stone axes were found inside urns 23 and 24. Urn 23 also contained 12 lithic beads. Skeletal remains were found in 15 urns. In addition, 81 charcoal samples and 51 soil samples were collected in association with burials. When the work was completed, a continuous 25 m^2 area had been uncovered, and some 37.5 m^3 of sediments had been removed.

Mound Structure and Cultural Features

M-17 was constructed through the addition of pale brown sandy clay, in a process similar to the one described for M-1. However, while M-1 had a number of platforms at different elevations, M-17 had only one. The top surface area of the mound progressively decreased as the mound was built higher. At least during the last period, it seems that most of the activities concentrated on a flat top area of about 20 to 25 m wide and 70 m long.

The lower half of the mound consisted mostly of pale brown sand layers with few artifacts, as the stratigraphy of excavation 2 and lower levels of both excavation 3 and 6 indicate. Therefore, the evidence points to an initial period of intensive mound building, followed by seasonal construction.

According to the radiocarbon dates obtained for three charcoal layers in excavation 3 (Table 5), two meters of sediments could have been deposited over a period of about 100 years, since the dates range from A.D. 730 to 830. The date of A.D. 960 obtained for burial no. 18 may well represent the last occupation of the site. In this sense, the upper 50 cm in excavation 3 could have been deposited in another hundred years.

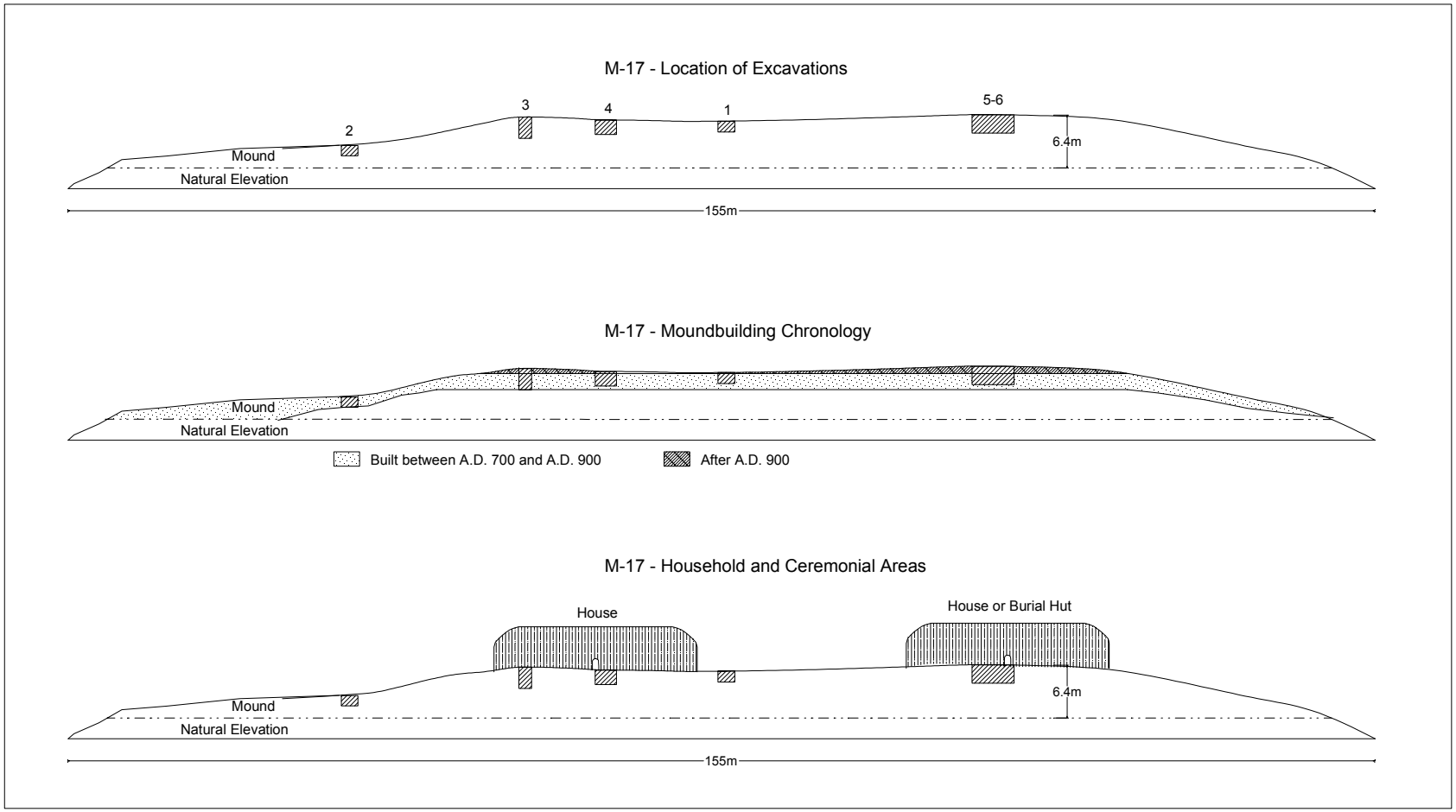


Figure 63 – M-17 hypothetical reconstruction

According to the cultural features investigated (burials, garbage fill, stoves and prepared floors), it is assumed that two houses existed on the top of the mound (Figure 63). Although the burial area contained all the stoves found in the site, it may well be a consequence of sample bias, since that area was more intensively excavated. The presence of stoves together with the burials may indicate that either the house was inhabited (the stoves being used for preparation of daily meals), or the house was a mortuary temple and, in this case, the stoves would be used for ceremonial purposes. Among several south American tribes, there was the custom of keeping a fire near the grave for days or weeks, even years (Metraux 1947: 26). The other house is assumed on the basis of the prepared surfaces uncovered in excavation 3, consistent with indoor characteristics, as well as the refuse disposal area identified in excavation 4, which would be consistent with a toss area at the back of the house. Therefore, the two houses had either different functions (one for funerary rites and the other for habitation) or different status (one for elite members and the other for commoners).

Funerary Patterns

Description of Burials

Funerary vessels were transported from the field to the Museu Paraense Emílio Goeldi, where the excavation of their interior was completed. Sheila M. de Souza, a physical anthropologist from FIOCRUZ, Escola Nacional de Saúde Pública, Rio de Janeiro, described and analyzed skeletal remains from urns 3, 7, 13, 23 and 24. Human bones from the other burials have not been studied to date. The horizontal and vertical position of the burials can be observed in Figures 64 though 68.

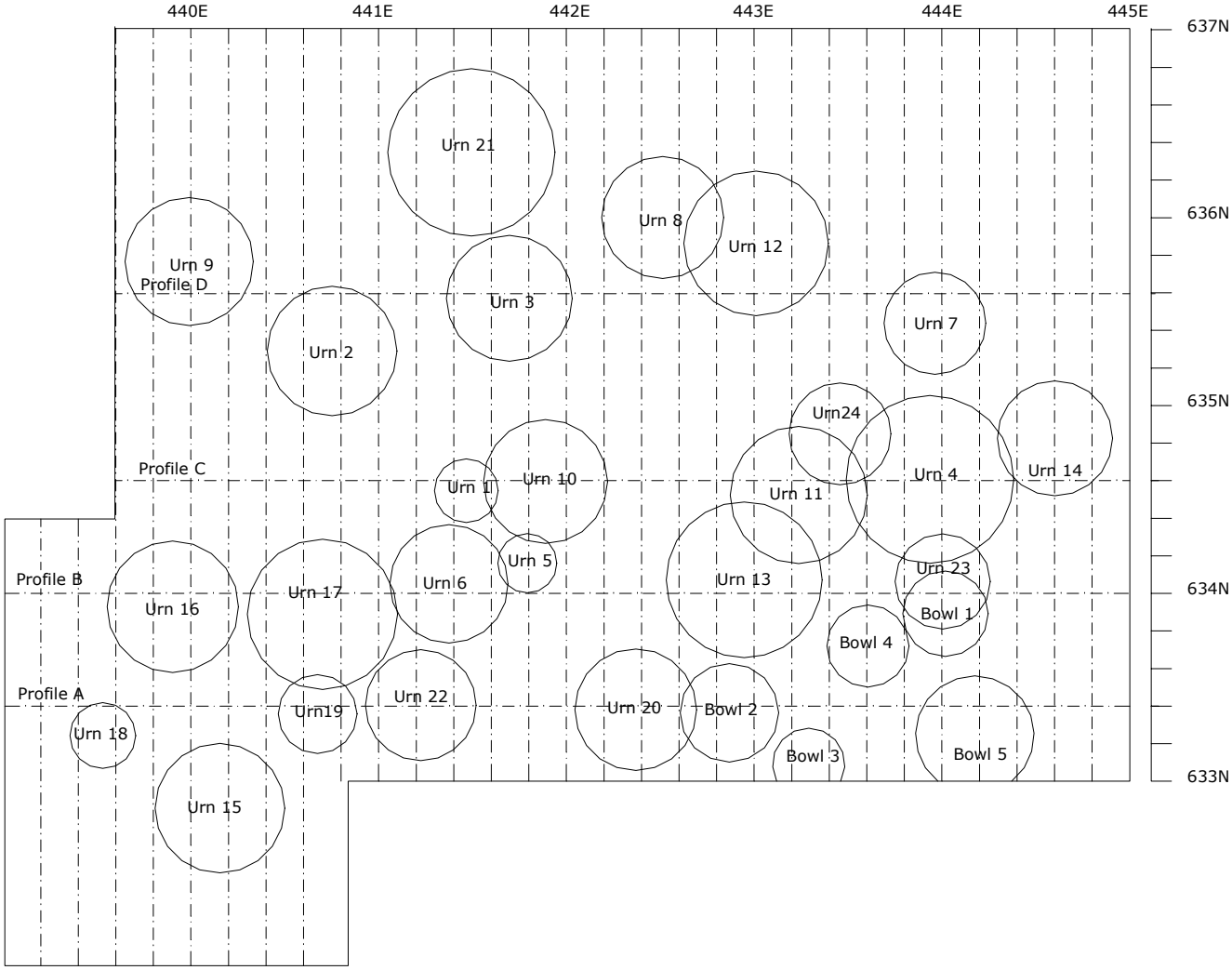


Figure 64 - Location of burials on the horizontal plan

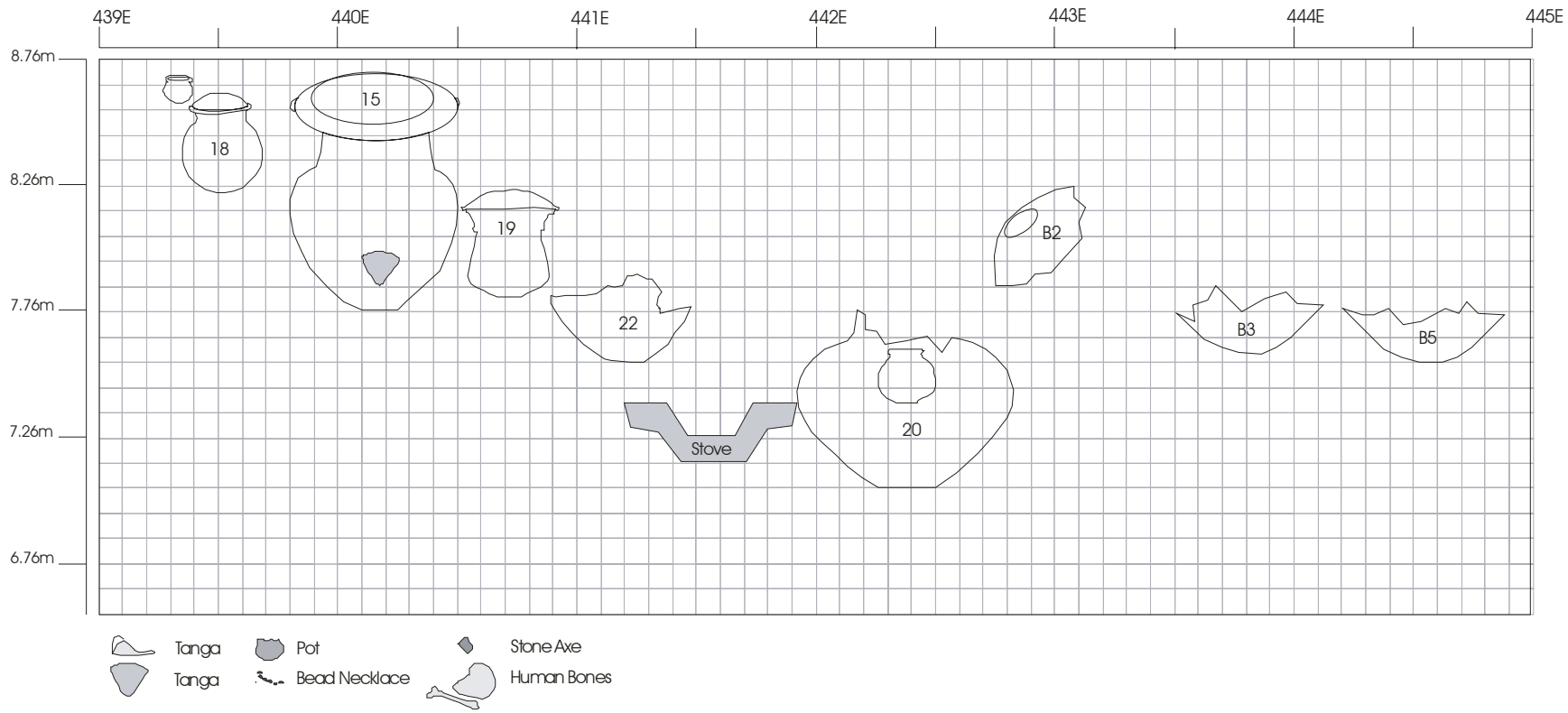


Figure 65 – M-17 burials, profile A (633.4N)

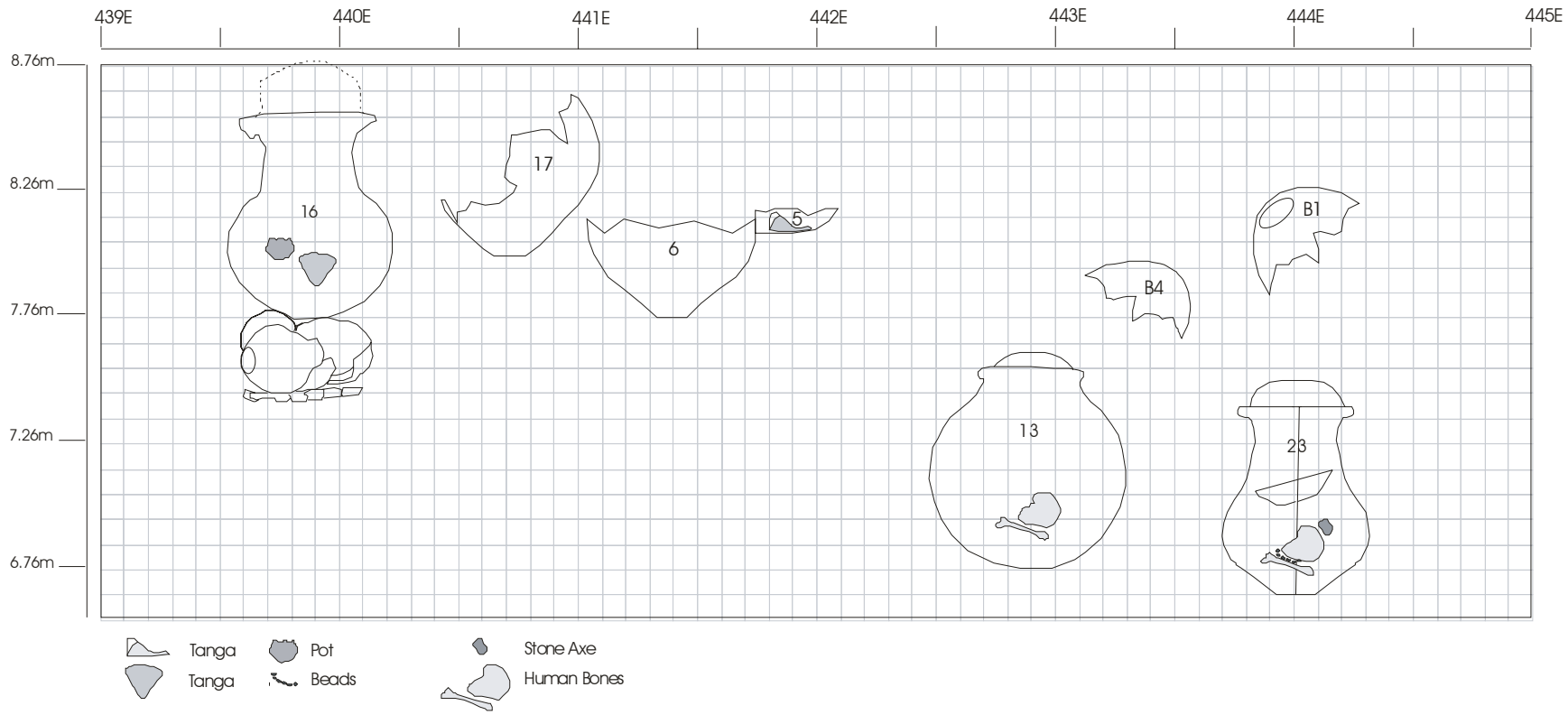


Figure 66 – M-17 burials, profile B (634N)

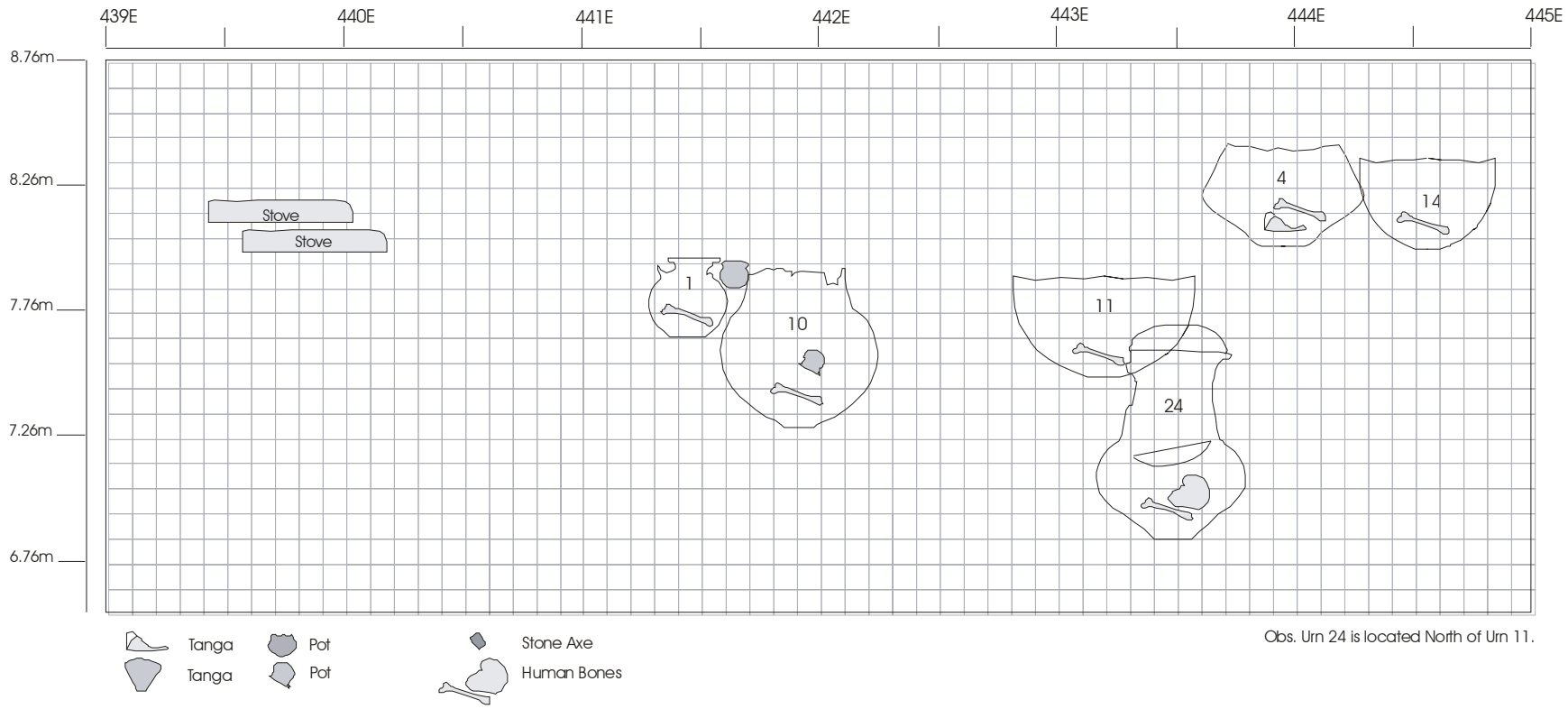


Figure 67 – M-17 burials, profile C (633.6N)

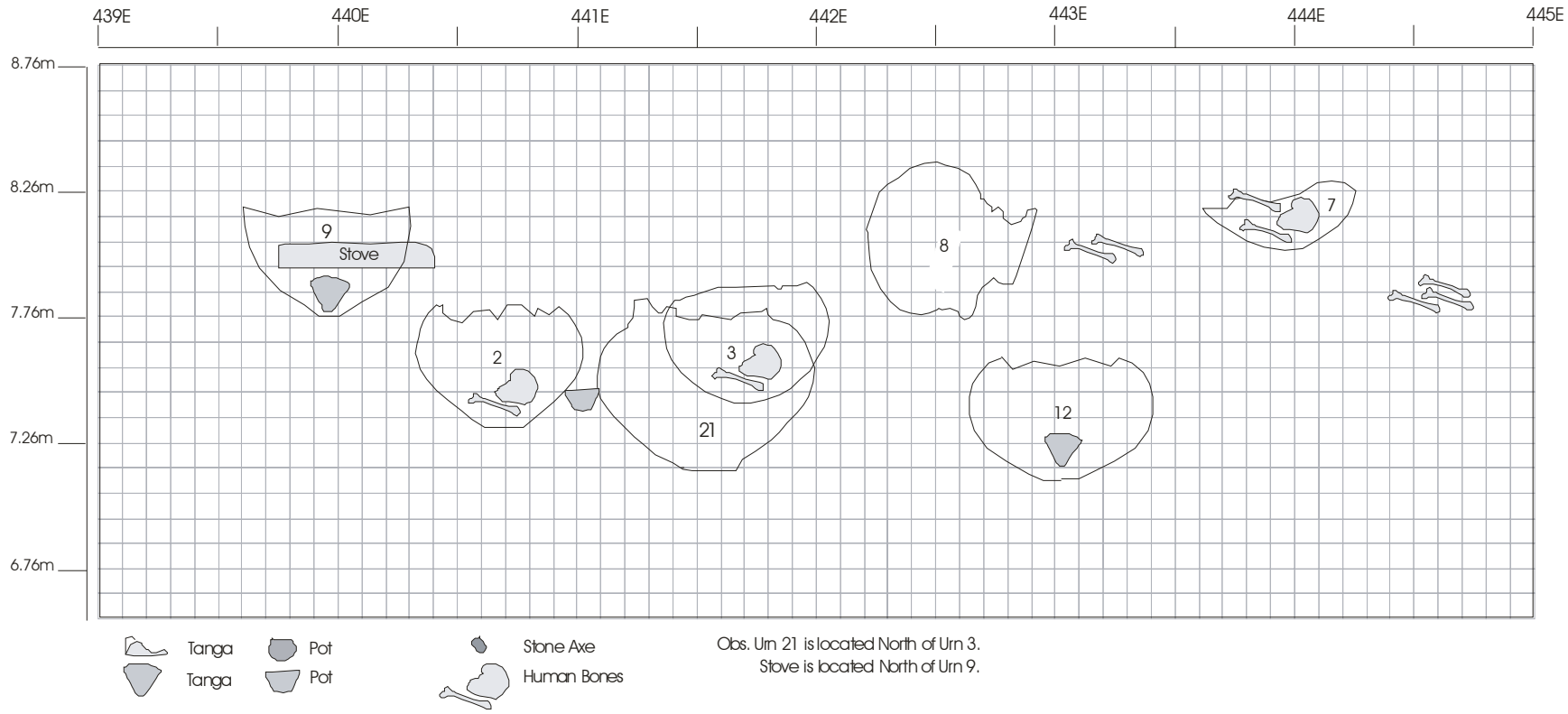


Figure 68 – M-17 burials, profile D (635.6N)

Urn - 1 (Cat. 2606-495)

This globular vessel, with a maximum body diameter of 34 cm, 30 cm tall, with a constricted neck and everted rim is decorated with red designs on a white slipped surface (Figure 67). Base is flat, 14 cm in diameter. No lid was present. Human bones found inside mixed with wet, dark soil were certainly a secondary burial, due to the urn's small size. A white slipped rounded vessel (10 cm of maximum diameter), decorated with incised straight lines, was encountered next to the urn's rim.

Urn - 2 (Cat. 2606-170)

The entire external surface of this 53-m tall vessel is decorated with elaborate red-on-white painted designs. It has a flat bottom, 20 cm in diameter, and a globular body with a maximum diameter of 69 cm. At the maximum diameter the walls slope inward to form a constricted neck, which was fragmented inside the vessel and was later restored. The vessel's base rested on top of a burnt clay layer at the 7.32 m level (Figure 68). It contained bone fragments and teeth, in a poor state of preservation.

Urn - 3 (Cat. 2606-497/521)

This is a large globular vessel (67 cm of maximum body diameter) decorated with red and black painted designs on a white slipped surface. With the rim missing, the existing height was 47 cm. Its base rested on the 7.42 m level. It contained teeth and poorly preserved bone fragments, as well as small fragments of a partially disintegrated skull (Figure 68).

Sheila Souza reported that the state of both the vertebrae and some skull fragments indicate it was a primary burial of a young adult, since there were no signs of aging. There were no elements to estimate sex.

Urn - 4 (Cat. 2606-151)

Red-on-white painted medium sized vessel, with flat base, carinated lower body and walls sloping inward to form a cylindrical neck, which was badly broken. Not only the rim was missing, but also the whole vessel was broken in small pieces, which nevertheless, were held in place by sediment. Excised designs decorated the red slipped neck. The urn was filled with dark gray soil, small fragments of bones, sherds, and flecks of charcoal (Figure 67). A tan slipped tanga (Cat. 2606-4) rested on the bottom, which suggests female burial.

Urn - 5 (Cat. 2606-526)

The concave bottom of this vessel was resting in a break in the upper body of urn 6, at the 8.02 m level (Figure 66). Most of the vessel was missing, and the remaining bottom contained light grayish brown sediment, sherds and a complete polished tanga (Cat. 2606-5), suggesting female burial.

Urn - 6 (Cat. 2606-516)

Red and black painted designs decorate the white slipped body of this large globular vessel, with a maximum body diameter of 76 cm, and flat base (18 cm in diameter). With the rim missing, the existing height was 47 cm. It was found lying on the 7.76 m level, below urn 5. Filled with dark grayish brown sediment, it contained large sherds, but neither bones nor charcoal were associated (Figure 66).

Urn – 7 (Cat. 2606-528)

The lower body of this red on white painted vessel rested on a bed of broken vessels, at the 8.03 m level. Human remains from one individual were mixed with dark grayish brown sediment. Some bones were also found outside, but broken parts of the vessel were missing (Figure 68).

Parts of the vertebrae, still articulated, indicate this was a primary burial, although there was post-depositional disturbance. Sheila Souza reported that the teeth were worn flat, and there are deposits of calculus especially at the lingual face of the incisive. The calculus is very extensive, firmly adhered to the teeth. A sample was sent to the University of Nebraska, where it was analyzed by Dr. Karl Reinhard, who identified phytoliths, fibers, and starch granules (pers. communication 2004). The lack of reference collections from the area made it impossible to identify the plant species.

Sheila Souza also reported dental losses during life and pitting hypoplasia, which is commonly associated with stress caused by disease or food shortage. Despite the intense dental abrasion, the vertebrae do not show signs of osteoarthritis, suggesting the individual was a younger adult (less than 30 years of age). The chin is small, but the submental triangle is marked, thus it is not possible to affirm whether the individual was a female or not.

Urn - 8 (Cat. 2606-517)

This 67 cm tall vessel has a globular body (65 cm in diameter), rounded shoulder and insloping neck, decorated with stylized anthropomorphic faces on two opposite sides. The entire external white slipped surface is painted with red and black designs. It was found lying on its side on the 7.76 m level. The missing parts of the neck and rim were not found in the fill. The vessel contained dark grayish brown sediment, flecks of charcoal, sherds and fragmented bones, which were also found outside the vessel (Figure 68).

Urn - 9 (Cat. 2606-514)

The flat base of this globular vessel (64 cm in diameter, 48 cm tall) was resting on the 7.76 m level. A red-slipped tanga found inside was fragmented but could be fully restored. Neither bones nor the missing rim were found in the moist dark sediment that filled the vessel (Figure 68).

Urn - 10 (Cat. 2606-349)

Modeled, stylized facial features on the neck are harmonized with red-on-white painted designs that cover all the external surface of this large globular vessel. Maximum body diameter is 66 cm and, with the rim missing, the existing height is 71 cm (Figure 67). Besides poorly preserved bones, it contained a 10-cm tall globular vessel (Cat. 2606-2), with a vertical neck and everted rim. The external surface of this small pot is decorated with incised designs, which were made with a double pointed tool (Guajará Incised type).

Urn - 11 (Cat. 2606-529)

Red and black painted designs decorate the white slipped surface of this large rounded vessel (maximum diameter of 73 cm). The broken rim was missing. The flat 16-cm diameter base rested on top of a burnt clay layer, at the 7.52 m level. Dark grayish brown sediment filled the vessel. Inside were sherds, flecks of charcoal, and fragile, fragmented bones (Figure 67).

Urn - 12 (Cat. 2606-512)

Elaborate red-on-white painted designs decorate both the globular body (77 cm of maximum diameter) and neck of this 80-cm tall vessel. Pieces of the constricted, insloping neck were found in the fill, allowing for restoration. The vessel's reduced flat base (15 cm in diameter) rested on the 7.11 m level. A complete red tanga (Cat. 2606-471) was inside. The vessel was filled with dry, dark gray soil, flecks of charcoal, and sherds. No human remains were found (Figure 68).

Urn - 13 (Cat. 2606-474)

Near urn 24 was this large, polished globular vessel (maximum body diameter: 83 cm). Inside the short, constricted neck, a shallow, undecorated rounded bowl (Cat. 2606-502) was inverted as a lid, circumscribed by the exteriorly thickened rim (Figure 66). The vessel was filled with dark grayish brown soil, a few sherds, and flecks of charcoal. The human skeleton on the

bottom was partially excavated at the field, but most of the bones were left in place for excavation in the laboratory.

Sheila Souza reported that the bones belonged to one individual. A fragment of the skull shows thin edges and rounded forehead. At a first glance the remains seem to belong to a female, but the marked chin and the low dimorphism in the sample as a whole makes it difficult to estimate sex based on fragments. Part of the superior and inferior arcades is present, showing the teeth in occlusive position. The abrasion is flat, but less intense than in the individual from burial 7, which may suggest this was a younger individual. The same pitting hypoplasia is present. The size of the vessel is compatible with a primary burial.

Urn - 14 (Cat. 2606-512)

The painted walls of this globular vessel flanked urn 4, indicating they were buried together. A moist, dark soil filled the upper part of the vessel and its surroundings, while the lower body was buried in a much lighter, dry soil. Sherds, flecks of charcoal, and bone fragments were inside (Figure 67).

Urn - 15 (Cat. 2606-518)

A badly broken carinated bowl served as the lid for this 85-cm tall globular vessel (maximum diameter of 69 cm). The white slipped urn is covered with red and black painted designs that harmonize with anthropomorphic faces placed on opposite sides of the vertical neck. Because the whole vessel was tilted some 20 degrees south, only part of its 14-cm wide base rested on the 7.56 m level. Sediment, sherds, and small pieces of charcoal filled the vessel. Very few bone fragments, and a complete, tan slipped tanga (Cat.2606-470) were inside, suggesting the individual was a female (Figure 65).

Urn - 16 (Cat. 2606-520)

This 79 cm tall vessel has a red on white painted globular body, with rounded shoulders that smoothly lead to a red slipped vertical neck decorated with excised designs. Red and black painted designs also decorate the exterior of the broken lid, an inverted white slipped carinated bowl (Cat. 2606-524), which was originally placed inside the vessel's everted rim. When the lid was restored, its height indicated that it was once above the present surface (Figure 66). The urn was filled with dark moist soil, sherds, very few fragmented bone remains, and flecks of charcoal. A small 10-cm wide globular vessel (Cat. 2606-367), and a tanga (Cat. 2606-469) were inside, suggesting this was a female burial. The external surface of the offertory vessel is reddish-brown polished, and its insloping short neck is decorated with vertical scraped lines. The tanga's crude surface showed traces of red paint or slip. Three cylindrical (20 to 30 cm tall) plain vessels, named pot 1 (Cat. 2606-491), pot 2 (Cat. 2606-492) and pot 3 (Cat. 2606-493) were placed between the urn's flat base and a layer of thick sherds. These sherds belonged to roughly finished, thick walled vessels used for food processing (Vessel Type I, see Chapter 6).

Urn - 17 (Cat. 2606-513)

The broken walls of this 80 cm wide globular vessel were found some 30 cm below the surface. The whole exterior is decorated with red-and-black on white painted designs. Rim, neck, and part of the body are missing, and the existing height is 63 cm. It contained only dark gray sediment and sherds (Figure 66).

Urn - 18 (Cat. 2606-488)

A plain, rounded, shallow plate (Cat. 2606-489) was inverted on top of urn 18, a 33 cm tall white slipped vessel, with vertical neck and everted rim. Both urn and lid were fragmented, but were later completely restored. The urn contained sediment, charcoal and a few sherds, but

no bones were found. An upside down small offertory vessel (Cat.2606-366) was found directly above the lid, some 20 to 30 cm below surface (Figure 65).

Urn - 19 (Cat. 2606-525)

This 42 cm tall red on white vessel has a very distinctive shape. It has a flat base, with sides outsloping to maximum diameter (35 cm) very close to the bottom, and then insloping upward to meet the outsloping neck just some 10 cm below the rim. Stylized modeled eyes against a red background decorated two opposite sides of the neck. Mouth diameter is 3 cm larger than the body's maximum diameter. The lid is an incomplete shallow plate, red slipped on the outside and internally decorated with elaborate red painted designs on a white slipped surface (Cat. 2606-412). Lid fragments were found both inside and outside the vessel, which also contained other sherds, soil, and flecks of charcoal (Figure 65).

Urn - 20 (Cat. 2606-515)

This large (75cm tall and 80 cm wide) red on white globular vessel was located close to the south wall of the excavation. A white slipped globular vessel, 22 cm tall, with a constricted mouth (14 cm in diameter) and everted rim was inside, right below the broken rim. Sediment, sherds, fragile bone fragments, and flecks of charcoal filled the urn (Figure 65).

Urn - 21 (Cat. 2606-498)

This large globular vessel, with a maximum body diameter of 89 cm was located on the north part of the pit. It is decorated with red painted designs on a white slipped surface. Modeled stylized eyes harmonize with thin red designs on the broken vertical neck. Existing height is 66 cm. Inside the urn were sediment, flecks of charcoal, and sherds, which included pieces of the broken neck and a red on white shallow plate, probably the lid (Cat. 2606-496). Neither bones nor tangas were associated. A plain open vessel (Cat. 2606-530), with outsloping, straight walls (15 cm tall and 15 cm of mouth diameter) was encountered west of the urn's body (Figure 68).

Urn - 22 (Cat. 2606-511)

This is the broken base of a white slipped globular vessel, which was located close to urn 6, but at a lower level. The missing parts of the vessel were not found in the fill, which contained only other sherds (Figure 65).

Urn - 23 (Not collected)

This large red slipped vessel, similar in shape to urn 24 could not be recovered, because it was extremely fragile. A plain rounded bowl, with exteriorly thickened rim (Cat. 2606-499) was inverted as a lid. A red slipped rounded bowl (Cat. 2606-500) was found below the lid. The urn contained a primary burial. The skull was associated with a 12-bead necklace (Cat. 2606-523), which was placed originally around the neck, as well as a stone axe (Cat. 2606-522), located northeast of the head (Figure 66).

Examining the bone remains, Sheila Souza pointed out that the teeth show the same flat wear patterns observed in other individuals. One of the teeth is a deciduous molar, and another molar was still unerupted, suggesting that the individual could have been 10 years old at the time of death. The size of the urn suggests it was a primary burial. Most of the bones could not be recovered in the field.

Urn - 24 (Cat. 2606-510)

This 90 cm tall vessel has a depressed-globular body (75 cm in diameter), insloping long neck and everted rim. The whole white slipped surface is decorated with red painted designs. Fragments of the broken lid (Cat. 2606-486), an interiorly red slipped rounded bowl, were found attached to the rim, as well as in the sediment that filled the urn. Another rounded, shallow bowl was inside the urn (Cat. 2606-440), below the lid. An articulated skeleton was lying against the wall, associated with a fragmented stone axe (Cat. 2606-449) (Figure 67).

Sheila Souza reported that the state and position of the human remains on the bottom of this urn attest to a primary burial. It was an adult individual, with permanent teeth in place. The articulated vertebrae disposed against the vessel wall show the original alignment of the individual's spine. The vertebrae, in order and parallel, show the superior edge oriented up, confirming that the individual was seated on the bottom of the vessel, with its back supported by the vessel wall, making the body conform to the vessel's shape. The long bones were distributed and aligned on a symmetrical fashion on both sides of the body indicating that the flexed limbs accommodated themselves progressively to the vessel's shape. It is possible that perishable objects may have contributed to fill in the space, keeping the legs apart. The final disposition of the legs suggests that the individual was not placed strongly tied in a classic fetal position. The flat bones of the pelvis were found coherently aligned with the spine and limbs, on the bottom of the urn. Future analysis of the sediment collected from the pelvis cavity might provide information about diet.

The left portion of the cranium rested on the abdomen, since it may have fallen after being released from the cervical column, which is very common, given the fragility of the cervical spine joints and the relative weight of the skull. From a taphonomic point of view, it indicated that there was an empty space inside the vessel for a certain period of time.

The teeth show less intense abrasion if compared to the other individuals examined. One of the molars had a cavity. The teeth, very fragile, do not show signs of hypoplasia. The individual was an adult of a short stature, possibly a male.

Analysis of Funerary Practices

The objects included with the individuals (summarized in Table 4), the preliminary analysis of the human remains and the information obtaining during the excavation allow for a

preliminary evaluation of funerary practices, as well as indicate that some of these practices varied through time.

The burials consisted mostly of large, soil filled ceramic vessels, containing fragmentary bone remains, pottery sherds, and a few ceramic and stone items. The older burials seem to have been completely buried, since they were inside of a more uniform stratum of silt. In the upper layers, however, the burial method consisted of the placement of the vessel either on top of a burnt clay layer, or inside a prepared pit. The vessel's neck and mouth were kept above the ground. It suggests that the burials occurred inside of a roofed structure, more likely a house. Several vessels were topped by inverted plates or bowls, which might have been sized specially for every urn.

An important distinction between the burials that were completely buried and those that were kept at least partially above the ground is the access to its contents. Recent burials, such as urns 15 and 16, contained few bone remains, which indicate that the bones were eventually removed from the vessel. In terms of the social meanings of the burial practices, it is possible to affirm that unburied vessels permitted closer contact with the ancestors. It may mean that relating to ancestors was more important towards the end of the sequence.

The urns contained just a few non-perishable items, which included ceramic vessels, tangas, and stone axes and beads. These items may not reflect the full range of items placed with the body and around the urns, which may have included artifacts and jewelry made out of wood, seeds and feathers. Six of the burials (4, 5, 9, 12, 15 and 16) contained a slipped tanga. Since the tanga is considered a female object (Meggers and Evans 1957: 382; Schaan 2001b: 124-5), it is possible that those burials belonged to female individuals. Small spherical pots, with constricted mouths and everted rims were inside five of the urns (1, 10, 16, 18, and 19). These urns belong to upper levels, which could give this small vessel a chronological significance. On

the other hand, urn 16 contains both the spherical pot and a tanga, which could also have gender significance.

Stone objects are present in only two burials. In urn 24, a fragmented stone axe is associated with a plate and a small vessel. In urn 23, the stone axe is associated with a bead necklace and a pottery plate. The fact that the stone objects are not associated with tangas could also have gender significance. In this sense, stone axes would indicate male burials. In burial 23, the remains of a child with lithic objects implies a high rank for this individual, since these were long-distance exchange items, thought to have been particularly rare and prestigious.

The analysis of human remains, although preliminary and incomplete, seems to suggest that burials in the large urns were primary internments. Scattered bones found between urn 7 and 8 showed traces of black paint, which may mean that some of the burials were secondary. The absence of most of the bones in recent burials as well as the use of small urns seem also to indicate that secondary burial was practice towards the end of the sequence. Cremation is also a possibility for small urns that contained only sediment. Future analysis of the sediments will determine whether there were cremated bones inside or not.

Ethnographic examples may explain why some funerary urns contained just a few bone remains. For example, mortuary practices of the Jivaro, reported by Morales-Chocano (2000), include the preparation of the corpse for secondary inhumation either inside or close to the house. Initially the corpse is allowed to decay, and after that the cleaned bones are placed inside of a small ceramic vessel, which is kept inside the house, close to the roof. Every year, they opened the vessel, cleaned the bones, worshiped the ancestor and returned the bones to its place. After several years or decades, some of the remains are lost, since damaged bones would be discarded. After a certain period of time only a few bones would still be left inside of a small urn, when it is time to bury them under the house floor (ibid.: 86-87).

Table 4 - Characteristics of M-17 burials

Urn #	Bones	Decoration	Tanga	Small Vessel	Plate or Vessel	Stone Beads	Stone Axe
1	X	Polychrome		X			
2	X	Polychrome					
3	X	Polychrome					
4	X	Polychrome + Excised	Tan slipped				
5		Polychrome	Tan slipped				
6		Polychrome					
7	X	Polychrome					
8	X	Anthropomorphic*					
9		Polychrome	Red slipped				
10	X	Anthropomorphic		X			
11	X	Polychrome					
12		Polychrome	Red slipped				
13	X	Plain					
14	X	Polychrome					
15	X	Anthropomorphic	Tan slipped				
16	X	Polychrome + Excised	Tan slipped	X			
17		Polychrome					
18		Polychrome		X			
19		Anthropomorphic		X			
20	X	Polychrome			X		
21		Polychrome + Excised		X			
22		Polychrome					
23	X	Red Slip			X	X	X
24	X	Polychrome			X		X

* Anthropomorphic is also polychrome

The elaborateness of the decoration of the urns throughout the sequence and especially among the recent burials does not support the idea that there was a decline in funerary practices towards the end of the sequence, as previous researchers (Farabee 1921; Meggers and Evans 1957; Palmatary 1950) suggested. Data from M-17 indicate there was a change in burial practices; in fact funerary rites may have become more important over time.

Each funerary vessel (when bones were present) contained only one individual. Some groups of vessels were identified (urns 4 and 14, urns 15, 16, 17 and 19), indicating that families or related individuals were buried together in the same area, or maybe at the same time.

M-17 burials were elite burials and do not represent the full range of people who inhabited and performed activities on the mound. Therefore, other forms of disposal of the dead may have occurred, such as primary burial in the ground, abandonment, cremation, endocannibalism, etc (Metraux 1947).

History of the Cemetery Area

Excavations 5 and 6 included all but two of the burials found in the mound, indicating that, over a period of a few hundred years, funerary rites took place in the same area. Although the burials represent many different episodes of death and mourning rites, only major chronological periods can be identified at this moment, based on relative chronology deduced from stratigraphic position and cultural features. As such, four major periods are proposed, as follows: (1) A first period of primary internments in completely buried large lidded vessels; (2) A second period of either primary or secondary burial, using both small and large vessels, whose rims were kept over the ground; (3) A third period during which secondary burials were vandalized, leading to the temporary abandonment of the area; (4) A fourth (and last period) of secondary burials in both large and small lidded vessels.

The first period is represented by burials 13, 23 and 24. These vessels were completely buried in archaeologically sterile silt, brought to the site for mound construction. These were large, thick vessels, but only urn 24 was decorated with red on white designs over a white slipped surface. It cannot be determined whether the burials were contemporary or not. However, due to their stratigraphic position, burial 23, which belonged to a child of high prestige, could be the

oldest. Each urn contained only one individual and the inhumation was likely primary for all of them. It is not clear at this point whether the burial area was enclosed or not. Offerings were included inside the urns, and non-perishable items were not found on the outside. Lithic objects are associated with these burials (23 and 24) and were not found in upper levels. The fact that the urns were placed close to each other may indicate a short time interval between burials.

Urns 1, 2, 3, 10, 12, 20 and 21 are assigned to the second period. The inclusion of a tanga with urn 12 indicates that at least one of the individuals was a female. The bases of these urns rested between the 7.3 and 7.1 m levels, while their broken tops were located between 7.7 and 7.8 m levels. The fact that their rims and lids were missing, as well as the presence of a small vessel close to the outside walls of urn 21 suggest that they were not completely buried. Both the presence of incomplete skeletons inside and the small size of urn 1 suggest secondary burial.

Urns 5, 6, 7, 8, 11, 22, and bowls 1 through 5 belong to the third episode. These large globular vessels display polychrome decoration, and vessel no.8 is anthropomorphic. As in period 2, the urns were probably not completely buried. One of the stoves (feature 5) seems to be contemporary with this period, indicating the existence of a roofed structure. It appears that the funerary vessels were vandalized, since the vessels were not only broken, but displaced. Urn 8 was unburied and its contents fell out, remaining on the ancient surface. Bones remains were found in the fill between urns 8 and 7. Fragments of thick walled urns were abundant between the 7.9 and 8.1 m levels over a large area. Some of the vessels were not only intentionally broken, but they were turned upside down (bowls 1 and 2). This violent episode may indicate warfare, rather than any other form of post-depositional disturbance, such as animal action or abandonment. After that incident the area was likely abandoned, otherwise it would have been cleaned for use, and the burials would not have been found in the way here described.

A last episode of occupation is represented by urns 4 and 14 on the eastern part of the excavation, and urns 15, 16, 17, 18 and 19 on the southwestern side. Urns 15, 16 and 17 were

large globular vessels, while the other ones were smaller vessels. They were all decorated with polychrome painting; urns 15 and 19 were also anthropomorphic. Tangas inside urns 4, 15 and 16 suggest these were female burials. Urns 4 and 14 seem to have been buried together. Both lids were missing and their upper part were broken, which may indicate they were only partially buried. Urns 17 and 19 may have been placed before the others, due to their stratigraphic position. Urns 15 and 16, however, due to their size, proximity, and surrounding deposits, are likely to have been placed either at the same time or a few years apart. Urn 16 deserved a particularly special treatment, since it was placed over a bed of sherds and vessels. Few bones were found inside the urns, which suggest secondary burial and constant contact with the deceased.

The history of the cemetery area points to cultural changes in the treatment of the dead, as well as to an episode of military conflict. The need to get closer to the ancestors through time may indicate the need to reinforce social status and prestige during a period of sociopolitical instability (see Chapter 7).

Population and Dietary Patterns

The data on skeletal remains is limited, but allows for some conclusions that have to be placed in perspective due to the small sample size. Teeth abrasion suggests a diet with either rigid components or abrasive particles in the food. This is consistent with the ingestion of extremely gritty food. According to Sheila Ferraz (personal communication 2004) this could be compatible with a diet based on fish, seeds, and manioc flour.

Another interesting possibility for dental wear is offered by a study conducted by Reinhard and colleagues in the site of Roca Verde, Peru (Reinhard, et al. 2001). They observed that female dental wear was more pronounced than in males. Female teeth had dental calculus rich in cotton fiber and phytoliths from wild plants used to make matting and other woven

artifacts. In a separate study, Danielson and Reinhard (1998) had linked phytoliths to dental microwear because phytoliths are harder than tooth enamel. This information, when applied to the Peruvian study, implied that female dental wear was due to the fact that women used their teeth to strip plant fibers which were rich in phytoliths (Reinhard 2004, personal communication).

A dental calculus sample from M-17 was sent to the University of Nebraska for analysis. Reinhard identified phytoliths, fiber, and starch granules. Unfortunately, the species could not be identified on the basis of his collections.

The wearing seems to have happened early in life, since in one young individual the permanent teeth show intense abrasion, which may indicate that either the diet or the activity (in case the wear is related to plant fiber processing) was the same for adult and children.

Although the presence of hypoplasia is an indicative of dietary stress which may have affected the whole population, no pathology could be identified in the bones.

Long-Distance Exchange Items

The excavations produced just a few long distance exchange items, comprised of stone tools and 12 lithic beads. Due to the Island's geology, it is known that all lithic items originated from elsewhere. There is no indication on their provenience. A description of the lithic objects (Figure 69) is provided below:

a) Stone Axe (Cat. 2606-522) – This 4 cm wide, 5.8 cm long polished basalt axe was found inside of urn 23, positioned above the skull.

b) Fragmented Stone Axe (Cat. 2606-449) – This fragmented, worn tool is of microgabbro. It was found inside urn 24, and measured 4.8 by 6.5 cm.

c) Grinding Stone or Hammer (Cat. 2606-6) – This was possibly once a microgabbro axe. Existing measurements are 3.7 by 3 cm. It was found in the garbage fill, excavation 4 (80-90 cm below surface).

d) Fragmented Sandstone (Cat. 2606 – 462) – This fragmented tool was found in the top layer of excavation 1 (open area), measured 2.2 by 4.9 cm.

e) Ferrous Sandstone (Cat. 2606 – 233) – This unidentified piece was found in excavation 2 (peripheral area) 40 to 50 cm below surface. It measured 5 by 7.4 cm.

f) Perforator (Cat. 2606-290) - This microggabro fragment may have been a perforator. It measured 2.6 by 1.1 cm. It was found in excavation 2 (peripheral area) between 50 and 60 cm below surface.

g) Small Basalt Cylinder (Cat. 2606-290) – This object resembles a bead, but is not perforated. It measures 0.8 by 2.2 cm. It was found in excavation 2 (peripheral area) 50 to 60 cm below surface.

h) Stone Beads (Cat. 2606-523) - These cylindrical dark veined white microgabbro beads were drilled from both ends towards the middle. The twelve beads are of different sizes, varying from 0.7 to 1.8 cm long and from 0.4 to 0.6 cm in diameter.

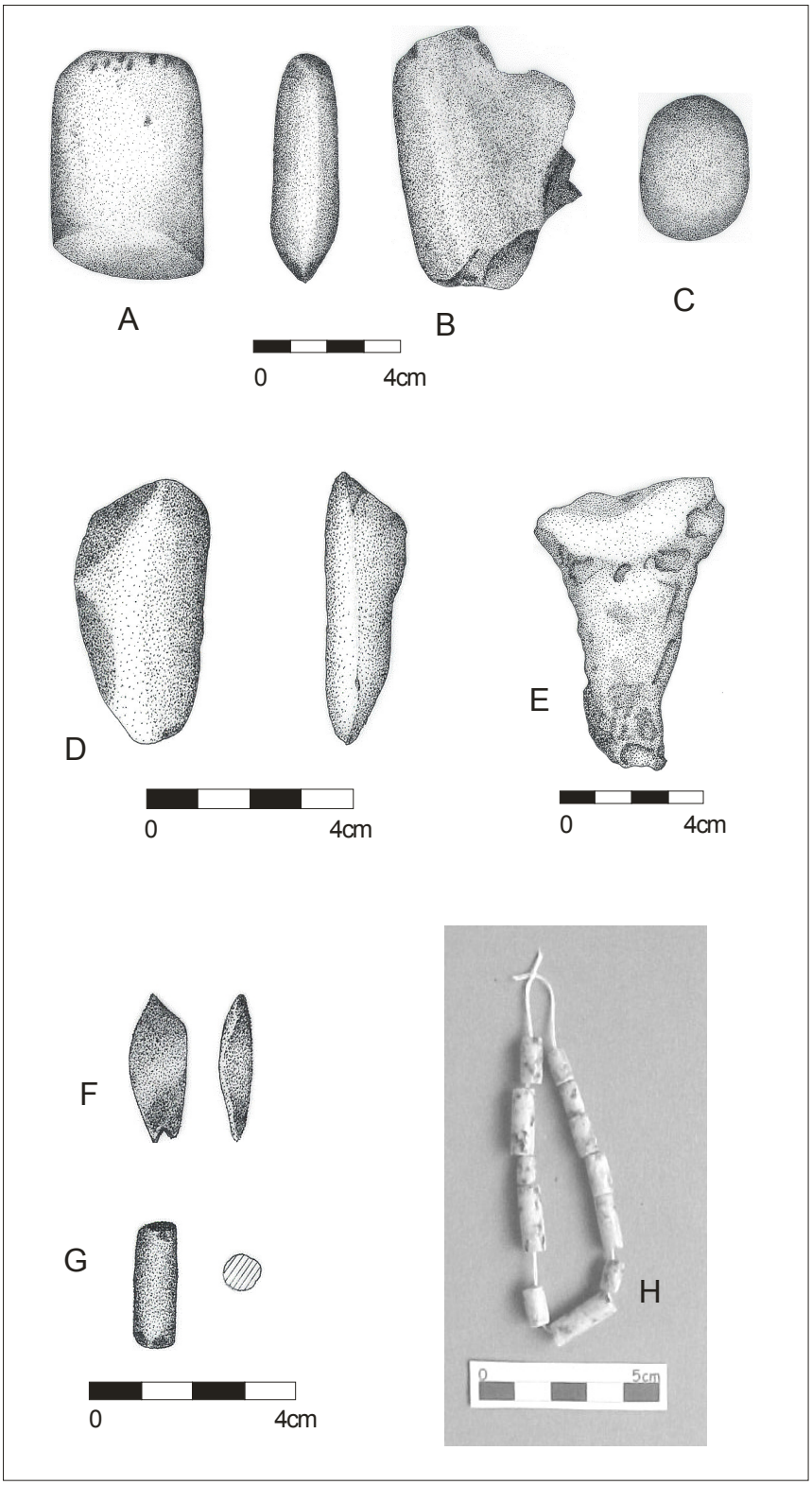


Figure 69 – M-17 lithic objects

As it was the case for M-1, M-17 stone artifacts were also trade items, supposedly highly valuable. Since no remains of stone tool production or raw materials were found at the site, it is evident that these objects were brought to the site as finished goods. The axe and beads found at M-17 are similar to those found at other Camutins mounds. For example, lithic beads found by Hilbert in one of the elite mounds he excavated in the upper Camutins River are similar to the ones found in M-17 (Meggers and Evans 1957:374). Several basalt axes from private collections, however, are larger than the ones found at M-17.

Chronology

The chronology of M-17 occupation is represented by three radiocarbon dates obtained from charcoal layers in excavation 3 and one radiocarbon date obtained from charred wood collected from the interior of burial 18. The dates are in Table 5.

Table 5 – Radiocarbon dates from M-17

Sample No. Level	Lab. No.	Conventional Radiocarbon Age	13C/12C Ratio	Calendar Age Range (2 Sigma Calibrated)
No.12 7.76 m	Beta 180942	1200 ± 60 BP	-25.0 o/oo	A.D. 680 to 980 (B.P. 1280 to 970)
No.106 6.76 m	Beta 179075	1250 ± 60 BP	-25.0 o/oo	A.D. 660 to 900 (B.P. 1290 to 1050)
No.75 5.96 m	Beta 185013	1190 ± 40 BP (AMS)	-27.3 o/oo	A.D. 720 to 740 (B.P. 1230 to 1210) AND A.D. 760 to 960 (B.P. 1190 to 990)
No. 179 (Urn 18)	Beta 188991	1060 ± 40 BP (AMS)	-25.9 o/oo	A.D. 900 to 1030 (B.P. 1060 to 920)

The dates suggest a time line of up to three hundred years for the upper three meters of deposits, depending on how the dates are interpreted. The fact that many of the layers in excavation 3 are thick silt strata with few artifacts indicate short episodes of construction and

favors the interpretation that 1.8 m of deposits (between 5.96 and 7.76 m levels) were built in one hundred years or less. In sites without intentional mound building, where the deposits result from natural refuse accumulation, 10-cm thick deposits may represent one hundred years (Smith 1980, see for example, dates and interpretation for Cacoal site, Chapter 4). The rate of construction at M-17 would indicate that every few years a layer of silt was added to the top of the mound.

The date of A.D. 900 – 1030 refers to one of the last burials. Urn 18 was found very close to urn 16. Urn 16 had its lid over the ground level when the site was abandoned, because the lid, when reconstructed, was above the present surface level. Urn 18 would have been buried after urn 16. This indicates that the date obtained for urn 18 also indicate the date for the abandonment of the site. If the site was abandoned at A.D. 1,000, M-1 was still inhabited.

SUMMARY AND DISCUSSION

Survey along the Igarapé dos Camutins located and mapped 34 mounds, distributed in three separate clusters along the river margins. Mound building was found to be related to a history of landscape management, including excavation of pools and ponds, as well as construction of dams and earthen causeways. Both local ecology and current *caboclo* subsistence strategies indicate the need for landscape management in order to guarantee water supplies and facilitate fishing. In this sense, aboriginal management is primarily understood as related to subsistence activities, particularly intensification of aquatic resource capture.

Data on mound size and location, together with the study of the relations between mounds and landscape features allow the construction of a model encompassing settlement rules and evolution. According to this model, the settlement displays clear hierarchical patterns, according to which elite rulers occupied mounds located at the lower river course, controlling the aquaculture system, and hosting ceremonies and feasting. Commoners lived upriver, in two clusters of mounds that outnumber the elite mounds. In the last mound cluster, smaller elite

mounds enclosed the settlement, indicating both expansions of the elite as well as the need to maintain control over the commoner's population.

Differential mound heights and sizes in the middle and upper Camutins River are believed to be a function of timing of expansion and antiquity of the settlements, instead of hierarchy. This is based on similarities of material culture and absence of other cultural features. This hypothesis, however, has not been verified, since none of those mounds were excavated. Location of settlements preferentially on one side of the river (east) was probably related to the location of spring water sources, proximity to the open campo, and ease of mobility between mounds.

The fact that elite mounds are located next to the largest fish pools in the settlement indicates both control over the economy and capacity of labor mobilization. In order to keep the system operating, seasonal labor was required, in order to remove sediments from the pools and built dams and removable fences. The study of M-1 and M-17 stratigraphy showed that major excavation of the pools were followed by innumerous episodes of maintenance, which were registered in the mounds by the accretion of thin layers of silt and prepared floors. Radiocarbon dates attest that the fish farming system was fully operating and that the ceremonial mounds were already monumental by A.D. 700.

Population figures were estimated on the basis of the mound's area, assuming that all the 34 mounds were inhabited at the same time. House size and number of occupants per house was estimated based on ethnographic analogy. Accordingly, the Camutins chiefdom would have a population of about 2,000 people. Although the fragility of such estimate is acknowledged, it is considered important in order to compare to other complex societies and be tested in future work.

M-1 and M-17, elite mounds located in front of each other in opposite sides of the river, were investigated through excavations. A more comprehensive study of activity areas was possible in M-17, which had preserved deposits. In both mounds, excavations gave the

opportunity of studying mound building features. The data showed that the mounds had similar structures, consisting of thick layers of silt resulted from the excavation of the pools, alternated with occupational layers with remains of charcoal and burnt clay surfaces which resulted from hearths. In peripheral areas of the mound, retaining walls built with sherds and clay prevented from erosion.

The data also showed differences between the two major mounds. Radiocarbon dates indicate that M-1 had platforms at different levels. M-17 had only one platform, on its top. A type of thick burnt clay surface identified in M-1 was not found in M-17. On the other hand, baked clay stoves identified in M-17 were absent in M-1. These differences, however, may be due to vagaries of sampling, as well as the fact that M-1 had been extensively looted.

Baked clay structures that have been interpreted as stoves and hearths in Roosevelt's research at Teso dos Bichos and Guajará mounds were also found in M-17. While the stoves identified at M-17 burial area are similar to the stoves found at Teso dos Bichos, the decayed baked clay structure found in M-17 excavation 3 is similar to the hearths found at Guajará. At M-17, differences between the two types of features likely relate to their function and context. At the same time, their differential state of preservation is informative about their function and location. For example, the well-preserved condition of stoves at the cemetery area can be credited to their ceremonial purpose. On the other hand, the two-ridge baked clay structure found at excavation 3, whose remains were along 30 cm of deposits, indicate constant use and rebuilding over several decades of use for cooking purposes.

On the other hand, discontinuous baked clay layers found at M-1 (excavation 2, profiles 1 and 4) and M-17 (excavation 3), as well as underneath burial urns in M-17 should be interpreted in different ways. Hard orange clay surfaces might have originated from open firings, while surfaces beneath urns might have been hardened for the solely purpose of supporting the burial. The investigation of these clayey structures is informative about their differential functions,

helping to identify spatial distribution of activity areas. At the same time, it may serve as a cautionary note against generalized interpretations of such features as cooking hearths, ignoring intrasite variability.

Data produced by the excavation of a cemetery area containing 24 burials in M-17, compared with data provided by Meggers and Evans (1957) research at M-1 does not give elements to infer about hierarchical relations between the two mounds. Burials display a range of differences in terms of urn size, decoration and associated items that most likely related to gender, age and status, not rank differences. Non-perishable items included just a few ceramic objects, which were most probably containers for food. Tangas and lithic objects may mark gender differences, although social status is also implied, since these objects are not included in all burials. The burial of a child with lithic beads and a basalt axe in M-17, for example, would not support the idea (due to the larger size of M-1) that elite of higher rank lived in M-1, since the placement of such valuable items with a child indicates enormous prestige. It is known that at least three nephrite pendants were excavated from M-1 (Instituto Banco Santos Collection). Thus the presence of beads at this M-17 burial is not compelling evidence that higher rank individuals lived at M-17 instead.

In the absence of clear hierarchical differences between M-1 and M-17 burials, it is possible to conclude that power was based on kinship lines and rank, without individual displays of power. In this sense, elite population was distributed in three mounds (M-16 included) in the lower river course, and settlement hierarchy (differences in mound size and height) may not be equated with rank distinctions, but with antiquity of the settlements.

Investigations at M-17 allowed some insights on the function of this elite mound. Cultural features such as prepared floors, cleaned surfaces, stoves, refuse disposal, and burials suggest the existence of a communal house and a mortuary temple on the top of the mound. Abundance of workshop waste in an area between the two hypothetical buildings indicates

pottery production at that location. Abundance of decorated pottery there and in the mortuary temple is also evidence for feasting and ceremonies.

Long-distance exchange items are represented by a few lithic tools, mostly basalt or microgabbro axes, which eventually broke and were reutilized. These objects were found either in burials or in the fill. The small number of specimens speaks about their rarity. The use in burials indicates that they were personal objects that likely signalized prestige and privileged access to exchange networks.

Radiocarbon dates indicate that the period investigated by this research spans from A.D. 700 to 1100, which covers the phase of major development of the fish-farming system. This is in accordance with the hypothesis proposed in Chapter 4, according to which the Marajoara III, or classic period, would be characterized by prosperity, multiplication of chiefdoms, and spread of a religious ideology throughout the Island. The abandonment of M-17 after a violent conflict (not dated) as well as the possibility that M-17 was abandoned while M-1 was still inhabited may indicate sociopolitical instability.

Chapter 6

PRODUCTION AND USE OF CERAMIC ARTIFACTS

POTTERY PRODUCTION

In describing and discussing Marajoara phase ceramics, Meggers and Evans (1957: 403) suggested that ceramic vessels and objects were produced by specialists. Their main arguments were the "uniformity in both rim and shape" exhibited by utilitarian vessels, the technical competence necessary to produce the ceremonial ceramics, and the frequent duplication of vessel types (same shape and decoration), despite some subtle differences. In fact, the spread of Marajoara ceramic style over a large area, replacing local industries, indicates the presence of two variables usually considered important in evaluating ceramic production: scale and competition (Feinman, et al. 1984).

Scale of production is closely related to demand. In this sense, larger societies tend to have more complex production systems, generating increasingly standardized final products (Rice 1987: 180-1). Standardization is expected to increase as workshops produce higher quantities in repeated episodes (DeBoer 1984). This standardization is not only a matter of specialized production, but also a consequence of a market economy. Although standardization is usually taken as indicating producer specialization (meaning the potter is a specialist), other variables have to be considered. Costin (1991:3) points out that specialization should not be defined by the appearance of the final product, but by the way the production is organized.

The ceremonial Marajoara pottery displays considerable local variation, indicating the existence of multiple centers of production. In this case, standardization may be rather explained by intensity of production (see Rice 1987: 190). Accordingly, although skilled potters do exist, pottery production is a seasonal activity, a time during which the number of potters and the

amount of time and resources allocated for pottery production may increase, resulting in larger number of vessels produced within more consistent patterns. Moreover, standardization may be a social or ideological requirement, regulated by a particular demand (Costin 1991:33; Hays 1993).

As another important variable, competition may stimulate the type of craftsmanship that is usually associated with part or full-time specialization. Highly elaborated ceramics can be produced in contexts of more intensive labor and energy expenditure by competitive potters (Feinman, et al. 1984). This competition may limit individual variation, since potters are required to produce within certain requirements, causing increasing standardization (Costin 1991: 34). On the other hand, potters would seek to improve their ceramics, not creating new forms, but embellishing and aiming to perfect the ones they are expected to produce. Whether this process causes either site or producer specialization is, however, a matter of investigation.

The investigation of pottery production in both M-1 and M-17 was focused upon identifying ceramic workshops in order to further evaluate mode and scale of production. Throughout this chapter, the study of distribution of pottery types, vessels and ceramic objects will also elucidate aspects of pottery consumption and distribution.

In order to infer about aspects of pottery production at the Camutins site, workshop related features were investigated at M-1 and M-17, while remains of pottery making activities were examined during laboratory analysis. The study produced the following evidence for pottery production:

1) *Raw Material* – Chunks and coils of worked clay were identified during laboratory analysis. The clay had been cleaned, worked, and prepared for use (Figure 70a).

2) *Unfinished Ceramic Artifacts* – In M-17, some fragments of poorly finished or unfinished vessels were found. In one example, coils had been superimposed, but not smoothed (Figure 70b). In another, a groove for the insertion of an appendage had been done, but the

appendage was not attached or had fallen off. In addition, several pieces of fired clay with finger marks were also found, indicating that clay was discarded during the process of vessel forming (through pinching, see Rye 1981:70), were eventually fired together with the vessels themselves (Figure 70c).

3) *Support for Vessel Forming* – A crude ceramic slab, whose fragments were found in M-1, is believed to have been used as a base for vessel forming (Figure 70d), as indicated by ethnographic and archaeological examples (Rivera-Casanovas 1994).

4) *Wasters* – Some vessels spall during firing, due to quickly temperature rise and sudden pressure exerted by vaporized moisture inside vessel walls. Even skilled potters cannot totally control temperature and prevent occasional breakage, particularly in situations of open firing (Rye 1981). Such accidents produce ceramic flakes that leave very distinctive signatures in manufacture sites. Since this type of debris would not be removed from the site, they indicate activities of firing not far from the place they are found. Abundant remains of vessels broken during firing were found in both M-1 and M-17 (Figures 70e and 70f).

5) *Kilns* – Open firing was the common procedure for ceramic production in prehistoric Amazonia (Lima 1986). Here, the absence of kilns favors this method. However, some enclosures could have been built in order to better control firing temperatures. For example, at M-1, a pit dug into a clay floor (Figure 35) is consistent with ethnographic examples of enclosures used for firing small pottery objects (see Rye 1981:99).

6) *Lithic Tools* – A fragmented axe found in M-1 is believed to have been used for burnishing vessels, as indicated by marks on its polished surface.

7) *Children's Toys* – When ceramics are produced in household settings, it is common that children engage in pottery production, modeling little animals and pots. Eventually, such artifacts are also fired, together with adult's products. Miniatures found in M-1 and small

modeled animals found in M-17 are suggestive of children's play (Figure 70 g, h; see also Figures 121 and 122).

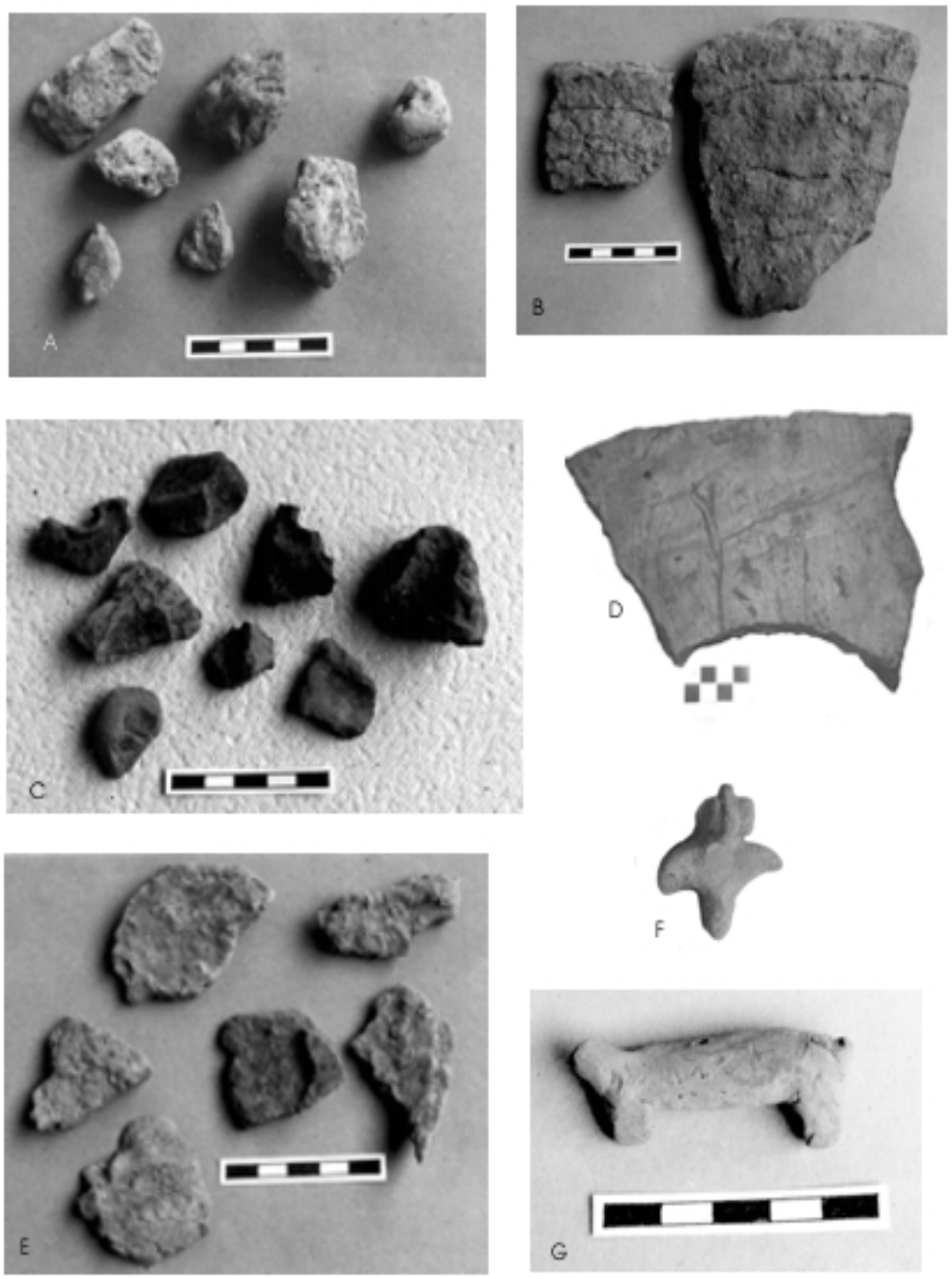


Figure 70 - Evidence for pottery production in M-1 and M-17

Remains of pottery making activities found in M-1 and M-17 indicate that ceramics were produced in both locations. In M-1, workshop waste account for 4.83% of the cultural remains found in excavation 2. In M-17, they comprise 4.67% of the artifacts found in all excavations (Table 15, Appendix A). There, workshop remains were abundant in excavations 1 and 3 (Figure 71). In particular, the overwhelming presence of workshop remains found in excavation 1 (area between the house and the mortuary temple) suggests that vessels were formed and possibly fired there. The high proportions of remains found inside the house (excavation 3) suggest that some activity was also carried out there, perhaps when the weather did not permit outside work

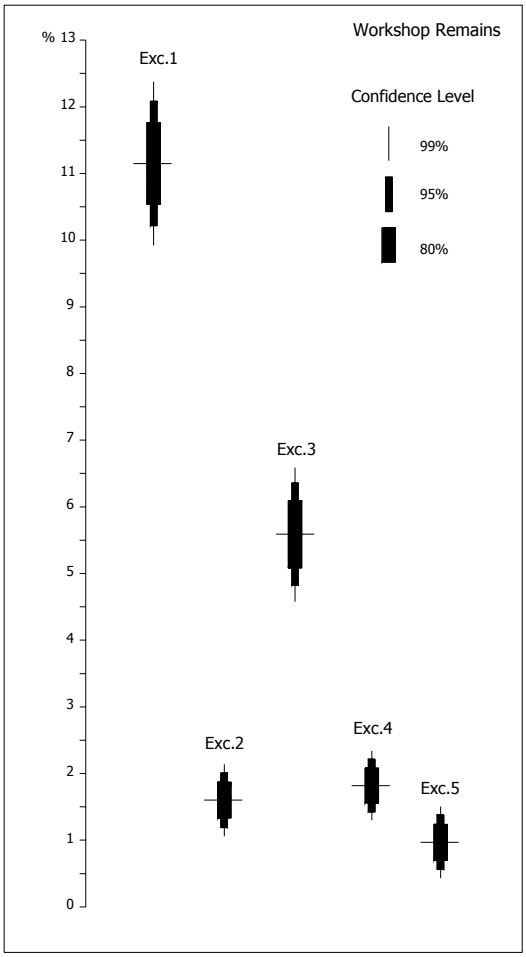


Figure 71 – Comparison of M-17 areas with respect to workshop remains

The bullet graphs (Figure 71) show the relative proportions of pottery production remains, with their attached error ranges and associated probability between excavated areas. Differences observed between excavation 1 and 3 on one side and the other excavations are highly significant.

Deposits of clay were identified south of M-17, along the river margins and in the excavated pools. A soil probe in pool 1 (Figure 23) identified a clay substratum at a depth of 0.5 to 1 m below surface. Clay samples were collected, cleaned of debris, and used by potters Déo Almeida e Sinéia Santos to replicate archaeological pottery using aboriginal techniques.

The clay was mixed with crushed sherds and vessels were formed by modeling and coiling. Some of the vessels received slip. The vessels dried for four days, after which they were fired. Due to the potters limited experience with open firing (they use professional kilns), most of the vessels spalled during firing. However, the results allowed for some insights with respect to pottery production in the site. The clay collected proved to be suited for pottery production. Its high ferrous content is responsible for the bright orange color characteristic of the Camutins Plain type. Gray colored clay, collected in the same place, was used for slipping. The resultant color was a light gray to white color, similar to some slipped fragments identified at M-17.

The experiment was performed in September, in dry conditions. Even so, the vessels were allowed to dry for several days before being ready for firing. Due to the constant winds during the summer, firing had to take place during the night, before the sunrise. Given the high humidity year round and the constant rains during the winter months, most of the pottery production in prehistoric times was likely performed during the summer months.

In sum, the results of the investigations suggest that both domestic and ceremonial ceramics were produced in M-1 and M-17, probably for local consumption. Possibly some domestic and ceremonial ceramics were traded, and skilled potters may have been involved in producing special kinds of artifacts. However, ceramic production in the Camutins site was not a "specialized production" in the meaning that the term usually has. Differences in ceramic styles

and vessel forms, even within Camutins mounds, as shown later in this Chapter, suggest that ceramics were not regionally distributed from a center of production. The presence of children's toys and the variability within the assemblage, discussed below, suggest, otherwise, that ceramics were produced in household contexts.

POTTERY ANALYSIS

Objectives

The analysis of ceramic artifacts aimed at characterizing both the M-1 and M-17 assemblages in terms of vessel types and ceramic objects. The range of ceramic artifacts identified and their relative proportions would determine which activities (involving food production, storage and feasting) were carried out in each mound. The larger size of M-1 could imply a higher position in terms of hierarchy. However similarities between the two mounds in terms of funerary practices and cultural features were not conclusive about a hierarchy between the two. For this reason, artifact assemblages could shed light on this question and finally determine whether differences in activities carried out in each mound could indicate hierarchical relations. Particularly regarding M-17 assemblage, the analysis also intended to characterize the use of ceramic vessels and objects in both temporal and spatial dimensions, in order to infer about changes in intrasite spatial organization and activities (domestic and ceremonial) through time.

Methodology

The ceramic analysis was conducted on all of the fragments collected from M-17 excavations 1, 2, and 3, M-1 profile 1 and excavation 2, and M-16 surface collection, as well as on selected samples of M-17 excavation 5 and M-1 surface collection. A stratified random sample from M-17 excavation 5 was selected due to the large size of that assemblage. Fragments

from M-17 excavation 6, and M-1 profiles 2, 3 and 4, and excavations 1 and 3 were not analyzed. The selected assemblages from M-1 and M-17 resulted in a total of 20,842 sherds, weighing about 610 kg.

Sherds were analyzed having in mind that they were part of a larger entity (vessel or object) which assessment and description was the ultimate objective (Raymond 1995). The sherds were sorted according to type of vessel or object (when the identification was possible), temper, decoration, and wall thickness. In general, fragments of objects such as stools, figurines, spindle whorls, tangas and funerary urns could be easily recognized and separate for special classification. In order to compare the assemblages with earlier data available for other Camutins mounds, the typology used by Meggers and Evans (1957: 324-71) was incorporated into the classification.

Rim and base sherds were selected for vessel reconstruction when their size allowed for the measurement of angle and diameter. The reconstruction of forms was primarily based on entire vessels found at the same mounds. When fragments were too small and a whole specimen was not available, vessels from museum collections, particularly those originated from the Camutins mounds (including collections in São Paulo and Belém, as well as vessels depicted in Palmatary 1950 and Meggers and Evans 1957) were used as models. The reconstructed vessels were classified according to shape and decoration, which resulted on a typology of vessels. Using ethnographic analogy, the vessel types were grouped into three categories: food-processing vessels, serving vessels, and containers for liquids and storage.

A stratified random sample of 977 rim sherds (166 from M-1 and 811 from M-17) was analyzed for the definition and classification into vessel types. They represent about 70% of all the rim sherds that composed the assemblage. Comparison between M-1 and M-17 assemblages was based both on qualitative and quantitative data.

Classification of Ceramic Sherds

Meggers and Evans' Typology

The classification of Marajoara ceramics is a very complex task, due to the variety of decorative techniques employed and the wide range of vessel shapes involved. Many vessels are decorated with one technique on the inside and another one on the outside; moreover, decoration may vary according to the area of the vessel. For example, a plate may have red painted designs on the white slipped interior surface and excised decoration on the outside red slipped surface, while the rim is decorated with incised lines.

Meggers and Evans (1957: 324-325) faced the problem basing the classification of the decorated sherds on a hierarchy among the decorative techniques, giving priority to the more complex. They defined 14 decorated types that basically describe 14 different decorative techniques. They are: Anajás Double-Slipped Incised, Anajás Plain Incised, Anajás Red Incised, Anajás White Incised, Arari Double-Slipped Excised, Arari Plain Excised, Arari Red Excised, Arari Red Excised White-Retouched, Arari White Excised, Carmelo Red, Goiapi Scraped, Guajará Incised, Joanes Painted, and Pacoval Incised.

These decorative techniques involve slip, painting, incision, excision, and scraping. Most of them are self-explanatory. For example, incision and excision may be applied over white, red or double (red and white) slip, producing the types Anajás Plain Incised, Anajás Red Incised, Arari Plain Excised, Arari White Excised and so on. When incised or excised designs are made over a slipped surface, typically the underlying paste or slip (in the case of the double slip) is revealed, contrasting with the overlying color. In the case of Pacoval Incised, thin and wide incisions are first made on a white slipped surface. After that, the wider incisions are retouched with red paint, which differentiates this type from the non-retouched Anajás White Incised.

Other peculiarities of the decorative techniques were solved by creating the Carmelo Red and the Guajará Incised types. Carmelo Red refers to a vessel that received a very thin red slip, almost a wash, which distinguishes it from the red slip of the incised and excised types (Meggers and Evans 1957: 353). Guajará Incised defines a decorative technique that consists of incisions made with a double pointed tool, frequently producing straight parallel lines, forming triangles and repetitive patterns that may also include curves (ibid.:356). Therefore, although both Anajás Plain Incised and Guajará Incised refer to incised decoration and the absence of slip, Guajará Incised vessels have the double pointed tool designs, while Anajás Plain Incised refers to all other types of incised designs.

In order to account for sherds of plain vessels, which comprised the majority of the assemblages, Meggers and Evans (1957: 348-9, 358-9) defined two non-decorated types (Camutins Plain and Inajá Plain), mainly on the basis of the core color, although some subtle differences in coils size, ground sherd particles and tensile strength are also mentioned in the description of the paste. Accordingly, Camutins plain exhibits a uniform orange or reddish-orange color, which could have been produced by total oxidation due to open firing. Inajá plain, on the other hand, is characterized by a gray core, varying from a thin section to about 90% of the cross section, being the steel gray the typical color (ibid.: 359). This color is believed to result from an incomplete oxidizing firing. Both types of paste are used independent of vessel shapes. Although some modeled decoration was identified on plain vessels, especially in the form of nubbins on everted rims, as well as anthropomorphic and zoomorphic appendages, these features were left out of the classification, since they may occur together with several of the decorative types.

Marajoara ceramics are tempered with ground potsherds (grog), and the two plain types also define two different types of paste that can be found in all decorative types. For example, Anajás White Incised describes a white-incised decorated vessel which has either Camutins Plain

or Inajá Plain paste. Therefore, to the extent this typology is concerned, there is no correlation between decorative technique and paste, or between vessel shape and paste.

Due to the higher occurrence of plain types in the assemblages, and the low proportions of decorative types, the basic difference in core color was used by Meggers and Evans to define relative chronologies. According to their data, the relative proportions of Camutins Plain and Inajá Plain sherds would vary through time. Inajá Plain sherds were found to be more frequent in lower deposits; Camutins Plain sherds, on the other hand, would gradually prevail, being more popular in upper deposits. Differences in proportions of plain types were then used to establish relative chronology between sites (see Chapter 3).

System of Classification Used in This Research

The typology created by Meggers and Evans was incorporated into a system of classification that involved also other variables such as temper, wall thickness and artifact shape. Marajoara pottery is mostly produced with grog tempered clay, but a few sherds tempered with the crushed ashes of a tree bark known as "caraipé" (*Licania scabra*) (Carneiro 1974) and a combination of grog and caraipé are also found. Research conducted in sites located along the Anajás River (see Chapter 4) indicates that the use of caraipé as temper material has chronological significance. It is introduced to the Island around A.D. 500, and the increase of its use might have followed the increasing popularity of this material in the Amazon Basin towards the end of the first millennium, associated with polychrome ceramics.

In the middle Anajás River caraipé tempered ceramics tend to replace the grog tempered ceramics, even within assemblages where the Marajoara style predominates. The occurrence of a similar trend was initially hypothesized for the Camutins mounds as well. Sherds were therefore sorted according to temper material, before further classification into plain and decorated types.

Sherds of artifacts such as stools, tangas, spindle whorls, and figurines were not included among the general population of sherds. Stools were classified according to temper, decoration and seat diameter (small ≤ 16 cm, medium ≈ 18 cm, and large ≥ 22 cm). Tangas were classified according to decoration into Red Slipped and Painted (or Joanes Painted, according to Meggers and Evans typology). Spindle whorls were classified according to decoration (Plain Incised, Red Incised and Punctuated). Figurines were classified according to decoration and height (small ≤ 10 cm, medium from 13 to 15 cm, large ≥ 16 cm).

The remaining sherds were classified according to temper (grog, caraipé, grog and caraipé combined), decoration (according to the types defined by Meggers and Evans), and wall thickness. White Slip alone was considered as a decorated type. In the previous systems of classification, white slip was considered Joanes Painted, since in many cases the post-fired red or black paint does not resist post-depositional processes. In this system of classification, Joanes Painted was only used to classify sherds that had painted designs over the white slipped surface. For those sherds where only the white slip was visible, "White Slip" was used to describe a decorative type.

The decorative types described by Meggers and Evans are used in a simplified form in the present system of classification. Part of the types' names, such as "Arari" and "Anajás" were abandoned. For example, "Arari White Excised" will be referred to as "White Excised". The system of hierarchy of types was abandoned as well. For example, a plate exteriorly decorated with excisions and interiorly white slipped, which would be classified as "Arari Plain Excised" in Meggers and Evans system, here is called "White Slip/Plain Excised". When two decorative techniques are mentioned, as in this case, the first one describes the interior decoration, while the second one describes the exterior decoration.

Thickness was defined as thin (less than 5 mm), medium (between 5 and 9 mm) and thick (more than 10 mm). These three categories were established based on a stem-and-leaf plot distribution of wall thickness measurements obtained from a random sample of 120 sherds.

Plain sherds tempered with either grog or a combination of grog and caraipé were sorted according to core color into Camutins Plain (orange core) and Inajá Plain (gray core) types. Caraipé tempered sherds were not sorted according to core color, because they typically exhibit a gray core, with many hue variations. Therefore, all caraipé tempered plain sherds were defined as Caraipé Plain.

When the analysis was underway, an important difference among the grog tempered plain sherds was noticed, which had not been incorporated into either system of classification. A large number of thick sherds exhibited a rough, grainy surface, resulting from coarse, heavily tempered, porous paste, and hand-smoothing outside walls. The inside walls, on the other hand, were in general smooth. These sherds had both gray and orange core colors, despite their common overall appearance. The great majority of these thick, roughly finished sherds belong to the same type of vessel. Meggers and Evans (1957:349) have indicated these as the predominant vessel shape in the Camutins mounds. They describe the vessels as "large, deep bowls, with flat bottom, outcurving and upcurving sides, ending in a direct, vertical or slightly curving rim". Herein this vessel was named Vessel Type I.

QUANTITATIVE ANALYSIS: POTTERY TYPES

Distribution of Pottery Types in M-1

A sample from surface collections (196 fragments) and all the sherds from excavation 2 (2,661 fragments) and profile 1 (171 fragments) were selected for analysis.

From the 171 fragments produced by profile 1, 122 fragments were grog tempered and 10 fragments were caraipé / grog tempered. The caraipé / grog tempered fragments consisted mostly of decorated sherds (only one plain), and seven of the fragments belonged to a single small vessel, internally decorated with white slip and externally with excised designs. The classification of the grog tempered sherds into plain and decorated types is shown on Table 16 (Appendix A). The decorated types, which comprise 22.13 % of the assemblage (Table 17), are White Slip, Red Slip, Plain Incised, Plain Excised, Red Excised and Scraped. Camutins and Inajá Plain sherds occur in similar proportions. However, thick walled vessels, which comprise about 50 % of the total, have Camutins Plain paste.

A random sample was selected from artifacts collected from M-1's surface, comprising 196 fragments. From these, 159 were grog tempered, 2 caraipé tempered, 6 were grog / caraipé tempered, 26 were fragments of tangas, 2 were fragments of stools and 1 was a workshop waste. Among the grog tempered ceramics the decorated types identified were White Slip, Red Slip, Plain Incised, Plain Excised, Red Excised, Scraped, Double Slip, Pacoval Incised, and Joanes Painted (Urn fragments) (Table 18). Decorated sherds comprise 38.36 % of the sample, and 15.09 % of the sample are of funerary urns fragments (Table 19). All the decorated are 45.19 % of the sample. This high proportion of decorated sherds is credited to the fact that the surface collection is skewed towards decorated types and funerary urn fragments due to looting.

Inajá and Camutins Plain sherds are present in similar proportions. Table 19 shows that plain vessels and funerary urns tend to have thick walls, while decorated sherds have both thick

and medium walls in similar proportions. The overall percentage of thin walled vessels is low and there are two times more thick walled than medium walled vessels in the total. This reflects that the majority of the sherds come from thick, large domestic vessels and funerary urns.

Excavation 2 produced sherds collected from 15 different strata, for a total of 2,796 fragments. From these, 4.83 % were remains of ceramic production. Tangas comprised 2.61 % of the fragments, and fragments of Joanes Painted urns were insignificant. Excluding tangas and workshop waste, the total was 2605 fragments. From these, 50.6 % were Camutins Plain, 33.8 % were Inajá Plain, 6.9 % were grog and caraipé tempered, and 0.5 % were caraipé tempered alone (Table 20).

Decorated sherds, which comprise 8.21% of the assemblage, are typically medium and thin walled vessels. Plain vessels, conversely, comprised 91.79 % of the assemblage, and have thick and medium thickness walls (Table 21).

When sorted by stratum, the proportions of decorated sherds are very small (Table 22). The decorated types identified are White Slipped, Red Slipped, Plain Incised, Plain Excised, Red Excised, Scraped, Guajará Incised, and Joanes Painted. The caraipé tempered pottery was present in insignificant amounts in 5 levels, especially in the upper levels, so they might have a temporal significance at M-1 as it was initially hypothesized. The grog tempered, plain ceramics, is predominant throughout the excavation.

With respect to the relation between Inajá and Camutins plain types, their relative frequency per stratum show some abrupt fluctuations, in part due to the small sample size of some of the strata (Table 22). In any case, if we exclude from the table levels with less then 100 fragments (strata I, V and VI, IX to XI), it is possible to affirm that Camutins Plain tends to be more frequent than Inajá Plain throughout the sequence. Therefore, at least to the extent that this particular excavation is concerned, the relative proportions of Camutins and Inajá Plain types do not show temporal significance.

Distribution of Pottery Types in M-17

All sherds collected in excavations 1 through 4, as well as a stratified random sample of sherds from excavation 5 were selected for analysis. Excluding from the count fragments of tangas and other ceramic objects such as stools, figurines, spindle whorls (discussed later in this chapter), the total assemblage consisted of 15,926 sherds.

Excavation 1 (central, open area, top of the mound) yielded a total of 3,219 sherds. From these, 82.26% belonged to plain types and 17.74% to decorated types (Table 23). Grog tempered sherds largely predominate; the percentages of both plain and decorated sherds tempered with caraipé or with a combination of grog and caraipé are less than 1%. Between the grog tempered plain types, Camutins Plain predominates with 44.8% against 36.19% of Inajá Plain. Grog tempered decorated sherds comprise 11 different types, among which the most popular are White Slip (6.55%), Plain Excised (3.91%), Scraped (1.86%) and Joanes Painted (1.4%). All the other types are present in frequencies lower than 1% each.

Excavation 2 (peripheral area, lower elevation), produced a total of 3,411 sherds, from which 90% belonged to plain types. Caraipé plain sherds are 3% of the assemblage, while grog and caraipé plain are less than 1% (Table 24). Contrary to excavation 1, Inajá Plain sherds predominate with 46.12%, while Camutins Plain is 40.81%. This is the only excavation in which Inajá Plain sherds are more frequent. Since Excavation 2 deposits are older than other deposits, due to its lower elevation, the predominance of Inajá Plain sherds could be explained by its temporal significance, if Meggers and Evans' hypothesis is correct.

In excavation 2, caraipé decorated sherds appear in very low proportions (0.24%). Among the grog tempered decorated sherds, 13 types were identified. The most frequent are White Slipped (5.57%), Red Slipped (1.38%) and Joanes Painted (0.67%).

Excavation 3, which comprised well-stratified deposits related to mound construction and occupational layers, yielded a total of 3,514 sherds. Plain sherds comprise 84.86% of the assemblage (Table 25). Plain sherds tempered either with caraipé or with a combination of both temper materials make 3.59%. Among the grog tempered sherds, Inajá Plain is more frequent than Camutins Plain (respectively 41.55% and 39.76%). When organized by level and stratum (Table 26), the relative proportions of Camutins and Inajá Plain show fluctuations through time, so there is not a clear trend in the relative proportions of the two plain types.

Grog decorated sherds in excavation 3 occur in 13 different types, of which White Slipped (4.27%), Red Slipped (3.18%), Scraped (2.28%) and Plain Excised (1.71%) are the most frequent types. Other decorated types occur with frequencies lower than 1% (Table 25).

Excavation 4 yielded a total of 3,645 sherds. For the purposes of this analysis, the results are organized in two different tables. In Table 27, there are the results for the classification of the 2,402 sherds that were found in *terra preta* deposits, interpreted as refuse midden. In Table 28, the 1,243 sherds collected from stratified, intact deposits from the same excavation are organized into types.

Plain type sherds comprise 82.26% of the sherds in the garbage fill. Among the grog tempered plain sherds, Camutins Plain is more frequent, with 43.84%, while Inajá Plain occurs with 37.18%. Sherds tempered with caraipé or a combination of grog and caraipé are less than 2%. Among grog tempered decorated sherds, 16 different types are present. The most frequent are White Slipped (8.37%), Joanes Painted (3.04%), Red Slipped (1.59%), Plain Excised (1.29%) and Scraped (1.21%). Other types are less than 1% frequent.

In excavation 4 stratified deposits, plain sherds are 82.39% of the assemblage (Table 28). Caraipé plain sherds occur here in their highest proportions in the whole mound, with 4.51%. Since this is the second highest area of the mound, here the use of caraipé may have temporal significance. Among the grog tempered sherds Camutins Plain (40.79%) is more frequent than

Inajá Plain (37.01%). Among the grog tempered decorated sherds there are 12 different types. The most popular are White Slipped (7.08 %), Red Slipped (3.38%), Plain Excised (1.77%), Joanes Painted (1.37%) and Scraped (1.37%). All other decorated types are less than 1%. Both sections of excavation 4 are very similar in terms of relative proportions of plain and decorated pottery types. Some differences, however, are noticed, such as the occurrence of a higher number of pottery types in the refuse disposal, as well as the greater proportions of Joanes Painted type in there, while greater proportions of Red Slipped type are present in the more intact deposits of the mound top.

Excavation 5 (burial area) produced a total of 2,133 sherds, from which 306 were fragments of funerary urns, which were excluded from Table 29. If fragments of urns are included, plain sherds are 55.09% and decorated sherds are 44.91%, clearly skewing the results towards decorated sherds. Even without counting the urn fragments collected in the fill during the excavation, decorated sherds comprise 35.83% of the assemblage, a proportion considerably higher than in the other excavations. Among the plain types, caraipé plain is 0.49%, while grog and caraipé are 2.29%. Camutins Plain (35.55%) is more frequent than Inajá Plain (25.4%). This again confirms Meggers and Evans proposition that Camutins plain is more predominant in late deposits, since excavation 5 represents the very upper 90 cm of deposits of the highest area of the mound. In this excavation there are several caraipé and grog and caraipé decorated types represented, contrary to the other excavations. They are represented only by a few sherds; however, this shows a greater variability of pottery types if compared to other areas of the site. Among the grog tempered decorated sherds, 13 types were identified; the most frequent are White Slipped (17.37%), Joanes Painted (8.68%), Plain Excised (1.97%), Plain Incised (1.8%), and Red Slipped (1.53%).

Conclusions from M-17 Data

Considering the data described above, it is possible to conclude that:

1) All excavations but excavation 5 have proportions of plain pottery sherds between 82 and 90%, indicating that most of the activities performed in the mound were related to domestic, daily activities. The higher proportion of decorated types in excavation 5 is due to the fact that most of the ceremonial activities were performed in this area of the site. These activities were related to funerary rites.

2) Caraipé Plain sherds are poorly represented, with the exception of excavation 4 well-preserved deposits, where it accounts for 4.5% of the plain sherds. Although this percentage is still low, it may indicate that caraipé, occasionally used in the site (it was present even in lower levels) could have become more popular towards the end of the occupation.

3) Proportions of Camutins and Inajá Plain types are similar, but Camutins Plain predominates in Excavations 1, 4 and 5. It is possible that the predominance of Inajá Plain in Excavations 2 and 3 is related to the antiquity of those deposits. The trend of increasing popularity of Camutins Plain sherds would follow Meggers and Evans' predictions.

4) Grog tempered decorated ceramics in every excavation occur in 12 to 16 different types. The more frequent is White Slipped, followed by Joanes Painted, Plain Excised, Red Slipped and Scraped. The other types typically appear in proportions lower than one percent. Some rare types such as Pacoval Incised, for example, which is a popular type in sites located east of the Arari Lake (Meggers and Evans, 1957: 387) may be object of trade. It appears only in excavations 2 and 3, where it may have temporal significance (e.g. it is present in earlier deposits).

The proportions of decorated sherds per excavated areas with attached error ranges and associated probabilities are shown on Figure 72. The differences in proportions of decorated

sherds between areas of the mound are highly significant and can be credited to spatial distribution of activities (use and discard of ceramic objects).

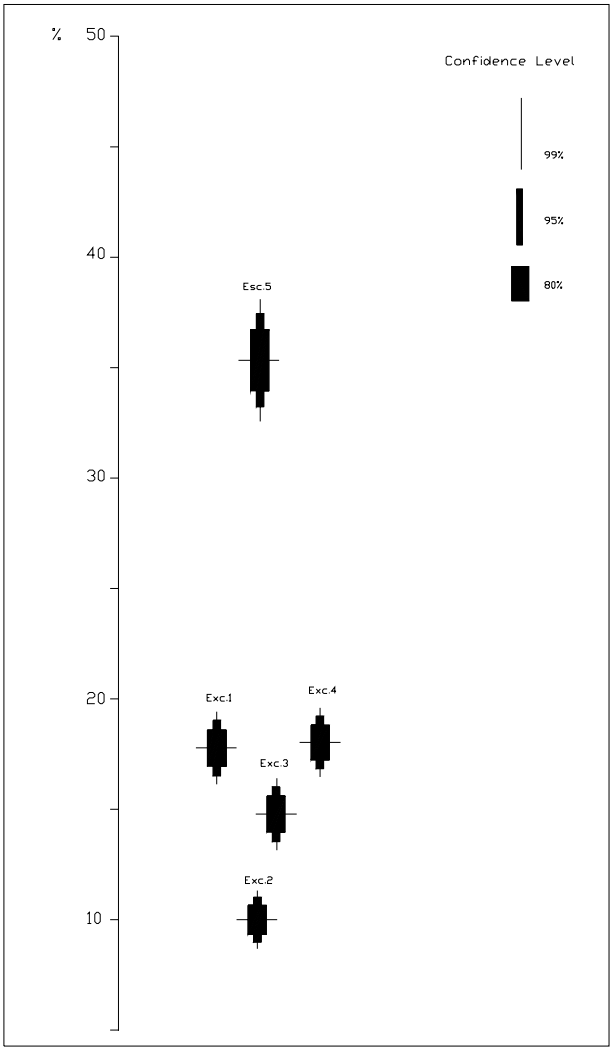


Figure 72 – Frequencies of decorated types in M-17

Comparing M-1 and M-17

In examining differences in proportions of pottery types between excavated areas, it was observed that there is important variability, even within the same mound. This variability is credited to spatial distribution of activities and corresponding distribution of discarded materials. Similar variability may also be present when areas of two different mounds are compared, as it is the case here.

On Table 30, the relative proportions of plain and decorated types are organized per mound and per excavation, in order to evaluate the distribution of pottery types between M-1 and M-17. Based on the data on Table 30, it is possible to affirm that:

1) M-1 has higher proportions of plain types than M-17, which may indicate that certain activities related to food-processing were more frequent in M-1 than in M-17.

2) Conversely, proportions of decorated types are higher in M-17. That is true despite the fact that M-1 has in its assemblage sherds from surface collections, which are skewed towards decorated types. Moreover, a number of funerary urn sherds were excluded from the count of M-17's excavation 5. Comparing, for example, M-1's excavation 2 and M-17's excavation 3, which have similar stratigraphy, M-17 still has higher proportions of decorated types. Even the area of M-17 with less decorated types, excavation 2, has higher proportions than M-1's excavation 2.

3) The use of caraipé or a combination of caraipé and grog as temper material is more common in M-1 than in M-17. It may indicate that either caraipé tempered vessels were object of trade, or that they were, for example, produced only in M-1.

4) There is more variability of decorated types in M-17 than in M-1. Eleven decorated types were identified in M-1, while the same types and other eight (or combination of) types were identified in M-17, although in very small proportions.

Although within site variability has to be considered, both assemblages were subjected to similar kinds of bias. One variable that has to be considered, however, is the fact that M-17 assemblage was more diverse than M-1's, because a larger number of areas are represented in the sample.

VESSEL TYPES

Vessel assemblages from M-1 and M-17 were compared based on the reconstruction of vessel forms accomplished with the analysis of 166 rim sherds from M-1 and 811 rim sherds from M-17. A total of 28 different vessel types were identified and classified into three broad categories: (1) Food Processing Vessels (8 vessel types); (2) Serving Vessels (10 vessel types); and (3) Containers for Liquids and Storage (10 vessel types).

These categories were established based on vessel shape and ethnographic analogy. However, it is known that vessels may have multiple uses. The classification, therefore, does not intend to establish functional types, but to provide a framework for comparison and evaluation of types of activities carried out on each mound.

Food processing vessels are those vessels used both for cooking and other food processing activities, such as grinding, grilling, soaking, and grating. These vessels typically have no decoration, although nubbins, some scraping and crude incisions may be present. Decorated vessels were considered serving vessels. Containers and storage vessels are deep, restricted vessels and jars, both with and without decoration. Their shape and volume capacity suggests their use for drinking, carrying and storing water and beverages, as well as for storing dry foodstuffs.

In part due to its larger size, M-17 sample produced a greater variety of vessel types. For comparative purposes, vessel types from both mounds were grouped into the same system of classification (Figures 73, 74 and 75), even though some variation was present.

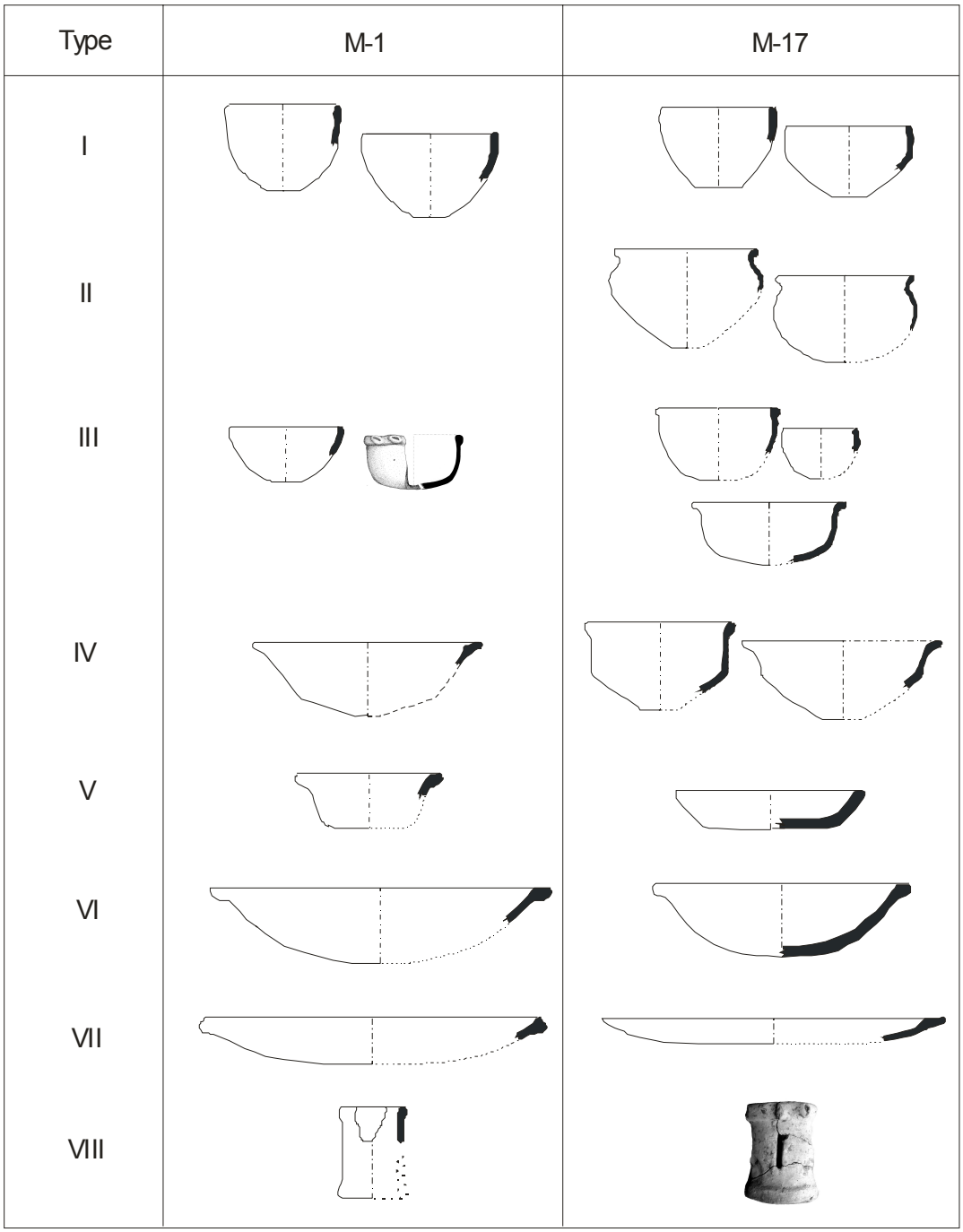


Figure 73 – Food processing vessels

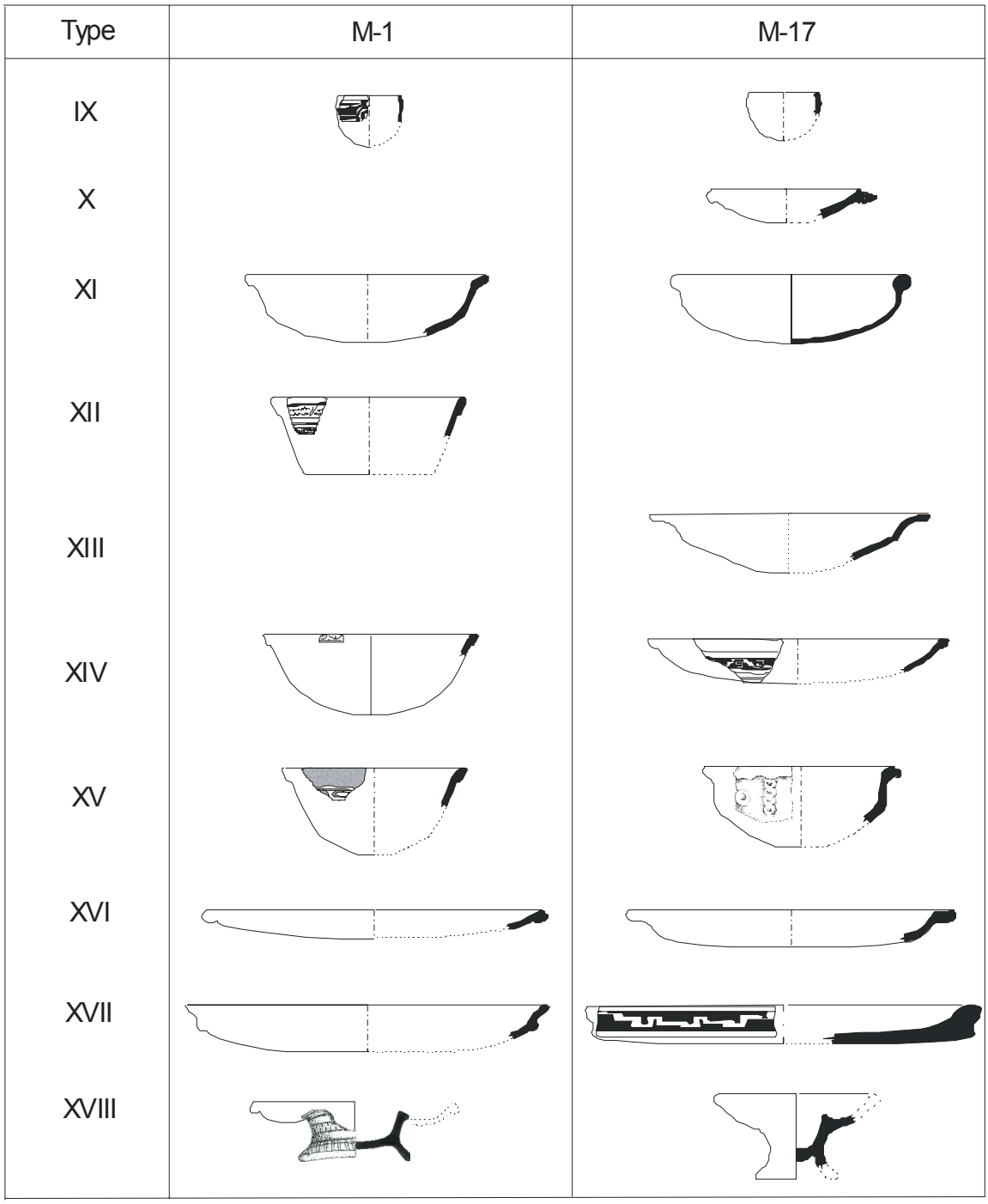


Figure 74 - Serving vessels

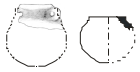
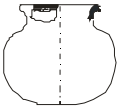
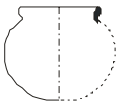
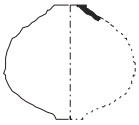
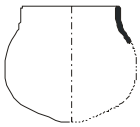
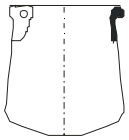
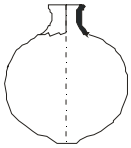
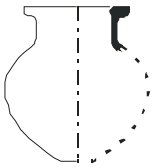
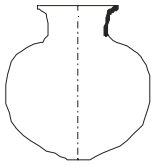
Type	M-1	M-17
XIX		
XX		
XXI		
XXII		
XXIII		
XXIV		
XXV		
XXVI		
XXVII		
XXVIII		

Figure 75 - Containers for drinking and storage

Description of Vessel Types

Food Processing Vessels

Type I

Unrestricted deep bowls with a flat, thick base, walls sloping outward to minor carination and then upward to direct or slightly incurving rim. Variations include more marked carination. Rims are slightly thickened, and lips are commonly rounded. Exterior surface is grainy, roughly finished, showing the coarse, poorly mixed paste. In four examples from M-17 the exterior was scraped. Surface color is more often orange, although core color is either orange or gray, following the patterns for Camutins and Inajá Plain paste. Interior surface is smooth, usually the result of the application of a thin slip of the same color as the paste. Walls are thick and increase the width towards the base, which may be 3 cm thick (Figures 76 and 77).

Rim diameter: Ranges from 20 to 42 cm (median 31 cm) in M-1 sample and from 16 to 44 cm (median 27 cm) in M-17 sample. Outliers include some small vessels with diameters varying from 8 to 12 cm.

Body wall thickness: Ranges from 0.75 to 2 cm (median 1.4 cm) in M-1 sample and from 0.6 to 2.7 cm (median 1.4 cm) in M-17 sample.

No correlation was found between paste (Inajá or Camutins Plain) and any of the other variables, such as location (site, excavation, level), shape, rim diameter and wall thickness.

Thick walls and heavily tempered paste are responsible for making this a heavy vessel. Carelessness of finishing indicates utilitarian purposes, while the sturdy base suggests need for stability. Ethnographic analogy suggests this type of vessel may have been used as a mortar, used to process starch or pound up *maniva* (manioc leaves) (Roth 1929: 217).

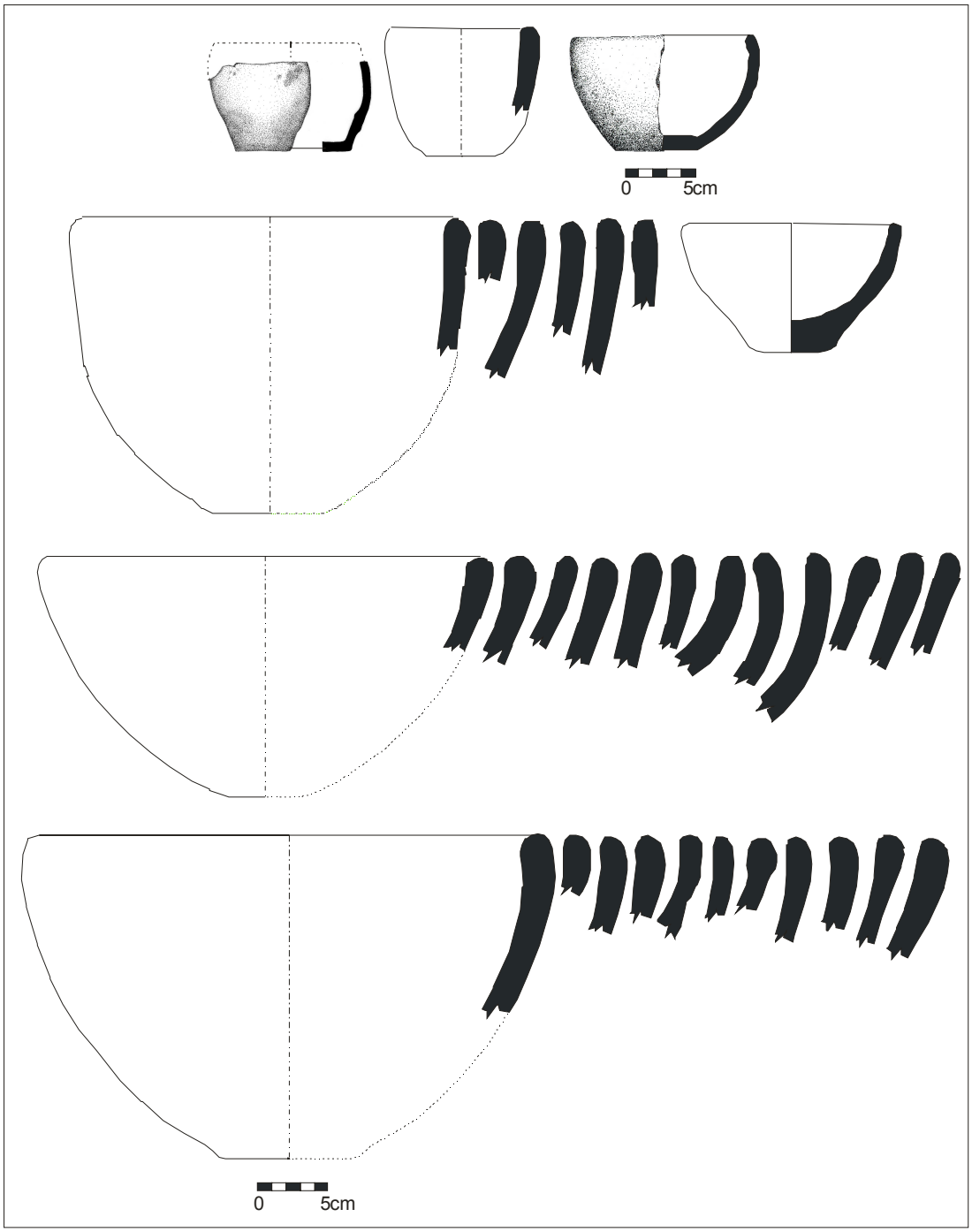


Figure 76 – M-1 vessel type I

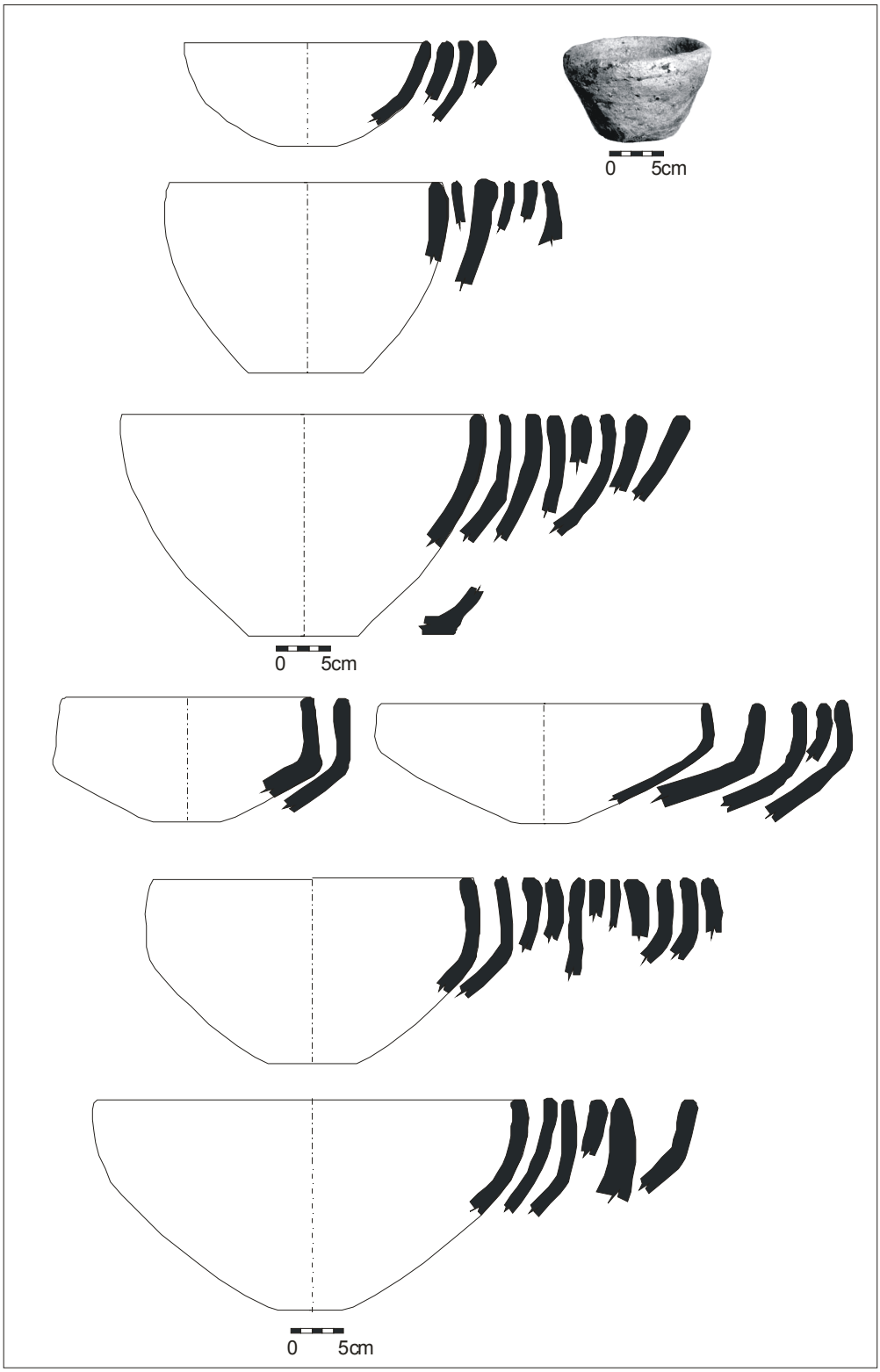


Figure 77 – M-17 vessel type I

Type II

Flat or rounded-bottomed vessel, with globular body, constricted mouth and everted rim. Variations include vessels with upcurving walls and pronounced shoulder, constricted mouth, and everted rim (Figure 78). Some rims are decorated with coffee-bean shaped nubbins. Paste is grog tempered; two thirds of the sample was Inajá Plain. Two of the sherds belonged to Guajará Incised and Scraped types and the remaining to Camutins Plain. The differential frequency of types may be a product of vagaries of sampling, due to the small sample size. No sherds of this type were present in M-1 assemblage.

Rim diameter: Ranges from 18 to 44 cm (median 28 cm).

Body wall thickness: Ranges from 0.4 to 1 cm (median 0.6 cm).

Ethnographic analogy suggests that this vessel could have been used for cooking (tapioca, piqui, fish, meat), water transport and storage (Heckenberger 1996:139-42; Lima 1986:188-9).

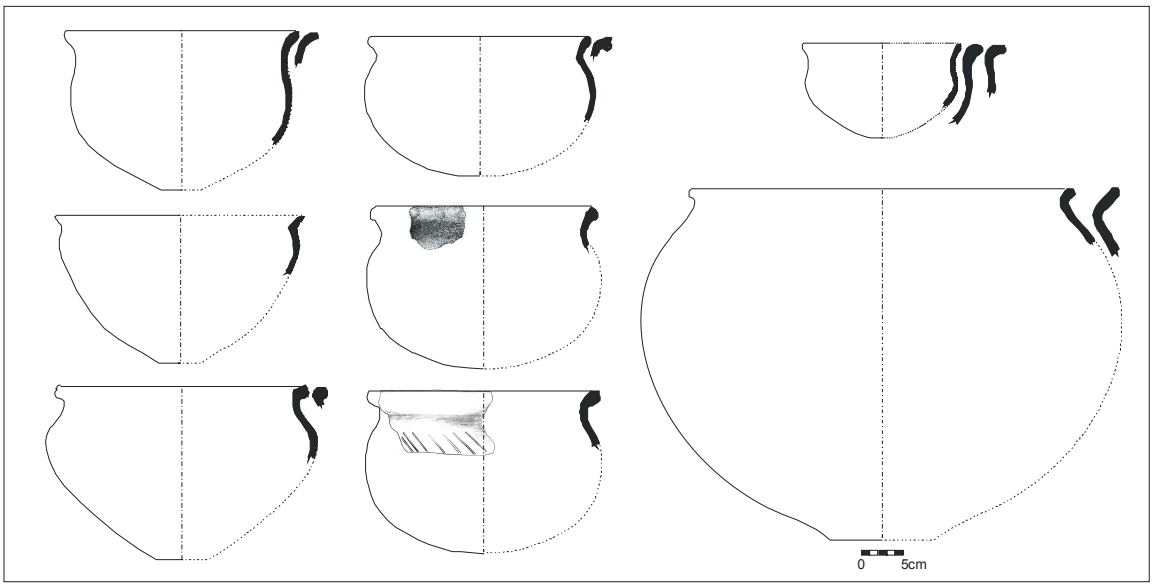


Figure 78 – M-17 vessel type II

Type III

Rounded or flat-bottomed bowls with outsloping or vertical walls, thickened, sometimes everted rim. Vessels with a direct rim are often similar in shape to Vessel Type I, but differ from those in paste and surface finishing. A complete vessel of this type was found in M-17, and a fragmented one in M-1. The paste is grog tempered in Camutins Plain or Inajá Plain types. In M-17 sample, more than 65% of the sherds were Inajá plain. Vessels are typically plain, but rims may be adorned with coffee-bean-shaped nubbins (Figures 79 and 80).

Rim diameter: Ranges from 16 to 26 cm (median 22 cm) in M-1 sample; from 10 to 32 cm (median 22 cm) in M-17 sample.

Body wall thickness: Ranges from 0.5 to 1.7 (median 1.3 cm) in M-1 sample, and from 0.5 to 2 cm (median 0.9 cm) in M-17 sample.

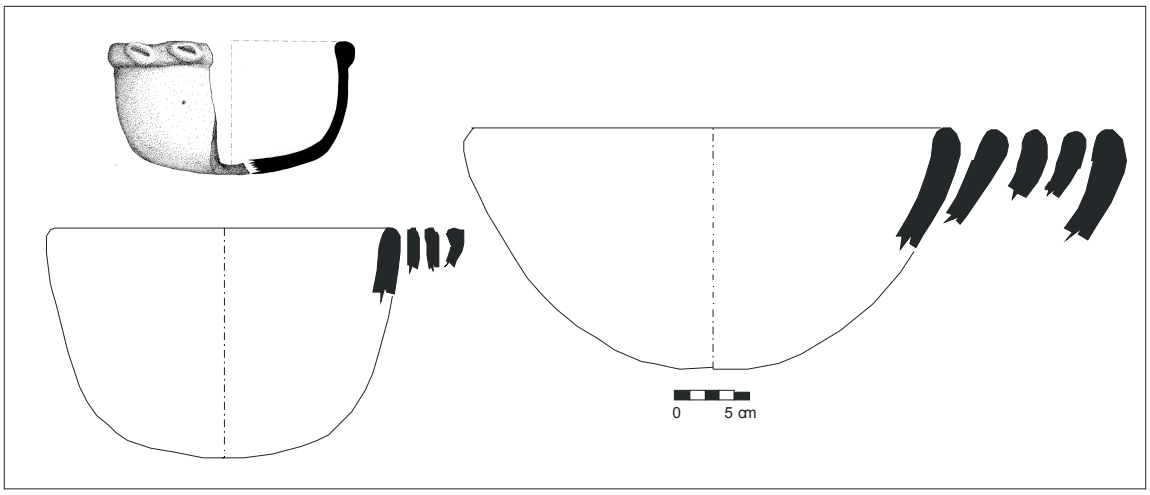


Figure 79 – M-1 vessel type III

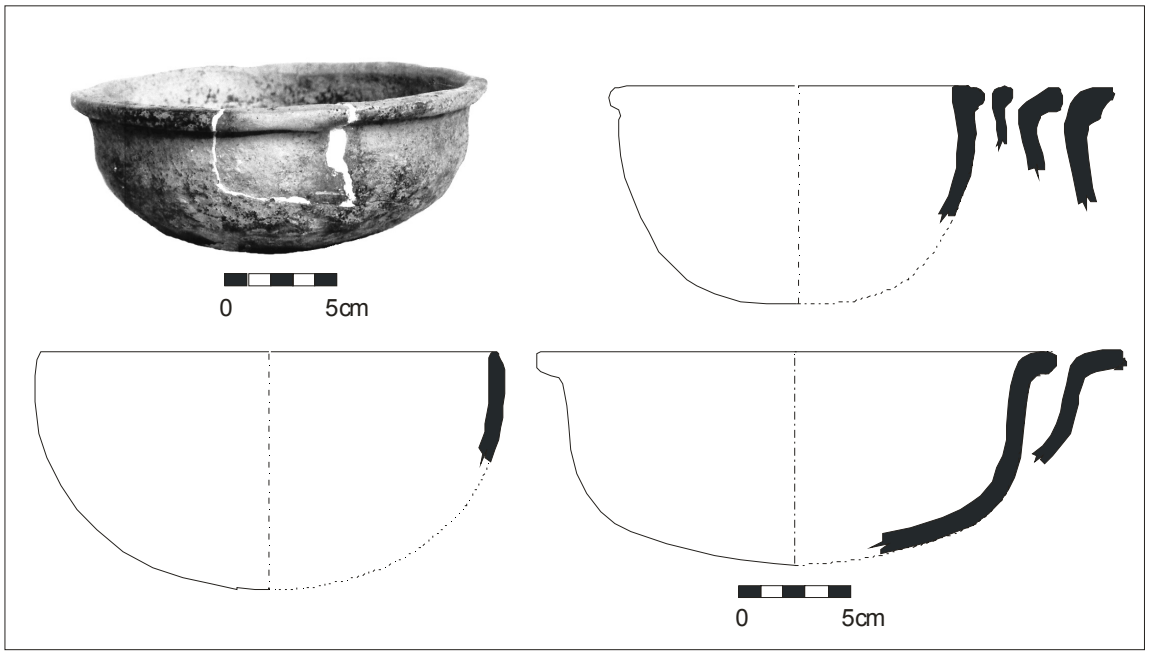


Figure 80 - M-17 vessel type III

Type IV

Deep bowls with small flat base, walls outsloping to carination and then outward to everted, exteriorly thickened rim. Variations include more pronounced carination and vertical upper walls. Some specimens showed thickening at the carination (Figures 81 and 82). Paste is typically grog tempered, but one sherd was caraipé tempered in M-17 sample. These non-decorated bowls are made both in Camutins and Inajá Plain types, in roughly similar proportions.

Rim diameter: Ranges from 18 to 52 cm (median 36 cm) in M-1 sample; from 7 to 54 cm (median 30 cm) in M-17 sample.

Body wall thickness: Ranges from 0.5 to 1.5 cm (median 0.8 cm) in both M-1 and M-17 samples.

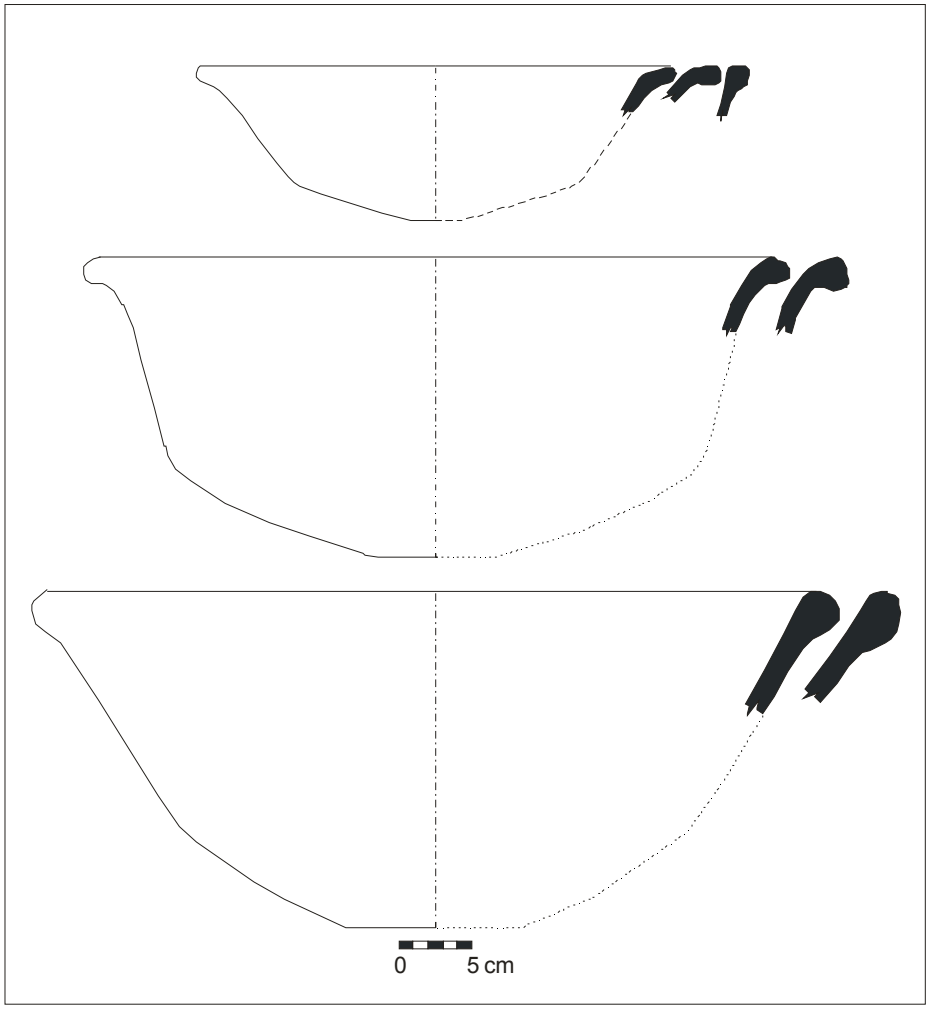


Figure 81 - M-1 vessel type IV

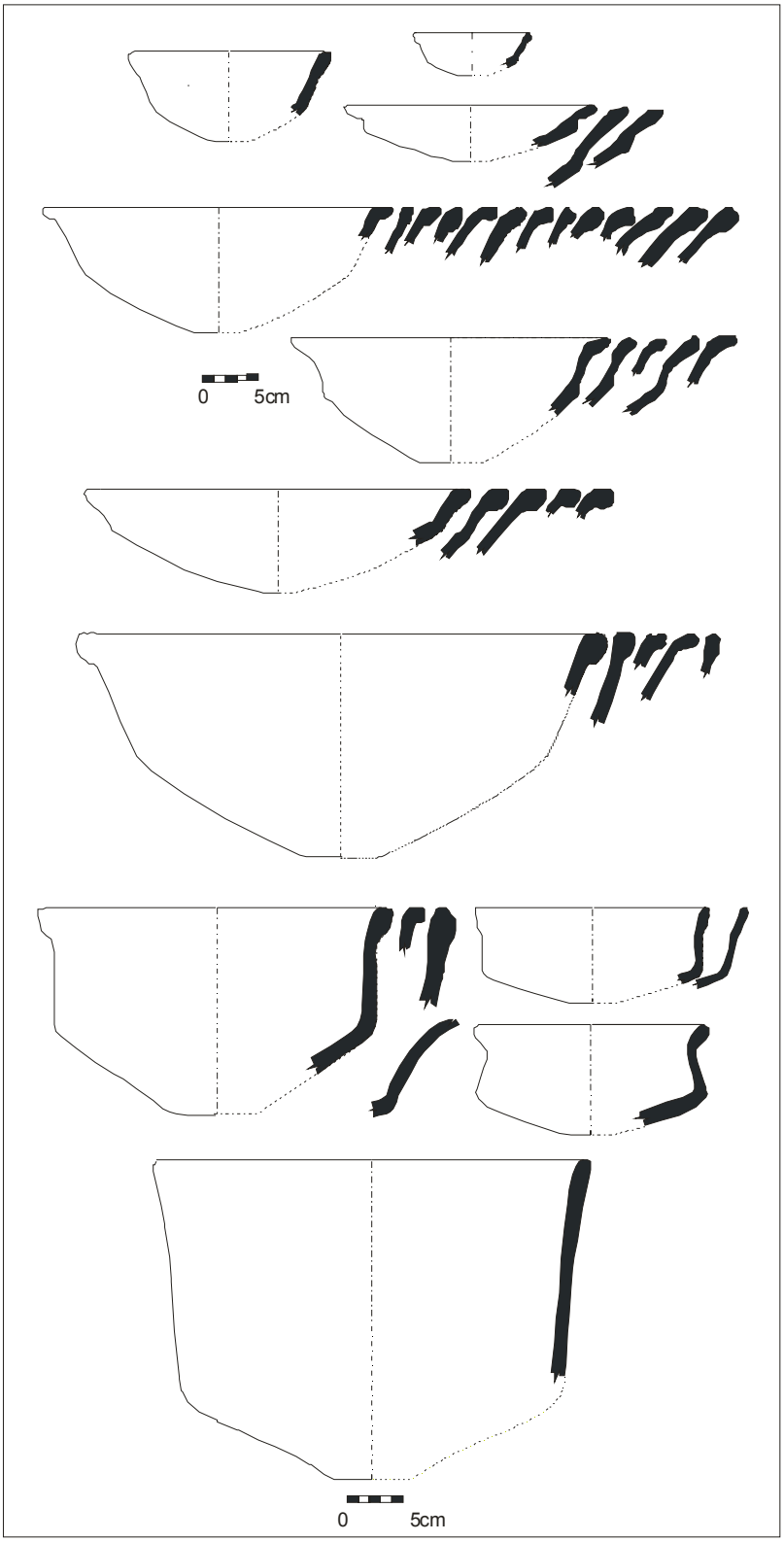


Figure 82 - M-17 vessel type IV

Type V

Small flat-bottomed bowls with vertical or outsloping straight walls, to a direct or everted rim. A complete bowl of this type with a pointed, incised lip was found in M-17 (Figures 83 and 84). Paste is grog tempered in both Camutins and Inajá Plain types. Surface treatment included scraping in one fragment from M-17, but all the other fragments were plain.

Rim diameter: Ranges from 12 to 18 cm in M-1 sample; from 13 to 18 cm in M-17 sample.

Body wall thickness: Ranges from 0.5 to 0.8 cm in M-1 sample; from 0.6 to 1 cm (median 0.7 cm) in M-17 sample.

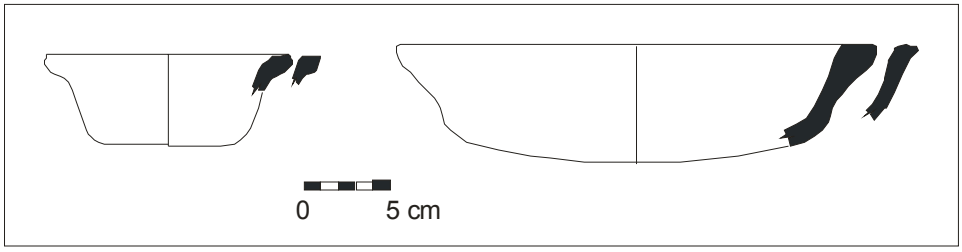


Figure 83 - M-1 vessel type V

Figure 84 - M-17 vessel type V

Type VI

Rounded open bowls, with walls outsloping to maximum mouth diameter to an everted, usually exteriorly thickened rim. Differences in rim shape and direction account for most of the variation within this type. Base is either rounded or slightly flat (Figures 85 and 86). Paste is typically grog tempered, but two examples from M-17 were tempered with a combination of grog and caraipé. In M-17, 78 % of the sherds of this type are Inajá Plain, while in M-17 sample Camutins Plain is predominant. However, the samples are too small to allow for statistical confidence.

Rim diameter: Ranges from 16 to 40 cm (median 30 cm) in M-1 sample; from 10 to 52 cm (median 28 cm) in M-17 sample.

Body wall thickness: Ranges from 0.5 to 1.8 cm in both samples. Median is 1 cm for M-1 and 0.8 cm for M-17.

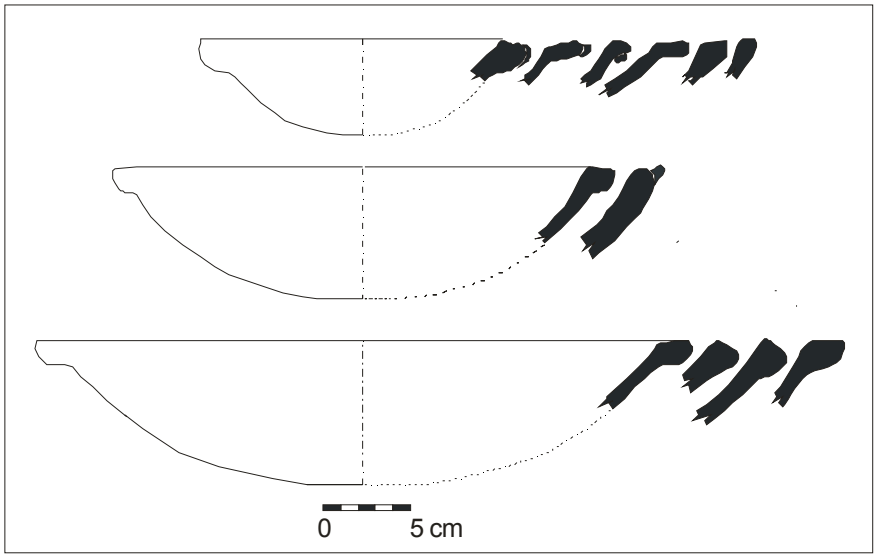


Figure 85 - M-1 vessel type VI

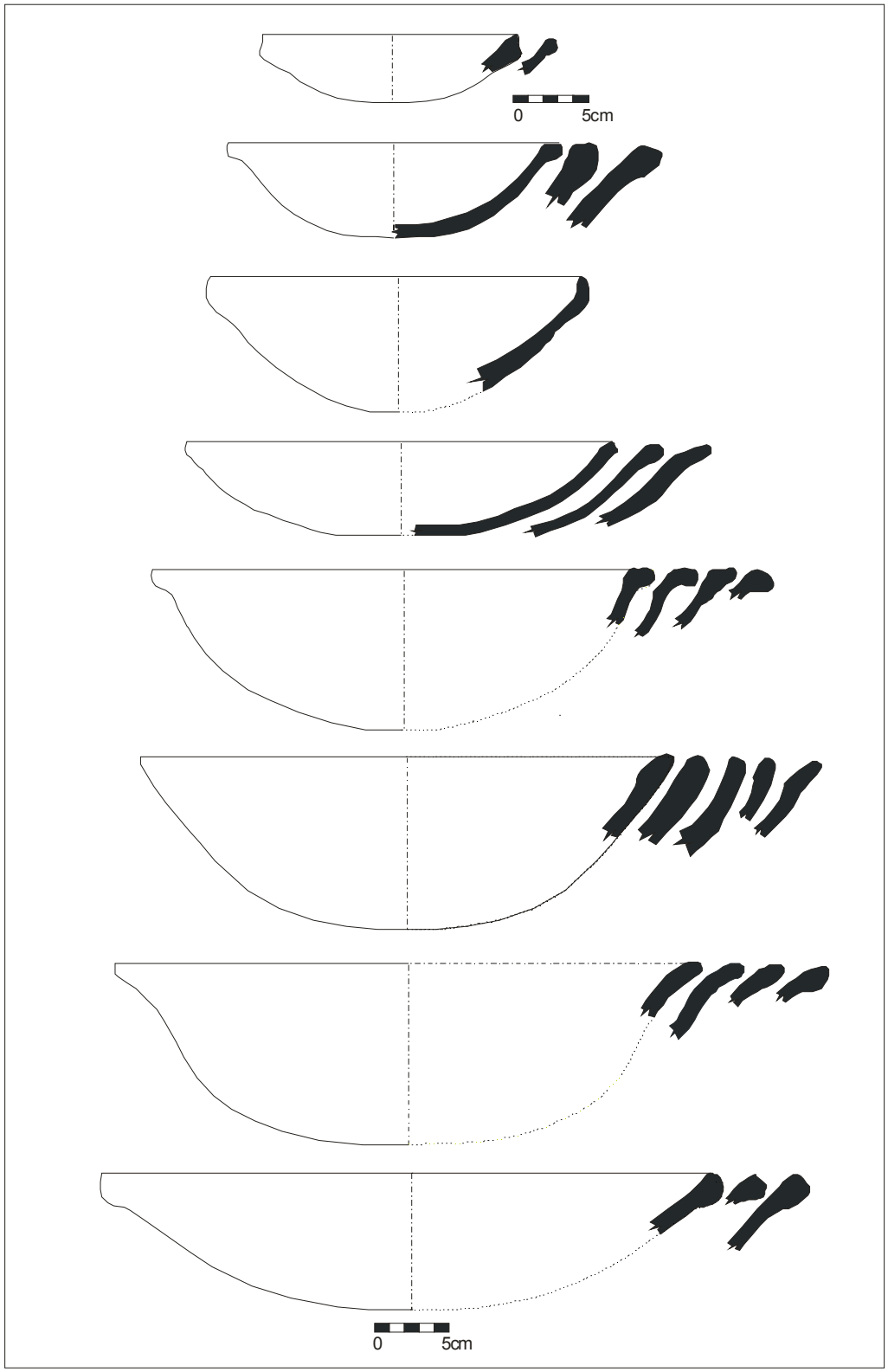


Figure 86 - M-17 vessel type VI

Type VII

Shallow, flat-bottomed bowls and plates, with everted or direct rim. Differences in rim shape account for most of the variation within this type (Figures 87 and 88). Paste is grog tempered, Inajá or Camutins Plain in similar proportions. Two examples, from M-1 and from M-17, show scraping on the outside wall.

Rim diameter: Ranges from 24 to 54 cm (median 40 cm) in M-1; from 14 to 52 cm (median 34 cm) in M-17.

Body wall thickness: Ranges from 0.5 to 1.3 (median 0.7) in M-1 sample; from 0.4 to 1.5 cm (median 0.8 cm) in M-17 sample.

Ethnographic analogy suggests this vessel could have been used as a griddle for producing manioc flat cakes (*beiju*) (Roth 1929:290-92).

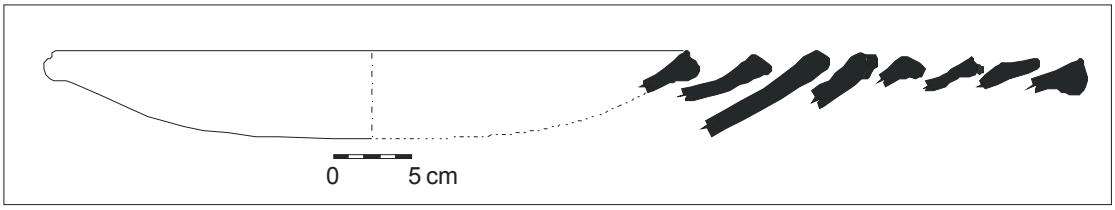


Figure 87 - M-1 vessel type VII

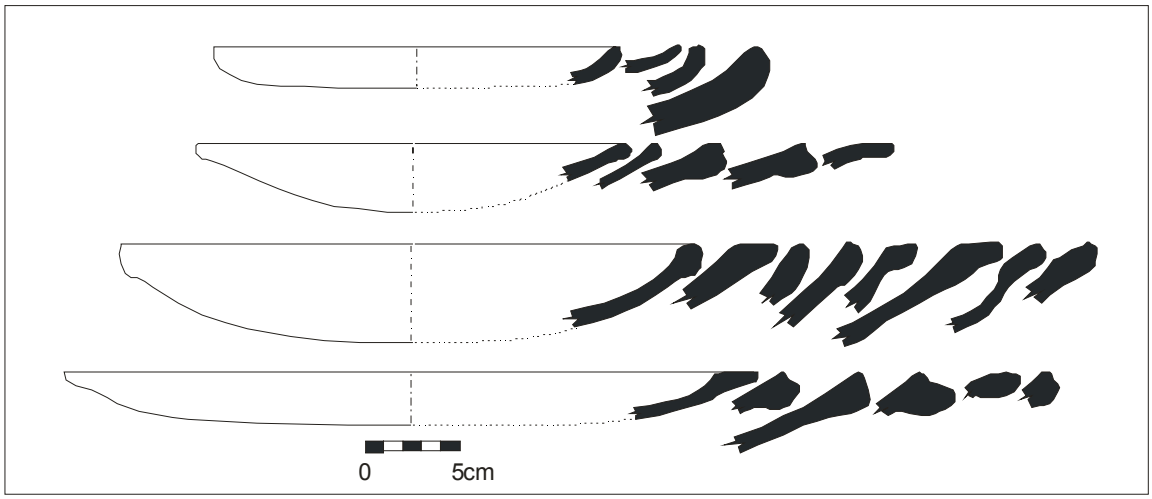


Figure 88 - M-17 vessel type VII

Type VIII

Cylindrical pot stands (called *trempe* in the ethnographic literature), with thickened rims at the top and bottom. Wall perforations were probably made to release vapors. Plastic ornamentations at the rim consist of coffee-bean-shaped nubbins (Figure 89). Paste is grog tempered, typically Camutins Plain. One sherd from M-17 had scraping on the external surface.

Rim diameter: Ranges from 8 to 14 cm, with most of the examples with a 10 cm diameter in M-17 sample. An incomplete specimen found at M-17 was 14 cm tall. M-1 sample produced only one sherd (Figure 89-a). Body wall thickness: Ranges from 0.7 to 1.6 cm.

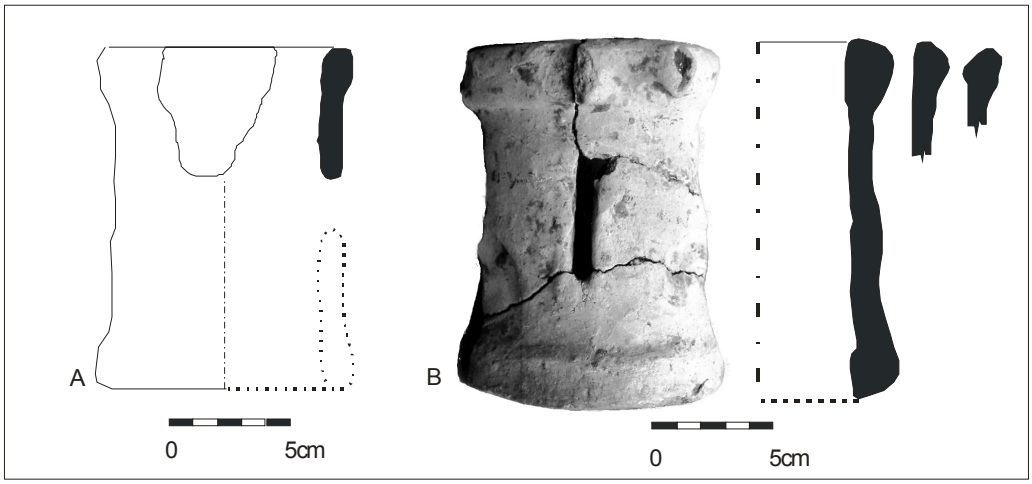


Figure 89 - M-1 and M-17 vessel type VIII

Serving vessels

Type IX

Rounded vessels with upcurving walls to direct rim and a rounded lip (Figure 90). Paste is grog tempered and decoration includes red slip, white slip, painting and incision. Decorated types are Joanes Painted and Plain Incised in M-17 sample and Plain Excised in M-1 sample (Figure 90-a). One sherd from M-17 was red slipped in the inside and white slipped in the outside. A variation observed in a sherd from M-17 showed a carination produced in the junction between the base and the vertical wall. The exterior was decorated with straight, incised lines (Figure 90-c).

Rim diameter: Ranges from 10 to 16 cm.

Body wall thickness: Ranges from 0.5 to 0.7 cm.

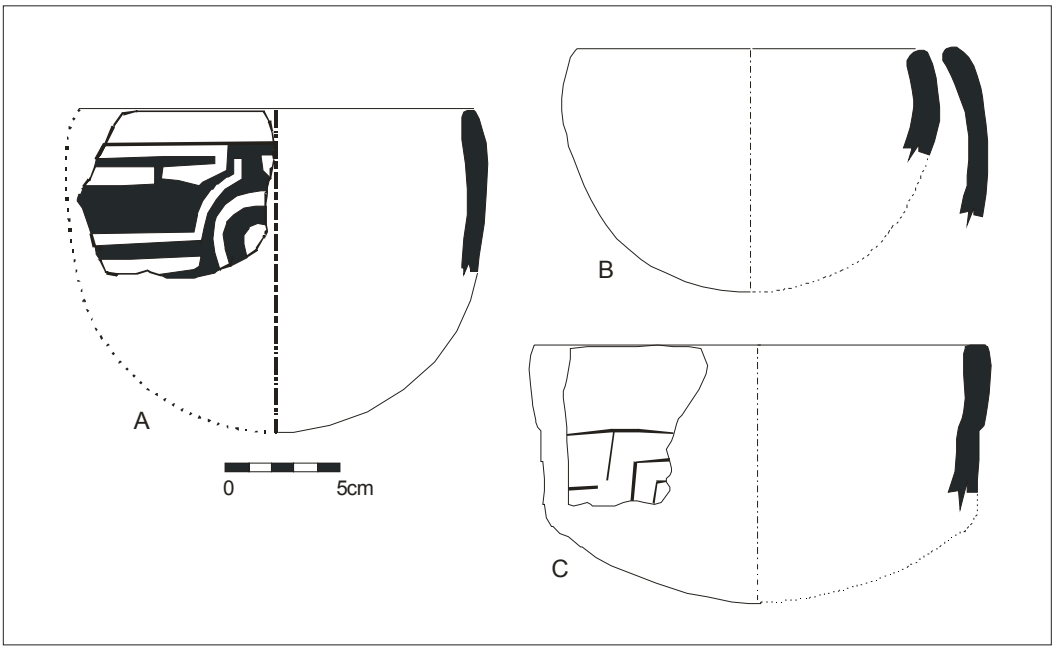


Figure 90 - M-1 and M-17 vessel type IX

Type X

Small, shallow, profusely decorated plates, in unusual shapes. Rim is ornamented with anthropomorphic or zoomorphic heads or nubbins. The paste is grog tempered. Decoration includes modeling, painting, red and white slip, excision and incision. Types present in the sample are Joanes Painted, Red Incised and Red Excised (Figure 91).

Rim diameter: Ranges from 20 to 24 cm, but most sherds were irregular, belonging to oval or leaf-shaped plates.

Body wall thickness: Ranges from 0.7 to 1 cm.

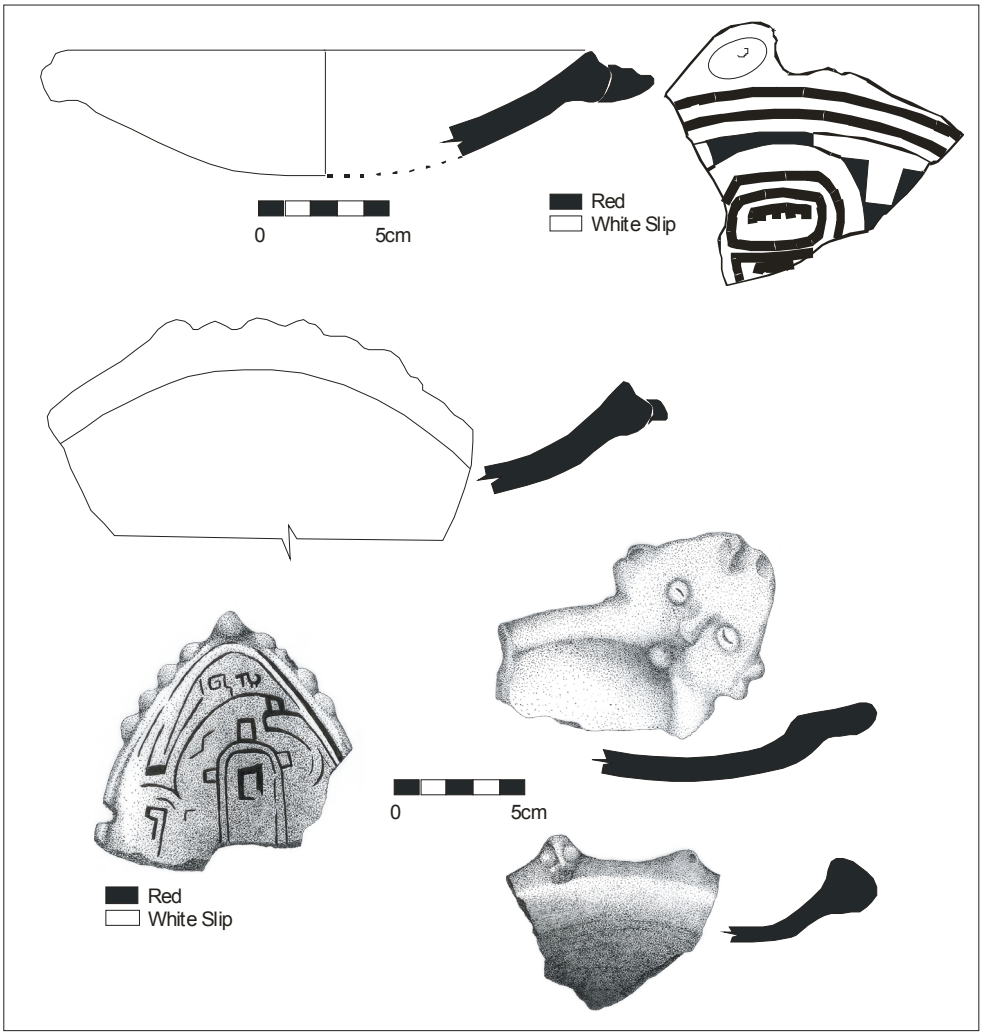


Figure 91 – M-17 vessel type X

Type XI

Rounded bowls with upward walls and exteriorly thickened, sometimes everted rims. This type was defined based on a complete bowl used as a lid for urn 24 at M-17 (Figure 93a). Paste is grog tempered and the decoration is typically red slip in one or both sides (Figures 92 and 93). One sherd from M-17 was white slipped instead. In M-17 sample, sherds from this type differ from Type XVI by their vertical walls. Examples from M-1, more often rounded walled, differ from Type XVI by their red slipped decoration. Rim may be adorned with coffee-bean-shaped nubbins.

Rim diameter: Ranges from 24 to 36 cm in M-1 sample (most of the vessels 36 cm), and from 24 to 42 cm (median 32 cm) in M-17 sample.

Body wall thickness: Ranges from 0.55 to 1.4 cm in M-1 sample; from 0.6 to 1.2 cm (median 0.9 cm) in M-17 sample.

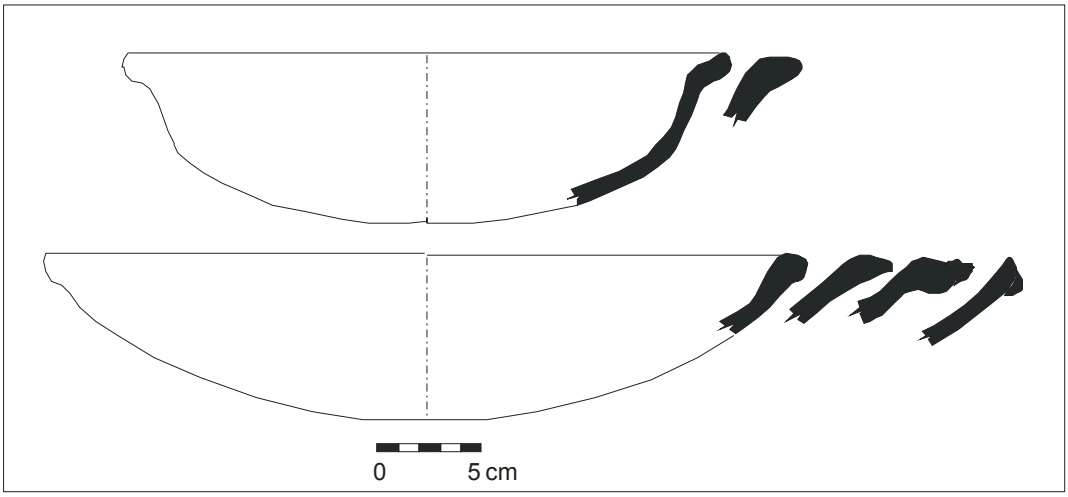


Figure 92 - M-1 vessel type XI

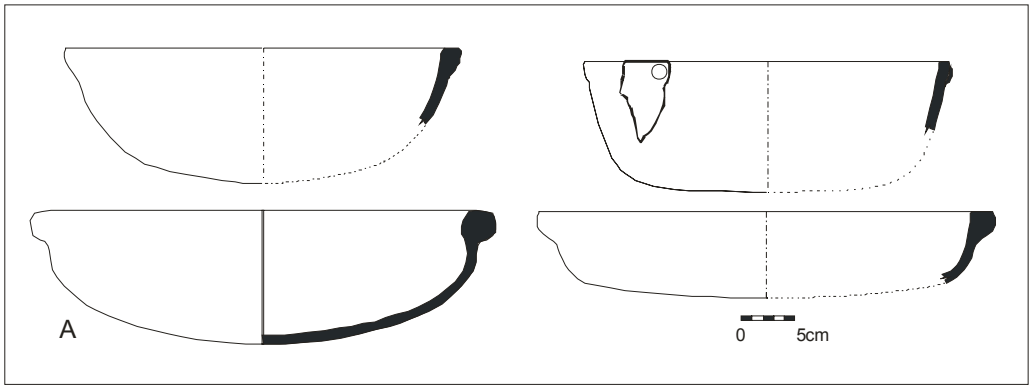


Figure 93 - M-17 vessel type XI

Type XII

Flat-bottomed bowls with almost vertical or outsloping walls, ending on a direct or everted thickened rim. Paste is grog tempered. The decoration is red excised on the outside and plain or white slipped in the inside. Similar bowls described by Meggers and Evans and from museum collections (Meggers and Evans 1957:344-5; Palmatary 1950: plates 31 and 48; Schaan 2001b:123) are double-slipped excised on the outside and Joanes Painted on the inside. The only two examples of this type are from M-1 assemblage (Figure 94).

Rim diameter: Ranges from 18 to 32 cm.

Body wall thickness: Ranges from 0.6 to 0.65 cm.

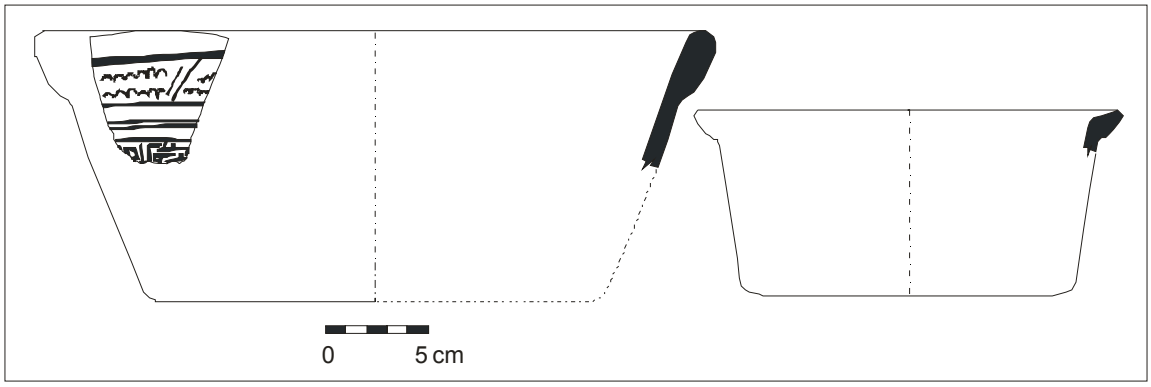


Figure 94 - M-1 vessel type XII

Type XIII

Flat-bottomed bowls with walls outsloping to carination and then to everted, flared rims. Variations include less pronounced cariation and more straight walls. Rims are usually thickened (Figure 95). Paste is grog tempered. Surface treatment typically consists of white slip on the inside and burnishing on the outside. In M-17 sample, three sherds were Joanes Painted on the inside and two sherds were Red Slipped on the outside.

Rim diameter: Ranges from 22 to 52 cm (median 32 cm).

Body wall thickness: Ranges from 0.4 to 1.2 cm (median 0.85 cm).

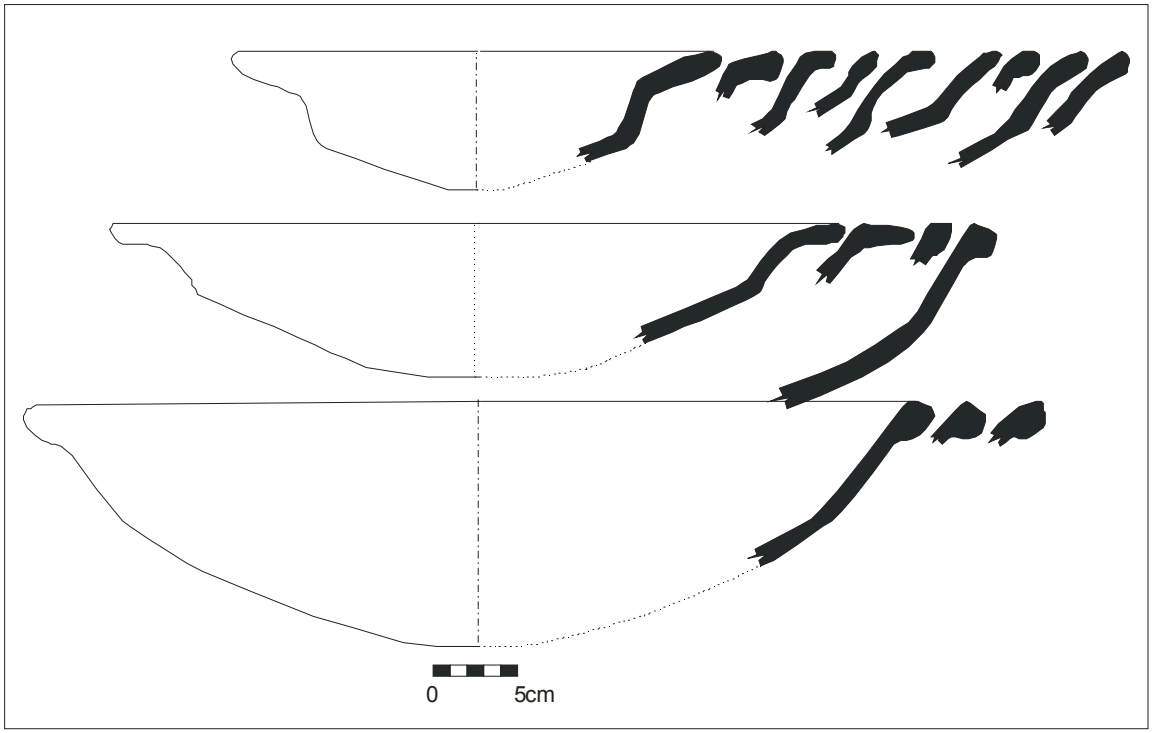


Figure 95 - M-17 vessel type XIII

Type XIV

Open, rounded bowls, with exteriorly thickened rim. Variations within this type include slightly flattened base and slight carination (Figures 96 and 97). Paste is typically grog tempered, but one caraipé tempered sherd was found in M-17 sample. Internal decoration includes burnishing (in most of the cases) and occasionally white slip. External decoration includes the Plain Incised, Plain Excised, Red Excised, and White Excised types. Combinations of decoration include white slip on the inside and plain or red slip on the outside.

Rim diameter: Ranges from 16 to 52 cm in M-1 sample; from 18 to 50 cm (median 35 cm) in M-17 sample.

Body wall thickness: Ranges from 0.5 to 1.3 in M-1 sample; from 0.5 to 1.15 cm (median 0.75) in M-17 sample.

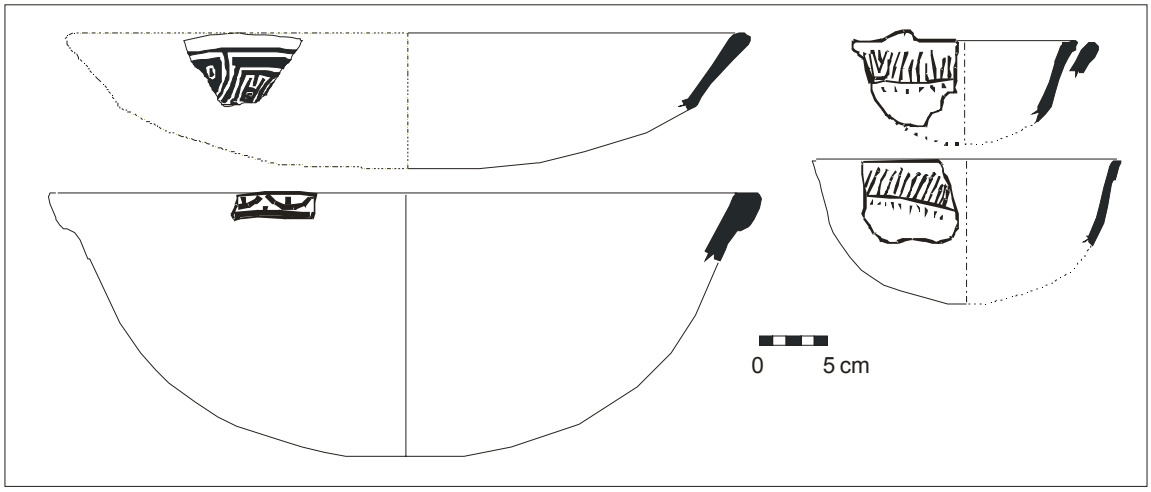


Figure 96 - M-1 vessel type XIV

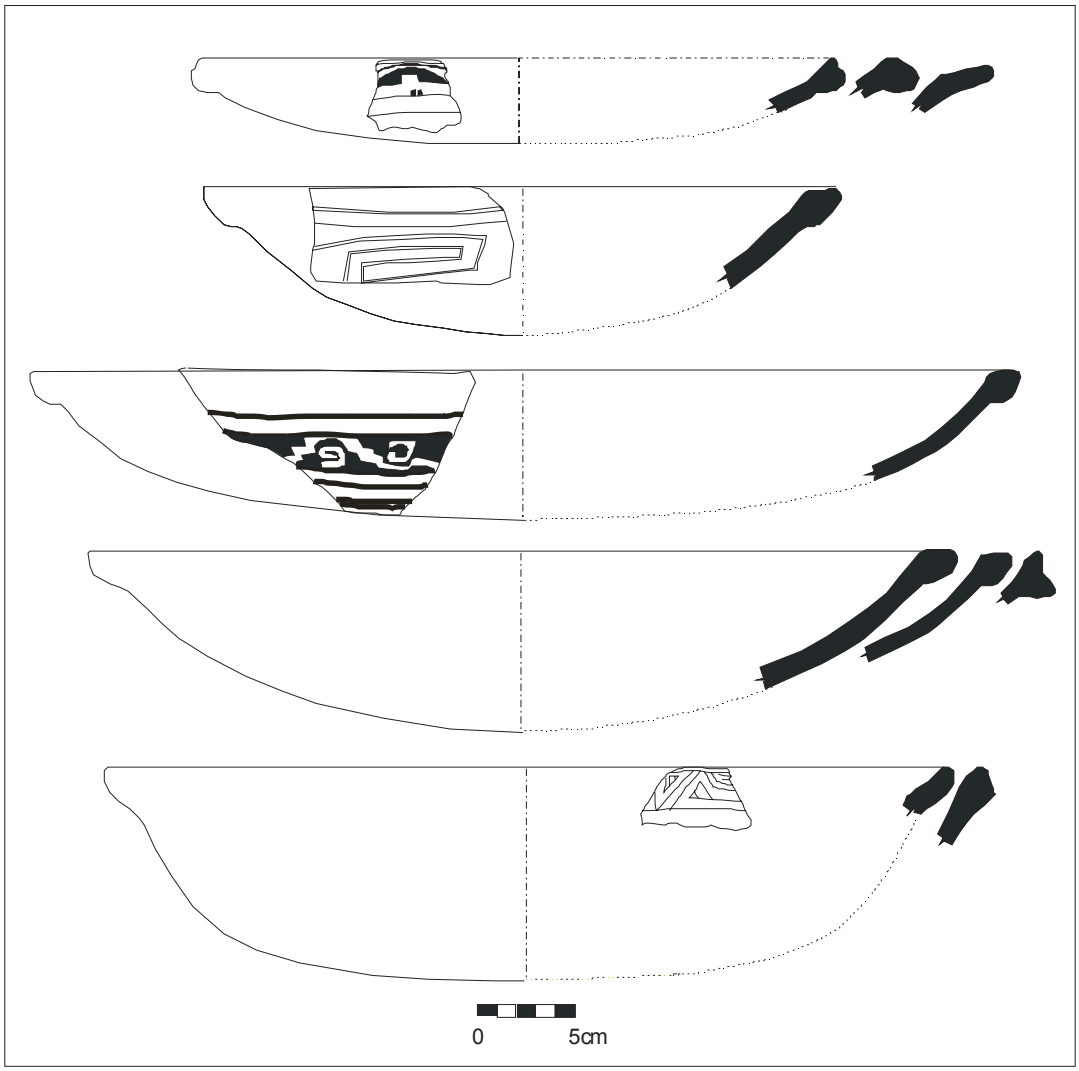


Figure 97 - M-17 vessel type XIV

Type XV

Flat-bottomed carinated bowls, with walls outsloping to carination and then upward to everted, exteriorly thickened rim. Variations within this type include short upper walls with outflaring rim (Figures 98 and 99). A Joanes Painted specimen of this type was inverted as a lid on top of urn 16 at M-17 (Figure 99a). Paste is grog tempered. Internal surface treatment includes smoothing (more common), white slip, and red slip. External decoration includes the Plain Incised, Plain Excised, Joanes Painted, and Guajará Incised types.

Rim diameter: Ranges from 20 to 28 cm (but one vessel is 56 cm in diameter) in M-1 sample; from 16 to 54 cm (median 40 cm) in M-17 sample.

Body wall thickness: Ranges from 0.65 to 0.9 cm (one vessel with 1.3 cm) in M-1 sample; from 0.5 to 1.45 cm (median 0.9 cm) in M-17 sample.

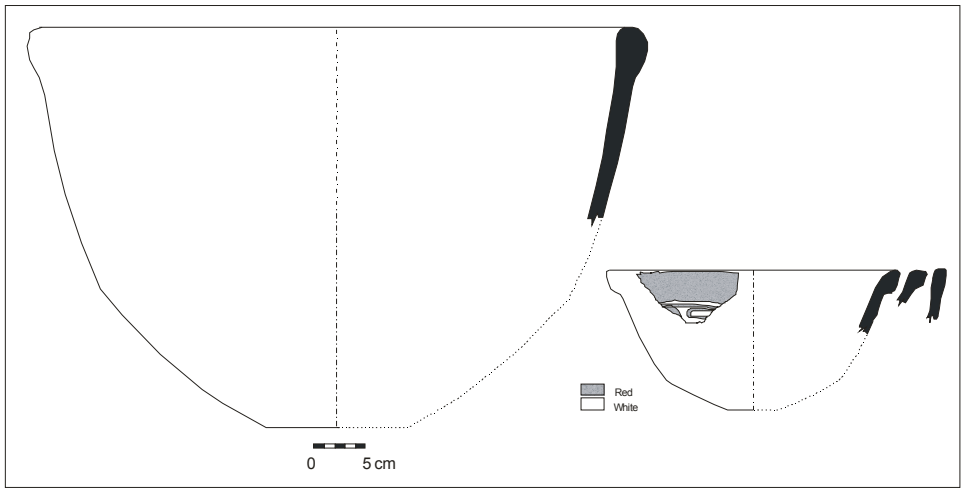


Figure 98 - M-1 vessel type XV

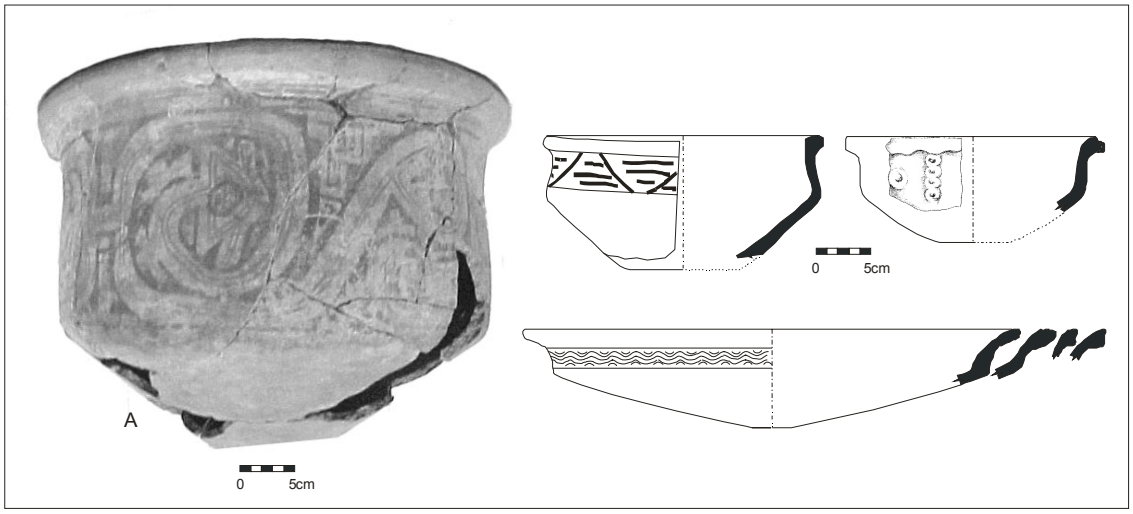


Figure 99 - M-17 vessel type XV

Type XVI

Shallow, rounded bowls and plates, in the same shapes as described for vessel Types VI and VII. Type XVI vessels, however, are White Slipped or Joanes Painted on the inside. Joanes Painted decoration account for 23% of vessels in M-17 sample, while the majority is White Slipped. The exterior is typically plain, smoothed. If decoration exists on the outside, it is restricted to the rim. No correlation was found between decoration and variations in vessel size or shape. The paste is grog tempered, but one caraipé / grog tempered sherd was part of M-1 sample (Figures 100 and 101).

Rim diameter: Ranges from 28 to 46 cm in M-1 sample; from 12 to 52 cm (median 30 cm) in M-17 sample.

Body wall thickness: Ranges from 0.6 to 1.2 cm in M-1 sample; from 0.4 to 2.2 (median 0.8 cm) in M-17 sample.

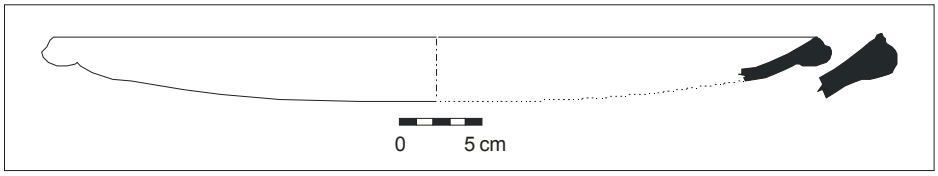


Figure 100 - M-1 vessel type XVI

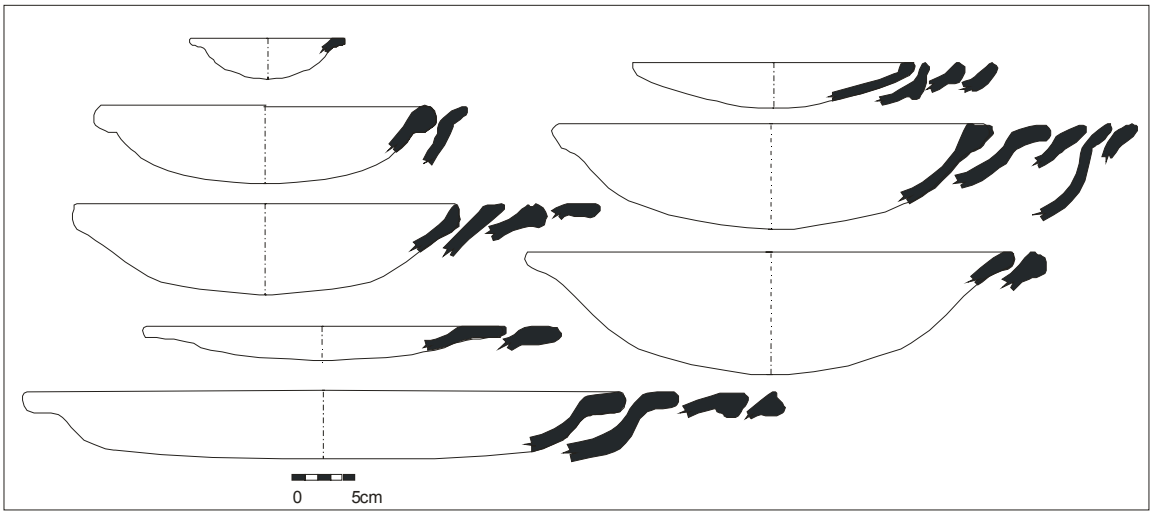


Figure 101 - M-17 vessel type XVI

Type XVII

Flat or slightly rounded-bottomed, shallow plates, with short, vertical or outsloping walls. The junction between the large base and the short vertical wall causes a pronounced, thick carination (Figures 102 and 103). On the exterior, this junction is emphasized with incised or excised lines, as part of the decoration. Paste is usually grog tempered, but one caraipé tempered sherd was found in M-17 sample. Internal surface treatment consists of burnishing in M-17 sample, and either burnishing or White Slip in M-1 sample. External decoration is typically Plain Excised, but one specimen in M-17 sample was Plain Incised.

Excised decoration on the vertical, external wall typically consists of a band containing an undulating thick line that bounces between the upper and lower margins, forming semicircles containing stepped figures (Figure 103). This motif has been identified as "snake skin pattern" (Schaan 1997a; 2001b see also Chapter 7, Figure 139), by comparison to three dimensional representations of snakes in Marajoara iconography.

These plates are usually large, but some small specimens, made in the same shape and decoration are also found. This vessel type is often found as a lid for funerary vessels (see, for example, Meggers and Evans 1957, plate 57).

Rim diameter: Ranges from 42 to 50 cm (one sherd was 24 cm in diameter) in M-1 sample; from 32 to 54 cm (two vessels were 12 and 14 cm in diameter, median 44 cm) in M-17 sample.

Body wall thickness: Ranges from 0.8 to 1.2 in M-1 sample; from 0.4 to 1.2 cm (median 0.8 cm) in M-17 sample.

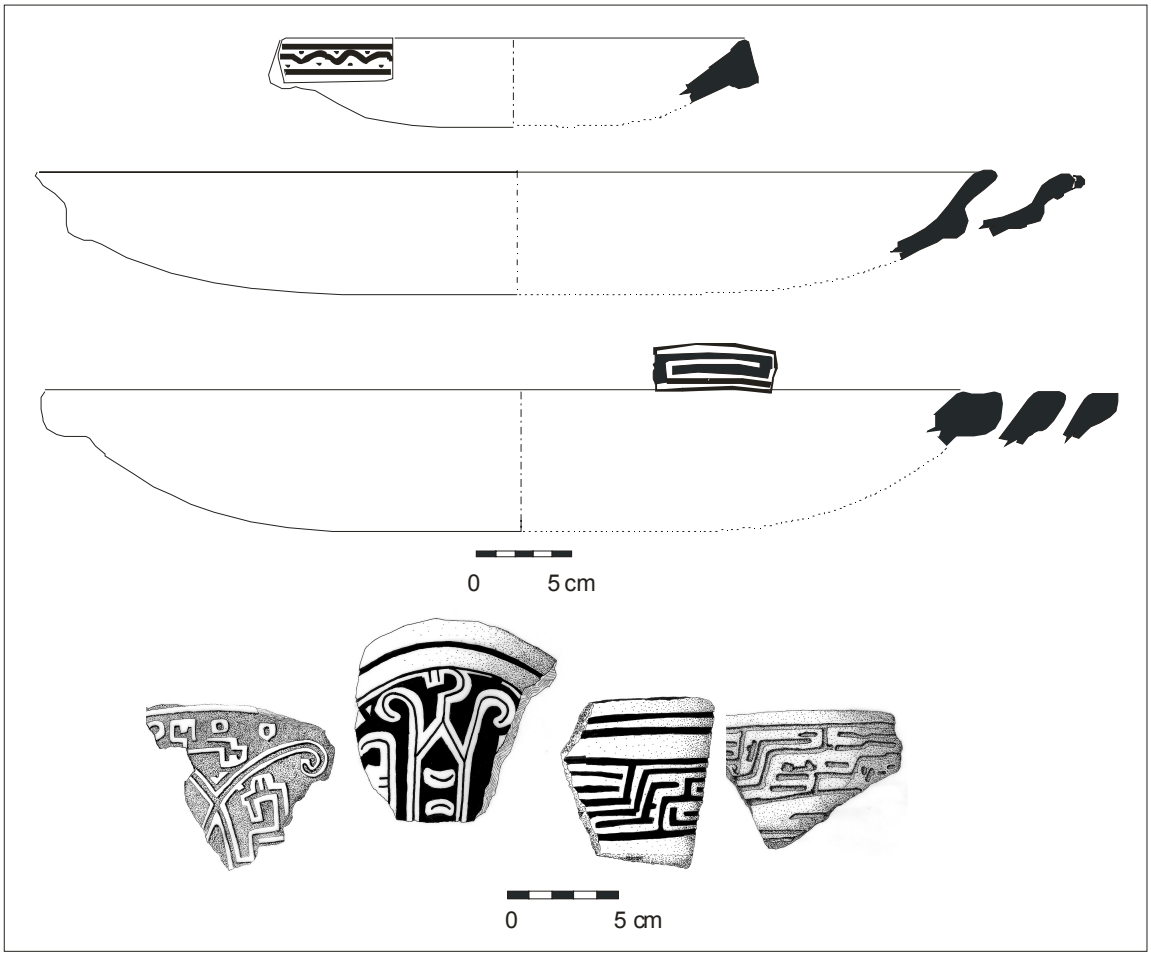


Figure 102 - M-1 vessel type XVII

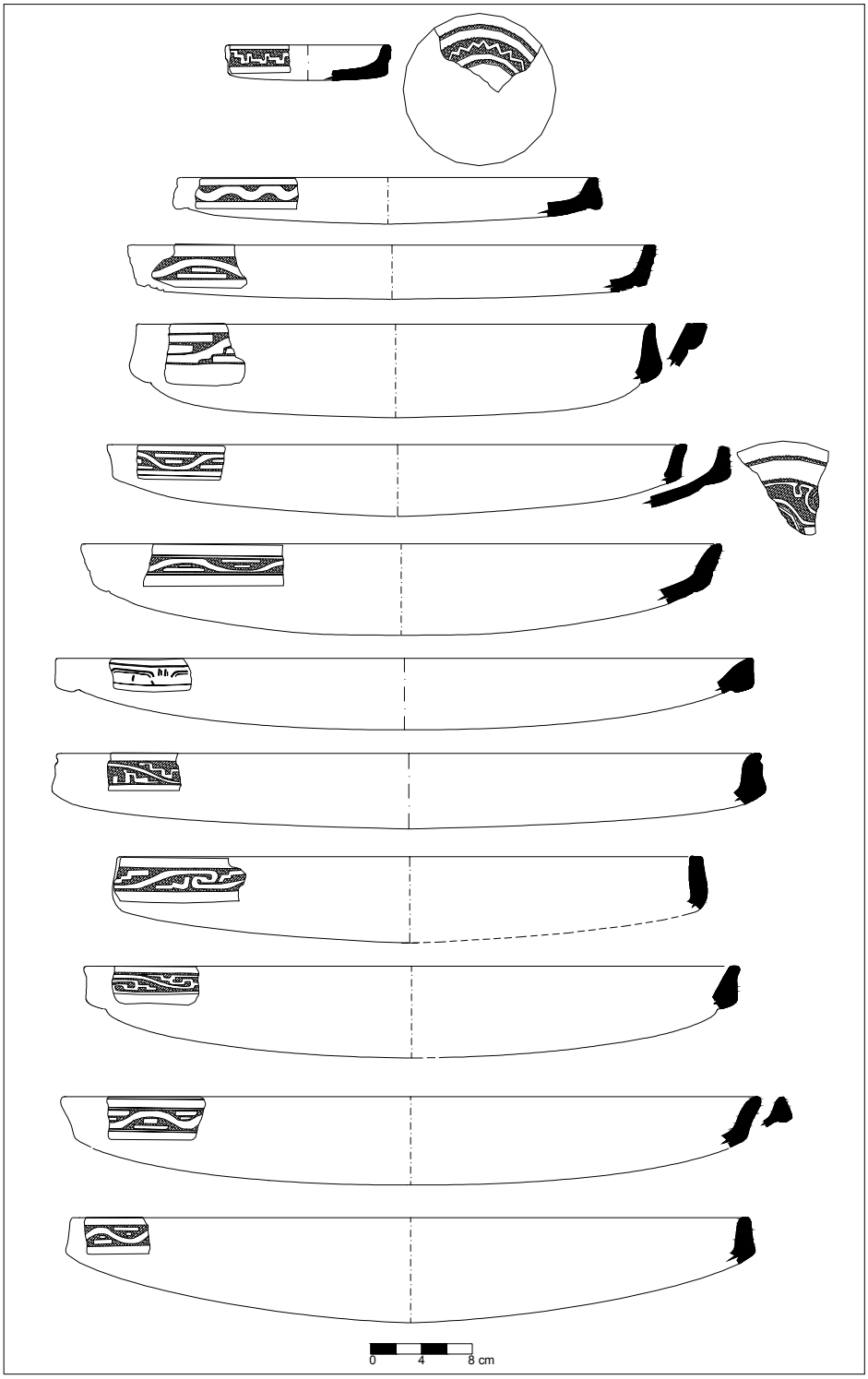


Figure 103 - M-17 vessel type XVII

Type XVIII

This vessel type was described by Meggers and Evans (1957:361) as "platter-bowls with flaring annular base, deep bowl like center inserted into the middle of a broad platter, producing a wide, troughlike, lateral extension, terminating in an exteriorly thickened, often flanged, rim". Paste is typically grog tempered. Excised decoration on the base and on the bottom is common, despite the odds of the decoration being visible while the vessel is in use. Inside is usually plain smoothed, White Slipped or Joanes Painted. Exterior may be plain, Red Slipped, Plain Excised or Red Excised. Since the sherds in the sample belong to different parts of vessels, common measurements were not possible. M-17 assemblage had a larger number of fragments than M-1 (Figures 104 and 105).

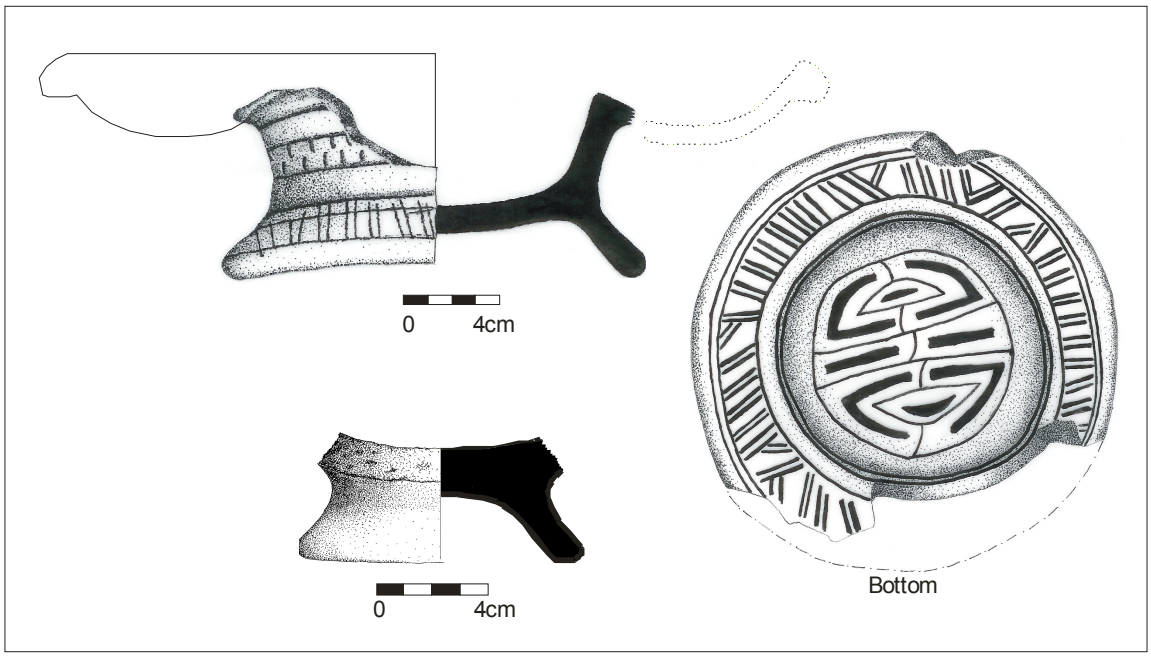


Figure 104 - M-1 vessel Type XVIII

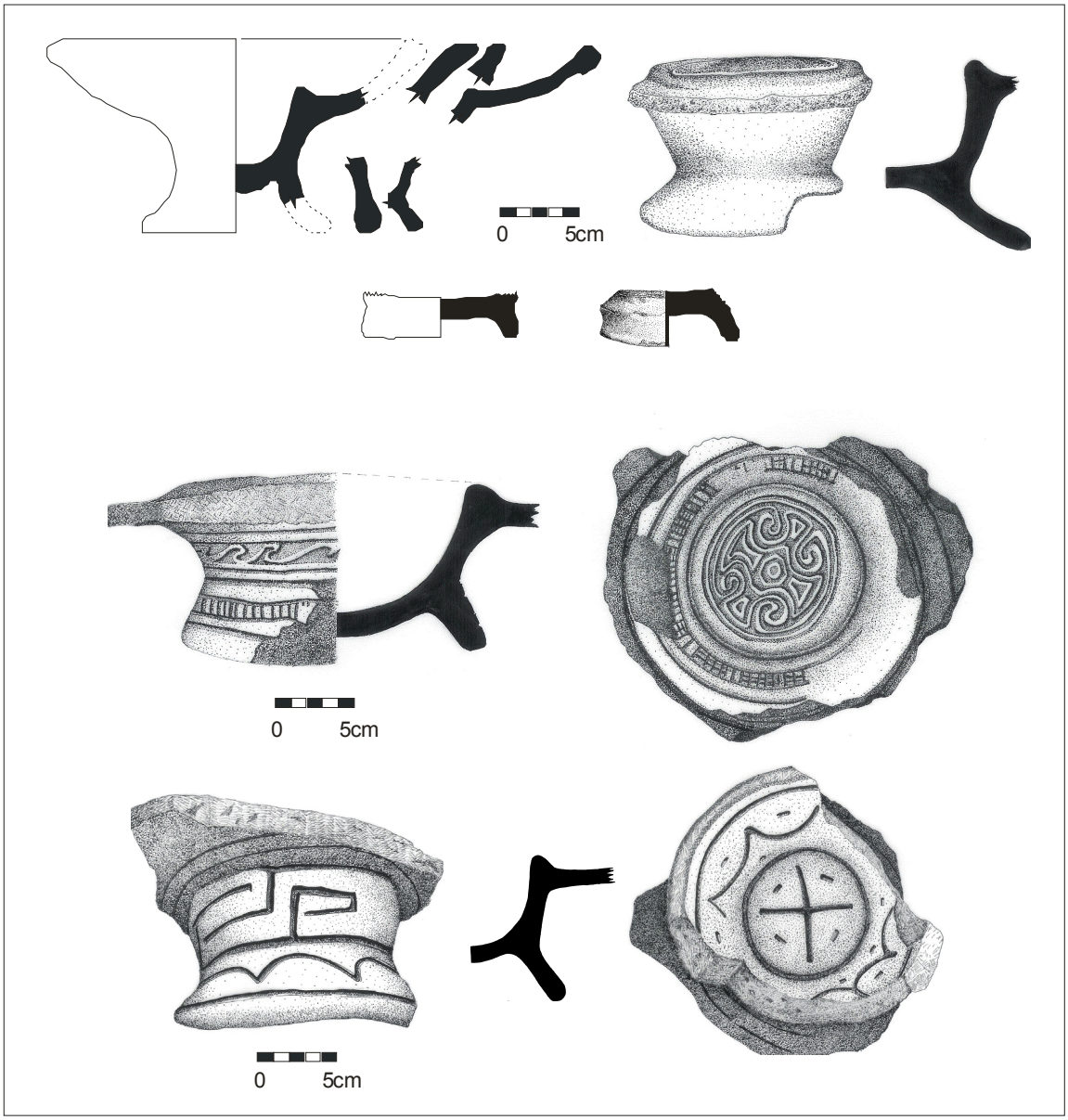


Figure 105 - M-17 vessel type XVIII

Containers for Liquids, Drinking, and Storage

Type XIX

Small globular vessel, with constricted mouth and direct rim. A variation includes a short neck and loop handles on opposite sides. Paste is grog tempered in both Inajá and Camutins Plain types. All the sherds were plain. Only one sherd of this type was found in M-1 sample (Figure 106 left).

Rim diameter: 4 cm in M-1 example. It ranges from 4 to 12 cm (median 6 cm) in M-17 sample. Estimated maximum body diameter: 11 to 14 cm. Estimated height: 9 to 12 cm.

Body wall thickness: Ranges from 0.5 to 1.1 cm (median 0.7 cm) in M-17 sample.

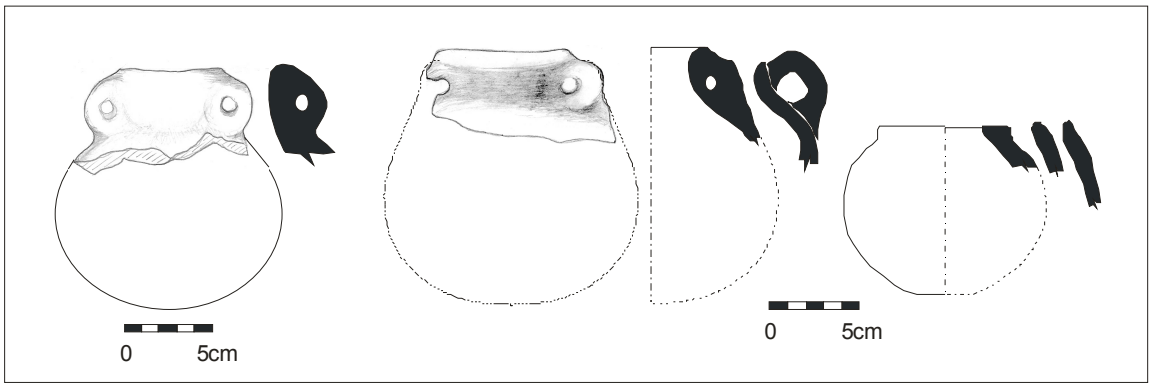


Figure 106 – M-1 and M-17 vessel type XIX

Type XX

Small globular vessel, with constricted mouth and everted rim. Variations within the type include vessels with a short vertical neck and slightly flattened base. This type was defined on the basis of entire vessels found inside urns 10 and 16 and on top of urns 1 and 18 at M-17. A complete vessel was also found in the looters fill of M-1 (excavation 1) (Figure 107). Paste is

typically grog tempered, but one caraipé tempered sherd was part of M-17 assemblage. Plain vessels are made either with Inajá or Camutins Plain paste. Decoration includes scraping, incision (Plain Incised and Guajará Incised types) and white slip. Most of the sherds in M-17 assemblage are plain, but vessels found in association with urn 10 (Figure 108b), urn 16 (Figure 108c), and urn18 (Figure 107-d), are Plain Incised, while the vessel on the top of urn 1 (Figure 108a) is White Incised.

Rim diameter: Ranges from 9 to 12 cm in M-1 sample; from 7 to 12 cm (median 10 cm) in M-17 sample.

Body wall thickness: Ranges from 0.4 to 0.6 in M-1 sample; from 0.4 to 1 cm (median 0.5 cm) in M-17 sample.

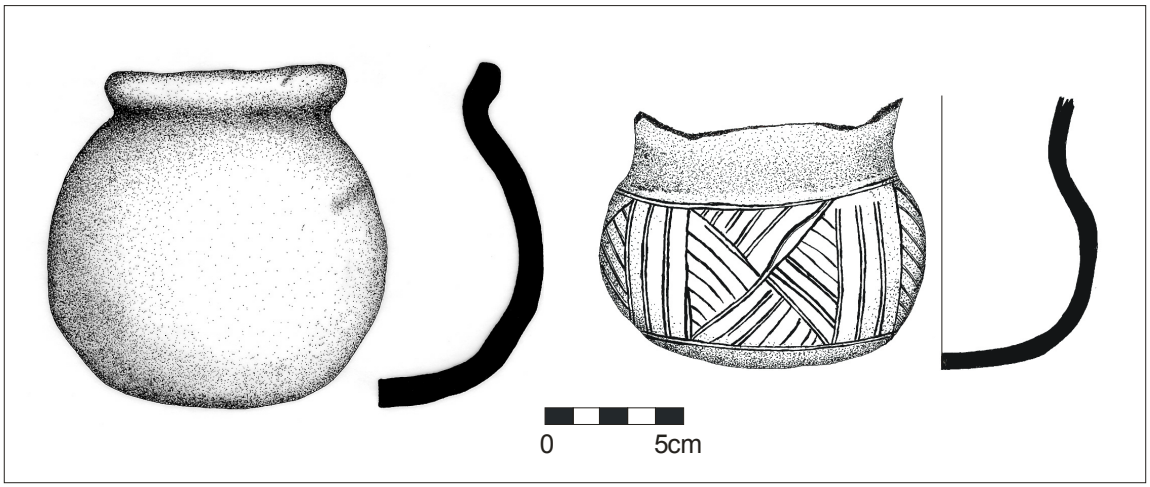


Figure 107 – M-1 vessel type XX

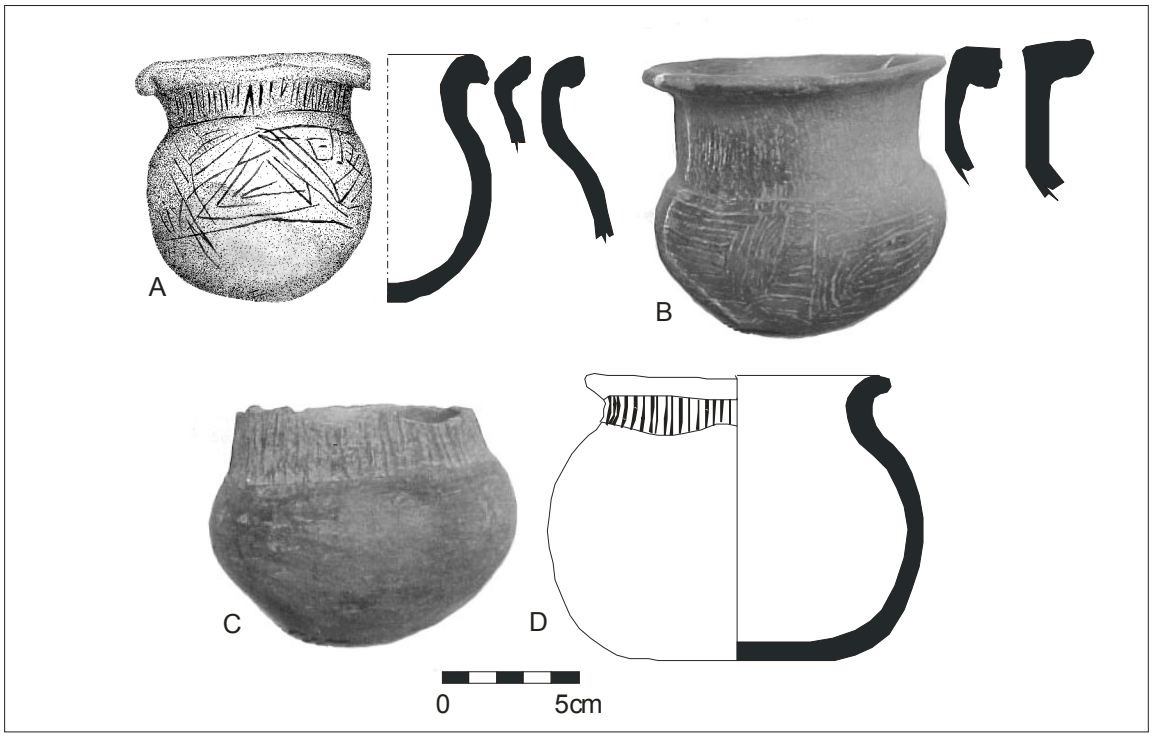


Figure 108 - M-17 vessel type XX

Type XXI

Similar in shape to Type XX, Type XXI is, however, larger. Even among the smallest specimens, the mouth is less restricted than Vessel Type XX specimens. Paste is grog tempered. In M-17 sample, 76% of the sherds were plain, Inajá or Camutins Plain in similar proportions. The remaining sherds were White Slipped, Scraped, and Plain Incised types. Rims are decorated with nubbins or incisions. One specimen from M-17 sample was decorated with a three dimensional, vertical snake on the exterior wall (Figures 109 and 110).

Rim diameter: Ranges from 20 to 24 cm in M-1 sample; from 12 to 22 cm (median 14 cm) in M-17 sample.

Body wall thickness: Ranges from 0.5 to 0.55 cm in M-1 sample; from 0.35 to 9.5 cm (median 0.5 cm) in M-17 sample.

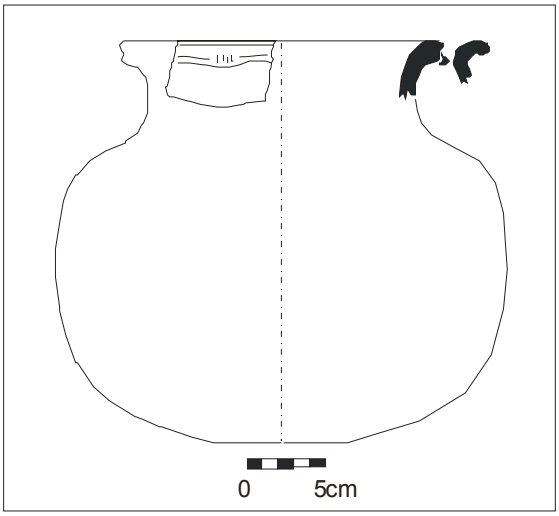


Figure 109 - M-1 vessel type XXI

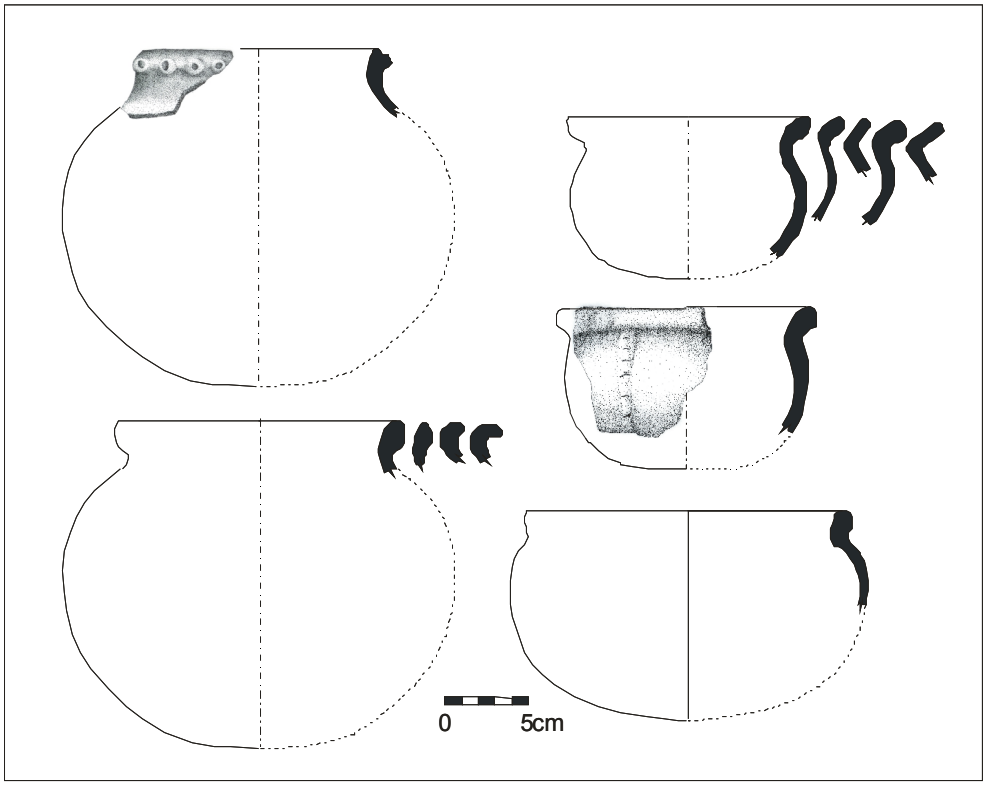


Figure 110 - M-17 vessel type XXI

Type XXII

Jars with small flattened base and walls outsloping to maximum diameter at about one-third of the height and then insloping upward to a slightly constricted mouth and everted, thickened rim (Figures 111 and 112). Three vessels of this type were found underneath urn 16 at M-17 (Figure 111 – 1, 2 & 3). Temper is grog and paste is either Camutins or Inajá Plain. One specimen from M-1 was tempered with a combination of grog and caraipé. Most of the vessels are plain, but Plain Incised (1 fragment) and White Slipped (2 fragments) were also identified in M-17 sample.

Rim diameter: Ranges from 24 to 32 cm in M-1 sample; from 12 to 42 cm (median 24 cm) in M-17 sample.

Body wall thickness: 0.5 cm in M-1 sample. It ranges from 0.5 to 1.7 cm (median 0.8 cm) in M-17 sample.

Ethnographic analogy suggests that this type of vessel could have been used to carry or store water (Lima 1986).

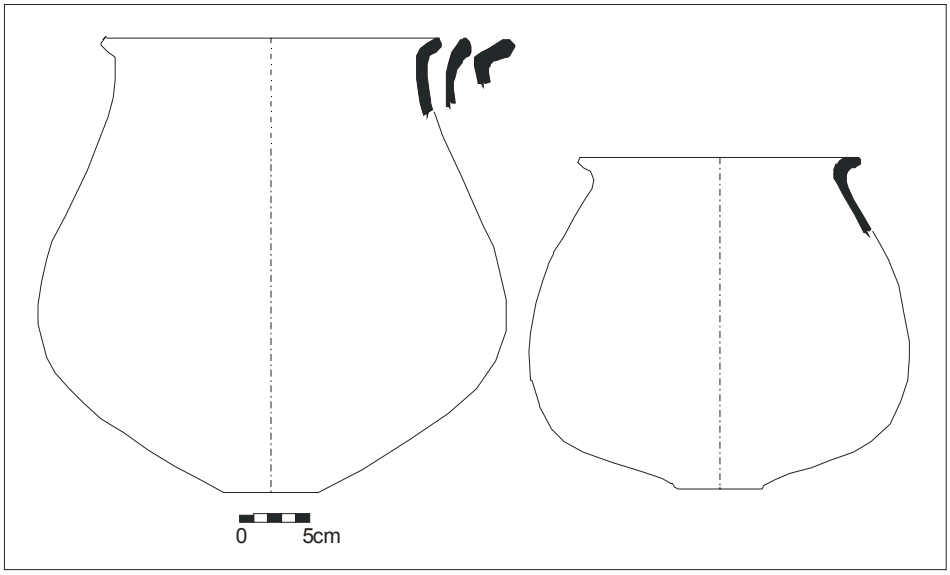


Figure 111 - M-1 vessel type XXII

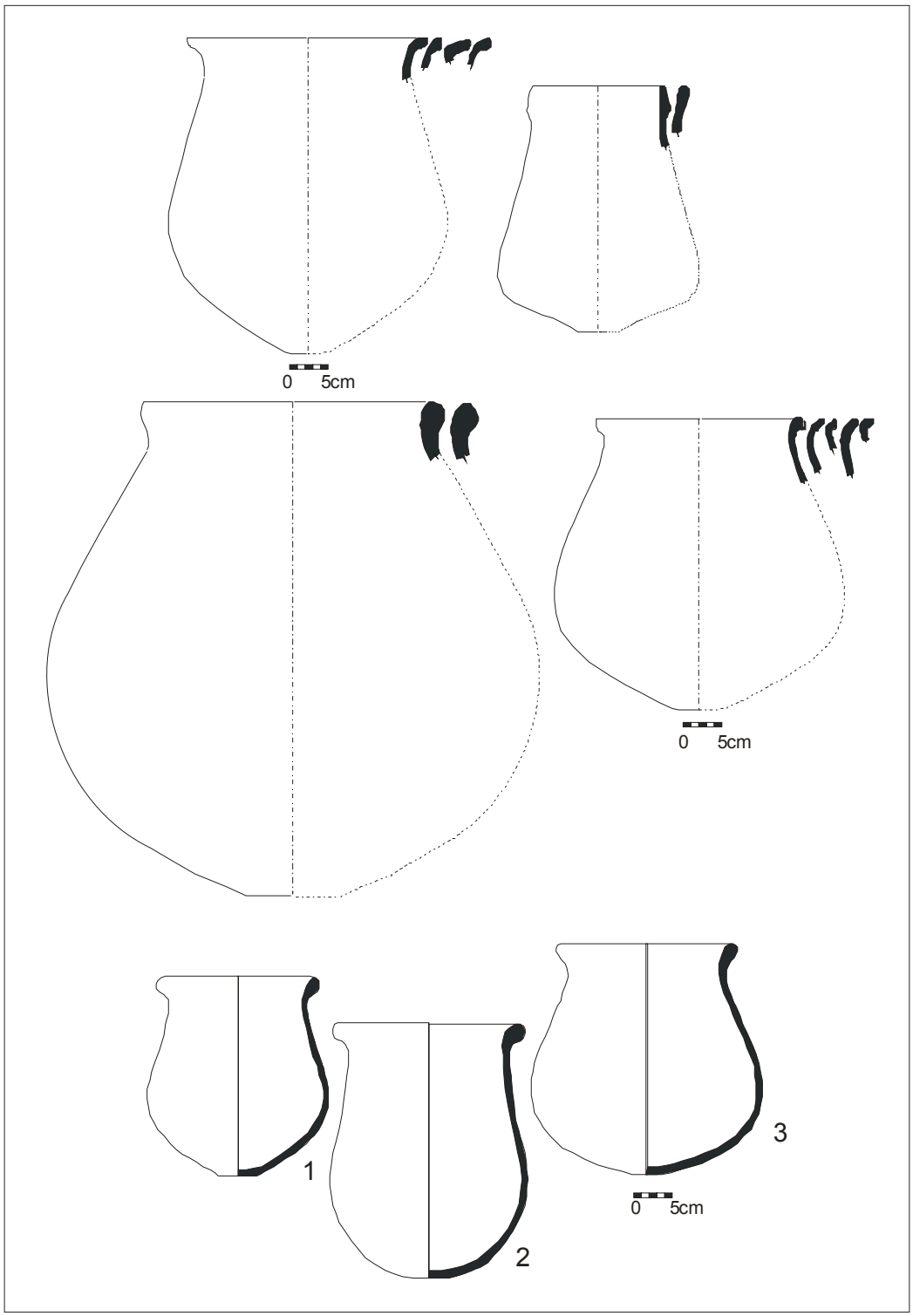


Figure 112 - M-17 vessel type XXII

Type XXIII

Globular vessels with constricted mouth, direct rim (Figure 113). The paste is grog tempered, either Camutins or Inajá plain. No sherds of this type were found in M-1 sample.

Rim diameter ranges from 8 to 16 cm. Estimated height: 30 cm.

Body wall thickness: Ranges from 0.8 to 1.1 cm.

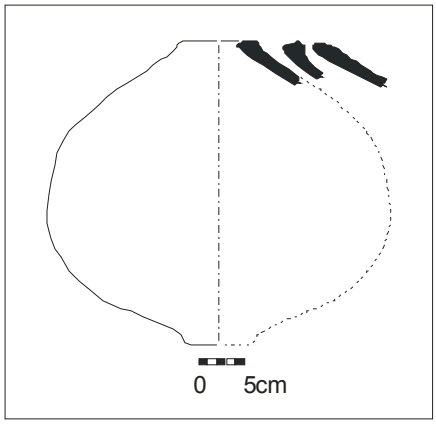


Figure 113 - M-17 vessel type XXIII

Type XXIV

Flat-based vessels with a globular body, short, wide vertical neck and direct, slightly thickened rim. Two of the fragments from M-17 sample show modeling of sections of the walls into a concave, rounded form, imitating a breast. Nubbins are also used as adornments, mimicking eyes or nipples (Figure 114). Paste is grog tempered, Inajá or Camutins Plain. Decorative types include Joanes Painted and Red Slipped, but most of the sherds are plain. No sherds of this type were found in M-1 sample.

Rim diameter: Ranges from 12 to 30 cm.

Body wall thickness: Ranges from 0.6 to 1.0 cm.

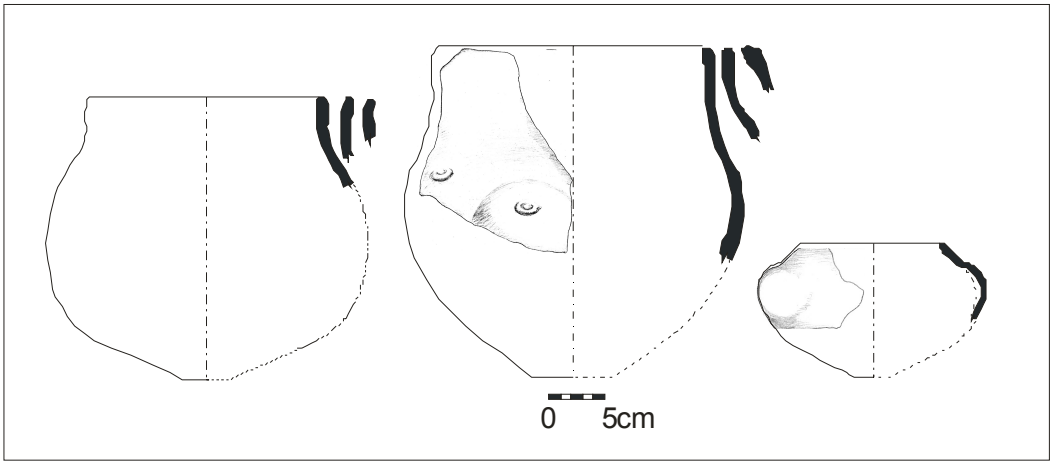


Figure 114 - M-17 vessel type XXIV

Type XXV

Short, wide vessels, with flat base, walls outsloping to carination and then gentle insloping upward to meet the everted, exteriorly thickened rim (Figures 115 and 116). Paste is grog tempered, Inajá or Camutins Plain. Most of the vessels are plain. Decorated types include Scraped, Red Excised, Plain Excised, and Plain Incised.

Rim diameter: Ranges from 28 to 34 cm in M-1 sample; from 14 to 54 cm (median 29 cm) in M-17 sample.

Body wall thickness: Ranges from 0.7 to 1.2 cm in M-1 sample; from 0.5 to 1.5 cm (median 0.8 cm) in M-17 sample.

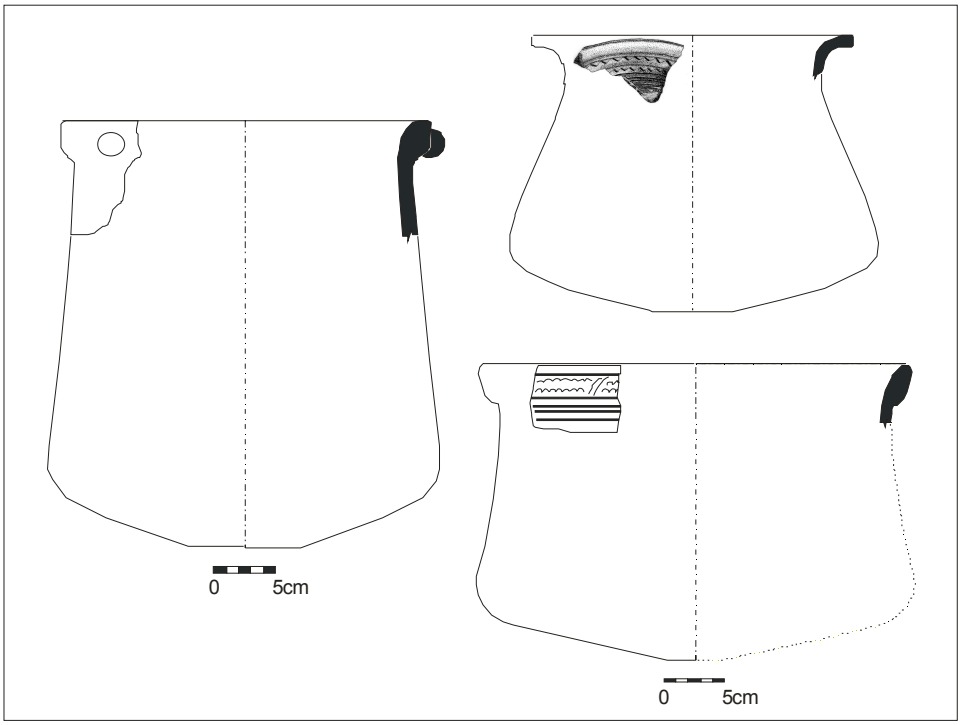


Figure 115 - M-1 vessel type XXV

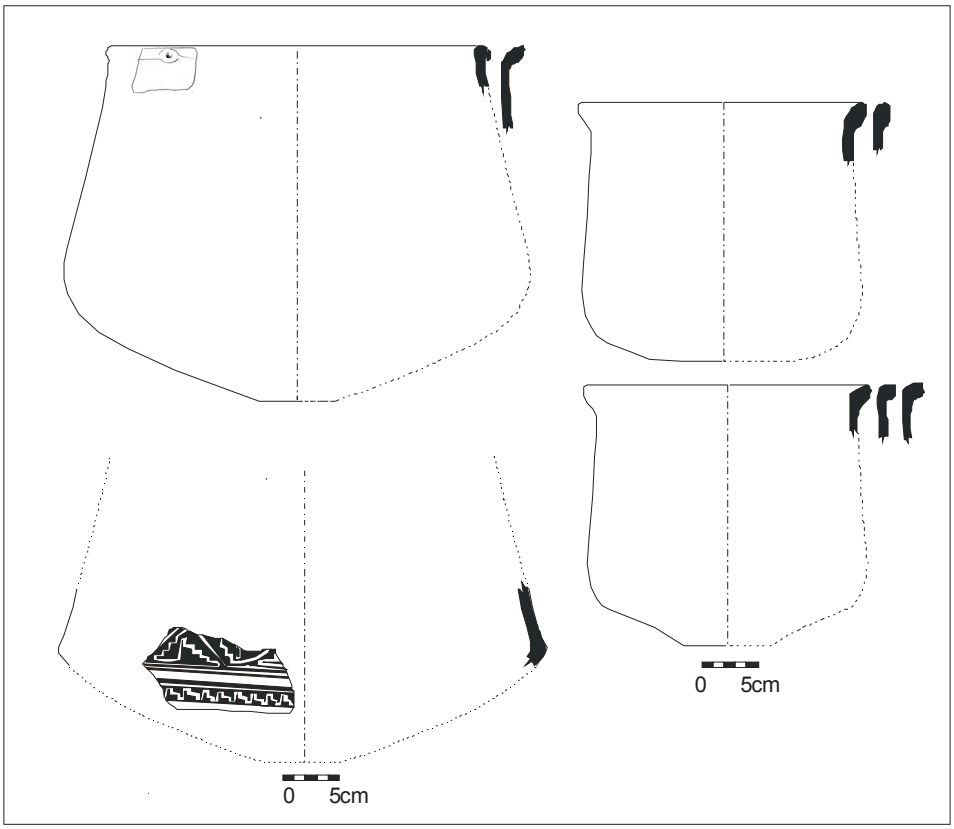


Figure 116 - M-17 vessel type XXV

Type XXVI

Flat-bottomed vessels with vertical, slightly outsloping walls, exteriorly thickened rim. Paste is grog tempered, no decoration was present (Figure 117).

Rim diameter: 24 cm. Estimated height: 21 cm.

Wall thickness: Ranges from 0.5 to 0.6 cm.

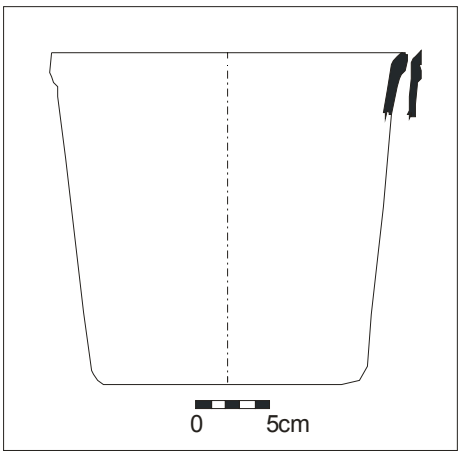


Figure 117 - M-1 vessel type XXVI

Type XXVII

Globular vessels with constricted, vertical neck and everted rim (Figure 118). Paste is grog tempered in both Camutins and Inajá Plain types. One White Slipped fragment from M-17 sample was decorated with black parallel painted lines around the neck.

Rim diameter: The single specimen from M-1 was 7 cm in diameter (Figure 118b). Ranges from 7 to 20 cm in M-17 sample.

Estimated height for M-1 specimen: 38 cm. Estimated maximum height for M-17 sample: 23 cm.

Body wall thickness: The single specimen from M-1 was 1.2 cm. It ranges from 0.55 to 0.9 cm in M-17 sample.

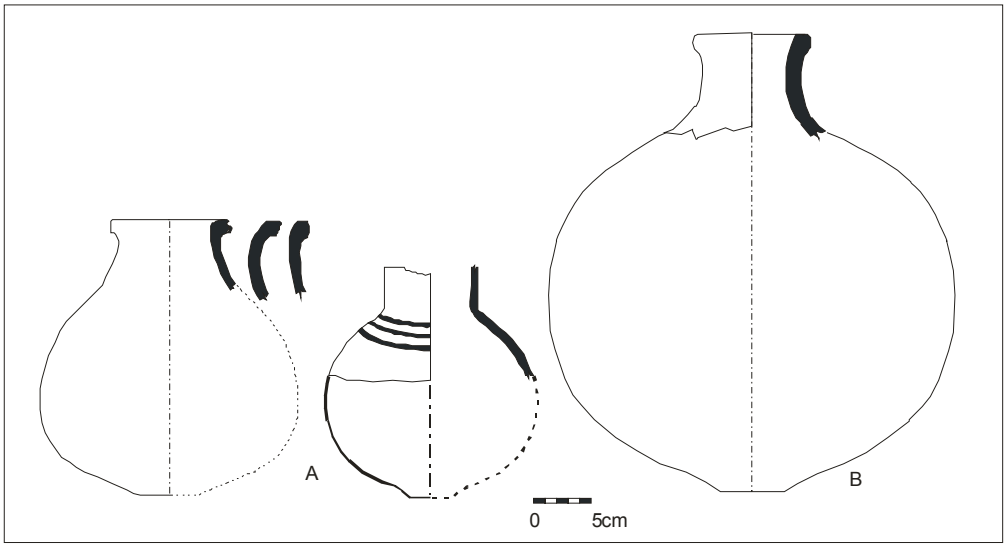


Figure 118 - M-1 and M-17 vessel type XXVII

Type XXVIII

Vessels with reduced flat base, ovoid or globular body, pronounced or rounded shoulder and outsloping or vertical neck, and widely everted thickened rim (Figures 119 and 120). The typical example is the Joanes Painted funerary vessel, adorned with anthropomorphic faces on opposite sides. Paste is grog tempered, Camutins or Inajá plain. Decoration is more often Joanes Painted, but includes Scraped and Red Slipped types. A number of sherds from M-17 sample had also modeled noses below the rim (Figure 120). Although this vessel type was often used as a funerary vessel, it may have had other uses.

Rim diameter: Ranges from 20 to 54 cm (with most vessels larger than 52 cm) in M-1 sample; from 17 to 54 cm (median 31 cm) in M-17 sample.

Body wall thickness: Ranges from 0.7 to 1.2 in M-1 sample; from 0.6 to 2 cm (median 0.95 cm) in M-17 sample.

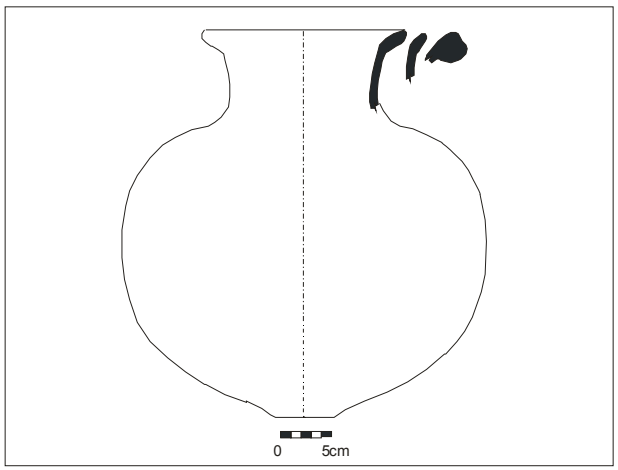


Figure 119 - M-1 vessel type XXVIII

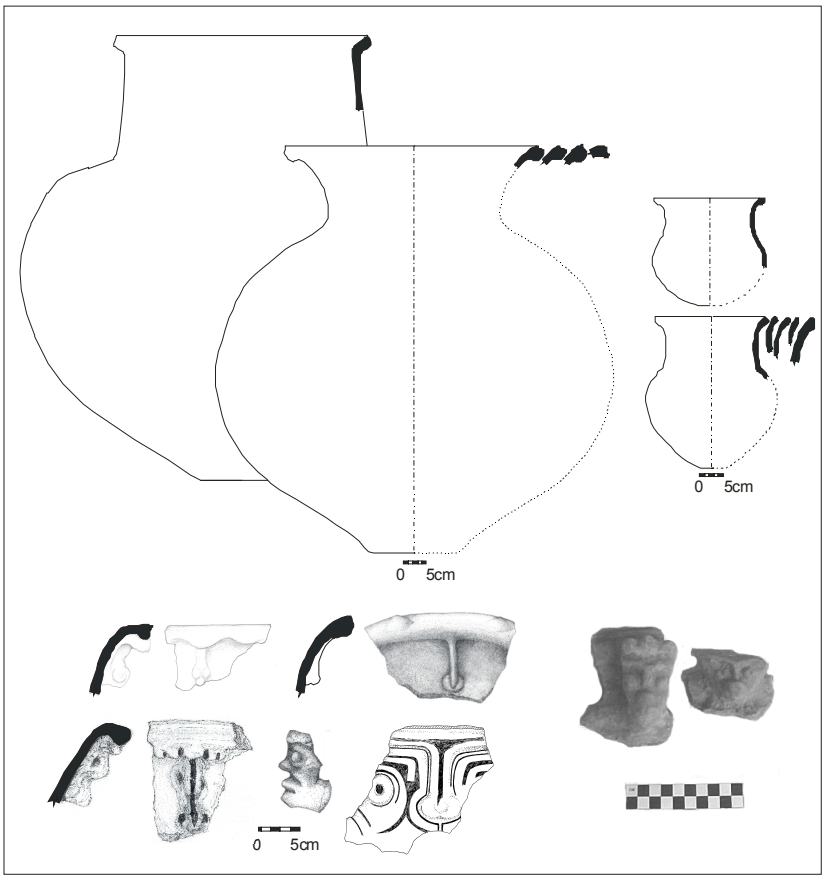


Figure 120 - M-17 vessel type XXVIII

Less Common Vessel Forms and Miniatures

Less common vessel forms include miniatures, two types of serving bowls and a roughly finished cylindrical vessel found in both M-1 and M-17 assemblages.

a) *Miniatures* – M-1 assemblage included four miniatures; M-17 included only one. Miniature 1 (Figure 121a) is a complete flat-bottomed open bowl, with 5 cm rim diameter and 3 cm tall, with handles on opposite sides of the rim. The exterior surface was not finished, revealing the coils. Rim and handles were decorated with parallel incisions. Miniature 2 (Figure 121b) is a fragment of a plain, roughly circular plate, with a thickened rim, 7.5 cm of maximum diameter. Miniature 3 (Figure 121c) is a rounded-bottomed, carinated vessel, with insloping walls and a constricted, direct rim. The lip and surface were uneven, as if the vessel was not finished. Miniature 4 (figure 121d) is a fragment of a rounded vessel with constricted rim, with a modeled zoomorphic adornment on the exterior wall. The mouth is not perfectly round. The crude appearance of these vessels suggests they were produced by children. Miniature 6 (Figure 121a), on the other hand, is a Red Excised cylindrical vessel, with carefully executed designs. Rim diameter is 4 cm.

b) *Small Cylindrical Vessels* – M-1 and M-17 samples included each one a example of cylindrical, flat-bottomed small vessel (maximum diameter for M-1 example is 7 cm, the same being estimated for M-17 example), with unfinished surface (Figures 121e and 122b). It was formed by modeling, instead of coiling. As with the miniatures, it was probably produced by unskilled potters, probably children.

c) *Uncommon Bowls* – These two unusual bowl types are known from Museum collections. One consists of an open bowl, with an annular base and two joined concavities. Two examples of this bowl were found in M-17 assemblage (Figure 122c,d). Another type consists of a flat-bottomed bowl with outsloping sides and thickened rim, ornamented with three solid

adornments. One of these appendages was found in M-1 sample and another one in M-17 sample (Figures 123b & 124a). Other anthropomorphic and zoomorphic appendages were found in both samples, belonging to vessels and bowls whose original forms were not identified.

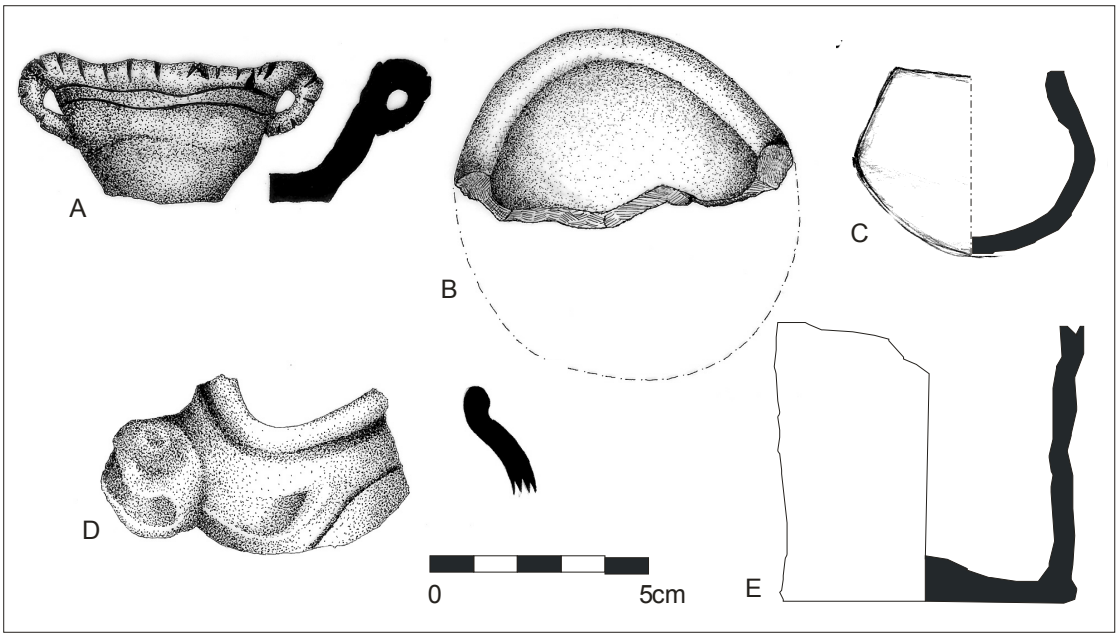


Figure 121 – Less common forms and miniatures from M-1

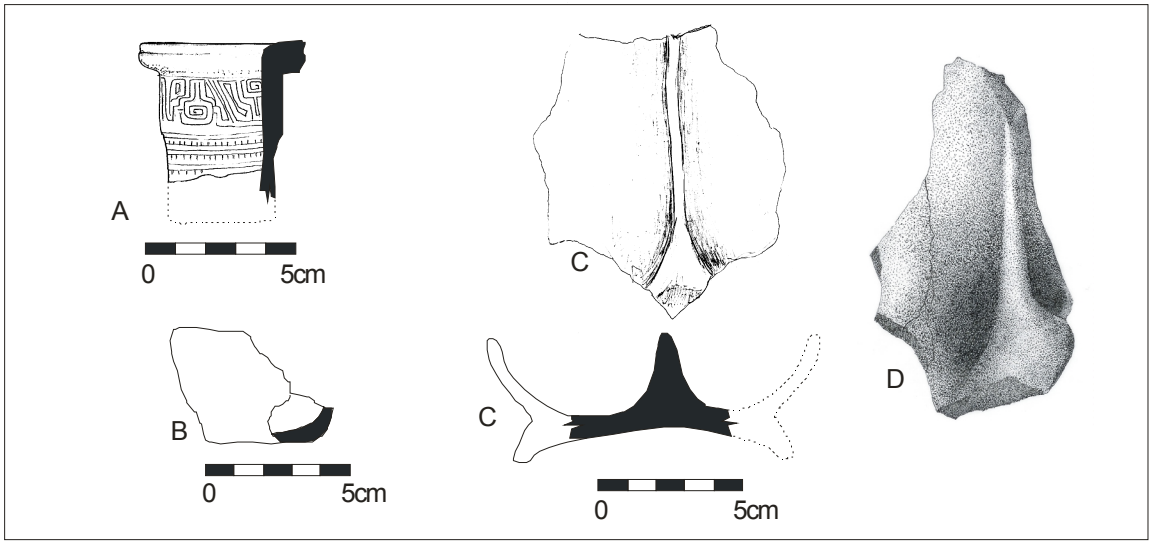


Figure 122 - Less common forms and miniatures from M-17

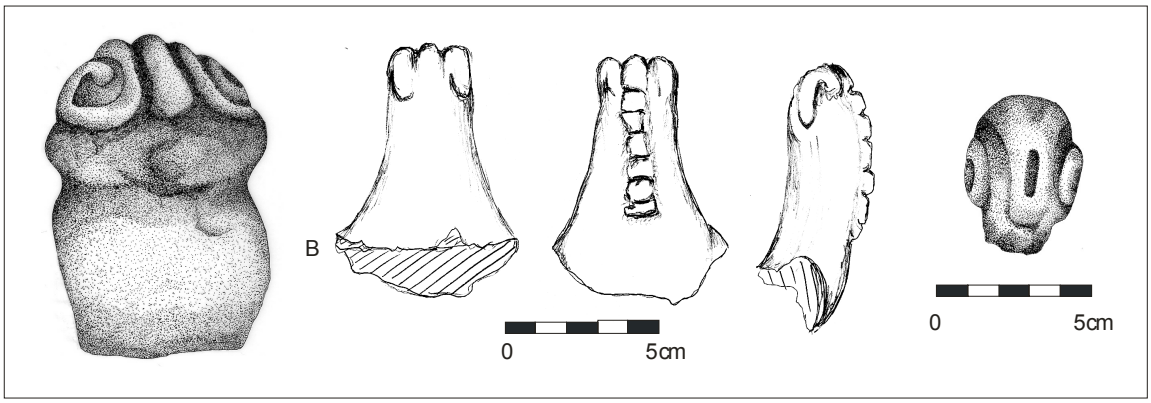


Figure 123 – M-1 appendages

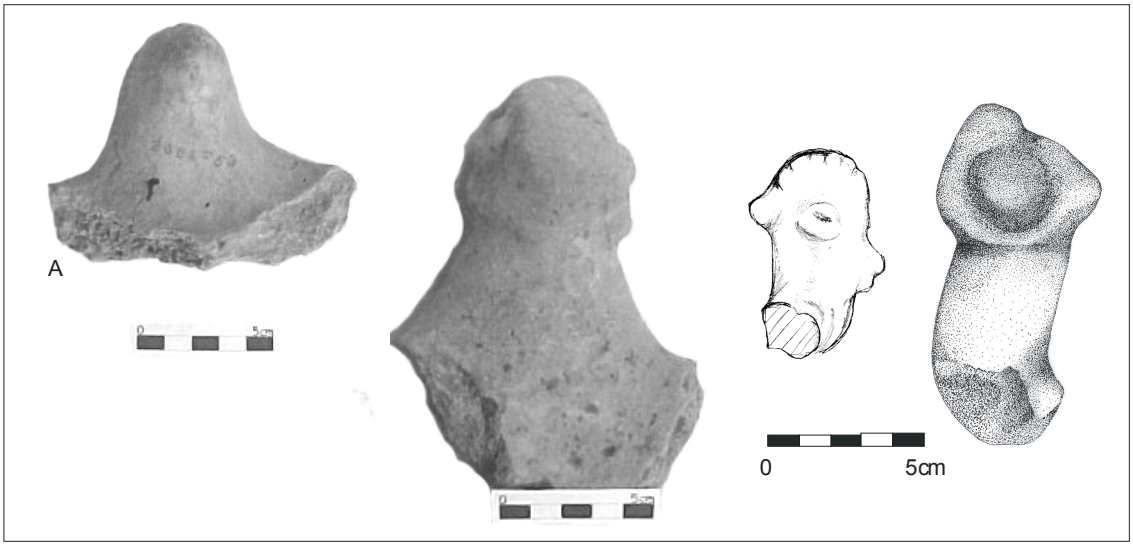


Figure 124 – M-17 appendages

COMPARISON BETWEEN M-1 AND M-17 VESSEL ASSEMBLAGES

Based on the selected sample, it was possible to evaluate the relative occurrence of vessel types in both mounds. Vessel Types II, XIII, XIX, XXIII and XXIV are absent in M-1 but present in M-17, while Vessel Types XII and XXVI are absent from M-17, but present in M-1 (see Table 31). The differences between M-1 and M-17 with respect to proportions of vessel type sherds are very significant and of moderate strength ($X^2 = 58.74$, $p \leq .001$, $V = 0.245$). It may indicate that different types of activities were carried out in each mound. On the other hand, it may indicate that while similar activities were carried out in each mound, their intensity varied, suggesting some degree of specialization.

Organizing the data according to major categories of vessel types (Table 32), the proportions of each vessel category is similar in both mounds. In fact, a statistical test of the probability associated to these proportions shows that the differences are probably due to vagaries of sampling, since they are not very significant ($X^2 = 0.0135$, $p > 0.5$, $V = 0.003$).

Therefore it is possible to assume that domestic and ritual activities, as well as activities related to storage were carried out in both mounds. If some specialization occurred, it happened within certain categories of activities. For example, inhabitants from the two mounds could have cooperated in food processing or feasting, without establishing any hierarchical or permanent distinction between activities carried out in each location. Each mound was, however, to a certain extent, self-sufficient in food processing, feasting and storage.

Some important distinctions can be made in terms of ceramic vessel types present in M-1 and M-17. For example, Vessel Type I has a more consistent and regular shape in M-1 than in M-17. At M-17, there is a greater variety of shapes, particularly given the use of carinated forms. Type I vessels in M-1 are larger and deeper, which would be more consistent with grinding. At M-17, vessels tend to be smaller and shallower. Together with the variety of shapes, it may

indicate that at M-17 this type of vessel was used for a wider variety of purposes, while at M-1 the use was more restricted.

The absence of Vessel Type II in M-1 may indicate that cooking liquid meals (such as stew or soup) was more common in M-17. Vessel Type IV is more popular in M-17 than in M-1. This is again a carinated vessel, used for a variety of purposes that may include manioc and açaí processing. It may well indicate that carinated forms were more popular in M-17, given both a preference and the need for this type of vessel.

Although similar considerations can be drawn regarding other vessel types, the data does not indicate a strong specialization between the mounds. It seems that while some differences existed, similar activities were carried out in both locations. Some of the differences perceived in vessel forms and shapes can be credited to the fact that ceramics were produced in both mounds, thus individual variation and local preferences were also important.

DISTRIBUTION OF VESSEL ASSEMBLAGES AT M-17

Spatial Distribution

Frequencies of vessel types were observed according to their spatial distribution at M-17 (Table 33). Vessel types XIX and XX were excluded from the count, for being small containers for personal usage. Excavation 4 was split into two different columns, separating the material from the slope (garbage fill), which was called excavation 4, from the material from the preserved layers of the top of the mound, which was called excavation 4t. Excavation 3 was excluded due to the small sample size of the analyzed rim sherds.

The relative frequencies of vessel categories according to their spatial distribution can be examined through the bullet graph below (Figure 125), where the proportions of vessel types in

each excavation are shown with their attached error ranges and associated probability. The small size of samples from excavations 4t and 5 resulted in larger error ranges.

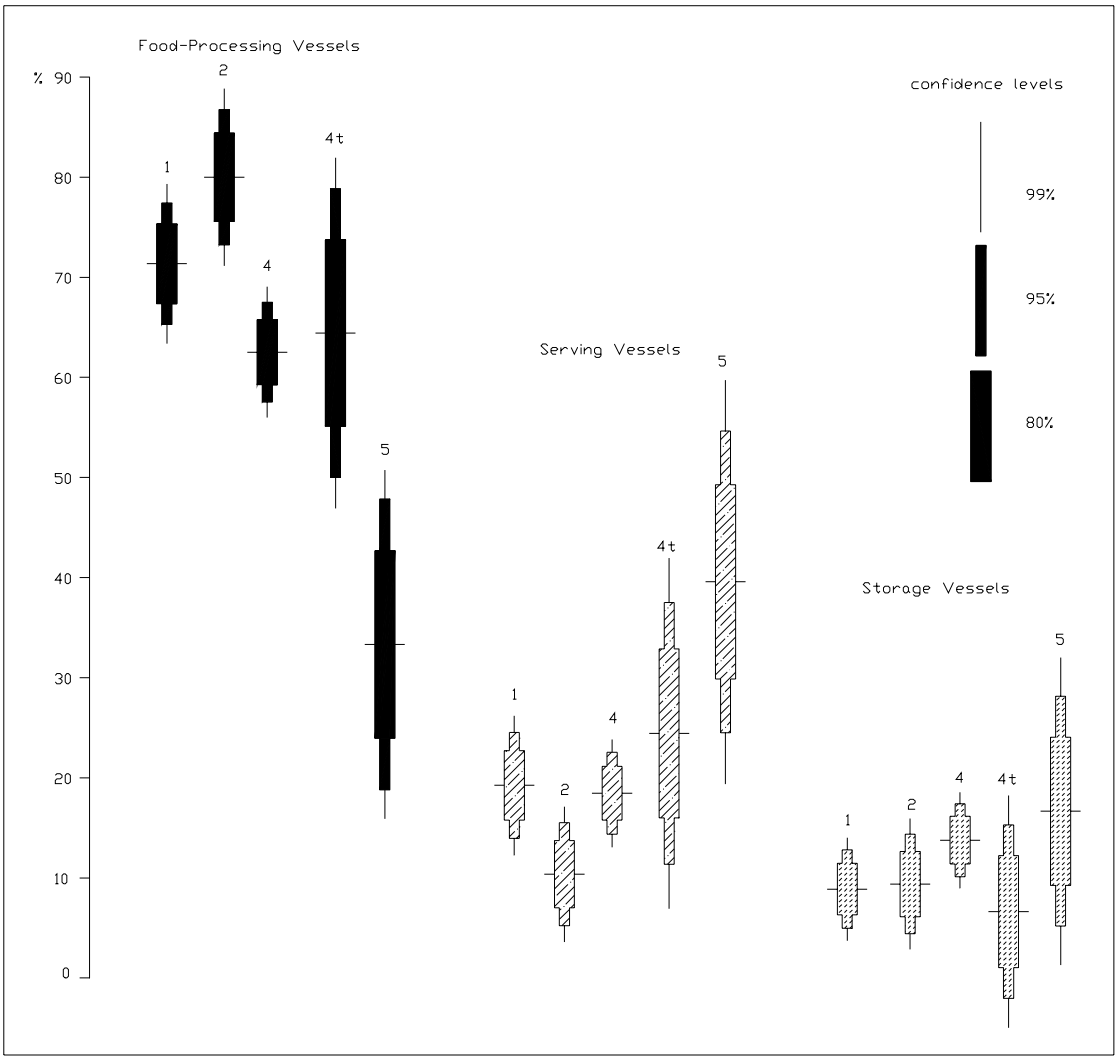


Figure 125 - Comparison of proportions of vessel types in M-17 areas

It is possible to conclude that significant differences in the distribution of vessel types across the site is related to both food processing and serving vessels, while storage vessels have a more even distribution everywhere. Excavations 4t and 5 have significantly greater proportions of serving vessels, which is consistent with their location on the top of the mound and burial area. Excavation 2, on the other hand, located in a peripherical, lower elevation, has proportionally

more food processing vessels and less serving vessels. The differences in proportions of food-processing vessels between excavations 4 and 4t are within the 80% error range. However, as far as serving vessels are concerned, the difference is highly significant (more than 99% confidence level), indicating that more often serving vessels would be used and remain on the top area, or be used in other areas instead of being discarded in the garbage fill.

Chronological Distribution

A few chronological trends could be observed in terms of proportions of vessel types in M-17. For example, Vessel Type II occurs in deeper levels. Only three sherds out of 25 occurred above 60 cm in excavation 4, the place where the majority of the sherds belonging to this type was found. Also, serving vessels are less frequent in upper layers in all excavations, although the sample size per level is too small to allow for statistical confidence.

CERAMIC OBJECTS FROM M-1 AND M-17

Stools

Stools are thick rounded pottery disks attached on top of flaring, annular bases (Meggers and Evans 1957: 381). The top is either flat or slightly concave, and few examples had a perforation in the center. Ethnographic analogy indicates that stools are symbols of power and leadership; their use by shamans and chiefs, would help them in establishing contact with the supernatural world (McEwan 2001). Some of the designs used to decorate Marajoara stools are also observed in ethnographic stools, such as those of the Desana Indians from the northwestern Amazon (reproduced by Ribeiro 1992).

Funerary vessels depicting individuals seated on low stools are common in the archaeological cultures of the lower Amazon (Gomes 2001; Guapindaia 2001), indicating that

stools were prerogative of both ancestors and those with similar status (McEwan 2001). Pottery stools are virtually absent from Marajoara iconography, but present among the sherd assemblages.

Among the nine stools or stool fragments collected in M-1 there were 2 incomplete plain examples, one of them with a perforated center, and seven decorated, including excised and incised types. Seat diameter ranges from 15.5 to 20.5 cm (median 18 cm), which characterizes the stools as medium sized. One of the stool fragments (Figure 126a) was found in the fill of a burial excavated next to profile 3. It is 18 cm in diameter and its seat is decorated with well executed parallel incised lines arranged in crossed bands that evoke woven textile or basketry. A 15.5 cm in diameter, plain, perforated stool, was found during the cleaning of profile 2 (Figure 126b). The remaining stools (Figure 126) were found during surface collection.

Among the nine stools collected in M-17, five were plain, including a whole one found at level 90-100 cm in excavation 1. One of the plain fragments had a perforation in the center. Guajará Incised, Plain Incised and Joanes Painted were among the decorated types. Seat diameter varies from 15 to 22 cm (median 20 cm, 15 is an outlier). Although still characterized as medium sized, M-17 stools are larger than M-1's.

Stools in M-17 were found in excavation 1 (open area) between the levels 50 and 100 cm, in Excavation 4 (top of the mound) between the level 50 and 70 cm, in the garbage fill, level 105-115 cm, and in the cemetery area, between levels 30 and 80 cm, not associated with any particular burial (Figure 127).

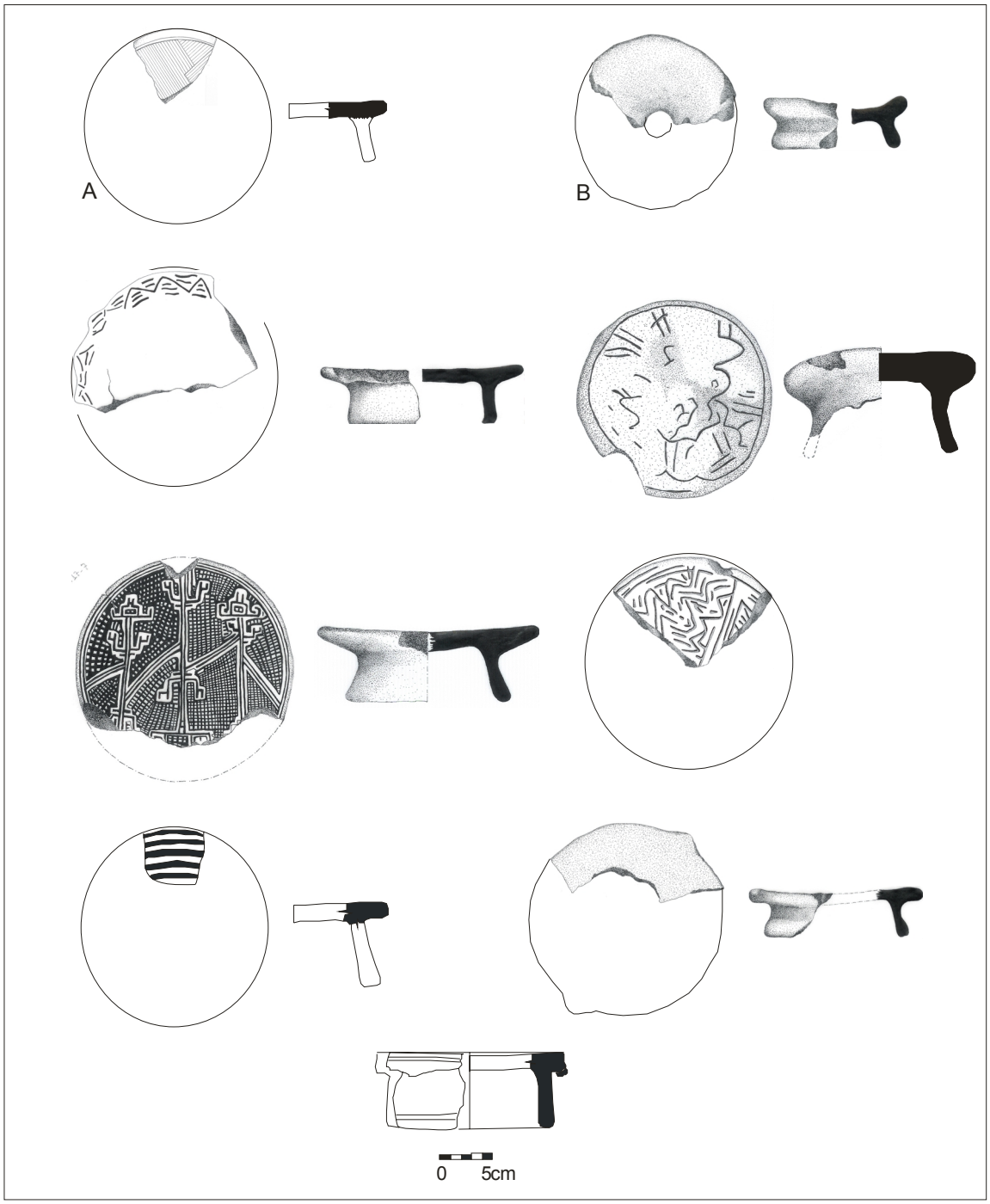


Figure 126 – M-1 pottery stools

Comparing M-1 and M-17 assemblages, it is evident the great variability in terms of decoration. Particularly one stool from M-1 showed a very elaborate decoration, in contrast to a higher number of plain stools found at M-17. On the other hand, M-17 stools are consistently larger. However, in the absence of information on the cultural significance of either decoration or size it is difficult to evaluate the possible social meanings of the differences observed between M-1 and M-17 stools.

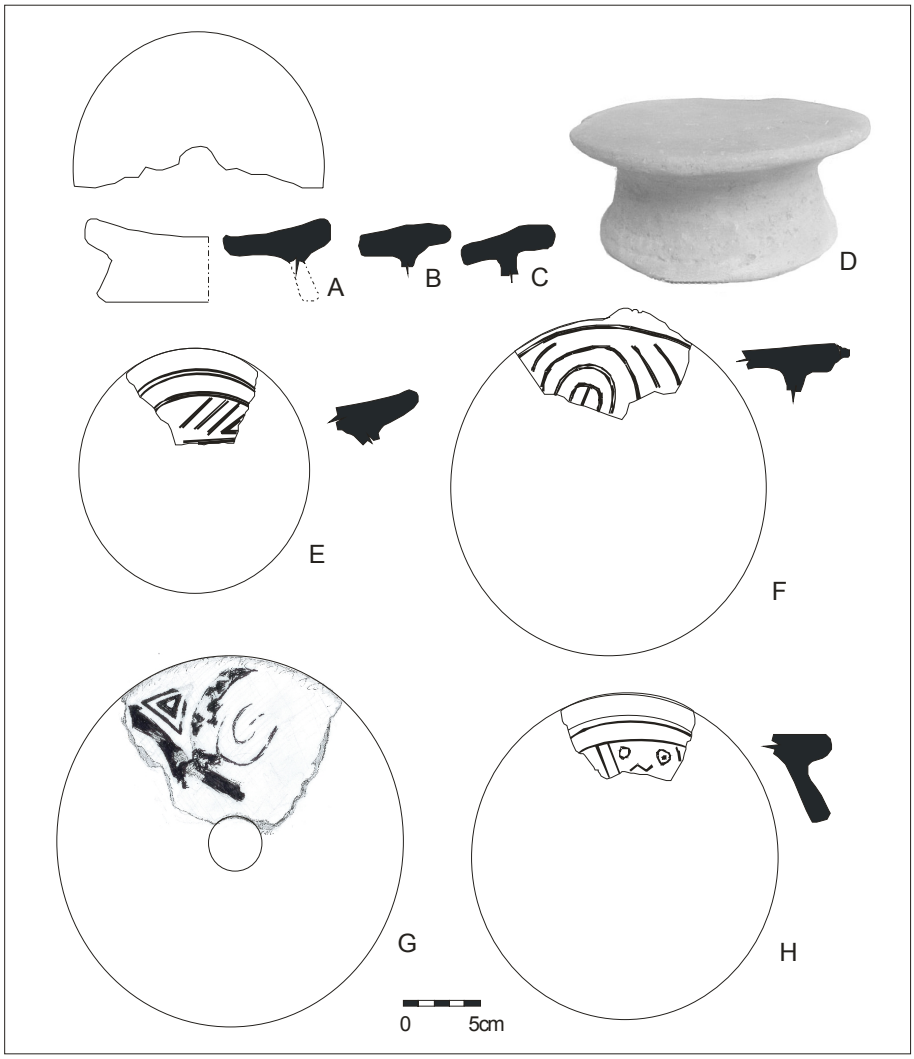


Figure 127 – M-17 pottery stools

Figurines

Fragmented figurines were found in M-1, M-16, M-17 and M-31. A common shape consists of a sexless seated hollow figurine, with open, folded legs, and with their hands fused with their knees, forming two handles on opposite sides (Figures 128, 129 and 130). Similar figurines from M-17 and M-16 were incomplete, headless.

One of the figurines from M-1 had an ovoid head, with a coiled headdress, nubbin eyes and mouth. There is a perforation on the stomach (Figure 128a). It was found during the cleaning of profile 4. Existing height is 10 cm. Two other fragments of the lower bodies of similar figurines were found during surface collection. One consisted of the lower body of a plain seated figurine, which had a perforation across its belly. One of the legs was missing. Existing height is 4.5 cm (Figure 128c). Another fragment consisted of a hollow, conical knee, decorated with three dimensional spirals. Existing height is 4.5 cm (Figure 128b).

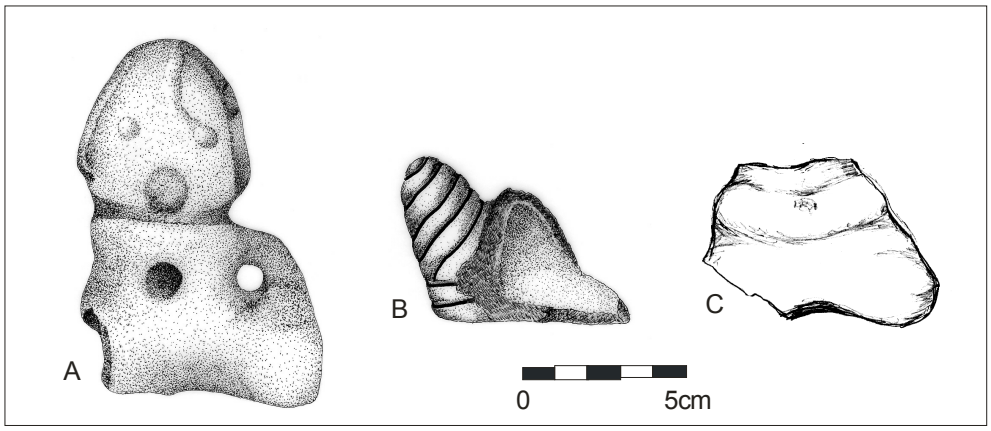


Figure 128 – M-1 figurines

A figurine from M-17 (Figure 129a) is Joanes Painted; red lines highlight the zoomorphic feet and the short leg. Existing height and width are respectively 11 and 7 cm. It was found in excavation 4 (115-125 cm below surface, refuse disposal).

Other three fragmented figurines were found at M-17. One is a Joanes Painted anthropomorphic head, with appliqué ears and eyebrows that are linked to the realistic nose, and a rectangular adornment inserted in the lower lip. The eyes are hollow rectangles, framed by red lines depicting a scorpion. The head is 7 cm wide and 8 cm tall. The estimated original height for the complete figurine is 25 cm. It was found in the west section of the cemetery area, below the level were urns 15 and 16 rested (Figure 129b).

Another fragmented seated figurine consisted of a solid white slipped fragmented torso (Figure 129c). Long hair or a hair dress is implied by a salient feature on the back. Between the legs, there seems to be male genitalia, which is uncommon among Marajoara figurines. This figurine is 7.5 cm wide and 9 cm tall. The original height could have been 14 cm. It was found 50 to 60 cm below surface in the southwest part of the cemetery area.

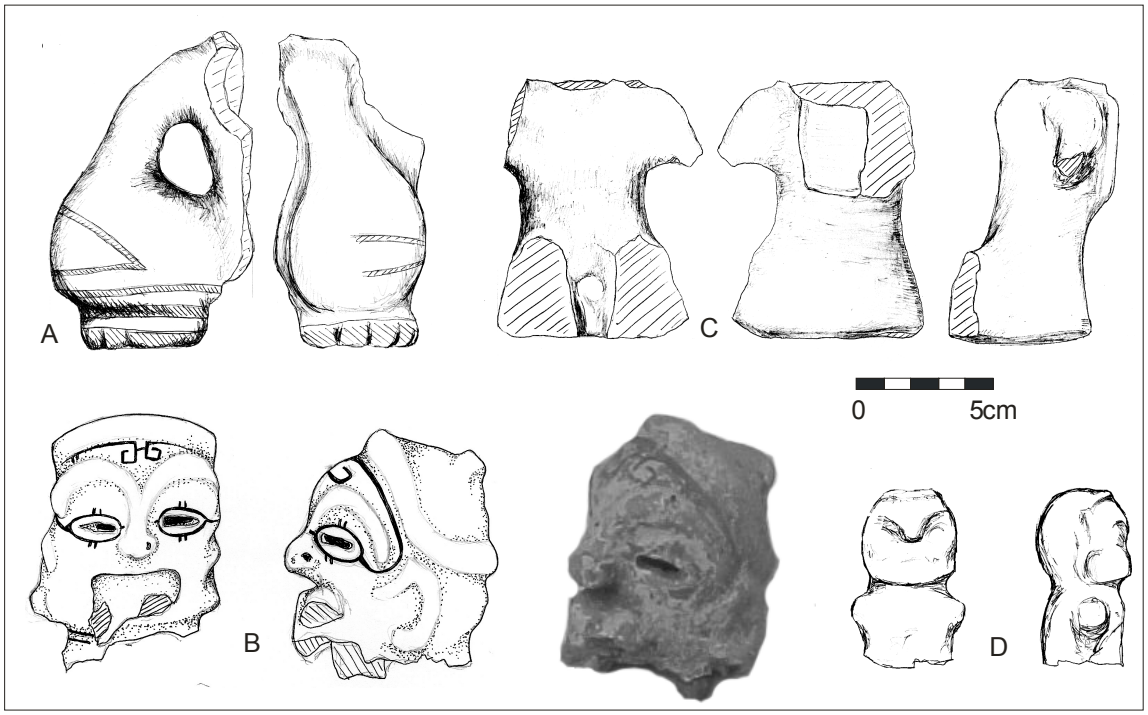


Figure 129 – M-17 figurines

A fourth figurine found in M-17 is a limbless upper body with pronounced shoulders, topped by an anthropomorphic head (Figure 129d). Appliqué eyebrows join the nose and, although some modeling suggests the facial features, there are no painted lines or nubbins indicating mouth and eyes. It was originally Joanes Painted, which can be concluded from the remains of white slip. It was found in the cemetery area, in the northwest portion of the excavation, 60 to 70 cm below surface. Existing width and height are respectively 4 and 6 cm.

The body of a plain, seated figurine was found in M-16 (Figure 130a). The existing height is 7 cm and the existing width is 9.5 cm. In M-31, the base of a seated, plain figurine was found on the surface (Figure 130b). Existing width is 10.5 cm and existing height is 4.5 cm.

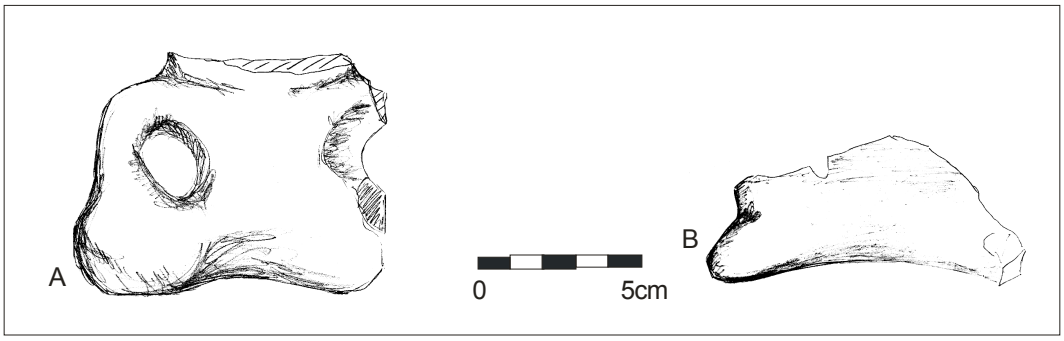


Figure 130 – M-16 and M-31 figurines

Both the similarities and differences observed between the figurines from M-1, M-16, M-17 and M-31 are consistent with the variability found in museum collections (Schaan 2001a). Despite the small amount of figurines from M-17, all but one was in the cemetery area, implying a ritual significance, although they were not associated to any particular burial. Figurines were not restricted to the ceremonial mounds of the lower course of the river, although they might be restricted to elite mounds. M-1 and M-17 examples do not show qualitative differences that could imply hierarchical relation between the mounds with respect of this type of ritual object.

Tangas

Tangas are thin triangular concave ceramic pieces, similar to the pubic coverings made out of vegetal materials, used by women of several Amazonian tribes. The only known case of modern use of such pottery artifact was reported among the Panoan tribes of the Ucayali River, where girls would wear an egg-shaped ceramic pubic covering during their puberty observance period (Steward and Metraux 1948: 585, quoted by Meggers and Evans 1957:416).

Tangas are either red slipped and polished, or decorated with geometric red or red-and-black designs over a white slipped surface. The decorated tangas are the most impressive and rarer, which could be taken as a measure of their importance, such as that they were worn by high rank women, in special occasions. Red tanga fragments, on the other hand, are more popular on the mounds' surface, catching the eyes by their bright red coat. Among complete tangas found in burials, tan or red slipped types are often associated with highly decorated vessels (Meggers and Evans 1957; Schaan 2003d). The tan or light orange slipped type is uncommon in fragment collections. If highly decorated funerary vessels were reserved for high rank individuals, the red and tan slipped tangas had greater status significance.

Significant amounts of tanga fragments, as well as a few complete and fragmented specimens, were found in both M-1 and M-17. Tanga fragments were absent from surface collections from other elite mounds, including M-16. Decorative designs on tanga fragments from M-1 and M-17 mounds are within the same range of variability observed in museum collections. It was not possible to establish differences between the two mounds regarding designs on decorated fragments (Figures 131 and 132).

In M-1 assemblage, 4.36% of all pottery sherds were tanga fragments. In M-17, the proportion was 3.89%. The relative proportions of Red Slipped and Joanes Painted types also vary between the two mounds (see Table 34).

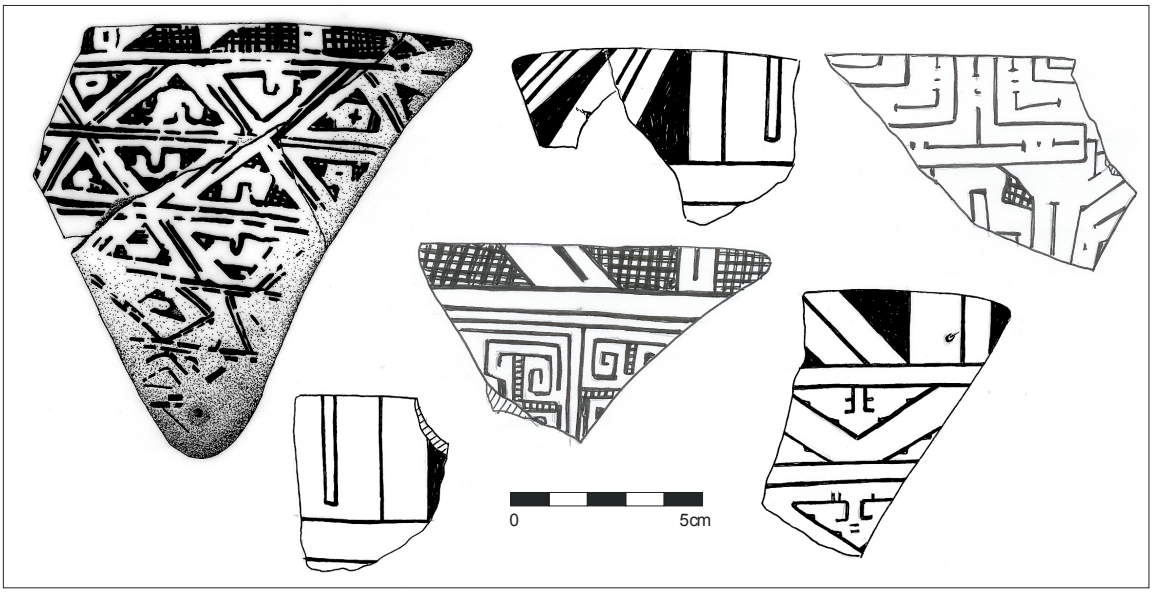


Figure 131 – M-1 tangas

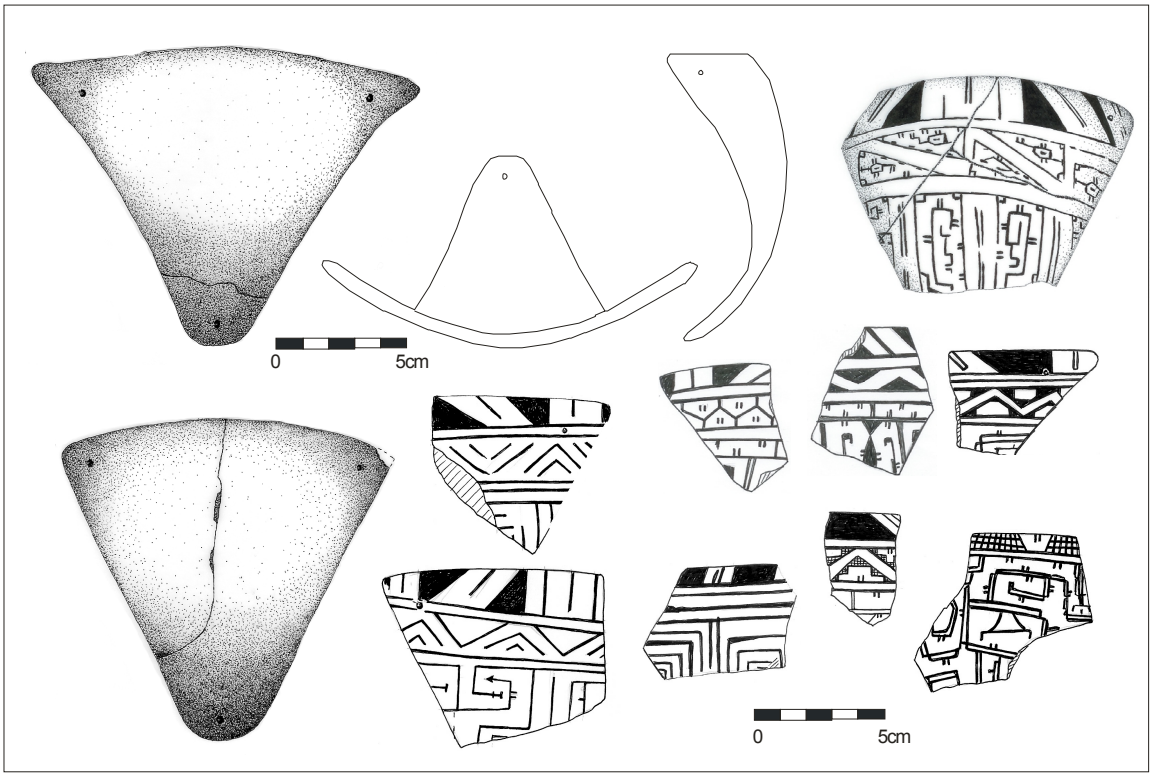


Figure 132 – M-17 tangas

The observed differences between M-1 and M-17 with respect to relative proportions of red slipped and decorated tangas are highly significant and of moderate strength (X^2=13.03, $p < 0.001$, Φ=0.2).

Considering the likelihood that tangas have social significance, representing group or family affiliation as well as gender and age (Meggers and Evans 1957; Schaan 2001b, 2003b), it is possible that the observed differences in proportions reflect differences in the population of females who inhabited each mound. Because of the more common association of red tangas to burials, and the fact that they are in higher proportions, it has been proposed that red tangas belonged to elder women, while decorated tangas would be used by girls in puberty rites (Schaan 2003a). If that is true, a higher population of elder women would be expected for M-1.

Now, regarding proportions of tanga fragments with respect to each excavated area in M-17, tanga fragments are more frequent in excavations 1 and 4 (Table 35), which are open areas (top of the mound and refuse disposal). Figure 133 shows that there is more than 99% probability that the differences observed between excavations 1 and 4 on one hand and excavations 2, 3 and 5 on the other hand are in fact significant.

Observing the distribution of tanga types between excavated areas (Table 36), it is observed that red tanga fragments are far more frequent in all excavations than painted tanga fragments.

In order to assess the significance of these proportions, the mean for each sample of red tangas was calculated with error ranges and associated probability of 80, 95 and 99% confidence levels (Figure 134). Only the proportions of red tangas are represented, since the results for decorated tangas are exactly the opposite. The bullet graph shows that differences between excavations 1, 4 and 5 have an associated probability of about 80%. More significant differences exist between these excavations on one hand and excavations 2 and 3 on the other hand. Combining the results from the two graphs, it is possible to conclude that higher proportions of

tanga fragments on the top of the mound, in areas associated with outdoor activities (rituals, feasting and pottery production), are also related to significant proportions of decorated tangas. If painted tangas are associated with young females and puberty rites, it is possible to suggest that initiation rites were more frequent at M-17 than at M-1.

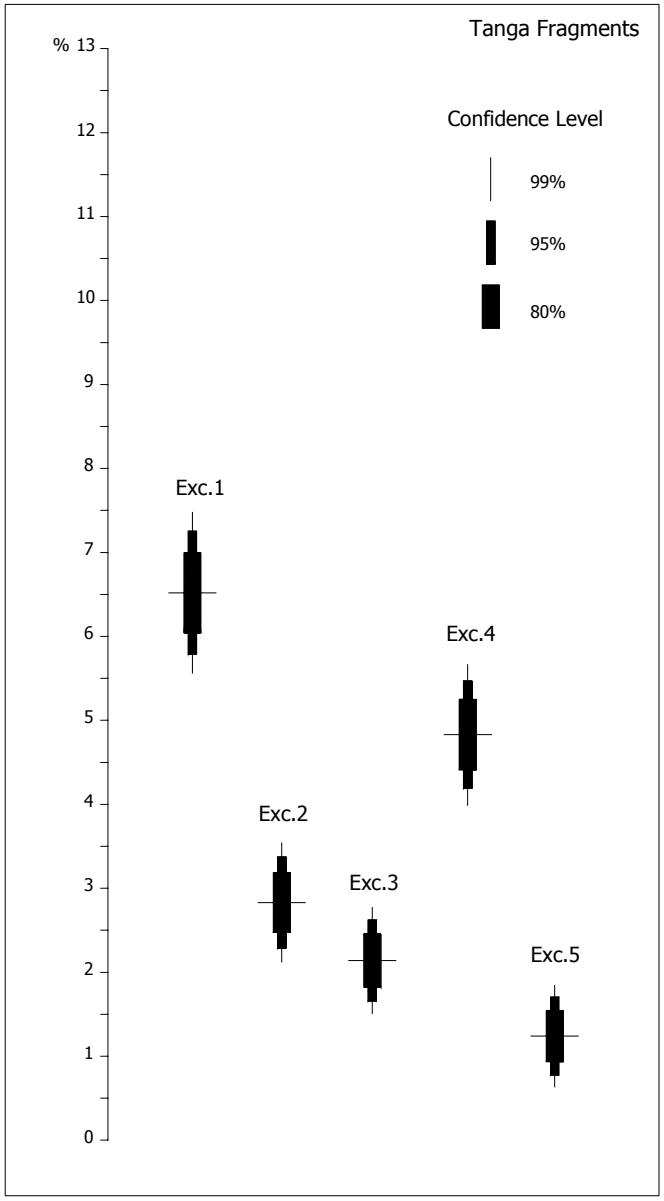


Figure 133 – Spatial variability in proportions of tanga fragments in M-17

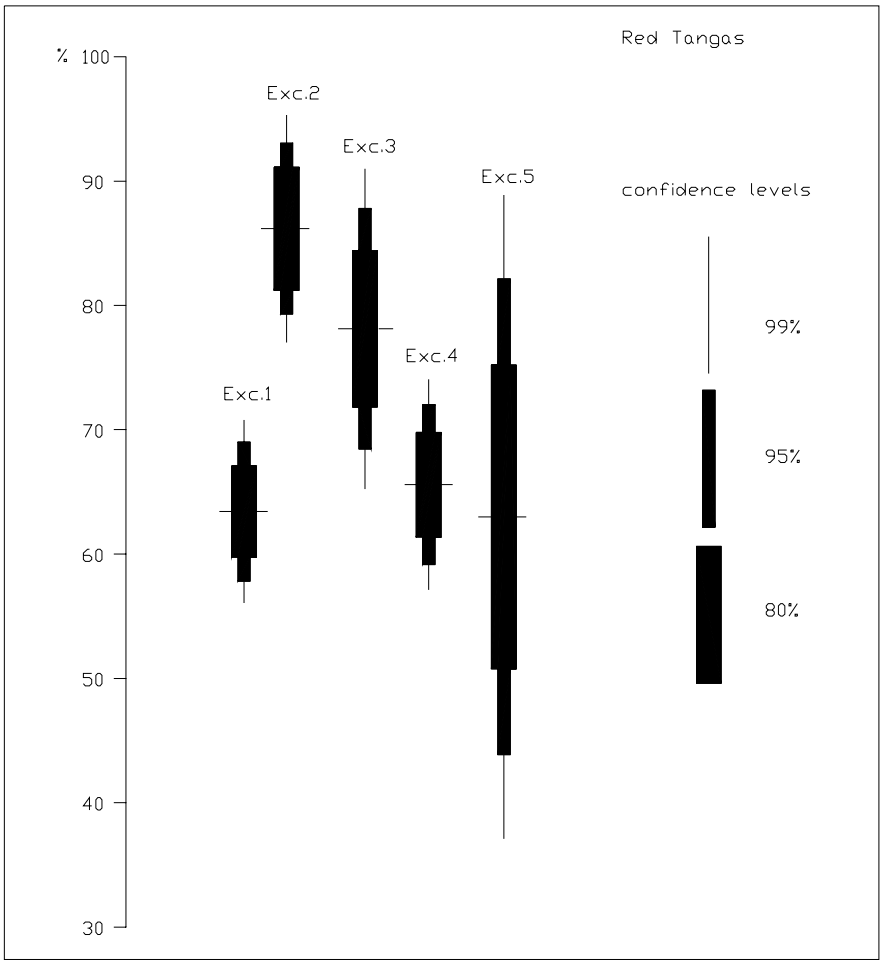


Figure 134 – Relative proportions of red tangas in M-17 excavations

Snuffers

Two complete and one fragmented snuffers were found in M-17. They consist of an oval shaped constricted miniature bowl, with a hollow stem on one side. Meggers and Evans (1957:380-1) called these objects "spoons", but research conducted by Klaus Hilbert (1992), based on ethnographic and archaeological material, identified them as snuffers. Roth (1929: 243-7) reported that quite a few drugs used by Indians of the Upper Amazon were inhaled through

their nostrils. One of the devices for inhalation described by Roth (op.cit.: Fig 67) is similar to the Marajoara snuffers.

M-17 assemblage presented a large, plain snuffer, 9.8 cm long and 4 cm wide (Figure 135a), a small, red excised snuffer, 6 cm long and 3.2 cm wide, with carefully executed excised designs on the bottom (Figure 135b), and a 3 cm long, 1.8 cm wide fragment of a hollow stem (Figure 135c). These objects were collected respectively in excavation 4 (50 cm below surface), excavation 5 (54 cm below surface) and in excavation 3 (50 cm below surface). The provenience indicates they were all contemporary.

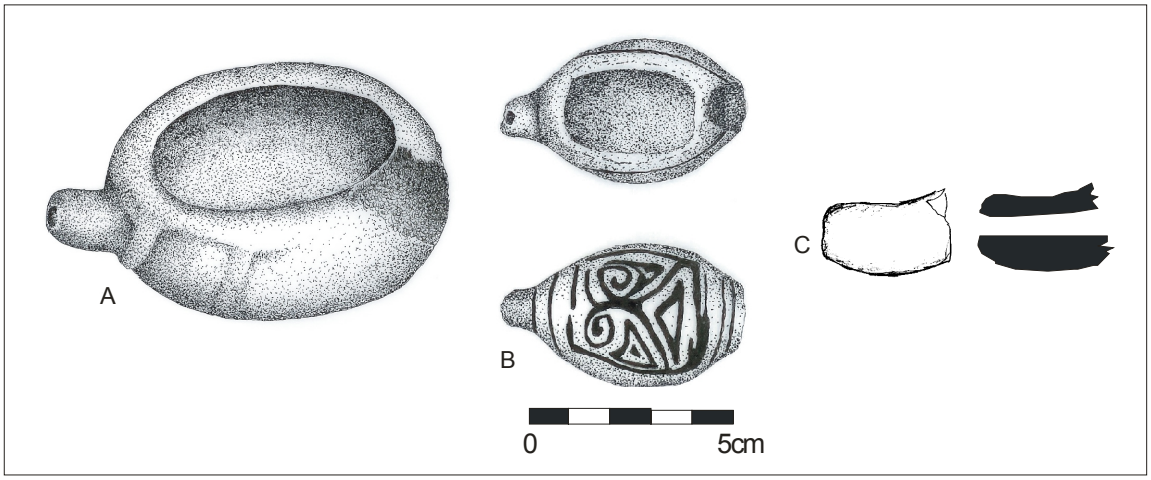


Figure 135 – M-17 snuffers

Spindle Whorls

One complete and two fragmented spindle whorls were collected in M-17. One is a solid, almost conical object, with a rounded base and a flat top, 4 cm long, 3.8 cm of maximum diameter, with a longitudinal perforation. It is decorated with incised spirals and triangles (Figure 136a). It was found in excavation 2, 70 cm below surface, thus this it is the oldest object of its

type in the mound. A fragmented flat, rounded disc, 5.4 cm in diameter, with a perforated center is also believed to be a spindle whorl. Its surface is decorated with punctures (Figure 136b). It was found in the refuse disposal, 20 cm below surface. A third specimen is a fragmented solid sphere, with a maximum diameter of 3.4 cm, decorated with incised lines and punctures. A perforation was observed in cross-section (Figure 136c). It was also found in excavation 4, top of the mound, between 20 and 40 cm below surface.

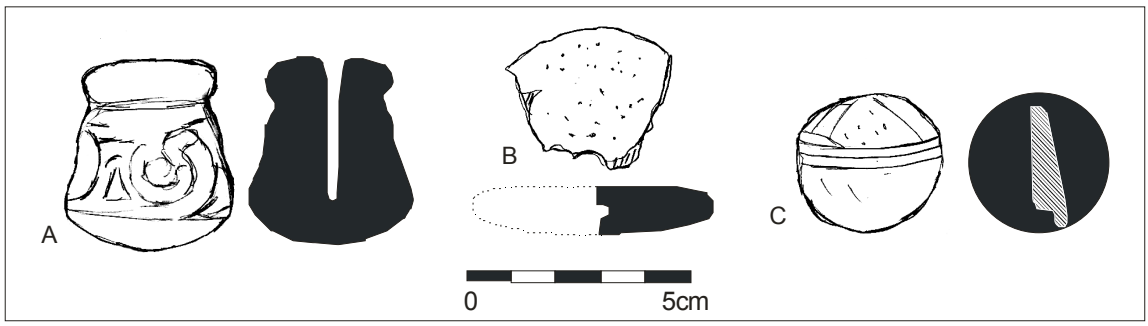


Figure 136 – M-17 spindle whorls

Pendants

Two pottery pendants were found at M-17. The first one consists of a 5.2 cm long, 5 cm wide, and 2 cm thick flat object shaped as an anthropomorphic torso. Incised lines mark the waist and the junctions with the absent limbs. A perforation crosses the entire object at the level of the under arms (Figure 137a). It was found in the cemetery area, in the fill around burials 15 through 19, 80 cm below surface. The pendant is flat, frog shaped, with incised lines marking the torso, head and legs, much in the style of the famous nephrite *muiraquitãs* of the lower Amazon (Boomert 1987; Gomes 2001:141) (Figure 137b). It was perforated at the head level, and found in excavation 3 (inside the house), 60 to 70 cm below surface.

Frog-shaped pottery pendants were identified in private collections, as well as in the Casinha site (mentioned in Chapter 4). Given the probable high status assigned to bearers of the lithic frog-shaped pendants, the pottery ones can be interpreted as emulation. At the same time, it points to the scarcity of lithic pendants.

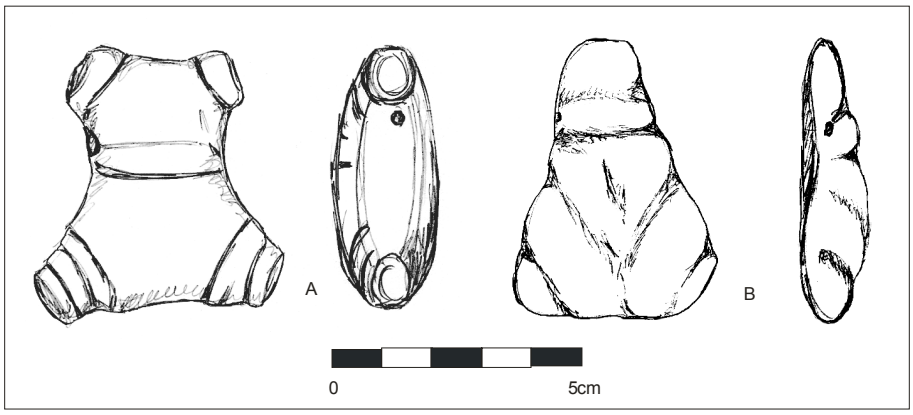


Figure 137 – M-17 pottery pendants

Pottery Labrets

Two pottery labrets were found in M-17. One was found in the burial area, 104 cm below surface. It is a white slipped, 4.5 cm long elongated cone (Figure 138a). The other one is similar in shape to the first object, but it is roughly finished. It was found in the refuse disposal, 40 to 50 cm below surface (Figure 138b).

Figure 138 – M-17 pottery labrets

DISCUSSION

Craft Specialization

In the beginning of this chapter, it was proposed that craft specialization cannot be assumed on the basis of the quality and standardization of the final products, but that the contexts of production and use of ceramic goods should be examined in order to assess division of labor and the role of craft production in the political economy. Throughout the chapter, evidence for pottery production, as well as the study of vessel forms and the spatial distribution of pottery types were presented in order to characterize mode of production and patterns of consumption and distribution in the Camutins Site.

Identification of clay sources, observation of local weather conditions, as well as the results of a small experiment with pottery production provided some insights about availability of resources and environmental conditions that likely affected pottery production in the past. For instance, floods and intense precipitation from January through May are assumed to have inhibited pottery production, since clay deposits were submerged, high humidity levels delay the drying of pots, and the unpredictability and frequency of rains impair open firing. For these reasons, it is highly unlikely that pottery was produced during the winter months. Arnold (1985: 90) considers that climate alone can be used to predict seasonality in pottery production; in the absence of kilns or drying facilities, pottery production is impossible during periods of intermittent rains in tropical climates. As a consequence, pottery production would be a seasonal activity, which could be considered, at best, part-time specialization. Potters would necessarily have to engage in other economic activities in order to survive.

Costin (1991:43) defines specialization as "a differential participation in economic activities", which is measured according to the ratio between producers and consumers. Since individuals may engage in one or another economic activity due to their personal abilities, some

level of specialization is always expected. In this sense, the degree of specialization is what has to be evaluated. Highly specialized societies would be the ones in which there are few producers attending large consumption demands. According to this view, specialization is defined by mode of production, which can be described by evaluating the context of production (independent or attached specialists), concentration of workshops (dispersed or nucleated), scale of production (kin-based or factory), and intensity of production (part or full time specialization) (Costin 1991: 9; 2004: 190-91). These variables will be discussed below in the light of the available data for Marajó Island and specifically for the Camutins Site.

Highly decorated ceramics have a limited distribution in the Camutins site. They were identified in six of the 34 mounds studied. Since evidence for pottery production was identified in two of these mounds (M-1 and M-17) (the others were not investigated for pottery production activities), the ceremonial pottery was likely produced locally, for local consumption (e.g. within the elite domain, for elite consumption). Within these mounds, the small proportion of highly decorated pieces, the uniqueness of most of these pieces, the simplicity of most of the pottery that is usually classified as decorated (White Slipped is more frequent, for example), the predominance of domestic pottery, the presence of children's play, and the absence of a formal workshop indicate that pottery production occurred in household contexts.

Comparing the technology necessary for producing Marajoara ceramics with the ceramics from previous phases (Ananatuba and Acauan, for example) it cannot be said that there was any important technological change. Although Marajoara ceramics are more elaborate and have a number of characteristics that were absent among previous styles, the level of craftsmanship and technology present in Acauan and Ananatuba phases is not inferior to the Marajoara. Marajoara potters did not introduce any technological improvement, such as molds or kilns that would accelerate or standardize production.

Considering the types of vessels produced, the type of pottery paste, the use of open firing, the basic techniques of decoration, and the household context of production in Ananatuba and Acauan phases, it is possible to affirm that the mode of production did not change with Marajoara phase. However, the intensity of production (time, labor input and level of demand) did change. The demand was not regional (given evidence for local styles and lack of evidence of a market economy), but local. The increase in local demand, and the new standards for certain types of vessels have to be analyzed, not in purely economic terms, but within sociopolitical contexts (Brumfiel and Earle 1987; Costin 1991; Feinman, et al. 1984; Hays 1993).

The greater availability of protein obtained through intensification of fishing likely resulted in more free time for activities not immediately related to food production. In this sense, a number of people within the household could dedicate themselves more intensively to pottery production. Moreover, since non-elite people were likely engaged in food production, elite members could specialize in producing ceremonial pottery. In fact, the season during which pottery production is favored by the weather is exactly the same in which food resources are more abundant. The production of high quality pottery by elite members can be understood under Hayden's concept of "prestige technologies". According to Hayden (1995) in societies where pottery has only utilitarian functions, few resources and time are spent in pottery production, in order to make the activity efficient. But in complex societies, "a prestige technology" appears "based on the principle of displaying or showing off one's wealth, power, or control over labor and resources". Therefore, as much time and labor as possible will be invested in producing the prestige goods (Hayden 1995: 258).

An increase in the intensity of production during the summer months may have led to the kind of standardization that is usually associated with non-domestic specialists. Within the kin group, production may have been organized in order to maximize time and efforts, likely creating a production line so a few people would cooperate to produce larger quantities of certain vessels.

It may have involved a few skilled potters and a number of occasional helpers that included children and adults not usually engaged in ceramic production. Although this type of economic arrangement sounds like specialization, since a number of people are engaged in part or full-time activities related to pottery production, it is necessary to ask whether these "specialists" are in fact producing goods they will exchange for food or other products. That seems unlikely. Given the evidence for the distribution and the range of vessels produced both for domestic purposes and feasting, it is more likely that there was a kin-based arrangement of production, in which individuals are assigned particular functions given their skills, gender and age.

Here another differentiation seems necessary. Although both domestic and ceremonial pottery was produced in M-1 and M-17, the level of craftsmanship displayed in the decorated pottery is not observed among the utilitarian vessels. Especially Vessel Type I, a coarse vessel that is abundant in the assemblages, displays variability in rim and lip shapes that is consistent with the existence of several different potters. The evidence suggests that while some types of vessels with high quantity demands would be produced in cooperation by several potters, the decorated ceramics, as a prestige item, would be produced only by a few selected elite members, who had access to sacred knowledge (see Chapter 7) and could spend indefinite time in performing this activity.

Although the data is limited, since only two mounds were studied, differences in pottery styles between Marajoara mounds demonstrated by previous researchers suggests that similar conditions existed elsewhere. Therefore, if in every ceremonial mound the elite produced pottery for local consumption, there is no site specialization in the economic sense. The specialization is related to political and religious functions. However, the data is limited and a regional study focusing on production would have to be performed, especially on areas where the concentration of ceremonial mounds is higher in order to infer about mode of production and distribution of ceremonial pottery in a supra regional perspective.

Now it would be reasonable to hypothesize that although ceramics were produced both in M-1 and M-17, each one would specialize in producing particular types of vessels which would then be distributed to both mounds. In this case, it would be expected that similar vessel forms would be found in both mounds. For example, if M-1 produced ceramics A and M-17 produced ceramics B, we would find ceramics A and B in both locations. The analysis of distribution of vessel types, however, invalidates this hypothesis. Although the method of analysis used here is aimed at classifying vessels found in both mounds according to the same typology, there is variation in shape, size and decoration when similar vessels from both mounds are compared. Although exchange is likely to have occurred, it was not the type of exchange that is expected in a situation of site specialization, where there is a demand for a product that is not produced locally.

A final observation concerns the fact that most studies of craft specialization approach the matter from an economic point of view (Costin 1991:38), which does not seem to be the case here. The production of elaborate ceramic items in Marajoara society is triggered mainly by sociopolitical and religious purposes. Therefore, the intensity of production caused by the demand of a few elite consumers might in fact produce elaborate final products that resemble those made by part-time or full-time specialists. In fact, in situations of sociopolitical pressure and competition (among elites or factions), ceramic products are known to vary although mode of production may still be the same (Feinman, et al. 1984; Hays 1993).

Feasting

Feasting was an important ingredient of the Camutins political economy. This can be concluded from the artifact assemblage, funerary patterns, and ethnographic analogy. Reasons for feasting may include puberty or marriage rites (DeBoer 2001), the burial of a leader (Goody 1962; Huntington and Metcalf 1991), ancestor worship (Metraux 1947; Morales-Chocano 2000),

and exchange (Chernela 1997b), among others. Feasting includes consumption of food, drink, and other "recreational" substances, such as tobacco, cannabis, and alcohol (Dietler and Hayden 2001: 3; Hayden 2001: 40). Archaeological evidence for feasting is provided by the presence of unusually large serving dishes, unusual quantities of certain vessels, ritual objects, and elaborate serving vessels (Lathrap 1970: 55, cited by DeBoer 2001; Hayden 2001).

By analogy to other Amazonian societies, several vessel forms and decorative characteristics of Marajoara ceramics have been interpreted as related to rituals and feasting that involved the consumption of alcoholic beverages and drugs (Roosevelt 1991b: 80-85). At M-1 and M-17, a number of highly decorated vessels and unusual vessel forms are evidence for ritualistic activities. Snuffers indicate the consumption of tobacco or other substances (Figure 135). Serving vessels with diminutive space for food, such as platter-bowls (Figures 103 and 104) indicate serving of special foods. Large shallow plates were certainly used to serve food for large numbers of people; high proportions of such vessels were present in M-1 and M-17 assemblages. Breast shaped vessels (Figure 114) may indicate serving of hallucinogenic infusions in initiation rites, symbolizing "ancestral breast milk", as observed among the Tucanoan Indians of Northwestern Amazon (Roosevelt 1991b: 84).

Small rounded vessels (Figures 106 to 108) may have served as beer mugs. Large, deep, decorated bowls (Figures 115 and 116) may have been used for fermenting beer. Especially the Vessel Type I (Figure 76 and 77), which has been interpreted as a mortar, used to prepare starch, might have been part of the process of producing beer for feasting. The unusual amounts of this vessel type in the assemblages (above 32% of the sherds) suggest it was used to intensively produce some type of food. The abundance of food processing vessels in mounds that were initially believed to have been used only for ceremonial purposes makes sense in terms of their use for feasting, since large quantities of meals would have to be prepared to feed a population much larger than the one who normally inhabited the mound. Although the data indicate

feasting, the particular uses of each vessel can only be deduced by their size, shape, and ethnographic analogy. Analysis of micro residues recovered from these vessels could in the future identify the types of foods prepared.

Site Hierarchy

One of the aims of the ceramic analysis was to characterize M-1 and M-17 regarding the activities that were performed in each mound, in order to assess their relative hierarchical position within the settlement system. The settlement pattern study suggested that M-1 would be the political and ceremonial center and that M-17 would be elite residence, attached to M-1. This was predicted mainly on the basis of the smaller size of M-17. Such an assumption is common in settlement pattern studies, as discussed in Chapter 5. The results of the ceramic analysis, however, support neither a marked site specialization nor a secondary position for M-17.

M-17 cannot be considered as inferior to M-1 regarding quality and quantity of ceramic artifacts. Differences in frequency of certain vessel types may account for differences in the intensity of some activities, eventually leading to a certain degree of specialization. However, given the proximity of the two mounds, such specialization can be better understood in terms of division of labor within or between kin-groups that are neighbors and frequently share and exchange foods and goods. Other differences observed in terms of relative proportions of tanga types or different qualities of stools, for example, cannot be considered as establishing hierarchy, before their sociopolitical significance is assessed. Still the absence of certain items such as snuffers in M-1 can be credited to vagaries of sampling, due to sample size.

In sum, the ceramic analysis indicates that food processing, domestic activities, as well as feasting and ceremonies were performed in both M-1 and M-17. Although each mound may have played different (although likely complementary) roles in the political economy, such roles could not be completely explained by the artifact analysis.

Chapter 7

ICONOGRAPHY AND RELIGIOUS SYMBOLISM

Ceramics produced for feasting, rites and funerals constitute the only surviving vehicle of Marajoara sacred symbolism. They contain a rich source of information on ancient mythology, cosmology, and social identities. While abundant in museums and private collections, the exquisitely decorated ceramics constitute only around 10% of the pottery assemblages. Higher proportions of decorated sherds are found in looted sites, where the removal of funerary vessels resulted in the dispersal of broken pottery that was originally part of the mortuary furniture.

The lack of information on the provenance of ceramics in collections has prevented scholars from making a more comprehensive iconographic analysis of an assemblage originating from a given site. Studies have focused on material coming from several different archaeological sites; therefore lumping Marajoara iconography all together as if it was a single manifestation, without local variations. This approach, however, is eventually justifiable. Marajoara style quickly spread over the region, disseminating basic designs and techniques of decoration. Nevertheless, through similar cosmological and mythological themes, local kin groups expressed their own identity, giving preference to certain symbols, techniques of decoration, and vessel shapes.

Marajoara iconography is expressed in two complementary ways: by realistic representations and graphic designs. Realistic representations consist of stylized depictions of humans and animals, sometimes in their entirety, but more often only as body parts. Graphic designs consist of geometric or “abstract” patterns, whose meaning is not apparent, but often representing human and animal body parts as well. In the first type of representation, which is called realistic, humans and animals are represented in three dimensions, retaining aspects of their

morphology and structural characteristics. These are, for example, anthropomorphic or zoomorphic head adornos or appliqués, zoomorphic (snake, lizard, caiman) appliqués, anthropomorphic funerary vessels, anthropomorphic figurines, bird shaped vessels, bat or turtle shaped plates, etc.

While not all vessels and objects are decorated with realistic representations, all are decorated with graphic designs. Graphic designs are used on framing bands, encircling bands, as fillings, space breakers, or composing more complex figures over the whole vessel surface. Ethnography tells us that in illiterate societies designs used to decorate objects and bodies are imbued with social meanings, communicating concepts on cosmology and appropriate social roles (Geertz 1983; Müller 1990; Ortten 1971; Turner 1980; Velthem 1994; Vidal 1992). Designs that may be considered "abstract" by an outsider have meanings that are shared by the social group, thus used as a means of communication (Munn 1962, 1966). According to Geertz (1983: 99), art is a vehicle that allows the transportation of collective ideas to the world of objects, where people can see them.

The meaning of Marajoara graphic designs is not apparent, but some of them have been decodified by comparison to realistic representations. A number of repetitive geometric symbols were found to be depictions of particular animals, which were likely important mythological creatures. Among them, the most recurring is a snake or a pair of snakes.

In this chapter, two aspects of Marajoara iconography and religious symbolism are examined. The first one is the overwhelmingly representation of snakes on all types of pottery vessels and objects. Due to the common association of snakes with fish reproduction in Amazonian mythology, it is proposed that snake symbols were used as part of a religious system manipulated by elite to claim their ability to promote resource abundance, as well as to justify hierarchy in access to resources. The second aspect of Marajoara symbolism to be analyzed is the

iconography of funerary vessels, exploring aspects of group identity and possibly alliances among the elite.

THE SNAKE PEOPLE

The myth of the anaconda or "cobra-grande", in its many variations, is a recurrent theme in Amazonian mythology (see, for example, Chernela 1988; Reichel-Dolmatoff 1971; Velthem 1994). The Wayana, an indigenous group who live in northern Brazil, Suriname, and French Guiana, explain that decorative patterns woven with vegetal fibers to produce baskets were copied from the skin of *Tuluperê*, an immense snake who once terrorized the Wayana and Aparai tribes (Velthem 1998). According to the myth, *Tuluperê* periodically left the mountain where it lived, and came to the village to eat people. When men tried to kill it, the snake transformed itself into a canoe and engulfed them. Finally the Wayana organized an expedition, with men armed with bows and arrows, who killed *Tuluperê*. Getting close to the dead creature, they observed its beautiful skin, and learned the designs they reproduce in their basketry (ibid: 120-121).

According to the Desana, a Tucanoan group living in the northwestern Amazon, the snakes are the progenitors of the fish, thus snake tales are frequently related to fish abundance (see Reichel-Dolmatoff 1971: 255, 267). One of the variations of the myth tells that the Sun created everything on Earth but people and fish, which were created later. All the tribes were transported to the Earth inside of the live snake-canoe, which was surrounded by fish. The tribes settled at the headwaters, and the position of every tribe along the river corresponds to their position inside the snake-canoe (ibid: 26).

The Wanâna, indigenous communities of the Upper Uaupés River, also believe that the location of their settlements, as well hierarchical positions among the sibs is determined by their relation to an ancestral anaconda (Chernela 1997b). According to the Wanâna mythology, the sib

seniors emerged from the head of the snake-canoe, which explains their location at the lower river course, a rich resource area. The sibs juniors emerged from the tail, reason why they are located upriver. They justify the permanence in the ancestral settlements because this is the only way by which the soul can return (ibid.: 293).

Realistic and stylized snakes, snake heads, and snake skin patterns are the most recurrent figures and designs on Marajoara ceramics. The perception of certain repetitive patterns as representing either snakes or snake skin patterns was demonstrated elsewhere (Schaan 1997a, b, 2001b). One of the representations consists of interlocked spirals disposed along a band on the body or neck of vessels, or on the flat rim of plates. The spaces between these stylized snakes are filled by stepped figures, or solid "L"s (Figure 139).

Figure 139 – Stylized snakes

Another type of representation is the repetition of triangles, diamonds, stepped pyramids, concentric squares, rectangular or triangular volutes, and zigzag lines along a band. Such designs, for example, border the short walls of excised plates (Figure 102). Although this type of geometric decoration is very common in pottery (Shepard 1956: 295-98), on Marajoara ceramics they represent the snake skin pattern. Naturalistic snakes represented on some vessels display exactly the same patterns (Schaan 2001b: Fig. 4.16-17). While for an outsider this is only an "abstract" pattern, for a member of the social group the endless repetition of designs with the same "structure"[1] is a constant reminder of significant cosmological concepts. The use of snake

[1] Structure is here understood as a set of basic lines (or strokes) that remind the referent, by displaying its basic form (Eco 1976; Munn 1973).

patterns over vessels and objects used for feasting and rituals suggest that Marajoara religious symbolism included the snake myth, probably used to justify social hierarchy and differential access to critical resources.

FUNERARY ICONOGRAPHY AND SOCIAL IDENTITY

Funerary patterns, involving the type of sepulture and associated mortuary furniture, are believed to provide information about the deceased's social identity, in the sense it may communicate about personal characteristics (gender, age and status) as well as group membership (Binford 1971). Excavations of Marajoara funerary structures have revealed variation in size, form and decoration of funerary vessels and associated grave goods both in the horizontal and vertical dimensions, indicating that mortuary practices varied between individuals, as well as geographically and chronologically (Derby 1879; Farabee 1921; Meggers and Evans 1957; Ferreira Penna 1879).

Clustered urn burials found in the highest mounds are a sign that only a small part of the total population deserved such special treatment. The fact that the burials were clustered in a special area of the mound and personal wealth was not emphasized suggests that group membership was more important than individual identity. Ancestor worship ceremonies in these mounds were likely performed as part of a strategy to justify elite access to resources (see, for example, Curet and Oliver 1998: 218; McAnany 1995: 160-62).

Researchers have observed geographic variation in funerary vessel shape, decoration techniques and designs. These differences are believed to reflect social boundaries, in the sense that people use style to express group identity (Wiessner 1983 "emblemic style"). On the other hand, iconographic symbols on vessels used in ancestor worship ceremonies possibly had ideological and religious meanings. Artifacts have been interpreted by archaeologists as actively used by social actors in order to make statements, and prevent or promote social change as well as

to advance political goals (Beaudry, et al. 1991; Wiessner 1989; Wobst 2000). Earle (1990: 73) points out that this "active" component of style is especially apparent in chiefdoms, where some "elements of style, as in objects used in ceremonial display, are chosen purposefully to signal social relationships and group membership".

In Marajoara funerary vessels, this would be accomplished by demonstrating genealogical ties to ancestors on the iconography, in order to empower the new generations. In this sense, funerary vessel style was likely used to reinforce genealogy and tradition.

In Chapter 5, a discussion of funerary patterns in M-1 and M-17 showed that few or none non-perishable items were included with the deceased. These included ceramic plates and bowls, tangas, and lithic items. The association of long distance exchange items (lithic beads and axe) with a child placed inside of an undecorated large vessel has implications for the understanding of funerary practices and social organization. It means that the child received its status for being part of a prestigious corporate descent group. Ascribed status is a common feature of chiefdoms, where the social position of an individual is determined by his or her place in the kinship system (Earle 1997: 5; Sahlins 1958). Vessel decoration, in this case, seems not to be important in determining rank, since the vessel was plain. It challenges common sense assumptions that decoration equates with status. Clearly a set of circumstances determined status, including ceremonies that cannot be observed in the archaeological record.

Mortuary items such as undecorated tangas and undecorated or poorly decorated pots were recovered associated with large, profusely decorated vessels (burials no. 15, 16, 20 and 21). Differences among tangas are assumed to represent age differences instead of social status, thus decorated tangas might have been used by girls during puberty rites, while plain tangas associated with burials could have belonged to high rank older women. It is clear from these two examples (plain urn with lithics and decorated urns with undecorated items) that evaluating amount of time and effort spent on decoration alone is not likely to lead to an understanding of social rank and

status in that society. Rather, the association between objects and vessel used for internment, as well as the context in which they are found should be taken in account to begin understanding how individual and social identities were expressed in mortuary contexts.

Some of the observed variation in burial practices was likely related to age and gender. Since all the individuals buried in the mounds represent a small proportion of the society, it is likely that they were all high rank individuals. Mortuary practices likely emphasized group membership, but individual identities are also expressed. The failure to recognize that may lead to the interpretation of variation as resulting from social and political status differences, while other social differences, not necessarily related to power, may be represented.

In this chapter, the decoration of funerary vessels is examined in order to test the hypothesis that vessel shape and iconography display information on group membership rather than personal identity. Accordingly, a great amount of uniformity in style is expected within the same site, since in order to justify access to resources by ties to ancestors, the living had to demonstrate that they all belonged to the same lineage.

Geographic Similarities and Differences in Style

Based on available data, the major geographic distinctions among funerary vessels can be observed between vessels originated from the Anajás River area (Camutins and Monte Carmelo sites) on one hand, and the eastern Lake Arari area (Pacoval site) on the other hand. Vessels found at the Camutins and Monte Carmelo sites are more often globular in shape, and decorated with red-and-black painted designs over a white slipped surface. The typical example is the Joanes Painted anthropomorphic vessel, which displays appliqué facial features (eyes, mouth, nose and ears) on the vertical neck, and painted body parts (arms, uterus, and vagina) on the globular body (Meggers and Evans 1957: Plates 75, 76; Palmatary 1950: Plates 93-95; Roosevelt 1991b: Fig. 1-17; Schaan 2001b: Fig 4.12-13). The anthropomorphic features are represented on

opposite sides of the vessels, in a nearly symmetric way. Other small anthropomorphic figures are often present in between the ears, inside the womb, or on the lateral body.

Vessels originating from the Pacoval site (and perhaps other mounds on the eastern *campo*), by contrast, have a nearly cylindrical but complex shape, and are decorated with incised lines over a white slipped surface (Meggers and Evans 1957: Plate 78a; Palmatary 1950: Plate 34; Roosevelt 1991b: Fig. 1.21-a & b; Schaan 2001b: Fig. 4.16). Parts of the vessel (such as rims and appliqués) as well as the larger incised lines are painted red. Some of these anthropomorphic vessels are composed of two parts: a truncated conoidal base, with insloping walls to the neck, forming the body, and a slightly globular neck, which forms the head. The facial features are stylized appliqués, framed by incised lines. In some of these vessels, the arms are snakes which originate from a zoomorphic appliqué (sometimes a vulture) at the shoulder level extending vertically along the body and curving towards the womb, where they end in a rake-shaped hand. The womb is represented by a circle or a nubbin. The vagina is a rectangle or a triangle, often depicting pubic hair or a tanga. In some vessels, three dimensional but underdeveloped legs indicate a sitting position. The anthropomorphic face is represented on one side of the vessel, while the back of the body and head are on the opposite side.

There are several similarities between the Joanes Painted and Pacoval Incised vessels, such as the representation of a female persona, the position of hands towards the womb, the representation of the vagina by rectangles, the use of red color to emphasize the female sexual characteristics, as well as the use of lines and geometric figures over the body and face, representing body painting.

Magalis (1975:356-60) considers that the two-faced representation of the Joanes Painted vessels (she calls Tradition 1) and the one-faced representation of the Pacoval Incised vessels (Tradition 2) constitute an important distinction between them in terms of their relation to other Amazonian styles. Magalis considers that Pacoval Incised vessels were similar to late

Amazonian cultural styles such as those represented by the Maracá and Aruã Phases, which date to A.D. 1300 – 1600. In a typical culture history approach, Magalis points out that the Pacoval style represented people who arrived on Marajó Island after Camutins society had already developed. Magalis then constructed a seriation of Joanes Painted funerary vessels, by isolating features that would show resemblance to early or late phases of the polychrome tradition, thus providing a chronological framework for the evolution of the style. This procedure clearly reveals a "passive" view of style (Earle 1990: 73).

Although Amazonian styles influenced each other, these influences were unlikely unidirectional. Social groups certainly reproduce styles as a matter of tradition, but, especially in complex societies, certain elements of style may be used or not used depending on ideological and political goals. Therefore, the absence of Pacoval traits on some Joanes Painted urns may also be seen as a strategy to reinforce social boundaries, instead of evidence for lack of contact and chronological distance.

M-1 Funerary Iconography

Funerary practices observed at M-1 were discussed in Chapter 5 (data on Table 3) on the basis of information provided by Meggers and Evans (1957: 281-6) excavations. That research described nine funerary vessels, recovered from four different locations of the mound. Three of those vessels were plain, three were Joanes Painted, one was Red Excised, one was White Incised, and one was decorated with a "low-relief snake twisting over the exterior" (ibid: 285). Only three of the vessels were illustrated in the volume. These are described and discussed below.

1) An Arari Red Excised vessel was recovered from cut 1 (Meggers and Evans 1957, plate 61 b). This was a globular, 38 cm tall vessel, with a short (9 cm tall) outflaring neck. The exterior was profusely decorated with excised designs on a red slipped surface, while the interior

was white slipped (Meggers and Evans 1957: 281). The photography does not permit a description of the designs.

2) An Anajás White Incised vessel was recovered from burial group 1 (Meggers and Evans 1957, plate 55 a). This is a cylindrical vessel with a depressed globular lower body (Figure 140). The cylindrical neck is 24 cm tall while the lower rounded body is only 14 cm tall. The maximum body diameter is at the lower bottom, 36 cm. The rim is exteriorly thickened, round, 31 cm in diameter. The exterior surface is white slipped, covered with incised designs. Different depths of incisions caused a color effect, as deeper, larger incisions cut into the clay revealing the orange paste underneath. The decorative motif is commonly used for the Pacoval style ceramics present at the site of same name (Meggers and Evans 1957: 285-6). This vessel shape, type of decoration and designs are extremely rare at the Camutins site, while being very popular at the Pacoval site. If it is assumed that funerary vessels represented the deceased's identity, this vessel was likely used to bury an individual who belonged to a foreign lineage.

Figure 140 – M-1 Pacoval style funerary vessel

3) A 38-cm tall Joanes Painted globular vessel was recovered from burial group 2 (Figure 141, after Meggers and Evans 1957: plate 73 b). The body is decorated with red painted designs on a white slipped surface. The neck has a pair of low relief stylized face (Meggers and Evans 1957: 286). The eyes are composed by a ring center and outer elongated ring, which Magalis (1975: 109) calls "appliqué tear eyes". Magalis (1975: 107) considers the tear-eyes an important feature for correlating different styles of Marajoara phase urns. According to her seriation, this characteristic would be present in the latest urns of the sequence.

Figure 141 – M-1 Joanes Painted funerary vessel

A stylized face is depicted on the urn's body. It consists of a pair of oval shaped eyes, a big smiley mouth and "nose-brows"[2]. Short black lines emerging from the upper eye line are believed to represent eyelashes (Magalis 1975: 183). The mouth is a semicircle crossed by vertical lines that most likely represent teeth. Spirals on the cheeks originate from a space between the nose and mouth, framing the mouth as a funny moustache, composing which Magalis

[2] Expression used by Magalis (1975) to refer to a recurrent feature of Marajoara iconography that consists of depicting nose and eye brows joint by continuous lines or appliqués.

called the “winged mouth”. The eyes are framed by a broad semicircular line, which turns into a spiral on the area where one would find ears. There, these snake-like eyebrows end as “rake-shaped hands” (in Magalis terminology 1975: 171). Solid stepped figures are used as space breakers. Between the two anthropomorphic faces (on the neck and on the globular body) lies the snake’s band (compare to Figure 139). This is a two-face vessel.

M-17 Funerary Iconography

The majority of the vessels excavated from M-17 are decorated with either red or red-and-black painted designs on a white slipped surface. When only red paint is used on the white slipped surface, it normally produces the effect of negative painting, i.e. the red is used as background color, in order to emphasize white designs. When both red and black paint are used, the decoration is more often positive, i.e. red and black designs are applied maintaining a white background.

Two of the vessels in the assemblage are only slipped, undecorated. Besides a painted body, vessels 4, 16 and 21 have also excised decoration on their red slipped necks (Table 4). Therefore, the assemblage is remarkably homogeneous if compared to M-1’s. The iconography also shows consistent patterns. The analysis below will follow a chronological line, clustering the burials into four different chronological periods according to their stratigraphic position. The first group is the oldest and the fourth group is the more recent. Vessel no. 18 from the upper group was dated to circa A.D. 960. The earliest date obtained for the site (excavation 3) is circa A.D. 730. This date may be contemporary with the oldest burials. Therefore, the four groups may represent a time span of 230 years.

The first group of burials is comprised by urns 13, 23 and 24. Vessels 13 and 23 are not decorated, and vessel 24 has not been restored, therefore not providing data for this analysis.

The second group is comprised by vessels 1, 2, 3, 10, 11, 12, 20, and 21. This group is very homogenous in terms of vessel form, decoration and iconography. Vessels are globular, with short necks, with the exception of urn 2 that has a taller neck. All but urn 11 are decorated with red painted designs on a white slipped surface. Urn 11 has both black and red painted designs.

Designs on urns 1, 3, 12, and 21 consist on minor variations of a same theme (Figures 142 to 145). The vessel's globular body is decorated with a stylized face, comprised of eyes, nose, eyebrows and open mouth, similar to the "smiling face" described above for M-1 Joanes Painted vessel. Eyes are enclosed by circles or tear shaped lines that end up in a tail. The nose and eyebrows are represented by a "T" (Magalis 1975: 116,130-31). The snake's band is positioned above the face, either between the body and neck, or on the neck itself.

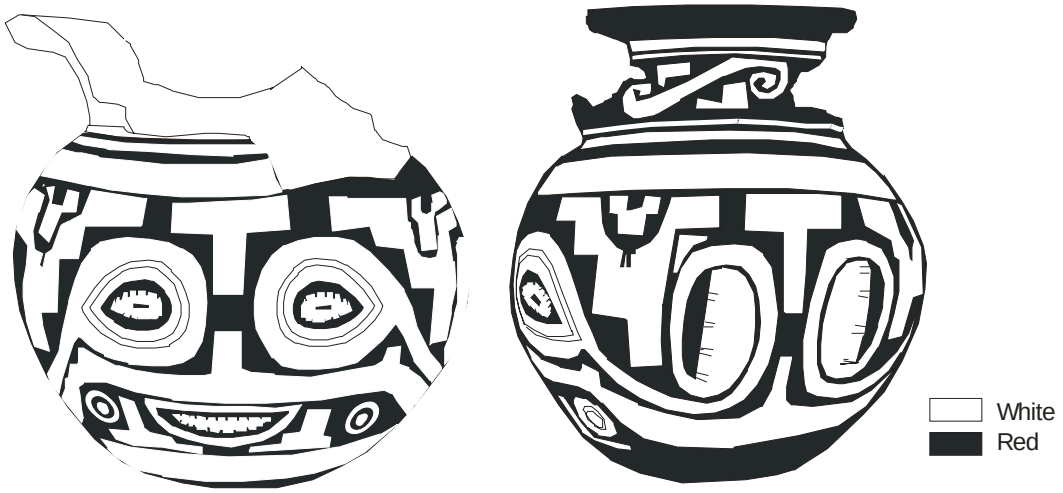


Figure 142 – M-17 urn 1

Figure 143 – M-17 urn 3

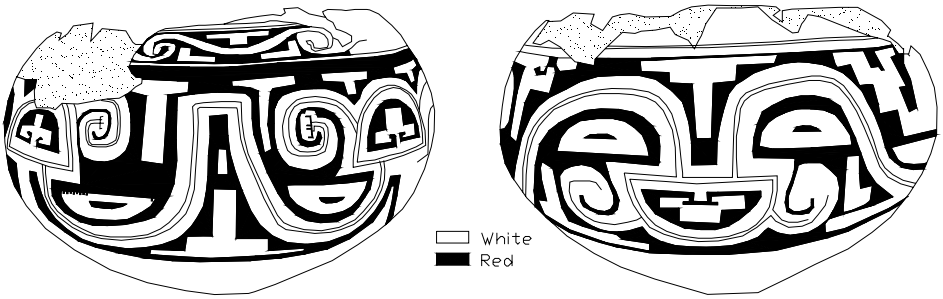


Figure 144 – M-17 urn 12

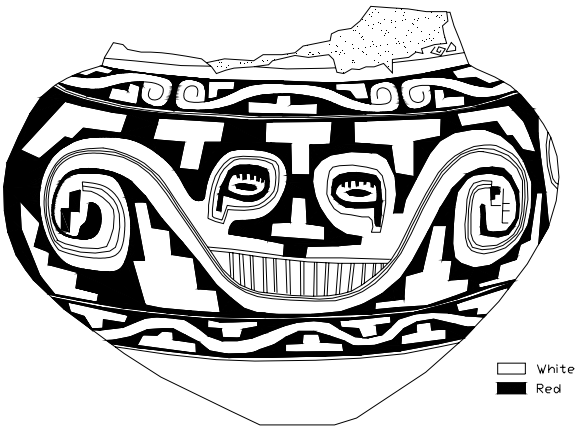


Figure 145 – M-17 urn 21

Different composition of designs is observed on urns 2 and 20. The smiling face is not present on urn 20 (Figure 146). Here the snake theme is repeated along bands of different widths on the neck, and similar designs (spirals that end as a rake) are depicted on the body.

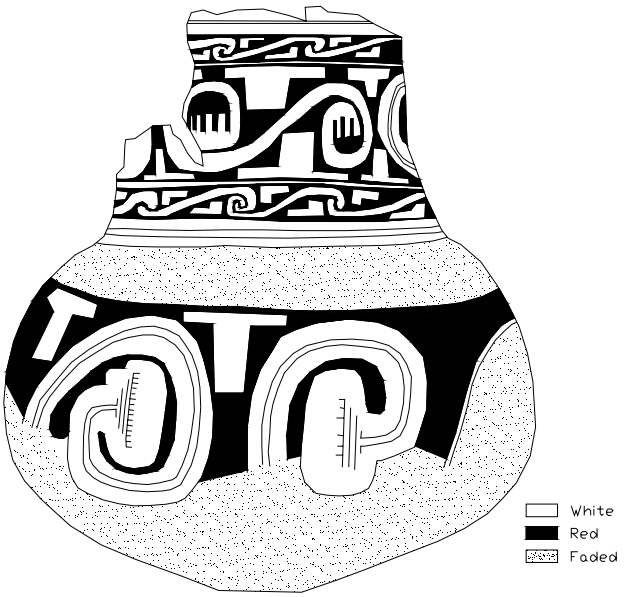


Figure 146 – M-17 urn 20

On urn 2, spirals and crosses are represented on the neck, while crosses and arrows are represented on the body. That particular representation of arrow has been identified as the triangular head of the "jararaca", or *Bothrops atrox* (Schaan 1997a: 153-55). Therefore, although using different designs, urns 2 and 20 depict the same snake theme.

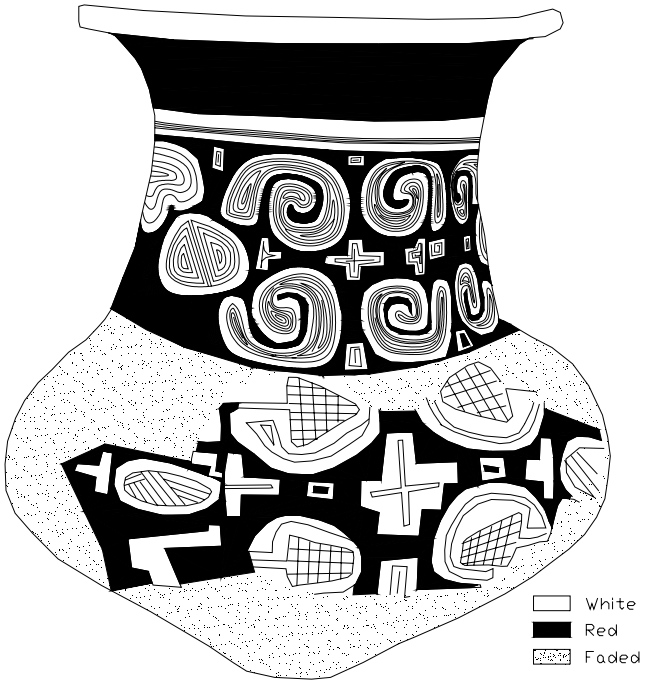


Figure 147 – M-17 urn 2

Urn 10 differs more markedly from the group (Figure 148). The face is on the urn's neck, not on the body. The mouth is an oval nubbin framed by an appliqué ring with curved strings on both sides, forming the "winged mouth" (Magalis 1975: 93). Magalis suggests that this type of mouth was introduced by influence of the Pacoval variant, because winged mouths are commonly found in Pacoval urns. The designs are painted negative, red-on-white. Parallel red lines are traced inside of large white curved lines. "T"s and spirals are depicted on the body.

Figure 148 – M-17 urn 10

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A third period is represented by vessels 5, 6, 7, 8, 9, and 22. Urns belonging to this group have many parts missing, which makes the analysis and comparison more difficult. Moreover, the restoration has not been completed, thus not all the painted details are visible. The common characteristic is the fact that all of these, but urn 9 and possibly 22, are anthropomorphic vessels. The globular body represents the human body, while the neck represents the head, different from the previous group where stylized features predominated and faces were represented on the vessels' body. These urns typically have the facial features formed by appliqué, emphasized by painting, while the body features are only painted (Magalis 1975: 150).

Urn 5 (Figure 149) is polychrome, with black-and-red designs on the white background. The part that is preserved displays body decoration found in between opposing anthropomorphic features (as in Palmatary 1950: Plates 88 and 94).

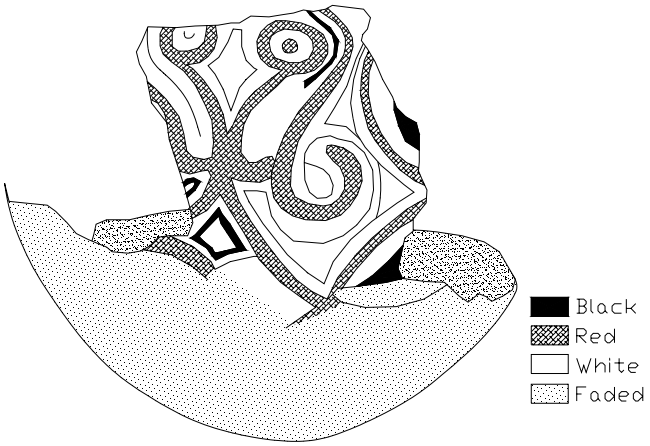

Figure 149 – M-17 urn 5

Urn 6 (Figure 150) was a large globular vessel, but only the lower body is preserved. A red ring containing a black circle depicts the womb. Upper members are represented by shoulders, arm, hand and fingers. According to Magalis' (1975) typology, this urn has a simple round shoulder, simple triangular upper arms, and semicircular simple zone hands. There are three fingers attached to the hand, with a fourth one emerging from the lower arm instead. This type of hand has been interpreted as bird talons. Although the anthropomorphic urns clearly portray females, it has been suggested that several of the characteristics also represent owls, resulting in a hybrid (human and animal) entity (Schaan 1997a: 140-142).

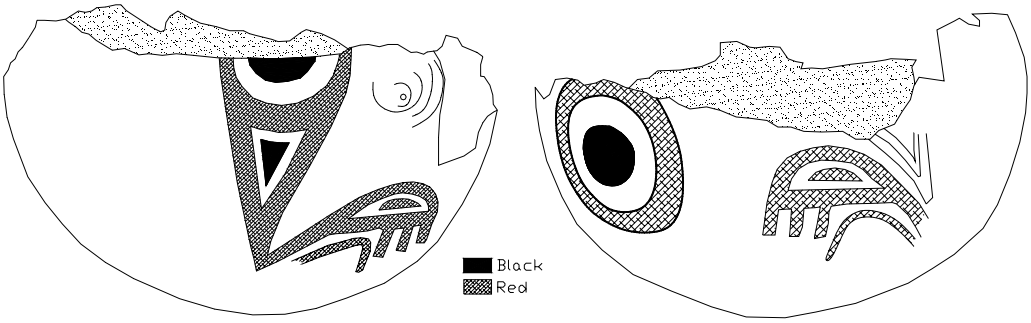

Figure 150 – M-17 urn 6

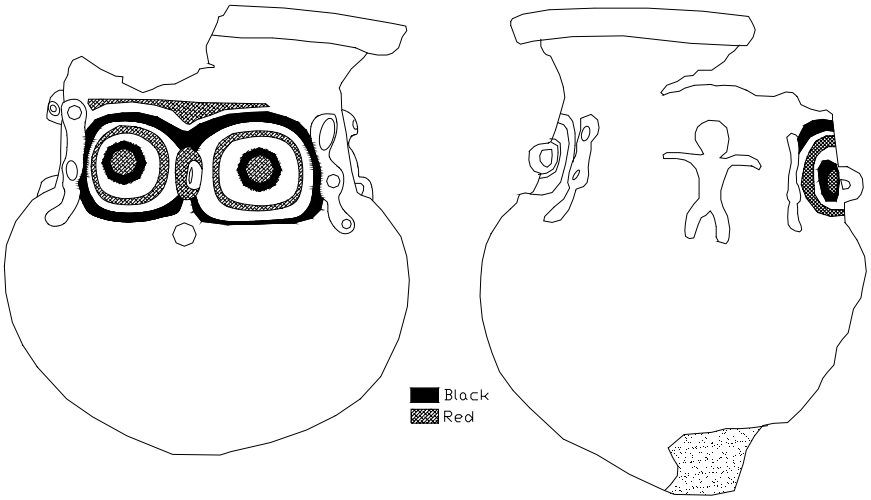

Figure 151 – M-17 urn 8

Urn 8 (Figure 151) displays facial anthropomorphic features such as eyes, ears, mouth and nose. The mouth is represented by a nubbin. The ear is naturalistic, composed by upper ear, ear spool, and pendant. These 3 components are found from phases I through V of Magalis' (1975) seriation. The eyes are nubbins enclosed by appliqué circles, red painted circles and black painted circles. Simple nubbin eyes are rare in the seriation, assigned to Phase II (Magalis 1975: 102). Appliqué eye brows in a Y shape are linked to the ears. The nose is a loop, which could also be a handle. There is an appliqué neck side anthropomorphic figure, with legs, arms and head. This side figure has both arms folded, elbows up and hands down. Legs are also folded as if in a sitting position. These characteristics are consistent with urns assigned to Phase IV of Magalis (1975: 108-122) seriation. The vessel's upper neck still has another pair of tear-eyes that could not be accurately reproduced. The body painting is too faded to analyze.

Urn 9 (Figure 152) differs from the group for being more similar to vessels from the previous group. This is a red on white vessel, with a painted band just below the neck, representing the paired snakes and the stepped figures. On the body there is also a representation of a snake head (Schaan 1997a).

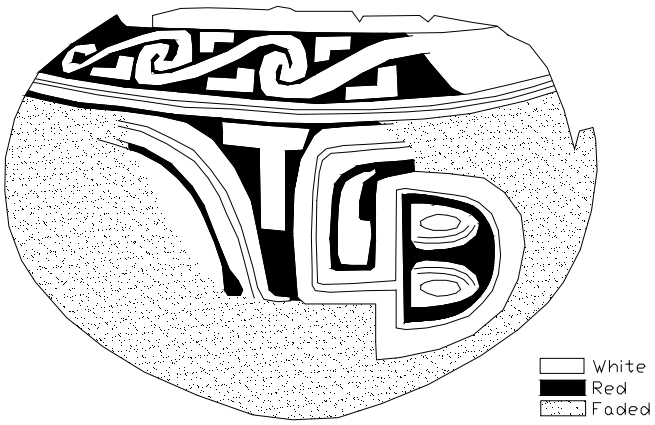

Figure 152 – M-17 urn 9

Vessels 15, 16, 17, 18 and 19 belong to the fourth and more recent period. Urns 4 and 14, which have not been restored, are possibly contemporaneous to them, but were located on the opposite side of the burial area.

Vessels 4, 14 and 16 have excised decoration on their necks. This gives a temporal significance for this type of decoration at M-17. Painted designs on urns 16 and 18 have not been preserved. It is not clear whether urn 18 was only white slipped or was also painted.

Urn 15 (Figure 153) is decorated with red-and-black designs on a white slipped surface. It is very similar to urn 8. It has a face on the neck, with a pair of simple nubbin eyes. The body is decorated with background designs instead of having a more clear representation of female body parts.

Figure 153 – M-17 urn 15

Urn 17 was badly broken, only the bottom and part of the wall was found. The decoration consists of red-and-black painted designs on a white slipped surface, similar to other anthropomorphic vessels.

Urn 19 (Figure 154) differs from all other urns in the mound by its complex, nearly cylindrical shape. However, the iconography is similar to that of the second group of urns analyzed, with the smiling face on the body. On the vessel's neck, a face is represented by a pair of tear-eyes, as well as a realistic three-dimensional nose, which may also be a handle. The ear is stylized, composed by an upper ear segment. According to Magalis' seriation, more complex ears (with upper part, spool and pendant) belong to the early part of the sequence. Although she does not have an example similar to this one, this urn would probably be assigned to Phase VI (Magalis 1975: 52-53).

Figure 154 – M-17 urn 19

This last group is more heterogeneous in shape, iconography and decoration. However, the styles are similar to those of urns belonging to the second and third groups. The shape of urn 19 is probably the most dissonant characteristic. On the other hand, its iconography represents the most recurrent style found in this mound.

CONCLUSIONS

M-1 funerary vessels show variability in shape, technique of decoration and iconography. Although the sample is very small, the high proportions of Joanes Painted vessels (three out of nine), is consistent with the predominance of painted vessels in collections and in excavation reports from the area. Excised vessels are also very popular in collections of the area, but the white incised example is very rare.

In opposition, M-17 assemblage shows an impressive uniformity in shape (globular), decoration (red on white) and iconography (smiling face) among funerary vessels. These

characteristics are especially pervasive in the second period of use of the burial area. In the third period there is the introduction of anthropomorphic vessels, together with the use of positive, black-and-red painting (in three of the four vessels examined). In the fourth period, there is more variability, with both anthropomorphic vessels and the stylized smiling face present. In this period, excised decoration and red slip are found on three vessels.

In assuming that homogeneity in vessel decoration, shape and iconography suggest uniformity in social identity, differences between M-1 and M-17 funerary vessel assemblages might be significant in terms of understanding the spatial distribution of elite populations as well as marriage patterns. If it is accepted that the vessel's iconography display lineage information, foreign vessels may indicate marriage alliances among elite.

Assuming that spouses that move away from their kin to marry are buried in their kin group funerary vessels, sites showing a higher degree of variability would be sites to where spouses from different kin groups converge. On the other hand, sites with very similar vessel types would be sites where marriage is restricted to people of the same lineage. Differences between M-1 and M-17 could be understood in this sense.

Variations in vessel iconography at M-17 display a very consistent chronological pattern, since there is more uniformity among vessels of a same stratigraphic level than among vessels of different levels. This change in iconography through time was not likely caused by gradual evolution in style. Vessel 19, of the fourth group, displays an iconography similar to the vessels from the second group, indicating that that particular iconographic theme (the smiling face) had survived for a number of generations. Two different painted urns were observed, the typical anthropomorphic and the stylized "smiling face", which may belong to two different kin groups. Although these are speculations at this time, this type of data will be important in mapping elite factions when a larger number of sites are investigated.

Most of the iconographic features observed are assigned to the later phases of Magalis seriation, when Camutins style would be contemporaneous with the Pacoval style. M-17, however, is not a "late" site in the chronology. Its last period of occupation is still assigned to the period here called the "classic" Marajoara (A.D. 700 – 1100). In fact it is very likely that most Marajoara sites are contemporaneous during the classic period; therefore, attempts made to seriate material from this period based on style and decoration are not very likely to be successful, particularly if it departs from the assumptions that there is a priority of one site over another.

The presence of snake skin patterns on funerary urns, in a very consistent manner among the vessels analyzed, shows the importance of snakes in Marajoara religious symbolism. If Marajoara mythology was similar to that of the northwestern Amazonian populations, according to which an ancestral anaconda (the snake-canoe) brought the elite to the Earth, (justifying their presence in areas of resource concentration and their rights to the land of their ancestors), the snake symbolism was not only a cultural marker, but played a critical role in the ideological justification of the Camutins political economy.

Chapter 8

SUMMARY AND CONCLUSIONS

ECOLOGY AND SOCIETY IN THE AMAZON DELTA

The human occupation of Marajó Island's eastern savannas cannot be understood without a correct assessment of the natural environment. On Marajó, more than in other parts of the estuary, landscape changes caused by seasonal alternation of flood and drought dramatically affect resource availability, mobility, and determine the tempo of human activities (Smith 2002).

During the Holocene, several episodes of marine regression and transgression, as well as depositional systems, shaped the Island's ecology and topography, influencing human strategies. The formation of mangroves along the changing shoreline provided opportunities for intensive exploitation of aquatic resources, particularly shellfish. Indications of such occupations were provided by 19th century accounts. This way of life is believed to have given room to sedentary villages living inland when the shorelines stabilized about 3,000 years ago. Settlements consistent with small, egalitarian, and relatively autonomous social groups living on subsistence agriculture, fish, game, and wild plants were identified by Meggers and Evans (1957) from 3500 B.P. onward.

The so-called tropical forest phases were considered to have similar settlement and subsistence patterns, mirrored in ethnographic examples. The major differences between the archaeological phases were credited to their ceramic industry. Ananatuba, Mangueiras, Acauan and Formiga Phases were considered to be the archaeological correlates of different ethnic groups which would have influenced each others ceramic styles by coexisting in the same geographical area.

The present study attempts to demonstrate that these early occupations may have contributed much more to the development of social complexity than early researchers realized. In considering change in settlement patterns through time, it is suggested that early occupations were developing knowledge of the natural environment, and learning techniques of resource exploitation that would be critical for the development of social complexity. The main evidence for this is the location of Formiga phase intentionally built mounds on the inundated savannas, suggesting that those populations were already experimenting with intensive fishing before regional societies appeared.

Other indications of the relationships between Marajoara and the previous occupations are provided by the analysis of their ceramic industries. Vessel forms, ceramic technology and techniques of decoration that became important during Marajoara Phase as prestigious items owned by the elite, display a technology known to earlier phases. Therefore, Marajoara ceramics cannot be seen as an imported cultural trait as Meggers and Evans (1957) had proposed. Elaborate ceramics produced for funerary rituals, initiation rites and feasting are known to be used and manipulated in several ways by local elites in order to display wealth and prestige, as well as to legitimate power (Costin 1991; Earle 1990, 1991b; Feinman, et al. 1984; Peregrine 1991). Therefore, the polychrome ceramics were produced by elites within historical circumstances, and the development of such a style was linked to the development of social complexity (Earle 1990).

The discussion on earlier occupations was also meant to provide a basis to propose a chronological framework within which to understand the development of social complexity. Research at a 5 km stretch of the middle / upper Anajás River identified pre and post-Marajoara phase sites that helped to understand the development of social complexity from a local perspective, and as part of a long process of cultural change. Research on an Ananatuba site allowed for the study of spatial organization of activity areas, which was lacking in previous

research. It identified a burial and ceremonial area, as well as a possible storage pit. Although no offerings were associated with the burials, the use of funerary vessels denotes burials practices that were thought absent in earlier phases. Other three sites in the area, possibly camp sites, represent very short-term occupations, indicating that pre-Marajoara sites were less numerous, as well as less sedentary. Subsistence economies hypothesized for previous phases may have been more variable and complex than previously assumed.

Based on available data, it is suggested that by A.D. 10, settlements associated with the simple ceramic industry of Formiga Phase appeared in several locations, including the seasonally inundated savannas. In settling in the savannas and in some instances building earthen mounds, Formiga populations provided the first indications of landscape management. This yet poorly studied period is called "Incipient Marajoara".

The transition from dispersed communities to regionally organized societies is observed following Formiga occupation, in the multiplication of earthen mounds next to lakes and rivers headwaters and spread of a new ceramic style, by A.D. 400. An "Expansionist Marajoara period" is hypothesized as a phase during which earthworks and water management become a reality in several locations. Although research on this early period is lacking, there are indications in the literature (Roosevelt 1991b; Simões and Figueiredo 1965) that initial earthworks were not limited to mound building, but included the construction of weirs and ponds. The abundance of aquatic resources in permanent and temporary lakes in the savannas, and especially at river headwaters, suggests that settlement location was chosen on the basis of resource concentration. The development of water-control technology enabled the intensive exploitation of aquatic resources, which may have supported population growth and multiplication of similar subsistence systems in several locations where ecological conditions were favorable. This process would have taken a few centuries. Future research might be able to verify the locus of the first settlements and

document the directions and timing of spread of subsistence systems. This period of expansion of a new subsistence strategy, accompanied by the construction of mounds is also poorly studied.

By A.D. 700 chiefdoms were fully developed, as documented by this and previous research. The period of main development at Teso dos Bichos site has been dated to A.D. 800 - 1100, when it is also contemporaneous with Guajará mound, at the Upper Anajás River (Roosevelt 1991b: 366-67 and Table 5.1). Research at the Casinha and Saparará sites (Chapter 4), non-mound villages from the same period, demonstrated the spread of cultural traits associated with the moundbuilders of the headwaters to the main rivers. This period, called "Classic Marajoara", spans from A.D. 700 to 1100. Much of the information about Marajoara societies produced by previous research is probably dated to this period. This challenges early attempts at establishing a relative chronology between mound groups (Magalis 1975; Meggers and Evans 1957), since most likely data used in ceramic seriation came from roughly contemporary periods.

The typical Classic Marajoara period settlement can be described in the following way. Mounds are found in groups, usually aligned along the shores of a small stream. In each group, one or two mounds were used for funerary rituals, feasting, and elite residence. These mounds contain retaining walls, baked clay surfaces, baked clay platforms, stoves, hearths, burials, and broken remains of highly decorated ceramics, used for feasting and rituals. Episodes of more intense mound building, with the addition of thick layers of silt are associated with construction of ponds and weirs. Thin layers containing remains of charcoal and discontinuous baked clay surfaces, together with hearths and stoves are interpreted as occupational surfaces.

Lack of substantial research in non-ceremonial mounds prevents a more comprehensive comparison between the two basic mound types. Available data, however, indicates that mounds containing only remains of domestic vessels were likely habitation sites for the non elite population, where funerary structures have not been reported. The "habitation" mounds largely

outnumber the ceremonial mounds, as expected for hierarchical settlement systems (Flannery 1976a; Johnson 1977). In the Camutins society, there is an average of 5 to 6 habitation mounds for each elite mound, but the geographical distribution is not consistent with this ratio. For example, there is a cluster of 15 habitations mounds and three ceremonial mounds at the upper river course, a cluster of 15 habitation mounds without any elite mound at the middle river course, and there is a cluster of three elite mounds and one habitation mound, comprising the major ceremonial center, at the lower river course. This settlement pattern is believed to be a function of proximity to critical resources, control over particular geographic areas of the river (especially water-control systems), as well as ideological ideas on the appropriate spatial distance between elite and non elite population. Future research should focus on investigating the range of activities performed in the habitation mounds, in order to better understand their role in the political economy, as well as to provide information on population size. Presently, population estimations can only be speculated on the basis of research undertaken at elite mounds.

At elite mounds, however, it is intriguing that there is the absence of reports on post molds that would indicate house shape and location. It is assumed that the houses had only one central post. The lack of aligned post molds indicates the absence of palisades. This is unlikely to be simply the product of sample bias or problems of archaeological visibility. One post mold was identified in the Casinha site, where it was interpreted as a central post in the house structure.

In the absence of post molds and continuous floor surfaces, the existence of hearths, stoves and burials have been used to identify house location. The reduced upper platform of the mounds suggests the use of communal houses (Meggers and Evans 1957: 399). House size has been suggested based on ethnographic analogy. Population estimates have been proposed based on number of houses per mound. Roosevelt (1991b: 342) has estimated a population of 1,000 people for the 3-hectare village area of Teso dos Bichos.

This research has proposed a much more conservative estimation for the total population of the Camutins chiefdom, based on number and area of mounds, as well as on ethnographic analogy in order to infer about house size and number of inhabitants per house. Accordingly, it has been proposed that the Camutins populations, living on 34 mounds, would have totaled around 2,000 people. Since little is known about settlement systems in other parts of the Island, it is not possible to estimate the number of chiefdoms on the Island, and therefore to estimate the overall population. However, regional aggregation of mounds displaying similar settlement patterns, cultural features, and material culture to those identified at Camutins site suggest the existence of several small chiefdoms. The greater number of Marajoara Phase sites, if compared to previous phases, indicates that population growth was associated with the new way of life. Therefore, population growth would rather be the result of cultural change, not its cause.

By A.D. 700, populations settled along the Camutins River had built a water-control system, comprised of weirs and large pond excavations. Mound building is understood as part of the water control system, as sediment removed from ponds was redeposited, in order to build dams, weirs, and mounds. On the basis of current practices of landscape management and fishing strategies, these earthworks can only be interpreted as a means to intensively exploit aquatic resources.

The very beginnings of the earth moving activities were not documented by this research and can only be deducted from indirect data. It has been observed that populations living along main rivers seasonally move to the headwaters in order to harvest fish, using very simple techniques, such as damming the rivers and placing removable fences and nets in optimal locations. This is accomplished by cooperation between several fishermen, who usually divide the product among those who help in building the fences and dams, as well as maintaining and defending them. Although fishing is far more productive at the headwaters, life there is more difficult than along the main rivers, because availability of water is dependent upon constant

management. For this reason, the population has selected to live along the main rivers and seasonally exploit fish at the headwaters.

Since the archaeological mounds were likely inhabited on a permanent basis, water-management was a requirement for sedentary life and population aggregation. Maintenance of water-managements systems requires cooperation and administration (Scarborough 2003). In order to infer the character of the social relations behind such an effort, it is necessary to ask how large the labor force was required.

The building of water-control systems and mounds on Marajó Island certainly involved much less labor mobilization than the construction of the Mississippian mounds or the Hohokam canals. Even so, earthworks were likely the result of a communal effort, requiring coordination and leadership. Water-management strategies in general involve a communal investment of labor which ultimately reinforce links to a territory and encourage complex social and economic relations (Scarborough 1991: 139). This effort enabled populations to settle definitively at the headwaters, managing aquatic resources and creating a storable surplus.

The advantage of this system was the amount of surplus that could be produced with minimal effort. Seasonal maintenance was necessary, but did not require any spectacular labor force. Although populations had to work in maintaining the system, it was probably more advantageous to engage in cooperation than to subsist on one's own labor. Scholars tend to assume that economic intensification requires an increase of labor force, and they question the circumstances under which an independent farmer would willingly join in a regional system (Carneiro 1981, 1995; Netting 1990). However, cooperation can in fact reduce the work load while increasing production (Stanish 2004).

The fish-farming systems likely consisted of a reliable and relatively stable source of protein obtained with little labor investment. Dams, ponds, and corrals had to be built, maintained and defended, requiring a number of people that exceed that of the extended family.

Communal facilities would likely be preferred, because labor is divided between several households, keeping labor involvement very low while productivity is still high. In this type of economy, surpluses are so high per labor investment that cooperation is the best way to maximize production while minimizing labor at the same time.

Surplus was likely administered and controlled by those who first started the system, or were able to claim rights over the fisheries. These groups might have soon invested themselves with the power that abundant protein would give them in the form of a “staple finance” (D'Altroy and Earle 1985), which could also be used to trade for other foodstuffs and goods. Before this system came into existence, economically autonomous households had to cope with resource fluctuations, especially protein rich resources. As they specialized in capturing aquatic resources, moving to areas where other resources were scarce, their need for other foodstuffs and goods might have encouraged them to engage more actively in exchange. Although there is no archaeological data besides lithic tools to evaluate exchange systems, ethnohistorical information indicates that exchange was an important part of Amazonian economies (Lathrap 1973; Whitehead 1994). This economy might have attracted populations that saw advantages in joining the intensive fishing economy. Since elite rights were justified by a sacred genealogy, the economic productivity of the system was certainly credited to the protection offered by ancestors and gods. The elite’s close (kin) relation to ancestors likely sanctioned the relations between humans and the natural resources, establishing the rules through which the system should operate to obtain maximum productivity and well-being.

In the Camutins society, settlement patterns, and landscape modifications, as well as the nature of funerary practices investigated indicate that access to critical resources was regulated by social rank. Only four of the 34 mounds that comprise the Camutins society were located next to the main fishing facilities. Among them, two higher mounds (6.4 and 11 m high) and one small mound (3.2 m high) contained elaborate burials suggesting that restricted access to resources was

justified through ritual, and genealogy (Curet and Oliver 1998; McAnany 1995). The time and resources spent in funerary rituals, as well as the associated iconography (see Chapter 7), point to the importance of genealogy in sustaining social hierarchies. Through funerary rites, which took place in the higher mounds, the elite defined itself in relation to the territory as the land of their ancestors, legitimating the status quo (Drennan 1995b: 94-95; Earle 1990: 74; Helms 1998; Service 1962).

Mound building has also to be evaluated in its symbolic meaning. On a flat landscape, high earthen mounds might be seen as a symbol of power and prestige. The inhabitants of high mounds are showing their ability to mobilize labor. At the same time, mounds can be seen as territorial markers, signaling ownership of land and resources. The ability of kin groups to mobilize people for such an enterprise was likely related to their capacity to manipulate religion, by claiming access to the supernatural world.

The monumentality of the mounds, then, can be understood as a metaphor for social distance and differential access to the supernatural world (McAnany 1995). A comparison can be made to Neolithic megalithic monuments in Europe, which have been interpreted by archaeologists as indicating claims over resources in situations of social stress (Renfrew 1976), as well as symbolic structures that would legitimate sociopolitical strategies (Gilman 1976; Hodder 1982; Shennan 1982b).

In Amazonia, there are ethnographic examples of societies whose social rank is equated with rights to particularly abundant resources zones or rights to labor. For example, among the indigenous communities of the Upper Uaupés River (10,000 people over an area of 750,000 square kilometers), symbolic notions of kinship and social hierarchy determine the distribution of ecological zones, according to which high status groups are established in areas of aquatic resource concentration (Chernela 1997b: 279-80). Since areas occupied by the elite (given their nobility and ties to ancestors) are highly productive, they are expected to be generous and

promote ceremonies that include feasting and exchange of food and goods. Commoners are expected to help in preparing for the ceremonies and elite generosity is praised, and eventually converted into prestige (ibid.: 282).

Abundant remains of ceramics used for food processing as well as large amounts of decorated vessels in M-1 and M-17 were considered remains of feasting, suggesting that elite-sponsored feasting was used to promote community integration, and reinforce ranking (Junker, et al. 1994). Feasting likely promoted ceremonial exchange, resource distribution, and reinforced rights and obligations among elite and commoners.

In having privileged access to resources, the elite amassed huge surplus that could be exchanged for other food stuffs and labor. The elite had control over a stable and very desirable source of protein, but their circumscription certainly prevented their access to other resources. This situation likely created interdependence between elite and commoners, as well as between elite groups. Ethnographic research has demonstrated that feasting may be an important arena for competition over basic resources and political power, at the same time creating mechanisms for a support network in times of subsistence stress (Clarke 2001: 144).

The archaeological record at Camutins site is consistent with such a situation. The relation between elite and commoners was likely one of cooperation, rather than overt social coercion. Roosevelt (1999) has argued that the absence of indicators of social coercion would indicate social equality. However, the data points to the existence of social hierarchies and differential access to resources. The absence of social coercion in the archaeological record suggests a relation of mutual obligations between people of unequal social rank. Accordingly, commoners would contribute with labor and possibly other products such as starch, over which elite likely did not have direct control. The elite would reciprocate with protection and protein resources, due to their “generosity” and special relation to the gods.

Control over the production of ceramics and possibly other objects used for ritual and feasting provided the elite with material means to manipulate religion and legitimate their leadership (Earle 1990). This study demonstrated that ceremonial ceramics were produced within elite households. Therefore, the elite reserved for themselves not only the prerogative of using special symbols of prestige and supernatural power, but also of producing and distributing such objects. The emphasis on ceramics (an available material) as symbol of prestige may indicate the unavailability of foreign materials such as lithics. The production of pottery frog-shaped pendants, for example, was an emulation of nephrite pendants, the famous *muiraquitãs*, exchanged by elites along the Amazon River. The production and use of pottery *muiraquitãs* suggests that elites were giving esoteric significance to "mundane materials" (McAnany 1993; Peregrine 1991). This may well explain the fact that lithics were found in early burials in M-17 together with undecorated vessels, while fancier urns in upper deposits did not have lithics. In other words, the unavailability of long-distance exchange goods as esoteric items for displaying elite wealth and prestige may have led elites to reinforce the value of "handy materials" by empowering them with symbolic meaning (McAnany 1993).

The fact that the ceremonial area, elite residence, craft production, funerary rituals, and feasting were all concentrated in the same physical setting next to resources resulted in the centralization of the political economy. This should not be understood, however, as absolute power. On the contrary, the need to use all the possible means to assure control over surplus production only attests to the fragility of the political system. It is too early to speculate about the fluctuations in political power which determined both the success of regional political systems, as well as their collapse. It is possible that the strong emphasis on the infallibility of the system, because it was previewed and protected by religion, may have also caused its crisis. Aquatic resources are subjected to risks caused by environmental change, especially if the economic system is not diversified and includes reliable agricultural products (Widmer 1988: 279). In

situations of subsistence stress, leaders may lose confidence by not being able to explain resource fluctuation within the ideological and religious premises that sustained their power (see, for example, Richardson III 1994).

Non-agricultural complex societies have often been marginalized from the discussion on chiefdoms, labeled as “complex hunter-gathers”, or “complex foragers” (Arnold 1996b; Johnson and Earle 2000: 262-63). Some complex societies of the United States Northwest Coast, or the Calusa of Florida, however, displayed all the characteristics commonly associated with chiefdoms, such as social hierarchy based on ascribed status, paramount chiefs, capacity of chiefs to mobilize labor and request tribute payment, surplus production, slave labor, competitive feasting, part-time specialization, and warfare (Ames 1995; Arnold 1996b; Marquardt 1992; Widmer 1988). These societies settled in areas of predictable and highly productive aquatic resources, where protein could be obtained in amounts much higher than usually necessary. Widmer (1988) points out that societies that initially adapt to aquatic resources in highly fertile estuarine zones tend also to develop agriculture. Therefore, in the process, fishing might become a specialized activity within a much more complex economic system. Another possibility is that agricultural products become incorporated into the economy through trade (ibid: 277-78). This incorporation of agriculture might be one of the reasons why chiefdom economies based on aquatic resources are so invisible in the literature.

One point in common among complex societies whose economies are based on aquatic resources may be the fact that resource exploitation starts as a communal activity, but later resources are appropriated by kin groups that claim ownership to the area and finally established systems of control over surplus flow and labor (Isaac 1975). Opportunities for such an appropriation may have emerged in the process of organizing resource management, storage, and defense. Although a functionalist understanding of the rise of leadership based on such managerial functions is here rejected (after Earle 1977), administrative functions had to be

fulfilled. This might be accomplished initially by impermanent managers (Widmer 1988: 279) but soon providing "opportunities" (Gilman 1991: 148) for certain kin groups to develop more permanent systems of control.

The decline of Marajoara political economy is observed in the abandonment of M-17 around A.D. 1,000, the abandonment of the Casinha site at about A.D. 1150 and the change in settlement patterns showed by late sites (Cacoal Phase) associated with Marajoara culture traits. The reasons behind this crisis are not well understood, but such a transition period is hypothesized as ranging from A.D. 1100 to 1300.

A post-Marajoara phase period was also investigated along the Anajás River, represented by the Leal, Cacoal, and Vista Alegre sites. These are occupations that span from A.D. 1300 to A.D. 1600, being partially contemporaneous with the European occupation. Ethnohistorical documents report that the Island was occupied by several different indigenous nations during the 16th and 17th centuries, totaling a population of about 40,000 Indians. Each one of these nations would have a principal, or cacique, who ferociously defended their territories (Hemming 1978; Vieira 1992). The archaeological record shows small, apparently autonomous villages, without elaborated ceremonial structures. Ceramic assemblages still contain Marajoara style vessels, but there is greater local variability in vessel shape, decoration, as well as manufacturing techniques. These sites were located along the Anajás River, far from the fisheries.

THE CAMUTINS CHIEFDOM

The term chiefdom was used throughout this dissertation as a loose concept that defines a society that is regionally organized under some sort of permanent leadership (after Oberg 1955; Carneiro 1981; Spencer 1987; and see Chapter 1). The Camutins society fits the concept, although its particular sociopolitical and economic characteristics may differ from other chiefdoms in many ways. This variability reinforces the thesis that chiefdoms cannot be defined

by a checklist of necessary characteristics. Instead, variability forces us to review our models and refine our theories towards a better understanding of the processes that led communities to historically subsume under increasingly larger sociopolitical systems.

The main features of the Camutins chiefdom are summarized below:

- Social Hierarchy - society was hierarchical and stratified. A division between elite and commoners was defined by ascribed rank, or genealogical distance to ancestors. Rank defined control over and access to natural resources, access to the supernatural world, and access to prestige goods and technology.

- Economy - the economy was based on intensive exploitation of aquatic resources by the means of a fish farming system, which included the building of permanent facilities and probably the development of techniques for storage. Other foods included starch (from either manioc or palm), açaí, nuts, semi-domesticated and wild fruits. While the elite controlled the fish-faming system, other products were probably obtained by the commoner population. This might have generated interdependence between elite and non elite population.

- Settlement System - the ceremonial and political core is represented by a group of four mounds at the lower river course, with complementary roles in the political economy. These mounds are located next to the fish farming system, controlling the economy. The settlement system was comprised of 34 mounds disposed along the river in a hierarchical pattern. Elite mounds enclosed the settlement, as a measure of sociopolitical control. Mounds for the non elite population were located in between the elite mounds. Spatial distance between elite and non elite mounds is likely a metaphor for social distance, replicating hierarchical patterns.

- Power – power was in the hands of a kin group. Positions of power, when held by individuals, were based on genealogy. The corporate group was praised, instead of the individuals.
- Ideology - control over the economy involved the manipulation of a religious ideology that justified social stratification. This religious system was likely important in organizing labor for the maintenance of the fish farming system.
- Labor mobilization - earthmoving activities and labor mobilization were not monumental. Water management, accomplished with the excavation of pools and building of dams, weirs, and mounds was accomplished over a period of a few centuries. Although there is evidence that during A.D. 700 major excavations and mound building took place, it could have been done by 50 to 300 people during a period of a few years.
- Population density - the overall population is estimated to have been 2,000 people.
- Craft specialization - there was no craft specialization in a market economy sense. Pottery was produced in household contexts for local consumption. Some more elaborate ceramic pieces might have been produced by skilled potters as a seasonal, prestigious activity. Highly decorated ceramics, imbued with religious meanings, were prestigious goods reserved for the elite.
- Feasting – feasting was important in promoting cohesion and justifying the status quo. Feasting might have been important in sponsoring exchange, as well as in establishing relations with other chiefdoms.
- Long-distance exchange - lithic tools and adornments were very rare and likely important in the beginning of chiefdom formation in order to establish ties with elites elsewhere. Access to long distance lithic materials might have fluctuated through time and seem absent towards the end of the sequence.

- Warfare - warfare was inferred based on vandalism on burials in one of the elite mounds. Warfare, competition, exchange, and marriage alliances likely characterized relations between Marajoara chiefdoms.
- Gender – gender inequality seems absent among the elite. Roosevelt (1991b) has suggested that genealogy was probably based on matrilineal descent, due to the abundance of female symbolism in funerary vessels and other ritual objects.

MARAJOARA CHIEFDOMS IN THE AMAZONIAN CONTEXT

The model for chiefdom development discussed here can be to a certain extent extrapolated for the Amazonian context, because it offers an explanation that encompasses ecological arguments, which have been in the center of the debate on the development of complex societies in the area (Carneiro 1995; Roosevelt 1991a). The focus of this debate has been the possibilities offered by the tropical environment for the development of highly productive subsistence systems. The existence of a productive economy that could feed dense populations and generate surplus in order to sustain complex political and administrative functions is expected to correlate with the development of complex societies in Amazonia. In effect, the need for economic surplus in order to support part of the population not immediately involved in food production is a requirement acknowledged in most chiefdom studies (Earle 1987; Feinman 1991; Flannery 1972; Isaac 1988b; Netting 1990; Peebles and Kus 1977; Renfrew 1982; Spencer 1987; Spencer, et al. 1994; Steponaitis 1981).

Indigenous subsistence systems have been largely discussed based on ethnographic and ethnohistorical data (Carneiro 1995; Meggers 1995a; Roosevelt 1994b). Ethnography has shown that native Amazonians have an impressive knowledge of local ecosystems. This accumulated knowledge has been employed to develop original and sustainable practices for the exploitation of tropical resources (Meggers 1971; Posey 1989; Ribeiro 1997). Native economies are based on

extensive (swidden) cultivation of bitter manioc and several other crops, together with generalized gathering of wild and semi-domesticated plants. These economies have their main protein intake from fish and game, although plant protein (*açaí*, for example) is also important. The specialized literature is abundant on the uses of an amazing array of plants species for food, medicine, crafts, and habitation construction together with their management in order to count on useful plants around settlements and walkways, a process that is believed to have created part of the present biodiversity (Balée 1989b, 1993; Politis 2001; Posey 1989). This knowledge is structured in aboriginal cosmologies (Reichel-Dolmatoff 1999); therefore cultural systems have played an important role in disseminating information and providing a holistic understanding of the relations between human societies and the environment that may have prevented resource depletion (Meggers 1984, 1995c). The advanced knowledge of the tropical resources and the capacity of aboriginal groups to maximize their productivity is understood by Meggers (1984; 1985a; 1995c) as a strategy to cope with cyclical climate change, seasonal resource fluctuation, and subsistence stress.

It is evident that present low populations densities have resulted from decimation caused by the spread of European diseases, enslavement, forced migration, and military conflict, whose consequences were particularly dramatic during the first two centuries of the conquest (Beckerman 1979; Denevan 1976; Heckenberger 1996; Myers 1992; Neves 1998; Roosevelt 1994a). If it is accepted that present subsistence systems mirror those of pre conquest times, economies are now operating well below "carrying capacity" levels. In fact, ethnographic populations are known to produce foodstuffs in amounts beyond their subsistence needs, while their time allocation for subsistence activities is very low (Carneiro 1961; Descola 1994). Therefore, ethnographic economies would have the potential to produce much more than they actually do, sustaining even larger populations. Moreover, aboriginal practices of landscape management, such as raised fields, and fish-farming systems, likely correlated with intensified

economies that are not in use anymore (Denevan 1966; Denevan and Zuchi 1978; Erickson 1980, 2001). The presence of large patches of highly fertile *terra preta* soil, consistently associated with archaeological settlements (Kern and Kampf 1989; Lehmann, et al. 2003; Neves, et al. 2003; Petersen, et al. 2001; Smith 1980) indicate that ancient economies were in fact much different than present ones. Although some indigenous groups still employ soil management techniques in order to improve soil fertility (Posey 1989), scholars believe that aboriginal peoples may have developed soil management strategies that have not survived to the present day (Denevan 2001, 2003; McCann and Woods 2000; Smith 1980; Woods and McCann 1999).

Ethnohistorical chronicles and colonial documents indicate that aboriginal populations were fairly numerous (Denevan 1976; Hemming 1978). Especially dense populations characterized várzea societies, organized in provinces that extended for several kilometers with tens of thousands of inhabitants (Acuña 1859; Carvajal 1934; Porro 1994). These societies are believed to have been multiethnic, regionally organized, being socially stratified (nobility, commoners, slaves), with paramount chiefs, priests, elaborate crafts, and complex exchange systems (Carneiro 1970a; Lathrap 1970b, 1973; Myers 1992; Neves 1998; Porro 1994; Roosevelt 1980; Whitehead 1994).

Resource abundance is indicated by the impressive amounts of food that could be gathered in a short period of time to supply the conquerors' ships, as well as by colonial documents that report trade with the natives (Acuña 1859; Carvajal 1934; Hemming 1978; Myers 1981). Foodstuffs reportedly included manioc flour, manioc bread, sweet potatoes, corn, native seed crops, dry fish, aquatic mammals, turtles, iguanas, etc. Although maize is mentioned, it is not possible to evaluate how important maize was for local economies. Roosevelt (1994a: 7) believes that maize was a staple food by A.D. 1000; therefore, the present reliance on manioc as a major staple food would be a result of the colonial process that dismantled aboriginal economies (ibid.:11). Considering the variety of aquatic resources reported in the chronicles, which include

“houses full of dry fish” (Drumond 1950: 100; cited by Porro 1994: 84) as well as live turtles kept in corrals, manatees, and several fish species used not only for consumption but also for trade, it is possible to conclude that aquatic resources were an important component of the diet, and probably a major source of protein (Carneiro 1970b, n.d.; Lathrap 1970b).

In sum, both ethnographic and ethnohistorical data indicate the ability of aboriginal economies to produce surplus in the necessary amounts to sustain dense, regionally organized societies. However, neither ethnography nor ethnohistory has provided information on how the production, consumption, distribution, and exchange of surplus had financed elite emergence and the extent to which these elite managed surplus flow at regional levels. Most of the discussion on subsistence patterns in the specialized literature has left aside the problem of surplus flow, which is critical for accounting for the development of a political economy in chiefdoms. If surplus is necessary to sustain a ruling class that is unattached from subsistence activities, it is necessary to ask how surplus is generated, and which mechanisms are in place in order to funnel the surplus to the functions it is supposed to support (Isaac 1975, 1988a; Saitta 1994; Saitta and Keene 1990).

Roosevelt (1980) tried to address this question during her study of Orinoco chiefdoms. Following most classic pathways for the development of social complexity, Roosevelt proposed that social complexity emerged as a result of agriculture intensification. With an elaborate argument, she offers the hypothesis that population pressure over limited agricultural land would have been solved with technological change, caused by the introduction of maize, a protein rich crop. The cultivation of maize could generate a tributary economy and support social stratification.

After testing this hypothesis in Parmana, Roosevelt tried to demonstrate that similar processes might explain the development of chiefdoms in the Amazon várzea and particularly on Marajó Island. However, Roosevelt did not identify maize in her study of Teso dos Bichos mound, but an economy based on intensive seasonal fishing and seed crops, as well as foraging.

The fact that the most complex society of the lower Amazon did not rely on maize eventually caused a problem for Roosevelt's theory. The solution was to downplay the level of centralization and social inequality of Marajoara societies, stating that, although dense, complex, and ranked, there was no socio-economic differentiation among the population and all sites displayed similar cultural features and artifact remains (Roosevelt 1999: 20-23). As this study has demonstrated, however, Marajoara societies were stratified, in the sense that access to critical resources was regulated by genealogy. The lack of centralization identified by Roosevelt actually derives from an incorrect assessment of the chiefdoms boundaries. Roosevelt seems to believe that there was a single Marajoara chiefdom, while accumulated settlement pattern data indicates the existence of several relatively independent settlement systems.

The failure in explaining the development of social complexity on Marajó Island, however, would not imply that chiefdom development on the lower Amazon could not be understood in the terms set by Roosevelt's model. Roosevelt (1999) supports her hypothesis with the Tapajós chiefdom, for ethnohistorical data indicated they practiced maize agriculture and had paramount chiefs. The problem with Roosevelt's model is the correlation of the subsistence system to a particular sociopolitical structure. As Saitta (1994: 201) has argued, in disaggregating the study of surplus flow from the development of political power, it is possible to pay attention to variability in political-economic relationships.

Another interpretation in understanding the emergence of chiefdoms in Amazonia is the one proposed by Carneiro (1970a; 1981). In defining chiefdom by its sociopolitical characteristics (which helps comparing chiefdoms to each other while considering different developments) Carneiro focuses on the sociopolitical process, in the transition from independent villages to regional societies. Carneiro (1981; 1998) asks a question he considers critical for understanding chiefdom development: why would villages give up their autonomy to join in regional societies? His arguments depart from considering the point of view of local villages, and

he tries to visualize the conditions and the mechanisms that ultimately led to the emergence of regional polities, a “qualitative” change in the history of human societies (Carneiro 1970a; 1981: 38).

Carneiro’s model predicts that population pressure in resource rich, ecologically circumscribed areas would cause competition for productive land. Given these conditions, warfare would be the mechanism that would enable the rise of regional organization. Warfare leaders would then become chiefs, while the defeated groups would loose their lands, and be coerced to stay, paying tribute, or being incorporated as slaves (Carneiro 1981: 64). Defensive needs are therefore seen as the most logical reason that would compel populations to give up their autonomy and join regional societies (Carneiro 1998; see also Netting 1990).

Although competition for resources is an important part of the explanation, surplus is left out of the model (Isaac 1975: 127). Therefore, it is not clear how the transition from the local village economy to the regional economy operated. Carneiro does not explain whether some form of intensification of production was adopted. Did the war chiefs themselves collect tribute and organize the economy? Were warfare chiefdoms auto sufficient economically? Were chiefdoms in constant war, redefining boundaries for tribute taxation? The model would be greatly improved if it was better defined how the political economy was organized given the situation described. For example, would chiefdom stability be based on constant coercion? Would warfare leaders impose themselves also ideologically? How was the stability of such a system negotiated? It seems that economic and ideological details are not considered important for Carneiro, but indeed they are critical since the model is based on competition for resources and predicts the emergence of ascribed rank.

It cannot be said, however, that Carneiro has not contributed to our understanding of Amazonian subsistence systems. In fact, few scholars have given so much thought to this matter. In several of his papers, Carneiro has emphasized that aquatic resources were a major source of

protein (see also Lathrap 1970b; Myers 1992: 136). He criticized Roosevelt for downplaying the importance of aquatic resources for Orinoco chiefdoms in order to argue for her maize theory (Carneiro 1995: 54). Carneiro (n.d.) feels that if fish provided enough protein, there was no reason to cultivate maize. Beckerman (1991: 146-47) also points out that the alleged preference for maize in the model is not as obvious as it may appear. Manioc is more resilient, has less impact on soil fertility, is twice as productive, and provides three times more kcal per work hour than maize. Therefore, an economy based on manioc and fish would be not only ecologically favored, but would also maximize calorie and protein intake with less labor investment if compared to other possible subsistence systems.

Another important argument developed by Carneiro (1995) is related to an evaluation of the problems with várzea agriculture. While várzea soils are more productive, seasonal floods are a problem for manioc cultivation, which has a maturation cycle of 16 to 18 months. An attempt to solve this problem is reflected in the development of a short term variety of manioc (*mandioca purê*) which can be planted in the high várzea, and be edible in 6 months (Carneiro 1995: 57; Meggers 1984: 643). Regardless, unpredictability of the floods would have várzea peoples occasionally relying on terra firme crops (Carneiro 1995). This may have caused interdependence between várzea and terra firme populations, something that, although mentioned in the literature, has not been sufficiently explored by scholars in understanding the emergence of social complexity in the várzea.

The model developed during this research on Marajó might be useful to account for the emergence of social complexity in other parts of the lowlands, while observing differences in local ecology. Funerary vessels and artifacts collected from sites located in the central and lower Amazon areas indicate the existence of ancestor worship and similar ritualistic activities to those here discussed for Marajoara phase (Barreto and Machado 2001; Gomes 2001; Guapindaia 2001; McEwan 2001; Roosevelt 1988, 1999). The regional exchange of basalt axes, nephrite pendants,

lithic adornments and effigies across regional lines indicate the existence of supra regional networks between societies of similar social organization (Boomert 1987).

Regional societies appeared in the central Amazon and at the mouth of the Tapajós River by A.D. 900 (Eduardo Neves, personal communication 2004, Gomes 2002: 131). A process of increased sedentism, population growth, and increased reliance on agriculture, however, is believed to have started in the central Amazon much earlier, 2,000 – 2,500 years ago, attested by the formation of *terra preta* soils (Neves, et al. 2003).

Following Carneiro's predictions, the late development of complex sociopolitical institutions in the central Amazon, if compared to Marajó Island development, may be credited to diminished circumscription (more available high productive land), meaning that societies could live on extensive economies for longer period of time until population pressure became a factor. It can be hypothesized that, as on Marajó, aquatic resources were also the economic basis for surplus production along the Amazon várzea. The development of techniques to intensify, manage, and store aquatic resources, was probably experienced independently by household economies and autonomous villages. Resource management strategies may have emerged with cooperation instead of top to bottom organization.

Stanish (2004) provides a model for understanding the development of surpluses on the basis of cooperation, arguing that cooperation would enable populations to maximize resource gathering while maintaining low labor investment. The possibility of optimizing resource gathering without expending more time than usual for subsistence activities might have been critical in the transition from a household to a regional based economy (see Descola 1994). As surpluses were being produced, some social groups would have claimed rights to their administration, justifying themselves by means of religion and ideology. In this sense, the intensified economy is neither created by the elite nor needs the elite for its administration. The

appropriation of surplus by the elite can be seen as resulting from a process of co-evolution (Stanish 1994) which may well have different outcomes.

As várzea populations became more sedentary and concentrated in particular areas, intensively exploiting aquatic resources, the need for products outside their zone of influence would become more and more necessary, and exchange would be critical in shaping the political economy. The unpredictability of the várzea agriculture, as pointed out by Carneiro (1995), may have caused some dependence on hinterland crops (Myers 1992: 135), although there is archaeological and ethnohistorical evidence that várzea peoples occupied bluffs above the flood levels where agriculture was possible in fertile land (Denevan 2003; Meggers 1984: 641; Neves 2003). Although the trade of perishable items cannot be identified by direct means, the exchange of prestigious lithic materials and the stylistic similarities in the ceramics may indicate the exchange routes (Lima, et al. 2003; Whitehead 1994: 34-35). The interdependence in exchange might have shaped chiefdoms boundaries, and set limits on the power of local elites. Neves (2003) has suggested that episodes of site abandonment identified in the central Amazon can be interpreted as sociopolitical instability of várzea chiefdoms, which developments would be cyclical. A dependence on exchange might have been one of the causes for both sociopolitical power and its instability.

If this model is correct, it is possible that maize was introduced late in the várzea as a measure aimed at decreasing dependence on terra firme crops. Another possibility is that maize had a ritual significance in the production of beer for ceremonies (Nimuendaju 1949 cited by Roosevelt 1999: 26), and is the reason why elites could have promoted cultivation as part of the symbolics of prestige.

Regardless, the relation of economic interdependence between várzea and terra firme societies, if confirmed, may have caused social tensions and military conflict. If várzea elites had power originating from their political control over the surplus produced by an intensified wild

food economy, it is possible that hinterland peoples sought to negotiate power by withholding desirable products cultivated or available in their lands. The size and range of influence of várzea societies was likely limited by their area of exploitation, sustainability of their protein sources, and their capacity to generate surplus for exchange.

Warfare might have evolved together with the development of complex societies instead of being a major mechanism for initial regional aggregation around a chief, as Carneiro (1970a; 1981; 1991; 1998) has proposed. Ethnographic data suggests that warfare, together with trade and marriage alliances constitute the means by which external and internal social, political, and economic relations are woven in complex societies that lack formal state institutions (Dalton 1977). Therefore, warfare might have been important in establishing geographical boundaries, forging alliances between corporate descent groups, negotiating exchange routes, and regulating power between chiefdoms.

This model for chiefdom emergence and development in the Amazon várzea is preliminary and handicapped by insufficient archaeological data. However, it has been offered as alternative to traditional models of chiefdom development that assume agriculture intensification as a necessary condition for surplus production and development of complex sociopolitical functions. By focusing on local ecology, the suitability of local ecosystems for surplus production, and the forms of social organization that may have emerged on the basis of an intensified wild food economy, this model seeks to demonstrate how particular ecological conditions might have been manipulated creatively by Amazonian societies, following rather original paths towards greater complexification of social systems.

DIRECTIONS FOR FUTURE RESEARCH

As usual, this research has left some questions unaswered as well as raised other problems for future research. The relation between Marajoara Phase and previous occupations has been

proposed to be one of continuity, but lack of a good chronology and a better understanding of subsistence patterns and social organization during Mangueiras and Formiga phases has prevented from providing a better interpretation of the link between these occupations and the initial development of social complexity.

Accumulated data indicates that several ceremonial mounds distributed over the savannas display similar cultural features and funerary practices. Moreover, ceramics coming from these mounds show a supra-regional style, with local technical and stylistic variations, suggesting parallel developments. Information is scanty, however, on possible landscape modifications associated with these mounds. It is known that mounds are located on the shores of streams or lakes (Meggers and Evans 1957: 398), which are known to be very abundant in aquatic resources. Since the emergence of social complexity and development of a political economy, as studied at Camutins site, is believed to have been possible due to the surplus produced by an intensified fishing economy, the existence of mounds at similar locations elsewhere on the Island can be explained using the same model.

This model, however, needs to be tested in other settlements. Future research should be able to identify regional settlement systems associated with fish-farming earthworks. The identification of ceremonial mounds containing evidence for ancestor worship and feasting next to the fish farming systems will indicate control over access to resources. At the same time, there should be a lack of evidence for surplus production at house-mound sites located away from ceremonial mounds.

If similar chiefdoms emerged on several areas of the savannas, where subsistence systems could be replicated, future research should be able to demonstrate that each fish-farming system was related to an administratively independent chiefdom. Research should also be able to demonstrate that the size of the chiefdom (number of mounds and area) is proportional to the size of the fisheries.

The relation between these chiefdoms was likely one of competition. This is suggested by the parallel development of ceramic styles related to feasting and ritual, as well as the average height of ceremonial mounds located in various parts of the savannas, around 12 meters. Chiefdoms may have been competing for labor and products not available in their areas of control. Preliminary data indicates the absence of a supra-regional political center, suggesting a system of alliances between chiefdoms, compatible with peer-polity interaction models (Renfrew 1986; Roosevelt 1999; Schaan 1997a). It is possible that the relations between chiefdoms were established on the basis of exchange systems, alliances for exchange of spouses, as well as warfare. It is likely that these competitive chiefdoms exhibited various levels of social complexity due to the size of their territory and the productivity of their ecosystem (Junker, et al. 1994; Liu 1996).

There is also the need to better understand the relation between elite and non elite mounds. Which activities were carried out in non elite settings? Which household features can be found in these mounds? Were they occupied intermittently? How large was the non elite population?

This research has also proposed that feasting on ceremonial mounds involved exchange of other foodstuffs. The study of vessel use through micro residue analysis, as well as the study of skeletal remains from M-17, presently underway, should provide important information on ancient diet as well as a more complex picture of early subsistence patterns. Although the fishing economy is proposed as being critical for the political economy, the production and exchange of other foods was certainly important and should be studied in more detail in order to better account for the proposed patterns of exchange.

Future research may want to investigate the whole savanna area using a landscape archaeology approach. Landscape archaeology provides the necessary perspective to examine the way human populations modified the land around them, creating a cultural environment (Crumley

and Marquardt 1990). This theoretical approach is consistent with a focus on the relations among artifacts and cultural features and their spatial and temporal distribution in the landscape, instead of assuming site boundaries as a unit of analysis (Dunnell 1992). The "boundaries" between Marajoara chiefdoms are not self-evident, and cannot be assumed before these societies are studied. Such a study clearly requires a landscape dimension of analysis.

Comparing the various settlement systems would make it possible to better understand their sociopolitical systems, the building of alliances between elite populations, and assess the sustainability of local fisheries. The spread of similar sociopolitical systems throughout the Island, however, cannot be merely seen as a replication of a successful subsistence system. Their development has to be understood also within the contexts of exchange, cooperation and conflict that certainly emerged between Marajoara phase societies. Explaining chiefdom emergence consists not only of accounting for the development of a regional society at a certain point in time and location, but also on understanding how the regional system impacted other social formations, which would now evolve under new conjunctures.

APPENDIX A

Tables Chapter 4

Table 6 - Proportions of pottery sherds per level from Rio Branco site

	Ananatuba Phase (Grog)				Caraipé Pottery				
Level	Plain		Decorated		Plain		Decorated		**TOTAL**
in cm	Count	%	Count	%	Count	%	Count	%	
0-10	1,804	74.42	562	23.18	7	0.29	51	2.10	2,424
0-20	104	77.61	30	22.39	0	0.00	0	0.00	134
10-20	2,325	77.86	640	21.43	6	0.20	15	0.50	2,986
20-30	2,805	74.52	953	25.32	5	0.13	1	0.03	3,764
30-40	3,360	75.71	1,075	24.22	1	0.02	2	0.05	4,438
40-50	2,176	61.99	1,084	30.88	84	2.39	166	4.73	3,510
F1	470	56.63	259	31.20	46	5.54	55	6.63	830
50-60	1,533	71.94	593	27.83	4	0.19	1	0.05	2,131
60-70	1,711	76.38	456	20.36	72	3.21	1	0.04	2,240
70-80	657	79.16	173	20.84	0	0.00	0	0.00	830
80-90	854	79.89	215	20.11	0	0.00	0	0.00	1,069
90-100	342	80.47	82	19.29	1	0.24	0	0.00	425
TOTAL	18,141	73.21	6,122	24.70	226	0.91	292	1.18	24,781

Table 7 - Proportions of pottery sherds from São Benedito site

	Plain		Decorated		TOTAL	
Temper	Count	%	Count	%	Count	%
Grog	120	26.60	44	9.76	164	36.36
Caraipé	239	53.00	10	2.22	249	55.21
Grog+Car	21	4.66	6	1.33	27	5.98
Other	10	2.22	1	0.22	11	2.43
TOTAL	390	86.50	61	13.50	451	100.00

Table 8 – Proportions of pottery sherds per level from São Benedito Site

Level	Grog		Caraipé		Grog & Caraipé		TOTAL	
in cm*	Count	%	Count	%	Count	%	Count	%
0-20	5	10.64	41	87.23	1	2.13	47	100.00
20-30	11	22.45	34	69.39	4	8.16	49	100.00
30-40	20	51.28	14	35.90	5	12.82	39	100.00
40-50	7	29.17	12	50.00	5	20.83	24	100.00
50-60	19	55.88	14	41.18	1	2.94	34	100.00
60-70	17	34.00	28	56.00	5	10.00	50	100.00
TOTAL	79	32.51	143	58.85	21	8.64	243	100.00

* Sherds from surface collection not included

Table 9 – proportions of pottery sherds from Casinha site

	Vessel Temper									
	Grog		Caraipé		Grog and Caraipé		Other		TOTAL	
Surface	Count	%	Count	%	Count	%	Count	%	Count	%
Plain	5,815	29.29	6,481	32.65	1,886	9.50	1,381	6.96	15,563	78.40
Decorated	2,385	12.01	632	3.18	336	1.69	936	4.71	4,289	21.60
TOTAL	8,200	41.31	7,113	35.83	2,222	11.19	2,317	11.67	19,852	100.00

Table 10 – Proportions of pottery types by activity area from Cacoal Site

Excavations / Activity Area	Type 1 (%)	Type 2 (%)
1 (Ceremonial)	49.64	36.39
2 (Pit)	40.52	49.57
3 (Refuse Disposal Area)	35.57	50.30
4 (Burials)	35.04	53.66
5 (Refuse Disposal Area)	41.15	45.61

Table 11 – Proportions of pottery types from Leal Site

	Surface Treatment				Total	
Vessel Temper	Plain		Decorated			
	Count	%	Count	%	Count	%
Grog	1,507	20.81	333	4.60	1,840	25.41
Caraipé	4,118	56.86	116	1.60	4,234	58.46
Grog & Car	1,118	1.15	40	0.54	1,158	15.99
Other	10	0.14	0	0.01	10	0.14
TOTAL	6,753	93.25	489	6.75	7,242	100.00

Table 12 - Proportions of pottery types per level from Leal Site

Types	Levels (% of the total)				
	0-10cm	10-20cm	18-30cm	30-40cm	40-50cm
Grog Plain	10,10	17,31	24,46	30,09	28,57
Grog Decorated	0,67	3,56	5,86	7,32	4,66
Caraipé Plain	73,07	60,61	48,08	43,47	46,27
Caraipé Dec	0,75	1,91	1,69	1,25	0,62
Grog & Car Plain	10,92	13,55	16,74	15,46	16,77
Grog & Car Dec	0,30	0,55	0,62	0,42	0,62
Other Plain	4,11	2,46	2,42	1,83	2,17
Other Decorated	0,07	0,05	0,11	0,17	0,31
TOTAL	100,00	100,00	100,00	100,00	100,00

Table 13 – Proportions of pottery sherds from Vista Alegre site

	Plain		**Decorated**		**TOTAL**	
Temper	Count	%	Count	%	Count	%
Grog	191	44.42	33	7.67	224	52.10
Caraipé	104	24.19	6	1.40	110	25.58
Grog & Car.	88	20.46	2	0.46	90	20.93
Other	6	1.40	0	0.00	6	1.39
TOTAL	389	90.47	41	9.53	430	100.00

Table Chapter 5

Table 14 - Proportions of pottery types in surface collections from Camutins mounds

Pottery Types	M-2		M-3		M-4		M-5		M-6		M-7		M-8		M-9		M-10		M-11		M-12	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Plain types																						
Camutins	41	69.5	38	55.0	67	60.9	23	37.7	84	58.0	55	44.8	81	57.9	51	53.7	31	52.5	66	52.5	46	40.7
Inajá	16	27.1	31	45.0	42	38.1	35	57.4	61	42.0	65	52.7	54	38.6	42	44.3	27	45.8	49	38.8	66	58.3
Decorated																						
Joanes							3	4.9											11	8.7	1	1.0
Plain Inc											3	2.5	3	2.1	2	2.0	1	1.7				
Plain Exc	2	3.4			1	1.0							2	1.4								
Total	**59**	**100**	**69**	**100**	**110**	**100**	**61**	**100**	**145**	**100**	**123**	**100**	**140**	**100**	**95**	**100**	**59**	**100**	**126**	**100**	**113**	**100**

Pottery Types	M-13		M-14		M-15		M-16		M-18		M-26		M-27		M-30		M-31		M-32		M-33	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Plain types																						
Camutins	50	46.4	86	48.0	71	47.6	125	40.4	62	52.6	12	46.1	7	63.6	10	43.5			17	42.5		
Inajá	58	53.6	84	46.9	67	45.0	89	28.8	49	41.5	13	50.0	4	36.4	11	47.8			23	57.5	2	100
Decorated																						
Joanes			1	0.6	8	5.4	79	25.6	3	2.5					2	8.7	3	60.0				
Plain Inc			6	3.4	3	2.0	1	0.3	3	2.5												
Plain Exc			2	1.1			1	0.3	1	0.9												
Red Exc							2	0.65			1	3.9					2	40.0				
Scraped							3	0.97														
Carmelo							2	0.65														
Red Slip							5	1.60														
Caraipé							2	0.65														
Total	108	100	179	100	149	100	309	100	118	100	26	100	11	100	23	100	5	100	40	100	2	100

* Combines data from Meggers and Evans (1957) and this research's.

Tables Chapter 6

Table 15 – Frequency of workshop remains from M-17

Excavation	Count	%	Total Sherds	%
Exc. 1	486	11.15	4,358	100.0
Exc. 2	57	1.60	3,570	100.0
Exc. 3	191	5.59	3,417	100.0
Exc. 4	79	1.82	4,330	100.0
Exc. 5	21	0.97	2,176	100.0
TOTAL	834	4.67	17,851	100.0

Table 16 – Sherd count from M-1 profile 1

	Plain Types		Decorated Types						
Wall Thickness	Camutins Plain	Inajá Plain	White Slipped	Red Slipped	Plain Incised	Plain Excised	Red Excised	Scraped	**TOTAL**
Thin	5	11	2	1	2	0	1	1	23
Medium	8	12	3	1	0	5	9	0	38
Thick	35	24	2	0	0	0	0	0	61
TOTAL	48	47	7	2	2	5	10	1	122

Table 17 – Proportion of pottery types from M-1 profile 1

	Plain Types				Decorated		TOTAL	
	Camutins Plain		Inajá Plain					
Thickness	Count	%	Count	%	Count	%	Count	%
Thin	5	4.10	11	9.02	7	5.74	23	18.85
Medium	8	6.56	12	9.84	18	14.75	38	31.15
Thick	35	28.69	24	19.67	2	1.64	61	50.00
TOTAL	48	39.34	47	38.52	27	22.13	122	100.00

Table 18 – Sherd count from M-1 surface collection

	Plain Types		Decorated Types									TOTAL
Thickness	Camutins	Inajá	Double Slip	Painted Urn	White Slip	Red Slip	Plain Incised	Plain Excised	Scraped	Pacoval Incised	Red Excised	
Thin	0	0	0	0	0	0	0	4	0	1	1	6
Med	11	12	1	4	3	0	4	11	4	0	5	55
Thick	27	24	1	20	3	1	4	11	0	0	7	98
TOTAL	38	36	2	24	6	1	8	26	4	1	13	159

Table 19 - Proportions of pottery types from M-1 surface collection

Thick ness	**Plain Types**				**Decorated Types**				**TOTAL**	
	Camutins		Inajá		Sherds		Urn Sherds			
	Count	%	Count	%	Count	%	Count	%	Count	%
Thin	0	0.00	0	0.00	6	3.77	0	0.00	6	3.77
Med	11	6.92	12	7.55	28	17.61	4	2.52	55	34.59
Thick	27	16.98	24	15.09	27	16.98	20	12.58	98	61.64
TOTAL	38	23.90	36	22.64	61	38.36	24	15.09	159	100.0

Table 20 – Proportions of pottery types from M-1 excavation 2

	Grog				**Grog and Caraipé**									
Thickness	**Camutins Plain**		**Inajá Plain**		**Camutins Plain**		**Inajá Plain**		**Caraipé Plain**		**Decorated**		**Total**	
	No.	*%*	No.	*%*	No.	*%*	No.	*%*	No.	*%*	No.	*%*	No.	*%*
Thin	71	*23.6*	106	*35.2*	18	*6.0*	48	*15.9*	2	*0.7*	56	*18.6*	301	*100*
Med	395	*39.5*	383	*38.3*	34	*3.4*	63	*6.3*	10	*1.0*	116	*11.6*	1001	*100*
Thick	851	*65.3*	392	*30.1*	9	*0.7*	9	*0.7*	0	*0.0*	42	*3.2*	1303	*100*
Total	1317	*50.6*	881	*33.8*	61	*2.3*	120	*4.6*	12	*0.5*	214	*8.2*	2605	*100*

Table 21 - Proportions of plain and decorated pottery types from M-1 excavation 2

	Pottery Types				TOTAL	
	Plain		Decorated			
Thickness	Count	%	Count	%	Count	%
Thin	245	*81.40*	56	*18.60*	301	*100.00*
Medium	885	*88.41*	116	*11.59*	1001	*100.00*
Thick	1261	*96.78*	42	*3.22*	1303	*100.00*
TOTAL	2391	*91.79*	214	*8.21*	2605	*100.00*

Table 22 – Proportions of pottery types per stratum from M-1 excavation 2

STRATUM	Camutins Plain		Inajá Plain		Caraipé Plain		White Slip		Joanes Painted		Other Decorated		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
XV	456	*53.0*	330	*38.3*	2	*0.2*	47	*5.5*	1	*0.1*	25	*2.9*	861	*100.0*
XIV	74	*49.7*	55	*36.9*	4	*2.7*	6	*4.0*	1	*0.7*	9	*6.0*	149	*100.0*
XIII	72	*47.1*	71	*46.4*	-	*0.0*	3	*2.0*	-	*0.0*	7	*4.6*	153	*100.0*
XII	86	*39.8*	111	*51.4*	3	*1.4*	9	*4.2*	-	*0.0*	7	*3.2*	216	*100.0*
XI	48	*38.1*	67	*53.2*	-	*0.0*	3	*2.4*	-	*0.0*	8	*6.3*	126	*100.0*
X	12	*44.4*	14	*51.9*	-	*0.0*	-	*0.0*	-	*0.0*	1	*3.7*	27	*100.0*
IX	19	*55.9*	12	*35.3*	-	*0.0*	-	*0.0*	-	*0.0*	3	*8.8*	34	*100.0*
VIII	160	*54.1*	113	*38.2*	-	*0.0*	2	*0.7*	-	*0.0*	21	*7.1*	296	*100.0*
VII	79	*56.0*	42	*29.8*	-	*0.0*	-	*0.0*	-	*0.0*	20	*14.2*	141	*100.0*
VI	10	*33.3*	12	*40.0*	1	*3.3*	3	*10.0*	-	*0.0*	4	*13.3*	30	*100.0*
V	54	*67.5*	19	*23.8*	-	*0.0*	2	*2.5*	-	*0.0*	5	*6.3*	80	*100.0*
IV	94	*72.9*	34	*26.4*	-	*0.0*	-	*0.0*	-	*0.0*	1	*0.8*	129	*100.0*
III	101	*60.5*	42	*25.1*	2	*1.2*	8	*4.8*	-	*0.0*	14	*8.4*	167	*100.0*
II	100	*64.5*	49	*31.6*	-	*0.0*	-	*0.0*	1	*0.6*	5	*3.2*	155	*100.0*
I	5	*20.8*	17	*70.8*	-	*0.0*	-	*0.0*	-	*0.0*	2	*8.3*	24	*100.0*
Total	1370	*52.9*	988	*38.2*	12	*0.5*	83	*3.2*	3	*0.1*	132	*5.1*	2588	*100.0*

Table 23 – Proportions of pottery types from M-17 excavation 1

			Wall Thickness							
			Thin		Medium		Thick		Total	
			Count	%	Count	%	Count	%	Count	%
Plain	**Grog**	Camutins	41	*1.27*	605	*18.79*	796	*24.73*	1442	*44.80*
		Inajá	37	*1.15*	512	*15.91*	616	*19.14*	1165	*36.19*
	Grog & Caraipé	Camutins	-	-	2	*0.06*	-	-	2	*0.06*
		Inajá	-	-	10	*0.31*	4	*0.12*	14	*0.43*
	Caraipé		4	*0.12*	11	*0.34*	10	*0.31*	25	*0.78*
Total Plain			82	*2.55*	1140	*35.41*	1426	*44.30*	2648	*82.26*
Decorated	**Grog**	White Slipped	17	*0.53*	124	*3.85*	70	*2.17*	211	*6.55*
		Plain Excised	5	*0.16*	101	*3.14*	20	*0.62*	126	*3.91*
		Scraped	-	-	51	*1.58*	9	*0.28*	60	*1.86*
		Joanes	-	-	24	*0.75*	21	*0.65*	45	*1.40*
		Plain Incised	4	*0.12*	19	*0.59*	9	*0.28*	32	*0.99*
		Red Slipped	1	*0.03*	33	*1.02*	10	*0.31*	44	*1.37*
		Guajará Inc	1	*0.03*	22	*0.68*	-	-	23	*0.71*
		Red Excised	-	-	8	*0.25*	3	*0.09*	11	*0.34*
		White Incised	-	-	3	*0.09*	1	*0.03*	4	*0.12*
		Double Exc	-	-	2	*0.06*	-	-	2	*0.06*
		W Slip/RSlip	-	-	-	-	1	*0.03*	1	*0.03*
	Grog & Caraipé	Joanes	-	-	2	*0.06*	-	-	2	*0.06*
		Plain Incised	-	-	3	*0.09*	1	*0.03*	4	*0.12*
	Caraipé	Plain Excised	-	-	-	-	3	*0.09*	3	*0.09*
		Red Excised	-	-	-	-	1	*0.03*	1	*0.03*
		Red Slipped	-	-	2	*0.06*	-	-	2	*0.06*
Total Decorated			28	*0.87*	394	*12.24*	149	*4.63*	571	*17.74*
Total			110	*3.42*	1534	*47.65*	1575	*48.93*	3219	*100.00*

Table 24 – Proportions of pottery types from M-17 excavation 2

			Wall Thickness							
			Thin		Medium		Thick		Total	
			No.	%	No.	%	No.	%	No.	%
Plain	**Grog**	Camutins	71	*2.08*	560	*16.42*	761	*22.31*	1392	*40.81*
		Inajá	157	*4.60*	787	*23.07*	629	*18.44*	1573	*46.12*
	Grog & Caraipé	Camutins	-	-	3	*0.09*	-	-	3	*0.09*
		Inajá	1	*0.03*	-	-	-	-	1	*0.03*
	Caraipé		24	*0.70*	70	*2.05*	7	*0.21*	101	*2.96*
Total Plain			253	*7.42*	1420	*41.63*	1397	*40.96*	3070	*90.00*
Decorated	**Grog**	White Slip	1	*0.03*	76	*2.23*	113	*3.31*	190	*5.57*
		Red Slip	-	-	23	*0.68*	24	*0.7*	47	*1.38*
		Joanes	-	-	19	*0.56*	4	*0.12*	23	*0.67*
		Red Exc	-	-	21	*0.62*		*0.00*	21	*0.62*
		Incised	6	*0.18*	7	*0.21*	1	*0.03*	14	*0.41*
		Scraped	1	*0.03*	10	*0.29*	3	*0.09*	14	*0.41*
		Excised	3	*0.09*	6	*0.18*	2	*0.06*	11	*0.32*
		Doub Slip	-	-	3	*0.09*	1	*0.03*	4	*0.12*
		White Inc	-	-	2	*0.06*	1	*0.03*	3	*0.09*
		Guajará	1	*0.03*	1	*0.03*	-	-	2	*0.06*
		Double ex	2	*0.06*	-	-	-	-	2	*0.06*
		Doub Inc	-	-	1	*0.03*	-	-	1	*0.03*
		Pacoval In	-	-	1	*0.03*	-	-	1	*0.03*
	Caraipé	Incised	1	*0.03*	2	*0.06*	1	*0.03*	4	*0.12*
		Excised	-	-	3	*0.09*	-	-	3	*0.09*
		White Inc	-	-	1	*0.03*	-	-	1	*0.03*
Total Decorated			15	*0.44*	176	*5.16*	150	*4.40*	341	*10.00*
TOTAL			268	*7.86*	1596	*46.79*	1547	*45.35*	3411	*100.00*

Table 25 – Proportions of pottery types from M-17 excavation 3

			Wall Thickness							
			Thin		Medium		Thick		**TOTAL**	
	Sherd Types		Count	*%*	Count	*%*	Count	*%*	Count	*%*
Plain	**Grog**	Camutins	68	*1.94*	697	*19.83*	632	*17.99*	1376	*39.46*
		Inajá	108	*3.07*	910	*25.90*	442	*12.58*	1460	*41.87*
	Grog & Caraipé	Camutins	1	*0.03*	21	*0.60*	-	-	22	*0.63*
		Inajá	4	*0.11*	59	*1.68*	8	*0.23*	71	*2.04*
	Caraipé		3	*0.09*	28	*0.80*	1	*0.03*	32	*0.92*
Total Plain			184	*5.24*	1715	*48.80*	1083	*30.82*	2982	*84.92*
Dec	**Grog**	White Slip	22	*0.63*	86	*2.45*	42	*1.20*	150	*4.30*
		Red Slipped	13	*0.37*	67	*1.9*	31	*0.88*	111	*3.18*
		Scraped	13	*0.37*	64	*1.82*	3	*0.09*	80	*2.29*
		Excised	3	*0.09*	44	*1.25*	13	*0.37*	60	*1.72*
		Incised	8	*0.23*	25	*0.71*	-	-	33	*0.95*
		Guajará	7	*0.20*	18	*0.51*	-	-	25	*0.72*
		Joanes	1	*0.03*	17	*0.48*	5	*0.14*	18	*0.52*
		Red Exc	3	*0.09*	10	*0.28*	3	*0.09*	16	*0.46*
		Brushed	-	-	10	*0.28*	2	*0.06*	12	*0.34*
		Red Inc	1	*0.03*	3	*0.09*	-	-	4	*0.11*
		Doubl Slip	-	-	-	-	1	*0.03*	1	*0.03*
		White Inc	-	-	1	*0.03*	-	-	1	*0.03*
		Pacoval	1	*0.03*	-	-	-	-	1	*0.03*
	Grog & Caraipé	White Slip	-	-	3	*0.09*	-	-	3	*0.09*
		Red Slip	1	*0.03*	1	*0.03*	-	-	2	*0.06*
		Incised	-	-	1	*0.03*	-	-	1	*0.03*
		Scraped	-	-	1	*0.03*	-	-	1	*0.03*
	Caraipé	Red Slip	1	*0.03*	2	*0.06*	1	*0.03*	3	*0.09*
		Excised	-	-	1	*0.03*	1	*0.03*	2	*0.06*
		Incised	-	-	1	*0.03*	-	-	1	*0.03*
		Painted	-	-	1	*0.03*	-	-	1	*0.03*
Total Decorated			74	*2.11*	356	*10.13*	102	*2.90*	526	*15.08*
TOTAL			258	*7.34*	2071	*58.94*	1185	*33.72*	3487	*100.00*

Table 26 – Proportions of pottery types per stratum from M-17 excavation 3

		Grog		Grog & Caraipé					TOTAL	
Level	**Stratum**	Camutins Plain	Inajá Plain	Camutins Plain	Inajá Plain	Caraipé Plain	Grog Decorated	Other Decorated	Count	%
0-10	Top Soil	*34.62*	*51.92*	*0.00*	*5.77*	*0.00*	*5.77*	*1.92*	52	*100.0*
10-20	Top Soil	*25.64*	*33.33*	*0.00*	*7.69*	*2.56*	*30.77*	*0.00*	39	*100.0*
10-20	A	*47.07*	*37.19*	*0.00*	*1.08*	*0.15*	*13.89*	*0.62*	648	*100.0*
20-24	Top Soil	*41.94*	*53.23*	*0.00*	*0.00*	*3.23*	*1.61*	*0.00*	62	*100.0*
20-30	A	*44.94*	*35.13*	*0.00*	*0.32*	*0.95*	*17.72*	*0.95*	316	*100.0*
20-30	B	*0.00*	*42.86*	*0.00*	*14.29*	*0.00*	*42.86*	*0.00*	7	*100.0*
30-40	B	*58.76*	*26.80*	*1.03*	*0.00*	*3.09*	*9.28*	*1.03*	97	*100.0*
40-50	B	*77.78*	*15.28*	*4.17*	*0.00*	*2.78*	*0.00*	*0.00*	72	*100.0*
50-60	B	*68.18*	*27.27*	*0.00*	*0.00*	*0.00*	*0.00*	*4.55*	22	*100.0*
60-70	B	*26.27*	*34.75*	*0.00*	*3.39*	*0.00*	*33.90*	*1.69*	118	*100.0*
70-80	B	*43.40*	*20.75*	*1.89*	*30.19*	*0.00*	*3.77*	*0.00*	53	*100.0*
80-90	Sand	*40.63*	*40.63*	*0.00*	*9.38*	*0.00*	*9.38*	*0.00*	32	*100.0*
90-110		*37.41*	*38.78*	*0.00*	*2.04*	*0.00*	*21.09*	*0.68*	147	*100.0*
95-110	Loam	*33.33*	*33.33*	*0.00*	*6.67*	*0.00*	*26.67*	*0.00*	15	*100.0*
110-120	Clay	*56.52*	*28.99*	*0.00*	*0.00*	*0.00*	*14.49*	*0.00*	69	*100.0*
120-130	Clay	*15.36*	*54.23*	*1.25*	*1.57*	*1.88*	*25.39*	*0.31*	319	*100.0*
130-140	Loam	*18.85*	*50.38*	*2.31*	*3.46*	*3.46*	*21.54*	*0.00*	260	*100.0*
130-140	Sand	*17.95*	*43.59*	*2.56*	*15.38*	*0.00*	*20.51*	*0.00*	39	*100.0*
140-150	Loam	*48.28*	*45.40*	*1.72*	*0.00*	*1.15*	*2.87*	*0.57*	174	*100.0*
150-160	Loam	*25.00*	*58.15*	*1.09*	*1.63*	*0.00*	*14.13*	*0.00*	184	*100.0*
160-170	Black Loam	*52.41*	*36.90*	*0.00*	*0.00*	*0.00*	*10.70*	*0.00*	187	*100.0*
170-180	Black Loam	*48.95*	*42.66*	*0.00*	*0.00*	*0.70*	*7.69*	*0.00*	143	*100.0*
180-190	Black Loam	*43.24*	*36.49*	*0.00*	*1.35*	*1.35*	*17.57*	*0.00*	74	*100.0*
180-190	Sand	*48.05*	*44.16*	*0.00*	*0.00*	*1.30*	*6.49*	*0.00*	77	*100.0*
190-200	Loam	*26.76*	*63.38*	*0.00*	*2.82*	*0.00*	*7.04*	*0.00*	71	*100.0*
200-210	Loam	*40.74*	*35.80*	*0.00*	*1.23*	*0.00*	*22.22*	*0.00*	81	*100.0*
210-220	Loam	*40.58*	*55.07*	*1.45*	*1.45*	*0.00*	*1.45*	*0.00*	69	*100.0*
220-230	Loam	*72.00*	*22.00*	*0.00*	*2.00*	*0.00*	*4.00*	*0.00*	50	*100.0*
230-250	Sand	*37.84*	*56.76*	*0.00*	*0.00*	*0.00*	*5.41*	*0.00*	37	*100.0*
TOTAL		*39.76*	*41.55*	*0.63*	*2.02*	*0.91*	*517*	*0.43*	3514	*100.0*

Table 27 – Proportions of pottery types from M-17 refuse disposal

			Wall Thickness							
			Thin		Medium		Thick		**TOTAL**	
Sherd Types			Count	*%*	Count	*%*	Count	*%*	Count	*%*
Plain	**Grog**	Camutins	78	*3.25*	489	*20.36*	486	*20.23*	1053	*43.84*
		Inajá	58	*2.41*	436	*18.15*	399	*16.61*	893	*37.18*
	Grog & Caraipé	Camutins	1	*0.04*	1	*0.04*	-	-	2	*0.08*
		Inajá	-	-	2	*0.08*	-	-	2	*0.08*
	Caraipé Plain		-	-	23	*0.96*	3	*0.12*	26	*1.08*
Total Plain			137	*5.70*	951	*39.59*	888	*36.97*	1976	*82.26*
Dec.	**Grog**	White Slip	8	*0.33*	86	*3.58*	107	*4.45*	201	*8.37*
		Joanes	3	*0.12*	51	*2.12*	19	*0.79*	73	*3.04*
		Plain Excised	-	-	25	*1.04*	6	*0.25*	31	*1.29*
		Scraped	1	*0.04*	14	*0.58*	14	*0.58*	29	*1.21*
		Red Slipped	1	*0.04*	21	*0.87*	16	*0.67*	38	*1.59*
		Plain Incised	-	-	15	*0.62*	7	*0.29*	22	*0.92*
		Red Excised	-	-	10	*0.42*	1	*0.04*	11	*0.46*
		Guajará	-	-	5	*0.21*	-	-	5	*0.21*
		WSlip/RSlip	-	-	3	*0.12*	1	*0.04*	4	*0.17*
		Joanes/White Excised	-	-	2	*0.08*	-	-	2	*0.08*
		Slip/Excised	-	-	2	*0.08*	-	-	2	*0.08*
		White Incised	-	-	2	*0.08*	-	-	2	*0.08*
		Doubl. Excis.	-	-	1	*0.04*	-	-	1	*0.04*
		Red Incised	-	-	1	*0.04*	-	-	1	*0.04*
		WSlip/W Exc	-	-		*0.00*	1	*0.04*	1	*0.04*
	Caraipé	Doubl Incised	-	-	1	*0.04*	-	-	1	*0.04*
		White Incised	-	-	2	*0.08*	-	-	2	*0.08*
		Painted	-	-		*0.00*	-	-	0	*0.00*
Total Decorated			13	*0.54*	241	*10.03*	172	*7.16*	426	*17.74*
TOTAL			150	*6.24*	1192	*49.63*	1060	*44.13*	2402	*100.00*

Table 28 – Proportions of pottery types from M-17 excavation 4

			Wall Thickness						TOTAL	
			Thin		Medium		Thick			
Sherd Types			Count	*%*	Count	*%*	Count	*%*	Count	*%*
Plain	**Grog**	Camutins	39	*3.14*	204	*16.41*	264	*21.24*	507	*40.79*
		Inajá	37	*2.98*	269	*21.64*	154	*12.39*	460	*37.01*
	Grog & Caraipé	Camutins	1	*0.08*	-	*0.00*	-	*0.00*	1	*0.08*
		Inajá	-	*0.00*	-	*0.00*	-	*0.00*	0	*0.00*
	Caraipé		4	*0.32*	38	*3.06*	14	*1.13*	56	*4.51*
Total Plain			81	*6.52*	511	*41.11*	432	*34.75*	1024	*82.38*
Decorated	**Grog**	White Slipped	5	*0.40*	58	*4.67*	25	*2.01*	88	*7.08*
		Red Slipped	-	*0.00*	38	*3.06*	4	*0.32*	42	*3.38*
		Excised	4	*0.32*	11	*0.88*	7	*0.56*	22	*1.77*
		Joanes	-	*0.00*	8	*0.64*	9	*0.72*	17	*1.37*
		Scraped	4	*0.32*	10	*0.80*	3	*0.24*	17	*1.37*
		Incised	-	*0.00*	8	*0.64*	5	*0.40*	13	*1.05*
		Double Slipped	2	*0.16*	1	*0.08*	1	*0.08*	4	*0.32*
		Guajará	-	*0.00*	4	*0.32*	-	*0.00*	4	*0.32*
		Slip/Excised	-	*0.00*	2	*0.16*	1	*0.08*	3	*0.24*
		White Inc	-	*0.00*	3	*0.24*	-	*0.00*	3	*0.24*
		Doubl Excised	-	*0.00*	1	*0.08*	-	*0.00*	1	*0.08*
		Red Excised	-	*0.00*	-	*0.00*	1	*0.08*	1	*0.08*
	Grog & Caraipé	Guajará Inc	1	*0.08*	-	*0.00*	-	*0.00*	1	*0.08*
		Excised	-	*0.00*	1	*0.08*	-	*0.00*	1	*0.08*
	Caraipé	Painted	-	*0.00*	1	*0.08*	-	*0.00*	1	*0.08*
		Whi Slip	-	*0.00*	1	*0.08*	-	*0.00*	1	*0.08*
Total Decorated			16	*1.29*	147	*11.83*	56	*4.51*	219	*17.62*
TOTAL			97	*7.80*	658	*52.94*	488	*39.26*	1243	*100.00*

Table 29 – Proportion of pottery types from M-17 excavation 5

Sherd Types			Wall Thickness							
			Thin		Medium		Thick		TOTAL	
			Count	%	Count	%	Count	%	Count	%
Plain	Grog	Camutins	55	*3.00*	241	*13.16*	355	*19.39*	651	*35.55*
		Inajá	44	*2.40*	169	*9.23*	252	*13.76*	465	*25.40*
	Grog & Caraipé	Camutins	-	-	10	*0.55*	7	*0.38*	17	*0.93*
		Inajá	2	*0.11*	19	*1.04*	12	*0.66*	33	*1.80*
	Caraipé Plain		-	-	6	*0.33*	3	*0.16*	9	*0.49*
Total Plain			101	*5.52*	445	*24.30*	629	*34.35*	1175	*64.17*
Decorated	Grog	White Slip	10	*0.55*	143	*7.81*	165	*9.01*	318	*17.37*
		Joanes	-	-	46	*2.51*	113	*6.17*	159	*8.68*
		Plain Excised	3	*0.16*	23	*1.26*	10	*0.55*	36	*1.97*
		Plain Incised	6	*0.33*	20	*1.09*	7	*0.38*	33	*1.80*
		Red Slipped	3	*0.16*	13	*0.71*	12	*0.65*	23	*1.53*
		Red Excised	4	*0.22*	6	*0.33*	4	*0.22*	14	*0.76*
		Scraped	1	*0.05*	6	*0.33*	1	*0.05*	8	*0.44*
		Guajará Incised	-	-	7	*0.38*	-	-	7	*0.38*
		White Excised	-	-	1	*0.05*	5	*0.27*	6	*0.33*
		Double Excised	-	-	-	-	5	*0.27*	5	*0.27*
		Double Slip	-	-	2	*0.11*	1	*0.05*	3	*0.16*
		Red Incised	-	-	2	*0.11*	-	-	2	*0.11*
		WSlip/Red Incis	-	-	1	*0.05*	-	-	1	*0.05*
	Grog & Caraipé	White Slip	10	*0.55*		*0.00*	3	*0.16*	13	*0.71*
		Plain Incised	-	-	2	*0.11*	-	-	2	*0.11*
		Red Slip	-	-		*0.00*	1	*0.05*	1	*0.05*
		W Slip/Incised	-	-	1	*0.05*	-	-	1	*0.05*
		W Slip/W Excise	-	-	1	*0.05*	-	-	1	*0.05*
	Caraipé	Plain Excised	-	-	3	*0.16*	6	*0.33*	9	*0.49*
		W Slip/W Excise	-	-	1	*0.05*	5	*0.27*	6	*0.33*
		White Slip	1	*0.05*	1	*0.05*	-	-	2	*0.11*
		Painted	-	-	1	*0.05*	-	-	1	*0.05*
Total Decorated			38	*2.08*	280	*15.29*	338	*18.46*	656	*35.83*
TOTAL			139	*7.59*	725	*39.60*	967	*52.81*	1831	*100.00*

Table 30 – Relative proportions of pottery types from M-1 and M-17

	Grog				Caraipé & Grog / Caraipé		Grog Decorated		Other Decorated		TOTAL	
	Camutins		Inajá									
M-1												
Profile 1	48	36.36	47	35.61	1	0.76	27	20.45	9	6.82	132	100.00
Surface	38	22.75	36	21.56	4	2.40	85	50.90	4	2.40	167	100.00
Exc 2	1,317	50.50	881	33.78	193	7.40	214	8.21	3	0.12	2,608	100.00
TOTAL	**1,403**	**48.26**	**964**	**33.16**	**198**	**6.81**	**326**	**11.21**	**16**	**0.55**	**2,907**	**100.00**
M-17												
Exc. 1	1,442	44.80	1,165	36.19	41	1.27	559	17.37	12	0.37	3,219	100.00
Exc. 2	1,392	40.81	1,573	46.12	105	3.08	333	9.76	8	0.23	3,411	100.00
Exc. 3	1,376	39.46	1,460	41.87	125	3.58	512	14.68	14	0.40	3,487	100.00
Exc.4(1)	1,053	43.84	893	37.18	30	1.25	423	17.61	3	0.12	2,402	100.00
Exc.4(2)	507	40.79	460	37.01	57	4.59	215	17.30	4	0.32	1,243	100.00
Exc. 5	651	35.55	465	25.40	59	3.22	620	33.86	36	1.97	1,831	100.00
TOTAL	**6,421**	**41.18**	**6,016**	**38.58**	**417**	**2.67**	**2,662**	**17.07**	**77**	**0.49**	**15,593**	**100.00**

Table 31 – Frequency of vessel types from M-1 and M-17

	M-1		M-17	
Type	Count	*%*	Count	*%*
1	58	*34.94*	262	*32.31*
2	0	*0.00*	25	*3.08*
3	9	*5.42*	42	*5.18*
4	7	*4.22*	59	*7.27*
5	4	*2.41*	7	*0.86*
6	21	*12.65*	78	*9.62*
7	9	*5.42*	54	*6.66*
8	1	*0.60*	8	*0.99*
9	1	*0.60*	3	*0.37*
10	2	*1.20*	7	*0.86*
11	6	*3.61*	7	*0.86*
12	2	*1.20*	0	*0.00*
13	0	*0.00*	17	*2.10*
14	4	*2.41*	12	*1.48*
15	4	*2.41*	17	*2.10*
16	5	*3.01*	67	*8.26*
17	7	*4.22*	16	*1.97*
18	2	*1.20*	12	*1.48*
19	1	*0.60*	5	*0.62*
20	3	*1.81*	16	*1.97*
21	3	*1.81*	25	*3.08*
22	4	*2.41*	26	*3.21*
23	0	*0.00*	6	*0.74*
24	0	*0.00*	7	*0.86*
25	4	*2.41*	14	*1.73*
26	2	*1.20*	0	*0.00*
27	1	*0.60*	5	*0.62*
28	6	*3.61*	14	*1.73*
Total	166	*100.00*	811	*100.00*

Table 32 – Proportions of vessel categories from M-1 and M-17

Vessel Type	M-1		M-17		TOTAL
	Count	*%*	Count	*%*	Count
Food-Processing	109	*67.28*	**535**	*67.72*	644
Serving	33	*20.37*	**158**	*20.00*	191
Drink / Storage	20	*12.35*	**97**	*12.28*	117
Total	162	*100.00*	**790**	*100.00*	952

Table 33 – Proportions of vessel types per excavation from M-17

Excavations		Vessel Types			TOTAL
		Food	**Serving**	**Storage**	
Exc.1	Count	152	41	20	213
	%	*71.36*	*19.25*	*9.39*	*100.00*
Exc.2	Count	108	14	13	135
	%	*80.00*	*10.37*	*9.63*	*100.00*
Exc.4	Count	108	67	50	344
	%	*31.40*	*19.48*	*14.53*	*100.00*
Exc.4t	Count	29	11	4	44
	%	*65.91*	*25.00*	*9.09*	*100.00*
Exc.5	Count	16	19	8	43
	%	*37.21*	*44.19*	*18.60*	*100.00*

Table 34 – Proportions of tanga types from M-1 and M-17

	Tanga Types				Total	
	Red Slip		**Joanes Painted**			
	Count	*%*	Count	*%*	Count	*%*
M-1	118	*85.51*	20	*14.49*	138	*100.00*
M-17	478	*68.88*	216	*31.12*	694	*100.00*
TOTAL	596	*71.63*	236	*28.37*	832	*100.00*

Table 35 – Proportions of tangas sherds per excavated area in M-17

	Total Tangas		Total Sherds	
	Count	*%*	Count	*%*
Exc. 1	284	*6.51*	4,358	*100*
Exc. 2	101	*2.82*	3,570	*100*
Exc. 3	73	*2.13*	3,417	*100*
Exc. 4	209	*4.82*	4,330	*100*
Exc. 5	27	*1.24*	2,176	*100*
TOTAL	694	*3.88*	17,851	*100*

Table 36 – Proportions of tanga types per excavated area in M-17

	Red Slip		Joanes Painted		Total Tangas	
	Count	%	Count	%	Count	%
Exc. 1	180	*63.38*	104	*36.62*	284	*100.00*
Exc. 2	87	*86.14*	14	*13.86*	101	*100.00*
Exc. 3	57	*78.08*	16	*21.92*	73	*100.00*
Exc. 4	137	*65.55*	72	*34.45*	209	*100.00*
Exc. 5	17	*62.96*	10	*37.04*	27	*100.00*
TOTAL	478	*68.88*	216	*31.12*	694	*100.00*

APPENDIX B

Description of Camutins Mounds

Ceremonial Center: Lower River Course

M-1 (Camutins) – This is the largest and highest mound of the group, measured by Meggers and Evans (1957) as 255 m long and 30 m wide, with varying elevations. Since then, it has suffered damage from both looting (see Roosevelt 1991:35 – Fig. E) and erosion. The northwest portion that faces the river was still intact in 2001. The mound was once at least 10 m high on a flat summit that was probably no wider than 11 m. Other platforms at different heights also existed, as attested by previous investigations and the topographic map. Today the mound occupies an area of 193 by 90 m, but the area effectively occupied prehistorically by houses and mortuary temples was probably not wider than 30 m. Scientists and looters have reportedly found prepared floors, platforms, hearths, superimposed layers of charcoal, baked clay and sterile sand, grouped burials (inside and outside urns), stone artifacts and pottery offerings.

M-16 (Camutinzinho) – This mound, located south of M-1, is elongated, and measured 140 by 16 m in 1949 (Meggers and Evans 1957:293). In 2001, it was found badly damaged, with a deep looters trench in its center, as well as eroded trenches that drained sediments down to the river. The area measured 88 by 27 m in September 2002, considering the horizontal extension of the archaeological deposits in relation to the shallow beach that surrounds them. The mound is located inside of a loop in the river, and is surrounded by water on three sides during the rainy season.

Since Meggers and Evans' surface collection produced only plain types, it was considered at that time a habitation mound. Sometime during the 1970s or 1980s, however, a local rancher looted the mound, finding one single burial group. The six medium sized funerary urns (Joanes Painted type) were, according to Mr. Boulhosa, placed at different levels. The looting generated the spread of decorated sherds from vessels and objects that were probably related to the burials. For this reason, the 2002 surface collection produced much more decorated pottery than Meggers and Evans'.

M-17 (Belém) – This thin, elongated mound (80 by 20 m of area on its summit), is located across the river from M-1. The highest point is located on its northern side, and it slopes gradually from the summit towards its southern limits. The slopes are more pronounced on the western and eastern side, often at 45 to 60 degrees. Meggers and Evans measured the mound as 250 by 59 m, which may reflect the spread of its lower half in both southern and northern directions. Its height may have reached from 6.4 to 7 m. Meggers and Evans excavated a 1.5 m² test-pit at its center, to the depth of 1.2 m. The sample of pottery sherds recovered presented unusual frequencies of decorated types, which led them to conclude it was a cemetery mound, although burials were not found (Meggers and Evans 1957:294-295).

M-18 (Arraial) – Located south of M-17, this almost circular mound (62 by 54 m) is about 3 m high. Only very few badly eroded plain sherds were found on the surface. Meggers and Evans considered it a habitation site, although its proximity to M-17 and location within the ceremonial center implies it was under direct elite control.

Habitation Group: Middle River Course

M-2 (Tesinho) – This small, badly eroded elongated mound, located about 2.1 km north of M-1, is 5 m long, and about 2 m high. An excavation next to it indicates the removal of sediment for water retention and mound construction. When visited by Meggers and Evans in 1949, only a small portion of land, 5 by 0.5 m in area and 0.75 m high remained above the water level. They collected a few plain sherds over the surface. Surface collection during the 2002 survey also produced mainly plain sherds, belonging to thick walled vessels.

M-3 (Jatobá) – This elongated mound, located some 480 m upstream from M-2, is limited to the north by a narrow water channel called *Igarapé do Sacrário*. The mound measured 32 m long and 8 m wide in May 1949 (Meggers and Evans 1957:286) and 24.4 m long and 26 m wide in July 2001. Meggers and Evans noticed that the top of the mound was a ten-meter by 5-meter area, rising 3 m over the water line. They also reported that the archaeological stratum was about

2 m deep, as seen on the eroded north bank, and sherds were mostly plain. In the beginning of the 2001 rainy season, the mound's highest point was 2.76 m above water level. The differences in measurements are credited to seasonal variation in water levels and erosion triggered by trampling of buffaloes[1].

M-4 (Sacrário) – This very thin, elongated mound, is located north of the *Igarapé do Sacrário*. It measured 100 m long and 5 to 8 m wide in 1949, when surface collections produced mainly plain sherds (Meggers and Evans 1957:288). It was noticed that its height was 1.25 to 1.5 m above the water, but a knoll (15 m by 7 m) on its east end reached 2.5 m. In 2001, it measured 63.9 m long, with widths varying from 11 m at the southern extremity and 8.4 m at the northern end. The mound top was not level, but displayed a number of low and high elevations up to 2 m high. Few plain sherds could be found on the surface, and soil was dark brown.

M-6 – Located north of M-4, this mound is composed of two elevated areas, one oval (23 m by 11.7 m), with a maximum height of 3.94 m and another one rounded (16 m in diameter), with a maximum height of 2.72 m. A 13-meter long causeway connects both elevations. The whole complex has an area of 543 m². The soil that comprises the bridge is light brown sandy clay, while the soil on the elevated areas is a dark brown loam. When identified in 1949, the double mound was reported as being formed by a small oval area (0.5 m by 8 m) with a height of 5 - 6.5 m, a 4-m long causeway and a smaller circular area (4 m in diameter) with only 1.75 m in height. The differences in area in relation to those measured in 2001 are due to the variations in the water levels, but the differences in height can only be explained by erosion. Surface collection produced a small sample of plain sherds.

[1] There are a number of inconsistencies between our data and Meggers and Evans'. They report that M-3 was located 75 m upstream from M-2, while during our survey the distance was measured in about 480 m. First we thought we were referring to different mounds. However, the distances between M-3, M-4 and M-5 are consistent with our data. Especially the fact that M-5 is the only mound located on the opposite side of the river, leaves no doubt that M-3 is located exactly where we mapped it and not close to M-2 as Meggers and Evans affirmed.

M-7 (São Bento) – This elongated mound, 60 m long 13 m wide, has its highest elevation (5.38 m) on its west side, at the edge of the river. From there it slopes gently towards the south, east and northern limits with the campo, where excavated areas were identified. In the peak of the 1949 rainy season the summit measured 30 m by 5 m in the center of the mound (Meggers and Evans 1957:289). Sherds were abundant in 1949, especially in the eroded bank, while in 2001 they were virtually absent on the surface.

M-21 – This small mound, with a maximum height of 3 m, measured 16.6 m by 11.5 m in 2001. Sherds are rare on the light brown sandy soil that covers the surface. This mound was not identified during the 1949 survey, probably due to its small size and the chance it may have been partially underwater.

M-8 – This elongated mound may have originally had platforms at three different levels. At the high water level in 1949, the mound was 45 m long and 10 to 12 m wide, with a height of 3 to 4 m in the south and west sides. Meggers and Evans (1957:289) measured its largest platform, on the northeast side, 30 m by 6 m, and also identified "sandy clay with bright fire-reddened zones". Plain sherds were also collected. In 2001, the total area measured 59.5 by 18.3m.

M-9 – Located some 20 m north of M-8, this oval small mound measured 20 m long by 10 m wide in 1949, with a circular top platform of 7 to 8 m in diameter, where it reached a height of 5 m. Sherds were collected (Meggers and Evans 1957:289). In 2001, the area measured 16.5 by 9.5 m. Excavated pools south and north of the mound contrast with the slightly elevated (1 – 1.5 m in relation to the river level in July) "terra mulata"[2] field located on the east side. Although this area was not extensively examined, it was noticed that the soil was dark brown, different

[2] The denomination "terra mulata" (Sombroek 1966) has been used to characterize Amazonian dark soils soils that can be differentiated from original soils by its color, but that do not present the high concentrations of Ca and P levels that are characteristic of the "terra preta" (black earth) fertile soils. A hypothesis offered to account for this type of soil is "combination of long-term mulching and frequent burning" (Woods and McCann 1999).

from the surroundings. However, these darker deposits were not very deep (only around 20 cm) and were not associated with artifacts. Although this area was elevated in relation to the surroundings, and extended further in the east direction, it remains waterlogged during most of the winter, as Meggers and Evans had observed. For this reason, it is unlikely (although not impossible) that it was used for cultivation in the past.

M-10 – This elongated mound (18 m wide and 46 m long) is 80 m upstream from M-9. Its height is 3.24 m above the surrounding plain. An excavated area was identified on its east side. The light gray topsoil contained very few sherds. When visited in 1949, it measured 30 m long by 15 m wide, with a maximum height of 3.75 m[3]. The soil was reddish-brown loam, and no sherds were found on the surface. Meggers and Evans (1957:289) obtained a sherd sample from subsurface testing, together with a broken jar and a complete plain stool.

M-11 – This oval mound (13.4 m wide, 36 m long and 5.21 m high) is 40 m upstream from M-10. A few sherds were seen on the surface of this mound that has been used as a modern cemetery for the local population. It does not appear to correspond to the 1.75 m high Mound 11 reported by Meggers and Evans. It is possible it was eroded away. Since M-11 was the last of their count on this stretch of the river, the same number was used for the present identification.

M-22 – Located 22 m north of M-11, this ear-shaped mound (23.6 m in length and 14 m of maximum width) rises abruptly to 4.54 m at its north side, next to the river. *Terra preta* soil and a few red sherds were observed on the eroded bank.

Right Bank (South/North Direction)

M-5 (Sacacão) – This mound is located next to *Igarapé do Sacacão*, a small tributary of the Camutins. In 1949 the 45 m long and 8 m wide mound was already badly damaged, showing

[3] There are here some inconsistencies between our survey and Meggers and Evans. Mound 10, according to them, was separated from Mound 9 "by a deep, low area, 25 meter wide". According to our survey the distance was greater. Since we did not find any other mound between the two, we assume the mound we found north of M-9 is M-10. The measurements seem to agree.

many plain sherds on the light gray sandy clay surface. Meggers and Evans (1957:288) measured it 1.5 m in height. In the 2002 visit the height was measured 2 m, but it was most likely higher during prehistoric times.

M-23, M-24, M-25 – These three mounds, located respectively at 350 m, 936 m and 1580 m north of M-5 have areas that range from 150 to 200 m² and heights from 1 to 2 m. M-24 remains underwater during the rainy season. Since they are located in lands belonged to Fazenda Santa Margarida, the traffic of buffaloes is intense, which has caused extensive soil erosion. Only few leached sherds could be seen on the surface. Excavated pools were identified near M-24 and M-25.

Elite/ Habitation Mound Group: Upper River Course

The mounds located along the upper course of the Igarapé dos Camutins were more intensively affected by looting, erosion, and buffaloes.

Left Bank (South/North Direction)

M-12 (Carmo) – It is located 2.3 km north of the last habitation mound of the middle river course group. Meggers and Evans (1957:289) reported this mound as circular (12 m in diameter) and 1.25 m in height. The greater length observed during the 2002 survey (19.6 by 12.3 m) is probably due to erosion. The highest elevation (about 2 m) is a small area, probably representing the original height, since everything else had been flattened. Sherds are rare on the surface.

M-13 – This is 19 m long and 9.5 m wide, located just a few meters north of M-12, which roughly agrees with Meggers and Evans (1957: 290) observations. Its northeast side follows a bend in the river. Excavated pools were identified on opposite east and south sides.

M-14 (Inajasal) – The largest habitation site in this stretch of the river, it is located 700 m northeast of M-13. In 1949, Meggers and Evans mapped the mound and excavated a 1.5 m² test-

pit, which provided sherds for analysis and information on the stratigraphy. The mound was 51 m long, 25 to 35 m wide, and 5.75 to 6.25 m high (in relation to high water levels). M-14's stratigraphy, as described by Meggers and Evans (1957:290-2), is similar to that observed in M-1 and M-17. Although the definition of layers is imprecise, it is possible to notice that occupational surfaces alternate with light, grayish white soil with fewer sherds that likely represent episodes of mound construction.

In 2000, bulldozers flattened the mound in order to build a dam, which retains water that emerges from a natural spring, forming a dark, clear lake. That project also involved the preparation of a landing strip, which was paved with archaeological sediment and sherds. Witnesses to the destruction of the mound in 2001 said that the bulldozer broke quite a few vessels in its path. A complete red tanga was reportedly recovered.

M-19 – Located some 100 m east of M-14, this circular mound (25 m in diameter and 0.75 to 1 m in height), located by Meggers and Evans (1957:295), has been recently flooded by the lake mentioned above. No sherds could ever be collected.

M-15 (Pau d'Arco) – This is located about 280 m upstream from M-14. The highest point of the mound (6 m) is an area of 9.5 by 10.5 m, from which it slopes gradually towards the northern plain for about 21.5 m. It measured 4.5 m in 1949, due to the higher water levels (Meggers and Evans, 1957:292-3). In 2002, four fragments of a Joanes Painted funerary urn weighing almost 2 kg were recovered from an eroded trench.

M-26 – This badly eroded, 2 m high mound was built in the riverbed, which was dry during the 2002 visit. Mostly plain sherds, from thick walled vessels, were present on the surface. It is possible this mound no. 9 of Hilbert's count (Hilbert 1952:12).

M-27 – Badly eroded mound, located close to the confluence of the Camutins River with a small watercourse that flows from the east, called Igarapé do Aritengá. Eleven sherds on the

surface were collected, and the soil on the surface was light gray sandy clay. The mound is comprised of two elevations (maximum: 3 m) linked by an earthen bridge. This is mound no. 11 of Hilbert's count (Hilbert 1952:12).

M-28 – Roçado – Slightly elevated *terra preta* area, crossed by a small creek, which was dry in September 2002. The area is used by a *caboclo* (non-Indian native) for manioc cultivation and is heavily vegetated. It is located 850 m east of M-26. Few sherds were seen on the surface (collected), and the area was estimated to be around 600 m².

M-29 – Aritengá – This is comprised of two joined low mounds, located north of the Igarapé do Aritengá, in front of M-27. There is one abandoned camp house on the first mound, which is presently some 1.5 m in height and a permanent house on the second mound, which has lost most of its deposits due to erosion. Few plain, reddish sherds were seen on the surface. Hilbert noticed many plain sherds on the surface and reported the heights as being 2.5 and 1.5 m. A nearby source of water natural spring water located east of M-27 may account for the mound's location.

M-31 - Urubu – These two ceremonial mounds, located some 130 m north of M-29, were very damaged by looting and erosion. Today they are heavily covered with secondary vegetation, mainly fruit trees. The soil is dark brown (*terra preta*), and broken, decorated pottery is found everywhere. The largest mound measures 61 by 26.5 m and the smallest one measures 22 by 17 m.

Right Bank

M-30 - Cuieiras – Hilbert and the Museu Paulista expedition excavated this 3 m high mound in 1950. They observed that the archaeological deposits were 2 m deep. Funerary urns, sometimes placed at two distinct strata, were found both on the center and on marginal areas of

the mound. Hilbert noticed the virtual absence of tanga fragments that are so ubiquitous at M-1 and M-17. Only one complete tanga was found inside of an urn (Hilbert 1952:18).

This now badly damaged mound is located right across the river opposite to M-31. During the 1999 survey, many eroded sherds were distributed over the light gray sandy soil that covered the surface, which extended over an area of 30-40 by 50-60 m. The predominantly flat surface was the result of looting and erosion, since a few locations were still 2 m high (March water levels). A funerary urn was found buried underneath the exposed roots of a tree, confirming that at least two meters of deposits were literally eroded away. The undecorated urn contained some fragile human bone fragments, pieces of a large excised plate, which may have been originally the lid, a plain stool fragment, and other 23 mostly plain sherds. Sherds collected from the surface included just one fragment of a decorated tanga.

M-33 – Tucumeira – This badly eroded mound is located upstream from M-30. The original area and height of this habitation site are estimated respectively at 600 m² and 2 m (based on Hilbert 1952 data). Surface collection produced only 2 thick walled plain fragments.

M-34 – Furinho – This last mound of the group is located upstream from M-33. Hilbert estimated it covered an area 60 m long by 30 m wide. The maximum height was measured 2.5 m, and the archaeological deposits extended 1.7 m in depth. As observed in M-30, here funerary urns were also placed at two distinct strata on the center but at only one stratum on marginal areas of the mound. Funerary vessels were typically 35 to 80 cm tall, decorated either or both with painted or/and excised designs. Poorly preserved human remains and lid fragments were found in the soil that filled the vessels (Hilbert 1952:18-19). Looting and trampling of buffaloes destroyed this elite mound, presently almost leveled to the western forest.

M-32 (São Marcos or Ingá) – This 3.5 m high mound is located between M-26 and M-15, on the opposite side of the river. A surface collection produced 40 fragments of plain sherds,

representing both thin and thick walled vessels. It has suffered from trampling of buffaloes and erosion. It is number 6 of Hilbert's (1952:12) count.

APPENDIX C

Top Views of M-17 Burial Area

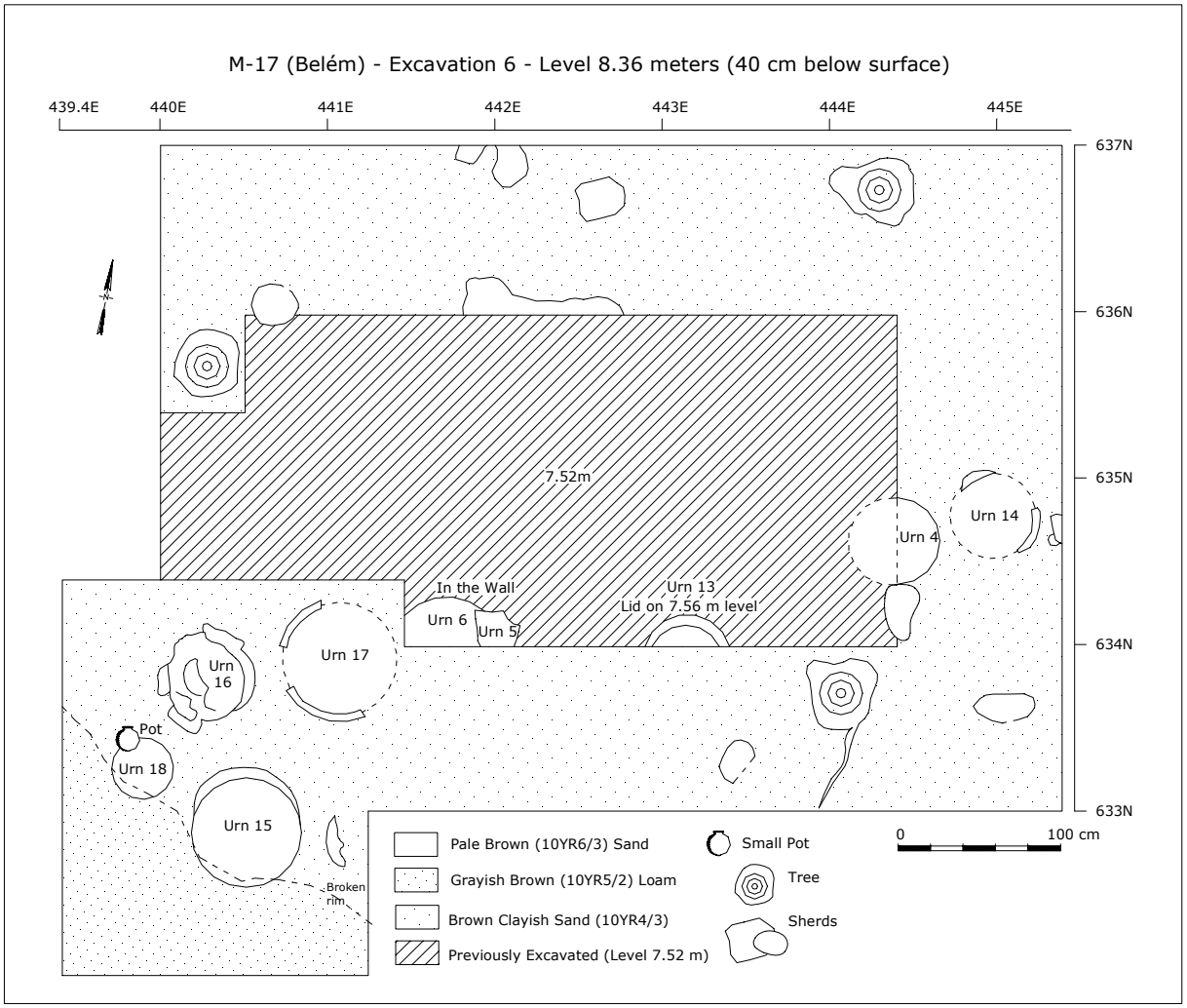

Figure 155 - M-17 excavation 6, top view at 8.36 m level

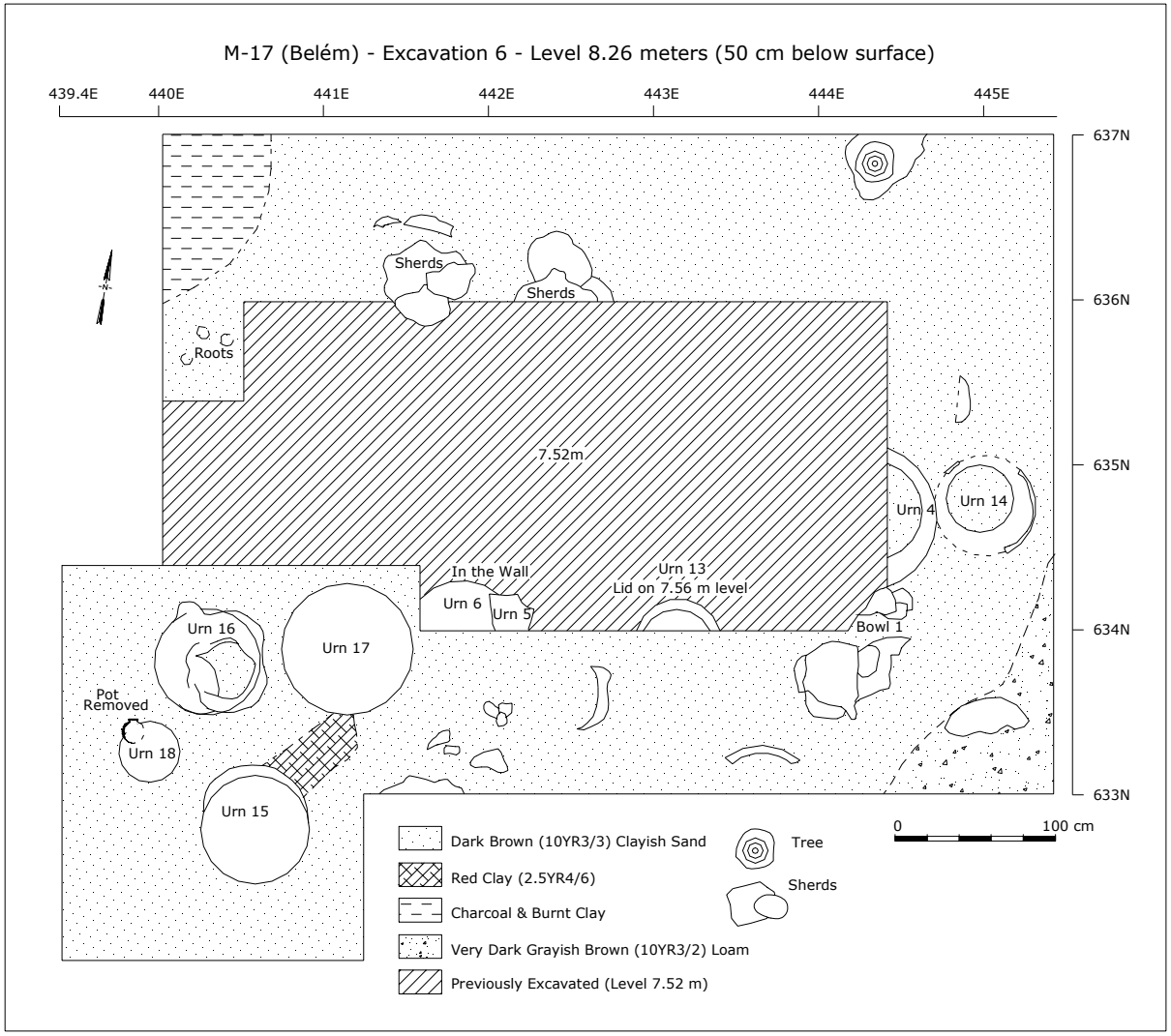

Figure 156 - M-17 excavation 6, top view at 8.26 m level

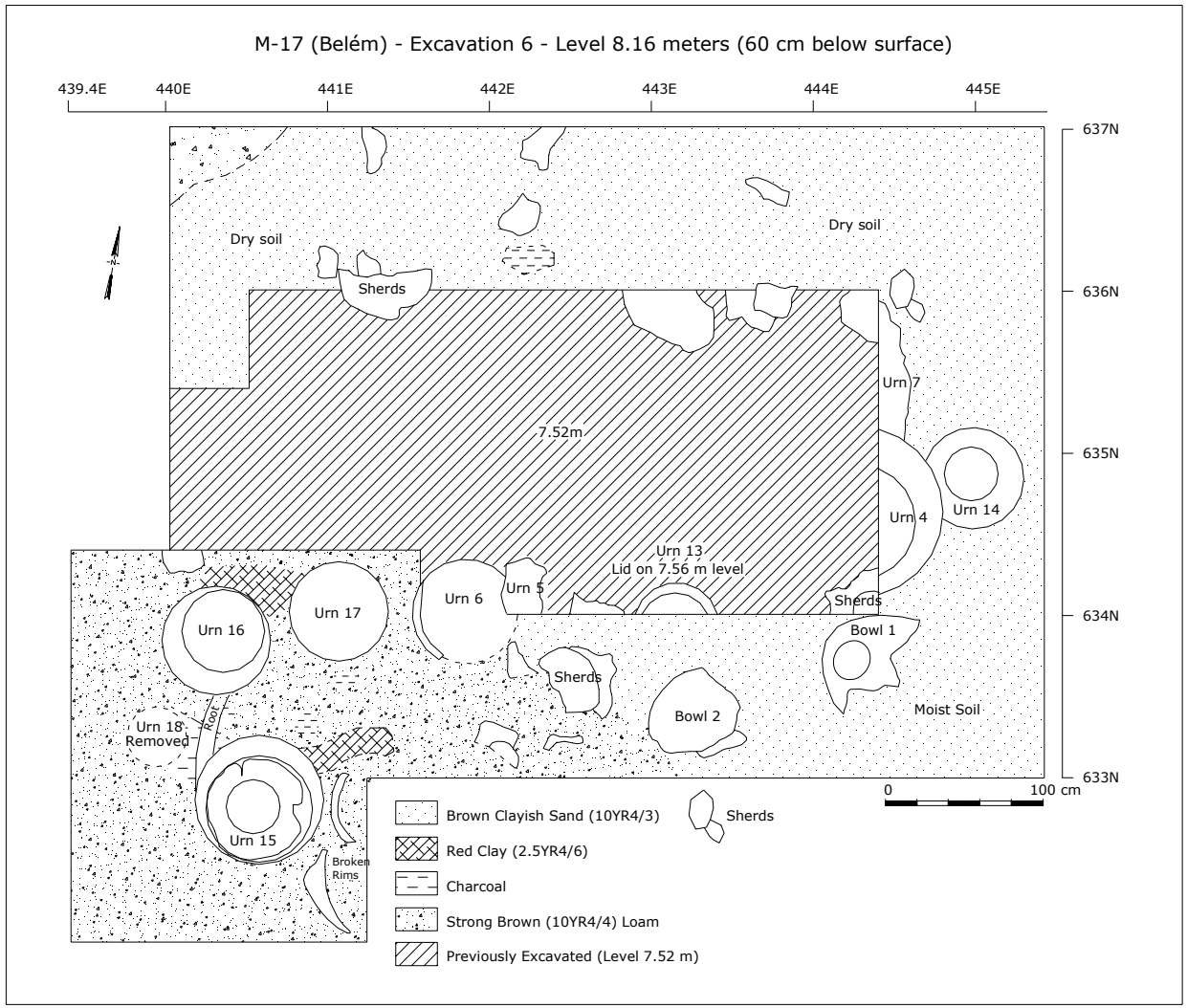

Figure 157 - M-17 excavation 6, top view at 8.16 m level

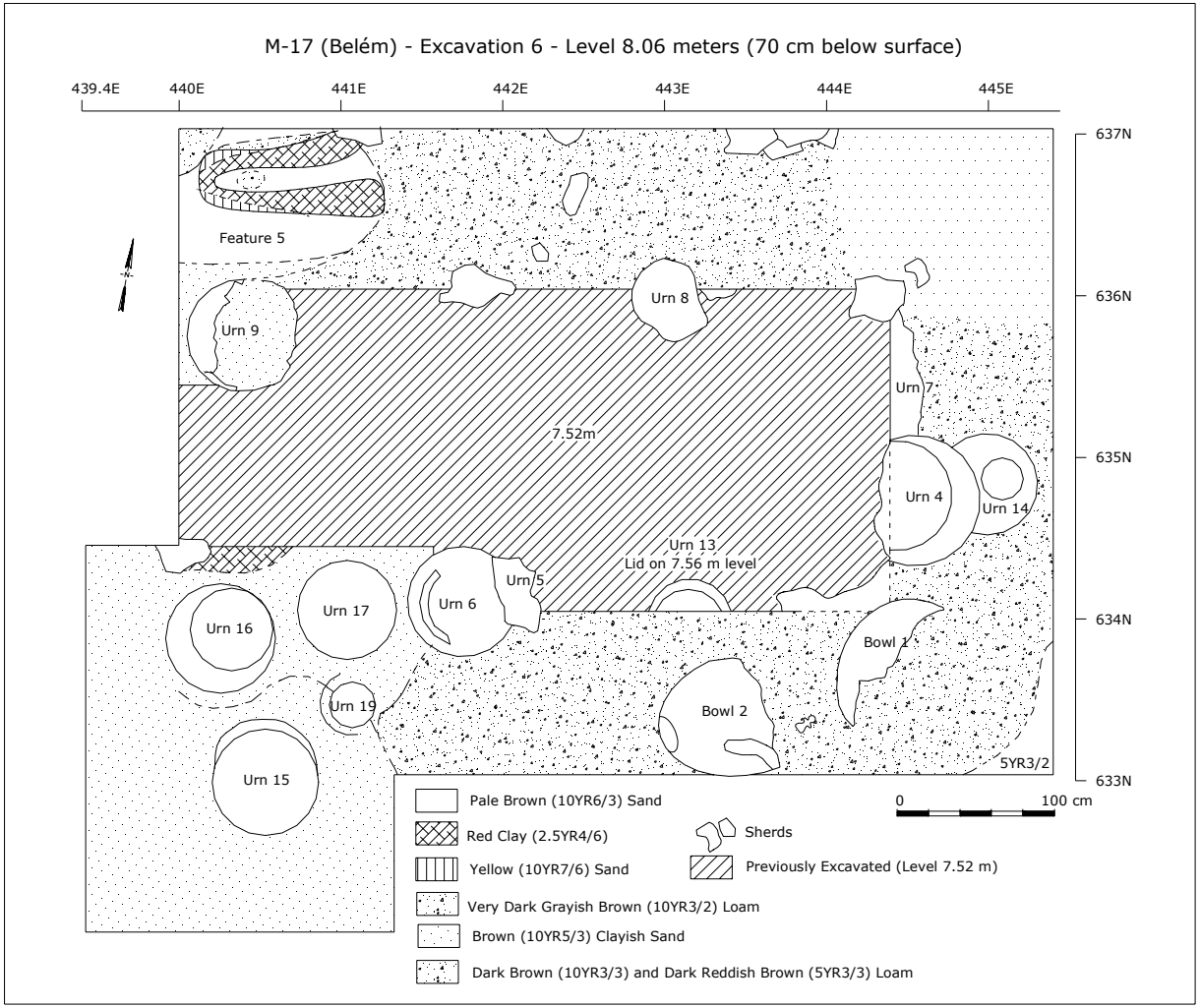

Figure 158 - M-17 excavation 6, top view at 8.06 m level

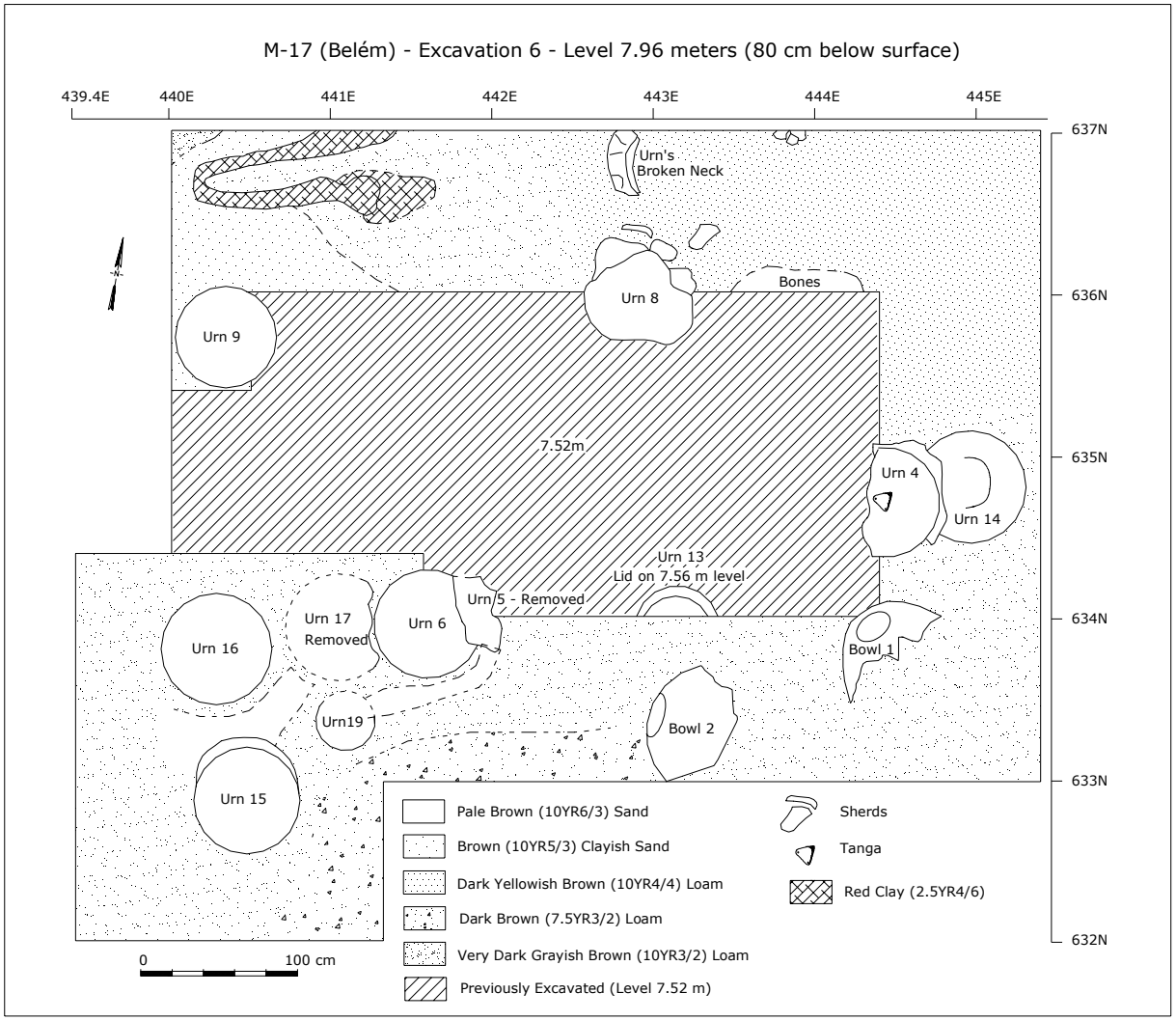

Figure 159 - M-17 excavation 6, top view at 7.96 m level

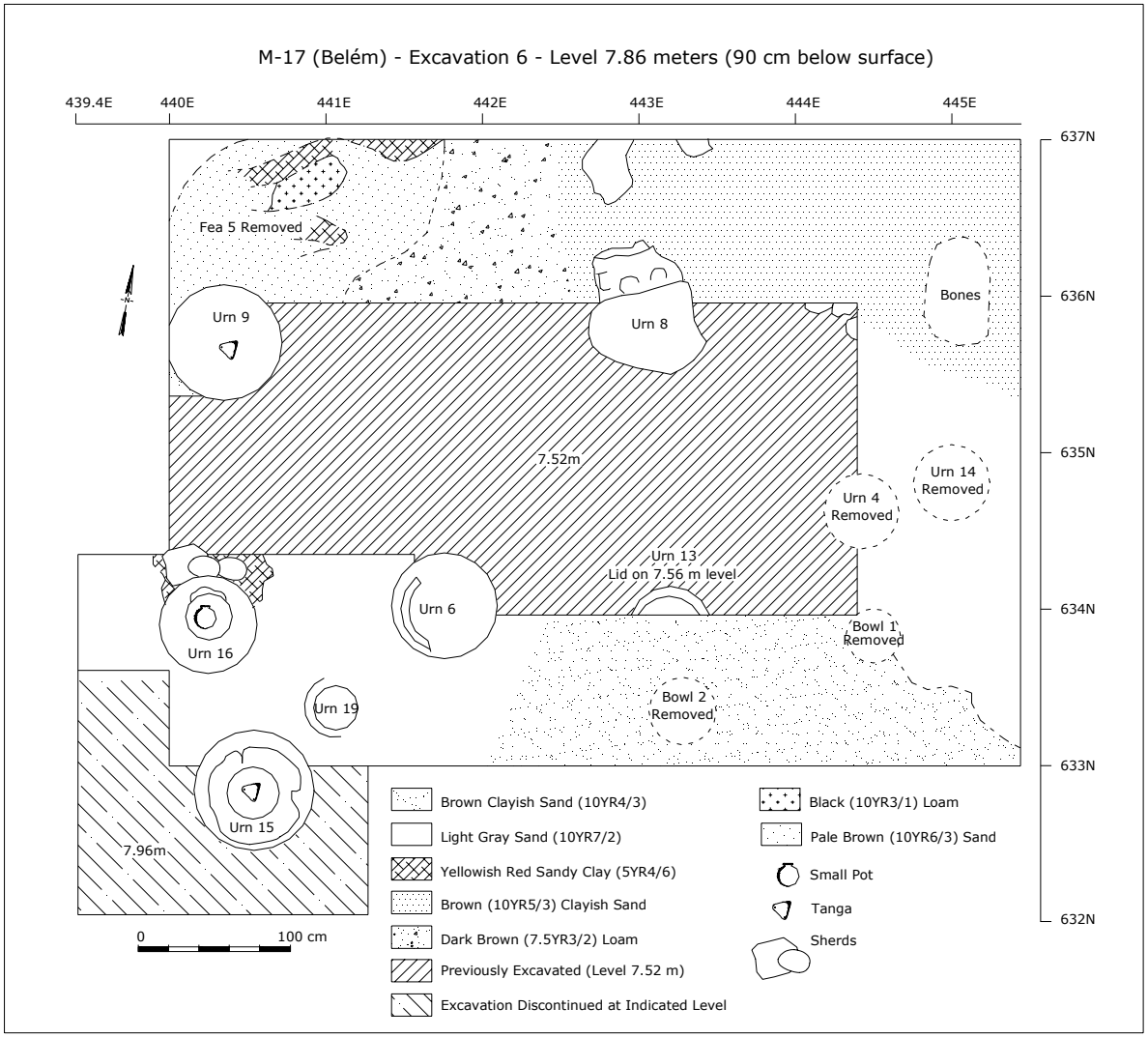

Figure 160 - M-17 excavation 6, top view at 7.86 m level

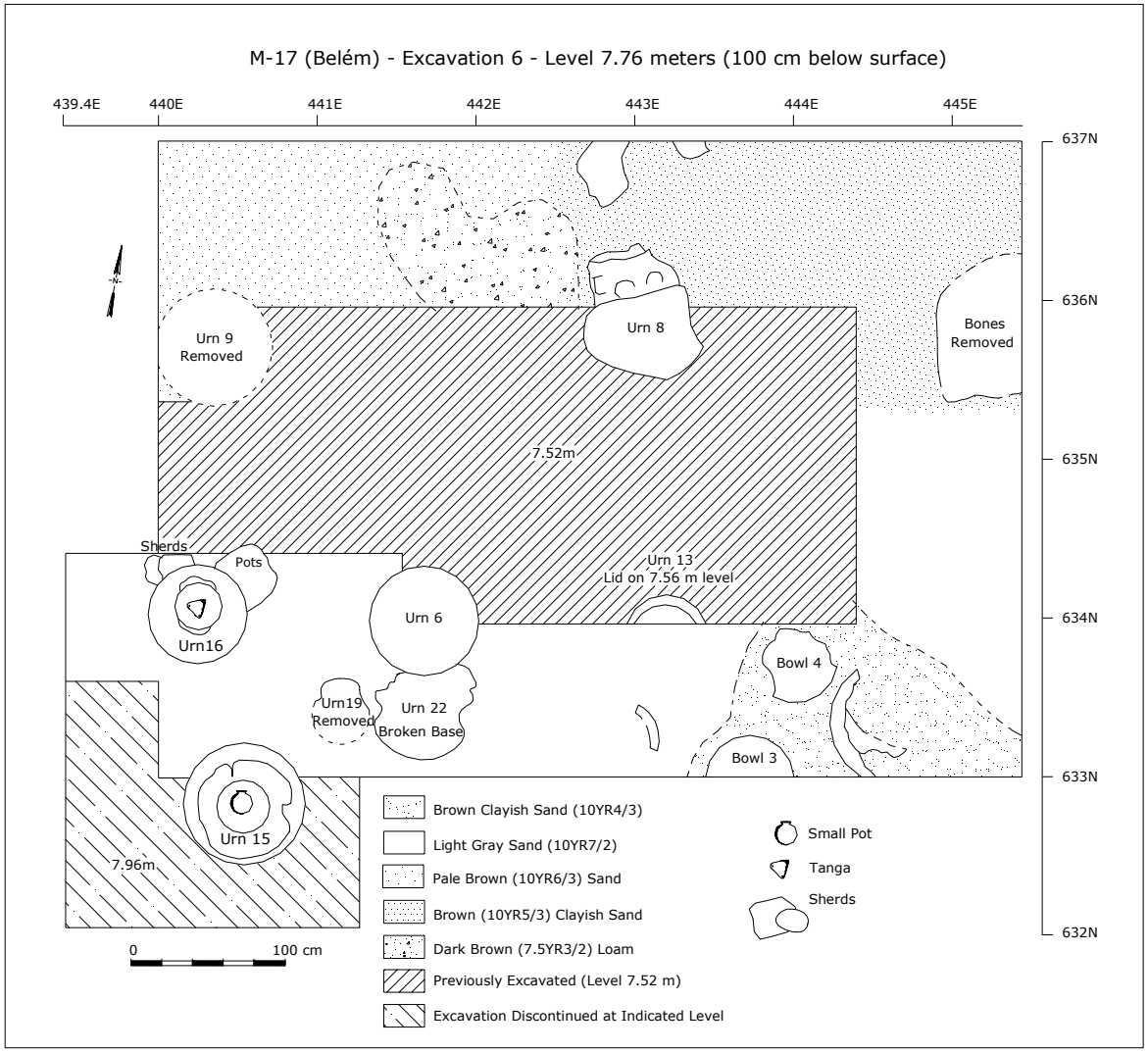

Figure 161 - M-17 excavation 6, top view at 7.76 m level

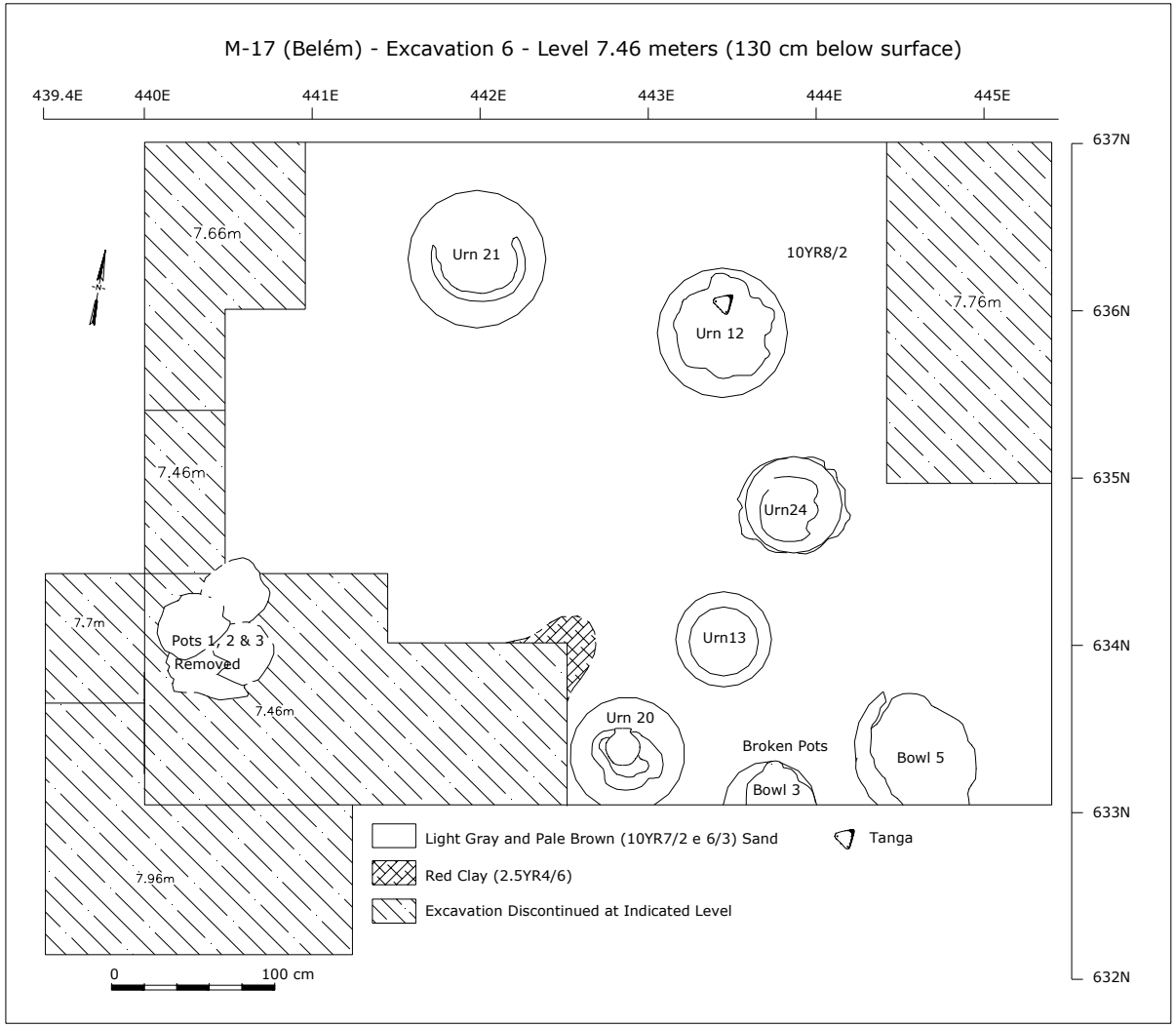

Figure 162 - M-17 excavation 6, top view at 7.46 m level

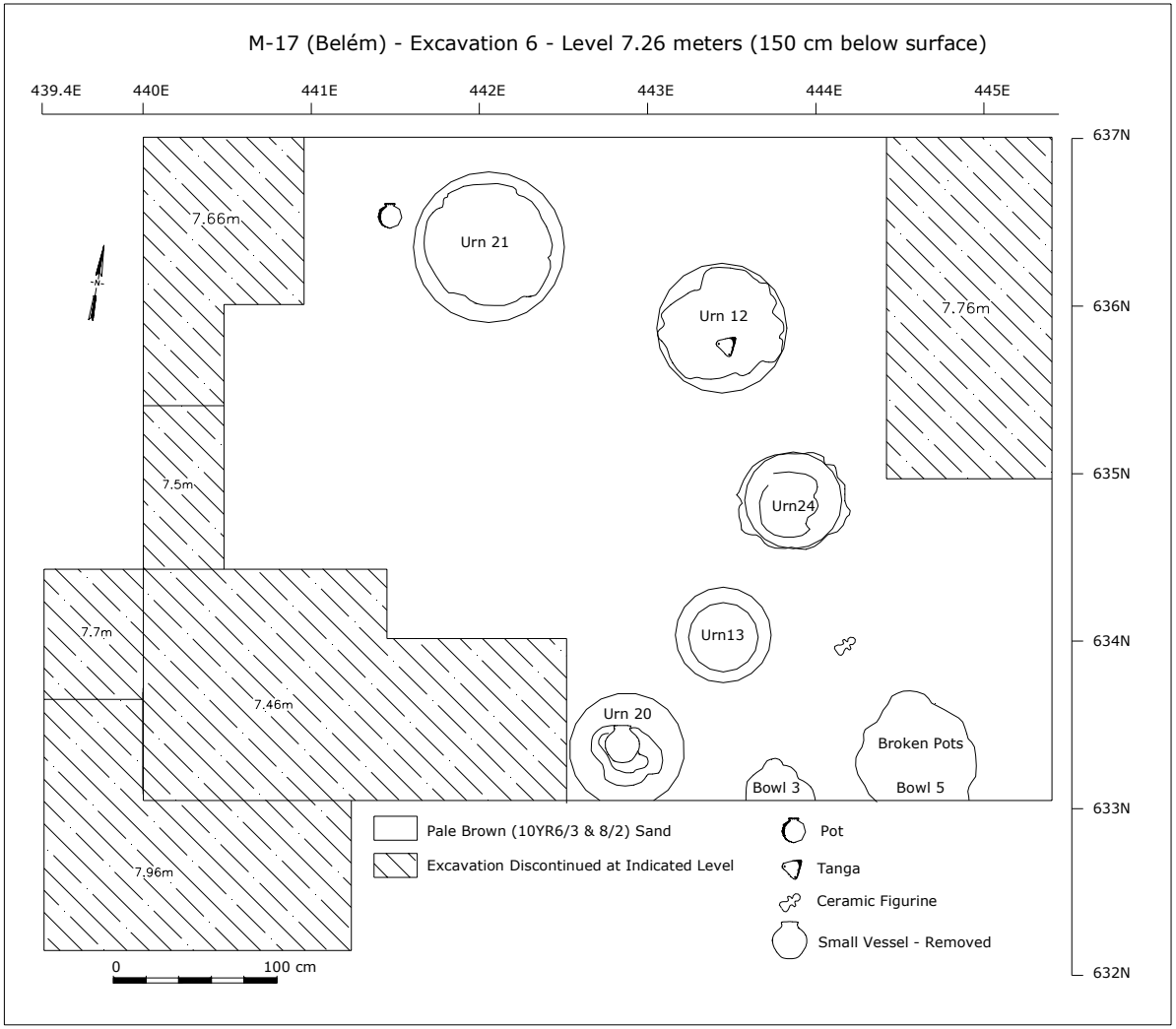

Figure 163 - M-17 excavation 6, top view at 7.26 m level

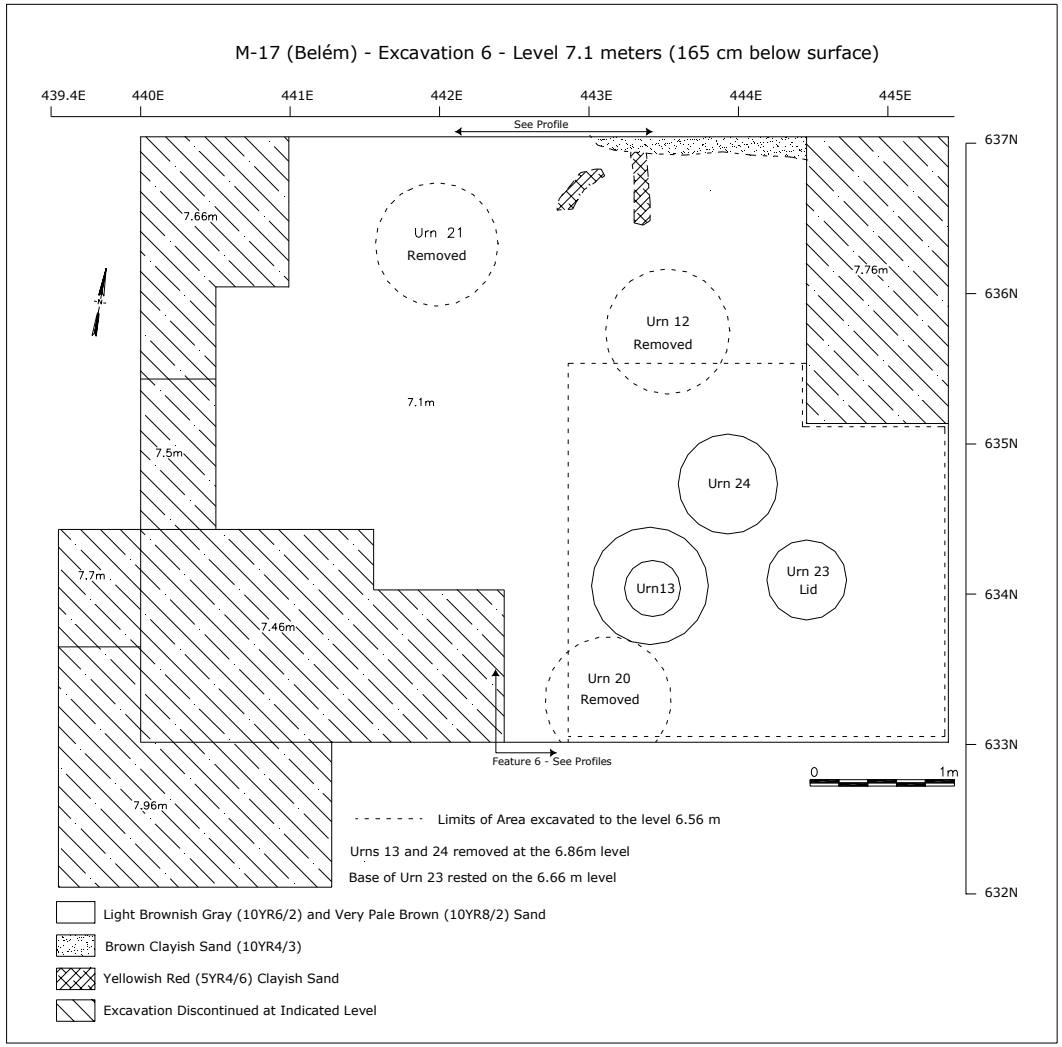

Figure 164 - M-17 excavation 6, top view at 7.1 m level

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