

TOWARDS AN UNDERSTANDING OF THE SOCIO-POLITICAL ORGANIZATION OF THE TAPAJÓ DURING LATE PRECOLONIAL TIMES, LOWER AMAZON

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submissão: 02/02/2021 | aprovação: 11/08/2021

RESUMO

Archaeological research conducted in the Lower Amazon has demonstrated that this region was populated by one of the largest Amazonian polities during late pre-colonial times. This article presents a reflection on the socio-political organization of the Tapajó society based on the comparison between the well-studied Santarém site located at the mouth of the Tapajós River and new data collected at Cedro site located in the Belterra plateau. Until recently, archaeological sources on the Santarém region came from ethnohistorical accounts and archaeological research conducted at the mouth of the Tapajós River. Based on these data, archaeologists concluded that the Tapajó were organized into a hierarchical chiefdom. Based on new data, this work concludes that the Tapajó organization was heterarchical.

Keywords: Santarém phase ceramics; Social complexity; Belterra plateau.

BUSCANDO ENTENDER A ORGANIZAÇÃO SOCIOPOLÍTICA DOS TAPAJÓ DURANTE A ÉPOCA PRÉ-COLONIAL TARDIA, BAIXO

AMAZONAS RESUMO

As pesquisas arqueológicas desenvolvidas no baixo Amazonas têm demonstrado que esta região foi povoada por grandes sociedades regionais durante o período pré-colonial tardio. Baseando-se numa comparação entre o sítio Santarém, localizado na foz do rio Tapajós, e novos dados sobre o sítio Cedro, localizado no platô de Belterra, este artigo visa apresentar uma reflexão sobre a organização sociopolítica dos Tapajó. Até recentemente, as fontes arqueológicas sobre a região de Santarém eram constituídas por relatos etno-históricos e pesquisas arqueológicas desenvolvidas na foz do rio Tapajós. Baseando-se nestes dados foi concluído que os Tapajó eram organizados em um cacicado hierárquico. O presente trabalho reavalia esta interpretação à luz de novos dados e conclui que a organização dos Tapajó era heterárquica.

Palavras chaves: Cerâmica Santarém. Complexidade social. Platô de Belterra.

BUSCANDO COMPRENDER LA ORGANIZACION SOCIO-POLÍTICA DE LOS TAPAJÓ DURANTE EL TARDÍO PRE-COLONIAL

BAJO AMAZONAS RESUMEN

Las investigaciones arqueológicas llevadas a cabo en el Bajo Amazonas han demostrado que esta región estuvo poblada por grandes sociedades regionales durante el período precolonial tardío. A partir de una comparación entre el sitio Santarém ubicado en la desembocadura del río Tapajós y nuevos datos sobre el sitio Cedro ubicado en la meseta de Belterra, este artículo tiene como objetivo presentar una reflexión sobre la organización sociopolítica de los Tapajó. Hasta hace poco, las fuentes arqueológicas de la región de Santarém estaban constituidas por informes etnohistóricos e investigaciones arqueológicas realizadas en la desembocadura del río Tapajós. Con base en estos datos, se concluyó que los Tapajó estaban organizados en un cacicazgo jerárquico. El presente trabajo reevalúa esta interpretación a la luz de nuevos datos y concluye que la organización de Tapajó era heterárquica.

Palabras clave: Cerámica Santarém. Complejidad social. Meseta de Belterra.

INTRODUCTION

Since the second half of the 20th century, the study of social complexity in pre-colonial Amazonia has been influenced by divergent theoretical frameworks and ideological aspirations. Until recently, two opposite views coexisted for explaining social complexity in the Lower Amazon. On the one hand, Betty Meggers and Clifford Evans' standard model (Viveiros de Castro 1996) elaborated through their work for the National Program of Archaeological Research (Programa Nacional de Pesquisas Arqueológicas – Pronapa) classified past Amazonian people as “tropical forest tribes.” In this model, Amazonian societies are considered as socially simple and present settlement patterns and social behaviours similar to present-day populations (Meggers 1954, 1990, 1993, 1995, 2001). On the other hand, the emergence of environmental archaeology and historical ecology during the 1980s encouraged scholars to look at long-term anthropogenic impacts on landscapes and continuity of cultural practices between past and present inhabitants of the Amazon. These approaches led archaeologists to formulate models that highlighted the social complexity of these past

societies. One of those models was formulated by Anna Roosevelt to explain the socio-political organization of past societies occupying the Santarém area. In this model, Roosevelt (1989, 1993, 1999) uses ethnohistory and archaeological data from the Santarém site at the mouth of the Tapajós River to argue that past inhabitants were organized into a complex, centralized, and warrior chiefdom at the time of the European conquest. A third model emerged in the 2000s based on decolonizing archaeological practices through works that focused on collaborative methodologies and indigenous ontologies. Results of this research offer a less dichotomous perspective on past socio-political organization by highlighting the diversity of social forms where hierarchical and autonomous societies coexisted (Gomes et al. 2018; Heckenberger & Neves 2009; Schaan 2015¹).

The present research combines previous data collected at the well-excavated Santarém settlement, composed of the Port and Aldeia sites² Located at the mouth of the Tapajós River, with new data coming from the Cedro settlement located in the Belterra Plateau, in order to investigate the socio-political organization of the ancient polity

1 This reference is an unpublished article written by Denise P. Schaan in 2015 and entitled: Relational Ontologies, ritual practices, and the political landscape in pre-Columbian Amazonia.

2 The Port and Aldeia sites were separated by a small lake in pre-colonial times, which led archaeologists to designate them as a single site called Santarém. Both sites are formed by large deposits of Amazonian Dark Earths (ADE) and are currently located within the modern city of Santarém.

that inhabited the Santarém region during the late pre-colonial times (Figure 1). The Belterra plateau is part of the Amazon Planalto, which dates from the Plio-Pleistocene age. It rises between 60 and 180 m above sea level (masl). Its altitude is 175 masl at Belterra Estate, 180 masl at Curuá-una centre, and 60 masl between Nhamundá and Trombetas rivers, and it is relatively flat (Sombroek 1966:21). The plateau provides an impressive view of the Tapajós River and could have offered a strategic location for

its past inhabitants. In addition to its altitude, the Belterra plateau is characterized by its distance to the two main watercourses of the Lower Amazon: the Amazon and the Tapajós rivers. Inhabitants living far away from these watercourses used enclosed depressions and ponds in order to have a water supply during the dry season (Nimuendajú 2004). The enclosed depressions are natural water-holding depressions that are large and circular in form, while human-made ponds are characterized

by their smaller size (between 15 and 30 m in diameter) and elongated shape, as found at the Cedro site (Stenberg et al. 2018). Furthermore, the distance of upland settlements from main watercourses also impacted ceramic industries, which uses fewer sponge spicules than riverine industries, since these are usually found in riverine locations (Gunnarsson & Castillo 2016, Schaan 2016).

1 PREVIOUS ARCHAEOLOGICAL DATA

A large body of data exists for the Santarém site, which has been excavated

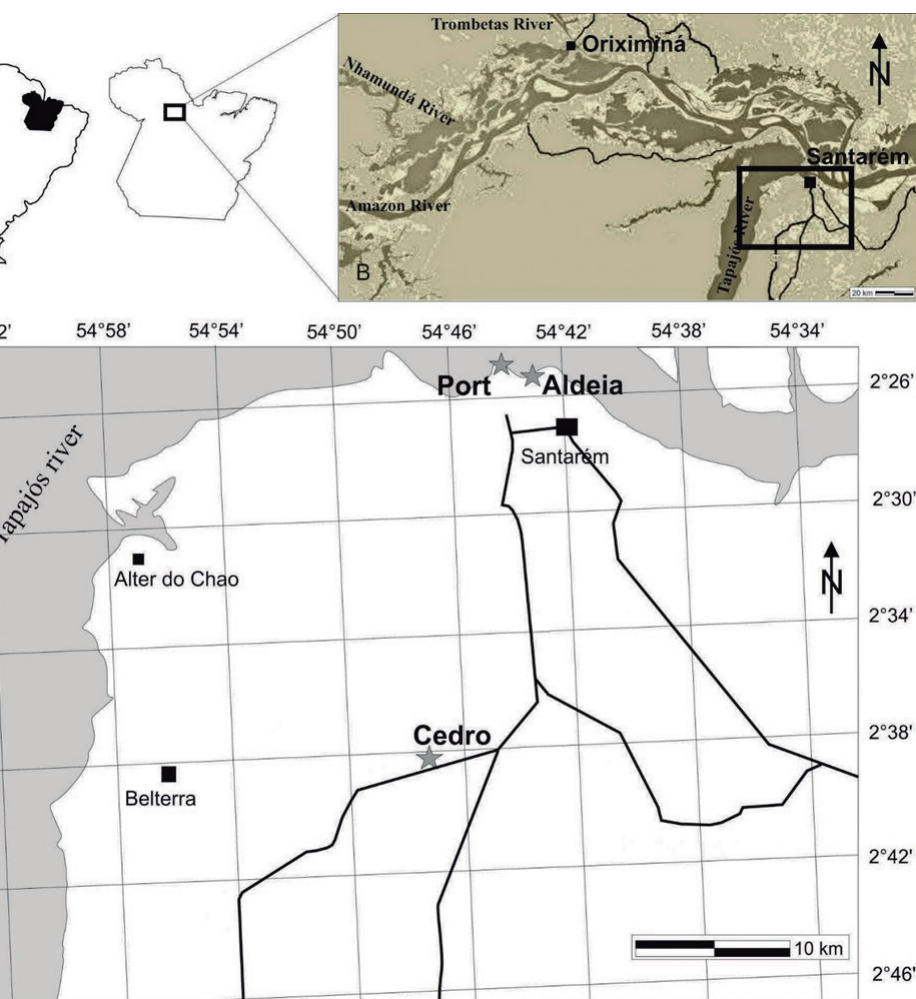


Figure 1- Maps of the study region by the author. A: location of the Pará state in Brazil, B: Lower Amazon region with study area, and C: archaeological sites mentioned in this paper.

scientifically since the 1980s through research projects and salvage archaeology projects (Alves 2012, Gomes 2010, 2016, Gomes & Luiz 2013, Quinn 2004, Roosevelt 1993, 1999, Schaan & Alves 2015). In contrast, sites in the Belterra plateau have only been investigated recently (Figueiredo 2019, Gomes et al. 2018, Schaan 2012, Stenborg 2016, Stenborg et al. 2012, 2014 and 2018). Since 2006, several salvage archaeology projects and the “Cultivated Wilderness Project,” motivated by the publication of Curt Nimuendajú’s (2004) pioneer work in the Belterra Plateau, have been conducted by Denise Schaan and Per Stenborg. These projects revealed the existence of 111 archaeological sites in the Santarém surroundings, including 68 sites in the Belterra Plateau (Schaan 2016). Most of these sites are characterized by the presence of Amazonian Dark Earth (ADE) soils, earthworks (e.g. small mounds, ponds, and pathways), ceramics from the Incised and Punctate Tradition, and occupations from the late pre-colonial period.

Since the first archaeological studies conducted in the Santarém region during the 19th century, ceramic classifications have been used as a tool to understand the distribution of the Santarém archaeological culture and, by extension, past indigenous territorial occupations. Typologically, ceramics from this region are classified as belonging to the Incised and Punctate Tradition,

which extends along the Orinoco and Amazon rivers, as well as to Amapá and British Guiana (Meggers & Evans 1961). This ceramic tradition is divided into two phases: Konduri and Santarém. These archaeological phases are associated with the ceramic production of indigenous groups that dominated the Nhamundá/Trombetas (for the Konduri society) and the Santarém (for the Tapajó society) areas between the 8th and 16th centuries and were described by contact chronicles. The distribution of the material culture associated with the Tapajó people was first estimated to cover the area south of Santarém, Alter do Chão, Samahuma, Arapixuna, the South bank of Lago Grande of Vila Franca, and the right bank of the Amazon River (between Lago Grande of Vila Franca and Arapixuna) (Nimuendajú 2004:155). However, recent research shows that ceramic distribution extends further south (Gomes 2008, Figueiredo 2019, Martins 2012).

This paper aligns with previous efforts to document sites located in the surroundings of Santarém to better understand the relationship between what has been considered as the Tapajó capital, that is to say, the Santarém site, and the surrounding settlements (Figueiredo 2019, Gomes 2008, Martins 2012, Schaan 2016). Although extensive research conducted at the mouth of the Tapajós River led researchers to interpret

the Santarém site as the capital of the Tapajó, characterized as a hierarchical chiefdom (Quinn 2004, Roosevelt 1989, 1993, 1999), increasing research conducted in the area surrounding Santarém has changed this perspective. For instance, Denise Gomes's (2008) research at the Paraua community located 100 km south of present-day Santarém led her to observe that people living in these settlements were not highly influenced by the Tapajó chiefdom. Gomes (2008, 2009) argues that, although the Tapajó chiefdom shows hierarchical patterns (identified through her work at Aldeia and Port sites, as well as studies on ceramic iconography), her research does not present proof of centralization, warfare, and conquest as presented in Roosevelt's model. The development of research in the Belterra plateau also led to a critique of Roosevelt's (1989, 1993, 1999) hierarchical model. Schaan (2016) conducted a comparative study of diagnostic sherds from 52 sites in the Belterra plateau (not including the Cedro site). Results show an absence of hierarchy between riverine and upland sites concerning the ceramic assemblages. Schaan (2016:34) concluded that "the Tapajó were not centralized and stratified, but were tied together by a built environment that involved a common cultural history based on specialization in economic activities, both internal and external exchange, and religious ritual." Gomes and colleagues (2018) recent publication presents the results of surveys conducted in 30 archaeological sites. The authors argue that Santarém culture ceramics are present in sites located far away from the Santarém site. However, while domestic ceramics coming from the 30 surveyed sites share technological, formal, and decorative patterns with domestic ceramics from the Santarém site, ritual artefacts present differences in shape, size, and decoration. Therefore, this study shows similarity in domestic vessels but differences in ritual ones and concludes that although the Santarém site was the largest settlement, the socio-political system of the Tapajó was composed of fragmented space. Finally, Figueiredo (2019) conducted her dissertation research on archaeological sites located at Flona-Tapajós and mapped 14 sites and five trail networks. Based on archaeological data and ethnographic examples, the author concludes that the socio-political organization of the Tapajó polity relied on the strategic use of resources based on complementary ecological landscapes. This model argues that past inhabitants of the region were able to use and exchange resources coming from the varzea, the bluff, and the plateau. Finally, landscape and ceramic findings of this research sustain the idea previously proposed by Schaan (2016) of the Tapajó as a decentralized polity.

2 RESEARCH HYPOTHESES

The present paper provides a review of previous models of social complexity in light of new data from the Cedro site. Three hypotheses were formulated in order to test differences in socio-political organization from the archaeological record. The first hypothesis states that if the Cedro site is smaller than the Santarém site if it contains domestic and ceremonial contexts identical to those of Santarém, as well as evidence of large-scale rituals, the relationship between Cedro and Santarém will be characterized by an absence of stratification and centralization. If it cannot be disproved, this hypothesis will undermine the idea of the Santarém site as the capital of a regional polity.

The second hypothesis states that if the Cedro site is significantly smaller than the Santarém site if it presents evidence of local production of ceramics with similar shapes and iconography to those found at the Santarém site but an absence of large-scale rituals as those documented at Santarém, it will show autonomy in ceramic production but shared religious practices at a regional level. This will indicate an absence of stratification but a centralization of ritual activities. If it cannot be disproved, this hypothesis will validate the idea

of the Santarém settlement as a capital or primary centre and the Cedro settlement as a secondary centre.

Finally, the third hypothesis states that if the Cedro site is significantly smaller than Santarém, if it does not present evidence of local ceramic production but identical wares are collected at both sites, and if it shows an absence of large-scale rituals as those documented at Santarém, it will show a relationship of economic dependence where manufactured goods were imported from the capital to the surroundings, as well as a centralization of ritual activities. If it cannot be disproved, this hypothesis will validate the idea of a hierarchical relationship between Santarém and Cedro settlements.

3 METHODS

Surveys and excavations at the Cedro site (UTM 21M 746707/9707942) located in the Belterra plateau, 30 km away from the Tapajós River, took place from July 11th to August 10th, 2011 (Schaan & Martins 2012³). Archaeologists excavated thirteen 1 x 1-m units and a 5 x 1-m trench across the pond by natural layers subdivided by arbitrary 10-cm thick levels (Figure 2). Excavations revealed several archaeological features, such as a domestic

³ This reference is an unpublished report in: Schaan (2012).

house floor, a fire-pit, three buried vessels, a refuse-pit, and an artificial pond. The high quantity of archaeological features, good preservation conditions of the site, lightly impacted by shifting cultivation, influenced the choice to use the Cedro site to investigate the relationship between upland and riverine settlements. The ADE, archaeological

features and artefact distributions were interpreted in the light of ethnoarchaeological studies to determine activity areas (Schmidt 2013, Silva 2003, Silva & Rebellato 2004).

The Cedro site ceramics were analyzed from June to December 2015 at the Laboratory of Archaeology of the Federal University of Pará

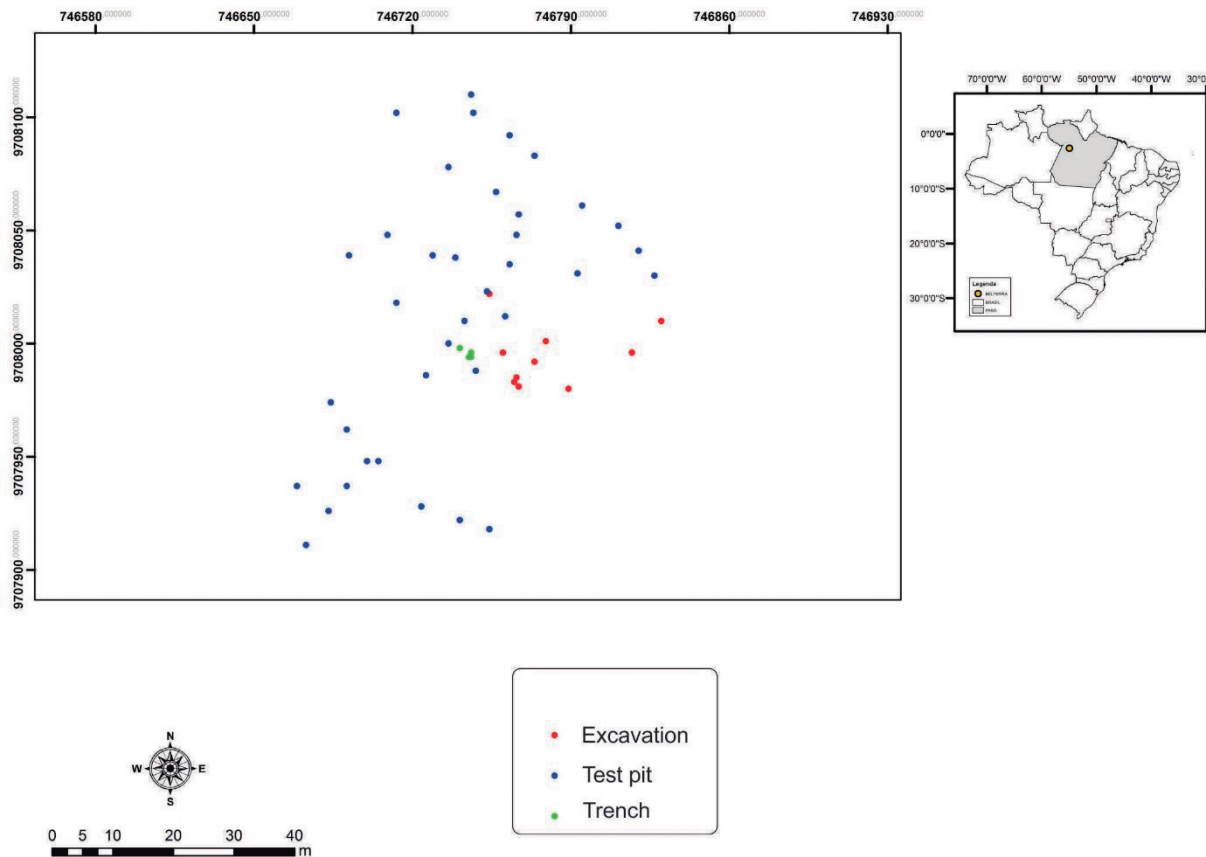


Figure 2 - Location of excavation units and test pits by Araujo da Silva (2016).

(Troufflard 2017). This analysis aimed to define the Cedro site technological style by using the concept of *chaîne opératoire* to look at each technological stage involved in the vessel manufacture. Several observations delineated technological stages, such as clay collection, preparation, forming, surface finishing, decorating, drying, and firing (Lemonnier 1986, Leroi-Gourhan 1943, 1945, 1964, 1965, Mauss 1934). By not focusing exclusively on decoration features, this approach offers a definition of style that considers the sum of the stages involved in the manufacture of vessels (Dietler & Herbich, 1989). This approach is best suited to the present study as the assemblage is composed mainly of plain wares unearthed in domestic contexts and because upland and riverine ceramics are objectively similar. The techno-functional analysis focused on 1,424 diagnostic sherds collected during surveys and excavations at the site. Analysis also focused on the material culture associated with vessel manufacture and use, such as burnt clumps of clay and vessel supports. The author used vessel lots as a unit of analysis determined through rim count in order to estimate the minimum number of vessels (MNV) per excavation unit. Variables used for the techno-functional analyses include clay composition (analyzed through mineral and chemical analyses), colour, temper, forming technique, orifice diameter, wall thickness, firing

modes, and decoration techniques. Furthermore, based on ethnographic work conducted in the Amazon (DeBoer 1991, DeBoer & Lathrap 1979, Lagrou 2007, Silva & Lima 2015), vessels were classified into three main functional types: 1) cooking, 2) serving, and 3) liquid storage.

In addition to providing a local perspective on the Cedro site, this research also looked at the regional scale of upland and riverine settlements. The comparative analysis between Cedro and Santarém sites considered seven variables: 1) environment and subsistence, 2) chronology, 3) settlement size and demography, 4) domestic and ceremonial contexts, 5) domestic ceramics, 6) ceremonial ceramics, and 7) lithic industries.

4 ACTIVITY AREAS AT THE CEDRO SITE

The observation of soil texture and colour, archaeological features, and artefact type and density led to the characterization of three main activity areas at Cedro: 1) a public/community area, 2) a private/domestic area, and 3) a disposal area (Troufflard 2017). The identification of these activity areas contributes to the general understanding of the Tapajó daily-life practices. A focus on the activity areas has been an understudied subject in this region. For the most part, the focus has been on ceremonial contexts and ceramics until recently. The public/community

area is characterized by Brown Earth soils and low artefact density. This correlates well with ethnographic studies that describe these types of areas as usually kept clean of material remains (Silva 2003, Silva & Rebellato 2004).

Archaeologists at the Cedro site excavated three archaeological features in the private/domestic area: 1) a domestic house floor, 2) a fire pit, and 3) three buried vessels. The fire pit and the buried vessels are both associated with the domestic house floor. The domestic house floor is characterized by a compacted surface with few artefacts (mostly small vessels), charcoal fragments, and laterite concretions. The fire pit was unearthed beneath the domestic house floor. It served as both a ceramic workshop and a kitchen, which parallels ethnographic studies showing the occurrence of both activities in a single space (Silva & Rebellato 2004).

The fire pit is characterized archaeologically by abundant clumps of clay, burnt adobe, charcoal, carbonized seeds, numerous cooking vessels, and lithic artefacts, such as spindle whorls and tiny flint flakes. Phytoliths of edible plants were also identified inside the pit (Troufflard & Alves 2019). Furthermore, clay colour diversity is higher in the fire pit context than in surrounding areas. A sandstone abradar with negative scars associated with pottery decoration was unearthed inside

the fire pit (Araujo da Silva 2015:130). These data corroborate the use of this space as a ceramic workshop. Since traditional Amazonian societies have a gendered division of labour, where ceramic production, the manufacture of tiny flakes (Araujo da Silva 2015:128, Prous et al. 2009-2010), and food preparation are usually associated with women, I suggest that this space is structured by a feminine presence.

The final feature excavated in the private/domestic area consists of three large serving vessels collected underneath the domestic floor that were intentionally buried after the floor construction. Although these types of buried vessels are commonly associated with funerary activities in the archaeological record of Santarém (e.g. Alves 2012, Gomes 2010, Martins 2012, Schaan & Alves 2015), no secondary funerary practices were documented during the vessel excavations undertaken by Dr. Cunha at the Laboratory of Archaeology of the Federal University of Pará. Nonetheless, the special status associated with these vessels can be inferred through their association with high-status artefacts and their placement underneath the floor. Vessel 1 was collected 48 cm below the surface and was associated with a hematite earplug (Figure 3). This artefact is associated with high-status individuals among past and present Amazonian societies.



Figure 3 - Hematite earplug collected 58 cm below surface under Vessel 1 (photograph by the author).

Finally, the disposal area of the Cedro site consists of two archaeological features: 1) a funnel-shaped refuse pit and 2) an artificial pond. The refuse pit is characterized by a high number of artefacts. It shows large and ornate serving vessels, high numbers of cooking vessels, vessel supports,

fire-cracked rocks and other evidence of burning activities (i.e. charcoal, burnt ceramic fragments, and a broken sherd resulting from thermal shock), and phytoliths of edible plants (Troufflard & Alves 2019). An anthropomorphic ceramic head was unearthed at the base of the pit and exhibits an individual wearing earplugs, which is a common attribute found in figurines depicted in ornate vessels (Figure 4). Both radiocarbon dates and the differentiation in sediment colour inside the pit show that it was formed by two events (Table 1). This pit was interpreted as a result of communal rituals involving food consumption.

Excavations revealed that the pond is an anthropogenic feature measuring 12 m in diameter and 1.1 m of depth (Schaan & Martins 2012:26). It



Figure 4 - Anthropomorphic head found at the base of the refuse pit that was probably part of a globular vessel (source: Troufflard & Alves 2019:571).

presents many fragmented vessels, especially in its deeper parts. The assemblage expresses greater type diversity than assemblages from surrounding areas. High amounts of burnt clumps of clay were unearthed inside the pond and probably served for sustaining its walls (Schaan & Martins 2012:24). Moreover, the pond has ornate vessels, such as anthropomorphic appendages and one crescent-based figurine. The presence of these ceramics inside the pond could be intentional.

5 THE TECHNOLOGICAL STYLE OF CEDRO SITE CERAMICS

Results of the ceramic analysis show that

the Cedro site technological style is consistent through approximately 200 years of occupation and differs little from riverine ceramic industries (Troufflard 2017). Technological style at Cedro was inferred by looking at each step of vessel manufacture: 1) clay collection, 2) clay preparation, 3) forming, 4) surface finishing, 5) decorating, 6) drying, and 7) firing. Although sources of clay are unknown due to the lack of geological survey in this area, upland potters may have collected their clay at the mouth of the Tapajós River.

Indeed, the pottery literature shows that potters

Lab No.	Unit	Area Function	Depth below surface (cm)	Conventional Age	Calibrated Age
Beta-324192-CDR-001*	1	Domestic house floor	18	550 ± 30 BP	Cal 1320-1350 AD Cal 1390-1430 AD
Beta-324193-CDR-003*	3, Trench 1	Pond	23	240 ± 30 BP	Cal 1640-1670 AD Cal 1780-1800 AD
ICA-16C/0745	6	Refuse pit	24	460 ± 20 BP	Cal 1420-1450 AD
ICA-16C/0746	6	Refuse pit	52	530 ± 20 BP	Cal 1330-1340 AD (7.0%) Cal 1400-1430 AD (88.4%)
ICA-16C/0747	6	Refuse pit	94-104	630 ± 30 BP	Cal 1290-1400 AD
ICA-16C/0748	7	Domestic house floor with fire pit	26	580 ± 20 BP	Cal 1310-1360 AD (64.8%) Cal 1390-1410 AD (30.6%)
ICA-16C/0749	7	Domestic house floor with fire pit	43	600 ± 20 BP	Cal 1300-1370 AD (73.5%) Cal 1380-1400 AD (21.9%)
ICA-16C/0751	13	Domestic house floor with buried vessels	48	510 ± 20 BP	Cal 1410-1440 AD

* Schaan, 2016:25.

Table 1 - Chronology for the Cedro site (source: Troufflard & Alves 2019).

could travel as far as 25–50 km in order to get to harvest the raw material (Arnold 1981:37). Furthermore, wasters of ceramic production, such as an abundance of burnt clay clumps ($n = 2,102$) along with a large amount of burnt adobe show that the Cedro site pottery was produced locally. Virtually all vessels in the Cedro assemblage are made of a uniformly pink-coloured fired clay, suggesting a limited range of clay sources as well as a consistent firing atmosphere. Mineralogical and chemical analyses show that fragments share a similar composition independently of their functions as ceremonial or domestic (Troufflard 2017). However, these analyses are based on a small sample ($n = 11$), which makes any conclusion tenuous.

The clay preparation stage involves the addition of tempering agents. Six different temper combinations are present in the assemblage: 1) grog, grit, and sponge spicules, 2) sponge spicules and grit, 3) grog and grit, 4) tree ash, 5) sponge spicules and grog, and 6) other combinations⁴. The dominant combination is grog, grit, and sponge spicules. Since sponge spicules are collected close to riverine environments, it is possible that upland people obtained this tempering agent through trade or exchange with people living at the

mouth of the Tapajós River (Schaan 2016). Both functional and cultural factors can explain the use of sponge spicules. The ceramic analysis shows that higher amounts of sponge spicules are found in cooking vessels, which could prevent breakage due to fire exposure (Rye 1976, Skibo et al. 1989). Although the use of sponge spicules in upland ceramic industries is lower than in riverine ceramic industries due to ecosystem differences (Schaan 2016), its use in the uplands illustrates the social choice of maintaining a longstanding Amazonian tradition. The ceramic analysis showed that grog usually concentrates most of the sponge spicules found in ceramic fragments, which demonstrates that potters chose to crush pottery made with lots of sponge spicules as a tempering agent. This assumption is corroborated by the low-frequency of sponge spicules mixed with grit among the assemblage.

As such, one hypothesis to explain the presence of sponge spicules in the upland would be that people living in upland settlements may have obtained whole pots made with a high amount of sponge spicules from riverine settlements in order to crush them for obtaining the tempering agent for their clay. Another hypothesis to explain the longstanding presence of sponge spicules relates to

⁴ Other combinations of temper are represented by less than 10 rims having grit only, sponge spicules only, or sand only.

the learning process of pottery making transmitted from one generation to the next. As these traditions are usually carried on by women, it is plausible to imagine that marriage between women coming from the floodplain and men living in the uplands under a tradition of patrilocality would result in the need for sponge spicule procurement in order for women to maintain their pottery traditions.

The forming stage of the *chaîne opératoire* shows the prevalence of the coiling technique over the modelling technique typically used for the manufacture of ceramic appendages and flanges. Possible finger marks were documented on four burnt clumps of clay, which illustrates the process of clay preparation for artefact forming. Mat-impressed ceramic bases show the use of basketry during the pottery-making process, which is a technique documented ethnographically (Myers 1976). At least two types of basketry techniques are observable on the ceramic sherds, which are represented by a small and a large grid pattern. Furthermore, the wall thickness of the vessels and their orifice diameter co-vary showing a certain standardization in the ceramic production. Lastly, small (1 to 15 cm) and medium (16 to 30 cm) sized vessels dominate the assemblage. Serving

vessels are usually larger than cooking vessels and illustrate the prevalence of communal meals, especially associated with the refuse pit context.

The analysis of the surface finishing and decorating stage of vessel manufacture shows that most of the vessels are plain and smooth on both surfaces. Seven decoration types were documented among the vessels: 1) red slip, 2) punctation, 3) incision, 4) file, 5) modelled, 6) multiple⁵, or 7) other⁶. The use of red slip was extremely common among decorated vessels. Differences were also observed between decorations used in cooking and serving vessels. While cooking vessels show the use of red slip or simple decoration on the rim, serving vessels have more complex and diverse decorations than cooking vessels.

Due to the seasonality of tropical climates, in which rainy and dry seasons alternate, most of the pottery is carried out during the dry season when it is easier to dry and fire (Arnold 1985). Although rainfall averages about 2,000 mm a year in the area under consideration, the rainy season lasts from December to June and accounts for more than 70% of the annual rain (Embrapa 2001:9). Ethnoarchaeological studies show that pottery production and agricultural activities

⁵ The category “multiple” represents combinations of decorations, such as incision and punctation, file appliqué and red slip, incision and red slip, or engraving and red slip.

⁶ Other decorations represent less common vessels, which are polished, decorated with red paint or orange slip.

decrease during the rainy season (Dietler & Herbich 1989, Silva 2008). Furthermore, ethnography shows that while pots may take 3 to 5 days to dry during the rainy season, they usually take only 1 to 3 days to dry during the dry season (Silva 2008:228).

Ceramics in the Cedro assemblage show evidence of open firing observed through the presence of “fire clouds” in vessels (Skibo 2013:108). From a mineralogical point of view, it is possible to estimate the firing temperature range of vessels by looking at mineral transformation (Rodrigues et al. 2015). Indeed, mineralogical studies conducted on sherds coming from the pre-colonial Lower Amazon have estimated a firing temperature ranging from 550 to 600°C (Rodrigues

et al. 2015:152).

In addition to documenting several steps of vessel making, the ceramic analysis also aimed to look at vessel use (Troufflard 2017). Ethnographic analogies were also used to classify vessels into three techno-functional groups: 1) cooking, 2) serving, and 3) liquid storage (DeBoer 1991, DeBoer & Lathrap 1979, Lagrou 2007, Rice 1987, Rye 1976, Shepard 1985, Silva & Lima 2015). Results of the techno-functional analysis show that the Cedro site assemblage is composed of 97 cooking vessels, 258 serving vessels, and 6 liquid storage vessels (Figure 5).

Cooking vessels are restricted and have globular forms. They usually present a direct rim with a rounded lip. Some of these cooking

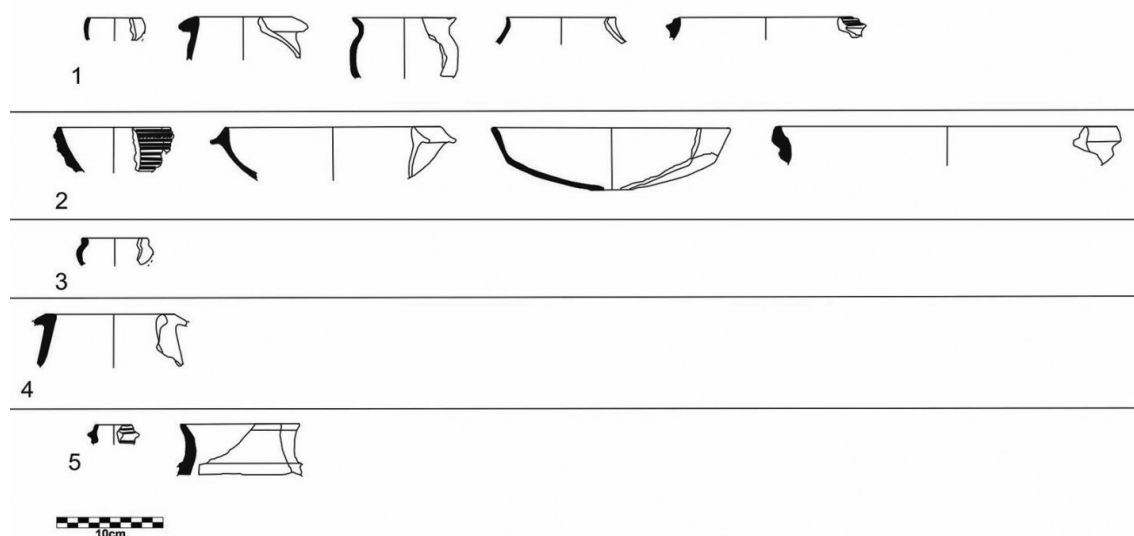


Figure 5 - Vessel shapes and hypothetical functions from the Cedro site. 1: cooking vessels, 2-4: serving vessels, and 5: liquid storage vessels (source: Troufflard & Alves 2019:562).

vessels also present a neck, which is a functional advantage for pouring (Shepard 1985:229). Vessels presenting a neck also show expanded or everted rims with lips that can be rounded, thickened, or pointed. They are smoothed on both surfaces and can present decoration on the rim, such as incision, punctation, dragged punctate decoration, or filet appliqué. These simple decorations may have increased thermal shock resistance as these vessels were exposed to fire, and some even present blackening on their external surface (Schiffer et al. 1994). These vessels are usually tempered with low amounts of sponge spicules, grog, and grit. They are reductively fired. The mean for orifice diameter varies between 7.7 cm to 24 cm. The mean for wall thickness varies between 0.6 cm and 0.9 cm.

Serving vessels are unrestricted bowls, which facilitate food accessibility, and present flat bases for stability purposes (Rice 1987:236). They present three main formal variations: 1) medium to large bowls with annular, sturdy bases, and outflaring rims or walls outslipping to carination and then outward to flared or everted mouth, or inward to constricted mouth; 2) small bowls with walls outslipping to shoulders and then inward to constricted mouths, and 3) deep bowls with vertical or incurved walls with an everted rim or flared mouth. Differences in size are related to the vessel

functions as individual or group vessels (Rice 1987:236). Serving vessels are usually smoothed on both surfaces and present more diverse decorations than cooking vessels, such as red slip, red paint, and filet appliqué with incision, punctation, or engraving. These vessels are mostly tempered with low amounts of sponge spicule, grog and grit, but some examples also present lots of sponge spicules. They are reductively fired. For medium to large bowls, mean for orifice diameter varies between 18.4 cm and 19.5 cm and mean for wall thickness varies between 0.6 cm and 1 cm. For small bowls, mean for orifice diameter is 7.3 cm and mean for wall thickness is 0.4 cm. Finally, deep bowls present a 7.3 cm mean for orifice diameter and a 0.4 cm mean for wall thickness.

Liquid storage vessels have restricted orifices, which avoid spills and are practical for storing purposes (Rice 1987:236, Shepard 1985:229). They present necked forms with straight rim and incurved walls. They are smoothed on both sides and are tempered with low amounts of sponge spicules, grog, and grit. They present decoration of red slip, filet appliqué, or incision. These vessels are reductively fired. Their mean for orifice diameter is 6.7 cm and 0.6 cm for wall thickness.

6 THE RELATIONSHIP BETWEEN SANTARÉM AND CEDRO SITES

The comparison between riverine and upland

sites recalls the historical dichotomy between floodplain and upland formulated by authors that claimed the superiority of the former for the emergence of social complexity in Amazonia (Carneiro 1970, 2007, Lathrap 1970, Roosevelt 1980). This vision, tainted by environmental determinism, has recently faded thanks to the development of archaeological research conducted far away from the floodplain areas, such as in the Belterra Plateau, as well as at the Flona-Tapajós (Figueiredo 2019, Stenborg et al. 2018), the Upper Xingu (Heckenberger 2005), the Southwestern Amazon (Parssinen et al. 2009), and the interfluvial areas of Central Amazonia (Myrtle Shock, personal communication, 2016). In the Belterra Plateau, archaeologists documented the presence of enclosed depressions and ponds that served as water providers and possibly as fish, turtle, and caiman storage facilities, as illustrated by present-day uses of these structures. Furthermore, the presence of Brown earth in the uplands illustrates the development of agricultural practices. Archaeological work carried out in upland areas as well as research conducted among present-day river dweller communities (Smith 1999, Winklerprins 2002) shows that riverine and upland environments can be used in a complementary fashion for the acquisition of food resources (see also Figueiredo 2019, Stenborg 2016). If applied

to the region under study, these studies suggest that while some aquatic resources were collected in floodplain settings – in this case at the mouth of the Tapajós River – upland areas presented suitable land for farming. Although paleoecological data are still necessary for understanding this phenomenon, it is hypothesized that faunal and floral products from both geographic areas were possibly exchanged and traded within and among pre-colonial polities living in contemporaneous permanent settlements, such as Santarém and Cedro. The use of sponge spicules in local upland industries stands as evidence of this exchange.

Although riverine and upland areas were both occupied during late pre-colonial times, their chronologies differ (Table 2). The mouth of the Tapajós River shows earlier occupations from the Formative and the Tapajó period than the Belterra plateau. These earlier occupations are documented by diagnostic artefacts and radiocarbon dates, which led archaeologists to conclude that the Tapajó expanded from the river to the plateau after AD 1100 (Stenborg 2016). Archaeological sites located at the mouth of the Tapajós River show occupations from the Formative through the colonial period (Alves 2012, Gomes 2011, Quinn 2004, Symanski & Gomes 2012). These sites were contemporaneous with the upland sites during the late pre-colonial period and may have continued to be so in colonial

times, though this is currently debated. Although radiocarbon dates also identify colonial-period occupations in upland sites, these dates are suspect because no diagnostic artefacts from the colonial period (e.g. ceramic pipes or wheel-made vessels) have ever been collected in the uplands.

Riverine sites are estimated to be larger than upland sites. This difference is corroborated by the presence of larger and deeper ADE deposits, as well as higher artefact density at the mouth of the Amazon. However, this comparison is biased by the lack of research conducted at upland sites, as well as their poor state of preservation. Estimates

of settlement size are available for riverine and upland sites, but no data on demographic density exist for upland sites. Although researchers disagree about the size of the Santarém site⁷, there is a consensus that it was the largest site of the Santarém culture and served as a capital (Roosevelt 1999, Schaan 2016). This argument, initially presented by Roosevelt (1989, 1993, 1999), was supported by following research conducted on upland sites (Schaan 2016). As a matter of comparison, based on the distribution of ADE, Cedro was estimated to be 6 ha in size. However, this is certainly an underestimation of its original size as the site has

Chronological period	Site location	Site name	Calibrated age	Source
Pre-Tapajó (Formative)	Floodplain	Port	Cal BC 379 –1053	Quinn 2004
		Port	Cal BC 1610 –1490	Alves 2012
		Aldeia	Cal BC 1380 –AD 50	Gomes 2011
Tapajó	Floodplain	Iruçanga	Cal AD 690 –890	Schaan 2016
		Port	Cal AD 1300 –1450	Quinn 2004
		Port	Cal AD 900 –1600	Schaan & Alves 2015
		Aldeia	Cal AD 1280 –1490	Gomes 2017
	Upland	Amapá 1	Cal AD 1490 –1650	Schaan 2016
		Bom Futuro	Cal AD 1450 –1640	Schaan 2016
		Cedro	Cal AD 1320 –1800	Schaan 2016
Cedro		Cal AD 1290 –1450	Troufflard 2017	

Table 2 - Chronology for Pre-Tapajó and Tapajó occupations at floodplain and upland sites (source: adapted from Troufflard & Alves 2019:561).

⁷ While Gomes (2007) states that the Aldeia site measures 120 ha and the Port site measures 50 ha, Schaan (2016) estimates that both sites together (the Santarém site) measure only 16.36 ha. Neither of these authors provides population estimates.

been impacted by modern-day activities. Site size estimates are available for 11 upland sites and show that none of these sites is larger than the Santarém settlement (Schaan 2016:25).

Both floodplain and upland sites show similar domestic and ceremonial archaeological contexts, such as domestic house floors, fire pits, buried vessels, and refuse pits. However, some attributes of these features vary among both geographical areas. As such, while the fire pits excavated at the Port site are associated with funerary contexts (Alves 2012), the Cedro site fire pit served both as a kitchen and a ceramic workshop. Furthermore, although excavators unearthed buried vessels in both areas, the ones collected at the Port site are clearly related to funerary contexts (Gomes & Luiz 2013, Schaan 2012) unlike the buried vessels found at the Cedro site. The other difference between these sites is that the vessels from Cedro were buried under the domestic house floor, in the habitation space, not in a cemetery, as for the Port site (Schaan & Alves 2015).

Refuse pits are the archaeological features that vary the most between floodplain and upland sites (Figure 6). Indeed, these refuse pits differ in sediment colour, shape, size, artefact density, and duration of use. While the refuse pit sediment

colours at the Port site vary from black to very dark brown, the one at Cedro is composed of brown sediment. Furthermore, while Port and Aldeia sites are characterized by the presence of bell-shaped refuse pits⁸, the one at Cedro is funnel-shaped. The artefact density inside the pits is also higher at the Port site. While the Port site refuse pits were formed in a quick time period perhaps in a single event (this assumption is based on radiocarbon dates and the occurrence of sherds from same vessels dispersed in the stratigraphy) (Schaan & Alves 2015), the Cedro site pit was formed by a succession of events (assumption based on radiocarbon dates and the differentiation in sediment colour inside the pit). Finally, riverine and upland refuse pits present ornate potteries associated with ritual context as well as evidence of food consumption. The difference between riverine and upland refuse pits is qualitative as well as quantitative, as more archaeological refuse pits are found at the Santarém site, and they present a greater artefact density. This observation suggests that more communal rituals were conducted at the Santarém site than at the Cedro site.

Comparisons between domestic vessels collected at the Port site with those from the Cedro site are hampered by an emphasis in the

⁸ Although most of the Santarém site refuse pits are bell-shaped, Gomes and Luiz (2013) documented an example of a funnel-shaped pit at the Port site, which they classify as a domestic refuse pit.

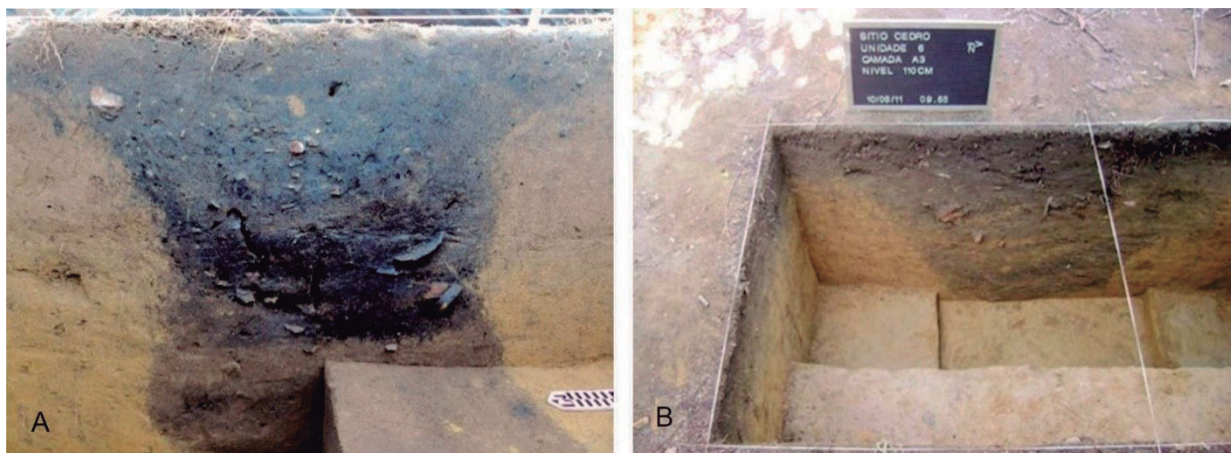


Figure 6 - Comparison between Port and Cedro refuse pits. A: bell-shaped refuse pit at the Port site (source: Schaan & Alves 2015:109) and B: funnel-shaped refuse pit at the Cedro site (source: Schaan & Martins 2012:46).

literature on ceremonial vessels (see Alves 2012; Cardoso da Silva 2016 for exceptions). The first of only two archaeological works looking at domestic vessels at the Port site was conducted by Dr Daiana Travassos Alves. The author based her vessel analysis on 140 rims (out of 303) and classified the vessels into 22 types. By comparing these types to the ones defined for the Cedro site, 21 parallels were found in vessel shape. The only Cedro site vessel that did not have any parallel with the Port site vessels is considered a rare vessel type at the Port site (only two examples were collected). Results of the comparative analysis show that although serving vessels dominate the Port site assemblage as they do at the Cedro site, the Cedro site has a greater diversity of domestic vessels.

The second project involving domestic wares was conducted by Barbara Cardoso da Silva with sherds coming from the bell-shaped pits excavated at the Port site. The author classified the vessels into 28 types. Although these are exclusively non-domestic contexts, the comparison with the Cedro site domestic contexts is justified as the author concluded that there are no clear qualitative differences between the artefacts collected inside and outside the refuse pits, as the main difference is quantitative. From the 28 types classified by Silva (2016), 22 types have parallels with the Cedro site ceramic assemblage. Results show that medium and large serving vessels are dominant among the refuse pit assemblages of both the Port and Cedro sites.

The identification and comparison between

Cedro site ceremonial sherds and complete vessels collected at the Santarém site show that the same type of ceremonial vessels (e.g. bowls with hollow flanges, globular vessels, and shallow plates) and ritual objects (e.g. crescent-based and pedestal figurines) were used at both sites. Furthermore, symbolic animals found in typical Santarém ceremonial vessels are depicted on Cedro site vessels, such as vultures, frogs, and snakes. In addition to these animals, formal dualism is used to represent body transformation through animal, human, or hybrid figurines, which are perceived differently according to the observer's perspective (Figure 7). However, while the Santarém site

ceramics involved abundant sponge spicules for temper, the Cedro site ceremonial vessels show a paste similar to domestic wares, which are tempered with small amounts of sponge spicules mixed with grog and grit. While differences in the technological style of Port and Cedro site were considered as illustrative of the autonomy in the ceramic production process, similarities in vessel shape and iconography were interpreted as an illustration of shared religious practices.

Lithic industries of riverine and upland sites present similar raw material and lithic types, such as earplugs, spindle whorls, stone axes, cores,

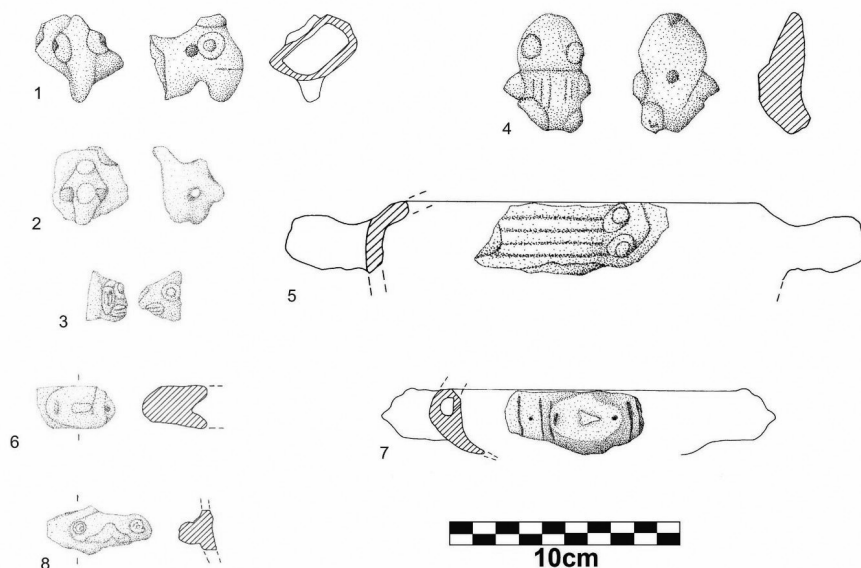


Figure 7 - Ornate vessels from the Cedro site by the author. 1-2: modelled king vulture' heads, 3: dual figure depicting a bird when looked frontally and an anthropomorphic figurine when seen from profile, 4: modelled frog probably associated with the lower body of a necked vessel, 5-7: zoomorphic and anthropomorphic hollow flanges, and 8: anthropomorphic appendage.

flakes, and polishing/sharpening stones. Both areas present nonlocal raw material (e.g. flint), which demonstrates the existence of long-distance trade or exchange characteristic of complex societies. Decorated spindle whorls in hematite and *muiraquitã* are also present at both riverine and upland sites showing cultural connections between these areas.

CONCLUSION

While the cultural ecology framework from the second half of the 20th century emphasized neo-evolutionist classifications of cultures through concepts such as, “centrality” and “hierarchy,” a theoretical shift occurred during the 1990s criticizing typological and unilineal visions of cultures (McGuire 1983, Pauketat 2007, Roosevelt 1999). As part of this theoretical shift, researchers highlighted some of the advantages of heterarchical organizations over hierarchical ones, such as better political and environmental stability, as well as cultural longevity (Roosevelt 1999). Crumley (1995:3) defines the concept of “heterarchy” as “the relation of elements to one another when they are unranked or when they possess the potential for being ranked in a number of different ways.” Crumley, therefore, argues for the possible co-existence of hierarchy and heterarchy. As part of this theoretical tendency, scholars conducting

research in the Santarém area criticized the hierarchical model of social complexity formulated by Roosevelt (1989, 1993, 1999) during the 1980s and developed alternative heterarchical models (Figueiredo 2019, Gomes 2017, Gomes et al. 2018, Schaan 2012, 2015, 2016). Although these models brought about an interesting discussion on centralization and stratification of pre-colonial polities, they still lack archaeological data coming from sites surrounding the Santarém site. This paper, based on new data from the Belterra Plateau, was, therefore, an attempt to re-evaluate these previous models of social complexity.

Results of the study of the Cedro site and the comparison between upland and riverine settlements show that the relationship between these settlements was heterarchical with the Santarém site serving as a centralized capital. In fact, the first hypothesis of this study, which states an absence of stratification and centralization between Cedro and Santarém sites, was disproved based on the differences between the settlement sizes, the absence of large-scale rituals at Cedro, and the presence of local ceramic industries at Cedro. The third hypothesis of this study, which states the presence of stratification and centralization between Cedro and Santarém sites, was dismissed as well based on the existence of a local ceramic industry at Cedro. In fact, the Cedro

settlement ceramic production shows that it did not depend on Santarém for the acquisition of economic goods as stated in a hierarchical model, such as the “Central Place Theory” (Johnson 1977). In this model, the central place provides specialized services and manufactured items, whereas the complementary region supplies the central place with an agricultural surplus (Crumley 1976). As such, the validated hypothesis is the second one, which states the absence of stratification but the presence of a centralized primary centre or capital.

The patterns that validate this hypothesis are the small size of the Cedro site, the presence of local ceramic industry, the similarities between Santarém and Cedro ware forms and iconography, especially in the ritual sphere, and the absence of large-scale rituals at Cedro. It is, therefore, argued that the Santarém site served as a primary centre or capital due to its size, the occurrence of large-scale communal rituals documented through the density of bell-shaped pits, and the presence of a cemetery where the power of the Tapajó’s ancestors would have been materialized. Due to the occurrence of more feasting patterns at the Santarém site, it is plausible that upland inhabitants travelled to the mouth of the Tapajós River in order to attend these communal rituals. Indeed, the presence of similar ritual features and ceremonial wares clearly shows that people living in Santarém and Cedro

shared religious practices. It is therefore argued that the Cedro settlement can be considered as a secondary centre, showing both autonomy and integration to the Santarém capital. Hence, these results contradict Roosevelt’s (1989, 1993, 1999) hierarchical model and align with Figueiredo (2019), Gomes’s (2007, 2009, 2017), and Schaan (2012, 2015, 2016) heterarchical models.

Although this study focuses on the relationship between riverine and upland settlements during late pre-colonial times, this relationship is not considered as static over time (Troufflard 2017). Stenborg (2016) shows that these settlements may have emerged in a system of economic complementarity of different ecological areas involving the seasonal migration of people living in centralized settlements to peripheral areas. As such, settlements in the Belterra plateau first emerged as seasonal stations used during the rainy season when floodplain agriculture would have been interrupted. It is only later with the expansion of the Tapajó polity (around AD 1100) that these settlements became progressively permanent with the construction of water providers and the development of agricultural fields.

Finally, although this work represents an additional contribution to the study of social complexity in the Lower Amazon, it is impossible to conclude anything about the socio-political

system of the Tapajó without additional data from sites located in other geographical areas surrounding the Santarém site, such as the sites located close to secondary rivers, slopes, and lakes, as well as on hilltops (as documented by Schaan 2016). For now, present archaeological data from these sites do not reflect a clear pattern of clustered villages of different sizes that could point towards the existence of independent polities integrated at a regional scale as illustrated by Heckenberger (2005) in the Upper Xingu.

ACKNOWLEDGMENTS

This paper presents the results of my Ph.D. research funded by the Brazilian Capes

scholarship (1079/12-3) and several grants from the Anthropology Department of the University of Florida. I am very grateful to Daiana T. Alves who invited me to be part of this volume dedicated to the memory of Denise P. Schaan, whom I consider as my mentor in Amazonian archaeology. I thank my Ph.D. advisor Kenneth Sassaman for his guidance, Marcondes Lima da Costa and Suyanne Flavia Santos Rodrigues for the mineralogical and chemical analyses of the ceramics. Finally, I am thankful to the anonymous reviewers, to Jenny Watling and Kevin McDaniel, who kindly accepted to review the manuscript.

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