Bruna Rocha

Ipi Ocemumuge

A Regional Archaeology of the Upper Tapajós River

Ipi Ocemumuge:

A Regional Archaeology of the Upper Tapajós River

Bruna Cigaran da Rocha

2017

Thesis submitted as requirement for obtaining a PhD in Archaeology.

Institute of Archaeology, University College London

Supervisors:

José Ramón Oliver

Manuel Arroyo-Kalin

Eduardo Góes Neves

Cover watercolour by Vitor Flynn Paciornik

Declaration

I, Bruna Cigaran da Rocha, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Bruna Cigaran da Rocha
Santarém, 30th January 2017

Abstract

Ipi Ocemumuge: A Regional Archaeology of the Upper Tapajós River

The aim of this thesis is to offer an initial construction of the long term past of the Upper Tapajós River, considering processes of long-term continuities as well as ruptures. I will attempt to “bridge the gap” between pre-Columbian and post-conquest occupations in the region through the study of archaeology, historical linguistics, ethnohistory, and social anthropology. The least known of these is the region’s archaeology, which constitutes the main focus of this study. The bulk of the archaeological data was generated through the analysis of ceramic complexes from two archaeological sites called Terra Preta do Mangabal (TPM) and Sawre Muybu (SM), dating initially to approximately the late seventh and the early ninth centuries AD respectively. The remains were found stratified in expanses of anthropogenic soils known as Amazonian Dark Earths (ADEs). The study of these artefacts permitted not only comparisons on a wider scale but also allowed me to address questions related to ancient exchange networks and potential links to the distribution of Carib and Tupian language families. Both sites belong to territories traditionally occupied by the Munduruku Indians (in the case of SM) and the Beiradeiros of Montanha e Mangabal (in regard to TPM). The framework of Historical Ecology has provided a key vantage point from which to observe the ways in which the current inhabitants of the studied landscape engage with environments transformed by past human actions. The research has been carried out in a context of conflict and resistance by these forest peoples against planned development projects that could cause primary, irreversible alterations to the landscape in which they have lived for generations and in which their collective memory is inscribed. The role of scientists and archaeologists involved in environmental assessment studies undertaken in the context of human rights violations is questioned.

Contents

List of figures

List of maps

List of tables

Acknowledgements

This research was funded by the CAPES Foundation of the Brazilian Ministry of Education. The Institute of Archaeology and the UCL Graduate School Research Projects Fund paid for the expenses of the March and July 2014 field expeditions to Sawre Muybu and Mangabal. The Institute of Archaeology Awards contributed towards most of the costs related to radiocarbon dating; another date was generously subsidised by the IoA Archaeology of the Americas lecturers through a raffle, and another three were offered by Dr. José Oliver's Project, *Timing the beginning of settled village life in Northern South America*. The UCL Jackson Lewis Scholarships and the IoA Awards also contributed funding towards the illustrations presented in the text.

The Beiradeiros of Montanha e Mangabal and the Munduruku people of Daje Kapap Eïpi gave me access to the archaeological sites in their territories, imparted important information, housed and fed our team during our field trips. They are therefore among the principal sponsors of this project.

The trajectory of this PhD has met with a number of challenges over the past four years. They were only overcome because of the support, advice and help I have received from so many people. Though solitary, I was not alone. The input of the people listed below has greatly enriched the experience and contributed decisively to this work. The failings of the thesis, of course, are my own responsibility.

My supervisors have, each in their own way, offered me constant inspiration, inestimable intellectual and practical guidance, moral support and encouragement and constant displays of patience. I will never be able to thank them enough. José: thank you for believing in me, always; for taking on this challenge with me. So many times you have lifted me up when all seemed lost. It has been an honour to be your student and I will always cherish the many stimulating moments we have spent together. Thank you for teaching me about pottery, about Amerindian peoples and about archaeology. Thank you for your patient dedication to this thesis. Your humility is an example to me. I will terribly miss knocking on your door! Manuel: from the outset, back in 2010 you were on side about us going to the Tapajós. Your ability to turn things around, with your

customary verve, and offer a fresh perspective never ceases to amaze me. Thank you for all the thought, energy and time you have put into this project, for your openness to the unconventional and for pushing me to go in new directions. Edu: thank you for all the opportunities you have offered me. The *joie de vivre* you instil into Amazonian archaeology is truly incredible. Thank you for the optimism, generosity of spirit, practical and moral support, at all times, and for always having confidence in me. Thank you for showing me the relevance of archaeology in Brazil today.

Chico Noelli: Working in a country of shadow cabinets, I can say you have been a shadow supervisor – except not, of course, in opposition to the party in government! Thank you for lifting me up when I most needed it, for the friendship, for the zillions of references and for the generosity with your time. Being able to discuss issues relating to my responsibilities as a researcher was fundamental. Your integrity and clearness of vision greatly helped to ground me.

I thank Stéphen Rostain and Bill Sillar for agreeing to examine the thesis and for the invaluable comments and criticisms offered during the viva examination, which I hope to implement in the following stages of this work.

Maurício Torres... where to start? You are *only* responsible for our coming to the Tapajós in the first place. Thank you for introducing us to the Beiradeiros and for doing everything in your reach to support our work. Your constant presence has made all the difference to this project and to the sort of engagement we were able to develop. Your influence will, I hope, be perceptible in many points of the text. Thank you for the informative maps and beautiful photographs (which could only have been taken with fungus free lenses), which have greatly added to this thesis.

Fernando Almeida: My Tupian friend, thank you for always being ready to read and revise pieces of text, for the unstinting backing you gave to this endeavour from the beginning, for the shared readings, ideas and critical comments.

I thank Osvaldo Anacleto Júnior for the staggering hard work and several displays of patience while working on statistics for this thesis. How can I ever repay you?! Adília

Nogueira, thank you for providing us with PAST and for your advice on statistics. I also thank Anna Grüner for translating Friedrich Katzer's 1901 article from German, and Maria Backhouse for finding it for me in Berlin. I thank Marcos Brito Castro for the beautiful illustrations and profile drawings provided to this thesis, which have made all the difference to the end product. I also thank you for the company and support you gave when you came to Santarém. Without Marianne Arake, the final throes would have been a lot more traumatic. Thank you for the revision of citations in the text at the last minute, which you conducted with characteristic efficiency and good humour. I am most grateful to Vitor Flynn Paciornik for producing the beautiful cover of this thesis and for working on many of the images, by removing photographed sherds from their backgrounds, adjusting separate illustrations and photos so they were proportional to one another and for producing adaptions of images presented in other works, while displaying a great deal of patience and his usual competence. Thank you to Natália Guerrero for help with proof-reading our first project to the IPHAN and to Malu Camargo for promptly providing me with a copy of Pereira Brazil's book. To Mark Harris, thank you for sharing your transcription of the *Breve Noticia do Rio Topajôs,* an as-yet unpublished document, and for the interest and ideas. I thank Jago Cooper, Kate Jarvis and Kiera Gould from the British Museum for kindly making available Munduruku artefacts for Vinicius and I to photograph. Franciso Stuchi: *guerreiro*, it's been an honour… *a luta segue*. Thank you for your lasting support. I also greatly thank and admire Marcia Bezerra, who at IPHAN provided me with good advice on how to proceed, and whose work is so important in providing new paths in Brazilian archaeology. Juliana Machado: What a pleasure it has been to meet you. I have been much heartened by your continuous prioritisation of local communities. Thank you for the reassurance you have so kindly offered. Carla Jaimes Betancourt: thank you for your generous encouragement and valid inputs into this project, particularly as pertains to the ceramics aspect of it. Chico Pugliese: thank you for all the help while you were at IPHAN and for all the backing you have given this project over the last years. I thank Chris Whitehouse for translating an important document, which was of great help with bureaucratic issues. I thank my friend Felipe Milanez for always being ready to help when needed, and Brent Millikan for his hard work for the Tapajós. I am most grateful to Flávia Alice Nogueira for the support and advice offered while responsible for my process at CAPES.

I thank Roberto Stanchi for the cordiality and attention given in obtaining this project's authorisation with IPHAN. I also thank Fernando Figali and Ana Paula da Rosa Leal for fast-tracking our authorisation to send ^{14}C samples abroad. I thank Thiago Trindade for the various assistances and advice given. At IPHAN in Pará, I thank the Superintendent Maria Dorotéa de Lima, Denise Rosário de Carvalho and João Aires for their help.

I thank Jeremy Campbell at Roger Williams University for the continued interest and support, and for his commitment to the Tapajós. I thank Michael Heckenberger for the encouragement and alongside Bill Mitchell, Barbara Worley and in particular Janet Chernela, for trying to help me find Yolanda Murphy's MA thesis. I thank Lucy Salazar at Yale University for sending me a copy of Regina Müller's book. I thank William Balée for letting me use a photograph of a *cauixí* sponge, and for the encouragement. I would also like to thank Stéphen Rostain for receiving me at the Université Paris Ouest Nanterre in France and for generously giving me a copy of his PhD thesis.

In São Paulo, my first 'archaeological home' was provided by MAE, the Museu de Arqueologia e Etnologia of the Universidade de São Paulo (MAE-USP), where I had the privilege of meeting a number of people who were of the utmost importance to my trajectory. Fabíola Silva, thank you for the teachings, counsel and support offered. Your work with the Asurini blazed a trail, and your long-standing commitment to them is much admired. Cristiana Barreto: thank you for introducing me to MAE, and for the attention you have given to my research over the course of the years. Hélio Rosa de Miranda, at the MAE library, can only be described as the world's best librarian… muito obrigada Hélio por toda sua ajuda e presteza, assim como agradeço a todos da biblioteca do MAE. Meliam Gaspar and Alexandre Robazzini generously shared texts and information. Verônica Wesolowski de Aguiar e Santos kindly received me at MAE and showed me a funerary urn from the Cidade da Pedra that has suspiciously-looking Munduruku designs. I thank the students who organised the Semana de Arqueologia of 2015, who are greatly helping in setting a progressive agenda for Brazilian archaeology.

Colleagues and friends from the Projeto Amazônia Central, coordinated by Eduardo Neves, made me want to study and work with archaeology. They include: Kazuo, Márjorie, Helena, Fernando Caminhão, Delegado, Seu Nêgo, Seu Bené, Claudio, Filippo, Marcinho, Marquito, Carol, Ceará, Bernardo, Jaq Beletti, Val, Anne, Claide, Silvia. Carla Gibertoni introduced me to Public Archaeology and, along with Tereza Parente, showed me ways of taking archaeology beyond the walls of academia. It has since been my good fortune to be involved with Arqueotrop, set up by Cristiana Barreto and Eduardo Neves. What an incredible group of researchers you have assembled. I thank Eduardo Kazuo Tamanaha, Márjorie Lima, Laura Furquim (extra thanks for the help with the ^{14}C sample), Thiago Hermenegildo (in particular for looking at and treating the bone remains in the lab following our first expedition to Sawre Muybu), Filippo Stamparonni, Marta Cavallini, Michel Flores, João Saldanha, Jaq Gomes and others for many moments in which you offered assistance and for the great company too, what a privilege it is to know and count on you.

<u>UK</u>

The Institute of Archaeology provided a welcoming and stimulating environment in which to work. The dedication of the staff to the students is an example to me. I am most grateful to Stephen Shennan, for his enduring support, who made all the difference at critical junctures during my time here. Todd Whitelaw, thank you for the attention you gave this project, for sustained incentive and help at crucial turning points. Andy Bevan, thank you for being so supportive as our Postgraduate tutor. Liz Graham, I am grateful for your encouragement and example. Thank you to Todd, Liz and Andy for the comments made during my upgrade examination. Bill Sillar: you have been a wonderful teacher. I will miss the South American seminars! Andy Bevan and David Wengrow, thank you for the advice in my 3rd and 4th year progress meetings. To Sue Hamilton, thank you for your help with important issues since you became director. To the staff at the IoA – Lisa Daniel, Thom Rynsaard, Sandra Bond, Fiona McLean, Judy Medrington, Alex Uhde and the library staff: thank you for all your help over the past years, and for providing us with a great place in which to work. I also thank Helen Notter and the staff at UCL Student Records for the help with granting me an extension at the end, which hugely eased the pressure.

To my friends and colleagues at the IoA: Lindsay and Leah, my steadfast companions, who always give me strength and happiness. It has been a great privilege to undertake my PhD alongside you. Natália and Felipe, my compañeros queridos; Constance (+1!), Juhee, Carol, Max, Alia, Agnese, Anna, Jilke: thank you for making Room 116 so welcoming. I will miss you all. Oli, Mariana, Johnny, Beatriz: thank you for the good conversation and ideas along the way.

Fiona Watson, *patron* of the archaeology of the Upper Tapajós: bom dia, boa tarde, boa noite! Thank you for taking me in over the last stretch, for your enthusiastic support, for helping me to cut through to what is relevant, for the great inspiration, laughter and many stimulating conversations. *Força na luta!* I am ever grateful to Sue Branford and Ralph Smith for welcoming me at Clun, for taking care of me there and for the massive support given. This made a crucial difference to my progress at a critical stage. Thank you Sue for the sustained interest, encouragement and proofreading, and thank you Ralph for the most useful referencing tips! Hanna Limulja: what a friend. Thank you for helping me to keep balanced, for all your encouragement and inspiration, and for insisting I stay healthy! I thank my friend Nayana Fernandez for her active help and support at many important moments. I also thank Simone Ruotolo for the company in the final weeks. To my neighbours at Coopersale Road: Rose, Jeremy and Louis, Maureen, John and Steve (*in memoriam*), Penny, Dennis (*in memoriam*) and sons… thank for your kindness over many moments.

Pará

To my colleagues of the Anthropology and Archaeology Program at the Federal University of West Pará, thank you for doing what was in your powers to allow me the chance to finish this thesis. Thank you for allowing me to skip many meetings and for shouldering administrative duties on my behalf. Specifically, I would like to thank Raoni Valle, who introduced me to the Munduruku when we travelled to Jacareacanga and the General Assembly in Sai Cinza, who sent me photographs of the pottery of Sawre Muybu before I travelled there. Thank you for the encouragement and general support throughout, for sharing ideas and thoughts on inexorability. Claide Moraes, thank you for the help at many moments of this project, for the exchange of ideas about pottery and for suggesting I excavate Sawre Muybu. Thank you for the great stippled drawing and for the positive thoughts! Anne Rapp Py-Daniel, thank you for accompanying me to Sawre Muybu to excavate the burial urn in January 2015. Thank you for helping me set up my ceramic analysis form and for the help in navigating our institutional bureaucracy. Myrtle Shock: it has been my luck to work at the Curt Nimuendaju lab with you as its coordinator, not only helping me to treat samples but also for never failing to throw a solution at a problem that appeared insurmountable, and with a smile at that. Gabriela Prestes Carneiro, thank you for the hospitality in Santarém and in Paris. Thank you for coming with me to Sawre Muybu in October of 2014 and helping with the burial urn. Lucybeth Arruda: it was my great fortune to arrive at UFOPA having you as our program's coordinator, or should I say fairy godmother? Thank you the continued advice and serenity, for offering, along with Diego Amoedo, a refuge where I could work on this thesis, and a home away from home. Diego thank you too for the generous support. Thank you both for everything, for being so understanding and generous. Cínthia Moreira: *minha companheira*, *obrigadinha*, as they say in Portugal, for looking out for me and doing all you could to help me in this challenging moment. Now it's your turn to finish your PhD! Camila Jácome: thank you for the constant support, friendship and stimulating ideas since we first met, for sharing important readings. *Longa vida à arqueologia do Tapajós-Trombetas*! I look forward to reading your thesis! Cínthia and Camila: just think, one day we'll look back on all of this and laugh… though that's hard to imagine right now! Raiana Ferrugem: I will always remember the support and friendship you gave myself, Camila and Cínthia in this challenging moment of our lives. *Muitíssimo obrigada*.

To the students at the Universidade Federal do Pará, João, Erikson, Tathiane, Clara, Marcelo, Victor, Heslley, Max, Simone and Fabiano, and other undergraduate volunteers, *muito obrigada pela ajuda* in washing, sorting and organising the material. Hugo, *valeu mesmo* for all the help in the lab, I don't know what I would have done without you! Fran, *muito obrigada* for your dedication and analysis of fauna. Jair, Eliano, and Karô, xipat? It's great to have you at the university involved with archaeology. I hope this is just the beginning.

I thank Denise Schaan who gave us indispensable institutional support at the beginning of the project. Thank you Denise for making available the material from the BR-163 and 230 for me to study. Alas, I did not manage to include it here, simply for lack of time.

I thank our Mocorongo friends for the many occasions in which practical support, help, friendship and inspiration was given: Ítala Nepomuceno, Cândido Cunha, Edna Machado, Moacir Lima, Maite Guedes, Seu Osmar, Dona Marília, Sérgio Guedes Martins and Felipe Garcia.

I am grateful to the public prosecutors Janaína Andrade de Sousa and Luís de Camões Lima Boaventura, as well as to Rodrigo Oliveira, for their help at different points.

<u>Itaituba</u>

Em Itaituba, agradeço à Conce, Odon, Tairine e Augusto Rodrigues, Edivânia, Dunga, Joãozinho, Seu Simar e família: somos privilegiados em conhecê-los e nos dá grande felicidade morar mais próximo de vocês agora, em Santarém. Em Montanha e Mangabal, especialmente agradecemos à Dona Diloca, Pedro Braga, Josué Lobato Cirino, Jucilene Campos dos Anjos (Dona Juci) e família, Chico Caititu, Ageu Lobo Pereira, Vanessa e família, Dona Lausminda, Teófilo Braga Cirino (Seu Filó), Dona Creusa, Pedro "Radial" Boro e família, Valter Palhares, Dona Maria, Manoel Martins, Maria Raimunda Palhares (Dona Santa – *in memoriam*) e Clementino de Jesus (Seu Quelé), Nildete Cardoso e Raimundo Colares, Seu Natural, e a todos os Beiradeiros que generosamente nos ajudaram e cuidaram de nós, nos mostraram os sítios arqueológicos em seu território e nos deram permissão para trabalhar neles. Pedro worked with us on both excavations, taking us to and from the site in his boat, and told me the name of the palm species in the TPM site.

Martinelles Galvão and Regina Oliveira of the Aracy Paraguaçú museum in Itaituba, I am beholden for your kind attention and help.

I thank the Munduruku people for giving us hope in resisting the inexorability of political decisions. Aos Munduruku de Dace Kapap Eïpi. Em Sawre Muybu, *muito obrigada* pelo generoso apoio que nos deram, por cuidarem de nós e por autorizar que escavássemos a aldeia! E agradeço pelos conhecimentos e informações compartilhadas. Agradeço especialmente o Cacique Juarez Saw Munduruku, Dona Juquita Akay Munduruku, Marcia Karu Kirixi Munduruku, Marunha Kirixi Munduruku, Diego Saw Munduruku, Prof. Deusiano Saw Munduruku, Profa. Aldira Akai Munduruku, Pajé

Fabiano Karo Munduruku, José Akay Munduruku, Daniel Saw Munduruku, Beca, Antônio, Jairo Karo Munduruku, Dona Maria Parawa Munduruku, Geraldo Kirixi Munduruku, Felícia Kirixi Munduruku, Acelino Dace Munduruku. Agradeço também aos Munduruku de Dace Watpu – Cacique Valto Datie Munduruku, Maria Madalena Karu, Edovaldo Datie Munduruku, Dagvaldo Datie Munduruku e o restante da aldeia. Agradeço também ao Cacique Francisco Karo Munduruku e à aldeia Karo Muybu. Também agradeço aos Munduruku de Sawre Apompu – Cacique Adriano Saw Munduruku, Claudette Sal Munduruku e o restante da aldeia; aos Munduruku de Sawre Juybu: Cacique Soberalino Saw Munduruku e todos os outros da aldeia. Aos Munduruku da Praia do Índio – especialmente ao Cacique Brasilino Moraes Lima, ao Everaldo Manhuari Munduruku, à Alessandra Korap Silva – e aos Munduruku da Praia do Mangue, em especial ao Cacique Thiago Sirma de Moraes que tanto nos ensinou sobre história e resistência Munduruku. Agradeço imensamente ao Prof. Jairo Saw, que sugeriu a parte Munduruku do nome desta tese e ao longo do caminho explicou perspectivas Munduruku sobre o passado para mim, em breve irei visitar Sawre Aboy! Muito obrigada ao Rozeninho Saw Munduruku, coordenador da Pariri. Também agradeço imensamente Maria Leusa Kabá Munduruku, coordenadora da Ipereğ Ayũ, guerreira que é grande exemplo de força. Agradeço ainda ao Cecílio Kirixi Munduruku pela informação sobre os desenhos nas cerâmicas de Mangabal.

In Itaituba we were supported and made happier by Juan Doblas, Maitê Guedes, Barbara Campello and Leide Brusnello… obrigada.

From FUNAI, I thank Juliana Araújo, who took my proposal to the Munduruku at Sawre Muybu, Isabel Saraiva, for the constant encouragement, Wyncla Paz, Nikolas Mendes, Laíres Carvalho, Geraldo Dias, Aléssio Dantas and José Arthur Macedo Leal, who took on us on our first odyssey to Sawre Muybu, a journey that took 24 hours from Itaituba because of the historic floods of 2014 and which involved following two youngsters on a motorbike along the unlit routes leading out of Trairão at 10pm… Artur also helped with sending us supplies once we were at the village.

To Rosamaria Loures, *muitíssimo obrigada* for all the help. Sua perseverança, trabalho com e dedicação aos Munduruku são admiráveis e estão fazendo a diferença. Fernanda

Moreira, *muito obrigada* por toda a ajuda prática que me deu! Seu compromisso com os Munduruku e Beiradeiros é de grande valor.

<u>Fieldwork</u>

Guilherme Mongeló: you saved our first expedition to Sawre Muybu. Simple as. In spite of the hardship, you kept up our morale. At Mangabal you again provided indispensable help. Sorry about the ticks! On both occasions you displayed great sensitivity and empathy with the forest peoples of the Tapajós. Márcio Amaral: *Comandante*, you made all the difference during our first field season at Sawre Muybu. I will always remember the smile on your face and raised fist as you left… *muito obrigada*. And for the good ideas, texts and general goodwill. Rogério Andrade dos Santos, thank you for all the hard work and sacrifice at Sawre Muybu. You were very courageous in the face of uncertainty. Gizelle Morais, thank you for your efforts at Sawre Muybu, for helping in so many ways, including with your father’s truck to pick us up from the port in Santarém! Fabiano Santos, thank you for the great help at Sawre Muybu, and for keeping the team smiling!

In Belém, I would like to thank Morgan and Millie Schmidt for hosting us on our stop-overs in and out of the field. I thank Maura Imazio for the support given to the proposal of studying materials at the MPEG. Unfortunately, this did not come to fruition, but hopefully it still will. Also in Belém, Carol Caromano, Marquinho Mota and Morgan Schmidt saved us by handing in projects and reports at IPHAN. *Valeu demais*.

I would like to particularly thank Helena Lima, at the Museu Goeldi, who has taught me much about archaeology, for providing me with one of the necessary references for CAPES and for her continued dedication to promoting the development of Amazonian archaeology and archaeologists. And thank you for, along with Flora, Maia and José putting us up at your flat. I thank Arlene Rosen, now at the University of Texas, for providing me with another of the much needed references for CAPES, and for motivating me to do this PhD.

Vitória

At IPHAN in Vitória we were kindly received by Yuri Batalha, Bruno Barreto and Rafael Deminicis. Henrique Valadares Costa patiently explained about the organisation of the collection, and Celso Perota himself came to see us, providing us with context, and later making available documentation and dates related to his pioneering field expeditions on the Tapajós. We thank *Zé Moqueca*, Daiane Pereira, Paulo Vinícius Bonfim *et al.* for the hospitality. In Vitória we were taken in by the family of Ana Caracoche, who made us think a lot about history. Maria Paz, Manolo and Marcela, Maria Eugênia: *gracias,* obrigada!

Family and friends

I thank my friend Daniela Moreau, who gracefully accepted my departure from African studies into Amazonian archaeology and continued to support me through this change. I also thank Benedita Machado (*in memoriam*), Elizabeth Wincott (*in memoriam*), Daniela Katzenstein (*in memoriam*), Nádia Somekh, Stella Senra and Laymert Garcia for their various parts they played in my trajectory. I also thank Mari Delellis, Rita Guimarães, Fernão Ciampa and Lucia Guisalberti for the moral support.

Agradeço minha família gaúcha por entender minha demorada ausência. Agradeço minha família mineira – Hulda, Lúcio, Hugo, Lúcio, Romeu, Tereza, Olmes e Horacir pelo afeto que ajudou a me manter e pelo apoio contínuo, e por compreender minhas ausências ao longo do processo de produção desta tese. Um beijo e um queijo procês. I thank my English family – Nick, Estelle, Becky, Bea, Owen, Matt, Emma, Raya, Ellis and Lélia! And Sue and Ralph again. Our time here in England has been so much happier, and more interesting, because of you. Tenho saudades!

Finally, I thank my parents Jan and Plauto for their constant and unwavering support through good times and bad, throughout this project. You provided me with motivation, respite, critical perspectives and always made sure I am in touch with the world. Thank you for the many lessons and for everything you have done. Jan, thank you also for proof-reading the majority of the text. Ali: thank you for looking after me in London and for your incentive. Camilo, Ju and Celeste, thank you for being so understanding of my absence and for the constant encouragement. Lourdes: thank you for taking care of me.

To Vinicius – husband, friend and partner, who has inputted into this thesis in every imaginable way – in terms of the moral support given, collaboration in fieldwork, reading through and commenting on the manuscript; for producing most of the profile drawings and some of the other illustrations, maps and most photographs displayed; above all, I thank you for the many sacrifices… as the other half of PROALTA, this project owes its inception, continuation and closure to you. It also belongs to you.

This work is dedicated to the Munduruku and Beiradeiros of the Tapajós River,

to Jan and Plauto,

José,

and Vinicius.

Não somos nada sem a terra

(We are nothing without the land)

Rozeninho Saw Munduruku 28/06/2016

Sem tekohá não há tekó

(Without land there is no 'good way to live')

Francisco Noelli, 1993

The world is going to change in any case, I would argue, and our knowledge will contribute to the change whether we want it to or not. What we have a responsibility to do is see that our knowledge is used for humane changes, as we define humaneness (Berreman 1968, p. 394).

Chapter 1. Introduction

The aim of this thesis is to offer an initial construction of the long term past of the Upper Tapajós River, considering processes of long-term continuities as well as ruptures by drawing on archaeology, historical linguistics, ethnohistory, and social anthropology. Of these four areas of inquiry, the least known is the region's archaeology, which constitutes the main focus of this study. The bulk of the archaeological data was generated through the analysis of late Holocene ceramic complexes from two archaeological sites called Sawre Muybu (SM) and Terra Preta do Mangabal (TPM). These remains are found stratified in expanses of anthropogenic soils known as Amazonian Dark Earths (ADEs). The study of these artefacts permitted not only comparisons on a wider scale but also allowed me to address questions related to ancient exchange networks and potential links to the distribution of Carib and Tupian language families. I further explore issues related to female agency, identity and alterity and how their interpretation informs our reading of post-Conquest ethnogenesis in the region. In this context, a historical ecological perspective (Balée 1989a; 1998) provides a key vantage point from which to observe the ways in which the current inhabitants of the studied landscape engage with environments transformed by past human actions.

The SM and TPM sites are respectively situated within the *traditionally occupied territories* of Daje Kapap Eïpi and Montanha e Mangabal, which in turn are occupied by Munduruku Indians and Beiradeiros of Montanha e Mangabal.[1] The sites' enriched soils and associated vegetation constitute important resources for these communities today. The Munduruku are Amerindians who speak Munduruku, a language belonging to the homonymous language family, in turn classified as part of the Tupian language stock. The Beiradeiros are "forest peasants" who have lived along the banks of the upper Tapajós for eight generations (Torres 2008).[2] They are partly descended from migrants who came from the arid Brazilian northeast to tap rubber from the second half of the

[1] The concept of "traditionally occupied territories" relates to the construction of specific identities alongside the construction of specific territories (Almeida 2004, p. 29).

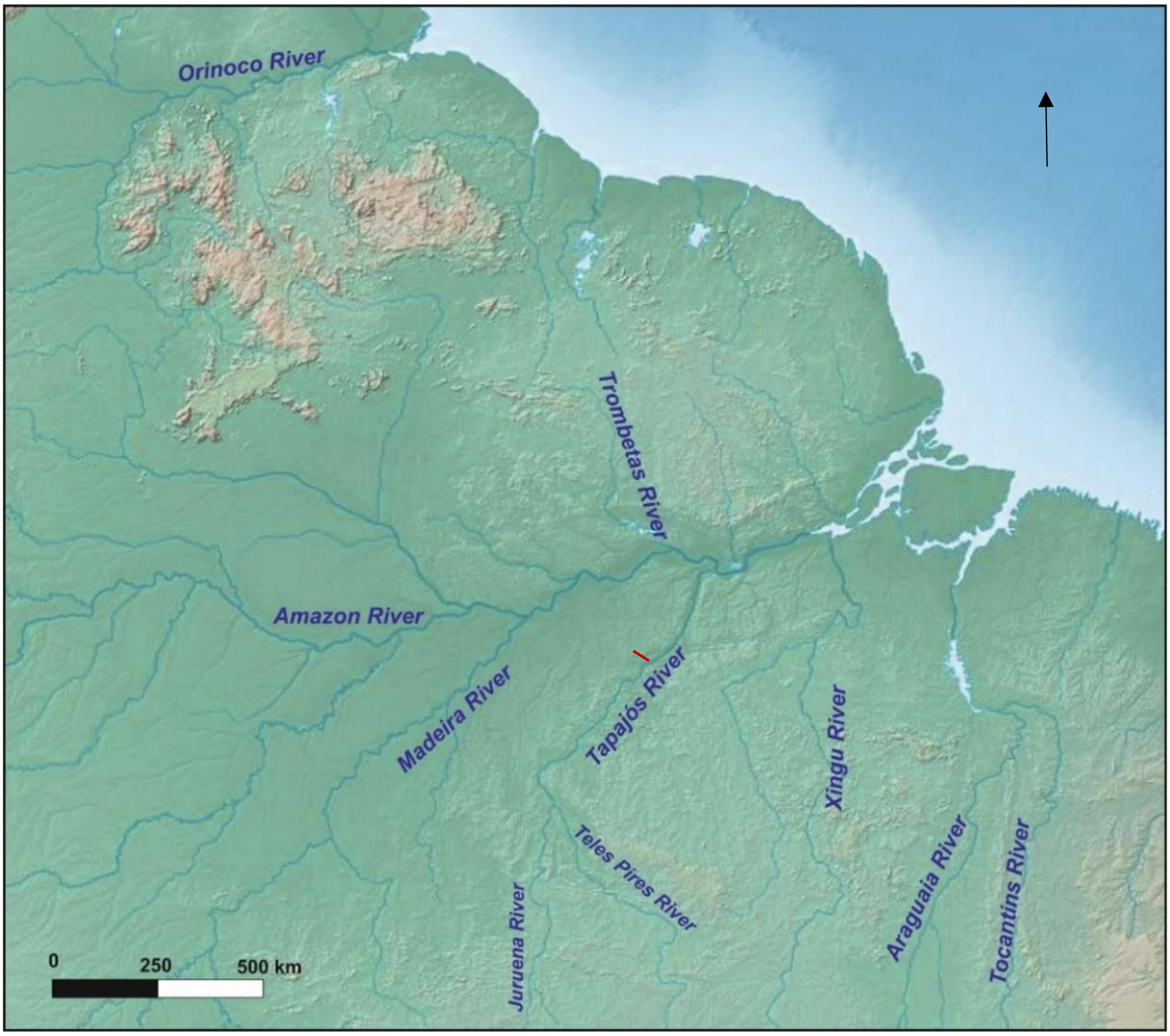
[2] Making use of the term coined by M. Almeida, Maurício Torres (pers. comm., 11 December 2016) defines forest peasantry as a born out of the sudden crash of the rubber industry in the Amazon around 1913, leading the rubber barons to abandon the lands they had taken possession of, while leaving the rubber tappers on these lands. They would continue living as peasants using technologies inherited from Amerindians, which guarantee efficient use of the forest and rivers. The forest peasantry was thus engendered by the uneven and combined development of capital.

nineteenth century and partly descended from Amerindians – particularly indigenous women – who married or were made to marry the *seringueiros* (rubber tappers).

Physically, SM and TPM lie on the middle Tapajós, but we will keep to the definition employed by the Beiradeiros of Montanha e Mangabal, which refers to the 'Upper Tapajós,' or simply, "o *alto,*" as the stretch of river encompassing 99 rapids that extend south from the vicinity of São Luiz do Tapajós, where the last of the rapids are located, to the Barra de São Manuel, on the border with the state of Mato Grosso, where the Tapajós is formed. This geological aspect has fundamentally shaped the region's history and as such deserves to be emphasised. Since the nineteenth century the literature on the region (e.g. Castrovalvas 2000 [1871-1873]; Coudreau 1977 [1897]) has acknowledged this physical frontier, and divided the river accordingly into its lower and upper segments:

> …as soon as [the Island of] Goiana is passed, immediately above the Island of Lauritânia, the first currents of the Maranhãzinho rapid are reached. From then on there is nothing but rapids [and] cascades… up until its limits, and even up until the heart of Mato Grosso. Below the two islands, the river is free, accessible to steamers; upstream, the river is obstructed, it leaps from fall to fall, runs from rapid to rapid. Downstream is the Amazon Valley; upstream lies the Brazilian Central Plateau
> (Coudreau 1977 [1897], p. 24).

In the Munduruku language, *Ipi ocemumuge* means "the world that we, the Munduruku, created," in the sense that "the Munduruku helped to build and finish what was needed for the world to become complete" (Jairo Saw Munduruku, pers. comm., 20 August 2016). The expression synthesises the grounding of this work within a historical ecological framework, which places greatest emphasis upon the weight of *historical* events as "responsible for the principal changes in relationships between human societies and their immediate environments" (Balée 1998, p. 13). Beyond the Upper Tapajós, this history has been largely ignored, however.



Map 1 Amazonian rivers referred to in the text. Red line shows approximate location that marks the division between the Tapajós' lower course (going in NE direction) from its upper course (extending SW). Map by Vinicius Honorato, based on Natural Earth online website: http://www.naturalearthdata.com. Arrow points north.

1.1 The 'silent paradigm'[3]

> …what is fundamental… is the premise that, in the lowlands of South America, archaeology is the privileged source for the study of the history of indigenous peoples (Neves 2013, p. 4).

The culture historical paradigm has been strongly criticised for its normative and essentialised understanding and portrayal of culture. Rosemary Joyce (2015), for instance, favours Adam Kuper's (1999) critique: the unintended legacy that we would inherit from Boasian anthropology (since it influenced Americanist culture historians

[3] This expression was coined by Neves (2010, p. 55).

such as Alfred Kroeber) would be a "commitment to the idea that the people we study anywhere in the world were organized in structures like those [that] nineteenth century European nation-states were trying to concretize," with single languages and closed frontiers (2015, pp. 4, 15). Such critiques serve as useful reminders lest we oversimplify our interpretation of the archaeological record. As DeBoer (2011, p. 88) writes, "…the extent to which language and other aspects of culture march around holding hands or, alternatively, go their separate ways is a variable rather than a principle."

A more nuanced understanding of the archaeological record has been offered, nonetheless, by many archaeologists of the culture historical persuasion working in Amazonia. In assessing a generalisation put forward by processual archaeologists – that little stylistic variation was to be expected of pottery produced by the members of matrilocal extended families, since it would be taught and produced by closely related potters (Deetz 1965; Longacre 1964) – Lathrap (1983) would discuss ethnoarchaeological data drawn from his observations of the matrilocal Shipibo-Conibo potters to demonstrate how a number of factors relating to individuals and their personal circumstances or life trajectories, their idiosyncrasies, or to individual artistic geniuses, can impinge upon stylistic variability and creativity.

Problems involved in associating patterns observed in the static archaeological record to dynamic social systems or processes are recognised (Neves 2011, p. 31; Tarble de Scaramelli & Scaramelli 2011). Because the pursuit of correlations between the archaeological record and ethnolinguistic identities "can and needs to be done if one is willing to integrate archaeology and cultural anthropology in understanding the long-term history of occupation of lowland South America" (Neves 2011, p. 35), however, lowland archaeologists have made working proposals with a view to tackling these issues. Noting that multi-ethnic and multi-linguistic social formations would have existed in the pre-Columbian Amazon as they do today, Neves suggests looking for contexts in which correlations between variability in the archaeological record and language variability are likely to be stronger (Ibid., pp. 32, 37).

There are also 'practical' conceptual issues that can be addressed by culture historical approaches, as Preucel and Hodder would point out: "the development, diffusion and movement of cultural traits establishes a space-time systematic which forms an essential building block for research in a new region" (1996, p. 6-7). Regions unknown or hardly known to archaeology abound in large, developing countries like Brazil, where, consequently, the culture historical paradigm is in fact very much alive (Neves 2010, p. 55). Notwithstanding bouts of "classificatory intoxication", it is undeniable that tools provided by Culture History – such as the concepts of Tradition, Phase and Horizon as defined by Willey and Phillips (1958) – still provide basic organising principles (Neves 2010, p. 57).

In *An Archaeological Approach to the study of Cultural Stability*, Haury *et al.* (1956) define a tradition as "a socially transmitted form unit (or a series of systematically related form units) which persist in time;" integral to the concept are the quality of persistence and the role of social transmission; the latter can occur along "single, multiple or cross cultural lines" (1956, p. 38). The authors acknowledge the impossibility of knowing the entire history of a tradition; moreover, a tradition may change form. They therefore advocate dealing with *segments of traditions*; a segment is a "chronologically restricted portion of a tradition; its duration depends upon the available archaeological information or the focus of the particular problem". They present a classification of traditions based on the form of tradition segments rather than on the form of whole traditions (see fig. 1). In order to describe these forms, attention must be given to change as well as to persistence (1956, p. 42). For the most part, change seems to be directionally patterned and differences in this patterning can serve as the basis for a classification of tradition segments. The ideal tradition segments suggested by the authors are: Direct (essentially unchanging continuity); Converging (a segment in which two or more traditions come together); Diverging (where one tradition splits into two or more distinguishable traditions); Elaborating (a segment displaying increasing complexity); and Reducing (a segment displaying increasing simplification). The descriptive terms may be combined in the name of a single segment, for instance, the reducing branch of a diverging tradition. The terminal phases of a tradition can be termed disruption and they usually lead to its collapse, although the possibility of re-emergence and reconstitution also exist. Stagnation refers to unchanging traditions. The authors recommend that hypotheses can be formulated about the relationship of various tradition forms to cultural and environmental factors (Haury *et al.* 1956, p. 43-44).

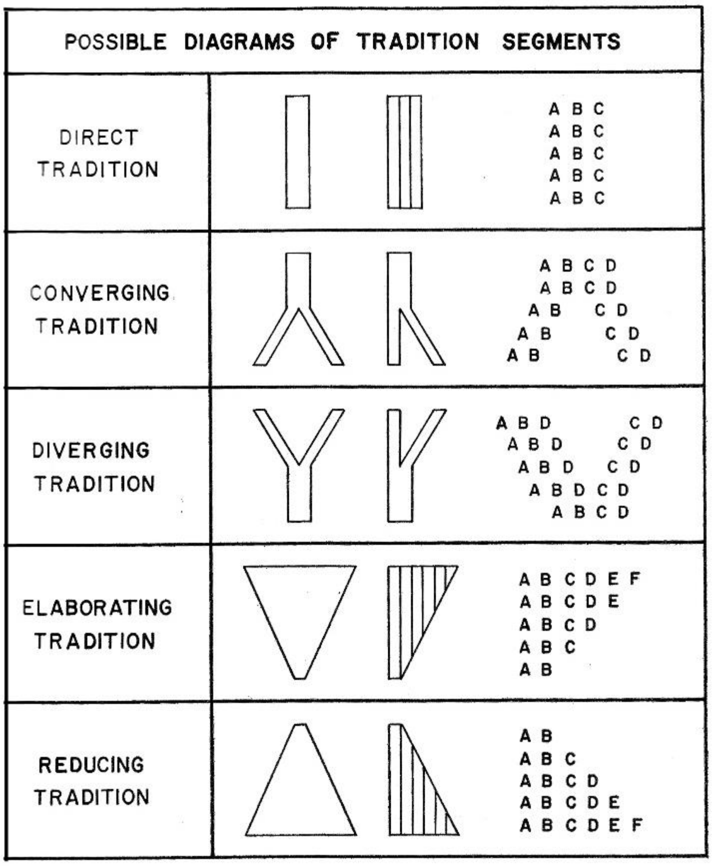


Fig. 1 Possible Diagrams of Tradition Segments. Reproduced by permission of the Society for American Archaeology from Haury et al. 1956, p. 43.

These conceptualisations can be viewed through the concept of cultural transmission – defined as "…the emergence, acquisition, storage, and communication of ideas and practices (Cohen 2010, p. S194 cited in Ellen & Fischer 2013, p. 2) – and by approaches that conceive learning as socially situated and practice-based, contesting the idea that it is cross-culturally invariant (Sassaman & Rudolphi 2001, p. 407). Ellen and Fischer (2013, p. 2) argue that rather than just 'information,' what is being transmitted are "expressions or relations." Wenger-Trayner (interviewed by Omidvar & Kislov 2014, p. 269) sees "…learning as happening at the boundary between the person and social structure – not just in the social structure or not just in the individual, but in that relationship between the two". Consequently, learning is related to identity formation – "becoming a different person, rather than primarily the acquisition of knowledge products" (Fuller 2007; Murillo 2011 cited in Omidvar & Kislov 2014, p. 267). Single individuals are always the vectors of acquisition and transmission. These micro-processes involve the detailed way in which cultural information is acquired at an individual level and include copying, learning and innovation (Ellen & Fischer 2013, p. 4). Such approaches also challenge cognitivist assumptions that posit that learning is "an individual process of acquisition taking place inside the learner's mind" (Omidvar & Kislov 2014, p. 266).

Ellen and Fischer (2013) explain that the process of acquiring cultural competence, knowledge and skills is interactive and complex. They acknowledge the drawback of the term 'transmission,' which can confer the idea of a passive 'flow' between generations and through time, but still defend its usefulness. Citing McCauley and Lawson (2002), Ellen and Fischer emphasise that cultural transmission "resembles rather the development of linguistic competence, in which representations and actions are generated, retained and communicated." Transmission is an incremental process, comprising gradual coordination, and involves encouragement and reinforcement. It is not simply copying abstract models or representations though it is at least in part an "imitation of actions" (Bourdieu 1990 cited in Ellen & Fischer 2013, p. 3-5). Ellen and Fischer highlight that within a life-span, phases of greater or lesser intensity of transmission exist:

> … one does not need 'filters' to account for why early representation is resistant to change later in life. Those fundamental relationships are so heavily leveraged to such a wide range of subsequent relationships that to change these would undermine much of the knowledge and understanding one apparently possesses
> (Ellen & Fischer 2013, p. 11-12).

They also argue that "Although new patterns of behaviour are acquired and information lost and replaced once a particular threshold has been reached, the acquired behavioural and information repertoire has a constraining effect on change, and becomes part of the context" (Ellen & Fisher 2013, p. 13).

These ideas on cultural transmission help to renovate the culture historical endeavour, as they are brought to bear on the study of cultural stability and change. They encourage an attempt at a more nuanced reading of local assemblages, by focussing on the role of individual potters. Sassaman and Rudolphi (2001) argue that cross-cultural comparisons show that "when pottery production is household based, nonspecialized, and part-time, women exclusively are the potters" (Ibid., p. 420). In my attempt to pursue the study of persistence and change through the examination of archaeological ceramics, I similarly assume that women produced most, if not all of the ceramics analysed from the Upper Tapajós.

1.2 The Upper Tapajós on the margins of Amazonian archaeology

Considering the similarity or differences between the ceramic industries of the Lower and Upper Tapajós and contemplating what this could mean in terms of cultural transmission was therefore a starting point. For in contrast with the lower course of the Tapajós, which includes the town of Santarém (comprising the Aldeia and Porto sites), much of the vast stretch of approximately 300km of river known to the Beiradeiros as "o alto Tapajós" figures only incidentally in archaeological accounts of Amazonia. It has occupied the role of a generic upland, or *terra firme* area.

Donald Lathrap (1970, p. 129) proposed that intense competition existed for the Amazon floodplain, thus "Groups pushed even temporarily onto the uplands of old alluvium could be expected to lose the more complex aspects of their social and religious life, and there would be far less time for non-functional embellishments of ceramics". They were summarily condemned by Lathrap and his then student, José Brochado:

> …populations in the *terra firme* are failed populations. They can add as a harassment to the populations in the *várzea* (the floodplains). They can act as a mechanism through which the *várzea* populations exploit the resources of the *terra firme*… However, the populations of the *terra firme*, with a few exceptions, remained static in both a demographic and an evolutionary sense
> (Brochado & Lathrap 1982, p. 4).

Michael Heckenberger (1996; 1999; 2005) had long put these notions to rest by showing the monumental scale and complexity of pre-Columbian occupations in the Upper Xingu. But still the Upper Tapajós remained metaphorically enveloped in fog, in spite of its potential to provide evidence on the Tupian expansion (Brochado 1984; Noelli 1996; 1998; Rodrigues 2012; Urban 1996) and on the peopling of the Americas

(Simões 1976). Investigators with archaeological sensibilities had unsuccessfully tried to reach it in the late nineteenth and early twentieth centuries, but only got as far as its last rapids. Barbosa Rodrigues (1875) had fallen ill and had had to turn back once he reached the Montanha Island. In 1923 Curt Nimuendaju had to give up on going upstream from Pimental, on the eastern bank of the Tapajós, because of the ramshackle state of the boat he was meant to cross the rapids in (2001, translated by T. Hartmann, p. 190). The region's archaeological potential only began to be glimpsed from the second half of the twentieth century, when Friar Protásio Frikel excavated funerary urns from the Cururu mission on one of the tributaries of the Upper Tapajós (Hilbert 1957), and Mário Simões (1976) reported two bifacial lithic projectile points. Celso Perota excavated sites near the lower rapids of the Tapajós, in 1979, and in the vicinity of Jacareacanga in 1982 (1979; 1982; Simões 1983). More recently, Oliveira *et al.* (2010) surveyed the Amazon National Park (PARNA) and described 29 sites. Denise Schaan's team undertook licensing work for the paving of the BR-163 and BR-230 highways to the east of the Tapajós (e.g. Martins 2010; 2012; 2008; Schaan & Martins 2009; Schaan & Santos 2009). But we still knew next to nothing about the upper Tapajós: the rapids and the resultant difficulty of access also shaped the development of scientific knowledge of the region.

1.3 Articulating fragments from the past and the present

"There's endless *terra preta*, and you'll be tripping over the potsherds and *machadinhas*".[4] I had been promising to accompany Maurício Torres to Montanha e Mangabal since 2007, but Vinicius Honorato and I only saved up sufficient resources for the trip in March 2010.[5] The Beiradeiros had recently won an historic judicial victory that recognised their collective land rights over those of landgrabbers, who had forged documents and denied the long presence of the Beiradeiros in the area, accusing them of being invaders.[6] The collective memory of the Beiradeiros had however served as a

[4] *Machadinhas* can be translated as polished or ground stone axes.
[5] The localities of Montanha e Mangabal will from now be referred to as 'Mangabal'.
[6] The landgrabbers had forged documents giving them title to 1.138,000 ha. of land within the municipalities of Itaituba and Jacareacanga in the name of a company called Indussolo, from southern Brazil. The judicial ruling that overturned this false claim prohibited any attempt to claim the territory of Montanha e Mangabal by any party other than the 101 families who lived there. The decision was the first of its kind to rule in favour of forest communities who were neither indigenous nor *quilombolas* (Afro-Brazilian descendants of fugitives from slavery).

form of "vernacular resistance" to an official history engendered in public notary offices, which ignored their presence by relying on the implicit assumption of the irrelevance and unreliability of non-written sources (Torres 2014, p. 235-236).

> To disregard oral testimony in the face of written documents corresponds to a valorisation of the literate (as the dominant society presents itself) to the detriment of the oral narrator… Literally, what is understood as truth is only that which is said in the language of one of the parties – writing
> (Torres 2014, p. 236).[7]

The Beiradeiros had not had much time to celebrate. A hard fought campaign had followed to create an Extractive Reserve (RESEX) – which would have helped to assure their way of life and guarantee their collective ownership of the territory. It suffered a monumental setback when the then Chief Minister to the President,[8] Dilma Rousseff, recommended that the RESEX should not go ahead because it would interfere with plans to build hydroelectric dams.[9] Rather than ask whether the dams would not interfere with the Beiradeiros, President Lula accepted her verdict. The federal government was beginning to make known its plans, announcing:

> …a new concept in the construction and operation of hydroelectric dams… the platform dams …are inspired by offshore sea oil platforms – in other words, [designed] for areas *where man is not present*, and the idea is to cause minimum environmental impact (Programa de Aceleração do Crescimento, 2012, my emphasis).[10]

In conducting an archaeological survey in the area, we sought to employ archaeological evidence to counteract the official discourse, which wanted at this point to deny the very existence of the forest peoples of the Tapajós. Recording and registering archaeological sites with the Heritage Agency (IPHAN) could effectively constitute a first step in proving that people have been present in the region for centuries. On arrival, we met Beiradeiros at different points along our route. We explained the

---

[7] Unless stated otherwise, I am responsible for the translation of sources in Portuguese.
[8] *Ministra-Chefe da Casa Civil*.
[9] Technical note published by the Department for Energy Planning on the 5th December 2007, annexed to the Recommendation n° 260 – Casa Civil, 16 April 2008. See Appendix 1.
[10] See https://www.youtube.com/watch?v=4nPxakomGjM. Accessed on 07/11/2016

purpose of our survey in relation to the dam project, which was being officially justified by a narrative reliant on the idea of the area being a pristine forest, devoid of people, history and culture. It was important for us to present a proposal that was relevant to the Beiradeiros: had we solely expressed an academic interest in ancient Amerindian remains, we would – understandably – be regarded with scepticism and reservations, especially as official recognition of their territory still seemed uncertain. Although the Beiradeiros are partly descended from Amerindians, they by and large reject this identity. Their profound knowledge of the environment and landscape in which they live, from which they source their sustenance, technology, medicines and collective, orally-transmitted memory, has these indigenous women at its root, however (Torres 2008). Thanks to their knowledge and guidance, in three days we registered 24 archaeological sites: the Projeto Alto Tapajós was underway.

We returned to Mangabal in 2011 and sampled the TPM site, as well as the Pajaú and Cocalino sites further downstream in the localities of Pimental and Cocalino, respectively (Honorato de Oliveira 2015; Rocha 2012). Although the samples collected were very fragmented, we could see that the pottery from Pajaú and Cocalino sites shared attributes often associated with the Incised and Punctate tradition (IPT).[11] In contrast, the ceramics at Mangabal displayed thinner vessel walls and distinct decorative attributes. A design that stood out was one composed of incised, oblique-oriented, criss-cross lines that followed the upper vessel body around, forming lozenge shapes. In my Master's dissertation, I proposed that this pottery was related to the historic Munduruku people, since portraits and written sources refer to the Munduruku tattoos in very similar terms (e.g. Agassiz 1869; Bates 1864; Florence 2007 [1876]; Hartt 1885; Rodrigues 1875). As well as producing vivid watercolours of the tattooed Munduruku in 1828, French watercolourist Hércule Florence observed:

> …notable changes in the ceramic ornaments used by the Indians. Those of the apiacás are constantly made with straight angles; those of the mundurucús, with lozenges, while in other places [pottery] is irregular in its design, though it always [displays] greater or lesser taste… [The designs] appear on the pots, vessels and pipe tubes (Florence 2007 [1876], p. 272).

[11] In particular, the use of quartz sand and of *cauixí* (sponge spicule) temper, rectilinear incised designs (such as the "fish spine" motif), and applied and punctated clay ridges.

The practice of transposing graphic designs to different surfaces – including the body – is documented among Tupi-Guaranian peoples (Almeida 2008, p. 174; 2013, p. 84; Müller 1990, p. 220), whose languages similarly belong to the Tupian stock. This practice can be conceptualised as a "total artefactual environment" of pervasive design (DeBoer 1991, p. 147). The pottery encountered at this point was distinctly different to that usually related to speakers of Tupi-Guarani, however (Rocha 2012, p. 1).

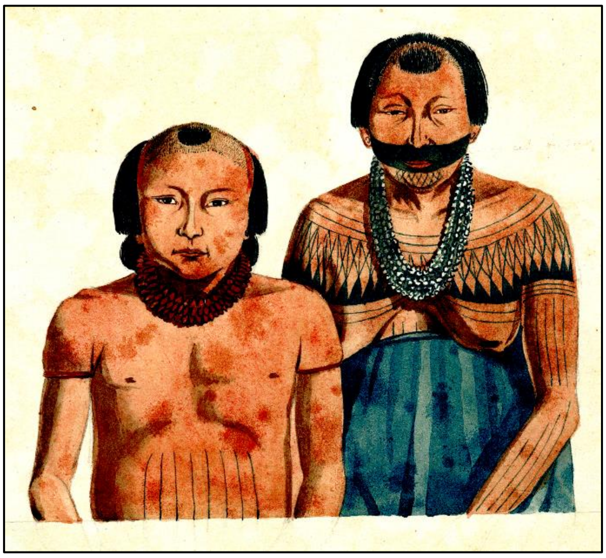


Fig. 2 "Femme et enfant Mandurucús. Aux bas-fonds appelé Tiacoron en la Riviere Tapajós, Juin 1828." Watercolour by Hércule Florence (In: CCBB 2010, p. 193) © The Archive of the Russian Academy of Sciences. Fig. 3 Pottery retrieved from N1074/E1000 test pit. Photo: V. Honorato.

Nineteenth century historical sources also registered Munduruku presence in the area, before they were pushed out by the advance of the rubber economy (e.g. Chandless 1862; Florence [1874], 2007). Barbosa Rodrigues (1875, p. 124) even mentioned an "extinct" Munduruku village in front of the Mangabal rapids. But we did not yet have C^{14} dates, and the 50-120cm depth of ADE at the site suggested greater antiquity of occupation. I proposed that the Munduruku could have reoccupied the area, already enriched by the ADE stratum and associated plant species (Rocha 2012, p. 51).

1.4 The pristine myth: the peoples of the Americas after 1492[12]

In the 1950s, Robert and Yolanda Murphy would conduct their seminal studies among the Munduruku (R. Murphy & Y. Murphy 1954; R. Murphy 1954; 1960; Y. Murphy & R.

[12] This is a play on the words of Denevan's classic article (1992a), titled "The pristine myth: the landscape of the Americas in 1492."

Murphy 1985 [1974]).[13] R. Murphy would opine that "The person in search of the exotic would be sorely disappointed at his first contact with the Mundurucú" (1960, p. 10). His PhD thesis concerned itself directly with the effect of "acculturation" on the Munduruku, who in "aboriginal times were a sedentary group devoted to horticulture, hunting, and fishing" (1954, p. 1); he evaluated that "the process of assimilation of the Mundurucú into the local Brazilian population" had led to the "breakdown" of their village life. Portraying the Munduruku as passive subjects of History, Murphy argued that engagement with the regional economy irreparably altered the nature of their society:[14]

> It is a prosaic and simple tale, unadorned with episodes of valiant resistance and glory, and surprisingly lacking in oppression and suffering. But, perhaps for this reason, it contains an element of tragedy, because *the processes of this history have worked inexorably upon* Mundurucú society and culture for a century and a half and have brought a once proud people to the brink of social extinction… fundamentally what has taken place is the attraction of a simple people by the new, glittering, and eminently useful objects proffered by Western civilization, and their ultimate reliance upon these items
> (R. Murphy 1960, 3-4, my emphasis).

Changes within indigenous societies and the incorporation of elements from Euro-American culture have often been understood to be an inexorable, unidirectional process, and are traditionally framed solely through the perspective of 'loss' (e.g. Clement 1999; Moreira Neto 1988). Anthropologist John Monteiro (2001) draws attention to the implications of these views: "with perceptions marked by the perspective of acculturation, Indians who are assimilated or integrated into the society that surround them are somehow 'less' Indian" (2001, p. 4).

This type of approach "invests in a crystallised – some would say fossilised – image of the Indians, be this as inhabitants of a long-distant past or of a faraway forest" (Monteiro, 2001, p. 4). This has "hampered the understanding of multiple processes of

[13] For more recent anthropological studies on the Munduruku, see Colevatti 2006; 2012; Loures (2016; 2017) and Ramos 2000.
[14] In their seminal *Women of the Forest*, Yolanda and Robert Murphy (1985 [1974]) would offer a fascinating assessment of gender relations within Munduruku society.

ethnic transformation that would help to explain a considerable part of the country's social history" (Ibid., p. 4). As Neil Whitehead (1993, p. 297-298) reminds us, "Cultural interchange with the Europeans and Africans has been a central feature of Amerindian life for nearly half a millennium." Not even Curt Nimuendaju, one of the fathers of lowland ethnography and archaeology, was immune to the ideal of pristine peoples. In contrast to the dedicated and extensive collection of pre-Columbian archaeological specimens to send to the Museum in Gothenburg, he "excluded – almost continuously – the modern Indian specimens from the collection" (Nimuendaju 2004 [1925], p. 151):

> Of the distinctly post-Columbian finds, I sent only such as showed characteristic Indian features. Innumerable others I put aside, of course, among them also some fragments almost 0.5 m high, statue-like human figures of burned clay with decidedly naturalistic features. They wear long, curly hair and smart moustaches and are dressed in the old-fashioned Portuguese style. They seemed indeed to have been made by Indians of the Mission
> (Nimuendaju [1924] 2004, p. 151).

The context of this statement is a discussion with Erland Nordenskiöld, who had questioned the pre-Columbian authenticity of some of the material. Irritated, Nimuendaju also affirmed that "to dismiss" some of the material as recent, "as Ladislau Netto did (if I remember right), is absolutely wrong" (Ibid., 151). To be fair to Nimuendaju, he did later "regret" his rejection of modern specimens from the collection (Nimuendaju 2004 [1925], p. 151). His irritation was mostly directed at the questioning of the ability of pre-colonial Amerindian potters to produce materials as sophisticated as those from Santarém; nonetheless, his argument allowed a common prejudice about perceived 'impurity' to transpire.

Ideas conceiving indigenous societies as static still prevail in the popular imaginary, and they are extremely damaging. By holding up a picturesque image which Amerindian people today can never conform to – and which has as a corollary the notion that forest peoples such as the Beiradeiros are 'falsified others' – (see Adams, Murrieta & Neves 2008, p. 16-17) – the identity, and therefore legitimacy of these peoples can, and has been questioned. Casting doubt over how 'traditional' the Munduruku are is an effective way of debilitating their collective claims to traditional territories, guaranteed by the Brazilian Constitution of 1988.[15] Such arguments have been used recently in the legal challenges against the official recognition of the Sawre Muybu territory (this is its official name; the Munduruku call it Daje Kapap Eïpi).[16]

Fig. 4 On a wall inscribed with writing and drawings of Jesus, the Bible and Spiderman, Munduruku feather caps perch, bird-like, alongside bead ornaments. Photograph by Maurício Torres.

1.5 Archaeology as an instrument in the struggle for visibility of present day forest peoples

By associating archaeological material with the history of living Amerindian peoples in South America, approaches advanced by Donald Lathrap (1970) and by José Proenza Brochado (1984), marked a turning point in Brazilian archaeology. While one of the main aims of this thesis is to offer an initial panorama of the long term history of the

[15] M. Torres, in interview to Nayana Fernandez' film, *"The Munduruku Indians Weaving Resistance."* Available at https://vimeo.com/112230009 Accessed 24/11/2016.
[16] Anonymous Report submitted by the Ministry of Mines and Energy entitled: "A tradicionalidade da Terra Saweré (sic) Muybu incidente na área da Flona Itaituba I"; Challenge presented by the Consórcio Tapajós: Case n° 08620.056543/2013-19, protocolled under n° 08620.128745/2015-31.

upper Tapajós, I will also seek to understand how its 'deep' past connects with its present-day inhabitants, in particular, the Munduruku.[17]

While anthropological accounts doubtless feed into archaeological interpretation, archaeological information and perspectives can also help us see the ethnographic present in a less absolute way, opening up to observations of longer temporal processes that are valuable in assessing issues related to socio-cultural stability and change in the past and in the present. Archaeological pottery tends to be a particularly sensitive marker of processes of persistence and change (even if the interpretation of what this may mean will depend on a more nuanced understanding of context and regional comparisons). Modal analytic methods in particular allow for a detailed examination of such processes, even within relatively short (c.100-200 years) time-spans, which is one of the reasons that led to the employment of these methods in this study, which will be discussed in chapter 6.

Processes of renewal manifest in material culture. Munduruku waist ornament, from the late 19th or early 20th century. Fig. 5 front of waist ornament.

Photographs: Vinicius Honorato.

Courtesy of the British Museum.

[17] For a detailed account of the history of the Beiradeiros, see Torres (2008).

Fig.6 Rear of waist ornament shown in fig. 5. The rear part is held together by industrially-produced cloth signalling trade with Euro-Brazilian society. Fig. 7 Munduruku appropriation of imported products (right): Munduruku girl 'Mundurucanises' her doll. Photograph: Bruna Rocha

I will attempt to "bridge the gap" between pre-Columbian and post-conquest occupations by also sourcing ethnohistorical, anthropological and linguistic information in order to challenge "the radical opposition between 'original purity/post-contact contamination'" with the perspective that 'contact' took place in a number of different ways and that the incorporation of European elements did not necessarily lead only to 'loss' of indigenous characteristics but also to a process of renewal" (Monteiro 2001, p. 55-56). Indeed, I hope to provide evidence to demonstrate that engagement with alterity is not solely a post-Conquest phenomenon.

1.6 Thesis outline

A contextualisation of this research within broader topics in Amazonian archaeology will be presented in **Chapter 2**. This includes a brief exposé related to how historical ecological perspectives have contributed to novel interpretations of Amazonian archaeological contexts, and how Amazonian Dark Earths – which are an important element within these approaches – can be defined. Historical linguistics as they pertain to our study area will be briefly discussed, with a focus upon distributions of Tupian and Carib speakers. A description of archaeological ceramic traditions mentioned in the text and their postulated links to Amerindian languages will ensue. Particular focus will be devoted to the Incised and Punctate Tradition and its potential association with speakers of Carib languages, and to Tupian archaeology and its premises, which are based on the idea of an inherent conservatism of Tupian peoples. These three elements – Historical Ecology, Amazonian archaeological ceramics and Historical Linguistics – allow us to formulate some of the problems researched, which relate to the connection between languages and material culture in the past, and the creation of 'cultural environments' that furnish an ecological infrastructure (in terms of resource concentration) for later occupants.

Chapter 3 will contextualise the Tapajós in physical, historical and social terms. Firstly, the region's ecology and geomorphology will be presented. Following this, hypotheses related to the history of Carib and Tupian peoples on the Tapajós, developed by linguists and ethnologists, will be put forward. The chapter will then synthesise the colonial and republican history of the region, enabling a discussion on the profound ruptures and processes of ethnogenesis occasioned by the colonial process and will demonstrate the role of the rapids of the Tapajós as a physical buffer to direct Euro-Brazilian presence until the mid-eighteenth century. Amerindian agency in the face of the new colonial reality will also be debated. A brief panorama of Amerindian peoples along the Tapajós in the twentieth century will then ensue.

Chapter 4 will provide an account of the ongoing context of conflict in which this research has been undertaken, and the way that the forest peoples of the Tapajós have resisted dam construction. This refusal to accept the inexorability of political decisions, which have been taken in total disregard of the Munduruku and Beiradeiros, demonstrates the agency of these peoples today in defining the course of their history, and has motivated my pursuit of connections between the past and the present and allowed me to perceive that this investigation pertains to histories that are still in the making. The chapter will then narrate ethnographic encounters that took place during this project's fieldwork, again based on historical ecological foundations, which show how the historical landscapes of the study area connect its current peoples to the past, particularly in terms of Amazonian Dark Earths, known to the Munduruku as *katomb*. A brief reflection regarding the role archaeology can have in this current context of struggle for land and potential issues in relation to it representing an imposition upon other historical regimes will follow.

Chapter 5 first introduces the questions researched – which are basic archaeological questions. They rely heavily on the analysis of the excavated pottery, and refer to whether the sites excavated are unicomponent or multicomponent, and whether the archaeological materials allow us to infer the existence of a social boundary along the rapids of the Tapajós towards the late first millennium AD. Crucially, we also seek to investigate the extent to which we can correlate material assemblages with linguistic distributions in the past. The archaeological fieldwork undertaken, methods and initial findings will then be described, alongside the dates obtained. This will be accompanied by interpretations of the stratigraphic contexts encountered. The expedition to Vitória, Espírito Santo, which took place in January 2016 in order for materials excavated in the late 1970s by Celso Perota to be studied will also be succinctly described.

The following three chapters are parts of one section, related to the study of archaeological pottery. **Chapter 6** explains the aims, objectives and methods employed in the ceramic analysis, which have built on conceptualisations and procedures developed initially by Rouse (1939; 1960), Lathrap (1962), Spaulding (1960) and Shepard (1968 [1954]), largely with the help of Read (2007). **Chapter 7** details the classification of the ceramics from the Terra Preta do Mangabal and Sawre Muybu sites. The pottery from the two sites is then compared and the discussion relating to social boundaries is returned to. In **Chapter 8**, the ceramics from these two sites are compared and contrasted with those from the wider region, excavated by other archaeologists. This allows us to place the Sawre Muybu and Mangabal assemblages within a wider context, by evaluating their potential affiliation to wider ceramic traditions. Potential correlations between the archaeological record and linguistic distributions can then be debated further. Additional interpretations for these materials will be proposed.

Chapter 9 concludes the thesis, summarising and reflecting upon its findings. The social responsibility of scientists in general and of archaeologists in particular in contexts of conflict will be considered in light of the recent destruction of the Sete Quedas rapids, a sacred place for the Munduruku, Apiaká and Kayabi peoples, to enable the construction of the Teles Pires dam. The traditionality of the Munduruku occupation at Dace Kapap Eïpi will be pondered. Finally, the next steps to be undertaken can then be outlined.

Chapter 2. Broader Topics in Amazonian archaeology

This chapter will present different routes to the study of the past in Amazonia, providing a necessary backdrop for the framing of the research questions, to be presented in chapter 5. The development of perspectives in Historical Ecology have encouraged a more nuanced study of archaeological contexts and have contributed to fundamental reassessments regarding the longevity of ancient Amerindian occupations – something that in turn impinges on considerations relating to pre-Columbian social complexity and upon our reading of Amazonian landscapes today. Investigation of Amazonian Dark Earths has greatly subsidised this shift in interpretations. Meanwhile, attention to Historical Linguistics is indispensable if connections between archaeological remains and current Amerindian peoples are to be sought. The distribution of Carib and Tupian languages are the subject of my focus, since they are known to be prevalent in and around the Tapajós. Finally, relevant archaeological ceramic traditions, and their postulated relationships with certain language families or with the development of cultural environments will then be considered as yet another 'path' to the deep past in the region.

2.1 Past and present Amerindian occupations in Amazonia

The development of theory in Historical Ecology, which "conceives of relationships between nature and culture as a dialogue, not a dichotomy" (Ingerson 1994 cited in Balée 1998, p. 13) has opened up new research avenues in Amazonian Archaeology and interpretations of the ancient past and its relation to later occupations. Heckenberger *et al.* (1999, p. 372) state that "over time, choice settlement locations are not necessarily degraded but can become even more desirable through intentional modifications and unintentional alterations resulting from human occupation". Pre-Columbian anthrosols known as Amazonian Dark Earths provide a "positive feedback process, which may be the pattern of greatest interest: the long-lasting increase in productive capacity of soils for agricultural activities as a result of ancient habitation practices" (Arroyo-Kalin 2010a, p. 378).

For much of the twentieth century, debates about Amerindian societies in Amazonia hinged on the idea that the environment of the tropical forest could not provide the resources necessary for sustaining dense populations, long-term, permanent settlements and socially complex societies. Thus, unlike the circum-Caribbean, where 'chiefdoms' developed, or the Andes where 'civilisations' flourished, in the South American tropical forest area only simpler, more mobile and lower density societies exhibiting a tribal level of social integration could be sustained. This "standard model" (Viveiros de Castro 1996) gained currency with the publication of the monumental *Handbook of South American Indians* (1946-1950), edited by Julian Steward, and was further strengthened by Steward and Faron's (1959) later work. Heavily influenced by nineteenth century naturalist accounts, which were usually penned by Euro-American travellers to the Amazon who were inspired by evolutionist ideas, the core 'traits' of 'Tropical Forest Culture' were held to be root crop agriculture and effective transportation by water, ceramics and hammocks (Lowie 1948, p. 1). Amazonian Amerindians were thought to be unable to develop large communities, a stratified social organisation or a temple-priest-idol cult (Myers 1992, p. 82). Small (50-100 people) and impermanent settlements (lasting only a few years, until adjacent soils had been exhausted) were thought to represent the norm (Myers 1973, p. 236).

In Amazonian Archaeology, Betty Meggers (e.g. 1971; 1991; 1992; 1995; 2003) was the most vocal and persistent exponent of the standard model, proposing that environmental constraints placed a cap on the development of large, complex societies in the region. In her popular summary "Amazonia: Man and Culture in a Counterfeit Paradise" (1971) and in more detailed works, cultural complexity was (loosely) inferred from ceramics considered to be techno-stylistically sophisticated. Even when found, as was the case of Marajó Island, such manifestations of cultural complexity were invariably attributed to migrations originating outside Amazonia. The paradox of the presence of a complex culture in the limiting Amazonian environment was 'explained away' by arguing that these societies had then rapidly degenerated or devolved to a simpler tribal level. The poverty of soils and (seasonal) environmental fluctuations were alluded to as great restrictions upon the possibilities for sustaining large/dense human populations over long periods (Meggers 1995, p. 2). Soil exhaustion and game and fish (i.e., protein) inadequacies due to dispersion and seasonality meant that habitation sites had to be periodically, if not frequently, relocated to optimize resource exploitation. Thus, Meggers staunchly defended the idea that "all but the smallest habitation sites are the product of multiple reoccupations over centuries or millennia by villages within the dimensions reported among surviving indigenous groups" (Meggers 2003, p. 98; cf. also Meggers *et al*. 1998; Miller *et al*. 1992; Meggers 1995). She dismissed as unreliable historical sources from the time of contact that described large and densely populated settlements (2003, p. 93-96). Risks had to "be minimized or neutralized to achieve the sustainable local food supply essential for settlement permanence and population concentration, which in turn are prerequisite to the emergence and maintenance of socio-political complexity" (Meggers 2003, p.90).

In contrast, Donald Lathrap (1970) and his students (Brochado & Lathrap 1982; Lathrap *et al*. 1985) argued that the rich aquatic fauna (i.e., reliable, concentrated protein resources) on the white water rivers and the cultivation of bitter manioc along fertile floodplains of the central Amazon not only supported population growth, large settlements and long-term sedentism, but also led to periodic population pressures on the *várzea* (floodplain) resources that were a catalyst for the ensuing outmigration of proto-Arawakan and proto-Tupian speakers to distant regions of the South American continent. Like Meggers, Lathrap however also considered *terra firme* (upland) environments to be unconducive to social development (Heckenberger, Petersen & Neves 1999, p. 353).

Meggers (1995, p. 29) stated that the surface extent of archaeological sites could not be used to infer village size and that the task was complicated by the frequency of reoccupations and consequent enlargement of the surface dimensions of sites through time and by the absence of information on the relationship between refuse disposal and house area (Meggers 1995, p. 27). She utilised Fordian typology and seriation (Ford 1962) to classify pottery, build relative chronologies and infer distinctive occupations in archaeological sites. Ceramic assemblages were first segregated according to temper types and then further divided between undecorated and decorated types. The relative frequencies of each type were calculated – respecting their stratigraphic order – so as to ascertain trends of increasing or decreasing popularity frequencies, which were used to infer successive occupations (Meggers 1995).

DeBoer, Kintigh and Rostoker (1996), however, questioned Meggers' use of seriation to infer multiple reoccupations of the same area and queried her direct comparisons between precolonial and present-day Amerindian patterns of territorial occupation. In order to define distinct occupations, it was necessary to determine the degree of difference that existed between the excavated (arbitrary) levels or sets of levels that would be sufficient to separate them into temporally discreet occupations (DeBoer *et al*. 1996, p. 265). Part of the problem stemmed from how much typological variation could be expected within a contemporary community, something still in need of better theory. The authors demonstrated how one Shipibo vessel, if broken into sherds, could be classified into different types and ascribed to several different occupations, because of differential use of temper and decoration on the different constituent parts of the same vessel (1996, p. 273-275). They concluded that seriation alone is insufficient to support the claim that large sites are the result of a palimpsest of multiple, reoccurring occupations (1996, p. 275-276).

Heckenberger, Petersen and Neves (1999) contributed decisively to this debate with examples from the lower Negro and the upper Xingu Rivers, proposing that *terra preta* is made up from accretional deposits formed by gradual deposition and sediment enrichment related to relatively continuous human occupation (1999, p. 355). They wrote that if Meggers' contentions were accurate, *terra preta* deposits would be relatively homogenous patches, interspersed with areas of little or no settlement alteration (1999, p. 355). Instead, the sites of Açutuba, on the lower Negro, and Nokugu, Kuhikugu and Hialugihïti, in the upper Xingu, present "broad contiguous strata with considerable variability in depth and composition within and between sites and within individual excavation units, due to differential deposition, intensity of use, functional variability, and, in some cases, significant landscape modification" (1999, p. 355). Short, small-scale occupations would not be capable of producing such deposits (1999, p. 355). Further, structural elaboration at these sites, including central plazas, earthworks, and specialized midden deposits testified to the functional variability expected from large, sedentary communities, not small, impermanent groups (1999, p. 356). They estimated that villages in the upper Xingu supported populations that ranged into the low thousands (at least 1,000 to 1,500 people) (Heckenberger *et al.* 1999, p. 370). Besides excavations at Nokugu, Kuhikugu and Hialugihïti revealing that the sites had analogous developmental histories, it was shown that earthworks (such as ditches, roads and linear mounds placed at the edges of plazas) were built during the same period, more or less simultaneously, reflecting a rapid shift in settlement patterns (Heckenberger *et al*. 1999, p. 370). The authors believe that at regional level, large villages existed as more or less peer communities (Heckenberger *et al*. 1999, p. 371).

Meggers contended that the existence of substantial earthworks did not necessarily implicate large, sedentary, and hierarchically organized populations (2003, p. 98). Habitation on the mounds of Marajó island looked to be "temporally and spatially discontinuous" (2003, p. 96); relatively small groups had been capable of constructing large earthworks, while other mounds in the Americas had been attributed to biological agents (2003, p. 97-98). She argued that in order to assess the intensity of pre-Columbian occupations, social entities among pre-historic populations would have to be identified that were comparable to endogamous communities among contemporary indigenous groups (1995, p. 19). This constitutes an important distinction in perspectives, as opponents of the standard model held that current Amerindian groups encountered in the tropical forest had undergone nearly four centuries of "forced culture change" (Myers 1973, p. 235):

> In particular, it is clear that the present distribution and configuration of indigenous groups in Amazonia is not simply reflective of any 'natural' or fortuitous pattern, but is also an artefact of European conquest and interaction. Surviving native societies have complex histories of post-contact cultural change marked by dramatic disruption, displacement and depopulation (Beckerman 1979, 1991; Whitehead 1994). As a result, recognition of links between past and present Amazonians requires an understanding of the historical trajectories and local processes of post-contact change which gave rise to the current ethnographic groupings
> (Heckenberger 1996, p. 26).

Heckenberger *et al*. (1999, p. 372) proposed that the large, sedentary pre-Columbian villages in the central Amazon and upper Xingu were supported by intensive upland agriculture, different to the extensive shifting agriculture, typical of contemporary Amerindian groups in Amazonia, or from the intensive floodplain agriculture suggested by authors such as Lathrap (1970) and Roosevelt (1989). Amazonian Dark Earth sites investigated were shown to be "continuously occupied for multiple decades and longer, even some or many centuries in the case of the most substantial settlements" (Heckenberger *et al*. 1999; Neves *et al*. 2003). This suggested that village mobility "was much reduced during these times relative to contemporary ethnographic circumstances for Amerindians in the region (Neves 2000)" (Neves *et al*. 2003, p. 39).

2.1.1 Amazonian Dark Earths

Soils known as Amazonian Dark Earths (ADEs), or *terras pretas de índio* ("Indian dark earths"), are understood to correlate with profound social change that took place across much of Amazonia around the first millennium AD (Arroyo-Kalin 2010b, p. 476; Neves *et al.* 2003, p. 29). ADEs are archaeological sites by definition, containing high levels of nutrients, organic matter and ceramic, lithic, faunal and botanical remains (Kern *et al.* 2003; Neves, Petersen, Bartone & Silva 2003). The formation of ADEs may be an unintentional consequence of human habitation and/or the intentional result of soil management (Neves *et al.* 2003, p. 35); either way, ADEs are a solid proxy for the presence of sedentary lifestyles in Amazonia (Arroyo Kalin 2010b, p. 476). In contrast to 'natural' Amazonian oxisols, ADEs are extremely fertile.

ADEs vary in size from <1-80 ha, in shape (linear or rounded patches), and location. They can be found on relict floodplain areas, on uplands situated near alluvial lakes and flooded forest, on interfluvial terrain away from large rivers and on alluvial sediments (Arroyo-Kalin 2014, p. 169), although most of the ADEs located to date are situated on Tertiary-age sediments (Arroyo-Kalin 2014, p. 168). In comparison to common Amazonian A horizon topsoils, *terra preta* topsoils are darker and have a thicker A horizon as well as "a more enhanced agricultural aptitude than the vast majority of soils in the Amazon basin" (Arroyo-Kalin 2010b, p. 475). This means that, unless buried, they are easily discernible and sought-after by present-day farmers (Petersen, Neves & Heckenberger 2001) as well as by archaeologists.

Various factors led to the formation of ADEs and their composition, including burial activities, food preparation, food waste, housing, and other activities (dyes, oils, fibre from palms and bark) (Neves *et al.* 2003, p. 40). Andrade (1986) and Myers (2004) consider ADEs as the remains of pre-Columbian house gardens produced by the deliberate composting of settlement residues, while other investigators emphasise alluvial inputs (Herrera *et al.* 1992; Woods 1995) or the role of pottery (Lima *et al*. 2002; Schaefer *et al*. 2004; Sergio *et al*. 2006 cited in Arroyo-Kalin 2014, p. 171). ADEs are the "outcome of the accumulation of settlement debris, the effects of faunally induced burrowing, mixing, and/or churning of soil material; of the upwards or "conveyor" translocation of sediments from lower in the deposit; and of a higher overall deposition of organic matter (Arroyo Kalin 2008)" (Arroyo Kalin 2014, p. 172).

ADEs hold "up to 70 times more pyrogenic carbon (charred plant matter, i.e., charcoal) than adjacent Oxisols" and display "a higher cation exchange capacity, a more basic pH, and higher concentrations of, among others, **"**organic carbon, calcium, phosphorus, manganese, potassium, barium, copper, manganese, strontium, and zinc" to these and to underlying B horizons (Arroyo Kalin 2014, p. 169). Often adjacent to *terras pretas* are lighter anthropic soils known as *terras mulatas* ("brown soils"), which indicate areas of clearance around former settlements (Arroyo Kalin 2010b, p. 476). Although the formation of *terras pretas* "ceased in most… parts of Amazônia during the early Contact period" (Neves *et al.* 2003, p. 38), recent research has shown how Amerindian peoples living in villages can still produce ADE in the present (Schmidt & Heckenberger 2009).

2.2 Languages as a path to the past

Amazonia is famous for its unparalleled level of linguistic diversity at the level of language stock. Speakers of Tupian, Carib, Gê and Arawak languages have lived or currently live within the Tapajós basin. Gê presence in the area (and in the southern Amazon generally) appears to occur only after the colonial period (Urban 2006 [1992]), while Arawaks are concentrated in the south, in the upper tributaries of the Tapajós. We will concentrate upon Tupian and Carib languages, because of the widespread nature of ethnographic distributions of speakers of these languages within our study area, which points to pervasive and temporally protracted presence.

2.2.1 Historical linguistics

The method of phonological comparison in linguistics involves comparing and reconstructing lexical units. These units contain certain sequences of phonemes that are associated with certain meanings – so that comparisons are at once phonological and semantic. The similitude of meanings guides the search for phonological correspondences, while regular phonological correspondences can also point to less obvious semantic similarities (Rodrigues 2007, p. 168). What can limit the endeavour is a reduced lexical coverage and, above all, the lack of recording of autochthonous concepts in the dictionaries produced, which restrains the possibility of finding diachronic changes of meaning (Ibid., p. 198).

The advantage of linguistic reconstruction is that it provides a way to distinguish between genetic relationships among languages on the one hand, and borrowing on the other. Linguistic reconstruction can also reveal which languages within a group are closest to one another and which are more distant. By considering the spatial distribution of historically-related languages, hypotheses concerning their localisation in the past and the migrations or expansions that led to current distributions can be proposed (Urban 2006 [1992], p. 87-89).

2.2.2 Tupian

The Tupi language stock is one of the largest in Amazonia and in South America, with over seventy languages spoken (Rodrigues & Cabral 2012, p. 507). Tupian languages are (or were) spoken in Argentina, Bolivia, Brazil, Colombia, French Guiana, Paraguay, Peru, and Venezuela (Campbell 2012, p. 60). Aryon Rodrigues (1964) provided the first systematic classification of Tupian languages, classifying as Tupian all peoples who possess between 12-36% of cognates in common (Rodrigues 1964, p. 101). Employing the method of phonological comparison, Rodrigues eventually refined his classification of the Tupian language stock into ten different language families. There are few doubts as to the genetic relationships between the Tupi-Guarani languages and there is a considerable degree of certainty regarding the other families of the Tupi stock, termed “Macro-Tupi” by Urban (2006 [1992], p. 91). The ten linguistic families classified by Rodrigues into the Tupian stock are shown in the diagram in fig. 8 below.

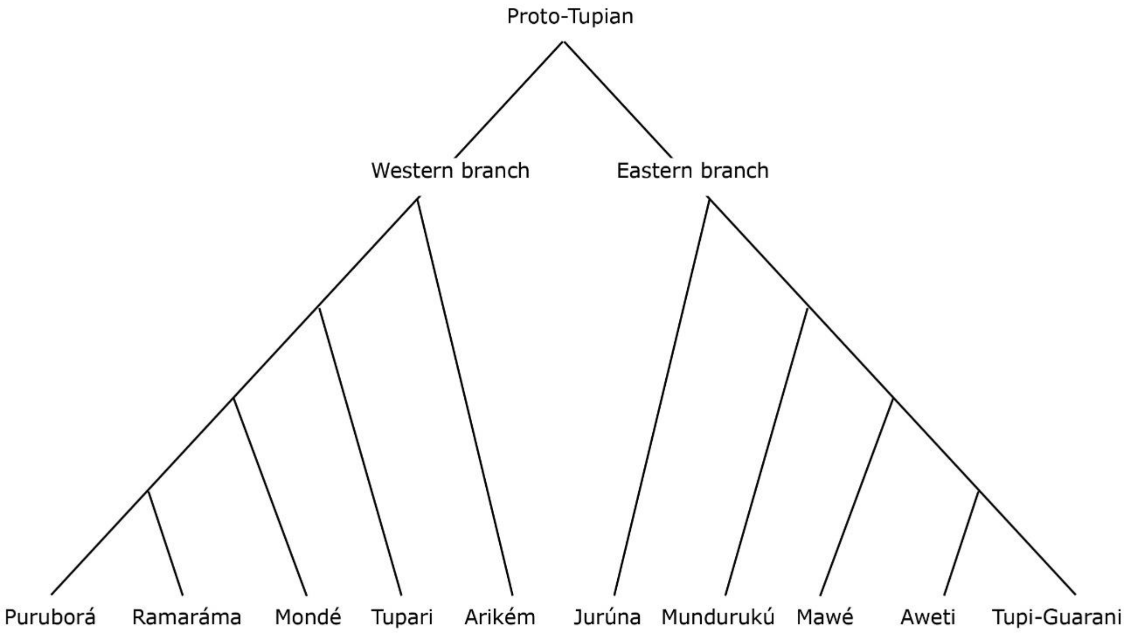


Fig. 8 "Family tree of the Tupian stock". Adapted from Rodrigues & Cabral (2012, p. 497, Fig. 1) by Vitor Flynn Paciornik.

Languages from the families of the western branch are spoken by peoples who live exclusively in the upper Madeira basin, in the southwest Brazilian Amazon. The other families are distributed to the east. Mawé is located between the lower Madeira and the Tapajós, while the Munduruku family is located on the Madeira, Tapajós and Xingu. The Tupi-Guarani family has a far wider dispersal, from the Madeira until the eastern limits of Amazonia in the Tocantins basin, and even further east in Maranhão; Tupi-Guarani languages are also spoken to the north of the Amazon River, in the north of Pará state and in French Guiana, as well as to the south, in the Paraguay and Paraná basins as well as, in the historical past, along the entire Brazilian Atlantic coast (Rodrigues 2007, p. 168).

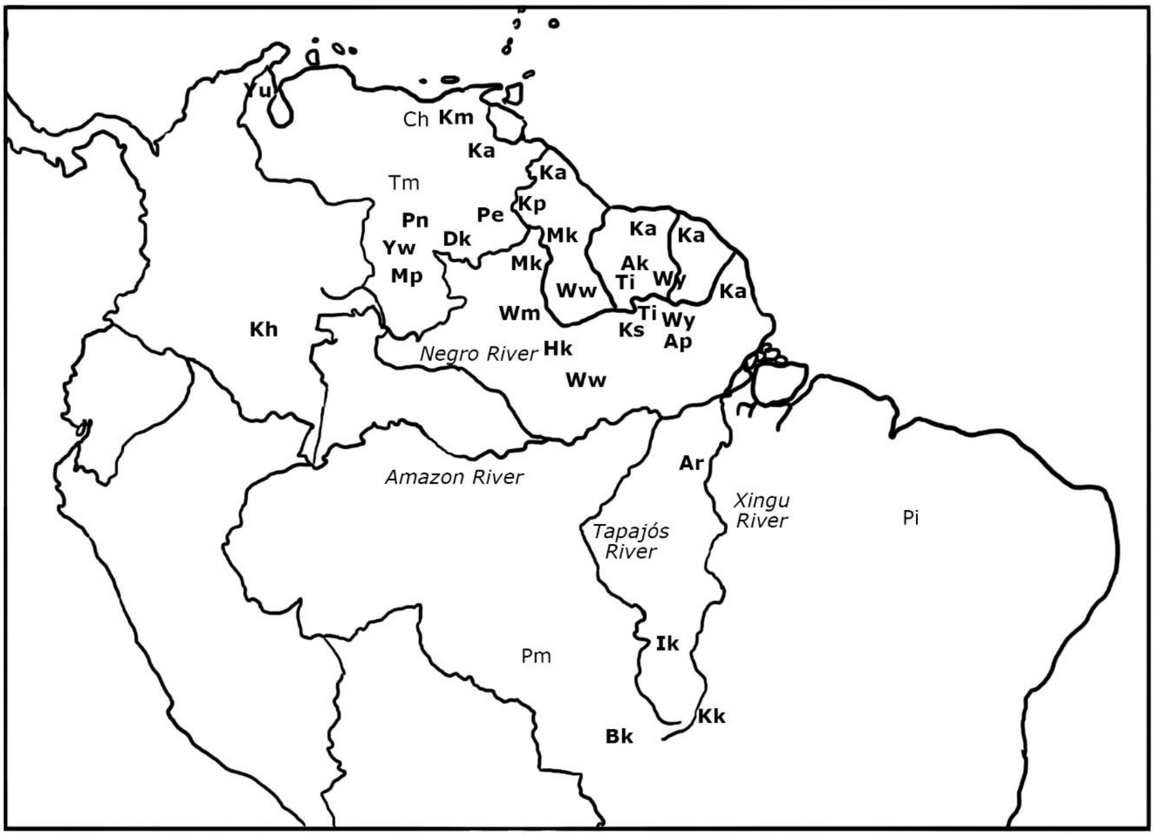
Different linguists have pinpointed other areas south of the Amazon (see Noelli 1998, p. 651) as the centre of dispersal of Tupian peoples, however, the most consistently argued and widely accepted is Rodrigues' indication of somewhere between the Guaporé and Aripuanã Rivers, where five of the ten Tupian linguistic families (the western families in Rodrigues' classification), as well as part of the Tupi-Guarani family, are found (Rodrigues 1964; 2007). Rodrigues based his proposition upon the application of the lexical-statistical method and the premise that a concentration of language families suggests the homeland of a protolanguage (Noelli 1996; 1998, p. 651).

The differentiation of speech communities resulted from successive processes of fission, and sequential expansions and migrations separated them farther and farther. The initial dispersal would have occurred some 5,000 years ago, while the expansion of the Tupi-Guarani family would have begun to take place some 2-3 thousand years ago (Corrêa 2014; Noelli 1996; Rodrigues 1964).

2.2.3 Carib

Though many are now extinct (Meira 2006b), Carib languages also cover extensive areas, reaching into Brazil, Colombia, French Guiana, Guyana, Suriname, and Venezuela; they used to be spoken also on Caribbean islands (Campbell 2012, p. 59-60). The first linguistic endeavour related to these languages came with the publication of friar Filippo Salvatore Gilij's discussion on Carib languages in central Venezuela (1965 [1780-1784] cited in Campbell 2012). Gilij would find that the apparently infinite languages spoken in the region belonged to nine matrices (Campbell 2012, p. 64). In spite of this early beginning, most Carib languages are still insufficiently described (Meira 2006a, p. 199).

Because the early period of European colonisation was more intensive along the coast of the Guianas, it was thought that the Carib family extended exclusively to the north of the Amazon River. Though this is still the region where most Carib languages are spoken today (and presumably also in 1492) (Meira & Franchetto 2005, p. 128-129), Carib languages are also spoken in the extreme south of the Amazon on the border with central Brazil. The German ethnologist Karl von den Steinen (1886) was the first non-Indian to realise this, when he travelled to central Brazil towards the end of the nineteenth century (Meira & Franchetto 2005, p. 128-129). The most recent, albeit 'speculative' classification of the modern Carib family of languages has the following branches: Parukotoan, Pekodian, Venezuelan, Nahukwa and Guianan; there are also 'Residue' groups and languages that have not yet been classified (Gildea 2012, p. 445).



Map of the current distribution of Cariban languages. Living languages in bold, extinct languages in normal type. **Ak**, Akuriyo; **Ar**, Arara; **Bk**, Bakairi; Ch, Chayma†; **Dk**, De'kwana; **Hk**, Hishkaryana; **Ik**, Ikpeng; **Ka**, Karinya; **Kh**, Karihona; **Kk**, Kuikuro; **Km**, Kumanakoto†; **Kp**, Kapong; **Ks**, Kashuyana, **Mk**, Makushi, **Mp**, Mapoyo; **Pe**, Pemong; Pi, Pimenteria†; Pm, Palmella†; **Pn**, Panare; **Ti**, Tiriyo; Tm, Tamanaku†; **Yu**, Yukpa; **Yw**, Yawarana; **Wm**, Waimiri-Atroari; **Ww**, Waiwai; **Wy**, Wayana.

Map 2 Current location of Carib families (living languages in bold; extinct languages not bold). Adapted from Meira (2006b, p. 160) by Vitor Flynn Paciornik.

Between the Tapajós and Xingu basins are found speakers of Kuikuro, Arara-Ikpeng and Bakairi. These have long been classified as the “southern branch” of Carib languages. Using the comparative method, Meira and Franchetto (2005) argue that there is no basis for including these three languages within a single subgroup, although the existence of a Bakairi-Ikpeng (Arara is a co-dialect/language of Ikpeng) branch does seem plausible. The authors propose this branch be named Pekodian (Ibid., p. 177).

2.2.4 Evidence of Tupi-Carib relationships?

Having established regular phonological correspondences based on lexical equations encompassing areas such as kinship, body and plant parts, nature, non-cultural and cultural items, qualities, actions and states, as well as grammatical morphemes (inclusive of person markers), Aryon Rodrigues endorses the potential existence of a genetic relationship between some languages of the Tupí stock and languages of the

Carib family (1985, p. 374) proposed by de Goeje (1909 cited in Rodrigues 1985). From the Tupí languages, Rodrigues sampled Tupinambá, Tuparí and Mundurukú, while Waiwai, Hishkaryána and Taulipang were taken as representatives of North Amazonian Carib languages, and words from Bakairí and Nahukwá were taken to represent Carib languages to the south of the Amazon River (1985, p. 374-375). Though some of these lexical similarities can be attributed to recent and old borrowing, "a sizable number of lexical items... can be shown to be cognates"; though their similarity is not always obvious, many of them belong to "semantic domains in which the intrusion of loanwords is less likely to occur" (Rodrigues 1985, p. 393). Rodrigues wrote that the then limited knowledge of Carib languages posed a limitation to the proposal, but he believed the hypothesis would be borne out as Carib languages become better studied (1985, p. 394). Of note is the resonance Rodrigues detected between the cognates for 'dish/pot', 'calabash' and 'calabash bottle' between three Tupian and one Carib language:

Tupí-Carib cognates for dish/pot/calabash				
Language	Tupinambá	Tuparí	Munduruku	Taulipang[18]
Cognate	ya?ẽ	wa?ẽ	wa?e	wai
Translation	'dish, pot'	'pot'	'calabash'	'calabash bottle'

Table 1 Tupí-Carib cognates for dish/pot/calabash (Reproduced from Rodrigues 1985, p. 385)

This proposition would entail a south Amazonian origin for Carib languages and conflicted with Durbin's (1977) suggestion for a north Amazonian origin, which holds southern languages as resulting from more recent expansions or migrations. Rodrigues argued that there was an apparently higher degree of linguistic diversity in the southern Carib languages, while there was apparently greater homogeneity among the northern languages (cited in Meira & Franchetto 2005, p. 177-178). The results of Meira and Franchetto's study tends to weaken this hypothesis, however, because of the limited number of independent branches in the south (2005, p. 177-178). Because of the demographic collapse we assume took place along much of the lower Amazon, we might

[18] I believe this corresponds to the language spoken by the Pemon/Taurepang, whose language belongs to the Carib family of languages and who today live in the savanna areas between the Brazilian state of Roraima, Venezuela and Guiana. See: https://pib.socioambiental.org/pt/povo/taurepang/113

never be sure how representative the current distributions of Carib languages to the south of the Amazon are of the past, and whether Arawak languages were also spoken in the area. But if Durbin's hypothesis and Meira and Franchetto's findings are correct, the high degree of similarity between cognates of Tupian and Carib languages at least point to intensive historical interactions. Meira proposes emigration from the Venezuelan-Guianese region to be the more likely scenario (Meira 2006b, p. 161).

2.3 Amazonian pottery and Amerindian languages

In spite of the development and application of a wide array of techniques from Environmental Archaeology, ceramics still serve as an indispensable index by which to study cultural transmission, communities of practice and situated learning (Lave & Wenger 1991; Wenger 1998; 2000) in the past and problems related to wider temporal and geographic scales, such as regional interactions and population movement. The synthetic properties of clay and the wide array of options available to potters during different stages of the manufacturing process have not resulted in infinite variation (Neves 2010, pp. 56, 69) but in observable patterns, which relate to processes of transmission, to technical choices and social boundaries (Ellen & Fischer 2013; Stark 1998, p. 2).

A crucial distinction between European and Amerindian conceptions pertaining to 'art' and artefacts should also be noted. Among Amazonian Amerindian societies, the figure of the artist "as an individual creator, whose commitment to the invention of something new is greater that his desire to give continuity to an artistic tradition or style considered ancestral" does not usually exist (Lagrou 2009, p. 14; see also Rostain 1994, p. 147-148). This is not to say innovation and expressions of individuality do not occur, but continuities are valued as expressions of collective identities and this helps to account for common (formal and stylistic) patterns or elements in the production of pottery spanning vast distances and protracted temporal periods in ancient Amazonia.

Amazonian ceramic traditions were at first defined through specific combinations of shared techno-stylistic features (Meggers & Evans 1961). Initially termed horizons after Kroeber's (1944) application of the concept to the Andean area, Meggers and Evans (1983 [1978]) later implicitly recognised greater time-depth was involved and adopted the concept of Tradition after Willey and Phillips (1958), which is roughly equivalent to the idea of series in Venezuela and the Caribbean (Cruxent & Rouse 1958).

As well as reformulations, novel classifications have been proposed with the advent of new research projects, which are based on more detailed data, awareness of context and whose premises are more closely aligned with those of Historical Ecology. A more nuanced picture of ancient Amazonians has thus emerged, relegating assumptions regarding the *Tropical Forest Culture type* (Lowie 1948), supposedly characterized by "semi-sedentary agriculturalists living in small communities, possessing the major technologies (except metallurgy) and a social organization characterized by lack of differentiation, whether in occupation, wealth or social position" (Meggers & Evans 1957, p. 25). A brief presentation of the ceramic traditions mentioned over the course of this thesis will be given below. Because it is of central importance to this study, the Incised and Punctate tradition and issues related to it will be described in greater detail.

2.3.1 The Zoned-Hachured Tradition (?2,500 BC-?1000 BC)

Originally posited as the earliest horizon style identified by Meggers and Evans (1961) Zoned-Hachured potteries display "the use of broad line incision to outline areas that are filled with fine, parallel strokes or crosshatching," which is often combined with painting "in the form of a red band at the rim or bands on the body of the vessel" (Ibid., p. 375). They are distributed in western, central and eastern Amazonia. Members of this horizon were initially the Early and Late Tutishcainyo complexes of the Ucayali, the Yasuní phase of the Napo River, the Ananatuba phase on Marajó Island and the Jauarí phase on the middle Amazon (Ibid., p. 376). At Oriximiná and Alenquer, Protásio Frikel collected specimens of this pottery at Ponta do Jauarí, from a seasonally inundated *sambaqui* (shell midden) also containing tubular pipes and over a hundred stone artefacts (mainly axes) (Hilbert 1968, p. 69-84). More recently Gomes (2011, p. 283) located and dated a context in which pottery attributed to the Zoned-Hachured Tradition (2040±40 BP) was found alongside Pocó materials in the Aldeia site in Santarém (2011, p. 290).

Meggers and Evans proposed that the Zoned-Hachured Horizon represented the introduction of ceramic technology in the Tropical Forest Area (Ibid., p. 375).

Tempering materials can include sand, *cauixí*, wood ash and shell (Brochado & Lathrap 1982, p. 28; Meggers & Evans 1961, p. 375). However, this purported horizon or tradition still needs to be better evaluated. Besides its contexts not always being clearly defined; it displays great variability in terms of vessel morphology (Brochado & Lathrap 1982, p. 33). Its status as the earliest sign of pottery in Amazonia has since been overtaken by the shell tempered Taperinha and Mina wares (Roosevelt 1991; Bandeira 2009; Simões 1981).

2.3.2 The Pocó-Açutuba Tradition (c.1000 BC-600 AD)

Initially subsumed under the Incised Rim Tradition (Guapindaia 2008; Hilbert & Hilbert 1980; Lima 2008; Meggers & Evans 1961, p. 382), the Pocó-Açutuba tradition is associated with early sedentary lifeways that gave rise to cultural transformations of the landscape, leading to the formation of ADEs (Neves 2006, p. 55-57). These ceramics are usually found in the lowest, earliest archaeological deposits and have mainly been identified along and near the main channel of the Amazon – this likely reflects a sampling bias, as specimens from the Rio Branco basin in Roraima have also been located (Neves *et al.* 2014, pp. 138, 144) and they display strong stylistic similarity with pottery of the Saladoid series in Venezuela. These potteries date between c.1000BC to 600AD (Gomes 2011; Guapindaia 2008; Hilbert & Hilbert 1980; Lima 2008; Meggers & Evans 1961; Neves *et al.* 2014).

Pocó-Açutuba ceramics are tempered mostly with *cauixí* and *caraipé* and display great formal variability, including non-circular horizontal cross sections, mesial and labial flanges and lobular rims. Their decorative repertoire is unparalleled in Amazonian ceramics; the most striking feature is the use of polychrome painting (in orange, yellow, red, maroon and black often over white slip) to produce geometric designs. Plastic decoration includes incision, modelling, excision, punctation and brushing; designs are composed of rectilinear and curved elements, such as scrolls. Modelled appliqué can consist of zoomorphic representation (Neves *et al.* 2014, p. 145-147).

Following Lathrap (1970), Amazonianists linked the production of Incised Rim ceramics with speakers of Arawak languages (Heckenberger 1996, 2005; Hornborg 2005; Neves *et al.* 2014). Based on linguistics, it would seem that Proto-Arawakan speakers dispersed from the west or northwestern Amazon between three and four thousand years ago (Payne 1991 cited in Urban 2006 [1992], p. 95). Recent phylogenetic classification of Arawak languages suggests a high similarity in cognates, which may indicate a rapid dispersal (see Neves *et al.* 2014, p. 153); given the high degree of coherence between these widely dispersed assemblages and their relative contemporaneity (in archaeological terms), this proposition seems plausible.

2.3.3 The Modelled Incised/Incised Rim Tradition (?1800 BC-500 AD)[19]

In some cases, such as with the Manacapuru phase of the Central Amazon, a historical relation between the Incised Rim and Pocó-Açutuba traditions seems clear (Neves *et al.* 2014, p. 153). Incised Rim pottery was originally defined by "…a broad, flat-topped rim produced by interior thickening, giving a heavy, trianguloid cross-section". The "level or slightly insloping rim surface is usually decorated, typically with rather broad, incised lines… red paint or red slip was used to cover the exterior and/or interior surface of some vessels" (Meggers & Evans 1961, p. 378). Sites possessing these ceramics or those of the Pocó-Açutuba tradition were often reoccupied. In such multicomponent contexts archaeologists have increasingly noticed that elements from Incised Rim or Pocó-Açutuba assemblages are found in later assemblages belonging to distinct ceramic traditions (Almeida 2013; Garcia 2012; Lima 2008). It is possible that this indicates historical relationships (Lima & Neves 2011; Neves *et al*. 2014, p. 153) or relationships based on trade and exchange with Arawak speakers (Almeida 2013, p. 312-314).

2.3.4 The Polychrome Tradition (?450 AD-1800 AD)

Save for two early dates of c. 450AD (Belletti 2015)[20], the Amazon Polychrome Tradition dates from approximately 600-1800 AD (Belletti 2016; Meggers & Evans 1961, p. 382; Moraes 2013; Tamanaha 2012). It is characterised by the predominant use of *caraipé* temper, composite or complex (keeled) contours and mesial and labial flanges; light post-firing paste colour prevails (Almeida 2013, p. 44). It is identified by "a white slip and polychrome (red-and-black-on-white) painting… [and] relatively complex techniques", such as "excision, incision retouched with red or white before

---

[19] The early date of c. 1800BC refers to contexts dated by Gomes (2005). See discussion in chapter 8.
[20] Miller's (1992) 700BC date is no longer accepted as valid for the Polychrome Tradition (Almeida 2013).

firing, and grooving. Incision or excision on a red slipped or white slipped surface is also characteristic" (1961, p. 379). Secondary urn burials are often associated with this tradition, and burial urns can be anthropomorphic, displaying complex geometric designs (Almeida 2013, p. 44). In the Central Amazon, ceramics classified as part of the Amazonian Polychrome Tradition are frequently encountered in the uppermost layers or on the surface of archaeological sites that contain pottery related to the Modelled Incised/Incised Rim Tradition (Lima 2008; Moraes 2006; 2013; Tamanaha 2012). There is discussion surrounding the origin and driving factor for the dispersal of this Tradition (Almeida 2013; Belletti 2016; Tamanaha 2012; Tamanaha & Neves 2014). Initially thought to originate in the Central Amazon (Brochado 1984; Lathrap 1970), this tradition has been correlated with the expansion of speakers of Tupi-Guarani languages from the southwest Amazon, in the present-day state of Rondônia (Almeida 2013; Noelli 1996; 1998; Urban 2006 [1992]).

2.3.5 The Tupi-Guarani Tradition (>500 BC-present)

While acknowledging potential connections to Tupi-Guaranian peoples, in a deliberate attempt to dissociate archaeological remains from historic ethno-linguistic identities, the National Program of Archaeological Research in Brazil, PRONAPA, named these widely dispersed and distinctive painted, corrugated and brushed wares, often tempered with grog or mineral nonplastics and which frequently contained convex or oval bases and composite or complex vessel forms as the 'Tupiguarani' Tradition (1970, p. 12). The choice of the unhyphenated term was anachronistic since by then, Aryon Rodrigues had already published his influential classification of the Tupian stock (1964), in which Tupi-Guarani was only one of the seven families of the stock (F. Noelli, pers. comm., 11 January 2017). Based on the unsubstantiated hypothesis of Métraux (1927; 1928), PRONAPA proposed that the different wares' surface treatments represented different subtraditions resulting from "migratory waves" from Paraguay and reflected the cultural degeneration of peoples who had originated in the Bolivian Andes (Noelli 2008, pp. 20, 23).

José Proenza Brochado, one of the principal contributors to PRONAPA, would then fundamentally revise and question these assumptions in his PhD thesis (1984).

Alongside his supervisor, Donald Lathrap, he would propose the Amazon[21] as the centre of dispersal for Tupian peoples (Brochado 1984; Brochado & Lathrap 1982; Lathrap 1970) and sought to link these archaeological remains with Guaranian peoples of southern Brazil, Paraguay, Argentina and Uruguay on the one hand, and with coastal Tupinambá peoples on the other (1984). He would come to the conclusion that different forms of surface treatment and decoration – plastic decoration includes corrugation, ungulates, finger-pressing and brushing, while chromatic decoration occurs in red, white and black, covering the entire vessel as slips, displayed in bands or through geometric designs, on inner or outer vessel surfaces – were related to different vessel forms and functions and to contingency, such as the lack of particular materials at a given moment (La Salvia & Brochado 1989; Noelli 2008, p. 24). Funerary urns are also commonly found in association with these potteries. They are often large vessels covered with lids – both the lids and the vessels can be reutilisations from culinary wares (Buarque 2010; La Salvia & Brochado 1989; Noelli & Brochado 1998 cited in Almeida 2013, p. 43).

This tradition is dated from c. 500 BC (Corrêa 2014) and was divided by Brochado into regional manifestations, which he believed correlated with processes of genetic drift that resulted in the different languages of the Tupian stock (Noelli 2008, p. 16): the Tupinambá sub-Tradition, whose emphasis is upon chromatic decorations, and which is found along the Atlantic rainforest of the coast of Brazil, and the Guarani sub-Tradition, encountered in the southern Brazilian Atlantic coast and to the south of the country, extending to Argentina, Paraguay and Uruguay. The plastic decoration mentioned above predominates in this latter case. Brochado (1984) and Lathrap (1970) saw the Tupinambá and Guarani sub-Traditions as an extension of the Amazon Polychrome Tradition.

It is likely that, as research in as-yet little known regions progresses, archaeological contexts and artefactual assemblages related to Tupi-Guaranians and to Tupians from other language families will become better known and lead to further revisions of the Tupi-Guarani Tradition; the incorporation of information on assemblages and contexts

[21] Lathrap initially proposed central Amazonia as the centre of origin while Brochado, strongly influenced by the propositions of Aryon Rodrigues, would point to the southern Amazon.

related to Tupians from other language families may indeed lead to a change in the nomenclature and overall definition of this tradition (F. Noelli, pers. comm., 12 January 2017).

2.3.6 The Amazonian Tupinambá sub-Tradition (c.300 AD-1800 AD)

This recently-defined sub-Tradition is located in south-east Amazonia along the middle courses of the Xingu and Araguaia-Tocantins Rivers, as well as in their interfluves (Almeida 2008; 2013; Almeida & Neves 2015; Garcia 2012). It possesses elements in common with the coastal Tupinambá and Guarani sub-Traditions: in technological terms, this includes densely tempered material and reduced firings. Regarding form, composite or complex vessels occur; vessels can be large. Surface treatment can involve fine smoothing that at times is unfinished, and decoration includes corrugation, ungulates, finger-pressing and brushing. Chromatic decoration occurs in red, white, black and brown; painted motifs of interlocking scrolls are extremely similar to those used ethnographically among Tupi-Guarani peoples in Amazonia today and are applied to different 'canvases,' including the body and ritual artefacts. Funerary urns are associated with this sub-Tradition. This industry is dated to between the 4th-18th century AD (Almeida & Neves 2015, pp. 508-509, 514).

Thus far, Zoned-Hachured, Pocó-Açutuba, Modelled Incised/Incised Rim, and ceramics from the Amazon Polychrome Tradition have not been detected in our study area, but more extensive research needs to be conducted before we can confidently exclude these traditions from the Upper Tapajós. The main reason for synthesising information on them here is that they are alluded to by other researchers discussed in chapter 8. Meanwhile, attributes in common with those of the Tupi-Guarani Tradition are noted among ceramics of the Mangabal complex and among the Maloca dos Índios pottery, as will be seen in chapter 8.

2.3.7 The Incised and Punctate Tradition (c. AD 900-1700)

If Barbosa Rodrigues was the first to explicitly relate pottery from Santarém (situated on the mouth of the Tapajós River) with the Tapajó Indians, it was the German ethnologist and archaeologist Curt Nimuendaju who made famous "perhaps the most remarkable [pottery] in the Amazon Valley" (Meggers 1948, p. 163). In the 1920s

Nimuendaju shipped several specimens of Santarém pottery to the (then) Gothenburg Ethnographic Museum in Sweden (2004). He (1952) concurred with Rodrigues that ceramics found in Santarém and environs were probably produced by the same Tapajó Indians who had attacked the Orellana expedition in 1542 (Carvajal cited in Medina 1934) and proposed the Tapajó likely spoke a Carib language (1952). Ceramics from Santarém are classified as belonging to the Incised and Punctate Tradition.

The Incised Punctate Tradition (hereafter IPT), thought to date between c. AD 900-1700, is present from the middle to lower Amazon, on the Tapajós[22], Xingu[23] and Tocantins[24] drainages to its south; along the Urubu and Trombetas basins[25] to the north. The lower Urubu River represents a cultural boundary area to the west (Bassi 2016; Lima *et al.* 2016), while to the east it is found in the Brazilian state of Amapá[26] and in French Guyana.[27] Meggers and Evans described the IPT through recurrent combinations of solely decorative features:

> …the use of incision, punctation and modelling in several consistent ways… alternating elements in bands occupying the interior of bowl rims or the exterior of jar necks… the filling of areas with finely drawn, evenly parallel and closely spaced incised lines… Adornos are also common and varied, including anthropomorphic, zoomorphic and geometric forms
> (Meggers & Evans 1961, p. 381).

Besides the pottery from Santarém, the Kondurí style of the Trombetas area (Boa Vista and Cipoal do Araticum sites) is well known. Related industries in the Brazilian and French Guianas have also been described in more detail, and include the Aristé Ancien sub-complex, the Aruã complex, the Mazagão complex and the Caripo Kwep type (Rostain 1994, pp. 418, 428-430). Ceramics belonging to the IPT are often found in multicomponent sites, usually within the upper archaeological layers; it is often hard to

[22] E.g. Barata 1953; 1968; Gomes 2002; 2005; 2008; Guapindaia 1993; Martins 2012a; Nimuendaju 2004; Palmatary 1960; Perota 1979; Rocha 2012; Schaan 2016.
[23] E.g. Garcia 2012; Perota 1977; 1990; Schaan & Amaral Lima 2012; Simões & Araújo-Costa; 1978; 1987; Stenborg 2016; Toney 2012; 2016.
[24] E.g. Araújo Costa 1983; Garcia 2012.
[25] E.g. Guapindaia 2008; Hilbert 1955; Hilbert & Hilbert 1980.
[26] E.g. Cabral & Saldanha 2008; Pardi & Silveira 2005; Saldanha & Cabral 2010.
[27] E.g. Bel 2015; Rostain 1994.

distinguish a 'cut off' point between this pottery and that which precedes it. In the Lower Amazon, IPT Pottery is frequently found overlying pottery from the Incised Rim or Pocó-Açutuba Tradition, and is associated to Amazonian Dark Earth (Guapindaia 2008; P. Hilbert & K. Hilbert 1980). Meggers and Evans (1983 [1978], p. 324) believed the IPT "expanded down the Amazon and up the southern tributaries"; Lathrap (1970, p. 168) and Rostain (1994, p. 460) proposed that the 'hearth' of the Incised and Punctate Tradition (IPT) is located in the middle Amazon.[28]

Technology – temper, in particular – can vary. Though its 'classic' component (associated in particular to Santarém wares) is often associated with sponge-spicule temper and reduced firings, quartz sand and other minerals and oxidised firings are also observed. Vessel morphology encompasses an incredibly wide range of forms, from simple and unrestricted hemispherical vessels and shallow dishes, to unrestricted and composite, dependent and restricted, globular vessels, to independent restricted inflected globular vessels or jars. Highly complex forms, including animal shaped vessels and caryatid bowls, as well as figurines and pipes, are associated to the Santarém industry. Chromatic techniques have more recently been observed as an important element within Santarém pottery (Gomes 2002). Tripod vessel supports and variations of these baroque decorations – so overwhelming as to be called "grotesque" at one point by Nimuendaju (2004, p. 135) – tend to be connected to the Konduri style. This diverse gamut of artefacts has been the subject of a number of in-depth studies (e.g. Barreto forthcoming; Gomes 2001; 2002; Guapindaia 1993; Palmatary 1960; Quinn 2004) and are beyond the scope of this thesis. Though Santarém pottery is described as a 'phase' or 'style' of the Incised and Punctate tradition, the longevity and diverse formal and decorative elements of this industry could warrant it being understood as a local tradition, this being a subject for future consideration.

Lathrap (1970, p. 165) argued that the constituent elements of the IPT were "sufficiently coherent for them to be perceived as a ceramic tradition;" and wrote that among diagnostic elements were "…thin, deep incision, executed with a sharply pointed

[28] Possibly based on Hilbert's presentation of Itacoatiara ceramics (1968) Lathrap suggests the north shore, but this pottery has more recently been reclassified into the earlier Incised Rim Tradition (Lima 2008, p. 366-369).

stylus" and a "mode of V-shaped incised lines," "almost always organized into rectilinear designs… By far the most common germinal motif in all of the fine-line incised styles is a continuous band of contiguous isosceles triangles". The "peculiar use of appliqué" also stands out; "lots of spherical blobs" are combined with "thin rolls of wet clay" so that "The total effect could well be simulated by using the ribbon of cake icing exuded from a pastry tube" (Lathrap 1970, p. 168).

The IPT tradition is linked with processes of population increase, denoted by the presence of ADE patches within which its ceramics are usually encased. Carvajal's description of a densely populated region coupled with the dense stratum of ADE encountered at the Aldeia site would later lead Anna Roosevelt (1993) to propose that Santarém was the centre of an Amazonian chiefdom, whose southern limits on the Tapajós have been the object of previous studies (e.g. Martins 2012; Rodrigues 1875). Roosevelt affirmed that the similarity between ceramic designs observed in Santarém, the Lower Amazon, and in specific places in Venezuela (the middle Orinoco River and Valencia) and Surinam suggested "continuing interregional stylistic communication during much of the late prehistoric period, possibly produced by a network of alliances, intermarriage, and war among the elites of regional cultures" (1993, p. 263). Roosevelt's propositions would help to provide an alternative idea of the pre-Columbian past in the Amazon.

More recently, D. Schaan, P. Stenborg and collaborators have been studying settlement systems related to the societies that developed by the mouth of the Tapajós from the latter half of the first millennium AD on the Belterra Plateau, with an aim to explore and analyse the organisation of these pre-Columbian societies at regional level (Stenborg, Schaan & Amaral Lima 2012, p. 228; Stenborg 2016). The authors believe trade routes and networks for communication may have directly and indirectly linked distant areas. So far 112 sites have been identified (Stenborg 2016, p. 16) and a hierarchy of settlements is proposed, having the Porto/Aldeia site as a regional centre. Other sites on the Belterra Plateau are located in proximity to one another, being thus interpreted as large villages or clusters of villages. Plateau sites would have produced items such as crops and cloth (suggested by the presence of spindle whorls) while riverine and lakeside sites could have been fishing stations (Schaan 2016, p. 33-34).

Referring to the IPT, Stenborg, Schaan & Amaral Lima (2012, p. 232) postulate that "To the extent that homogenisation of material culture also implied the spreading of properties such as modes of production, land use, socio-political organization and the like it also renders a development towards political unity quite likely". Quite what that unity would be, however, is open to debate. Martins (2012b) believes that, while similarities can be detected in the ceramic assemblages of the Tapajós, certain morphological differences suggest a level of local autonomy (2012b, p. 52). Schaan does not identify technological and iconographic differences between the ceramics of Santarém and the inland sites. She writes that within the Tapajó 'domain,' "feasting and ceremonies appear pervasive pointing to social equality and solidarity instead of a rigid hierarchy" (2016, p. 34).

2.4 Archaeology and language

2.4.1 The Incised Punctate Tradition and Carib languages

The IPT tradition is closely related to the Arauquinoid and Valloid series or traditions of Venezuela and the Guianas (Cruxent & Rouse 1958; Roosevelt 1980; Tarble & Zucchi 1984; Rostain & Versteeg 2004). The dissemination of Arauquinoid potteries was associated by Lathrap (1970) and Zucchi (1985) with the expansion of Carib speakers from the Orinoco Valley into Amazonia from around 800-1000AD. Lathrap also affirmed that he was not claiming that "all the fine-line incised styles… discussed were made by Carib groups or that all Carib groups, as of contact time, made ceramics which could be accommodated within the broad stylistic tradition outlined above"; notwithstanding, "the general timing and direction of expansion of this stylistic tradition correspond remarkably well to the known fact of Carib expansion" (1970, p. 170). Extrapolating from ethnohistoric accounts of Carib warfare in the Guyana and Orinoco regions and St. Vincent and Grenada in the Lesser Antilles (J. Oliver, pers. comm., 2 January 2017), Lathrap described the Carib expansion into Amazonia through the perspective of the dominating male, as happening through "raiding parties of young men who attacked the neighbouring peoples. All adult males of the conquered villages were barbequed and eaten while the *more desirable women* were taken as wives" (Lathrap 1970, p. 164, my emphasis).

Nimuendaju noted that the Jesuit João Felipe Bettendorf, who authored texts in the Tupian-based lingua franca of northern Brazil, called Língua Geral,[29] required an interpreter to communicate with the Tapajó (postulated as the makers of IPT Santarém ceramics). This observation may be misleading however, since Bettendorf may not have spoken the Língua Geral himself when he first arrived in Santarém, as he was then very new to the region (M. Harris, pers. comm., 6 December 2016). But Bettendorf did mention the Tapajó's language as distinct from the Língua Geral when he wrote about translating the catechism (Bettendorf 1910 [1693-1699], p. 168; Nimuendaju 1952, p. 6). Heriarte also distinguished the language of the "Orucucuzes and Condurizes" (the latter being related to Konduri pottery mentioned above) from the Língua Geral (Heriarte [1662] cited in Nimuendaju 1952, p. 6). Nimuendaju adds that the name of the 'cacique' of the Tapajó mentioned by Gaspar de Carvajal was "Chipayo" and that this "has no meaning in the Lingua Geral," belonging rather – "like so many other geographical names along the Amazon and on the north coast of Brazil which end in -jó and -yú, to a now extinct language which was evidently dominant in these regions before the expansion of the Tupí language" (Nimuendaju 1952, p. 5). Nimuendaju explains that:

> Of the Tapajó language we know only three proper names, that of the tribe, that of the chief, Orucurá, and that of 'the devil,' Aura (Heriarte, 1874, p. 36). None of these can be interpreted in Tupí. The last suggests the "awirá" (post-palatal i) with which the Aparaí designate the yellow headed buzzard (*Cathartes aura*, Linn.), and it is noteworthy that the Aparaí name of the black headed buzzard (*Coragyps atratus,* Bechst), "kurumú", is found in this area as the name of a range of hills near the mouth of the Trombetas. According to de Goeje, these two names designate mythological beings among the Wayána Indians. It is true that the great majority of the native place names of the region are from the Lingua Geral, which is still not entirely extinct in Alter do Chão. Others, however, doubtless belong to non-Tupí languages, and among these are some which have interpretations in Carib languages
> (Nimuendaju 1952, p. 6).

[29] The *Língua Geral Amazônica* (or *Nheengatu*, meaning 'good speech') started in the seventeenth century in Maranhão and Pará, as a semi-creolized variety of Tupinambá. It was adopted by missionaries who implemented it as a major language of inter-ethnic communication, and spread it to the rest of the Amazon from the seventeenth to the nineteenth century (Aikhenvald 2012, p. 30).

2.4.2 Tupian archaeology

Archaeological attempts to study Tupians and identify their centre of origin date back to the nineteenth century (see Noelli 1996; 1998, p. 651). Greatly inspired by the work of Aryon Rodrigues, José Proenza Brochado sought to establish a method of inquiry that drew together archaeology, linguistics, anthropology and history in order to understand the long duration of historical processes related to Tupian peoples. Brochado shunned attempts (such as those advanced by PRONAPA, led by Betty Meggers) to divorce the archaeological record from the peoples who had produced it and argued that instead, ethnographic connotations of ceramic traditions and styles ought to be actively pursued (Brochado 1984, p. 1).

The work of Rodrigues, Brochado, Lathrap and later Noelli has influenced a branch of Brazilian Archaeology that has come to define itself as *Arqueologia Tupi*, or *Tupian Archaeology* (e.g. Almeida 2008; 2013; Corrêa 2014; Garcia 2012; Noelli 2008; Silva & Noelli forthcoming; Miller 2009; Zimpel 2008). In a nutshell, the underlying aim of this research agenda is to contribute towards the construction of a long duration history of Tupian peoples (Corrêa 2014, p. 17). Noelli (1993; 1996, p. 10; 1998) would offer a central concept to this sphere of research – that of *expansion*, instead of migration. Migration entails abandoning the place of origin and moving elsewhere – this is an appropriate way of describing Tupian movements following European conquest, caused by territorial encroachment and displacement. However, pre-colonial movements appear to have been caused by factors such as demographic growth, socio-political situations leading to village fissioning and agroforestry management. This would not entail abandonment of territory:

> Research in ethnobiological and indigenous history has been demonstrating that territories under the domain of some of the Tupian peoples were slowly conquered, managed and retained for long periods… The adequate term to define these dislocations, therefore, is *expansion*, meaning prolongation, enlargement, extension (Noelli 1996, p. 11, my translation).

One of the working assumptions of Tupian archaeology is that populations of speakers of the different Tupian languages produced ceramic assemblages that contained specific characteristics, reflecting their linguistic drift and varied historical processes (see Noelli 2008, p. 16). But however distinctive, the vessel sets produced by speakers of different Tupian languages are thought to share a common point of departure in terms of certain rules or 'grammars', transmitted successively across the generations (Corrêa 2014, p. 18-19). These rules or grammars would particularly relate to correlations between vessel shape, surface treatment and vessel use. Rather than an exercise in essentialism, this should reinforce the premise that Tupians do possess conservative aspects within their cultures, which is what has permitted linguists and anthropologists to speak of similarities between their various communities of speakers (F. Noelli, pers. comm., 27 October 2016). It is worth noting, for instance, that the word for cooking vessel and for storage vessel is very similar among different languages of different Tupian language families (Silva & Noelli forthcoming, table 2).

2.5 Discussion

This thesis is therefore inserted within the overarching frameworks of Culture History and Historical Ecology. Elsewhere in Amazonia, Historical Ecology has provided a more nuanced and holistic reading of the archaeological record and provides a bridge between the past and occupations in Amazonia today. In our examination of ruptures and continuities between the past and the present, this is an important avenue to follow. The sites investigated are composed of ADE patches, which suggests their occupation may have been continuous over time.

Wider-scale interpretations of archaeological ceramics and their potential relationships to speakers of particular language stocks and families are also central to this study. For all its possible pitfalls and limitations, this association allows us to think of archaeology as indigenous history. The presence of IPT ceramics downstream and the association of Mangabal material with the Munduruku upstream connect this investigation with over-arching archaeological and linguistic formulations concerning the *longue durée* of Carib and Tupian peoples respectively.

The presence of Carib speakers and their potential association with the IPT must be further explored. Their expansion into the Tapajós is denoted by present-day distributions of speakers of the Pekodian branch in the region and is therefore a given, but except for Lathrap's proposition of violent conquest, we have little idea of the form(s) this expansion may have taken. The relationship between occupations along the lower rapids of the Tapajós and the Tapajó "chiefdom" is also unclear.

The analysis of archaeological ceramics potentially related to Tupians, on the other hand, will allow for an assessment of whether the elements thought to be common to all Tupian potteries – vessel morphology, surface treatment and vessel use – are indeed present along the assemblages studied from the Upper Tapajós. The presence or absence of these characteristics must then be explained. Further hypotheses related to the expansion of Tupian peoples specifically in relation to the Tapajós will be presented in the following chapter, which will contextualise the study area in terms of its physical, historical and social aspects.

Chapter 3. The Tapajós

It is widely accepted that in social and in environmental terms, there is not one, but many Amazons. But variations within the various Amazonian regions can be just as dramatic. This chapter aims to contextualise the Tapajós. First, a brief summary of some its physical aspects will be offered. Hypotheses generated by scholars of Carib and Tupian peoples that are relevant to the Tapajós will subsequently be addressed. The region's tumultuous history from c. 1500 will then be described and followed by a short panorama of its peoples in the twentieth century. These constitute vital elements in my endeavour to bridge the gap between the pre- and post-colonial pasts of the Tapajós, and will contribute to an appraisal of ruptures and persistence in the region.

The rapids of the Tapajós are a significant geomorphological formation that shaped not only its ancient but its post-1492 history, so that European conquest and colonisation were far delayed in the Upper Tapajós in comparison with the river's lower course. The difficulty of access to the area also results in a huge disparity between written records for the lower and upper course of the Tapajós, and in the amount of scientific research conducted in different areas of the basin. This is signalled by the quantity and quality of information regarding the physical characteristics of the Lower and Upper Tapajós.

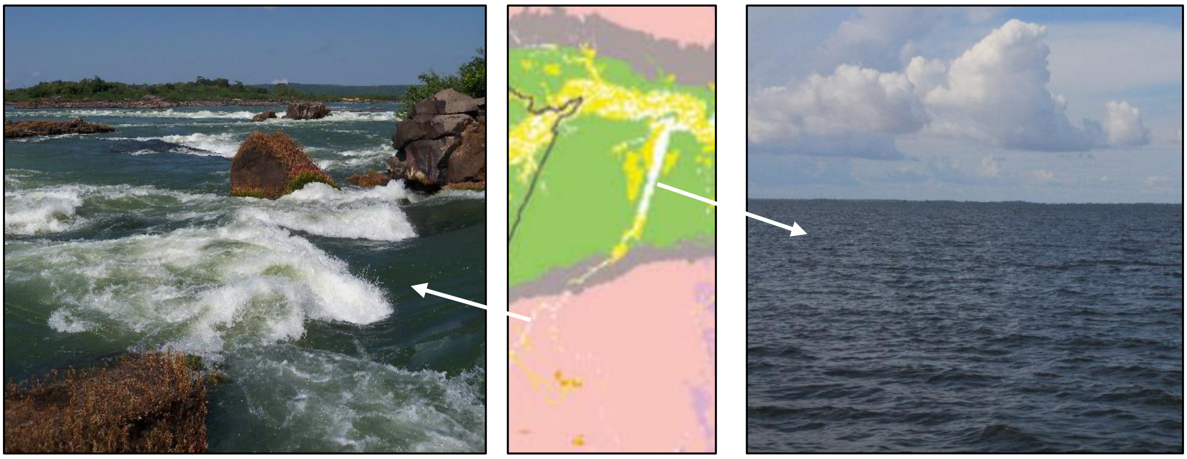


Fig. 9 The contrast between the upper (left) and lower (right) course of the Tapajós is determined by geological factors (centre). Adapted from Honorato de Oliveira (2015, p. 22). Geological map extracted from Schobbenhaus & Neves (2003, p. 27).

3.1 Geographical setting

In the Tapajós basin, significant differences in the geomorphology, climate, water and biodiversity exist. Bridging the savannah-type *cerrados* of the Brazilian shield and the Amazon rainforest, the Tapajós basin is situated to the south of the Amazon River, in its central region. With visibility reaching as deep as 5m, the most crystalline of Amazonia's waters[30] pour northwards over numerous falls, rapids and cascades until they reach the relative tranquillity of the lower course of the Tapajós – in turn characterised by a wide alluvial plain, with sandy shores, which is followed by a lowered plateau of approximately 100m elevation, with low hills and ravines (Scoles 2016, p. 29-31). The clearness of the water is explained by the Brazilian Shield's geological antiquity, of approximately 3.5 billion years, which results in a low content of sediments (Goulding *et al*. 2003; Hales & Petry 2016 cited in Scoles 2016, p. 30-31). The presence of phytoplankton can tinge the water green (Morais 2008).

Apart from the Amazon floodplain**,** which results from the accumulation of Holocene alluvium and is limited to the river's left bank, around the town of Itaituba, all other geomorphological units present within our study area are characterized by steep hills and tableland. Thus, most of the study area lies in an upland, or *terra firme* context, which until recently was regarded by archaeologists as unfavourable for the development of agriculture.

Encompassing the states of Mato Grosso, Pará and Amazonas, the Tapajós basin covers extensive and diverse ecosystems from the higher elevations of the Mato Grosso savannahs until the floodplain system found in the vicinity of Santarém. The principal tributaries of the basin are the Jamanxim, flowing in a NW direction into the middle course of the Tapajós, the Juruena and Teles Pires. The meeting of the latter two forms the Tapajós River proper.

The Tapajós-Juruena River system's climate is hot and humid (Espírito-Santo *et al.* 2005 cited in Scoles 2016, p. 30). The rainy season is around the months of January to June. Towards the south, the dry season – when it rains less or not at all – is generally longer

[30] Goldmining activity is having a severe effect upon this however, making several tributaries appear as 'white water' (i.e. brownish, mud coloured) rivers on satellite images.

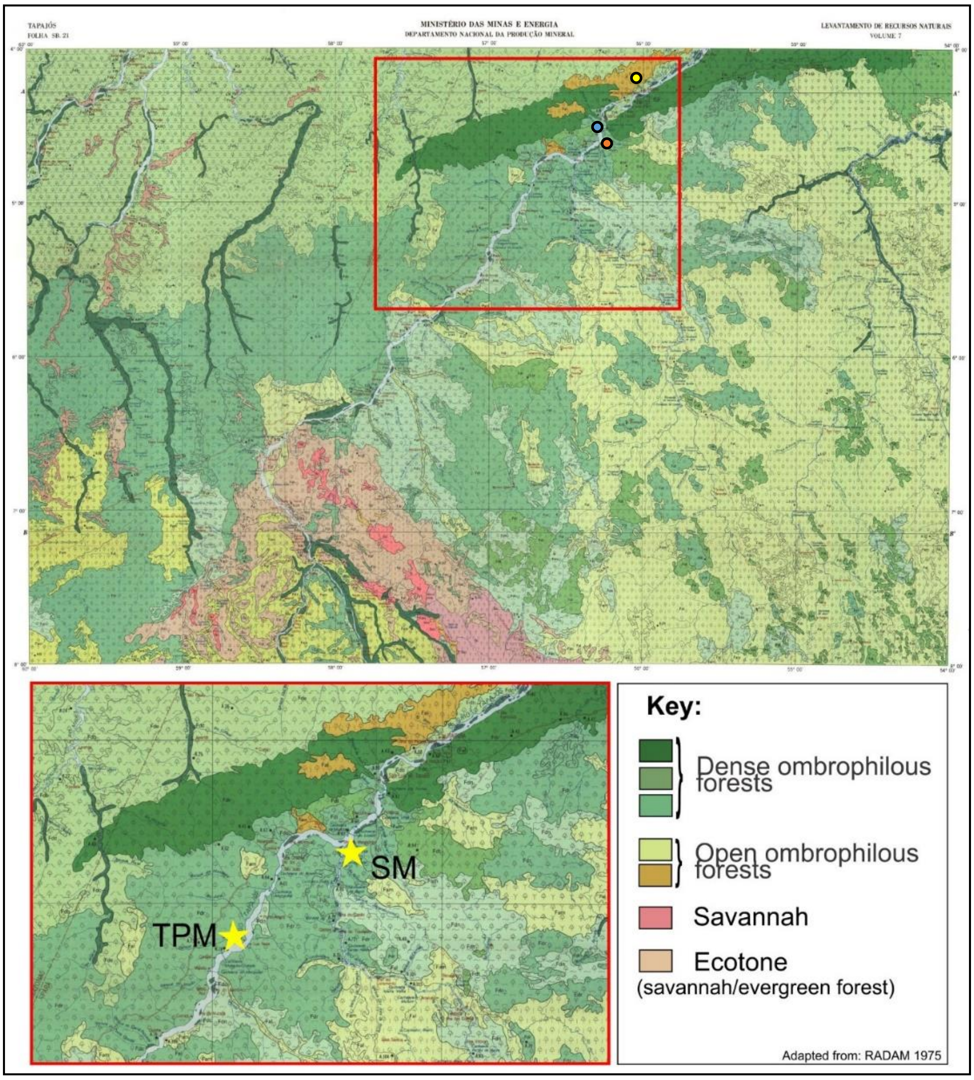
than to the north (Brasil/MPOG/IBGE cited in Scoles 2016, p. 31), though average yearly precipitation in the Serra do Cachimbo mountains to the southwest is higher than in Santarém (2,900ml in contrast with 2,100ml). Periods of high water level similarly vary, beginning earlier (around September or October) upstream than towards the river's lower course. Water level can fluctuate between 4-5m. Data for the northern tributaries and mouth of the Tapajós indicate significant changes to the water's acidity, from pH 4 to 7 (Sioli 1984; Junk *et al.* 2007; Cunha 2008 cited in Scoles 2016, p. 31).

Humid tropical rainforest prevails for much of the Tapajós basin – this can be subdivided into dense ombrophilous forests (DOF) and open ombrophilous forests (OOFs). DOFs possess exuberant vegetation, with high biodiversity and complex forest stratification; there is tremendous presence of lianas[31] and epiphytes. Different forest formations can further be distinguished at different elevations, these being alluvial (0-5m), lowland (5-100m), submontane (10-600m) and montane (600-2000m) forests. In areas with dry seasons of over 60 days per annum, DOFs are replaced by OOFs, which in comparison present reduced forest stratification, a lower canopy and a greater presence of clearings – this is what prevails in the southern part of the Tapajós basin (Scoles 2016, p. 33-34).

The high rates of biodiversity in the Tapajós region are often referred to, in spite of the great asymmetry between the enormous amount of research conducted along the Lower Tapajós (particularly in the FLONA Tapajós)[32] and the river's upper course. In a survey of fishes conducted in 2011 at 27 collection points along the upper course of the Tapajós, ichthyofauna belonging to nine orders, 40 families and 204 species – 20 of which had not yet been described – were located by the ICMBio[33] (Britzke & Senhorini 2011 cited in Scoles 2016, p. 35).[34]

[31] William Balée has suggested liana forests in the Xingu may be linked to past human occupation (1989a, p. 9-14; 2013, p. 43-49).
[32] FLONA is the Portuguese acronym for Floresta Nacional, or National Forest, which is a type of conservation area (public land).
[33] ICMBio is the Portuguese abbreviation for the Instituto Chico Mendes de Conservação da Biodiversidade, which is part of the Ministry of the Environment and which is responsible for the management of conservation areas, among other things.
[34] The survey was conducted along tracts of the Tapajós that would be affected by dam construction, so the upper section of the river was focussed upon.

The environmental conditions described above were likely encountered by the occupants of the Terra Preta do Mangabal and Sawre Muybu archaeological sites, from c. 700-1100AD; and if this assumption is correct, they also probably prevailed in the region over the last 500 years.[35]



Map 3 Phyto-ecological map of the Tapajós upstream from Itaituba. Insert shows Terra Preta do Mangabal (TPM) and Sawre Muybu (SM). Forests closest to sites investigated include broadleaf and submontane forests. Yellow dot in top map pinpoints town of Itaituba, blue dot represents port of Boburé and orange dot, the community of Pimental.

Reproduced and adapted from RADAM 1975 Tapajós.

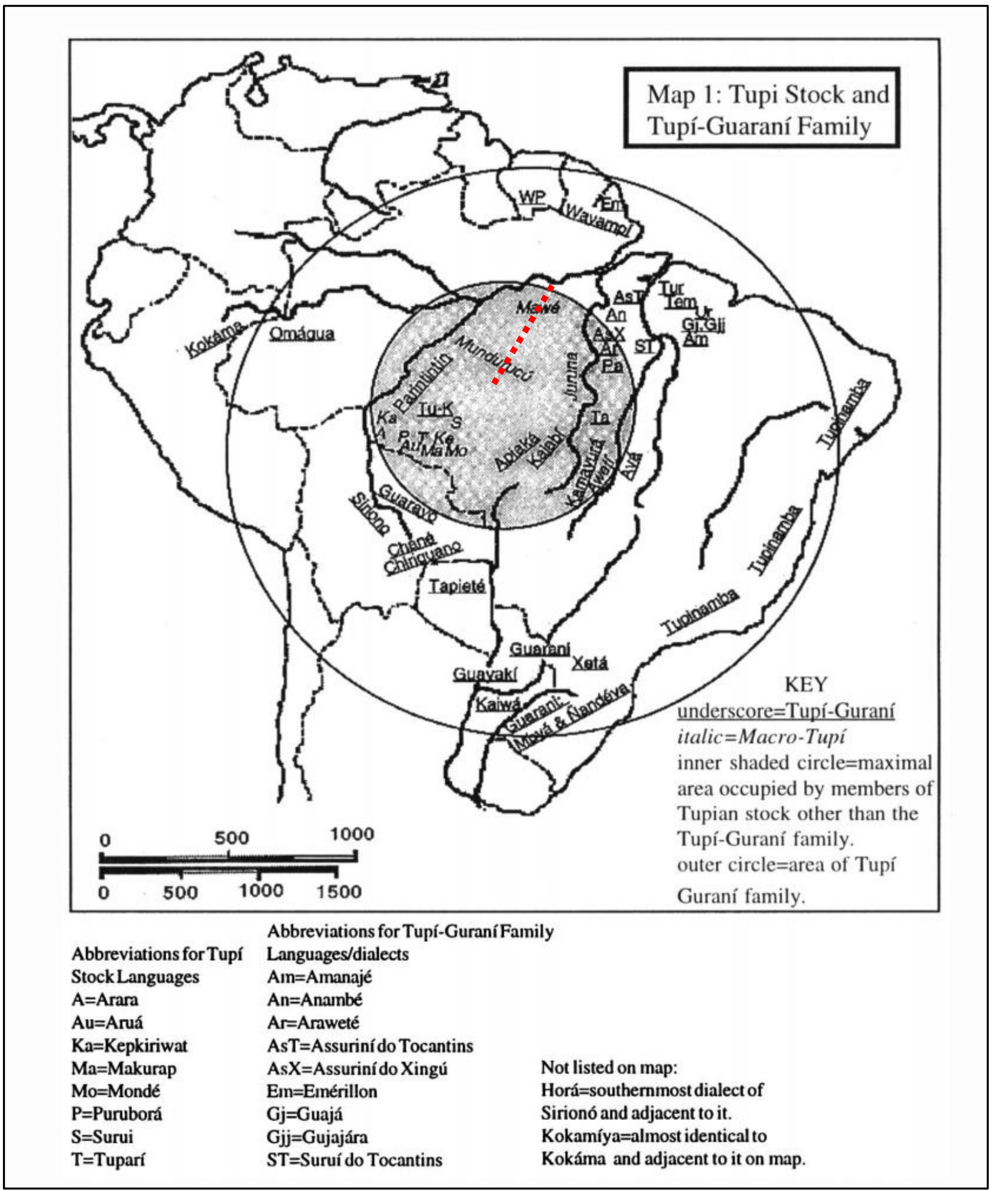
3.2 Persistence on the Tapajós

3.2.1 The Tupi

A number of Tupian speakers would have traversed the Tapajós from the present-day state of Rondônia in an eastwards expansion towards the Xingu and Araguaia-Tocantins basins. These include speakers of Kuruáya (Munduruku language family), members of

[35] Chapter 5 will consider how pre-Columbian human occupations at Sawre Muybu and Terra Preta do Mangabal shaped the ecology of the landscape studied.

the Juruna language family (Juruna and Xipáya) (Rodrigues & Cabral 2012, p. 500-501) as well as speakers of Tupi-Guarani languages. Rodrigues and Cabral posit that "Some other Tupí-Guaranían groups took a southbound course, displacing themselves to the south, mainly following upwards the Tapajós river and its formers, the Arinos and the Juruena, whose headwaters approach the riverhead of the Paraguay;" they belong to the Tupinambá, Guaráyo, and Guaraní branches of the Tupi-Guarani family (Ibid., p. 500).[36] Others remained in the Tapajós basin, or in the Tapajós-Madeira interfluve; these include speakers of the Mawé family, the Munduruku family, and some speakers of the (Tupi-Guarani) Kawahíb branch of languages (Apiaká, Parintintín) (Ibid., p. 500).



Map 4 Tupi Stock and the Tupí-Guaraní Family. Reproduced from Urban (1996, p. 66).

The Tapajós is not shown on the map; its approximate location is signalled by the red dotted line.

[36] The Arinos is a tributary of the Juruena River.

Greg Urban (1996, p. 70) suggests that "the Macro-Tupian languages began their dispersal in the uplands and that some of them moved downstream, coming in contact with cultural developments along the Amazon river and possibly participating in them." He terms this the "headwaters hypothesis": that the Tupi language stock would have originated along the headwaters of the southern Amazonian tributaries around 4-6 thousand years ago, meaning their initial 'ecological adaptation' would have taken place in more open, savannah-type environments (2006 [1992], p. 92).

Urban (1996, p. 64) further posits that "The languages that branched off first did not travel very far, or, at least, they ended up within a relatively circumscribed area" when compared to speakers of Tupi-Guarani languages, whose extent is encompassed by a circle of more than twice the diameter of the area occupied by the rest of the stock (Ibid., p. 68). On this basis, he hypothesises that there is a fundamental difference between speakers of Tupi-Guarani and speakers of other Tupi language families, which explains this distinct relationship to space (Ibid., p. 68-69). He highlights the need for archaeological investigations along the Tapajós to verify his proposals (Ibid., p. 64).

3.2.2 Carib presence on the Tapajós

Writing on the Bakairi in the upper Xingu and Teles Pires basin, Barros (2001, p. 314) calls on further ethno-historical and archaeological research to verify a north-south Carib migration along the Tapajós. Meira (2006b, p. 161) speculates that, even if remotely, the Bakairi language presents certain aspects that links it with Guianese languages (such as Apalai). The Bakairi also maintain within their oral tradition the memory that they migrated, "walking against the sun," and that their ancestors lived along the banks of "a large river" (Barros 2001, p. 314). Given the upheaval of the colonial period on the Tapajós, it seems probable that this migration occurred following the European invasion of Amazonia.

3.3 The Tapajós on the margins of History: the colonial and republican periods

> A história nunca é exata
> ("History is never exact")
> (Jairo Saw Munduruku, pers. comm., 20 November 2015).

The European colonisation of Amazonia ushered momentous changes that led to a major reconfiguration of the region's ethnic make-up. In the Tapajós region, as elsewhere in the Americas, this was a period of profound transformation ushered in by epidemics, missions and slave raiding following Cabral's landing on the Brazilian coast in 1500. These historical processes did not happen uniformly across the Amazon region, or even within the Tapajós basin. Contact was "a temporally extended process, rather than a single instant or event that ruptures the otherwise pristine Garden of Eden into which Europeans at first believed they had stumbled (Hemming 1978)" (Whitehead 1993, p. 288). Amerindian responses to conquest and colonisation varied dramatically, leading to very different outcomes for the many different peoples involved. Understanding the changes that took place during this period is necessary in our attempt to bridge the gap between the pre-Columbian and post-Conquest history of the region, aiding our assessment of long-term change and persistence in the Tapajós, particularly its upper reaches.

Following Orellana's journey in 1541-1542, the history of most of the Tapajós River is hardly documented until the mid-eighteenth century. In the early seventeenth century, the English, Irish and Dutch vied for influence in the Lower Amazon – the Dutch even established trading forts (Myers 2004, p. 224; Sweet 1974 cited in Isaacson 1981, p. 41). In the 1630s, the English and Irish drew up plans to establish a settlement on the Tapajós River (Lorimer 1989, pp. 116-7, 125, 432-433), following a reconnaissance expedition around 1638 (Lorimer 1989, pp. 117, 437). Charles I's political troubles in England discouraged him from backing such a venture in the face of growing Portuguese presence in the area, however (Lorimer 1989).

While the first European chroniclers to travel in the Amazon wished to record in detail what they were seeing for the first time (Menéndez 1981/1982, p. 292), the subsequent seventeenth and eighteenth century literature on the Amazon has been divided into two main periods (Porro 2006, p. 8). The first phase, from the 1600s to the 1750s, reflects the pre-eminence of regular clergy in colonial society and culture.[37] Dismissed as baroque and pre-scientific, several of these historical sources pertaining to the Estado

[37] On a wider scale these sources could be distinguished according to their engagement with Enlightenment ideals.

do Maranhão e Grão-Pará have been neglected by scholars; notwithstanding, they contain a wealth of information (Porro 2006, p. 7). The second phase came into being following the Marquis of Pombal's expulsion of the Jesuits, under the *Diretório* (1755-1798), when power was secularised and most authors we come across are administrative officials, magistrates and military men; few belong to religious orders (Porro 2006, p. 8) – when they do, they tend not to criticise settlers or the administration. By the nineteenth century, the nature of the accounts produced about the Amazon and its peoples again changed significantly, as enlightened men of science travelled to the area and strove to depict its 'disappearing' peoples (Cunha 2006 [1992]).

Relationships between Europeans and Amerindians – characterised by social exclusion and the imposition of new standards of behaviour, meant that Amerindians were barred from literacy, even by missionaries. Written sources thus provide us not with "a history narrated *by* Indians, but rather, *about* the Indians, left by white informers" (Porro 2007, p. 8). As a result, our perception of Amerindian agency is filtered through the perceptions and values of Europeans:

> In three hundred years of conviviality with hundreds of tribes, the fact that under forty people merited having their names registered – and in general, for banal reasons –, illustrates well the insignificance of the Indian as a human being to the white man. In the mid-eighteenth century, even João Daniel, missionary and connoisseur of Amazonia, would say that Indians 'only by their features appear to be people [for] in their way of living and working they should be understood as beasts'
> (Porro 2007, p. 10).

Names used to refer to social or ethnic collectivities were often vague; ethnonyms registered could refer to 'tribes', phratries, sibs or even local groups.[38] Furthermore, the "freezing and isolation of these ethnic groups is a post-Columbian phenomenon"; the attribution of ethnonyms resulted from "total incomprehension of the ethnic and political dynamics of the Amerindian *socius*" and of the "relative and relational nature of

[38] See Robazzini (2013) for compilation of ethnonyms cited from the sixteenth to the nineteenth century within the Tapajós basin.

ethnic, political and social indigenous categories" (Viveiros de Castro 1993 cited in Monteiro 2001, p. 57). The essentialisation of ethnic categories was in fact part of a deliberate operation of classifying subordinate (or potentially subordinate) subjects into naturalised and rigid categories – a fundamental condition for colonial domination, leading to what is otherwise referred to as 'tribalisation' (Monteiro 2001, p. 57).

3.4 The effects of Old World diseases

The arrival of Old World diseases – including smallpox, measles, influenza, tuberculosis, malaria and yellow fever – heralded a new era for Amerindian peoples, decimating their numbers. Environmental historian Alfred Crosby (1976) asserts that "As far as we can say now, Old World diseases were the chief determinants in the demographic histories of particular tribes for 100 to 150 years after each tribe's full exposure to them" (1976, p. 292). So-called virgin soil epidemics would have killed large percentages of people aged fifteen to forty, "…men and women of the prime years of life who are largely responsible for the vital functions of food procurement, defence**,** and procreation [sic]" (1976, p. 294). This type of scenario has a deadly impact upon infants, who, besides not possessing antibodies for protection, are "often neglected by ailing adults during such epidemics and often die when their ailing mother's milk fails" (1976, p. 294). Because children in indigenous societies are commonly dependent on their mother's milk until two years of age, its failure boosts the death rate during epidemics (1976, p. 294).

A number of factors would have contributed to the proliferation of smallpox, measles, influenza and tuberculosis and to the intensification of their effects. Mission settlements were "critical in creating stable pools for reinfection" (Whitehead 1993, p. 290). The lack of experience of these contagions meant quarantine of the sick was rarely practiced (Crosby 1976, p. 296). Cook (1955 cited in Dobyns 1966, p. 411) comments on "the biological fact that epidemic infection is not limited to tribal populations in immediate face-to-face contact with Europeans… but extended outward as far as disease agent and vector could spread from intrusive (white) carriers to aboriginal populations". Disease could even be transmitted in cases of 'silent trade', when items such as feathers – potential carriers of lice, bacterial, and viral organisms – were left in bamboo tubes sealed in beeswax (Posey 1987, p. 141). While Whitehead (1993, p. 289) warns against imputing "far too uniform a characteristic to the spread of epidemics, not allowing for the way in which transmission rates are affected by diet, physical settings, social practices and active native responses to epidemics," he does not dispute that before physically encountering Europeans or Africans, Amerindians died from Old World diseases. Located at a major juncture of pre-Columbian networks, Santarém at the mouth of the Tapajós would likely have acted as a centre of dispersal for hitherto unknown diseases, through trade goods and person-to-person contact, once it become a stop-off point for European vessels ascending and descending the Amazon River.

3.5 The Tapajó and the Tupinambá

Carvajal is responsible for the first written reference to what is widely accepted to be the Tapajó people and river in 1542:

> …they did not let us rest one moment; on the contrary, there were more and more warriors every hour, indeed the river was all cluttered up with pirogues, and this [was] because we were in a land thickly inhabited and one belonging to an overlord whose name was Nurandaluguaburabara
> (Carvajal cited in Medina 1934, p. 226).[39]

Other manuscripts record the name Ichipayo in reference to the overlord of this territory. Ethnologist Curt Nimuendaju, one of the prime exponents of the archaeological remains of the Tapajó in Santarém from the 1920s, thought Ichipayo more likely, and reminiscent of "Tapajó" (Nimuendaju 1952, p. 3).

The Spanish Jesuit Cristóbal de Acuña [1641] penned the next widely known reference to the Tapajós River and its inhabitants. He accompanied the Portuguese captain Pedro Teixeira's expedition back downstream from Quito in 1639, at the end of the period of Iberian union (1580-1640). Teixeira had led the first Portuguese expedition to the Tapajós in 1626, reaching the bay of Alter-do-Chão (Nimuendaju 1952, p. 3), from where forty Amerindian captives were taken to Belém to be enslaved (Menéndez 1981/1982, p. 297). He returned two years later, in the company of Bento Rodrigues de Oliveira (Menéndez 1981/1982, p. 297). He used such violence that the Governor of

[39] Before returning to the Amazon River in 1545-1546, Orellana spent approximately two months in Cape Verde, where, according to Pedro de Guzmán, 98 members of the expedition died from an "unnamed infestation" (Myers 1988, p. 65). Orellana would himself fall ill and die in "the province of San Juan (Tapajós)" (Guzmán 1934 cited in Myers 1988, p. 65).

Pará later decreed that there should only be two *entradas* (slaving expeditions) a year, which would have to be previously authorised by him. Isaacson (1981) reasons that "between 1615 and 1626 the Portuguese through disease and slave trading had already decimated the numerous native groups around Pará [i.e. Belém] and Maranhão [i.e. São Luís] all the way to the Rio Tapajós in order to warrant Teixeira's forays up the Tapajós" (Ibid., p. 43).

Layman Maurício de Heriarte also travelled with Portuguese captain Pedro Teixeira and later was appointed magistrate by the Portuguese King. Heriarte wrote that the Tapajó were "feared by the other Indians and nations and in this way have become sovereign of that district" (Heriarte 1874 [1662], p. 35). He claimed the Tapajó occupied the largest settlement known to Europeans and had "sixty thousand arrows", in other words, sixty thousand warriors (Ibid., p. 35).[40]

The "Great Island of the Tupinambás" (1994 [1641], p. 148), which connected the lower Tapajós, Lower Amazon and Lower Madeira Rivers, was also described by Acuña. The Tupinambá, who were Tupi-Guarani speakers, had recently arrived, following a long migration from Pernambuco in northeastern Brazil and had apparently come to dominate a large territory to the west of the lower Tapajós. Acuña alleged that in spite of being fewer in number, they "ravaged and dominated all those with whom they engaged in warfare, annihilating whole nations while forcing others to abandon their lands to wander through strange regions" (Acuña 1994 [1641], p. 149). Heriarte declared that other 'nations', including the "Aratús, Apacuitáras, Yaras, Goduis and Cariatos", "paid tribute" to the Tupinambá (Heriarte 1874 [1662], p. 40).

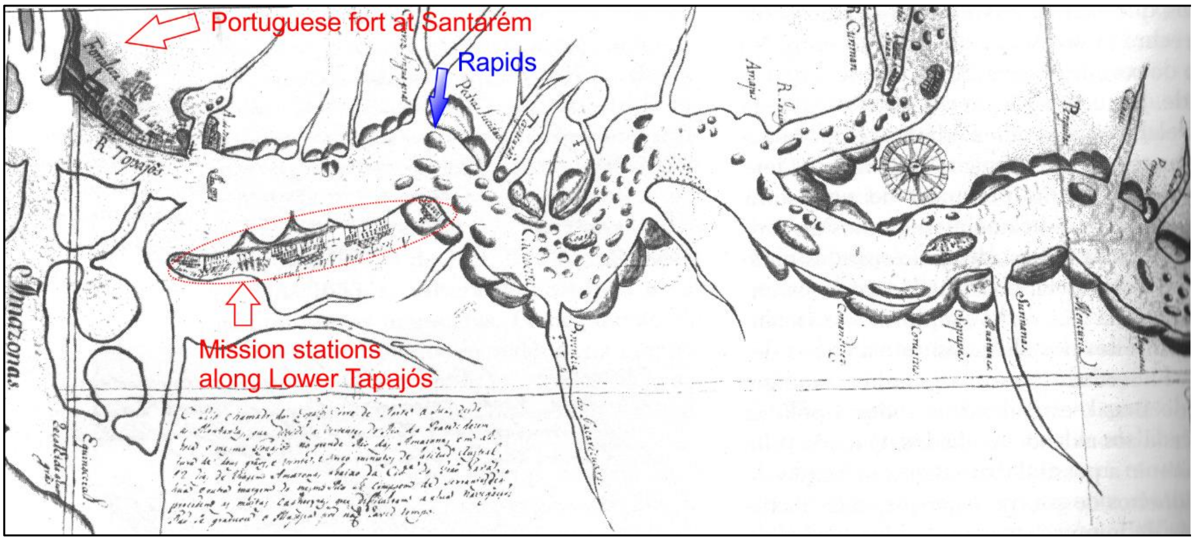
While it is indeed clear that networks connected the Tapajó polity with other peoples inland and upstream, the relationship between these various peoples seems to have been complex. The European concept of slavery entailed altogether different relations from what occurred among native tropical American peoples. Santos-Granero (2011) conducted a study of large-scale Amerindian slave raiding and/or the subjugation of enemy peoples as servant groups during pre-colonial and early colonial times. He advances that the ethnic transfiguration undergone by the Naborey, Makú, and Chané

[40] Heriarte only composed his report twenty years after the expedition, possibly collating reminiscences from fellow travellers (Robazzini 2013, p. 65).

was the “outcome of ‘selective emulation,’ a process by which collectivities involved in political or cultural hierarchical relations seek to imitate or adopt some of the practices of another collectivity perceived as being in some way superior” (2011, p. 344).[41] Potential forms of interaction along the Tapajós need to be further examined; little is known about the Tupinambás in the area in archaeological terms.

3.6 Jesuit rule and the establishment of colonial settlements

Much of the existing knowledge of the early centuries of European colonisation for the Amazon region in general and for the Tapajós in particular comes from the records of the Jesuit order. From 1665, the Jesuits would administer numerous indigenous mission villages (RIHGB 1909, p. xviii). In their “golden years” (Porro 1996, p. 39) prior to their expulsion from the Americas, they dominated the south bank of the Amazon River and its tributaries, the Tapajós, Xingu, and Madeira (Hemming 1995 [1978], p. 467). The Jesuits were responsible for putting into practice the two principal motives for colonisation of the territory: the catechisation and ‘civilising’ of the Indians (Perrone-Moises 2006 [1992], pp. 118, 120).



Map 5. Manuscript map of the Tapajós of the mid-eighteenth century. Five Jesuit villages are drawn here, located not too far from the Portuguese fort, situated on the right bank of the mouth of the Tapajós (upper left of image) (Reproduced from Carneiro da Cunha 2006 [1992], p. 130). © Biblioteca Pública de Évora.

---

[41] Bhabha (1994) goes a step further by proposing that in such situations “the colonised do not produce a copy of the original but rather misappropriate it, subverting it in the process by revealing its ambivalence and denying its authority. From the perspective of the dominant mimicked group, however, the process of selective emulation is seen as producing a copy that is always inferior to the original” (cited in Santos-Granero 2011, p. 344).

The headquarters of all mission activity in Portuguese Amazonia would be established at the mouth of the Tapajós, among the Tapajó Indians. Santarém was also a stop-over for Portuguese incursion expeditions (*entradas*) to the Negro and Solimões Rivers. Antônio Vieira, the Paiaçu ("great father/priest"), was the first Jesuit who arrived with the express motive of going to the Tapajó, in 1659 (Leite 1943, p. 357). Vieira was also to choose Jesuit mission locations in the Amazon and had the power to determine entrances and exits into the hinterland areas (*sertões*) (RIHGB 1909, p. xviii-ix).

As can be seen in map 5, missions were initially founded along the lower Tapajós, remaining within a safe distance of the Portuguese fort in Santarém. In the space of a few decades, they were also established along the Abacaxis, Urariá and Ramos Rivers, which fed into the Tupinambarana channel, in the intermediary area between the Tapajós and Madeira Rivers, as well as on the banks of the Lower Madeira (Menéndez 1981/1982, p. 301).

A consistent procedure known as *descimentos* saw missionaries uprooting Amerindian groups from their villages and resettling them into mission stations (*aldeamentos*). This aggravated the dissemination of diseases and generated a series of territorial dislocations and the weakening or disintegration of Amerindian social organisation along the lower Tapajós and environs. Rather than lofty religious argument, *descimentos* relied on tools and gifts – such as glass beads, sugar cane rum, fishing hooks, knives and metal axes – to lure Amerindians into the *aldeamentos* from their villages in the *sertão* (bush) (Daniel 2004 [1722-1776] pp. 58, 61, 378). Often these mission towns were an amalgamation of diverse ethnic groups. As Jesuit Jacinto de Carvalho wrote in 1719 (cited in Porro 2012, p. 771), the Tapajó, the Arapiuns and Corarienses Indians lived together in the Tapajó mission – amounting to "over 35 thousand Christians".

This was the most prosperous period for the Jesuits, even though there was continual conflict between missionaries and slave raiders (Daniel 2004 [1722-1776]; Leite 1943, p. 361). Much to the dissatisfaction of settlers, missionaries monopolised control of converted Indians, who made up the only available workforce. The Jesuits were

responsible for the allocation of Amerindian labour to colonists (Moreira Neto 1988, p. 21; Perrone-Moises 2006 [1992], p. 120).
The collection of forest resources known as *drogas do sertão* was the first 'industry' of the Lower Tapajós and interior areas from the mid-seventeenth century. These activities tended to be under mission control (e.g. São José 1847 [1763], p. 77) and sought to supply Belém (Menéndez 1981/1982, p. 307). *Drogas do sertão* ('drugs of the wilds') included *salsaparilha* – a wild tropical vine used for making medicinal tea and in great demand as a palliative for syphilis –, wild cacao, *cravo* (similar to cloves in taste), Brazil nuts, oil or butter from turtle eggs, dried fish, Amazonian vanilla, spicy peppers, *guaraná*, among others (Hemming 1987, pp. 16, p. 526 [footnote]).

The Portuguese divided Amerindians into two distinct categories. They could be *aldeados* (living in mission villages) and allied to the Portuguese, or they could be enemies, scattered throughout the *sertões* (hinterlands). Legislation and policies were drawn up according to this distinction: Indians who were *aldeados* and allies of the Portuguese were considered 'free' (though they were liable to have to provide labour for settlers) and were granted ownership of lands around the mission settlements. Settlers were supposed to pay them a wage and treat them humanely, because after all, "The support and defence of the colony was recognised to depend on them" (Perrone-Moisés 2006 [1992], p. 117). This principle was frequently flouted. Meanwhile, 'enemy' Indians were often invented by Portuguese settlers in order to justify slave-raiding expeditions. Hostile engagements of this sort were considered a last resort, and had to be justified to the Crown. Documents relating to such attacks speak of the "bestiality", "cruelty" and "barbarity" of the Indians in question; in response, several recommendations of "total destruction" of these 'enemies' were issued in the seventeenth and early eighteenth centuries (Perrone-Moisés 2006 [1992], p. 125-126).

Finished in 1698, the Luxembourgian Jesuit J.F. Bettendorf's personal account of his experience on the Tapajós is peppered with references to the constant and devastating outbreaks of disease that led to a steady decline in Amerindian populations over the years (1910 [1693-1699], pp. 491, 606, 651). Bettendorf recalled that some "Tupinambaranas" and Tupinambá had begun to refuse baptism and extreme unction, associating it to a premature death (1910 [1693-1699], pp. 261, 653). The Tapajó and

Tupinambá polities, which had previously commanded strategically-located trade centres near the east and west of the mouth of the Tapajós River, would no longer exist by the eighteenth century (Menéndez [2006] 1992, p. 282). A seismic shift in the Amerindian geopolitics of the Tapajós region and a transformation of its social configuration was already underway.

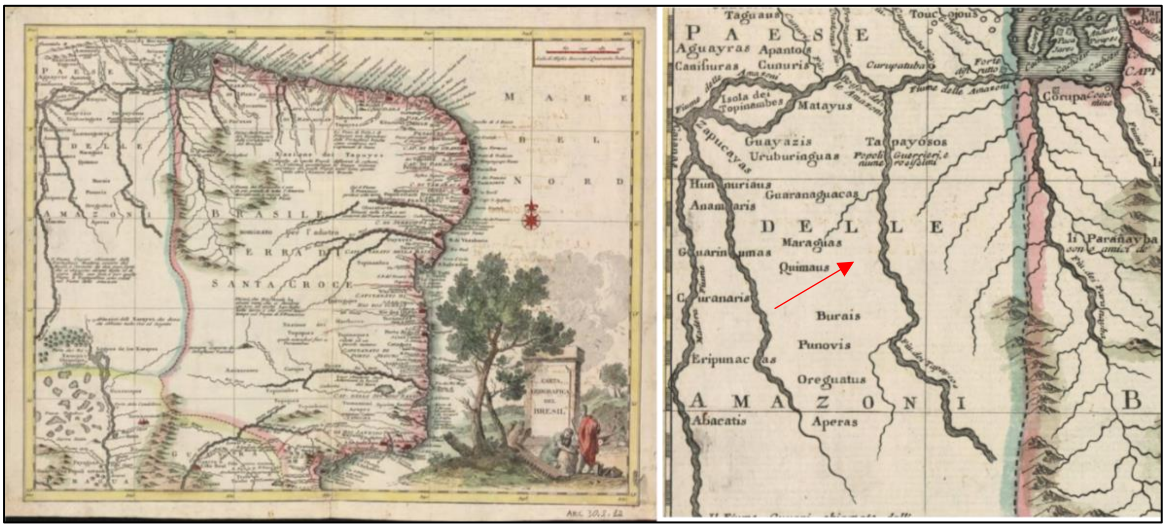
3.7 Beyond the Lower Tapajós

The Jesuits were the first Europeans to advance within the area lying in between the Tapajós and Madeira Rivers (Menéndez 1981/1982, p. 299). In 1714, Bartolomeu Rodrigues, who was stationed at the Tupinambaranas mission, registered and located 85 Amerindian groups who lived or had been attracted to the Tapajós-Madeira area (Porro 2012, p. 762) suggesting the area was densely populated at the time (Menéndez 1981/1982, p. 319; Robazzini 2013, p. 81). Later sources do not repeat many ethnonyms mentioned by Rodrigues, however (Robazzini 2013, p. 81); we cannot be sure whether this was due to the fatal spread of diseases or to the fact that the ethnonyms registered were in fact sub-groups or names that were not self-referential (Mark Harris, pers. comm. 4 December 2016). The fact that the missionary José Lopes relocated the Tupinambaranas mission in the period 1735-1740, when he founded the Santo Inácio mission[42] on the left bank of the Tapajós in search of more salubrious airs (Menéndez 1981/1982, p. 325), suggests disease had been an issue. Other peoples joined the Sto. Inácio mission, including the “Comandióros”, many “Suariranas”, “Apenoirios”, the Periquitos and two hundred “Guarupas” (Caeiro 1936 cited in Menéndez 1981/1982, p. 325).

Some of the ethnonyms referred to by Rodrigues had been mentioned by previous sources, and were associated with different locations. Fritz [1691] had situated the Sapupés on the left bank of the Tapajós, while Rodrigues [1714] placed them closer to the Mahué River. Other ethnonyms would only be mentioned by Rodrigues. Others still would be cited in later sources, such as the Sapupé, Periquito, Apanariâ and Soarirana (Robazzini 2013, p. 84).

[42] Sto. Inácio mission would be renamed Vila de Boim in 1758.

The Jesuit Order did not manage to establish missions beyond the rapids of the Tapajós (Leite 1943, p. 365), however: they stood as a physical buffer between Amerindian societies upstream and the emerging colonial society downstream. Information about the events taking place would have reached the peoples living in the Upper Tapajós through trade networks, however, and European trade items – and possibly disease, would also have preceded the physical presence of Europeans and their descendants there.



Map 6 Map of Brazil before the Treaty of Madrid, published by Giovanni Battista Albrizzi c. 1740.[43] The image on the right is a magnification showing the Tapajós. Note the Jamanxim River is not yet recorded. © Biblioteca Nacional do Brasil.

Only towards the mid-eighteenth century did non-Indian navigation of the river extend to the Upper Tapajós (Menéndez 1981/1982, pp. 297, 301). The Tordesilhas Treaty of 1494 had assigned the Tapajós (and much of present-day western Brazil) to Spanish control, but while the Spanish focussed on the extraction of resources further west and in the Andes, the Portuguese made inroads into the area. The Treaty of Madrid redefined the limits between the two colonies along the rivers Paraguay, Guaporé, Mamoré and half way down the Madeira in 1750, bringing the Tapajós under official Portuguese control from then on (Menéndez 1981/1982, p. 299).[44] Strategic and military motives were added to the previous (economic) reasons for navigating along

[43] Map downloaded from https://www.wdl.org/es/item/1195/ Accessed 04/12/2016.
[44] The Treaty of Madrid defined the general outline of Brazil as we know it today (excluding the present-day state of Acre) according to presence on the ground and natural landmarks. Retrieved on 25/09/13 from World Wide Web http://pt.wikipedia.org/wiki/Tratado_de_Madrid_%281750%29.

the Madeira, Tapajós and their tributaries. The stage was set for a new colonial push, this time from the south.

Direct pressure upon the peoples of the Upper Tapajós region, particularly in the form of slave raiding, would first come from the south. Towards the 1750s *bandeirantes* (slave raiders and gold prospectors) made incursions northwards from Mato Grosso. The broader strategic goal of these expeditions was to secure Portuguese territories bordering the Spanish domains and to establish a route that would link Belém to Cuiabá and Vila Bela (Menéndez 1981/1982, p. 298-299). The *bandeirante* expeditions initiated new cycles of raiding, leading to uprooting of Amerindians from their territories (referred to in Portuguese as *desterritorialização*) and likely compounded the effects of Old World diseases.[45]

In 1739 the 'River of the Arinos' was 'discovered' by Antonio Pinheiro de Faria; gold mining began in the Santa Isabel mines on the Arinos in 1745 (Menéndez 1981/1982, p. 297); diamonds were also found (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, p. 10). The first recorded full navigation of the Tapajós by non-Indians was undertaken in 1742 by Corporal Leonardo de Oliveira (Manuel da Motta cited in Fonseca 1880, vol. 1, p. 76). This was soon followed by João de Sousa Azevedo's expedition, which departed from the São Francisco Xavier mines in Mato Grosso on 4th August 1746 (its itinerary was recorded and reproduced in Fonseca [1880, vol. 1, 69-72]).

3.8 Amerindian agency in the face of colonial encroachment

A report of the earlier 1742 journey mentions a number of ethnonyms along the Tapajós and notes the prevalence of the *"lingoa g.al"* – (i.e., the *língua geral*) throughout the course of the Tapajós (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, 5).[46] The document allows a rare sighting of Amerindian actions at the time: the 'Jacareguaras' are mentioned as having "escaped from a troop" (i.e. an armed Portuguese contingent) that was attacking them in response to their aggressions against the Portuguese (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, p. 5). The

[45] The advent of the Transatlantic Slave Trade would usher in new viruses, whose insect vectors survived in the water casks of the vessels sailing the Middle Passage, bringing yellow fever, dengue, dengue haemorrhagic and malaria from West Africa.
[46] Transcription by Silvia Espelt Bombin and Mark Harris.

'Jaguains', said to have facial markings, are referred to as "constant traitors" who would settle in missions but then always abandoned them, going off into the forest (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, p. 6); the 'Guarupaz', living further upstream, are reproached for behaving in similar fashion. This demonstrates more complicated trajectories than have frequently been implied, in which missionization leads inevitably towards the formation of 'generic' Indian identities. Other ethnonyms mentioned for the upper Tapajós are the 'Apencuriâs' and the 'Periquitos' (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, p. 5). This report also contains what is arguably the first written record of the Munduruku, referred to as "Manurucûs."[47] It mentions how they were engaged in warfare against other Amerindian peoples (BPE, CXV/2-15 'Breve Noticia do Rio Topajôs,' fol. 51r, p. 7), stating that this was one of the motives leading entire villages to seek refuge in mission stations.

The signing of the Treaty of Madrid and the rise to power of the Marquis of Pombal in Portugal inaugurated a turning point in terms of colonial encroachment, and further exploitation and disruption of Amerindian societies in closer contact with colonial society. The missionaries had established the infrastructure necessary for the colonial occupation of the region (Menéndez 1981/1982, p. 304), but the Society for the Order of Jesus was expelled from Brazil in 1757; members from other orders were also soon driven out (Moreira Neto 1988, p. 21). The 'liberation' of the Indians from mission control provided a justification for these measures. Thenceforth, forced indigenous labour was to be provided to settlers, who in effect gained the upper hand (Moreira Neto 1988, p. 27). The Pombaline regime began a concerted effort to integrate indigenous populations living in mission villages into colonial society (Moreira Neto 1988, p. 20-21). The process of disorganisation and domination of indigenous communities was now accelerated and a "particularly deadly phase in the history of Amazonian indigenous populations was begun" (Moreira Neto 1988, p, 21). Portuguese

[47] Porro (1996, p. 160) mentioned that Bettendorf's [1693-1699] reference to the "Ururucús" represents the first mention of the Munduruku. Porro also wrote (2007, p. 103) that the language spoken by the Ururucús was intelligible to the Tapajó. As we have seen, it is more probable that the Tapajó spoke a Carib language. It seems unlikely the Tapajó would have understood Munduruku. Besides, ethnonyms recorded during the early colonial period are less reliable (Mark Harris, pers. comm., 5 December 2016). Other than this reference, it had been suggested that José Monteiro Noronha, the Vicar General of the Province of Rio Negro, was responsible for the first written reference to the Munduruku, in 1768, situating them near Maués, between the Tapajós and Madeira Rivers (*apud.* Horton 1948, p. 272).

was to replace the *língua geral amazônica*, based on Tupi-Guaranían. Although Pombal lost power in 1777 and the *Diretório* was abolished in 1798, legislation pertaining to Amerindians would progressively harden as formal permission and official incentives for their enslavement were established (Moreira Neto 1988, p. 30). Historian Moreira Neto (1988) assesses the hundred years beginning with the *Diretório* in the following terms:

> Until the mid-eighteenth century, the face of the Brazilian Amazon was definitively indigenous… From the mid-nineteenth century, [it] would be radically transformed through the drastic reduction in the number of tribal and detribalised Indians, who went from being a majority to a minority
> (Moreira Neto 1988, p. 15).

This process of ethnocide did not mark the end of Amerindian history on the Tapajós, however. Francisco Noelli (pers. comm. 10 September 2013) postulates that fallow landscapes along the banks of the Tapajós, abandoned by erstwhile inhabitants, would subsequently be occupied by other Amerindian groupings, who expanded into them from hinterland areas. Monteiro (2001) reminds us that following European conquest and the ensuing collapse of Amerindian populations and politico-social institutions, ethnogenetic processes ensued: "This set of shocks also produced new societies and new *types* of society" (Monteiro 2001, 55, emphasis in original). The most famous of these were the Munduruku.

3.9 The Munduruku expansion

Drawing on *bandeirante* João de Sousa Azevedo's account, the Benedictine Bishop of Pará, João de São José, who travelled upstream to the first rapids of the Tapajós, referred to a number of ethnonyms along the river and its tributaries (S. José 1847 [1763], p. 96-97). Soon after, José Monteiro Noronha produced a detailed and extensive account of the province's inhabitants. Noronha was precursor of a new phase of studies in human geography in the region and demonstrated ethnographic sensibility when he recognised different facial tattoo motifs as ethnic markers (Porro 2006, pp. 12, 14). Until then, rarely had sources provided descriptions about the visual identity or material culture of the peoples encountered or engaged with. Noronha also referred to the "Maturucu" (i.e., 'Munduruku') on the Maués River, to the west of the Tapajós.

In 1774, three days after a surprise attack, the first of many letters to be written by local administrators and military men, describing the havoc wreaked by the *Gentio Mundurucú*, the "Munduruku heathen", was sent to the Governor of Pará. The administrator of Vila Boim, on the lower Tapajós, wrote that the inhabitants of the *vila* were afraid and had ceased attending to their crops; he requested that a military escort, directed by a good corporal, be sent along with gunpowder, munitions, lead and flint (Moraes [1774] cited in Santos 1995, p. 28). This scenario would repeat itself on the lower Madeira – where Mundurukus killed Iruris and Jauaris Indians (Coutinho [1786] In: Santos 1995, p. 32). In 1788, the Munduruku onslaught on the Tapajós had escalated, bringing agriculture and extraction of the *drogas do sertão* to a standstill as far downstream as Alter do Chão; the Munduruku took their victims' heads as trophies. In a letter to the Minister for Foreign Affairs, the Governor of Pará reported on the developing situation and informed him that a captured Munduruku warrior was being sent to Lisbon. The social standing of this unnamed warrior was said to be important and signalled by the tattoos on his chest, shaped like a necklace (Albuquerque [1788] In: Santos 1995, p. 35-36).

In 1790, the Tapajós would be officially opened up to navigation (Menéndez 1981/1982, pp. 299, 306). However, Munduruku attacks continued. Their "ferocity" (*fereza*) was often alluded to in the official correspondence (Santos 1995). A truce was eventually reached between the Munduruku and the Portuguese on the Madeira in November 1794 (D'Almada [1794] In: Santos 1995, p. 63) and in March or April 1795 on the Tapajós (Salgado [1795] cited in Santos 1995, p. 75).

R. Murphy (1954, p. 11) advanced the idea that, while each village was an autonomous political unit, "The system of patrilineal sibs and moieties combined with matrilocal residence crosscut the tribe with kinship bonds heightening this solidarity." Moreover,

> By drawing their warriors from a number of villages, the Mundurucu were able to leave enough men in each village to support those women, children, and old people who were

> not able to leave. They were also able to amass a greater number of warriors, especially when it was necessary to face the Portuguese colonial troops that were sent against them in the late 18th century.
> Such efforts called for a series of social linkages between villages. This was provided by the social organization which crosscut the society in two ways; by bonds of matrilocality and by the system of sibs and moieties. This meant that those men of the village who came from other villages through marriage were linked to those villages by birth and by the residence there of the mother's family. Such linkages formed a chain whereby all villages ultimately were bound to one another by interpersonal ties.
> (R. Murphy 1954, p. 35).

The establishment of peace between the Munduruku and the Portuguese around 1795 marked a historical juncture, after which many Munduruku would come to live near missions further downstream and would frequently act as mercenaries against traditional Amerindian enemies of theirs, such as the Mura of the Madeira River to the west. Although the Portuguese took advantage of old animosities, these new confrontations would prove much more deadly, as expeditions to exterminate other groups were undertaken with European firearms (Menéndez 2006 [1992], p. 290-291). Paradoxically, this *volte-face* was a way of the Munduruku safeguarding their autonomy through 'collaboration' – a phenomenon also observed elsewhere (Monteiro 2001, p. 63).

In his 1817 historical and geographical description of Brazil, Aires de Casal mentioned how, in relation to the Tapajós region, the Munduruku "give the country its name" (1976 [1817], p. 324), evidencing the speed of their expansion through the region. This northwards push along the Tapajós was undoubtedly facilitated by the presence of abandoned anthropogenised landscapes, where the Munduruku could establish new villages with relative ease and by the fact that the peoples still living in this area had suffered the debilitating consequences of European presence, in the form of diseases, raiding and forced labour.

3.10 The nineteenth century

During the 1800s, Brazil would experience three successive political regimes, as a Portuguese colony, as an independent constitutional monarchy (from 1822), and as a republic (from 1889). The physical presence of the Portuguese Royal Court in Brazil would further centralise decisions relating to indigenous populations and their rights to land (Cunha 2006 [1992], p. 133). Political changes related to the nascent nation state would also have important repercussions in the Amazon and in the Tapajós, as Amerindian territories contracted in the face of the expansion of Brazilian society. Until the eighteenth century, the saving of souls was the principal value placed upon catechism and civilisation. This would be replaced by the belief in the inherent happiness of a civilised life, subject to Positivist law; in both cases, Europeans and their Brazilian descendants believed they knew what was best for Amerindian peoples (Perrone-Moisés 2006 [1992], p. 122). Fundamentally, the indigenous question was transformed from being essentially a question of labour to one of land (Cunha 2006 [1992], p. 133), as settlers and trade expanded into previously unconquered territories.

3.10.1 Scientific missions to the Tapajós and surrounding area

In the only known instance of colony-turning metropolis, the Napoleonic invasion of Portugal in 1807 impelled the Portuguese Court to flee to Rio de Janeiro under British protection, and from 1808 up until 1821 the colony of Brazil became the centre of the Portuguese empire. Dom João VI (King John VI) decreed Brazilian ports open to friendly nations, "which from the perspective of the contemporary sciences meant the South American continent had at last unlocked itself to science" (Amoroso 2011, p. 9)[48], leading to an influx of scientific missions from several European nations, inspired by Humboldt's travels in Hispanic America. These scientists were mostly unsympathetic towards Amerindian peoples and at times helped to provide an academic rationale for their extermination and the expropriation of their territories (Cunha 2006 [1992], p. 134). Some of these expeditions would reach the Tapajós.

Among the first foreign scientists to arrive in the environs of the Tapajós were the young Bavarian naturalists, zoologist Johann Baptist von Spix and botanist Carl Friedrich Philip von Martius. They visited the Carmelo do Canomá Carmelite mission, located near the confluence of the rivers Urariá and Canomá, near the mouth of the Madeira river, at the eastern edge of the Tupinambarana island. Approximately one

[48] Dom João VI also inaugurated the Botanic Gardens and the Royal Museum in Rio, one of the birthplaces of ethnographic and later archaeological research in Brazil.

thousand Mundurukus lived in or around it; Maués were also under its influence (Spix & Martius 1981 [1831], p. 274). Spix and Martius only met some missionized Maués, because most were away picking sarsaparilla (1981 [1831], p. 278-279).

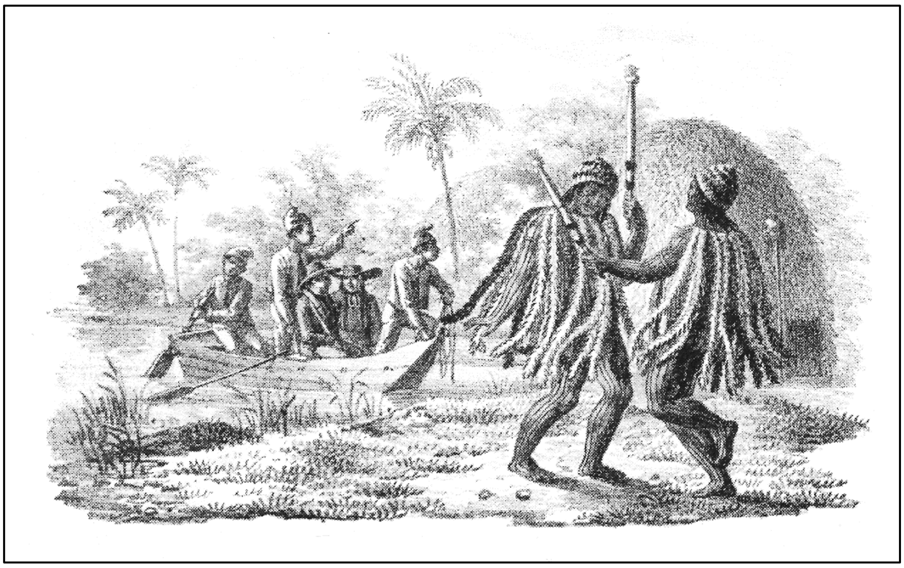


Fig. 10 An unlikely scene: a couple of highly ornamented Munduruku men dance together as the naturalists arrive.

"Besuch bei den Mundrucus". Drawn by Martius and lithographed by Nachman, 1823-1831. Reproduced from Moura 2012, p. 266.

Spix and Martius estimated the total Munduruku population to lie somewhere between eighteen and forty thousand people, living to the east and west of the Tapajós, partially on the savannahs (1981 [1831], p. 276). They wrote that, in their permanent settlements (as opposed to their hunting camps), the Munduruku lived under "military order", with exclusively male quarters and night-time watchmen (1981 [1831], p. 276). They mentioned Munduruku attacks upon the Carib-speaking Arara and the Tupi-Guaranian Kagwahiva (Jumas and Parintintins) living on the Maués and Canomá rivers. They predicted the extermination of the Jumas and Parintintins (1981 [1831], p. 276). They encountered an Arara man, identified by his characteristic septum piercing, who no longer spoke his own language, because he had been taken captive by the Munduruku as a child (1981 [1831], p. 276, ft. 31).

Spix and Martius observed aspects that could be identifiable in the archaeological record. They wrote that Maué houses were rounded and occupied by individual families, while Munduruku constructions were communal. They collected some of their featherwork, as well as trophy heads (1981 [1831], p. 277).[49] They also made a number of observations on perceived Munduruku customs (1981 [1831], p. 275) and described their lozenge-shaped, geometric tattoos. Although some of their descriptions are rich in detail, their judgements are laden with degenerationist ideas. They forecast the inevitable demise of Amerindians – who, according to their logic, were themselves to blame for this:

> We must therefore incline to the conclusion that the Indians cannot endure the higher culture that Europe wishes to implant in them. Progressive civilisation is the vital element of flourishing human society; but it irritates them like a destructive poison. They therefore seem to us destined to disappear, like many other species in the history of nature. They will leave the ranks of the living before they have achieved the highest level of progress whose seed is implanted in them. We thus think of the red man as a stunted branch of the trunk of humanity… incapable of producing the highest flowers and fruits of humanity
> (Spix & Martius 1823-31 cited in Hemming 1995 [1987], p. 133).

Noelli and Ferreira's (2007) analysis of Martius' later work (1831, 1832, 1838 and 1844) shows how he propounded the idea that Amerindian populations were degenerate, a "testament to the immobility and stagnation of a race", whose underdevelopment had been compounded by the harsh tropical environment (Noelli & Ferreira 2007, p. 1242-1243).[50] Martius held Tupian speakers to have descended from the Incas, and to be an example of a previously 'civilised' people who had since degenerated through miscegenation and tropical exposure (Ibid., p. 1243). As subjects of the Brazilian Empire, Amerindians should not deserve the same rights; the main interest in studying them was "as a document for the writing of the primitive history of Brazil" (Ibid., p. 1243).

[49] The Staatlichen Museum für Völkerkunde in Munich houses 741 ethnographic artefacts collected by Spix and Martius in Brazil from 1817-1820; the Munduruku are among the ethnic groups listed in relation to this collection (Dorta 2006 [1992], p. 503).
[50] This thinking was to influence the theories of one the most important Amazonian archaeologists, Betty Meggers (Noelli & Ferreira 2007).

3.10.2 Expeditions under the Brazilian Empire (1822-1889)

In 1822, the heir to the throne, Dom Pedro I, declared Brazil independent and it became a parliamentary monarchy known as the Empire of Brazil. Tupi and Guarani peoples became symbols of the new nation. This category of "agricultural" and "settled" Indians would be contrasted with "wild", nomadic and fierce Indians, generic "Botocudos" – who, in large part thanks to Prince Maximilian von Wied-Neuwied's efforts, had already become the object of scientific inquiry (Amoroso 2011). Debates regarding what course of action – extermination or 'civilisation' – should be taken in relation to 'wild' Indians were reactivated. The former alternative tended to be favoured by settlers, while politicians who assumed these peoples could be incorporated into society as labour often advanced the latter alternative (Cunha 2006 [1992], p. 134). In theoretical terms, such debates would focus on how human or animal-like indigenous people were (Ibid*.,* p. 134). Along the Tapajós, the 'Parárauátes,' Parintintin and 'Tapahumas' were among the most cited nomadic peoples, receiving the least sympathy (Bates 1864, p. 271; Chandless 1862, pp. 271, 276; Florence 2007 [1876] pp. 261, 260).

Though often laden with prejudices and the aforementioned political agendas common to their time, the accounts of this period provide us with information on the peoples of the region, touching on their political affiliations, geographical location and movement; languages spoken; settlement pattern or house plan; technologies; and food production or consumption. Read sequentially, they also allow us to trace some of the broader changes these peoples lived through over the course of the nineteenth century. By then, greater knowledge – and control – of Amerindian peoples by the encroaching state means that ethnonyms mentioned are more stable and reliable (Mark Harris, pers. comm., 4 December 2016). Information bearing on the Bakairi, Paresí, Apiaká, Munduruku, Maués and the rubber tappers – who represent the formation of a new society in the region – will be presented below. In chronological order, the sources were produced by:

- Hércule Florence, a member of the Russian Empire's ill-fated 1824-1828 Langsdorff Expedition. Florence travelled down the Juruena and into the Tapajós. The French aquarellist produced the finest of all the sketches and watercolours made of the peoples of the Tapajós and also kept a diary. He devoted particular attention to Amerindian artistic expressions.[51] Florence himself succumbed to fevers, making his diary entries sporadic from the Arinos River onwards;

- Henry Walter Bates, who was a quintessential English gentleman naturalist. He spent years living in the Amazon, including Santarém (in 1851) and visited Munduruku settlements on an eastern tributary of the lower Tapajós. Bates was influenced by Martius and by social evolutionist ideas. He surmised that "…the mind of the Indian is in a very primitive condition …the life of these people is naturally monotonous and dull". With an emphasis on negatives later echoed by Lowie's (1948) characterisation of the "Tropical Forest Tribes" in the *Handbook of South American Indians*, he pronounced: "their virtues are, properly speaking, <u>only negative</u>" (Bates 1864, p. 277, my emphasis). Bates' writing almost appears as a blueprint for the twentieth century seminal tome.
- British explorer William Chandless, who travelled down the Arinos, Juruena and Tapajós, and published his findings in the Journal of the Royal Geographical Society of London (1862);
- Louis and Elizabeth Agassiz (1869), who as part of the Thayer Expedition travelled from Manaus to the Tupinambarana Island, along the Igarapé Ramos and the Maués River in 1865. As a polygenist creationist, L. Agassiz did not consider Amerindians as humans in the same way as Europeans and their descendants;
- Brazilian naturalist João Barbosa Rodrigues, who made his way up the Tapajós as far as the Montanha Island. He devoted a whole book to the river (1875) as part of his series on the Amazon River Valley. The book is both a primary and secondary source: much of the first part is based on his own trip up to the Montanha Island, however, because he succumbed to illness, he was unable to travel further upstream. He based most of the section on the Upper Tapajós on the accounts of others, including Chandless (1962);

[51] The leader of the expedition was the German Consul in Brazil, G.I. Langsdorff. Langsdorff suffered what appears to be a mental breakdown from which he would never recover during the trip. The expedition was prematurely terminated once Santarém was reached. The plan was to meet in Manaus and navigate up the Negro river, through the Casiquiare canal and into the Orinoco and finally to the Guyanas. The other similarly ill-fated half of the party went along the Guaporé, Mamoré and Madeira Rivers; the French painter Auguste Taunay drowned on the Guaporé

- Engineer Antônio Gonçalves Tocantins (1877), who travelled up the Tapajós and into the *campinas* expressly to meet the Munduruku in 1875. His motive was “to see a savage tribe in its primitive state, exactly as it would have been before the discovery of Brazil, living by the law of nature, without any contact of ideas… that could alter its beliefs and traditions” (Tocantins 1877, p. 81);
- North American geologist Charles Frederick Hartt, who travelled widely around Brazil and was also part of the Thayer expedition. Hartt travelled to the vicinity of Itaituba and wrote an essay about the Munduruku (1885). Most of his observations were based on Chandless (1862), Bates (1864), Agassiz (1869) and Tocantins (1877);
- Frenchman Henri Coudreau, who was employed by the then governor of the State of Pará, Lauro Sodré, to undertake a scientific expedition to investigate a territorial dispute along the frontier between the states of Mato Grosso and Pará. He travelled up the Tapajós in July 1895, returning by January 1896. Coudreau frequently predicted the inevitable extinction of all Amerindians.

Selected extracts of the descriptions of the peoples encountered by these travellers will now be presented. By relating peoples to specific toponyms at different times and describing material culture and other elements, these sources demonstrate how archaeological investigations of this period would be extremely profitable.

It is worth noting that, at the close of the nineteenth century, the advance of the rubber economy had made inroads up the Tapajós, which gradually led to the expropriation of Amerindian peoples or to profound changes in their ways of life. Chandless for instance would comment on how the rapids were still “a limit to white settlers, whose houses begin almost within sight of them. Some 6 leagues below, on the left bank, is Itaituba, the first town and the chief port of trade with Cuyabanos” (1862, p. 278). According to him, fleets of ten to fifteen canoes, known as *monsões* would descend the Tapajós yearly (1862, p. 278). These canoes were usually made from single *ubá* trunks and these journeys would take approximately six months to travel upstream. *Igarités*, on the other hand, were faster, taking only 80 days, although their carrying capacity was reduced in comparison (1862, p. 278). The *aviamento* system of debt bondage – which expanded over much of Amazonia from the second half of the nineteenth century with the rubber economy – steadily advanced into the Upper Tapajós. The system involved the trader advancing consumer goods and work tools to producers, who would pay off the debt contracted with forest or agricultural products. It was known for being extremely exploitative. The traders' goods were taken on large boats called *regatões*.[52]

The Bakairi

The first reference Chandless (1862) made to Amerindian peoples was near the "Bacairís" River and strongly contrasts with Sousa Azevedo's description of numerous Amerindian settlements in the area (cited in Fonseca 1880, vol. 1, p. 70) of under a century before. Near a tributary of the Rio dos Patos, "the Bacairís, a small and very timid tribe of Indians, used to be met with; but, owing to the attacks of stronger tribes, they have latterly withdrawn more towards the head-waters of the Arinos" (Chandless 1862, p. 270). This suggests the knock-on effect of Brazilian expansion into Amerindian territories along the main river courses, leading more numerous, expropriated peoples to encroach on the territory of smaller groups.

The Paresí

Chandless' reference to the Arawak-speaking 'Parecis' also sharply contradicts Pires de Campo's 1723 report (published in 1862). While Pires de Campos had written of the populous Parecis' "Kingdom", with plentiful Amerindian settlements and peoples living in abundance, tilling the land and reaping manioc, corn, beans, potatoes and pineapples, as well as hunting deer, emus and other animals (Pires de Campos 1862 [1723], p. 56), Chandless simply referred to them as "an indolent, inoffensive tribe" (1862, p. 270). This may be due to the fact that the term "Paresí" is a nineteenth-century construct applied to several Arawak speakers of this area.[53] Yet it seems more likely that the contrast between the accounts again reflects the changes set in motion by Portuguese and Brazilian colonisation of Mato Grosso: they had been "prevailed on… to move nearer to the town, where they occasionally come to trade, chiefly in the sale of sieves" (Chandless 1862, p. 270-271). Where Chandless and Pires de Campos agree is that the Paresí "are not warriors, and only defend themselves" (Pires de Campos 1862 [1723], p. 56).

52 This system is still in operation today in areas of the Amazon.
53 http://pib.socioambiental.org/pt/povo/paresi/2030. Accessed on 07/10/2013.

The Apiaká

The Apiaká hosted members of the Langsdorff Expedition for ten days in 1828 on the Arinos River, where they lived (Florence 2007 [1876], p. 218). Florence wrote that they and other Amerindians they encountered on the Juruena, Tapajós and Amazonas rivers spoke 'Guarani' (2007 [1876], p. 224) – again suggesting the prevalence of Tupi-Guarani or Tupian speakers along the main waterways of the Tapajós at the time. Their *cacique* did not seem to enjoy any particular distinction (2007 [1876], p. 208). They lived communally in large houses, which sheltered approximately eighty people in one of the villages visited, and one hundred in another (2007 [1876], pp. 218, 222). They kept fish weirs, called *pari*. They effortlessly produced river craft from trees (2007 [1876], p. 218). Allied to his mention of the recent relocation of the village to the place he was visiting on account of the high quantity of fish along that part of the river (2007 [1876], p. 218), the technologies used by the Apiaká suggest fish as an important dietary component of theirs.

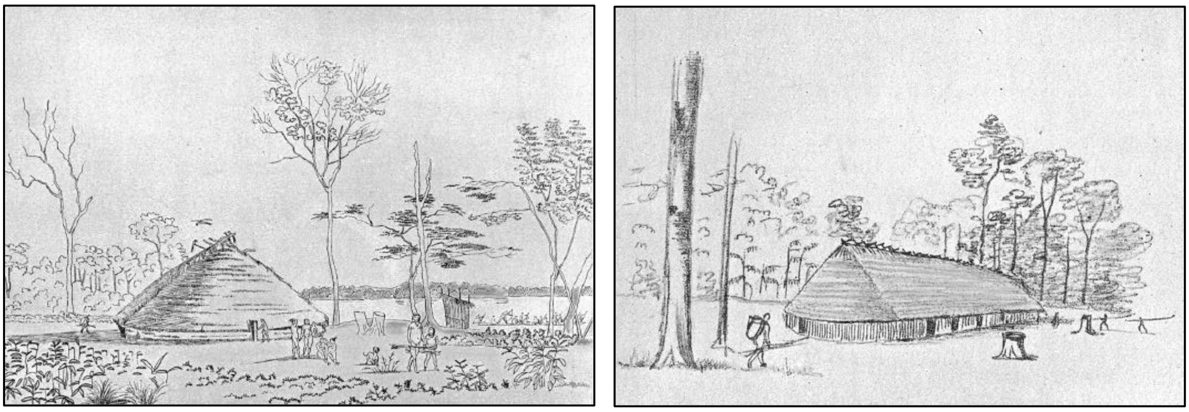


Fig. 11 Apiaká settlement on the Juruena. Reproduced from Florence (2007 [1876], pp. 214, 216). © The Archive of the Russian Academy of Sciences.

Florence praised the "excellent quality" of the clay used by the "skilled" Apiaká potters (2007 [1876], p. 220): "The vessels in which they boil the *camuí* are three hands high and have the same diameter, and, yet, the walls are so fine and the whole is so light that they weigh half as much as our vessels of the same dimensions" (2007 [1876], p. 220).[54] He identified recurrent motifs adorning the pottery and their bodies:

[54] The *camuí* is a corn-based mixture, prepared by mashing the corn and cooking it in a ceramic vessel full of water (Florence 2007 [1876], p. 220).

> The bowls, vessels, pots in general have the shape of two truncated cones joined at the base. The pottery is decorated with the same straight angles, parallel among themselves, as they paint on their bodies, but the whole presents more variety (Florence 2007 [1876], p. 220).

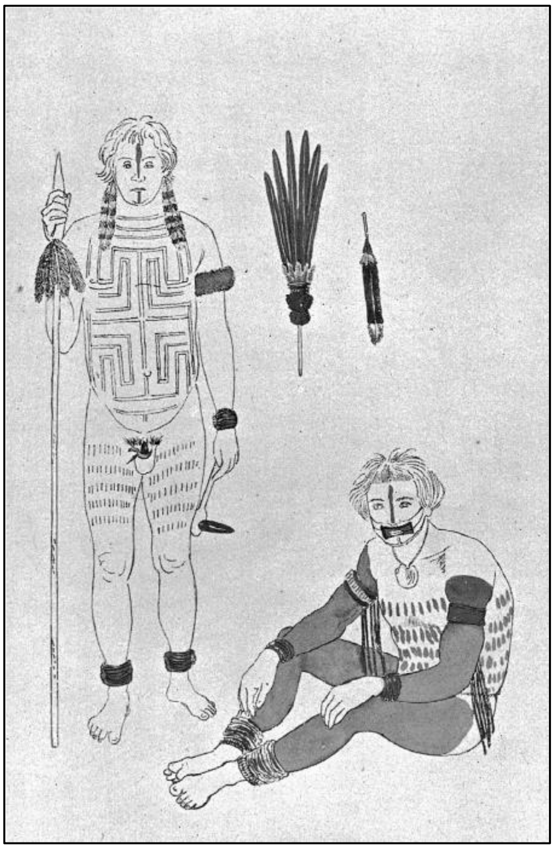


Fig. 12 Apiacás. Hand ornament. Reproduced from Florence (2007 [1876], p. 211).

Their body art was characterised as such:

> The men draw on their faces designs that are the same for all; those of the women are less complex. Besides this *tattoo*, which appears to be distinctive for the tribe, they paint their chests and abdomens liberally, however, always delineating the same angles, straight and parallel to one another.
>
> On their arms and legs they design clumsy figures of animals and fish; sometimes they draw male or female figures. Besides the tattoo, which is fixed with the juice of the *jenipapo* fruit they create black designs, varied in accordance with the whim [of the painter], lasting no longer than twenty or thirty days or a month… If the women do not

> tattoo their bodies, in compensation they employ *jenipapo* to produce stripes either on their hips, or on their legs.
>
> I saw *apiacás* painted from their waist down to their ankles. It would be said they were wearing tight black trousers. Others had imitated on their arms a sort of sleeve, and as they bore armbands made artistically, it seemed like the purpose of these was to hold them down. These armbands are ornaments either glued to the body, or surrounded by fine plumage, which pleases the sight
> (Florence 2007 [1876], p. 218).

The Apiaká would again be met in the early 1860s by William Chandless, who came across them on the Juruena. We have indications of the impact of continuous contact with colonial and Brazilian society upon their population and location. They are described as a "…small tribe, and the first one meets with that understand the Lingoa Geral: it is said that a larger portion of the tribe, not wishing to hold intercourse with the whites, broke off and settled on the Rio S. Manoel" (Chandless 1862, p. 273). They cultivated urucú (*Bixa orellana*), cotton, sugar cane, manioc, bananas, corn, sweet-potatoes, "the cultivation being at least as good as one sees anywhere in the interior of Brazil" (1862, p. 273). Chandless stated the Apiaká were involved with the trade in *salsaparrilha* and "seem to have learnt its value; anything else may be bought for a few fishing-hooks" (Chandless 1862, p. 273). Henri Coudreau reached the Apiaká near the São Simão rapids in 1895, where they were employed as rubber-tappers (Coudreau 1977 [1897], p. 64).

The Munduruku

The Langsdorff expedition first encountered travelling Mundurukus around the Tucurizal area, near Salto Augusto (they lived a few days' downstream). Florence gives us a sense of the territorial encroachment underway in the 1820s. The expedition met Mundurukus who produced manioc for Brazilian traders. They had recently killed a "Brazilian" for destroying their crops, after which they had abandoned their village, located too close to Brazilian settlements (2007 [1876], p. 244). It is unclear where Munduruku territory began as the expedition travelled northwards. Their villages were seen by Florence from the river: "to the interior and to the left [bank] they have their most important settlements" (2007 [1876], p. 257), but by this stage the author was constantly feverish and only wrote irregularly. The first Munduruku village they stopped at was apparently small, with two or three houses and a small manioc and cotton garden. It may have been established near the river to facilitate trading. The women used seeds as well as glass beads in their necklaces. Florence traded two "worthless blades" for two baskets of tubers (*cará* and *aipim*) (2007 [1876], p. 258). They also stopped at a village with a large house, containing approximately forty people, where women were processing manioc, using "great earthenware vessels" to toast it (2007 [1876], p. 258). Florence likened the Munduruku dwellings to "the houses of the poor throughout Brazil" (2007 [1876], p. 258), suggesting Brazilian influence upon their construction. They continued through Munduruku territory for a number of days,[55] passing the Montanha island, and beyond the Maranhãozinho rapid. On the 13th June 1828 they sighted a Munduruku village with "better built" houses (2007 [1876], p. 260). Further downstream on the right bank of the Tapajós lay the district of Uxituba, inhabited by some Portuguese and Mundurukus; Florence noted their language was different to that of the Maués, but also remarked that both idioms were derived from the *língua geral brasílica* (2007 [1876], p. 261).

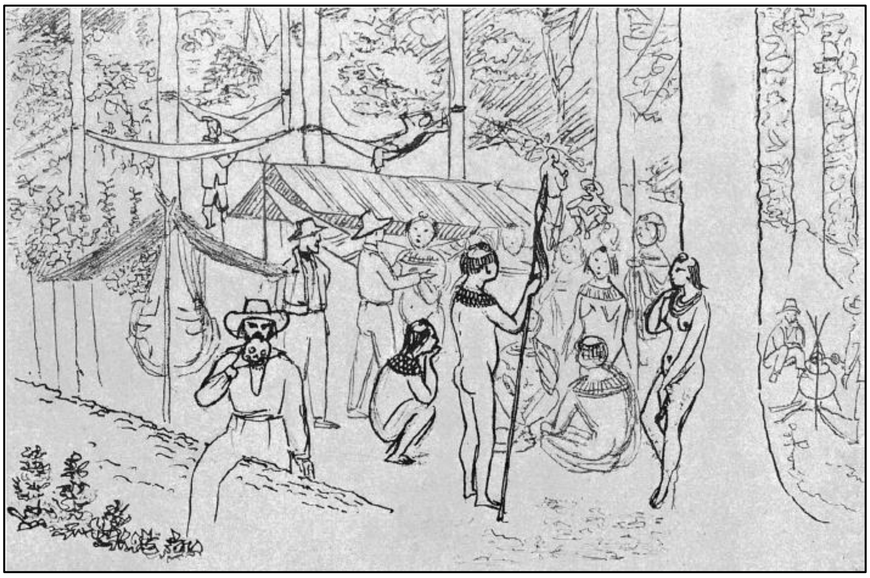


Fig. 13 Mundurucus visit Tucurizal camp. Reproduced from Florence (2007 [1876], p. 249).

© The Archive of the Russian Academy of Sciences.

Florence described their tattoos covering their necks, chests and back, which "resembled a monk's scapular, glued to the body" (2007 [1876], p. 224). Florence wrote

[55] During this period, they would have passed by Mangabal and Daje Kapap Eïpi, but unfortunately Florence was too unwell to write in his diary.

that they shaved their heads leaving a small, short circle of hair above the forehead and that in each ear they wore two cylindrical spools (2007 [1876], p. 244). The Munduruku facial tattoos "consist in two lines that go from the nose and the mouth to the ears and a checkered lozenge pattern on the chin. Besides these fixed streaks, they paint themselves with the juice of the *jenipapo* fruit, which is the colour of writing ink. Sometimes they paint vertical lines along some parts of their body" (2007 [1876], p. 244). As mentioned in Chapter 1, Florence also noticed the connection between designs applied to the body in the form of tattoos and to ceramic vessels, through incisions (2007 [1876], p. 272).

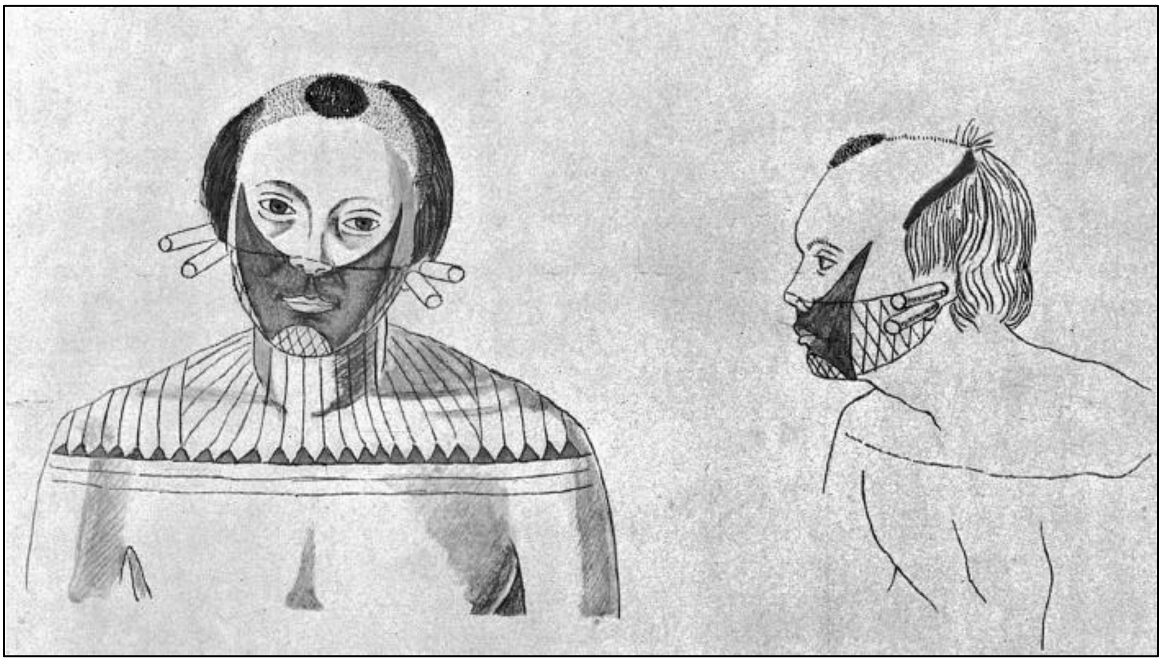


Fig. 14 A young mundurucu. Reproduced from Florence (2007 [1876], p. 250). © The Archive of the Russian Academy of Sciences.

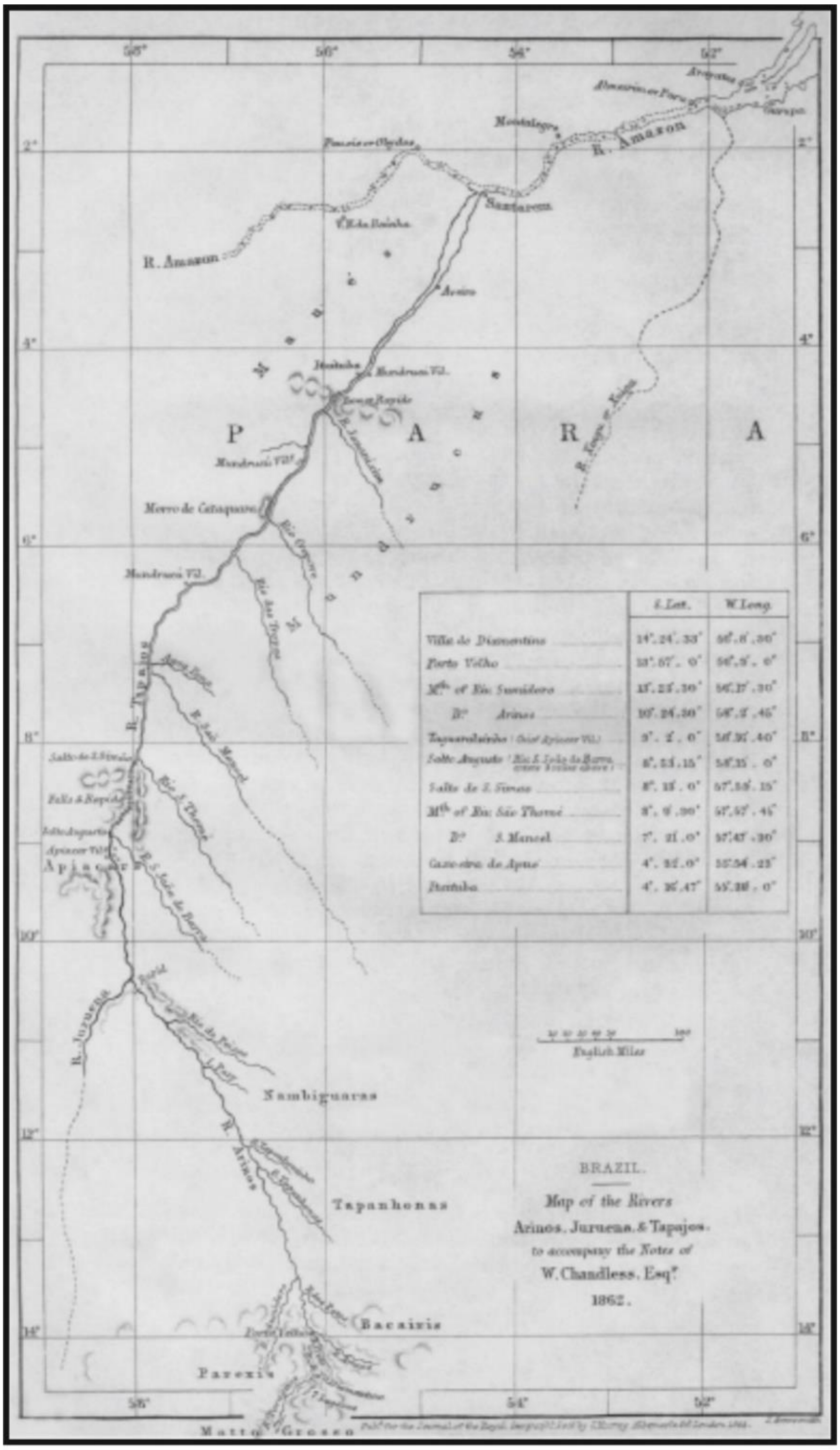
Forty years later, on the left bank of the Upper Tapajós, Chandless' came upon "a small settlement of Mundrucus, who originally came here to work for two runaway slaves from Manaos; they all wore clothes, and understood Portuguese" (1862, p. 275). He wrote that their territory "extends from the S. Manoel to near the Amazon on the east of the Tapajos, though most of their villages along the river are on the left bank" (1862, p. 276). He also remarked that the Crepori River, a tributary to the east of the Upper Tapajós, led to Munduruku territory on the *campinas* (savannahs) (1862, p. 277). At that time, Mangabal was the limit between Munduruku and Maué territory on the left bank of the Tapajós:

> At the shallow of Mangabal Grande, 8 or 10 miles long, the whole river-bed is granite, with many smooth lages above water, and numerous small islands: the width varies here from 1 to 2 miles; the steering is very difficult on account of the shallow water, but the rock being all smooth there is no risk. The hills on each side are of some height, and here and there the hill-tops are open campo. A little below the Mangabal are two or three Mundurucús villages on the left bank, and the last on that side, as the Maue country begins soon below [sic]
> (Chandless 1862, p. 277).

Chandless thought the Munduruku were "the most powerful and warlike tribe of all these sertões [hinterlands]" while also "the most honest and faithful, and very friendly towards white people"; they extended "a sort of protection over weak tribes of Indios mansos, and carry on perpetual war with Indios bravos" (Chandless 1862, p. 276).[56] He wrote about Munduruku bellicosity and their practice of kidnapping and assimilation, "head cutting" and potential cannibalism (1862, p. 276-277). He characterised their tattoos as "a check-pattern of black stripes" (1862, p. 277). Chandless explained that, unlike the Apiaká, the Munduruku "fish chiefly with bow and arrow, and set little store by fishing hooks" (1862, p. 277).

At around the same time, Bates visited Mundurukus living under mission influence on the Cupari River, on the lower Tapajós. Bates stated that the Munduruku inhabited the shores of the Tapajós, particularly the right bank, from 3° to 7° south latitude, as well as the intermediary area between that part of the river and the Madeira and that they numbered about 20,000 (1864, p. 273). He affirmed that "the main body of Mundurucús" lived along the *campinas* savannahs, beyond the cataracts (1864, p. 273-274). Bates' account also reveals that the Munduruku continued to attack other Amerindian peoples. He had been told that "on the Tapajos alone they can muster… 2000 fighting men" (Bates 1864, p. 273).

[56] "*Índios mansos*" literally means "tamed Indians" – who had made peace with Euro-Brazilians, in contrast to the so-called "*Índios bravos*."



Map 7 Map or the Tapajós, Arinos and Juruena by Chandless (1862).

© Royal Geographical Society (with IBG).

Note extent of areas covered by ethnonym "Mundurucus" to the east of the Tapajós, which would include Daje Kapap Eïpi. On the other side of the river, "Mundurucú Vil." is repeatedly written around the Montanha e Mangabal area. "Maués" also cover a wide expanse of territory.

Bates described "conical huts" which sound similar to those depicted by Spix and Martius at the Canomá mission (1981 [1831], p. 277). Bates remarked on how, on the banks of the Tapajós, Munduruku children were "seldom" tattooed (Bates 1864, p. 274). His writing demonstrates how the portrayal of the Munduruku had changed since the late eighteenth century to far more favourable terms following their truce and subsequent collaboration with the Portuguese. Superlatives abound in his portrayal of them, as "perhaps the most numerous and formidable tribe of Indians now surviving in the Amazons region" and "the most warlike of the Brazilian tribes… considered also the most settled and industrious" (Ibid., 1864, p. 273). Bates thought "agricultural tribes" "nobler" (1864, p. 193) and claimed that "It would be a misnomer to call the Mundurucús of the Cuparí and many parts of the Tapajos, savages; their regular mode of life, agricultural habits, loyalty to their chiefs, fidelity to treaties, and gentleness of demeanour, give them a right to a better title" (1864, p. 274). Producers of manioc, they sold surplus to traders; they also gathered large quantities of *salsaparilha*, India-rubber, and Tonka beans (Bates 1864, p. 273). Yet, "like the rest of the Brazilian tribes, [they] seem incapable of any further advance in culture" (Bates 1864, p. 274).

Bates concluded that "The Mundurucús seem to have retained more of the general characteristics of the original Tupi stock than the Mahués" (1864, p. 169). By this, he meant, "settled agricultural habits, their living in well-constructed houses, their practice in many arts, such as the manufacture of painted earthenware, weaving, and their general custom of tattooing, social organisation, obedience to chiefs, and so forth" (Ibid., p. 193). It is not clear whether Bates is referring to the Tupí-Guarani practice of painting ceramics or whether he witnessed the Munduruku, specifically, doing this; if the latter, this is the only reference known to suggest the Munduruku painted their pottery.

Louis and Elizabeth Agassiz disembarked at a "civilised" Munduruku village at around the same time, in 1865 (1869, p. 307).[57] They described "the size and solidity of their houses, with never a nail driven, the frame consisting of rough trunks bound together by withes made of long, elastic sipos [lianas], the cordage of the forest", which the Munduruku preferred to nails (1869, p. 307-308). Inside the chief's house

> The ridge-pole… could not have been less than twenty-five to thirty-eight feet high, and the room was spacious in proportion. Hammocks were hung in the corners, one of which was partitioned off by a low wall of palm-thatch; bows and arrows, guns and oars, hung on the walls or were leaning against them, and adjoining this central apartment was the

[57] It appears that this section was written by Elizabeth, because of the reference to "Mr. Agassiz" on page 315.

> mandioca kitchen. There were a number of doors and windows in the room, closed by large palm-mats
> (L. & E. Agassiz 1869, p. 308).

The house of the chief "stood at the head of a line of houses… they made one side of an open square, on the opposite side of which was a corresponding row of buildings;" a church stood at the head of the square (1869, p. 308). The Munduruku living at the village were "decently dressed in the invariable costume of the civilized Indian, the men in trousers and white cotton shirts" and "the women in calico petticoats, with short, loose chemises either of cotton or calico" with "their long, thick black hair drawn up and fastened on the top of their head by a semi-circular comb" (L. & E. Agassiz 1869, p. 309-310). These combs were ubiquitous among Amerindian women, according to Agassiz; "although of foreign manufacture, they find their way to the most isolated forest settlements, brought, I suppose, by the travelling pedlers, 'regatão' [sic]" (1869, p. 310) indicating the advancement of the *aviamento* system of debt bondage in the area. Few of the Munduruku here spoke Portuguese (1869, p. 312). The expedition went on to another Munduruku village, where an old Munduruku woman's tattoos are described in detail by E. Agassiz (1869, p. 312-314). Arriving at Maués, they encountered "*specimens* of the *genuine* Mundurucus" who were "more interesting" than those they had visited before (1868, p. 312-313, my emphasis).

Images removed due to copyright restrictions

Fig. 15 The systematic description of another species.

Left: Mundurucu Indian (Male). Right: Mundurucu Indian (Female). Reproduced from Agassiz (1869, pp. 313, 314, my emphasis).

Barbosa Rodrigues (1875, p. 124-125) estimated the Munduruku population along the banks of the Tapajós to be 1,200. About the Capuchin mission on the Tapajós' east bank, called Bacabal, then home to 700 Munduruku Indians, Rodrigues wrote that "The illnesses that ordinarily reign here are pleurisy, and dysentery, which annually take 15 to 20 lives" (1875, p. 122) which sounds casual, suggesting they were a common cause of death at the time. Rodrigues also provides a detailed description of Munduruku tattoos and other aspects, based on evidence gathered by other scientists. Rodrigues would enumerate Munduruku villages (from north to south) along the river:

> Cury, Santa Cruz, Uxituba (in these the Indians are semi-civilized), Boburé, two at the Montanha rapids, Igapó, at the headwaters of Mangabal, Bacabal, Boa-Vista (below the Pacú stream), Chacorão, Capoeiras and Iri. The most populous of these is Bacabal, while some are extinct, such as the one at the mouth of the Juanxim, and the one at the middle of the Mangabal rapids
> (Rodrigues 1875, p. 124).

In 1875 Antônio Gonçalves Tocantins estimated the total Munduruku population at 18,910 people (1877, p. 101). Even if this figure is exaggerated, it still suggests a potential increase in the Munduruku population, which may be explained by their expansionary practices and incorporation of other peoples. He itemised trade between the Munduruku and the *regatões* (1877, p. 151-154). Tocantins arrived at the village of 'Necodemus' (likely to be the village of Dekodyém [R. Murphy 1954, p. 15]) where he was lodged in a "vast house", the open-sided men's quarters (1877, p. 81). This "*ekçá*" – a long house, approximately 100m in length, facing eastwards, was located at the centre of the settlement (1877, p. 102). The warriors would stack their weapons and instruments under the roof and small fires would be lit on the ground among the hammocks (1877, p. 103). Around the men's quarters would be the houses inhabited by the women, children, elderly, and the ailing (1877, p. 103). These would be walled; inside, there were no interior divisions, and different families occupied different areas with their hammocks and utensils, such as baskets and looms, while at the centre of these houses one or two hearths could be found (1877, p. 103). These would consist of piled, more-or-less flat stones (1877, p. 103). The men would store valued items – such as feather ornaments, necklaces made from human teeth, trophy heads – with the women (1877, p. 103). Tocantins also reported on Munduruku burial customs (1877, p. 117). He wrote the grave of a deceased person was dug underneath their hammock; its shape would be cylinder-like (on a vertical axis) and the corpse would be buried in foetal position (1877, p. 117). Objects belonging to the deceased, such as weapons and feather ornaments would be buried with them (1877, p. 117). When a warrior died in combat away from home, Tocantins explained his companions would cut off his head and mummify it and bring it back with them (1877, p. 130). The warrior in question would then be celebrated; his head would be buried after four years (1877, p. 131). Tocantins also described the Munduruku's affection for their dogs, which were buried (1877, p. 90). He compiled a list of Munduruku words that includes several plants.

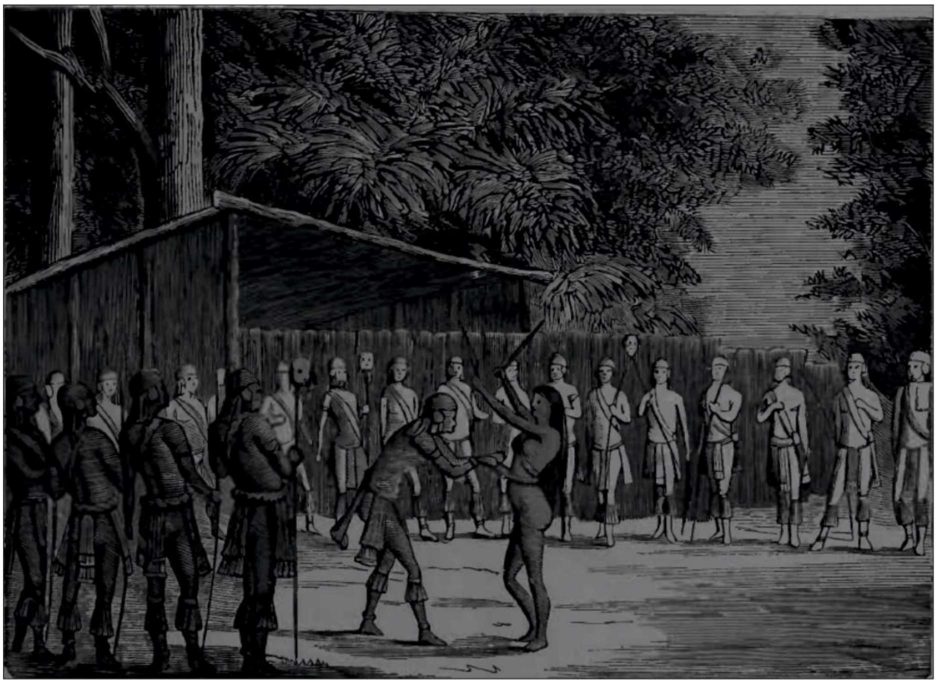


Fig. 16 "A festa da Pariuate-Ran." Reproduced from Rodrigues, 1882, p. 45, showing the condecoration of warriors following battle against enemies, or pariwat.

This image, showing "authentic" Mundurukus strongly contrasts that of fig. 15, which shows Mundurukus 'being assimilated' into Euro-Brazilian society.

Charles Hartt visited an archaeological site previously occupied by Mundurukus soon after Tocantins' expedition. Citing Lieutenant Joaquim Caetano Corrêa, Hartt listed the following locations for Munduruku *malocas*[58] along the banks of the Tapajós: Buburé, Montanha, Yutaí, Mangabal, Rato, Bacabal, Boavista, Yakareakáya, Xakuráuy, Iré, and Kadéte; he also named Munduruku settlements in the interior (Hartt 1885, p. 117).

[58] Nowadays, the term *maloca* usually connotes a single Amerindian dwelling. However, Hartt wrote that it referred to dwellings of uncatechised Indians, while von Martius thought it to mean a whole village (Hartt 1885, p. 15, ft. 1).

Warfare with Parintintins and the taking of child captives was again referred to by Hartt: “When the Mundurucús attack the Parentintins, they kill all the adults, making no prisoners, but they take all the children, who they later adopt as their own children… who, after being tattooed, become Mundurucús” (1885, p. 130).

Hartt remarked that due to the rubber and *salsaparrilha* trade, the Munduruku on the banks of the Tapajós “are supplied with necklaces and ornaments. They like mirrors very much,” however, Corrêa assured Hartt the *campinas* Munduruku did not appreciate these items (1885, p. 123). Similarly, tattooing was being abandoned by the Munduruku along the banks of the Tapajós, while still being practiced in the interior (1885, p. 119). Hartt wrote that Munduruku women molded their pottery by hand, rather than through coiling (1885, p. 125). He contradicted Tocantins in regard to Munduruku burials, writing that they never buried weapons along with the corpse (1885, p. 129).

In 1895, Coudreau placed the most northerly Munduruku *maloca* in the area known as Igapó-Açú, upstream from Mangabal: the Mundurukus living there, who numbered about 30, all worked for another rubber baron called Pedro Pinto (1977 [1897], p. 34-35). Another Munduruku settlement called Samaúma was situated on the savannahs above the Cadariri stream, still further upstream; the general area was known as Sai Cinza (1977 [1897], p. 38). Drawing heavily on Tocantins’ writing, Coudreau declared the Munduruku to be “undergoing a process of extinction;” he estimated that there were only 1,460 Mundurukus left (1977 [1897], p. 144).

The Maués

Below the Maranhãzinho rapids to the west of the Tapajós, Maué villages were spotted by Hércule Florence in 1828 (2007 [1876], p. 260). Itaituba was then composed of a small number of Portuguese, their slaves, some Brazilians and the Maués, who made up most of its population (2007 [1876], p. 261). Its district commander was said to have 200 Maués under his control, who had built ten or twelve houses, planted manioc and were extracting *salsaparrilha*. According to Florence, they spent their payments on *cachaça*, sugar cane rum (2007 [1876], p. 261). Florence mentioned the production of *salsaparrilha*, rubber, cloves and another spice called *pichiri*, as well as guaraná and pirarucú fish for export.

In the early 1860s, downstream from Montanha Island, on the left bank of the Tapajós, Chandless noticed “the houses of several Maués, who have broken off from their tribe, and settled as farmers on the river-bank; the villages are all in the interior” (1862, p. 278). Chandless noted small-scale gold mining taking place near the island of “Cuatá”, by the Maranhão Grande rapid (1862, p. 278). Apparently *guaraná* was the only item exported from Itaituba at this time (1862).

Bates would refer to the “native seat” of the Maués as “the district of country lying in the rear of the Canomá [River], between the Madeira and the Tapajos” (1864, p. 169). Apparently influenced by Martius’ writings on the Tupi (1982 [1845]), he thought it plausible that the Maués could be considered to be a branch “of the great Mundurucú nation, having segregated from them at a remote period” (1864, p. 169). Here, he demonstrated an awareness of the possibility of historical changes within Amerindian societies. Bates perceived the Maué customs and language to be different from those of the Munduruku (1864, p. 169). Indicating malaria was by then a commonplace ailment, Bates commented that the Maués used *paricá* “chiefly as a preventive against ague” (i.e., malaria) (Bates 1864, p. 195), while the Munduruku did not make use of it. He wrote that “When a dose is required, a small quantity of the paste is dried, and pulverised on a flat shell, and the powder then drawn up into both nostrils at once through two vulture quills secured together by cotton thread” (Bates 1864, p. 195).

A decade later, in the vicinity of the Tucunaré Island, Barbosa Rodrigues disembarked to visit Maué Indians who cultivated *guaraná*, manioc, corn and cashew trees (1875, p. 106). Along the Lower Tapajós, Munduruku and Maué settlements seem to have been interspersed, as both peoples were involved in rubber production (1875, p. 108-110). Munduruku attacks had forced most Maués to move to the interior, however. Barbosa Rodrigues estimated the Maué population along the banks of the Tapajós to be to be 500 in the 1870s (1875, p. 124-125). He wrote that “besides some dispersed families, the following villages can be found: Boia-açú, Urubutu, and Acará” (1875, p. 124).

Towards the end of the nineteenth century, according to Coudreau, the Maués had been producing rubber instead of *guaraná*; he wrote that the “southern limit of the maués” was the Igarapé da Montanha (the Montanha 'stream'), opposite the Montanha Island (1977 [1897], 33). Their territory extended inland to the west, up to the vicinity of Parintins (1977 [1897], p. 33). The Maué population was estimated at four thousand people, but he thought they numbered 1,500; "Like all the other *indígenas*, they are in a process of absorption by the civilised ones, or even undergoing progressive extinction," he again insisted (1977 [1897], p. 33). He also mentioned that to the south and southeast of the Montanha stream there were *"*maués *bravos*" with whom there was no contact (1977 [1897], p. 33).

Nomadic hunter-gatherer peoples

The idea that nomadic societies in the Amazon were in fact "devolved agriculturalists" (Rival 1999, p. 77) who had lost their territories through the expansion of other peoples was initially proposed by Claude Lévi-Strauss (1968) and Donald Lathrap (1973). Lathrap believed this phenomenon had environmental causes, propelled by societies expanding from the Amazonian floodplains into adjacent areas. Balée & Moore (1994) have demonstrated how nomadic Tupi-Guaranian Ka'apor have retained words for domesticated plants that closely resemble those used by sedentary speakers of other Tupí-Guaranian languages. Whether or not nomadic hunter-gatherers existed in the late pre-Columbian period remains an open question; what is certain is that many agriculturalist sedentary peoples had to turn to nomadic pathways in order to survive conquest.

Passing the Rio dos Peixes, Florence mentioned the 'Tapanhumas,' 'wild' Indians who had engaged in a violent encounter with a priest by the name of Lopes (2007 [1876], p. 221). He claimed that towards the interior, the Indians were "wilder" (2007 [1876], p. 260).

Chandless wrote that that a day below the Sumidouro falls, "one is in the country of hostile Indians, the Tapanhonas and Namibiguaras, who frequent both banks of the river, but chiefly the right bank" (1862, p. 271). Later he commented on how navigation along the São Manoel (Teles Pires) was abandoned in favour of the Arinos and Juruena because of attacks from "hostile Indians" (Chandless 1862, p. 276). He commented on how, months after leaving "looking-glasses, knives, &c.", Benedicto França was lured into a surprise attack by one of these groups (Chandless 1862, p. 271) and "at other places he found they had examined the things he left, but carried nothing away" (1862, p. 271).

Forty years on, the Munduruku had already exterminated the Júmas[59] and the Jacarés, according to Bates, and made an annual expedition against "the Parárauátes, and one or two other similar wild tribes who inhabit the interior of the land, but are sometimes driven by hunger towards the banks of the great rivers to rob the plantations of the agricultural Indians" (Bates 1864, p. 274). The Parárauátes were callously described by Bates as "a tribe of intractable savages… They had no fixed abode, and of course made no plantations, but passed their lives like the wild beasts, roaming through the forest, guided by the sun" (Bates 1864, p. 271).

Continuing hostilities between the Munduruku and Parintintin were reported by Tocantins, and substantiated by the trophy head given him, of a Parintintin girl, for which Tocantins gave the Munduruku warrior who owned it a rifle and gunpowder (1877, p. 85).[60]

Barbosa Rodrigues also recorded several ethnonyms for nomadic groups living at the time in the *centro* (the hinterland/interior) of the Tapajós. They were: Parintintins, Têtêuates, Tuparurus, Iaurités, Tapaiunas, Jacaréuaras (1875, p. 132).

In the 1890s, Coudreau affirmed that "From what it seems, it is at the headwaters of the Jamanxim, of the Crepori, of the das Tropas and of the Cadariri that the Indians live" (1977 [1897], p. 31). He commented that the Parintintins were living along the Jamanxim River and that they would not go further downstream than the Caí rapids (1977 [1897], p. 30). He mentioned Indians called 'Pariuaia-Bararati' living along the Bararati River (1977 [1897], p. 58). The Frenchman stated that "half a dozen tribes of índios bravos" occupied the areas between the Salto Augusto and the Sete Quedas rapids and the tributaries of the Upper Tapajós in the north of Mato Grosso and the São

[59] Spix and Martius (1981 [1831], p. 276) had predicted the Munduruku would exterminate the Jumas and Parintintins.
[60] Tocantins donated this trophy head to the National Museum in Rio de Janeiro.

Manoel River; he declared this “a hostile and closed zone, the ‘Wild Land’” (1977 [1897], p. 83). He stated that “the tapanhunas and nhambiquaras, the parintintins, the *raipexixis* or *aipocicis*, the *bacairis mansos* and the *bacairis bravos*, the *cajabis*, the *parauaretês*” (italics in original) lived in the region between the Arinos and the tributaries of the São Manoel, (1977 [1897], p. 85). After describing the “treacherous” ambush tactics of the “tapahumas”, Coudreau declared he believed that “*índios* ‘*bravos*’ are purely and simply hereditary and professional bandits, in relation to whom philanthropy is an illusion” (1977 [1897], p. 86). Coudreau collected and illustrated several stone axes, which he attributed to some of these ethnic groups (1977 [1897], p. 85-87).

Seringueiros (rubber tappers)

From the second half of the nineteenth century, the rubber economy gained ground in the Tapajós. Although Amerindian labour was engaged in this process, “…without doubt, the engine propelling the process was the conquest of territory and the security of the routes and of settlers. Indigenous labour is only still fundamental as a local and transitory alternative in face of new opportunities” (Cunha 2006 [1992], p. 133).[61] Thousands of migrants from the northeast were increasingly brought to work as tappers. Lured with promises of wealth, they were in effect exploited and enslaved by a system of debt bondage. Most of these migrants were men; marriage to Amerindian women was often forced (Torres 2008).

Chandless gives what was perhaps one of the earliest references to *seringueiros* in the area, near the mouth of the São Manoel River, where he found “India-rubber makers” who practiced trade with the Munduruku living inland, on the *campinas* (1862, pp. 275, 277). Below the Chacorão rapids, the expedition passed “several parties of India-rubber makers” (1862, p. 277).

By the time Barbosa Rodrigues travelled towards Montanha Island, the extraction of latex from rubber trees was firmly instituted, something he saw as a blight upon the inhabitants and the advancement of the Tapajós (1875, pp. 52; 54; 55; 57; 96; 110; 124-125). He wrote that “all of this population lives in poverty, miserably… distracted by the

[61] Though Cunha makes explicit reference to the western Amazon, this pattern can also be observed along the Tapajós River.

extraction of rubber" which they were obliged to use as currency by traders, who fixed "fabulous prices" for their goods (Rodrigues 1875, p. 124-125).

By the time Henri Coudreau travelled up the Tapajós, the main course of the river was no longer dominated by Amerindians. His expedition passed by the houses of rubber barons, such as José Pereira Brazil, who had approximately 70 rubber tappers under his command, among them "men and women from the state of Maranhão, Ceará and Pará, who produce a very considerable quantity of rubber for him" (1977 [1897], p. 32). Coudreau provides a list of the names of the rubber tappers in his Appendix (1977 [1897]).

3.11 The Tapajós transformed

In 1888, slavery was officially abolished in Brazil, and the Brazilian Republic was proclaimed in 1889. These fundamental changes at the country's centre did not have an immediate impact along the Tapajós. The rapids of the river still played a major role in the way the region was incorporated into the nascent national society: this remained a peripheral area. As the sources make clear, the Upper Tapajós and its peoples lived in a constant state of flux over the four centuries following the European invasion of Amazonia, however. The sources give us an idea of the territorial fluidity of the region, showing how, at different times, collectivities were reconfigured, and ebbed and flowed over these areas.

Amerindian societies responded in diverse ways to the profound effects of European presence and its myriad forms of encroachment. Responses to colonisation varied between different peoples and also changed over time, from open resistance to complicity with the imposed colonial system (Perrone-Moisés 2006 [1992], p. 129). Moreover,

> …those groups that proved politically incapable of producing adequate responses to change, who were true conservatives in their attitude to the status quo, were simply destroyed, dispersed or enslaved by the Europeans. Where Amerindian responses were more flexible and innovative… European conquest was either delayed or never took place
> (Whitehead 1993, p. 298).

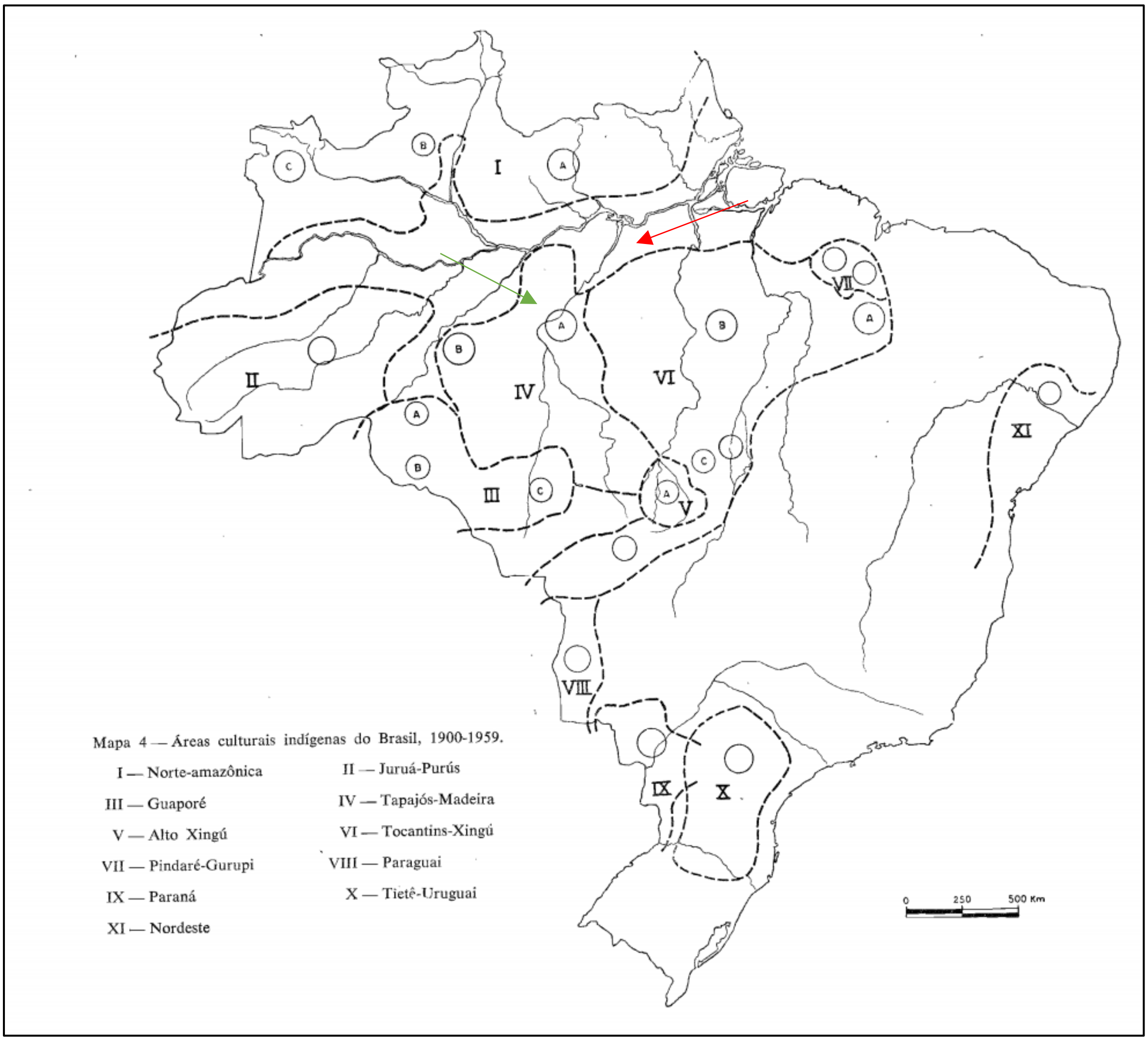
The Munduruku most visibly incorporated the widest range of responses over time – from open resistance, to negotiation and eventual collaboration with the colonial and monarchic authorities. This guaranteed their survival – often at the expense of others, and shaped the history of the Tapajós region from the late eighteenth century; their "political consent and active military assistance… was the *sine qua non* of colonial occupation" (Whitehead 1993, p. 286).

Whitehead (1993, p. 297) observes that indigenous economic and political relationships were "deeply disturbed and it therefore became possible, even imperative, to practise new modes of leadership amongst the Amerindians. This is a key reason why such groups as the… Mundurucu rose to dominance in colonial times."

3.12 Amerindian peoples of the Tapajós in the twentieth century

It is intriguing to note that, in his definition of "Indigenous Cultural Areas" in Brazil for the period between 1900-1959, Eduardo Galvão (1960) placed the 'boundary' between areas I and IV on the Tapajós at roughly its lower rapids. He used as determining criteria the spatial distribution of cultural elements in relation to material culture and socio-cultural aspects; geographic elements were also considered (1960, p. 8).

The idea of a 'cultural area' is a broad generalisation and as such, is hardly consensual, with its implication of fixed boundaries and internal homogeneity within each area. But it still offers a point of discussion in considerations related to the overall distributions of the region's peoples in this sixty-year period. The two cultural areas straddled by the Tapajós were called the northern Amazon and the Tapajós-Madeira (1960, p. 16-18). The 'A' division of the northern Amazon cultural area lay mostly in the Brazilian Guianas, and it was dominated by Carib speakers. The Tapajós-Madeira cultural area was composed only of Tupian speakers ('A' being Kawahyb speakers and 'B,' Munduruku speakers), and encompassed most of the interfluve between these two major rivers, much of the Juruena and Teles Pires, and the western edges of the upper Xingu.



Map 8. *'Áreas culturais indígenas do Brasil, 1900-1959'. Reproduced from Galvão 1960, p. 17. Red arrow points to lower Tapajós, included in 'northern Amazon' area, and green arrow point to 'Tapajós-Madeira' area.*

The picture of course is more complex than that presented by Galvão.[62] Arawak-speaking **Paresí** peoples – including the Kaxinití, Uaimaré, Kozaríni, Iránxe and Salumã/Enawenê-nawê (Heckenberger 2005, p. 59) – are present to the south of the Tapajós basin, for instance, historically living around the Juruena River (Pires de Campos 1862). But speakers of Tupian languages are indeed prevalent in the region. They include both Tupi-Guaranian and Macro-Tupians, as mentioned by Rodrigues & Cabral (2012; see section above on the Tupi on the Tapajós). The **Kagwahiva** are Tupi-Guarani peoples who are sub-divided into smaller groups, some of whom are

[62] Unless otherwise mentioned, this information was derived from https://pib.socioambiental.org/pt Accessed 23/11/2016

uncontacted today. Their northern grouping lies within the Tapajós-Madeira area and includes the Tenharim, Parintintin, Juma and Jiahui. Many of the Kagwahiva were displaced or exterminated by the Munduruku during the colonial period, causing them to migrate to the Madeira River. The **Kayabi** are a Tupi-Guarani people who traditionally lived along the lower Teles Pires, Juruena and Tutuy Rivers and who resisted incorporation into encroaching settler society. In 1966 the Villas Bôas brothers took many of them to the Xingu Park. They number some 2,250 people. The **Apiaká** are also a Tupi-Guarani people who were initially recorded along the middle and lower Juruena River and its eastern tributaries and near the upper reaches of the Tapajós. Some Apiaká today are uncontacted. They number approximately 850 people. The **Munduruku** today number around 13 thousand people. Their language, along with **Kuruaya** (whose speakers live in the Xingu basin), belongs to the Munduruku language family. They live along the banks of the Tapajós and its tributaries, including the lower Teles Pires River. The **Sateré-Maué**, or **Maué**, today number some 13,350 people. They are Tupians but their language does not belong to the Tupi-Guarani family either. They are concentrated in the interfluvial area between the Tapajós and Madeira River, but during the colonial period also lived in missions and as rubber collectors along the banks of the Tapajós.

It is likely that the language spoken by the **Arapium** (*Arapiyú*) in the past was a Carib language (Nimuendaju 1948, p. 253), even though Martius (1867) and Métraux (1928) considered them to be related to the Maué (this may be an indicator of interactions between these peoples). Their territory lay to the west of the lower Tapajós along the homonymous river. Today their descendants number approximately 2,200 people. The **Arara**'s language belongs to the Pekodian branch of the Carib family (Gildea 2012) or to the South Amazonian Carib group (Kaufman 2007 cited in Campbell 2012). They live to the east of the Tapajós, now in the Xingu basin, but were previously reported along the Tapajós proper. They number approximately 380 people and some of them are uncontacted. Meanwhile the **Kurâ** (**Bakairi**) live today in northern Mato Grosso along the Teles Pires River to the south, in Mato Grosso, and number approximately 980 people. Their language also belongs to the Pekodian branch of the Carib family of languages (Gildea 2012) or to the South Amazonian Carib group (Kaufman 2007 cited in Campbell 2012).

Along the lower Tapajós there are several indigenous peoples who have not to my knowledge been the subject of recent ethnographic research. They are: **Tupaiú**, **Apiaka**, **Arapium**, **Arara Vermelha**, **Borari**, **Cara-Preta**, **Cumaruara**, **Maytapú**, **Jaraqui**, **Tapajó**, **Tupinambá, Maró** and **Tapuia**.

A better understanding of the specific elements assembled by Galvão to define these limits would be needed before more confident and detailed extrapolations can be made. It is not entirely clear why he placed the boundary between Areas I and IV near the lowermost rapids of the Tapajós. Galvão's boundary generally coalesces with what has been hypothesised archaeologically in relation to the limits of the influence of the Tapajó chiefdom on the Tapajós. If Galvão's depiction is indeed a faithful portrait (inasmuch as a generalising representation can be) of the years 1900-1959, this would suggest an apparent continuity between pre-Columbian and post-colonial times, particularly in terms of the 'Carib' presence (that is, if we take the liberty of associating IPT remains with Carib speakers). This is contrary to expectations, considering the social upheaval, territorial dislocation and postulated demographic collapse occurred in the area during the colonial period, and deserves further investigation.

A fundamental change in the region would take place from the 1960s, with the opening up of the Transamazon Highway, which led to the forced contact, death and displacement of numerous Amerindian peoples along its path. The Transamazon made inroads towards the Upper Tapajós, into an area hitherto inaccessible to national society because of the rapids and the forests. Its effects upon the peoples living in and around the Tapajós region must be the object of future inquiry, particularly as the Figueirdo Report (Figueiredo Correia 1967), which revealed atrocities committed against several indigenous peoples of Brazil from the 1940s-1960s by the Indian Protection Service of Brazil and by powerful landowners, has been found after being lost for 45 years.[63]

[63] See http://www.survivalinternational.org/news/9191. Accessed 10/12/2016.

3.13 Discussion

The Tapajós basin and river proper are composed of a diversity of environments. Towards the river's upper reaches, pre-Columbian and post-Conquest Amerindian societies would have had access to varied forest and grassland areas, rivers and feeder streams. The geology of the region – in particular, the river's rapids, also played a decisive part in its history over the last 500 years.

European conquest and subsequent colonisation did not happen uniformly along the Tapajós. The rapids acted as a buffer, slowing down the southward advance of missionaries. In contrast, the lower course of the river – and what would become known as Santarém, in particular – were exposed to early incursions and settlement of Europeans. Besides the violence deployed by the Portuguese, the diseases brought by Europeans would prove deadly, particularly after the Jesuits arrived in the area and mission stations were established. *Descimentos* saw the uprooting of entire villages and consequent territorial displacement. Indigenous societies on the Lower Tapajós suffered these impacts heavily, to the point that the previously powerful polities known as the Tapajó and the Tupinambá stop being mentioned in the records by the seventeenth century. Santarém developed out of the densely populated pre-Columbian Tapajó settlement, and it probably acted as a centre of dispersal for contagions along pre-Columbian trade routes, meaning Old World diseases likely reached peoples who never came into physical contact with Europeans. We must beware of assuming that a synchronised and uniform demographic collapse took place, as a number of factors would have influenced the spread of contagions, however.

Likewise, Amerindian responses to conquest and colonisation varied dramatically, and some of these responses can at times be glimpsed through historical records. They hint at complex trajectories, that contrast with the linear 'tribalised' to 'missionised' pathway that is often assumed. Our understanding of conquest and colonisation on the Tapajós is still strongly dependent on these sources, which until the nineteenth century were without exception produced by white males – firstly by missionaries, and latterly by colonial administrators. The ethnonyms recorded must be treated with caution.

The colonial push into the Upper Tapajós would come eventually from the south, and was greatly motivated by the search for gold. These new incursions would have caused further instability – this time, far more directly – among Amerindians living along the upper reaches of the Tapajós. Enormous changes in the Amerindian geopolitics of the whole Tapajós region, and a transformation of its social configuration, undoubtedly took place over these approximately 400 years. But this did not mark the end of Amerindian history on the Tapajós, in spite of this being frequently prophesised by the men of science who came to the region in the nineteenth century. Read sequentially, their accounts show how Amerindian territories were successively fragmented by the advance of national society during the second half of the nineteenth century, particularly as the rubber economy advanced. These sources also allow us to consider the material culture in use at the time, and how Europeans adopted Amerindian technologies, foodstuffs and relied on their geographical knowledge, while Amerindians incorporated European objects, such as metal tools and industrialised cloths, into their lives.

With limited written records, archaeological information, and knowledge of oral traditions, verifying the ways in which aspects of Amerindian societies changed or remained stable along the Upper Tapajós is a challenge. The Munduruku have been portrayed as a warrior society in the anthropological literature**:** however, we may ask whether this characteristic was indeed an "inherent" Tupian characteristic, as it is often suggested to be, or whether it was constructed in reaction to the harsh colonial reality. Their 'warrior ethic' may be a developed response to slave raids suffered as a consequence of the expansion of the colonial frontier from Mato Grosso (M. Harris, pers. comm., 5 December 2012), pushing them into an aggressive 'foreign policy,' which entailed the incorporation of captives and of already anthropogenised environments from other peoples. While the assimilation of others into their society and their expansion into the Lower Tapajós would almost certainly entail ethnogenetic processes during the colonial period, their linguistic cohesion, and impressively consistent responses towards colonial society and other Amerindian collectivities – particularly if we consider the vast areas involved, the relatively short time periods concerned and the fact that travel was undertaken on foot or with paddle canoes –, would point to the existence of longer term identities and developed networks within the area.

Linguistic studies certainly point to protracted Tupian presence in the Upper Tapajós region, making it highly likely that speakers of the Munduruku, Mawé and Tupi-Guarani language families were present in our study area by the late Holocene, if not before. It is also probable that speakers of other Tupian families today found to the east traversed the Tapajós. Carib speakers also inhabited the Tapajós. Like the Tupians, the geographical limits of their pre-Columbian occupation are uncertain. We will turn to the archaeological record to consider these issues, as well as questions related to cross-cultural interactions and relationships with alterity.

The project to construct hydropower dams and turn the entire river into a navigable waterway for industrial watercraft represents a dangerous step towards the destruction and appropriation of the historical landscapes of the Tapajós by private interests, which will lead to the elimination of social diversity and of the heritage of forest peoples along the Upper Tapajós. The existence of the river's rapids, which have served to protect its peoples from encroachment, is now threatened. The following chapter will register the context encountered on the ground during this research project, which contributed to shaping the overall aim and objectives of this thesis. It is also important to describe these recent events to give an idea of the social and political setting in which archaeology on the Upper Tapajos region has to be carried out today.

Chapter 4. Working in the shadow of the Tapajós Hydroelectric Complex

4.1 The Tapajós at the centre of conflict

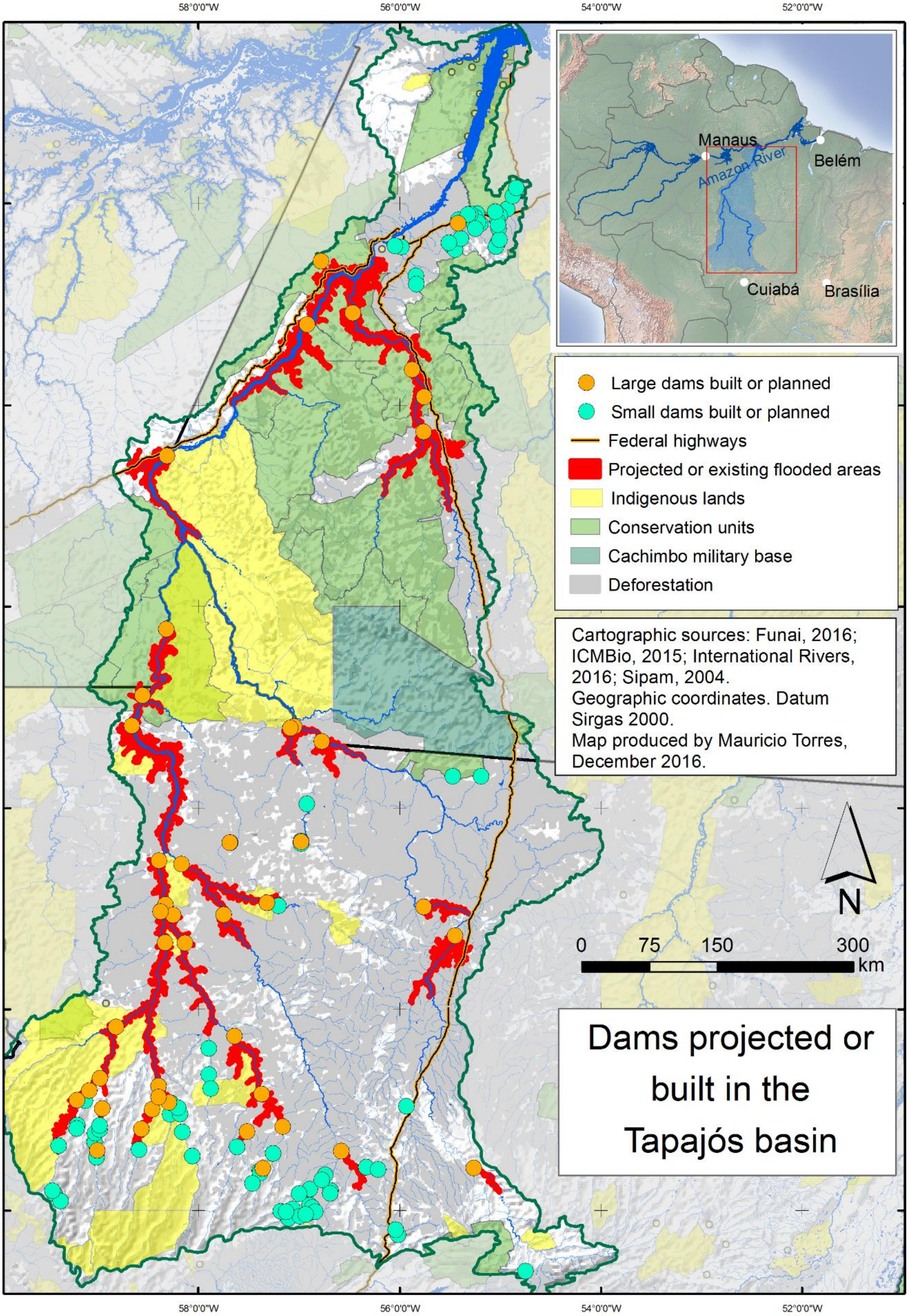
> The Tapajós river Basin is Brazil's most recent and most active 'hydroelectric frontier' (*fronteira hidrelétrica*). The wild-west implication of this Brazilian term is not undeserved
> (Fearnside 2015, p. 373).

This study has been conducted within the context of the struggle for recognition of the Munduruku territory of Daje Kapap Eïpi (known officially as Sawre Muybu). This struggle, which is ongoing, is part of a wider conflict that has pitted local forest communities of the upper Tapajós against a consortium of multinational corporations and the Brazilian federal government, which together have sought to build a series of hydroelectric dams as part of its Growth Acceleration Programme.

In a project of unprecedented magnitude, 43 large (i.e. producing over 30 megawatts) hydroelectric dams have been planned within the Tapajós River basin (Fearnside 2015; 2016, p. 79). The largest of these would be São Luiz do Tapajós (SLT), near the lowermost rapids of the Tapajós. Jatobá and Chacorão would form barriers across the river further upstream.[64] Another four dams are projected for the Jamanxim, a tributary of the Tapajós, while six dams are already under construction or being planned for the Teles Pires, and 30 are projected for the Juruena and its tributaries.

The aims of dam construction are twofold: first, to supply the mining industry with subsidized energy to exploit the area's untapped mineral reserves; and second, to create a vast industrial waterway to move commodities cheaply from the nation's interior to the coast (Alarcon *et al*. 2016; Branford 2016). This view of the Tapajós, as a means to supply highly-concentrated industries with energy or as a channel for commodities, clashes with and disregards local perspectives of the region and its historical landscapes.

[64] The territory of Montanha e Mangabal would thus be divided between SLT and Jatobá.



Map 9 Dams and projected flooded areas along the Tapajós basin. Map by Maurício Torres.

Since 1986 Brazilian legislation requires environmental licensing studies of projects that can affect the environment or society during or after their construction. This involves the production of Environmental Impact Studies and Reports. In theory, this should allow for both the evaluation of the probable impacts of planned construction and later evaluation of the actual impacts on: the health, well-being and safety of the population; social and economic activity; the integrity of the affected biota; the aesthetic and sanitary conditions of the environment; the quality of environmental resources; and cultural heritage. Studies related to environmental licensing are organised into a series of phases. Up to March 2015, the Heritage Agency's (IPHAN, Brazilian acronym) ordinances ns° 07 and 230 determined the way in which archaeology should be integrated within the process (CONAMA 1986, Article 1; CONAMA 1997; IPHAN 1988; 2002).

One of the legacies of the construction of the Balbina hydroelectric dam in the state of Amazonas in the 1980s, however, was to turn the environmental licencing process into an exercise in rubber stamping. As Philip Fearnside writes,

> Unfortunately, the EIA/RIMA[65] is still viewed as a token exercise for bureaucratic approval of the projects, rather than as an input to decision making. It is a bureaucratic hurdle that infrastructure promoters consider to be an obstacle and opponents view as an opportunity to delay projects on procedural grounds. Unfortunately, the EIA/RIMA does not play its desired role as a serious discussion of the pros and cons of each project and of the development strategies of which the project is a part
> (Fearnside 2016, p. 38-39).

Furthermore,

> Environmental impact studies in Brazil are always highly favourable to the proposed projects, minimising their impacts and exaggerating their benefits. This derives in part from a system where the proponent pays for the study, comments upon the report and suggests alterations before it is presented to the authorities. The last payment instalment is usually made only if the report is received favourably by the governmental

[65] EIA/RIMA stands for Estudo de Impacto Ambiental/Relatório de Impacto Ambiental, i.e., Environmental Impact Assessment/Environmental Impact Report.

> organ. The report-producing industry – both on the level of consultancy companies and on the level of individual consultants, has strong incentives to produce reports that are favourable to the projects, in order to increase their chances of being hired for future projects.
> (Fearnside 2014).[66]

Scientists began travelling to the upper Tapajós region to conduct studies required by Brazil's environmental licensing legislation for the Jatobá and São Luiz do Tapajós dams in 2005-2006, for the first stage known as "Inventory Studies," which involves widespread surveys of the area to be impacted. A few years later, with the political decision to build the dams already taken, researchers would return for the next phase, known as EIA-RIMA.

By 2012 the Munduruku resistance movement had begun to demonstrate its opposition to dam projects in the region and to demand their right to be consulted in accordance with Article 231 of the Brazilian Constitution and with the International Labour Organisation's (ILO) 169 Indigenous and Tribal Peoples Convention, to which Brazil is signatory. They realised that if environmental impact studies were allowed to proceed, it would be impossible to halt dam construction. Loures and Torres (forthcoming) narrate how in June of 2012, the Munduruku resistance movement, Ipereğ Ayũ,[67] detained a group of 25 researchers employed by a construction company called Concremat,[68] which was funding environmental impact assessment studies related to the Jatobá dam.[69] The Munduruku found them near the Cantagalo rock, on the left bank of the Tapajós, upstream from Mangabal. This is an area containing rock art considered sacred by them. The Munduruku confiscated the flora and fauna collected by the scientists and held three researchers for two days. In an open letter entitled "Researchers, do not enter our lands", the Munduruku wrote:

---

[66]See http://amazoniareal.com.br/barragens-na-amazonia-22-licenciamento-de-hidreletricas/ Accessed on 09/11/2016.
[67] Ipereğ Ayũ can mean the people "who know how to defend themselves", or "who are not easy to trick", or "who are difficult to catch" (Loures & Torres, forthcoming).
[68] See also: http://candidoneto.blogspot.co.uk/2013/06/mundurukus-expulsam-pesquisadores-de.html Accessed on 09/11/2016.
[69] If built, the Jatobá dam would interrupt the flow of the Tapajós near the Machado community and destroy the Mangabal site, whose area would become a construction site.

> We demand that the government suspend all studies and research related to the dams on the Tapajós and Teles Pires Rivers. We know the research is the first step to enable the construction of the dams. We will not allow the research and studies to take place. If the government does not suspend [the impact assessment studies], we will find a way. We suggest to researchers that they do not enter our lands.
> All have been warned
> (The Munduruku people, 2012).[70]

The Munduruku released the hostages upon receiving a guarantee by representatives of the National Indian Foundation (FUNAI, Brazilian acronym) that they would be consulted about the dam projects and the continuation of impact assessment studies. Less than a month later, however, researchers working for Concremat had returned – this time under armed escort provided by the country's National Security Guard:

> From then on, all [licensing] research [related to the Tapajós dams] would be undertaken under the escort of the National Security Guard… as a result of Munduruku resistance, for the first time in Brazilian history we had environmental impact studies carried out under armed escort
> (Loures & Torres 2017).

In December of 2012, three colleagues and I[71] travelled up to Jacareacanga, the last town of the Upper Tapajós near the border with Mato Grosso to talk with the Munduruku. They told us how, on the 7th November 2012, the Brazilian Federal Police and National Security Guard descended with full force upon the Munduruku village of Teles Pires in the state of Mato Grosso, inside the Kayabi Indigenous Territory, where there are a number of Munduruku villages (Rocha *et al.* 2012).[72] The operation involved a helicopter and dozens of police agents, armed with machine guns and assault rifles and wearing flak jackets. By the end of the day, 19 people had been injured and Adenilson Kirixi Munduruku had been killed. He was shot three times in the leg and then received a bullet in the head. The police immediately denied the murder.[73] Witnesses told us that

[70] http://candidoneto.blogspot.co.uk/2013/06/mundurukus-expulsam-pesquisadores-de.html Accessed on 09/11/2016.
[71] I travelled alongside Raoni Valle, Claide Moraes and Ítala Nepomuceno.
[72] See report originally published in 2012 in: http://lab.org.uk/day-of-terror
[73] See http://www.prpa.mpf.mp.br/news/2014/mpf-denuncia-delegado-da-pf-pelo-assassinato-de-adenilson-munduruku Accessed on 09/11/2016

a bomb had been exploded at the scene of the crime to conceal evidence. Adenilson's body floated to the surface of the river on the following day. The village's inhabitants, including the elderly, women and children, were left traumatised after being teargassed and ordered to lie on the ground in the sun without water for many hours, during which time they were not allowed to talk to each other in Munduruku. Most of the footage filmed on their mobile phones, registering the violence, was destroyed by the police.

Fig. 17 An archaeology of state violence. The remnants of the exploded gold mining dredge floating in front of wooden boards used for washing dishes and clothes still serve as a daily reminder to the Munduruku of the Teles Pires village of the fateful day of 7th November 2013, when Adenilson Kirixi Munduruku was killed by a shot to the head and the village was attacked by the National Security Guard in an operation supposedly intended to stop environmental damage to the area. The photograph was taken exactly three years on by Maurício Torres.

The action was ostensibly part of "Eldorado Operation," a campaign to combat illegal gold mining activities along the Tapajós River and its tributaries in defence of the environment. Besides resulting in the death of a man, it caused extensive environmental damage to the area, since the goldmining dredger was blown up with everything in it – including gallons of petrol, an oven and gas cylinders. With illegal gold mining rife throughout the region, the choice of the Teles Pires village raised questions and was interpreted by the Munduruku as an attempt at intimidation by the government, following their acts of resistance against the dams.

In January-February 2013 Claide Moraes, Vinicius Honorato, myself and two colleagues from UFOPA accompanied Raoni Valle, who had been invited by the Munduruku to their General Assembly in Sai Cinza.[74] My intention was to show the Munduruku the findings of the first stage of my research (Rocha 2012), in which I had associated some of the excavated pottery with their ancestors. Because of what had happened in the preceding months, the word *pesquisador*, or 'researcher', had acquired an extremely negative connotation among the Munduruku and other forest peoples of the Tapajós, having become synonymous with people working for impact assessments for the dam consortium. We were well looked after during the meeting, but as scientists, we were regarded with distrust by some. Our presentations were well received, but the Munduruku living on the upper tributaries of the Tapajós did not express an interest in developing a research relationship with us: they were adopting a policy of shutting themselves off to any researcher. The Munduruku who lived closer to the river's last rapids were more receptive, though at the time I did not make any concrete proposals.

Over the course of the meeting, many Munduruku expressed their grief at the killing of Adenilson Kirixi the month before. A Munduruku woman who was at the village of Teles Pires on the day of its attack by state forces spoke before an assembled panel of representatives from the National Indian Foundation and of President Dilma's office: "*What they did [on that day] will never leave me… it is as if it were a tattoo*" (Munduruku woman, 2013).[75] Over the course of the assembly, it became clear that the Munduruku believed they would stop dam construction: they did not accept official discourse about the inevitability of the projects. Here I learnt an important lesson from the Munduruku, and realised that I was studying a history that was still alive. History was not *acting upon* the Munduruku: they did not accept its inexorability. *They* were shaping history.

[74] At this assembly the then Cacique-Geral of the Munduruku people, Bi Boi, would be succeeded by his son, Arnaldo.
[75] Antônio Carlos Moriel Sanches, the police officer accused of the killing was summarily acquitted and is currently working as a Brazilian police attaché in Bolivia. The Federal Public Prosecution Service from the State of Pará have appealed the decision.

Fig. 18 Bi Boi, the then Cacique-Geral, is received at the Sai Cinza village by the Munduruku warrior women, the guerreiras, or female warriors. Photograph by Vinicius Honorato.

4.2 Guns and reports. Resistance moves into a new gear.

I did not return to the Tapajós again that year, but important developments took place in my research area. Scientists were taking part in the Tapajós Operation, launched on the 25th March 2013. This saw heavily armed personnel (some 250 men from the Federal Police, National Security Force, Federal Highway Police and the Brazilian Air Force) drafted into the area to accompany biologists, forestry engineers and technical assistants, among others, tasked with conducting technical studies for the EIA-RIMAs of the São Luiz and Jatobá hydroelectric dams.

Local people felt intimidated (Ageu Lobo Pereira, pers. comm., 19 August 2014). Archaeologist Raoni Valle went to the village of Sawre Muybu on the 29th March 2013 and witnessed the climate of fear that prevailed among the Munduruku there.[76] A helicopter had circled over the village repeatedly during the previous days, at times

[76] For an account of the episode, see: http://www.ihu.unisinos.br/entrevistas/operacao-tapajos-os-munduruku-nao-querem-guerra-entrevista-especial-com-roani-valle Accessed on 09/11/2016.

flying so close to the houses that the palm thatch roofs were blown off. The Munduruku did not feel safe leaving the village to go to their manioc gardens, to collect wild fruits or to hunt, lest they come across researchers accompanied by heavily armed guards. The danger – particularly to hunters who were carrying rifles – was evident, and people started to go hungry. The same sense of fear and intimidation affected the Beiradeiros at Mangabal, where another contingent of researchers and armed guards had been drafted to protect studies related to the Jatobá dam. With an air of bitter indignation, Josué Lobato Cirino of the Machado community said of the presence of researchers escorted by military personnel:

> We cannot say anything, we cannot do anything, we cannot express ourselves – because of this. The police are here. This is what I find painful. We're in our land, in our place. And we have to accept all of this. This is wrong
> (Josué Lobato Cirino, 2013).[77]

On the 16th April a Federal Appeals Court suspended the operation. The psychological damage had been done, however: from then on, researchers working for the dams could circulate in the area freely; the threat of violence was implicit and no longer needed to be demonstrated. Archaeologists working for specialised consultancies would participate in this second stage.


Fig. 19 Helicopter flying over Sawre Muybu village during the last days of March 2013 as part of Operation Tapajós. Photograph: anonymous. Fig. 20 Scientists are barred from talking to journalists at the "Amigo Garimpeiro" restaurant, 180km south from Itaituba on the Transamazon Highway. Photograph by Nayana Fernandez.

In 2013, the Munduruku would twice occupy the Belo Monte dam site (Loures 2016), alongside other indigenous groups, in order to draw attention to their opposition to the

[77] Filmed by Minguarana Producciones. Avaliable at: http://mortedotapajos.tv/o-rio-tapajos/ Accessed on 09/11/2016.

Tapajós dam projects; Chico Caititu represented the Beiradeiros in the occupations. They were also demanding that the government officially recognise the territory known as Sawre Muybu, where we would come to work the following year. After a series of setbacks, the anthropological report – which cited archaeological information generated by our project – was produced by the National Indian Foundation (FUNAI, Brazilian acronym) that same year (Seixas *et al.* 2013). This is a prerequisite to official recognition of an indigenous territory. According to the Brazilian constitution, officially recognised indigenous territories cannot be flooded by dam construction and neither can their occupants be forcibly relocated. But the recognition process had suffered from a series of official delays because of the federal government's interest in building dams on the Tapajós, as the then president of FUNAI would later admit to the Munduruku.[78] Thus the plight of the Munduruku was similar to what had happened to the Beiradeiros and their struggle for a RESEX: both these forest peoples' territorial rights to their ancestral lands had been put aside in the interest of "progress."

In 2014, following a number of attempts at building dialogue with the state that included the elaboration of a consultation protocol along the lines of the ILO's 169 Convention, the Munduruku decided again to resort to direct action (Loures 2016, p. 162-163) to pressure the government in recognising the territory of Sawre Muybu, known also as Daje Kapap Eïpi. The direct action took the form of *autodemarcação* ('self demarcation') which meant staking out the land in accordance with what had been determined by the FUNAI anthropological report, as a way of putting pressure on the government. It would entail opening a trail of approximately 200km around the territory, which was accomplished over several stages between October 2014 and July 2015 (F. Moreira, pers. comm., 15 November 2016); dangerous encounters with loggers and gold and diamond miners who had invaded the area occurred in several of the stages.

[78] See https://autodemarcacaonotapajos.wordpress.com/2014/11/26/funai-admite-pressao-e-condiciona-demarcacao-de-ti-a-hidreletrica/ that shows the then President of the National Indian Foundation, Maria Augusta Assirati, break down in tears and admit to the fact that the was not able to forge ahead with official territorial recognition of Sawre Muybu because of political pressure, in November 2014. Accessed 15/11/2016.

Map 10 Map showing the territory of Sawre Muybu, or Daje Kapap Eïpi, showing current Munduruku villages and the location of Os Fechos, or Daje Kapap, where the peccary crossed the Tapajós according to Munduruku mythical narratives. The path staked out during the self-demarcation is marked in white. Map by Maurício Torres. Sources cited above.

Fig. 21 Munduruku warriors from several villages assemble to begin the 'autodemarcação,' in October 2014. Photograph by Vinicius Honorato.

4.3 Fieldwork at Sawre Muybu

I first travelled to Daje Kapap Eïpi, where the village of Sawre Muybu is located, in March 2014 to conduct archaeological excavations. To work at the site, I wrote a project proposal to the Munduruku of Sawre Muybu that offered a definition of archaeology and explained why I was interested in excavating in their village. I also suggested how this could potentially help them in their fight for their land by providing proof that the area possessed signs of ancient Amerindian habitation and that it was therefore not virgin forest. The Munduruku accepted my proposal, which then led me to assemble a series of documents to send to FUNAI in Brasília – a detailed project proposal, documents and health certificates for all team members, etc. The fact that the proposal was presented to the Munduruku by Juliana Araújo, a FUNAI worker whom they trusted, certainly helped towards its acceptance.[79]

In spite of our coordinates being Cartesian and our conception of time, linear, engagement with the Munduruku opened up intersections between our archaeological practice and our findings and Munduruku epistemology and cosmology. On arrival, I gave the Munduruku photographs of nineteenth and early twentieth century

[79] See Appendix 2 for declaration of the Munduruku from Sawre Muybu authorising this research.

Munduruku feather ornaments kept at the British Museum.[80] Many historical ethnographic collections of Munduruku materials exist in Brazil and in other countries: the Munduruku must gain further access to these repositories, which are a testament to their historical presence in the Tapajós region and which document the development of their technical and artistic traditions. I also showed them a report we had written for the Heritage Agency (Honorato de Oliveira & Rocha 2013) with images of nineteenth century Munduruku tattoos, as well as of Antônio Gonçalves Tocantins' (1877) sketch of the paintings on the rock surface at Cantagalo, on the upper Tapajós. Juarez informed me (pers. comm., March 2014) that the rock paintings were produced by Karusakaibö, the Munduruku culture hero and first historian.

Fig. 22 Juarez Saw Munduruku, Claudette Saw Munduruku and others peruse our report on the archaeology of the Tapajós (submitted to the Heritage Agency) and observe photographs of nineteenth and early twentieth century Munduruku featherwork stored at the British Museum. Photos: Francisco Forte Stuchi.

[80] I am grateful to Jago Cooper, Kiera Gould and Kate Jarvis for giving us access to the collection.

In addition, much can be learned from viewing the establishment of the village of Sawre Muybu from a historical ecological perspective. While such a perspective would provide, on the one hand, a lens through which to interpret the contexts encasing the analysed material (primarily pottery), on the other, it would serve as a conduit connecting the archaeological record with the present. In particular, this would include incorporating "the knowledge accumulated by non-state peoples (i.e. 'non-scientists') who are closely related to their local biotic and geophysical resources;" this "knowledge that has been 'captured' (Gunn 1994) over the long term [is seen] as one guide in understanding the formation and development of landscapes" (Balée 1994, p. 2).

4.4 Historical Ecology as process: in search of *katomb*

To the present-day Munduruku, Neves *et alli*'s (2003) statement that "What one considers 'nature' and 'natural' in Amazônia today has been in fact derived from past human management to some significant degree" (Neves *et al*. 2003, p. 34) would come as no surprise. Amazonian Dark Earths are known as *katomb* in Munduruku. Munduruku predilection for these soils can be inferred already in the nineteenth century, when Charles Frederick Hartt (1885) visited and excavated funerary urns at an archaeological site downstream from Itaituba that contained a layer of dark earth.[81] Not long before, the place had been a Munduruku village:

> Cafezal is the name of a property belonging to Mr. Castilho of Itaituba, and is situated on the left bank of the Tapajós, behind a large, tree-laden island, five or six miles downstream from Itaituba. The river bank (*ribanceira*) there is steep, rising between 10 and 12 metres above water level when the river is low... The earth at the top is clayey or black… According to tradition, in relatively modern times a Munduruku Indian village used to exist there
> (Hartt 1885, p. 16).

Because the Munduruku are thought to only have settled in the lower Tapajós following their truce with the Portuguese, when they came to live near Christian missions, Hartt (1885, p. 17) reasoned that it was improbable that the urn burials he encountered had been produced by the Munduruku, unless they had been in the area prior to Portuguese

[81] Besides the reference to 'black' earth, Hartt also wrote that the funerary remains in one of the urns were mixed with dark earth (1885, p. 15).

arrival. It is likely that the Munduruku had selected the already fallow area for their occupation, and were later evicted from the land – which became private property – with the advance of Brazilian society in the area, largely due to the rubber boom.

A similar scenario was reported in the 1950s, when Hilbert narrated Friar Protásio Frikel's archaeological finds at the Cururú Franciscan mission, among the Munduruku: "The urns were found immediately beneath the surface with a layer of *terra preta* [ADE] of approximately 50cm depth, which in its turn extends over a layer of yellow clay" (Hilbert 1957, p. 3). Hilbert concluded that the urns were not produced by the historical Munduruku because they allegedly did not usually practise secondary burial (exceptions being made for distinguished members of Munduruku society). The Munduruku themselves did not recognise the burials as theirs, calling them *pariwat tï a* – vessels made by foreign Indians (Hilbert 1957, p. 10-11). From this, it can be inferred that the Munduruku reoccupied the archaeological site containing *katomb*, upon which the Cururú mission was later established (in 1911).

In his study of Munduruku agriculture, Friar Protásio Frikel (1959) described how the Munduruku selected land for planting:

> …depending on what he wants to plant, he must choose a type of soil. Because of this, during his hunting excursions into the forest, the Indian pays attention to the terrain through which he passes in order to know where to find appropriate soil when he is in need of it. As a general norm, the following rule applies:
>
> Sandy soil: - good only for *maniva* [manioc]; inadequate for other crops
>
> Clayey soil: - especially good for *maniva*, tubers in general and also banana trees; other plants do not develop well in this soil;
>
> Black earth: - good for everything. *This is why they always seek dark earths and why they give them preference*. It is a special soil for tobaccos
> (Frikel 1959, p. 7, my italics).

The 2008 *Levantamento Etnoecológico Terra Indígena Munduruku* similarly reports Munduruku preference for areas with *katomb*:

> The search, selection and occupation of places for the implantation of new villages is an art among the Munduruku. The men of a family are accustomed to traversing large areas of Munduruku territory, at times during hunting or fishing excursions, or when they intentionally look for new places to establish villages. In many cases, older members of the family and village refer to extremely bountiful regions, with plentiful game, fish and nuts and in some cases the occurrence of '*terra preta*', because this type of soil is propitious for agriculture
> (Melo & Villanueva 2008, p. 25).

Today the village of Sawre Muybu houses approximately one hundred Munduruku. Cacique Juarez Saw Munduruku described to me how the Munduruku traditionally select an area to settle in:

> When we choose a place to settle, we observe if the area is bountiful. We will not choose a place where we will go hungry… We know the land, we know dark earth: it is fertile. Everything planted grows… This land is good for fishing, it is good for hunting. We need a place in which our children and grandchildren will not go hungry. In the upper reaches of the Tapajós, all the villages are settled on top of dark earth… We Munduruku choose a village in this way: we go where it is plentiful
> (Juarez Saw Munduruku, pers. comm. 13 March 2014).

Juarez further explained that, "When we hunt, we also observe the land. That's how we selected this area". He went into detail:

> "Where there is more game, there is abundance. This is how we came here. Also because of the earth. Everything you plant, yields, because it is *katomb*. We've known this type of earth for a long time… my father always made our gardens on this type of earth. Where I was born [on the upper reaches of the Tapajós], there is *katomb* earth everywhere. Here it is harder to find, but we still find it. But up there it's almost continuous along the river bank… My late father used to say that it meant that many people had lived there. I know a thing or two about it. The Indians make *katomb*, not the white man. Wherever Indians lived, not just the Munduruku, the earth turned out like that"
> (Juarez Saw Munduruku, pers. comm. 26 March 2014).

Jairo Saw Munduruku narrates the inception of the *terra preta* soils that the Munduruku know so well (Teixeira & Saw Munduruku 2015).[82] Karo Ebak was a boy who constantly asked his grandmother for fruit. She decided to fulfil her grandson's wishes: after teaching him how to prepare the land and to plant, she buried herself alive in the soil. Several types of fruit trees started to grow, even ones that had not been planted by Karo Ebak. A different type of manioc also emerged.

This story points to a relationship between *katomb* and fruit trees and the development of manioc varieties. Numerous studies suggest that house gardens may have been vital to the formation of centre type ADEs (Clement *et al*. 2003; Silva 2003, cited in Erikson 2003, p. 476):

> The gardens that regularly receive organic matter from food preparation and cooking are located near the kitchen (thus residence and garden spaces are in close proximity). In small settlements the garden is always adjoining the domestic space. As settlement size is increased, gardens can either be relocated outside the residential area or squeezed into spaces between houses (house lot community). There were fewer domestic animals (such as introduced pigs, goats, and chickens) to compete for house garden space in pre-Columbian settlements, thus house gardens may have been larger and more common than in modern villages
> (Erikson 2003, p. 476).

4.5 The establishment of Sawre Muybu

The village of Sawre Muybu began to be established just over a decade ago within the traditionally occupied Munduruku territory of Dace Kapap Eïpi. Juarez Saw Munduruku and other Munduruku now at Sawre Muybu had spent years living at Pimental, a predominantly *ribeirinho* (ribeirinhos are traditional riverine, forest dwellers) settlement, after leaving the upper reaches of the Tapajós.[83] Growing problems between the Munduruku and the *brancos* ('whites', by which is meant non-Indians), the limited fishing resources available at the rapids near Pimental and the fact that access to the indigenous health service would only be forthcoming if they lived in a separate

[82] See http://rosaluxspba.org/o-presente-de-karo-ebak-aos-munduruku/ Accessed on 11/10/2015.

[83] Many departures from the upper reaches of the Tapajós are motivated by accusations of witchcraft against the people who flee or against their closer family members.

indigenous village led them to leave Pimental and set up the village of Sawre Muybu. The locale lay within their hunting territory and other Munduruku lived nearby; they therefore already knew it was a place with *katomb*. However, this is present-day Brazil; the presence of national society, the state and national agencies also affect Amerindian settlement dynamics:

> At a Munduruku Assembly at the Praia do Índio [a Munduruku territory in the environs of the town of Itaituba], we began the process of claiming for the land to be demarcated [within the FLONA conservation area] … only then did we feel it was safe for us move here… We knew the [bureaucratic recognition] process had started, but we still had no security
> (Juarez Saw Munduruku, pers. comm. 26 March 2014).

The move happened in stages. During the summer (which in the Amazon means the dry season) month of July, they opened up a community plot, by burning an area and cutting back the vegetation and finally planting manioc. They continued with their base at Pimental[84] until they set up a large *tapiri* shelter at Dace Watpu, near the shoreline. At the time of the move, they did not have a shaman (*pajé*) with them to consult; otherwise, this would have constituted an important element within the decision-making process. Shamans are able to see where the spirit mothers live. On the subject of the *mães das caças* [spirit mothers of the prey in Portuguese], Robert Murphy (1958b, p. 13) wrote: "The single most important class of supernaturals believed to be active in the world are the spirit mothers of the game animals". Seu Fabiano, the shaman who now lives part of his time at Sawre Muybu, later endorsed their move, telling them that the place is propitious for raising the coming generations. He found the *mãe da caça* present at the limits of their territory, in the headwaters of a stream. The *putcha ši* (spirit mother, in Munduruku) is not an anthropomorphic personage; it can be found as a special stone called *wirakuá* in the springs at the headwaters of the streams or in the body of the land tortoise and the *coatá* monkey (Murphy 1958b, p. 14). These places are invariably good for hunting "because of the desire of the game to congregate about their mother, and Mundurucú shamans have techniques whereby they can place the *putcha ši* in springs near their villages" (1958b, p. 14).

[84] Pimental is another historical settlement founded by rubber tappers. Pre-Columbian archaeological sites have also been located there (Honorato de Oliveira 2015; Rocha 2012).

The existence of *putcha ši* in certain locations suggests the Munduruku have choice, and recalls their agency in relation to their environment; in other words, “It is against a background of resource abundance and ecological diversity that the history of these societies must be understood” (Neves *et al.* 2003, p. 34).

It is no coincidence that the village of the head Cacique of all the Munduruku is named Katomb. Balée’s affirmation that “The utilization of terra preta by these modern groups represents an adaptation to past human activity, an adaptation to culture itself” (Balée 1989a, p. 11) has been documented among the Munduruku and is confirmed by what the Munduruku occupants at Sawre Muybu told us. Although this specific group of Munduruku may have arrived relatively recently at Sawre Muybu, their dynamic of territorial occupation follows a pattern noted in the nineteenth century at Cafezal (Hartt 1885) and that was observed further upstream (Frikel 1959; Hilbert 1957; Melo & Villanueva 2008).

4.6 On the traditionality of Munduruku occupation at Sawre Muybu

At the end of one of our trips to Sawre Muybu, as our boat sped away from Dace Kapap Eïpi, I turned to a young man from Rio who had come to visit the Munduruku with a friend who was supporting their self-demarcation. Following the well-publicised and dramatic occupations of the Belo Monte dam site and the beginning of the self-demarcation, the Munduruku had gained something of a cult status within activist circles. “So,” I asked of him, “what did you think?” He mused for a while, gazing into the distance. “I don’t know,” he said, disappointed. “I thought they’d be more like real Indians.”

Besides fighting for their land, for the installation of a school system and basic health service, and suffering constant threats from loggers, goldminers and landgrabbers, the Munduruku still have to fight against an essentialised image of themselves. Such an image, propagated also by innocent bystanders, is politically convenient to their enemies, and is based on the myth of the pristine peoples of the Americas.

This is evident in arguments presented in the challenges to the official recognition of Munduruku territory. They emphasise how the Munduruku chose to settle the village of Sawre Muybu only to gain access to the Indigenous Health service (as if that were a motive deserving recrimination); how the only sacred places to the Munduruku are solely contained within the area encompassing the upper tributaries of the Tapajós. They even inserted a single photograph from a poster about our work that we had left at the Machado community, whose caption reads "Pottery potentially related to Carib peoples excavated at Sawre Muybu," as if to imply that Munduruku presence there now is somehow illegitimate (Anonymous Report submitted by the Ministry of Mines and Energy entitled: *"A tradicionalidade da Terra Saweré (sic) Muybu incidente na área da Flona Itaituba I"*).

Over the course of our visits to Sawre Muybu, aspects related to Munduruku village life have caught my attention, or the attention of colleagues who accompanied me. Some of these aspects can be compared to practices inferred from the study of archaeological contexts (see chapter 5). Relevant photographs will be presented below, some of which point to the "smearing" process indicated by several scholars in relation to the process of ADE formation (Denevan 2001; Heckenberger *et al.* 1999; Sombroek *et al.* 2003; Wüst & Barreto 1999 cited in Erikson 2003, p. 475).

4.6.1 Kitchen areas and related culinary activities

Kitchen areas among the Munduruku of Sawre Muybu are located adjacent to their houses, at the back or at the side. They tend to have open sides and palm thatch roofs. Food preparation activities are performed by women, but kitchen areas are places where people often assemble to talk or to perform other activities. The plank of wood in fig. 25 below was to be used to build a canoe, an activity undertaken by men in the space adjacent to the kitchen.

Fig. 23 Marunha, Márcia and Beca prepare açaí berries. Fig. 24 Marunha prepares an armadillo hunted by Diego. Photos: Bruna Rocha.

Fig. 25 Present-day kitchen area, in March 2014, behind and adjacent to Juarez' and Juquita's house. Plastic and metallic containers have replaced ceramics, but similar relations between shape and function still hold. Note presence of fruit trees surrounding house and how ground is swept clean. The long board to the right is for building a canoe.

Hearths or ovens can vary from smaller structures placed directly on the ground, to clay structures placed on raised platforms; manioc is toasted in large metal griddles placed within raised clay structures. River turtles can be cooked within their carapaces, which are placed directly on the fire. The space designated for manioc processing is separate from peoples' houses and is shared by a number of families. These culinary practices are shared with the Beiradeiros and other traditional forest peoples of the region.



Fig. 26 Deer head is roasted over fire contained by clay structure on raised wooden platform. Photo: B. Rocha. Fig. 27 Pressure cooker on hearth adjacent to house. Fig. 28 Manioc is turned into flour through toasting on metal griddle supported by clay structure. Photos: Guilherme Mongeló.

When I returned to Sawre Muybu in January of 2015, an excavated archaeological pit which we had left half full (as requested by Cacique Juarez, so it could become a turtle pen) had been filled with debris. Though food can still be prepared in the area behind Juarez' and Juquita's house, particularly if it rains, this new area is now another alternative. A metal cooking pot and other plastic containers sat atop the fill. A platform used for washing kitchenware and for food preparation and butchering had been set up. A recently collected tortoise hung from a tree.

Fig. 29 Pit where N1000/E957-958.5 test pits were excavated filled up with recent refuse. Photo: B. Rocha.

At Sawre Muybu the Munduruku source their food from their manioc plots, from the river and from the forest. The presence of dogs mean most fish bones are eaten and do not enter the archaeological record. The diversity of game hunted by the Munduruku at Sawre Muybu can be noted by observing current areas of food discard, which was undertaken with the help of Gabriela Prestes Carneiro. Butchering marks and different culinary techniques can be observed among the remains of the carcasses. The collection of samples of these carcasses was not permitted, since game animals are considered relatives, and their remains need to stay at the site so their spirits can return to the forest (Juarez Saw Munduruku, pers. comm. to Gabriela Carneiro, 17 October 2014). The disposal pits were located approximately 10-20m away from the houses, occasionally near privy areas.

Fig. 30 Top row, l-r: Tortoise; turtle (displaying signs of having been cooked inside its carapace); the top part of a tapir skull. Middle row, l-r: monkey skull showing signs of incineration; monkey skull; undetermined mandible; peccary skull. Bottom row, l-r: top part of tapir skull, deer skull. Photos: B. Rocha and Gabriela Prestes Carneiro.

4.6.2 House construction and relocation

In the 1950s, Robert Murphy observed that Munduruku villages tended to shift every five to ten years. He attributed this to "the exhaustion of nearby stands of high forest in which to make gardens… the rapid decay of houses, and also because the immediate environs become overgrown with weeds that are soon infested with insects and snakes" (1954, p. 38). The advent of metal tools means we cannot necessarily extrapolate this practice to precolonial times (Denevan 1992b). More recently, modern brickwork construction of schools and health posts are likely to act against the movement of villages. But what can be observed today is shifts of house location within the area of the village. Some of the factors mentioned by Murphy, such as the infestation of the surroundings by snakes and inserts, might contribute to this, which reminds us of the aforementioned "smearing" effect, which will be returned to in the following chapter.


Fig. 31 Recently abandoned house, which was dismantled. Different types of building materials have been assembled together, suggesting they will be transported and reused in the next construction. Note metallic toasting griddle near dry palm fronds at the back, on the left (red arrow). Photo: Guilherme Mongeló. Fig. 32 Post hole that calls feature F1 to mind. Photo: Bruna Rocha.

Fig. 33 Path connecting older village with new area of houses and leading towards the nearby stream (the Tapajós River is visible in the background). Further ahead a manioc garden growing. Photo: Bruna Rocha

4.7 Discussion: The archaeology and politics of persistent places

Aside from the problems associated with the production of "cosmetic" Environmental Impact Studies for the São Luiz do Tapajós dam (Fearnside 2015), scientists – who may believe themselves to be 'neutral' – have been working within a context of human rights violations. Neutrality is being confused with a lack of ethics. By continuing to work in these circumstances – some going so far as to accept being escorted by heavily armed guards – they have been complicit with the oppression of the forest peoples of the

Upper Tapajós, conducted in a neo-colonialist framework. It is not surprising that the word 'researcher' has come to mean an outsider who is associated with projects that will result in territorial expropriation, undertaken without the consent of local peoples. I decided to avoid describing myself as a researcher when I first met people in my study area, until I had the chance to explain what I was doing.

The Munduruku have greatly motivated me to seek connections between the region's archaeological heritage and the present. By resisting the advance of large-scale capital into their territories, the Ipereğ Ayũ movement also resists the narrative of inexorable 'progress.' Their creative strategies draw upon their historical narratives and myths (Loures 2016; 2017). By occupying the Belo Monte dam, performing the *autodemarcação* or stopping researchers who enter their territories without asking for permission, they continue to struggle for control over their destiny as a people.

As we have seen in chapter 3, the Munduruku have acted as protagonists in their interactions with colonial and national society for hundreds of years. Testament to more recent interactions include the range of industrialised material objects, including radios and televisions, plastic bottles and denim trousers, some of the house building materials (such as industrialised bricks and corrugated roofs), and of course, the presence of the Portuguese language seen and heard at Sawre Muybu. Alongside these 'external' elements we can observe palm thatch roofing, the consumption of animal game, the use of the Munduruku language, medicinal plants sourced from the forest, and a worldview based on Munduruku oral tradition. While the Munduruku have incorporated technologies, language and other aspects from Brazilian society, they still continue the history of their forebears: in fact, these phenomena should not be understood as a dichotomy.

Persistence is expressed in their cosmology and in their reading of and relationship with the cultural landscapes of the Tapajós. It is evidenced in their search for *katomb*, in their interpretation of rock art, and in their everyday actions, involving hunting, food preparation and consumption, and actions related to discard, to mention but a few. The repetition of these actions leaves new marks in a landscape already indelibly altered by their ancestors – who, in part, are also the ancestors of the Beiradeiros and of other Amerindian and forest people who live in the region.

Daje Kapap Eïpi refers to an event in Munduruku mythical narrative, relating to when the peccary crossed the Tapajós from the right to the left bank at the river's narrowest strait. The location where this occurred is considered a sacred place (Munduruku people 2013; Torres *et al.* 2016). It is one among several meaningful, persistent (Zedeño & Bowser 2009) places that exist for the Munduruku and the Beiradeiros along the Upper Tapajós River. Such places may or may not be defined strictly as archaeological 'sites,' in the sense that they may or may not contain material vestiges from past human activity, but they are potent presences in the landscape, whose access may be restricted to those who understand their significance, even if often imperceptible to the external, lay observer.

Within such a context, where another historical regime is in operation, the role of archaeology may be questioned: do we not risk imposing a linear conception of time, and 'freezing' a past that, from emic Munduruku perspectives, may be more cyclical and dynamic? While this research project is not exactly a project in community archaeology, the discussion held by Silva, Bespalez and Stuchi (2011) on the subject is relevant. The authors state that community archaeology presupposes the alignment of interests – and should benefit both the researchers and the communities involved (2011, p. 37). Community archaeology does not necessarily require archaeologists and the participating communities to share the same ideas or interpretations about the phenomena studied, but rather to value the different perspectives and knowledge of the actors involved in the process (2011, p. 37).

Most initiatives in community archaeology in Brazilian Amazonia have been undertaken within *relatively* secure territorial contexts, i.e., in areas that have at least already been officially recognised as indigenous territories.[85] This was not the case of this research project and the fate of Daje Kapap Eïpi is still uncertain. As such, in this first instance, which involves a considerable degree of urgency, archaeology is conceived of as an

[85] This is not to underestimate the constant and considerable threats to already recognised indigenous territories, even more so now than before.

instrument in a struggle for Amerindian territorial rights. The evidence compiled in this first instance is being harnessed for an 'external' discussion, within the logic and framework of the nation state. The very imposition of fixed territorial boundaries, outlined on maps, can be seen as a further manifestation of a colonialist logic and reality in which the Munduruku live and in which we carry out our research.

In this thesis, great emphasis has been placed upon 'archaeological' (in the sense of this being a 'western' science) interpretations of the past. This is not to be translated as belief in the supremacy of such interpretations. It should first be seen as a building block, for archaeological knowledge in the research area hardly exists, and as such needs to be constructed so that we can then be in a position to offer elements for discussion, and, if the Munduruku see fit, for appropriation by them. Further, there are today Munduruku intellectuals and university students who may think that it is *they* who should register (i.e. write down) their interpretation of history (again, if they see fit), rather than a *pariwat* like me.[86] It is within this context that the following chapter will now turn to the archaeology of the Upper Tapajós.

[86] This word has meant 'other,' or 'foreigner,' in the past (see Hilbert 1957), while today it is synonymous with 'whites' or, tellingly, 'enemies.' The Beiradeiros are not called *pariwat* by the Munduruku. They are referred to as either *wuyguybu gun* or *wuy g̃uy bugum*, which can mean 'those who live in the same way as the Munduruku,' or 'those who have ears similar to the Munduruku' (Jairo Saw Munduruku, pers. comm., 12 February 2015; Torres 2015).

Chapter 5. The Archaeology of the Upper Tapajós

Initial excavations at the Terra Preta do Mangabal, Pajaú and Cocalino sites had led me to propose that the pottery unearthed at Mangabal belonged to an as yet undefined ceramic tradition, which could have some relation to the historic Munduruku people, while the pottery from the sites downstream, near the last rapids of the Tapajós, could be associated with the Incised and Punctate Tradition (2012, p. 52). Studying the Sawre Muybu (SM) and Mangabal (TPM) sites, I faced two research scenarios: because much has already been written about Incised Punctate Tradition (IPT) and what it may denote, the formulation of a more deductive research strategy was possible in regard to SM; in relation to TPM, the lack of comparative ceramic references would require a more inductive, exploratory approach. But in both cases, existing knowledge about local ceramic assemblages and archaeological sites was still fragmentary. The questions that I have sought to answer over the course of this work are therefore basic, but necessary.

Following an enunciation of the archaeological questions pursued by this project, this chapter will offer a summary of the archaeology of the Tapajós. While framing an overall picture, the extent of our ignorance of this vast region should become clearer. I will then detail the archaeological fieldwork undertaken, which will include a description of the project's expeditions and field findings, site chronology and stratigraphic interpretation.

5.1 Research questions

Though the presence of ADE at both Terra Preta do Mangabal and Sawre Muybu pointed to intensive and continuous occupations at these locales, we did not know what the chronology and longevity of the archaeological occupations were, or whether they were unicomponent or multicomponent sites.

In relation to the excavated pottery of SM, which I knew to contain elements signalling the Incised and Punctate Tradition, I would need to consider how it relates to the Incised and Punctate Tradition in chronological, technological, formal and stylistic terms. Can the study of pottery contribute to an consideration on the issue of the lower rapids of the Tapajós representing a periphery of the Tapajó 'chiefdom'? If so, in what sense?

Carib expansion into the Tapajós is denoted by present-day distributions of speakers of the Pekodian branch in the region. But except for Lathrap's proposition of violent conquest, we have little idea of the form(s) this expansion may have taken. Can the interpretation of ceramics provide us with alternative views?

In terms of the Mangabal scenario, we had to investigate whether one or more ceramic complexes were present – i.e., was the site indeed reoccupied, as I had previously suggested? How extensive is it? What was the timing of the occupation(s), and how did this material, its context and chronology relate to those of the wider region? How can this be interpreted? How does the pottery compare with that of the Tupi-Guarani tradition? Assuming a relationship between (at least part of) the assemblages analysed and Macro-Tupian speakers, we will later return to whether Urban's postulation of the existence of fundamental differences between speakers of Macro-Tupian languages on the one hand and Tupi-Guaranian speakers on the other. Is this reflected by our data? Or can we detect shared vessel (morphological and decorative) grammars that could point to a common point of departure between the makers of the TPM potteries and those of the Tupi-Guarani tradition?

Because we were not yet in possession of dates, we did not initially know whether the differences in ceramic material observed within the research area signalled the presence of a cultural boundary, or whether there was a chronological hiatus between these occupations. Honorato de Oliveira's investigation into the lithic assemblages from the TPM, Sawre Muybu and Pajaú sites found evidence to support a shared technological 'grammar' between the Pajaú and the Porto site in Santarém (i.e., pointing to the operation of IPT networks encompassing the lower Tapajós and its lowermost rapids), while the Mangabal site's raw materials and technological practices related to lithics were seen to differ entirely. These findings corroborated initial observations based on pottery (Rocha 2012). Honorato de Oliveira (2015, p. 78) asks whether social or cultural impediments restricted access of the inhabitants of Mangabal to the more pliable lithic resources downstream, or whether the differences observed could be related to the operation of a different technological system.

Lowland archaeologists (e.g. Meggers 1988; Miller 2009) have long considered rapids as potential cultural boundaries, following J.M. Cruxent, who frequently espoused this proposition after his expedition to the Ventuari River with Meggers and Evans in the 1950s (J. Oliver, pers. comm., 10 December 2016). In this sense, a 'boundary' would imply a sort of frontier or border, separating different peoples. More recently, Almeida (2013) has proposed we view Amazonian rapids differently, as *persistent places* (sensu Zedeño & Bowser 2009), which are meeting places or areas of potential cultural interaction. In this case, would it be possible to locate material evidence of the Tupi-Carib interactions suggested by Aryon Rodrigues (1985)?

Considering present-day Amerindian peoples of the region, is it possible to detect continuities between these ancient remains and historically recorded and/or present-day forest peoples of the Tapajós? What would these potential continuities consist of?

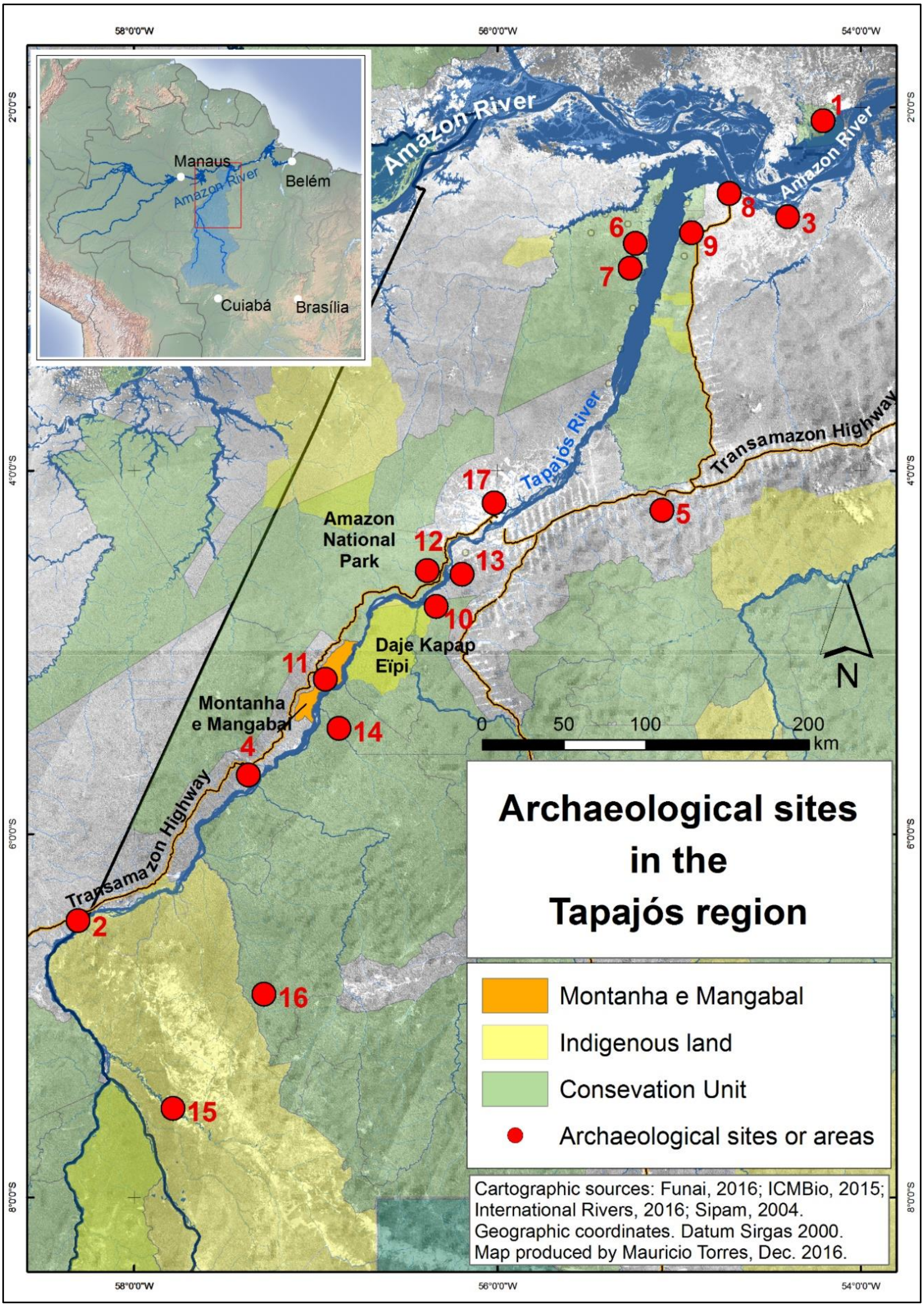
These questions will begin to be addressed below, following a synthesis of the archaeology of the Tapajós region. The interpretation of the contexts excavated, partly based on their comparison to ethnographic observations, is one way of examining whether we can detect possible continuities or changes with present, day-to-day practices. Chapter 7 will then detail the results of the pottery analyses conducted and offer a comparison of the ceramic industries of the two sites, while chapter 8 will pursue further comparisons on a wider scale, beyond the Upper Tapajós. But first, the scene – disjointed though it is – must be set.

5.2 The archaeology of the Tapajós region

The Tapajós basin arguably contains at the same time the most famous and the least known archaeology of Amazonia.[87] What is indisputable, at any rate, is the time-depth and variety of the archaeological record within the region. For over a hundred years, scientists have visited the Tapajós – in particular, Santarém and the lower Tapajós and surrounding areas – and recorded archaeological finds. Not only would these materials and sites already have been known to Amerindian peoples living in the region; they would be part of their cultural landscape and resource base (Balée 1989; 2013).

---

[87] Some of the information contained in this section has been published in Rocha & Honorato 2016.



Map 11 Archaeological sites or areas mentioned in the text. 1. Pedra Pintada/Monte Alegre; 2. Vicinity of bifacial points finds; 3. Taperinha; 4. Cantagalo; 5. Rurópolis; 6. Parauá; 7. Boim; 8. Santarém (Aldeia and Porto sites); 9. Belterra plateau; 10. Sawre Muybu; 11. Mangabal; 12. Port of Boburé; 13. Pimental/Pajaú; 14. Priririma; 15. Franciscan mission on the Cururú River; 16. Rio das Tropas; 17. Itaituba. Map by Maurício Torres. See Appendix 17 for maps of sites identified by Perota.

It is probable that the Tapajós region was peopled at the end of the Pleistocene: in the vicinity of Santarém, at the Pedra Pintada cave in Monte Alegre (near the north bank of the Amazon) one of the earliest occupations in the Americas was dated to ~11,200BP - 10,000BP (Roosevelt *et al.* 1996, p. 380). Bifacial lithic projectile points located especially along the upper course of the Tapajós River (Hilbert 2008; Katzer 1901; Rocha 2012; Rodrigues 1876; Simões 1976), often by wildcat goldminers, suggest evidence of early occupations there. The ample sources of knappable raw materials along this tract of the river helps to explain this (Honorato de Oliveira 2015, p. 23). Environments of open woodland (*cerradão*) were more widespread, and these early peoples who inhabited and traversed the Tapajós region likely lived in these, rather than the humid tropical forests prevalent in much of the Tapajós basin today (Rossetti *et al.* p. 2004).

It seems likely that what we presume to be small, nomadic groups initiated processes that would begin to modify the region's ecology with the use of fire and by generating "islands of resources", phytogeographic features resulting from plant remains and seeds concentrated in their camps and trails, as was verified ethnoarchaeologically among the Nukak hunter-gatherers, who have very high mobility, in the Colombian Amazon (Politis 1996).

Fig. 34 Rock paintings on the Cantagalo Rock photographed by Fábio Mozzer in 2009.[88]

[88] Made available at the following online address: http://www.panoramio.com/photo/25481247. Accessed on 04/02/2014.

It may also be possible that these ancient inhabitants were the first to inscribe the landscape with rock art, found along sections of the upper reaches of the Tapajós, as well as in its tributaries and in the interfluvial areas. The region's geological diversity also provided an abundance of supports for rock art, expressed as paintings and petroglyphs. In addition to its scientific and artistic value for Brazilian society in general, this heritage has symbolic meanings of great relevance to the Amerindian peoples living in the region today. This is the case of paintings on the Cantagalo rock, located on the left bank of the upper Tapajós, eight metres above the river at high water level (Tocantins 1877). The red ochre paintings represent anthropomorphic, zoomorphic and geometric forms. The Munduruku call the Cantagalo paintings "the writing of Muraycoko," who was one of their culture heroes. When Antônio Tocantins showed the Munduruku his sketch of the Cantagalo paintings, the Munduruku informed him of the presence of rock art within their territory, along some of the smaller upper tributaries of the Tapajós. Near the community of São Luiz do Tapajós, petroglyphs display anthropomorphic and zoomorphic figures (Eletronorte & CNEC 2008, v.19-22, pp. 362, 363).

Five rock art sites have also been documented in the interfluvial area of Rurópolis, to the east of the Tapajós (Pereira & Silva 2014) and more recently two of these were investigated in greater detail (Pereira *et al.* 2016). This rock art is located within aphotic cave spaces; absence of other remains within the Caverna do 110 site suggests a ritual context (Ibid., p. 7). Paintings and engravings were produced separately and also in combination (Ibid., p. 9). Figures represented are zoomorphic, possibly anthropomorphic or biomorphic and also geometric (Ibid., p. 10-16). Dates obtained for wood charcoal extracted from a test pit beneath the panels range from 8100±30BP to 2200±30BP (Ibid., p. 17). Along the Juruena river, cave paintings of abstract figures, also in red ochre, were photographed recently.[89] We also know of petroglyphs in the Teles Pires region. On the island of Caldeirão, on the Teles Pires river, approximately 30 boulders present two different finishing techniques (pecking and engraving), with

[89] See online photographs (n°29 and 31): http://www.forestcom.com.br/blog/juruena-livre/?fb_action_ids=430743910387797&fb_action_types=og.likes. Accessed 04/02/2014. Also http://kino.photoshelter.com/image/I00009Ylgv5wYtjY. Accessed 16/11/2016.

representations of geometric, zoomorphic and anthropomorphic figures (Pardi, 1995-1996, p. 3).

Between seven and four thousand years ago, sea level stabilised and human groups in the Amazon began exploiting aquatic resources more intensively (Silveira & Schaan 2005, p. 68), leading to the formation of shell middens – *sambaquis* in Portuguese – that may have functioned as central base camps – "dwelling sites which formed the *loci* of the major procurement activities of a collector population belonging to the family/hamlet type" (Boomert 2000, p. 65). Roosevelt *et al.* retrieved the oldest known pottery in the Americas, dated to the 8th millennium BC (Roosevelt *et al.* 1991) from the fluvial shell midden (*sambaqui*) of Taperinha, located approximately 50 kilometres to the east of Santarém. These findings challenged models for occupation of Amazonia presented by Meggers & Evans (1961), which proposed that pottery was invented outside the region.

Arroyo-Kalin (2010b) notes that work on Taperinha and other fluvial shell middens in the Amazon (e.g. Miller 1987; 1992; Simões 1981) "prompted suggestions of a protracted antiquity for pottery making in the Americas and, more to the point, provided potentially time-deep ascendants for late Holocene ceramic occupations in Amazonia" (Arroyo-Kalin 2010b, p. 474). He also emphasises the "role of cumulative anthropogenic landscape transformations in the emergence of sedentism" (2010b, p. 475). It is possible that sea level rises that indirectly contributed to the widening of the mouth of the Tapajós have submerged shell midden sites along the lower course of the river (E. Neves, pers. comm. 17 November 2016).

At c. 4600BP, humidity in the Tapajós region was already greater, and its vegetation resembled present conditions (Rossetti *et al*. 2004, p. 298). Archaeological evidence denoting processes of population increase and domestication of the environment includes Amazonian Dark Earths (ADEs), ceramic remains, ground stone axes and floral remains. Among the earliest pottery related to these late Holocene occupations is that of the Zoned Hachured (?2,500 BC - ?1000 BC) and Pocó-Açutuba (c.1000 BC - 600 AD) Traditions. These ceramics have been found in other sites near or on the main channel of the Amazon (Hilbert 1955; Guapindaia 2008; Lima 2008; Neves *et al.* 2014) and were also located at the Aldeia site in Santarém by Denise Gomes and dated to 2040±40BP (2011, pp. 283, 290). Recently, Schaan and Amaral reported pottery potentially belonging to the Pocó-Açutuba tradition in the locality of Andirobal (Schaan & Amaral Lima 2012, p. 31), situated on the plateau approximately eight kilometres south from Santarém, extending the amplitude of these early ceramist occupations further south.

Gomes located ceramics she classified as belonging to the Incised Rim Tradition at the locality of Parauá, inland from the left bank of the Tapajós, and provided a suite of dates for these materials ranging from between 3800-910BP (Gomes 2011, p. 289). Hilbert (1968) identified pottery he denominated Boim in the homonymous village on the lower Tapajós, which was also classified into the Incised Rim tradition, though instead of incision, rows of punctations ornament rim tops (cited in Meggers & Evans 1961, p. 378). Dates have not yet been obtained for the Boim site and materials, however.

Archaeological sites containing ADEs are known throughout the Amazon (Neves *et al*., 2003) and have been linked to dense pre-Columbian occupations and cultural complexity. The Tapajós basin is no exception to this overall picture (e.g. Eriksson *et al.* 2016; Kern *et al*. 2003; Smith 1879; Woods & McCann 1999; Travassos 2016). But there are still few details about lithic and ceramic assemblages potentially associated with ADEs, poor chronological and stratigraphic controls, and limited evidence on site formation processes, to name but a few issues. Where more in-depth investigations have been conducted, dark earths have been observed to enclose abundant ceramics, often (but not solely) associated with the Incised Punctate Tradition (Gomes 2008; Martins 2012a; Rocha 2012; Stenborg, Schaan & Amaral Lima 2012).

H.H. Smith and C.F. Hartt (1885) were pioneers who recognised "black earths" on the plateau to the south of Santarém and related these to ancient Amerindian settlements. In the early 1920s Nimuendaju (1952; 2004) would further notice the presence of Amazonian Dark Earth under the town of Santarém itself, and locate another 65 archaeological sites in the surrounding area. There are several sites near Itaituba that contain ADE patches, both downstream (e.g. Hartt 1885, p. 14; Perota 1979, p. 5; Simões 1983) and upstream, such as at the Amazon National Park (Oliveira *et al*. 2010) and in the localities of Montanha e Mangabal (Honorato de Oliveira 2015; Rocha & Honorato de Oliveira 2011; Rocha 2012). The Tapajós' eastern bank is still little prospected, but some evidence exists: we know of the Pajaú site, in the vicinity of the Pimental community (Honorato de Oliveira 2015; Rocha 2012); Sawre Muybu, situated under the homonymous Munduruku village, near the mouth of the Jamanxim River. Perota (1979) also registered ADE sites to the east of the Tapajós; some of these are slightly inland. Such is the case with the Piririma site, placed two kilometres from the confluence of the Rato stream with the Tapajós (Lisboa & Coirolo 1995, p. 9). More recent archaeological investigations in the interfluve to the east of the Tapajós have researched further ADE sites (e.g. Martins 2012; Stenborg *et al*. 2012; Stenborg 2016). An intriguing feature has been the identification of potential artificial ponds or wells within such sites, situated far away from rivers and streams (Schaan 2016, p. 24; Stenborg 2016, p. 16-17; Troufflard 2016). Such structures served to enhance the biodiversity of local areas, by attracting fauna to them, and may have served to keep animals such as turtles, caiman and fish (Troufflard 2016, p. 43).

Upstream, the São Francisco do Cururú Franciscan Mission was first established on an ADE patch (Hilbert 1957). A recent expedition to the Rio das Tropas registered over ten ADE sites (Jair Boro Munduruku & Morgan Schmidt, pers. comm., 16 October 2016). Moving south towards the main tributaries of the Tapajós, further ADE sites have been described for both the Teles Pires and the Juruena (Gaspar 2014; Pardi 1995-1996; Perota 1982; Stuchi 2010). Dates for the sites within the Terra Indígena Kayabi on the lower Teles Pires suggest continuous occupation or reoccupation of the area from at least 1680±30BP through to the present (Gaspar 2014, p. 152).

Along the Tapajós – though apparently less so in Santarém (Nimuendaju 1952) – ceramic urn burials seem to be associated with this period of intensification of human presence. Locales where human remains are found within burial urns include the town of Itaituba itself (Nimuendaju 2004), downstream from it, at Cafezal (Hartt 1885), and upstream on the Cururu mission (Hilbert 1957). Only the latter materials have been described, while the classification of all of these materials is yet to be undertaken. The Cururú burial urns can be simple and unrestricted, and simple and dependent, restricted; some of the latter are shouldered vessels. All of these sites contain groupings of urns. More recently, further funerary vessels have been located in these environs, and also within inland sites. At the Nossa Senhora do Perpétuo Socorro site near Itaituba, 12 vessels linked to the Incised and Punctate Tradition were retrieved and later studied (Martins 2010; 2012; Py-Daniel 2015, p. 232-244). Py-Daniel (2015) excavated seven of these urns and observes that some had been deposited at a similar time while others appear to have been buried after a significant interval of time. It is not clear whether a separation existed between habitation and burial areas on this site. Not all vessels had yet been excavated so it is not possible to affirm whether they are in fact all urns or whether some are accompaniments. None of the vessels, however, contained bases; Py-Daniel suggests their bases may have been intentionally broken as part of a symbolic gesture. This stands in contrast to urns found elsewhere on the Tapajós, such as at the Serraria Trombetas and Paraná do Aráu-é-Pá sites, which have again been associated with the Incised and Punctate Tradition (Py-Daniel 2015, p. 243-244). Besides archaeological urn burials, historical sources register the practice of endocannibalism among the Tapajó, by allowing the corpse to decompose until only the bones remained, after which the bones would be pulverised and consumed by relatives (Heriarte [1662] cited in Guapindaia 1993, p. 23).

Evidence of production and use of stone tools and artefacts related to late Holocene occupations has also emerged, pointing to the existence of specialised production centres and related exchange networks in the region (Honorato de Oliveira 2015, p. 91; Moraes *et al.,* 2014). Comparing lithic assemblages of three sites on the upper Tapajós, Honorato de Oliveira (2015, p. 74) encountered considerable variation as concerns the strategies of reduction and raw materials used. Because most of the cortical pieces identified do not relate to river pebbles, it is likely these raw materials were collected close to their geological sources. At the Pajaú site, on the right bank of the Tapajós just above its last rapids, fine silicified sandstone/siltstone and high-quality flint were utilised (the latter related to formal tools). A formal artefact that may have been used as a piercer or drill identified at this site is technologically similar to materials retrieved from the Porto site in Santarém (Moraes *et al.* 2014). The Sawre Muybu site contains flint and fine sandstone (neither of these materials are local) flakes and cores, which would have either have been obtained through trade or by travelling to the source (2015, p. 75). On the other hand, the Mangabal site presents an abundance of knapped mudstone and siltstone, as well as rare specimens of high quality flint. It is not yet clear how these raw materials were accessed (2015, p. 75-76), but a substantial part of the *chaîne opératoire* of these tools has been detected at the site (2015, p. 86). It is possible that among these assemblages is the presence of “grater teeth” used in food processing (2015, p. 80-84). Indications of *in situ* production of *muiraquitãs*, polished green stones that most usually have batrachian forms with small perforations for the attachment of a cord (Palmatary 1960, p. 75) have also been identified at the Porto site in Santarém (Moraes *et al.,* 2014).

Rocky riverside outcrops that would have been used to produce ground stone tools have been located along the middle and upper course of the Tapajós. Rounded and rectilinear polishing features indicate the manufacture of axes and adzes, as well as elongated and polished wooden artefacts (spears and bows being a possibility). These ‘workshops’ have been located in the vicinity of the port of Boburé (Oliveira *et al*. 2010, p. 76; Rodrigues 1875, p. 111-112) and at the Terra Preta do Mangabal site further upstream (Honorato de Oliveira 2015, p. 34). Other boulders surveyed along the upper Tapajós have not presented these features, suggesting that the production of polished/pecked stone tools may have been restricted to specific communities or places (Honorato de Oliveira 2015, p. 85). Barbosa Rodrigues suggested polished axeheads would have been produced and exported from the Itaituba area (1875, p. 89). He also noted that the forms of ground stone axes he identified upstream from Boburé differed from those seen from Boburé on towards the river’s lower course (cited in Guapindaia 1993, p. 27-28). He thought the pottery up to Boburé to be similar to that around Santarém – related by him to the Tapajó sphere of influence, which he believed was particularly prevalent on the eastern banks of the Tapajós (cited in Guapindaia 1993, p. 27-28).

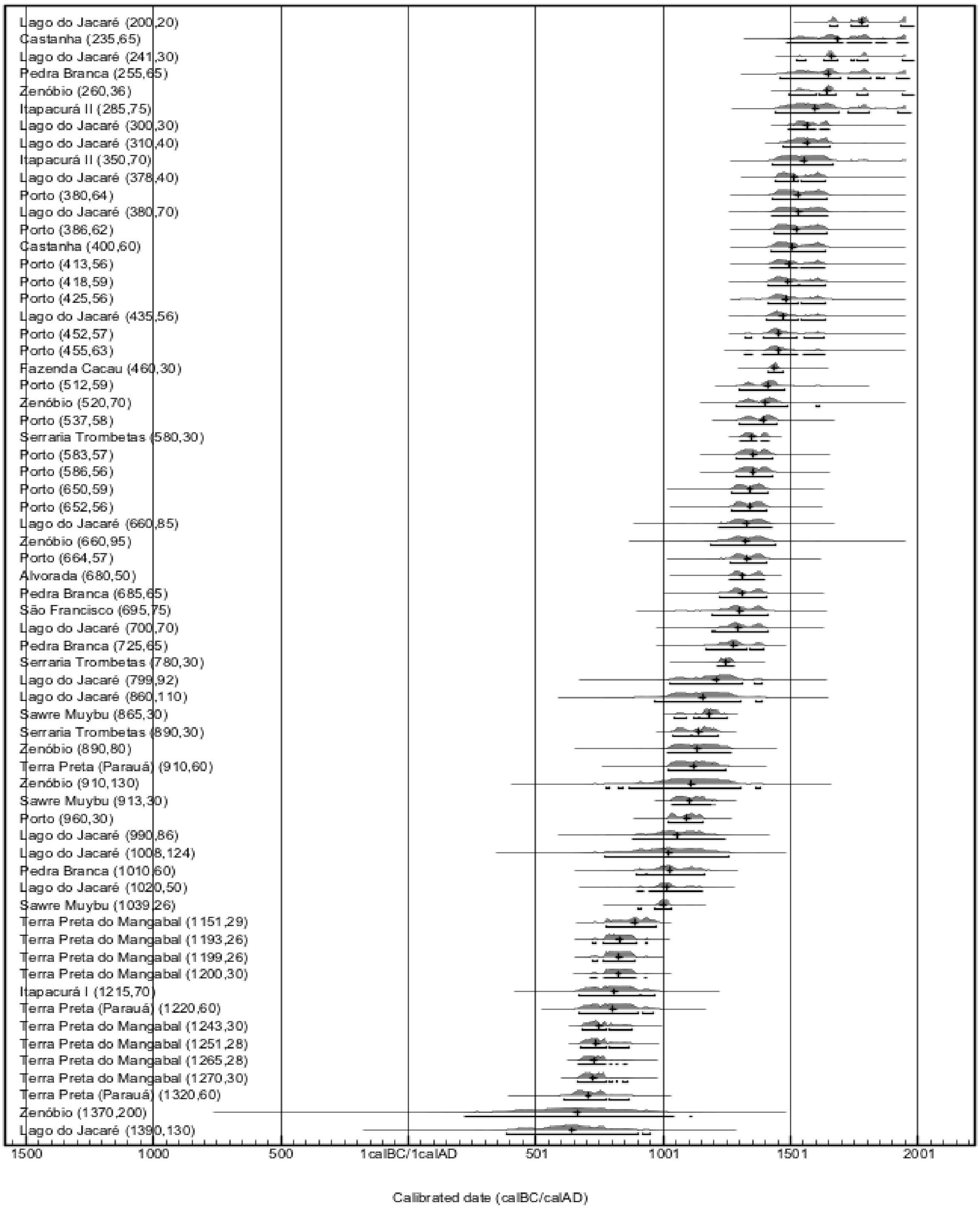


Fig. 35 Compilation of dates obtained for late Holocene occupations on the Tapajós and environs.

The graph in fig. 35 displays dates produced by radiocarbon and thermoluminescence methods for the Tapajós region from the 5th or 6th century AD (a table for these and other dates for the region, including those of PRONAPABA, is available in Appendix 3 and 3.1). This includes sites on the river itself as well as inland areas to the west (Parauá) and east (along the Transamazon highway). These dates point to continuous occupation of the region over the past 1,500 years. Many of these sites contain pottery that has been glossed as the Incised and Punctate Tradition.

Most frequently dated sites in Tapajós region

Site name	Number of dates
Lago do Jacaré	23
Porto	20
Bom Futuro*	15
Terra Preta do Mangabal	8
Zenóbio	7
Terra Preta (Parauá)	5
Serraria Trombetas	4
Pedra Branca	4
Caverna do 110*	4
Aldeia	4
Sawre Muybu	3

*Table 2 Sites with three or more dated samples. *Dates not included in Graph above.*

Though the quantity of dates is considerable, they are extremely concentrated: 97 dates come from just eleven sites, as can be seen in table 2 above, which displays all sites with three or more dates. Moreover, seventy of the dates come from the lower Tapajós (excluding inland areas to its east). Twenty-six dates come from the inland area to the east of the Tapajós researched by Schaan's, Stenborg's and Pereira's teams (see table in Appendix 3). Fourteen come from just below the river's last rapids. Only eleven dates come from the Upper Tapajós (Mangabal and Sawre Muybu sites).

Our understanding of the chronology of human occupation generally, and of sedentary villages specifically, is thus limited to a relatively low number of sites, most of which are situated along the lower course of the Tapajós and environs. This means that while we can compare dated archaeological contexts and artefactual assemblages to those of the lower Tapajós, we are still far from understanding developments within our study area itself, and to its south, east and west.

5.3 The Projeto Alto Tapajós: Fieldwork

The fieldwork undertaken in Montanha e Mangabal and at the Sawre Muybu village and archaeological site will now be presented. The methods of data collection employed during the different stages of the work will be discussed. The sites and test pits will be described, and the stratigraphy of the auger holes and excavation units will be analysed and interpreted in light of the radiocarbon dates obtained, with particular attention to the description and interpretation of the occupation layers and features. A discussion on potential community patterns that could have led to current site contours will also ensue. Finally, the trip undertaken to Vitória, where Celso Perota's collections are stored, will be presented as another data collection trip; the context of Perota's expedition to the region will be described.

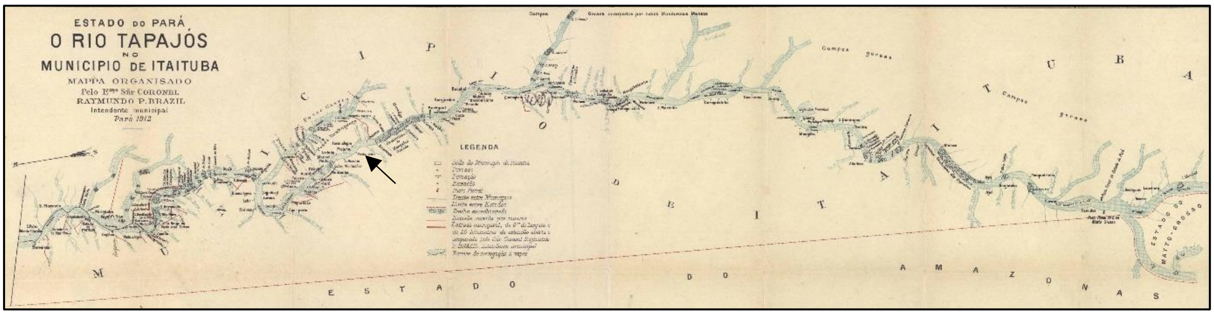
5.3.1 Montanha e Mangabal

Fig. 36 One of the localities visited in 2010 was Praia Chique, where Seu Quelé and Dona Santa† lived surrounded by useful plant species, including açaí palms seen to the right. A buried earthenware vessel and potsherds were noted near their house. Photographs and collage by Bruna Rocha.

In our surface survey in 2010 we recorded 24 archaeological sites between Montanha Island and the Peruano rapids. By the riverside we registered smaller sites – one of which had been home to a rubber tapper, decades before –, and others that included potsherds, lithic flakes and ground stone tools used by Amerindians prior to Beiradeiro occupation, in the pre- or post-Conquest past. Some sites also contained buried vessels. The available flat area in these places was often reduced by their topography: soon after the end of the beaches, upward slopes emerge; when the river level is high, space is restricted (roughly between the months of December – May). These areas are where the Beiradeiros live today, scattered in small *comunidades* along the left bank of the Tapajós whose names date back to the old rubber tapper sites or *colocações* (see Coudreau 1977 [1897]). A *colocação* is where rubber tappers used to live and produce latex, and from where paths would lead off into the forest along which rubber trees were situated. On higher ground we visited larger sites, which contained ADEs (Rocha & Honorato 2011; Rocha 2012).


Fig. 37 São Tomé community and site. Fig. 38 Vila do Tapajós community and site. Photos: B. Rocha

The success of this first expedition is due to the Beiradeiros, who informed and took us to the places they already knew to contain ADEs, potsherds or ground stone axes. It is worth noting that the names given to the sites shown in Map 13 already existed: they are historical names dating back to at least a century ago, as can be verified in map 12 below, produced by Col. Raymundo Pereira Brazil, a rubber baron of the Tapajós in the early twentieth century.



Map 12 Map of the upper Tapajós produced by Col. Raymundo Pereira Brazil in 1912 for the 1913 National Rubber Exhibition, held in Rio de Janeiro. Place names still used today can be found here, such as "Praia Chic" (highlighted by black arrow). For enlarged version of this map, see Appendix 4.

The help of the Beiradeiros provided this research project with an effective and economical starting point, as we were led straight to archaeological sites. We were beginning to glimpse the palimpsest of occupations that were part of the history of the place. This survey strategy, based on the knowledge of local people is invaluable for archaeological work in tropical forest areas of difficult access and low ground visibility. The inherent bias towards more visible sites and remains can be redressed by longer term, more intensive surveys of these areas.

Employing local knowledge to find sites is a common component of what is usually called "opportunistic survey" in Brazil. This term obscures the vital role of local communities in archaeological endeavours alongside chance observation of cuts, pits and potential archaeological locales. Such treatment stands in stark contrast to how surveys conducted within indigenous territories under a collaborative framework are undertaken and later presented (e.g. Silva, Bespalez & Stuchi, 2011). The fact that, as Adams, Murrieta & Neves (2008, p. 16) write, "For anthropology, *caboclo*[90] societies represent the direct antagonists of indigenous societies, the advance posts of colonialism and, in its aftermath, national society" (Ibid., p. 17) might help to explain this. Members of traditional communities do not necessarily feel, or express, explicit connections to Amerindian archaeological remains, and, as archaeologists focussing upon the pre-colonial past, this has impacted upon our sense of responsibility towards them. While greater attention must be directed in future to the post-Conquest past, we have meanwhile proposed emphasising the knowledge imparted by such local communities by suggesting the term *consultative survey* (Rocha *et al*. 2014) to refer specifically to this aspect of the survey.

The following year, in 2011, we would be similarly helped by members of the Pimental community to locate the Pajaú site, found downstream from Mangabal, only some 12km before the last rapids of the Tapajós, on its right bank. In the same year we also arrived at the site of Cocalino, near the left bank of the Tapajós, following indications from Seu Cosme of Vila Rayol and the inhabitants of the Cocalino community in the vicinity of the Amazon National Park. In turn, members of the Boa Vista community led us to the Boa Vista site, 26km south of Itaituba. The latter site has been severely impacted by the Transamazon Highway (Rocha & Honorato 2011; Rocha 2012).

[90] The word *caboclo* derives from a Tupian (Tupi-Guaranian?) expression that means "from the forest' (Ayrosa 1967, p. 80-81).

Map 13 Map showing sites identified in Montanha e Mangabal in 2010. Produced by Vinicius Honorato based on Google Earth images.

Ponta do Jatobá

In 2011 we augured the Ponta do Jatobá site, which is comprised of an ADE layer of approximately 40cm, at 50m intervals, finding pottery up to the depth of 20cm on three occasions. The pottery found is coarse tempered and undecorated. We decided not to invest further effort here for the time being. Even so, the site is of interest for demonstrating a pattern of Amerindian settlement in the area in the past, namely, the location of villages along the terrace top of hills, and use of the areas at water level for specific activities (burial, fishing, tool fabrication, bathing). This pattern contrasts with the Beiradeiro occupations, who live in nucleated settlements and who, true to their ethnonym, have their habitation areas by the riverside while using higher ground for agriculture, hunting, collecting, and so forth. Thus, though the Beiradeiros do not reside on higher ground, they nonetheless occupy these areas.

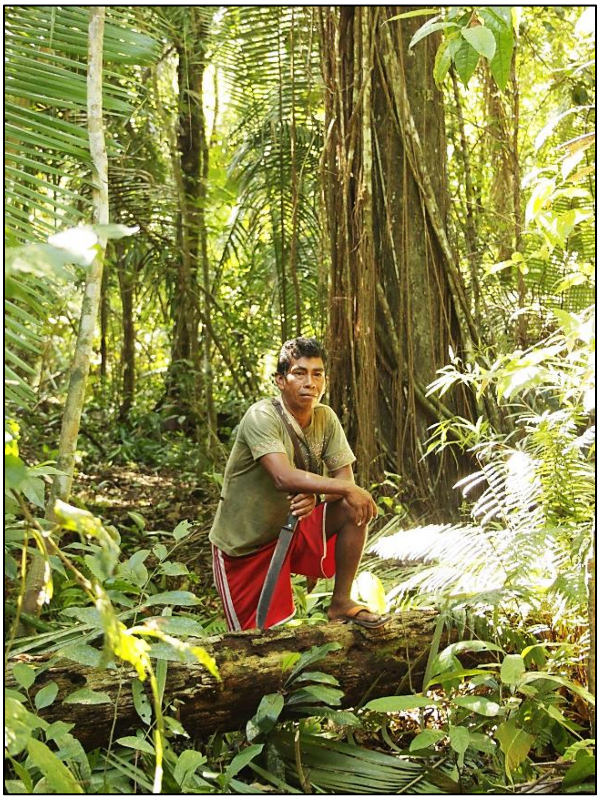
Fig. 39 Ponta do Jatobá community. Archaeological remains (potsherds, polished axeheads and flaked quartz) were located near the houses. On higher ground (approximately 90m above low water level in August) an ADE site is located. Photo: Bruna Rocha

5.4 Terra Preta do Mangabal

Much of this project's focus has been upon the apparently largest ADE site located in Mangabal, called Terra Preta do Mangabal.[91] The site is occupied by Josué Lobato Cirino, Jucilene Campos dos Anjos and their family, whose house is in the Machado community, and who use this area for planting manioc, watermelons and corn, for hunting and for collecting wild fruits and other plant materials for construction or remedies. They occasionally bring down some of the *terra preta* to plant greens and vegetables in Jucilene's raised planting platform, showing how the ADE is a useful resource to them and how the TPM site is integrated into their daily lives.

Fig. 40 Jucilene tends to her spring onions and lettuces grown on the terra preta brought down from the TPM site, cultivated in an elevated platform, in her house garden at the Machado village. Fig. 41 Dual heritage: in southeast area of the TPM site, Pedro regards Amerindian earthenware (left hand) and bottom of glass bottle (right hand) likely left by past rubber tappers. Photos: Bruna Rocha.

[91] Hereafter referred to as TPM or Mangabal.




TPM site. Fig. 42 Pedro "Radial" Boro. Fig. 43 Josué preparing the ground for planting after having cleared the area with fire. Note the dark earth and palm species in the background. Photos: B. Rocha.

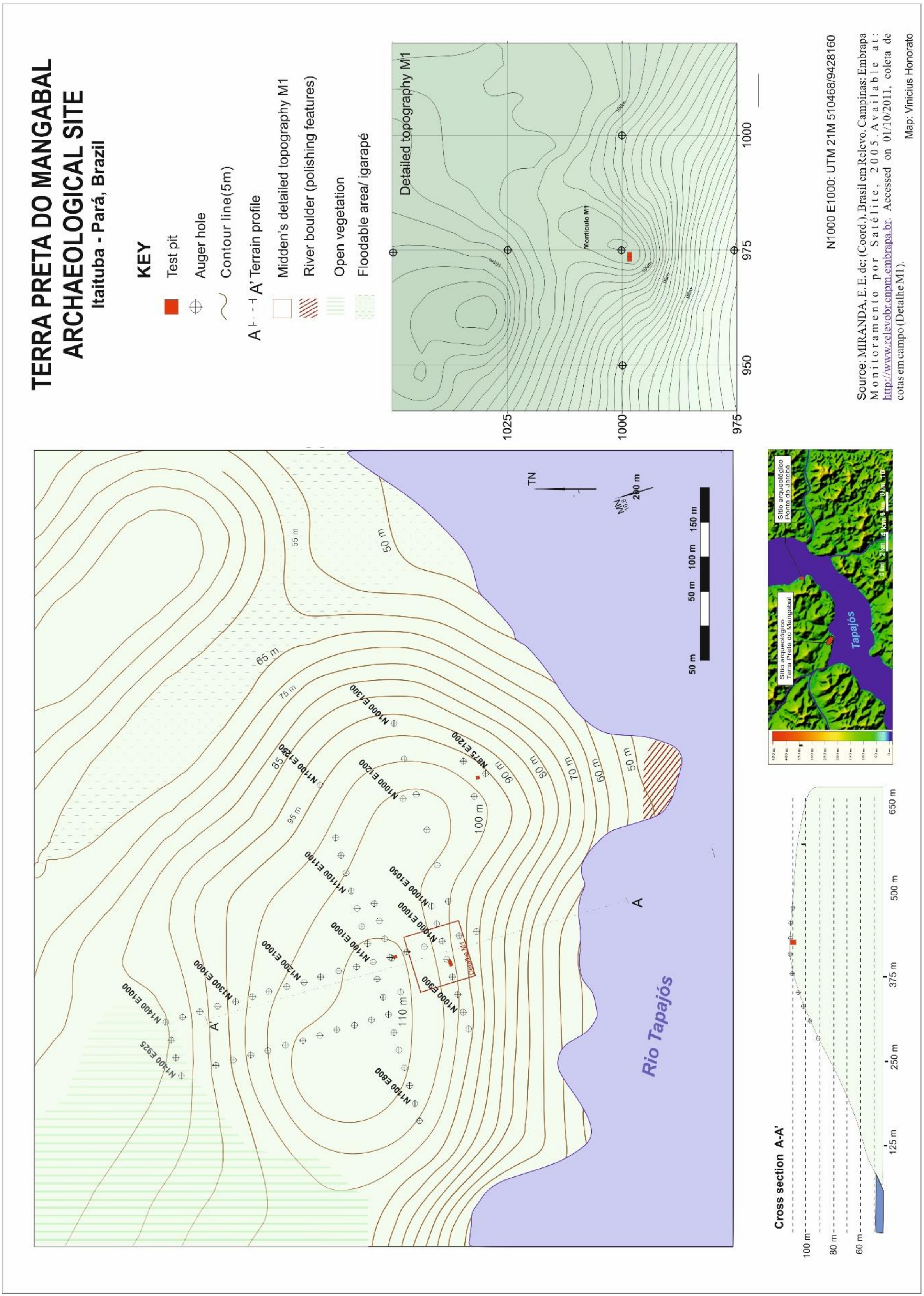
TPM is on average about 60m above river level. It is located on the left bank of the Tapajós. To its west, following a grassland area known locally as *campo da natureza*, lies a stream called Igarapé do Jacaré. Granite boulders containing polishing features are found at the bottom of the eastern part of the site. These polishing features have varied shapes, including rounded concavities that point to circular motion, as well as rectilinear grooved lines (Honorato de Oliveira 2015, p. 34). Some boulders contain isolated features while others have sets of features, such as fig. 46 below. TPM is mostly covered by an area of secondary forest, containing a large number of palm species (e.g. *Astrocaryum murumuru, Attalea speciosa, Oenocarpus bacaba* and *Maximiliana maripa*). The density of secondary forest varies across the site, suggesting different activities in the area over more recent times. Pedro took us to an area in the southeast of the site that he explained was occupied by *seringueiros.* There is a concentration of mango trees in this place, a sure sign of post-Columbian habitation.

Fig. 44 Collage of photos taken from the Tapajós looking to the TPM site. Towards the eastern end of the site, rocky boulders once provided the support for workshops. Photos and collage: B. Rocha.

Mangabal's N1000/E1000 point corresponds to UTM 21M 510468/9428160 (WGS '84 datum)[92]. In total, 70 auger points were excavated at 25m or 50m intervals in 2011 and 2014 (see map in Appendix 5.1, and sherd count map in Appendix 5.2). We have not yet finished delimiting the site but can affirm that is contains at least 20 ha. of *terra preta* and that the average depth of *terra preta* on the site is 50cm. The greatest amount of ceramics and deeper ADE seem to be concentrated from the N875 to the N1100 points, but further east-west lines need to be opened up for us to build a fuller idea of the site. Augering into the grassland adjacent to the site showed us that as the *terra preta* promptly ends as the *campo da natureza* begins, pottery and lithics reduce abruptly with the end of forest cover. Could this suggest the site is in fact a forest island (Balée 1989, p. 9; 2013), resulting from human activity in the past?

Fig. 45 Fragment of pottery related to prior seringueiro occupation of the area found at the bottom of the Mangabal site, near Fig. 46 the river and "workshop' on rocky boulders, containing tool polishing and sharpening features. Photos: Bruna Rocha.

[92] See Appendix 5 for brief description of delimitation and excavation procedures.



Map 14 TPM site. Map by Vinicius Honorato

Over two seasons (2011 and 2014), one 2x1m test pit (N998-E973.5-974.5) and two 1m^2 (N1074/E1000 and N887/E1200) control units were excavated.[93] Crucially, the dates obtained for the Mangabal site thus far point to an intensive occupation of approximately 200 years. Given the technological, formal and stylistic similarity between the ceramics and the recurrence of raw materials and technological choices related to the lithic materials (Honorato de Oliveira 2015), it is safe to say that N887/E1200 is part of the same occupation, in spite of it not having an associated date.

Fig. 47 Guilherme and Pedro augering point N1150/E1000 in front of a samaúma tree (Ceiba pentandra) Fig. 48 Point N1350/E924 near the campo da natureza, where terra preta ends and sub-surface archaeological remains were found in diminutive quantities or not at all. Photos: B. Rocha

Given the archaeologically limited temporal span thus far ascertained from the dated charcoal samples, the excavated ceramics from Mangabal can be thought of as resulting from a single occupation and a single ceramic component (*sensu* Lathrap 1962). This is represented throughout the sampled units, with an estimated duration of ca. 100 to 200 years at most. This would suggest that ceramic analysis will lead to the definition of a single ceramic complex with subtle modal variations and/or changes.

[93] See Appendix 6, 7 and 8 for forms used in augering and test pit excavation.

^{14}C dates at Mangabal								
Test pit		**PN**	**Depth (cm)**	**Material type (AMS)**	**^{14}C Age (BP)**	**±**	**Lab. No**	**Context**
N998	E974.5	TPM-528	55	Wood charcoal	**1151**	29	OxA-33125	Layer V
	E973.5	TPM-1102	85	Wood charcoal	**1193**	26	UBA-29069	Between layers IV - V
	E973.5	TPM-1045	74	Wood charcoal	**1199**	26	UBA-29068	Between layers IV - V
	E974.5	TPM-513	30-40	Wood charcoal	**1200**	30	Beta-432570	Layer IV, screened
	E974.5	TPM-572.6	120-130	Wood charcoal	**1243**	30	OxA-34134	Associated to F1 feature
	E974.5	TPM-607	135	Wood charcoal	**1251**	28	OxA-34133	Taken from E profile, layer III
	E974.5	TPM-510	20-30	Carbonised seed, palm?	**1265**	28	OxA-34135	Between layers V, VI
N1074/ E1000		TPM-114	35	Wood charcoal	**1270**	30	Beta 400865	Found above TPM-117 – Layer III

Table 3 ^{14}C dates obtained for TPM site. See Appendix 10.1-10.5 for certificates and greater details.

A brief description of each test pit is provided below. Detailed profile drawings, sherd counts and sherd weight per level are provided in Appendix 9.

N887/E1200: Excavated in 2014, this 1m^2 test pit is located towards the southeast of the site, not far from the slope leading to the river. This unit displayed similarities with what was observed in N1000/E1074, although the archaeological stratum is shallower. It was only excavated until 100cm depth, and because of this, layer I is not visible in the unit's profile. Layer II is a transition between the A and B horizons. Layer III has diffuse limits, and low quantities of archaeological remains; the action of biological agents is evident. The soil was loose from here up to the surface thanks to roots, rootlets and bioturbations. Layer IV contains greater quantities of ceramic, lithic, floral and faunal vestiges. Layer V is the humic layer. See fig. 50.

N1000/E1074: Located towards the centre of the site, the ADE extends for approximately 50cm and cultural material is found until about 65cm depth. Two archaeological layers were defined on the basis of soil colour and texture as well as the presence of archaeological materials (pottery, lithics, charcoal and carbonised seeds). Mechanical mixing was caused by burrowing organisms, which towards the bottom of the excavation took archaeological materials into the latosol, lending it a mottled aspect around transitional layer II (fig. 49). Because it was the first test pit excavated on the site, N1000/E1074 was excavated until the depth of 150cm. We obtained a radiocarbon date of 1270±30 14C BP for Layer III (35cm depth). The charcoal sample was located directly above two articulated pottery fragments (TPM-117).

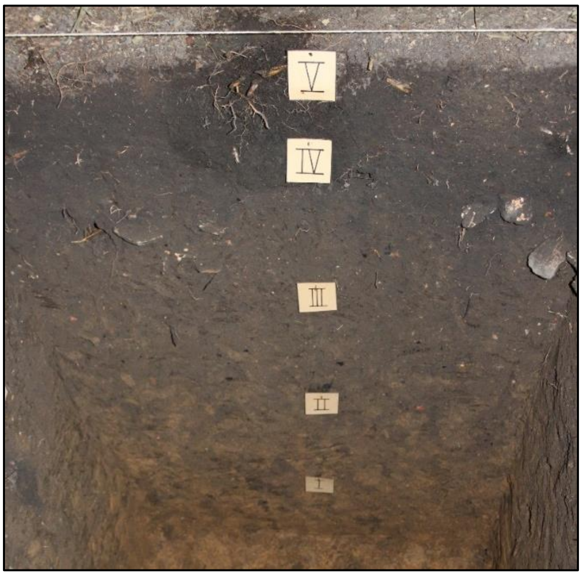


Fig. 49 Northern profile of N1000/E1074 1x1m unit excavated in 2011 (150cm depth). Fig. 50 Northern profile of N887/E1200 (100cm depth)

N998/E974.5-973.5: This is situated towards the southwestern edge of the plateau on which the site is located, near the drop-off towards the river. ADE is present until approximately 150cm depth; N998/E974.5 was excavated until the depth of 200cm and N998/E973.5 was excavated to the depth of 170cm. A 1m auger hole was dug at the end of the excavation N998/E974.5; 3mm meshes were used for screening.

The archaeological layers follow the topography of the area in terms of a smooth decline from east to west. Layer I is archaeologically sterile and was only reached by augering N998/E974.5 at the depth of 200cm; it is not visible in the profile. Layer II is a transition layer in which occasional, small remains are found associated to darker soil from layer III, transported downwards by the actions of burrowing organisms (bioturbations). The layer extends to the depth of approximately 250cm. There is a high quantity of charcoal fragments in this layer and, save for instances of bioturbation, soil is highly compacted and mostly clayey. Layer III's limits are diffuse and the main factor distinguishing it from layer IV was the soil's consistency and texture. Within layer III feature F1 was located (fig. 51), which consists of apparently *in situ* deposition of griddles, fire dogs and cobble-sized rocks that displayed thermal action, which may have integrated a hearth/cooking structure at the depth of 120-130cm. Poorly-fired sherds were seen here – could these have been 'wasters' and indicate pottery production?

Fig. 51 Feature F1 in NE quadrant of N998/E974.5 containing horizontally-placed ceramic fragments of considerable size and cobble-sized rocks in a semi-circular disposition and fire dogs. A large number of faunal remains were found associated with this and a high quantity of charcoal was also present.

A structure that may have had a similar function was unearthed within layer IV (fig. 52). Once again, large pottery fragments, including a number of griddle pieces, were found lying horizontally alongside fire dogs and cobble-sized granite rocks that were possibly used as fire rests. Considerable amounts of animal bones – particularly of fish –, charcoal and carbonised seeds were found. This seems to represent an occupational floor. The soil above and below this was not strongly compacted, which may be related to the intense action of burrowing agents and also to the relatively fast formation of the deposit. Besides pottery, lithic fragments were found in abundance throughout the excavation (see Honorato de Oliveira 2015). Carbonised seeds were also found in very large quantity and still need to be studied.

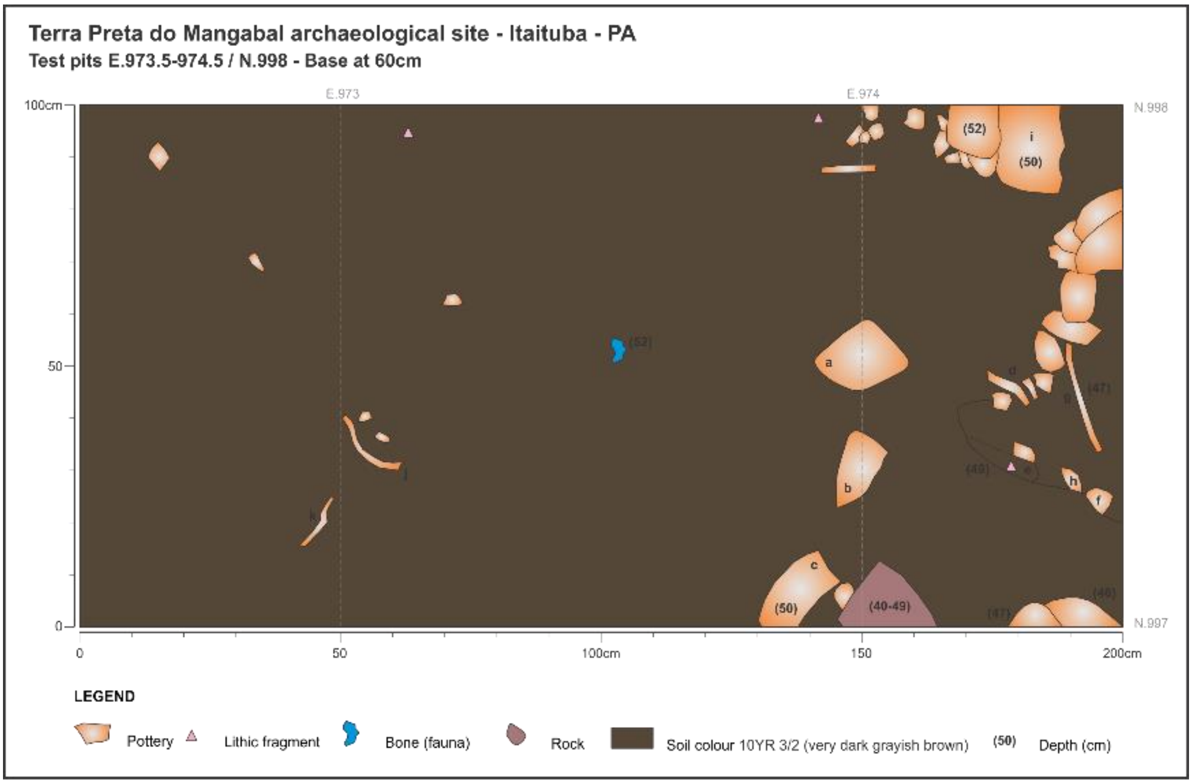


Fig. 52 Concentration of ceramic fragments at approximately 60cm depth, including several semi-integral pieces. A considerable amount of cobble-sized rocks was also encountered. Graphic art by Marcos Brito.

Within the mounded deposit, a considerable amount of faunal and floral vestiges was recovered. Those retrieved from N998/E973.5 were inspected and recorded by Francielly Sá (see Appendix 11).[94] Though the results are preliminary, they demonstrate the presence of perciform, characiform and siluriform fish throughout the stratigraphy. Pedro repeatedly identified the *peixe cachorro* during screening. Reptiles – carapaces likely belonging to river turtles – and a caiman skull fragment are also represented. Regarding mammals, a bat, rodents (including at least one instance of a paca), peccary, and birds were identified by Ramos de Sá. This points to exploitation of river, forest and potentially grassland environments and a varied diet. Some of the bones displayed the effects of fire. The profuse amounts of carbonised seeds from the mounded deposit await further study.[95] These remains are in an excellent state of preservation and were collected throughout the stratigraphy (see excavation profiles). They belonged to an

[94] Francielly dos Santos Ramos de Sá is an undergraduate student at the Federal University of West Pará (UFOPA), whose studies in faunal remains have been supervised by Gabriela Prestes Carneiro.
[95] The material has been organised by UFOPA student Eriksson Branches under the supervision of Myrtle Pearl Shock.

apparent diversity of plants, including several palm species, which would have provided additional sources of protein (Beckerman 1979) for the people who lived on the site.

Fig. 53 Northern profile of N998/E974.5-973.5. Photo: Bruna Rocha.

5.4.1 Interpretation of mounded deposit's formation process

Although we have previously referred to this feature as a *midden* (Honorato de Oliveira 2015; Rocha 2012) this is not accurate, because over the ~150 years it took to form, it appears that it resulted from diverse depositional activities besides refuse/discard. To solely label it a midden risks simplifying meanings the feature may have had to the site's inhabitants; it may have had symbolic connotations to them (M. Schmidt, pers. comm., 8 September 2016).

It appears however that this mounded deposit has extended the higher surface of this part of the site in a north-south direction, in effect forming a sort of 'peninsula' (Honorato de Oliveira 2015, p. 32). Such actions have been observed ethnoarchaeologically among the Kuikuro of the upper Xingu basin. They include "spreading of household organic refuse adjacent to (behind) middens, in effect expanding them, with the reported objective of improving the soil for future cultivation of (homegarden) crops" (Schmidt & Heckenberger 2009, p. 175).

Fig. 54 Beginning the excavation of the mounded deposit. There is a natural decline that is followed by the archaeological layers towards the west. The mounded deposit has extended the flat surface of the site terrace towards the south. The decline is marked by the dotted yellow line. Photo: B. Rocha.

The excavation of the mounded deposit and the dates obtained for it allow us to infer that the use of this area apparently changed during the site's occupation. Among present Amazonian Amerindian peoples,

> …although indigenous societies are very different from one another, it is possible to say that there is not the high degree of spatial specialisation as happens in our society. We have places that are visibly distinct and separated by large distances for working, for family life, for the children's formal socialisation, for leisure, for looking after one's health, and so forth.

> With this I do not mean that indigenous societies conceive of their space as something that is homogenous and indistinct… Yet in indigenous societies activities take place in a space that is, fundamentally, an integrated space (and not compartmentalised as ours is) (Novaes 1983a, p. 6).

Ethnographic descriptions of Amerindian villages and house areas help us conceive of processes and contexts that potentially could have contributed to the formation of the mounded deposit. The presence of hearths and griddle fragments suggests a domestic area. Among the Bororo people, who live in Mato Grosso do Sul state and whose language is classified within the Macro-Jê language stock, villages are (or were) ring - shaped with men's houses at their centre. The periphery was constituted by the houses, which correspond to the domestic and feminine sphere (Novaes 1983b, p. 59). Being a matrilocal society, this is more so the case; although the rule was not always followed, it was nevertheless the standard ideal (Ibid., p. 67). Hearths within the space of the house were lit continuously, in order to fend off insects, to provide heat during the night, or for cooking (Ibid., p. 66). Women also cooked behind their houses (Ibid., p. 67, fig. 45). A similar scenario was seen amid the Kayapó Xikrin living between the Araguaia and Xingu Rivers. Their language is part of the Jê language family, which also belongs to the Macro-Jê stock. Their villages are, again, circular, and their cooking hearths, tended to by women, are reported to have been placed behind the house (Vidal 1983, p. 86).

Spatial organisation among the Parakanã – a people whose language belongs to the Tupi-Guarani family, which in turn, is part of the Tupi language stock – is entirely different. Vidal (1983) visited recently-contacted Parakanã who had been reduced to only 35 individuals and were living at the Posto Indígena Pucuruí near the left bank of the Tocantins River. She writes that upon arrival, used as she was to the clear spatial organisation of Jê peoples, she felt lost (1983, p. 94). She was soon able to understand how spatial organisation reflects marriage patterns and genealogy, however (Ibid, p. 96-97) and notes how "The Tupian family is calm and reserved" (1983, p. 95) in contrast to the Jê people she had worked with. The houses were headed by the men, and spouses undertook many activities, including hunting, together (1983, p. 85). Vidal writes that inside the houses, which were very clean, only fibre hammocks and a few individual belongings were kept. Outside, each family possessed their own *tapiri*[96]-kitchen-workshop, where nuclear families spent the day undertaking their daily activities (1983, p. 96). Meanwhile at the Lontra indigenous post, 118 Parakanã lived in two large longhouses without internal divisions, but sleeping areas were organised according to a number of criteria. Outside,

> On both sides of the village and at a short distance from the houses, there was a certain number of palm thatch constructions, closed on three sides but open on the side of the longhouse, which were large *tapiri*, where many related nuclear families spent the day cooking, smoking the meat, toasting the manioc flour… [and] producing arrows (Vidal 1983, p. 98).

Another Tupi-Guarani people are the Waiãpi, who live in the Brazilian Guyana among Carib-speakers, and who build different types of houses among themselves, some of which are raised off the ground (*iura*) (Gallois 1983, p. 155-157). In any type of house, hearths remain constantly alight within one of the extremities. In the raised houses, the hearth is placed over a disc of clay with a diameter of 1m circumvented by vines; on top of this or on the side, a rack is used to place food, gourds, and so on. This domestic fire is used by women for food preparation and by men when making artefacts. Women however do not usually utilise the house hearth for kitchen activities; manioc-related foods are never prepared inside the house, they are made in the *okawu* (kitchen houses) or when these do not exist, they are made adjacent to the house (Gallois 1983, p. 164-166). According to Robert Murphy (1954, p. 40), among the "less acculturated" Munduruku, "Each house had one very large hearth and the griddle on which the *beijú* was made" although he does not specify whether the hearth was within or outside the house.

These examples thus point to the likelihood that this mounded deposit integrated domestic spaces over time, though we cannot say whether this would have been within a house or outside. Either way, they also suggest that this impressive feature resulted from everyday actions – such as cooking activity (signalled by ceramic griddles and hearth structures apparently found *in situ*); sweeping, clearing or discard actions; and,

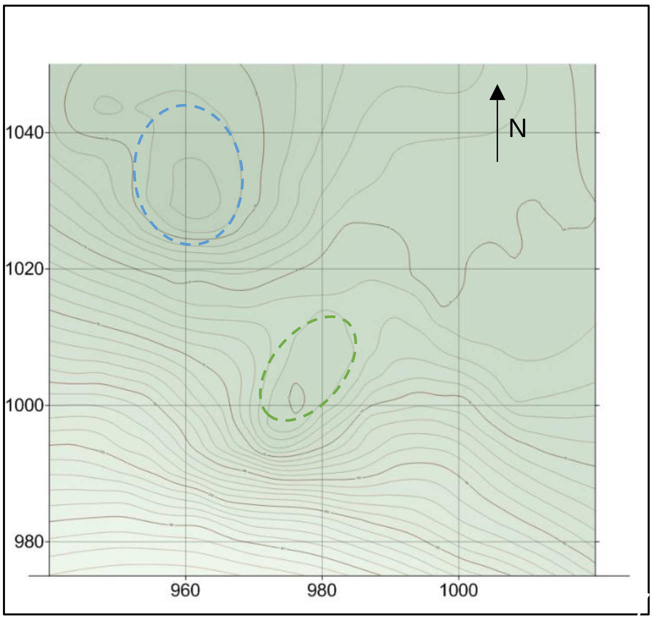
---

96 This is an area sheltered on the top with palm fronds but open at the sides.

potentially, the production of ceramic artefacts (though as yet inconclusive) – which in ethnographic contexts are most often undertaken by women.

A similar feature is found a few metres away (see map 15 below) and was mapped in a precursory way in 2014. This points to the complexity and intensity of the occupation at the site, which calls for a long-term excavation programme.

Fig. 55 Nearby mounded deposit to N998/E974.5-973.5 that has yet to be excavated. Red dotted line shows inclination.



Map 15. Green ellipse shows mounded deposit where 2x1m excavation (N998/E973.5-974.5) was undertaken; blue circle shows top of mounded deposit shown in fig. 55. Elevation points collected using an optic level. Mapping conducted by Vinicius Honorato with the help of Pedro Braga and Guilherme Mongeló. Map by Vinicius Honorato.

5.4.2 On the community pattern at Mangabal

Based on our (still limited and preliminary) data, bearing in mind the pre-Columbian occupation of the site appears to have been unicomponent,[97] and in accordance with Myer's (1973, p. 236-243) overall categorisation of ancient site patterns, it seems safe to say the Mangabal site pattern was non-linear. It would probably not have entailed a line of houses or a multifamily longhouse (see also Erikson 2003, p. 467, 470, figs. 5C, 5D). Robert Murphy (1954) describes "aboriginal" Munduruku villages as such:

> The aboriginal Mundurucú village consisted of three to five dwelling places and the men's house, or *eksa*. The average population was about 250 people. Commonly, these villages were located on stretches of high savannah. Such a site was easily defensible as its open location protected it from the surprise attacks always used by Amazonian Indians. Also, these locations were relatively free of insects. The Mundurucú say too that 'it is beautiful here for you can see far.'
>
> The houses were oblong with rounded ends and had steeply pitched thatched roofs. Some houses were 80 to 100 feet in length. The eaves of the roofs terminated at about five feet from the ground and the house was closed by vertical bark walls. Doors made of the center stalks of palm fronds were used.
>
> The men's house was a large lean-to type building, the open end of which always faced east. It was up to 100 feet long and had a roof that gently sloped from the east end. At which point it was about fifteen to twenty feet high, until it met the ground at the west end. The front and both sides were open. Adjoining the south side of the west end of the men's house was the small room in which the sacred trumpets, forbidden to female eyes, were kept. Three horizontal beams, one in the middle and one on either side of the house, ran from east to west at about five feet above the ground. Beneath these beams, men stretched their hammocks to sleep
> (R. Murphy 1954, p. 37-38).

In another publication, Robert and Yolanda Murphy (1954, p. 6) mention that Munduruku villages were circular, with the houses surrounding a village plaza that was swept clean. For 'central plaza-type communities' (Myers 1973, p. 248-249), which

[97] For the post-Columbian *seringueiro* occupation means this is a multicomponent site.

Erikson (2003, p. 468) describes as "the most highly structured, non-linear community," refuse is usually "placed in individual piles up to 10m 'behind' the houses that face the plaza (Ibid.; Heckenberger *et al*. 1999). Over time, the piles of midden form a doughnut shaped ring beyond the house circle creating what would be a 350 m diameter or 10 ha site (Myers 1973). Myers predicts that the sweeping effect in the plaza and the mounding effect in the midden would create slight topographic differences. In a recent fieldwork trip to the Rio das Tropas within the Terra Indígena Munduruku, a Munduruku territory that was officially ratified in 2004,[98] UFOPA undergraduate Jair Boro Munduruku was reminded by relatives that the Munduruku used to throw their refuse near their houses, and that they would sort their refuse, particularly faunal remains, into different piles.[99]

Far more mapping and testing of the site with horizontal excavations will be necessary for us to be able to gain a more precise idea of the shape of footprint of the ADE (Erikson 2003, p. 466) at the site in order to approximate a potential community pattern for it. The majority of ADEs are centre type, defined as having a continuous distribution of *terra preta* across the site, being deepest in the centre, with no evidence of an ADE-free central plaza (Sombroek *et al.,* 2003 cited in Erikson 2003, p. 474). This can either be explained by pre-Columbian communities having forms that are not represented in the ethnographic and historical record, or by complex formation processes, which could include slight shifts of the community's location or their residences within the area of the site over time (Erikson 2003, p. 474-475). This periodic relocation of the community through movement about the centre (if we consider concentric communities) would lead to a "smearing effect" (Denevan 2001; Sombroek *et al.* 2003 cited in Erickson 2003, p. 475).

The Mangabal site appears to consist of a 'centre type' ADE, but this may be due to repeated relocations within the site over the period of its occupation, something indicated by the presence of griddles and "occupational floors" within the space of the

[98] The Portuguese term for this is *homologado*.
[99] This trip was part of Jair's Independent Study Project, called *Mapeando as agũkabuk em territórios tradicionalmente ocupados pelo povo Munduruku*, sponsored by UFOPA's Affirmative Action Program and the Society of American Archaeology's Native American Scholarships program. The project is supervised by Bruna Rocha and Vinicius Honorato, and Morgan Schmidt undertook the fieldwork with Jair.

excavated midden, interspersed by less structured remains, suggesting a change in activities in this area over the approximately 200 years during which it was occupied (Table 3). This can be observed among the Munduruku of Sawre Muybu today (see Chapter 4).

5.5 Sawre Muybu

The Munduruku village and ADE site of Sawre Muybu is situated on a high bluff (approximately 40m above high water level, in March) on the eastern margin of the middle section of the Tapajós River, below its confluence with the Jamanxim. Besides Sawre Muybu, the Munduruku villages of Dace Watpu and Karo Muybu also occupy the territory.

Fig. 56 The Sawre Muybu village and archaeological site, January 2013. Photo: Bruna Rocha.

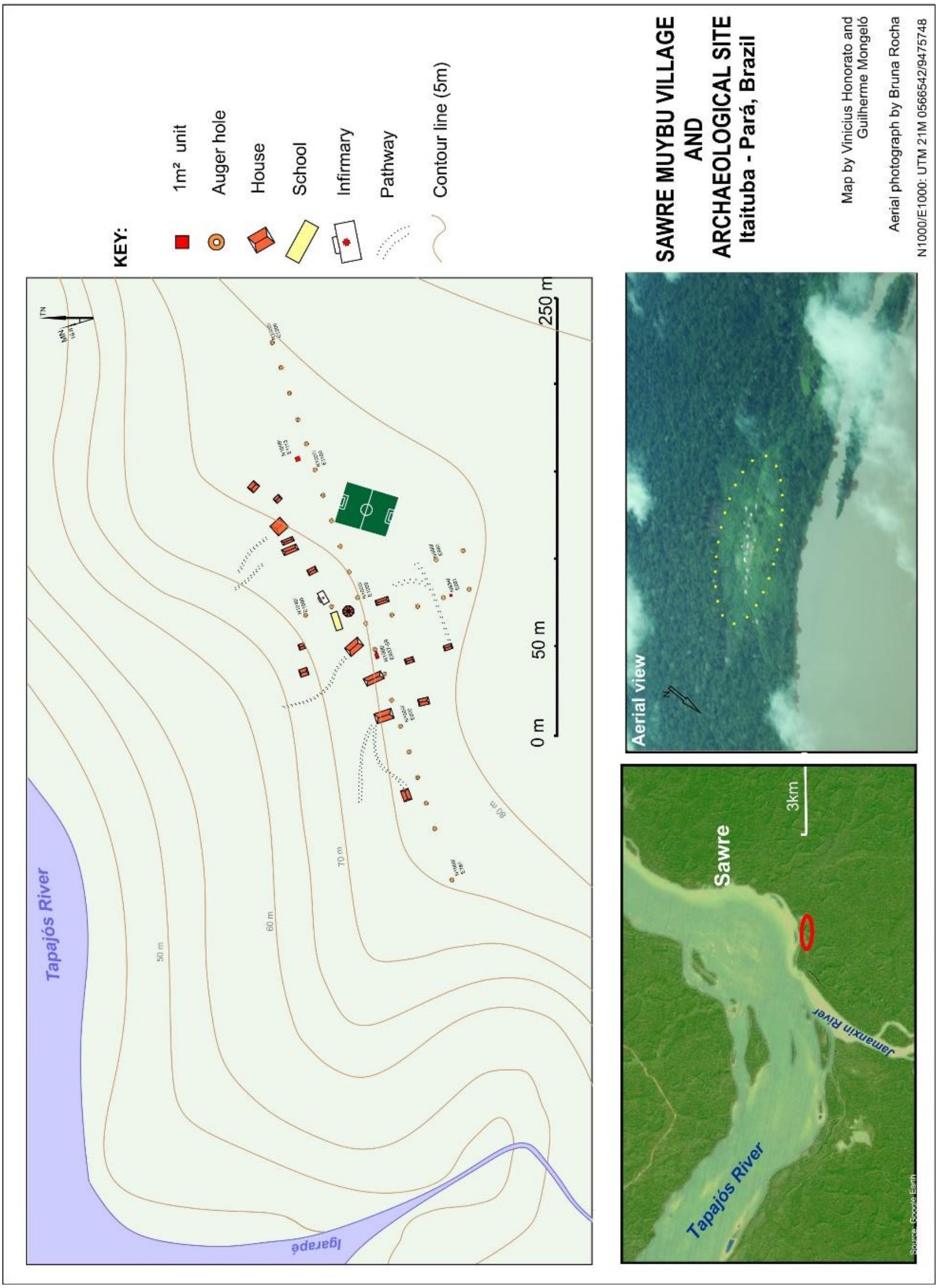
We travelled to Sawre Muybu in March 2014. The village can only be reached from Itaituba by small river craft, which needs to navigate upstream from the port of Boburé, approximately 80km south of Itaituba near the Transamazon Highway on the river's left margin, or from the village of Pimental on the right bank of the river. Because the Tapajós was undergoing an historic flood, the Transamazon Highway had been flooded so we were not able to reach Boburé. We had to turn back, cross the river and go to Pimental. The road to Pimental was also flooded, so we had to turn back again, only arriving there late at night. The Munduruku came to fetch us at Pimental the following morning, after we radioed them.

In March 2014 the Sawre Muybu (SM) site was delimited and excavated with the help of Márcio Amaral Lima, Guilherme Mongeló, Rogério Andrade dos Santos, Gizelle Morais and Fabiano Santos. José Munduruku also helped with the final augering. During our stay, the Munduruku and some of our team members suffered from health problems because of water contamination at the village: the usual source had been submerged by the river's high water level. This was a direct consequence of the official delays in recognising the territory as Munduruku land: its indeterminate legal status meant public funding for building a water pump had been barred by the local municipality. In the last week of our stay, an increasing number of people at the village, including two team members, fell severely ill with dysentery, while also feeling feverish and nauseous. Another team member had an allergic reaction to the relentless swarms of mosquitos and sandflies such that they had to return to Itaituba for two nights. A gold dredge was at times stationed in front of the village, its motor chugging away for 24 hours a day, affecting everyone's sleep. Two team members had to leave on the 26th March, when our supply of mineral water ran out for the day. The following morning, another two left because one of them had fallen ill with the same symptoms – diarrhoea with blood, and fever. From the 27th to the 31st March, Guilherme Mongeló and I were the only ones remaining to finish augering (with help from José Munduruku), excavating, drawing the profiles, and closing two test pits. Guilherme also produced the map of the village (see map 16 below).

5.5.1 Excavations at Sawre Muybu

Site grid and augering programme

On our first morning at Sawre Muybu, the village leader, Cacique Juarez, took us around the village and showed us concentrations of pottery sherds, fragments of polished stone axe heads and dark earth. He pointed to a tree, called *cutite* (*Pouteria macrophylla*), which they know to be an indicator of ADE, or *katomb* (fig. 57). Juarez also pointed out that a tractor had been to the village and levelled out some of the terrain in its central area, which would have removed the upper layer of archaeological remains.



Map 16. Sawre Muybu village and archaeological site. Map by Vinicius Honorato and Guilherme Mongeló.

Fig. 57 Cacique Juarez Saw Munduruku indicates the cutite tree. Note the dark soil colour, the planted corn, the house frame and chicken coop beside it.

For site delimitation and excavations, the procedures described in Appendix 5 were followed. The N1000/E1000 point was established near the centre of the village. This corresponded to UTM 21M 0566542/9475748. Using an optic level, compass and 50m metric tape auger points were marked at 20m intervals along the east-west line.[100] In total, 30 holes were augured.[101] Five millimetre screens were used for sieving excavated soil. The auger profiles can be seen in Appendix 12, showing the changes in soil colour and density of ceramic remains.

Three adjacent test pits (1x1m, 0.5x1m and 0.6x0.7m) and two $1m^2$ test pits were excavated at the village. During the work, these procedures were always explained to the Munduruku, who seem to have appreciated the excavation methodology as a sign of our respect in regard to the *antigos* (the ancients). When registering the test pit profiles,

[100]Save for one occasion, at what would have been the N1000 E800 point, which had to be skipped because of dense vegetation. The line was re-established using trigonometry.
[101] Three points were only augured at the end of our stay (N1000/E1000, N1020/E1000 and N1040/E1000).

we numbered the layers according to those already identified in Excavation Area 1, which was the only area in which all five layers (including the latossol) were observed.

The dated charcoal indicates that Sawre Muybu site was occupied for anything between 120-230 years, from the late ninth or early tenth century AD. It was likely abandoned in the first half of the twelfth century AD. As will be seen in the following section, the stratigraphy of the site is complex, presenting a number of features, and its ceramics are variable. The dates obtained and the site stratigraphy do not make it entirely clear whether Sawre Muybu is multicomponent or whether it was produced by a single occupation. This will need to be addressed through the analysis of the ceramics retrieved.

^{14}C dates at Sawre Muybu							
Test pit	**PN**	**Depth (cm)**	**Material type (AMS)**	**^{14}C Age (BP)**	**(+/-)**	**Lab. No**	**Observations**
N1008/ E1113	SM-618	52	Charcoal- possibly palm	865	30	UBA-29072	Found in feature F4
N1000/ E957	SM-558	70-80	Wood charcoal	913	30	UBA-29071	Found directly beneath horizontally-placed griddle (beneath feature F3)
N1000/ E958	SM-325	34	Wood charcoal	1039	26	UBA-29070	Found directly beneath horizontally-placed griddle (Transition between layers III-IIa)

Table 4. ^{14}C dates obtained for SM site. See Appendix 10.5 for certificates and greater details.

Excavations

Fig. 58 Acelino Dace narrates Munduruku history as Fabiano digs. Acelino explained the nicks seen on sherds would have been produced using inajá palm (Maximiliana maripa) seeds rather than fingernails.

A brief description of each test pit is provided below. Detailed profile drawings, sherd counts and sherd weight per level are provided in Appendix 13.

N1000/E957-958.5: The N1000/E958-958.5 excavation area,[102] from which the river is visible, was situated on a natural elevation near Cacique Juarez' house. Besides recent litter, pottery was strewn across the surface. While augering the N1000/E960 point, relatively large, apparently articulated vessel fragments were encountered during the second (20-40cm) level. This motivated us to open up a 1m^2 test pit to see what kind of feature it was, at N1000/E958. We then expanded it 50cm eastwards, into N1000/E959 so that the augured area could be encompassed (this half unit was named N1000/E958.5).[103] The total area then became 1x1.5m.

[102] To be referred to as Excavation Area 1.
[103] Although the points marked for augering were precise, the actual hole is always dug near to the point depending on where is more convenient. For this reason, the perforated area straddled the N1000/E958 and N1000/E958.5 units.

Layer I is a clayey latosol of yellowish orange colour (10YR 7/8) with an element of sand. It is sterile archaeologically and highly compacted. Its limits with layer II are diffuse; there is much mottling of the soil. Bioturbations – ant nests, roots (active and former), and beetle cocoons – were found through much of this cut, and caused the mixing of the A and B horizons. In layer II, some ceramic sherds were located and there are sparse fragments of wood charcoal. The limits of layer III are again blurred, but its colour is relatively homogenous (10YR 3/1, very dark gray). Its soil is not as compact. Archaeological remains are present but not abundant. Layer IV contains the greatest density of archaeological remains. At approximately 30cm depth an apparent occupational 'floor' was unearthed, with a horizontally-placed griddle (SM-323) and associated fire rests and charcoal. It is probable that the features F1 (which is a possible post hole negative), F2 and F3 are related to this layer. Three polished stone axe heads, pottery fragments (from <2cm to 10x5cm; some were articulated), lithic flakes, faunal remains and charcoal were also found here. The soil texture is a sandy clay, with medium compactness, and colour is 10YR 2/1 (black). Towards the surface, in layer V, we found plastic, bits of metal and glass.

Fig. 59 N1000 E958-958.5 base at 30cm: a) clay fire rests; b) griddle fragment. Other pottery fragments can be observed in the photograph. The hole corresponds to the N1000/E960 auger (which was suspended). Photo: Bruna Rocha.

Feature F1 may have been a post hole (compare fig. 60 with fig. 32, chapter 4); it can be seen clearly at the base of the 100cm level. It tapered off after 120cm. Its diameter averaged 10cm.

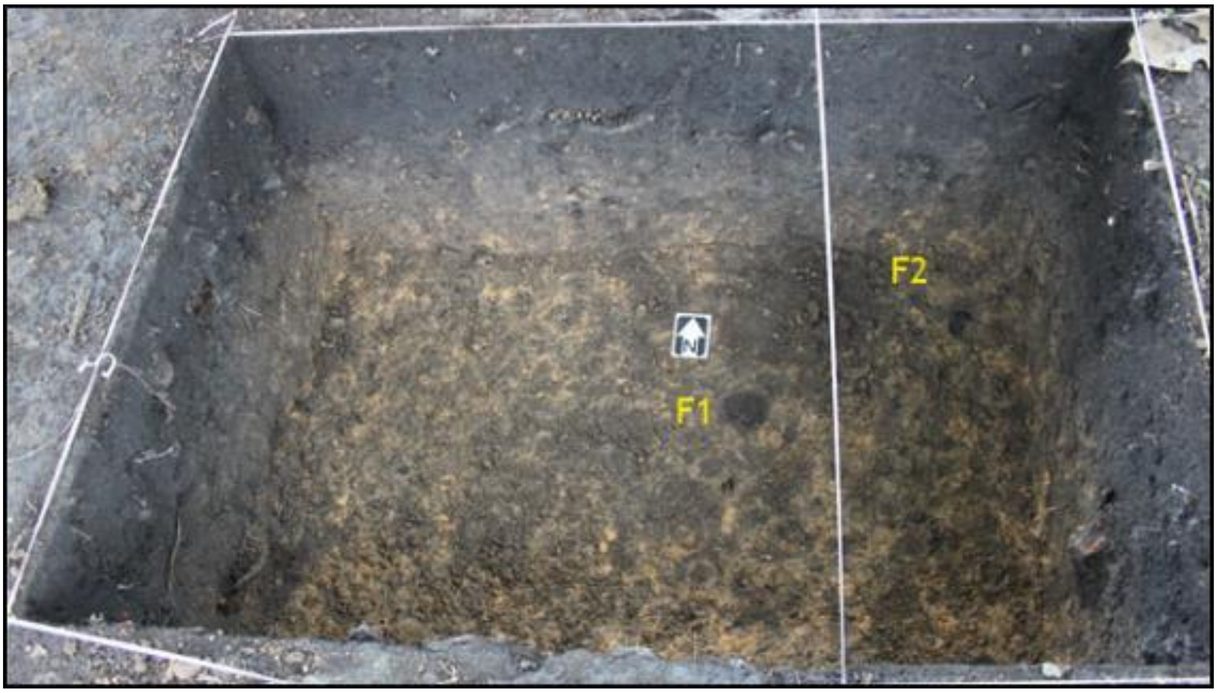


Fig. 60. N1000/E958 and E958.5 at 60cm, where F1 and F2 become easily discernible thanks to the colour contrast with the surrounding latossol. Photo: Bruna Rocha.

F2 had a more irregular shape and was at times permeated with 'spots' of yellowish latossol, prompting us to question whether it really was a cultural feature or just a feature caused by a biological agent. It seems to be both. Medium-sized ceramic sherds were encountered at the bottom of F2 at the depth of 70-80cm. The only place where roots were still to be seen in the lower levels of the cut was here. Material from this feature, which encompasses a part of both N1000/E958 and N1000/E958.5 was collected separately from the rest of the levels. Poorly fired pottery, possibly belonging to a previous occupation, was identified in the 70-80cm level. In contrast to other ceramics associated to the features and bioturbations, a further ceramic sherd encased in the latossol was located near the base of the 100cm level (fig. 62). To ascertain the end of archaeological remains, the excavation continued until 120cm (see profile drawing).

Fig. 61 Jacinto Saw Munduruku looks at the excavation unit. Fig. 62 Pottery fragment encountered near base of 100cm level.

Fig. 63 Northern profile for N1000/E958 and E958.5 showing F2. Fig. 64 Western profile for N1000/E958, showing F3.

N1000/E957 subunit (F3): A 60x70cm section was excavated out of the 1m^2 corresponding to N1000/E957 because of F3, which clearly had large, articulated ceramic vessel fragments within it. Although the roots of a *caju* (*Anacardium occidentale*) tree permeated much of the feature this did not damage the pottery, even when some of the artefacts may have been displaced. From 10cm on, extremely high quantities of ceramics were recovered, and after 20cm many of the large vessel fragments (which include pieces composing a third or half of the original vessel) were observed to be deposited diagonally. Charcoal was abundant throughout. Soil colour was 10YR 2/1 until below 50cm, although latossol was also visible from 30cm on in the NW corner, suggesting one of the lateral limits of the feature. Within the 50-60cm level, several medium ceramic fragments lying horizontally were encountered, indicating potentially intentional deposition. Towards the bottom of the feature, at approximately

60cm depth, large, horizontally placed ceramic fragments, which practically blocked visualisation of the soil at the base of the level were evidenced; what soil could be glimpsed had lightened to 10YR 3/1. Clay fire rests were evidenced between 60-70cm depth.

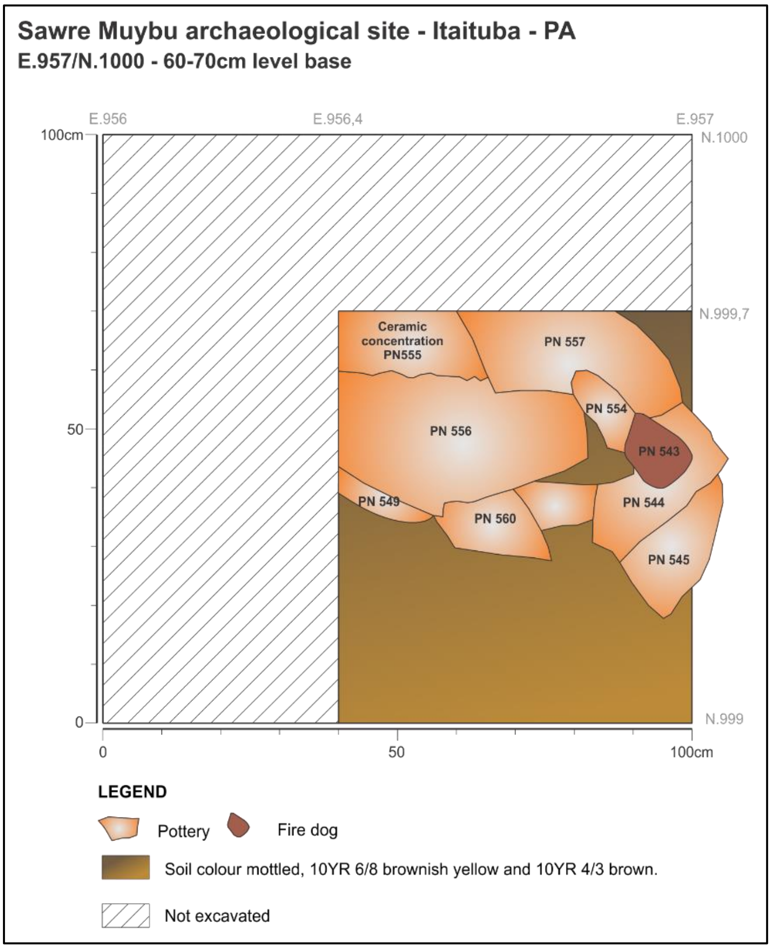


Fig. 65. Base of 60-70cm level of N1000/E957 subunit (F3). TPM-545 a large griddle fragment.

Graphic art by Marcos Brito.

Beneath a very large, horizontally placed griddle fragment, an inordinate amount of charcoal was located (fig. 66). Beneath this, bone remains were present (fig. 67). They were removed within a block of soil. We selected the southern (fig. 68) and western (fig. 69) profiles for drawing because features F2 and F3 were located there respectively (see profile drawings in Appendix 13). At the end of this excavation, the cut was only half filled, because Cacique Juarez wanted some of the orange-coloured soil to make a new floor for his kitchen area, and the pit would later be used as a tortoise pen.

Clockwise from top left. Fig. 66 Charcoal situated underneath large griddle fragment (10cm scale). Fig. 67 Bone fragment(s) evidenced beneath charcoal (2cm scale). Fig. 68 Southern and Fig. 69 Western profiles of the N1000 E957 subunit.

N934/N981: Situated near a manioc garden, the second 1m^2 unit was chosen because the two auger holes on either side of it yielded relatively dense concentrations of ceramic fragments and because it was further away from the river, to the south. However, this particular squared metre turned out to have a relatively low ceramic density. Soil colour lightened to a mixture of 10YR 4/1 (predominant) and 10YR 7/8 by the end of the second (10-20cm) level, which nonetheless produced articulated ceramic fragments and associated charcoal in its NE corner. Further articulated fragments were encountered in the level below, where the soil colour was lighter still, and already displaying transition: 10YR 8/8 (predominant) and 10YR 4/2; this mixture carried into the 30-40cm level, however by the time the following and final level was excavated, the latossol was homogenously coloured as 10YR 7/8. An auger was executed in the centre of the pit to ensure archaeological remains were absent. Soil texture was predominantly a sandy clay throughout the entire unit.

Fig. 70 Work at N934/E981. Fig. 71 View of the unit's base at 50cm. Photos by Gizelle Morais.

N1008/E1113: The third and final $1m^2$ test pit excavated was located further to the east of the site, beyond the football pitch and the houses, near trails leading to manioc gardens. Two nearby auger holes (N1000/E1100 and N1000/E1120) had revealed possible clay fire rest fragments as well as a considerable amount of pottery and lithic fragments.

Layer I is an archaeologically sterile layer of latosol, which again has a clayey soil texture. Soil colour is yellow (10YR 8/8). Layer II is a transitional layer with blurred limits and mottled soil colour: 10YR 4/1 (dark gray) and 10YR 7/8 (yellow). Its soil texture is sandy clay and it is less compact than layer I. Excepting Feature F4, which enters this layer, the density of archaeological remains here is low. This unit does not have a layer similar to what we called layer III in Excavation Area 1. Layer IV has a greyer (10YR 3/1) soil colour initially but becomes dark (10YR 2/1) in its upper levels, when the archaeological materials begin to increase. The final layer is the humic layer.

A feature was revealed that contained a concentration of lithic artefacts (nuclei, flakes and hammerstones) in the unit's NW corner during the 30-40cm level; it was labelled F4 and its contents were screened separately. Its soil differed from the rest of the level's, being looser. Its shape was conical and it went on until 81cm depth. It included a large amount of charcoal and lithics.

Because the rest of the cut was archaeologically sterile from the 40-50cm onwards, the excavation of the southern half of the unit was terminated. From 50cm onwards, the remaining feature was emptied out as one level (i.e., not at every 10cm); it ended at 81cm.

Fig. 72 F4 feature in NW sector of N1008/E1113 at 50cm depth. Fig. 73 Feature emptied out (it reached a depth of 81cm). Photos by Bruna Rocha.

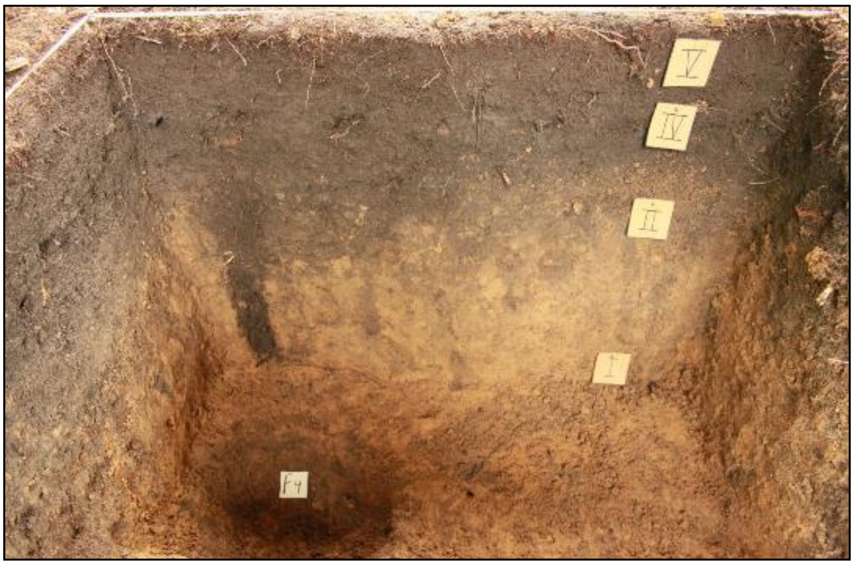


Fig. 74 Northern profile of N1008/E1113, with space where F4 used to be. Photo by Bruna Rocha.

5.5.2 Considerations on the site

The clearest signs of human occupation are concentrated in the upper 50cm of the site. Based on the observation of the 30 auger holes (see map in Appendix 12), we can state that the variation in the colour and depth of the ADE along the E-W axis is constant: the ADE dips to approximately 50-60cm (e.g. at the N1000/E1120 and the N1000/E920 points), then becomes shallow (only 20cm deep). It is likely that part of the E-W axis was affected by the aforementioned tractor, which may have scraped off some of the upper layer.[104] In contrast, the N-S axis demonstrates a certain degree of constancy: the archaeological layers are shallower and soil colour, lighter; the two southernmost augered points display light coloured soils, even in the first 20cm. Furthermore, ceramic density does not always correlate with soil colour (i.e. the greater the density, the darker the soil). Can this point to actions leading to the expansion of ADEs, as observed by Schmidt and Heckenberger (2009) and mentioned above, in relation to the TPM mounded deposit? Different to the Mangabal site, it seems that the ADE and other archaeological remains are spread in an approximately linear disposition, with the east-west axis being longer than the north-south axis (Erikson 2003, 467; Myers 1973, p. 244). Due to the possibility of "smearing" referred to above and to our limited understanding of the site, which displays a complex stratigraphy however, we are not in a position to say whether the settlement pattern would have in fact been linear. The soil over the football pitch is lighter, which apparently corroborates findings from augering conducted alongside the area of the pitch, towards the back of the site, where the soil becomes lighter and contains fewer archaeological remains. Caution is required however because of the possibility of the tractor having scraped off the upper layer of this sector.

Fig. 75 View of soil on football pitch at Sawre Muybu. Photo by Bruna Rocha.

[104] We were not able to complete the site's topography because of the unexpected reduction of our team.

At the N1008/E1113 unit, layer III was apparently absent from the profile. Our field notes register that from the 20-30cm level, the soil colour at N1008/E1113 was 10YR 3/1 mixed with 10YR 7/8, and at the 30-40cm level, 10YR 7/8 was mixed with 10YR 4/1 (the former prevailing). This might suggest that layer III may have been very thinly distributed here, or have been interfered with in some way in the past. The nearest auger profiles (N1000/E1000, N1000/E1020 and N1020/E1000) presented a greyer, less dense (in terms of ceramic artefacts) archaeological layer also.

Features

Four features were located during the excavations. F1 strongly resembled a posthole in its shape (round), diameter and depth. F2 is harder to understand, having been strongly mixed with the surrounding layer through the action of biological agents. F3 and F4 deserve further attention. The limits of F3 are associated with bone fragments, which in turn are covered by a large amount of charcoal, located under a large, horizontally-placed griddle fragment. This points to cooking activity. Directly above this, another clay fire rest and a number of large fragments were likewise found horizontally placed. Further up, large sherds were found in a diagonal situation. F3 brings Barreto's (2013) discussion of *memory pits* to mind. These features, made up of localized pits of dark earth, ceramics and charcoal are often present in multicomponent ceramic sites. Barreto writes that apparent trash pits in fact present "a selection of fragments with important decoration information… but also… these fragments seem to have been carefully placed in a cavity in order to be intentionally buried and burnt" (Barreto 2013, p. 5). She raises interesting interpretative possibilities:

> …it is not clear whether intentional burials of ceramics were practiced by the very same people who produced them, as perhaps some sort of 'memory archive' or 'identity marking' of territories, or by people who reoccupied these sites, as some sort of terrain 'cleaning' and termination of power of objects produced by others
> (Barreto 2013, p. 6).

Looking at this feature towards the end of our excavation, Cacique Juarez described how his late father told him that when people were buried in the past, all of their belongings would be buried with them. We were not able to identify the bone fragment retrieved because of its advanced state of decomposition by the time it reached the Curt

Nimuendaju lab in Santarém. It was assessed by Thiago Hermenegildo, Anne Rapp Py Daniel and Gabriela Prestes Carneiro, but unfortunately, it is not possible to ascertain what the bone is. Thiago Hermenegildo excavated it from the block of earth circumventing it after consolidating it with a polymer.

As for F4, the most striking aspect was its lithic material, leading us to think this could have been a stone tool workshop area.

The precolonial ADE site of Sawre Muybu lies beneath a present-day Munduruku village, as mentioned above. This allows for a number of observations and reflections on the relationship of the Munduruku with the culturally-constructed landscape and also for comparisons between their relationship with the village space and use of forest (plant and animal) resources and those postulated in relation to the archaeological record. These comparisons allow us to assess possible continuities with the past beyond the obvious ruptures, which are manifest particularly in changes related to material culture. The observation of kitchen areas, ovens and hearths, rubbish pits and house relocation also help us to think of these small-scale processes that would have led to the formation of the archaeological record.

5.5.3 Funerary urns at Sawre Muybu

When we first visited Sawre Muybu, in March 2014, Cacique Juarez also told us about how the villagers disinterred a funerary urn when they built the first school building. The vessel had thick walls and an open mouth; earth had fallen inside it. It was painted (or slipped) red, but did not display any designs; its rim however was nicked or punctated. A smaller, upturned vessel was inside it, protecting the skeletal remains, which included large arm and leg bones, parts of a cranium and teeth. A second vessel was later found close by, however, without bone fragments. The second vessel was placed within the transitional layer between the dark earth and the latossol. During digging, the vessels disintegrated. Their pieces were initially kept but they eventually got lost (pers. comm. to Gizelle Morais, March 2014). These episodes were blamed for a severe outbreak of malaria at the village.

When I returned in October of that year with Vinicius Honorato and Gabriela Prestes Carneiro, as I walked towards the east of the village, I noticed a pit dug near a house under construction. The Munduruku like to line their floors with the orangey-coloured clay latosol rather than the ADE, which is what led to the digging of the pit. Observing its profile, I could see half of a funerary urn containing two bones, which looked like fibulas in cross section, having been sliced through. Horizontally-placed fragments lay above the top of the vessel, acting as a sort of lid. Within the pit, large ceramic fragments that had probably belonged to this urn could be seen. The use of large pottery sherds to cover the contents of this urn as a sort of lid brought to mind urns excavated by Protásio Frickel in the 1950s at the Cururu Franciscan Mission, described by P. Hilbert (1957).

I informed Cacique Juarez and the others of what I had located. I suggested that if the vessel stayed where it was, the remainder of it would probably be destroyed, because it lay beneath a passage area. I said that if the Munduruku decided to have the vessel removed, we could extract it from the ground (in a bloc of soil), transport it to the university in Santarém, where it could be excavated and restored. I said we could then return it to the village once a space, such as a small museum, is created for it. A discussion ensued. Shaman Fabiano Karo initially recommended it should stay where it was, because removing it implied a risk to the health of the villagers. Vinicius suggested we could try and erect a protection for it. I did not propose reburying the urn as it was elsewhere; the alternative did not even occur to me. The Munduruku did not propose this either. Cacique Thiago from the Praia do Mangue village asked us what our mission was. I replied and said it was to help divulge the little-known history of the area and to provide subsidies for the education of local children. He then explained how the Munduruku are closed to outside society in terms of providing information about themselves, but reflected on how young Munduruku did not understand the value of their culture. In any event, he affirmed that the decision of what should be done lay with them – a point of common accord. Discussions were then held in Munduruku until a consensus was reached. It was agreed that if the urn stayed where it was, it would be destroyed because a protective cover would not last. So it was decided that we should remove the urn, and that we would take it to the university to clean and study it, but then it should be returned to the village.

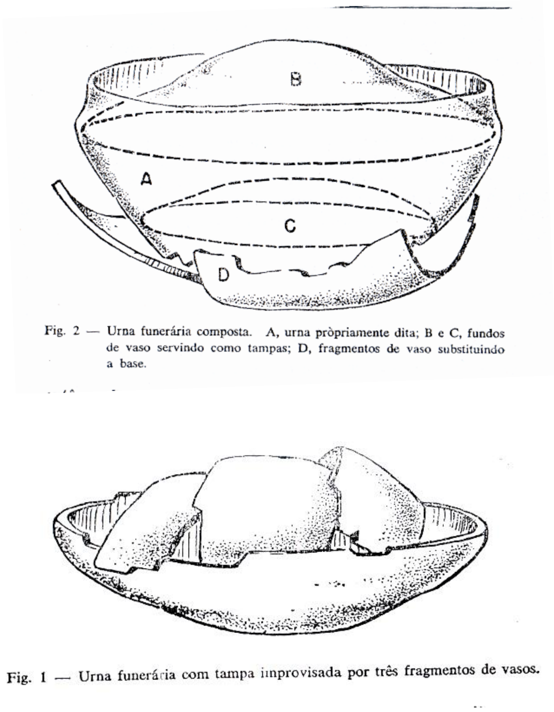


Fig. 76 Funerary urn located near N1008/E1113 test pit in October 2014. Permission was obtained from the Munduruku for the reproduction of this photograph. Photo: B. Rocha. Fig. 77 Funerary urns excavated at the Cururu Mission in the 1950s. Reproduced from Hilbert (1957, p. 4 & 5, figs. 1 & 2).

Fig. 78 People gathered around pit containing funerary urn at Sawre Muybu. Photo: Gabriela Carneiro.

We had come to Sawre Muybu unprepared for this endeavour – our intention had been to proceed with topographical mapping. We had one day at our disposal. We excavated around the urn, wrapped it in cling film and with our mosquito nets. Night had fallen by the time it was removed as a block. It was incredibly heavy. Once we lifted it out of the ground, we realised that it would not survive the trip back to Santarém. The urn was put in the community's school storage area. As we said goodbye to the Munduruku, the owner of the house built next to the pit sounded relieved that we had removed the urn from its resting place.

Fig. 79 The urn is prepared to be removed. Fig. 80 It is finally lifted out of the ground with great difficulty. Photos: Larissa Saud.

I returned to Sawre Muybu at the first opportunity, in January 2015. I was concerned about the potential decay of the bones inside the urn and the fact that any outbreaks of disease at the village could be associated with the urn's uncertain situation. Anne Rapp Py-Daniel accompanied me, as an expert in the excavation of human remains. On the way to Sawre Muybu, on the Transamazon Highway, we passed the FUNAI car taking many of the Munduruku from Sawre Muybu to Itaituba. Juarez and others had to go to Brasília, to continue their campaign for territorial recognition, which meant they would not be at the village as we undertook the work. We spoke and agreed that we should excavate the urn, re-bury the bones and take the vessel fragments back to the university in Santarém.

The brother of Juarez, Valto Dace, from the village of Dace Watpu, was to be consulted if any issue arose. We stopped by Dace Watpu on our way to Sawre Muybu to tell them about our reason for visiting. Shaman Fabiano Karo was at Sawre Muybu. He explained that the question of the bones was the most sensitive, not the pottery. We had a meeting with the people of Sawre Muybu. We explained the excavation procedures we intended to adopt. The urn was excavated in the open school space, which is a conical structure with a thatched roof and no walls. The location was good, since we were in the centre of the village and people could stop by and watch us working. Chico Caititu, from Montanha e Mangabal, had come with us. His mother had been indigenous. As we worked on the urn, he told us that she had wanted to be buried in her hammock, directly into the ground when she died. But he could not bear the thought of throwing earth "on her face," so he buried her in a coffin. He thus revealed a marker that distinguishes Beiradeiro from Amerindian identity. At a later moment, Antônio Dace, a Munduruku health worker at Sawre Muybu, sat with us and narrated stories about Karo Daybi. Karo Daybi is a Munduruku culture hero, a mythical warrior who instituted the practice of head cutting among them (Caba 1980 cited in Loures 2016, p. 192). Shaman Fabiano would occasionally stop by to observe our work. I believe the length of time (three days) and systematic methods adopted in excavating the urn were interpreted as a sign of respect for the human remains.

Methods adopted and observations

We did not follow artificial levels, but kept the surface level and were guided by the layers – of 'lids' and then bones. We used the base of the urn as our datum. The sediment was screened. The pottery and few charcoal and lithic fragments collected were bagged separately in accordance with what they were associated with (be this the "lids," or sherds found in the bloc of soil outside the urn, or inside it, for instance). We gave separate provenience numbers to the different sets of material.

The colour of most of the sediment inside the urn was 10YR 2/1 (Black) and it was loose throughout the excavation. Small roots and rootlets were located during the urn's excavation. We found two layers of articulated ceramic fragments, which we termed "lids," covering the bones. It is possible they might belong to the same original artefact. There was hardly any soil between them. The thickness of these lids is greater than that of the urn's walls. The bottom of the second layer of 'lids' was approximately 5cm above the bones seen in cross section through the sliced urn.

Fig. 81 First layer of ceramic 'lid' protecting the bones. Photo: Anne Rapp Py-Daniel. Fig. 82 Second layer. Photo: B. Rocha.

Once we reached the layer with bones, we found they were in advanced state of decomposition. We applied consolidant to them (5% strength, mixed with water and ethanol in equal proportions), to preserve them from disintegrating. We did not remove them immediately. We worked on the vessel exterior, excavating the soil circumventing the urn. When the bones were revealed more clearly, we could see they may have been femurs because of their considerable thickness and rounded form. Other bones revealed may have been ribs. The femurs were arranged in parallel and placed together as if in a bundle. Beneath and to the side of this bundle another long and large bone was identified. Other bone fragments – one of which may have been a tooth – were located. A second set of bones was revealed, but these were very decomposed.

Fig. 83 Bundle of long bones placed at the bottom of urn. Fig. 84 The Munduruku and Chico Caititu bury the bones back in the pit. Photos: Anne Rapp Py-Daniel.

The bone fragments were placed inside a box we had brought for this end. The remainder of the vessel was dismantled and the rest of the soil surrounding it was screened. The box was then taken back to the pit so the bones could be reburied. The vessel fragments were taken to the Federal University of West Pará, in Santarém. Their restoration will take place in 2017.

This situation was novel and unexpected. I believe we took sound decisions, which were only possible because we consulted with the Munduruku at every step. Another alternative could have been simply to rebury the entire urn. On the other hand, by restoring its remainder, we will begin to understand practices related to burial customs at the site and increase our knowledge of the region's archaeology. This work is still ongoing.

5.6 Descending into the Pronapaba vaults

The final 'expedition' of this project, which took place in early 2016, was of a different nature. It did not involve excavation, but could almost be described of an archaeology of PRONAPABA archaeology, as we will see below.

Celso Perota pioneered archaeology on the upper Tapajós River. Besides his work in the vicinity of Itaituba carried out in 1979, in 1982 he travelled up to Jacareacanga from where he reached another 12 sites. Perota's expeditions aimed to test the forest refugia theory (e.g. Meggers 1977), but the work would not be subsequently continued. Perota (1982, p. 4), wrote that his team aroused suspicion, as local people often mistook them for gold prospectors, hampering their access to information related to site location.

Perota took the archaeological remains he retrieved during both of his Tapajós expeditions to his home city of Vitória, capital of the southeast state of Espírito Santo. Initially this material was kept by the Federal University of Espírito Santo, where Perota taught, alongside materials he collected for the National Program of Archaeological Research in the Amazon Basin (PRONAPABA) on the Xingu River, and other PRONAPA collections from Espírito Santo itself (Costa 2013, p. 12-13). Following his retirement, these collections – which represented a lifetime's work and materialised much of what was known of the archaeology of Espírito Santo – were discarded by university staff together with odontological rubbish in a disused sector of one of the Federal University's buildings, which was in a state of disrepair (Costa 2013, p. 30-32, see fig. 85).

With the help of Perota and state representatives, Valadares Costa undertook the Herculean task of rescuing this material, and separating out the Amazonian pottery and lithics from *capixaba*[105] archaeological remains. Henrique Valadares focussed on organising the considerable collections from Espírito Santo. The material, including that from the Amazon, would eventually be stored in the Heritage Agency's (IPHAN) building (Costa 2013).

I was particularly interested in the collections from the vicinity of Jacareacanga and the upper tributaries of the Tapajós; I wanted to see if they bore any resemblance to Mangabal ceramics. In January 2016 Vinicius Honorato and I travelled to Vitória to access the material. At the IPHAN, Yuri Batalha and Bruno Barreto received us and made available Perota's reports and a microscope for us to analyse the pottery. Henrique Valadares explained about the organisation of the collection and Perota himself came to see us, providing us with some additional contextual information for these collections.

Perota explained how the team came across significant difficulties because this was then a militarised area – Brazil was still under dictatorship, and Jacareacanga was an air force base connected to the nearby Serra do Cachimbo military zone.[106] It was interesting to realise that, thirty years on, some of the difficulties encountered by Perota's expedition – particularly regarding reaching the sites – were encountered by our team also.

We spent the best part of our ten days at the Superintendancy of the IPHAN separating the Tapajós material from that of the Xingu River and then trying to organise it. The great majority of the upper Tapajós material was not numbered and therefore, was not identifiable; the only pottery we could locate in relation to Perota's 1982 expedition was a small bag from a site on the lower Juruena River, called Maloca dos Índios. In the few days left I opted for analysing representative samples of the pottery collected by Perota from the environs of Sawre Muybu, from sites called Itapacurá I and Itapacurá II, while

[105] This means 'from Espírito Santo'.
[106] A planned expedition by the French explorer Jacques Cousteau (which was not apparently fulfilled), had also led to the military barring access to certain areas (C. Perota, pers. comm., January 2016).

Vinicius Honorato illustrated rims and photographed diagnostic sherds. The choice was fortunate because when Perota later furnished me with the dates obtained for his samples, Itapacurá I and II were among the dated sites.

Fig. 85 Federal University of Espírito Santo building, and room (entrance and interior) where archaeological collections were abandoned alongside discarded odontological material. Photos: Carol Abreu. Courtesy of Henrique Valadares Costa.

5.6 Closing remarks and next steps

In this chapter, we have proposed that the TPM site may be a forest island, generated by a single (unicomponent) pre-Columbian occupation of some 200 years. It appears that the extensive patch of ADE can be categorised as a centre-type ADE, probably resulting from shifts in house location and activity areas over time. The impressive quantity of archaeological remains – including soils, lithics, pottery, carbonised seeds and charcoal and faunal vestiges point to an intensive occupation, which permanently altered the vegetation and topography of the area. The site's stratigraphy and array of dates suggest we are likely to find a single ceramic complex.

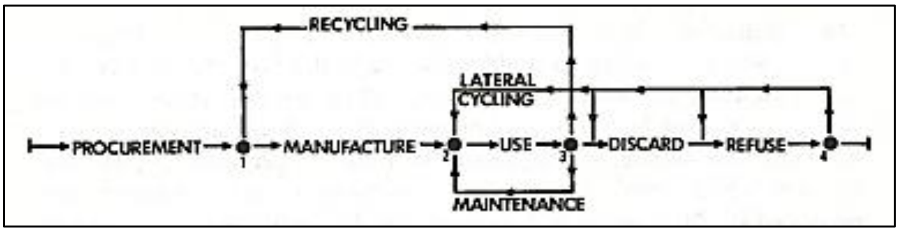
The SM site covers a smaller area than Mangabal but may have been occupied for a longer period of time (~230 years). The stratigraphy of the site is complex, being permeated by a number of features, which were only identified once their contrast with the surrounding A horizon latosol became evident. Again, the use of specific areas changed over time, leading to the 'smearing' effect. Considerable ceramic variability is present, which will be examined in chapter 7. Is this the result of change over time within the same ceramic complex, or are we looking at distinct occupations?

To test these initial impressions, the analyses of the ceramics from these sites will be undertaken and revealed in chapter 7 and supported by detailed modal analysis data. Following a comparison between the ceramics from both these sites, the pottery analysed from the PRONAPABA collections studied in Vitória will be described and compared to our original data, as well as to assemblages and collections from the wider region. But first, we will discuss the methodology implemented in the analysis and classification of the pre-Columbian ceramics.

Chapter 6. Methods of ceramic analysis

Ceramics are a privileged medium for contemplating a number of issues at different scales. Pottery is vital to food preparation, to the enactment of ritual and it acts as a support for graphic art – expressing principles that may be fundamental to the community's worldview; studying pottery further allows us to ponder processes of learning and transmission, or technological traditions and creative individuality (Silva 2000, p. 55-56). In other words, "…pottery vessels hug the social jugular" and "Whatever entities they are tracking, they are not of the transitory kind" (DeBoer 2011, p. 78).[107] Interpretations based on the results of ceramic analysis and classification often provide us with a baseline from which to associate other remains, and from which we can build further questions to study.

The analytical steps undertaken by this project were ordered in such a way as to follow the ceramic production sequence and the life cycle of pottery through the "cultural system" (following DeBoer and Lathrap 1979, p. 104) as closely as was possible, beginning with the technological choices of the potters – reflected in the characteristics of the fabrics –, followed by analyses of form and decoration. Form is a privileged medium through which to infer the function of pottery vessels; decoration can also give us insights in this direction, as well as furnishing us with elements to consider issues related to art and identity. Use-wear marks and signs of post-depositional processes were also sought but seldom found. Revealed and as yet unknown steps pertaining to the *chaînes opératoires* of the ceramics studied are synthesized in table 5 below.



Reproduced from DeBoer & Lathrap (1979, p. 104).

Fig. 86 A flow chart for the passage of artifacts through a cultural system. Numbered nodes indicate points where storage (temporal displacement) or transport (spatial displacement) may take place.

[107] In an otherwise articulate and compelling piece of work that argues for the role of women captives in maintaining cultural stability, it is perplexing that DeBoer should choose the expression "flows of female flesh" (2011, p. 90) to mean the capture of women by Panoan men and their incorporation and input into Panoan societies. In the same chapter, in Figure 4.5 (p. 88), the author represents males with capital letters (PN) and females with small caps (pn). It is surprising that the volume's editors could overlook these choices of words and symbols.

Archaeological visibility of stages in the ceramic cycle

Stages	Components	Procedures for identification	Present/Absent or Not Found
PROCUREMENT	Temper sources	Geological survey; Petrographic analysis	A
	Clay sources	Survey of clay sources, petrographic analysis	A
	Pigment sources	Macroscopic inspection, microscopic analysis	A
	Resin sources	Invisible? Inferred from botanical survey.	A
	Fuel sources	Anthracological analysis of charcoal related to ceramic production context	A
	Raw materials for tools	Inferred: waterworn pebbles in context. Bone, seed, wood tools probably decomposed	NF
	Related social practices	Invisible archaeologically? Inferred from ethnographic contexts, historical documents	NF
MANUFACTURE	Temper types & recipes	Physical feel; microscopic analysis	P
		Petrographic analysis	A
	Vessel forming	Evidence of coiling, leaf marks on bases	P
	Surface finish	Macroscopic inspection	P
	Tools	Inferred from materials (e.g. waterworn pebbles) or marks left by techniques on sherds	P
	Firing	Macroscopic inspection of sherd break	P
	Colour of the paste	Macroscopic inspection	P
	Related social practices	Invisible archaeologically? Inferred from ethnographic contexts, historical documents	P
USE	Cooking	Form; Presence of soot on exterior sherd face	P
		Marks from scraping cooking implement	NF
		Pollen & starch grain analysis	A
	Serving	Inferred from vessel form, decoration	P
		Phytholith & starch grain analyses	A
	Storage	Form	P
	Transport	Form	P
	Learning	Miniatures; lesser ability in forming/decoration	P
	Ritual	Inferred from vessel form, decoration	P
		Phytolith analysis	A
	Related social practices	Inferred to an extent from form and decoration. Ethnographic contexts or historical documents	P P
MAINTENANCE & RECYCLING	Repair of cracks	Perforation on wall, resin	NF
	Lateral cycling of sherds	Microscopic analysis: grog temper	P
		Archaeological contexts: sherds as lids Ethnographic observation of use as supports[2]	P
	Lateral cycling of tools	Inferred; ethnographic contexts or historical documents	NF
	Related social practices	Ethnographic contexts or historical documents	NF
DISCARD & REFUSE	Mound construction	Use of sherds as construction material	P
	Deposition into pits	Features	P
	Related social practices	Marks of intentional breakage	NF
		Ethnographic contexts or historical documents	P

Table 5 Archaeological visibility of stages in the ceramic cycle and their presence or absence in this study. A = Absent from the analytical procedures undertaken by this project. Present = Present among procedures undertaken by this project. NF = Signs of the components of the stages could have been present, and were investigated, however they were not found.

Table 5 outlines the stages and potential components that make up the ceramic *chaîne opératoire*, and how they can either be detected archaeologically, inferred indirectly, or considered through analogies. The latter refers especially to social practices that are related to each of these stages. As can be noted, data related to procurement is not yet available: petrographic research will have to be undertaken in future, involving a survey of potential clay sources and a study of ceramic thin sections from the area. Information on ancient social practices is more elusive, however ethnographic information and ethnoarchaeological studies can provide useful analogies.

6.1 Classificatory approaches to ceramic analysis in Amazonia

As a result of the legacy of far flung and pioneering investigations conducted from the 1960s by the National Program of Archaeological Research in the Amazon Basin – PRONAPABA, taxonomic approaches to ceramic classification have prevailed in the region. Rouse (1967, p. 157) has defined seriation as "...the procedure of working out a chronology by arranging local remains of the same cultural tradition in the order which produces the most consistent patterning of cultural traits". Applying methods in frequency seriation developed by James Ford (1962), Betty Meggers, Clifford Evans, Mário Simões, Peter Hilbert and others within the PRONABAPA structured local chronologies through the creation of ceramic typologies and phases, which in turn were connected with geographically wider and chronologically deeper ceramic traditions (Meggers & Evans 1961). By offering chronological frameworks, these ceramic typologies laid the groundwork for present archaeological research in many parts of Amazonia – the Tapajós included (Gomes 2005; 2008; Martins 2012; Rocha 2012). Even so, in spite of their popularity, these approaches – and in particular, the theoretical assumptions behind them, which were influenced by degenerationist theories (Noelli & Ferreira 2007) that presented Amazonia as a *counterfeit paradise* (Meggers 1971) – have been strongly contested (e.g. Heckenberger *et al.* 2003; Schaan 2004). Debates surrounding the analysis, classification and resulting interpretations of archaeological ceramics accordingly remain a central concern of Amazonian archaeology (e.g. Barreto, Lima & Betancourt 2016; Neves 2010; Schaan 2007; Silva 2016).

Another school of classification known as analytic classification, or modal analysis, was initially developed by Irving Rouse (1939; 1960) and applied by Donald Lathrap (1962) and students to Amazonian contexts in Peru, Ecuador and Venezuela (e.g. DeBoer 2003; Oliver 1989; Scott Raymond, DeBoer & Roe 1975). Modal analysis diverges from taxonomic classification in terms of its aims, but only in part of its procedures.

Rouse has offered different definitions for the concept of mode. A mode can be "…any standard, concept or custom which governs the behaviour of the artisans of a *community*, which they hand down from generation to generation, and which may spread from community to community over considerable distances (Rouse 1939)" (Rouse 1960, p. 313, my italics). This refers to a conceptual framework that guides the artisans, which is shared and transmitted from generation to generation (vertically), and between communities (horizontally) (Read 2007, p. 50). This shared conceptual framework can relate to 1) the artefacts themselves, or 2) to how these artefacts were supposed to be made or used (Read 2007, p. 49; Rouse 1960, p. 313).[108] Modal analysis has often been compared to linguistic analysis, where words are broken down into phonemes, which are used as basic classificatory units, and which can be transferred from one word to the other (Rouse interviewed by Siegel 1996, p. 675). Phonemes can only be determined for specific speech communities at particular times in their history, rather than for language generally (Lathrap 1962, p. 218). In a similar way, modal analysis must emerge from the artefacts produced by communities that were synchronically and diachronically circumscribed in time and space.

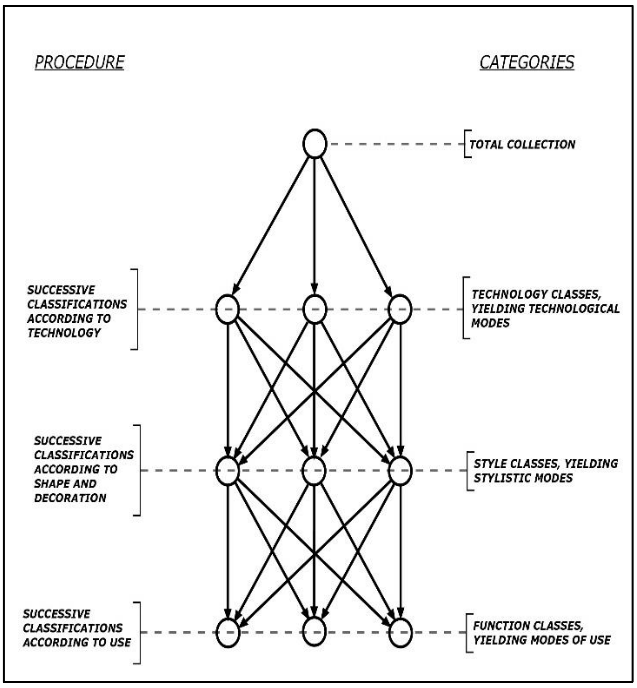
The aim of analytic classification is to discover the cultural norms or standards present among the community of makers and users of the material being studied (Rouse 1960, p. 313-314); it is preoccupied with emic perspectives (Pike 1967 cited in Read 2007, p. 73). The initial goal of modal analysis is to uncover independent modes (Rouse 1960, p. 314). This is achieved by studying the variability present in the various <u>dimensions</u> present within the material (Lathrap 1962, p. 225). Spaulding defines a dimension as "an aspect or property of the subject matter which requires its own special measuring

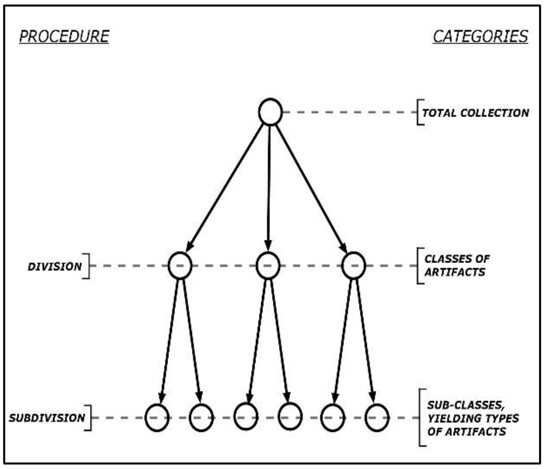
[108] In a third definition, Rouse (1967) proposed that a mode "...consists of a series of attributes which recur on the corresponding features of a number of artifacts" (1967, p. 168). Because Rouse has elsewhere (1960) given a more precise definition to the concept of attribute, for the purposes of this discussion, we will disregard this third definition inasmuch as it refers to "a series of attributes", since this idea is better expressed by propositions concerning modal combinations, which will be discussed further ahead.

device" (1960, p. 438).[109] Within a dimension, one or more modes can occur – this will depend on whether the makers of the ceramics always followed the same procedure, or used the same raw material - or whether there was more than one alternative available to them (the point being such alternatives are culturally determined).

The enumeration of modes and an assessment of how these modes behave in time and space and how are they articulated are essential steps in the definition of a ceramic complex. A ceramic complex is "the ceramic debris of a particular face to face community" and is "defined by a finite number of modes" (Lathrap 1962, pp. 214, 223). As a ceramic complex changes through time, it can show continuous and discontinuous variation. Discontinuous variation includes: 1) the addition of new modes or dropping of old ones; 2) adding or dropping whole dimensions; 3) adding or dropping modal combinations. Continuous variation happens when: 1) the number of modal combinations remains constant, while the popularity of particular modal combinations varies; 2) the number of modes remains constant, while the popularity of particular combinations may vary (Lathrap 1962, p. 244-245). We have chosen to use the concept of 'complex' because it is based on a complex of modes rather than on Fordian types from which phases are defined. A ceramic complex may also contain different wares. The concept of ware explained by Read (2007, p. 103) is similar to our usage: it involves transformation in the properties of the clay and transformation in the surface of the clay (Ibid., p. 99-100). We have defined wares based on the production sequences, or *chaînes opératoires*, of the pottery analysed. Besides being composed of distinct *chaînes opératoires*, we found some vessel forms (i.e., body and rim form) to be unique to specific groups. Moreover, certain decorative elements (which may have modal value) are only found in association with each ware.

[109] See the following section for a more detailed discussion on dimensions.





Diagrammatic representations of procedures undertaken by analytic and taxonomic classifications Fig. 87. Example of the analytic approach to classification. Fig. 88 Example of the taxonomic approach to classification. Adapted from Rouse 1960 (figs. 2 & 3, p. 315-316) by V.F. Paciornik.

Taxonomic and analytic approaches are not mutually exclusive (Rouse 1960, p. 321) and as Read has argued, the underlying methodology for creating types and typologies is very similar (2007, p. 73). Types can be generated either by including all the distinctive attributes of their artefacts, making this a sensitive tool for charting change (Rouse 1967, p. 171), or they can be created through the classifier's selection of two or more attributes (which may or may not be modes, as defined above). Particularly regarding the latter case, types will be etic constructs "imposed on the collection" (Pike 1967 cited in Read 2007, p. 73; Rouse 1960, p. 317). This premise represents a central point of contrast between analytic and taxonomic classifications: the same collection can generate different types depending on the attributes or modes <u>elected as relevant by the classifier</u> (Rouse 1960, p. 317-318; for a recent example of this, see Moraes 2013).

Barreto illustrates how typologies based initially on temper selection – a path often chosen by Meggers, Evans and fellow researchers during taxonomic analysis – would lead different sections of a single funerary urn from the Marajoara phase to be classed as belonging to three different types – the Anajás white incised, the Arari red excised and the Joanes painted (2016, p. 120, fig. 2). La Salvia & Brochado (1989) point out that taxonomic procedures initially separated on the basis of temper differentiation can lead the same vessel form to be attributed to different classes.

Despite these issues, typologies based on seriation techniques continue to be a powerful tool in the construction of chronologies, providing the basis for wider, regional comparisons (e.g. Almeida 2013; Lima 2008), while modes are better suited to reconstructing the rules underlying ceramic grammars. In sum, different approaches serve different objectives; the choice of one over the other can also be influenced by the desire to engage with previous work in a particular area, or by the nature of the material to be studied. As we have seen, these approaches can in fact be complementary.

6.2 Analytical choices of this project

This project has applied methods of modal analysis to the pottery from the Sawre Muybu and Terra Preta do Mangabal sites. This is partly motivated by the fact that modal analysis allows for a greater emphasis to be given to the identification of the different steps in the process of ceramic production without necessarily favouring any one dimension (such as temper). As ethnoarchaeological research in ceramics has demonstrated, an enormous gamut of factors influence the technological and stylistic choices made by potters (e.g. Rostain 2016; Silva 2016). La Salvia & Brochado (1989) point out that Guarani potters conceive of their vessels as a piling up of zones or horizontal segments that are clearly demarcated. With a greater amount of available material, the construction of types based on repeated modal combinations would have been feasible – and desirable. As will be seen, however, this would be a precocious move, and would likely lead to early revisions of the types proposed as more, varied material is unearthed from the area over the coming years.

The aims pursued through the analyses undertaken here are 1) to chart the presence and distributions of individual modes within the investigated sites; 2) to identify modal combinations occurring within the investigated sites; 3) to propose potential modal combinations that have not been demonstrated by the evidence, but which could, in future, be found; 4) to compare the results of 1) and 2) with ceramic materials from the surrounding areas. This comparison will enable us to follow an important objective of the project: an assessment of the persistence or discontinuity of technological and formal or decorative elements and configurations within the region (see Phillips & Willey 1953, p. 628), allowing us to better understand segments of wider ceramic traditions that operated within the area (Haury *et al.* 1956). The fulfilment of these aims and objective should allow us to infer technological and stylistic choices of the people who made and used the pottery studied, and how these modal systems changed over time, as well as to contemplate the transmission of knowledge and practices related to pottery production, and the networks of social interaction inherent in this.

Rouse did not clarify what objective method could be employed to distinguish how culturally salient attributes can be identified (Read 2007, p. 52). Read suggests applying simple statistical concepts, based on the idea that a mode is an attribute that materialises a community-wide consensus (2007, p. 52). Once culturally meaningful modes and dimensions have been listed, combinations of modes that are seen to occur and theoretically possible combinations can be enumerated, and the ceramic complex can begin to be defined (Lathrap 1962, p. 231).

We have endeavoured to achieve this by tabulating the data in order to observe the quantities and distributions of attributes, evaluating whether these can be considered modes, and later by applying multiple correspondence analysis to verify whether the recurrence of attribute combinations noted during the analysis have validity, and whether other patterns emerge (see Appendix 14). The listing of actual and potential modes and modal combinations should enable the construction of a flexible working framework for subsequent research in the area as its archaeology becomes better understood.

Multiple correspondence analysis (MCA) can be useful for understanding relationships between variables describing sherd characteristics. This is an exploratory multivariate technique that summarises data through a graphical representation of relationships between variables, using the frequency distribution of categories from different variables. Whereas for two variables this distribution can be described in a two-way frequency table, a Burt table is used for frequency distributions of categories from three or more variables. The plots created through multiple correspondence analysis are based on mathematical properties of Burt tables (for details, see Greenacre 2007).

A MCA of the sherd data was developed using the free softwares Past (Hammer *et al*. 2001) and R (R Core Team 2016). One of the outputs of the MCA is a scatterplot where the points represent variable categories. Proximity of the points in the scatterplot represents association between categories of different variables or categories of the same variable. The axes only act as a frame for comparative reference for the points, and the plot origin represents an average sherd profile (with respect to the frequency of the variable categories). The graphs produced were usually able to explain between 10-20 per cent of the variability inherent in the sample, they show relevant associations between different sherd attributes. The plots produced are presented in Appendix 14.

Clearly, some modes related to the behaviour of potters will not be visible or identifiable on the potsherds (Lathrap 1962, p. 230-231). For instance, among contemporary Paiter-Suruí (who live in the Brazilian state of Rondônia), pottery production is an exclusively female activity (the Suruí word for clay is *ganiak*). An important taboo refers to pregnant women, who are supposed to be kept ignorant of clay procurement expeditions, because this could lead to malformation of the vessels and to spalling during the firing process (Vidal 2011, p. 43).

6.3 Dimensions of variability studied

The dimensions of variability studied for the ceramics from both sites are listed below. Spaulding (1960, p. 439) writes that dimensions can be thought of as discrete "attribute systems", such as colour, chemical composition, weight, etc. His definition of attributes – as "minimal units of meaningful behaviour" (Spaulding 1960, p. 443) parallels Rouse's definition of modes. However, Rouse's proposition is more refined because while it allows for the researcher to distinguish any number of attributes, modes refer only to those attributes that were relevant, or had cultural salience (i.e., were 'meaningful'), for the makers and users of the material (Read 2007, p. 73). A design element seen on one pottery sherd among thousands would not necessarily represent a mode, since it could express an individual choice of a singular potter, rather than a standard held in common by the community. Equally, signs of natural, post-depositional processes are not modes, because they are not the product of cultural choices. Both of these, however, constitute attributes. Modes, on the other hand, express the behavioural and conceptual relationships between the community of artisans and the artefacts they made and used (Read 2007, p. 73).

Following Spaulding (1960), attributes (i.e., modes) within each dimension can be thought of as qualitative or quantitative, depending on how they are measured. While quantitative attributes vary continuously and can be measured by ordinary scaling devices divided into equal units, qualitative attributes are considered as discreet properties of artefacts, and as such are simply measured in terms of their presence or absence (1960, p. 440-441). An example of a quantitative attribute would be the measurement of a vessel rim diameter, while an example of a qualitative attribute would be temper. Attributes are articulated to form the artefact, and recognised attributes serve as linking constants that enable us to study the interrelationships of artefacts: "they are the units whose presences and absences constitute similarity or difference" (1960, p. 442).

Lathrap writes that, from the point of view of the potter working within a specific cultural framework, modes represent degrees of freedom or culturally approved alternatives (1962, p. 227). From the point of view of the archaeologist, modes are clusters of data along a particular dimension involved in a ceramic analysis (Lathrap 1962, p. 226). Lathrap proposes that by studying the variability within the different dimensions, it should be possible to see whether the range of variability is continuous or discontinuous (1962, p. 225). A continuous range that encompassed only a portion of the potentially available variability would suggest that the makers of the pottery studied only recognised one alternative as a possibility, whereas a discontinuous range of variation, with two or more clusters of data would point to there being more than one cultural norm controlling the variability in that dimension. Meanwhile, a continuous range taking in all of the available variability would suggest that the dimension had no cultural significance (1962, p. 226).

Before engaging in the analysis and presenting its results, I will succinctly define the technological, formal, surface treatment and decorative dimensions studied among the

Upper Tapajós pottery. I will also briefly introduce the procedures used for the classification of vessel forms. The format used to describe the different dimensions is an adaptation from that used by Lathrap (1962, p. 249-254) and Scott Raymond, DeBoer and Roe (1975, p. 6-7).

6.3.1 Technology

i. **Temper:** In line with an exercise proposed by Moraes (2013, chapters 7 and 9), during microscopic analysis tempering materials were ranked into dominant, secondary and third order categories. The reasoning behind doing this is that, besides the fact that most pottery contains more than one type of inclusion, it may be possible to find recurrent combinations of temper recipes, which in turn may or may not relate to different forms and/or functions (c.f. Moraes 2006, p. 178). The ranked categories were determined by observing relative quantities of the different non-plastics through the microscope. The overarching dimension of temper was divided into three sub-dimensions. Excepting cases where the processes involved in preparation preclude the natural presence of certain inclusions, to determine which inclusions were added intentionally and which were naturally present in the clay can be a misleading exercise. Ethnographic examples have demonstrated that clay selection may already factor in the presence of certain inclusions (Moraes 2013, p. 126; Silva 2000, p. 59). *See section below on the tempers present among the pottery of both sites.*
    - **a.** This sub-dimension embraces variations in the primary (or dominant) temper.
    - **b.** This sub-dimension includes variations in secondary tempers.
    - **c.** This sub-dimension includes variations in third-order tempers.

ii. **Firing:** This dimension encompasses the variation observed from the firing practices of the makers of the pottery studied. Three alternatives have been determined: oxidised firings, reduced firings and partially oxidised (also known as incomplete) firings.

iii. **Colour of the paste:** The colours obtained post-firing were annotated in order to observe whether certain colours combined with other aspects of the pottery, such as temper, form or decoration.

Temper 'tantrums'

A brief description of the most commonly occurring types of temper, their origins and/or performance-related characteristics follows.

Mineral tempers

Quartz sand

Quartz sand is abundant in the area: the Tapajós is lined with beaches, particularly during the dry season when the river level drops, and it is present among the majority of the sherds studied. Shepard (1968 [1954], p. 161) states that "… quartz as a fine silt occurs in some clays, but coarse, waterworn sand does not become mixed with them in the processes of nature". The colour and opacity of the quartz sand can range from milky white to translucent brown, to almost transparent (hyaline quartz).

Initially I had separated the categories of 'quartz' and 'sand'.[110] The former would be distinguished by its more angular outline while the latter, assumed to be more weathered, would present a more rounded contour. However, over the course of the analysis I came across many specimens that lay somewhere in between these two extremes, being sub-angular or sub-rounded, and one sherd usually contained particles with more than one of these types of contour. I thus decided to merge these categories into one, called 'quartz sand', and revise my analysis up to that point. The presence of angular quartz particles – which Rye (1981, p. 37) suggests may indicate crushing actions by the potters – probably originate from the less weathered beach sand; it seems improbable that quartz would be procured from granite outcrops in the area, to then be heated and crushed in order to be included as non-plastics in ceramic production.

Shepard (1968 [1954], p. 19) and Rye (1981, p. 33) mention the fact that at 573°C – well within the temperature achievable by open firings – the first crystalline inversion of quartz occurs, which Rye (1981, p. 33) points out to be a disadvantage of the material because of resultant inclination to fracturing of the ceramic fabric. However, in a study of archaeological cooking pots in England, Woods (1986) finds that the coarseness of fabrics can be vital to guarantee that vessels survive the firing process. She further

[110] Here 'sand' refers not to particle size but to its assumed river origin; the size of quartz particles is within the same range.

contends: “If pots can survive firing, and open firing in particular, they will usually be able to withstand the heat involved in any subsequent cooking process” (Woods 1986, p. 169). Later research attributes greater relevance to the quantities of non-plastics and, secondly, to the shapes of rock and mineral inclusions. Rounded rather than angular ceramic forms can further help to reduce stresses generated by heating (Whitbread 2015, 28; Tite and Kilikoglou 2002, cited in Whitbread 2015, p. 28). Woods concludes that, rather than the thermal properties present in different types of temper, local geology and consequent immediate availability usually governed temper selection among the makers of the pottery she studied: “...sand is used... particularly on coastal and riverine sites” (1986, p. 165).

Woods (1986, p. 170) notes the usefulness of quartz sand as “opening material” in three moments of the ceramic production process. Firstly, it opens the clay body during drying, speeding and evening the process up – a most useful characteristic in damp or humid climates. Secondly, it opens the clay body during the early stages of firing, helping the removal of remaining water and impeding spalling or explosions. Finally, it reduces problems related to thermal shock. Whitbread (2015, p. 29) reminds us that strength – “the ability to withstand stress without fracture initiation” – and toughness – the capacity to sustain structural integrity “once a fracture has been initiated, as may occur with short-term stresses arising from thermal expansion and contraction” – are important qualities to be considered alongside heating effectiveness. Manipulating the structure of ceramic fabrics through the choice of raw materials and the use of low firing temperatures can help control these properties. Whitbread’s “damage zone model” holds that inclusions and voids create boundaries within fabrics that can dissipate the energy of cracks (2015, p. 29-30). Experimental work has shown how the quantity of non-plastics (approximately 20 per cent or more in the case of quartz) is crucial for engendering a network of microcrack damage zones throughout the vessel wall able to absorb the energy of a crack, increasing toughness at the expense of strength (Kilikoglou *et al*. 1998 cited in Whitbread 2015, p. 29-30). Thus the “development of microcrack damage zones explains why quartz could be so widely used in ancient cooking pots” (Whitbread 2015, p. 30). Whitbread’s own work in the Aegean shows preference for quartz-rich fabrics in parts of mainland Greece – in spite of the potential for acquisition of cooking ware made from other materials. This leads him to conclude: "These cooking pots reflect the engagement of people with materials properties and performance within wider social contexts of availability, priorities and expectations" (Whitbread 2015, p. 34).

Gold?[111]

The presence of gold in ceramic fabrics along the upper Tapajós would in fact be unsurprising, considering this is alleged to be the world's largest auriferous province. The town of Itaituba is otherwise known as *Cidade Pepita* ('Nugget Town') and dozens of thousands of wildcat goldminers are active along the Tapajós basin[112] extracting gold from underneath the riverbed as well as from the environs of creeks and from ground sources in inland areas. These types of locales are near to potential clay sources, making it possible that gold could occur as a natural inclusion. This temper has a brilliant aspect to it, being visible macroscopically on some of the ceramic fragments. Perhaps the clay was intentionally selected, then, for this aesthetic trait. Chemical analysis of these samples was supposed to have taken place however problems with the laboratory's equipment have suspended the process.

***Cauixí*: sponge-spicule temper**

Throughout the Holocene, the neotropics have been the most abundant region in the world for freshwater sponges known as *cauixí* (Volkmer-Ribeiro & Viana 2009, p. 311).[113] These faunas' preferred habitats are acidic, blackwater lakes, however communities of sponges can also be found in the rocky substrate of riverbeds (2009, p. 312-313). Spicules made from siliceous oxides sustain the skeletons of these sponges; these mineral elements resist decomposition following the death of the living parts of the sponge. Volkmer-Ribeiro and Viana (2006, p. 313) state that it is to be considered as a mineral temper of zooarchaeological interest (2006, p. 313). The *Drulia browni* is among the most commonly used sponge species and takes between ten and fifteen years to reach a diameter of 10cm (Volkmer-Ribeiro & Viana 2006, p. 313).

[111] This possibility was first pointed out by Márcio Amaral after observing some sherds from SM.
[112] In 2012 this number was estimated at some 60 thousand men (Borges 2012).
[113] In Tupi-Guarani, *cauí* means 'itch' and *cy*, 'mother': *cauixí* therefore means 'the mother of the itch' (see Volkmer-Ribeiro & Viana 2006, p. 311).

When oriented in the same direction, *cauixí* can improve toughness against fractures by impeding the propagation of cracks (Natalio *et al.* 2015, p. 6), but random orientation of spicules does not contribute noticeably to increasing toughness. Volkmer-Ribeiro and Viana (2006, p. 313) further observe that *cauixí* confers lightness to vessels.

Fig. 89 Cauixí growing on a tree near the Igarapé do Bala, an eastern tributary of the Iriri River, Xingu basin. Photo: William Balée.

Organic tempers

<u>*Caraipé*[114] and *caraipé* "B" vegetable tempers</u>

Temper made from ash obtained from the siliceous bark of trees from the genus *Licania*, commonly known as *caraipé* also occurs among the ceramics from both sites; it has a woody aspect. Irmhild Wüst, the archaeologist to devote most attention to *caraipé*, states that the Karajá Indians of the Araguaia and Javaés river basins extract *caraipé* from the bark of the *Physocalymma scaberrimum* (1975, p. 156, cited in Viana *et al.*

[114] Until recently, Meggers' and Evans' misspelling of the term as '*cariapé*' (an error inaugurated in 1957) has been reproduced by Amazonian archaeologists (Carneiro 2009).

2011, p. 38). *Caraipé* increases ceramic porosity, contributing towards greater toughness. It also decreases heat conductivity (Rebellato 2007, p. 95), which may be an advantage for wares designed to remain directly over fires. Because of the process involved in the preparation of this temper, it can only be considered an intentional inclusion.

Milky white and shiny (Wüst 1990, cited in Moraes 2013, p. 127), observed under a microscope *caraipé B* has a similar appearance to *cauixí* spicules (Barreto *et al.* 2016, p. 556) and results from burning and processing other species altogether – however, there is still uncertainty as to what species this would be. Recent anthracological work points to the likelihood of *caraipé "*B" in fact being the sclereid of a palm species (C. Caromano, pers. comm., 04 August 2016). When used in temper, both types of *caraipé* produce lighter wares, which would be an advantage for larger artefacts. Based on empirical observation of the materials analysed, our working assumption is that these tempers were used interchangeably.

Argillaceous inclusions

Grog: crushed sherd temper

Crushed sherd or grog temper is widely documented within Amazonian ceramics. Having already been fired and being, therefore, dehydrated, grog plays an important role in the drying and firing process (Barreto *et al.* 2016, p. 555). DeBoer and Lathrap (1979) suggest that, in the Peruvian Amazon, access to archaeological sherds (and therefore to grog for use as a non-plastic) is one of the factors considered by the Shipibo-Conibo Indians when deciding upon a place to settle. Crushed sherd temper is relatively common within Santarém pottery.

Clay pellets

Inclusions resembling *tabatinga* clay will be tentatively described here as *clay pellets*, following Whitbread's (1986) definitions of argillaceous inclusions: "*'Clay pellets'* are inclusions which may conceivably have been formed within a depositional environment of the clay and are distinguishable through differences in their fabrics compared to the enclosing matrix", occurring naturally within clays (Whitbread 1986, p. 83). Whether our material can in fact fit this categorisation can only be really ascertained once petrographic investigations are developed in the area, which will involve the collection of samples from potential archaeological clay sources and ceramic thin section analysis. The clay pellets that can be observed among the pottery analysed are white, rounded and soft.

***Saibro*: argillaceous rock fragments?**

A temper known as *saibro* in Portuguese is possibly equivalent to Whitbread's (1986) Argillaceous Rock Fragments (ARF). *Saibro* is often found in the paste of archaeological ceramics along the Tapajós and is the result of weathering. Whitbread writes that "*Argillaceous rock fragments* are derived from detrital sediments composed of clay, mud and silt which have been lithified (Folk 1974, Potter *et al.* 1980). They have sharp to clear boundaries and a high degree of angularity, especially if they have suffered little transportation" (Whitbread 1986, p. 82). Although Rye (1981) proposes angular particles to generally be an indication of crushing actions (and consequently, intentional addition by the potter), Whitbread points out that "abraded, and thus rounded, ARFs could have been added to the clay as temper and angular fragments often predominate in soils and sediments" (1986, p. 82). Further work will be necessary to verify whether *saibro* and ARFs have similar origins.

6.3.2 Form

On the importance of studying the morphology of ceramic vessels, Lathrap writes that:

> There is considerable ethnographic evidence that… categories of vessel form have a considerable cultural reality. Where studies are available, it is usually these form categories which are found to be individually named. Basically such form categories seem to represent groups of vessels specialized for particular functions
> (Lathrap 1962, p. 236).

iv. **Vessel forming techniques:** This dimension includes variations in the way in which the vessels were constructed.

v. **Vessel wall thickness:** This covers the variation in thickness of vessel walls. Thickness was measured in places deemed average.

vi. **Vessel form** This over-arching dimension involves variation in the horizontal cross section and vertical profiles of the different vessel portions listed below:

a. **Horizontal cross section:** This dimension includes variation in the horizontal cross section through the side walls of the different vessel forms.
b. **Base form:** This embraces the variations in the profile of the form of the vessel base.
c. **Vessel body form:** This encompasses variations in the contour of the vessel body, without including base or rim.
d. **Neck modification:** This is related to the variations in the shape of the neck in vertical cross section**.**
e. **Rim modification:** This dimension encompasses the variability of rims, defined as the vessel wall just below the lip.
f. **Lip Form:** This dimension includes variations in the shape of the uppermost (and outermost if the vessel is unrestricted) part of the vessel mouth.

vii. Appendages: This broad dimension is divided into the following sub-dimensions:

1. Vessel supports: Solid cylindrical forms provide support for vessel bases.
2. Protuberances: Created by adding clay to external vessel surfaces, these can vary in terms of shape and dimension. Protuberances may have a function similar to handles, helping to clasp the vessel.
3. Handles: Coils of clay fastened to the vessel body and neck, serving to hold the vessel.
4. Adornos: Plastic modifications, involving modelling and appliqué, present on body walls.
5. Labial extensions: These provide a platform for the application of decorative elements.

Other clay artefacts:

<u>Fire dogs</u>: Amorphous forms of varying size (up to the size of a small lime) were often encountered in association with griddle fragments. They may have been part of hearth structures.

<u>Ovens:</u> Clay could also have been employed in the construction of ovens (see Chapter 4, figs. 10 and 12); Yolanda and Robert Murphy (1985 [1974]) make reference to these structures in their account of Munduruku life, however we did not encounter conclusive archaeological evidence of this.

Construction: It is possible clay was used to build houses, in wattle and daub structures, however we did not identify remains that could be associated with this. Nowadays the Munduruku at Sawre Muybu can choose to line the floors of their houses with the orange-coloured latosol, which they dig from beneath the ADE layer.

Vessel forming techniques

Occasional evidence from the sample studied and the fact that ancient and present-day traditional Amazonian ceramics are built by coiling or a combination of coiling and drawing and pinching techniques allow for the assumption that coiling was the predominant technique of vessel construction.

Coiling involves the superposition of clay ropes, rolls or fillets in order to build a vessel circumference, gradually increasing its height (Rice 1987, p. 127). Rice (1987, p. 128) explains that fractures following the coil joins occur when the coil below dries too much before the application of the next coil, resulting in a weaker join; this join can be additionally debilitated during drying, firing and use. One of the advantages of coiling is that it allows for the utilisation of a less plastic clay than would be needed if the vessel were to be drawn out from a solid lump of clay, since the clay does not have to undergo so much stretching and pulling (Shepard 1968 [1954], p. 59).

Coil-built vessels are usually started with "a basal disc of clay formed by various punching and patting manipulations" (Shepard 1968 [1954], p. 57); different supports have been observed ethnographically to help turning while coils are added, such as a shallow piece of pottery, the exterior base of an inverted pot or a basket (1968 [1954], p. 57). Shepard also notes that the angle at which the coils are superimposed affects their bonding: coils placed vertically on top of one another will have considerably less contact (and thus less potential for bonding) than overlapped coils that form an oblique plane of juncture. This plane of juncture can be subject to more direct pressure than that which can be applied to coils superimposed vertically (Shepard 1968 [1954], p. 58). Rostain (1994 Tome II, fig. 132) presents different alternatives for coil junctures: convex/concave, straight, straight with flanges, bevelled and stepped. He also illustrates how nicking and grooving along the coils could have helped latch coils onto one another.

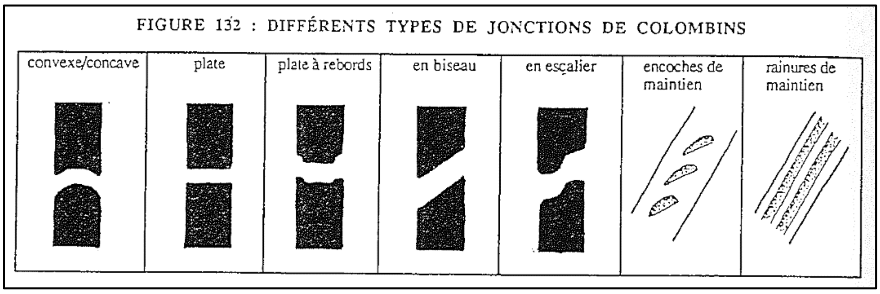


Fig. 90 "Différents types de jonctions de colombins" – 'Different types of coil junctures'.

Reproduced from Rostain (1994, Tome I, fig. 132).

Vessel shape classification

Terminology

In order to analyse vessel shape, Anna Shepard's (1968 [1954]) tried and tested recommendations have largely been followed; a brief summary of the relevant terminology she proposed will help equip the reader for the subsequent formal classification of ceramics. Using this terminology is also an advantage because it has been widely adopted in Brazilian Amazonia, which will facilitate communication and comparison of ceramics from other contexts in the region.

Shepard proposes analysing the general characteristics of <u>contour</u>, as well as comparing specific ceramic shapes with geometric figures. As defined by Birkhoff (1933 cited in Shepard 1968 [1954], p. 226), the "characteristic points" of a vessel profile consist of: 1) <u>end points</u> of the curve, which occur at the base and lip; 2) <u>points of vertical tangency</u>, which include the vessel's maximum diameter; 3) <u>corner points</u>, where there is an abrupt change in the tangent line's direction, leading to a sudden change in contour; and 4) <u>points of inflection</u>, which mark a division of the vessel, where its curvature changes from convex to concave, or vice versa (Shepard 1968 [1954], p. 226). Points of inflection are particularly prevalent in the ceramics analysed by this project.

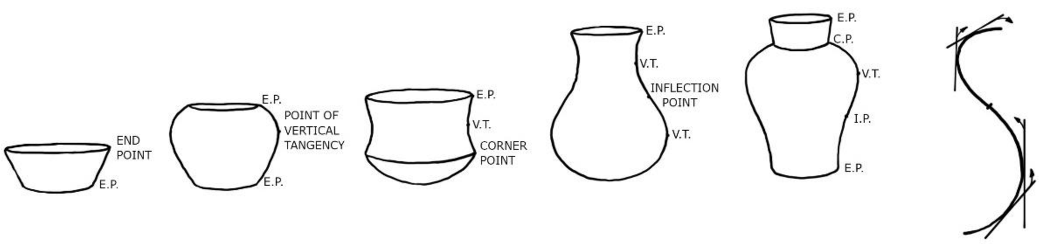


Fig. 91 "The characteristic points of a vessel profile". Fig. 92 (right) "The location of an inflection point". Adapted from Shepard (1968 [1954], figs. 18 and 19) by Vitor Flynn Paciornik.

Locating a vessel's characteristic points enables us to distinguish between different types of vessel contour, which vary in terms of complexity. The basic shape classes we have encountered can be associated with the following figures. In fig. 93, a) and b) only have end points; there is a single continuous line extending from the base to the rim and there is no point of vertical tangency. Meanwhile, c) and d) do have a point of vertical tangency. In fact, as a cylinder, d) has an infinite number of points of vertical tangency. The hemispherical c) has a point of vertical tangency at its point of maximum diameter (pointed out by a red arrow). A corner point, which is characterised by an angle in the contour, is to be seen in e) (also indicated by an arrow). Points of inflection, which lend the vessels their curved contours, are illustrated in f) and g) (Shepard 1968 [1954], p. 227, fig. 20).

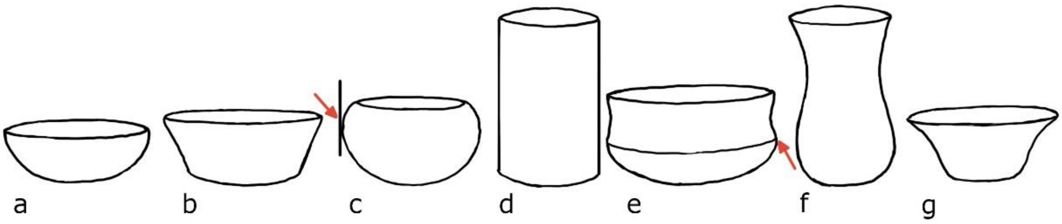


Fig. 93 "Shape classes defined by characteristic points". Adapted from Shepard (1968 [1954], fig. 20) by Vitor Flynn Paciornik.

Shepard goes on to divide vessels (that is, those that are basically symmetrical) into three broad categories, called *structural classes*. These are vessels with 1) unrestricted orifice; 2) restricted orifice and 3) neck. Such overall forms tend to relate to vessel function: unrestricted vessels are better adapted to having hands or implements inside them, or for display or drying of contents. In contrast, restricted vessels are more suited for the retention of contents or for their storage. Necks avert liquid spillage and assist pouring. The advantage of this system of categorisation is that general rather than specific functions may be inferred from it. It is well to remember that vessels can be put to uses to which their form does not best equip them; deducing specific functions from form can be problematic (Shepard 1968 [1954], p. 228).

The orifices (or mouths) of restricted vessels tend to have a smaller diameter than the vessel's maximum diameter. Unrestricted orifices, on the other hand, represent the vessel's maximum diameter. Independent restricted vessels contain a corner or inflection point above and distinct – or independent – from the diameter at the equator of the body (Shepard 1968 [1954], p. 228, 230).

In fig. 94, a) and b) show unrestricted vessels with a simple (i.e. uninterrupted) contour. Their mouths, or orifices, are marked by an end-point tangent that is either vertical (the case of b)) or slopes outwards (as happens with a)). The contour of these vessels do not display constrictions, marked by corner or inflection points. The simple and dependent restricted vessel, whose walls are converging, is represented by c) – its contour does not include a corner point or point of inflection. It is dependent because there is a coincidence between the diameter of the major point (the point of maximum diameter) and that of its corner point (Shepard 1968 [1954], p. 230).

With a corner point placed above the vessel's major point, we have an independent restricted form (d), e)). If, rather than a corner point (also known as a keel), a vessel has a point of inflection above its major point, we again have an independent restricted vessel (f)). An unrestricted, composite vessel occurs when the major and corner points meet (e)). A vertical or outsloping tangent at the inflection point also produces unrestricted forms (g) and h)). Although independent and restricted is a wider vessel category that includes necked vessels, the distinction between these categories can be appreciated by considering vessels whose corner point is so far out that it no longer presents the proportions normally associated to necks (i)). Thus, while independent restricted vessels are defined by the characteristics of contour, necked vessels are defined by proportions (Shepard 1968 [1954], p. 229-230).

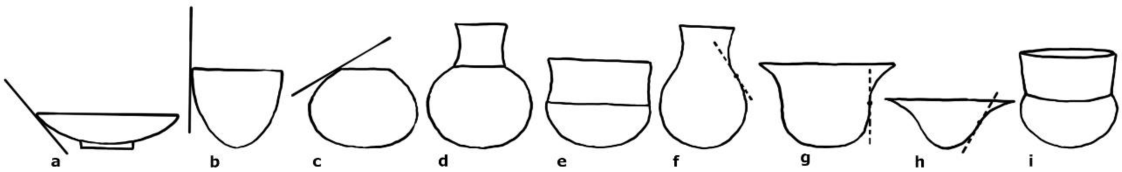


Fig. 94 "Three structural classes". Adapted from Shepard (1968 [1954], fig. 21) by Vitor Flynn Paciornik.

The aforementioned, broad structural classes – unrestricted, dependent and restricted and independent restricted – are further subdivided by observing their contour type.

Contours can be simple, composite, inflected or complex, and are determined by reference to the vessel's characteristic points (see fig. 95).

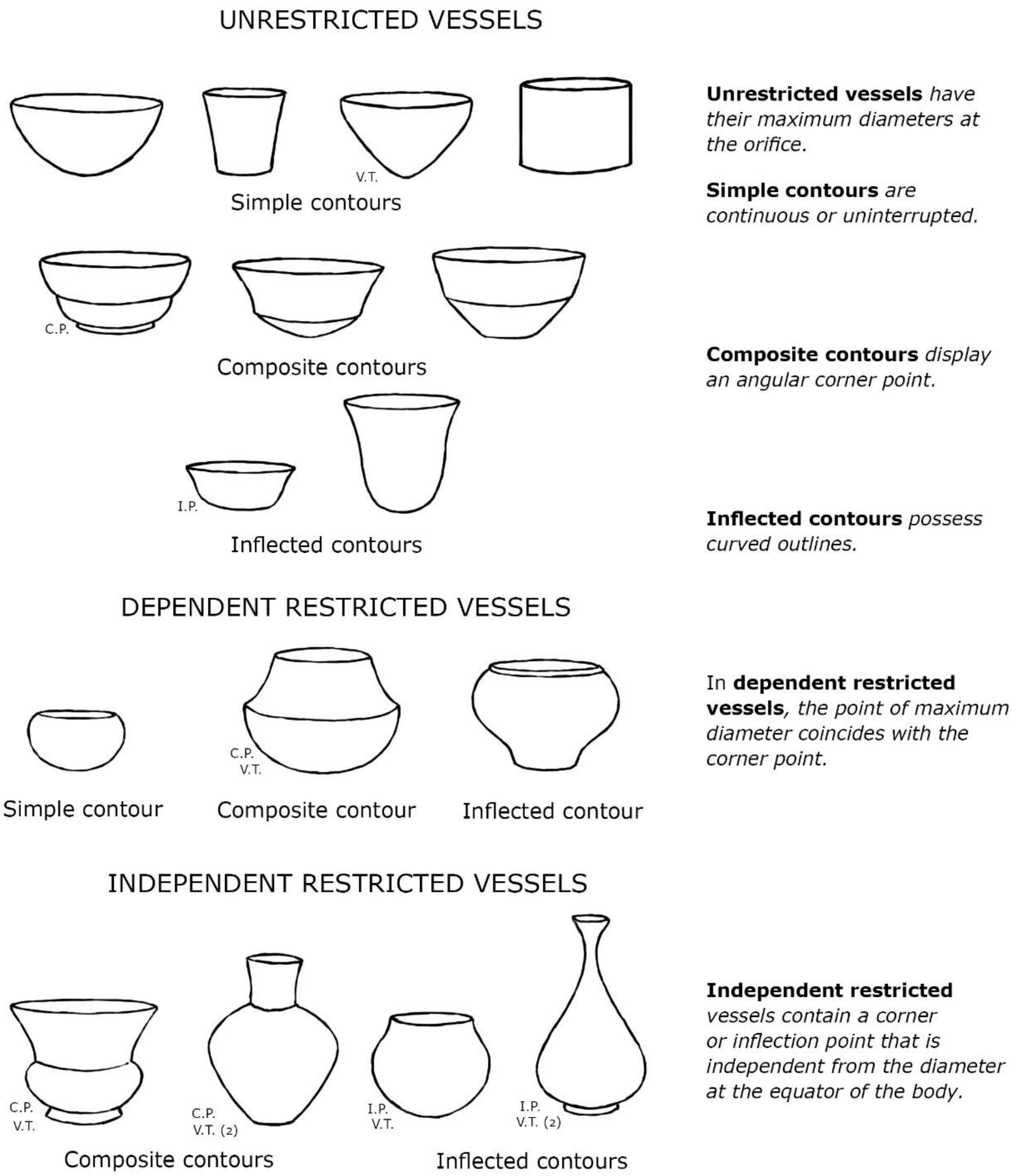


Fig. 95 "A general system of shape classification". Adapted from Shepard (1968 [1954], fig. 22) by Vitor Flynn Paciornik.

Simple contours are identified by continuous, unbroken lines, while composite contours include an angle. Inflected vessels present convex and concave sections combined by a smooth curve and are characterised by a point of inflection. Complex vessels, which have not been encountered among the ceramics studied and are therefore not illustrated here, have two or more corner or inflection points, or have both corner and inflection points. This system of classification only considers the vessel itself rather than including rims or base supports (Shepard 1968 [1954], p. 232).

Simple shapes are described with reference to geometric solids, such as hemispheres, cylinders and spheres. Because the term 'globular' has greater currency in the Brazilian Amazon, this term will be preferred over 'spherical'. Clearly, the synthetic properties of clay and the fact that the pottery was handmade mean these usually provide us with approximations, while the original pieces will rarely, if ever, be perfectly symmetrical or proportionate. Further, non-mathematical terms can also be applied – such as egg-shaped (or ovaloid), bell-shaped or drop-shaped, for example (Meyer 1945, cited in Shepard 1968 [1954], p. 233). Shepard cites a system amply used in American archaeology, where three solids (spheres, ellipses, and ovaloids) can be combined with three forms with open ends and undefined limits (known as surfaces): cylinders, cones and hyperboloids. Ovaloids are simply ellipses turned on their sides (Shepard 1968 [1954], p. 233).

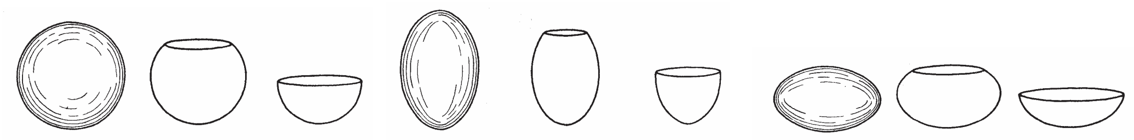


Fig. 96 Geometric solids as reference norms for vessel description: sphere, ellipsoid and ovaloid. Adapted from Shepard (1968 [1954], fig. 23).

Simple, restricted contours are shaped by terminating the solids above their equator, while unrestricted shapes are formed from equivalent solids end at or below their points of maximum diameters (Shepard 1968 [1954], p. 233). As Shepard explains, it is easier to identify these shapes with restricted surfaces. The shallower the unrestricted form, the harder it is to associate it to a particular form. Cylinders will always be unrestricted (Shepard 1968 [1954], p. 233-235).

Following the practice adopted by Lathrap and students, we will endeavour to come to a description not only of individual vessel forms but of sets of vessels (e.g. Brochado and Lathrap 1984), inasmuch as our data allows.

6.3.3 Surface treatment and decoration

The boundaries between finishing and enhancing surfaces can be blurred. Surface treatment has been placed here, in relation to the dimensions of decoration, yet it could also have been included within the technological dimensions of this analysis:

> We seem to take for granted that all analysts are referring to the same concepts… finishing, also known as "surface treatment", can be considered as either the final stage of production or the first stage of decoration. For example… Smoothing and applying a slip, the technical aspects of which are somewhat simpler than the resulting aesthetic effects, are not essential to the production of a vessel, but by masking surface irregularities, they enhance its appearance and accentuate its form. Alterations arranged in a regular order on the surface of an object also have a technical aspect, related to production, and an aesthetic aspect, associated with composition. The technical and aesthetic aspects, far from being mutually exclusive, are present throughout the various stages of production and decoration
> (Marois, Scatamacchia and Serrano 1994, p. 12).

viii. **Surface treatment:** The following sub-dimensions of surface treatment are present among the pottery analysed from both sites.

a. **Smoothing:** Smoothing aims to even out the ceramic surface while the clay is still plastic. It can involve using a pebble, cloth or even the palm itself; gourd-rinds are a further possibility reported ethnographically (Shepard 1968 [1954], p. 66).

b. **Self slip (barbotine):** Self slip or barbotine is a slip made from a similar (or the same) clay as is used to make the vessel and does not include temper (Barreto, Lima & Betancourt 2016, p. 555). It is made by uniformly mixing water and clay, forming a suspension that acts like a liquid (Rye 1981, p. 20) and can be applied by dipping the entire vessel in the suspension, by pouring the slip over the vessel or by wiping the suspension over the vessel body; application should occur while the vessel is sufficiently moist to minimise differential shrinkage (1981, p. 41). Self slip will make the vessel surface impermeable.

c. **Burnishing:** Burnishing is produced by rubbing a smooth, hard object back and forth, causing compaction and reorientation of clay particles and resulting in a surface lustre. Narrow, parallel and linear facets are an indication of the technique (Rice 1987, p. 138).

d. **Smudging:** Probably achieved by exposing the selected portion of the vessel to a smoky fire after firing, resulting in a glossy, black surface (Scott Raymond, DeBoer & Roe 1975, p. 7).
e. **Resin:** The distribution of vegetable resin to the surface of a vessel after firing, lending a shiny gloss to the vessel (Scott Raymond, DeBoer & Roe 1975, p. 7).

Decoration: For the aesthetic aspects of decoration to be analysed independently from the instruments, motions and techniques that produced them, it is useful to separate analysed attributes into what Marois (1984, cited in: Marois, Scatamacchia and Serrano 1994, p. 11) calls production elements and constituent elements, or what we call decorative techniques and design.

Decorative techniques: Decorative techniques were divided into four overarching dimensions: painted and slipped (chromatic), and plastic displacement and plastic additive (see Rice 1987, p. 144-152). These were then divided into sub-dimensions relating to specific techniques.

ix. **Decorative field:** This dimension focuses on the zones of the vessel surface where designs were applied. The location chosen may give indications relating to intended vessel function and are usually associated to vessel form.

x. **Chromatic decoration**

   a. **Slip:** See above description for processes related to self slip. Slip also contains pigment and is also applied before firing. It covers the whole vessel surface, or a substantial portion of it.
   b. **Paint:** This dimension involves variations in the application of mineral or vegetable pigments pre- or post-firing to restricted segments of vessels. The colour of the pigment varies. Paint is applied to restricted sections of the vessel surface.

xi. **Plastic decoration:**

   a. **Plastic displacement techniques:** These techniques involve removal or displacement of clay, usually when still moist or in a leather dry state (Rice 1987, p. 148). They include:

1. **Punctation:** This dimension involves variations in the pits punched into the vessel with rounded or rectilinear styluses.
2. **Impression:** Similar to punctation, this dimension includes variations in impressing the vessel with a distinctly shaped instrument.
3. **Excision:** This dimension covers variations in cuts to the vessel surface, leaving the remaining area in relief.
4. **Modelling:** This dimension encompasses a range of practices that modify the surface of the vessel by pushing it outwards or pressing it inwards.
5. **Incision:** This dimension involves what Rice has described as "one of the most variable of the decorative techniques" (Rice 1987, p. 145-146). It is possible to tell what the state of the clay was (plastic, leather hard, dry or fired) by observing the incised line's trough, so that wet or leather-hard paste leaves a clean line, sometimes with a raised margin resulting from the clay's displacement, whereas both pre- and post-firing incising tend to cause fine chipping of clay or slip at the margin of the lines (Rice 1987, p. 146). Other factors that affect the incisions are the texture of the paste, the size and shape of the instrument, the angle at which the tool was held and the direction in which it was moved; the pressure used and whether slip was applied before or after (Rice 1987, p. 146). The quality of incising depends on paste texture and firmness at the time of incising, and the kind of tool employed (Shepard 1968 [1954], p. 196). Of interest is Shepard's comment on the effect of coarse-tempered pottery:

   > Coarse, hard grains offer resistance to a tool; they drag if the paste is yielding and cause chipping and pitting if it is dry… It is important to consider texture in relation to smoothness of line, otherwise the raggedness caused by coarse temper may be misinterpreted as an indication of postfiring technique.
   > (Shepard 1968 [1954], p. 198)

6. **Nicking:** This dimension contains variations in small, regularly-spaced cuts incised into the edge of vessel lips.
7. **Notching:** This dimension covers variations in rectangular-shaped indentations along the edge of vessel lips.

8. **Corrugation:** This dimension encompasses pressuring and dragging the clay in still plastic state over the vessel surface, giving it a creased, furrowed or ridged appearance. Digits, spatulas or nails can be used (La Salvia & Brochado 1989, cited in Garcia 2012, p. 80).

   b. **Plastic additive techniques:** Additive plastic techniques involve the addition of clay, by pressing strips, spheres or other shapes to the surface of the vessel (Rice 1987, p. 148; Rye 1981, p. 93). The clay of the vessel and appliqué should be at roughly the same state – leather-hard or plastic (Rice 1987, p. 148).

      i. **Nubbins:** This dimension includes variations in nubbins, or clay blobs, applied to the vessel surface.

      ii. **Clay strips:** This dimension covers the addition of strips of clay to the vessel surface.

xii. **Lip finish:** This dimension encompasses variations in the ways vessel lips could be finished.

xiii. **Design** This overarching dimension is subdivided into the elements:

   a. **Rectilinear:** Includes variations in the orientation and relationship of rectilinear designs.

   b. **Curvilinear:** Includes variations in the orientation, relationship and arrangement of curvilinear designs.

These are thus the fundamental dimensions of the ceramic analysis that follows in Chapter 7. It is relevant here to emphasise that the detailed modal analysis of the ceramic assemblages of the sites investigated, including data on the vertical and horizontal distributions of modes (both qualitative and quantitative), are presented in Appendix 14. The synthesis of the ceramic analysis presented in the next chapter relies on the detailed evidence provided in this appendix.

Chapter 7. Ceramics from Sawre Muybu and Mangabal

The study of pottery both offers a window into local, micro-level processes of cultural transmission (persistence/change) while also enabling us to think of historical developments on middle-range and macro-level scales (see Ellen & Fischer 2013, p. 3). Towards this end, this chapter will present the results of the modal analysis of ceramics excavated from the Terra Preta do Mangabal and Sawre Muybu sites, and propose a classificatory scheme for them. Following a comparison between these ceramic complexes, we can return to the consideration of the presence of a cultural boundary along the rapids of the Tapajós.

Regarding the ceramics of Sawre Muybu, we seek to understand how the excavated pottery relates to the Incised and Punctate Tradition in chronological, technological, formal and stylistic terms. This can help to shed light on potential correlations with Carib language speakers and their expansion into Amazonia.

While we will assume as likely the correlation between the Mangabal industry and Macro-Tupian speakers from the outset, these ceramics need to be characterised in detail, so that we can return to the issue of whether TPM is a unicomponent or multicomponent site.[115] Once Mangabal ceramics have been described they can be compared to those of Sawre Muybu. The comparisons of ceramics within the study area, alongside chronological information, will help us to ponder the presence of a cultural boundary along the rapids of the Tapajós in the past.

7.1 Ceramic analysis of Sawre Muybu

The Sawre Muybu site was occupied between the late ninth or early tenth century AD for approximately 200 years. Analyses of samples of the site's pottery suggests the presence of one ceramic complex that contains two, or possibly three, distinctive wares (SM-1, SM-2 and SM-3). SM-3 is at this stage a hypothetical ware. Both SM-1 and SM-2 are associated with the Incised and Punctate tradition. The evidence at hand seems to suggest that SM-1 is a locally-made coarse ware that

[115] In fact, we know TPM was re-occupied by rubber tappers and the nineteenth or twentieth century, but we still needed to understand whether its Amerindian remains consisted of one or more components.

existed prior to the arrival of diagnostic (stylistic) elements associated with the IPT, and that it acquired these elements over time. Meanwhile, it appears that ware SM-2, which is integral to the complex, was imported. It is constituted of decorated fine wares used for serving and appears to be concentrated in Feature F3. The SM-1 and SM-2 wares are particularly cohesive in terms of their technological dimensions, which link the initial (i.e. temper and paste selection) and final stages (firing in particular) of their manufacture. We have found that formal and decorative features can vary accordingly. This means that temper allows for a reasonably confident prediction of other attributes or modes related to firing, and allows for some idea of which formal or decorative attributes can be expected. The existence of SM-3 will need to be verified in future. At present, it is only associated with one form, labelled Form 1, composed of flat-based griddles. SM-3 materials contain *cauixí* and/or *caraipé* or *caraipé* 'B' as their main temper, oxidation can be partial and they display incised or engraved oblique oriented, criss-cross lines.

The tentative nature of this explanation relates to the site's complex stratigraphy, possibly caused by translocation of sediments or past mulching, and to the fact that features such as F3 (subunit N1000/E957) were only detected once the transition between the A and B horizons had been reached, meaning material belonging to these features was initially collected as belonging to the adjacent N1000/E958 test pit and were therefore mixed with it. Appendix 14 details the modal analysis undertaken, which led to the definition of these wares.

The Sawre Muybu site yielded a grand total of 12,239 sherds. Of the collected sherds, I analysed 978 sherds from Excavation Area 1 and ten sherds collected from different points of the site's surface for technological, formal and decorative attributes; I also looked for use-wear marks and signs of post-depositional effects upon potsherds. Specimens from N1008/E1113 and N934/E981 that displayed distinctive formal or decorative attributes were included in the formal analysis of materials and illustrated. Three hundred and forty-five sherds from the 30 auger holes excavated during site delimitation were also analysed, mainly for technological attributes, by Hugo Lopes Tavares (under my supervision).[116] Tavares analysed five sherds from each 20cm level from each one of the auger holes. His selection was biased toward sherds containing further information on form or decoration when present. The decision to focus on materials from Excavation Area 1 in comparison to those from test pits N1008/E1113 and N934/E981 is justified by the fact that they are representative of the material from N1008/E1113 and N934/E981, and exhibit greater formal and stylistic diversity.

Pottery retrieved from Sawre Muybu site

	Augering programme	Surface collections	Funerary Urn and associated sherds	Test pits				
				N934/E981	N1008/E1113	Excavation Area 1 – N1000		
						E958.5	E958	E957
W	5.288	2.103	13.138	2.739	4.739	11.7	21.279	28.015
SC	868	27	944	512	920	2182	3414	3372
A	345	10	-	1*	5*	303	245	430

*Table 6 Pottery retrieved from Sawre Muybu. W= weight (kg); SC= sherd count (includes sherds <2cm², excludes fire dogs); A = analysed sherd count. *Sherds included in formal, but not technological analysis.*

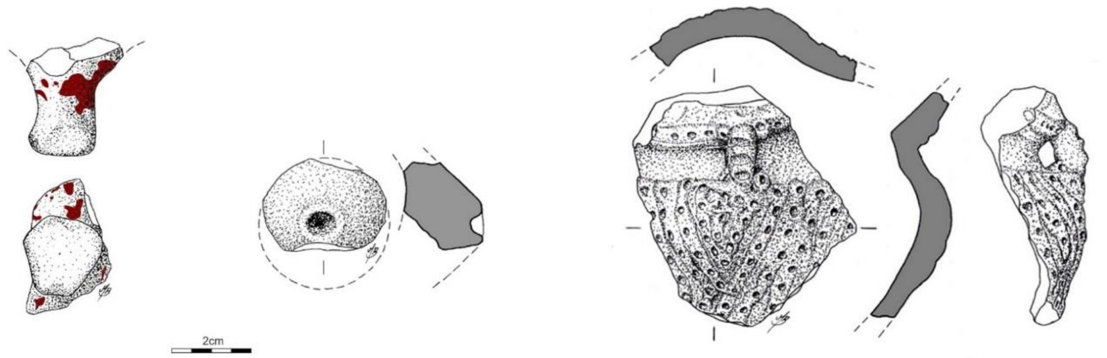
It was possible to establish vessel body form for 53 artefacts. Forty-four of these originate from Excavation Area 1, five from N1008 E1113, one from N934/E981 and three from our surface collection. Simple, unrestricted vessel contours are the most prevalent, and range from shallow griddles and dishes, to bowls of moderate depth. Independent and restricted vessels are also present. Although it is possible that simple and dependent restricted vessels were present, we did not identify any examples of this vessel body form. It is also possible that the functions met by this form were served by vegetable gourds.

The dimensions of technology, form and surface treatment/decoration for each of the three wares are summarised below.

[116] This work is part of Tavares' Independent Study Project (Projeto de Iniciação Científica), currently underway at the Federal University of West Pará (UFOPA), entitled *Estudo da variabilidade e distribuição de material arqueológico proveniente de furos-teste de sítios arqueológicos no Alto Rio Tapajós*, financed by the State of Pará's Reseach Council (FAPESPA), and which is part of the wider project *Arqueologia Regional do Alto Rio Tapajós*.

SM-1. This ware constitutes the bulk of the material retrieved from the Sawre Muybu site and represents a locally made coarse ware that served a variety of functions, and was in use continuously throughout the site's occupation. It seems that over time, it incorporated stylistic elements associated with the Incised and Punctate Tradition.

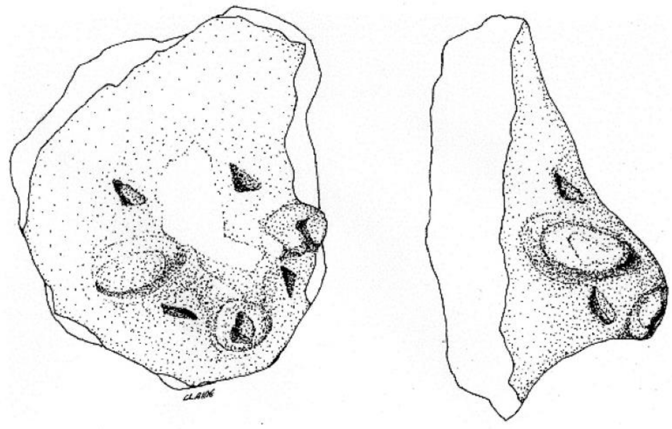
<u>Technology</u>*:* This pottery was tempered principally with poorly-sorted quartz sand, while unfired argillaceous inclusions – clay pellets and *saibro* – are found with notable frequency as secondary inclusions. It is possible that the latter were not actively added as tempers; their presence may however indicate a deliberate choice of clay. Although brown is the most regular colour, orange and red specimens are also present. SM-1 pottery was usually fired in oxidising environments; the presence of quartz likely also served as a heat conductor during firing, giving the fabrics a uniform colour.

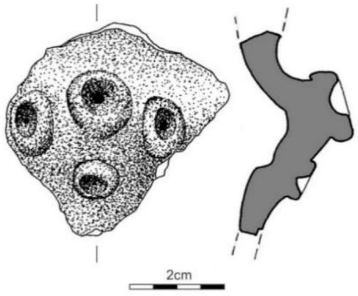


SM-1 appendages. Fig. 97 SM-538-02 is a vessel base support, or 'foot'. Fig. 98 SM-602-59 is a protuberance. Fig. 99 SM-707 possesses a looped handle. Illustrations by Marcos Brito.

<u>Form</u>*:* All horizontal cross-sections relating to SM-1 are circular. The thickness of wall fragments falls mostly between 7-15mm, but peaks between 10-12mm. Vessel bases found are flat but are likely to also have been rounded (breakage is likely to have obscured rounded bases, leading us to mistake them for vessel wall fragments). SM-1 is associated with unrestricted vessel body forms with simple contours and also to independent restricted, inflected vessel contours. This ware is associated with all specimens of forms 4 and 6 (see description below) and with the great majority of specimens from forms 2 and 3. Forms 7 and 9, which are unique specimens, also belong to SM-1. Appendages associated with SM-1 are

vessel base supports, protuberances, handles and adornos. They often pushed out from inside the vessel and were probably related to restricted vessel forms.





SM-1 appendages: biomorphic adornos Fig. 100 SM-716. Illustration by Claide Moraes. Fig. 101. Illustration by Marcos Brito.

<u>Surface treatment and decoration</u>: With firing and the ensuing shrinkage of the clay matrix, the high density of quartz sand present within these fabrics would have afforded a coarse aspect to the vessel surfaces. This was often remedied by applying a layer of self slip or slip after smoothing or burnishing, particularly to outer vessel surfaces. This would be especially useful for vessels that had to be constantly moved or handled, or to help make inner surfaces impermeable, besides affording vessels a smoother, more aesthetically pleasing appearance.

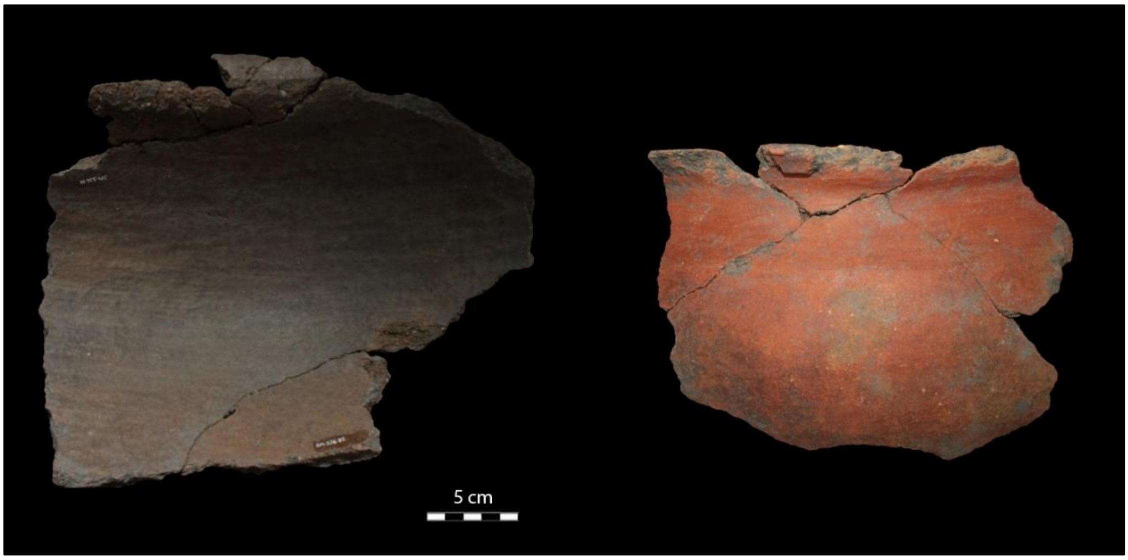


Fig. 102 Horizontal striations from burnishing process can be seen on the interior surface of SM-526, which is coated with self slip. Fig. 103 Red slip applied to SM-330. Photos: Vinicius Honorato.

Red slip is the predominant chromatic addition to these wares, and red paint[117] was at times applied, particularly in single lines. Plastic decorative techniques were also employed. The presence of rectilinear and curvilinear geometric designs points to a repertoire that goes beyond elements normally associated with the IPT.

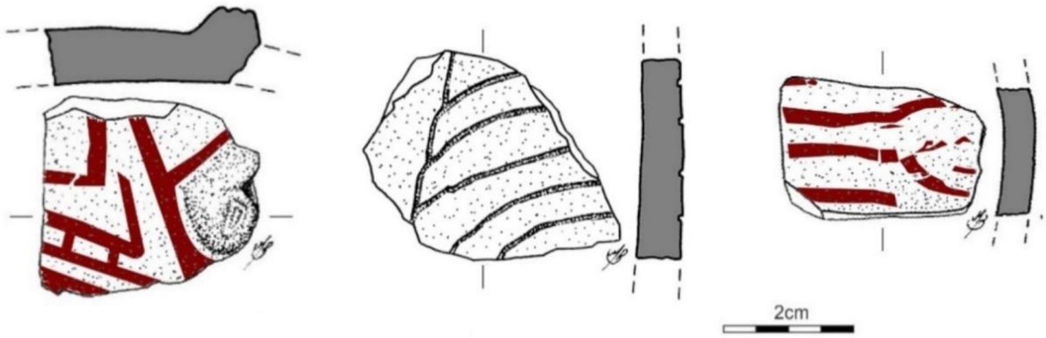
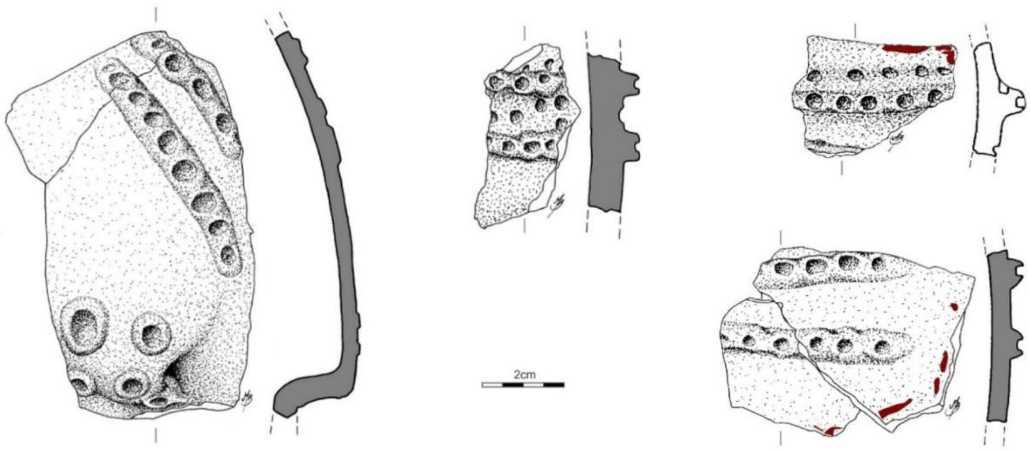


Fig. 104 SM-333-29 contains painted and additive plastic decoration. The geometric design shows connected rectilinear lines oriented in different directions. Fig. 105 SM-604-71 displays a curvilinear design of parallel and connected lines. Fig. 106 SM-625-17 possesses straight and curved painted lines. Illustrations by Marcos Brito.



"Chain" effect caused by applied and punctated clay strips on quartz sand-tempered pottery. The use made of a blunt stylus has led to the ridges and nubbins bulging. Clockwise from left: Fig. 107 SM-307; Fig. 108 SM-314-01; Fig. 109 SM-518-71; Fig. 110 SM-531-122. Illustrations by Marcos Brito.

Punctations and incisions are nonetheless very noticeable elements; excision occurs with some constancy while modelling and impressions are only seen

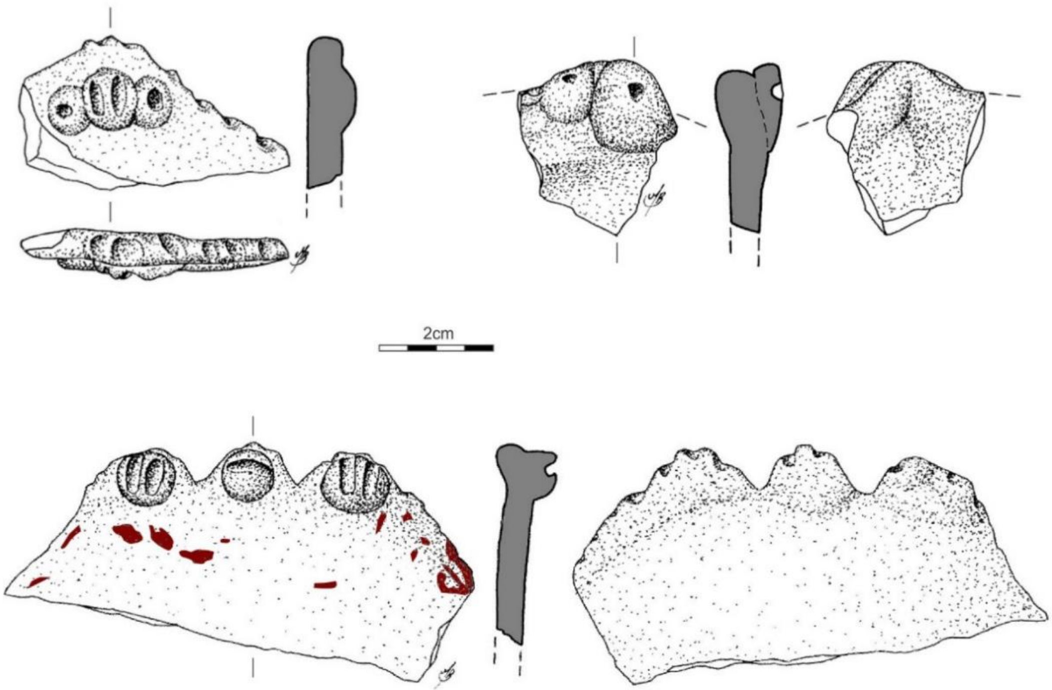
[117] Honorato de Oliveira notes that at Pajaú, "a piece of red haematite showing pigment extraction marks" was located, "while two pieces of coarse-grained sandstone that served as whetstones for the extraction of this type of pigment were found at Sawre Muybu" (2015, p. 88). From this we can infer the use of mineral pigments for ceramic painting.

infrequently. Applied nubbins, which are usually incised or punctated, are not regular, but again stand out. One of the 'signature' embellishments for the SM-1 ware are 'chains' created by applied and punctated clay strips, or ridges; this is the most obvious manifestation of the Incised and Punctate Tradition. But the apparent absence of the 'chain' motif from the deeper levels of the site seem to indicate that this element was incorporated into the potters' stylistic grammar at a later moment. Lips are mostly smoothed.

SM-2 was likely an imported fine ware that signals the participation of the community with networks that extended to the north, glossed as the Incised and Punctate Tradition. The production of the sponge spicule wares involved a greater degree of specialisation and the forms seen would likely have been intended for more specific, serving functions. Maurício de Heriarte (1874 [1662], p. 39) referred to the Tapajó exportation of ceramic vessels. Though the vessels we have found did not necessarily come all the way from Santarém, the statement confirms that exchange in ceramics during the pre-colonial period did take place in the region. This proposition is strengthened by the fact that neither the flint nor the fine sandstone lithics found at the site seem to be local (Honorato de Oliveira 2015, p. 75), indicating either direct sourcing of raw materials from areas downstream or involvement in exchange networks with peoples from these areas. Participation in this far-reaching network probably occurred at a later moment in the site's occupation – this may be confirmed by future C^{14} dating of a sample from the F3 feature, above the large griddle. Feature F4, which contained imported lithic material, has an associated date of 865±30BP. This pottery appears to be concentrated in Excavation Area 1 – particularly in N1000/E957 (F3), where semi-integral vessels were encountered; few sherds belonging to this ware were identified among the augered material analysed.

<u>Technology</u>: SM-2 ceramics have *cauixí* as their principal temper. Grog is on occasion a secondary temper. These materials are invariably associated with reduced firings and blackened sherd cores. Fireclouds can be seen on sherds. Post-firing colour of the paste varies from light orange to brown, to greyish brown.

<u>Form</u>: Most horizontal cross-sections relating to SM-2 are circular, but SM-529-01a displays a part-circular, part straight form above a hemispherical vessel (see fig. 119) and SM-522 is an elliptical vessel (see Plate 8). Vessel wall thickness is more standardised and generally thinner than with SM-1, falling between 7-12mm. Flat bases are associated with SM-2 (though lack of evidence of rounded bases should not be equated with absence). In terms of vertical cross sections, SM-2 is related solely with unrestricted forms and simple contours (even if vessel walls can be convex), including forms 1, 2, 3, 5 and 8. Regarding appendages, labial extensions provide the platform for the application of plastic and painted decorative elements. Labial extensions are exclusively associated with SM-2 and decorative elements appear on the inner rims of unrestricted vessels.



Labial extensions on SM-2 sherds. Clockwise from top left: Fig. 111 314-02 Labial extension exhibiting incised and punctated nubbins forming zoomorphic design. Fig.112 SM-546-29 Labial extension displaying punctated nubbins, or blobs, of different sizes, producing a zoomorphic design reminiscent of reptilian eyes. Fig. 113 SM-508-187 exhibits labial extension with applied and incised nubbins. See also Plate 8. Illustrations by Marcos Brito.

<u>Surface treatment and decoration</u>: Vessel surfaces are well smoothed. Red slip could be applied, but more frequently specimens display red (and on occasion, orange) paint, which is often applied in continuous horizontal bands, delineating

the rim from the vessel body. A unique polychromic design of interlocking scrolls is present on SM-529-01. Punctated or incised appliqué nubbins were employed to create zoomorphic representations, especially on the inner surface of labial extensions. One instance of a punctated clay strip is present, again on SM-529-01. The strip is considerably thinner and more discreet than the equivalent decorative technique applied to SM-1 pottery. Lips can be notched or modelled.

Fig. 114 We can observe the application of orange and red paint on the exterior face of SM-368-2. Photograph: Vinicius Honorato.

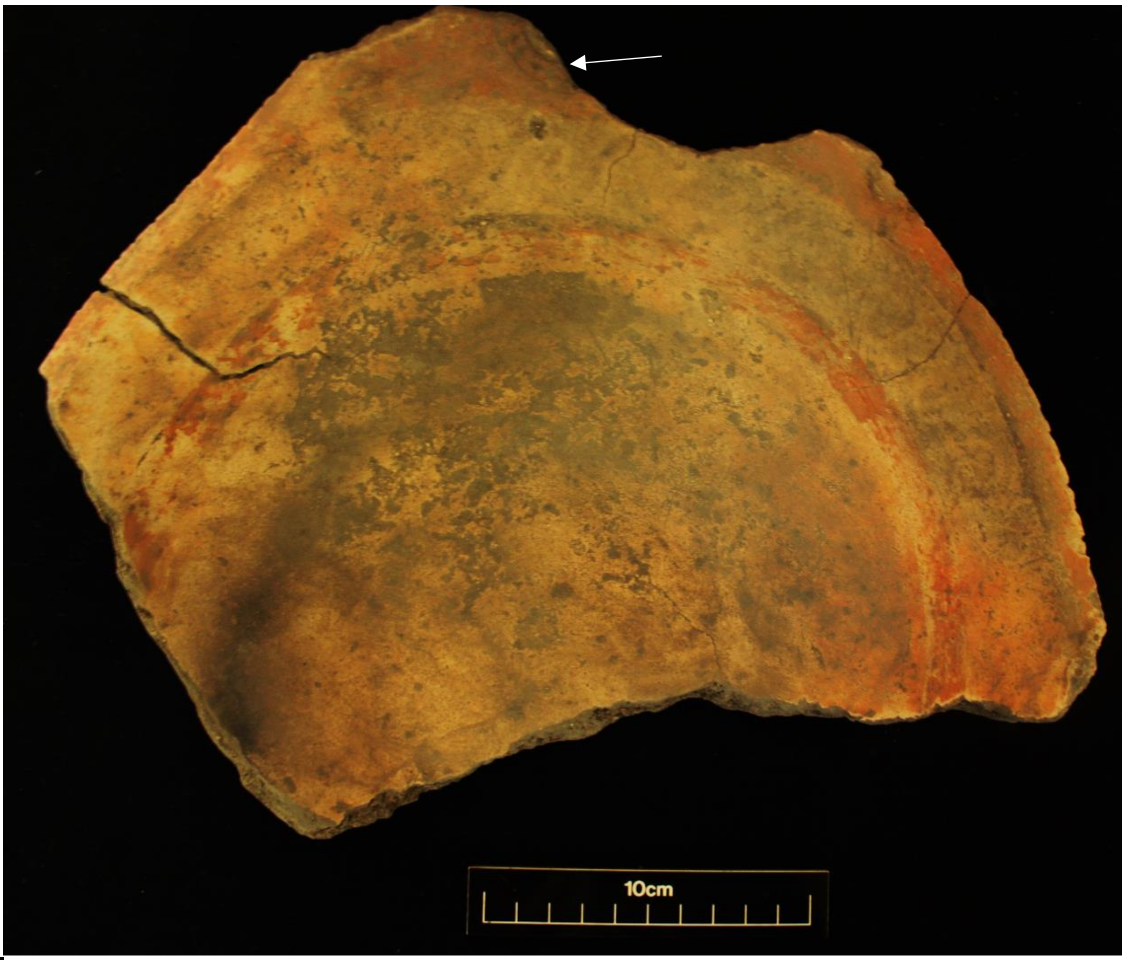


Fig. 115 SM-529-01 with extra contrast. Photo by Victor Rotiv Almeida. Arrow points to applied and punctated clay strip.

Fig. 116 This biomorphic motif of vessel SM-522-2 resembles two sets of eyes and a nose. Photograph by Victor Almeida.

SM-3 is a hypothetical ware and may be reconsidered following further sampling. SM-3 is exclusively related to unrestricted, shallow forms – griddles. Although the comparatively large size of griddles would lead to a greater value of brokenness, the fact we found two griddles *in situ* and others in relatively large pieces would suggest they were not moved as much as smaller vessels – consequently lasting longer, breaking less and leaving fewer sherds. They were in use at the beginning of the site's occupation, being located at the base of 'occupational floors,' but have also been retrieved from the site's surface. It is not clear whether this material, or part of it, was locally made or originated elsewhere. Nowadays, there are several *caraipé* trees by the waterfront of the Sawre Muybu village (Chico Caititu, pers. comm., April 2016).

Technology: SM-3 is tempered principally with *cauixí, caraipé* or *caraipé* "B." It is generally linked with partially oxidised firings. Post-firing colour of the paste is most often grey or pink.

Form: All horizontal cross-sections relating to SM-1 are circular. Sponge-spicule sherds thicker than 24mm are related to griddles or plates. Most sherds from this ware fall between 10-12mm, but some are thicker than 16mm.

<u>Surface treatment and decoration</u>: Surfaces were smoothed. The only form of decoration here is composed of oblique, intersecting incised (or in one case, possibly engraved) lines forming a lozenge design. Lips are smoothed.

Fig. 117 Oblique-oriented criss-cross lines incised or Fig. 118 possibly engraved into inner surface of griddle sherds. Photos: Victor Rotiv Almeida (left) and Hugo Tavares (right).

7.1.1 The Sawre Muybu vessel set

The considerably fragmented nature of most of the sherds studied means that a projection of vessel forms was restricted to a limited portion of the sample. At this point, we cannot be certain of the modal value of body and rim forms described in the sections below: this would need confirmation from a more numerically representative sample. Pottery excavated from the other excavated test pits (N1008/E1113 and N934/E981) were included in the analysis of vessel body profile.

Vessel form

<u>Horizontal cross section</u>: The overwhelming majority of vessels at Sawre Muybu have circular horizontal cross sections, save for two unique specimens belonging to ware SM-2, which were retrieved from N1000/E957 (F3).

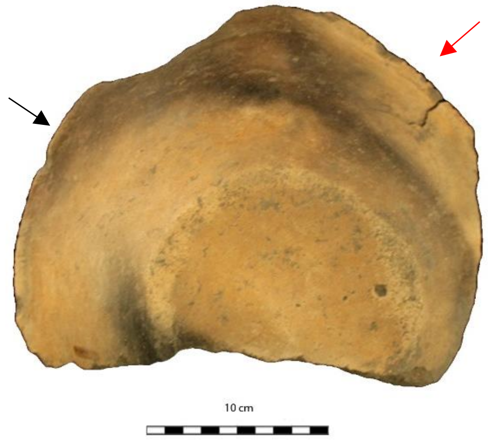


Fig. 119 SM-529-01 – below the rim this vessel has a circular cross section, yet the vessel's mouth has curved (black arrow) and straight (red arrow) sides. Fireclouds are commonly seen on SM-2 pottery. Photo by Vinicius Honorato.

<u>Vertical cross section</u>: We have identified eight recurrent vessel forms and three unique specimens. Three principal tempers were detected among the reconstituted forms: quartz sand, *cauixí* and *caraipé*. See Appendix 14 for more details on base, vessel and rim form, and tables 12 and 13 below. Specimens from each form are represented in illustrated plates that follow these summary descriptions.

Form 1: These are shallow and flat griddles that have a simple contour and are unrestricted. Form 1 is associated with different horizontal and stratigraphic contexts on the site: SM-625-04 came from N1008/E1113's 30-40cm level, and SM-323-02 from the 30-40cm level of unit N1000/E958 – the lower part of these levels are at the beginning of the site's *terra preta* layer. We retrieved SM-310-118 in level 20-30cm of N1000/E958, while SM-545 was located at approximately 70cm depth within N1000/E957 (F3).[118] Both SM-545 and SM-323-02 were placed directly over charcoal (and both disintegrated during the process of extraction). SM-709-01 and SM-708 were found on the surface, near Cacique Juarez' house. This widespread vertical and horizontal dispersal may point to a continuity in this form over time.

[118] Remembering that the greater depth of F3 does not correspond to greater temporal depth, since the bottom of this feature postdates the bottom of the 30-40cm level in adjacent N1000/E958.

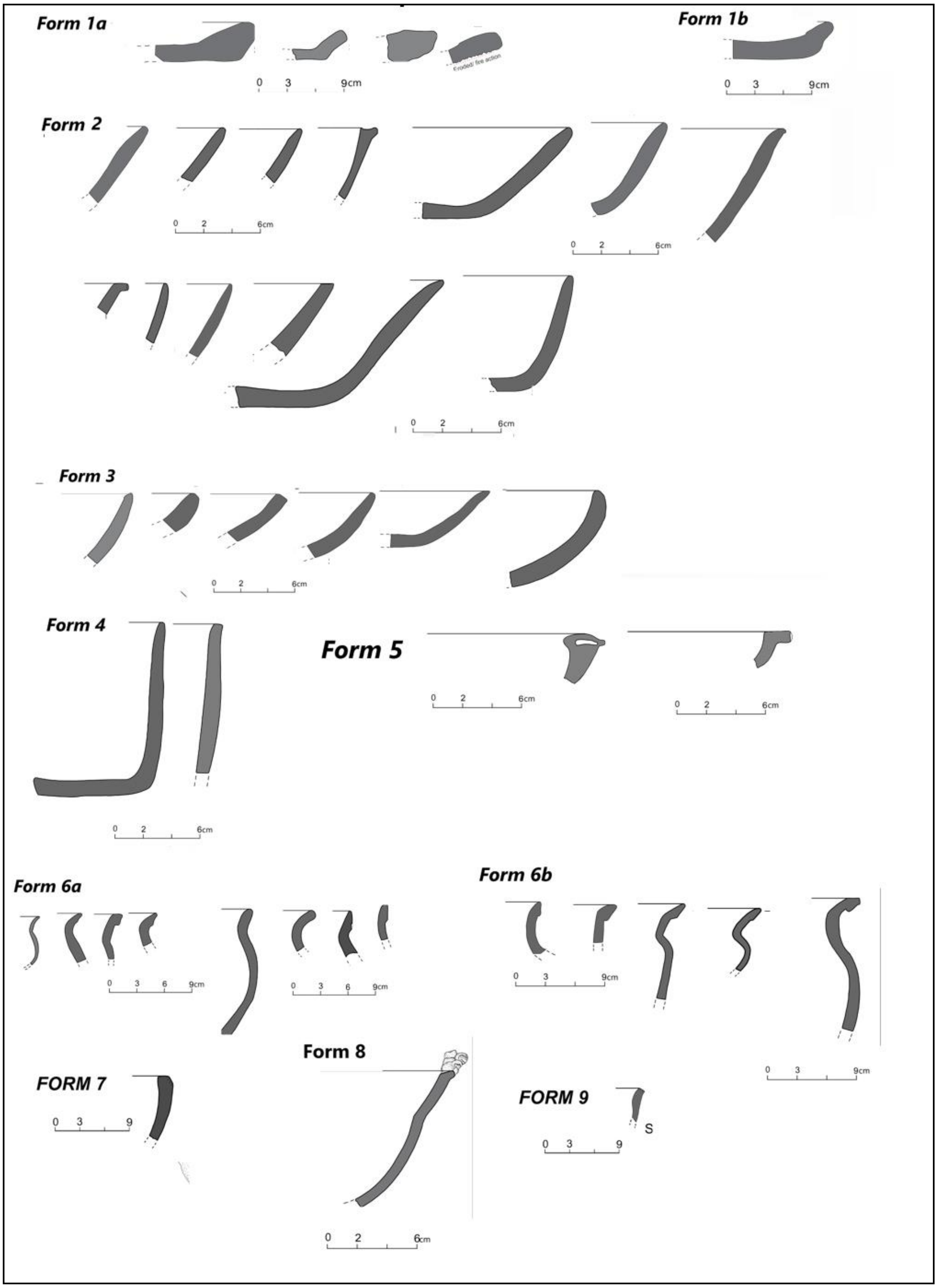


Fig. 120 Summary of vessel forms and associated rims belonging to SM vessel set. Includes wares SM-1, SM-2 and SM-3. See plates below for more detail. Compilation of forms by Manuel Arroyo-Kalin. Illustrations by Vinicius Honorato and Marcos Brito (see individual plates for more information).

Form 1 griddles always have internally thickened rims. They were found to be tempered with *cauixí* (SM-545-1, SM-708, SM-709-01), *caraipé* (in the case of SM-

323-02) and with quartz sand (SM-310-118). Form 1 is divided into sizes a and b (the limited number of specimens does not allow us to speak of modal orifice sizes). Size a encompasses large (60-67cm) griddles, while size b is represented by one medium (~35cm) griddle; these sizes may be related to different uses. SM-545, SM-709-01 and SM-708 display oblique, parallel and intersecting incisions on their inner rims. SM-708's design may in fact have been engraved. Soot is typically present on the underside of these artefacts. Most specimens from form 1 (except for those tempered with quartz sand) are associated with ware SM-3.

Form 2: These are unrestricted, moderately deep bowls with a simple contour, shaped as inverted, truncated cones. Most belong to ware SM-1. Rim diameters range from 12cm to 40cm. Zero modification, bevelled, tapered, everted (folded out at a slight angle), small flanges and rims with a concave inner surface can be attached to this vessel body form. This form could have served a number of uses, from food preparation to serving. SM-529-01a belongs to SM-2; it is elaborately painted, indicating the latter function. Coarse wares belonging to this form can also display decoration, such as is the case with SM-310-28.

Form 3: This form represents unrestricted, shallow dishes with simple contour. It was only located in the units comprising Excavation Area 1, particularly in the 20-30cm level. The mean vessel mouth diameter is ~31cm with a standard deviation of 3.4. Zero modification, tapered and indeterminately thickened rim forms are associated with this vessel form; though we did not find any, bevelled rims would also be a hypothetical possibility. Most specimens from form 3 belong to SM-1, but one (SM-384-1) has *cauixí* as its main temper. It is likely this form relates to food serving.

Form 4: This is an unrestricted, deep cylindrical vessel with a simple contour. We only identified two examples of this form, excavated from level 30-40cm of N1000/E957 (F3) (SM-508-04) and from F2, in between N1000/E958-958.5 (SM-384-30). Both these vessels were tempered with quartz sand – they belong to ware SM-1. This form may be associated to food preparation. The average vessel wall thickness of these two vessels is 10.8mm. Diameters measure between 30-40cm. Upright rims are associated with this form.

Form 5: These are unrestricted and shallow ovaloid dishes with convex walls and simple contour. This form (of which there are only two specimens) is associated with ware SM-2. Form 5 occurred at the top and bottom of the cultural layers in N1000/E958.5. Small flanges and hollow rims are found in connection with this form. This appears to be a serving vessel, with plastic decoration on the lip.

Form 6: This form is subdivided into a and b, which are again split on the basis of their size. Form 6a represents independent restricted, inflected globular to hemispherical vessels, and comes in small (Ø 10-16cm), medium (Ø 25cm) and large (Ø >50cm) sizes. Form 6b represents an independent restricted, necked, inflected globular to hemispherical vessel. The "S"-shaped contour of 6b tends to be more accentuated than that of 6a. Form 6b also has small (Ø 17-18cm), medium (Ø 25-30cm) and large (Ø 47cm) vessel mouth diameters. All specimens belonging to Form 6 belong to ware SM-1.

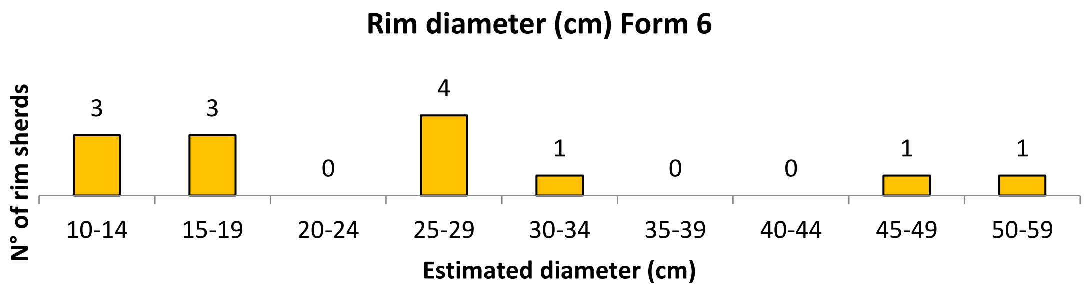


Chart 1 Rim diameter (cm) Form 6.

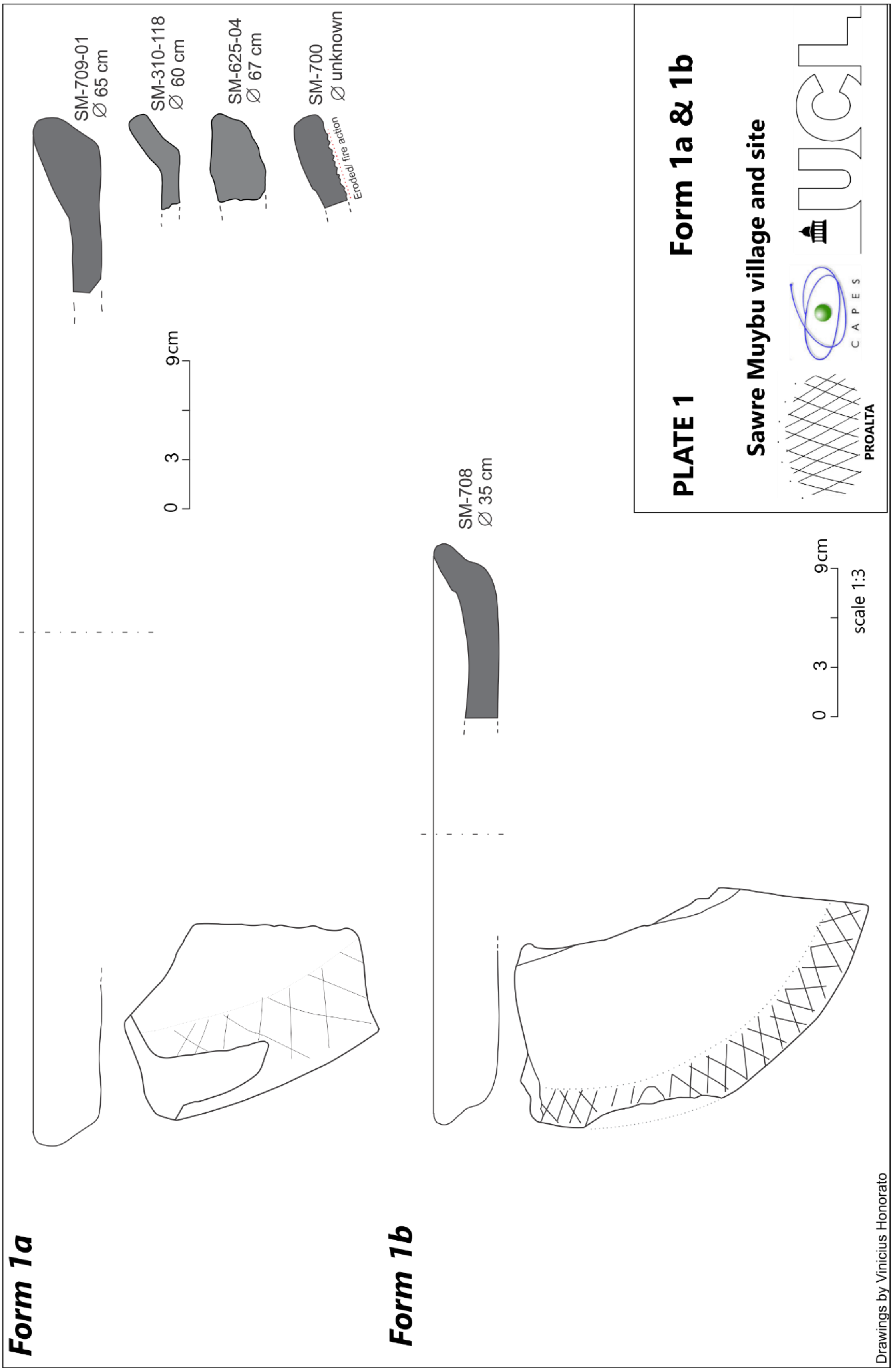
Forms 6a and 6b are associated with externally thickened or "folded' rims, which often display plastic displacement decorative techniques. SM-308-25 epitomises a style that brings together local elements and punctated, applied clay strips that signal a connection to the IPT. We located SM-367-01 in association with fire dogs in the 30-40cm level of the N1000/E958 unit. Because of their constricted orifices, these vessels would have been useful for holding liquids. I did not detect soot on the specimens analysed from this group.

Two neck forms are associated with this form: constricted, with slight to accentuated curves, and straight, with upright or lightly everted inclination.

Form 7: SM-537-31 is a robust, hemispherical bowl of moderate depth and simple contour. We recovered it from the 60-70cm level of N1000/E957 (F3). Primarily tempered with quartz sand, it has an indeterminately thickened rim. It displays a line of oblique, linear punctations along the top of its flat lip. It belongs to ware SM-1. *Unique specimen*.

Form 8: This is an unrestricted vessel of moderate depth with simple contour, whose walls are convex. We uncovered SM-522-1 from the 30-40cm level of N1000/E957 (F3). Its vessel wall thickness is 5.9mm and its estimated diameter is ~55cm (its ellipsoid horizontal cross section means we cannot estimate diameter precisely). The vessel's rim is everted at an angle and has a labial extension on which plastic additive and displacement embellishment techniques have been combined with painted techniques to form a design (see Plate 8). This artefact belongs to ware SM-2. *Unique specimen*.

Form 9: This is an unrestricted bowl with a simple contour. SM-531-138a is tempered with quartz sand and has an internally thickened rim. Its average vessel wall thickness is 8mm and its rim diameter is estimated to be 4.9mm. Its lip displays a line of left-oriented, oblique punctations. Vestiges of red paint can be seen on the exterior vessel body. It was found in N1000/E957's 50-60cm level. This form is associated with ware SM-1 on the basis of it being a coarse ware. *Unique specimen*.


Form 1a
SM-709-01
Ø 65 cm
SM-310-118
Ø 60 cm
SM-625-04
Ø 67 cm
SM-700
Ø unknown
Eroded/ fire action
0 3 9cm
Form 1b
SM-708
Ø 35 cm
0 3 9cm
scale 1:3
PLATE 1
Form 1a & 1b
Sawre Muybu village and site
PROALTA
CAPES
Drawings by Vinicius Honorato

Form 2

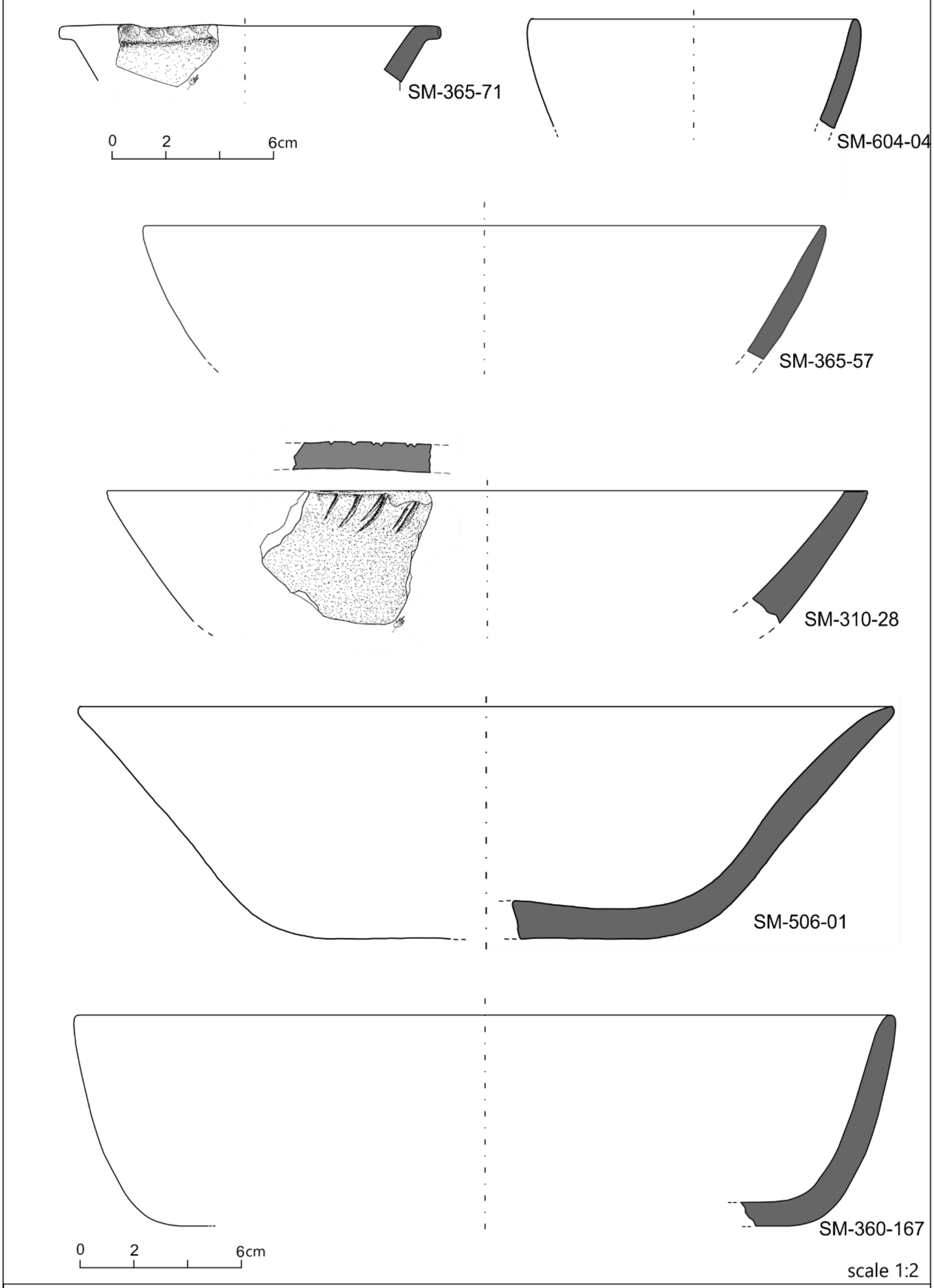


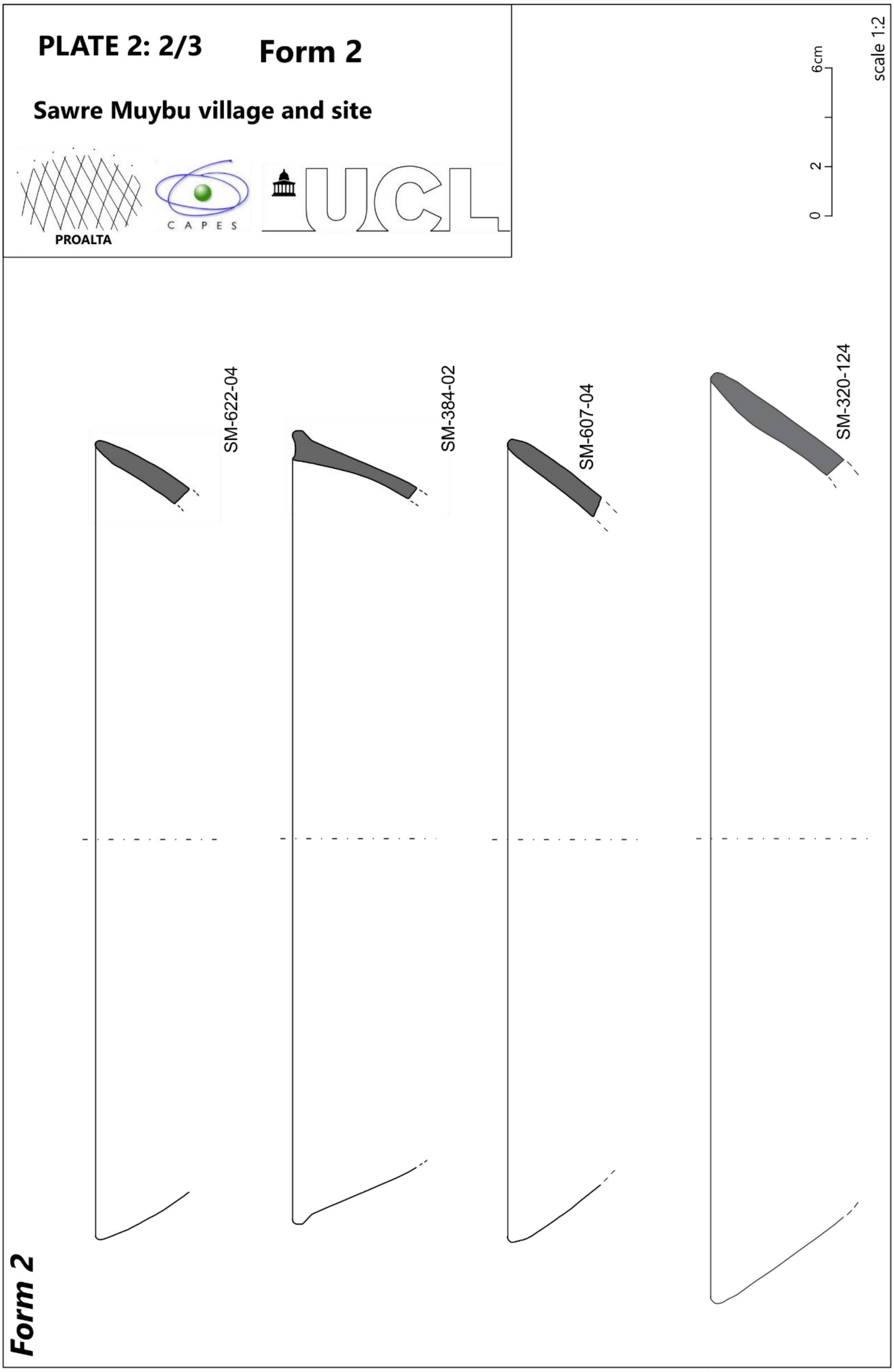
PLATE 2: 1/3 Form 2

Sawre Muybu village and site

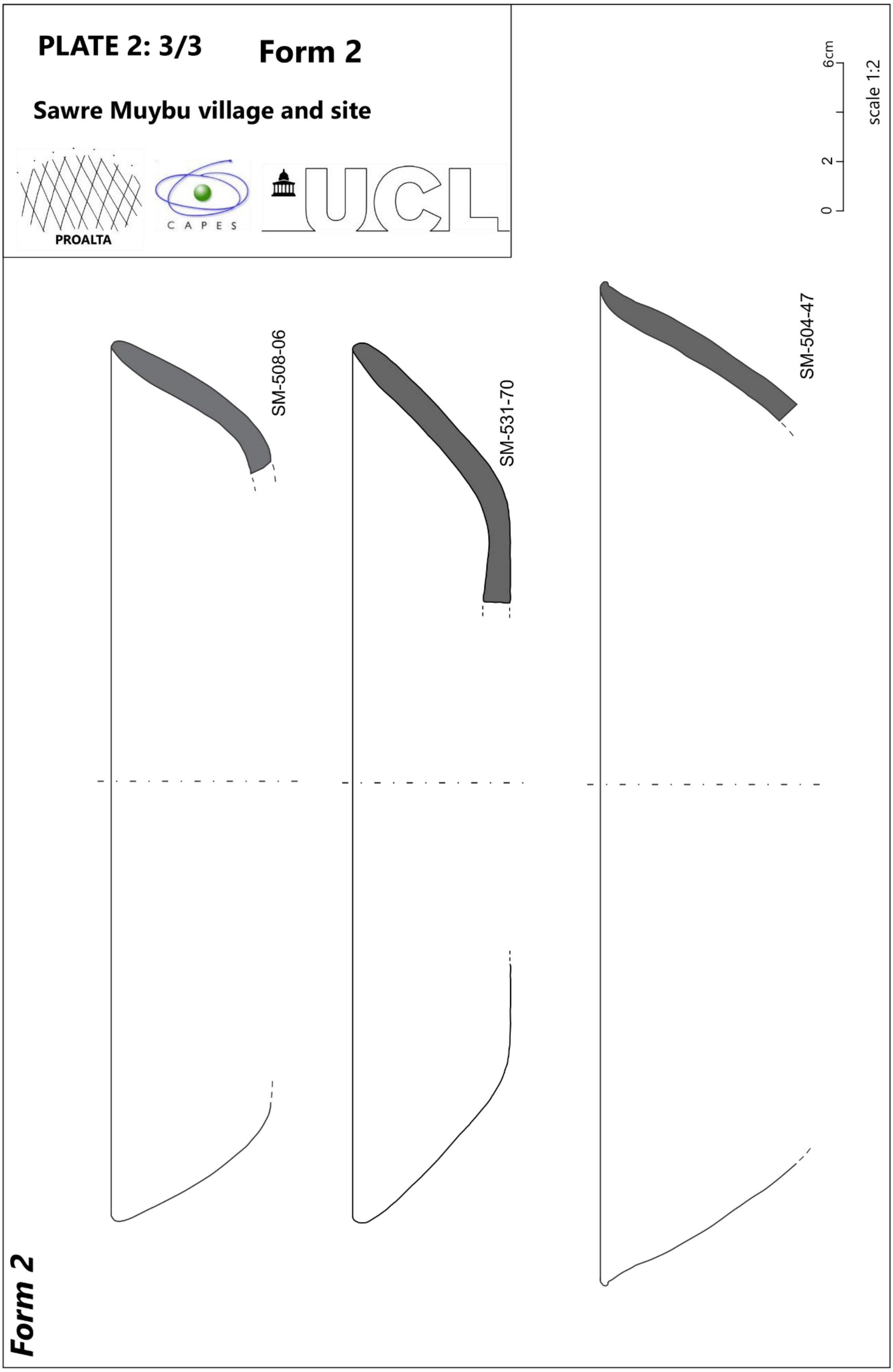
PROALTA

C A P E S

Drawings by Vinicius Honorato and Marcos Brito (stippled)



Drawings by Vinicius Honorato



Drawings by Vinicius Honorato

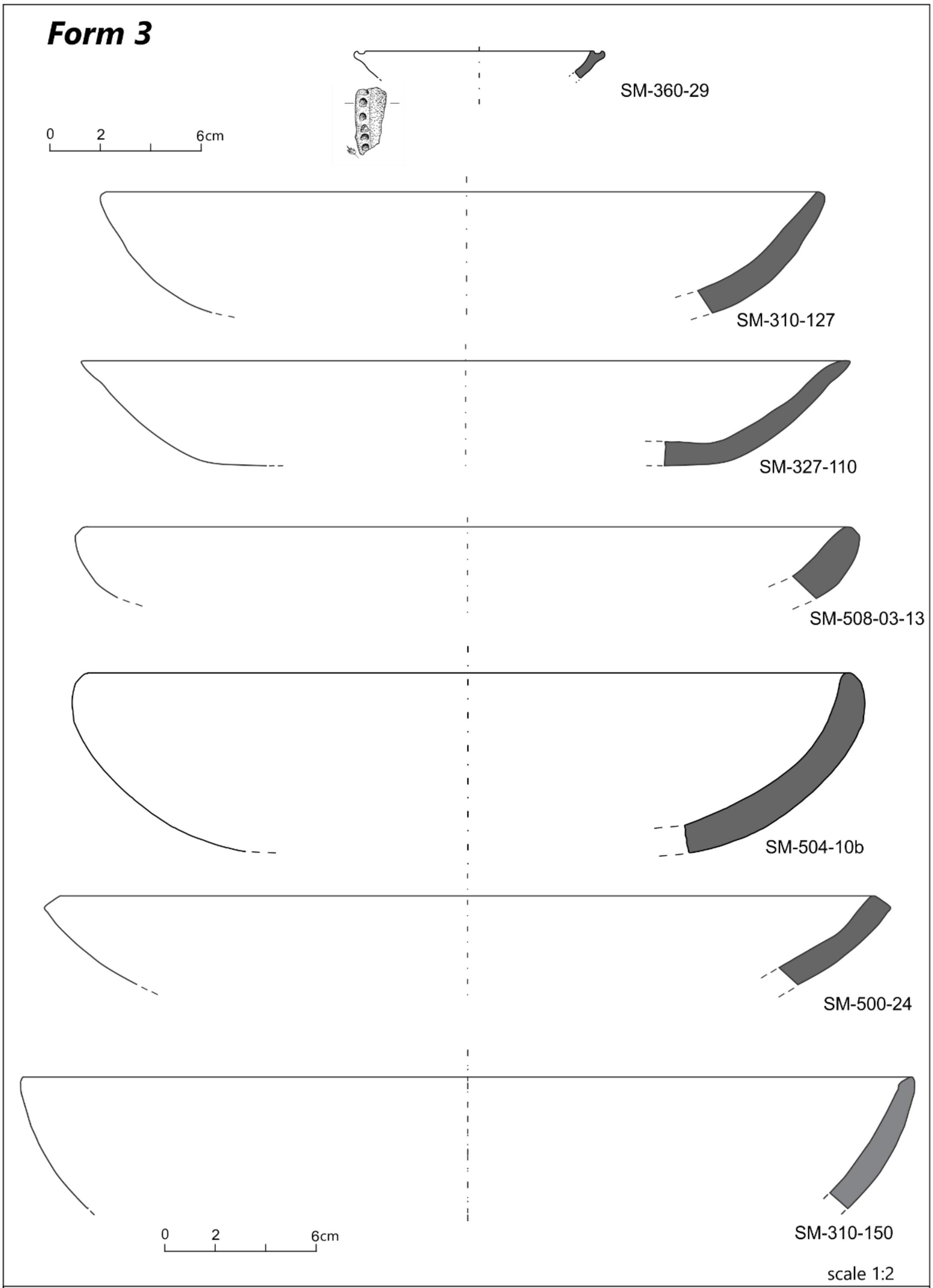
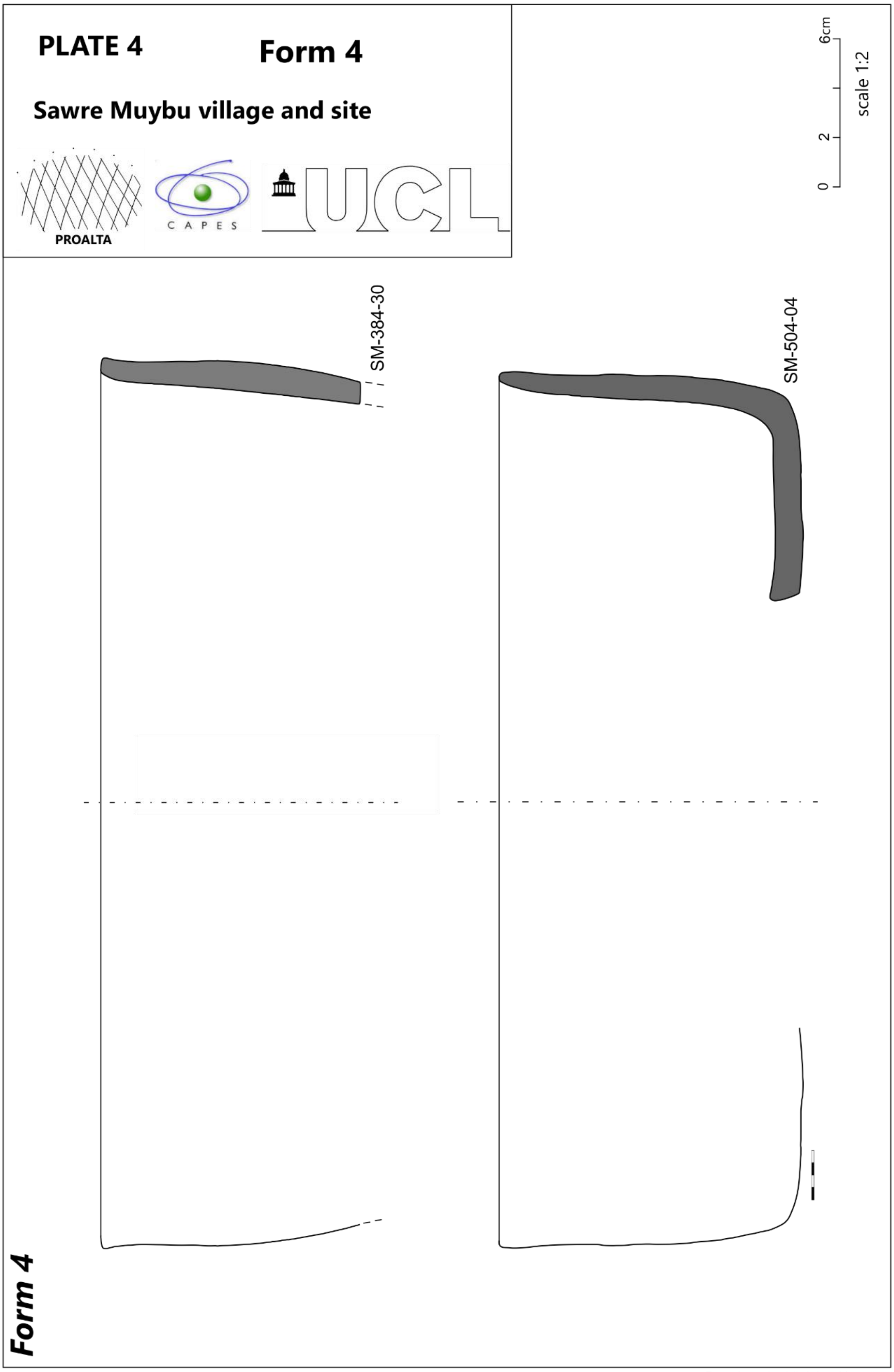


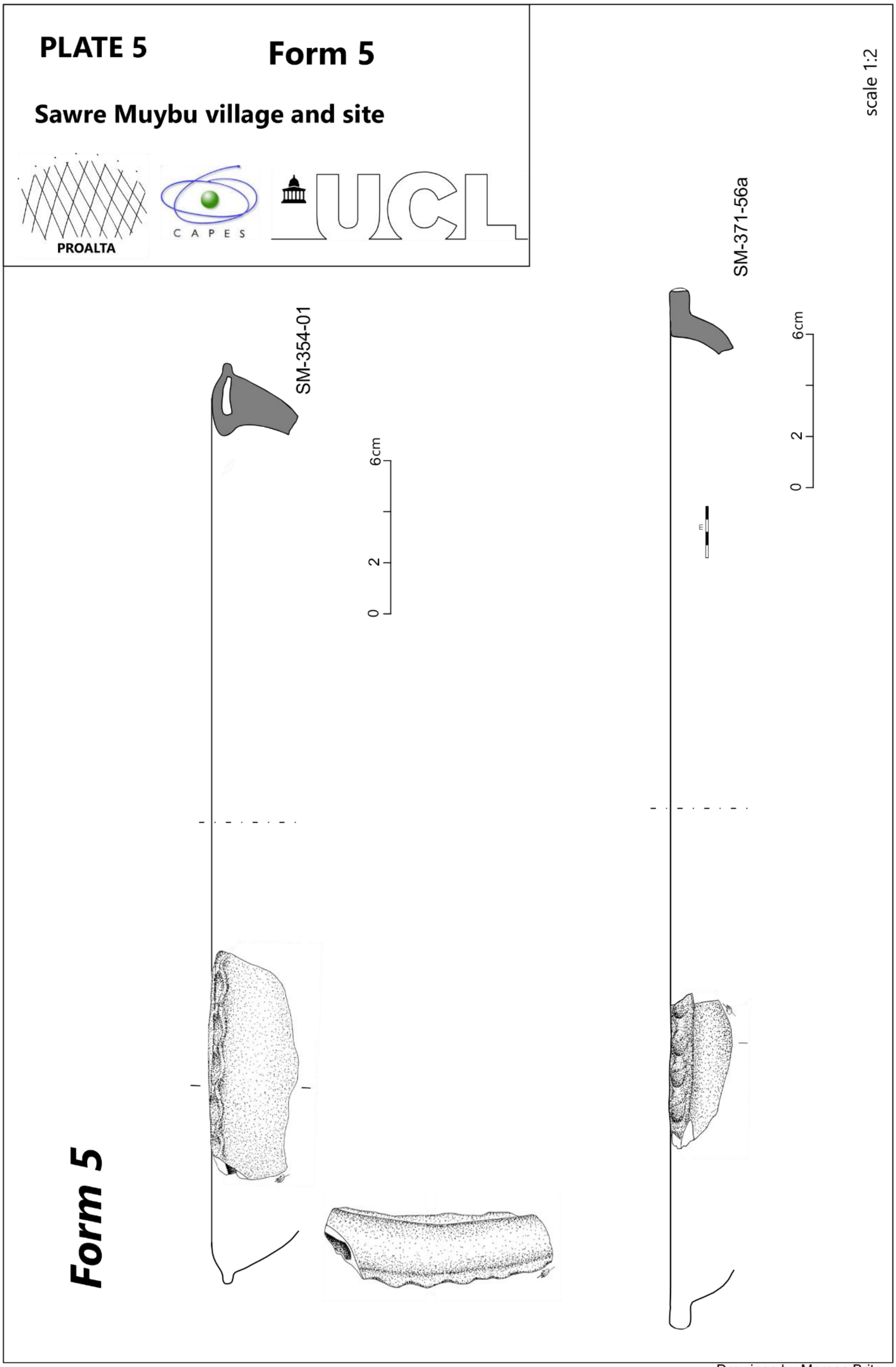
PLATE 3 **Form 3**

Sawre Muybu village and site

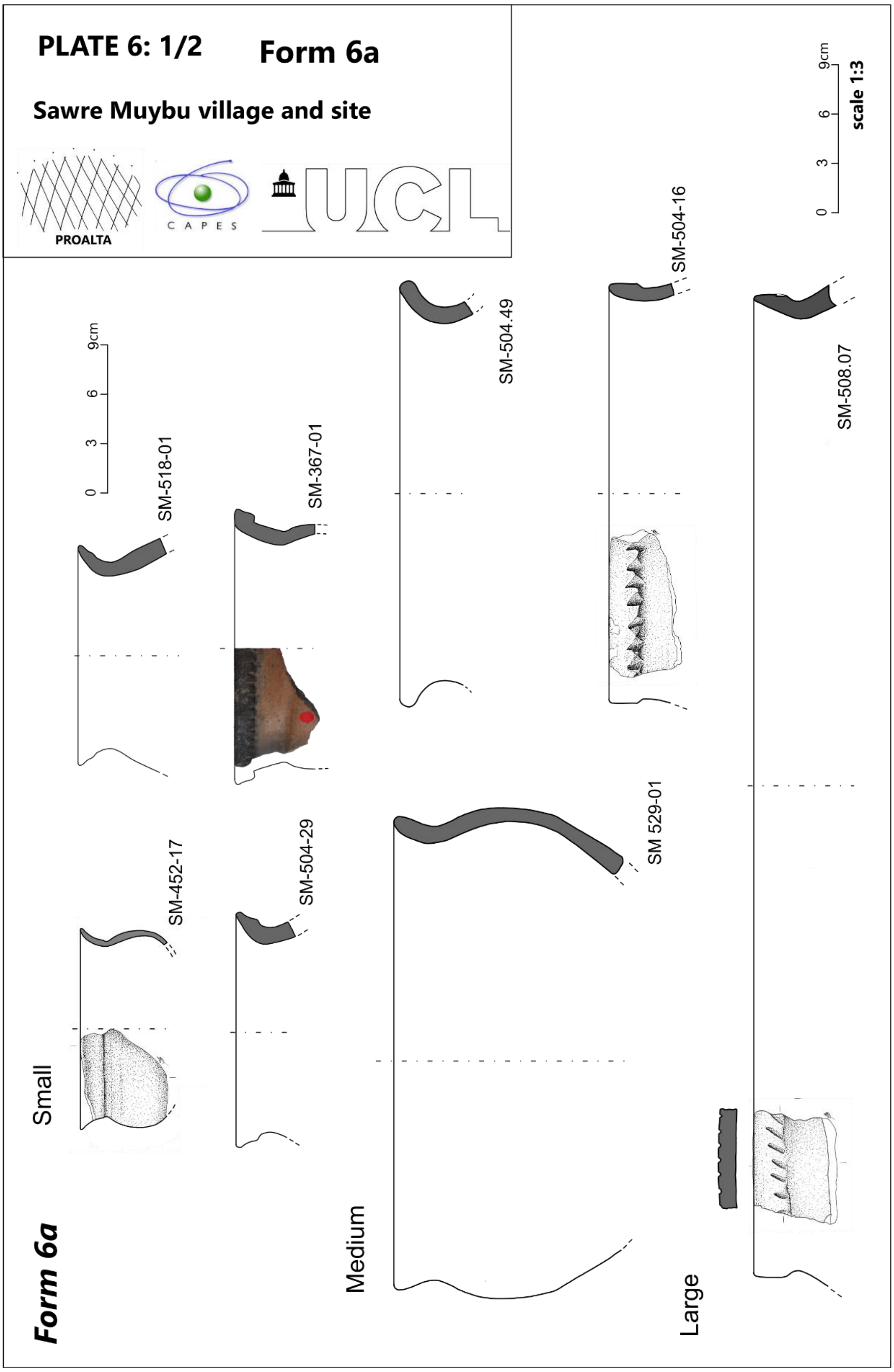
Drawings by Vinicius Honorato and Marcos Brito (stippled)



Drawings by Vinicius Honorato



Drawings by Marcos Brito



Drawings by Vinicius Honorato and Marcos Brito (stippled)

Form 6b

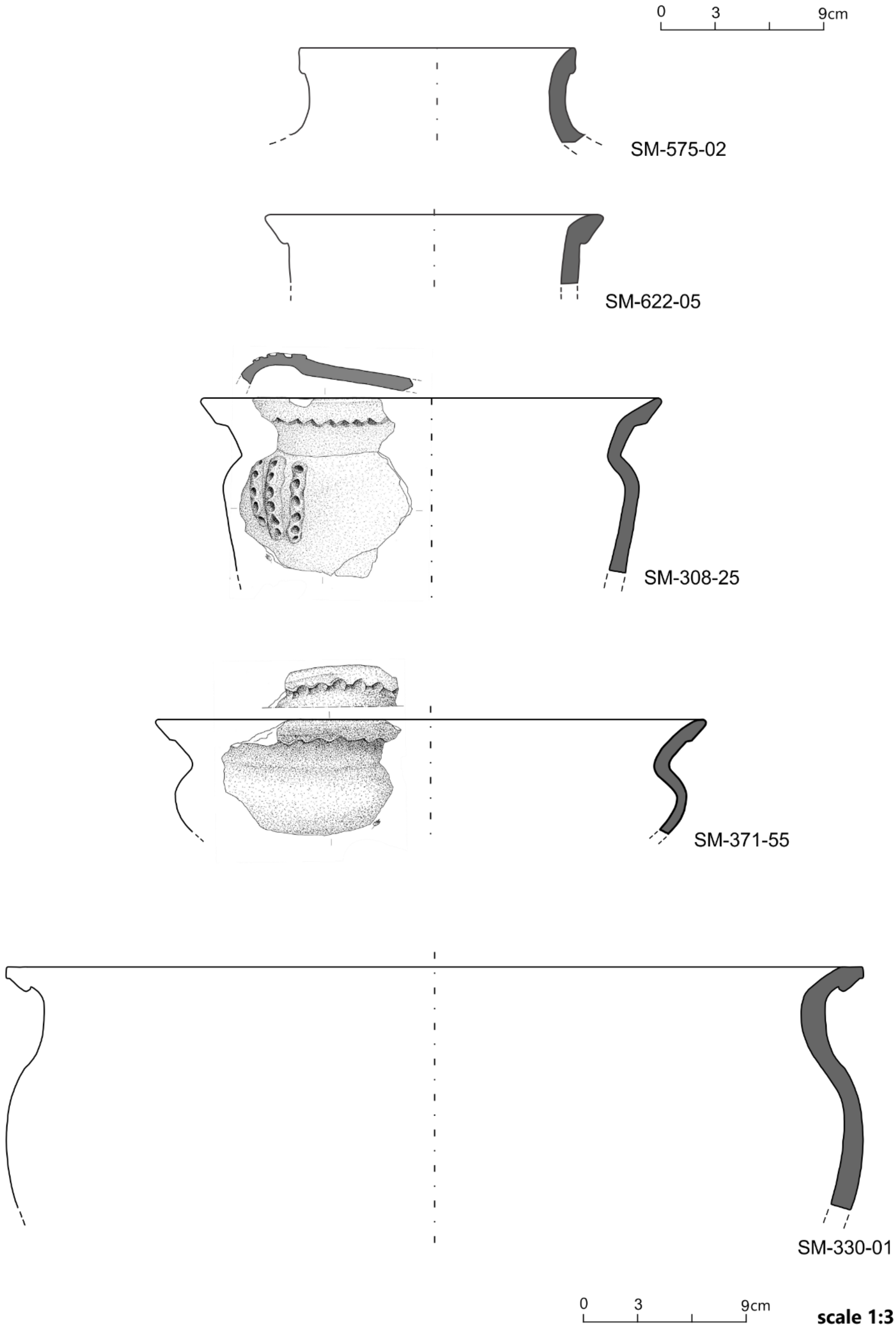


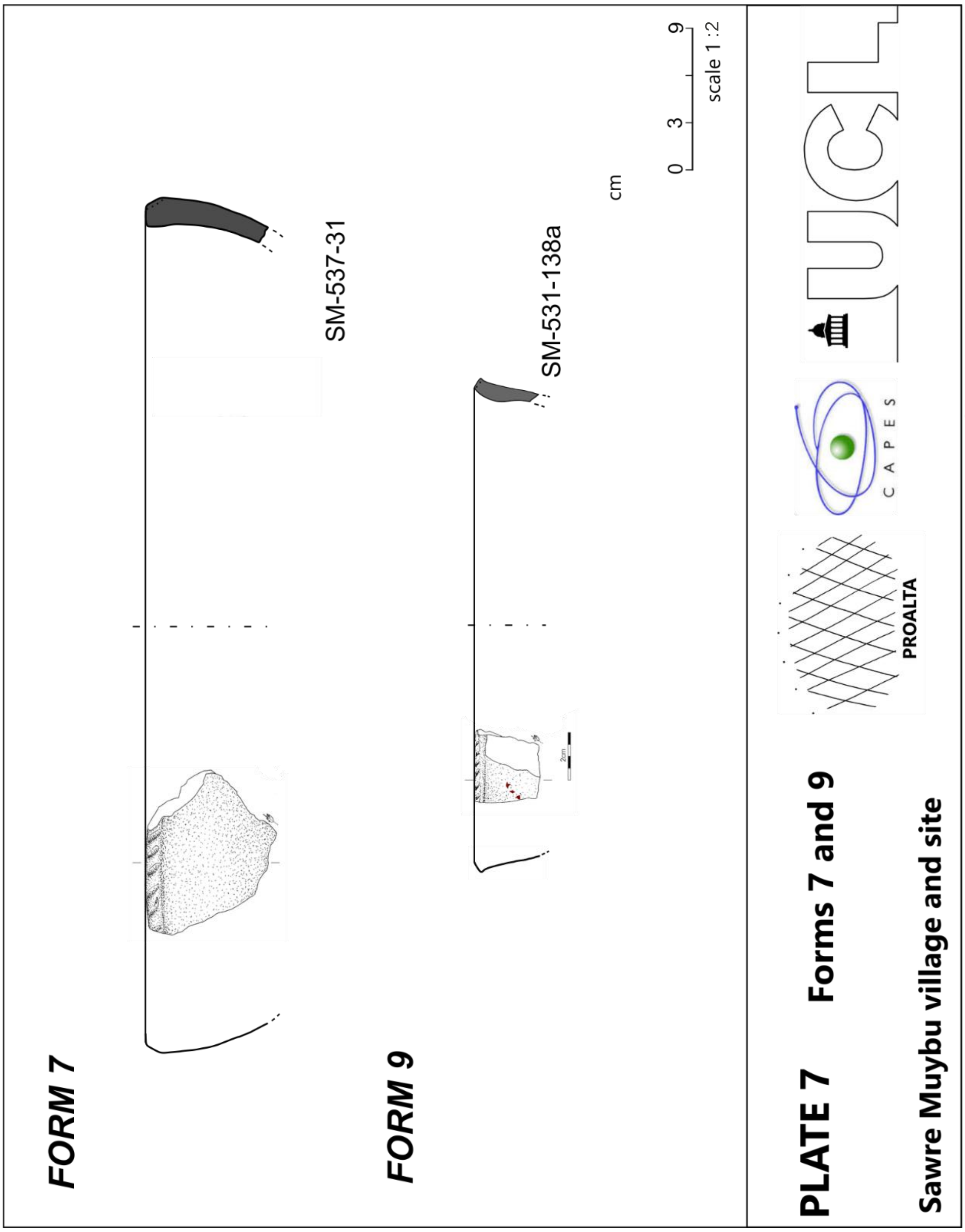
PLATE 6: 2/2 Form 6b

Sawre Muybu village and site

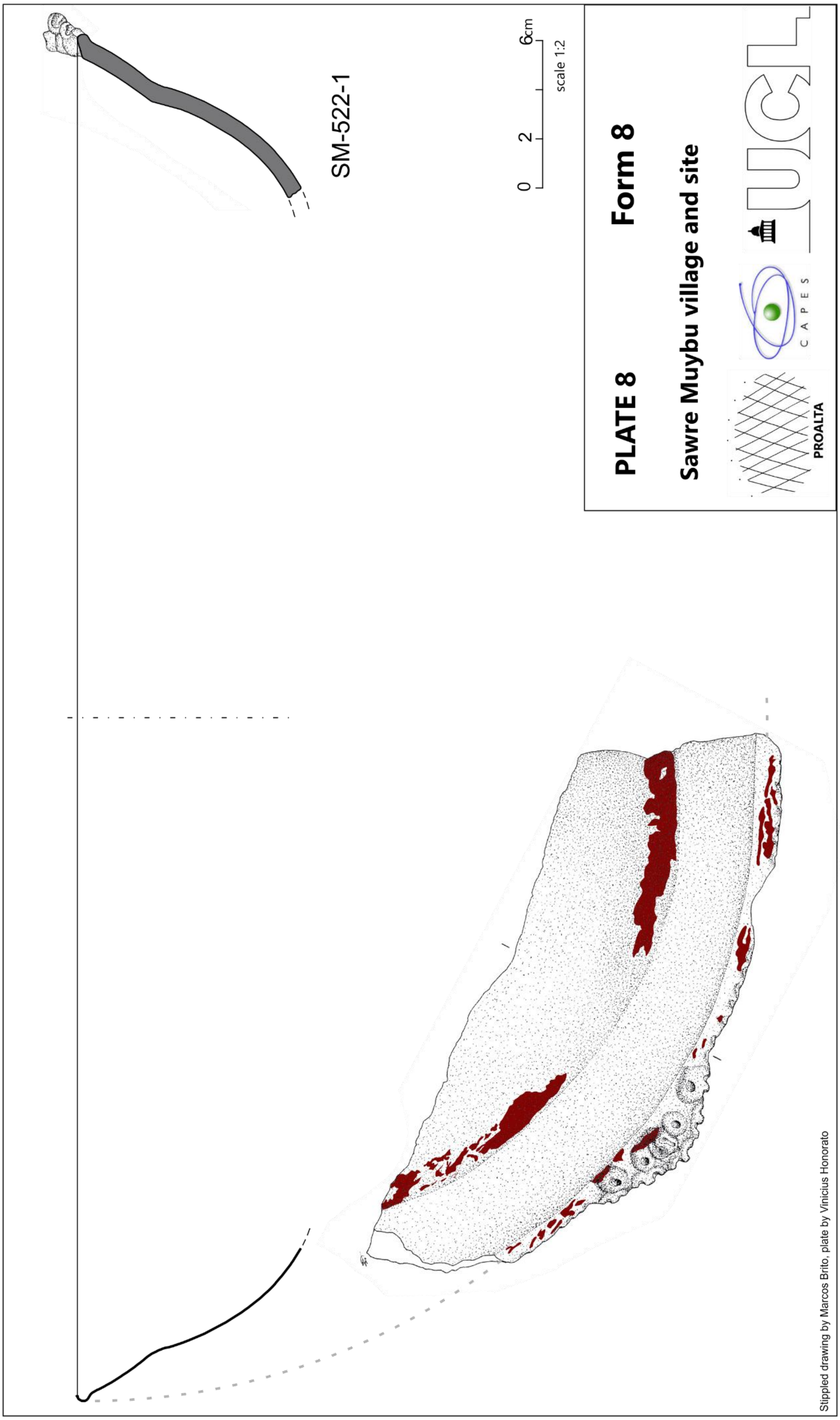
PROALTA

CAPES

Drawings by Vinicius Honorato and Marcos Brito (stippled)



Stippled drawings by Marcos Brito. Plate by Vinicius Honorato


SM-522-1
0 2 6cm
scale 1:2
PLATE 8
Form 8
Sawre Muybu village and site
CAPES
PROALTA
UCL
Stippled drawing by Marcos Brito, plate by Vinicius Honorato

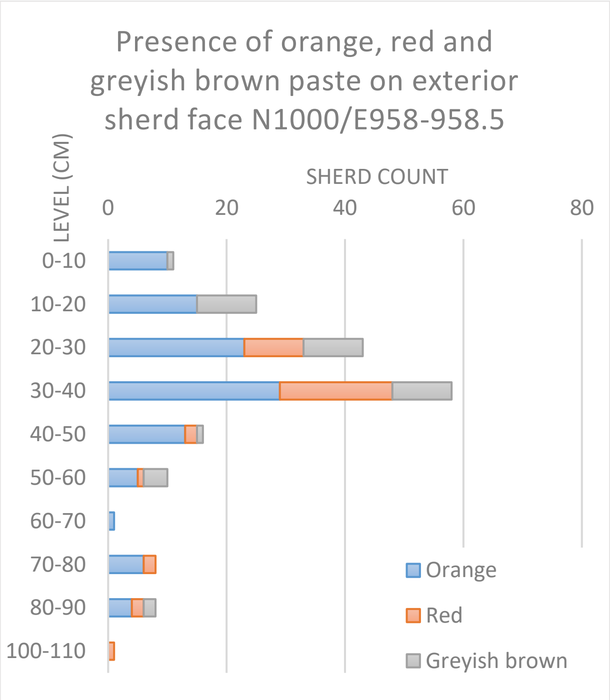
Vessel body forms, contexts and dates at Sawre Muybu							
Level (cm)	**N1000/E957**		**N1000/E958**		**N1008/E1113**		**Forms**
	Layer/ Context	**C^{14} date BP**	**Layer/ Context**	**C^{14} date BP**	**Layer/ Context**	**C^{14} date BP**	
Surface							1
0-10	V, IV, F3?		V, IV		V, IV		3
10-20	IV, F3?		IV		IV		5, 6
20-30	IV, F3?		IV		IV		1, 2, 3, 6
30-40	F3		IV, III	1039±26	IV, II, F4		1, 2, 3, 4, 6, 8
40-50	F3		III, IIa, F3, F2		II, F4		6
50-60	F3		IIa, IIb, F3, F2		F4	865±30	2, 5, 6, 9
60-70	F3		IIb, F3, F2		F4		1, 6, 7
70-80	F3, II	913±30	IIb, F3, F2		F4		
80-90	II		IIb, I, F3, F2		Not excavated		2, 3, 4
90-100	Not excavated		I, F2, F3				
100-110			I				
110-120			I				
120-130			Not excavated				

Table 7 Vessel body forms, contexts and dates at Sawre Muybu. We attempted to equate the layers across the site.

The date of 1039±26BP was obtained from a charcoal sample taken from beneath a horizontally-placed griddle (classed within hypothetical ware SM-3) and refers to the base of the occupation layer of the site; below this, there were significantly fewer archaeological materials and the soil transitioned to latossol. The date of 913±30BP comes from charcoal located beneath another griddle (again classed within hypothetical ware SM-3), whose rim is incised with oblique and intersecting lines, at the bottom of feature F3. Feature F4 is dated to 865±30BP. This contained remains of what seems to have been a lithic 'workshop' at the eastern end of the site.

7.2 Discussion

Back to F3. From the C^{14} dates obtained we can affirm that the beginning of F3 postdates the 'occupational floor' of N1000/E958 (dated 913±30BP and 1039±26BP respectively) and that F3 and adjacent N1000/E958 was initially an area of food preparation, since both dates, taken from adjacent units, relate to charcoal samples taken from beneath large, horizontally placed griddle fragments that seem to be *in situ*. The griddle found in F3 was placed in a lowered cavity. Sherds with red-coloured pastes only appear in significant numbers from the 20-30cm and 30-40cm levels of N1000/E958-958.5 and in the 40-50cm and 50-60cm levels of N1000/E957 (F3) (see charts 3 and 4 below). Although the totality of sherds from these test pits would have to be verified before it can be securely stated that red pastes are localised within specific stratigraphic contexts, this may be an indication of related deposition contexts between the 30-40cm level of N1000/E958-958.5 and the 40-50 and 50-60cm levels of N1000/E957 (F3).



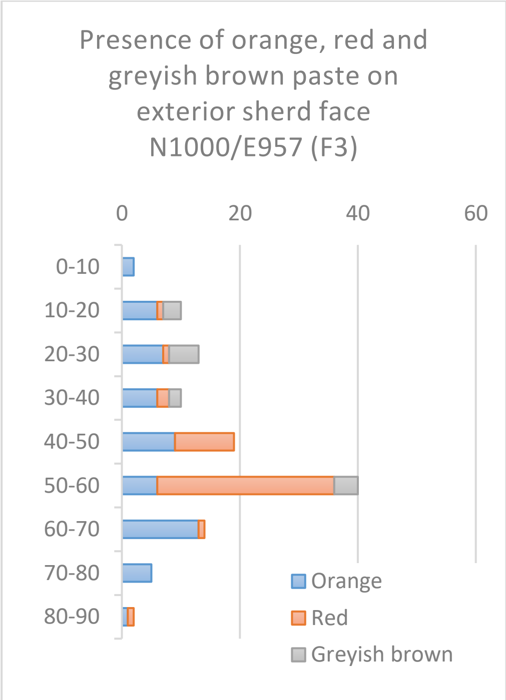


Chart 2 Presence of orange, red and greyish brown paste on exterior sherd face N1000/E958-958.5. Chart 3 Presence of orange, red and greyish brown paste on exterior sherd face N1000/E957.

A multiple correspondence analysis including data on decoration and stratigraphic level for N1000/E957 (F3) shows how its three lowermost levels (60-70cm, 70-80cm and 80-90cm) are all located at ever-increasing distances from the concentrated decorative attributes and other levels of this test pit, indicating that the lower levels of the unit contained little decorated pottery (this can be seen also in relevant tables in Appendix 14, where a larger version of the MCA plot can be viewed). This might be related to the fact that the lower levels contain remains of ceramics used for food preparation that had less decoration. Once F3 became a pit for secondary disposal of pottery used in serving food, the amount of decorated pottery increased.

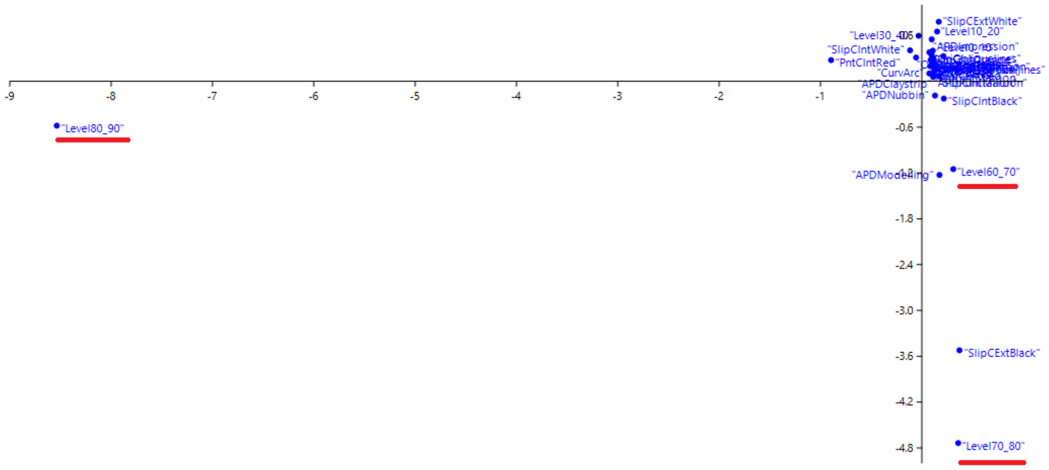


Fig. 121 MCA of levels and decoration of ceramic sherds from N1000/E957 (F3). The red lines underline levels 60-70cm, 70-80cm and 80-90cm.

The results of the ceramic analysis and the dates obtained point to the existence of one ceramic complex at the Sawre Muybu site, related to a community that established itself in the late ninth or early tenth century AD. We estimate that the site stopped being lived in[119] by the makers and users of this ceramic complex in the latter half of the eleventh century, or in the early twelfth century AD. It is not possible to say whether the site was lived in continuously over the approximately 200 years of its occupation, or whether it was temporarily abandoned and then reoccupied shortly thereafter. The continuous stratum of ADE would seem to point to continuous occupation, but this needs to be evaluated with further excavations, dates and soil analyses. The possible churning of ADE (as happens in some Amazonian sites) by subsequent re-occupations may have obscured our ability to determine if there was momentary abandonment/reoccupation.

[119] It may still have been occupied as part of a larger territory, as a hunting ground or agricultural plot, for instance.

The Incised and Punctate Tradition at Sawre Muybu. Among the 'signature' embellishments for the pottery found at the site are applied and punctated clay strips or ridges, and applied and punctated or incised nubbins, which usually occur in pairs, producing the appearance of zoomorphic eyes. These are obvious manifestations of the Incised and Punctate Tradition and are present on both wares SM-1 and SM-2. The overall appearance and finish of these two wares is nonetheless distinct. On the *cauixí*-tempered material (ware SM-2), the clay strips and their concomitant punctations are more refined, their formal and stylistic attributes controlled – they seem more 'sober' in comparison to the rough-and-ready, less disciplined application of designs observed on the quartz sand-tempered material (ware SM-1). The distinction is similar to that described between the Arauquín and Matraquero styles defined by Cruxent and Rouse (1958). They wrote that with the latter pottery, ridges were well worked into the vessel surface but in a cruder, more irregular manner than in the Arauquín style. They would be punctated with a blunter tool, which made the sides of the ridges bulge, producing a chain-like effect.

The IPT elements within SM-1 are perhaps what Lathrap would have described as a "poorly understood and garbled" version of Carib culture, produced by the "more desirable women" chosen as wives by the "raiding parties of young men" (1970, pp. 65, 164, 170). Sassaman and Rudolphi (2001, p. 408) write that women potters would have taken part in at least two communities of practice – "their natal communities, as mothers, daughters, and sisters, and their marital communities, as daughters-in-law and wives". They write that "Recognition of these varied social identities not only helps to explain regional variation in early pottery but also provides a basis for explaining change in communities of practice arising from the potential conflicts of contradictory social obligations and responsibilities" (Ibid., p. 408). This view, though far more nuanced and considerate of female perspectives in comparison with Lathrap's, still puts the emphasis on women attending to external obligations and responsibilities without apparently being able to determine the outcome of their ceramic production.

Analysing the development of women's pottery styles in the context of their political life stages (Browser and Patton 2008, p. 119) through the lens of the community of practice and situated learning concepts, ethnoarchaeological investigations undertaken along the Conambo River basin of the Ecuadorian Amazon by Brenda Bowser and John Patton (2008) emphasise that learners are *legitimate peripheral participants*: neophytes who at first take part as peripheral members and eventually become full members through a process of socialisation. *Dynamic tension* follows the process of transition and eventual displacement as newcomers endeavour to affirm their own identities through practice: "This phenomenon is precisely where explanations of discontinuity and change may lie" (Bowser and Patton 2008, p. 108).

The authors notice that women's domestic pottery style in Conambo "may be understood as part of their motivated political strategies and the active processes of constructing, maintaining, and negotiating social identity, social group membership, and group boundaries" (Bowser 2000; 2002 cited in Bowser & Patton 2008, p. 106). The data they analyse show that women's political strategies change during different moments of their lives and that, as they become competent in recognising stylistic symbols of group membership, they accordingly apply different strategies of stylistic behaviour (2008, p. 107). Transmission varies from vertical (inter-generational) to horizontal (between the same generation) in relation to the different life stages of a woman's political and social network (2008, p. 120-127) and corresponding conformity and nonconformity represent different strategies of signification and alliance building (2008, p. 129). Bowser and Patton surmise that ceramic style is associated "strongly with women's political relationships and only weakly with ethnicity, even though ethnicity is a more heritable dimension of social identity" (2008, p. 105). This research offers elements for an alternative interpretation of this pottery, which places the agency of the potters (who we assume to be women) in the foreground.

The apparent absence of the 'chain' motif from the deeper levels of the site may be another indication of this element being incorporated into the stylistic grammar applied by the site's potters at a later moment. This remains to be tested, but could provide insight into the timing of involvement of this community with IPT networks, denoted by the presence of the *cauixí* finewares and foreign lithic material and by the development of a hybrid ceramic style, or of an elaborating branch of a converging tradition, as Haury *et al*. (1956) would define it. An analogy may be drawn with the Caripo Kwep type (found from the eastern coast of French Guyana to the Lower Oyapock). According to Rostain (1994, p. 180-181) Caripo Kwep is characteristic of the IPT and may represent an intrusion originating in the middle Amazon that would later be assimilated by Aristé populations.

In Santarém, early IPT ceramics are dated to c. 900 AD (e.g. Quinn 2004). The arrival of IPT elements in the SM area do not seem to signal violent, partial ethnic displacement, but rather networks of negotiation and exchange and the circulation of people, perhaps along similar lines to what was proposed by Schaan (2016, p. 34, see chapter 2). Carib speakers may well have participated and circulated within these networks, but if there was movement of Carib speakers from the north to the south, there were already people living at Sawre Muybu. Considering the available linguistic information and hypotheses that cover the Tapajós, the likelihood is that the early occupants of Sawre Muybu were Tupians.

With this in mind, we shall travel further upstream to the Mangabal site.

7.3 The Mangabal complex

We had expected the considerable depth of the N998/E974.5-973.5 units to reflect the passage of hundreds of years. This, and the possibility of mechanical mixing, led us to send eight samples from the site (seven from N998/E974.5-E973.5 and one from N1074/E1000) for charcoal dating. However, all of the dates consistently fall between the mid-7th century AD and the early 9th century AD, encompassing a period of approximately 120 years. In spite of a sizable range of stylistic variability indicated by single specimens excavated, the materials from Mangabal constitute a single ceramic complex: throughout the stratigraphy and in different test pits there is a degree of standardisation in technological practices and formal elements. Honorato de Oliveira reached similar conclusions (2015), noting that there is marked continuity in raw materials used and in the lithic reduction sequences he examined. Thus, we can state with some confidence that Mangabal ceramics were made by the members of a face-to-face community who lived in the area from the 7th century AD for 150-200 years. As such they can be referred to as the Mangabal complex. The dates obtained for N998/E974.5-973.5 do point to a degree of mechanical mixing, with the earlier dates relating to shallower layers. This means we are not yet in a position to confidently chart incremental changes over the site's occupation, however this is an avenue that can be better explored in future.

We recovered a total of 20,638 ceramic sherds and 76 fire dogs from the Mangabal site, weighing 110.801kg in total. Collection of samples first took place in 2011, when we augered 11 post holes and opened up a 1x1m test pit at the N1074/E1000 point.[120] We returned to the site in 2014 and opened up a further 61 augers and three test pits. The 11 post holes excavated in 2011 yielded 3.3kg of pottery, while 61 augers produced 5.5kg in 2014. The proportionately greater amount of debris collected in 2011 suggests that the area initially augered by the project covered the part of the site subject to the longest and/or more intensive period of occupation.

Pottery retrieved from Mangabal site										
Year	Augering programme		Test pits							
			N1074/E1000		N887/E1200		Mounded deposit			
							N998/E973.5		N998/E974.5	
	W	SC	W	SC	W	SC	W	SC	W	SC
2011	3.330	1537	9.832	2152	-	-	-	-	-	
2014	5.491	1685	-	-	13.064	2562	38.051	6191	41.033	6511
A	-	800*	-	90**	-	4	-	549	-	30*

*Table 8 Pottery retrieved from Mangabal (weight and sherd count). W= weight (kg); SC = sherd count. * Analysed by H. Tavares under the supervision of Bruna Rocha. **Analysed in 2011 by R. A. dos Santos under the supervision of Claide Moraes and Bruna Rocha.*

In the following section, the subsample of 549 sherds I analysed in greater detail from N998/E973.5 will be the main basis for our description for the different dimensions. We checked the representativeness of our sample by comparing our findings regarding technological dimensions with the results of Tavares' analysis.

[120] See Appendix 5.1 for auger map.

Artefacts from all test pits were included in formal analysis (71 in total). See Appendix 14 for further information on the samples analysed and the analytical steps taken to reach the description presented below. A synthesis of the dimensions of the Mangabal complex now follows.

<u>Technology</u>: In contrast to what was observed among Sawre Muybu pottery, patterns for technological dimensions are not as clear cut as they are at Sawre Muybu: the connection between choice of temper, firing and colour of the paste is not as regular. Potters at Mangabal could select either quartz sand (seen in over half of pieces analysed) or sponge spicules as their primary tempers; *caraipé* occurred as an exception. When present, *cauixí* was added in abundance and we can observe that the spicules tend to be aligned, following the potters' gestures when the vessel body was being formed. In contrast with ware SM-2, *cauixí* was more likely to be fired in an oxidising atmosphere, while quartz sand seems more often to be associated with partially oxidised firings. *Caraipé* is uncommon and *caraipé B* is rare as a primary temper. Quartz sand is a frequent second-order temper, while *cauixí* is unusual, suggesting it was not already present in the clay matrix. *Caraipé*, *caraipé B*, and grog were intentional additions to paste recipes. Haematite and unidentified minerals were probably already present in the clay. Among unidentified minerals, particles that resemble gold (see photographs below) can occasionally be detected as a secondary temper. The presence of these inclusions may suggest the selection of specific clays by the potters of Mangabal.

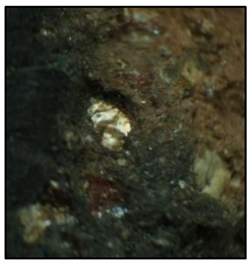


Fig. 122 An as-yet unidentified mineral found in the ceramic matrix, which may be found to be gold. The inclusion lends a glittery appearance to the pottery. Fig. 123 and 124 show particles magnified by the microscope. Fig. 125 Cauixí, photographed through the microscope lens; the abundance and alignment of the silicose spicules is evident. Photographs by Vinicius Honorato.

Oxidised firings are most common, closely followed by partially oxidised firings; blackened cores are not present. It is interesting to note that if anything, at Mangabal *cauixí* is more closely associated with oxidised firings. The colour of the paste post-firing varies most often from brownish to greyish colours; the former is more closely associated to quartz sand while the latter is to *cauixí*. Reddish and orange pastes also occur at times, but they are not clearly associated with a specific primary temper or type of firing.

<u>Form</u>: In contrast to what we saw with the material from Sawre Muybu, quartz sand temper does not automatically lead to thicker vessel walls – on the contrary, there are greater numbers of thicker sherds tempered primarily with *cauixí* than with quartz sand. Vessel wall thickness falls between 4-9.9mm, which is reduced in comparison to the SM materials. Vessel horizontal cross section is always circular. Bases found are mostly flat – it is likely that convex bases were also present among the excavated material, but fragmentation would have led to their being mistaken for vessel wall sherds. Vessels with convex bases were retrieved from the Tapajós River near the Mangabal site. Their body forms and incised designs are similar to Mangabal material. One excavated base has a bi-concave cross-section (fig. 128). The singularity of this piece (TPM-1056) lies not only in its form but also in the way the inside was painted (fig. 164). See below for description of the vessel set at Mangabal.

Fig. 126 Near the Machado community and Terra Preta do Mangabal site, Josué Lobato Cirino holds a vessel recovered from the river (2010). Fig. 127 Another recovered vessel kept by a family in the Vilhinha community, in Montanha (2010). Photos by Bruna Rocha.

Fig. 128 Profile of TPM-1056, which is a bi-concave base sherd. Its inner surface displays maroon red on white painting (concentric circles). Photo by Vinicius Honorato.

Inflected contours prevail over composite ones at Mangabal. On occasion keels were noted, but composite forms are not described here due to the lack of associated rims. Another form not described but present at the site is the corrugated 'bottle' fragment encountered by seu Josué while preparing the land for planting (fig. 158). Straight and constricted necks were identified at the site. Rims can have zero modification, upright inclination, a bevelled finish, they can be tapering (the latter two are mostly everted), they can be folded out at a slight angle or be curved outwards (figs. 129 and 130), they can be flanged (figs. 131 and 132), in-turning, internally thickened with a number of different profiles, such as trianguloid or trapezoid (figs. 133 and 134, Plate 9), they can be externally thickened (with either inverted, upright or everted inclination) or indeterminately thickened (see Appendix for full description and contextual information). Lips are more often flat than rounded – this is another distinctive feature of this ceramic industry.

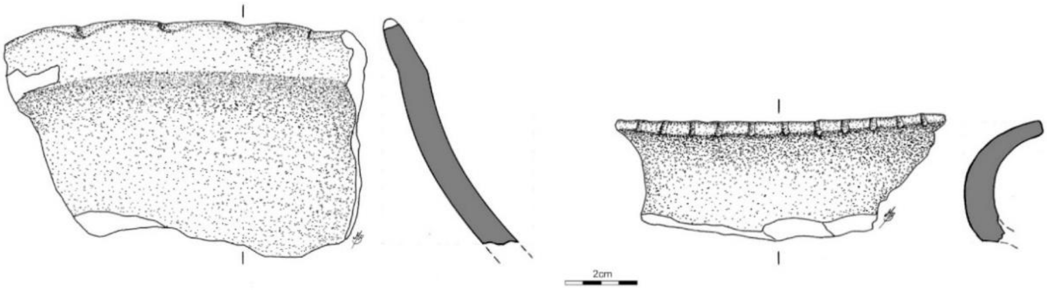


Fig. 129 TPM-562-30 is everted and folded out at a slight angle. It is associated with a simple, unrestricted vessel. Fig. 130 TPM-119-03 is an everted, out-curved rim, which has a flat, nicked lip. It was probably attached to an independent restricted vessel. Illustrations by Marcos Brito.

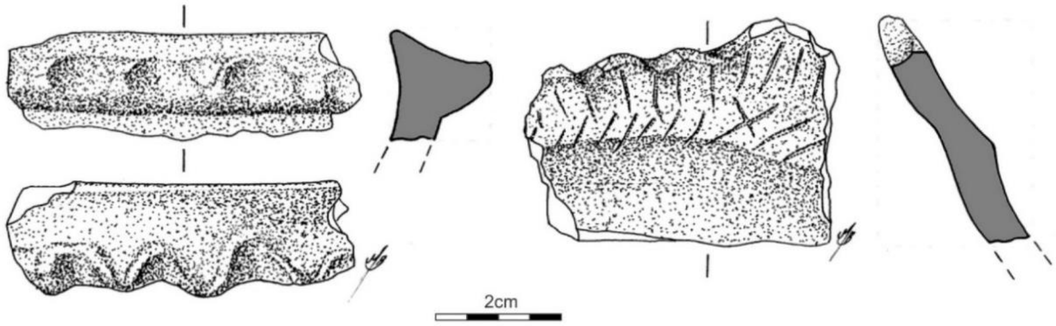
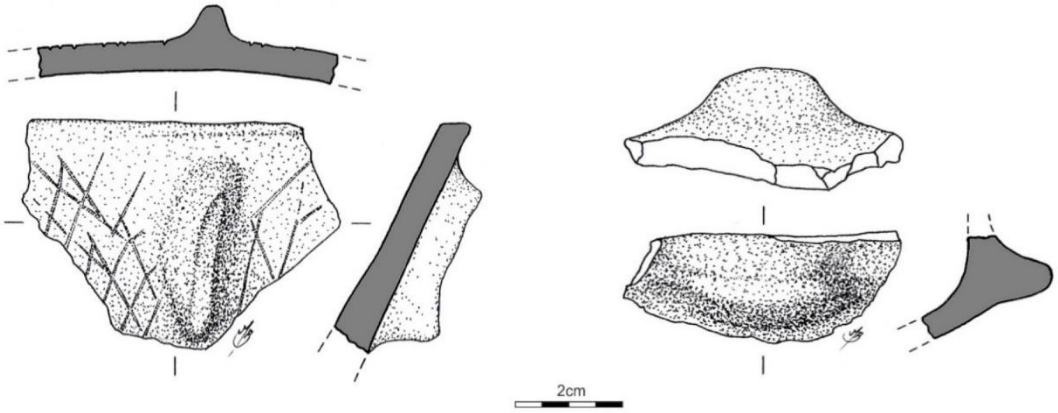


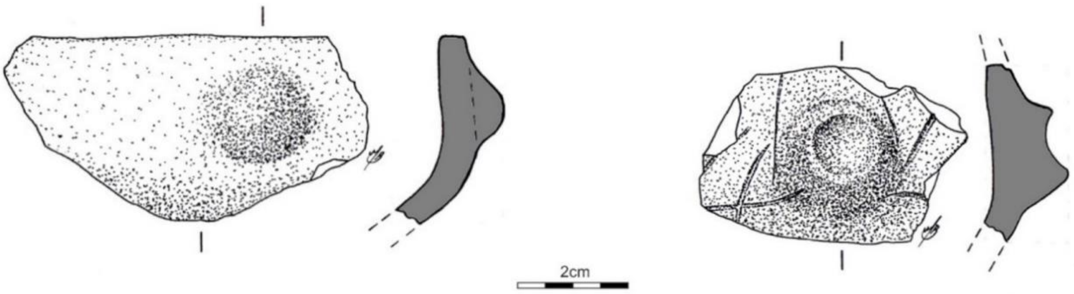
Fig. 131 TPM-1024-100 displaying a small flange. Fig. 132 TPM-1091-01 displays a more elongated flange. Illustrations by Marcos Brito.

Fig. 133 TPM-1006-57 is an internally-thickened rim. Fig. 134 The inner rim displays impressed decoration. Photos: Vinicius Honorato.

Four overall categories of appendages were observed among excavated pottery from Mangabal. They include protuberances/handles placed near the vessel rim or the midpoint of the body, which probably acted as supports for handling the vessels, facilitating grip. They were formed through the addition of clay to the body exterior and could have a rounded or more linear shape, and could be the object of plastic decoration (incision or modelling). Adornos, in the form of zoomorphic representations are also present, produced by combining modelling (pushing the vessel wall outwards) and the addition of clay nubbins that were incised, punctated or hollowed out. Appliqué adornos, created by adding clay to the vessel exterior and modelling, punctuating, excising and painting, were another possibility. Labial extensions were found in rare instances. A hollow and modelled figurine fragment may have been an anthropomorphic representation because of its general shape and a protruding element that resembles an arm. An unidentified artefact may also have belonged to a figurine, shaped by modelling and by plastic displacement techniques. In cross-section it is triangular-shaped, however its edges are rounded.



Protuberances. Fig. 135 TPM-548-70 has a linear shape and is perpendicular to the vessel rim. Fig. 136 TPM-542-75 is located at the point where there is a change from outwards inclination to an upright rim.



Protuberances. Fig. 137 TPM-1024-66 is a rounded protuberance placed towards the top of the vessel, on its upright rim. Fig. 138 TPM-1077-30 exhibits a rounded protuberance with a circular depression touched by incisions.

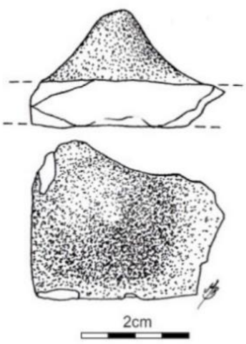
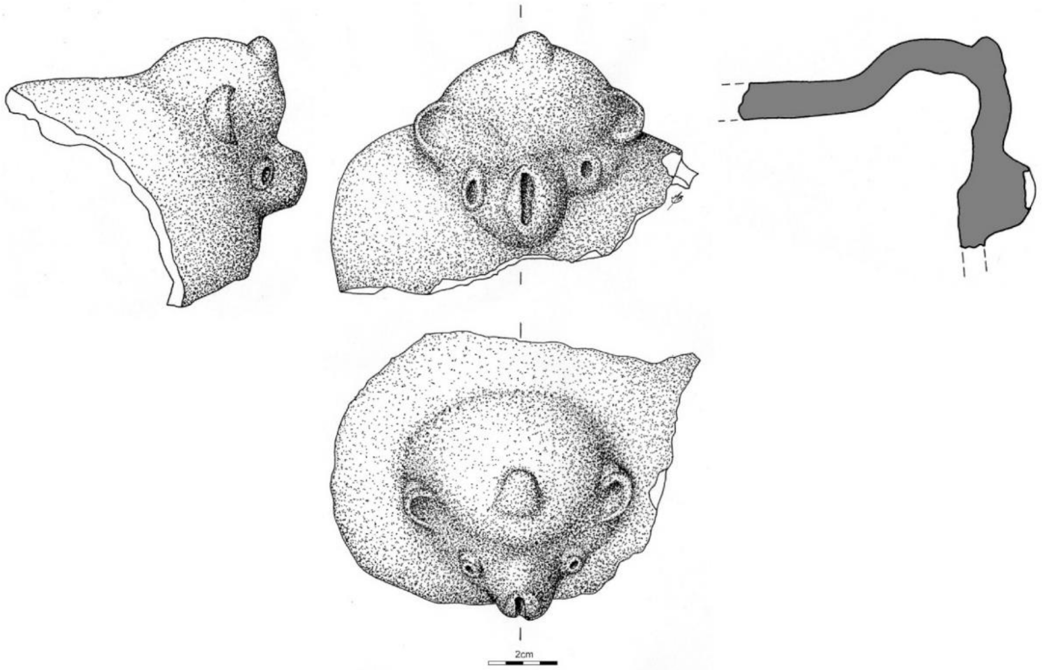
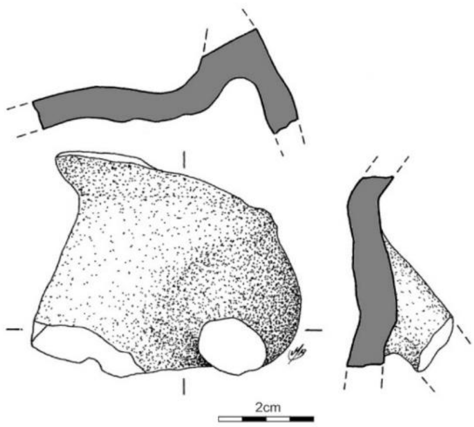
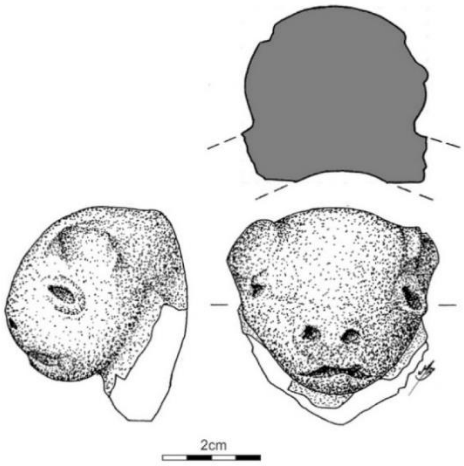
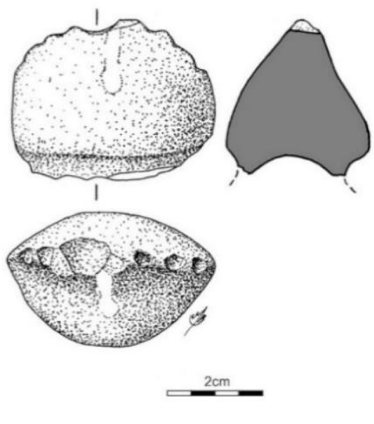


Fig. 139 TPM-1062-69 was located at an indeterminate point of the vessel. Illustrations by Marcos Brito.









Clockwise from top left: Fig. 140 TPM-551-1 is a zoomorphic adorno which was produced combining plastic additive and displacement techniques. Fig. 141 TPM-1046-01 is also a zoomorphic adorno, produced through the combination of plastic techniques and with chromatic application (see fig. 155). Fig. 142 TPM-1071-01 is an unidentified clay artefact. It may have belonged to a figurine. Fig. 143 TPM-531-7 may have been an anthropomorphic figurine and has also been painted (see fig. 154). Illustrations by Marcos Brito.

Surface treatment and decoration: Divergences produced from different tempers and imperfections resulting from variable firings were masked by the extensive application of surface treatments, including self-slip. Surface finish, or treatment, is one of the hallmarks of the Mangabal ceramic complex. Potters clearly took great care in finishing vessel surfaces and were well in control of these procedures. This set of practices could be extremely well executed, and certainly embellished the finished products, giving them a smooth, refined and rather elegant appearance, suggesting this 'smoothness' was a shared aesthetic value (even if 'striations' – see figs. 149 and 151 – and an outlier with a possibly corrugated surface – see fig. 158 – occasionally occur). Self-slip was frequently applied and smoothing is the most commonplace technique for evening vessel surfaces; burnishing, smudging and polishing (in decreasing order of popularity) are also seen. Though smudging and polishing were not encountered sufficiently to be considered modes, these surface treatments do stand out as a characteristic of Mangabal pottery. Future work should ascertain whether there is a relationship between vessel body form and specific surface treatments, or combinations of surface treatments. Another surface treatment technique occasionally observed, but not included in the tabulation, were deliberate 'striations' of the vessel surface. It is possible a spatula or string was employed to achieve this effect while the clay was still in a plastic state, seen below. Resin was only exceptionally identified; this low figure may be related to poor preservation conditions and/or the resin's biodegradability.

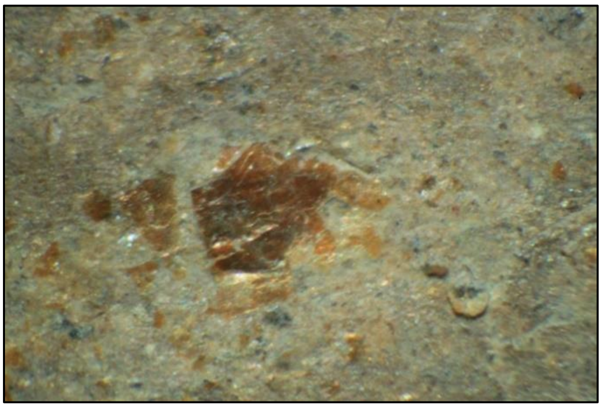
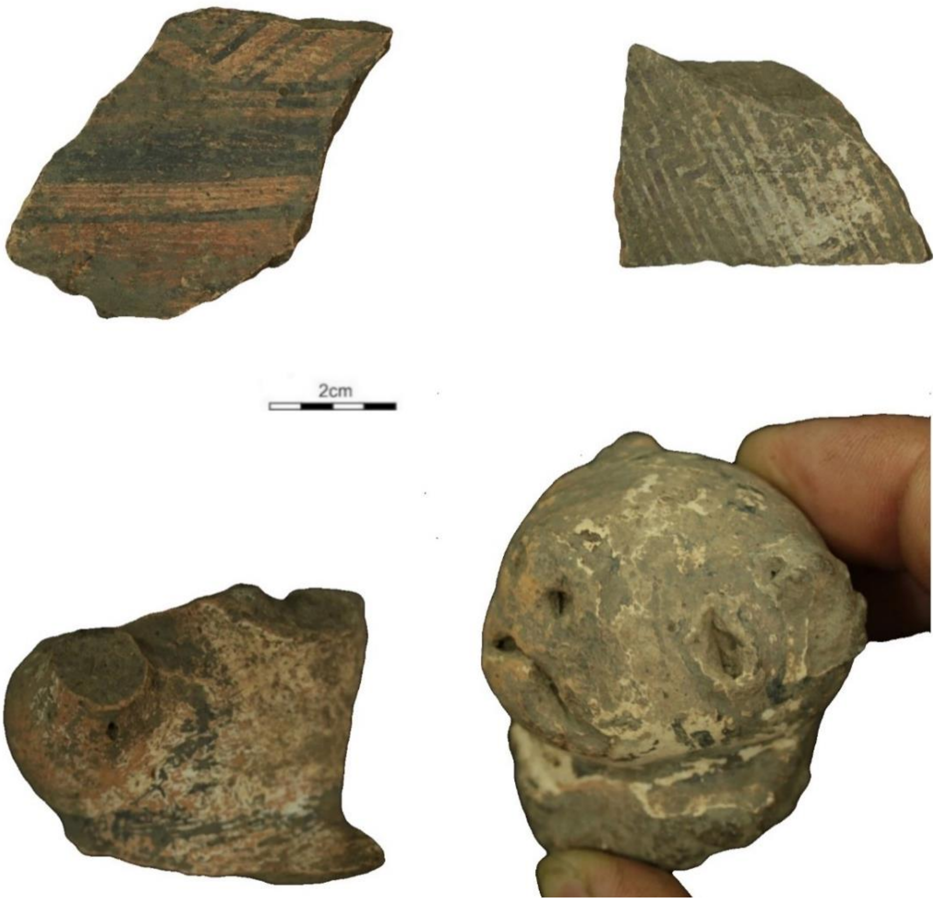


Fig. 144 Smudging can be noted on TPM-1042-182 Fig. 145 Traces of resin seen through the microscope on TPM-1024-29. Photos by Vinicius Honorato.

Top row: Fig. 146 TPM-1010-15 is burnished and self-slipped. Striations are apparent from the burnishing actions. Fig. 147 TPM-1020-6 is self-slipped and polished. Middle row: Fig. 148 TPM-1006-35 displays smudging. Fig. 149 TPM-1052-56 presents striations. Bottom row: Fig. 150 TPM-1042-16 is a small rim sherd that presents smudging. Fig. 151 TPM-1052-12 presents striations. Photos by Vinicius Honorato

Decoration was highly accomplished, integrating painted and plastic embellishments and demonstrating a varied artistic repertoire, even if some types of decoration were used sparingly. With regard to general techniques, slipping, particularly on external surfaces, is the most common; reddish pigments (maroon and red) were preferred. White slip is present through most of the stratigraphy, but only in small quantities. Orange is unusual and concentrated in the unit's deeper levels. Paint appears to have only been applied exceptionally. Again, reddish hues (red and maroon) are most usual. Some of the painted pieces recovered display intricate patterns requiring technical mastery, which could only have been achieved after much training. These elaborately decorated materials seem to be locally produced, because their technological characteristics closely resemble those of the site's other analysed pottery.



Top row: Fig. 152 Besides its polychrome painting, the surface of TPM-506 was brushed. Fig. 153 TPM-531-9 exhibits the superposition of fine red lines over white slip. Bottom row: Some artefacts present a combination of plastic and chromatic techniques. Fig. 154 TPM-531-7 displays black and white painting over a pinkish slip and may have been a figurine. It is also presented as an illustration in fig. 143. Fig. 155 TPM-1046-01 is an appliqué zoomorphic (feline?) head covered with white slip. Fine black lines delineate its eyes and other features. Photos by Vinicius Honorato.

Within the dimension of clay displacement techniques, incision prevails; impression, punctation, excision, modelling and channelling are infrequent. Clay displacement could also be combined with additive techniques.

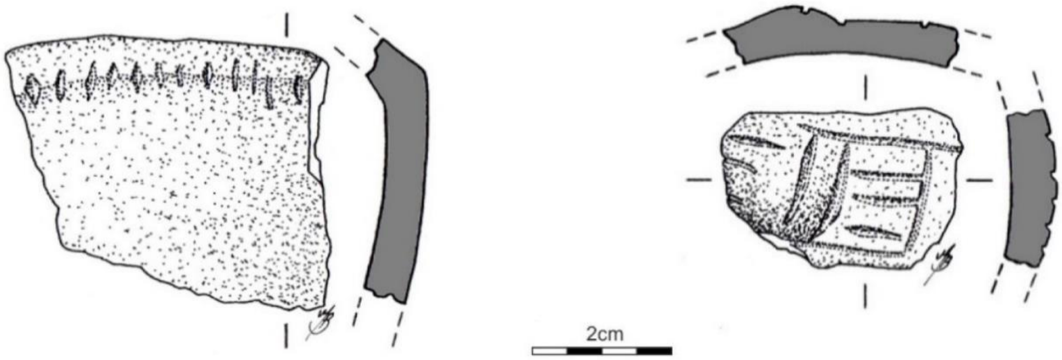


Fig. 156 TPM-1003-06 displays a line of vertical strokes (nicks) following the vessel keel. Fig. 157 TPM-1006-47 is a protuberance presenting a slight bulge and is decorated with incisions. Illustrations by Marcos Brito.

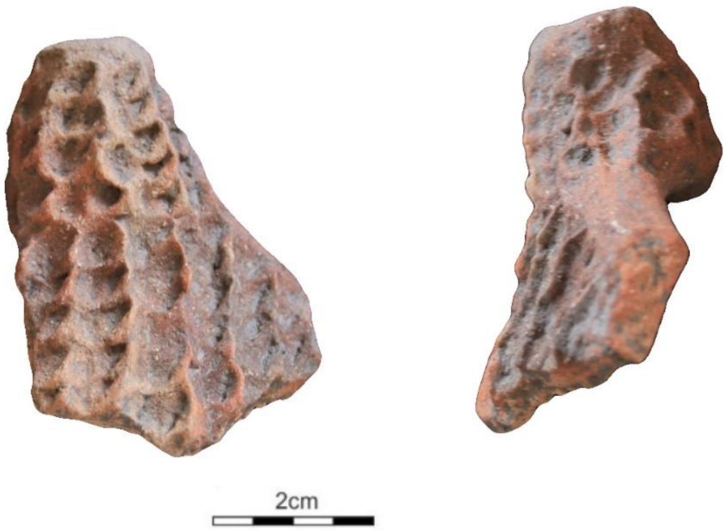


Fig. 158 Possibly corrugated (or stamped?) 'bottle' found by seu Josué as he worked the land. Photos: Vinicius Honorato.

Techniques involving clay displacement. Fig. 159 TPM-551 is a modelled zoomorphic adorno (includes the addition of clay for the eyes, ears and nose). Photo by Vinicius Honorato.

Techniques involving clay displacement. Fig. 160 Punctations can be observed along the lip of TPM-543. Photo by Vinicius Honorato.

Regarding rectilinear designs, what emerges as a common theme are intersecting, incised lines. These can either be oriented in vertical and oblique directions, or in opposing, oblique directions; if the angles are sufficiently acute the design resembles lozenges. These designs can appear on the interior face of griddle rims or on the upper body of inflected vessels (see Plate 9 and fig. 169) and were accomplished with varying degrees of expertise.[121]

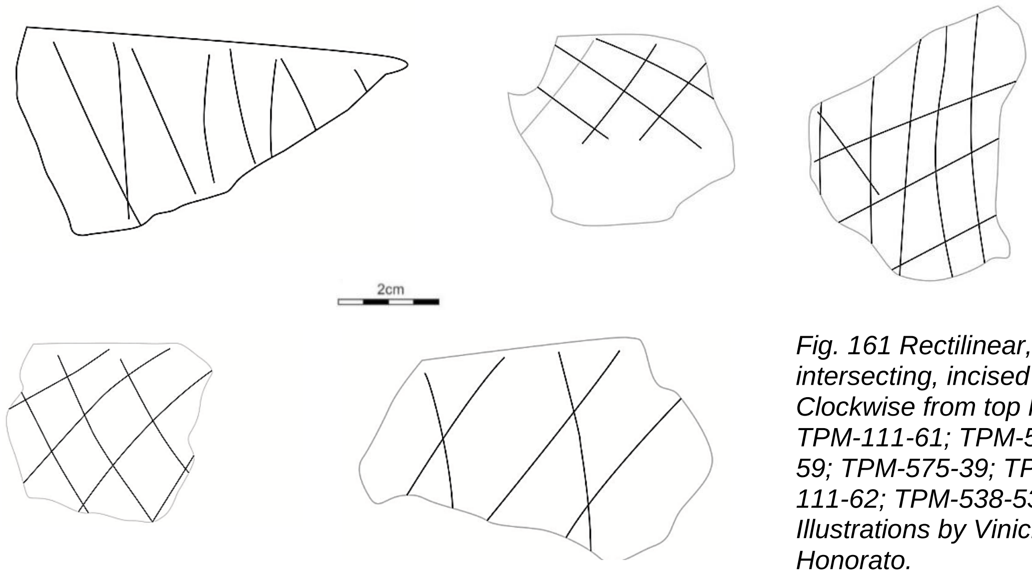


Fig. 161 Rectilinear, intersecting, incised lines. Clockwise from top left: TPM-111-61; TPM-554-59; TPM-575-39; TPM-111-62; TPM-538-53. Illustrations by Vinicius Honorato.

[121] Upon viewing some of these vessels at the Curt Nimuendaju archaeology lab in Santarém, Cecílio Kirixi Munduruku stated that different designs would have expressed different clan affiliations (pers. comm., 19 April 2016).

Other sherds display designs composed of oblique and converging lines, reminiscent of patterns produced by interweaving fibres in basketry. This was achieved through incision or through impression (see fig. 134). Three refitting griddle sherds display alternating sets of obliquely oriented and parallel lines (see Plate 9, TPM-534-08-10). This, again, seems to be a constant theme, observed on much of the body of TPM-305 and hinted at in smaller fragments (fig. 162). Both of these designs are present on vessels found by goldminers diving in the vicinity, in the Tapajós River (see figs. 126 and 127). The “lozenge” design was also noted on a griddle fragment during a cursory visit to the Itapel site, further upstream from the Mangabal site (see chapter 5, map 13). TPM-534-6 and TPM-1006-47 also appear to share a similar idea, exhibiting groupings of horizontal lines connected to three vertical lines (see Plate 9 and fig. 157 respectively).

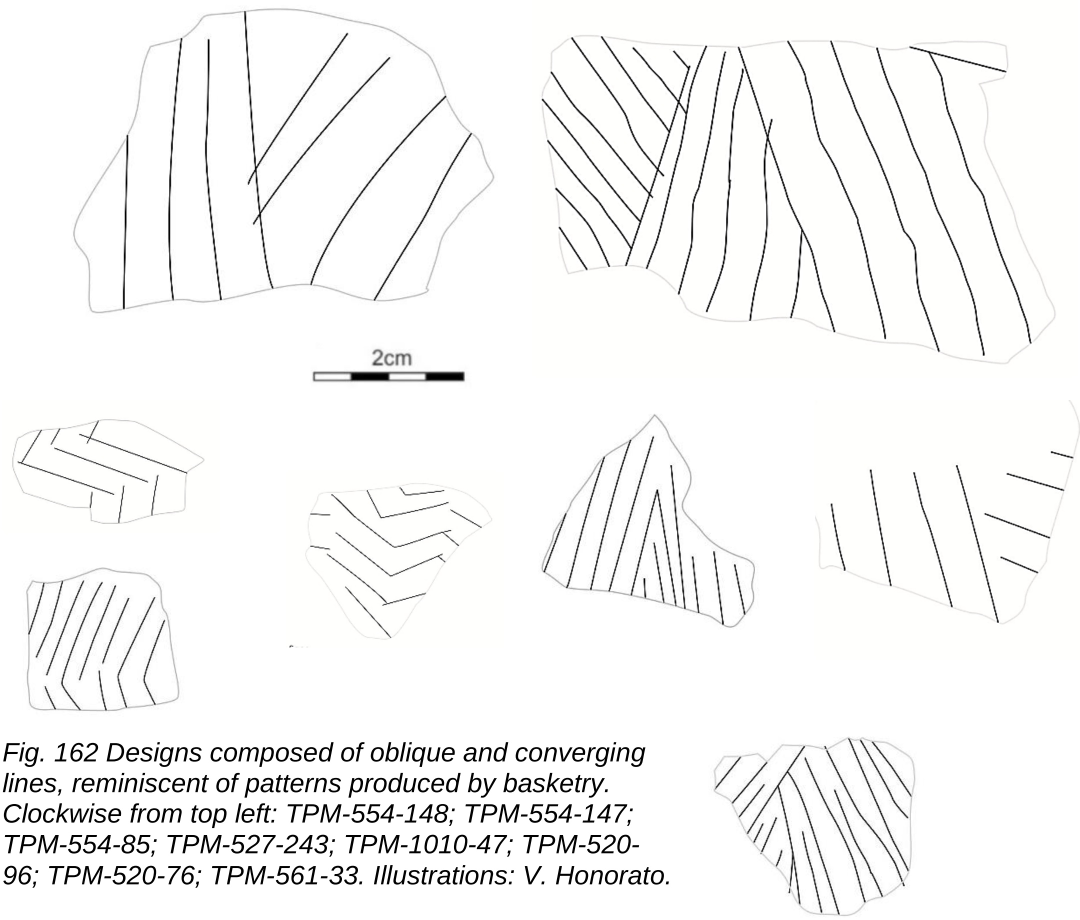


Fig. 162 Designs composed of oblique and converging lines, reminiscent of patterns produced by basketry. Clockwise from top left: TPM-554-148; TPM-554-147; TPM-554-85; TPM-527-243; TPM-1010-47; TPM-520-96; TPM-520-76; TPM-561-33. Illustrations: V. Honorato.

Curvilinear designs are less frequent among our sample. An inflected vessel shape can make rectilinear designs appear slightly curved; perhaps this was calculated by the artists. These designs can be composed of incised, oblique-oriented parallel lines converging to a line oriented in another direction. They can also be painted. Some compositions combined with plastic alterations to the clay create zoomorphic and possibly anthropomorphic figures (TPM-531-7 and TPM-1046-01). Another unique specimen exhibits red (maroon) on white concentric circles outlined in black on the inner surface of a bi-concave base (TPM-1056, shown in figs. 128 and 164).

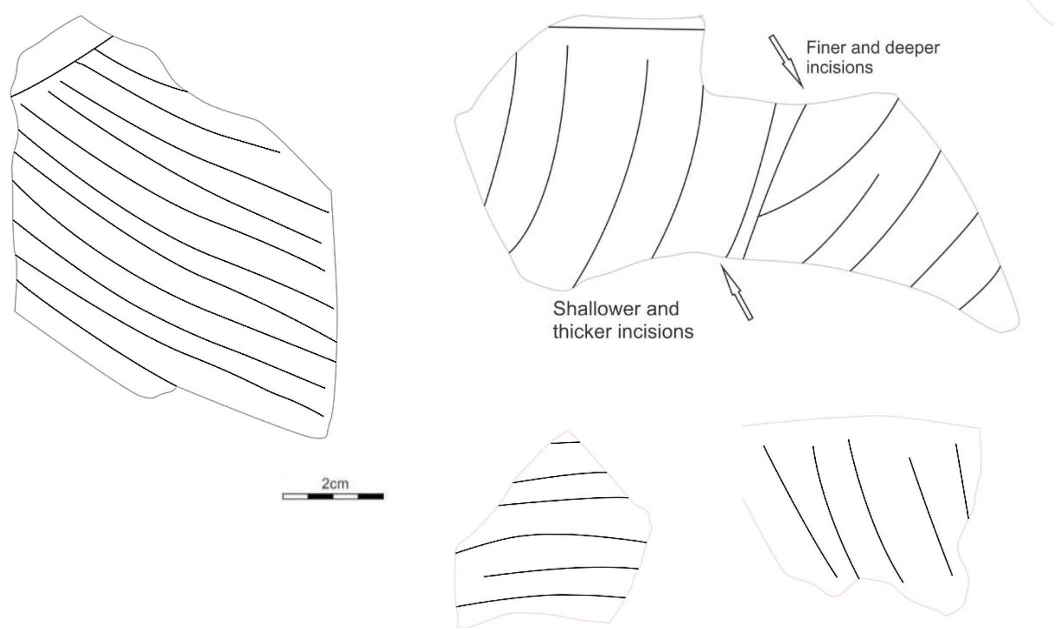


Fig. 163. Curvilinear oblique oriented parallel lines, sometimes connecting to a perpendicular line. Clockwise from top left. TPM-561-57; TPM-520-76; TPM-520-26; TPM-542-53.

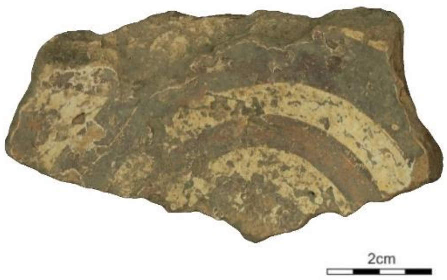


Fig. 164 TPM-1056 is a bi-concave base with its interior painted with concentric circles of alternating colour (white and dark red), outlined in black. Photo: Vinicius Honorato.

Concerning lip finish, smoothed lips make up the overwhelming majority of cases studied. Nicked lips, often applied to lips associated to rim form 7, are relatively frequent and are characteristic of the site’s pottery, being observed on rims from the different test pits (see fig. 130). Another form of finishing lips was to deliberately leave an “overhang” of clay on the outer edge.

'Overhang' of clay deliberately left on outer rims. Fig. 165 TPM-1003-9; Fig. 166 TPM-1010-33; Fig. 167 TPM-1042-66 and TPM-1042-179.

7.3.1 The Mangabal vessel set

Our projection of vessel forms from the Mangabal site is based upon 71 sherds from the excavated test pits (N1200/E887, N1074/E1000, N998/E974.5-E973.5) and from one of the augered post holes (N976/E1050). From this sample we can hypothesise that some of these forms display modal value (see Appendix 14 for further information). Tables 10 and 11 break down the formal segments observed, presenting combinations observed and other hypothetically possible combinations. Specimens from each form are represented in illustrated plates that follow these summary descriptions.

Form 1: Being flat-based griddles, specimens belonging to this form are unrestricted, with simple contours. Form 1 was concentrated in the 50-60cm and 60-70cm levels of N998/E974.5 and at 39cm depth in N1074/E1000. We were not able to confidently estimate the diameters of most of these sherds, though we can see they can be tentatively divided into two sizes, medium (55cm) and large (75cm). The specimens found associated with this form are primarily tempered with *cauixí*. Rims are internally thickened (rim form 9).

Form 2: Form 2 is an unrestricted, moderately deep hemispherical bowl with a simple contour. It is fairly well dispersed through the site in terms of its horizontal and vertical distribution. This form also has three sizes:[122] small (Ø 10-15cm), medium (Ø 18-32cm) and large (Ø 33-45cm). *Cauixí* was the principal temper most

[122] We cannot be sure whether the variations in size of the artefacts studied have modal value because of the limited number of specimens available.

commonly found associated with this form, but quartz sand was also used. This form likely attended to a number of functions, from storage, to preparation, to serving of food. Zero modification, upright, bevelled, tapered and externally thickened rims were seen to be combined with this body form.

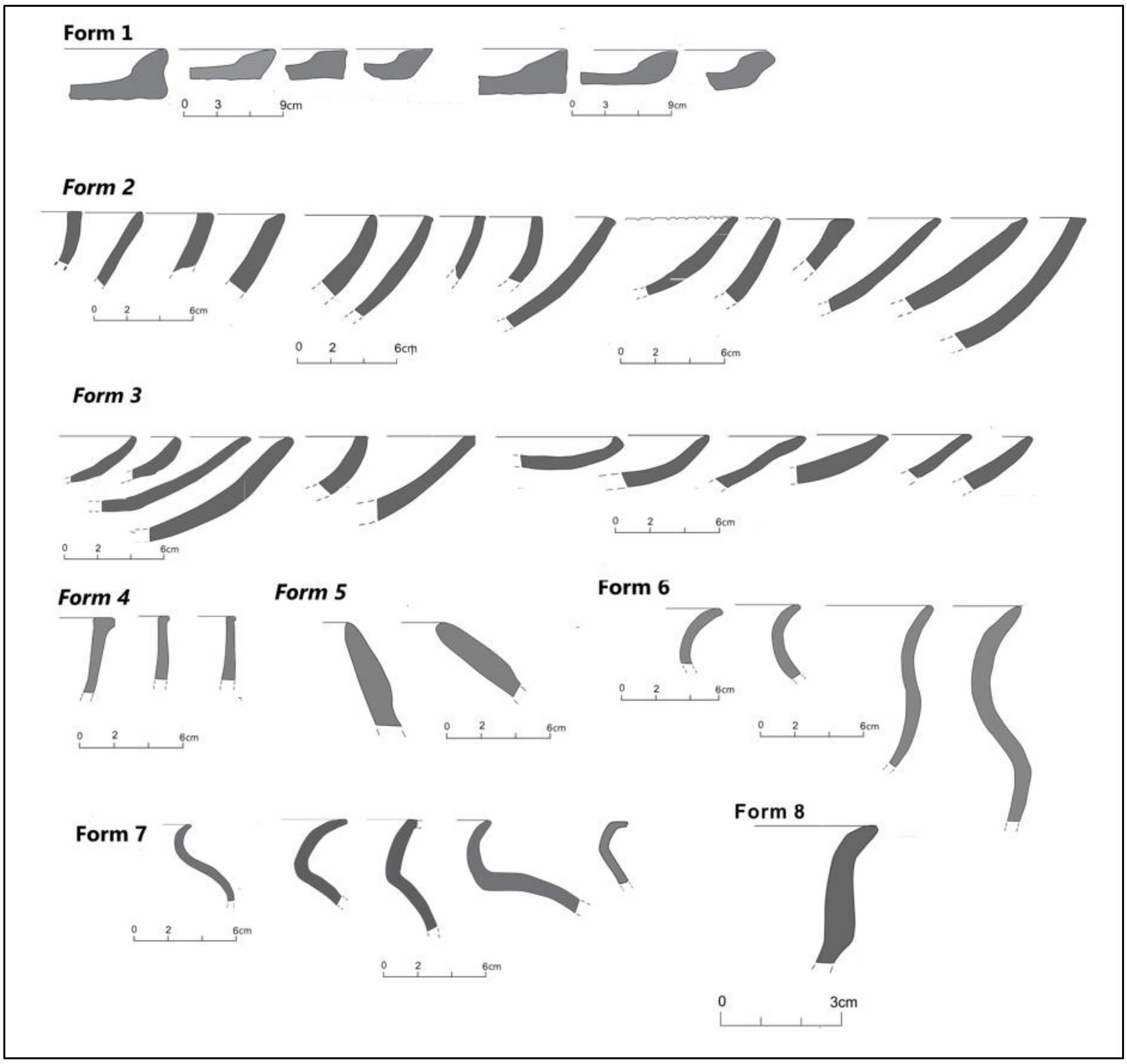


Fig. 168 Summary of vessel forms and associated rims belonging to TPM vessel set. See plates below for more detail. Compilation of forms by Manuel Arroyo-Kalin. Illustrations by V. Honorato and Marcos Brito (see individual plates for more information).

Form 3: Form 3 is an unrestricted, shallow dish with a simple contour; it has three sizes – small (Ø ~15cm), medium (Ø 20-34.9cm) and large (Ø 35-47cm). It was found in all test pits. Most of the time form 3 was found to be tempered with *cauixí*, but it can also be tempered with quartz sand. This form would probably have served a range of functions, from food preparation to serving. Zero modification, upright, bevelled, tapered, and everted rims (folded out at an angle) could be combined with this form.

Form 4: Form 4 has an unrestricted, simple contour and relatively straight walls; upright and/or externally strengthened rims are associated with it. The depth and consequent ability to hold contents could point to food preparation or serving. The specimens identified are mostly tempered with sponge spicules. The available material suggests the presence of small (Ø 15cm) and medium-sized (Ø 24, 25cm) vessels.

Form 5: This form is composed of simple and dependent, restricted vessels whose in-turning walls can be more rounded, with convex sides, or less so. The available material encompasses small (Ø 9cm, 10cm) and medium-large (Ø 35cm) vessels. The diameters of the vessel rims are considerably reduced in comparison to those of unrestricted vessels. In-turning and externally thickened rims are associated with this vessel body form. These vessels would be useful for storage or serving. TPM-305-04, likely to have been a funerary urn, was located during augering. The vessel displays an incised design of oblique, connected lines on its body, which is very similar to the geometric pattern seen on a vessel found inside the Tapajós by Josué Lobato Cirino (fig. 126).

Form 6: These are independent restricted, moderately deep, hemispherical bowls with mild "S"-shaped, inflected contours. Curvature of upper body, to which everted, out-curving rims are attached, varies from slight to more pronounced. This form is very popular, occurring in three sizes: small (Ø 9-15cm), medium (Ø 20-33cm and large (Ø 39-45cm). The uses these vessels were put to would have been partly determined by their size. The smaller vessels could be used by individuals, as cups, or to serve condiments, or as children's toys or learning devices for novice potters. The medium and large vessels could have been used for preparation of food (such as cooking or the fermentation of beverages), serving, or storage (particularly if covered). The independent restricted contour of this form would have been particularly useful for containing liquids. Both sponge spicule and quartz sand were chosen as principal tempering agents when making this form. It stands out as a characteristic vessel body form found on the site, retrieved from most levels of N998/E973.5. Soot can at times be seen on the lower outer body of the medium and large specimens.

Fig. 169 TPM-117 presents a combination one of the modal vessel body forms of the Mangabal site (form 6) and a design of criss-cross incised 'lozenges' also seen on the interior of griddle rims. Charcoal dated to 1270±30 was retrieved from above this vessel. Note presence of soot on lower body. Photo and drawing by Vinicius Honorato.

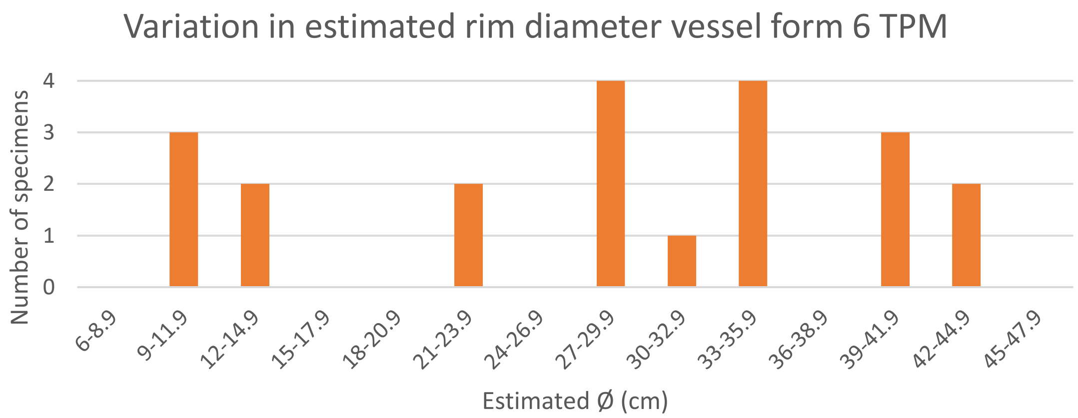


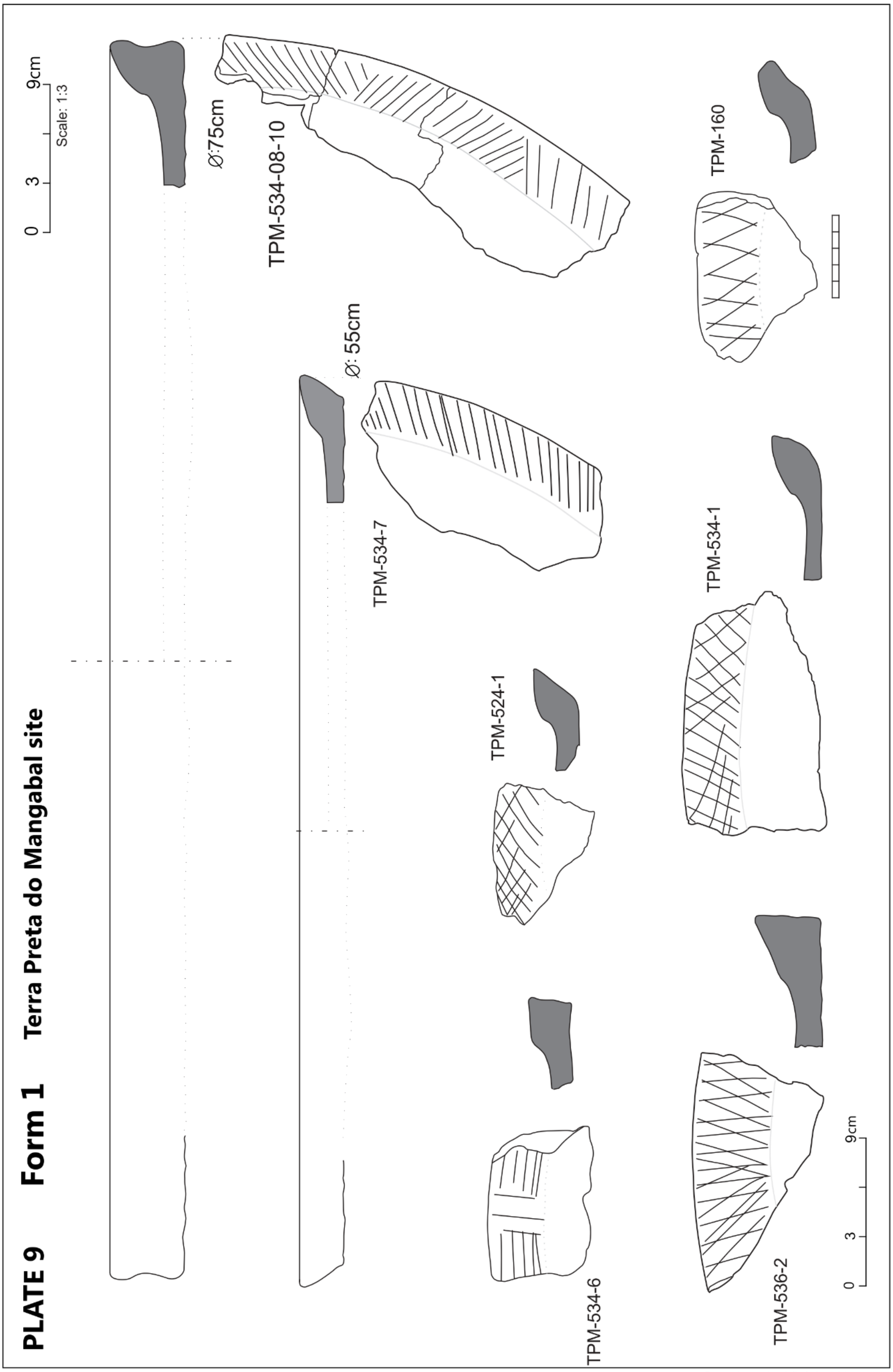
Chart 4 Histogram showing variation in estimated rim diameters associated to Form 6

Form 7: An independent restricted, globular[123] vessel with inflected contour and constricted neck. The angle between neck and body is particularly accentuated.

[123] Although Anna Shepard would likely use the term "spherical" rather than globular, the literature of the region, particularly related to Santarém ceramics, commonly uses the term "globular", which is why it has been preferred in this case. The two terms are interchangeable.

The specimens found have constricted necks attached to them, but upright necks could hypothetically also be attached to this body form. This form would be well suited to storing and pouring liquids. This form was probably not used for cooking activities; the polish on TPM-1020-6 (fig. 147) would seem to confirm this. Both quartz sand and *cauixí* were used to temper form 7. Everted, out-curved or flanged rims can be added to this vessel body form; upright rims could potentially present another alternative.

Form 8: Though its inflected contour resembles that of form 6, this unique specimen is an unrestricted vessel. Its diminutive size (Ø 7cm) suggests it could contain powder or that it could be a toy, or be a vessel made experimentally by a novice potter. It is tempered with *cauixí*. Its rim is everted and curved. *Unique specimen*.



Drawings by Vinicius Honorato

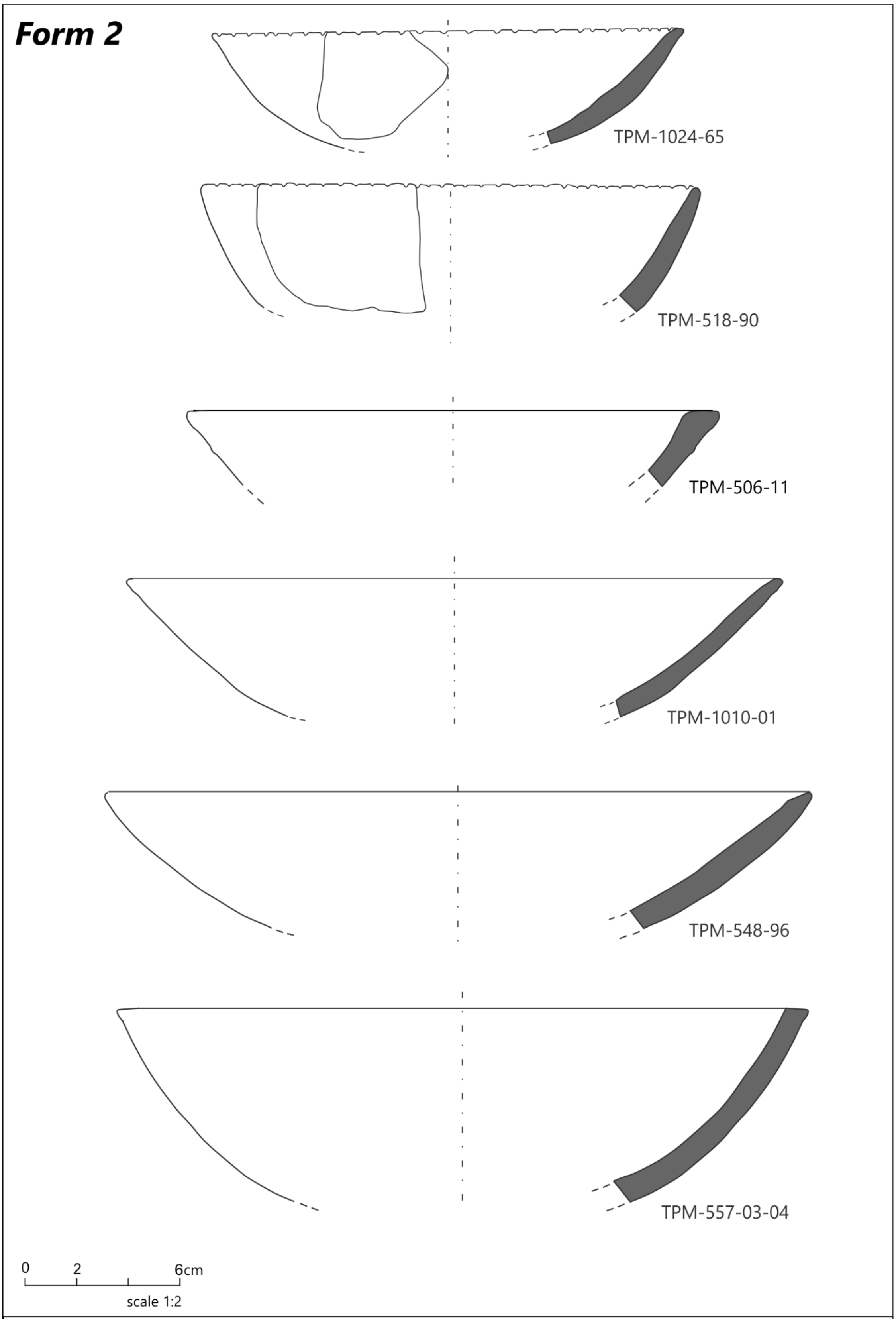


PLATE 10 1/3 Form 2

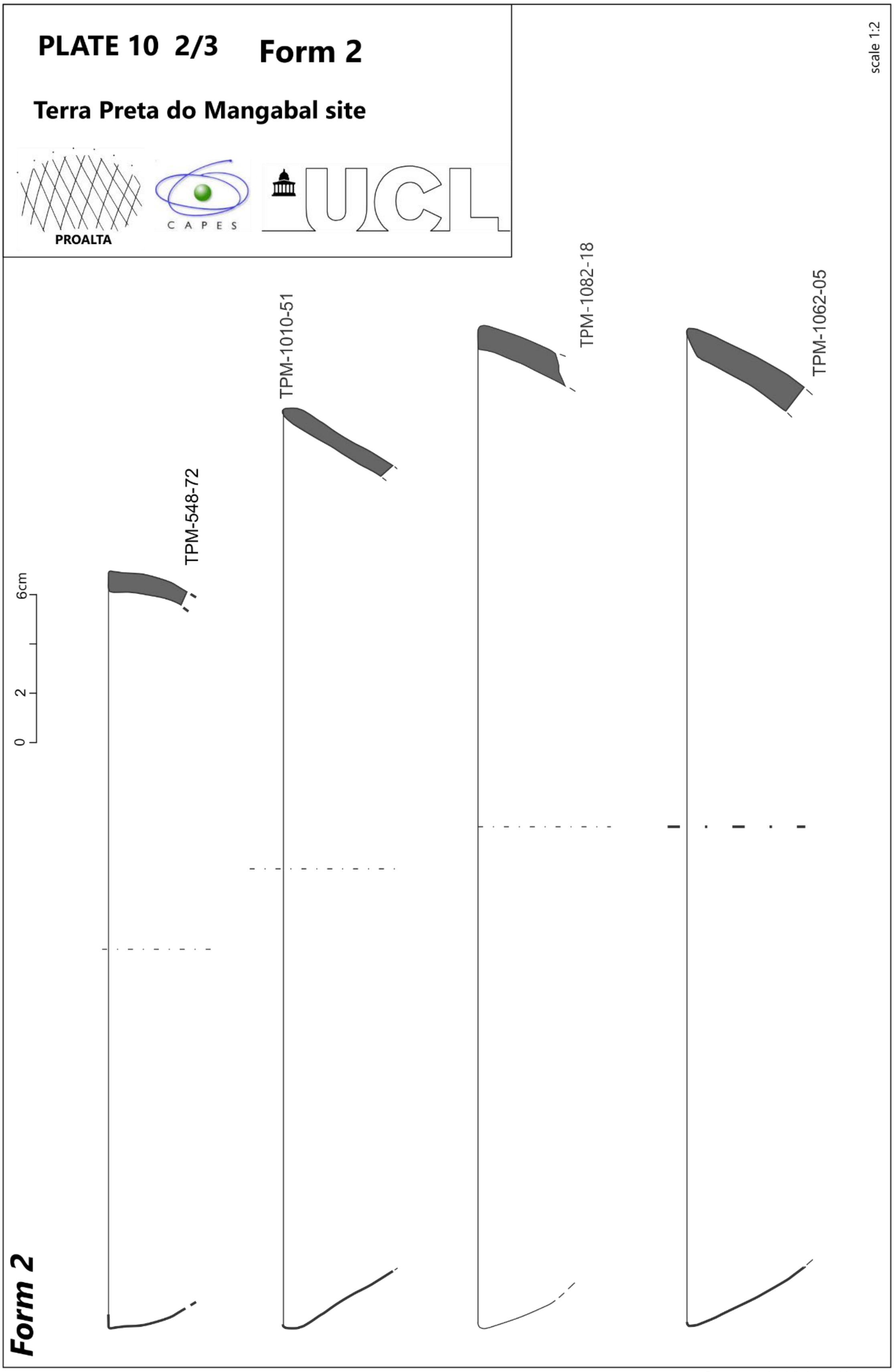
Terra Preta do Mangabal site

PROALTA

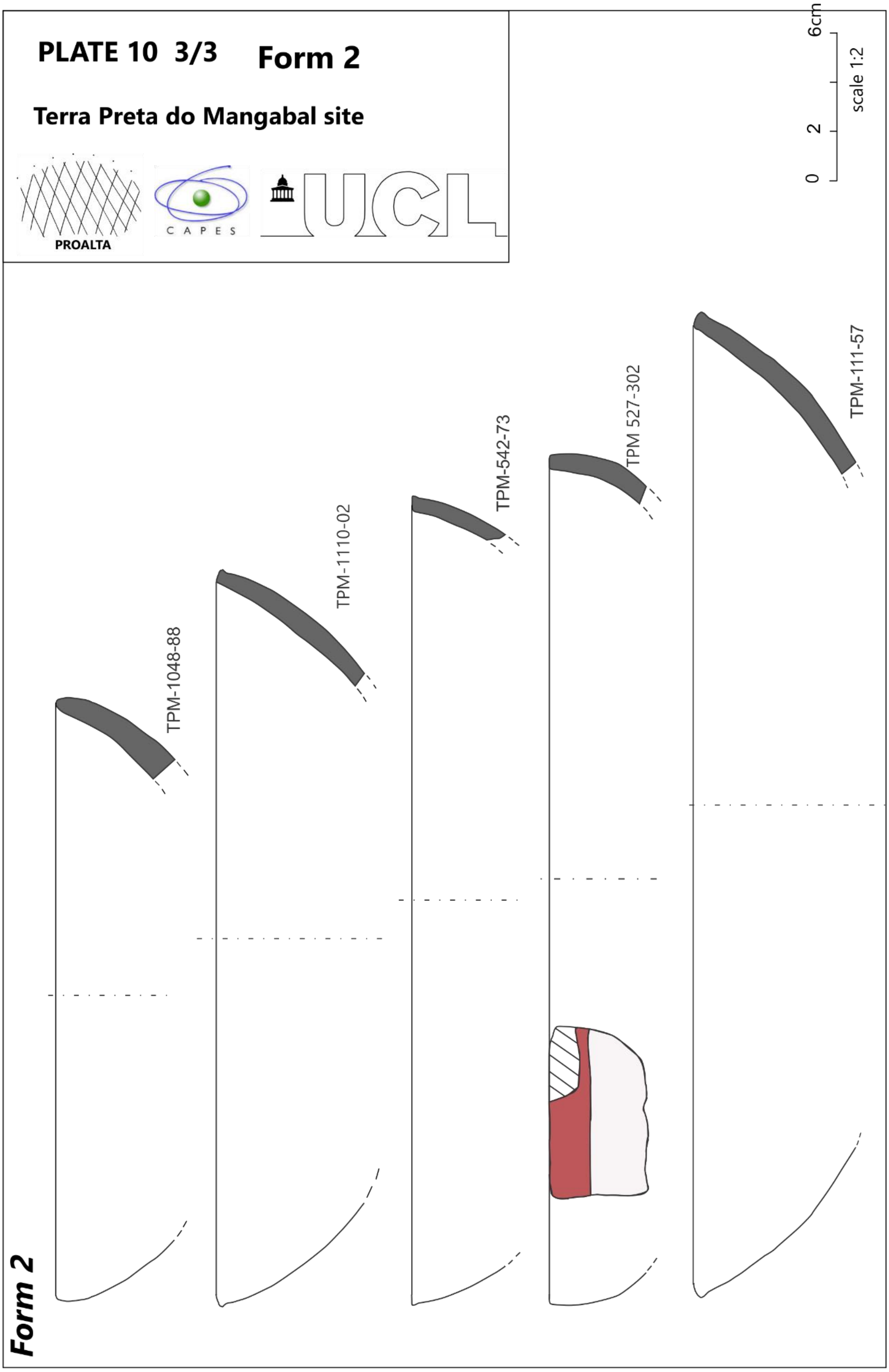
CAPES

UCL

Drawings by Vinicius Honorato

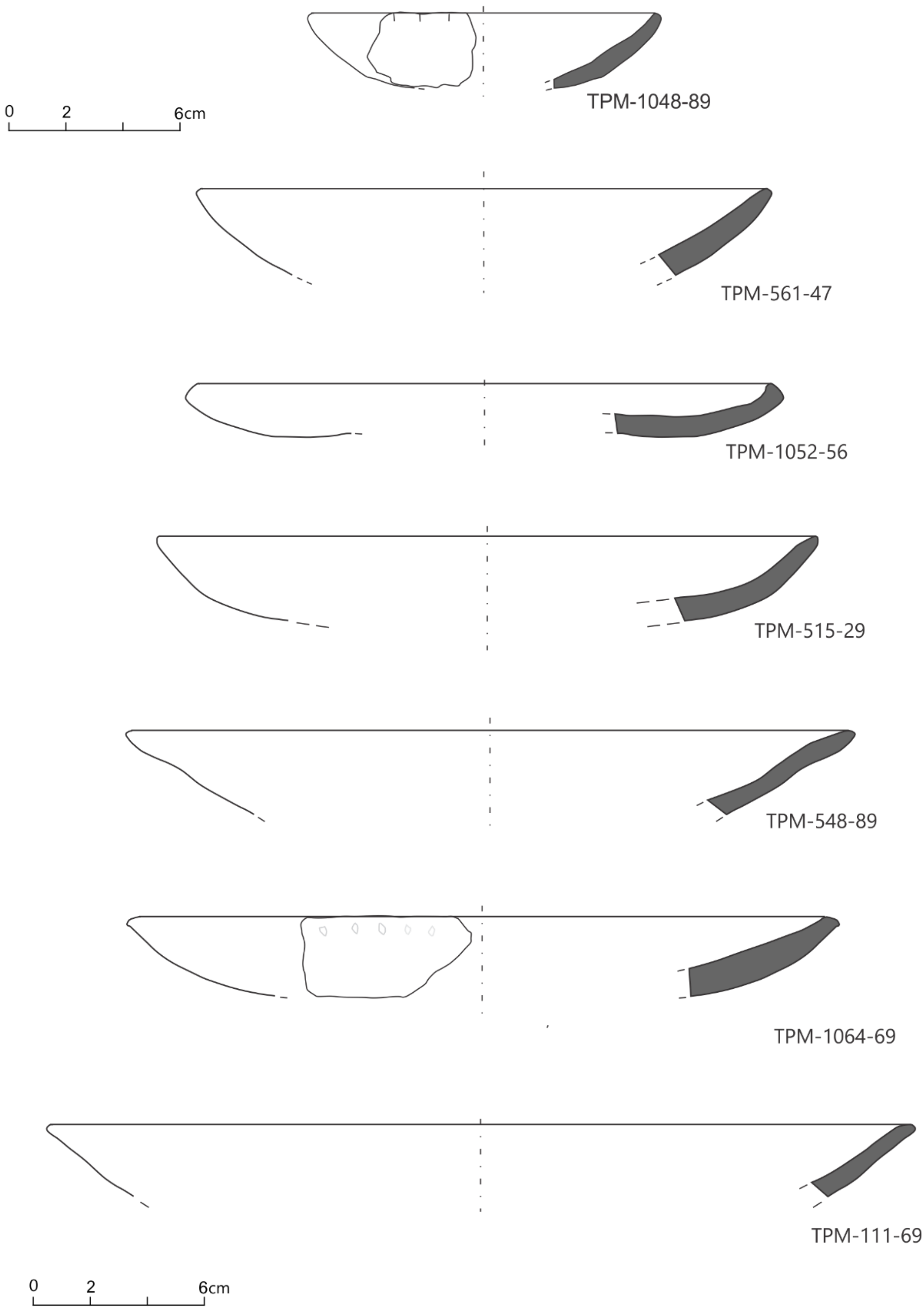


Drawings by Vinicius Honorato



Drawings by Vinicius Honorato

Form 3



scale 1:2

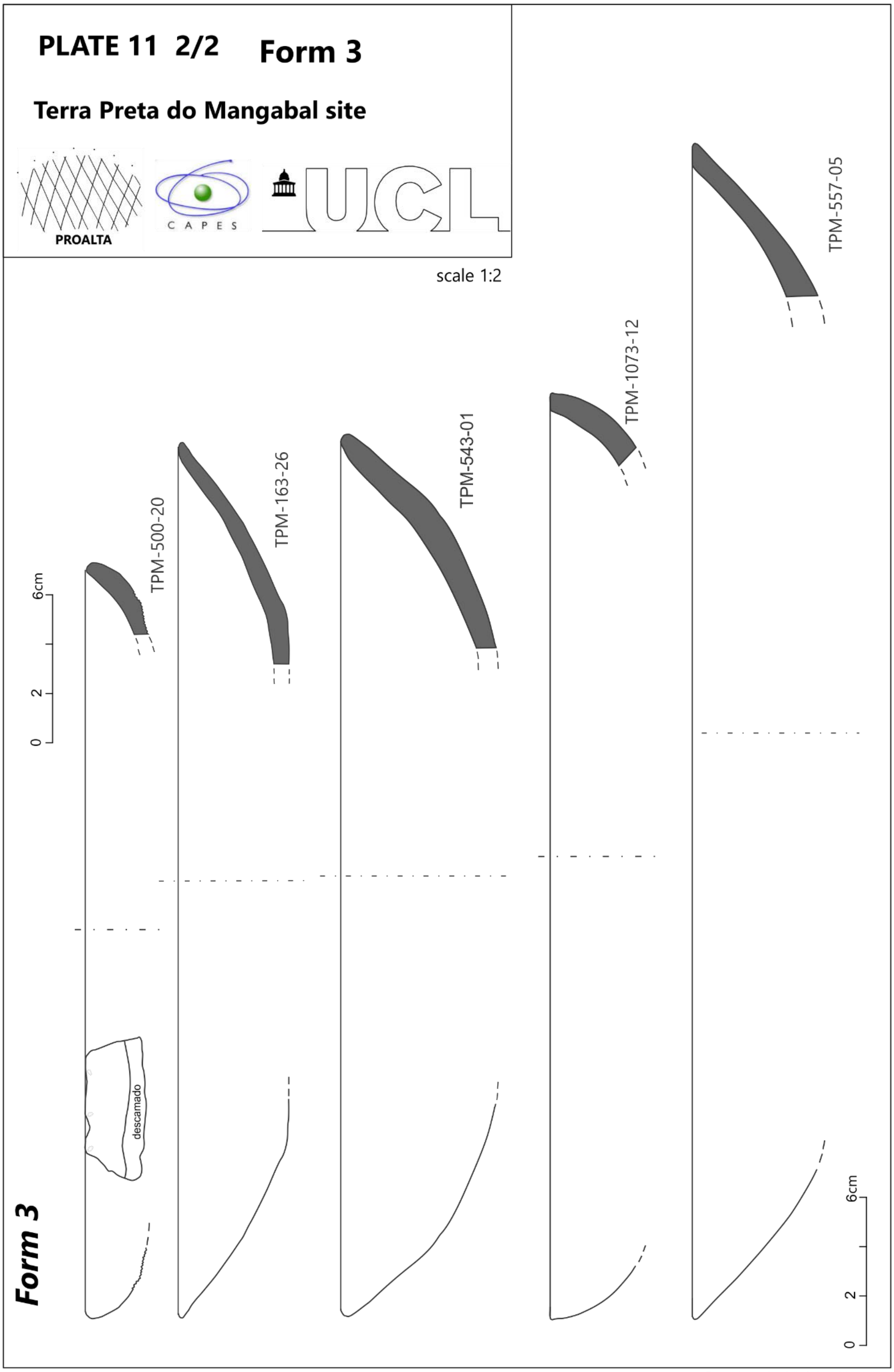
PLATE 11 1/2 Form 3

Terra Preta do Mangabal site

PROALTA

CAPES

Drawings by Vinicius Honorato



Drawings by Vinicius Honorato

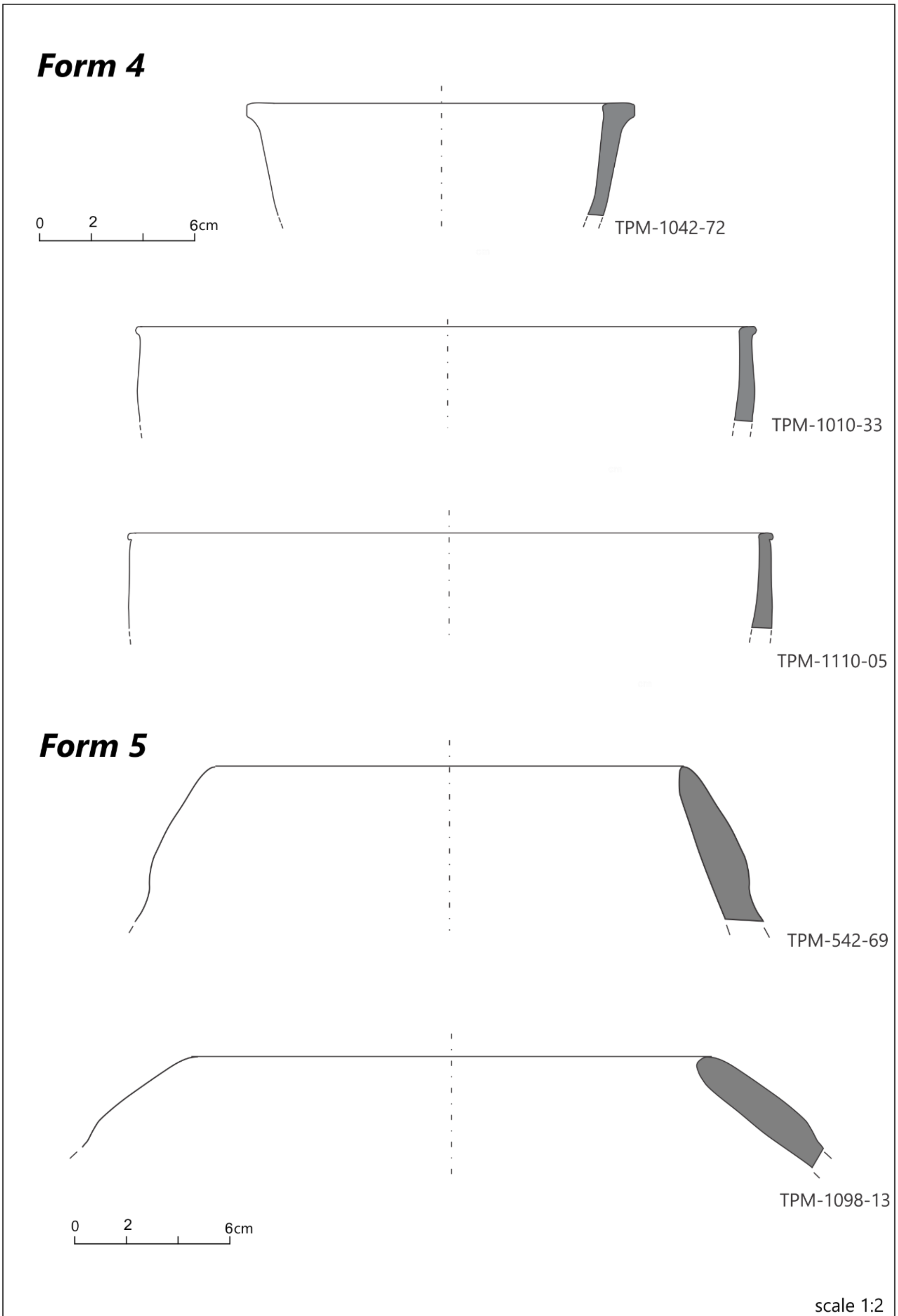


PLATE 12 **Forms 4 and 5**

Terra Preta do Mangabal site

PROALTA

CAPES

UCL

Drawings by Vinicius Honorato

Form 6

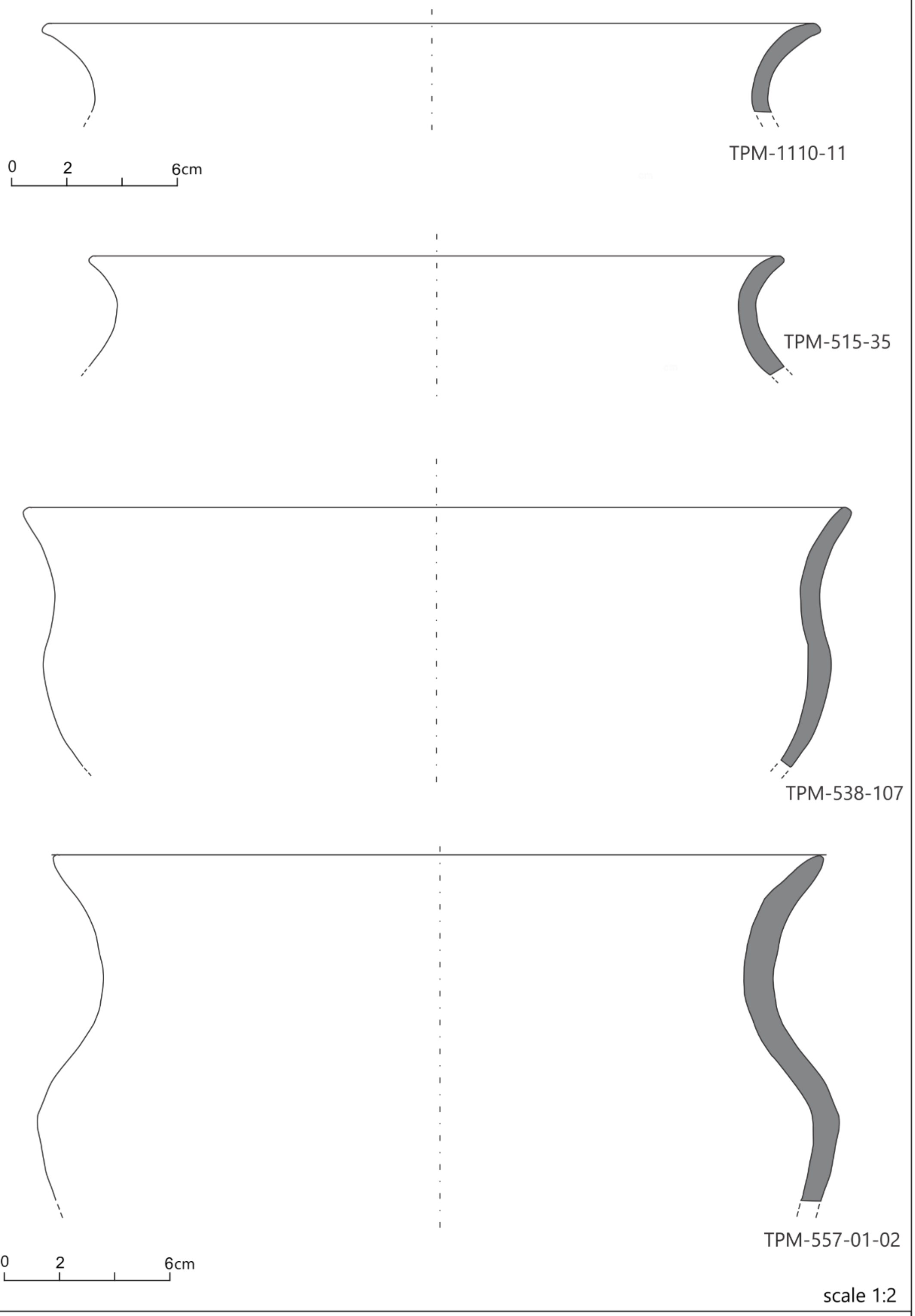


PLATE 13 **Form 6**

Terra Preta do Mangabal site

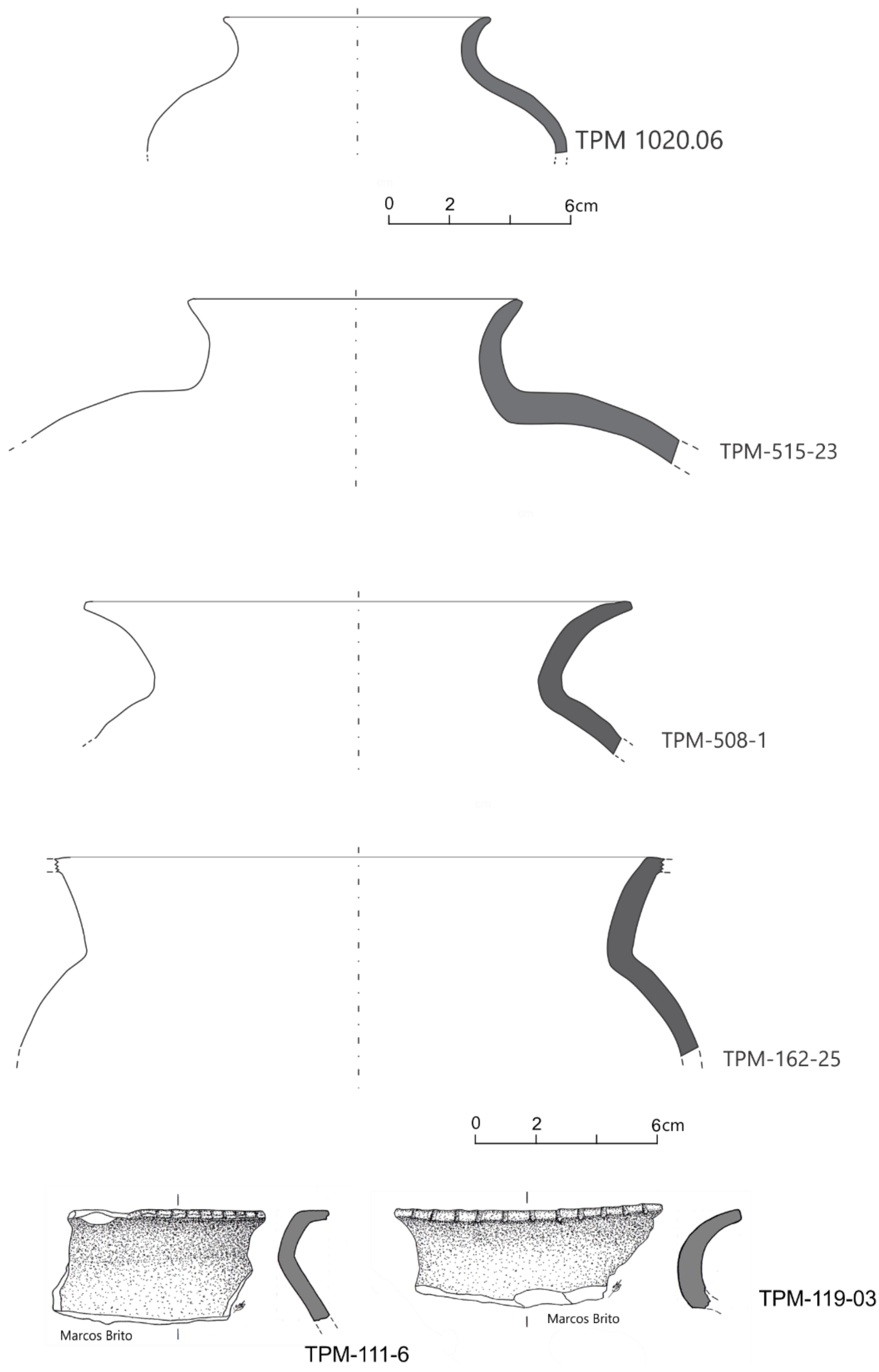
PROALTA

CAPES

UCL

Drawings by Vinicius Honorato

Form 7



scale 1:2

PLATE 14 **Form 7**

Terra Preta do Mangabal site

PROALTA

CAPES

Unless stated otherwise drawings by Vinicius Honorato

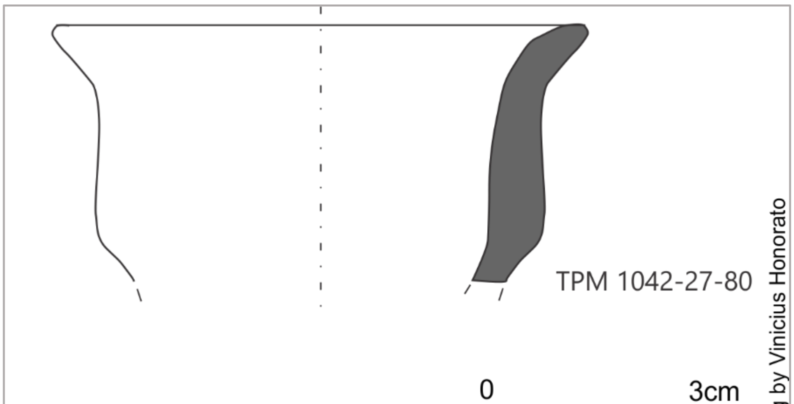


PLATE 15 Form 8
Terra Preta do Mangabal site

Vessel body forms, contexts and dates at Mangabal								
Level (cm)	**N1200 E887**	**N1074/E1000**		**N998/E974.5**		**N998/E973.5**		**Forms**
	Layer	**Layer**	**C^{14} date BP**	**Layer**	**C^{14} date BP**	**Layer**	**C^{14} date BP**	
0-10	IV	V, IV		V		V		3
10-20	III	IV		V		V		4
20-30	III	III		V, IV	1265±28	V, IV		2, 7
30-40	III	III	1270±30	IV	1200±30	IV		1, 2, 3, 4, 7, 6, 7
40-50	III, II	III, II		IV		IV		2, 5, 6, 7
50-60	II, I	II		IV	1151±29	III		1, 3, 5
60-70	I	II, I		IV, III		III		1, 2, 3, 4, 6, 8
70-80	I	I		III		III	1199±26	2, 5, 6,
80-90	I	Not excavated		III		III	1193±26	2, 3, 6
90-100	I			III, II		III, II		2, 3, 4, 6
100-110	Not excavated			III, II		III, II		3
110-120				III, II		III, II		3, 6
120-130				II, I	1243±30	II		-
130-140				II, I		II	1251±28	2, 6
140-150				II, I		II, I		6
150-160				I		II, I		5
160-170				I		II, I		-
170-180				I		Not excavated		-
180-190				I				-
190-200				I				-

Table 9 Vessel body forms, contexts and dates at Mangabal. Note that there is no equivalence between the layer numbers of units N1200/E887, N1074/E1000 and those of N998/E974.5-E973.5. Only the latter have equivalence. From observing the contexts and the dates obtained, it is likely that Layer III of N1074/E1000 is coeval to Layer II of N998/E974.5-E973.5.

The dates obtained for the Mangabal site point to the accumulation of considerable ceramic, lithic, floral and faunal debris and the generation of an extensive ADE area during approximately two centuries, suggesting that a high density of people lived here from the seventh century AD until the late eighth or early ninth century AD. At present, there is no discernible pattern related to the distribution of specific forms within the site.

There might be slight overlap between the end of the TPM occupation and the beginning of the SM occupation, but the TPM site largely predates that of SM – the latest date we have for Mangabal predates the earliest date we have for SM in approximately 50 years. How do their ceramic production sequences compare to each other?

7.4 Comparisons between ceramics from Mangabal and Sawre Muybu

Comparing ceramics from Sawre Muybu and Mangabal is necessary for us to determine the degree of similarity between these complexes, which in turn will help us to answer whether the rapids of the Tapajós may have constituted a cultural boundary. Observed and hypothesised combinations of formal segments and their modes at Mangabal and SM are summarised below.

Observed and hypothesised combinations of form dimensions at Mangabal

Form	Base	Body	Neck	Rim	Lip	Appendage
1	1	1*	-	9	1, 2	-
2	1, ?2, ?3	2	-	1,2, 3, 4, 10	1, 2	?2, ?3
3	?1, ?3	3	-	1,2, 3, 4, 5	1, 2	?2, ?3
4	?1, ?2	4	-	2, 10	1, 2	-
5	?1, ?2	5	-	8, 10	1, 2	?1, ?2, ?3
6	?1	6	-	6	1, 2	-
7	?1, ?2	5	?1, 2	?2, 6, 7	1, 2	?1, ?3

*Table 10 Observed and hypothesised combinations of base, body, neck, rim, lip and appendages at Mangabal. Hypothesised combinations are signalled by a question mark (?) *In the case of griddles the base and body are indistinguishable.*

Formal modes and attributes of the Mangabal complex

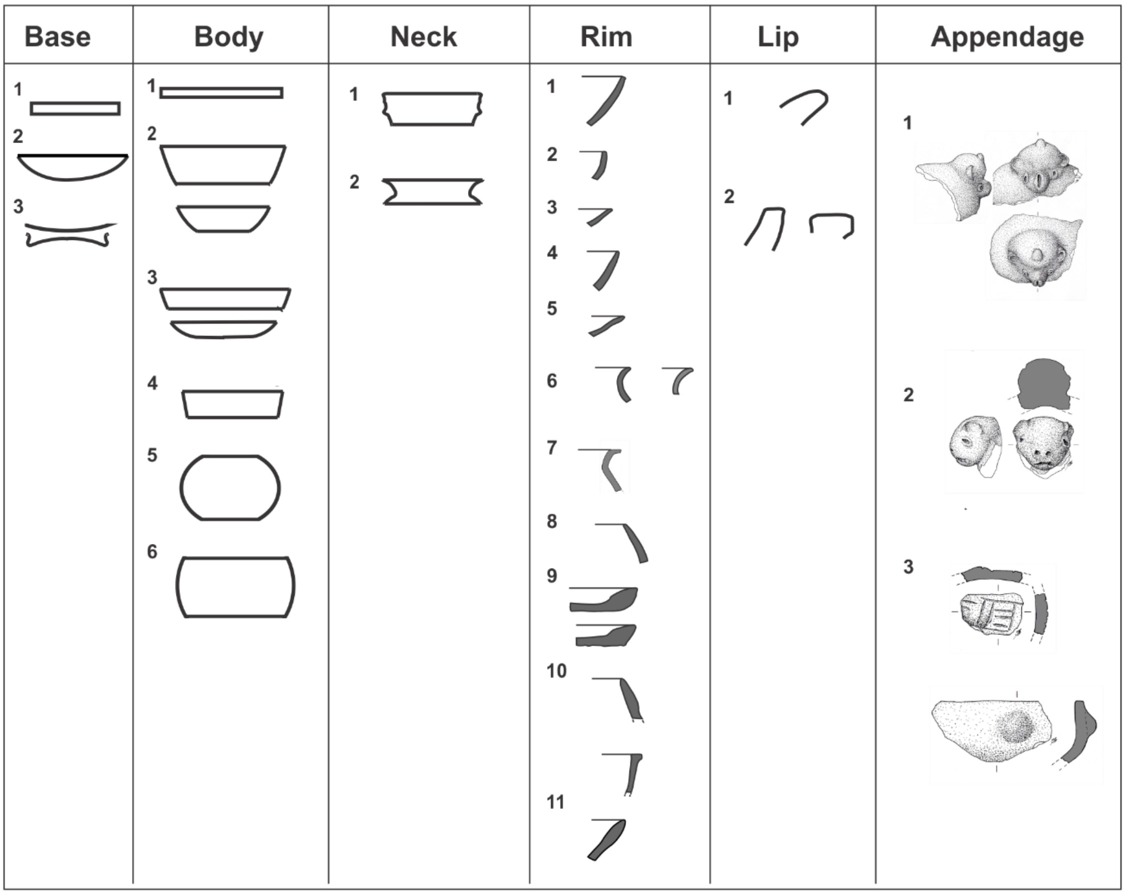


Table 11 Formal modes and attributes observed at Mangabal site. Numbers in table correspond to those given in table 10 above. Graphic art by Marcos Brito and Vinicius Honorato.

Observed and hypothesised combinations of vessel form dimensions at Sawre Muybu

Form	**Base**	**Body**	**Neck**	**Rim**	**Lip**	**Appendage**
1a	1	1*	-	13	1	-
1b	1	1*	-	13	1	-
2	1, ?2	2	-	1, 3, 4, 5, 7, 12	1	?2
3	?1	3	-	1, ?3, 4, 10	1, 2	-
4	1	4	-	2	?1, 2	-
5	?1, ?2	3	-	7, 11	1, 2	-
6a	?1, ?2	5	-	6, 9	1	?1, ?4, ?3
6b	?1, ?2	6	1, 2	6, 9	1	?1, ?3, ?5

*Table 12 Observed and hypothesised combinations of base, body, neck, rim, lip and appendages at SM. Hypothesised combinations are signalled by a question mark (?). *In the case of griddles the base and body are indistinguishable.*

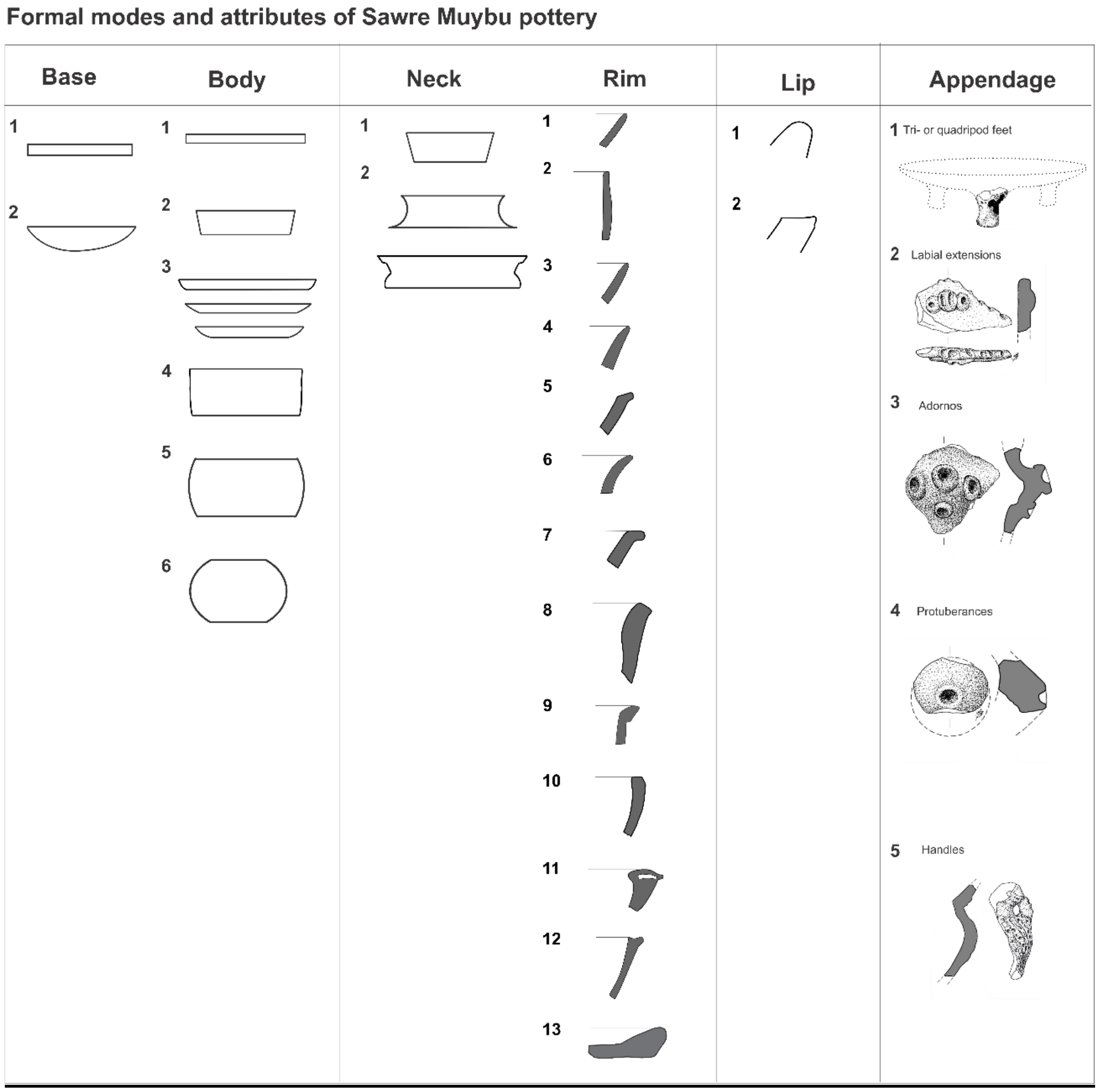


Table 13 Formal modes and attributes observed at SM. Numbers in table correspond to those given in table 12 above. Graphic art by Marcos Brito and Vinicius Honorato.

Although the pottery from SM and Mangabal have isolated features in common, the combinations of their attributes or modes can be seen to diverge significantly: their respective *chaîne opératoires* are distinct. The Incised and Punctate Tradition is not present at Mangabal. This is corroborated by the analysis of flaked lithic materials from the two sites (Honorato de Oliveira 2015, p. 89). These consistent differences show that the complexes belonged to distinct technological systems (Lemonnier 1992 cited in Honorato de Oliveira 2015, p. 12). As Tarble de Scaramelli and Scaramelli suggest (2011, p. 105), we can ask what the meaning is, in social terms, of differences in material assemblages found archaeologically.

Ware / complex		SM-1	SM-2	SM-3	Mangabal
Temper		Quartz sand	*Cauixí*	*Cauixí, caraipé* or quartz sand	Quartz sand or *cauixí*
Most usual vessel wall thickness (mm)		7-15	7-12	10-12,16-21	4-10
VESSEL FORM	**Horizontal cross-section**	Circular	Circular, ellipsoid, straight and circular symmetrical	Circular	Circular
	Vertical cross-section	Simple & unrestricted, independent restricted forms	Simple & unrestricted (possibility of wider diameters and unusual horizontal cross sections)	Simple & unrestricted 'griddles'	Simple & unrestricted, dependent and restricted, independent restricted
Surface treatment		Smoothing, self-slip	Fine smoothing	Smoothing	Smoothing, self slip, burnishing, smudging polishing
Decorative techniques		Slip, Plastic displacement and additive, painted	Plastic displacement and additive, painted	Incision and possibly engraving	Slip, clay displacement, painted, additive plastic
Design elements		Applied and punctated clay strips or ridges, applied and punctated nubbins. Biomorphic adornos	Applied and punctated or incised nubbins and occasional clay strips, bands of red lines, curvilinear interlocking scroll design	Oblique and intersecting criss-cross lines on the interior of rims	Rectilinear designs prevail: criss-cross, parallel and converging lines. Polychromic painting. Zoomorphic appliqué and adornos
Firing		Oxidised	Reduced	Partially oxidised/varied	Oxidised, partially oxidised

Table 14 Main characteristic of ceramic wares/complexes from Sawre Muybu and Mangabal.

The ceramic production sequences of the SM and TPM sites are distinct, but it is worth observing that Honorato de Oliveira notes the presence of notched axe-heads at both the Sawre Muybu and Mangabal sites. Thus, ground stone technology cut across areas with differing ceramic styles in the region (2015, p. 86-87). The criss-cross designs seen on griddle rims at Sawre Muybu may indicate some relation to the 'lozenge' designs seen at Mangabal; such elements are foreign to the

IPT. Had we encountered specific materials excavated in Mangabal within IPT contexts, these would not necessarily have seemed foreign; such is the case with the zoomorphic adornos found at the site (figs. 140/159 and 141/155). Thus, if a cultural boundary existed along the rapids of the Tapajós, it is likely to have been permeable.

7.5 Summary

Through the application of modal analysis, which was aided by the use of multiple correspondence analysis, I have proposed that both Sawre Muybu and Terra Preta do Mangabal are unicomponent sites. At Sawre Muybu, the ceramic complex is composed of two, possibly three wares, each with a distinct “recipe” or sequence of ceramic production. These sequences entail differences in the dimensions of technology, form, decoration and surface treatment. I further suggest that these wares have different origins: SM-1 is a locally made, coarse ware, SM-2 is an imported fine ware and SM-3’s origin is undefined. The available evidence indicates that SM-1 incorporated IPT elements over time – particularly as regards decorative (applied and punctated strips of clay) elements. The Mangabal complex shows more variation in terms of technological choices available to potters, but is more standardised in terms of vessel form and surface treatment, even if there are significant ‘outliers’ (particularly in terms of decoration) that point to greater formal (such as the presence of keels and a ‘bottle’ found by Seu Josué) and stylistic variability than has thus far been put forward.

Although our findings are limited by the amount of material studied, the comparison to augered pottery suggests that the sample studied is largely representative of the ceramic complexes present at these two sites. I believe that a flexible working framework from which future ceramic analysis in the area can be built on has been established.

The following chapter will widen the comparative scale so that further linkages or discontinuities may be traced in terms of the ceramics of the wider region, excavated by other archaeologists. This exercise should aid our attempt to connect archaeological ceramics to past peoples in the region.

Chapter 8. Shifting the locus: networked societies and social boundaries as viewed from the rapids of the Tapajós

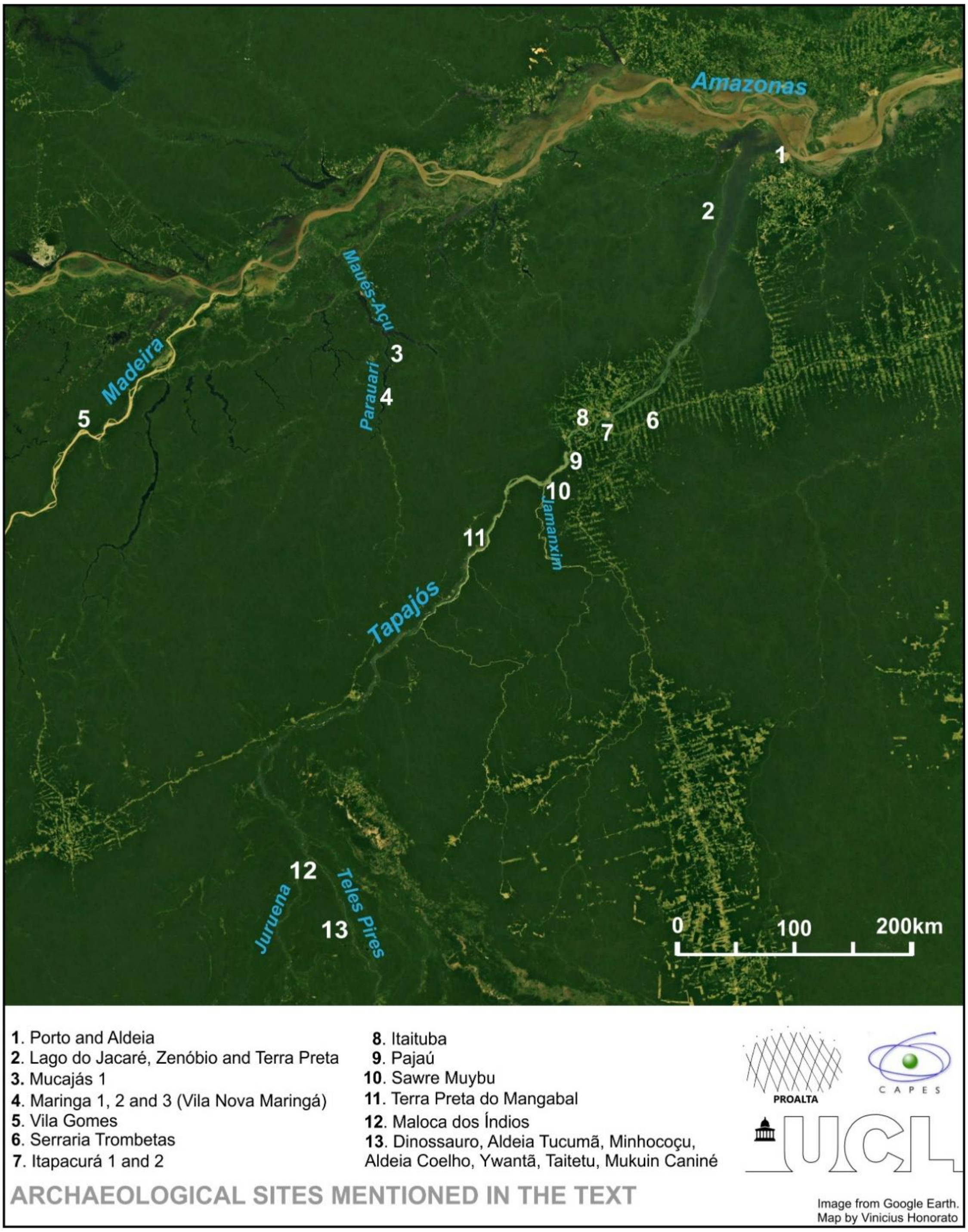
> …peripheries have their own independent developments… So you have to look at cultural contact and interconnections rather than at peoples in the periphery slavishly copying innovations produced in the center
> (Rouse interviewed by Siegel 1996, p. 683).

On the basis of early historical accounts, the presence of ADEs and incredibly sophisticated ceramics, the present-day town of Santarém, based on the confluence of the Tapajós and Amazon Rivers, is thought of as a pre-Columbian political centre dominated by the Tapajó Indians. Smaller sites in the vicinity, containing simpler ceramics that nonetheless bear techno-stylistic attributes that express a shared vessel 'grammar,' are often alluded to as belonging to the periphery of the Tapajó domain. The limits of Tapajó influence have been an archaeological concern since the nineteenth century (Rodrigues 1875), more recently taken up by Gomes (2005; 2008), Guapindaia (1993), Martins (2012) and by Stenborg, Schaan & Amaral Lima (2012), among others. The lowermost rapids of the Tapajós thus represent the known southern limits of this 'periphery.' Because our knowledge of the archaeology of the Tapajós proper is still limited, we cannot yet be sure whether other centres existed in the region, or whether, as Martins (2012, p. 171) suggests, we may in fact be before a heterarchical system of peer societies. Either way, Irving Rouse's recommendations are pertinent.

To think of Sawre Muybu as part of the periphery of Santarém is only useful if we think of peripheries along the lines proposed by Rouse. In order to verify cultural contact and interconnections in the region, pottery in the vicinity of Itaituba and from inland areas to the east and west of the Tapajós will now be examined in varying degrees of detail.[124] The correlates of the Incised and Punctate Tradition in the Guianas and Orinoco, the Arauquinoid and Valloid series, will also be

[124] Because they are already well described and amply known, I will only refer to Santarém and Konduri ceramics in a superficial way. For more information, see Gomes (2002; 2011), Guapindaia (1993; 2008), Hilbert (1955); Hilbert & Hilbert (1980); Palmatary (1960); Quinn (2004).

described, after which a reflection on the meaning of the Incised and Punctate Tradition will be endeavoured. We will then contemplate collections and assemblages from the lower Juruena and Teles Pires, as well as from the lower Madeira River. Finally, we shall return to historical processes related to Tupian peoples.



Map 17 Sites mentioned in the following section. Map by Vinicius Honorato. Source: Google Earth.

Attempting to compare one's own analysis with that presented by other archaeologists will rarely be a straightforward affair. There are differences in field conditions, excavation techniques and recording practices. Financial, human and time resources also change from project to project; the preservation of materials within the archaeological context is not homogenous; objectives and questions asked – as well as assumptions held – also vary. Decisions taken during the analytical process in the laboratory again differ from scholar to scholar; terminology used and measuring units chosen can change. On occasion this leads to incompatibilities, where it is not possible to relate specific attributes from the assemblages or collections being compared. Yet if we wish to study past processes of interaction, social transmission and social boundaries, pottery is well suited to the exercise as it contains a number of detectable elements related to its production and consumption. For the material considered in greater detail I will keep to the same structure utilised in the previous chapter, by looking sequentially at technological, formal, surface treatment and decorative dimensions (see Appendices 14 and 16 for further details).

8.1 Comparisons with ceramics studied elsewhere on the Tapajós

Downstream from Sawre Muybu

8.1.1 Itapacurá I (PA-ST-29)

Excavated in 1979 by Celso Perota, this site is located some 50km to the north of Sawre Muybu and upstream from the town of Itaituba, approximately 1.5km inland from the eastern bank of the Tapajós. The soil of the site is a sandy clay of a fairly dark colour. Many sherds were visible on the surface thanks to the recent planting of banana trees. Perota (cited in Simões 1983, 61) estimated it to cover an area of 500x100m. In June, it rises 100m above the river level. I analysed a small collection from this site at the IPHAN in Vitória.[125] Besides pottery, flaked and polished lithics were located at the site. An uncalibrated C14 date[126] of 1215±70 bp[127] was obtained for Itapacurá I by Perota, which suggests an occupation coeval with that

[125] Appendix 16 contains details on the sample.
[126] Courtesy of Celso Perota.
[127] It is probable that these dates are uncalibrated. The lab number for this sample is SI-4218.

of Mangabal, and at least 130 years earlier than our earliest date (of 1039±26 BP) for Sawre Muybu. The site may be multicomponent.

<u>Dimensions of technology</u>: Most material is tempered with quartz sand (fig. 170), *cauixí*, or, on occasion, clay pellets. *Caraipé* was found once. It appears that temper selection parallels what we observed among the pottery of Sawre Muybu, with quartz sand tempering "coarse wares" and sponge spicules, "finewares". Sponge spicule temper appears to be proportionately more common here than at SM, but this might be attributable to the targeted selection of decorated sherds (which are more often tempered with *cauixí*) over plain ones during collection at the site and during my analysis. The sherd that exhibits *caraipé* as its main temper is a base sherd, possibly of a griddle fragment.

Fig. 170 Particle of quartz sand visible in sherd break. Photograph by Vinicius Honorato.

Fig. 171 Sherd displaying blackened core.

Photos by Vinicius Honorato.

The association between temper and firing is not as clear-cut as was observed with SM-1 and SM-2 pottery. Brown (including greyish and yellowish brown) is the most usual post-firing colour of the paste among the sherds analysed.

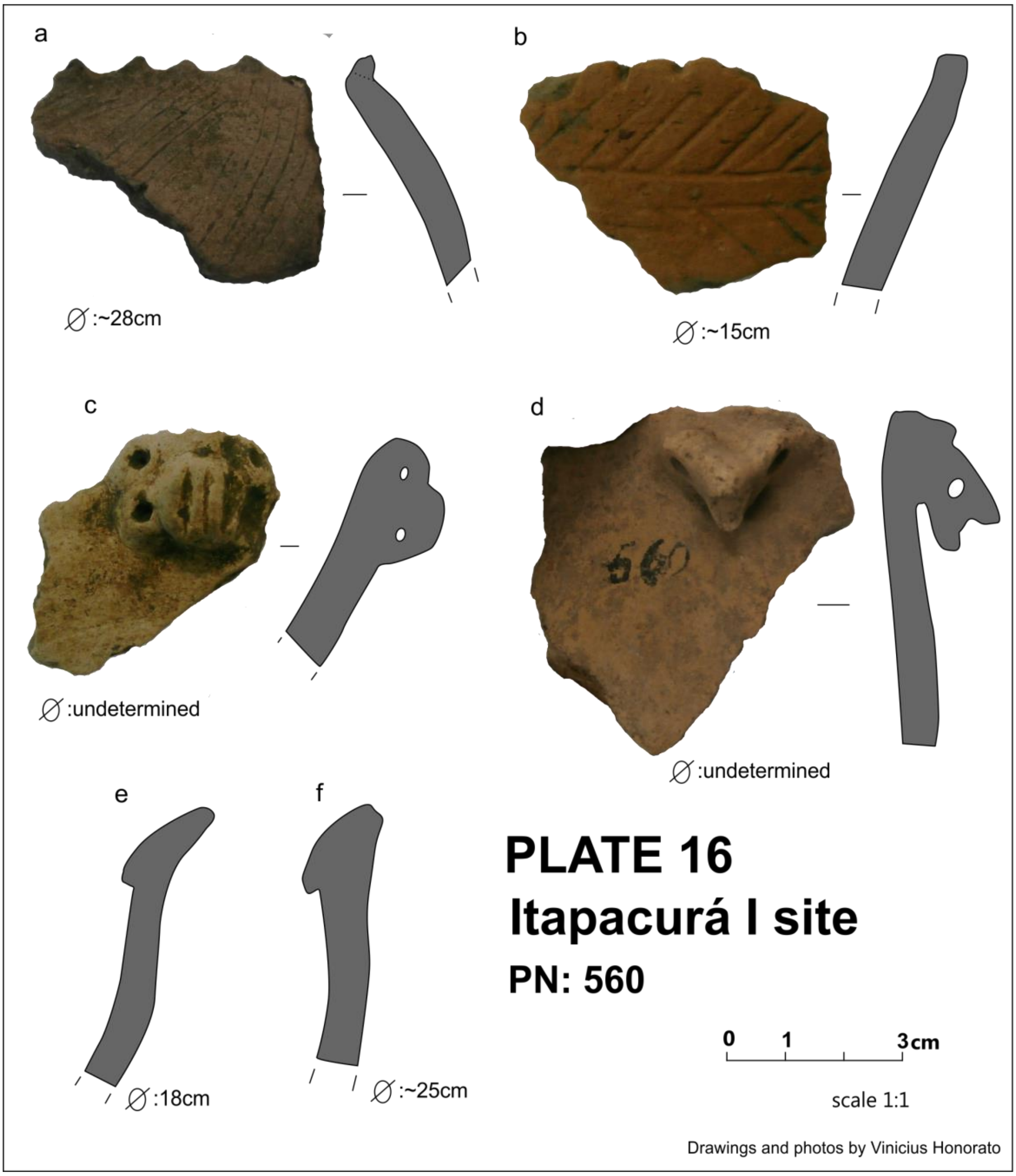
<u>Dimensions relating to form</u>: Given the restricted nature of this sample, it likely represents only part of a greater variety of forms produced and used by the people who once lived here. Sponge spicules seem to be associated with thinner vessel walls while quartz sand tempered material are more varied. All the observed specimens would have belonged to vessels with circular cross sections. Base

sherds are flat or annular. Simple and unrestricted vessels, which are likely to have been moderately deep hemispherical bowls, are present (Plate 16 b; Plate 17 a?). Simple and dependent restricted vessels – some of which have very constricted orifices – also occur (Plate 16 a and apparently Plate 17 f, g). Inflected contours are found in association with unrestricted (Plate 16 e, f; Plate 17 b, c) and restricted (Plate 17 d, e) orifices. Rims have in-turning, upright (Plate 16 d) and everted inclination (Plate 17 a, and c); some are unusual in turning inwards before extending out (Plate 17 b). Rims can be bevelled, indeterminately thickened and internally thickened, or "folded" (this is a variation of the externally 'folded' rims of SM). These 'folded' rims (Plate 16 e, f) have clay pellets as their main inclusion, followed by quartz sand. A number of appendages tempered with *cauixí* are included in the collection. They include protuberances of indistinct form, which possibly acted as handles; modelled and punctated appliqué (Plate 16 c, d); a tab composed of clay additions and circular punctations, creating a zoomorphic representation resembling the face of an owl; and an undetermined modelled clay artefact of curved form which may or may not have been attached to a vessel.

Fig. 172 Protuberance of undefined shape. Fig. 173 Ceramic tab composed of clay additions and punctations. Fig. 174 Modelled clay artefact of indistinct attribution. Photos: V. Honorato.

<u>Surface treatment and decoration</u>: Smoothing is omnipresent; self-slip is exceptional. Incision is the most observed decorative technique, with fine styluses apparently being used more frequently on *cauixí* tempered sherds and thicker ones being applied to the coarser, quartz sand tempered material. Clay strips or spheres can be punctated. One lip has had an extra coil and excised to produce a 'serrated' effect (Plate 16 a). Chromatic decoration is extremely unusual. The

majority of lips were smoothed; notches, nicks and punctations were observed on occasion; one lip was channelled. Rectilinear designs are most usual; their orientation can be oblique or horizontal. They can be parallel and/or converging, such as with the "fish spine" motif defined by Hilbert (1955a) for pottery within the Trombetas River basin, or in forming nested triangular designs. One rim sherd displays a wavy design in composition with a protuberance near the rim (fig. 180).



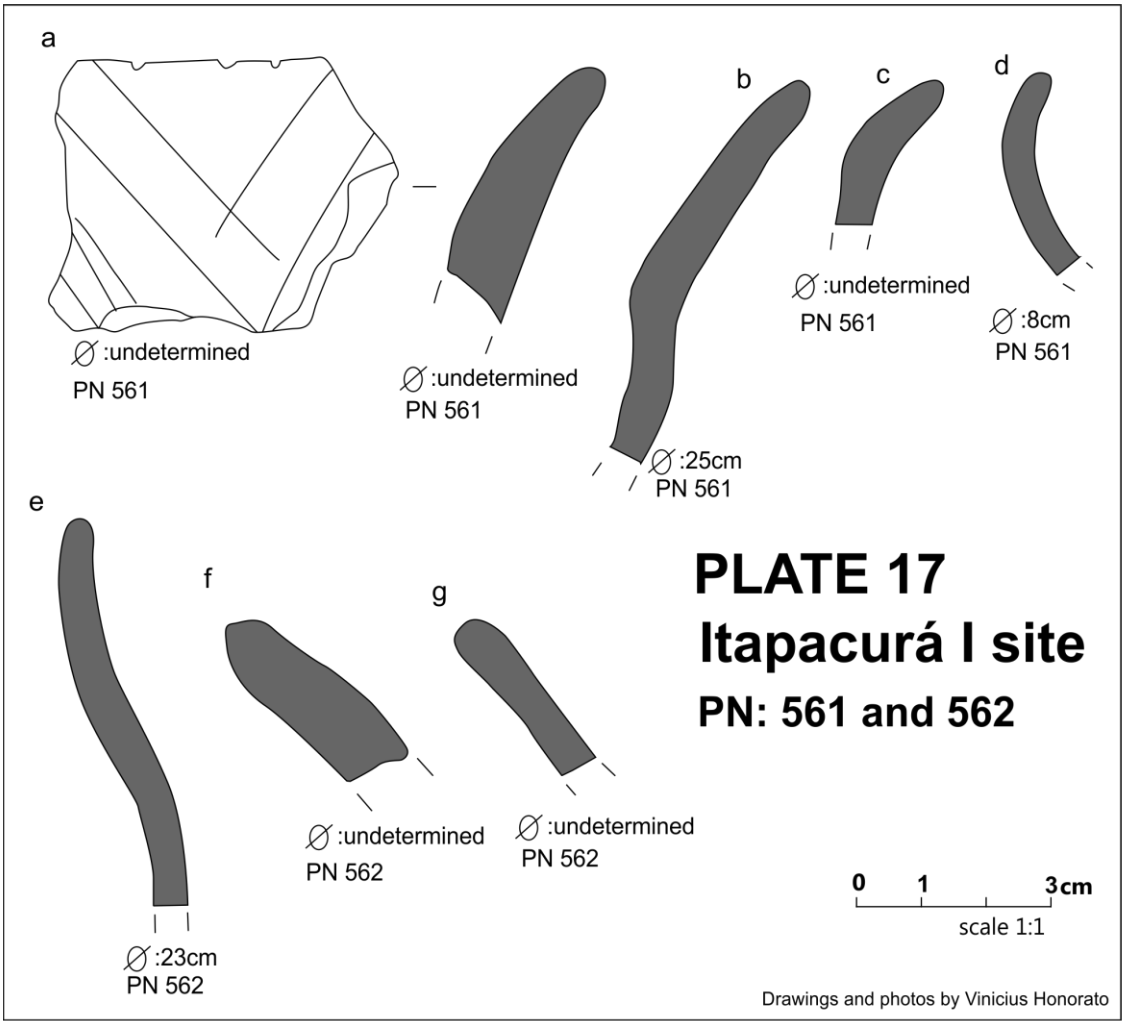


Fig. 175 Sherds displaying similar designs, incised (left and centre) and painted (on right).

Fig. 176 Superimposed strips of clay (compare with Cocalino pottery [Rocha 2012, Plate 8).
Fig. 177 Applied – but not punctated – strip of clay.

Photos: Vinicius Honorato.

Fig. 178 A variety of linear designs are found at Itapacurá I. They can be rectilinear, composed by oblique and parallel elements that can converge at parallel, horizontally-oriented lines (top right) or with lines oriented in the opposite direction, forming a zig-zag design (bottom, centre).

Curvilinear elements are found more infrequently, and seem to be composed of concentric circles (3rd row down, centre) or slightly curving lines (second row down, centre).

Photos: Vinicius Honorato.

Fig. 179 Applied, punctated or incised spheres produced zoomorphic representations. Fig. 180 Curvilinear, horizontally-oriented, roughly parallel elements.Fig. 181 Punctated lip. Photos: Vinicius Honorato.

Discussion

It is not yet clear whether all of the analysed material belongs to the same complex. While mostly distinct from Mangabal pottery, Itapacurá I material clearly shares technological, formal and decorative attributes – and probably, modes – with SM-1 and SM-2. Within this shared 'grammar,' variations can be observed within all dimensions. Though choices of principal temper generally run along parallel lines, the association between temper and firing is apparently not as strong at Itapacurá as it is at SM. ‘Generic’ simple and unrestricted vessels (moderately deep bowls) can be seen at both Itapacurá I and SM. Consistent with its larger sample, there is a greater variety of unrestricted forms among SM pottery. Yet we identified simple, dependent and restricted vessels at Itapacurá I that were not found among SM material. Both sites have inflected vessels that are independent and restricted, but Itapacurá I also has inflected and unrestricted forms and the contour of inflected vessels seems closer to Mangabal material. There is a variation of the distinct “folded” rims found at SM. The “folded” rims of Itapacurá I are internally strengthened and are placed on inflected – but unrestricted – vessels. Sherds at Itapacurá I contain the same recipe as that of ware SM-1, but this can be inverted so that clay pellets are the main inclusion and quartz sand is secondary. It may be that, by chance or design, different parts of the original vessels had differential concentrations of these inclusions. But ‘folded’ rims at Itapacurá I were not afforded the same decorative attention as their SM-1 counterparts. Although surface treatment was apparently more limited at Itapacurá I in comparison to Sawre Muybu, some of the decorative techniques and design elements employed are common to both sites. What is arguably the decorative insignia of the IPT – applied and punctated clay strips and spheres – is present at both sites. Incision appears to be more common and more varied at Itapacurá I than at SM, with parallel lines forming a greater range of designs and often being spaced closer together. Another difference is a penchant of the Itapacurá I potters for applying small blobs of clay to the edge of rims and lips, something which is absent at SM.

If the (uncalibrated) date of 1215±70 bp is indeed associated with the pottery we have just described, Itapacurá I may be a precursor to SM. This would reinforce the proposition of the existence of two distinct technological systems within our study area at around the 8th century AD (i.e., related to the Mangabal site on the one hand and to “IPT” sites, such as Itapacurá I and SM, on the other). Either way it implies social transmission within the area encompassed between the Itapacurá I and SM sites. Because the date appears to be earlier than the known time frame (of c. 1100-300BP) for the IPT, we have three possibilities: 1) the date refers to an occupation that predates the arrival of IPT elements; 2) the date is not entirely reliable; were it calibrated, it would point to a later moment; 3) the date is reliable and can be associated with the IPT elements, in which case it suggests the IPT is earlier than we had previously thought. This last option seems unlikely as the IPT is well dated along the lower Tapajós. Its diagnostic elements are present in the Guianas at an earlier (c. 500 AD) date, meaning that the IPT is likely to have arrived first in Santarém than further up the Tapajós.

8.1.2 Itapacurá II (PA-ST-30)

This site is located 150m inland from the right bank of the Tapajós, near the mouth of the Itapacurá stream, at an altitude of approximately 70m above river level (the site was visited in June). It is approximately 1.8km from the Itapacurá I (PA-ST-29) site. When visited by Perota and his team, banana trees and arrowroot had been planted in the area. The site's estimated dimensions are 600x100m; its soil is sandy until approximately 40cm depth, below this it is clayey (Perota 1979, p. 5; Perota cited in Simões 1983, p. 61). There were large amounts of ceramic, as well as polished and flaked lithic remains at the site. Archaeological material was encountered from the surface until approximately 50cm depth, after which it diminished significantly. At 70cm depth it again appeared in abundance. According to Perota (cited in Simões 1983, p. 61), much of the pottery presents polychrome painting. Two (uncalibrated) C14 dates were obtained for this site: 350±70 bp relates to a 20-30cm level, and 285±75 bp relates to a 30-40cm level.[128] The earlier date postdates our latest date for SM by approximately 500 years.

<u>Dimensions of technology</u>**:** In terms of technological dimensions, we can observe trends more similar to the Itapacurá I site than to SM, though the three sites clearly participate in the same technological tradition. Quartz sand and sponge spicules are most usually found as principal tempers. On occasion, clay pellets predominate. Quartz sand and clay pellets are more strongly associated with oxidised firings but *cauixí* tempered fragments could also display evidence of oxidised firing. Other types of firing occur with the different principal tempers. Brown was the most frequently occurring post-firing colour of the paste.

[128] Courtesy of Celso Perota. The lab numbers for these dates are SI-4212 (285±75bp) and SI-4211 (350±70bp).

Fig. 182 Example of reduced firing on painted, cauixí tempered sherd. Photograph by Vinicius Honorato.

Dimensions related to form: At Itapacurá II the correlation between principal temper and vessel wall thickness is not as strong as at Sawre Muybu. If the sample is representative of the site's pottery, could this be an indication that, with time, the vessel walls of coarse tempered wares tended to become thinner? The sample examined presented circular horizontal cross sections. Bases are flat or annular.

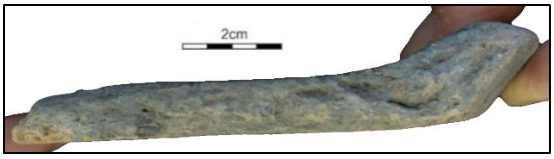


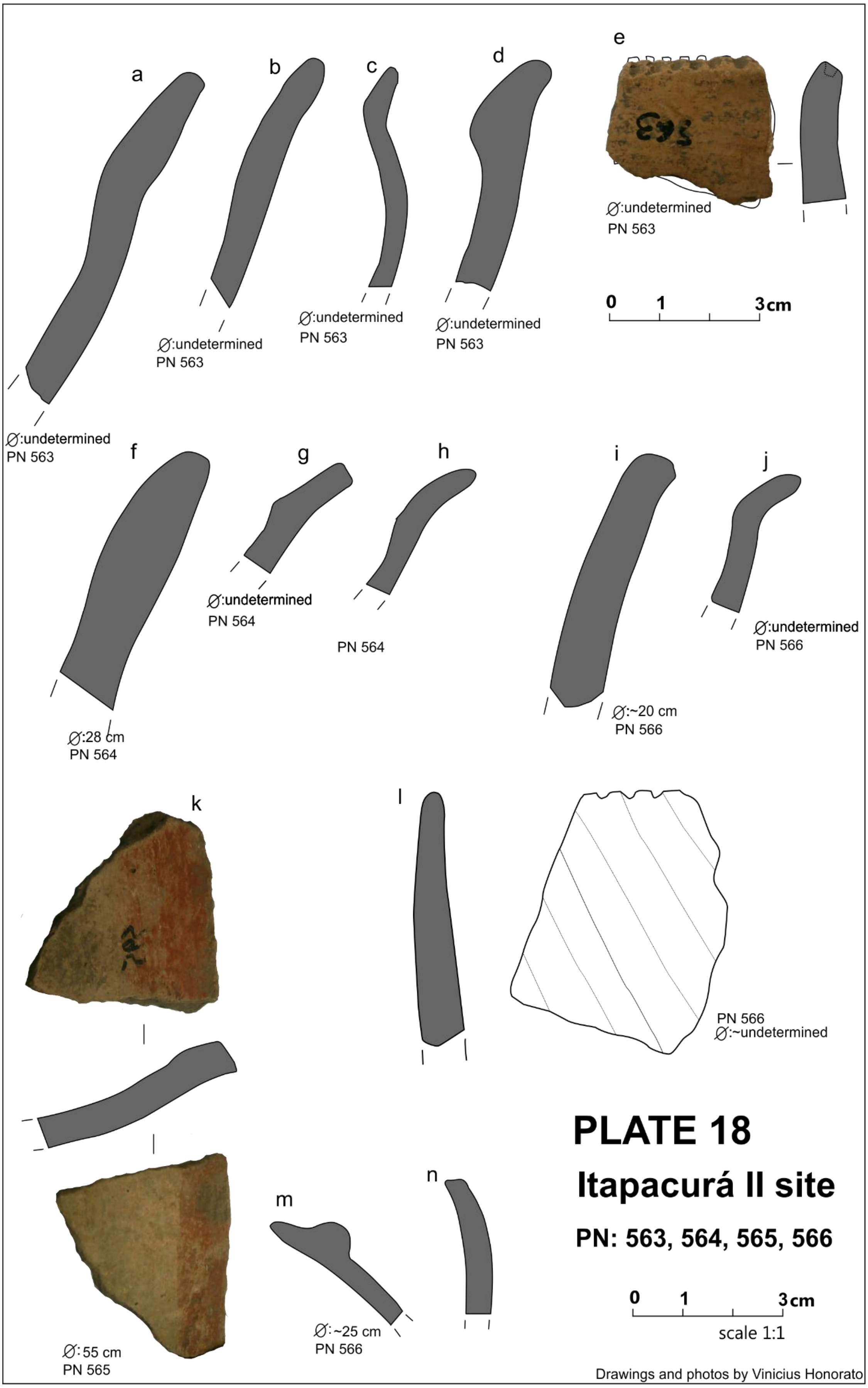
Fig. 183 A flat base. Photo: V. Honorato.

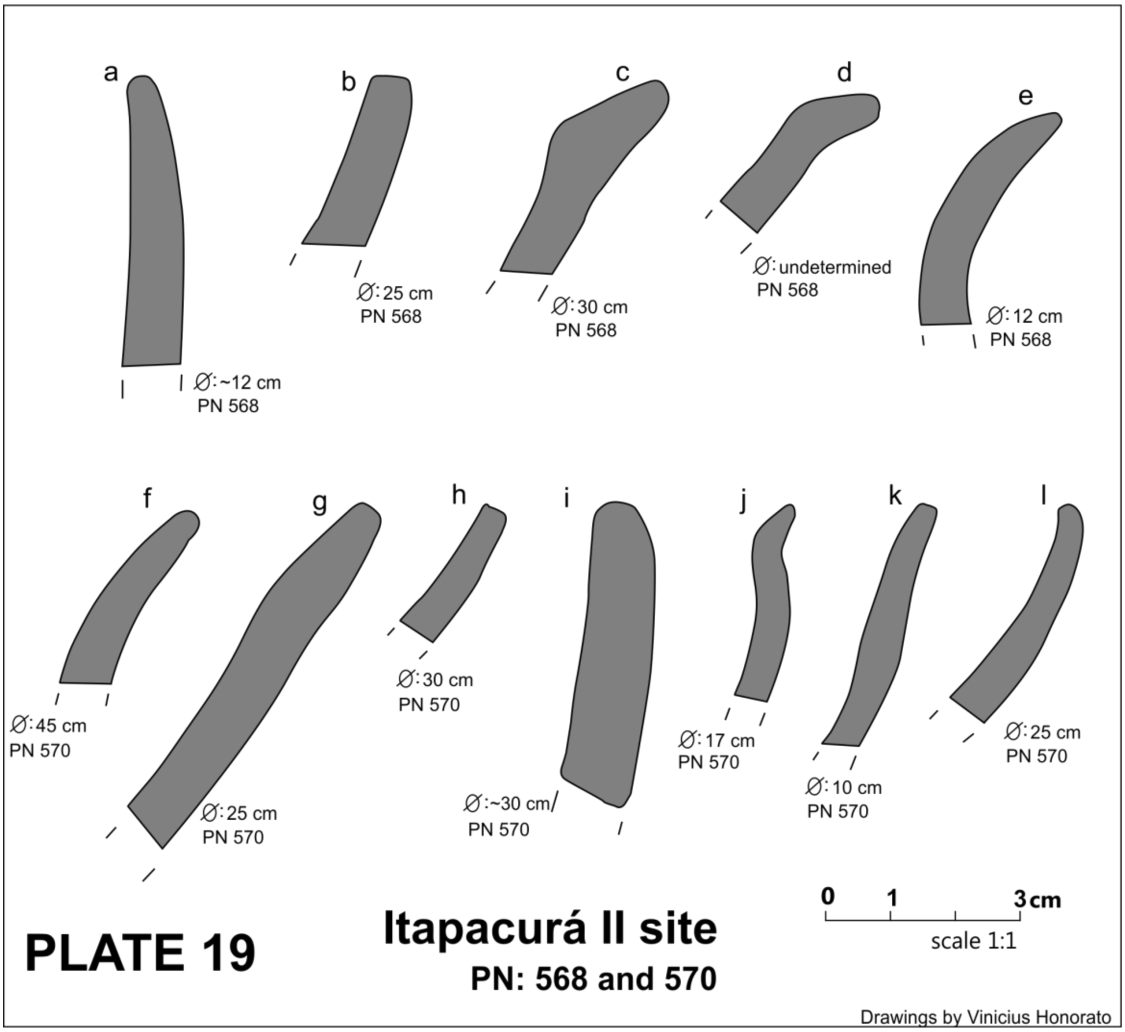
Simple and unrestricted vessel forms, including moderately deep 'bowls' (Plate 18 a, b, f, i; Plate 19 g and possibly i) and shallower 'dishes' (Plate 18 g, h, k; Plate 19 d, h, l), can be seen among the sample studied. Simple and dependent restricted vessels are also found (Plate 18 d, m, n). These are similar to analogous forms projected for Itapacurá I. Independent, restricted vessels also occur (Plate 19 e, and possibly f). Rim forms include zero modification, everted inclination – curved outwards, folded off at a slight angle (Plate 18 a, c, g, h, i; Plate 19 j), small flange (Plate 19 d) and in-turning rims. Tapered (Plate 18 l) as well as indeterminately thickened (Plate 18 f) rims can be seen. One rim has a familiar "folded" appearance with its additional, exterior coil not altogether smoothed, but it does not display further decoration (Plate 18 d). Appendages are comprised of protuberances – attached to exterior vessel walls near the rim, possibly acting as gripping supports, or small "blobs" added to the edge of vessel rims (Plate 18 m, fig. 185).

Fig. 184 Protuberance near top of simple and dependent restricted vessel rim

Fig. 185. Internally strengthened rim that has a "folded' appearance.

Photos: Vinicius Honorato.


a
b
c
d
e
Ø:undetermined
PN 563
Ø:undetermined
PN 563
Ø:undetermined
PN 563
Ø:undetermined
PN 563
Ø:undetermined
PN 563
0 1 3cm
f
g
h
i
j
Ø:undetermined
PN 564
PN 564
Ø:undetermined
PN 566
Ø:~20 cm
PN 566
Ø:28 cm
PN 564
k
l
PN 566
Ø:~undetermined
m
n
Ø:55 cm
PN 565
Ø:~25 cm
PN 566
PLATE 18
Itapacurá II site
PN: 563, 564, 565, 566
0 1 3cm
scale 1:1
Drawings and photos by Vinicius Honorato



<u>Surface treatment and decoration</u>: Smoothing preponderates. The application of self-slip is more frequent here than at Itapacurá I. Though techniques involving the displacement of clay are the most usual, followed by additive plastic decoration, chromatic decorative techniques including the application of slip and paint are also significant. Reddish hues were the preferred colour. Paint could be applied either in a "blanket" fashion covering sections of the vessels or as linear designs. Sherds displaying red paint are similar to SM-2, with cauixí as their main temper, thinner vessel wall thickness and blackened cores.

Fig. 186 Application of strip of red paint following vessel rim. Fig. 187 Dark red paint applied to white slipped surface. Fig. 188 The interior surface of the sherd displayed in fig. 187, again painted with a deep red coloured paint. Photographs by Vinicius Honorato.

Incision is again the prevalent plastic technique; punctation is seemingly less common than at SM and Itapacurá I. Excision is present but is not common. Additive plastic decoration occurs especially in the form of clay strips – which are not always punctated – and as applied blobs or spheres.

Fig. 189 Applied and punctated strips descending from rim. Lip has been notched. Fig. 190 Applied (but not punctated) clay strips oriented in horizontal direction. Photos: V. Honorato.

While smoothing is the most usual form of finishing lips; several were notched or nicked, while some were punctated and a few were painted. One rim and lip displayed a series of applied blobs (fig. 192).

Clockwise from top left. Fig. 191 Nicked lip. Fig. 192 A series of clay blobs applied to the rim and lip. Fig. 193 Nicked lip. Fig. 194 Notched lips (on right and left). Photos: V. Honorato.

Rectilinear designs predominate. The reduced size of sherds mean it was usually not possible to determine orientation. Oblique oriented lines seem to be most usual. In terms of arrangement, parallel and/or converging linear designs are most usual. Designs composed of criss-cross lines were also noted, reminiscent of SM-3.

Fig. 195 Rectilinear incised designs composed by oblique oriented, parallel elements connect to lines oriented in opposite direction. Fig. 196 Painted designs display similar patterns. Photos: Vinicius Honorato.

Top: Fig. 197 and Fig. 198 "Fish spine", zig zag design. Fig. 199 The edges of rectilinear incised lines oriented in parallel and opposing directions. Bottom: Fig. 200 and Fig. 201 Rectilinear, oblique-oriented parallel and criss-cross lines reminiscent of those seen at Sawre Muybu. Photos: Vinicius Honorato.

Discussion

While pottery from Itapacurá II displays greater variation than that of Itapacurá I, the materials from both show the existence of a shared ‘grammar’ in operation between these sites and Sawre Muybu. This is illustrated through commonalities in technological, formal and decorative dimensions. The basic division between coarse and fine wares observed at SM is partially echoed here. It is possible that the painted *cauixí*-tempered wares went through a different production sequence than the *cauixí*-tempered wares that only display plastic decoration. The former are smoother to the touch and display signs of reduced firing, whereas the latter feel rougher and went through variable firings. The painted designs are similar to the incised designs. Could the incised designs be emulating the painted ones?

If they are correct, the two C14 dates (350±70 bp and 285±75 bp) related to Itapacurá II suggest that its occupation was at least partly coeval with the European invasion of Amazonia, although it may have pre-dated the first Euro-Brazilian navigation of the entire course of the Tapajós (recorded as having taken place in the 1740s). One of the problems we have in placing this site’s material within a chronological framework is that we are not sure of what levels the sherds belonged to. Ceramics found below the 70cm depth may be from the pre-colonial period. If the pottery analysed – much of which displays techniques and designs usually associated with pre-colonial industries – dates to the post-Conquest period, could these continuities suggest that the effects of Old World disease, Portuguese slave raiding and resulting processes of territorial loss had not yet reached this area by the late seventeenth or early eighteenth century? Or could the C^{14} dates be related to a later occupation of the site, not associated with these ceramics? Perota’s description of the site’s stratigraphy and the map he produced of the sites (see Appendix 16) suggest he interpreted these sites as being multicomponent.

8.1.3 Itaituba

Curt Nimuendaju travelled to Itaituba in the early 1920s, where he assigned ceramic remains he found to the “Sapupé culture”, which was distinct from that of the Tapajó downstream (Nimuendaju 2004, p. 125). It is likely that Itaituba, situated on the left bank of the Tapajós, was a multicomponent site. Perota also visited it in the late 1970s and remarked that the construction of the town's airstrip destroyed (at least part of) the site. Perota's examination of the riverbank nearby led him to affirm that cultural remains reached a depth of 1.2m (Perota 1979, 8). Nimuendaju (2004, p. 125) located burial urns in front of the intendancy of Itaituba.

Fig. 202 Itaituba, seen from the Tapajós in 2011. Photograph: Bruna Rocha.

Nimuendaju apparently does not comment on technological attributes of the pottery he collected (this information could be contained in an unpublished manuscript). His illustrations of Itaituba ceramics show greater overall similarity in terms of formal and decorative attributes with SM-1 and SM-2, and with Itapacurá I and II than with those of Mangabal, save for a few exceptions. Regarding form, simple and unrestricted dishes, simple and dependent restricted vessels and independent restricted vessels were all found by Nimuendaju. Concerning surface embellishments, incision again appears the dominant form of plastic decoration; applied and punctated clay strips are also present (fig. 203, D, S). Some of the designs displayed resemble those of Itapacurá I and II – rectilinear, oblique-oriented parallel elements, which can connect to oblique lines oriented in the opposite direction. A curvilinear design (fig. 203, H) also resembles Itapacurá I pottery (see fig. 203). In spite of remarking on the absence of zoomorphic and anthropomorphic representations in the area, Nimuendaju does illustrate a zoomorphic representation (fig. 203, U) that in terms of technique and location on the vessel resembles appliqués from Itapacurá I. There are however entirely different designs among the Itaituba material that we have not seen among the ceramics studied (fig. 203, P, Q).

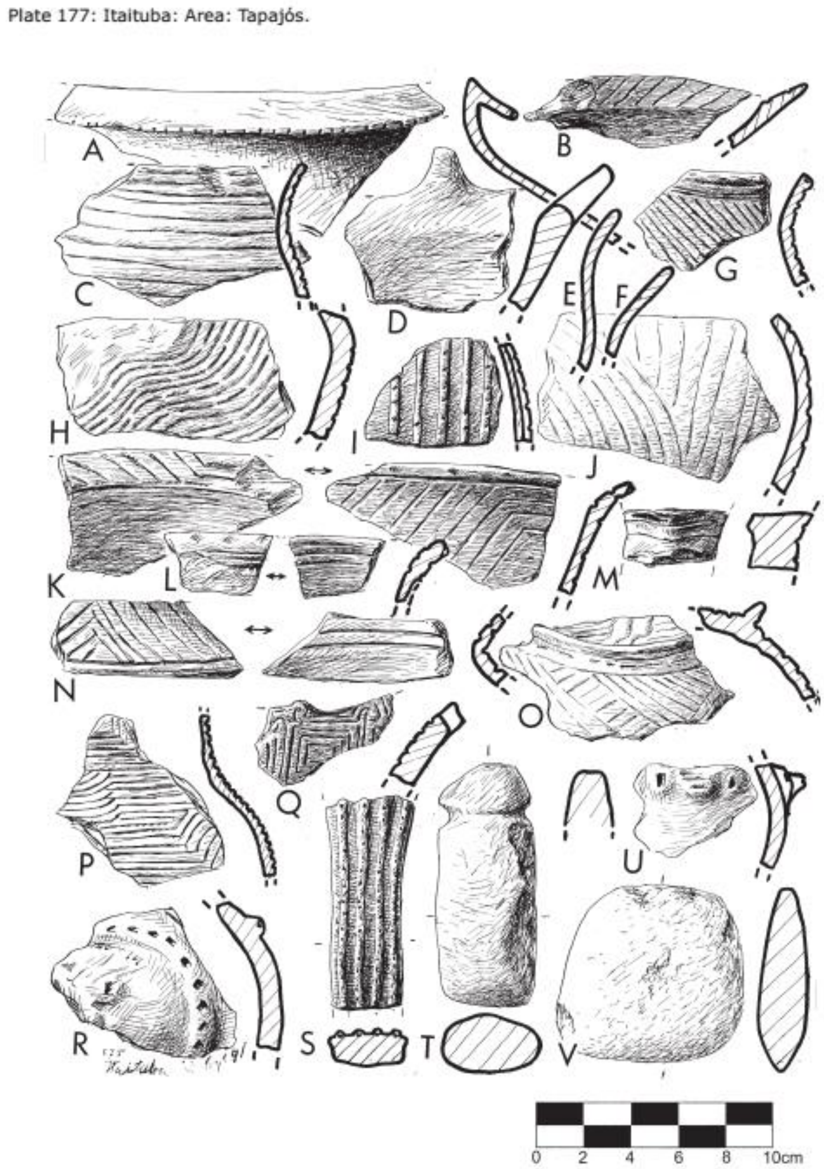


Fig. 203 Sherds located by Nimuendaju in Itaituba. The nicks along the rim of A are reminiscent of Mangabal materials, but the vessel contour is not. P and Q diverge from the materials we have encountered. Punctated and applied clay strips seen in D and S. (Reproduced from Nimuendaju 2004, p. 350, Plate 177).

Inland sites

8.1.4 Serraria Trombetas

Cristiane Martins carried out archaeological excavations at a site called Serraria Trombetas (see map 17), located inland, some 100km to the northeast of Sawre Muybu. The project sought to test the extent of Tapajó influence or the southern limits of the Incised and Punctate Tradition on the Tapajós (Martins 2012). Features excavated include a burial area, a vessel buried at considerable depth, and a hearth structure (Martins 2012). Within these features, semi-intact vessels were located. Three of the C^{14} dates obtained for the site place its occupation within the expected chronological period of the Incised and Punctate Tradition: 890±30 BP, 780±30 BP and 580±30 BP. Another sample produced a far earlier date, of 2200±30 BP (Martins 2012, p. 156). There are similarities and contrasts between Serraria Trombetas pottery (hereafter, abbreviated to ST) and the material excavated from Sawre Muybu (SM).

Technological dimensions: There are basically two principal tempers at ST: crushed rocks/minerals and sponge spicule. I believe that what Martins calls crushed rock is analogous to ware SM-1's quartz sand temper. *Caraipé* was not found among tempering agents at ST. Most of the sherds retrieved from ST had undergone incomplete oxidation; oxidised firing was most usually observed among sherds tempered principally with crushed rock (Martins 2012, p. 91).

Formal dimensions**:** Martins' method for classification of forms differs from ours, because she created sets according not only to morphology, but also size and inferred vessel function. Our comparison is only based on the morphological attributes of vessel body shape presented by Martins.[129] Studying the associations between temper and vessel wall thickness, Martins observes that thinner (≤5mm) vessel fragments tend to be tempered with *cauixí* or *cauixí* and secondary tempers such as grog and sand; medium (5-9mm) sherds can either be tempered mainly with crushed rock or with *cauixí*, while thicker sherds (9-13mm and >13mm) are more often tempered with crushed rock temper (2012, p. 90-91). This in part mirrors our findings with regard to SM pottery, where thinner vessel walls were often associated to ware SM-2's *cauixí* temper.

At ST, there are similar and contrasting vessel forms to those encountered at Sawre Muybu. Some forms occur at both sites: flat and unrestricted (griddle) forms, simple and unrestricted vessels with hemispherical shape of moderate depth (see Martins 2012, figs 78 I, N, O, P; fig. 80; fig. 81 E), and simple and unrestricted shallow dishes. Martins also found independent restricted vessels;

[129] I was unable to view Figure 82 (Form 5) and Figure 86 (Form 9) digital file of Martins' dissertation.

however, when necked, the neck curvatures are not as accentuated as those of SM vessels (Ibid, fig. 85). Another projected form has an in-turning neck (Ibid., fig. 85 A).[130] Martins also found simple and dependent restricted vessels (see Martins 2012, figs. 78 C, 88 A, 89) and, significantly, restricted and unrestricted composite vessels (see Martins 2012, fig. 83 A; C and fig. 84 A for the former and fig. 84 C for the latter) – forms that are not apparently present at Sawre Muybu. Composite forms such as these are reminiscent of Santarém ceramics. Basic rims are similar (including zero modification rims, upright rims, bevelled rims and in-turning rims), but there are also differences. At Serraria Trombetas tapering rims do not appear to be present. Neither are the characteristic, externally thickened, "folded" rims from SM. Although an externally thickened rim was located, its thick triangular profile is very different to what we found (see fig. 80 G in Martins 2012).

Martins also excavated integral vessels at the site, some of which contained human remains. These appear to be considerably smaller than the burial vessel encountered at Sawre Muybu and the osseous matter found consists of teeth. The burial urns found by Martins do not have 'lids' as the one we found did. The deposition pattern of some of these intact vessels is of interest, because several were located upside down – this again being something we did not observe at Sawre Muybu.

Martins' vessel n°5 is associated to the early date, of between 380-180 B.C. (2012, p. 78-81). I would suggest the date be 'put aside' until further corroborating dates are produced, because although the charcoal sample was located in close proximity to the bottom of the vessel, the vessel was placed very close to the latosol/Layer I, and its techno-stylistic attributes (sponge-spicule temper and hollow rim) would suggest association with the IPT (Martins 2012, p. 78-81).

<u>Dimensions of decoration</u>: Martins notes that decoration was most often present on material tempered with *cauixí* or combinations of *cauixí*, grog, and sand (Martins 2012, p. 92). At Serraria Trombetas, plastic decoration techniques often

[130] I would say this is a postulated form because the projection in question is based upon a rim sherd that did not have a part of the body attached to it.

involve incision, punctations, applied and punctated clay strips or applied nubbins; also present are notching, excision, channelling and appliqué, as well as less common techniques (Martins 2012, p. 93-101). Sherds displaying more complex decoration or combinations of decorative techniques are usually tempered with *cauixí* (2012, p. 101). Paint comprises red, black, and orange colours and slip is most usually white. Paint seems to have been applied in single colours. Some sherds display zoned painting; others exhibit designs that include rectilinear and curvilinear elements. The more elaborate applications of decoration can be seen on *cauixí*-tempered material (2012, p. 101-104). This reflects our findings at SM, where more elaborately decorated material is related to the SM-2 ware's *cauixí*-tempered fabrics.

In terms of design elements, though some recurrences with Itapacurá and SM designs (including rectilinear, oblique oriented parallel and connected elements composing triangular designs, and horizontally oriented lines of punctations) can be noted, there are also discrepancies. ST potters/consumers had a greater penchant for curvilinear elements and also for a combination of applied and punctated clay strips with incisions (rather than punctations) on the exterior vessel body (2012, p. 98-99, figs. 56 & 57).

Discussion

If we leave the very early date aside, Serraria Trombetas postdates Sawre Muybu (there may have been overlap between these occupations however). There is some equivalence between the coarse wares (SM-1) of SM and of the ST sites on the one hand, and the *cauixí*-tempered fine ware pottery on the other. Firing practices at ST do not seem as closely tied to temper as they are at SM. In terms of form, the sample from ST only partially resembles that of SM: composite forms more similar to vessel morphology seen among Santarém pottery are more common, while at SM inflected forms prevail. Within the dimensions of surface treatment and decoration, techniques and designs associated with the IPT can be noted on both sites, but again, these are not shared in their entirety. This thus suggests that the occupants of these two sites were engaged in wide-ranging "IPT" networks, yet the differences present at several moments of their respective ceramic production sequences point to the existence of other, independent influences or interactions.

8.1.5 Parauá, lower Tapajós

Three sites – called Lago do Jacaré, Zenóbio and Terra Preta – located in Parauá, an area that stretches inland from the western bank of the lower Tapajós River, were excavated by Denise Gomes for her PhD thesis. One of the objectives of the thesis was to "test the limits of the sphere of political influence of the regional chiefdom" of the Tapajó near the left bank of the Tapajós River at approximately 100km south of Santarém (Gomes 2005, p. 295). The aim of the ceramic study, which is an important, but not the sole focus of the thesis, is to establish a classification based on the analysis of patterns of vessel use (2005, p. 17).

Lago do Jacaré site

Lago do Jacaré (hereafter, LJ) is situated approximately 5km inland from the western banks of the Tapajós, on a plateau with declivity oriented in SE and N directions (see map in Gomes 2005, p. 101-102). The site contains a rounded ADE patch and covers an area of 650x600m/39ha (Gomes 2005, 55). The *terra preta* layer at the site extends to at most 30cm depth, and other archaeological material is concentrated until 20cm (Gomes 2005, p. 71). Gomes proposes that LJ underwent successive episodes of occupation and abandonment over its long history. From the site, 1445 sherds were analysed. The pottery is mostly described as belonging to the Incised Rim Tradition (Gomes 2005, p. 156), but also includes ceramics related to the Incised and Punctate Tradition, presenting formal and decorative attributes that resemble Santarém and Konduri ceramics (Gomes 2005, p. 165).

Level 15-20cm of unit 1 produced a date of 1020±50 BP. An array of very early dates is also presented for Excavation area 1 (called Unidade 1 and which comprised a 4x4m area) from 20cm depth and below, and from unit 6, where pottery was found in a very fragmented state and where the cultural layer ends at approximately 25cm depth. In the appendix (table A.1) of the thesis, a suite of 16 thermosluminescence dates, presumably related to the site's pottery, are listed. All the dates related to the site are summarised in table 15 below. The dates earlier than 3200 BP are consistent and do seem to be related to early human activity in the area, but it is not clear to what extent they relate to the pottery presented. Gomes does not make reference to the dates obtained by thermoluminesce methods in the text. It would have been useful to know why they have been excluded from the discussion; they would suggest continuous occupation of the area over much of the past millennium.

Dates for Lago do Jacaré site (Gomes 2005)			
Years BP	**Dating method (Radiocarbon/ Thermoluminescence)**	**Context**	**Area of site**
241 ± 30	TL	surface	
435 ± 56	RC	surface	
300 ± 30	TL	Unit 1, 0-10cm	SE of site
660 ± 85	TL	Unit 1, test pit 15, surface	SE of site
990 ± 86	TL	Unit 1, test pit 5, 0-5cm	SE of site
380 ± 70	TL	Test pit B.5N, 0-10cm	
378 ± 40	TL	Test pit D.2, 0-10cm	
700 ± 70	TL	Test pit B.2.S, 0-10cm	
799 ± 92	TL	Test pit 11.2N, 0-10cm	
860 ± 110	TL	Test pit 4.3S, 0-10cm	
310 ± 40	TL	Unit 1, test pit 5, 5-10cm	SE of site
1008 ± 124	TL	Unit 1, test pit 14, 5-10cm	SE of site
1390 ± 130	TL	Test pit 11.2.S, 0-10cm	
1990 ± 190	TL	Test pit C.1S, 0-10cm	
200 ± 20	TL	Test pit 8.1S, 10-20cm	
1680 ± 220	TL	Unit 1, test pit 5, 10-15cm	SE of site
1020 ± 50	RC	Unit 1, test pit 6, 15-20cm	SE of site
3600 ± 70	RC	Unit 6, test pit 4, 15-20cm	Centre of site
3260 ± 50	RC	Unit 1, Test pit 15, 20-25cm	SE of site
3660 ± 70	RC	Unit 1, Test pit 7, 20-25cm	SE of site
3660 ± 40	RC	Unit 1, Test pit 13, 25-30cm	SE of site
3800 ± 70	RC	Unit 1, Test pit 3, 25-30cm	SE of site

Table 15 Dates obtained through radiocarbon and thermoluminesce techniques for LJ site. Compiled from Gomes 2005.

<u>Technological dimensions</u>: The main primary tempers present are *cauixí* and *caraipé*, and a long-term continuity of these technological choices is suggested (Gomes 2005, p. 153). Secondary tempers include sand, *saibro* and crushed sherd (Gomes 2005, p. 153). *Cauixí* on its own and *cauixí* with quartz sand as a secondary temper are the most recurrent temper choices observed; *cauixí* and grog are also present in the sample. According to Gomes, grog is associated with later pottery in the region (2002 In: 2005, p. 153). *Cauixí* and *caraipé* also occur together. Other combinations are not as common (2005, p. 154). As concerns firing, incomplete oxidation prevails over complete oxidation (2005, p. 155).

<u>Dimensions related to form</u>**:** The most commonly identified base form is flat, followed by convex bases and annular bases; flat pedestal bases were found on occasion (2005, p. 161). This mostly falls between 6-10mm and 11-19mm, with thicker and thinner specimens also present (Gomes 2005, p. 159). LJ vessel thickness more closely corresponds to the trends observed in relation to Sawre Muybu pottery. Forms are similar to and distinct from materials from Mangabal and SM (see Gomes 2005, Plate 1, p. 167-169): 'generic' forms such as unrestricted and flat griddle forms, and different sizes of simple and unrestricted hemispherical vessels, as well as shallow, simple and unrestricted vessels with an ovaloid contour, were excavated from LJ. Independent restricted vessels are reminiscent of Mangabal's independent restricted, moderately deep, hemispherical bowls with mild "S"-shaped, inflected contours (see Gomes 2005, p. 168, Plate 1, form 6). Meanwhile, dependent restricted vessels with simple and inflected contours also occur within the sample – neither of these are apparently present at Sawre Muybu. Simple and dependent restricted vessels were encountered at Mangabal; the dimensions of the material from LJ are larger however. A small, unrestricted and composite vessel form (2005, p. 169, form 10) that we did not encounter on the sites upstream can also be seen. Gomes presents several estimates of vessel measures, including rim diameter, vessel height, vessel width and base diameter (2005, p. 162-163), as well as volume and size (2005, p. 162-163, p. 171-173). Over a quarter of the sample lies between 1.1-4l, while a similar number of vessels were estimated to have a capacity between 4.2-12l. The remainder of the sample is either small or exceptionally large (2005, p. 171). Rims can have zero modification,

exterior strengthening, interior strengthening, or be cambered, while inclination varies between in-turning, upright or everted (2005, p. 160-161). In terms of appendages, base supports ("feet") and adornos are found at the site.
Decorative and surface treatment dimensions: Smoothing is the most common form of surface treatment while polish is very rare (2005, p. 156). Preferred decorative field tends to be on rims – either on their exterior or, when everted, on their interior face. Incision is the most usual technique employed – producing designs in which rectilinear short, vertical or oblique-oriented elements are preponderant; this is a hallmark of the pottery of Lago do Jacaré. Other less frequent design elements consist of oblique lines, oblique and vertical lines and radial incisions. Sherds displaying rectilinear oblique, criss-cross elements also occur; the author hints at an association to the Zoned-Hachured Tradition, however, although they are hachured, it does not seem they are delimited by a wider incision as was typical of specimens attributed to this tradition (2005, p. 156). In contrast, other techniques and design elements – applied and punctated or incised strips of clay – are associated by the author to the Venezuelan Valloid series (Gomes 2005, p. 158). Oblique-oriented incised lines along the rims of some of the vessels from the LJ site (see 2005, p. 240-241, Plate 4) remind us of similar decorations observed on the quartz sand tempered material of Sawre Muybu, but forms of LJ tend to be more angular. Red and white slip are found rarely (2005, p. 160).

Discussion**:** Gomes presents a consistent set of early dates for the LJ site, which do seem to be related to anthropogenic activity: the carbonised seeds retrieved from the 20-25cm level belonged to palms whose presence is an indicator of disturbance (Gomes 2005, p. 102). Yet the author herself explains that pottery within these lower levels is sparse (*Ibid.*, p. 102). Photographs or illustrations of the pottery identified with this initial moment of occupation would have been useful. Inspired by Megger's (1990; 1995) arguments, the author proposes a sequence of discontinuous moments of inhabitation in the area. But if we consider the TL dates presented by Gomes in the appendix, the site would seem to have been continuously inhabited from approximately 1020±50BP. It certainly seems likely that the greater part of the ceramic material presented is related to a later occupation of the place. This C^{14} date of 1020±50 BP and two TL dates of 860±110 and 990±86 BP would render the LJ site coeval with the timing of occupation at Sawre Muybu, while the earlier TL date of 1390±130 BP could point to synchronicity with the Mangabal occupation.

While predominant use of *cauixí* as a principal tempering agent more closely echoes technological choices of part of the Mangabal material, of SM-2 or Santarém, overall forms from the LJ site resemble some of the forms encountered at both TPM and SM, although the inflected vessels again are more similar to Mangabal ceramics. In stylistic terms the material exhibited seems closer to IPT wares, but as the author herself notes the site was likely occupied prior to IPT-related developments.

8.1.6 Zenóbio site

This site is located only 500m from LJ. Its topographical situation is different from LJ – it is located on a hilltop plateau so its surface declines in all directions, though more steeply towards the north (Gomes 2005, pp. 61, 71 and 80 for map). Recent agricultural activities may have damaged part of the archaeological layers of the site; rain and erosion may also have transported cultural materials to the base of the hill (Gomes 2005, p. 125). Gomes posits Zenóbio could have served a complementary function to the LJ site (2005, p. 125). The site covers an area of 350x300m/10.5ha. Its *terra preta* deposit reaches approximately 30cm. The site yielded far fewer pottery sherds than the LJ and Terra Preta sites also investigated. Excluding *sondagens* (50x50cm test pits excavated during site delimitation), a little over 3kg of pottery was extracted from the site.[131] The three test pits excavated reveal pottery occurs up to the depth of 55cm, however greatest density occurs between 10-15cm or 20cm depth, where sherds are larger and more numerous (Gomes 2005, pp. 71, 125). One hundred and seven sherds were analysed from the site.

[131] This figure was reached by adding the individual weight of sherds tabulated for each test pit's levels.

Charcoal taken from 10-20cm depth was dated to 3680±50 BP (see table 16 below). Six TL dates were also obtained for the site, the oldest of which is related to a sample excavated at 30-40cm, dated to 1370±200BP. The other five are dated between 920±130 to 260±36 BP (Gomes 2005, Appendix, table A.2). The TL dates and the reason for not including them are not discussed in the body of the text.

Dates for Zenóbio site (see Gomes 2005)		
Years BP	**Dating method (Radiocarbon/ Thermoluminescence)**	**Context**
260 ± 36	TL	Test pit 1.LW, 0-10cm
520 ± 70	TL	Test pit 2.1S, 0-10cm
660 ± 95	TL	surface
890 ± 80	TL	surface
910 ± 130	TL	Test pit NE.2, 30-40cm
1370 ± 200	TL	Test pit NE.2, 20-30cm
3680 ± 50	RC	Unit 1, Test pit 1, 25-30cm OR 10-20cm[132]

Table 16 Dates obtained through radiocarbon and thermoluminesce techniques for Zenóbio site. Compiled from Gomes 2005.

<u>Technological dimensions</u>**:** Temper choices at Zenóbio were very similar to those of LJ: *cauixí*, or *cauixí* and quartz occur as main tempers, and combinations of *cauixí* and *caraipé*, and *cauixí* and grog are also seen (Gomes 2005, p. 185-186). Oxidised and partially oxidised firings are evenly distributed among the sample (2005, p. 186-187).

<u>Formal dimensions</u>: Flat and convex bases were found at the Zenóbio site (2005, p. 190). Most vessel walls measure between 11-19mm or 6-10mm (Gomes 2005, p. 189). There is less formal variation at Zenóbio than at LJ. Forms distinguished include simple and unrestricted hemispherical bowls, simple, dependent and restricted forms and independent restricted forms. Composite contours are absent; only inflected contours were found (see Gomes 2005, p. 194, Plate 2). Rim forms are very similar to the LJ site; zero modification, everted, upright and in-

[132] In Table 4.69 (Gomes 2005, p. 231), this sample is referred to as coming from the 25-30cm, but elsewhere (2005, p. 125) the author alludes to carbonised seeds taken from the 10-15cm and 15-20cm levels that produced this date.

turning rims occur; exterior strengthening, internally strengthened and cambered rims were found (2005, p. 189-190). Lip form varies (2005, p. 189).
Dimensions of surface treatment and decoration: Smoothing is ubiquitous; incised decoration again prevails. Short, simple incisions and long, simple incisions are most usual. Other types of plastic decoration, such as applied spheres and strips, are atypical. The only expression of chromatic decoration is red slip, which is common (Gomes 2005, p. 187).

Discussion

Two overall vessel forms – simple and unrestricted hemispherical bowls and independent and restricted inflected vessels – remind us of forms seen at both SM and Mangabal. Overall decorative techniques also resonate. These attributes seem to recur in assemblages throughout the region. The significance of such recurrence is greater if the later dates presented by Gomes are in fact associated to at least the majority of the pottery presented; if, on the other hand, the very early dates given are associated with this pottery and the thermoluminesce dates are to be discarded, we could hypothesise that this early pottery influenced later traditions. We would then have to find corroborating evidence for this, with ceramics and sites dated to the intermediate period.

8.1.7 Terra Preta site

The Terra Preta (hereafter, TP) site is situated at the confluence of the Amorim and Tapajós Rivers, on a plateau on the left bank of the Tapajós at 110m above river level (Gomes 2005, pp. 60, 69). Part of the site is used for agricultural activities in a slash and burn system of crop rotation, but over half of it is closed *capoeira* (Gomes 2005, p. 68), suggesting disturbance in the recent past. The site is estimated to cover an area of 350x300m/10.5ha (Gomes 2005, p. 55). The centre of the site is generally level, but there is a declination of the ground towards the north and particularly towards the east (see map in Gomes 2005, p. 81). Within its central portion, the layer of ADE and ceramic remains extend to a depth of approximately 30cm, but towards the periphery of the site, the *terra preta*'s depth can increase to approximately 70cm, which Gomes interprets as discard areas. Five test pits were excavated at the site, yielding a little over 34kg of pottery (excluding *sondagens*, 50x50cm test pits excavated during site delimitation);[133] 2353 ceramic fragments were analysed from this site. A funerary urn was encountered during site delimitation (Gomes 2005, p. 78).

Dates for the site range between 2490±80 BP (unit 1, 30-40cm level), 1840±50 BP (unit 5, 35-40cm level), 1320±60 BP (unit 4, 30-40cm level) and 1220±60 BP (unit 3) (Gomes 2005, pp. 133, 138). The latter two dates are roughly coeval with the Mangabal site. There are no TL dates for this site.

Radiocarbon dates for Terra Preta site (see Gomes 2005)	
Years BP	**Context**
910 ± 60	Test pit 4.3, 30-40
1220 ± 60	Test pit 3, 30-40cm
1320 ± 60	Test pit 4, 30-40cm
1840 ± 50	Unit 5, Test pit 4, 35-40cm
2490 ± 80	Unit 1, 30-40cm

Table 17 Dates obtained through radiocarbon techniques for samples from the Terra Preta site. Compiled from Gomes 2005.

Technological dimensions: As with the other sites excavated by Gomes, sponge spicule prevails (Gomes 2005, p. 201-202). In contrast to LJ and Zenóbio, a greater proportion of the sample selected for analysis contains grog as a secondary temper – an attribute Gomes relates to later industries of the region (2005, p. 202). Most of the pottery analysed from the TP site presents reduced cores while just over a third displays oxidised firing (2005, p. 203).

Formal dimensions: Flat, convex, annular and pedestal bases were excavated. Most sherds are between 6-10mm thick. Simple and unrestricted forms, such as flat griddles (Gomes 2005, Plate 3, form 11), hemispherical bowls (Gomes 2005, Plate 3, form 2 excepting form with composite contour displayed on upper left), and ovaloid dishes (Gomes 2005, Plate 3, form 14) parallel both Mangabal and Sawre Muybu material (cf. Gomes 2005, p. 214-215, Plate 3). Likewise, independent and

[133] Again, this figure was obtained by adding the weight given for each test pit's levels.

restricted forms can remind us of Mangabal pottery (Gomes 2005, Plate 3, form 7 and 9) or, to a lesser degree, SM pottery. A deep, almost cylindrical vessel resembles forms observed at Sawre Muybu. A number of forms reconstructed by Gomes have not been identified on the upper Tapajós sites, including unrestricted and restricted composite forms (Gomes 2005, Plate 3, forms 1 and 13 respectively), and dependent and restricted inflected contours (Gomes 2005, Plate 3, form 4). Rims can have zero modification, or upright, everted, and in-turning inclinations, and exterior or interior strengthening, or they can be cambered (Gomes, 2005, p. 207-208). Regarding appendages**,** vessel base supports ("feet") and adornos are present.

<u>Dimensions of surface treatment and decoration</u>: Although smoothing is still preponderant among the vast majority of materials analysed, resin and polishing are also noted (Gomes 2005, p. 204).

1. 2. 3. 4. 5.

Images removed due to copyright restrictions

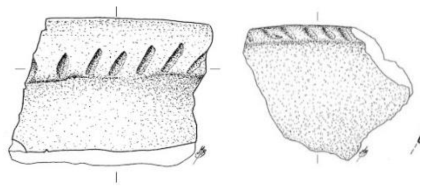


Fig. 204 1, 2: "Short, simple incisions"; 3: ungulate decoration. Reproduced from Gomes (2005, p. 243, Plate 6), photographs by Wagner Souza e Silva. 4, 5: Ware SM-1 specimens. Illustrations by Marcos Brito. Though forms are dissimilar to those presented by Gomes, there may be a shared aesthetic of thick, oblique-oriented incisions or impressions along rims.

Incision is again the predominant decorative technique utilised. Design elements in decreasing order of popularity consist of rectilinear, oblique or vertically oriented short elements; long simple incisions, radial incisions, criss-cross incisions and combinations of oblique and vertical incisions (Gomes 2005, p. 204-205). Other plastic decorative techniques mainly involve modelling (appendages), punctations, as well as applied spheres and strips (2005, p. 205). In contrast to the LJ and Zenóbio sites, chromatic decoration, particularly in the form of red slip, was detected on one third of the sample (2005, p. 206).

Discussion

The site's older occupations are dated to between 2400-1800 BP, while a later occupation occurred around 1320-910 BP. The author writes that in terms of surface treatment and decoration, the later dates are associated with polished surfaces, red slip, incision and the presence of plastic decoration and zoomorphic representations (Gomes 2005, p. 231). A clearer indication of which pottery displayed relates to which period would help us to better understand the assemblages and postulate connections (or discontinuities) between them. Perhaps mechanical mixing has made this unachievable. Some of the attributes described along technological, formal and decorative dimensions are shared with the SM and Mangabal assemblages. In terms of technology and some of the forms, it would seem that closer resemblances would be found with Mangabal material – however, discrepancies (such as the greater presence of grog at TP, and in terms of vessel form) are also present. Concerning decoration, ware SM-1 and Terra Preta (Parauá) pottery appear to have more in common (fig. 204). If these attributes in fact relate to the earlier dates, it could again be hypothesised that Parauá ceramics laid the foundations for later styles in the region.

General discussion of Parauá material

In-depth, pioneering work such as that conducted by Gomes is to be welcomed. Though the study includes other considerations beyond pottery (including discussions of survey techniques, evaluation of settlement types present, descriptions of the lithic materials and data on phytoliths), I will limit my comments to the ceramics presented, and here I will offer an alternative assessment to some of Gomes' interpretations.

There is a sequence of consistent, early dates taken from the beginning of the cultural stratum, but it is not clear to what extent these dates can be related to the ceramics presented (see Gomes 2005, p.106, fig. 3). Nor is it clear why the author did not include the TL dates listed in her appendix. The oldest material (3800-3600 BP?) from the LJ and Zenóbio sites presents "zoned punctations, red slip and modelled zoomorphic appendages [that are] occasionally present" (Gomes 2005, p. 231) but I did not find specific mention to these appendages in the photographs or illustrations. Later materials include a greater variety of ceramic artefacts (Gomes 2005, p. 299), including vessels that have appendages the author describes as breast-shaped, anthropomorphic figurines, annular bases, flat, pedestal bases and artefacts from the Santarém and Konduri complexes (2005, pp. 227, 231). Flat griddles, spherical forms with simple or inflected contour of varying size (small to large) are present (2005, p. 232). The later collections include greater investment in surface treatment and decoration as well as smaller vessels destined for individual use (Gomes 2005, p. 299); material associated to the Valloid series is also cited. But overall stylistic continuity among the materials studied is proposed (2005, p. 230).

The author affirms that the collections presented can by and large be classified as belonging to the Incised Rim tradition, based on similarities with the Boim complex described by Hilbert (1968) (Gomes 2005, p. 292) and presence of six of the fourteen decorative traits listed as criteria for membership of this tradition, postulated to date between 1840BP and 1140BP by Meggers & Evans (1961, p. 378) (Gomes 2005, pp. 232, 236). Though more recent research has pushed dates for the Incised Rim tradition back in time, if the pottery described by the author indeed dates to as far back as 3800-3600 BP, we may ask whether Gomes should not put forward a new formulation, rather than try to annex early Parauá pottery to a later (Incised Rim) tradition (F. Almeida, pers. comm., 20 October 2016).

Gomes states that besides the Incised Rim pottery, “quantitatively inexpressive” amounts of pottery from previous (Zoned Hachured) and later (Incised Punctate/Santarém/Konduri/Valloid) occupations (2005, p. 230) also occur. The sherds displayed as “Zoned Hachured” have incised, criss-cross lines (see Gomes 2005, p. 240, Plate 4. figs. 14 & 15), but are not large enough for us to evaluate whether the design is in fact zoned, in contrast to a convincing specimen Gomes would later excavate from the Santarém-Aldeia site (Gomes 2011, p. 291, fig. 8). One such fragment (fig. 205/14) reminds us of the design of criss-cross lines we have observed at sites investigated by Perota and Sawre Muybu, upstream from Itaituba, but it is an obvious design on a small sherd, which means that we cannot extrapolate much from it.

Images removed due to copyright restrictions

Fig. 205 "Hachured incisions". Reproduced from Gomes 2005, p. 240, Plate 4, figs. 14 & 15. Photographs by Wagner Souza e Silva.

Comparing materials from Itaituba, illustrated by Nimuendaju and seen by this project further upstream, with the photographs presented here, there appears to be a significant amount of material that could be assigned to the IPT (see Gomes 2005, p. 240-244, Plate 4, figs. 8-11; 16, 18, p. 21-30; Plate 6, figs. 9-12, 15, pp. 17-23, 25-29). This is to be expected; a survey conducted by Nimuendaju in the 1920s (2004) along the Arapiuns River, which is situated approximately 30km to the north of the sites researched by Gomes, resulted in the identification of sites whose ceramics Nimuendaju related to "Tapajó pottery, including variants of Arapiuns" (see fig. 206 below).

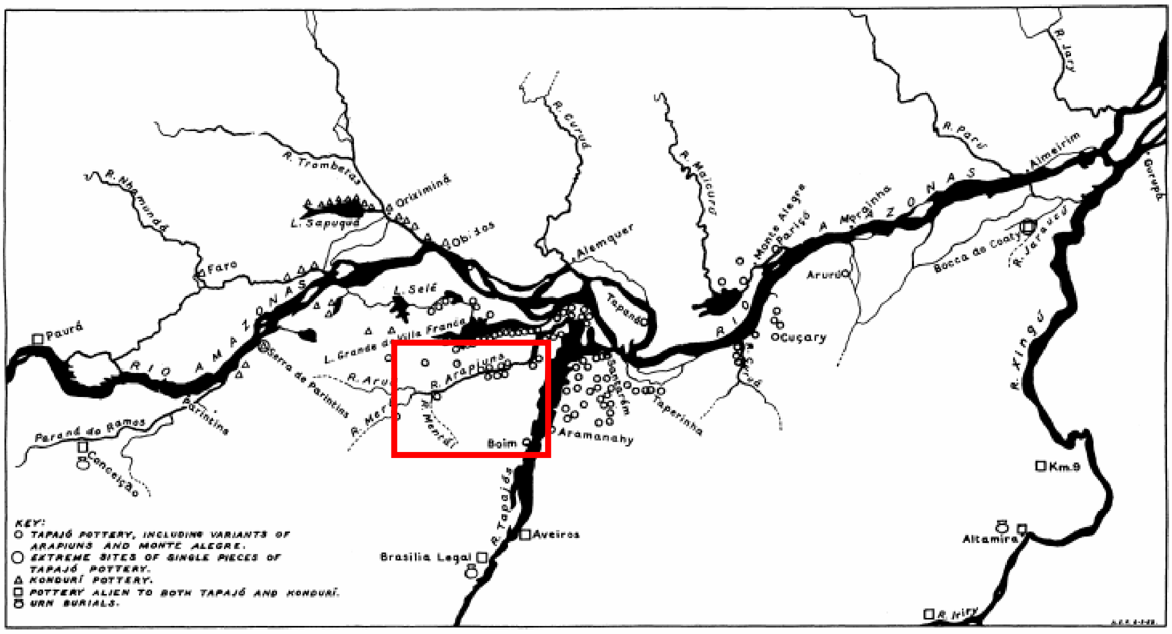


Fig. 206 "Nimuendajú's map of his excavations in the Tapajó and Konduri areas. Redrawn by A.E. Parkinson. Scale not given originally but calculated by D. Maria de Lourdes Jovita as 1mm=2,800 m. Distance between Paurá and Gurupá approximately 616 kms." from Palmatary 1960, p. 19. Red box highlights Arapiuns and Parauá area, located to the north of Boim.

The assessment of the ceramics undertaken by Gomes leads her to conclude that the pottery she has located was produced and consumed by communities autonomous from the Tapajó chiefdom (Gomes 2005, p. 300):

> The isolation generated by the 15km that separate the left and right banks, in this part of the lower Tapajós, should have contributed to the perpetuation of a way of life in which the communities bearing Incised Rim pottery, who occupied the left bank, remained autonomous, co-habiting at a distance from the Santarém society (Gomes 2005, p. 301).[134]

While I sympathise with the idea of autonomy, I am not sure I subscribe to the idea of a conquering chiefdom with "satellite communities" (Gomes 2005, p. 302) in the first place. Further, I cannot see how the lower Tapajós – an open river which, in comparison to its upper course, is easily navigable – could contribute to such isolation. Though Gomes does postulate some form of interaction or exchange with Konduri or Tapajó occupations, based on the presence of anthropomorphic figurines and appendages, annular bases, pedestal bases and artefacts typical of these industries (such as caryatid vessels and double rimmed plates) found in the LJ and TP sites and associated to later dates (Gomes 2005, p. 231), this is presented as negligible. I believe this should be reconsidered. Rather than isolation, it seems to me that what we are seeing is the existence of extensive networks in operation and connections between the peoples making and using these wares along the Tapajós.

Besides, the Tapajó 'chiefdom' would only pertain to the latter moments of pre-Columbian occupation of the area. We may find the earlier pottery presages what came later. This is something being proposed for other areas of the Amazon, in particular in relation to the Pocó-Açutuba/Incised Rim traditions and later complexes, such as Kondurí, Santarém, or Polychrome-related materials (e.g. Almeida 2013; Garcia 2012; Guapindaia 2008; Lima 2008; Moraes 2013, p. 318; Neves *et al.* 2014). In Venezuela, Cruxent and Rouse similarly advanced the possibility that, because of the presence of modelled-incised lugs and rim flanges decorated with broad line incision, the Arauquinoid series had originated out of the previously widespread Barrancoid series on the Orinoco River (1958, p. 27).

[134] Yet, based on formal similarities and decoration, the author also proposes connections between Parauá peoples and those related to the Uru tradition in central Brazil (2005, p. 301). This somewhat contradicts the idea of isolation, put forward on the same page.

Thus it could be worth considering the possibility that the early dates (over 3000 BP) relate to previous occupations, that used little or no pottery; that the area, already altered by early these gatherer-hunter-fishers, was resettled by bearers of an earlier, yet to be defined pottery industry. At around 1000 BP peoples engaging in ample exchange networks (signalled by Incised and Punctate/Valloid pottery) either reoccupied the area, were incorporated into already existing villages, or engaged with these villages potentially in a number of ways. It would be interesting to see if connections or influences from the early pottery from the Parauá sites can be detected in the later, IPT material (F. Ozorio, pers. comm., 21 October 2016); by referring to an overall continuity of technology, form and decoration over time, Gomes suggests it can.

8.2 Back to the Incised and Punctate Tradition: what does it mean? Mirage or chimera?

As noted in chapter 2, the association between the Arauquinoid series and the Incised and Punctate Tradition has long been recognised. Ceramics belonging to the Arauquinoid series were initially located along the banks of the Orinoco River's lower (Guarguapo and Apostadero sites) and middle (Caño Caroni, Matraquero, Arauquin, Camoruco and Corozal sites) courses, and on the adjacent parts of the Venezuelan Llanos. They have also been found to extend throughout much of the coastal Guyanas.[135] The most ancient sites with typical Arauquinoid pottery are located near the confluence of the Apure and Orinoco rivers and are dated between c. 500-600AD (Rouse & Cruxent 1963; Rostain & Versteeg 2004, p. 234); it is often the case that Arauquinoid pottery is found on multicomponent sites. One of its defining features is its sponge-spicule (*cauixí*) temper – thought, at first, to be the result of diffusion down the Orinoco from Amazonia (Cruxent & Rouse 1958; Linné 1925). Post-firing colour of the paste is grey to buff. In terms of vessel morphology, flat, rounded and annular bases can be found; body form varies between the different styles, but includes simple and composite contours for what Cruxent & Rouse called bowls, bottles, jars and *ollas*. Jars can be necked or collared. Rims can

[135] See Boomert 1980; 2000; Coutet 2016; Cruxent & Rouse 1958; Howard 1943; Osgood & Howard 1943; Petrullo 1939; Roosevelt 1980; 1997; Rostain & Versteeg 2004; Rouse & Cruxent 1963.

be tapering and rounded, thickened and triangular, bevelled or flanged. Lugs are frequent (attention devoted to them varies) and vertical strap handles can occur. Regarding decoration, distinctive rectilinear, fine-line incision, appliqué work, and appliqué faces on the collars of globular jars are common features (see Cruxent & Rouse 1958; Rostain & Versteeg 2004).

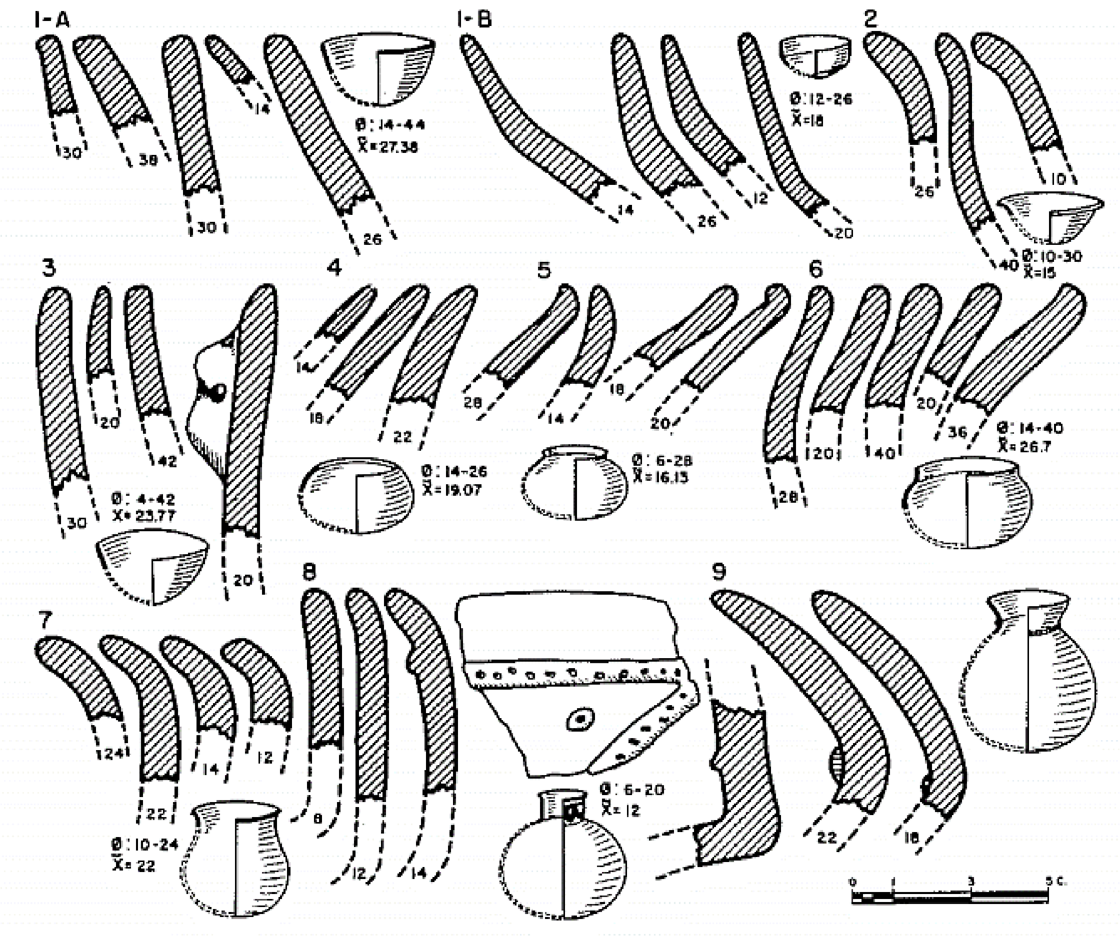


Fig. 207 "Perfiles de bordes y reconstrucciones de las formas para el material Valloide. Em la Figura se indica la gama de los diâmetros y la media para cada forma". Reproduced from Tarble & Zucchi 1984, p. 436, fig. 2.

Valloid pottery was first identified among middle Orinoco pottery from the Cerro Aislado, El Valle, Agüerito, Caño Asita, Orupe, Paragüito del Meta, La Urbana and Medano La Rompía sites (Tarble & Zucchi 1984, p. 436-437). It is dated to approximately 900 DC and is found in the uppermost levels of sites, usually in association with *cauixí*-tempered Arauquinoid pottery (Tarble & Zucchi 1984, p. 434). Valloid material is characterised by a reddish, yellowish or brownish coloured paste. It is tempered with ground minerals of varying size, of which quartz predominates. On occasion, particle size exceeds 3mm, causing the temper to extrapolate the limits of vessel walls. Firing tends to be oxidised and even; fireclouds are common. Overall, surfaces are well smoothed and vestiges of polishing can at times be detected, however many sherds are eroded and feel grainy to the touch. There is limited variability of shape. Open bowls, vessels with closed mouths of medium size predominate. A particularly distinctive Valloid shape is a vessel with a globular body with a high tubular collar, decorated at its base with applied fillets placed in different ways (Tarble & Zucchi 1984, p. 436). Valloid material is rarely decorated. The main techniques are appliqué-incised and modelling. Incision on the other hand is less frequent. Appliqué-incision is the most popular decorative technique in almost all the collections, and is especially employed to decorate the tubular necks of shape 8 (fig. 207). Rectilinear geometric designs are often employed (Tarble & Zucchi 1984, p. 437).

Clockwise from left: Fig. 208 Sherds associated with the Valloid style (or series) from the Buena Vista site, middle Orinoco. Fig. 209 Material from the Picure island, on the Atures Rapids (upper Orinoco). Fig. 210 Sherds from Cedeño site, Bolívar. Photographs by Natália Lozada Mendieta, courtesy of José Oliver.

Technological, formal and stylistic resemblances between Valloid and the SM-1 ware are at times startling. Differences are also present: Sawre Muybu “folded” rims and the decoration applied to them (such as excision), are apparently inexistent within Valloid assemblages; the necks of Sawre Muybu pottery are shorter than those of their ‘cousins’ from the Orinoco, so that they do not provide sufficient space to sustain applied and punctated ridges; the patterns produced by such ridges also tend to be simpler at Sawre Muybu (cf. Tarble & Zuchi 1984, p. 437, figs. 3 & 4). Though zoomorphic figurines were found at Sawre Muybu, anthropomorphic ones such as that from Picure Island were not (fig. 212).

Fig. 211 Valloid rims from Cerro Ailsado site, Bolívar, Venezuela. Fig. 212 Anthropomorphic figurine from Picure island, Atures Rapids. Photographs by Natália Lozada Mendieta, courtesy of José Oliver.

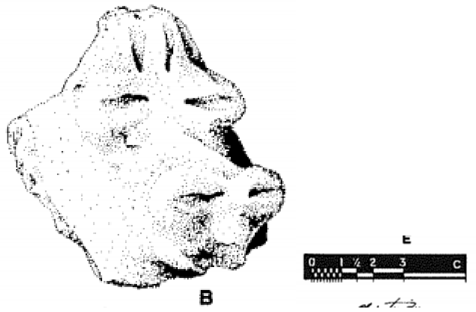


Fig. 213 "Apéndices modelados del material Valloide". Sitio Cerro Ailsado. Reproduced from Tarble & Zucchi 1984, p. 438, fig. 5 B. Compare with fig. 100, Chapter 7.

Thus the IPT encompasses what in Venezuela was seen as two separate, though related, series. While Tarble (1985), Tarble & Zucchi (1984) and Zucchi (1985) would initially relate the Valloid series to specific speakers of Carib languages, such as the Mapoyo (Tarble & Zucchi 1984), Lathrap (1970) made the connection between the Arauquinoid series and IPT and explained this in terms of a Carib 'invasion' of Amazonia. Tarble de Scaramelli and Scaramelli would later affirm that the ample distribution of Valloid materials goes "far beyond the limits of any one ethnic group and there is no reason to believe that this style was necessarily related to any specific language stock" (2011, p. 110-111), however. Commenting on Nimuendaju's assessment of the Tapajó and the language they could have spoken, Palmatary (1960, p. 14) reports Frederico Barata's divergence from Nimuendaju's opinion:

> Barata notes that the area over which Nimuendajú found Tapajó pottery was vast; he therefore believes that, through ordinary commerce as well as through the slave trade, the Tapajó must have had relations with Tupí-speaking peoples.
>
> He also notes that, in addition to the common nouns *putabas* and *atoassanâ*, previously referred to (which he states are Tupí), there are five other Tupí words in the Betendorf record of the Tapajó. These are:
>
> *Moaçara*, superior, chief.
> *Monhangarypy*, dried body of an ancestor.
> *Payassu*, great father.
> *Poracé*, a dance.
> *Xerimiréco-atê*, legitimate wife.

> Barata believes that, while the Tapajó had a specific language which was conserved by their chiefs and their elders, the *lingua geral* was also in common use among them."
> (Palmatary 1960, p. 14)

It seems plausible that the diffusion of features of these potteries towards the Guianas (Rostain & Versteeg 2004) and within the Amazon Basin can, in overall terms, be associated with Carib speakers; ethnographic maps of the Guianas and the contemporary presence of Carib speakers to the south of the Amazon basin, including the upper Teles Pires (Bakairi) and Xingu (Arara, Ikpeng, Kalapalo, Kuikuro, Matipu, Nahukwá and Naruvotu) Rivers indeed testify to the extent to which Carib speakers have migrated and expanded.

In spite of his gross stereotypes of speakers of Carib languages and the form of their processes of expansion into Amazonia (Lathrap 1970, pp. 164, 170), Lathrap put forward an interesting perspective when he stated that the IPT "is a tradition that cross-cuts several of the other horizons and traditions recognized" (1970, p. 165). A number of processes are likely to have been involved with the transmission of IPT elements, including migration, but also expansion (*sensu* Noelli 1996), intermarriage, trade and emulation, related to decisions taken by potters themselves, as Bowser and Patton have highlighted (2008). Perhaps we can liken the widespread geographical amplitude of these materials to the operation of a lingua franca or pidgin in the region, overlaying and fusing with underlying local traditions and elements, without entirely replacing them.

Parallels can be drawn with the dissemination of Koriabo materials, interpreted as a trade ware in ample circulation within the Guianas and around the mouth of the Amazon and Xingu Rivers (Cabral 2012; Bel 2010; Lima & Fernandes 2016, p. 222). In the case of the Incised and Punctate tradition, we can see how, besides trade, some of these elements were appropriated or incorporated into local traditions (see Barreto 2016b). I partly agree with Guapindaia (1993) when she posits that the IPT "places under the same criteria cultures that, in spite of their use of incised and punctated decorative motifs, had as a final result of their work completely distinct artefacts. Considering that incision and punctation techniques are universal, it is extremely vague to adopt them as diagnostic characteristics of a tradition" (1993, p. 40).

I believe the chronology and diagnostic decorative features of the IPT do have a coherence that merits attention. But simply labelling often disparate assemblages as "incised and punctate" does not do justice to the history of the region. We need to study local assemblages and stratigraphy at a more detailed level, to see if we can detect and distinguish underlying local elements in order to tease out potential processes involved. At any rate, it seems reasonable to relate the IPT with processes of ethnogenesis from around 1000 BP in a vast region, stimulated by the increase in demography (which is testified by a large number of *terra preta* sites dated at around this time), landscape management and a greater intensity of social networks. At present, Sawre Muybu is the southernmost site associated to the IPT on the Tapajós – further work beyond the Jamanxim River is needed to verify whether this postulated limit still holds.[136]

8.3 Constellations of practice and network models

Since "some configurations are too far removed from the scope of engagement of participants, too broad, too diverse, or too diffuse to be usefully treated as communities of practice" (Wenger 1998, p. 126-127 cited in Joyce 2015, p. 9-10), Wenger-Trayner has shifted his analytical focus from internal processes within individual communities toward interactions between groups inserted in "complex, overlapping landscapes and constellations of interconnected practices" (Wenger 1998, p. 2010) (Omidvar & Kislov 2014, p. 267). This has led him towards thinking about "multiple communities and systems of practice, landscapes of practice, and identity formed across practices and not just within practices" (Wenger-Trayner In: Omidvar & Kislov 2014, p. 270). Hence, a "constellation of practice" is composed of disparate groups of people sharing certain elements of the norms of production of their distinct products, due to historical conditions (Joyce 2015, p. 9). This is a useful way to view the Incised and Punctate tradition.

[136] Perota makes reference to the IPT further upstream (Simões 1983), but I chose to wait for further confirmation of this.

While communities of practice point toward a 'scope of engagement' not on a geographic scale, but in the sense of a level of interaction that can be understood as a "grouping of people working together and understanding each other as in some sense an identified collectivity" (Joyce 2015, p. 10), a constellation of practice enables us to identify traces that go beyond any recognisable scope of direct interaction, but where signs resulting from some degree of connection are present. "That 'something' can be visualized as a network" (Joyce 2015, p. 10).
Networks can comprise different scales and forms – such as corridors and directions of movement of people, things and knowledge – and can circumvent places while reaching from one node to another. Participants engaged at different ends of these routes could employ the objects in question in ways that made sense in their own local settings. Rather than taken to represent entire "cultures", the study of material culture within network models allows for the demonstration of manufacturing and consumption practices in specific ways (Joyce 2015, p. 11). These propositions seem pertinent to the case in point and can in future provide us with helpful tools through which to consider the IPT.

Upstream from Mangabal

8.3.1 The Lower Juruena River: Maloca dos Índios (MT-JU-1)

The Maloca dos Índios (MI) site is located on the right bank of the lower Juruena, near its confluence with the Teles Pires River, below the mouth of the Gorobal stream. The site occupies a small area, of 30x30m. The soil is sandy, there were several cashew nut trees growing on it and it had been perturbed (Perota 1982; Perota cited in Simões 1983, p. 48). Pottery from MI was not classified by Perota. We located a small bag from the site and I was able to analyse five body sherds, three keels and nine rims. The material is markedly distinct from that of Itapacurá I and II sites. Dates are not available for this site. Appendix 16 contains further details about the (diminutive) sample analysed.

<u>Dimensions of technology</u>: Quartz sand predominates as primary temper, but other unidentified minerals are also present; this includes particles similar to those seen at Mangabal that may be mica but which I believe may be gold, due to the aforementioned abundance of this mineral in the region. The pottery studied was

mostly oxidised, though partially oxidised specimens are also present. Only one fragment was seen to have been fired in a reduced firing atmosphere. The post-firing colour of the sherds analysed is brown.

Fig. 214 Unidentified mineral particles that may be mica or gold, which lend a glittery appearance to some of the material. Photograph by Vinicius Honorato.

<u>Dimensions relating to form</u>: Ceramics from the MI site cover a wide range of thicknesses: some vessels are considerably thick and robust, while others have thin vessels walls. The sherds tempered with the unidentified mineral temper display greater uniformity, varying from 7-9.9mm. The specimens observed have a horizontal cross section. Base sherds were not seen. One (angular) keel is present among the collection. Simple and unrestricted vessels integrate the collection (Plate 20 c, g, h); a moderately deep 'bowl' with thick vessel walls and corrugated decoration was examined (fig. 218) but as this is not a rim sherd we cannot be completely certain whether this would have been restricted or unrestricted; simple and dependent restricted composite (keel present but no rim, see fig. 215) vessels and independent and restricted (Plate 20 e, f) vessels also occur. Rim forms found include: zero modification, upright (Plate 20 e), everted – curved outwards (Plate 20 f) or folded off at an angle (Plate 20 c), in-turning (Plate 20 a, f), and externally thickened (Plate 20 b). Lips can be flat and rounded.

Fig. 215 Keel on composite and dependent restricted vessel. Photograph by Vinicius Honorato.

As for appendages, near the exterior rim of one of the sherds studied, modelling can be observed (Plate 20 a), even though some of it has since been detached/eroded from the sherd.

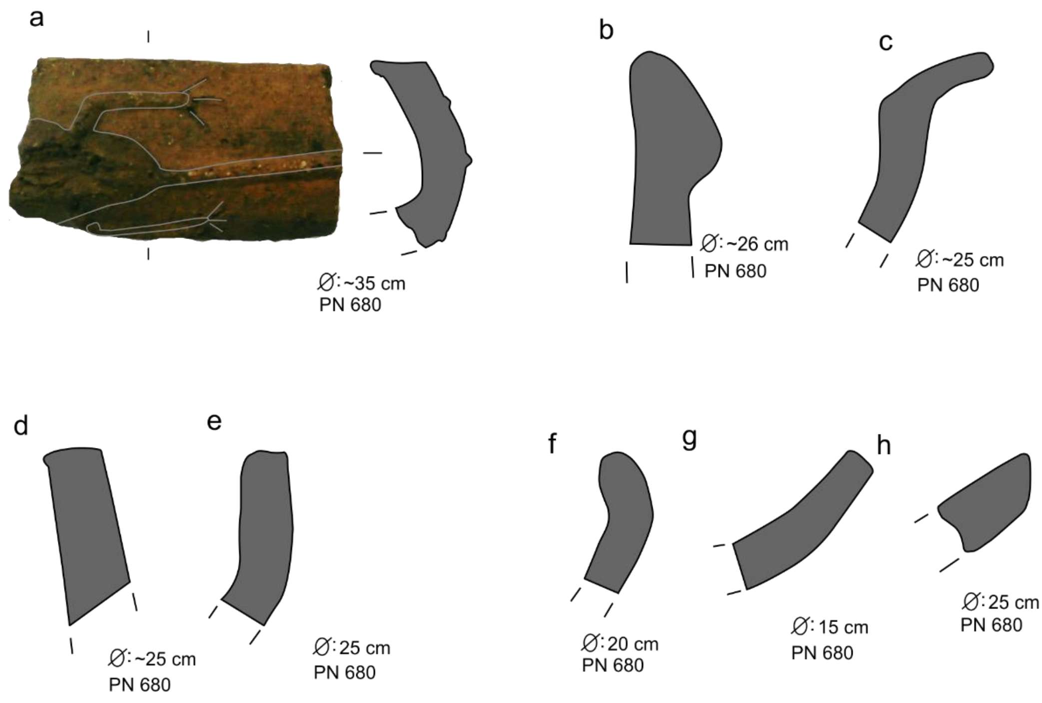


PLATE 20 **Maloca dos Índios site**

PN: 680

0 1 3 cm
scale 1:1

Drawings and photos by Vinicius Honorato

<u>Surface treatment and decoration</u>: All vessel surfaces had been smoothed; self slip is present. The most usual decorative field was the exterior vessel wall, followed by outer rims; one interior rim surface is also decorated. White slip was used, as was red or brown paint. Techniques involving displacement of clay include incision, corrugation (possibly by using finger digits) and modelling. Additive plastic decoration was seen with the application of a thin clay strip and with the addition of a zoomorphic representation shaped in clay. The only form of lip finish observed was smoothing. A rectilinear incised design of oblique oriented, parallel and converging elements was observed (fig. 217). A complex geometric pattern can be discerned on the keeled sherd of the collection, overlaying white slip. Though it has mostly faded, what can be seen is composed of rectangular shapes with rounded

edges and interconnected lines. A zoomorphic representation in clay is attached to the upper half of a vessel (Plate 20 a), which apparently portrays a reptile.

Fig. 216 White and brown slip present on Maloca dos Índios sherds.

Fig. 217 (above) Sherd displaying rectilinear incised design. Fig. 218 (right) Sherd displaying corrugation on exterior surface.

Fig. 219 Painted geometric design visible on keeled sherd from Maloca dos Índios. Contrast applied in order to accentuate design.

Photographs by Vinicius Honorato.

Discussion

There is little here that positively relates with the Sawre Muybu wares and with the IPT, in spite of the presence of robust coarse wares tempered with poorly-sorted quartz sand particles. This pottery bears some resemblance with that of Mangabal in terms of the use of a glittery mineral inclusion that may be mica or gold; these thinner vessel walls are also similar to Mangabal wares. Yet in terms of vessel wall thickness, the small sample collected displays considerable variation, and the thicker sherds are completely different from those of the Mangabal complex. While 'generic' vessel forms can remind us of those of both SM and Mangabal, other composite and restricted forms do not. As concerns surface treatment and decoration, there is some use of self-slip here, though its texture is not as smooth as that observed among Mangabal sherds; the corrugation also differs from the 'bottle' sherd found at Mangabal, which was ridged and fine, while the MI specimen is coarser. Some aspects are unique to the MI site: the use of white slip, the modelled representation of a reptile and the geometric, painted design.

Though extremely limited in terms of quantity, the material from MI is significant. It is the harbinger of a distinct ceramic tradition, which, in spite of limited commonalities, is unlike what we found at Mangabal and Sawre Muybu and Itapacurá I and II. On the other hand, some of these elements (composite contours, corrugation, use of chromatic decoration and geometric designs) may resonate with ceramics found further to the east, in the Araguaia-Tocantins interfluve, attributed to ancient Tupi-Guaraní speakers of that region by Almeida (2008) and Garcia (2012) . Could this be the materialisation of Rodrigues' and Cabral's proposition of a west-east expansion of Tupí-Guaraní peoples, which would involve their traversing the Tapajós? Far more intensive work along the Juruena and upper Tapajós, and along this supposed route, would be needed before we can come close to seriously evaluating this, particularly as, based on linguistic studies, Corrêa (2014) and Almeida and Neves (2015) have suggested the eastern Amazon as a centre of dispersal for Tupi-Guarani speakers. Furthermore, elements such as the appliqué zoomorphic element diverge from this, indicating that this material will first have to be understood on its own terms.

8.3.2 The Lower Teles Pires: The Kaiabi Indigenous Land

With the help of the Kaiabi, Francisco Stuchi (2010) visited thirty-four sites in their territory. Test pits were excavated in the Dinossauro, Aldeia Tucumã, Minhocoçu and Aldeia Coelho villages, which are currently inhabited by the Kaiabi, and in the Ywantã and Taitetu villages, previously occupied by them, as well as in a fallowed agricultural plot (*roça*) called Mukuin Caniné. The pottery retrieved was analysed by Meliam Gaspar for her MA dissertation (2014). The work provides a number of TL and radiocarbon dates for the area. Both Stuchi (2010, p. 80) and Gaspar (2014, p. 154) propose the territory to have been occupied and traversed by several ceramist peoples in the past.

Gaspar orders her ceramic classification by considering the sequences of choices open to and performance characteristics considered by the potters. She compares her observations with statistical analyses (2014, p. 106, table 15) and arrives at four assemblages (2014, p. 108-152). Some fragments could not be unequivocally placed within these groupings and will have to await future research in the area (2014, p. 131-135). Appendix 16 summarises Gaspar's findings in greater detail.

Fig. 220 Pottery from Ywantã and Dinossauro sites classified into set 1. Photos taken by and courtesy of M. Gaspar.

The first assemblage, mainly defined on the basis of it being mineral tempered (2014, p. 108-113), has associated dates of 4920±30 BP and 420±40 BP from the Ywantã site. The first date is considered too ancient and is discarded by Gaspar

(2014, p. 152). Gaspar proposes a potential correlation between the criss-cross motifs seems on some of these sherds with those from Mangabal. It would seem to me that, as Gaspar herself notes, the similarities appear greater with part of the material from the Capão do Canga site, reported by Erig Lima (2012).

The second assemblage (2014, p. 114-118) is made up from two sub-sets, tempered with grog on the one hand and *caraipé* on the other. Geometric designs (which can be painted or incised) are present in the form of triangular designs, interlocking scrolls, and spirals. Gaspar notes that one of these designs is strongly reminiscent of Apiaká tattoos (2014, p. 178-179) and to a representation of an Apiaká cooking vessel depicted by Hércule Florence, both in terms of its dependent and restricted form and in terms of the design elements incised on the upper vessel body (see Gaspar 2014, fig. 92). The date of 870±120BP is associated with this material (2014, p. 152), which is coeval with the Mangabal complex.

Fig. 221 Ceramics from Mukuin Caniné classified into set 2 by Gaspar. The specimen on the right is reminiscent of Apiaká designs portrayed by Hércule Florence. Photos taken by and courtesy of M. Gaspar.

The third assemblage defined by Gaspar (2014, p. 119-125) is composed of combinations of *cauixí* and *caraipé*. Two divergent dates are related to the material: one is a radiocarbon date from the Dinossauro site, of 1680±30 BP, and another is a thermoluminescence date of 380±50 BP from the Taitetu site (2014, p. 152). The Taitetu site appears to be multicomponent; the discrepant dates will be a matter for further investigation.

Fig. 222 Sherds from Dinossauro, Minhocoçu and Taitetu classified into set 3. Photos taken by and courtesy of M. Gaspar.

The fourth assemblage (2014, p. 125-130) is tempered with combinations of *cauixí* and grog. There are no dates associated with this assemblage. Technological and stylistic elements (such as the ‘fish spine’ motif) described are similar to those observed for the IPT on the Tapajós. Firing here appears to have at times been undertaken in oxidised environments, however. It seems highly unlikely that pottery would be transported over such distances, considering the incredible difficulty of navigating the rapids upper Tapajós. If this pottery were found to post-date the European invasion, it could be asked whether it was produced by peoples originating from or in contact with the Tapajós. Gaspar postulates that the Bakairi (a Carib-speaking people) may have passed through the lower Teles Pires as they migrated to the upper course of the river (2014, p. 162). Photographs shown in fig. 223 are suggestive of potential connections to the IPT. Whether these attributes really can be related to the IPT is, again, a matter for future research.

Fig. 223 Fragments from Aldeia Coelho, Taitetu and Dinossauro sites. Photos taken by and courtesy of Melian Gaspar. The incisions on the fragment second to the left resembles the ‘fish spine’ motif that is often present among IPT assemblages.

Gaspar proposes that the differences noted between these assemblages can be explained by 1) cultural groups who made pottery in different ways; 2) different segments of a single cultural group who made pottery in different ways; 3) temporal divisions; 4) vessel function; 5) other possibilities yet to be put forward (Gaspar 2014, p. 136).

8.4 The Tapajós-Madeira region

8.4.1 Maués

A territory as vast as it is unknown to archaeology lies between the Tapajós and Madeira rivers. In 2011 Fernando Almeida and Guilherme Mongeló travelled to the Maués Conservation Unit. Besides sites associated with the ancestors of the traditional communities who live in the area today – remains left by rubber tappers and related forest peoples from the nineteenth and twentieth centuries – the area contains pre-Columbian archaeological sites and materials (Almeida *et al.* 2011). Archaeological remains are commonly found and collected by members of local communities as they go about their daily affairs.





Clockwise from top left: Fig. 224 Zoomorphic ceramic adorno found and marked by member of Monte Sinai community. Fig. 225 Clay pipe found by Monte Sinai community member. Fig. 226. Sherd found in cut at Vila Nova Maringá. Fig. 227 Vessel collected from Mucajás 1 site by community member. Fig. 228 Vessels collected by members of V.N. Maringá community. Photos: Fernando Almeida.

Among the material gathered by members of the Monte Sinai community, situated on top of a *terra preta* site on the right bank of the Parauari River, is a zoomorphic adorno and a clay pipe. Almeida *et al.* (2011, p. 34) posit the former's likeness to

Paredão adornos, but write that clay pipes are a feature associated with Santarém ceramics, not known to occur among Paredão materials. At the Vila Nova Maringá community and site, on the Parauari's left bank, further signs of the IPT insignia are present (fig. 226).

On the Parauari's left bank, at the Maringá 1 site – which again is beneath a current community village area, the two vessels shown in fig. 228 were reported to have been found together, inside one another; the smaller vessel contains a modelled zoomorphic appliqué. At the Mucajás 1 site, on the right bank of the Parauari, an almost entire restricted vessel had also been retrieved by a local inhabitant (fig. 227). Only further investigations can tell if these materials form part of a palimpsest of successive occupations or are witness to cultural encounters in the past (or both).[137] Of interest is the authors' observation related to these diverging elements found on the same or in nearby sites, which they liken, on the one hand, to Paredão pottery from the Central Amazon, and to Santarém ceramics, on the other; we will return to this below.

8.4.2 The Lower Madeira

Going further west brings us to a discussion on Axinim ceramics on the Madeira River and to recent formulations involving them (Moraes 2013). The Axinim phase was initially defined by Mário Simões and Daniel Lopes (1987), following their 1981 survey and excavations along the middle and upper course of the Madeira River, to the west of the Tapajós. They also defined another two phases, named Curralinho and Borba. Axinim and Curralinho were classed as belonging to the IPT while Borba was associated with the Polychrome tradition. Simões and Lopes connected the Curralinho phase to three dates: 840±90 AD (SI-5376), 855±90 AD (SI-5376), and 1450±55 AD (SI-5377) (1987, p. 122).

As part of his doctoral investigations, Claide Moraes revisited some of the places recorded by Simões and Lopes and identified further sites containing Axinim

[137] Sites related to rubber tapper occupations also deserve future investigation.

ceramics along the middle and lower Madeira River (2013, p. 27-33, table 2).[138] Among these is the Vila Gomes site, placed on the left bank of the lower Madeira, which was delimited and excavated. It contains materials that can be related to what Simões and Lopes classed as Axinim (2013, p. 40). Vila Gomes comprises approximately 40 ha. of ADE, and part of this is enclosed by a ditch, which Moraes sectioned (2013, p. 44-53) and interpreted as a defensive structure related to the bellicose advance of peoples who produced Polychrome ceramics (2013, pp. 288, 308). Moraes and his team also encountered funerary vessels and a feature containing a concentration of decorated pottery and lithic artefacts, which Moraes suggests may be burial paraphernalia (2013, p. 46). Moraes did not come across mounds or middens at Vila Gomes, although concentrations of pottery (see site map in Moraes 2013, appendix 6) do occur, potentially suggesting discard areas (C. Moraes, pers. comm., 04 November 2016).

Based on a comparison between technological, formal and decorative attributes from both Axinim and Paredão materials, Moraes questions Simões and Lopes' classification of Axinim pottery into the IPT, arguing instead that the industry is more complex (2013, p. 327). He proposes the early part of the Axinim material is strongly associated with the Paredão phase from the Central Amazon (2013, p. 299) and consequently, with the Incised Rim Tradition (2013, pp. 41, 122, 286), while the latter part of the complex shows relations with the IPT (2013, p. 327). Moraes also proposes the Curralinho phase be scrapped, advancing that it should largely be attributed to the Polychrome Tradition (and not IPT), while part of it is potentially very similar to Axinim pottery (Moraes 2013, p. 146-147).[139]

Moraes demonstrates how, in respect of technological, formal and decorative attributes, the Axinim industry displays several similarities with the Paredão phase (Moraes 2006; 2013). Furthermore, part of the dates (surrounded by black border, below) he obtained predate the chronology established for both polychrome and IPT ceramics:

[138] The first Axinim site he came across travelling downstream from the river's upper course is Água Azul, some 120km upstream from the confluence of the Madeira and Aripuanã Rivers (2013, p. 40).
[139] Moraes' other discussions, involving Polychrome materials, the presence of conflict at around 1000 BP, the role of agriculture (or lack of it) are outside the scope of this discussion.

Dates for Vila Gomes site			
Cal. Years BP	**Material dated**	**Context***	**Sample reference**
720-660	charcoal	Inside funerary urn	Beta 338695
910-730	charcoal	110cm	Beta 297128
980-920	potsherd	60-70cm	Beta 338693
1060-940	charcoal	50-60cm	Beta 297127
1070-970	charcoal	30-40cm	Beta 338692
1290-1180	charcoal	80-90cm	Beta 338694
1320-1170	potsherd	20-30cm	Beta 297125
1940-1740**	potsherd	120cm	Beta 297126

*Table 18 Dates obtained by Moraes for Vila Gomes site. Table adapted from Moraes (2013, p. 237, Table 37). *See original for greater details. **This date is not being considered by Moraes until further data becomes available to explain it.*

Dimensions relating to technology: *Cauixí* is the principal temper of Axinim ceramics, followed by *caraipé*, grog and then by *caraipé* 'B'; sponge spicules are also common as second order tempers (2013, p. 127-128). Firing is mostly partially oxidised or reduced (2013, p. 138-140). Post-firing colour of the paste is usually brown or grey, followed by orange (2013, p. 123-124).

Dimensions relating to form: Based on Simões and Lopes' (1987) projections and on the material he collected, Moraes presents illustrations of Axinim types (2013, p. 203-210). Bases are flat or pedestal. Simple contours predominate. Restrictive vessels are more common, by a small margin, than unrestricted ones (2013, p. 130-131), but this is because Moraes includes vertical-sided vessels as restricted (2013, p. 131, graph 68); we have considered cylinder-shaped/vertical walled vessels as unrestricted. Were we to include vessels in the 'vertical' category with those in the 'unrestricted' grouping, the number of unrestricted vessels would overtake restricted specimens in Moraes' sample. Vessel body form ranges from simple and unrestricted griddles and shallow and moderately deep bowls, to simple, dependent and restricted spherical bowls, to independent restricted, necked vessels. Unusual vessel morphologies are also present (see Moraes 2013, p. 209). In decreasing order of popularity, vessel wall thickness predominantly measures 6-10mm, 1-5mm or 11-15mm, although thicker sherds are also found (Moraes 2013, p. 130). With respect to appendages, the presence of tripod vessel base supports is a notable feature, and adornos modelled from upper vessel bodies are conspicuous. Most analysed rims have an even thickness up to the lip; tapered rims and expanded rims also occur. In terms of inclination, the vast majority of rims follow the direction of vessel walls; everted rims also occur, but not as frequently, while in-turning rims are uncommon (2013, p. 132-133). Lips are mostly flat (2013, p. 134).[140]

Dimensions relating to decoration: Vessel bodies are the preferred decorative field (2013, p. 135), followed by bases, lips, necks rims and shoulders. Slip is frequent and plastic decoration, recurrent; it is especially represented by clay displacement techniques, such as incision, punctation and modelling (2013, p. 136-138). Combinations of types of techniques (e.g. plastic and painted) are unusual, but do occur. There is much variation in terms of design elements; most often these consist of incised, geometric motifs (see Moraes 2013, appendix/annex 28).

Discussion

There appear to be consistent parallels between the Mangabal complex and Axinim material in terms of technological and decorative modes or attributes. While some forms are also similar, our samples are too limited at present, and the forms we have in common are too generic to permit much inference. Notwithstanding, a certain minimalist aesthetic seems common to the industries of Mangabal and Axinim (and Paredão). The modelled zoomorphic adorno encountered at Mangabal (Chapter 7, fig. 140) is reminiscent of Axinim. Furthermore, the Mangabal site is coeval with the 1320-1170BP and 1290-1180BP dates for Vila Gomes. It likewise consists of a considerable ADE area (approximately 20 ha.) and contains earthworks.

Zuse (2016, p. 394) has suggested connections between pottery she studied from the upper Madeira and Axinim ceramics further downstream. If this is correct and if we accept the linguistic propositions of Rodrigues and Cabral (2012) related to

[140] In our analysis we would have subsumed the “thinned/tapering” and “expanded” categories into “flat” or “rounded”, and “thinned/tapering” or “expanded” forms would be associated with the rim.

Tupian peoples and their expansion down the Madeira and into the Tapajós, it could be possible that Axinim and Mangabal ceramics are linked with historical processes involving speakers of Tupian languages (though perhaps not Tupi-Guaranians) and their gradual movement from the present-day state of Rondônia northwards and eastwards.

If this proposition is valid, it shines a different light on Axinim ceramics. Should they still be annexed to the Incised Rim Tradition, with its implied Arawak connotations, or could they have been the result of a historical process that we are only beginning to glimpse? This perspective opens up new avenues for investigation, which may eventually impinge on how the Paredão phase is explained (E. Neves, pers. comm., 11 February 2016). Ethnographic and linguistic data point to the greater likelihood of these potteries being related to the expansion of Tupians – potentially 'Macro Tupians' as Greg Urban would call them – from the south.

The later dates obtained by Moraes, from c. 1060BP, are coeval with the occupation at Sawre Muybu, which is definitely tied into IPT networks in its latter moments. Aspects of Axinim material – as Moraes himself notes (2013, pp. 22, 84, 86, 92, 239, 321, 322, 327) – resonate with Konduri and Santarém ceramics: tripod base supports and the use of modelling are the most noticeable. It seems that with the IPT tradition, there is no 'black or white,' but rather, 'black and white.' These elements surely point, again, to what Haury *et* al. (1956) would define as elaborating branch of a converging tradition. They may again be a sign of multi-lingual communities or processes of interaction or even ethnogenesis in the region.

We have thus found that Itapacurá I, Itapacurá II, Itaituba, Serraria Trombetas, and Sawre Muybu share technological and stylistic elements that lead all or part of their ceramics to be classified as belonging to the IPT. IPT elements also occur in the Maués region, in between the Tapajós and Madeira Rivers, though it is not clear if this is in the form of a coming-together of different traditions, or whether they were traded or belong to a separate occupation. Among Axinim ceramics of the lower Madeira, elements of the IPT again seem to be incorporated into a pre-existing ceramic complex. This pre-existing ceramic complex in turn seems to have elements in common with Mangabal pottery, and which appear also to be present along the Maués. This may constitute material evidence of Tupi-Carib relationships suggested by linguists (see chapter 2). Further upstream from Mangabal, the ceramics from the Lower Teles Pires and Juruena do not clearly relate to the Mangabal complex, and further excavation will be needed along the vast area in between these sites. Parauá ceramics display common elements to Sawre Muybu and Mangabal pottery, something that in future merits further investigation.

8.5 Boundaries as spaces of interaction and negotiation

Concerned with "how past others regarded their others" and defending the idea that alterity must be considered a central dimension affecting archaeological variability (Lau 2013, p. 2), Lau articulates postulates based on South Americanist anthropological studies. He argues that since alterity functions as a "basic human principle now… there is no reason to believe that it did not for past cultures", and that the person is formed by recognition of and relations with unlike selves – "we constantly develop personal statuses through engagements with others" (2013, p. 1). Lau further posits that there are different kinds of alterity residing in multiple scales and at different times: "The notion of others is rarely fixed or in the singular: it is always contested, perspectival and changing" (2013, p. 4).

Identity is possibly more fluid than alterity (Lau 2013, p. 9); by identity is meant the understandings that structure "a person's recognition of self and those shared understandings of belonging to a particular collective" (2013, p. 6). On the dialectic relationship between identity and alterity, Lau writes of how alterity frames identity (Lau 2013, p. 8). This may be related with what Lévi-Strauss called "openness to the Other" (In: Grupioni 2009, p. 26) and has also been defined as a shared "Amerindian mode of relatedness" (Lau 2013, p. 11). Grupioni (2005, p. 39) asserts that this openness "is related to the impossibility of indifference before the experience of encounter/confrontation with whomever it may be". Lau posits that "If what produces identity are shared norms, things and practices we term 'culture' and the generative framework for learned dispositions, evaluation and change which we term the *habitus* (Bourdieu 1977), these same frameworks ought to characterize the processes of alterity" (2013, p. 8).

Recent ethnographic investigations in the Guianas (see Gallois 2005) have proposed that rather than focus solely on local groups as entities bound within a circumscribed space, multi-local networks can be studied (Gallois, Grupioni & Barbosa 2005). Gallois *et al.* define boundaries as a *meeting of interests*, or auspicious spaces for the construction of new social formations and representations – as spaces of connection, intersection or transition, in which interactions occur. If our interpretation of the ceramic materials at Sawre Muybu is correct, this is what is attested by ware SM-1, which seems to acquire IPT (decorative) elements over time. It seems also to be the case for the aforementioned sites and areas where IPT elements are noted in connection with disparate materials.

By focussing on fragments that would reveal some of the layers of the complex multi-community and multi-local systems in operation, Gallois *et al.* endeavoured to escape the "impossibility or illusion of a wide-ranging study, capable of reconstructing a supposed system operating throughout the study area" (Gallois 2005, p. 9-10). Writing about gift exchange in the region, Barbosa (2005) emphasises that instead of one large interaction network, diverse multi-centred networks can be traced, which are more or less overlapping and articulated, with tenuous and fluid boundaries (2005, p. 59).[141] Grupioni (2009), for instance, observes that:

> In an unassuming survey of graphic art of the peoples of the region that encompasses Amapá and northern Pará states, it is possible to observe that many patterns that compose the Tiriyó repertoire are recurrent, be this among the

[141] Clearly, distinctions exist between pre- and post-Columbian networks: disease- and war-induced depopulation, migrations and territorial compression, processes of fission and fusion between groups, the introduction of industrialised goods and specific policies undertaken by nation states have caused transformation – and frequent disarticulation – of regional networks, so that current networks appear to be more limited in extent in comparison to those described in the past. This does not mean that current networks should be seen as simple remnants of those described in the past by travellers and chroniclers; they have acquired other facets, relative to the presence of nation states and their actors' familiarity and engagement with the outside world's technology, writing and monetised economy (Barbosa 2005, p. 60).

> Wayana, Aparai and Wajãpi, only to mention the nearest, but similar patterns are also found among the Waiwai and other groups of northern Amazonia. Such recurrences do not reveal anything but the existence of a specifically Amerindian dynamic, of constant circulation and exchanges of peoples, goods and knowledge that do not fit within the interior of any ethnic, linguistic, or territorial boundary, but that overcomes all of these boundaries and belong to a common cultural scheme. In this scheme in which people, goods and knowledge circulate from one place to the other, graphic designs follow, being incorporated by different peoples, but the names and meanings attributed to them normally change because they are locally constructed with each new incorporation
> (Grupioni 2009, p. 32-33).

For such circulation and exchange to exist in the first place points to an underlying, shared 'language' (e.g., pidgin or trade language) between these groups (J. Oliver, pers. comm. 2 November 2016); it is noteworthy that Grupioni makes reference to both Tupian (Wajãpi) and Carib-speaking peoples.

8.6 Closing thoughts

Ceramics and their respective archaeological contexts included for comparison with the SM and Mangabal complexes relate to macro level processes beyond our Upper Tapajos study area:

The first regards the ceramics from the Maloca dos Índios site on the lower Juruena River. Could this pottery be correlated with the presence of Tupi-Guaranian peoples in the region? The limited ceramic samples available disallow a conclusive statement, but the potsherd collection examined display composite contours and surface treatment and decoration (such as slipping, painting and corrugation, as well as geometric designs), that are reminiscent of Tupi-Guarani ceramics described in other parts of Brazil;

The second is connected with the lower Teles Pires, where a diversity of technological traditions from a wide temporal span is presented by Gaspar (2014). Comparisons with contexts and materials from the Brazilian Plateau, as suggested by Pardi (1995), could be a path to pursue;

Thirdly is the Mangabal complex and potential association with materials to west. The possibility that this and Axinim ceramics on the Madeira are linked with the expansion of speakers of Tupian languages, possibly related to the Munduruku or Mawé language families, at around 1200 BP, should be investigated through survey and excavation of the intermediary areas, followed by systematic comparisons of ceramic assemblages and related lithic, floral and faunal remains. These occupations substantially altered the landscapes which they occupied, generating extensive *terra preta* deposits and earthworks. A comparison of botanical remains from these sites could help shed light on similar or different management of plant species in the past;

Fourthly is the comparison of Itapacurá I and II, Serraria Trombetas and some of the Itaituba material to that of Sawre Muybu. While some recurrences (particularly in use of tempers and in the decorative dimension) are clearly present, the Sawre Muybu pottery (in particular, SM-1 ware, which I assume to be locally made) displays far less incision and an absence of composite forms or restricted contours. While the link between the IPT and speakers of Carib languages seems highly plausible, the fact that the beginning of the occupation of Sawre Muybu is earlier than the generally accepted arrival of the IPT in the area, I propose that a connection between SM-1 and Tupian speakers is the most likely possibility, and that the acquisition of IPT decorative elements is a sign of Carib-Tupian interactions. This would also be endorsed by Barata's suggestions quoted above (cited in Palmatary 1960). The SM-2 ware on the other hand seems to be exogenous and may well have been made downstream from Sawre Muybu.

We have argued that Mangabal and Sawre Muybu point to the operation of distinct technological systems. These sites are not entirely coeval however, so the extent to which they stand for a cultural boundary is open to debate. Moreover, the Tupian language stock is represented by ten families, each containing its own languages. This amount of linguistic diversity can surely be followed by diversity in material culture. As Almeida (2013, p. 83) observes following a comparison between Yudjá and Tupinambá pottery: "If the Yudjá-Tupinambá comparison suggests that similarities between the different Tupian groups exist, it also suggests that there are differences. The extent to which linguistic differences mirror cultural differences is not known" (Almeida 2013, p. 83). As mentioned before, while SM-1 and SM-2 wares are tied in with the IPT (albeit in different ways), the IPT seems to be defined by hybridity. Rather than explain this through the aggressive expansion of Carib men, this can be related to choices and the political actions of the women potters.

The ability of pottery to provide us with good indicators for understanding identities and social-linguistic boundaries in the past, problematized by Silva and Noelli (forthcoming), depends on the studied contexts providing a stronger chance of there being correlations between variability in the archaeological record and language variability, as argued by Neves (2010, pp. 32, 37). The Upper Tapajós provides such a context, as a region historically occupied by Tupians speaking languages belonging to different families within the stock. It was also very likely traversed by Tupians in their eastward expansion. We will need far more work before we can assess whether we can go beyond this general statement and associate specific sites and their assemblages with specific language families.

Mangabal and Axinim assemblages appear to differ in many ways from pottery traditionally associated with Tupians (Almeida 2008; Brochado 1984; Corrêa 2014; La Salvia & Brochado 1989; Garcia 2012; Miller 2005; Zimpel Neto 2008). Even if there are particular specimens within the Mangabal assemblage that indicate the use of polychrome painting and corrugation, vessel morphology is on the whole different to what has been associated with the Tupi-Guarani tradition (and related sub-traditions). This can be explained by the fact (already noted by Almeida [2013]) that most of what we know in relation to 'Tupian archaeology' is related with Tupi-Guaranians. If we accept that SM-1 and SM-2 and the Mangabal complex are associated with "Macro Tupians," it is possible that Urban (1996, p. 68-69) was correct when he referred to a fundamental difference between "Macro Tupians" and Tupi-Guaranians.

The ethnographic Munduruku pottery presented by Corrêa (2014, p. 220) bears little, if any, resemblance to the forms and decoration elicited by our study of the Mangabal complex or of early SM-1 or SM-3 wares. We obviously need far more archaeological research to understand how ceramics may have changed in and around our study area between ~600-1500 AD. There is another issue to be borne in mind when comparing ceramics from pre-Conquest and post-contact periods, as Tarble de Scaramelli & Scaramelli (2011) observe in relation to pottery industries in the Middle Orinoco: they comment on a marked reduction in stylistic distinctions between ceramics following the European invasion. This is what Haury *et al*. (1956) would define as a reducing tradition segment, and can be explained by a number of factors: monumental population decline and displacement, with severe consequences for the transmission of decorative techniques and motifs; the prohibition of decorative elements by missionaries, who feared that they were expressions of pagan beliefs; a change in the scale at which pottery was used to express social identity and the eventual commoditization of pottery production (Tarble de Scaramelli and Scaramelli 2011, p. 100). Barreto (2008, p. 24) notes that pre-Columbian ceramics more commonly included figurative representations, particularly of human and animal figures, whereas following conquest, "less realistic representations (sometimes called 'abstract') of elements of nature, which are noticeably more stylised and geometric" are seen in historical ethnographic and contemporary materials. These "display a more codified symbolic language", accessible to "a more restricted readership, destined only to the members of that specific community or cultural group, and from which the possibility of a more universal reading of their symbolic meaning appears to have been abandoned" (Barreto 2008, p. 24).

Writing about social transmission, Ellen and Fischer note that "…human social systems provide for secure and effective <u>contexts</u> in which transmission can take place, and within which transmitted culture can be refined and edited to enforce sufficient conformance" (2013, p.2, emphasis in original). Such contexts were susceptible to change over time; many would have been disrupted following European conquest and colonisation.

Chapter 9. Conclusion.

> …the alternatives are not 'neutrality' and 'advocacy.' To be uncommitted is not to be neutral, but to be committed – consciously or not – to the status quo (Berreman 1962, p. 392).

9.1 Articulating between past(s) and present: synthesis of and reflections on key findings

I have attempted to 'bridge the gap' between the pre- and post-Conquest past of the Upper Tapajós by drawing principally on archaeological data – interpreted through the prisms of Culture History, Historical Ecology and more recent formulations on networks and constellations of practice. Direct ethnographic observations (again subsidised by a grounding in Historical Ecology) as well as previous work in social anthropology, historical accounts and analyses, and linguistic information have also contributed decisively to this endeavour. The exercise has not been straightforward; these complementary and contrasting strains of evidence open up complex pasts, which are not amenable to sweeping generalisations based on the premise of a unilineal historical process for the Amazon region. Indeed, they help us to consider the significant ruptures as well as to postulate certain continuities, which are perhaps less visible, pertaining to day to day practices, symbolic representations, and ways of engaging with the cultural landscapes of the region.

While a number of elements obviously point to ruptures – by and large, the Munduruku no longer produce pottery and their burial practices have changed, while the Beiradeiros tend not to even consider themselves as indigenous, for instance[142] – there are also aspects that have persisted into the present. Buried bodies are still potent presences today, as witnessed when I chanced upon a burial urn at Sawre Muybu. The 'lozenge' motif incised into ancient pottery was also recorded by nineteenth century travellers in the form of Munduruku ceramic design and body tattooing, and today is painted by the Munduruku on their bodies using *jenipapo* dye extracted from the *Genipa*

[142] Of course, in pre-Columbian Amazonia it is likely that no one considered themselves to be 'indigenous'. What is meant here is that the Beiradeiros do not necessary understand Amerindian archaeological remains as relating to their past.

Americana, for example. The study of Amerindian languages constitutes another path to the past: the Munduruku language belongs to the homonymous language family whose time-depth is likely to be millennial if we are to take the estimated age of 2.5 thousand years for the Tupi-Guarani language family as a parameter (F. Noelli, pers. comm., 10 Nov. 2016). At Sawre Muybu, shifting the position of houses or certain activity areas over short periods of time echoes the archaeological contexts studied, which have also been interpreted as displaying changing activities in specific areas over time. The filling up of test pit N1000/E957-959 with recent rubbish, most of which was plastic (and therefore exogenous) resonates with the filling up of F3 (subunit N1000/E957) with several potentially imported vessels. There are also noticeable repetitions in terms of some of the game encountered in TPM's mounded deposit (unit N998/E973.5) and that seen among the discard areas at Sawre Muybu today. Moreover, both the Beiradeiros and the Munduruku possess profound knowledge of their environments. This knowledge has been constructed and transmitted over centuries and includes the targeting of ADE areas and their associated resources.

A major break with the past happened following the European invasion of Amazonia. Apart from the political restrictions imposed upon access to the Upper Tapajós until the 1750s, the rapids significantly delayed direct European access to the Upper Tapajós, however. This is reflected by the tardy production of written accounts, which only begin in the mid-eighteenth century, and in the late and slow development of scientific research in the region. European contact and colonisation – and Amerindian responses to them – varied significantly, as

> …powerful chieftaincies of the 16th century, such as the Guayano, Tapajos or Manoas were reduced to virtual 'bands' by the 18th century, while marginal ethnic formations of the 16th century, such as the Aruan, Mundurucu or the Caribs, produced regionally dominant chieftaincies in the 18th and 19th centuries
> (Whitehead 1993, p. 288).

It is certainly true that the Munduruku seized their fate in their own hands, responding to European presence in a number of ways over time. We cannot however be certain that 'the Munduruku'[143] were "marginal;" if "there is little evidence that they were of central significance to the ancient status quo" (Ibid., p. 293), that is because historical records on the Upper Tapajós and adjacent regions to the east and west are simply too scant; we are even more ignorant of the region's archaeology.

The application of modal analytical methods to the pottery of the sites investigated, aided by multiple correspondence analysis, has allowed for a detailed examination of the steps pursued and options available to the potters at the TPM and SM sites. Three wares, with distinctive production sequences, were identified at Sawre Muybu: SM-1, SM-2 and SM-3 (the latter still being a hypothetical formulation). SM-1 has been defined as a locally-made coarse ware, while SM-2 is a fine ware, which may have been imported. SM-3 is composed of griddles, tempered with *caraipé* or *cauixí* that were also incised with oblique-oriented, criss-cross linear elements along their inner rims. Mangabal pottery similarly integrates a single complex, made and used by members of the same face-to-face community, but at Mangabal the distinctions between the pottery's technological dimensions are less clear cut, while in formal and stylistic terms the assemblage is relatively standardised (although there are important outlying, unique specimens).

Over the course of this study we have found that, contrary to what was postulated at the outset (Rocha 2012, p.51), the pre-Columbian ceramic remains found at the Terra Preta do Mangabal site belong to a unicomponent occupation, which dates to around the 8th century AD. Repetitive daily actions over ~200 years left an imprint that substantially altered this landscape in ways still visible today, creating a forest island of monumental proportions. Though our data are too limited to infer settlement pattern, it would seem that settlement layout was not based on a linear village pattern.

The establishment of TPM is unlikely to have happened in isolation. The nature of the site and its remains – which point to relatively standardised ceramic and lithic *chaînes opératoires* – suggest it was part of wider processes of demographic growth and

143 This was not the ethnonym they would have used in the pre-colonial period. The name Munduruku comes from the eighteenth century, when the Parintintins, their enemies, called them Munduruku, "red ants", because of their aggressive attacks (Ramos 2003). See http://pib.socioambiental.org/pt/povo/munduruku/794. Accessed on 11/09/2012.

intensification of environmental transformations that did not gravitate around the Amazon floodplain. Though the Mangabal site and its archaeological remains still need to be further examined, we can relate it to phenomena involving intensive and sedentary occupation of areas, related to the production of ADEs and associated earthworks occurring elsewhere in southern Amazonia during this period, such as the Upper Xingu and Madeira Rivers, and in the Xingu-Tocantins interfluves (Almeida 2013; Garcia 2012; Heckenberger 1996; 2005; Moraes 2013). These occupations (excluding, perhaps, the lower Madeira) occurred in ecologically diverse areas – some even in ecotones, which offered a diversity of environments and associated resources that clearly benefitted the peoples who settled in them (Almeida 2017). We therefore expect the TPM site to represent a shift in settlement patterns in and around the Upper Tapajós at around the 8th century AD, similar to what Heckenberger (1996; 2005) observed in the Upper Xingu basin. This remains to be tested, as it will require the continuation of archaeological surveys and stratigraphic excavations in order for site assemblages, layouts and chronologies to be examined and compared.

The Sawre Muybu site, which is again composed of Amazonian Dark Earth, was initially occupied somewhat after TPM, from the early 10th century AD. While there is a connection with the Incised and Punctate Tradition here, I have proposed that this results from the development of interactions, which may have led to ethnogenesis/incorporation of alterity, occurring subsequent to the area's initial occupation. Ware SM-2 and lithic artefacts made from foreign raw materials (Honorato de Oliveira 2015) point to participation in long-distance networks of exchange from the 11th or 12th century AD. Could the concentration of SM-2 fine wares within Excavation Area 1, particularly feature F3, represent evidence of social differentiation within the community? One way or the other, what is implied by the presence of these fine wares is the existence of networks that traversed more than one linguistic grouping. I have advanced that, following Lathrap's (1970) initial propositions, the Incised and Punctate tradition be likened to a pidgin language. But we still need to understand the local assemblages that underlie it. In regard to the Sawre Muybu complex, morphological differences in comparison with other "IPT" assemblages, linguistic propositions related to ancient interactions between Carib and Tupian speakers (Meira & Franchetto 2005; Rodrigues 1985) and ethnographic examples of such interactions in present-day circumstances (e.g. Grupioni 2009) have prompted me to interpret some of these ceramics as materialising Carib and Tupian interactions.

Yet contrary to Lathrap's argument, the evidence seen from Sawre Muybu does not point in the direction of Carib bellicosity and conquest, but rather seems to imply negotiated relations and may be interpreted through the prism of female agency and political strategies in incorporating novel elements. Hypothetical ware SM-3 is still difficult to place; survey of sites along the eastern banks of the Tapajós and investigation of pottery (including ceramic petrography) may help us to come closer to understanding whether these griddles are harbingers of another trade network, operating along other, possibly southern or east-west routes, whether they were locally made and conceived or whether they are local expressions of ideas that circulated more widely. As with the choice of potters to incorporate elements from the IPT into ware SM-1, another possibility is that some of the griddles found at Sawre Muybu were locally-made versions of imported wares, or even inspired by the 'lozenge' motif seen at TPM – which as we have mentioned, may have been more widely dispersed (only further survey and excavation can tell; a sherd with a 'lozenge' motif similar that seen at Mangabal was found in the Itapel site upstream). The lower rapids of the Tapajós therefore may have acted as a 'boundary' vis-à-vis the societies of the river's lower course, but we should see this boundary as a meeting place in the terms suggested by Gallois (2005), instead of as a closed frontier. Considering this as a 'periphery' of Santarém is only partly useful, for it is likely that other axes or networks were simultaneously in operation, similar to what has been proposed by Joyce (2015) for Central America.

I have argued that the study area is a place where associations between material culture and ethno-linguistic identities are likely to be stronger. If Greg Urban's headwaters hypothesis (2006 [1992], p. 92) and Rodrigues' and Cabral's (2012, p. 500) propositions – both of which place the Tapajós firmly within the paths taken by Tupian expansion – are correct, it is plausible that both the Mangabal complex and wares SM-1 and SM-3 are associated with the millennial dispersal of Tupian speakers from their putative centre of dispersal in the south-west Amazon. The oft-referred to concentration of speakers of different Tupian language families (Mawé, Munduruku, Tupí-Guarani) in the Tapajós region points to protracted historical presence, as well as historical divergences. These processes of separation could be signalled by the development of differing technological traditions, while shared cultural aspects continued in other domains. A potential connection with Axinim assemblages also merits further exploration; we may yet find what Haury *et al.* (1956) would have termed a segment of a “diverging tradition” that had common origins. For this, further investigation of the intermediary area between the Tapajós and Madeira rivers will be necessary. But if the proposition that these ceramics are to be associated with Tupian speakers is accepted, the Tupi-Guarani Tradition may have to be reconceived as representative largely of Tupi-Guaranians, and not necessarily of other Tupians. Thus the incorporation of information on assemblages and contexts related to Tupians from other language families may lead to a change in the nomenclature and overall definition of this tradition (F. Noelli, pers. comm., 12 January 2017). A comparison of botanical remains from these many sites may help to shed light on this.

Another avenue to pursue will be an investigation into settlement pattern. While Murphy (1954, p. 2-3) proposed that the “aboriginal” Munduruku had ring villages with men’s houses and the “acculturated” Munduruku had adopted a haphazard or linear pattern more similar to that of Brazilian rubber-tappers, we may find that ring villages with men’s houses, referred to as part of the Munduruku military complex by nineteenth century travellers, were in fact part of recently-acquired defensive responses, adopted during the colonial period following *bandeirante* attacks. This layout could even suggest interactions with Jê peoples of the Brazilian highlands – something potentially strengthened by Menéndez’ (2006 [1992], p. 284) postulation that the “Mondruci” encountered by Almeida Serra [1797] on the Vermelho River, a tributary of the Juruena in northern Mato Grosso, were the Munduruku. The implication of this is that the Munduruku could be inhabiting areas close to Jê settlements, later documented by Wüst (1990). The high mobility of Jê peoples and their expansion into southern Amazonia during the colonial period reinforces the plausibility of such contacts.

Our picture remains highly fragmentary; further archaeological prospection and sampling of the areas surrounding the TPM and SM sites are necessary for John

Monteiro's (2001, p. 55-56) challenge to be taken up.[144] The sites investigated were occupied as habitation areas for periods of c. 200 years. It is likely they continued to be occupied, but in different ways, perhaps as hunting grounds or places used for agriculture or other plant resource management; maybe they had symbolic functions that we are unaware of. Eighteenth and nineteenth century historical sources have shown that the TPM and SM sites integrated wider territories inhabited by Amerindian peoples and later, *seringueiros*.

Thus, while the Upper Tapajós remains on the margins of Amazonian Archaeology, it is perhaps now less of a 'blank space.' Claims that the area constitutes sparsely occupied, 'virgin forest', are misinformed at best, and politically motivated at worst.

9.1.1 On the 'traditionality' of Munduruku occupation at Sawre Muybu

While there is often a disconnect between the pre-Columbian archaeological record and Amerindian peoples referred to by historical sources of the Tapajós, "The Rosetta stone for Traditional Ethnobiological Knowledge in Amazonia is not made of rock; rather, it is to be found in living native languages and cultural practices themselves" (Balée 2000, p. 402). While the current Munduruku at Sawre Muybu do not live in isolation from contemporary Brazilian society, the traditionality of their way of life has been demonstrated through the continuity of forms of occupation. The choice of an ADE site for settlement, the relocation of kitchen areas, the consumption of game as well as fish and the disposal of refuse are examples of forms of continuity with millennial occupations. The incorporation of foreign elements, testified by ware SM-1's "IPT" elements, is a millennial practice and should thus not be interpreted simply as 'loss' of authenticity (and consequently, portrayed as a loss of legitimacy), but rather as integrating what may perhaps constitute one of the most recurrent and universal aspects of Tupian culture, which is its continued engagement with alterity. This engagement has taken many forms and is under constant transformation, but is based upon a Munduruku worldview (Loures 2016; 2017). Rather than "hurrying to its own

[144] Ageu Lobo Pereira recently unearthed a coin dating to 1790 in a manioc garden at Santa Maria, upstream from the Montanha Island, on the left bank of the Tapajós in Montanha e Mangabal, for instance.

demise" (R. Murphy, 1960, p. 179), Munduruku society has survived precisely because of its ability to change and renew itself, as Neil Whitehead (1993) observed.

9.1.2 Rescuing the ground from under their feet? Archaeology and environmental licencing

In spite of its early beginnings, the advance of scientific – including archaeological – research along the Upper Tapajós has been hampered by the difficulty of access to the area.[145] In recent years, science has returned to the rapids of the Tapajós – now, however, it arrived backed by armed escort.

The Munduruku and Beiradeiro strategy of resistance related to environmental licensing on the Tapajós River proper has met with partial success: on 4 August 2016, the Environmental Impact Studies of the São Luiz do Tapajós dam were considered insufficient by IBAMA, the Environment Agency responsible for conceding the license, and the project was cancelled. One of the principal elements leading to this decision was that the construction of the dam would lead to the forced relocation of the Munduruku of Daje Kapap Eïpi (officially known as Sawre Muybu), something that is unconstitutional under Brazilian law.[146] This decision represents a victory for the Munduruku and Beiradeiros, but it may not last. A proposed amendment to the Brazilian constitution, known as PEC65/2012 is advancing through Congress. If passed, this bill will irredeemably weaken environmental licensing, to the point that Environmental Impact Assessments will have no bearing whatsoever on decisions related to construction projects. Another proposed amendment called PEC215/2012 would transfer the process of indigenous territorial demarcation from the Ministry of Justice to the Brazilian congress, which is dominated by representatives of agribusiness, mining and Pentecostal evangelical churches: in effect, this would lead to the end of indigenous territorial demarcations. Thus, it may only be a matter of time before the SLT project is resurrected. Furthermore, processes related to the Jatobá and Chacorão

[145] We need only consider that the FLONA Tapajós, on the river's lower course, is the conservation unit that contains the greatest number of associated research projects in the whole of Brazil.
[146] The Heritage Agency considered the archaeological studies insufficient and required them to be complemented by fieldwork and other elements (Letter from Rosanna Najjar, Director of the National Centre for Archaeology of the Heritage Agency, to Thomaz Miazak de Toledo, Director of the Environmental Licensing department of the Environment Agency, dated 1/9/2014).

dams on the Tapajós are still underway. If built, the Jatobá dam would likely destroy TPM as it would be located near the dam's construction area.

Companies specialising in archaeological and cultural heritage have been involved in environmental licensing processes that have ignored local communities' rights to consultation, and have taken place in the context of human rights violations. Following a mission to the region in March 2016, the UN Special Rapporteur on the rights of indigenous peoples, Victoria Tauli-Corpuz, defined the Tapajós dam complex as an "emblematic case" alongside the Belo Monte dam.[147] Tauli-Corpuz expressed particular concern "about the potential impact on indigenous peoples of the Tapajós dam complex," and recommended extreme caution in relation to the project, in light of the allegations of ethnocide related to the Belo Monte dam case.

In such contexts, archaeological 'rescue' operations have become part of a machinery employed to legitimise the partial or complete destruction of traditionally occupied territories and the concomitant expropriation of forest peoples living in them. Thus, while 'salvaging' archaeological samples from destruction, paradoxically archaeological rescue work comes to integrate a process that will result in the discontinuation of traditional ways of living. The collective memory of communities whose histories are based on oral transmission relies on their landscapes and particular geographical markers, whose specificities are entangled with the very sense of the belonging of these peoples in these places. Writing on the potential expropriation of the Beiradeiro families of Mangabal, Torres (2008) explains that:

> They would not only lose the place they lived in and from which they drew their livelihoods, because… that form of life structures itself around the *land* – but further, of *that* land, specifically. The education of the children, the organisation of work, the structure of the family, sociability – ultimately, all the many spheres of that population's life are articulated around and mediated by the territory they occupy. The loss of this territory means the extinction of *that* way of life and of *that* culture, unique and exclusive to that place
> (Torres 2008, p. 313, italics in original).

[147] See http://unsr.vtaulicorpuz.org/site/index.php/en/documents/country-reports/154-report-brazil-2016 Accessed on 07/12/2016

While the eyes of the world were focussed on the Belo Monte dam on the Xingu River, on the Teles Pires River, the Brazilian Environment Agency, IBAMA, issued the licences authorising the construction and operation of the Teles Pires dam before any free, prior and informed consultation of the peoples and traditional communities affected by the project took place. Rulings issued that should have paralysed construction precisely because of this lack of consultation were repeatedly overturned through the deployment of a mechanism created during the Brazilian military dictatorship, called "security suspension" (*suspensão de segurança*) (see Oliveira & Vieira 2016; Trindade *et al.* 2016).

The construction of the Teles Pires dam has involved dynamiting and flooding of the Sete Quedas Rapids. This place is of utmost cultural and economic significance to the Munduruku, Apiaká and Kayabi peoples. Besides being where migratory fish spawn every year – meaning the Sete Quedas play a fundamental role in regional ecosystems and in the food supply of dozens of communities – the Sete Quedas Rapids are considered a sacred place by the Munduruku, Apiaká and Kayabi. The Munduruku consider that it is where the spirits of the dead travel to. The Munduruku described them in the following way:

> …Paribixexe: this is a beautiful waterfall with seven falls in the form of a stairway. This is the place where the dead are living, the heaven of the dead, which is to say, the world of the living, the kingdom of the dead. It is a sacred place for the Munduruku, Kayabi and Apiaká people, and also where diverse species and sizes of fish procreate, where the mother of the fish resides. On the walls can be seen rock paintings left by Muraycoko, father of writing, inscriptions left for the Munduruku since remote times by the hand of Surabudodot. There are also funerary urns buried at this place, the graveyard of our ancient warriors. There is also a portal there that cannot be seen by ordinary men, but rather is only visible to spiritual leaders, shamans, who can travel to another unknown world without being seen. The waterfall is stunning, and considered one of the seven wonders of the world, the greatest Brazilian heritage
> (Munduruku people, June 2013).[148]

[148] Translated by Bruna Rocha and Glenn Shepard. See http://lab.org.uk/brazil-indians-dont-take-no-for-an-answer.

For the Munduruku, the destruction of the Sete Quedas rapids has grave implications:

> It is a time of death. The Munduruku will start dying. They will have accidents. Even simple accidents will lead to death. Lightning will strike and kill an Indian. A branch will fall from a tree and kill an Indian. It's not chance. It's all because the government interfered with a sacred site
> (Valmira Krixi Biwũn, interviewed by Sue Branford and Maurício Torres, Nov 2016).

> The dynamiting of the sacred site is the end of religion and the end of culture. It is the end of the Munduruku people. When they dynamited the waterfall, they dynamited the Mother of the Fish and the Mother of the Animals we hunt. So these fish and these animals will die. All that we are involved with will die. So this is the end of the Munduruku
> (Eurico Krixi Munduruku interviewed by Sue Branford and Maurício Torres, Nov 2016)[149].

Notwithstanding the refusal of the Munduruku to participate in the 'collaborative' ethnoarchaeological component initially demanded by IPHAN, the Brazilian Heritage Agency – on the grounds that participation would validate the project's execution rather than serve as a basis for consultation as stipulated by the International Labour Organisation's (ILO) Indigenous and Tribal Peoples' Convention (N° 169), to which Brazil is signatory – studies related to the cultural heritage of the area conducted by a specialised archaeological company went ahead, with the endorsement of the Heritage Agency (Pugliese & Valle 2015). Contemplating the construction of the past, Silva, Bespalez & Stuchi (2011) conceptualise 'collaborative' archaeology:

> This reflection has fed into critiques regarding the colonialist nature of the discipline, leading to transformations in archaeological practices. The critiques are based on questioning what are the benefits of and who is benefitted by archaeological research, and it relativizes the right and capacity of archaeologists to control knowledge about the past, and eliminates the supremacy of scientific interpretation to the detriment of emic interpretations about the past
> (Silva, Bespalez & Stuchi 2011, p. 36-37).

[149] See https://news.mongabay.com/2017/01/the-end-of-a-people-amazon-dam-destroys-sacred-munduruku-heaven/ [Accessed 5 Jan 2017].

The same archaeological company excavated a number of vessels, which appear to be funerary urns. When this was discovered, the Munduruku lodged a formal complaint with the Public Prosecution Service because of what they understood to be a violation of an ancient cemetery (see Appendix 17). During their occupation of the Belo Monte dam site in 2013, the Munduruku wrote on separate occasions that "You steal the bones of the ancients that are buried in our lands," (Munduruku people 2013)[150] and "On the Teles Pires, the bones of our relatives, which are very ancient, were found. You are destroying a sacred place" (Munduruku people 2013).[151] In response to criticisms (Postgraduate students of MAE-USP 2013; Rocha *et al.* 2013) regarding this company's involvement in a process that was leading to the destruction of a sacred place, the company responded with a legal notification[152] in which it brought the Indians' assertions into question by claiming that the objects in question are *vessels*, rather than urns. They claimed that they were respecting the wish of the Indians by not excavating the vessels, so it was not possible to verify whether they are in fact urns. The company further declared itself to fully abide by ethical standards, and argued that environmental archaeology, historical ecology, public archaeology and ethnoarchaeology are among the supporting pillars of its practice. These ideals are also espoused in the Program of Cultural, Historical and Archaeological Heritage presented by the same company (Robrahn-González 2011), and its website advertises its public archaeology actions in the Teles Pires area, which involve exhibitions including local schoolchildren.[153]

On the development of the relationship between Archaeology and Politics in Argentina, Politis and Curtoni (2011) write that:

> The most important museums were created in the country at the end of the nineteenth century as part of a strategy to keep indigenous cultures in the past... By exhibiting the material culture of these people, as well as their physical remains, the western-

[150] Letter written on 2 May 2013. See https://ocupacaobelomonte.wordpress.com/2013/05/02/carta-da-ocupacao-de-belo-monte-numero-1/ Accessed 07/12/2016
[151] Letter written on 04/06/2013. See https://ocupacaobelomonte.wordpress.com/2013/06/04/carta-numero-9-tragedias-e-barragens-a-luta-nao-acaba-nem-la-nem-aqui/ Accessed 07/12/2016
[152] See http://www.sabnet.com.br/informativo/view?TIPO=1&ID_INFORMATIVO=169 Accessed on 08/12/2016.
[153] See http://www.arqueologiapublica.com.br/news/a3%C2%AA-oficina-cultural-do-programa-etnoarqueologico-da-uhe-teles-pires/ Accessed on 08/12/2016

> influenced society *broke the cultural continuity and "froze" in the past what was full of vitality in the present*
> (Politis & Curtoni 2011, p. 498, my emphasis).

When Rozeninho Saw Munduruku, former coordinator of the Pariri Munduruku Association, states that "We, the Munduruku, do not want to be seen in a museum,"[154] he demonstrates a keen awareness of how heritage-related actions can serve to present the Munduruku culture as paralysed and as part of the past, in effect robbing it of its agency in the present. Recognised as an action related to a legitimate political strategy, Munduruku refusal to participate in this archaeological endeavour should have rendered the continuation of a 'collaborative' project, as defined above, untenable. Instead, the work proceeded regardless.

While archaeological companies continue to work within the contexts of oppression in which large-scale infrastructure projects have been undertaken, disregarding the decisions and political strategies of resistance employed by the peoples and communities affected, the discipline will be distanced from these peoples. As its practitioners, we will be distrusted by those who are the principal inheritors of the past(s) we are studying. The very point of studying the past in such scenarios loses its purpose, unless it is to further colonialist agendas as defined by Trigger (1984). Against such arguments, it has often been said that only those within the ivory tower of academia can afford the luxury of adopting such positions, however. But it is quite the opposite; we can adapt Gerald Berreman's position on anthropology to our discipline when he points out that to pursue archaeological work without concern for its implications is to retreat to an ivory tower, without reference to the outside world. He continues: "They seek the impossible: to become students of man who are out of touch with men and unconcerned with men" (Berreman 1968, p. 393).

On the 2 December 2016 the 5th Session of the Federal Appeals Court of the 1st Region (TRF1) unanimously ruled that the free, prior and informed consultation of the Kayabi, Munduruku and Apiaká peoples impacted by the construction of the Teles Pires dam

[154] Talk given at the launch of *Ocekadi: hidrelétricas, conflitos socioambientais e resistência na Bacia do Tapajós* in Santarém, 28 June, 2016.

should have been undertaken in accordance with the ILO's 169 Convention. The appeals court judges also considered the operating licence for the Teles Pires dam to be invalid. The dam has already been built, however, and the Sete Quedas rapids no longer exist. While the archaeological company concerned is obviously not responsible for this destruction *per se*, its complicity in a process that continues to cause irreversible social trauma among the Munduruku, Apiaká and Kayabi is a fact. The fundamental importance and irreplaceability of the Sete Quedas rapids for these peoples should have been emphasised as something that could not be mitigated, and support from the Brazilian archaeological community could have been sought to back this position.[155] Responsibility also lies with the Heritage Agency for sanctioning the Teles Pires dam and consequently allowing for the destruction of the Sete Quedas Rapids.

9.2 The publication of the Sawre Muybu FUNAI Report

On 19th April 2016, President Dilma Rousseff authorised the publication of the Anthropological Report composed by the National Indian Foundation, FUNAI. This represents a great victory for the Munduruku people and their struggle, which counted on the support of the Beiradeiros, led by Chico Caititu – who, in his seventies, helped to carry out the self-demarcation, marking this historic alliance between the two groups. The publication of the Anthropological Report represents the first step in the process of legal recognition of a *Terra Indígena*.

But the recognition of the Sawre Muybu indigenous area is being challenged, and in today's Brazil, where anti-indigenous sentiment is strong, the outcome is uncertain, since the decision is likely to be based on political rather than technical grounds. The São Luiz do Tapajós dam could still be built, and Jatobá, Chacorão and other dams are in the pipeline. The destruction and submersion of the rapids of the Tapajós and its tributaries risk obliterating the region's history. The future of the Munduruku, of the Beiradeiros and other forest peoples in the region hangs in the balance, and responsible archaeology could have a role to play in deciding that future.

[155] In August 2014 the northern branch of the Brazilian Archaeological Society approved a motion calling on archaeologists "not to take part in activities related to the environmental licensing of the dams along the Tapajós basin" until consultation of forest peoples in accordance with the ILO's 169 Convention had been carried out.

9.3 Next steps: Archaeology in traditionally occupied territories

If we are to support forest peoples in their struggles for territory and recognition, we can start by challenging the notion that in order to be considered legitimate, Amerindians must subscribe to our essentialised images of them. Bolstered by the myth of pristine peoples of the Americas, these notions in fact condemn Amerindians to be "part of a vanishing past" (Trigger 1985, p. 3). Such ideas are frequently accompanied by a sense that members of non-indigenous traditional communities are somehow less deserving of our attention and backing; they are often seen as illegitimate and guilty of having displaced Amerindians in the past. The fact that the first rubber tappers were also oppressed and exploited, and that their descendants are forest peoples as Amerindians are, is still too often ignored. These notions are dangerous: they inadvertently feed into a political agenda that seeks to homogenise society and concentrate land and wealth even further into the hands of private interests, which have much to gain by delegitimising forest peoples and their struggles for land and territory as a collective right. Through the study of landscapes in the *longue durée* we can help foster local alliances of forest peoples, as conceived under the leadership of Chico Mendes in 1985. We can actively seek to include *other* Others, non-Amerindian members of traditional communities, as subjects worthy of archaeological research. This thesis is only a very small step in this direction: the following stages of this research project need to focus on including the Beiradeiro's heritage far more directly.

This project greatly benefitted from the fact that over its duration, we were able to return to the sites investigated. This has allowed us to observe ongoing processes related to present occupations and to compare them with observations of the archaeological record. Fundamentally, it has enabled us to build a relationship of trust with the present-day occupants of these territories, the Beiradeiros and the Munduruku. Thus, besides returning to the sites excavated during this PhD project and continuing to survey the area with the issues raised by this thesis and mentioned above – which will require further dating, classification of materials and regional comparisons – new directions also need to be trailed. One of the main priorities will be archaeological investigation of the Beiradeiros' heritage, and the archaeology of the colonial period. Missions such as Uxituba and Bacabal will reveal much about the post-Conquest history of the Upper Tapajós. A comparison of nineteenth and twentieth century sources and sites still within living memory will help us to detect further continuities and ruptures in the region's history, and will advance our overall aim of combatting the myth of pristine peoples of the Americas.

Studying more recent contexts can also include the comparison of sites and archaeological remains to oral historical narratives of the Munduruku and Beiradeiros. A "recognition of the accumulated labor through which this valued landscape has been and continues to be produced" (Raffles & Winkler Prins 2003, p. 182) will help to support arguments in favour of forest peoples who have been or are currently being threatened with territorial expropriation.

Fig. 229 Along the tracks slashed through the forest, along the limits of the Terra Indígena Sawre Muybu, the Munduruku work alongside the Beiradeiros from Montanha e Mangabal in the self-demarcation of their territory. The sign says: The earth is our mother. We should look after and respect her. This territory is where the peccary passed. Under the authority** of Karo Daybi. From left to right: Cacique Chico Índio, Ageu Lobo Pereira, Cacique Juarez Saw, Chico Caititú. Photograph: Maurício Torres. *This refers to an episode in Munduruku myths of origin. **Tellingly, the Munduruku don't have a word for "government" so they use the Portuguese word. Karo Daybi is a mythical Munduruku warrior who instituted the practice of head-cutting.*

10. References Cited

Acuña, C. (1994 [1641]). *Novo descobrimento do rio das Amazonas*. Rio de Janeiro: Agir.

Adams, C., Murrieta, R.S.S., & Neves, W. (2008). Introdução: As sociedades caboclas amazônicas: modernidade e invisibilidade. In: C. Adams, R. Murrieta & W. Neves, eds., *Sociedades caboclas amazônicas: modernidade e invisibilidade*. São Paulo: Annablume, 15-32.

Adams, C., Murrieta, R.S.S., & Neves, W. eds. (2008). *Sociedades caboclas amazônicas: modernidade e invisibilidade*. São Paulo: Annablume

Agassiz, L.E. (1869). *A Journey in Brazil*. Boston: Ticknor and Fields.

Aikenvald, A.Y. (2012). *The Languages of the Amazon*. Oxford and New York: Oxford University.

Aires de Casal, M. (1976 [1817]). *Corografia brasílica ou relação historico-geografica do Reino do Brazil composta e dedicada a Sua Majestade fidelíssima por hum presbitero secular do Gram Priorado do Crato.* Tomo 1. Rio de Janeiro: Impressão Régia.

Alarcon, D.F., Millikan, B. & Torres, M. eds. (2016). *Ocekadi: hidrelétricas, conflitos socioambientais e resistência na Bacia do Tapajós*. Brasília and Santarém: International Rivers, Programa de Antropologia e Arqueologia da Universidade Federal do Oeste do Pará.

Almeida, A.W.B. (2004). Terras Tradicionalmente Ocupadas. Processos de Territorialização e Movimentos Sociais. *Revista brasileira de estudos urbanos e regionais*, 6, 9-32.

Almeida, F.O. (2008). *O Complexo Tupi da Amazônia Oriental.* Unpublished MA dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Almeida, F.O. (2013). *A Tradição Polícroma no Alto Rio Madeira*. Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Almeida, F.O. (2017). The organics of settlement patterns in Amazonia. In: L.C. Kellett & E.E. Jones, eds., *Settlement Ecology of the Ancient Americas.* Oxon, New York: Routledge, 278-312.

Almeida, F.O., Mongeló, G., Py Daniel, A.R., Moraes, C.P. (2011). *Diagnóstico Arqueológico na Unidade de Conservação de Maués-AM*. Unpublished Report.

Almeida, F.O., Neves. E.G. (2015). Evidências arqueológicas para a origem dos Tupi-Guarani no leste da Amazônia. *Mana* 21/3, 499-525.

Almeida, F.O. (2017). The organics of settlement patterns in Amazonia. In: L.C. Kellett & E.E. Jones, eds., *Settlement Ecology of the Ancient Americas.* Oxon, New York: Routledge, 278-312.

Almeida Serra, R.F. (1869 [1847]). Navegação do Rio Tapajós para o Pará pelo tenente coronel Ricardo Franco de Almeida Serra, escripta em 1779, sendo governador Caetano Pinto de Miranda. *Revista Trimestral de História e Geografia.* IX Tomo, 2nd edition. Rio de Janeiro: Instituto Histórico e Geographico Brasileiro, 1-42

Amoroso, M. (2011). Nature and society: Conflicts concerning landscape cultivation at Itambacuri. Translated by Bruna Cigaran da Rocha. *Revista brasileira de Ciências Sociais*, 5, 1-27.

Andrade, A. (1986). Investigación arqueológica de los antrosolos de Araracuara (Amazonas). *Arqueología Colombiana* 31, 1-101.

Anonymous Report submitted by the Ministry of Mines and Energy entitled: *"*A tradicionalidade da Terra Saweré (sic) Muybu incidente na área da Flona Itaituba I"; Challenge presented by the Consórcio Tapajós: Case n° 08620.056543/2013-19, protocolled under n° 08620.128745/2015-31 (Unpublished).

Araújo Costa, F. (1983). *Projeto Baixo Tocantins: Salvamento Arqueológico na Região de Tucuruí - Pará*. Unpublished MA Dissertation, Faculdade de Filosofia, Letras e Ciências Humanas, Universidade de São Paulo.

Arqueologiapublica.com.br (2013). *Documento Arqueologia. 31/01/2013. 3ª Oficina Cultural do Programa Etnoarqueológico da UHE Teles Pires* [online]. Available at http://www.arqueologiapublica.com.br/news/a3%C2%AA-oficina-cultural-do-programa-etnoarqueologico-da-uhe-teles-pires/ [Accessed 08 Dec. 2016].

Arroyo-Kalin, M. (2008). Steps towards an ecology of landscape: the pedo-stratigraphy of anthropogenic dark earths. In: W. Woods, W. Teixeira, J. Lehmann, C. Steiner, A. Winklerprins & L. Rebellato, eds., *Amazonian dark earths: Wim Sombroek's vision*.
Dordrecht: Kluwer, 33-83.

Arroyo-Kalin, M. (2010a). A domesticação na paisagem: os solos antropogênicos e o Formativo na Amazônia. In: E. Pereira & V. Guapindaia, eds., *Primeiro Encontro Internacional de Arqueologia Amazônica*. Belém: Museu Goeldi, 367-388.

Arroyo-Kalin, M. (2010b). The Amazonian Formative: crop domestication and anthropogenic soils. *Diversity* 2, 473-504.

Arroyo-Kalin, M. (2014). Amazonian Dark Earths, Geoarchaeology. In: C. Smith, ed., *Encyclopaedia of Global Archaeology*. New York: Springer. 1, 168-178.
Asher, R.E. & Moseley, C. eds., (2007). *Atlas of the World's Languages.* 2nd edition. London: Routledge.

Autodemarcaçãonotapajós.wordpress.com (2014). *FUNAI admite pressão e condiciona demarcação à hidrelétrica* [online]. Available at https://autodemarcacaonotapajos.wordpress.com/2014/11/26/funai-admite-pressao-e-condiciona-demarcacao-de-ti-a-hidreletrica/ [Accessed 15 Nov. 2016]

Ayrosa, P. (1967). *Estudos Tupinológicos.* Universidade de São Paulo: Instituto de Estudos Brasileiros.

Balée, W. (1989a). The culture of Amazonian forests. In: D. Posey & W. Balée, eds., *Resource Management in Amazonia: Indigenous and Folk Strategies*. New York: New York Botanical Gardens, 7, 1-21.

Balée, W. (1989b). Cultura na Vegetação da Amazônia Brasileira. In: W. Neves, ed., *Biologia e Ecologia Humana na Amazônia: Avaliação e Perspectiva.* Belém: Museu Paraense Emílio Goeldi, 95-109.

Balée, W. (1998). Historical Ecology: premises and postulates. In: W. Balée, ed., *Advances in Historical Ecology.* New York, Columbia University, 13-27.

Balée, W. (2000). Antiquity of Traditional Ethnobiological Knowledge in Amazonia: The Tupí-Guaraní Family and Time. *Ethnohistory*, 47/2, 399-422.

Balée, W. (2013). *Cultural Forests of the Amazon. A Historical Ecology of People and Their Landscapes.* Tuscaloosa: University of Alabama.

Bandeira, A. (2009). Pesquisa arqueológica no sambaqui do Bacanga, São Luís, Maranhão: Reflexões sobre a ocorrência de cerâmica em sambaquis do litoral equatorial amazônico. *Amazônica* 1/2, 484-511.

Barata, F. (1953). A arte oleira dos Tapajó III. Alguns elementos novos para a tipologia de Santarém. *Publicações do Instituto de Antropologia e Etnologia do Pará*, 6, 1-16.

Barata, F. (1968). As artes plásticas no Brasil: *Arqueologia*. Rio de Janeiro: Edições de Ouro.

Barbosa, G.C. (2005). Das trocas de bens. In: D.T. Gallois, ed., *Redes de Relações nas Guianas*. São Paulo: NHII/USP/Humanitas, 59-111.

Barreto, C. (2008). *Meios místicos de reprodução social: arte e estilo na cerâmica funerária da Amazônia antiga*. Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Barreto, C. (2013). *Beyond pots and pans: ceramic record and context in pre-colonial Amazonia*. Unpublished paper presented at the 78th Annual Meeting of the Society for American Archaeology, Honolulu, HI.

Barreto, C. (2016). O que a cerâmica Marajoara nos ensina sobre fluxo estilístico na Amazônia? In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN: Ministério da Cultura, 115-124.

Barreto, C. & Nascimento, H.F. (2016). As cerâmicas dos sítios a céu aberto de Monte Alegre: subsídios para a arqueologia do baixo Amazonas. In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 262-278.

Barreto, C, Lima, H.P. & Betancourt, C.J. eds. (2016). *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura.

Barros, E.P. (2001). Os bakairi e o Alto Xingu: uma abordagem histórica. In: B. Franchetto & M. Heckenberger, eds., *Os povos do Alto Xingu: história e cultura*. Rio de Janeiro: UFRJ, 308-328.

Bassi, F.S. (2016). *A maloca Saracá: Uma fronteira cultural no médio Amazonas pré-colonial, vista da perspectiva de uma casa.* Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Bates, H. W. (2005 [1864]). *The Naturalist on the River Amazons.* Facsimile of the second edition. Marston Gate: Elibron Classics.

Beckerman, S. (1979). The Abundance of Protein in Amazonia: A Reply to Gross. *American Anthropologist*, 81, 533-560.

Beckerman, S. (1991). A Amazônia estava repleta de gente em 1492? In: W.A. Neves, ed., *Origens, Adaptações, Diversidade Biológica do Homem Nativo da Amazônia*. Belém: CNPq/Museu Paraense Emílio Goeldi, 143-159.

Bedwin, O. & Orton, C. R. (1984). The excavation of the eastern terminal of the Devil's Ditch (Chichester Dykes), Boxgrove, West Sussex, 1982. *Sussex Archaeological Collections* 122, 63-74 and fiche.

Bel, M.M. van den. 2010. A Koriabo site on the Lower Maroni River. In: E. Pereira & V. Guapindaia, eds., *Arqueologia Amazônica* 1. Belém: Museu Paraense Emílio Goeldi, 61-94.

Bel, M.M. van den. (2015). *Archaeological investigations between Cayenne Island and the Maroni river: a cultural sequence of western coastal French Guiana from 5000 BP to present*. Unpublished PhD Thesis, University of Leiden.

Belletti, J. (2015). *A Arqueologia do Lago Tefé e a expansão Polícroma*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Belletti, J., Hering, A., Henriques, G., Trindade, T., Calheiros, C.R., Melo, R.P. (2016). De tudo um pouco: o material cerâmico encontrado em dois sítios multicomponenciais do baixo Madeira. *Cadernos do Lepaarq*, 13/25, 39-67.

Berreman, G.D. (1968). Is Anthropology Alive? Social Responsibility in Social Anthropology. *Current Anthropology*, 9/5, 391-396.

Bettendorf, J.F. (1910 [1693-1699]). Chronica da Missão dos padres da Companhia de Jesus no Estado do Maranhão. *Revista do Instituto Histórico e Geográfico Brasileiro* 72/1, 1-697.

Bhabha, H.K. (1994). Of Mimicry and Man: The Ambivalence of Colonial Discourse. In: H.K. Bhabha, ed., *The Location of Culture*. London: Routledge, 85-92.

Biblioteca Digital Mundial (2016) *Mapa geográfico de Brasil. (c. 1740). Map of Brazil before the Treaty of Madrid, published by Giovanni Battista Albrizzi,* scale. Biblioteca Digital Mundial [online]. Viewed 04 Dec. 2016, <https://www.wdl.org/es/item/1195/>.

Birkhoff, G.D. (1933). *Aesthetic measure.* Cambridge: Cambridge University.

Bizzi, L.A., Schobbenhaus, C., Vidotti, R.M., Gonçalves, J.H. eds. (2003) *Geologia, Tectônica e Recursos Minerais do Brasil*. Brasília: CPRM.

Boomert, A. (2000). *Trinidad, Tobago and the Lower Orinoco Interaction Sphere. An archaeological/ethnohistorical study.* Alkmaar: Cairi Publications.

Bonomo, M., Angrizani, R.C., Apolinaire, E., Noelli, F.S. (2015). A model for the Guaraní expansion in the La Plata Basin and littoral zone of southern Brazil. *Quaternary International*, 356, 54-73.

Borges, A. (2012). *Garimpo invade bacia do Tapajós*. [online]. Valor Econômico online. Available at: http://www.valor.com.br/brasil/2765302/garimpo-invade-bacia-do-tapajos [Accessed 27 Jul. 2012]

Bourdieu, P. (1977). *Outline of a Theory of Practice.* Translated by Richard Nice. Cambridge: Cambridge University.

Bourdieu, P. (1990). *The Logic of Practice*. Translated by Richard Nice. Stanford: Stanford University.

Bowser, B.J. (2000). From pottery to politics: An ethnoarchaeological study of political factionalism, ethnicity, and domestic pottery style in the Ecuadorian Amazon. *Journal of Archaeological Method and Theory* 7/3, 219-248.

Bowser, B.J. (2002). Prologue: Toward an Archaeology of Place. *Journal of Archaeological Method and Theory*, 11/1, 1-3.

Bowser, B.J. & Patton, J.Q. (2008). Learning and transmission of pottery style: Women's life histories and communities of practice in the Ecuadorian Amazon. In: M. Stark, B. Bowser & L. Horne, eds., *Cultural transmission and material culture: breaking down boundaries.* Tucson: University of Arizona, 105-129.

Bowser, B.J. & Zedeño, M.N. (2009). *The archaeology of meaningful places*. Salt Lake City: University of Utah Press.

Branford, S. 2016. *Planned Tapajós industrial waterway - a potential environmental disaster* [online]. Latin America Bureau. Available at*:* http://lab.org.uk/ocekadi [Accessed 25 Nov. 2016]

Branford, S. 2017. *The end of a People: Amazon dam destroys sacred Munduruku "Heaven"* [online]. Mongabay. Available at: https://news.mongabay.com/2017/01/the-end-of-a-people-amazon-dam-destroys-sacred-munduruku-heaven/ [Accessed 5 Jan 2017].

Brazil, R.P. (1910). *Os sertões do Rio Tapajós*. Belém: Secção de Obras da Província do Pará.

Brochado, J.P. & Lathrap, D. (1982). *Amazonian Archaeology*. Unpublished manuscript revised by J. Oliver.

Brochado, J.P. & Lathrap, D. (1984). *An Ecological Model for the Spread of Pottery and Agriculture into Eastern South America.* Unpublished PhD Thesis, Department of Anthropology, University of Illinois at Urbana-Champaign.

Buarque, A. (2010). As estruturas funerárias das aldeias Tupinambá da região de Araruama, RJ. In: A. Prous, T.A. Lima, eds., *Ceramistas Tupiguarani.* Volume III. Belo Horizonte: Superintendência do Iphan de Minas Gerais, 149-172.

Caba, C.; Caba, A.; Waro, C. & Tawe, F. (1980). *Histórias dos Antigos Mundurukú*. v. 1. 2nd edition. Brasília: Summer Institute of Linguistics.

Cabral, A.S.A.C. & Rodrigues, A.D. eds. (2007). *Línguas e Culturas Tupí*. Brasília: LALI, Curt Nimuendajú.

Cabral, M.P. (2012). Juntando Cacos: uma reflexão sobre a classificação da fase Koriabo no Amapá. *Amazônica,* 3/1, 88-106.

Caeiro, J. (1936). Primeira publicação após 160 anos do Manuscrito inédito de José Caeiro sobre os jesuítas do Brasil e da Índia na perseguição do Marquês de Pombal (século XVIII). Salvador: Academia Brasileira de Letras.

Campbell, L. (2012). Classification of the indigenous languages of South America. In: L. Campbell & V. Grondona, eds., *The Indigenous Languages of South America. A Comprehensive Guide*. Berlin/Boston: Walter de Gruyter GmbH & Co. KG, 59-166.

Campbell, L. & Grondona, V. eds. (2012). *The Indigenous Languages of South America. A Comprehensive Guide*. Berlin/Boston: Walter de Gruyter GmbH & Co. KG

Carneiro, R.L. (1986). *The Ecological Basis of Amazonian Chiefdoms*. Unpublished manuscript, Department of Anthropology, American Museum of Natural History in New York.

Carneiro, R.L. (2009). “Cariapé”: um caso de padronização de erro em arqueologia. *Revista de Arqueologia*, 22/1, 9-13.

Carvajal, G. de. (1934). Discovery of the Orellana River. In: H.C. Heaton, ed., *The Discovery of the Amazon According to the Account of Friar Gaspar de Carvajal and Other Documents*, as published with an Introduction by José Toribio Medina. Translation by Bertram T. Lee. New York: American Geographical Society, 167-235.

Castrovalvas, P. (2000). *O rio Tapajós, os capuchinhos e os índios mundurucus: 1871-1883*. São Luís: Lithograf.

Chandless, W. (1862). Notes on the Rivers Arinos, Juruena, and Tapajos. *Journal of the Royal Geographical Society of London,* 32, 268-280.

Clement, C.R. (1999). 1492 and the loss of Amazonian crop genetic resources. I. The relation between domestication and human population decline. *Economic Botany*, 53/2, 188-202.

Clement, C.R., McCann, J.M. & Smith, N.J.H. (2003). Agrobiodiversity in Amazonia and its Relationships with Dark Earths. In: J. Lehmann, D.C. Kern, B. Glaser & W.I. Woods, eds., *Amazonian Dark Earths: Origin, Properties, Management.* Dordrecht: Kluwer Academic, 159-177.

Colevatti, J.H. (2006). *Ide, pois, e fazeis discípulos todos os povos: um estudo sobre a Missão de São Francisco do Rio Cururú*. Unpublished MA dissertation, Faculdade de Filosofia, Letras e Ciências Humanas, Universidade de São Paulo.

Colevatti, J.H. (2012). *Dualismo Munduruku: sobre clãs, metades e as relações de alteridade em um mundo dividido*. Unpublished PhD Thesis, Faculdade de Filosofia, Letras e Ciências Humanas, Universidade de São Paulo.

Cook, S.F. (1955). The Epidemic of 1830-1833 in California and Oregon. University of California Publications in American archaeology and ethnology, 43/3, 303-326.

Corrêa, A.A. (2009). *Tetama nas matas mineiras: sítios Tupi na microrregião de Juiz de Fora – MG*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Corrêa, A.A. (2014). *Pindorama de Mboîa e Îakaré. Continuidade e mudança na trajetória das populações Tupi*. Unpublished Phd Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Costa, H.A.V. (2013). *Arqueologia do estado do Espírito Santo: subsídios para gestão do patrimônio arqueológico no período de investigação acadêmica de 1966 a 1975.* Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Coudreau, H. (1977 [1897]). *Viagem ao Tapajós.* Belo Horizonte: Itatiaia.

Coutet, C. (2016). La tradición Arauquinóide en la Guyana Francesa: los complejos Barbakoeba y Thémire. In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 71-85.

Crosby, A.W. (1976). Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America. *The William and Mary Quarterly* 33/2, 289-299.

Cruxent, J.M. & Rouse, I. (1958). *An Archaeological Chronology of Venezuela*. Washington, D.C.: Pan American Union.

Cunha, M.M.C. da. (2006 [1992]). Política indigenista no século XIX. In: M. Carneiro da Cunha, *História dos Índios no Brasil*. São Paulo: Companhia das Letras, FAPESP, 133-154.

Cunha, M.M.C. da. ed. (2006 [1992]). *História dos Índios no Brasil*. São Paulo: Companhia das Letras - FAPESP.

Cunha, H.B. (2008). O mundo das águas. *Scientific American Brasil, Amazônia*: a *floresta e o futuro*, v.2, Tesouros. São Paulo: Duetto, 6-13.

Daniel, Pe. J. (2004 [1722-1776]). *Tesouro Descoberto no Máximo Rio Amazonas*. Belém: Contraponto.

Carvalho, J. (1995 [1719]). *Crônica da Companhia de Jesus no Maranhão*. Organized, introduced and annotated by Jomar Moraes. São Luís: Alumar Cultura.

DeBoer, W.R. (1991). The Decorative Burden: Design, Medium, and Change. In: W.A. Longacre, ed., *Ceramic Ethnoarchaeology*. Tucson: University of Arizona Press, 144-161.

DeBoer, W.R. (2003). Ceramic Assemblage Variability in the Formative of Ecuador and Peru. In: J. Scott Raymond & R.L. Burge, eds., *Archaeology of Formative Ecuador*. Washington D.C.: Dumbarton Oaks Research Library and Collection, 289-336.

DeBoer, W.R. (2011). Deep Time, Big Space: An Archaeologist Skirts the Topic at Hand. In: A. Hornborg & J. Hill, eds., *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 75-98.

DeBoer, W.R. & Lathrap, D.W. (1979). The Making and Breaking of Shipibo-Conibo Ceramics. In: C. Kramer, ed., *Ethnoarchaeology: implications of ethnography for archaeology*. New York: Academic Press, 102-138.

DeBoer, W.R., Kintigh, K. & Rostoker, A.G. (1996). Ceramic seriation and site reoccupation in lowland South America. *Latin American Antiquity* 7/3, 263-278.

Deetz, J. (1965). *The Dynamics of Stylistic Change in Arikara Ceramics.* Illinois Studies in Anthropology No. 4. Urbana: University of Illinois.

Denevan, W.M. (1992a). The pristine myth: the landscape of the Americas in 1492. *Annals of the Association of American Geographers,* 82/3, The Americas before and after 1492: Current Geographical Research, 369-385.

Denevan, W.M. (1992b). Stone vs. metal axes: the ambiguity of shifting cultivation in prehistoric Amazonia. *Journal of the Steward Anthropological Society*, 20/1, 153-165.

Denevan, W.M. (2001). Cultivated Landscapes of Native Amazonia and the Andes. Oxford: Oxford University.

Departamento Nacional de Pesquisas Minerais. (1975). Folha SB.21: Tapajós: Levantamento de Recursos Naturais. Geologia, Geomorfologia, Solos, Vegetação, Uso Potencial da Terra. *Projeto Radam*. Vol. 7. Rio de Janeiro: Programa de Integração Nacional, Departamento de publicações.

Dobyns, H.F. (1966). An Appraisal of Techniques with a New Hemispheric Estimate. *Current Anthropology*, 7/4, 395-416.

Dorta, S.F. 2006 [1992]. Coleções etnográficas: 1650-1955. In: M. Carneiro da Cunha, ed., *História dos Índios no Brasil*. São Paulo: Companhia das Letras, FAPESP, 501-521.

Durbin, M. (1977). A survey of the Carib language family. In: E. Basso, ed., *Carib-speaking indians: culture, society and language*. Tucson: University of Arizona, 23-38.

Eletronorte-CNEC. (2008). Relatório Final, Apêndice D, Estudos Ambientais, Part 2. vol. 19/22. *Inventário hidrelétrico dos rios Tapajós e Jamanxim*. Unpublished Report, vol. 18/22.

Ellen, R. & Fischer, M.D. (2013). Introduction: On the concept of cultural transmission. In: R. Ellen, S.J. Lycett & S.E. Johns, eds., *Understanding Cultural Transmission in Anthropology. A Critical Synthesis.* New York, Oxford: Berghahn, 1-54.

Erig Lima, L.F. (2012). A cerâmica Capão do Canga: Uma nova indústria cerâmica na bacia do Alto Guaporé, Mato Grosso, Brasil. *Amazônica*, 4/1, 186-220.

Erikson, C. (2003). Historical ecology and future explorations. In: J. Lehmann, D. Kern, B. Glaser & W. Woods, eds., *Amazonian Dark Earths: Origin, Properties, Management*. Kluwer Academic, 455-500.

Eriksson, J., Söderström, M. & Isendahl, C. (2016). Properties of Amazonian Dark Earths at Belterra Plateau, Pará, Brazil. In: P. Stenborg, ed., *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg, 87-98.

Fearnside, P.M. (2014). *Barragens na Amazônia 22: Licenciamento de hidrelétricas* [online]. Amazônia Real. Available at http://amazoniareal.com.br/barragens-na-amazonia-22-licenciamento-de-hidreletricas/ [Accessed 09 Nov. 2016]

Fearnside, P.M. (2015). Brazil's São Luiz do Tapajós Dam: The Art of Cosmetic Environmental Impact Assessments. *Water Alternatives,* 8/3, 373-396.

Fearnside, P.M. (2016). Environmental policy in Brazilian Amazonia: Lessons from recent history. *Novos Cadernos NAEA*, 19, p. 27-46.

Fernandez, N. (2014). *The Munduruku Indians Weaving Resistance*. [online]. 19 November 2014. Available at https://vimeo.com/112230009 [Accessed 24 Nov. 2016].

Figueiredo Report. (1967). Unpublished 7000-page report submitted to the Parliamentary Commission of Inquiry to investigate the Indian Protection Service. 30 volumes.

Florence, H. (2007). *Viagem fluvial do Tietê ao Amazonas de 1825 a 1829*. Brasília: Senado Federal.

Folk, R.L. (1974). *Petrology of sedimentary rocks.* Austin: Hemphill Publishing.

Fonseca, J.S. da. (1880-1881). *Viagem ao redor do Brasil, 1875-1878*. Rio de Janeiro: Typographia de Pinheiro.

Ford, J.A. (1962). *A Quantitative Method for Deriving Cultural Chronology*. Technical Manual 1. Pan American Union, Washington, D.C.

Forest Comunicação. *Juruena river, cave paintings (29 and 31), photographs* [online]. Forest Comunicação. Viewed 04 Feb 2014 <http://www.forestcom.com.br/blog/juruena-livre/?fb_action_ids=430743910387797&fb_action_types=og.likes>. Also Viewed 16 Nov. 2016. <http://kino.photoshelter.com/image/I00009Ylgv5wYtjY>.

Franchetto, B. & Heckenberger, M. eds., (2001). *Os povos do Alto Xingu: história e cultura*. Rio de Janeiro: UFRJ.

Frikel. P. (1959). Agricultura dos índios Munduruku. *Boletim do Museu Paraense Emílio Goeldi, Nova série Antropologia*, 4, 1-35.

Fuller, A. (2007). Critiquing theories of learning and communities of practice. In N. Jewson, J. Hughes, & L. Unwin, eds., *Communities of practice: Critical perspectives.* Oxon: Routledge, 17-29.

Gallois, D.T. (2005). Introdução: Percursos de uma pesquisa temática. In: D.T. Gallois, ed., *Redes de Relações nas Guianas*. São Paulo: NHII/USP/Humanitas, 7-22.

Gallois, D.T. ed., (2005). *Redes de Relações nas Guianas*. São Paulo: NHII/USP/Humanitas.

Gallois, D.T. (1983). A casa Waiãpi. In: S.C. Novaes, ed., *Habitações Indígenas.* São Paulo: Nobel, 147-168.

Galvão, E. (1960). Áreas culturais indígenas do Brasil: 1900-1959. *Boletim do Museu Paraense Emílio Goeldi*, Nova Série, 8, 1-41.

Garcia, L. (2012). *Arqueologia na região dos interflúvios Xingu-Tocantins: a ocupação Tupi no Cateté;* Unpublished MA dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Gaspar, M.V. (2014). *A Cerâmica Arqueológica na Terra Indígena Kaiabi (MT/PA)*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Gifford, J.C. (1976). *Ceramics of Barton Ramie.* Cambridge: Peabody Museum of Archaeology and Ethnology.

Gildea, S. (2012). Linguistic studies in the Cariban family. In: L. Campbell & V. Grondona, eds., *The Indigenous Languages of South America. A Comprehensive Guide*. Berlin/Boston: Walter de Gruyter GmbH & Co. KG, 441-494.

Gilij, F.S. (1965). *Ensayo de historia Americana*. Spanish translation by Antonio Tovar. (*Fuentes para la Historia Colonial de Venezuela*, Volumes 71–73.) Caracas: Biblioteca de la Academia Nacional de la Historia. First published as *Saggio di storia americana; o sia, storia naturale, civile e sacra de regni, e delle provincie spagnuole di Terra-Ferma nell' America Meridionale descritto dall' abate F. S. Gilij.* Rome: Perigio [1780–1784].

Goeje, C.H. de. (1909). *Études linguistiques caraïbes*. Amsterdam: Verhandelingen der Koninklijke Akademie van Wetenschappen Letterkunde, nieuwe reeks, deel X, no. 3. Amsterdam: Johannes Müller.

Gomes, D.M.C. (2001). Santarém: Symbolism and Power in the Tropical Forest. In: C. McEwan, C. Barreto & E.G. Neves, eds., *Unknown Amazon, Culture in Nature in Ancient Brazil*. London: British Museum, 134-155.

Gomes, D.M.C. (2002). *Cerâmica arqueológica da Amazônia. Vasilhas da coleção Tapajônica MAE-USP*. São Paulo: FAPESP/EDUSP/Imprensa Oficial.

Gomes, D.M.C. (2005). *Análise dos Padrões de Organização Comunitária no Baixo Tapajós: O Desenvolvimento do Formativo na Área de Santarém, PA.* Unpublished PhD Thesis, Museum of Archaeology and Ethnology, University of São Paulo.

Gomes, D.M.C. (2008). O uso social da cerâmica de Parauá, Santarém, baixo Amazonas: uma análise funcional. *Arqueología Suramericana,* 4:4-33.

Gomes, D.M.C. (2011). Cronologia e conexões culturais na Amazônia: as sociedades formativas da região de Santarém – PA. *Revista de Antropologia* 54(1): 269-314.

Greenacre, M. (2007). *Correspondence analysis in practice*. Boca Raton: Chapman and Hall/CRC.

Grupioni, D.F. (2005). Tempo e espaço na Guiana indígena. In: D.T. Gallois, ed., *Redes de Relações nas Guianas*. São Paulo: NHII/USP/Humanitas, 23-57.

Grupioni, D.F. (2009). *Arte Visual dos Povos Tiriyó e Kaxuyana.* São Paulo: Iepé.

Guapindaia, V.L.C. (1993). *Fontes Históricas e Arqueológicas sobre os Tapajó de Santarém: A Coleção "Frederico Barata" do Museu Paraense Emílio Goeldi*. Unpublished MA Dissertation, Departamento de História, Universidade Federal do Pernambuco.

Guapindaia, V.L.C. (2008). *Além da margem do rio - a ocupação Konduri e Pocó na região de Porto Trombetas, PA*. Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Gunn, J.D. (1994). Introduction: A perspective from the humanities-science boundary. *Human Ecology* 22/1, 1-22.

Guzman, F. (1934). Record of the statement made by Francisco de Guzmán, who came in on the caravel named 'Concepcion.' In: H.C. Heaton, ed., *The discovery of the Amazon according to the account of Friar Gaspar de Carvajal and other documents*. New York: American Geographical Society, Special Publication No. 17.

Hammer, Ø., Harper, D.A.T. & Ryan, P.D. (2001). PAST: Paleontological statistics software package for education and data analysis. *Palaeontologia Electronica* 4/1, 1-9.

Hartt, C.F. (1885). Contribuições para a ethnologia do valle do Amazonas. *Arquivos do Museu Nacional do Rio de Janeiro*, 6: 1-94.

Haury, E.W.; Rands, R.L.; Spaulding, A.C.; Taylor, W.W.; Thompson, R.H.; Wauchope, R. & White, M.E. (1956). An Archaeological Approach to the study of Cultural Stability. In: R. Wauchope, ed., Seminars in Archaeology:1955. *American Antiquity*, 22/2, Part 2, 32-57.

Heaton, H.C. ed., (1934). *The Discovery of the Amazon According to the Account of Friar Gaspar de Carvajal and Other Documents*. Translation by Bertram T. Lee. New York: American Geographical Society.

Heckenberger, M.J. (1996). *War and Peace in the shadow of empire: Sociopolitical change in the Upper Xingu of Southeastern Amazonia, AD 1400-2000*. Unpublished PhD Thesis, Department of Anthropology, University of Pittsburgh.

Heckenberger, M.J. (2005). *The Ecology of Power: Culture, Place and Personhood in the Southern Amazon AD 1000-2000*. London: Routledge.

Heckenberger, M.J. (2011). Deep History, Cultural Identities, and Ethnogenesis in the Southern Amazon. In: A. Hornborg & J. Hill, eds., *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 57-74.

Heckenberger, M.J., Neves, E.G. & Petersen, J.B. (1998). De onde surgem os modelos? As origens e expansões Tupi na Amazônia Central. *Revista de Antropologia, São Paulo* 41/1, 69-96.

Heckenberger, M.J., Kuikuro, A., Kuikuro,U.T., Russell, J.C., Schmidt, M., Fausto, C. & Franchetto, B. (2003). Amazonia 1492: Pristine Forest or Cultural Parkland? *Science*, 301, 1710-1714.

Hemming, J. (1978). Red Gold: The conquest of the Brazilian indians, 1500-1760. Cambridge: Harvard University.

Hemming, J. (1995 [1987]). *Amazon frontier: the defeat of the Brazilian Indians.* London and Basingstoke: Papermac.

Heriarte, M. de (1874 [1662]). *Descrição do Estado do Maranhão, Pará, Corupá e Rio das Amazonas*. Vienna: Carlos Gerold.

Herrera, L.F., Cavelier, I., Rodríguez, C. & Mora, S. (1992). The technical transformation of an agricultural system in the Colombian Amazon. *World Archaeology* 24, 98-113.

Hilbert, P.P. (1955). A cerâmica arqueológica da região de Oriximiná. *Publicação do Instituto de Antropologia e Etnologia do Pará*, 9.

Hilbert, P.P. (1957). Urnas Funerárias do Rio Cururú, Alto Tapajós. *Boletim do Museu Paraense Emílio Goeldi, Nova Série Antropologia*, 6: 1-14.

Hilbert, P.P. (1968). *Archäologische Untersuchungen am mittleren Amazonas: Beiträge zur Vorgeschichte des südamerikanischen Tieflandes*. Berlin: Reimer.

Hilbert, P.P. & K. Hilbert (1980). Resultados preliminares da pesquisa arqueológica nos rios Nhamundá e Trombetas, baixo Amazonas. *Boletim do Museu Paraense Emílio Goeldi* 75(2), 1-15.

Hilbert, K. (2008). Early holocene lithic projectile points from the Amazon. *Fumdhamentos* 7, 365-378.

Hill, J.D. ed., (1996). *History, power, and identity. Ethnogenesis in the Americas, 1492-1992*. Iowa City: University of Iowa Press.

Hill, J.D. (1996). Introduction. Ethnogenesis in the Americas, 1492-1992. In: J.D. Hill, ed., *History, power, and identity. Ethnogenesis in the Americas, 1492-1992.* Iowa City: University of Iowa Press, 1-22.

Honorato de Oliveira, V.E., Rocha, B.C., Neves, E.G. & Almeida, F.O. (2013). *Levantamento Arqueológico no Município de Itaituba, PA*. *Relatório Final, biênio 2011-2013*. Unpublished report submitted to the Brazilian Institute of Historic and Artistic Heritage.

Honorato de Oliveira, V.E. (2015). *Shatters Among Sherds: A study of lithic assemblages of the Upper Tapajós River.* Unpublished MA Dissertation: Institute of Archaeology, University College London.

Hornborg, A. (2005). Ethnogenesis, regional integration, and ecology in prehistoric Amazonia: toward a system perspective. *Current Anthropology* 46/4, 589-620.

Hornborg, A. & Hill, J. (2011). Introduction: Ethnicity in Ancient Amazonia. In: A. Hornborg, A. & J. Hill, eds., *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 1-27.

Hornborg, A. & Hill, J. eds., (2011). *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado.

Horton, D. (1948). The Mundurucu. In: J. Steward, ed., *Handbook of South American Indians. The Tropical Forest Tribes*. Washington D.C.: Smithsonian Institution. 3, 271-283.

IHU Online. (2013). *Operação Tapajós: "Os Munduruku não querem guerra". Entrevista especial com Roani Valle* [online]. IHU Unisinos. Available at http://www.ihu.unisinos.br/entrevistas/operacao-tapajos-os-munduruku-nao-querem-guerra-entrevista-especial-com-roani-valle [Accessed 09 Nov. 2016]

Ingerson, A.E. (1994). Tracking and testing the nature/culture dichotomy in practice. In: C. Crumley, ed., *Historical Ecology: Cultural Knowledge and Changing Landscapes*. Santa Fe: School of American Research, 43-66.

Ingold, T. (1993). The temporality of the landscape. *World Archaeology 25/2*, 152-174.

Isaacson, J. (1981). *The Amazon at the Time of Contact, a view from the Rio Tapajós*. Urbana: Unpublished manuscript.

Junk, W.J., Soares, M.G.M. & Bayley, P.B. (2007). Freshwater fishes of the Amazon River basin: their biodiversity, fisheries, and habitats. *Aquatic Ecosystem Health and Management*, 10/2. Aquatic Ecosystem Health and Management Society, 153-173.

Joyce, R.A. (2015). *Central America: Time for a Paradigm Shift*. Unpublished manuscript.

Katzer, F. (1901). Zur Ethnographie des Rio Tapajós. *Globus*, 79, 37-41.

Kaufman, T. (with help from Brent Berlin). (2007). South America. In: R.E. Asher & C. Moseley, eds., *Atlas of the World's Languages.* 2nd edition. London: Routledge, 59-94.

Kern, D. C., D'Aquino, G., Rodrigues, T.E., Frazão, F.J.L., Sombroek, W.G., Myers, T.P. & Neves, E.G. (2003). Distribution of Amazonian dark earths in the Brazilian Amazon. In: J. Lehmann, D.C. Kern, B. Glaser and W.I. Woods, eds., *Amazonian Dark Earths: Origins, Properties, Management*. Dordrecht: Kluwer Academic Publishers, 51-75.

Kellett, L.C. & Jones, E.E. eds. (2017). The organics of settlement patterns in Amazonia. *Settlement Ecology of the Ancient Americas.* Oxon, New York: Routledge.

Kilikoglou, V., Vekinis, G., Maniatis, Y. & Day, P.M. (1998). Mechanical performance of quartz-tempered ceramics. Part 1: strength and toughness. *Archaeometry*, 40,
261-279.

Kroeber, A.L. (1944). *Peruvian archaeology in 1942*. New York: Viking Fund Publications in Anthropology.

Kuper, A. (1999). *Culture: The Anthropologists' Account*. Cambridge: Harvard University.

La Salvia, F. & Brochado, J.P. (1989). *Cerâmica Guarani.* Porto Alegre: Posenato Arte e Cultura.

Lagrou, E. (2009). *Arte Indígena no Brasil*. Belo Horizonte: C/Arte.

Lathrap, D.W. (1962). *Yarinacocha: stratigraphic excavations in the Peruvian montaña.* Unpublished PhD Thesis, Department of Anthropology, Harvard University.

Lathrap, D.W. (1968). Aboriginal occupation and changes in river channel on the central Ucayali, Peru. American Anthropologist 33/1, 62-79.

Lathrap, D.W. (1970). *The Upper Amazon*. Southampton: Thames & Hudson.

Lathrap, D.W. (1977). Our father the cayman, our mother the gourd: Spinden revisited or a unitary model for the emergence of agriculture in the New World. *Origins of Agriculture*. C. E. Reed. The Hague, Mouton, 713-751.

Lathrap, D.W. (1983). Recent Shipibo-Conibo ceramics and their implications for archaeological interpretation. In: D.K.Washburn, ed., *Structure and Cognition in Art*. Cambridge: Cambridge University, 25-39.

Lathrap, D.W., Gebhart-Sayer, A. & Mester, A.M. (1985). The Roots of the Shipibo Art Style, 3 Waves on Imiriacocha, or there were Incas before the Incas. *Journal Of Latin American Lore* 11/1, 31-119.

Lau, G.F. (2013) *Ancient Alterity in the Andes: A Recognition of Others*. London and New York: Routledge.

Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University.

Lehmann, J., Kern, D.C., Glaser, B. & Woods, W. (2003). eds., *Amazonian Dark Earths: Origin, Properties, Management*. Dordrecht: Kluwer Academic.

Leite, S. (1943). *História da Companhia de Jesus no Brasil*. Rio de Janeiro and Lisbon: Imprensa Nacional.

Lima, H.N., Schaefer, C.E.R., Mello, J.W.V.; Gilkes, R.J. & J.C. KER. (2002). Pedogenesis and pre-Colombian land use of “terra preta anthrosols” (“Indian blackearth”) of western Amazonia. *Geoderma* 110, 1-17.

Lima, H.P. (2008). *História das Caretas: A Tradição Borda-Incisa na Amazônia Central.* Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Lima, H.P. & Neves, E.G. (2011). Cerâmicas da Tradição Borda Incisa/Barrancóide na Amazônia Central. *Revista do Museu de Arqueologia e Etnologia*, 21, 205-230.

Lima, H.P. & Fernandes, G.C.B. (2016) Cerâmicas arqueológicas da Foz do Xingu: uma primeira caracterização. In: C. Barreto; H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 210-223.

Lima, H.P., Araújo, L.S. & Moraes, B.M. (2016). As cerâmicas Saracá e a cronologia regional do Rio Urubu. In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 289-302.

Linhares, M. (1994). Introdução. In: *Novo descobrimento do rio das Amazonas*. Rio de Janeiro: Agir

Linné, S. (1925). *The technique of South American ceramics.* Gothenburg: Elanders Boktryckeri Aktiebolag.

Lisboa, P.L.B., Coirollo, A.D. (1995). Notas sobre implementos indígenas com madeira de 5000 anos da microrregião do Tapajós, Pará. *Boletim do Museu Paraense Emílio Goeldi, série Botânica* 11/1, 7-17.

Longacre, W.A. (1964). Sociological Implications of the ceramic analysis. *Fieldiana: Anthropology*, 55, 155-170.

Lorimer, J. (1989). *English and Irish Settlement on the River Amazon 1550-1646.* London: The Hakluyt Society.

Loures, R.S.P. (2016). *O r(existir) no Rio Tapajós: o movimento Munduruku Ipereğ Ayũ e a luta pelo território*. Unpublished MA Candidacy Report, Programa de pós-graduação em recursos naturais da Amazônia, Universidade Federal do Oeste do Pará.

Loures, R.S.P. (2017). *Governo Karodaybi: o movimento Ipereğ Ayũ e a resistência Munduruku*. Unpublished MA Dissertation, Programa de Pós-graduação em Recursos Naturais na Amazônia, Universidade Federal do Oeste do Pará.

Loures, R.S.P. & Torres, M.G. (2017). Movimento Ipereğ Ayũ. Habilidades de quem sabe se defender. In: B. Ricardo & F. Ricardo, eds., *Povos Indígenas no Brasil, 2011-2015.* São Paulo: Instituto Socioambiental.

Lowie, R.H. (1948). The tropical forests: an introduction. In: J.H. Steward, ed., *Handbook of South American Indians: the Tropical Forest Tribes*. Washington, D.C.: Bureau of American Ethnology, Smithsonian Institution, 3, 1-56.

Mahalem de Lima, L. (2015). No Arapiuns, entre verdadeiros e -ranas: sobre as lógicas, as organizações e os movimentos dos espaços do político. Unpublished PhD Thesis, Universidade de São Paulo.

Marois, R. (1984). *La céramique préhistorique canadienne / La ceramica prehistorica canadiense / Canadian Prehistoric Pottery*. Ottawa: National Museums of Canada

Marois, R., Scatamacchia, M.C.M. & Serrano. ed. (1994). *Essay on Decoration Composition*. Mexico City: Pan American Institute of Geography and History.

Martins, C.M.P. (2012a). *Arqueologia do Baixo Tapajós: Ocupação Humana na Periferia do Domínio Tapajônico*. Unpublished MA dissertation. Department of Anthropology, Universidade Federal do Pará.

Martins, C.M.P. (2012b). Os Moradores do Centro: Ocupações Indígenas Pré-Coloniais no Baixo Tapajós. In: D. Schaan, ed., *Arqueologia, patrimônio e multiculturalismo na beira da estrada: pesquisando ao longo das rodovias Transamazônica e Santarém-Cuiabá, Pará*. Belém: GKNoronha, 37-56.

Martins, C.M.P., Lima, A.M.A., Schaan, D.P., Bezerra, I.A. & Veiga e Silva, W.F. (2010). Padrões de sepultamento na periferia do domínio Tapajó. *Amazônica,* 2/1, 137-139.

Martius, K.P. von. (1867). Wörtersammlung Brasilianischer Sprachen. Glossaria Linguarum Brasiliensium: Glossários de Diversas Lingoas e Dialectos que fallao os Indios no imperio do Brazil. Leipzig: F. Fleisher, v. 2.

Maslin, M.A., Durham, E., Burns, S.J., Platzman, E., Grootes, P., Greig, S.E.J., Nadeau, M.J., Schleicher, M., Pflaumann, U., Lomax, B. & Rimington, N. (2000). Palaeoreconstruction of the Amazon River freshwater and sediment discharge using sediments recovered at Site 942 on the Amazon Fan. *Journal of Quaternary Science* 15/4, 419-434.

McCauley, N.R. & Lawson, E.T. (2002). *Bringing Ritual to Mind: Psychological Foundations of Cultural Forms.* Cambridge: Cambridge University.

McMichael, C.H., Piperno, D.R., Bush, M.B., Silman, M.R., Zimmerman, A.R., Raczka, M.F., Lobato, L.C. (2012). Sparse Pre-Columbian Human Habitation in Western Amazonia. *Science*, 336/6087, 1429-1431.

Medina, T. (1934). Introduction. In: H.C. Heaton, ed., *The discovery of the Amazon according to the account of Friar Gaspar de Carvajal and other documents*. New York: American Geographical Society, Special Publication No. 17, 7-242.

Meggers, B.J. (1948). The archeology of the Amazon Basin. In: J. Steward, ed., *Handbook of South American Indians. The Tropical Forest Tribes*. Washington D.C.: Smithsonian Institution. 3, 149-166.

Meggers, B.J & Evans, C. (1957)*. Archaeological Investigations at the Mouth of the Amazon.* Washington: Smithsonian Institution Press.

Meggers, B.J. (1971). *Amazonia: Man and Culture in a Counterfeit Paradise*. Washington: Smithsonian Institution.

Meggers, B.J. (1977). Vegetational Fluctuation and Prehistoric Cultural Adaptation in Amazonia: Some Tentative Correlations. *World Archaeology,* 8/3, 287-303.

Meggers, B.J. (1991). Cultural evolution in Amazonia. In: A.T. Rambo and K. Gillogly*,* eds., *Profiles in Cultural Evolution.* Ann Arbor: Museum of Anthropology, University of Michigan. 85, 157-182.

Meggers, B.J. (1992). Prehistoric population density in the Amazon basin. In: J.W. Verano & D.H. Ubelaker, eds., *Disease and demography in the Americas*. Washington, D.C.: Smithsonian Institution, 197-205.

Meggers, B.J. (1995). Judging the future by the past: the impact of environmental instability on prehistoric Amazonian populations. In: L.E. Sponsel, ed., *Indigenous Peoples and the Future of Amazonia: an Ecological Anthropology of an Endangered World*. Tucson: University of Arizona, 15-43.

Meggers, B.J. (2003). Natural versus anthropogenic sources of Amazonian biodiversity: the continuing quest for El Dorado. In: G.A. Bradshaw & P.A.

Marquet, eds., *How Landscapes Change: Human Disturbance and Ecosystem Fragmentation in the Americas*. Berlin: Springer-Verlag, 89-107.

Meggers, B.J & Evans, C. (1957). *Archaeological Investigations at the Mouth of the Amazon.* Washington: Smithsonian Institution Press.

Meggers, B.J & Evans, C. (1961). An experimental formulation of horizon styles in the tropical forest area of South America. In: S.K. Lothrop, ed., *Essays in Pre-Columbian Art and Archaeology*. Cambridge, Harvard University Press, 372-388.

Meggers, B.J & Evans, C. (1983 [1978]). Lowland South America and the Antilles. In: J.D. Jennings, ed., *Ancient South Americans*. San Francisco: W.H. Freeman and Company, 287-335.

Meggers, B. J., Dias, B. J., Miller, E. T. & Perota, C. (1988). Implications of archaeological distributions in Amazonia. In: W.R. Heyer & P. E. Vanzolini, eds., *Proceedings of a workshop on neotropical distributional patterns*. Rio de Janeiro: Academia Brasileira de Ciências, 275-294.

Meira, S. & Franchetto, B. (2005). The southern Cariban languages and the Cariban family. *International Journal of American Linguistics*, 71/2 127-192

Meira, S. (2006a). Cariban Languages. In: K. Brown, ed., *Encyclopedia of Language & Linguistics*, vol. 2. Oxford: Elsevier, 199–203
Meira, S. (2006b). A família lingüística Caribe (Karíb). *Revista de Estudos e Pesquisas*, 3/1-2, 157-174. Brasília: FUNAI.

Melo, J. & Villanueva, R. (2008). *Levantamento Etnoecológico Terra Indígena Munduruku*. Brasília: FUNAI/GTZ/PPTAL.

Menéndez, M. (1981/1982). Uma contribuição para a etno-história da área Tapajós-Madeira. *Revista do Museu Paulista*, XXVIII, 289-388.

Menéndez, M. (2006 [1992]). A área Madeira-Tapajós: situação de contato e relações entre colonizador e indígenas. In: M. Carneiro da Cunha, ed., *História dos Índios no Brasil*. São Paulo: Companhia das Letras, FAPESP, 281-296.

Métraux, A. (1927). Migrations historiques des Tupi-guarani. *Journal de la Société des Americanistes*, 19, 1-45.

Métraux, A. (1928). *La civilisacion matérielle des Tribus Tupí-Guarani*. Paris: Librarie Orientaliste.

Meyer, F.S. (1945). *A handbook of ornament.* Chicago: Wilcox & Follett.

Miller, E.T. (1987). Pesquisas arqueológicas paleoindígenas no Brasil Ocidental. *Estudios Atacameños*, 8, 37-61.

Miller, E.T. (1992a). *Archaeology in the Hydrolectric projects of Eletronorte*. Brasília: Eletronorte.

Miller, E.T. (1992b). Adaptação agrícola pré-histórica no Alto Rio Madeira. In: B.J. Meggers, ed., *Prehistoria Sudamericana: nuevas perspectivas.* Washington: Taraxacum.

Miller, E.T. (2005). A cultura cerâmica do tronco Tupi no Alto Ji-Paraná, Rondônia, Brasil: algumas reflexões teóricas, hipotéticas e conclusivas. *Revista Brasileira de Linguística Antropológica*, 1/1, 35-136.

Miller, E.T. (2009). A Cultura Cerâmica do Tronco Tupí no alto Ji-Paraná, Rondônia, Brasil: Algumas Reflexões Teóricas, Hipotéticas e Conclusivas. *Revista Brasileira de Linguística Antropológica*, 1/1, 35-136.

Minguarana Producciones. (2015). *Riberinhos e Mundurukus frente ao Complexo Tapajós.* [online]. Avaliable at: http://mortedotapajos.tv/o-rio-tapajos/ [Accessed 09 Nov. 2016].

Ministério do Meio Ambiente. (1986). *Resolução CONAMA,* 1, 23. [Resolution by the National Environment Council]. Jan. 1986. Brazil.

Ministério do Meio Ambiente. (1997). *RESOLUÇÃO CONAMA 237* [Resolution by the National Environment Council]. 19 Dec. 1997. Brazil.

Ministério Público Federal no Pará. (2014). *MPF denuncia delegado da PF pelo assassinato de Adenilson Munduruku* [online]. Ministério Público Federal. Available at http://www.prpa.mpf.mp.br/news/2014/mpf-denuncia-delegado-da-pf-pelo-assassinato-de-adenilson-munduruku [Accessed 09 Nov. 2016].

Monteiro, J. (2001). *Tupis, Tapuias e Historiadores: Estudos de História Indígena e do Indigenismo*. Unpublished Habilitation thesis, Department of Anthropology, Universidade de Campinas.

Moraes, C.P. (2006). *Arqueologia na Amazônia Central Vista de uma Perspectiva da Região do Lago do Limão*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Moraes, C.P. (2013). *Amazônia no Ano 1000: Territorialidade e Conflito no Tempo das Chefias Regionais*. Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Moraes, C.P., Lima, A.M.A. & Santos, R.A. (2014). Os Artesãos das Amazonas: a diversidade da indústria lítica dos Tapajó e o Muiraquitã. In: S. Rostain, ed., *Antes de Orellana. Actas del 3er Encuentro Internacional de Arqueología Amazónica.* Lima: Instituto Francés de Estudios Andinos, 133-140.

Morais, R. (2008). Águas Brancas, Pretas e Verdes. In: A. Ab'Saber, ed., *Leituras Indispensáveis*. São Paulo: Ateliê Editorial, 57-63.

Moreira Neto, C.A. (1988). *Índios da Amazônia. De maioria a minoria (1750-1850).* Petrópolis: Vozes.

Mozzer, F. (2009). *Rock paintings on the Cantagalo Rock, photograph* [online]. Panoramio Google Maps. Viewed 04 Feb. 2016. http://www.panoramio.com/photo/25481247.

Müller, R.P. (1990). *Os asuriní do Xingu: História e arte*. Campinas: Unicamp.

Murillo, E. (2011). Communities of practice in the business and organization studies literature. *Information Research*, 16/1.

Munduruku people. (2013). *Carta da ocupação de Belo Monte* [online]. Ocupação Belo Monte. Available at https://ocupacaobelomonte.wordpress.com/2013/05/02/carta-da-ocupacao-de-belo-monte-numero-1/ [Accessed 07 Dec. 2016]

Munduruku people. (2013). *Carta Número 9: Tragédias e Barragens (a luta não acaba nem lá nem aqui)* [online]. Ocupação Belo Monte. Available at https://ocupacaobelomonte.wordpress.com/2013/06/04/carta-numero-9-tragedias-e-barragens-a-luta-nao-acaba-nem-la-nem-aqui/ [Accessed 07 Dec. 2016]

Murphy. R.F. (1954). *The Rubber Trade and the Mundurucú Village.* Unpublished PhD Dissertation, Columbia University.

Murphy. R.F. (1958). *Mundurucú Religion.* University of California Publications in American Archaeology and Ethnology, 49/1, 1-154

Murphy. R.F. (1960). *Headhunter’s heritage – social and economic change among the Mundurucu indians.* Berkeley: University of California Press.

Murphy. R.F. & Murphy, Y. (1957). *As Condições Atuais dos Mundurucú.* Belém: Museu Paraense Emílio Goeldi. Série provisória. Publicação no. 8

Murphy, Y. & Murphy, R. (1985 [1974]). *Women of the Forest*. New York: Columbia University.

Myers, T.P. (1973). Towards the reconstruction of prehistoric community patterns in the Amazon basin. *Variation in Anthropology: Essays in Honor of John C. McGregor.* D.W. Lathrap and J. Douglas. Urbana, Illinois Archaeological Survey, 233-259.

Myers, T.P. (1988). El efecto de las pestes sobre las poblaciones de la Amazonía Alta. *Amazonia Peruana* 8/15, 61-81.

Myers, T.P. (1992). Agricultural Limitations of the Amazon in Theory and Practice. *World Archaeology* 24/1, 82-97.

Myers, T.P. (2004). Dark earth in the upper Amazon. In B. Glaser & W.I. Woods, eds., *Amazonian dark earths: explorations in space and time*. Berlin; London: Springer, 67-94.

Najjar, R. (2014). Letter n° 325/2014-CNA/DEPAM/IPHAN, addressed to Thomaz Miazak de Toledo. Contained in batch of documents entitled “UHE Eletronorte. UHE São Luiz do Tapajós. PA. Vol VIII.” Case n°02001.003643/2009-77, Ministry of the Environment, IBAMA.

Natalio, F., Corrales, T.P., Wanka, S., Zaslansky. P., Kappl, M., Lima, H.P., Butt, H.J. & Tremel, W. (2015). Siliceous spicules enhance fracture-resistance and stiffness of pre-colonial Amazonian ceramics. *Sci. Rep.* 5, 13303, 1-9.

Neves, E.G. (1999). Village size and permanence in Amazonia: two archaeological examples from Brazil. *Latin American Antiquity* 10/4, 353-376.

Neves, E.G. (2000). *Levantamento Arqueológico na Área de Confluência dos Rios Negro e Solimões, Estado do Amazonas*. Unpublished report submitted to FAPESP-MAE, Universidade de São Paulo.

Neves, E.G. (2006). *Arqueologia Amazônica.* Rio de Janeiro: Jorge Zahar.

Neves, E.G. (2010). A Arqueologia da Amazônia Central e a Classificação na Arqueologia Amazônica. In: E. Pereira, V. Guapindaia, eds., *Arqueologia Amazônica* 2. Belém: MPEG/ IPHAN/ SECULT, 53-72.

Neves, E.G. (2011). Archaeological Cultures and Past Identities in the Pre-colonial Central Amazon. In: A. Hornborg & J. Hill, eds. *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 31-56.

Neves, E.G. (2012). *Sob os Tempos do Equinócio: Oito Mil Anos de História na Amazônia Central (6.500 aC – 1.500 dC)*. Unpublished Habilitation Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Neves, E.G., Petersen, J.B., Bartone, R.N., Silva, C.A. (2003). Historical and socio-cultural origins of Amazonian dark earths. In: J. Lehmann, D. C. Kern, B. Glaser and W. Woods, eds., *Amazonian Dark Earths: Origin, Properties, Management*. Dordrecht: Kluwer Academic, 29-50.

Neves, E.G., Guapindaia, V.L.C., Lima, H.P., Costa, B.L.S. & Gomes, J. (2014) A tradição Pocó-Açutuba e os primeiros sinais visíveis de modificações de paisagens na calha do Amazonas. In: S. Rostain, ed., *Amazonía: Memorias de las Conferencias Magistrales del 3er Encuentro Internacional de Arqueología Amazônica.* Quito: Ministerio Coordinador de Conocimiento y Talento Humano e IKIAM, Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación, Tercer Encuentro Internacional de Arqueología Amazónica, 137-158.

Nimuendajú, C. (1952). The Tapajó. In: J.H. Rowe, ed., *Kroeber Anthropological Society Papers*. Berkeley, Kroeber Anthropological Society 6, 1-26.

Nimuendajú, C. (2001 [1929-1932]). Excursões pela Amazônia. Translated from German by Thekla Hartmann. *Revista de Antropologia da Universidade de São Paulo*, 44/1, 189-200.

Nimuendajú, C. (2004). *In Pursuit of a Past Amazon. Archaeological Researches in the Brazilian Guyana and in the Amazon Region*. A posthumous work compiled and translated by Stig Rydén and Per Stenborg. Gothenburg: Etnologiska Studier 45.

Noelli, F.S. (1993). *Sem tekohá não há tekó (Em busca de um modelo etnoarqueológico da aldeia e da subsistência Guarani e sua aplicação a uma área de domínio no Delta do Rio Jacuí-RS).* Unpublished MA Dissertation, Instituto de Filosofia e Ciências Humanas, Curso de Pós-Graduação em História, Pontifícia Universidade Católica do Rio Grande do Sul.

Noelli, F.S. (1996). As hipóteses sobre o centro de origem e rotas de expansão dos Tupi. *Revista de Antropologia*, 39/2, 7-53.

Noelli, F.S. (1998). The Tupi: explaining origin and expansions in terms of archaeology and of historical linguistics. *Antiquity,* 72, 648-663.

Noelli, F.S. (2008). José Proenza Brochado: vida acadêmica e idéias sobre o passado dos povos Tupi. In: A. Prous & T.A. Lima, eds., *Os ceramistas Tupiguarani*, v. 1. Belo Horizonte: Sigma, 5-35

Noelli, F.S. & Brochado, J.P. (1998). O Cauim e as Beberragens dos Guarani e Tupinambá: equipamentos, técnicas de preparação e consumo. *Revista do MAE*, 8, 117-128.

Noelli, F.S., Ferreira, L. M. (2007). A persistência da teoria da degeneração indígena e do colonialismo nos fundamentos da arqueologia brasileira. *História, Ciências, Saúde – Manguinhos*, 14/4, 1239-1264.

Noronha, J.M. (2006 [1862]). *Roteiro da Viagem da Cidade do Pará até as Últimas Colônias do Sertão da Província [1768].* São Paulo: Edusp.

Novaes, S.C. (1983a). Introdução. In: S.C. Novaes, ed., *Habitações Indígenas.* São Paulo: Nobel, 1-10.

Novaes, S.C. (1983b). As casas na organização social do espaço Bororo. In: S.C. Novaes, ed., *Habitações Indígenas.* São Paulo: Nobel, 57-76.

Novaes, S.C. (1983). ed. *Habitações Indígenas.* São Paulo: Nobel.

Oliveira, R. & Vieira, F.A. (2016). Suspensão de liminar e usinas hidrelétricas: a flexibilização do licenciamento ambiental por via judicial. In: D.F. Alarcon, B. Millikan & M. Torres, eds., *Ocekadi: hidrelétricas, conflitos socioambientais e resistência na Bacia do Tapajós*. Brasília: International Rivers Brasil; Santarém: Programa de Antropologia e Arqueologia da Universidade Federal do Oeste do Pará, 247-256.

Oliveira, W.C., Barbosa, L.A.S. & Silva, W.F.V. (2010). *Diagnóstico Arqueológico do Parque Nacional da Amazônia (PNA), Itaituba (PA)*. Belém: Inside Consultoria Científica. Unpublished Report.

Oliver, J.R. (1989). *The Archaeological, Linguistic and Ethnohistorical Evidence for the Expansion of Arawakan into Northwestern Venezuela and Northeastern Colombia*. Unpublished Ph.D. Thesis, University of Illinois at Urbana-Champaign.

Oliver, J.R. (2013). Nuevos aportes a la arqueologia del sitio el Saladero, Bajo Orinoco, Venezuela. Paper presented at *III Encuentro Internacional de Arqueología Amazónica*, Quito, Ecuador.

Omidvar, O. & Kislov, R. (2014). *Journal of Management Inquiry*, 23/3, 266–275.

Orton, C. & Tyers, P.A. (1990). Statistical Analysis of Ceramic Assemblages. *Archeologia e Calcolatori*, 1, 81-110.

Orton, C., Tyers, P.A. & Vince, A.G. (1993). *Pottery in Archaeology*. Cambridge: Cambridge University.

Palmatary, H.C. (1960). The Archaeology of the Lower Tapajós Valley: Brazil. *Transactions of the American Philosophical Society*, New Series, 50.

Pardi, M.L.F. (1995-1996). Frentes de Expansão. Seu Potencial e Impacto Sobre o Patrimônio Arqueológico – O Caso da Amazônia Mato-grossense e a Partir de um Reconhecimento de 14 ‘CR/IPHAN’. *Anais da VIII Reunião Científica PUC/RS* 1/1, 289-306.

Pardi, M.L.F. & Silveira, O. (2005). *Amapá: Gestão do Patrimônio Arqueológico e o Programa Estadual de Preservação.* Paper presented at the XIII Congresso da Sociedade Brasileira de Arqueologia – 4 a 8/09/05 – Campo Grande. Simpósio Arqueologia Amazônica - Amapá: Patrimônio, Gestão Estadual e Pesquisas.

Payne, D. L. (1991). A Classification of Maipuran (Arawakan) Languages Based on Shared Lexical Retentions. In: Derbyshire, D.C. & G.K. Pullum, eds., *Handbook of Amazonian Languages*. The Hague, Mouton: 355-499.

Pereira, E. & Silva, E.S. (2014). *Da penumbra à escuridão - A arte rupestre das cavernas de Rurópolis, Pará, Amazônia* [online]. Brazil. Rupestreweb, Available at: http://www.rupestreweb.info/cavernasruropolis.html. [Accessed 13 Dec. 2016].

Pereira, E., Py Daniel, A.R., Nascimento, H., Barbosa, C.A.P. & Honorato, V. (2016). Possíveis Práticas Rituais nas cavernas com arte rupestre de Rurópolis (Pará). *Habitus*, 14/1, 5-20.

Perota, C. (1979). *Pesquisas de campo realizada na bacia do rio Tapajós como parte do Programa Nacional de Pesquisas Arqueológicas da Bacia Amazônica* (PRONAPABA). Unpublished report to the CNPq - IPHAN – Universidade Federal do Espírito Santo.

Perota, C. (1982). Relatório de trabalho de campo (PRONAPABA), Unpublished report to the CNPq - INPA - SI - SPHAN - Universidade Federal do Espírito Santo.

Perota, C. (1990). *Pesquisas de campo realizadas na Bacia do Rio Xingu como parte do Programa Nacional de Pesquisas Arqueológicas da Bacia Amazônica (PRONAPABA).* Unpublished report to the CNPq - INPA - SI - SPHAN - Universidade Federal do Espírito Santo.

Perrone-Moisés, B. (2006 [1992]). Índios livres e índios escravos: os princípios da legislação indigenista do período colonial (séculos XVI a XVIII). In: M. Carneiro da Cunha, ed., *História dos Índios no Brasil*. São Paulo: Companhia das Letras, FAPESP, 115-132.

Petersen, J., Neves, E.G. & Heckenberger, M.J. (2001). Gift from the past: Terra preta and Prehistoric Amerindian Occupation in Amazonia. In: C. McEwan, C. Barreto & E.G. Neves, eds., *Unknown Amazon, Culture in Nature in Ancient Brazil*. London: British Museum, 86-105.

Phillips, P. & Willey, G. (1953). Method and Theory in American Archeology. An Operational Basis for Culture-Historical Integration. *American Anthropologist,* 55/5, 615-633.

Pike, K. (1967). Language in relation to a unified theory of the structures of human behavior, 2nd edition. The Hague: Mouton.

Pib.socioambiental.org/pt (2016). *Instituto Socioambiental. Povos Indígenas no Brasil.* [online]. Available at https://pib.socioambiental.org/pt [Accessed 23 Nov. 2016].

Pires de Campos, A. (1862). Breve Notícia que dá o capitão Antônio Pires de Campos do gentio que há na derrota da viagem das minas do Cuyabá e seu recôncavo. *Revista Trimestral do Instituto Histórico, Geográphico e Ethnográfico do Brasil*, 5, 437-449.

Politis, G. (1996). Moving to produce: Nukak mobility and settlement patterns in Amazonia. *World Archaeology*, 27/3, 492-511.

Politis, G. (2001). Foragers of the Amazon: the last survivors or the first to succeed? In: C. McEwan, C. Barreto and E. G. Neves*, e*ds. *Unknown Amazon: Culture in Nature in Ancient Brazil.* London: The British Museum, 26-49.

Politis, G. & Curtoni, R.P. (2011). Archaeology and Politics in Argentina During the Last 50 Years. In: L.R. Lozny, ed., *Comparative Archaeologies: A Sociological View of the Science of the Past*. New York; Dordrecht; Heidelberg; London: Springer, 495-525.

Postgraduate students of the Museu de Arqueologia e Etnologia, Universidade de São Paulo. (2013). *Nota de Posicionamento Alunos PPGArq MAE/USP* [online]. Sociedade de Arqueologia Brasileira. Available at http://www.sabnet.com.br/informativo/view?TIPO=1&ID_INFORMATIVO=161 [Accessed 07 Dec. 2016]

Potter, P.E., Maynard, J.B. & Pryor, W.A. (1980). *Sedimentology of shale*. New York: Springer-Verlag.

Preucel, R. & Hodder I. eds. (1996). *Contemporary archaeology in theory*. Oxford: Blackwell.

Porro, A. (1996). *O Povo das Águas: Ensaios de Etno-história Amazônica*. Petrópolis: Vozes.

Porro, A. (2006). Introdução. In posthumous publication of J.M. Noronha's *Roteiro da Viagem da Cidade do Pará até as Últimas Colônias do Sertão da Província [1768]*. São Paulo: Edusp.

Porro, A. (2007). *Dicionário Etno-histórico da Amazônia Colonial.* São Paulo: IEB/USP.

Porro, A. (2012). A 'Relação' de Jacinto de Carvalho (1719), um texto inédito de etnografia amazônica. *Boletim do Museu Paraense Emílio Goeldi, Ciências Humanas*, 7/3, 761-774.

Portaria 7 - SIPHAN - [Secretary for National Historical and Artistic Heritage]. 1 Dec 1988. Brazil.

Portaria 230 - IPHAN - [National Historical and Artistic Heritage Institute]. 17 Dec 2002. Brazil.

Posey, D.A. (1987). Contact before contact: typology of post-Colombian interaction with northern Kayapó of the Amazon basin. *Boletim do Museu Paraense Emílio Goeldi - Série Antropologia* 3/2, 135-154.

Programa de Aceleração do Crescimento. (2012). *Conheça as usinas plataforma, novo conceito de se construir hidrelétricas* [online]. YouTube. Available at https://www.youtube.com/watch?v=4nPxakomGjM. [Accessed 07 Nov. 2016].

PRONAPA. 1970. Brazilian Archaeology in 1968: An Interim Report on the National Program of Archaeological Research. *American Antiquity*, 35/1, 1-23.

Prous, A. & Lima, T.A. eds. *Os ceramistas Tupiguarani*, v. 1. Belo Horizonte: Sigma.

Pugliese Jr., F.A. & Valle, R.B.M. (2015). A gestão do patrimônio arqueológico em territórios indígenas: a resistência Munduruku e a preservação do patrimônio cultural frente ao licenciamento ambiental de empreendimentos em territórios tradicionalmente ocupados. *Revista de Arqueologia*, 28/1, 30-51.

Py-Daniel, A.R. (2015). *Os contextos funerários na arqueologia da calha do Rio Amazonas.* Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Quinn, E. (2004). *Excavating "Tapajó" ceramic at Santarém: their age and archaeological context.* Unpublished PhD Thesis, University of Chicago.

R Core Team. (2016). *R: A language and environment for statistical computing* [online]. Vienna: R Foundation for Statistical Computing. Available at https://www.R-project.org/. [Accessed 28 Sep. 2016].

Raffles, H. & Winkler Prins, A.M.G.A. (2003). Further Reflections on Amazonian Environmental History: Transformations of Rivers and Streams. *Latin American Research Review*, 38/3, 165-187.

Ramos, A.R.F. (2000). *Entre a Cruz e a Riscadeira: Catequese e Empresa Extrativista entre os Mundurukú (1910-1957)*. Unpublished MA Dissertation, Faculdade de Ciências Humanas e Filosofia, Universidade Federal de Goiás.

Ramos, A. 2003. Munduruku. Nome e língua. *Enciclopédia dos Povos Indígenas no Brasil online*. Available at http://pib.socioambiental.org/pt/povo/munduruku/794 [Accessed 11 Sep. 2012].

Read, D.W. (2007). *Artifact Classification: A Conceptual and Methodological Approach*. Walnut Creek: Left Coast Press.

Rebellato, L. (2007). *Interpretando a variabilidade cerâmica e as assinaturas químicas e físicas do solo no sítio arqueológico Hatahara*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Rice, P.M. (1987). *Pottery Analysis*. Chicago and London: University of Chicago.

RIHGB. (1909). Summaria Notícia. *Revista do Instituto Histórico e Geográfico Brasileiro* 72, 1: vii-liii.

Rival, L. (1999). Introduction: South America. In: R. Lee & R. Daly, eds., *The Cambridge Encyclopedia of Hunters and Gatherers*. Cambridge and New York: Cambridge University Press, 77-85.

Robazzini, A. (2013). *Dinâmica da Ocupação Territorial Indígena no Vale do Rio Tapajós*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Robrahn-González, E.M. (2011). *Projeto Básico Ambiental (PBA) UHE Teles Pires. P.3 Programa de Preservação do Patrimônio Cultural, Histórico e Arqueológico.* Unpublished document.

Robrahn-González, E.M. (2013) *Direito de resposta – Nota de Posicionamento Alunos PPGArq MAE/USP* [online]. Advocacia Fernando Rudge Leite. Available at http://www.sabnet.com.br/download/download?ID_DOWNLOAD=176 [Accessed 07 Dec. 2016]

Rocha, B.C. (2012). *What can ceramic decoration tell us about the pre- and post- colonial past on the Upper Tapajós River?* Unpublished MA Dissertation, Institute of Archaeology University College London.

Rocha, B. (2013) *Indians don't take no for an answer - Includes translation by Bruna Rocha and Glenn Shepard* [online]. Latin American Bureau. Available at http://lab.org.uk/brazil-indians-dont-take-no-for-an-answer. [Accessed 13 Dec. 2016]

Rocha, B.C., Honorato de Oliveira, V.E. (2011). *Levantamento Arqueológico nas Localidades de Montanha e Mangabal, Município de Itaituba (PA).* Unpublished report submitted to the Brazilian Institute of Historic and Artistic Heritage.

Rocha, B.C., Jácome, C., Stuchi, F.F., Mongeló, G.Z. & Valle, R. (2013). Arqueologia pelas gentes: um manifesto. Constatações e posicionamentos críticos sobre a arqueologia brasileira em tempos de PAC. *Revista de Arqueologia,* 26/1, 130-140.

Rocha, B., Valle, R., Moraes, C. & Nepomuceno, I. (2013). *Brazil: Day of Terror in Mato Grosso*. Latin American Bureau. Available at http://lab.org.uk/day-of-terror [Accessed 13 Dec. 2016]

Rodrigues, A. (1964). A classificação do tronco lingüístico Tupí. *Revista de Antropologia,* 12, 99-104.

Rodrigues, A. (1985). Evidence for Tupi-Cariban relationship. In: H. Klein & L. Stark, eds., *South American Languages: Retrospect and Prospect*. Austin: University of Texas, 371-404.

Rodrigues, A.D. (2005). As línguas Indígenas no Brasil. In: B. Ricardo & F. Ricardo, eds., *Povos indígenas no Brasil 2001/2005.* São Paulo: Instituto Socioambiental.

Rodrigues, A. (2007). As consoantes do Proto-Tupí. In: A.D. Rodrigues & A.S.A.C. Cabral, eds., *Línguas e culturas Tupí*, 1, 167-203. Campinas & Brasília: Curt Nimuendajú, LALI/UnB.

Rodrigues, A. & Cabral, A.S.A.C. (2012). Tupían. In: L. Campbell & V. Grondona, eds., *The Indigenous Languages of South America. A Comprehensive Guide*. Berlin/Boston: Walter de Gruyter GmbH & Co. KG, 495-574.

Rodrigues, J.B. (1875). *Exploração e Estudo do Valle do Amazonas. Rio Tapajós.* Rio de Janeiro: Typographia Nacional.

Rodrigues, J.B. (1876). Antiguidades do Amazonas. In: G. Schüch de Capanema, B.C. d'A. Nogueira & J.B. Rodrigues, eds., *Ensaios de Ciencia por Diversos Amadores*. Rio de Janeiro: Brown & Evaristo, 93-125.

Roosevelt, A.C. (1980). Parmana. Prehistoric Maize and Manioc Subsistence along the Amazon and Orinoco. New York: Academic.

Roosevelt, A.C. (1987). Chiefdoms in Amazon and Orinoco. In: R.U. Drennan, C. Lanham, eds., *Chiefdoms in Americas*. University Press of America, 153-185.

Roosevelt, A.C. (1989). Resource management in Amazonia before the conquest: beyond ethnographic projection. In: D. Posey & W. Balée, eds., *Resource Management in Amazonia: Indigenous and Folk Strategies*. New York: Botanical Gardens, 7, 3-62.

Roosevelt, A.C., Housley, R.A., Imazio da Silveira, M.I., Maranca, S. & Johnson, R. (1991). Eighth millennium pottery from a prehistoric shell midden in the Brazilian Amazon. *Science* 254/5038, 1621-1624.

Roosevelt, A.C (1993). The Rise and Fall of Amazonian Chiefdoms. *L'Homme*, 126-128/2-4, 255-283.

Roosevelt, A.C., Lima da Costa, M., Lopes Machado, C., Michab, M., Mercier, N., Valladas, H., Feathers, J., Barnett, W., Imazio da Silveira, M., Henderson, A., Sliva, J., Chernoff, B., Reese, D.S., Holman, J.A., Toth, N. & Schick, K. (1996). Paleoindian cave dwellers in the Amazon: the peopling of the Americas. *Science* 272/5260, 373-384.

Rossetti, D.D., Toledo, P.M., Moraes-Santos, H.M. & Santos Jr., A.E.A. (2004). Reconstructing habitats in central Amazonia using megafauna, sedimentology, radiocarbon, and isotope analyses. *Quaternary Research* 61/3, 289-300.

Rostain, S. (1994). *L'Occupation Amérindienne Ancienne du Littoral de Guyane*. Unpublished PhD Thesis, Centre de Recherche en Archeologie Precolombienne, Université de Paris I – Pantheon/Sorbonne.

Rostain, S. (2016). "C'est curieux chez les Amazoniens ce besoin de faire des vases": Alfareras Palikur de Guyana. In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 97-114.

Rostain, S. & Versteeg, A.H. (2004). The Arauquinoid Tradition in the Guianas. In: A. Delpuech & C.L. Hofman, eds., *Late Ceramic Age Societies in the Eastern Caribbean.* Paris Monographs in American Archaeology 14, 233-259.

Rouse, I. (1939). *Prehistory in Haiti: A Study in Method*. Yale University Publications in Anthropology, Number 21. New Haven: Yale University Press.

Rouse, I. (1960). The classification of artifacts in archaeology. *American Antiquity*, 25, p. 313-323.

Rouse, I. (1967). Seriation in Archeology. In: C.L. Riley & W.W. Taylor, eds., *American Historical Anthropology. Essays in Honor of Leslie Spier.* London and Amsterdam: Southern Illinois University; Feffer & Simons, Inc., 153-195.

Rouse, I. & Cruxent, J.M. (1963). *Venezuelan Archaeology*. New Haven and London: Yale University.

Rye, O.S. (1981). *Pottery Technology. Principles and Reconstruction*. Washington D.C.: Taraxacum.

Saldanha, J.D.M. & Cabral, M.P. (2010). A Arqueologia do Amapá: reavaliação e novas perspectivas. In: E. Pereira, V. Guapindaia, eds., *Arqueologia Amazônica,* vol. 1, Belém: MPEG/ IPHAN/ SECULT, 95-112.

Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas.

Santos-Granero, F. (2011). Captive Identities, or the Genesis of Subordinate Quasi-Ethnic Collectivities in the American Tropics. In: A. Hornborg & J. Hill eds., *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 335-347.

São José, J. (1847 [1763]). Viagem de visita do sertão em o bispado do Gran Pará em 1762 e 1763. *Revista do Instituto Histórico e Geográfico Brasileiro*, 9, 43-107.

Schaan, D.P. (2004). *The Camutins Chiefdom: Rise and Development of social complexity on Marajó Island, Brazilian Amazon*. Unpublished PhD thesis, University of Pittsburgh.

Schaan, D.P. (2007). Uma janela para a história pré-colonial da Amazônia: olhando além – e apesar – das fases e tradições. *Boletim do Museu Paraense Emílio Goeldi. Ciências Humanas*, 2/1, 77-89.

Schaan, D.P. (2008). *Programa de arqueologia preventiva BR-163.* Unpublished report.

Schaan, D.P. ed. (2012). *Arqueologia, patrimônio e multiculturalismo na beira da estrada: pesquisando ao longo das rodovias Transamazônica e Santarém-Cuiabá, Pará*. Belém: GKNoronha.

Schaan, D.P. (2016). Discussing Centre-Periphery Relations within the Tapajó Domain, Lower Amazon. In: P. Stenborg, ed., *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg, 23-36.

Schaan, D.P. & Martins, C.P. (2009). *Relatório de salvamento arqueológico na BR-230: trecho KM 30 a Rurópolis – 2ª. fase.* Unpublished report.

Schaan, D.P. & Santos, G. (2009). BR-163. *Programa de arqueologia preventiva.* Unpublished Report.

Schaan, D.P. & Amaral Lima, A.M. (2012). A grande expansão geográfica dos Tapajó. In: D.P. Schaan, ed., *Arqueologia, patrimônio e multiculturalismo na beira da estrada: pesquisando ao longo das rodovias Transamazônica e Santarém-Cuiabá, Pará*. Belém: GKNoronha. 17-36.

Schaefer, C., Lima, H.N; Gilkes, R.J. & Mello, J.W.V. (2004). Micromorphology and electron microprobe analysis of phosphorus and potassium forms of an Indian black earth (IBE) anthrosol from western Amazonia. *Australian Journal of Soil Research* 42: 401-409.

Schmidt, M.J. & Heckenberger, M.J. (2009). Amerindian Anthrosols: Amazonian Dark Earth Formation in the Upper Xingu. In: W. Woods *et al.* eds., *Amazonian Dark Earths: Wim Sombroek's Vision.* New York: Springer, 163-191.

Scoles, R. (2016). Caracterização ambiental da bacia do Tapajós. In: D.F. Alarcon, B. Millikan & M. Torres, eds., *Ocekadi: hidrelétricas, conflitos socioambientais e resistência na Bacia do Tapajós*. Brasília: International Rivers Brasil; Santarém: Programa de Antropologia e Arqueologia da Universidade Federal do Oeste do Pará, 29-42.

Scott Raymond, J., DeBoer, W.R. & Roe, P.G. (1975). *Cumancaya: A Peruvian Ceramic Tradition*. Occasional Papers No. 2. Calgary: University of Calgary.

Seixas, B.C.S.; Almeida e Castro, P.R.; Ferreira, I.N.R. (2013). *Relatório Circunstanciado de Identificação e Delimitação da Terra Indígena Sawré Muybu (Pimental) / PA.* Brasília: FUNAI.

Sergio, C.S. Santana, G.P.; da Costa, G.M. & Horbe, A.M.C. (2006). Identification and characterization of maghemite in ceramic artifacts and archaeological black earth of Amazon region. *Soil Science*, 171, 59-64.

Shepard, A.O. (1968 [1954]). *Ceramics for the Archaeologist.* Washington, D.C.: Carnegie Institution of Washington.

Schobbenhaus, C. & Neves, B.B.B. (2003). A Geologia do Brasil no Contexto da Plataforma Sul-Americana. In: L.A. Bizzi, C. Schobbenhaus, R.M. Vidotti, J.H. Gonçalves, eds., *Geologia, Tectônica e Recursos Minerais do Brasil*. Brasília: CPRM, 5-54.

Siegel, P.E. (1996). An Interview with Irving Rouse. *Current Anthropology*, 37/4, 671-689.

Sioli, H. ed. (1984). *The Amazon: limnology and landscape ecology of a mighty tropical river and its basin*. Monographiae Biologicae, 56. Dordrecht: Dr. W. Junk.

Silva, F.A. (2000). As tecnologias e seus significados. Um estudo da cerâmica dos Asurini do Xingu e da cerâmica dos Kaiapó-Xikrin sob uma perspectiva etnoarqueológica. Unpublished PhD Thesis, Department of Anthropology, Universidade de São Paulo.

Silva, F.A. (2003). Cultural behaviors of indigenous populations and the formation of the archaeological record in Amazonian Dark Earths. In: J. Lehmann, D. C. Kern, B. Glaser & W. Woods eds., *Amazonian Dark Earths: Origin, Properties, Management*. Dordrecht: Kluwer Academic, 373-385.

Silva, F.A. (2016). Tipos cerâmicos ou modos de vida? Etnoarqueologia e as tradições arqueológicas cerâmicas na Amazônia. In: C. Barreto, H.P. Lima, C.J.

Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN: Ministério da Cultura, 40-49.

Silva, F.A., Bespalez, E. & Stuchi, F.F. (2011). Arqueologia colaborativa na Amazônia: Terra Indígena Kuatinemu, Rio Xingu, Pará. *Amazônica* 3, 32-59.

Silva, F.A. & Noelli, F.S. (Forthcoming). Arqueologia e Linguística: Construindo as trajetórias histórico-culturais dos povos Tupi. *Crítica e Sociedade: Revista de Cultura Política.*

Silveira, M.I. (1994). *Estudo sobre estratégia de subsistência de caçadores-coletores pré-históricos do sítio Gruta do Gavião, Carajás (Pará)*. Unpublished PhD Thesis, Museu de Arqueologia e Etnologia, Universidade de São Paulo.
Silveira, M.I. & Schaan, D.P. (2005). Onde a Amazônia encontra o mar: estudando os sambaquis do Pará. *Revista De Arqueologia,* 18, 67-79.

Silveira, M.I. & Schaan, D.P. (2005). Onde a Amazônia encontra o mar: estudando os sambaquis do Pará. *Revista De Arqueologia,* 18, 67-79.

Simões, M.F. (1976). Nota Sobre Duas Pontas de Projétil da Bacia Tapajós (Pará). *Boletim do Museu Paraense Emílio Goeldi Nova Série,* 62.

Simões, M.F. (1981). Coletores-pescadores ceramistas do litoral do Salgado (Pará). *Boletim do Museu Paraense Emílio Goeldi, Nova Série.* 78, 1-26.

Simões, M.F. (1983). *Pesquisa e cadastro de sítios arqueológicos na Amazônia legal brasileira, 1978-1982.* Belém: Conselho Nacional de Desenvolvimento Científico e Tecnológico, Museu Paraense Emílio Goeldi.

Simões, M.F. & Araújo-Costa, F. (1978). *Áreas da Amazônia Legal Brasileira para pesquisa e cadastro de sítios arqueológicos*. Belém/PA: Museu Paraense Emílio Goeldi (Publicações Avulsas, v. 30).

Simões, M.F. & Lopes, D. (1987). Pesquisas arqueológicas no Baixo/médio Rio Madeira (Amazonas). *Revista de Arqueologia*, 4/1, 117-133.

Smith, H. (1879). *Brazil. The Amazonas and the Coast*. New York: Scribner's sons.

Sombroek, W., Ruivo, M.L., Fearnside, P.M., Glaser, B. & Lehmann, J. (2003). Amazonian Dark Earths as carbons stores and sinks. In: J. Lehmann, D.C. Kern, B. Glaser & W.I. Woods. eds., *Amazonian Dark Earths: Origin, Properties, Management*. Dordrecht: Kluwer Academic, 125-139.

Sousa Azevedo, J. (1943 [1746]). Parecer de João de Sousa Azevedo. *Revista do Instituto Histórico e Geográfico Brasileiro*, 179, 185-207.

Spaulding, A.C. (1960). The dimensions of archaeology. In: G.E. Dole & R.L.

Carneiro eds., *Essays in the science of culture in honor of Leslie A. White*. New York: Crowell, 437-56.

Sposati, R. (2013). *Hidrelétricas: Mundurukus expulsam pesquisadores de suas terras. Dilma manda a Força Nacional* [online]. Lingua Ferina. Available at http://candidoneto.blogspot.co.uk/2013/06/mundurukus-expulsam-pesquisadores-de.html [Accessed 09 Nov. 2016]

Spix, J.B. von. Martius, C.F.P. von. (1981 [1831]). *Viagem pelo Brasil, 1817-1820.* São Paulo; Belo Horizonte: Edusp; Itatiaia.

Stark, M. (1998). *The Archaeology of Social Boundaries*. Washington: Smithsonian Institution.

Stark, M., Bowser, B. & Horne, L. eds. (2008). *Cultural transmission and material culture: breaking down boundaries*. Tucson: University of Arizona.
Stenborg, P. ed. (2016). *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg.

Stenborg, P. (2016). Archaeological Research at Hinterland Sites on the Belterra Plateau, Pará. In: P. Stenborg, ed., *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg, 113-126.

Stenborg, P., Schaan, D.P. & Lima, A.M.A. (2012). Precolumbian land use and settlement pattern in the Santarém region, lower Amazon. *Amazônica* 4/1, 222-250.

Steward, J.H. ed. (1940-1950). *Handbook of South American Indians: the Tropical Forest Tribes*. Washington, D.C.: Bureau of American Ethnology, Smithsonian Institution.

Steward, J.H. & Faron, L. (1959). *Native peoples of South America*. New York: McGraw Hill.

Stuchi, F.F. (2010). *A Ocupação da Terra Indígena Kaiabi (MT/PA): História indígena e etnoarqueologia*. Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Survival International. (2013). 'Lost' report exposes Brazilian Indian genocide. Available at: http://www.survivalinternational.org/news/9191 [Accessed 23 Jan. 2017]

Sweet, D.G. (1974). *A Rich Realm of Nature Destroyed: The Middle Amazon Valley, 1640-1750*. Unpublished PhD Thesis, University of Wisconsin.

Tamanaha, E.K. (2012). *Ocupação policroma no Baixo e Médio Rio Solimões, estado do Amazonas.* Unpublished MA Dissertation, Museu de Arqueologia e Etnologia, Universidade de São Paulo.

Tarble, K. (1985). Un nuevo modelo de expansión Caribe para la época prehispánica. *Antropológica*, 64-65, 45-81.

Tarble, K.L. & Zucchi, A. (1984). Nuevos Datos sobre la Arqueología Tardía del Orinoco: La Série Valloide. *Acta Científica Venezolana,* 35, 434-445

Tarble de Scaramelli, K. & Scaramelli, F. (2011). Generic Pot and Generic Indians: The Archaeology of Ethnogenesis in the Middle Orinoco. In: A. Hornborg & J. Hill, eds., *Ethnicity in Ancient Amazonia*. Boulder: University Press of Colorado, 99-127.

Tauli-Corpuz, V. (2016). *Report of the Special Rapporteur on the rights of indigenous peoples on her mission to Brazil* [online]. Victoria Tauli Corpuz. Available at http://unsr.vtaulicorpuz.org/site/index.php/en/documents/country-reports/154-report-brazil-2016 [Accessed 7 Dec. 2016]

Tavares, H.L. (Forthcoming). *Estudo da variabilidade e distribuição de material arqueológico proveniente de furos-teste de sítios arqueológicos no Alto Rio Tapajós.* Unpublished Independent Study Project, Programa de Antropologia e Arqueologia, Universidade Federal do Oeste do Pará.

Teixeira, L.C.B. & Saw Munduruku, J. (2015). *O presente de Karo Ebak aos Munduruku* [online]. Fundação Rosa Luxemburgo http://rosaluxspba.org/o-presente-de-karo-ebak-aos-munduruku/ [Accessed 11 Oct. 2015].

Tite, M. & Kilikoglou, V. (2002). Do we understand cooking pots and is there an ideal cooking Pot? In: V. Kilikoglou, A. Hein, & Y. Maniatis, eds., *Modern Trends in Scientific Studies on Ancient Ceramics*. BAR International Series. Oxford: Archaeopress, 1-8.

Tocantins, A.M.G. (1877). Estudos sobre a Tribu "Mundurucú". *Revista Trimestral do Instituto Histórico Geográfico Brasileiro*: 73-161.

Toney, J.R. (2012). *The Product of Labor: Pottery Technology in the Upper Xingu, Southern Amazon, Brazil, A.D. 700-1770*. Unpublished PhD Thesis, Department of Anthropology, University of Florida.

Toney, J.R. (2016). Cerâmica e História Indígena do Alto Xingu. In: C. Barreto, H.P. Lima & C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 224-236.

Torres, M. (2008). *A beiradeira e o grilador: ocupação e conflito no Oeste do Pará.* Unpublished MA dissertation, University of São Paulo.

Torres, M. (2014). O escriba e o narrador: A memória e a luta pela terra dos ribeirinhos do Alto Tapajós. *Tempo Social*, *Revista de Sociologia da USP,* 26/1, 233-257.

Torres, M. (2015). De pariwat ('étrangers/ennemis') à wuy g̱uy bugum ('ceux qui pensent comme nous'): scissions et alliances de groupes sociaux distincts atteints par des menaces communes. In: *Identités et territoires: une approche patrimoniale* (Symposium). Paris: École des hautes études en sciences sociales.

Travassos, D.A. (2016). Plant Food Consumption and the Origin of Amazonian Dark Earth in the Lower Tapajós Region. In: P. Stenborg, ed., *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg, 61-70.

Trigger, B.G. (1984). Alternative Archaeologies: Nationalist, Colonialist, Imperialist. *Man*, 19/3, 355-370.

Trigger, B.G. (1985). *Natives and Newcomers. Canada's "Heroic Age" reconsidered.* Kingston and Montreal: McGill University.

Trindade, F.B., Ferreira, G.G., Albertin, H.A., Vedovato, L.R., Ceccarelli, M.B., Angelini, M.C.G., Temer, T. & Sampaio, A.A. (2016). A suspensão de segurança: peixe fora d'água diante da Constituição democrática. In: D.F. Alarcon, B. Millikan, M. Torres, eds., *Ocekadi: hidrelétricas, conflitos socioambientais e resistência na Bacia do Tapajós*. Brasília: International Rivers Brasil; Santarém: Programa de Antropologia e Arqueologia da Universidade Federal do Oeste do Pará, 257-276.

Troufflard, J. (2016). Well Builders of the Belterra Plateau, Lower Tapajós: Preliminary Data. In: P. Stenborg ed., *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland.* Gothenburg: University of Gothenburg, 37-46.

Urban, G. (1996). On the geographical origins and dispersion of Tupian Languages. *Revista de Antropologia*, 39/2, 61-104.

Urban, G. (2006 [1992]). A história da cultura brasileira segundo as línguas nativas. In: M. Carneiro da Cunha, ed., *História dos Índios no Brasil.* São Paulo: Companhia das Letras, FAPESP, 87-102.

Viana, S.A., Ribeiro, C.V. & Oliveira, S.D. (2011). Cauixi em cerâmica arqueológica: uma questão de escolhas culturais. *Revista da SAB*, 24/1, 32-51.

Vidal, L. (1983). O Espaço Habitado entre os Kayapó-Xikrin (Jê) e os Parakanã (Tupi), do médio Tocantins, Pará. In: S.C. Novaes, ed., *Habitações Indígenas.* São Paulo: Nobel, 77-102.

Vidal, JJ.A. (2011). *A cerâmica do povo Paiter Suruí de Rondônia: continuidade e mudança cultural, 1970-2010*. Unpublished MA Dissertation, Instituto de Artes. Universidade Estadual Paulista "Julio de Mesquita Filho.

Viveiros de Castro, E. (1993). Histórias Ameríndias (resenha de *História dos Índios no Brasil*, Manuela Carneiro da Cunha, org.). *Novos Estudos Cebrap,* 36, 22-33.

Viveiros de Castro, E. (1996). Images of nature and society in Amazonian ethnology. *Annual Review of Anthropology* 25/1, 179-200.

Volkmer-Ribeiro, C. & Viana, S.A. (2009). Cerâmica arqueológica com cauixí. In: S.A. Viana, ed., *Pré-História no Vale do Rio Manso/MT*. Goiânia: Editora da Universidade Católica de Goiás, 311-327.

Washburn, D.K. ed. (1983). *Structure and Cognition in Art*. Cambridge: Cambridge University.

Wauchope, R. ed. (1956). Seminars in Archaeology: 1955. *American Antiquity*, 22/2, Part 2.

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity.* Cambridge: Cambridge University.

Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7, 225-246.

Whitbread, I.K. (1986). The characterisation of argillaceous inclusions in ceramic thin sections. *Archaeometry*, 28, 79-88.

Whitbread, I.K. (2015). Materials choices in utilitarian pottery: kitchen wares in the Berbati Valley, Greece. In: M. Spataro & A. Villing, eds., *Ceramics, Cuisine and Culture: The archaeology and science of kitchen pottery in the ancient mediterranean world*. Barnsley: Oxbow, 28-36.

Whitehead, N.L. (1993). Ethnic Transformation and Historical Discontinuity in Native Amazonia and Guayana, 1500-1900. *L'Homme,* 33/126-128. *La remontée de l'Amazone*, 285-305.

Whitehead, N.L. (1994). The Ancient Amerindian Polities of the Amazon, the Orinoco, and the Atlantic Coast: A Preliminary Analysis of their Passage from Antiquity to Extinction. In: A.C. Roosevelt, ed., *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*. Tucson: University of Arizona, 33-53.

Whitehead, N.L. (1996). Amazonian Archaeology; Searching for Paradise? A Review of Recent Literature and Fieldwork. *Journal of Archaeological Research* 4/3, 241-264.

Willey, G.R. & Phillips, P. (1958). *Method and Theory in American Archaeology.* Chicago: University of Chicago Press.

Woods, A.J. (1986). Form, Fabric, and Function: Some Observations on the Cooking Pot in Antiquity. In: W.D. Kingery, ed., *Technology and Style, Ceramics and Civilization.* Columbus: American Ceramic Society, 157-172.

Woods, W.I. (1995). Comments on the Black Earths of Amazonia. *Proc. Applied Geog. Conf.,* 18, 159-165.

Woods, W.I. & McCann, J.M. (1999). The anthropogenic origin and persistence of Amazonian dark earths. *Yearbook, Conference of Latin Americanist Geographers* 25, 7-14.

Wüst, I. (1990). *Continuidade e Mudança: para uma interpretação dos grupos pré-coloniais na bacia do rio Vermelho, Mato Grosso*. Unpublished PhD Thesis, Departamento de Antropologia, Universidade de São Paulo.

Wüst, I. & Barreto, C. (1999). The Ring Villages of Central Brazil: A Challenge for Amazonian Archaeology. *Latin American Antiquity*, 10/1, 3-23.

Zimpel Neto, C. A. (2008). *Na Direção das Periferias Extremas da Amazônia: Arqueologia na Bacia do Rio Jiparaná, Rondônia*. Unpublished MA Dissertation, University of São Paulo.

Zucchi, A. (1985). Evidencias arqueológicas sobre posibles grupos de lenguas Caribe. *Antropológica*, 63-64: 23-44.

Zuse, S. (2016). Variabilidade cerâmica e diversidade cultural no alto Rio Madeira. In: C. Barreto, H.P. Lima, C.J. Betancourt, eds., *Cerâmicas arqueológicas da Amazônia: rumo a uma nova síntese*. Belém: IPHAN, Ministério da Cultura, 385-401.

<u>Manuscripts</u>

- Biblioteca Pública de Évora [BPE, Portugal], CXV/2-15 a nº 7, fol. 51r-54r. "Breve Noticia do Rio Topajôs, cujascabeceyras ultimò se descobrirão no anno de 1742 por huns certanejos ou Mineiros do Matto Grosso."

- Letter from the Governor of Pará, Martinho de Souza Albuquerque to the Minister of Ultramarine Affairs, Martinho de Mello e Castro. Pará, 17th August 1788. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim

Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 36-38.

- Letter from Antônio Carlos da Fonseca Coutinho, Commander of the district of Borba to the General João Pereira Caldas, Borba, 13th June 1786. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 32.

- Letter from the Governor of Pará, Francisco de Souza Coutinho, to the Governor of Rio Negro, 31st July 1794. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 55.

- Letter from the Governor of Rio Negro, Manoel da Gama Lobo D'Almada, to the Governor of Pará, 21st November 1794. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 50.

- Post-script to the letter from the Governor of Rio Negro, Manoel da Gama Lobo D'Almada, to the Minister of Ultramarine Affairs, Martinho de Mello e Castro. In: Santos, F.J. (1995). *Dossiê Munduruku*. Manaus: Museu Amazônico, Universidade do Amazonas. *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 63.

- Letter from the Administrator of Vila Boim, Venceslao Jozé de Souza Moraes to the Governor of Pará. Vila Boim, 7th March 1774. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 28.

- Letter from the Military Commander of Santarém, José Antônio Salgado, to the Governor of Pará, 9th January 1794. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 49.

- Letter from Lieutenant-Colonel José Antônio Salgado to the Governor of Pará, Francisco de Souza Coutinho, 1st April 1795. In: Santos, F.J. (1995). *Dossiê Munduruku*. Boletim Informativo do Museu Amazônico. Manaus: Fundação Universidade do Amazonas. p. 75

Bruna Rocha

Ipi Ocemumuge

A Regional Archaeology of the Upper Tapajós River

Ipi Ocemumuge:

A Regional Archaeology of the Upper Tapajós River

Appendix

Bruna Cigaran da Rocha

Thesis submitted as requirement for obtaining a PhD in Archaeology.

Institute of Archaeology, University College London

Supervisors:
José Ramón Oliver
Manuel Arroyo-Kalin
Eduardo Góes Neves

Cover watercolour by Vitor Flynn Paciornik

Appendix List

Appendix n°

Technical note published by the Department for Energy Planning on the 5th December 2007, annexed to the Recommendation n° 260 – Casa Civil, 16 April 2008.

RESEX Montanha Mangabal

Os estudos de inventário em andamento, realizados pela Elctronorte, indicaram a existência de que serão apresentarão interferências direta na unidade de conservação caso seja criada.

A Bacia do Rio Tapajós está em fase final dos estudos de inventário hidrelétrico. Os resultados estão indicando a existência de 3 alternativas de barramentos, que poderão apresentar cerca de 10.000MW de potência instalada. A RESEX Montanha Mangabal causará interferência em qualquer uma das alternativas estudadas visto que as alternativas estão inseridas na área proposta para a unidade de conservação.

Desta forma, conclui-se que a unidade de conservação não deve ser criada.

Authorisation for research from the Munduruku of Sawre Muybu

Data: 22 / 01 / 2014

Aldeia Sawré Muybu

Consulta sobre projeto de pesquisa arqueológica.

Na manhã do dia 22/01/2014 reuniram-se o Coordenador Regional substituto da CR Tapajós, sr. Ademir Macedo, a chefe do SEGAT/CR Tapajós, sra. Juliana Araújo, o cacique da aldeia, sr. Juarez Saw e cerca de vinte moradores. A pauta da reunião foi o andamento do processo de demarcação, a proposta de boas práticas de extração de palmito de açaí e a consulta sobre autorização à realização de pesquisa científica na área indígena. Sobre a proposta de pesquisa, a pesquisadora responsável, Bruna Rocha, encaminhou um resumo do projeto para ser apresentado aos moradores pelos representantes da Funai. O projeto foi lido e explicado para os indígenas e algumas cópias foram distribuídas. Os servidores da Funai esclareceram o objetivo do trabalho, o número de pessoas envolvidas, o período que permaneceriam na área e as atividades a serem desenvolvidas no local. A representante da Funai também explicou sobre a legislação vigente sobre autorização de entrada em Terra Indígena e o fato de que o mais importante é a anuência da comunidade indígena. São os próprios indígenas que decidem se permitem ou não a entrada de pesquisadores na área.

Alguns moradores se manifestaram (Antônio Dace e Juarez Saw) em favor da realização do projeto, pois entendem que pode contribuir para melhorar o conhecimento sobre a ocupação da região e sobre a presença do povo Munduruku.

A decisão final da comunidade foi favorável à realização da pesquisa.

Juarez Saw

Authorisation for research from the Munduruku of Sawre Muybu

Data: / /

2 Jiquirita AKAY
3º valdenildo Saw Munduruku
4º Aldira Akai Munduruku
5. Arlison Rodrigues de Morais
6. Edna Maria de Sousa
7- Marluzi Lopes Silva
8- Agnaldo Karo munduruku
9. Genildo karo mdk
10- mª P. mdk
11. Laurinio Saw M.d.R.K
12. Sandro Korop da S. Munduruku
13 Antonio Waré Munduruku
14 Daniel Saw mundurk-
15 Marina Saw munduruku
16. Francisco Sorano Waré md.R.K
17. Márcia Kirixi munduruku

Summary of known dates for Tapajós Region						
Years BP	**Site name**	**RC/TL/OSL**	**Site code**	**Context**	**Reference**	**Sample reference**
50 ± 30	Bom Futuro	OSL	PA02385	U2 2011 square 1, z: 45cm	Stenborg 2016	Risø 132309
108 ± 8	Bom Futuro	OSL	PA02385	U1 2011 square 1, z: 74cm	Stenborg 2016	Risø 132303
200 ± 20	Lago do Jacaré	TL	PA00795	Tp 8.1S, 10-20cm	Gomes 2005	LVD-Fatec-SP(612)/2003
230 ± 10	Bom Futuro	OSL	PA02385	U1 2010 square 1, z: 22.5cm	Stenborg 2016	Risø 112307
235 ± 65	Castanha	RC	PA00124/PA-IT-8	A: 20-30cm	Perota	SI-4205
241 ± 30	Lago do Jacaré	TL	PA00795	Surface	Gomes 2005	UW794/2008
255 ± 65	Pedra Branca	RC	PA00125/PA-IT-9	A: 20-30cm	Perota	SI-4207
260 ± 36	Zenóbio	TL	PA00796	Tp 1. LW, 0-10cm	Gomes 2005	LVD-Fatec-SP(708)/62
285 ± 75	Itapacurá II	RC	PA00136/PA-ST-30	A: 30-40cm	Perota	SI-4212
300 ± 30	Lago do Jacaré	TL	PA00795	U1, 0-10cm	Gomes 2005	LVD-Fatec-SP(610)/2001
310 ± 40	Lago do Jacaré	TL	PA00795	U1/Tp 5, 5-10cm	Gomes 2005	LVD-Fatec-SP(854)/0001
350 ± 70	Itapacurá II	RC	PA00136/PA-ST-30	A: 20-30cm	Perota	SI-4211
350 ± 30	Bom Futuro	RC	PA02385	U1 2010 square 1, 20-25cm	Schaan 2016	Beta-324178
370 ± 20	Bom Futuro	OSL	PA02385	U1 2011 square 1, z: 47cm	Stenborg 2016	Risø 132301
378 ± 40	Lago do Jacaré	TL	PA00795	Tp D.2, 0-10cm	Gomes 2005	UW845/70
380 ± 64	Porto	RC	PA00788	Ex. n°5 - 9B	Quinn 2004	WK6835
380 ± 70	Lago do Jacaré	TL	PA00795	Tp B.5N, 0-10cm	Gomes 2005	LVD-Fatec-SP(859)/25
386 ± 62	Porto	RC	PA00788	Ex. n°5 - 5	Quinn 2004	WK6832
400 ± 60	Castanha	RC	PA00124/PA-IT-8	A: 30-40cm	Perota	SI-4206
413 ± 56	Porto	RC	PA00788	Ex. n°5 - 11/4B	Quinn 2004	WK6838

U = unit; Tp = Test pit; S = ‘sondagem’ (either 0.5x1m or 0.5x0.5m)

Summary of known dates for Tapajós Region

418 ± 59	Porto	RC	PA00788	Ex. n°4 - 15C	Quinn 2004	WK6842
425 ± 56	Porto	RC	PA00788	Ex. n°5 - 13	Quinn 2004	WK6841
410 ± 30	Bom Futuro	OSL	PA02385	U1 2011 square 8, z: 45cm	Stenborg 2016	Risø 132305
420 ± 30	Bom Futuro	OSL	PA02385	U1 2011 square 1, z: 47cm	Stenborg 2016	Risø 132302
435 ± 56	Lago do Jacaré	RC	PA00795	Surface	Gomes 2005	UW847/2070
448 BP - ***European invasion of the Americas begins***						
452 ± 57	Porto	RC	PA00788	Ex. n°5 - 11/4B	Quinn 2004	WK6837
455 ± 63	Porto	RC	PA00788	Ex. n°3 - 25	Quinn 2004	WK6845
450 ± 30	Bom Futuro	OSL	PA02385	U2 2011 square 1, z: 35cm	Stenborg 2016	Risø 132308
460 ± 30	Fazenda Cacau	RC	PA00993	N481 E601, 51-61cm	Martins 2012b	Beta-293286
460 ± 30	Bom Futuro	OSL	PA02385	U1 2010 square 1, z: 32.5	Stenborg 2016	Risø
497 ± 30	Bom Futuro	RC	PA02385	U1 2011, square 8, z: 47cm	Stenborg 2016	Ua-46304
500 ± 30	Bom Futuro	OSL	PA02385	U1 2011 square 8, z: 60cm	Stenborg 2016	Risø 132306
500 ± 30	Bom Futuro	OSL	PA02385	U1 2011 square 8, z: 70cm	Stenborg 2016	Risø 132307
512 ± 59	Porto	RC	PA00788	Ex. n°3 – 25	Quinn 2004	WK6846
520 ± 70	Zenóbio	TL	PA00796	Tp 2.1S, 0-10cm	Gomes 2005	LVD-Fatec-SP(707)/34
537 ± 58	Porto	RC	PA00788	Ex. n°5 – 12	Quinn 2004	WK6840
540 ± 30	Bom Futuro	RC	PA02385	U1 2011 square 8, z: 58cm	Stenborg 2016	Ua-46305
550 ± 30	Bom Futuro	OSL	PA02385	U1 2011 square 8, z: 35cm	Stenborg 2016	Risø 132304
580 ± 30	Serraria Trombetas	RC	PA01009		Martins 2012	Beta-324187
583 ± 57	Porto	RC	PA00788	Ex. n°5 - 8	Quinn 2004	WK6833
586 ± 56	Porto	RC	PA00788	Ex. n°5 - 12	Quinn 2004	WK6839

U = unit; Tp = Test pit; S = 'sondagem' (either 0.5x1m or 0.5x0.5m)

Summary of known dates for Tapajós Region

586 ± 30	Bom Futuro	RC	PA02385	U1 2011 square 8, z: 68cm	Stenborg 2016	Ua-46306
650 ± 59	Porto	RC	PA00788	Ex. n°4 - 18	Quinn 2004	WK6843
652 ± 56	Porto	RC	PA00788	Ex. n°5 - 11/4B	Quinn 2004	WK6837
660 ± 85	Lago do Jacaré	TL	PA00795	U1/Tp 15 (surface)	Gomes 2005	LVD-Fatec-SP(855)/3204
660 ± 95	Zenóbio	TL	PA00796	Surface	Gomes 2005	LVD-Fatec-SP(710)/66
664 ± 57	Porto	RC	PA00788	Ex. n°2 - 20/5N	Quinn 2004	WK6844
680 ± 50	Alvorada	RC	PA01013	N219 E320, 12-22cm	Martins 2012	Beta-293282
685 ± 65	Pedra Branca	RC	PA00125/PA-IT-9	A: 90-110cm	Perota	SI-4210
695 ± 75	São Francisco	RC	PA00121/PA-IT-5	A: 20-30cm	Perota	SI-4215
700 ± 70	Lago do Jacaré	TL	PA00795	Tp B.2.S, 0-10cm	Gomes 2005	LVD-Fatec-SP(614)/2005
725 ± 65	Pedra Branca	RC	PA00125/PA-IT-9	A: 70-80cm	Perota	SI-4209
780 ± 30	Serraria Trombetas	RC	PA01009		Martins 2012	Beta-324188
799 ± 92	Lago do Jacaré	TL	PA00795	Tp 11.2N, 0-10cm	Gomes 2005	UW846/114
860 ± 110	Lago do Jacaré	TL	PA00795	Tp 4.3S, 0-10cm	Gomes 2005	LVD-Fatec-SP(858)/124
865 ± 30	Sawre Muybu	RC	PA02262	N1008 E1113 F4 z: 52cm	PROALTA	UBA-29072
890 ± 30	Serraria Trombetas	RC	PA01009	N559 E371, z:74cm	Martins 2012	Beta-293289
890 ± 80	Zenóbio	TL	PA00796	Surface	Gomes 2005	LVD-Fatec-SP(616)/3001
910 ± 60	Terra Preta (Parauá)	RC	PA00797	Tp 4.3, 30-40	Gomes 2005	Beta 178444
910 ± 130	Zenóbio	TL	PA00796	Tp NE.2, 30-40cm	Gomes 2005	LVD-Fatec-SP(711)/001
913 ± 30	Sawre Muybu	RC	PA02262	N1000 E957 70-80cm	PROALTA	UBA-29071
960 ± 30	Porto	RC	PA00788	53-63cm	Alves 2012	PSTM-002
990 ± 86	Lago do Jacaré	TL	PA00795	U1/Tp 5 (0-5cm)	Gomes 2005	LVD-Fatec-SP(855)/3207

U = unit; Tp = Test pit; S = 'sondagem' (either 0.5x1m or 0.5x0.5m)

Summary of known dates for Tapajós Region

1008 ± 124	Lago do Jacaré	TL	PA00795	U1/Tp 14 (5-10cm)	Gomes 2005	UW795/3005
1010 ± 60	Pedra Branca	RC	PA00125/PA-IT-9	A: 40-50cm	Perota	SI-4208
1020 ± 50	Lago do Jacaré	RC	PA00795	U1/Tp 6, 15-20cm	Gomes 2005	Beta 186954
1039 ± 26	Sawre Muybu	RC	PA02262	N1000 E958 z:34cm	PROALTA	UBA-29070
1151 ± 29	Terra Preta do Mangabal	RC	PA01311	N998 E974.5 z:55cm	PROALTA	OxA 33,125
1193 ± 26	Terra Preta do Mangabal	RC	PA01311	N998 E973.5 z:85cm	PROALTA	UBA-29069
1199 ± 26	Terra Preta do Mangabal	RC	PA01311	N998 E973.5 z:72cm	PROALTA	UBA-29068
1200 ± 30	Terra Preta do Mangabal	RC	PA01311	N998 E974.5 30-40cm	PROALTA	Beta-432570
1215 ± 70	Itapacurá I	RC	PA00135/PA-ST-29	A: 10-20cm	Perota	SI-4218
1220 ± 60	Terra Preta (Parauá)	RC	PA00797	Tp 3 30-40cm	Gomes 2005	Beta 178442
1243 ± 30	Terra Preta do Mangabal	RC	PA01311	N998 E974.5 120-130cm	PROALTA	OxA 34,134
1251 ± 28	Terra Preta do Mangabal	RC	PA01311	N998 E974.5 z:135cm	PROALTA	OxA 33,133
1265 ± 28	Terra Preta do Mangabal	RC	PA01311	N998 E974.5 20-30cm	PROALTA	OxA 34,135
1270 ± 30	Terra Preta do Mangabal	RC	PA01311	N1074 E1000 z: 52cm	PROALTA	Beta-400865
1320 ± 60	Terra Preta (Parauá)	RC	PA00797	Tp 4, 30-40cm	Gomes 2005	Beta 178443
1370 ± 200	Zenóbio	TL	PA00796	Tp NE.2, 20-30cm	Gomes 2005	LVD-Fatec-SP(709)/31
1390 ± 130	Lago do Jacaré	TL	PA00795	Tp 11.2.S, 0-10cm	Gomes 2005	LVD-Fatec-SP(611)/2010
1680 ± 220	Lago do Jacaré	TL	PA00795	U1/Tp 5, 10-15cm	Gomes 2005	LVD-Fatec-SP(857)/3263
1800 ± 40	Aldeia	RC	PA01037	U5	Gomes 2011	Beta 283903
1840 ± 50	Terra Preta (Parauá)	RC	PA00797	U5/Tp 4	Gomes 2005	Beta 186959
1990 ± 190	Lago do Jacaré	TL	PA00795	Tp C.1S, 0-10cm	Gomes 2005	LVD-Fatec-SP(613)/2004
2040 ± 40	Aldeia	RC	PA01037	U3 - 4	Gomes 2011	Beta 248485

U = unit; Tp = Test pit; S = 'sondagem' (either 0.5x1m or 0.5x0.5m)

Summary of known dates for Tapajós Region

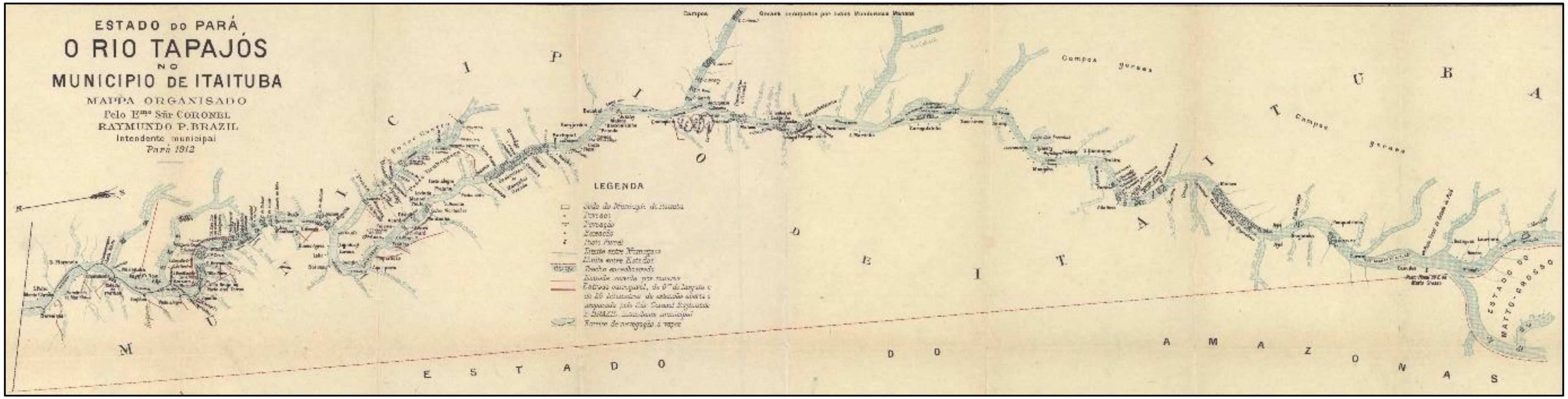
2200±30	Serraria Trombetas	RC	PA01009	N559 E350 z: 76cm	Martins 2012a	Beta 324198
2200 ± 30	Caverna do 110	RC	-	S1 05-10cm	Pereira et al 2016	-
2270 ± 63	Porto	RC	PA00788	Ex. n°5 - 9B	Quinn 2004	WK6834
2370 ± 60	Aldeia	RC	PA01037	U3 - 4	Gomes 2011	-
2490 ± 80	Terra Preta (Parauá)	RC	PA00797	U1, 30-40cm	Gomes 2005	Beta 180713
2740 ± 60	Lago do Jacaré	RC	PA00795	U8/Tp3, 15-20cm	Gomes 2005	Beta 186958
2880 ± 30	Água Azul	RC	PA00991	N791 E180, 39-49cm	Martins 2012b	Beta-293284
2900 ± 30	Porto	RC	PA00788	83-93cm	Alves 2012	PSTM-001
2912 ± 56	Porto	RC	PA00788	Ex. n°5 - 11/4B	Quinn 2004	WK6836
3000 ± 40	Aldeia	RC	PA01037	U5 - 2	Gomes 2011	Beta 283902
3060 ± 30	Porto	RC	PA00788	101cm	Alves 2012	PSTM-004
3260 ± 30	Porto	RC	PA00788	117cm	Alves 2012	PSTM-006
3260 ± 50	Lago do Jacaré	RC	PA00795	U1/Tp 15, 20-25cm	Gomes 2005	Beta 187492
3600 ± 70	Lago do Jacaré	RC	PA00795	U6/Tp 4, 15-20cm	Gomes 2005	Beta 186957
3660 ± 40	Lago do Jacaré	RC	PA00795	U1/Tp 13, 25-30cm	Gomes 2005	Beta 186956
3660 ± 70	Lago do Jacaré	RC	PA00795	U1/Tp 7, 20-25cm	Gomes 2005	Beta 186955
3680 ± 50	Zenóbio	RC	PA00796	U1/Tp 1, 25-30cm	Gomes 2005	Beta 186960
3800 ± 70	Lago do Jacaré	RC	PA00795	U1/Tp 3, 25-30cm	Gomes 2005	Beta 186952
5000	Itaituba	RC	PA00128/ PA-IT-14	Vessel interior	Lisboa & Coirolo 2005	-
6830 ± 30	Caverna do 110	RC	-	S1 15-20cm	Pereira et al 2016	-
6840 ± 30	Caverna do 110	RC	-	S1 10-15cm	Pereira et al 2016	-
8100 ± 30	Caverna do 110	RC	-	S1 30-40cm	Pereira et al 2016	-

U = unit; Tp = Test pit; S = 'sondagem' (either 0.5x1m or 0.5x0.5m)

Tocantins/Xingu/Tapajos

Date BP	Span	Lab.No.	Site	Tradition
90 ± 80	10-170	Beta 17127	PA-AL-39	
105 ± 55	50-165	SI-3508	PA-AL-13	Poly/Exc.
125 ± 60	65-185	SI-3505	PA-AL-10	Poly/Exc.
145 ± 55	90-200	SI-3506	PA-AL-10	Poly/Exc.
175 ± 55	120-230	SI-3511	PA-AL-6	I-P
220 ± 70	150-290	Beta 17134	PA-AL-39	
220 ± 100	120-320	Beta 17135	PA-AL-39	
235 ± 65	170-300	SI-4205	PA-IT-8	I-P
255 ± 65	190-320	SI-4207	PA-IT-9	I-P
270 ± 60	210-330	Beta 17129	PA-AL-39	
275 ± 75	200-350	SI-4345	PA-AL-39	I-P
285 ± 75	210-360	SI-4212	PA-ST-30	I-P
300 ± 60	240-360	Beta 17139	PA-AL-9	Poly/Exc.
350 ± 70	280-420	SI-4211	PA-ST-30	I-P
365 ± 60	305-425	SI-3507	PA-AL-13	Poly/Exc.
400 ± 60	340-460	SI-4206	PA-IT-8	I-P
400 ± 90	310-490	Beta 17128	PA-AL-39	
400 ± 70	330-470	SI-4058	PA-AT-4	Tupiguarani
460 ± 50	410-510	Beta 17131	PA-AL-39	
485 ± 90	395-575	SI-4344	PA-AL-39	I-P
510 ± 70	440-580	Si-4342	PA-AL-39	Tupiguarani
520 ± 55	465-575	SI-3512	PA-AL-15	Poly/Exc.
530 ± 60	470-590	SI-3514	PA-AL-17	Poly/Exc.
550 ± 80	470-630	Beta 17125	PA-AL-44	Mina
570 ± 80	490-650	Beta 17132	PA-AL-39	
575 ± 70	505-645	SI-4343	PA-AL-39	Tupiguarani
585 ± 60	525-645	SI-3509	PA-AL-13	Poly/Exc.
600 ± 60	540-660	SI-4351	PA-BI-4	I-P
600 ± 70	530-670	Beta 17133	PA-AL-39	
610 + 60	550-670	SI-3513	PA-AL-17	Poly/Exc.
610 ± 55	555-665	SI-7140	PA-AL-43	Mina
620 ± 70	550-690	Beta 17144	PA-AL-17	Poly/Exc.
625 ± 60	565-685	SI-4349	PA-BI-2	Tupiguarani
640 ± 80	560-720	Beta 17130	PA-AL-39	
645 ± 60	585-705	SI-4350	PA-BI-2	Tupiguarani
685 ± 65	620-750	SI-4210	PA-IT-9	I-P
690 ± 90	600-780	SI-4346	PA-AL-31	Tupiguarani
690 ± 70	620-760	Beta 17137	PA-AL-9	Poly/Exc.
695 ± 75	620-770	SI-4215	PA-IT-5	I-P
725 ± 65	660-790	SI-4209	PA-IT-9	I-P
760 ± 105	655-865	SI-6753	PA-BA-38	(Tucurui)
770 ± 80	690-850	Beta 17124	PA-AL-13	Poly/Exc.
780 ± 60	720-840	SI-3515	PA-AL-8	Poly/Exc.
790 ± 80	710-870	Beta 17146	PA-AL-17	Poly/Exc.
800 ± 70	730-870	Beta 17126	PA-AL-15	Poly/Exc.
800 ± 80	720-880	Beta 17141	PA-AL-43	Mina
830 ± 80	750-910	Beta 17140	PA-AL-9	Poly/Exc.
840 ± 60	780-900	SI-7142	PA-AL-44	Mina
850 ± 65	785-915	SI-7141	PA-AL-44	Mina
850 ± 100	750-950	Beta 17138	PA-AL-9	Poly/Exc.

860 ± 55	805-915	SI-7149	PA-AL-45	Mina
870 ± 65	805-935	SI-7145	PA-AL-45	Mina/ZH
890 ± 70	820-960	Beta 17147	PA-AL-17	Poly/Exc.
910 ± 60	850-970	Beta 17145	PA-AL-17	Poly/Exc.
940 ± 90	850-1030	Beta 17142	PA-AL-43	Mina
950 ± 70	880-1020	SI-4061	PA-BA-11	(Tucurui)
980 ± 80	900-1060	SI-4347	PA-AL-34	I-P
980 ± 70	910-1070	Beta 17136	PA-AL-9	Poly/Exc.
1000 ± 55	945-1055	SI-7148	PA-AL-45	Mina
1010 ± 60	950-1070	SI-4208	PA-IT-9	I-P
1050 ± 60	990-1110	SI-7143	PA-AL-44	Mina
1050 ± 50	1000-1100	Beta 17143	PA-AL-43	Mina
1060 ± 80	980-1140	SI-7147	PA-AL-45	Mina/ZH
1215 ± 70	1145-1285	SI-4218	PA-ST-29	I-P
1255 ± 70	1185-1325	SI-7150	PA-AL-45	Mina
1485 ± 75	1410-1560	SI-7144	PA-AL-44	Mina
1650 ± 70	1580-1720	SI-3517	PA-AL-18	Mina
2255 ± 55	2200-2310	SI-7146	PA-AL-45	Mina/ZH
2400 ± 70	2330-2470	SI-4348	PA-AL-42	Salvaterra
3745 ± 120	3625-3865	SI-6754	PA-BA-38	Preceramic
5595 ± 105	5490-5700	SI-4062	PA-BA-22	Preceramic



Map of the upper Tapajós produced by Col. Raymundo Pereira Brazil in 1912 for the 1913 National Rubber Exhibition, held in Rio de Janeiro.

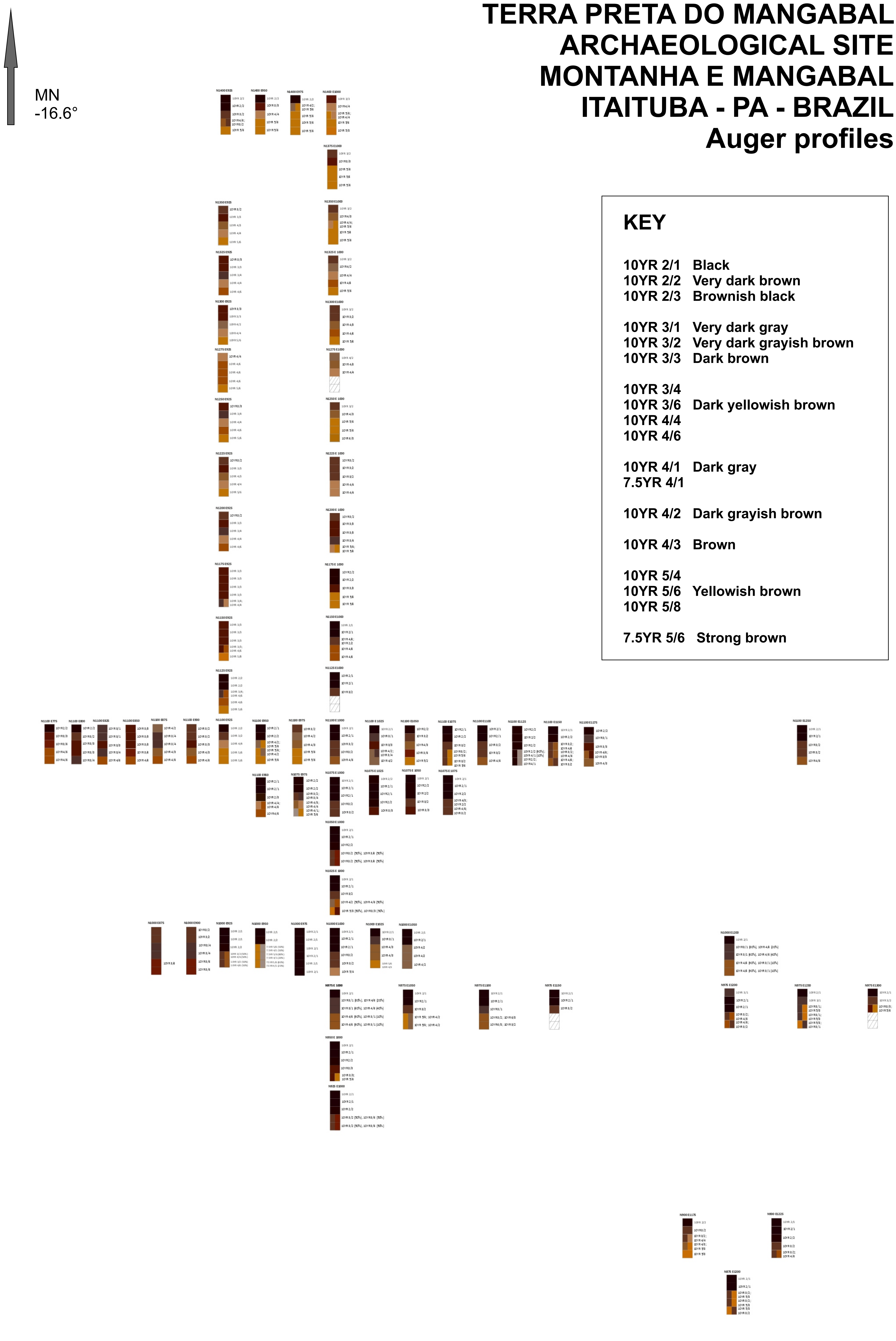
Site delimitation and excavation procedures

For all sites delimited and excavated by PROALTA, we followed the basic methodology of the Central Amazon Project, which has been refined over 15 years in equatorial and tropical forests and is thus well matched to the environmental conditions we encountered (see Neves 2000; 2013, and dissertations and theses produced by the project). Another advantage of this set of practices is their flexibility, being adaptable to a scenario of few workers and limited resources who have 'low tech' equipment at their disposal, or to well-funded projects with high precision equipment, science-based sampling techniques and dozens of people at their disposal. PROALTA falls into the former category.

For site delimitation, a grid datum point near the centre of the site is established and arbitrarily named N1000 E1000. This datum is geo-referenced using a GPS. Auger points are then marked out at regular intervals along east-west and north-south lines. Augering quickly maps sub-surface distributions of ADE and ceramic density. This information helps us to decide where to open up 1x1m excavation pits, which are larger and enable greater stratigraphic control of materials collected and observable profiles. Augering is undertaken using a standard posthole auger, whose mouth is approximately 20cm wide. Each auger level is 20cm deep and excavated holes are usually 1m deep. For each level, the soil colour (using the Munsell Soil Colour chart), ceramic density and the presence of lithics, charcoal and bone are recorded on individual forms. Each class of archaeological remain receives its own provenience number and is bagged separately. Once finished, the piles of soil from different levels are photographed and the holes are filled up.

Unless a feature of note is identified, test pits are excavated in arbitrary 10cm arbitrary levels. Depth is controlled by a datum set up at a high point near the pit and measured using a line level and metric tape. Characteristics of each level are recorded using separate forms. The base of each level is drawn and photographed. Each type of archaeological material is collected separately, according to level, and given its own provenience number. When required, individual specimens or features are plotted and recorded and then collected separately. The excavation is terminated once a culturally sterile layer is reached and confirmed. Prior to back-filling the pit, wall profiles are drawn and photographs taken.

TERRA PRETA DO MANGABAL ARCHAEOLOGICAL SITE MONTANHA E MANGABAL ITAITUBA - PA - BRAZIL
Auger profiles



KEY

10YR 2/1 Black
10YR 2/2 Very dark brown
10YR 2/3 Brownish black

10YR 3/1 Very dark gray
10YR 3/2 Very dark grayish brown
10YR 3/3 Dark brown

10YR 3/4
10YR 3/6 Dark yellowish brown
10YR 4/4
10YR 4/6

10YR 4/1 Dark gray
7.5YR 4/1

10YR 4/2 Dark grayish brown

10YR 4/3 Brown

10YR 5/4
10YR 5/6 Yellowish brown
10YR 5/8

7.5YR 5/6 Strong brown

Not to scale

Map by Hugo Tavares Lopes

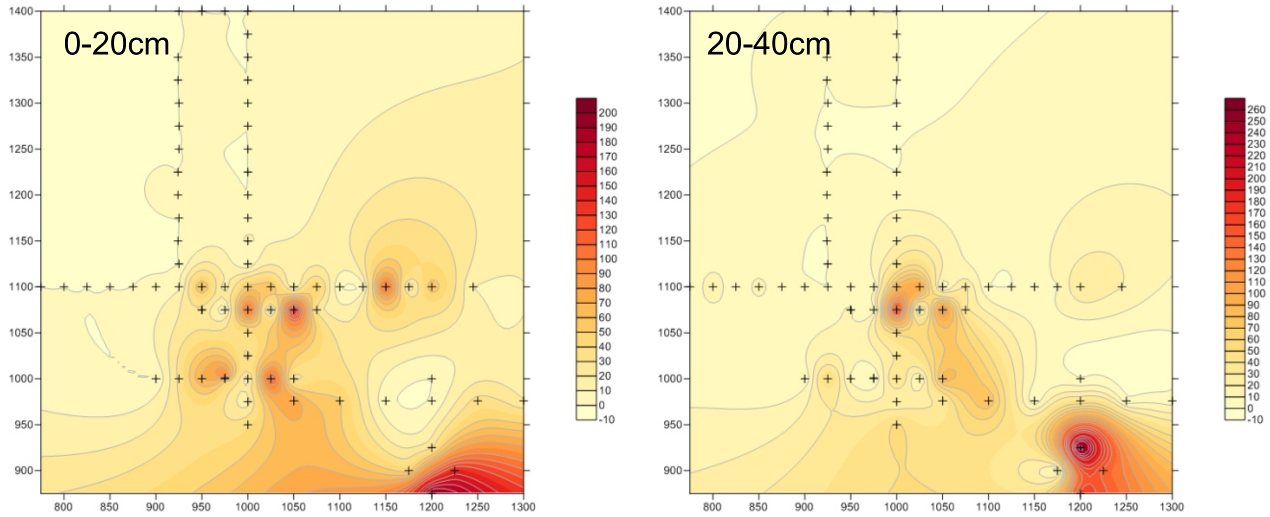
TERRA PRETA DO MANGABAL ARCHAEOLOGICAL SITE

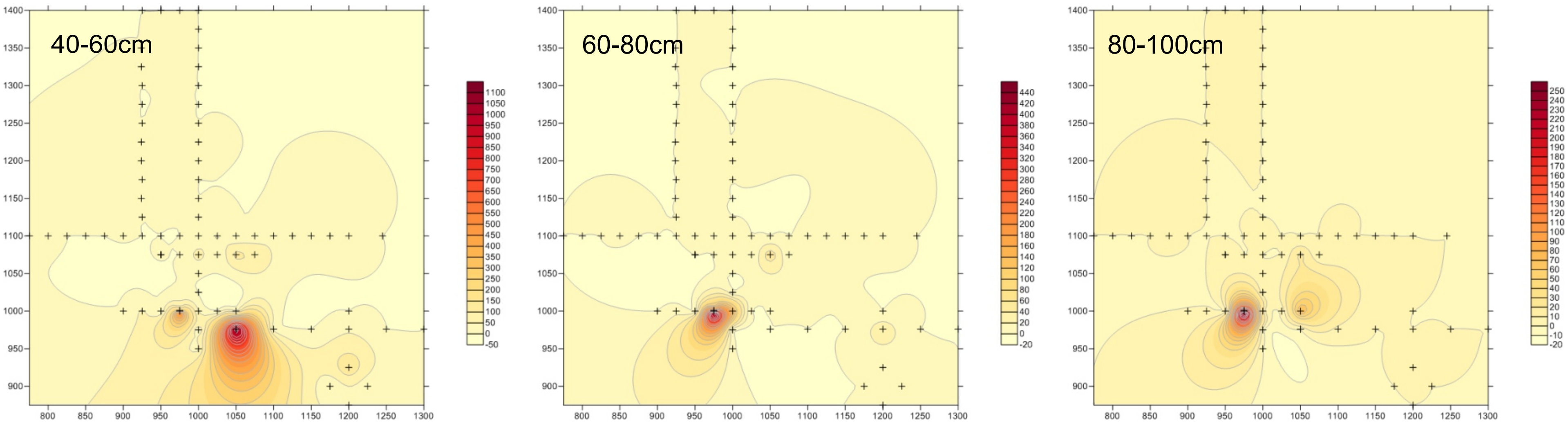
Itaituba - Pará - Brazil

Sherd count per 20cm level along augered points

**Note colour scales differ on different maps*

N





Maps by Hugo Tavares

Appendix 6

INSTITUTE OF ARCHAEOLOGY (UCL)

UPPER TAPAJÓS PROJECT

PROVENIENCE NUBER FORM

Site:_________________________ **Unit/Sector:** _______________ **Resp. Person:**________________ **Date:**___/___/____

PN	Description

UPPER TAPAJÓS PROJECT

Appendix 7

AUGER RECORD FORM

Site: ____________

Test hole n°: ________________ Resp. person:_____________________________ Date:___/____/______

10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

Pottery: ___ Lithic flakes:___ Polished lithics:___ Charcoal: ___ Seed:___ China, glass or porcelain:___ Other:______

Obs.:____

Sondagem n°: __________________Responsável:___________________________ Data:___/____/______

10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

Pottery: ___ Lithic flakes:___ Polished lithics:___ Charcoal: ___ Seed:___ China, glass or porcelain:___ Other:______

Obs.:____

Appendix 8

Sheet nº:___/___

INSTITUTE OF ARCHAEOLOGY (UCL)
UPPER TAPAJÓS PROJECT
EXCAVATION LEVEL FORM

NW **NE**

SW Scale: 1:10 **SE**

Unit: __________________________

Level: __________________________

Layer: __________________________

PN(s): __________________________

Charcoal collection: _______________

Dating sample: __________________

Soil colour: _____________________

Soil texture: ____________________

Responsible person: ______________

Date: _____/_____/_________

Legend:

Lithic flake:	◆	Bone:	○	Diffuse limit between layers:	- - - - - - - - - -
Polished lithic:	0	Seed:	△	Defined limit between layers:	__________
Pottery:	□	China, glass, porcelain:	✙		
Charcoal:	■	Other: ________________			

Observations:

Terra Preta do Mangabal: unit stratigraphy and ceramic sorting overview

In the sections on sorting pottery, quantitative information will be presented by using both weight measurements and sherd counts, because sherd counts alone can be misleading, since different types of vessels have different degrees of brokenness. The disadvantage of solely using weight measurements is that heavy vessels can become over-represented in comparison with light ones (Orton, Tyers & Vince 1993, 169).

UNIT N887/E1200: The 0-10cm level presented few sherds (it covered only about half of the unit's area as we were evening out the level). Unfortunately, most of the ceramics from this level were accidentally mixed with sherds from the following 10-20cm level in the laboratory. The compromised materials from both levels were set aside because of their uncertain provenience. The greatest weight and number of sherds occurred between 20-40cm, after which there was an abrupt decline in ceramic and other archaeological materials. The sherd counts for diagnostic pottery reflect these trends: the greatest number of pieces – particularly rim sherds – appears in the 20-30cm and 30-40cm levels. A very low number of ceramic bases were identified. This may suggest that bases were often rounded and, as broken sherds, difficult to distinguish from vessel body fragments. Material was sieved with a 3mm mesh.

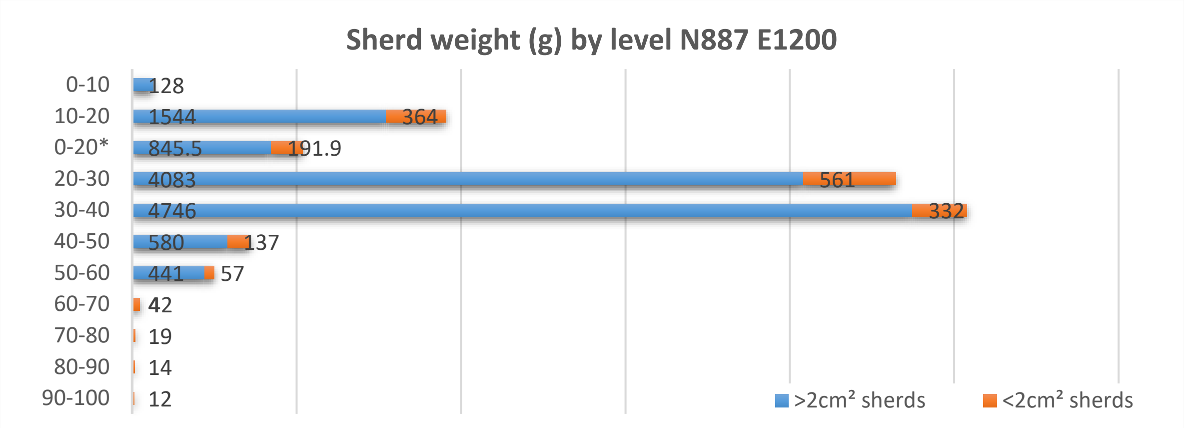
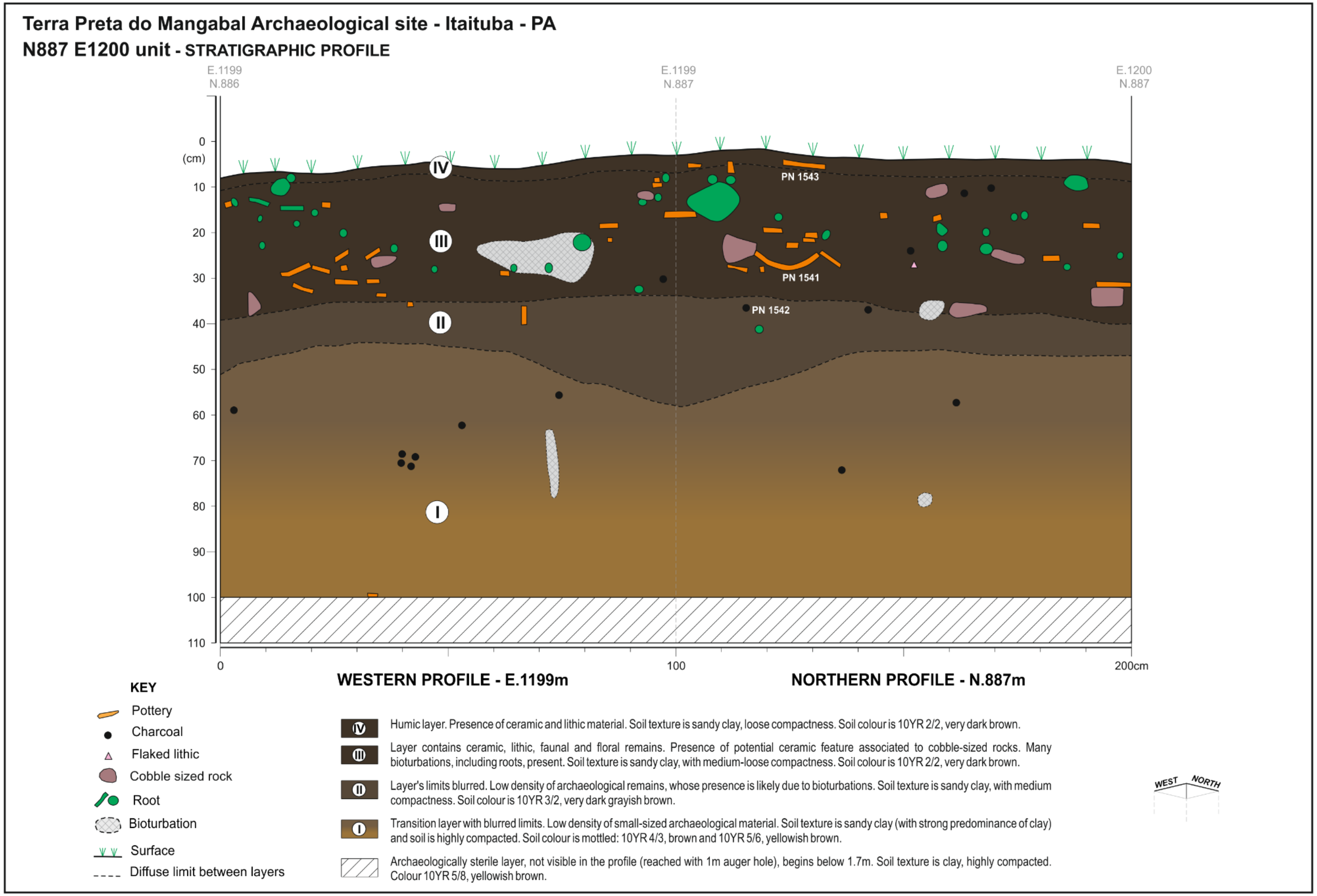


*Chart 1 Sherd weight (g) by level N887/E1200. *The 0-20cm level refers to materials from levels 0-10cm and 10-20cm that were mixed while drying in the laboratory.*

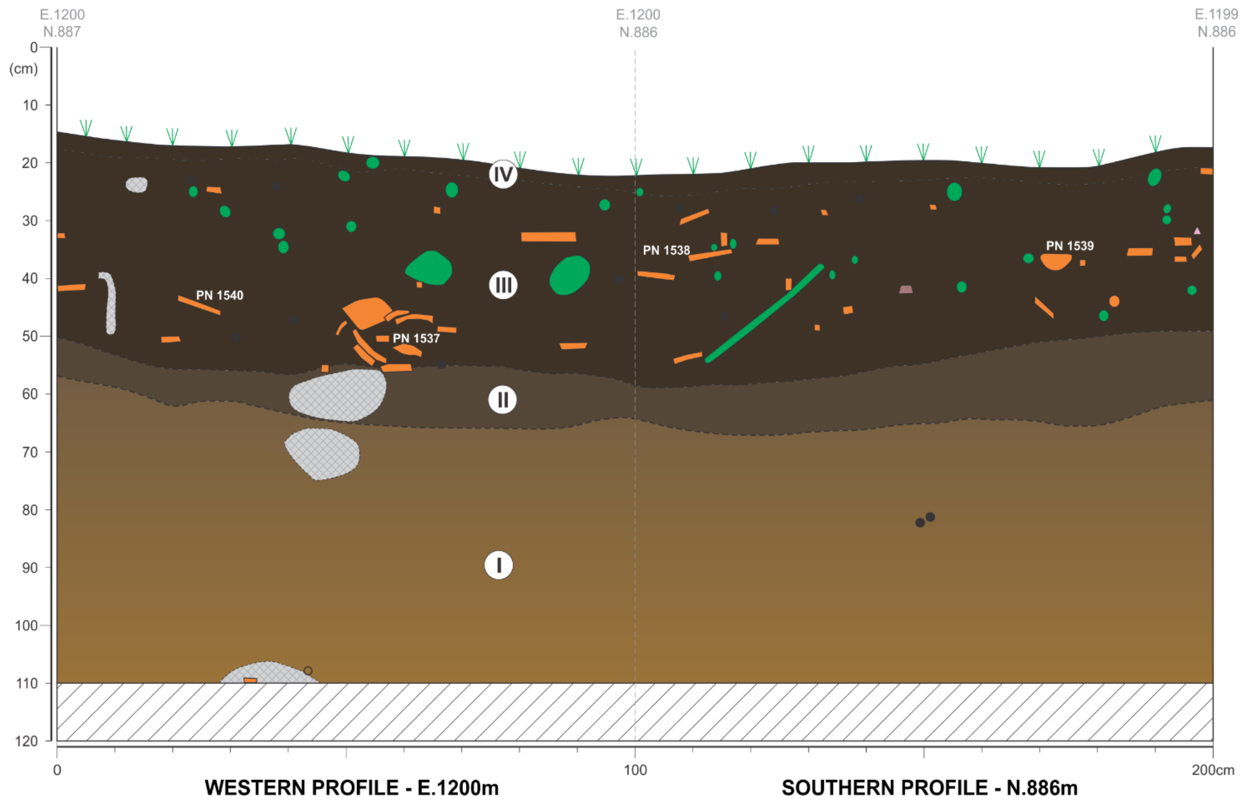
Sherd counts by level N887/E1200						
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Sherds <2cm²***	***Total***
0-10	-	-	8	1	-	9
10-20	-	1	156	16	276	449
0-20*	2	-	87	10	126	223
20-30	-	-	324	28	395	747
30-40	1	2	427	48	314	791
40-50	-	-	65	7	104	176
50-60	-	3	21	5	50	79
60-70	1	-	-	1	38	39
70-80	-	-	-	-	18	18
80-90	-	-	-	-	14	14
90-100	-	-	-	-	17	17

*Table 1 Absolute sherd counts by level N887/E1200. *Materials mixed from two levels.*



Graphic art by Marcos Brito

Terra Preta do Mangabal Archaeological site - Itaituba - PA
N887 E1200 unit - STRATIGRAPHIC PROFILE



KEY

- Pottery
- Charcoal
- Flaked lithic
- Cobble-sized rock
- Root
- Bioturbation
- Surface
- Diffuse limit between layers

IV — Humic layer. Presence of ceramic and lithic material. Soil texture is sandy clay, loose compactness. Soil colour is 10YR 2/2, very dark brown.

III — Layer contains ceramic, lithic, faunal and floral remains. Presence of potential ceramic feature associated to cobble-sized rocks. Many bioturbations, including roots, present. Soil texture is sandy clay, with medium-loose compactness. Soil colour is 10YR 2/2, very dark brown.

II — Layer's limits blurred. Low density of archaeological remains, whose presence is likely due to bioturbations. Soil texture is sandy clay, with medium compactness. Soil colour is 10YR 3/2, very dark grayish brown.

I — Transition layer with blurred limits. Low density of small-sized archaeological material. Soil texture is sandy clay (with strong predominance of clay) and soil is highly compacted. Soil colour is mottled: 10YR 4/3, brown and 10YR 5/6, yellowish brown.

Archaeologically sterile layer, not visible in the profile (reached with 1m auger hole), begins below 1.7m. Soil texture is clay, highly compacted. Colour 10YR 5/8, yellowish brown.

EAST SOUTH

Graphic art by Marcos Brito

UNIT N1000/E1074: Excavated in 2011, we selected the area in order to obtain a sample with a smaller likelihood of being affected by stratigraphic inversions in comparison to the area of the mounded deposit, which was located in 2011 but only excavated in 2014. The peak in weight of pottery occurs in the 30-40cm level. This is smaller than the peaks in pottery weight in the N887/E1200 unit. This could suggest this area was occupied for less time than the southeast area of the site, that it was (or became) a passage area that underwent clearing/sweeping more often, or that it was occupied later. From the depth of the test pit and characteristics of its deeper levels – where the AB horizon extended for further than in the N887/E1200 unit, I would propose that N1074/E1000 was not occupied later than N887/E1200, but that it may have been cleared more often. This will have to be ascertained through the analysis of stratigraphic samples from the profiles. Charcoal from this unit (TPM-114), located at x:52cm, y:39cm and z:35cm, yielded a conventional radiocarbon age of 1270+/-30BP. This is as early as the earliest charcoal dates obtained for the mounded deposit. The greatest weight of sherds smaller than $2cm^2$ is concentrated in the 50-60cm level. This is either an indication of breakage rates of the ceramic material here, of post-depositional processes, such as trampling, or of the easier movement of smaller material by bioturbations. Material was sieved using a 5mm mesh.

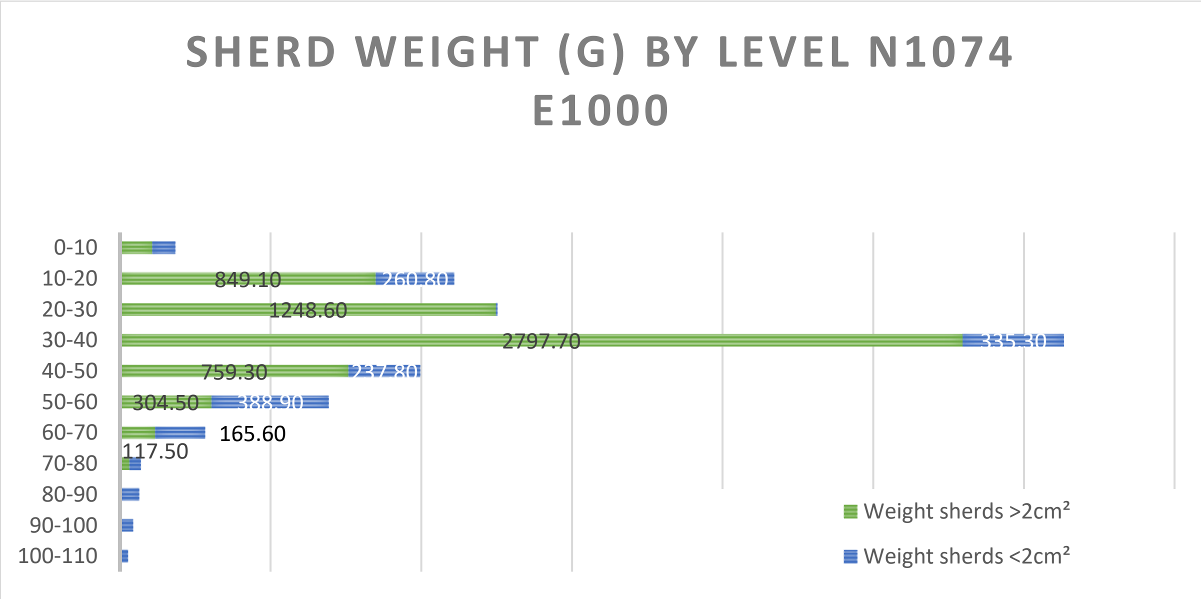


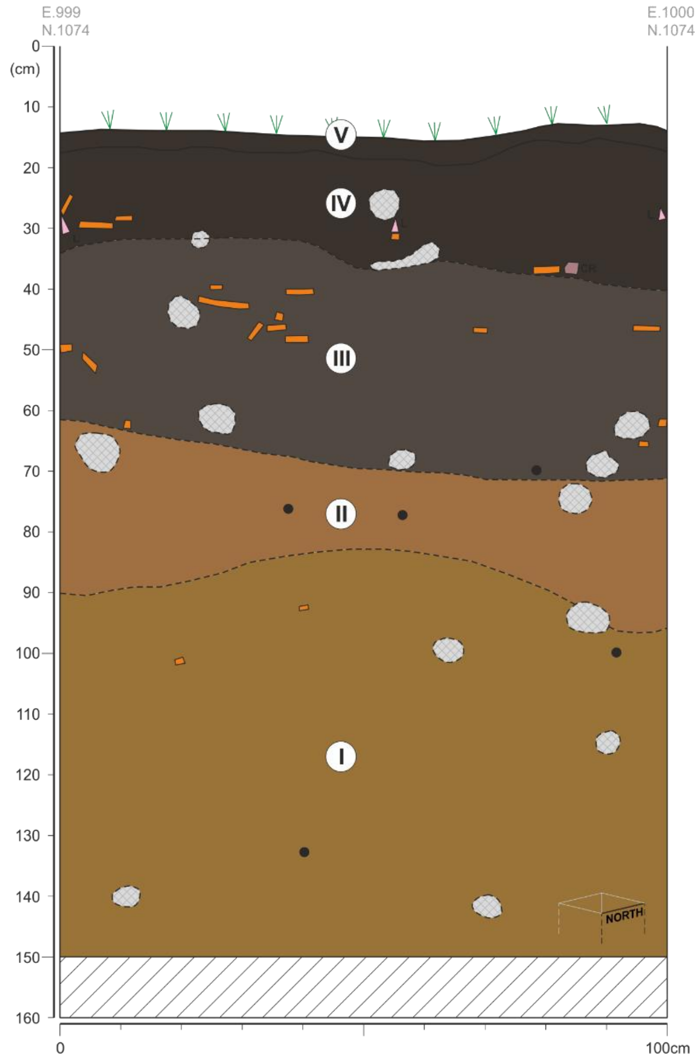
Chart 2 Sherd weight (g) by level N1074/E1000.

Sherd counts by level N1074/E1000						
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Sherds <2cm²***	***Total***
0-10	1	-	12	1	85	98
10-20	5	1	175	14	355	545
20-30	-	1	83	8	2	94
30-40	-	6	345	45	337	727
40-50	-	-	49	19	97	165
50-60	-	-	28	3	218	249
60-70	-	-	34	3	91	128
70-80	-	-	7	1	31	39
80-90	-	-	-	-	39	39
90-100	-	-	-	-	38	38
100-110	-	-	-	-	30	30

Table 2 Sherd counts by level N1074/E1000

Terra Preta do Mangabal archaeological site - Itaituba - Pará - Brazil

UNIT E.1000 / N.1074 - STRATIGRAPHIC PROFILE



NORTHERN PROFILE - N.1074m

KEY

- Pottery
- Charcoal
- Lithic flake
- Cobble-sized rock
- Bioturbation
- Surface
- Clearly defined limit between layers
- Diffuse limit between layers

V Humic layer. Soil colour 10YR 2/1 Black. Roots, rootlets and biotic activity. Pottery present. Soil of clayey-sandy texture.

IV Soil colour 2/1 Black. Layer impacted by recent agricultural activities. High density of archaeological remains (particularly from 20-30cm depth), although these are smaller than those in Layer III. Silex, quartz and arenite lithics (chips and flakes). "Loose" soil, of clayey-sandy texture. Presence of bioturbations, roots and rootlets.

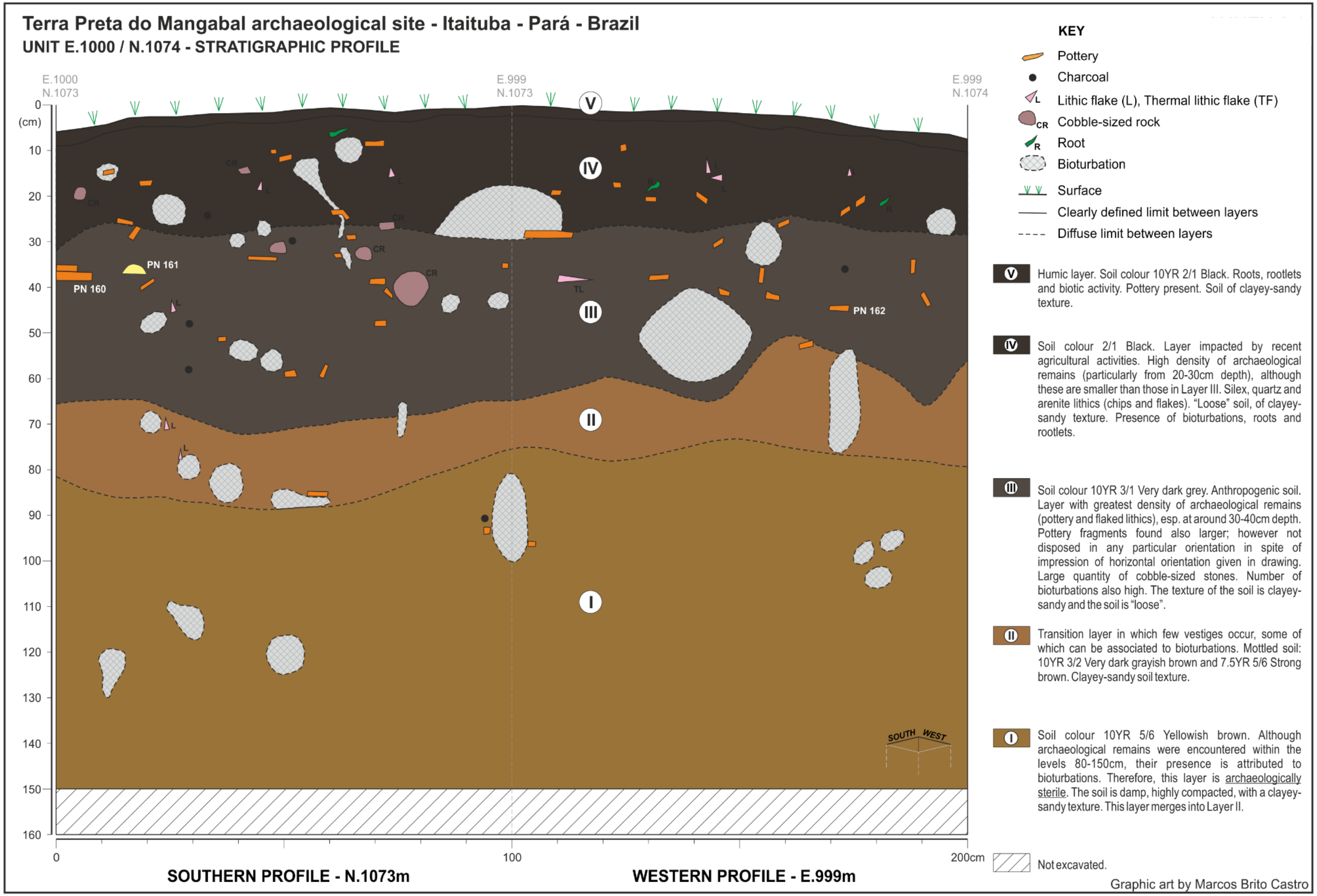
III Soil colour 10YR 3/1 Very dark grey. Anthropogenic soil. Layer with greatest density of archaeological remains (pottery and flaked lithics), esp. at around 30-40cm depth. Pottery fragments found also larger; however not disposed in any particular orientation in spite of impression of horizontal orientation given in drawing. Large quantity of cobble-sized stones. Number of bioturbations also high. The texture of the soil is clayey-sandy and the soil is "loose".

II Transition layer in which few vestiges occur, some of which can be associated to bioturbations. Mottled soil: 10YR 3/2 Very dark grayish brown and 7.5YR 5/6 Strong brown. Clayey-sandy soil texture.

I Soil colour 10YR 5/6 Yellowish brown. Although archaeological remains were encountered within the levels 80-150cm, their presence is attributed to bioturbations. Therefore, this layer is archaeologically sterile. The soil is damp, highly compacted, with a clayey-sandy texture. This layer merges into Layer II

Not excavated.

Graphic Art by Marcos Brito Castro


Terra Preta do Mangabal archaeological site - Itaituba - Pará - Brazil
UNIT E.1000 / N.1074 - STRATIGRAPHIC PROFILE
E.1000 N.1073
E.999 N.1073
E.999 N.1074
(cm)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
V
IV
III
II
I
PN 160
PN 161
PN 162
CR
L
TL
R
SOUTH
WEST
0
100
200cm
SOUTHERN PROFILE - N.1073m
WESTERN PROFILE - E.999m
KEY
Pottery
Charcoal
Lithic flake (L), Thermal lithic flake (TF)
Cobble-sized rock
Root
Bioturbation
Surface
Clearly defined limit between layers
Diffuse limit between layers
V Humic layer. Soil colour 10YR 2/1 Black. Roots, rootlets and biotic activity. Pottery present. Soil of clayey-sandy texture.
IV Soil colour 2/1 Black. Layer impacted by recent agricultural activities. High density of archaeological remains (particularly from 20-30cm depth), although these are smaller than those in Layer III. Silex, quartz and arenite lithics (chips and flakes). "Loose" soil, of clayey-sandy texture. Presence of bioturbations, roots and rootlets.
III Soil colour 10YR 3/1 Very dark grey. Anthropogenic soil. Layer with greatest density of archaeological remains (pottery and flaked lithics), esp. at around 30-40cm depth. Pottery fragments found also larger; however not disposed in any particular orientation in spite of impression of horizontal orientation given in drawing. Large quantity of cobble-sized stones. Number of bioturbations also high. The texture of the soil is clayey-sandy and the soil is "loose".
II Transition layer in which few vestiges occur, some of which can be associated to bioturbations. Mottled soil: 10YR 3/2 Very dark grayish brown and 7.5YR 5/6 Strong brown. Clayey-sandy soil texture.
I Soil colour 10YR 5/6 Yellowish brown. Although archaeological remains were encountered within the levels 80-150cm, their presence is attributed to bioturbations. Therefore, this layer is archaeologically sterile. The soil is damp, highly compacted, with a clayey-sandy texture. This layer merges into Layer II.
Not excavated.
Graphic art by Marcos Brito Castro

UNITS 998/E974.5-973.5: Here a 2x1m test pit was excavated. Although N998/E974.5 yielded a greater amount of pottery in total, some fluctuation occurred throughout the levels excavated. This results from the landform itself – N998/E974.5 is at a slightly greater altitude than N998/E973.5, meaning all the archaeological layers extended deeper in N998/E973.5. This difference may also point to different actions and activities related to this space over time, as well as the occurrence of natural post depositional processes.

Among the lowermost levels (130-140cm, 140-150cm, 150-160cm and 160-170cm), a greater amount of material was retrieved from N998/E973.5; much of it is associated to bioturbations. From 120-130cm upwards to 100-110cm, N998/E974.5 yielded a greater amount of ceramics. Towards the south of these two units, these levels lie between the transition from layer II to layer III. N998/E973.5 briefly contains more pottery larger than $2cm^2$ than N998/E974.5, between the 90-100cm level; this may in part be explained by the presence of a ceramic concentration situated in the north western quadrant of N998/E973.5.

N998/E973.5 consistently yields a greater amount of sherds smaller than $2cm^2$ in the 80-90cm, 70-80cm and 60-70cm levels, while adjacent N998/E974.5 contained greater amounts of larger material. These levels comprise the transition from layer III to layer IV. Both levels witness an abrupt decline in materials in their 70-80cm levels. This might suggest momentary relocation of the activities that generated the ceramic debris disposed of here.

The greatest peak in amounts of ceramic material occurs within the N998/E974.5 unit during the 50-60cm level, where we recovered over nine kilograms of potsherds related to a concentration of pottery fragments including a considerable number of griddle sherds. Their horizontal placement, the presence of granite rocks implies *in situ* deposition rather than discard. In addition, particularly in the unit's NE quadrant, the soil presented looser consistency, which may be related to the presence of a large bioturbation. This bioturbation can have helped downward migration of sherds from levels above, adding to the concentration of material. The boost in pottery was accompanied by a similar increase in lithics, rocks (some of which displayed thermal alteration), charcoal and seeds. Among other diagnostic potsherds in the 50-60cm level of the N998/E974.5 unit is what seems to be a figurine fragment. The concentration of material here and its disposition again suggest a change in the use of this area, possibly indicating the presence of an occupational floor. The concentration is close to the limits we established between layers IV and III.

The occurrence and distribution of ceramic bases is infrequent; this may be due to smaller base fragments being mistaken for vessel body sherds, which could have happened particularly if they were rounded. N998/E974.5 included 2973 body sherds while N998/E973.5 included 2054 body sherds in total. N998/E974.5 contained 540 rims while N998/E973.5 yielded 423 rims.

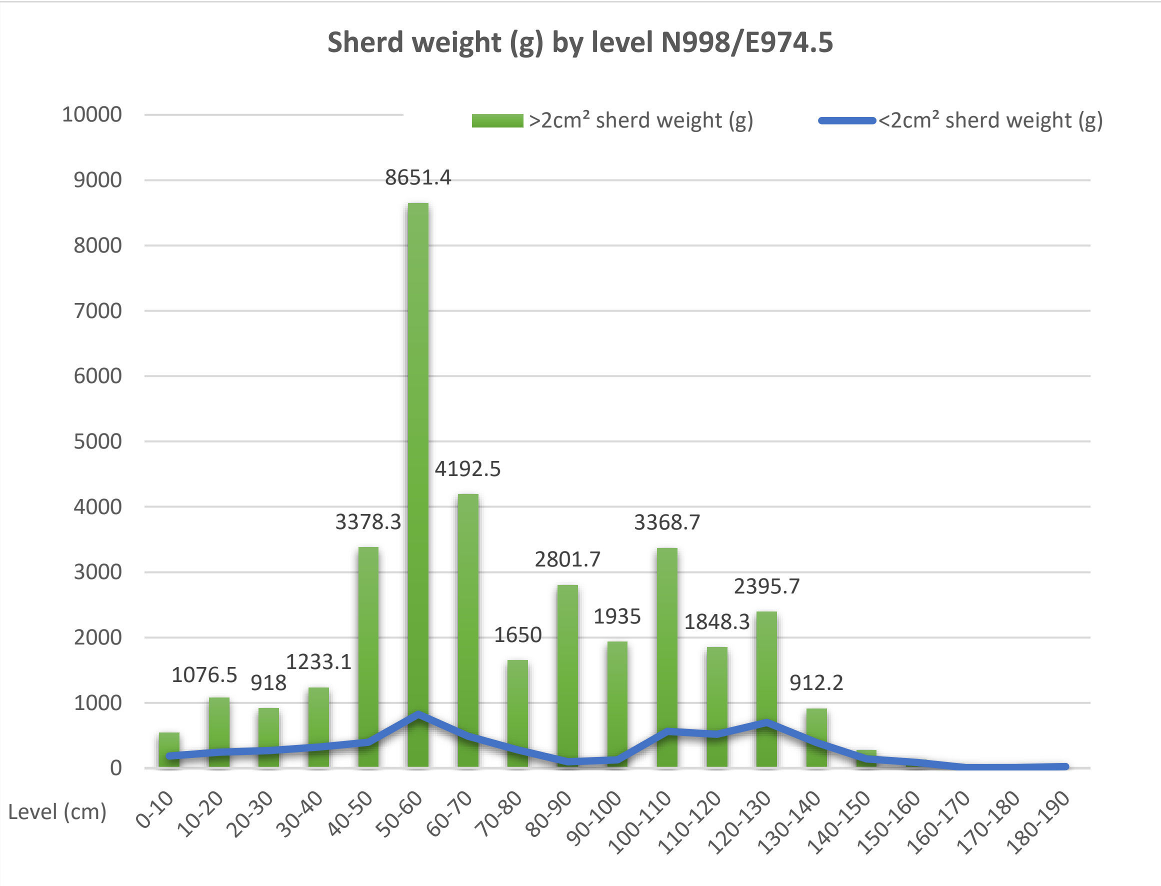


Chart 3 Ceramic sherd weight (g) by level N998/E973.5.

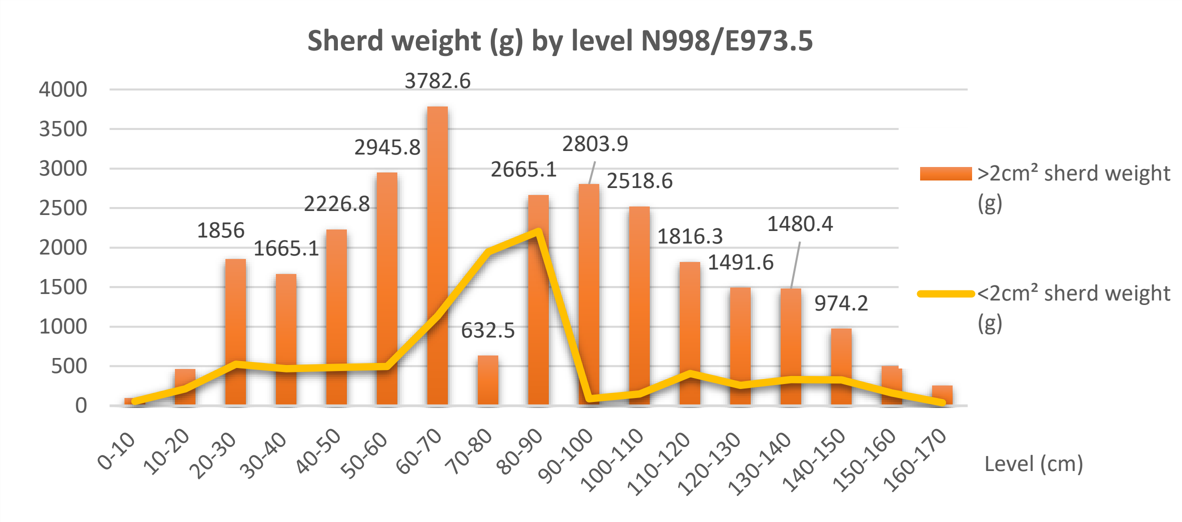


Chart 4 Ceramic sherd weight for units excavated in the mounded deposit at Mangabal. Chart 6 Sherd weight (g) by level N998/E974.5.

Sherd count by level N998/E974.5

Level (cm)	Fire dog	Base	Body	Rim	Appendage	< 2 cm² sherds	Total
0-10	3	-	104	13	-	156	273
10-20	3	-	164	25	-	171	360
20-30	1	5	116	31	1	239	392
30-40	-	-	146	23	-	172	341
40-50	2	-	227	52	-	159	438
50-60	-	3	584	106	3	456	1152
60-70	2	2	321	82	-	273	678
70-80	2	2	156	43	-	133	334
80-90	2	-	219	48	-	51	318
90-100	-	2	151	20	-	61	234
100-110	-	3	218	34	1	242	498
110-120	1	3	245	23	-	221	492
120-130	3	2	118	18	-	282	420
130-140	2	-	124	9	-	124	257
140-150	-	-	46	9	-	99	154
150-160	-	-	23	4	-	80	107
160-170	-	-	11	-	-	9	20
170-180	-	-	-	-	-	12	12
180-190	2	-	-	-	-	31	31

Table 3 Sherd counts by level N998/E974.5

Sherd count by level N998/E973.5							
Level (cm)	***Fire dog***	***Base***	***Body***	***Rims***	***Appendage***	***<2 cm² sherds***	***Total***
0-10	1	-	14	5	-	43	62
10-20	-	1	50	9	-	152	212
20-30	7	2	125	18	-	314	459
30-40	5	-	193	26	-	356	575
40-50	8		185	23		437	645
50-60	1	-	112	26	-	277	415
60-70	4		149	39	1	594	783
70-80	1	3	95	26	1	268	393
80-90	1	3	174	58		396	631
90-100	-	3	177	32	1	56	269
100-110	4	2	94	31		76	203
110-120	-	1	169	36	-	198	404
120-130	-	3	144	31	2	98	278
130-140	1	-	137	29	1	141	308
140-150	8		130	20		154	304
150-160	2	-	81	11	-	99	191
160-170	2	-	25	3	1	30	59

Table 4 Sherd counts by level N998/E973.5

Terra Preta do Mangabal Archaeologiacal site - Itaituba - PA

N998 E973.5 & 974.5 units - STRATIGRAPHIC PROFILE

KEY

- Pottery
- Charcoal
- Flaked lithic
- Fire rest
- Bone (fauna)
- Cobble-sized rock
- Root
- Bioturbation
- Surface
- Diffuse limit between layers

VI Humic layer. The ceramic material is of smaller size in comparison to inferior layers. High quantity of lithic fragments (especially shatters). High density of roots and rootlets. Some bioturbations. Soil texture is sandy clay, loose compactness. Soil colour is 10YR 2/2 very dark brown.

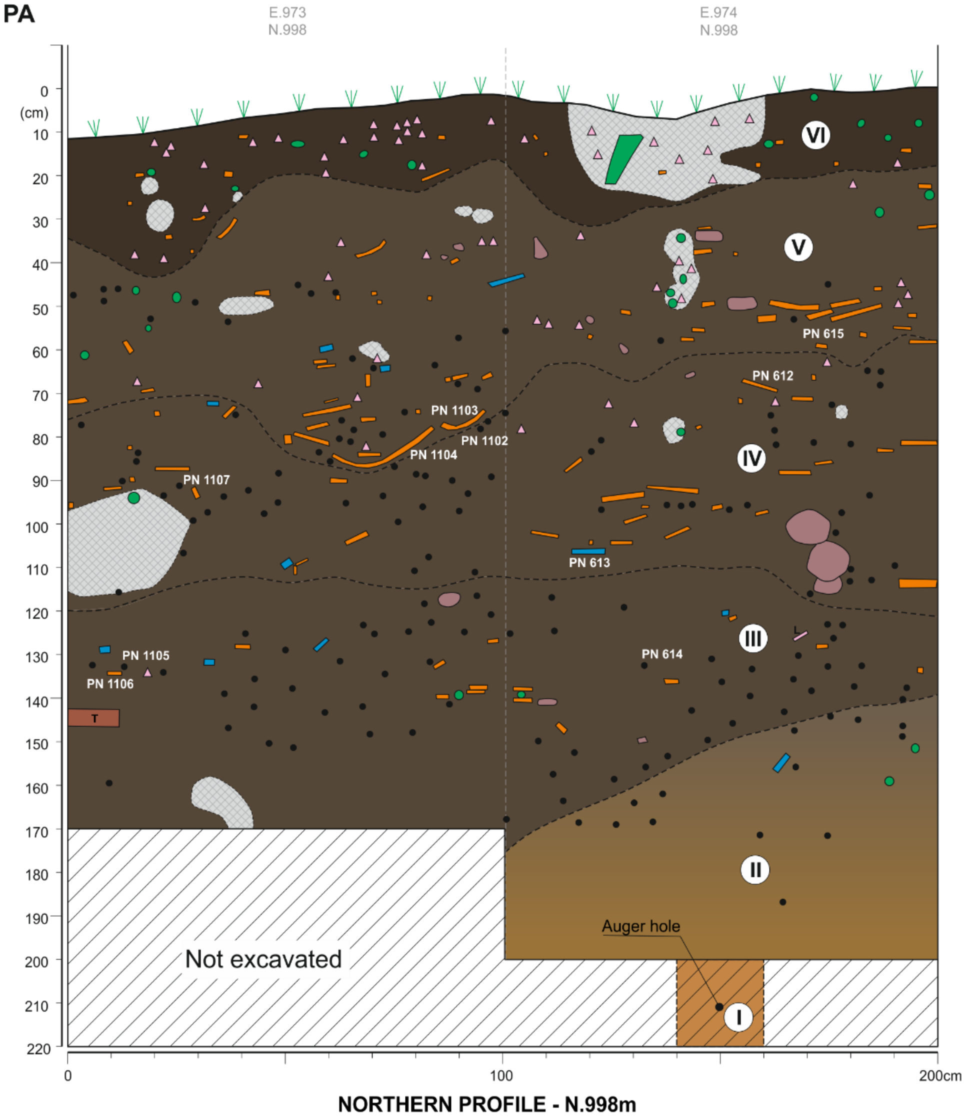
V Layer's limits blurred, particularly in relation to S profile. The layer's lower limits are more clearly perceptible in N and W profile, where they are defined by pottery concentrations that may indicate occupational 'floors'. Soil characteristics (texture, colour and compactness) are similar to those described for Layer IV.

IV Layer's limits blurred. High density of archaeological material, including ceramic, lithic, faunal and floral remains. Presence of potential feature (large, articulated vessel fragments) in N profile of N998 E973.5. Bioturbations present. Soil texture is sandy clay, with loose compactness (almost powdery). Soil colour is 10YR 3/2, very dark grayish brown.

III Layer's limits blurred. Large, diagnostic pottery sherds present. Faunal remains, carbonised seeds, wood charcoal and lithic fragments (flakes, shatters, thermal flakes and granite blocks) also. Possible occupational 'floor' near bottom limits of the layer (identified as Feature 1 in NW quadrant of N998 E974.5). Bioturbations and clear signs of biotic activity. Soil texture is sandy clay, with medium compactness. Soil colour is 10YR 3/2, very dark grayish brown.

II Transition layer. Low density of lithic and ceramic fragments, all of which are small and which may have originated in Layer III. High quantity of charcoal. This layer was still present during auguring, reaching 2.5m depth. Soil texture is sandy clay (with strong predominance of clay) and soil is highly compacted. Soil colour is mottled: 10YR 4/2 dark grayish brown and 10YR 5/6 yellowish brown.

I Archaeologically sterile layer, not visible in the profile. Reached with 1m auger hole carried out in N998 E974.5 unit – begins at approximately 2.5m depth. Soil texture is clay (with slight element of sand), highly compacted. Colour 7.5YR 6/8 reddish brown.



NORTH

Graphic art by Marcos Brito

Terra Preta do Mangabal Archaeologiacal site - Itaituba - PA
N998 E974.5 unit - STRATIGRAPHIC PROFILE

KEY
- Pottery
- Charcoal
- Flaked lithic
- Fire rest
- Bone (fauna)
- Cobble-sized rock
- Root
- Bioturbation
- Surface
- Diffuse limit between layers

VI Humic layer. The ceramic material is of smaller size in comparison to inferior layers. High quantity of lithic fragments (especially shatters). High density of roots and rootlets. Some bioturbations. Soil texture is sandy clay, loose compactness. Soil colour is 10YR 2/2 very dark brown.

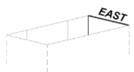
V Layer's limits blurred, particularly in relation to S profile. The layer's lower limits are more clearly perceptible in N and W profile, where they are defined by pottery concentrations that may indicate occupational 'floors'. Soil characteristics (texture, colour and compactness) are similar to those described for Layer IV.

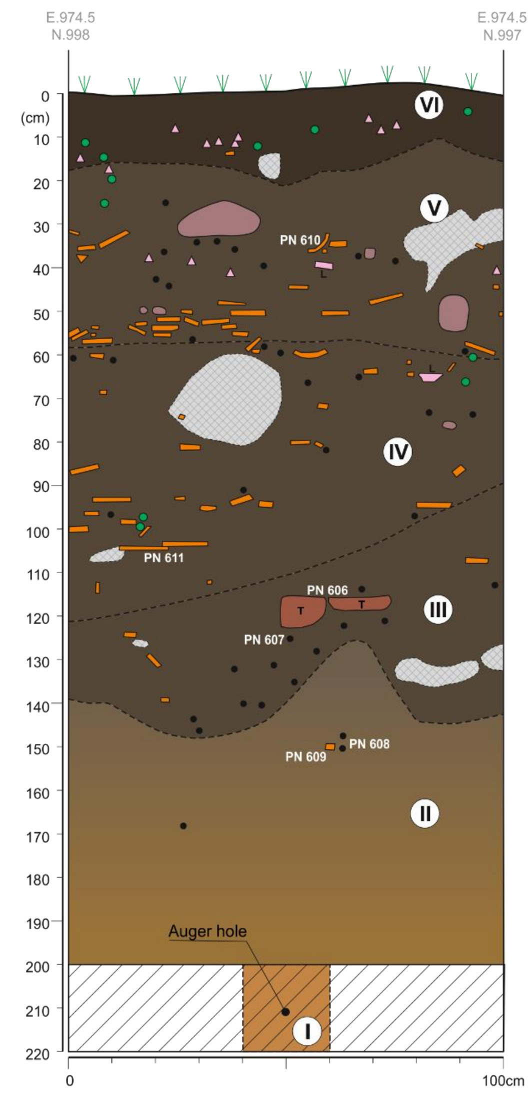
IV Layer's limits blurred. High density of archaeological material, including ceramic, lithic, faunal and floral remains. Presence of potential feature (large, articulated vessel fragments) in N profile of N998 E973.5. Bioturbations present. Soil texture is sandy clay, with loose compactness (almost powdery). Soil colour is 10YR 3/2, very dark grayish brown.

III Layer's limits blurred. Large, diagnostic pottery sherds present. Faunal remains, carbonised seeds, wood charcoal and lithic fragments (flakes, shatters, thermal flakes and granite blocks) also. Possible occupational 'floor' near bottom limits of the layer (identified as Feature 1 in NW quadrant of N998 E974.5). Bioturbations and clear signs of biotic activity. Soil texture is sandy clay, with medium compactness. Soil colour is 10YR 3/2, very dark grayish brown.

II Transition layer. Low density of lithic and ceramic fragments, all of which are small and which may have originated in Layer III. High quantity of charcoal. This layer was still present during auguring, reaching 2.5m depth. Soil texture is sandy clay (with strong predominance of clay) and soil is highly compacted. Soil colour is mottled: 10YR 4/2 dark grayish brown and 10YR 5/6 yellowish brown.

I Archaeologically sterile layer, not visible in the profile. Reached with 1m auger hole carried out in N998 E974.5 unit – begins at approximately 2.5m depth. Soil texture is clay (with slight element of sand), highly compacted. Colour 7.5YR 6/8 reddish brown.





EASTERN PROFILE - E.974.5m

Graphic art by Marcos Brito

Terra Preta do Mangabal Archaeologiacal site - Itaituba - PA
N998 E973.5 & 974.5 units - STRATIGRAPHIC PROFILE

KEY

- Pottery
- Charcoal
- Flaked lithic
- Fire rest
- Bone (fauna)
- Cobble-sized rock
- Root
- Bioturbation
- Surface
- Diffuse limit between layers

VI Humic layer. The ceramic material is of smaller size in comparison to inferior layers. High quantity of lithic fragments (especially shatters). High density of roots and rootlets. Some bioturbations. Soil texture is sandy clay, loose compactness. Soil colour is 10YR 2/2 very dark brown.

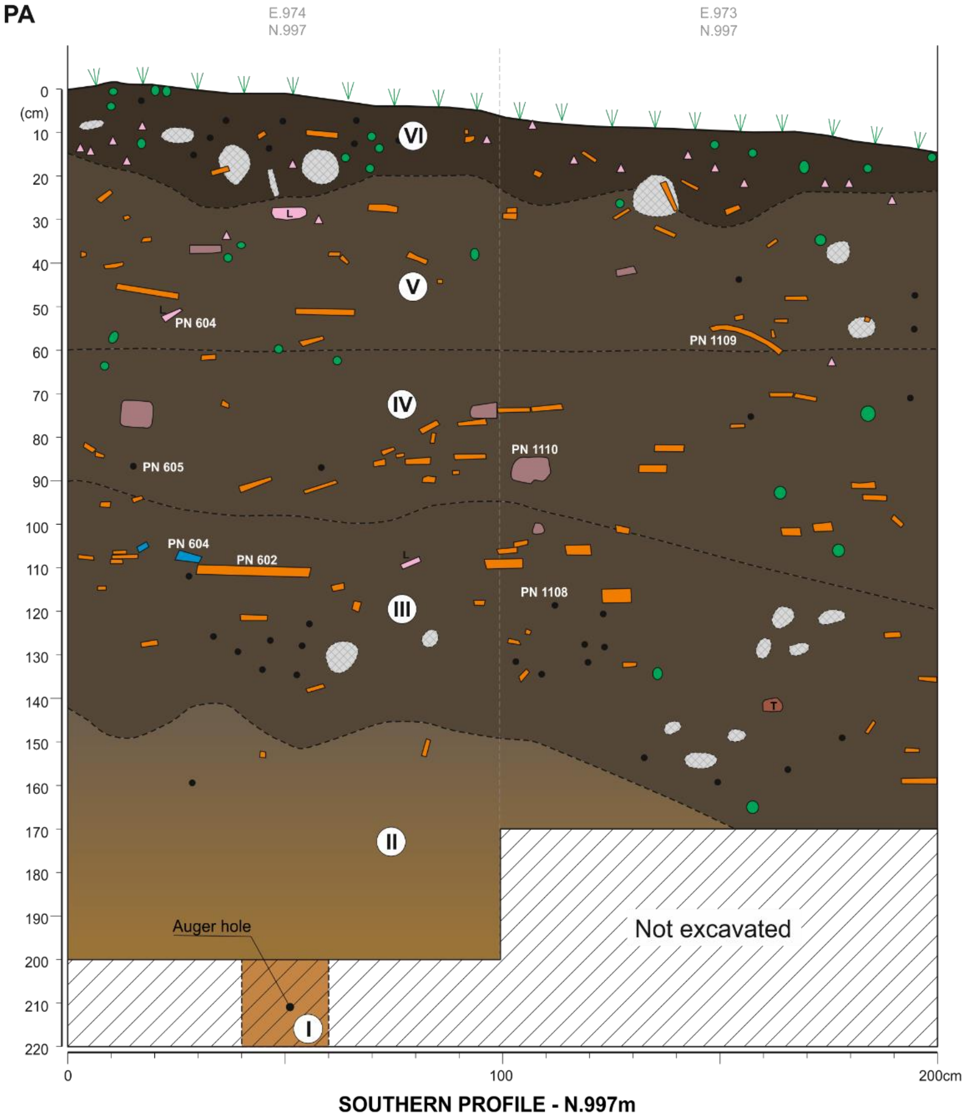
V Layer's limits blurred, particularly in relation to S profile. The layer's lower limits are more clearly perceptible in N and W profile, where they are defined by pottery concentrations that may indicate occupational 'floors'. Soil characteristics (texture, colour and compactness) are similar to those described for Layer IV.

IV Layer's limits blurred. High density of archaeological material, including ceramic, lithic, faunal and floral remains. Presence of potential feature (large, articulated vessel fragments) in N profile of N998 E973.5. Bioturbations present. Soil texture is sandy clay, with loose compactness (almost powdery). Soil colour is 10YR 3/2, very dark grayish brown.

III Layer's limits blurred. Large, diagnostic pottery sherds present. Faunal remains, carbonised seeds, wood charcoal and lithic fragments (flakes, shatters, thermal flakes and granite blocks) also. Possible occupational 'floor' near bottom limits of the layer (identified as Feature 1 in NW quadrant of N998 E974.5). Bioturbations and clear signs of biotic activity. Soil texture is sandy clay, with medium compactness. Soil colour is 10YR 3/2, very dark grayish brown.

II Transition layer. Low density of lithic and ceramic fragments, all of which are small and which may have originated in Layer III. High quantity of charcoal. This layer was still present during auguring, reaching 2.5m depth. Soil texture is sandy clay (with strong predominance of clay) and soil is highly compacted. Soil colour is mottled: 10YR 4/2 dark grayish brown and 10YR 5/6 yellowish brown.

I Archaeologically sterile layer, not visible in the profile. Reached with 1m auger hole carried out in N998 E974.5 unit – begins at approximately 2.5m depth. Soil texture is clay (with slight element of sand), highly compacted. Colour 7.5YR 6/8 reddish brown.



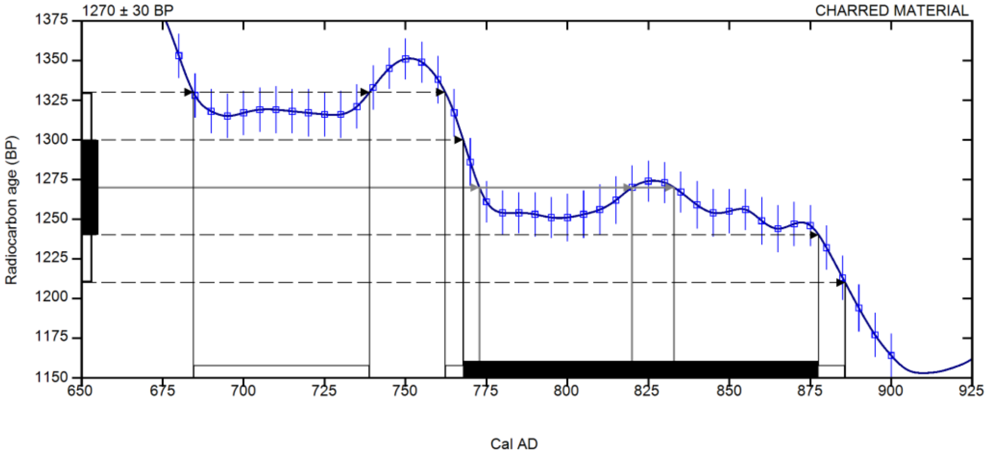
SUL

Graphic art by Marcos Brito

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -24 o/oo : lab. mult = 1)

Laboratory number	**Beta-400865**
Conventional radiocarbon age	**1270 ± 30 BP**
2 Sigma calibrated result 95% probability	**Cal AD 685 to 740 (Cal BP 1265 to 1210)** **Cal AD 760 to 885 (Cal BP 1190 to 1065)**
Intercept of radiocarbon age with calibration curve	Cal AD 775 (Cal BP 1175) Cal AD 820 (Cal BP 1130) Cal AD 835 (Cal BP 1115)
1 Sigma calibrated results 68% probability	Cal AD 770 to 880 (Cal BP 1180 to 1070)



Database used

SHCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to SHCAL13 database

Hogg AG, Hua Q, Blackwell PG, Niu M, Buck CE, Guilderson TP, Heaton TJ, Palmer JG, Reimer PJ, Reimer RW, Turney CSM, Zimmerman SRH. 2013. SHCal13 Southern Hemisphere calibration, 0–50,000 years cal BP. Radiocarbon 55(4):1889–1903.

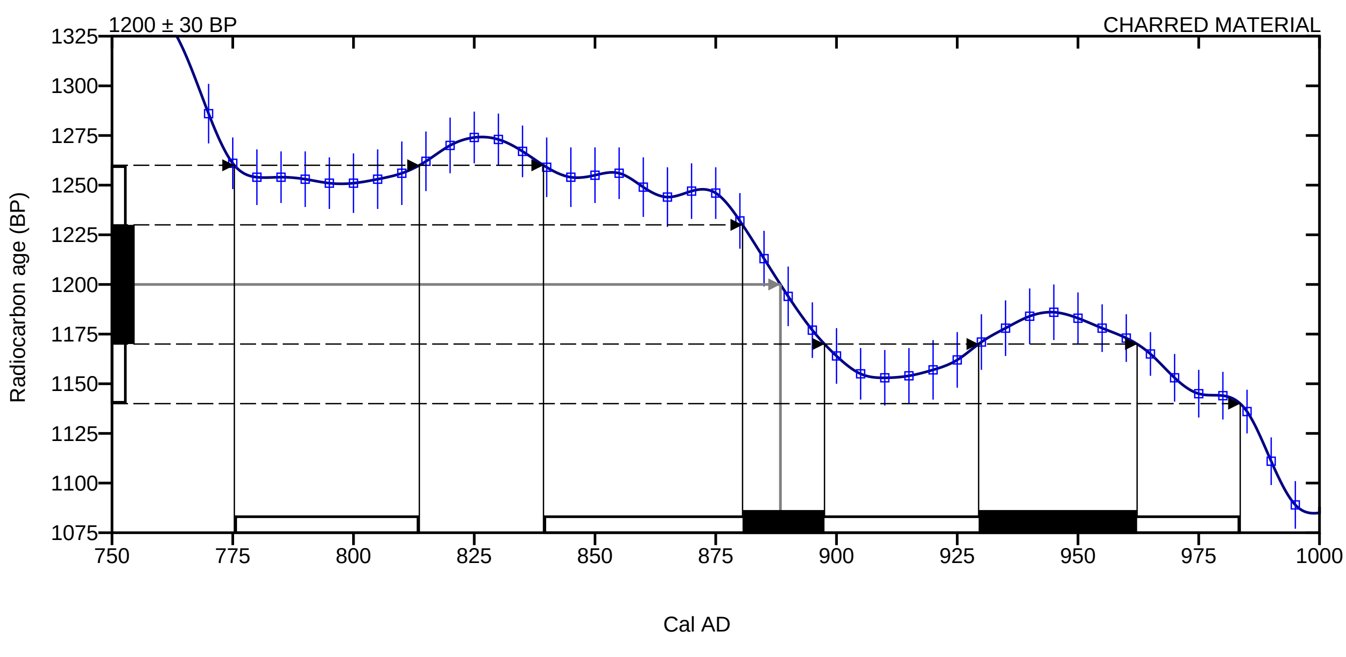
Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -26.8 o/oo : lab. mult = 1)

Laboratory number	**Beta-432570 : PN513**
Conventional radiocarbon age	**1200 ± 30 BP**
Calibrated Result (95% Probability)	**Cal AD 775 to 815 (Cal BP 1175 to 1135)** **Cal AD 840 to 985 (Cal BP 1110 to 965)**
Intercept of radiocarbon age with calibration curve	Cal AD 890 (Cal BP 1060)
Calibrated Result (68% Probability)	Cal AD 880 to 900 (Cal BP 1070 to 1050) Cal AD 930 to 960 (Cal BP 1020 to 990)



Database used

SHCAL13

References

Mathematics used for calibration scenario

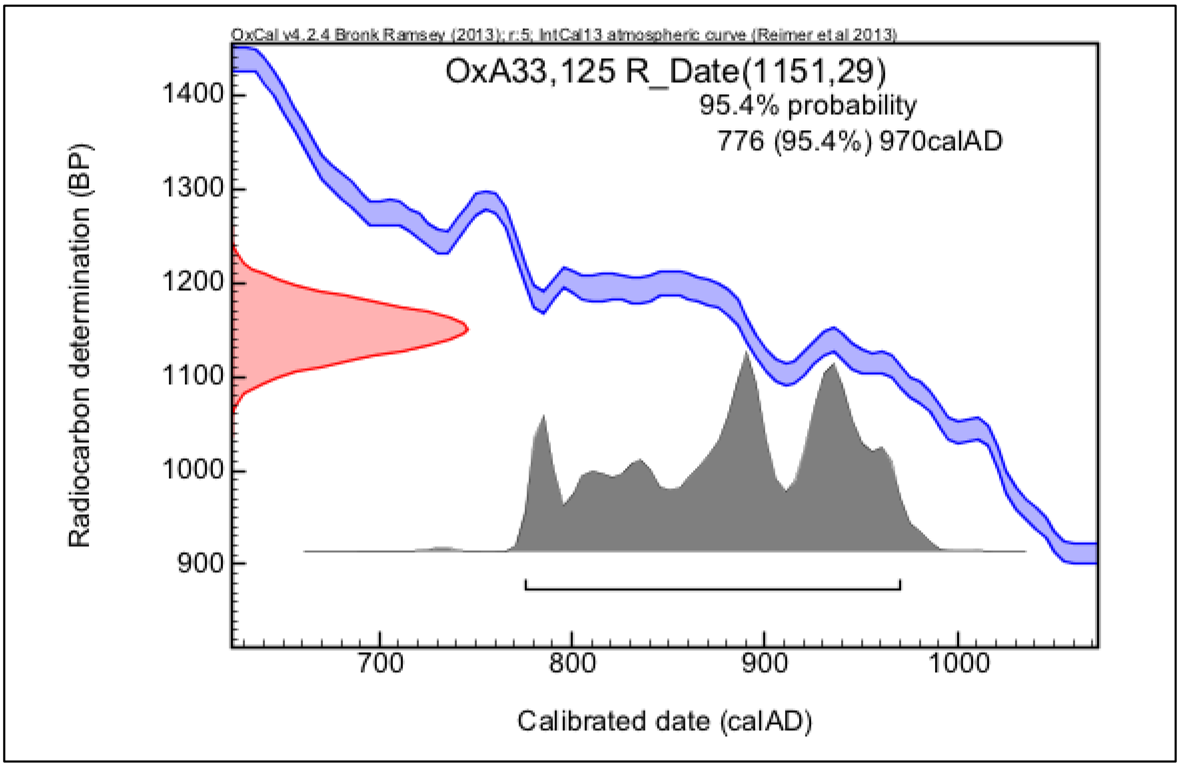
A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

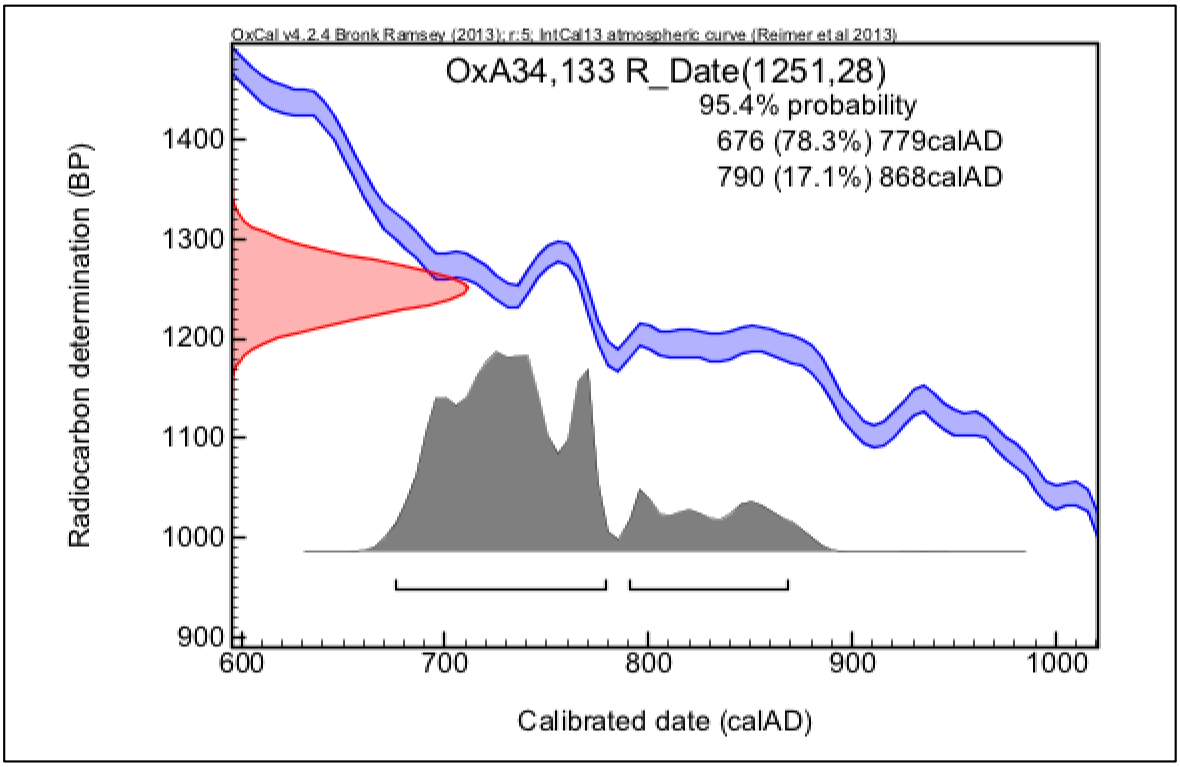
References to SHCAL13 database

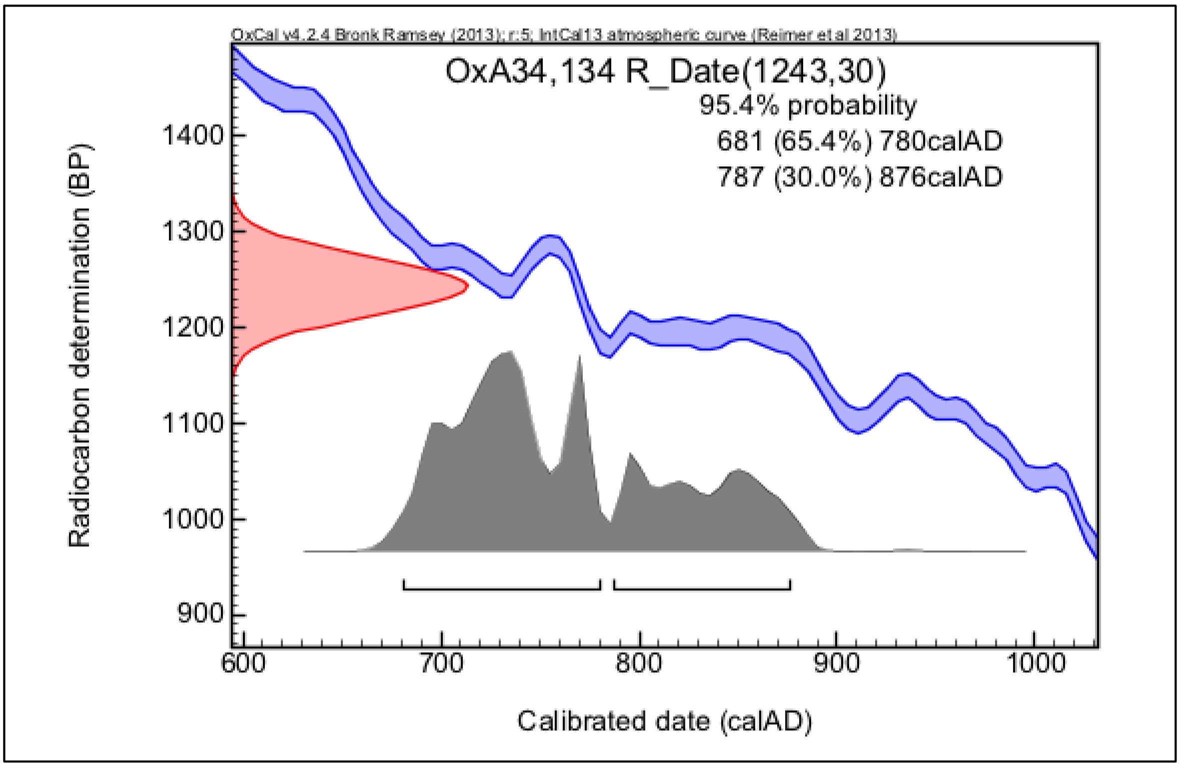
Hogg AG, Hua Q, Blackwell PG, Niu M, Buck CE, Guilderson TP, Heaton TJ, Palmer JG, Reimer PJ, Reimer RW, Turney CSM, Zimmerman SRH. 2013. SHCal13 Southern Hemisphere calibration, 0–50,000 years cal BP. Radiocarbon 55(4):1889–1903.

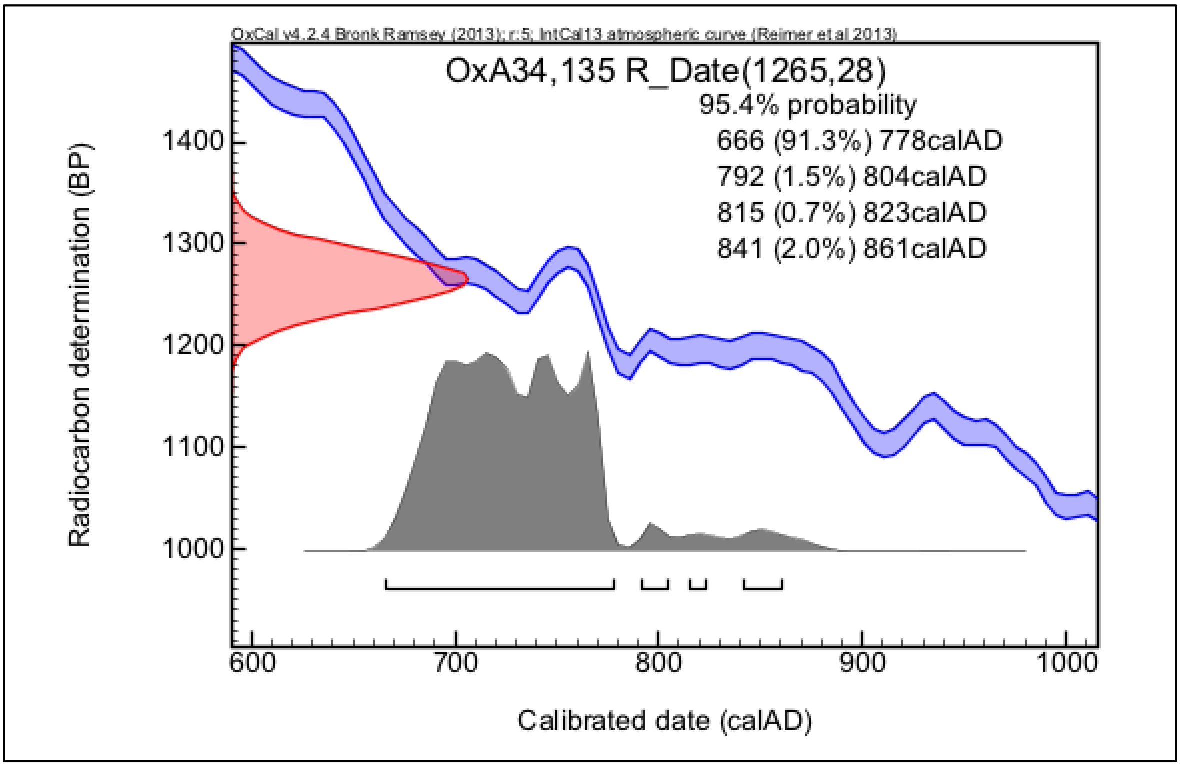
Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com


OxCal v4.2.4 Bronk Ramsey (2013); r:5; IntCal13 atmospheric curve (Reimer et al 2013)
OxA33,125 R_Date(1151,29)
95.4% probability
776 (95.4%) 970calAD
Radiocarbon determination (BP)
1400
1300
1200
1100
1000
900
700
800
900
1000
Calibrated date (calAD)


OxCal v4.2.4 Bronk Ramsey (2013); r:5; IntCal13 atmospheric curve (Reimer et al 2013)
OxA34,133 R_Date(1251,28)
95.4% probability
676 (78.3%) 779calAD
790 (17.1%) 868calAD
Radiocarbon determination (BP)
1400
1300
1200
1100
1000
900
600
700
800
900
1000
Calibrated date (calAD)


OxCal v4.2.4 Bronk Ramsey (2013); r:5; IntCal13 atmospheric curve (Reimer et al 2013)
OxA34,134 R_Date(1243,30)
95.4% probability
681 (65.4%) 780calAD
787 (30.0%) 876calAD
Radiocarbon determination (BP)
1400
1300
1200
1100
1000
900
600
700
800
900
1000
Calibrated date (calAD)


OxCal v4.2.4 Bronk Ramsey (2013); r:5; IntCal13 atmospheric curve (Reimer et al 2013)
OxA34,135 R_Date(1265,28)
95.4% probability
666 (91.3%) 778calAD
792 (1.5%) 804calAD
815 (0.7%) 823calAD
841 (2.0%) 861calAD
Radiocarbon determination (BP)
1400
1300
1200
1100
1000
600
700
800
900
1000
Calibrated date (calAD)

Appendix 10.4

Site	Country	Region	Location
Terra Preta do Mangabal	Brazil	Amazonia	5 10’21.20”S 56 54’20.81”W

Appendix 10.4

P	Country	Site	Period	Sample	Material	Species	Expected	Status
39,982	Brazil	Terra Preta do Mangabal	Late Holocene	PN 528	charcoal		2016-01-13	✓
39,983	Brazil	Terra Preta do Mangabal	Late Holocene	PN 614	wood		2016-01-13	×
	Lab comment: Failed due to very low yield;							
41,077	Brazil	Terra Preta do Mangabal	1200BP	PN607	charcoal		2016-07-25	✓
41,078	Brazil	Terra Preta do Mangabal	1200BP	PN572.6	charcoal		2016-07-25	✓
41,079	Brazil	Terra Preta do Mangabal	1200BP	PN510	charcoal		2016-07-25	✓

Appendix 10.4

OxA	P	Site	Sample	Material	Species		Date	±	$\delta^{13}C$
33,125	39,982	Terra Preta do Mangabal	PN 528	charcoal			1151	29	-24.9
34,133	41,077	Terra Preta do Mangabal	PN607	charcoal			1251	28	-26.5
34,134	41,078	Terra Preta do Mangabal	PN572.6	charcoal			1243	30	-24.2
34,135	41,079	Terra Preta do Mangabal	PN510	charcoal			1265	28	-25.5

Appendix 10.4

OxA	P	Site	Material	Species	Used	Yield	%Yld	Excess	%C	$\delta^{13}C$	$\delta^{15}N$	CN
33,125	39,982	Terra Preta do Mangabal	charcoal		37.17	27.72	74.6	24.35	69.8	-24.9		
34,133	41,077	Terra Preta do Mangabal	charcoal		20.53	7.3	35.6	4.27	64.7	-26.5		
34,134	41,078	Terra Preta do Mangabal	charcoal		42.33	28.37	67	25.14	63.5	-24.2		
34,135	41,079	Terra Preta do Mangabal	charcoal		50.91	41.92	82.3	38.82	64.9	-25.5		

Appendix 10.5

UBANo	Sample ID	Material Type	^{14}C Age	±	F14C	±
UBA-29068	TPM-1045	Wood	1199	26	0.8614	0.0028
UBA-29069	TPM-1102	wood	1193	26	0.8620	0.0028
UBA-29070	SM-325	Wood	1039	26	0.8787	0.0028
UBA-29071	SM-558	Wood	913	30	0.8925	0.0033
UBA-29072	SM-618	Possibly palm	865	30	0.8980	0.0033

Appendix 10.5

Bruna Cigaran Rocha
UFOPA
Av. Mendonça Furtado, nº 2946
Santarém, Pará 68040-47
Brazil

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-29068
Date of Measurement:	2015-08-24
Site:	Terra Preta do Mangabal
Sample ID:	TPM-1045
Material Dated:	charcoal
Pretreatment:	AAA
Submitted by:	Bruna Cigaran Rocha

Conventional ^{14}C Age:	1199±26 BP
Fraction corrected	using AMS $\delta^{13}C$

Appendix 10.5

Bruna Cigaran Rocha
UFOPA
Av. Mendonça Furtado, nº 2946
Santarém, Pará 68040-47
Brazil

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-29069
Date of Measurement:	2015-08-24
Site:	Terra Preta do Mangabal
Sample ID:	TPM-1102
Material Dated:	charcoal
Pretreatment:	AAA
Submitted by:	Bruna Cigaran Rocha

Conventional ^{14}C Age:	1193±26 BP
Fraction corrected	using AMS $\delta^{13}C$

Appendix 10.5

Bruna Cigaran Rocha
UFOPA
Av. Mendonça Furtado, nº 2946
Santarém, Pará 68040-47
Brazil

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-29070
Date of Measurement:	2015-08-24
Site:	Sawre Muybu
Sample ID:	SM-325
Material Dated:	charcoal
Pretreatment:	AAA
Submitted by:	Bruna Cigaran Rocha

Conventional ^{14}C Age:	1039±26 BP
Fraction corrected	using AMS $\delta^{13}C$

Appendix 10.5

Bruna Cigaran Rocha
UFOPA
Av. Mendonça Furtado, nº 2946
Santarém, Pará 68040-47
Brazil

14CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-29071
Date of Measurement:	2015-08-25
Site:	Sawre Muybu
Sample ID:	SM-558
Material Dated:	charcoal
Pretreatment:	AAA
Submitted by:	Bruna Cigaran Rocha

Conventional ^{14}C Age:	913±30 BP
Fraction corrected	using AMS $\delta^{13}C$

Appendix 10.5

Bruna Cigaran Rocha
UFOPA
Av. Mendonça Furtado, nº 2946
Santarém, Pará 68040-47
Brazil

^{14}CHRONO Centre
Queens University Belfast
42 Fitzwilliam Street
Belfast BT9 6AX
Northern Ireland

Radiocarbon Date Certificate

Laboratory Identification:	UBA-29072
Date of Measurement:	2015-08-25
Site:	Sawre Muybu
Sample ID:	SM-618
Material Dated:	charcoal
Pretreatment:	AAA
Submitted by:	Bruna Cigaran Rocha

Conventional ^{14}C Age:	865±30 BP
Fraction corrected	using AMS δ^{13}C

Information about radiocarbon calibration

Appendix 10.5

```
                  RADIOCARBON CALIBRATION PROGRAM*
                            CALIB REV7.0.0
             Copyright 1986-2013 M Stuiver and PJ Reimer
        *To be used in conjunction with:
        Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.
                  Annotated results (text) - -
                  Export file - c14res.csv

TPM-1045
UBA-29068
Radiocarbon Age BP   1199 +/-   26
Calibration data set: intcal13.14c                # Reimer et al. 2013
  % area enclosed       cal AD age ranges             relative area under
                                                  probability distribution
  68.3 (1 sigma)     cal AD 775- 779                       0.061
                            788- 869                       0.939
  95.4 (2 sigma)     cal AD 723- 739                       0.034
                            767- 892                       0.966

TPM-1102
UBA-29069
Radiocarbon Age BP   1193 +/-   26
Calibration data set: intcal13.14c                # Reimer et al. 2013
  % area enclosed       cal AD age ranges             relative area under
                                                  probability distribution
  68.3 (1 sigma)     cal AD 776- 780                       0.049
                            787- 794                       0.086
                            800- 874                       0.866
  95.4 (2 sigma)     cal AD 727- 737                       0.015
                            768- 894                       0.975
                            931- 937                       0.010

SM-325
UBA-29070
Radiocarbon Age BP   1039 +/-   26
Calibration data set: intcal13.14c                # Reimer et al. 2013
  % area enclosed       cal AD age ranges             relative area under
                                                  probability distribution
  68.3 (1 sigma)     cal AD 990- 1019                      1.000
  95.4 (2 sigma)     cal AD 906- 915                       0.018
                            968- 1029                      0.982

SM-558
UBA-29071
Radiocarbon Age BP    913 +/-   30
Calibration data set: intcal13.14c                # Reimer et al. 2013
  % area enclosed       cal AD age ranges             relative area under
                                                  probability distribution
  68.3 (1 sigma)     cal AD 1045- 1097                     0.590
                            1119- 1142                     0.246
                            1146- 1161                     0.164
  95.4 (2 sigma)     cal AD 1031- 1189                     0.996
                            1199- 1202                     0.004

SM-618
UBA-29072
Radiocarbon Age BP    865 +/-   30
Calibration data set: intcal13.14c                # Reimer et al. 2013
  % area enclosed       cal AD age ranges             relative area under
                                                  probability distribution
  68.3 (1 sigma)     cal AD 1157- 1218                     1.000
  95.4 (2 sigma)     cal AD 1047- 1088                     0.137
```

Appendix 10.5

1122- 1138	0.034
1148- 1253	0.829

References for calibration datasets:
Reimer PJ, Bard E, Bayliss A, Beck JW, Blackwell PG, Bronk Ramsey C, Buck CE
Cheng H, Edwards RL, Friedrich M, Grootes PM, Guilderson TP, Haflidason H,
Hajdas I, HattÃ© C, Heaton TJ, Hogg AG, Hughen KA, Kaiser KF, Kromer B,
Manning SW, Niu M, Reimer RW, Richards DA, Scott EM, Southon JR, Turney CSM,
van der Plicht J.
IntCal13 and MARINE13 radiocarbon age calibration curves 0-50000 years calBP
Radiocarbon 55(4). DOI: 10.2458/azu_js_rc.55.16947

Comments:
* This standard deviation (error) includes a lab error multiplier.
** 1 sigma = square root of (sample std. dev.^2 + curve std. dev.^2)
** 2 sigma = 2 x square root of (sample std. dev.^2 + curve std. dev.^2)
where ^2 = quantity squared.
[ ] = calibrated range impinges on end of calibration data set
0* represents a "negative" age BP
1955* or 1960* denote influence of nuclear testing C-14

NOTE: Cal ages and ranges are rounded to the nearest year which may be too precise in many instances. Users are advised to round results to the nearest 10 yr for samples with standard deviation in the radiocarbon age greater than 50 yr.

<>

Número de inventário	PN	Unidade	Nível (cm)	Classe	Ordem	Familia	Genero
1	1005	N998 E973,5	10-20	Osteichthyes	Perciformes	Cichlidae	cf. *Cichla*
2	1009	N998 E973,5	20-30	Mammalia	cf. Chiroptera		
3	1013	n998 E973,5	30-40	Reptilia	cf. Testudines		
4	1022	n998 E973,5	40-50	Mammalia	Rodentia	Cuniculida	cf. Cunicul
5	1022	n998 E973,5	40-50	Mammalia	Rodentia		
6	1022	n998 E973,5	40-50	Osteichthyes	Characiforme		
7	1022	n998 E973,5	40-50	Osteichthyes			
8	1022	n998 E973,5	40-50	indeterninado			
9	1041	n998 E973,5	60-70	Osteichthyes	Characiforme		
10	1041	n998 E973,5	60-70	Mammalia	Rodentia		
11	1041	n998 E973,5	60-70	Mammalia	Artiodactyla	Tayassuidae	
12	1041	n998 E973,5	60-70	Osteichthyes			
13	1041	n998 E973,5	60-70	Osteichthyes			
14	1041	n998 E973,5	60-70	Aves			
15	1041	n998 E973,5	60-70	tecido indeterminado à investigar!			
16	1041	n998 E973,5	60-70	indeterminado			
17	1047	n998 E973,5	70-80	Osteichthyes	Characiforme		
18	1047	n998 E973,5	70-80	Osteichthyes	Siluriforme		
19	1047	n998 E973,5	70-80	indeterminado			
20	1059	n998 E973,5	90-100	Osteichthyes			
21	1059	n998 E973,5	90-100	Osteichthyes	Characiforme		
22	1059	n998 E973,5	90-100	Reptilia	Chelonia		
23	1059	n998 E973,5	90-100	indeterminado			
24	1054	n998 E973,5	80-90	indeterminado			
25	1068	n998 E973,5	100-110	Mammalia	Rodentia	Cuniculidae	
26	1068	n998 E973,5	100-110	Mammalia	Rodentia	Cuniculidae	
27	1070	n998 E973,5	110-120	indeterminado			
28	1069	n998 E973,5	110-120	indeterminado			
29	1088	N998 E973,5	120-130	cf. Mammalia			
30	1088	N998 E973,5	120-130	cf. Mammalia	Artiodactyla	Tayassuidae	
31	1088	N998 E973,5	120-130	indeterminado			
32	1086	N998 E973,5	130-140	Reptilia	Crocodylia	cf. Aligatoridae	
33	1086	N998 E973,5	130-140	cf. Mammalia			
34	1086	N998 E973,5	130-140	indeterminado			
35	1090	N998 E973,5	140-150	Osteichthyes	Siluriforme		
36	1090	N998 E973,5	140-150	indeterminado			
37	1101	N998 E973,5	160-170	cf. aves			
38	1101	N998 E973,5	160-170	indeterminado			
39	1097	N998 E973,5	VERIFICAR	indeterminado			
40	1088	N998 E973,5	120-130	cf. Mammalia	Artiodactyla	Tayassuidae	

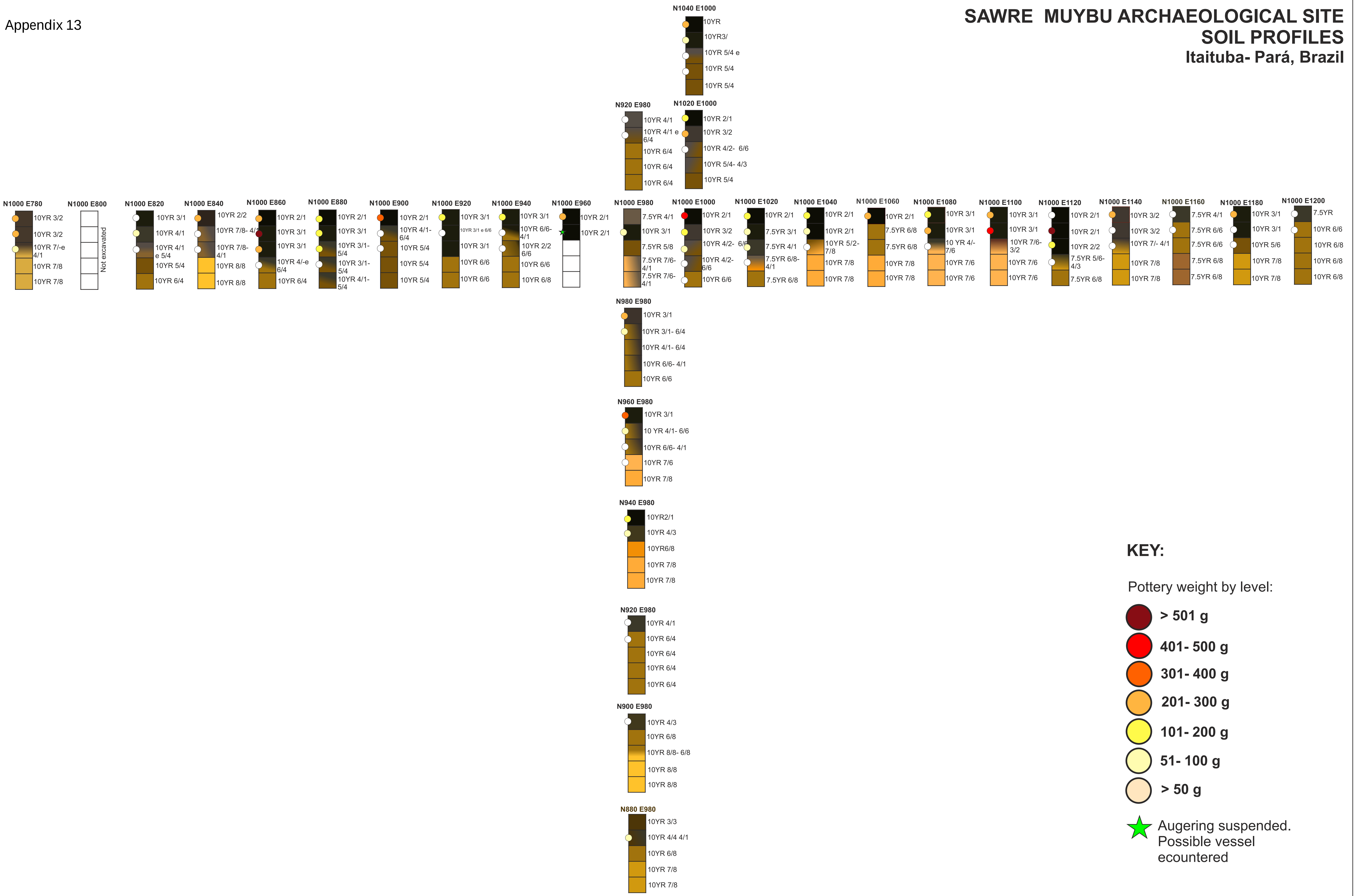
Número de inventário	Espécie	Parte esqueslética	Posição	Comentarios	NR
1	sp.	ver	pc		1
2		man	direito		1
3		plastron/carapaça			1
4	Paca	dente pré-	direito inferior		1
5		man	esquerdo		1
6		dente		Familia cynodontidae ou erythrinidae	1
7		ver	caudal	Peixe de pequeno porte com 500 g aprox	1
8					7
9		dente		Familia Cynodontidae ou Erythrinidae	1
10		dente incisivo			5
11		dente	Molariforme		1
12		vert	pré-caudal		1
13		vert		por estar muito fragmentado não perebi a posiçã	1
14				Verificar depois	1
15				Verificar depois	2
16					12
17		dente		Familia Cynodontidae ou Erythrinidae	1
18		cleitron	esquerdo		1
19					3
20		ver	caudal		1
21		ver	pré-caudal		1
22		plastron/carapaça			2
23					13
24					1
25		epífise dist	esquerdo		1
26		epífise de osso longo			1
27					12
28					3
29		dente	molar		1
30		dente	molar		2
31					7
32		crânio		Não foi possível a identificação exata da parte an	1
33		Epífise de osso longo		O osso não permite identificar a posição anatôm	1
34				5 fragmentos não foram pesados devido estarem	8
35		epífise proximal da nadadeira lateral esquerdo articulada ao cleitron			1
36					7
37		epífise			1
38					5
39			alguns fragmentos não foram pesados porque estavam com		28
40			dente	molar	

Appendix 11
Faunal analysis by Francielly Santos Ramos de Sá

Número de inventário	NMI	P (g)	Alterações antropicas	Estagio de queima	Outras alterações tafonômicas		
1	1	0.7	fogo	05/06	frag e calcinado		
2	1	0.1			frag		
3	1	4.7	fogo	0/3	frag e calcinado		
4	1	1.0			frag		
5		0.4			frag e desplacamento		
6	1	0.1			frag		
7	1	0.0			frag		
8		0.6		0/3/6	frag e calcinado		
9	1	0			frag		
10	1	0.2			frag		
11	1	0			frag		
12	1	0	fogo	6	frag e calcinado		
13		0			frag		
14	1	0.2	fogo	4	frag e calcinado		
15		1.1			frag		
16		0	fogo	5/ 6	frag e calcinado		
17	1	0.0			frag		
18	1	0.0	fogo	6	frag e calcinado		
19		0.0	fogo		frag e calcinado		
20	1	0.2	fogo	5	frag e calcinado		
21	1	0.0	fogo	6	frag e calcinado		
22	1	0.8	fogo	02/03	frag e calcinado		
23		0.1			frag		
24		0.6		0	fra		
25	1	0.9		0	frag		
26	1	0.7		0	frag		
27		2.5		0	frag		
28		1.6		0	frag		
29				0	frag		
30	1	0.3		0	frag		
31		1.4		0	frag		
32	1	1.3		0	frag		
33	1	3.0		0	frag		
34		2.2					
35	1	0.6		0	frag		
36		0.3	fogo	2frag: 0/5 frag: 6	frag e calcinado		
37	1	0		0	frag		
38			fogo	3 frag:0/2 frag:6	frag e calcinado		
39		1.5	fogo	21 frag:0/7frag:6	frag e calcinado		
40	1		0.0				

Appendix 13

SAWRE MUYBU ARCHAEOLOGICAL SITE
SOIL PROFILES
Itaituba- Pará, Brazil



Graphic art by Vinicius Honorato

Sawre Muybu: unit stratigraphy and ceramic sorting overview

Excavation Area 1: N1000/E957-E958-E958.5: Three features were identified within this excavation area: F1, F2 and F3. We only recognised these features at 50-60cm (in the case of F1), 70-80cm (F2) and 80-90cm (F3), however – once they contrasted against the lighter-coloured latosol matrix. Along with bioturbations, which occurred throughout the excavation, this can affect the stratigraphy and distribution of potsherds in a significant way. This is particularly evident in the N1000/E958 test pit, where we can observe a near absence of pottery within the 50-60cm level, and a slight increase in the two lower levels; the existence of bioturbations and the presence of three features explains this. I initially considered presenting the ceramic counts for material collected separately from F1, F2 and F3 below, however, since the presence of ADE obscured the best part of these features during the excavation, leading to inadvertent mixing of their contents with those of the surrounding test pit, this appears to defeat the object of the exercise. Most if not all of the N1000/E957 0.6x0.7m subunit is part of a feature, called F3. While the results from adjacent N1000/E958 and N1000/E958.5 will be presented jointly in the ceramic analysis section, those from F3 (or N1000/E957) will be kept separate.

UNIT N1000/E958: This was the only 1x1m test pit opened up in Excavation Area 1. Table 5 shows how the bulk of the potsherds were retrieved from the first 40cm, with an abrupt decline in ceramic materials below the 30-40cm level. At 50-60cm, we encountered an all-but-sterile level; features and bioturbations account for the presence of pottery in the deeper levels. In terms of absolute counts, sherds larger than 2cm^2 are more numerous in the 10-20cm level, but weigh more in the 30-40cm level largely because of the presence of a large griddle fragment. There is an elevated number of fire rest fragments in this unit.

Sherd counts by level N1000/E958							
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Appendage***	***< 2cm² sherds***	***Total****
0-10	9	-	324	31	-	332	687
10-20	28	12	342	58	3	959	1374
20-30	60	8	173	42	-	372	595
30-40	41	9	213	51	1	259	533
40-50	12	-	64	17	-	55	136
50-60	-	-	2		-	-	2
60-70	3	-	16	2	-	20	38
70-80	1	-	22		-	7	29
80-90	-	-	14	1	-	5	20

*Table 5 Absolute sherd counts by level N1000/E958. *Totals do not include counts for fire dogs.*

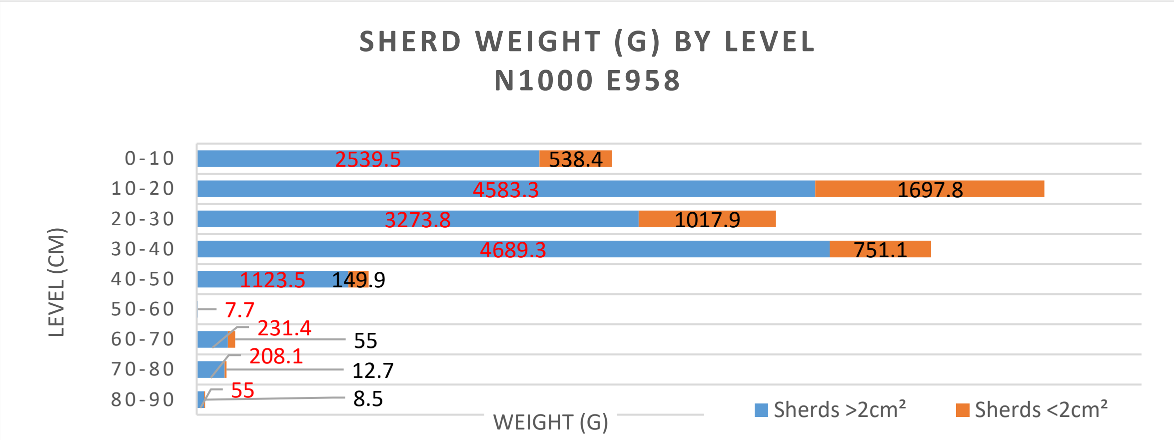


Chart 5 Weight of sherds by level at N1000 E958

UNIT N1000/E958.5: At the N1000/E958.5 test pit a similar but more gradual decline in materials below the 30-40cm level occurred in comparison to contiguous N1000/E958. This is due to the presence of F2/bioturbations – which often straddled these two units but which were collected under the provenience number series pertaining to this test pit. Chart 6 shows how there is a negligible amount of pottery smaller than 2cm^2 below the 30-40cm level.

Sherd counts by level N1000/E958.5							
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Appendage***	***< 2cm² sherds***	***Total****
0-10	3	-	62	16	-	206	284
10-20	17	-	280	32	-	647	959
20-30	25	1	149	37	2	241	430
30-40	20	6	173	36	-	21	236
40-50	19	-	58	8	-	17	83
50-60	9	-	53	9	-	5	67
60-70	6	1	12	1	-	2	16
70-80	9	-	45	5	-	20	70
80-90	7	-	23	7	-	3	33
90-100	-	1	1	-	-	-	2
100-110	-	-	2	-	-	-	2

*Table 6 Sherd counts by level N1000/E958.5. *Totals do not include counts for fire dogs.*

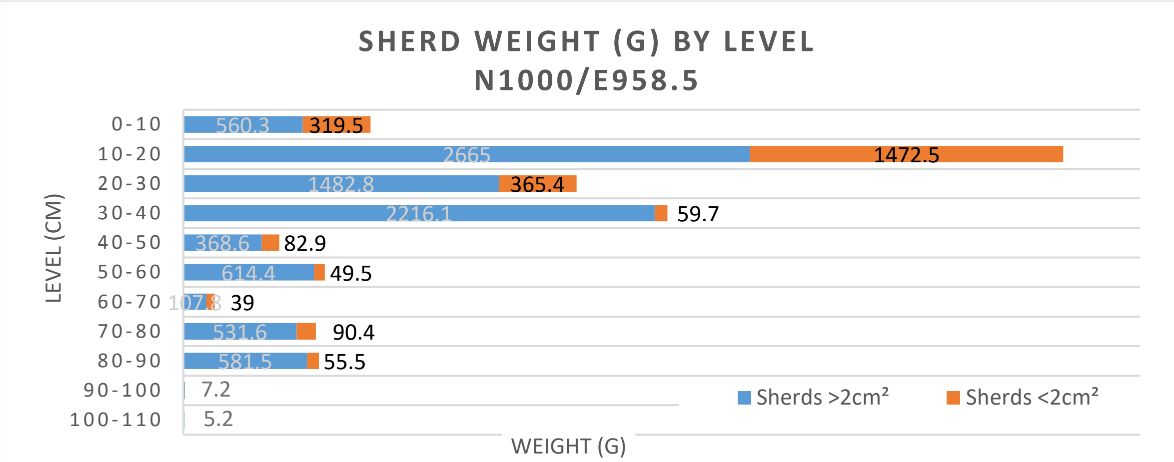


Chart 6 Weight of sherds by level at N1000/E958.5.

UNIT N1000/E957: This 0.6x0.7m test pit corresponds the better part of the F3 feature. The feature extends approximately 40cm deeper than adjacent Layer III from the N1000/E958 unit excavation. Towards the bottom of the cavity, at around 60cm we extracted a large, horizontally placed griddle that took up most of the 0.6x0.7m of the unit's surface area at that depth. In the levels above the griddle, several semi-entire vessels or diagnostic fragments were encountered, often disposed diagonally or vertically. The reduction in quantity of material around the 30-40 and 40-50cm levels relates to the fact that during excavation, the pit's eastern profile collapsed, leading to mixing of some of the materials from levels above and below (and to their consequent exclusion from the sample to be sorted and analysed for lack of precise provenience).

This subunit presents a high number of absolute counts for the different classes of ceramic materials: fire dogs, diagnostic pieces (rims in particular), fragments from bases and decorated body sherds. The peak in terms of weight occurs in the 50-60cm level, however, this corresponds only in part to absolute sherd counts, which also peak in the subunit's 10-20cm level, demonstrating that the size of sherds increases considerably around the 50-60cm level.

Sherd counts by level N1000/E957							
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Appendage***	***Sherds < 2cm²***	***Total***
0-10	4	-	61	5	-	232	298
10-20	29	-	104	25	-	490	619
20-30	23	13	136	24	1	311	485
30-40	4	2	78	16	-	217	313
40-50	11	3	43	14	-	283	343
50-60	9	17	143	24	1	387	572
60-70	12	3	94	7	-	252	356
70-80	54	9	86	5	-	205	305
80-90	-	5	20	3	-	23	51

*Table 7 Sherd counts by level N1000/E957. *Totals do not include counts for fire dogs.*

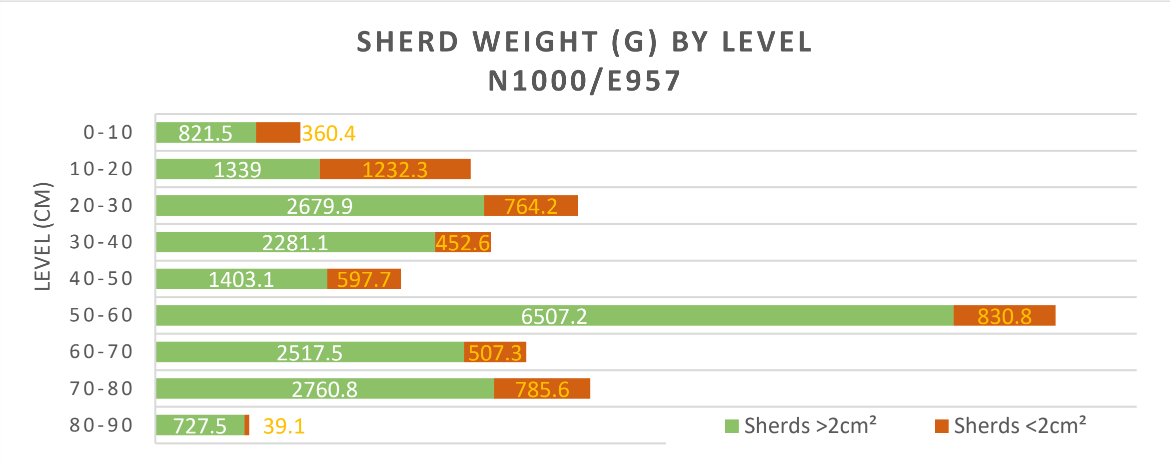
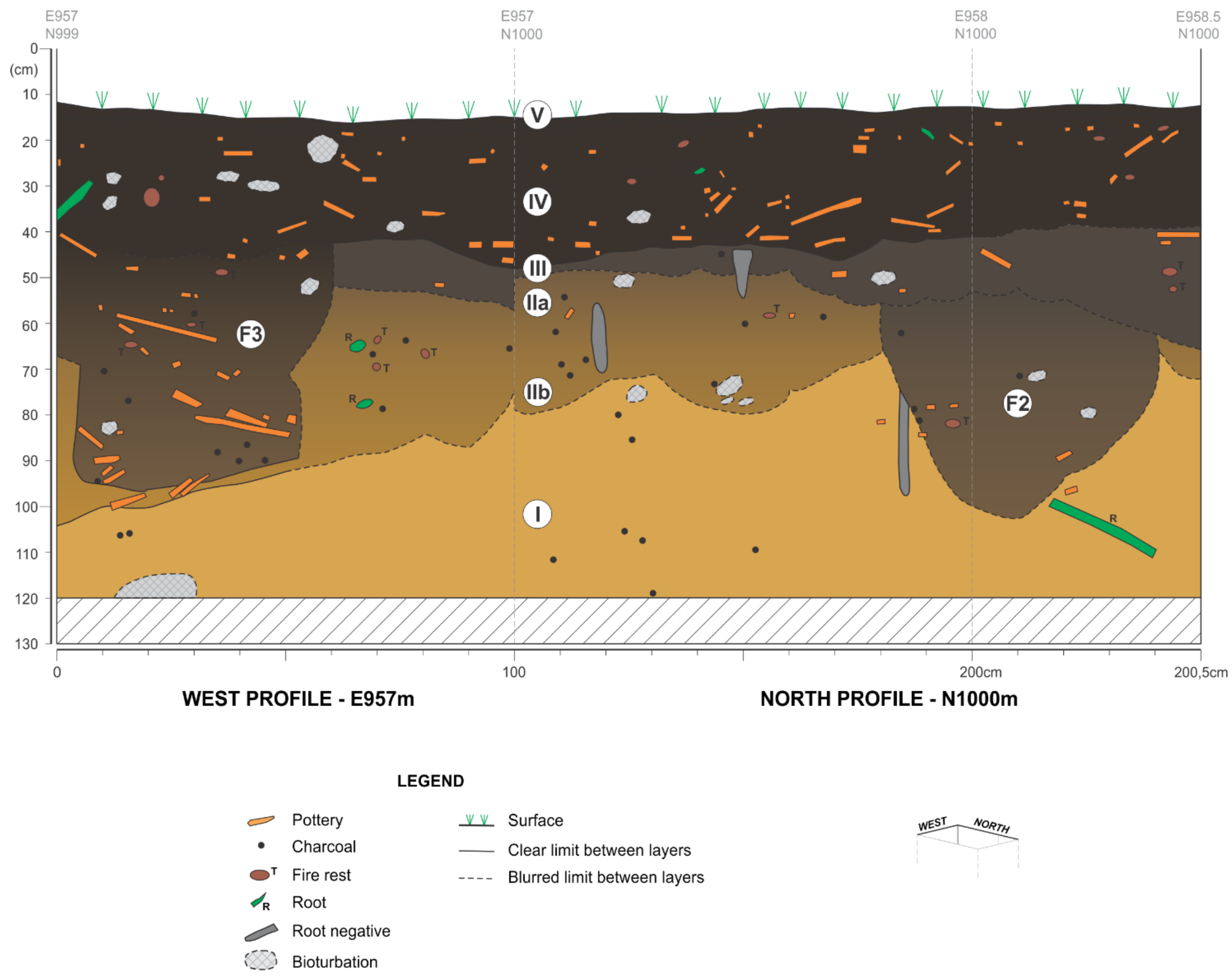


Chart 7 Weight of sherds by level at N1000/E958.5.

Sawre Muybu Archaeological Site - Daje Kapap Eipi - Itaituba - PA

N1000 E957 – 958.5 units - STRATIGRAPHIC PROFILE



V — Humic layer. Presence of roots and rootlets. Soil texture is sandy clay. Soil colour is 10YR 2/1, black.

IV — This layer contains the greatest density of archaeological remains. At approximately 30cm depth an apparent occupational 'floor' was encountered, with horizontally-placed griddle (PN 323), with associated fire rests and charcoal. It is probable that the features F1 (possible post hole negative), F2 and F3 are related to this layer. Ceramic fragments of varying sizes (from <2cm to 10x5cm) observed here are often horizontally disposed. Soil texture is sandy clay, with medium compactness. Soil colour is 10YR 2/1, black.

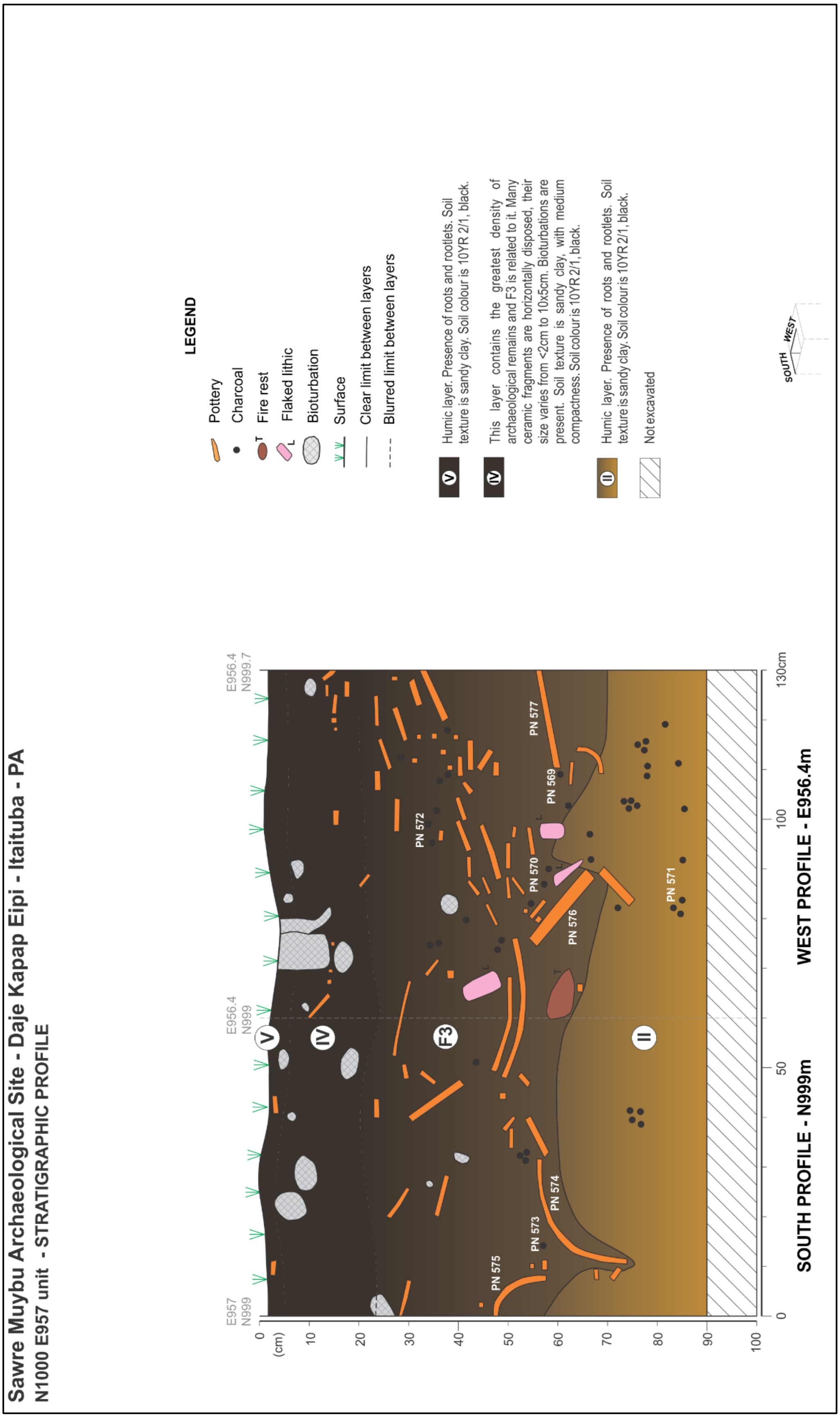
III — Layer's limits blurred. Low density of archaeological remains. Bioturbations present. Soil texture is sandy clay, with medium compactness. Soil colour homogenous: 10YR 3/1, very dark gray.

II — Layer with blurred limits. This layer, with mottled soil colour, has been subdivided into IIa and IIb. In IIa, colour 10YR 6/8, brownish yellow, predominates over 10YR 4/3, brown, while in IIb colour 10YR 4/3 prevails over 10YR 6/8. Presence of bioturbations throughout the layer. Possible Feature F2 enters into this layer. Latosol admixture within F2 suggests the feature may in fact be a bioturbation. Feature F3, containing large ceramic sherds often disposed diagonally, also invades this layer.

I — Limits with Layer II are blurred. Some ceramic sherds are associated with this layer and there are sparse fragments of wood charcoal, however the final 10cm excavated are archaeologically sterile. Bioturbations present. Clayey latosol with element of sand. Soil is highly compacted. Colour 10YR 7/8, yellowish orange.

Not excavated

Graphic art by Marcos Brito



Graphic art by Marcos Brito

UNIT N934/E981: Placed further away from the river, this the N934/E981 unit is located towards the southern limits of the site. Lighter soil colour, a reduced density of sherds and the concentration of archaeological material in the two uppermost levels suggests this area may have been occupied later, or in a less intense form, than the other areas sampled during excavation.

Sherd counts by level N934/E981						
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Sherds <2cm²***	***Total****
0-10	6	1	218	23	66	308
10-20	3	-	112	11	23	146
20-30	-	3	55	14	13	85
30-40	2	-	7	-	-	7
40-50	-	-	1	-	-	1

Table 8 Absolute sherd counts by level N934/E981. Total excludes fire dogs.

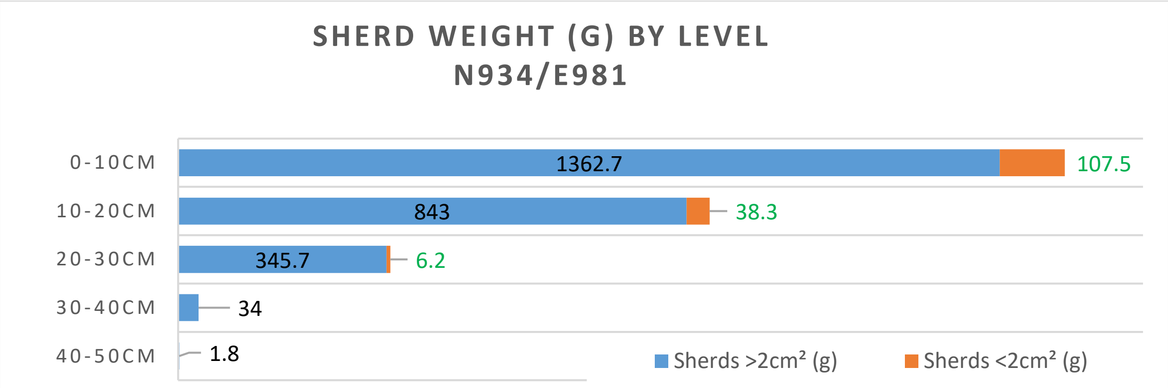
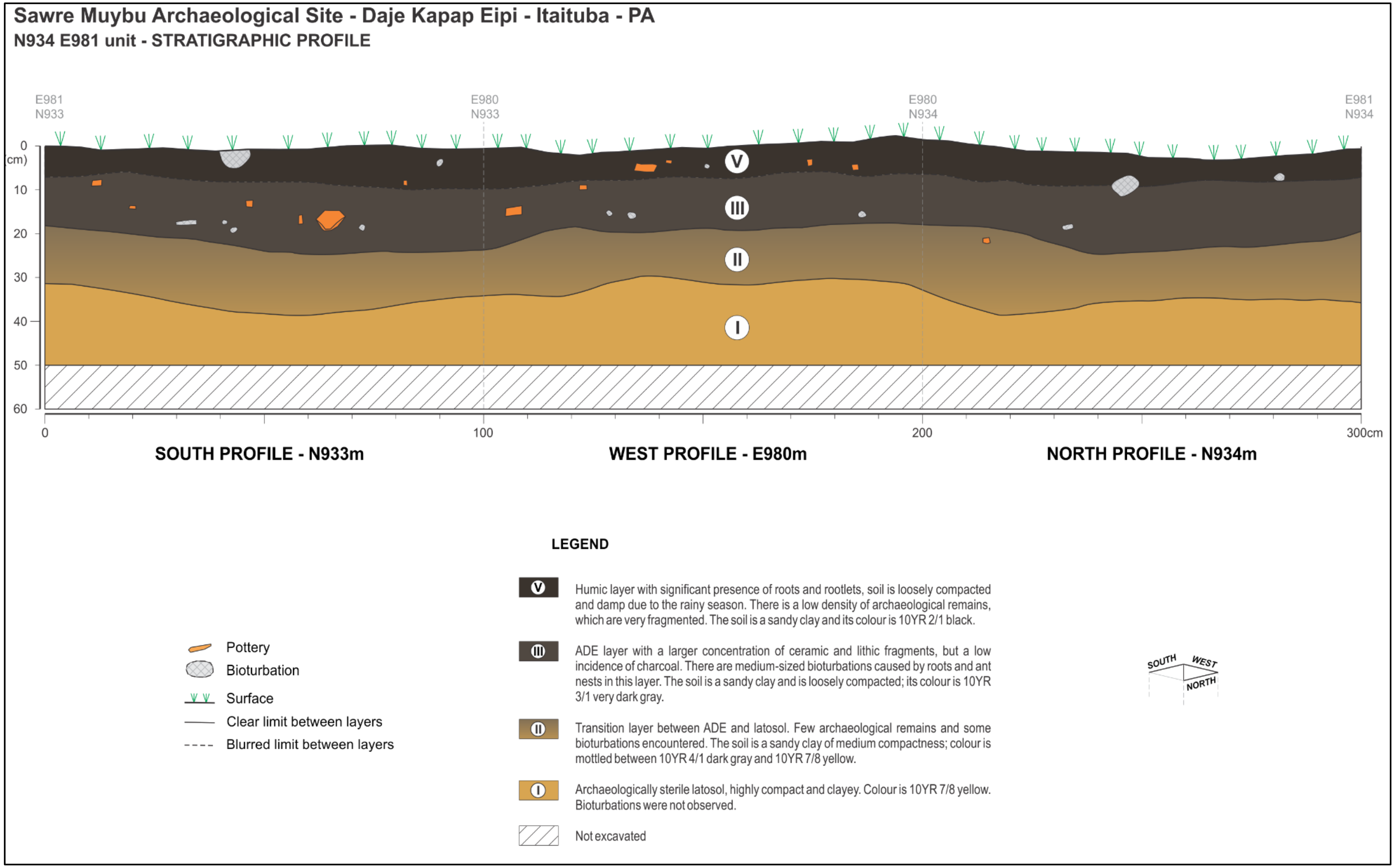


Chart 8 Weight of sherds by level at N934/E981.



Graphic art by Marcos Brito

UNIT N1008 E1113: Located in the eastern area of the site, the distinguishing characteristic of this test pit was the lithic material, mostly associated with feature F4 (see Honorato de Oliveira 2015 for details on lithic materials). Although cultural remains within this 1x1m excavation unit were not – excepting those related to F4 – encountered at deeper levels than at N934/E981, the quality of the soil was markedly different, being a darker brown, and displaying signs of greater biotic activity in the form of roots, rootlets and bioturbations. The quantity of ceramic material (in terms of absolute sherd counts and weight) is also greater in comparison. The first 10cm of this excavation pit yielded few sherds: the majority of the pottery is concentrated here between the 10-20cm and 20-30cm levels, after which there is an abrupt decline in the quantity of material. Feature F4 was identified during the 30-40cm level; only then were its materials collected separately from the rest of the unit. From 40cm onwards, with the emergence of the latosol and absence of archaeological materials, we only continued to excavate the northern half of the $1m^2$ unit, which – again, excepting F4 – we found to be archaeologically sterile. From 50cm onwards, we emptied out the conical-shaped feature F4, recording and bagging the materials found within the final 50-81cm together. Level 20-30cm contains more small sherds than level 10-20, which may indicate different activities in the area over time. The increase in sherds measuring $>2cm^2$ in the 10-20cm level in comparison to the 20-30cm level also suggests a change in the use of the area.

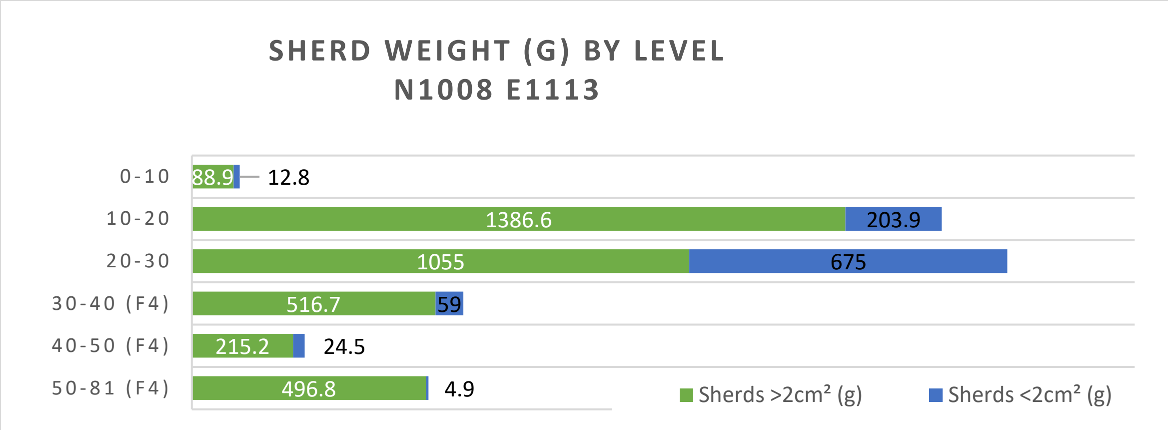
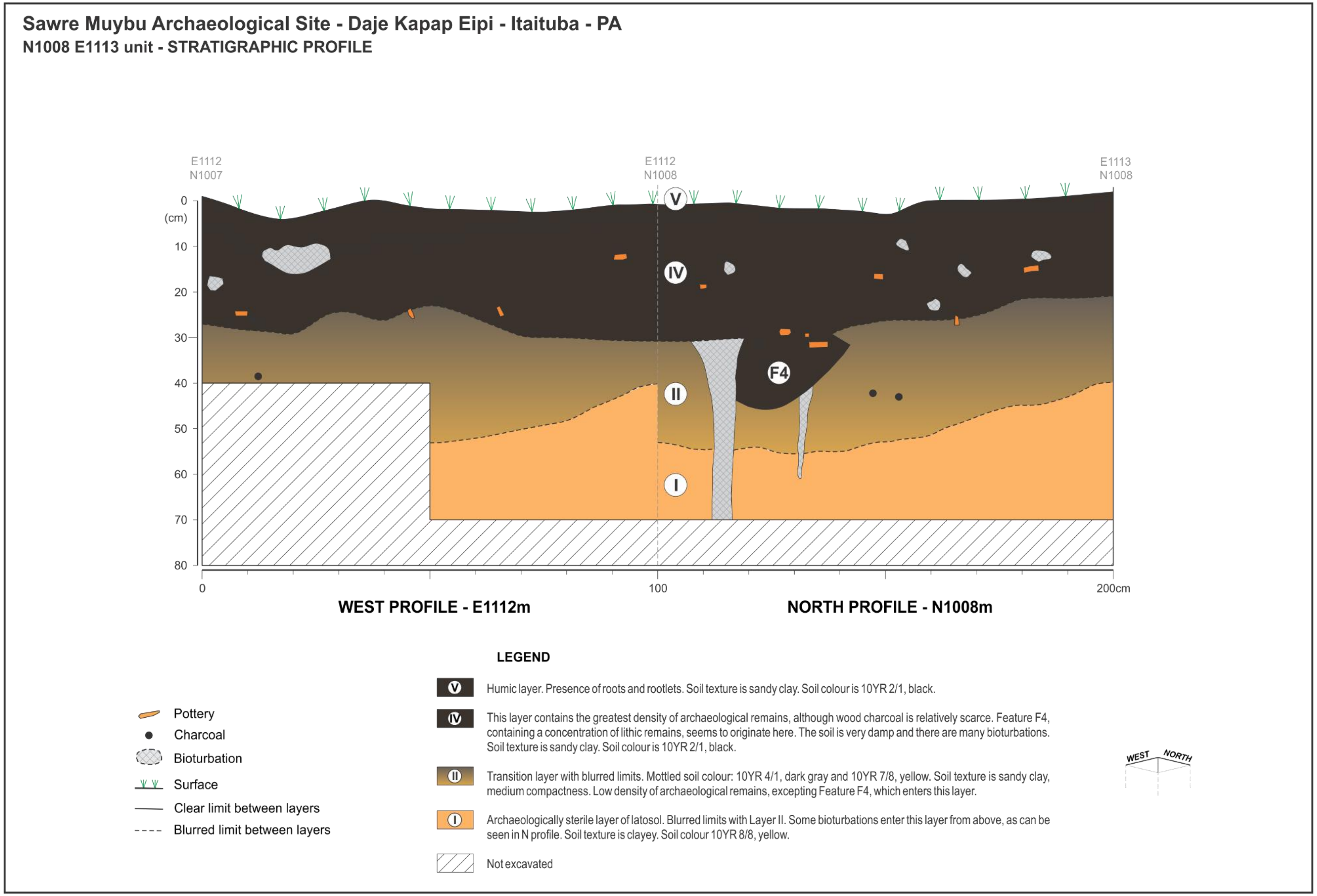


Chart 9 Weight of sherds by level at N1008 E1113.

Sherd counts by level N1008 E1113							
Level (cm)	***Fire dog***	***Base***	***Body***	***Rim***	***Appendage***	***Sherds <2cm²***	***Total****
0-10	-	2	9	0	-	9	20
10-20	18	21	153	17	3	120	314
20-30	6	16	50	8	-	188	262
30-40	1	2	54	6	-	36	98
30-40 (F4)	4	1	53	9	-	30	93
40-50 (F4)	3	4	28	2	-	21	55
50-81 (F4)	4	5	29	6	-	4	44

*Table 9 Absolute sherd counts by level N1008 E1113. *Totals do not include counts for fire dog fragments.*



Graphic art by Marcos Brito

Ceramic Analysis

Each and every sherd can inform us about technological choices – temper selection or type of firing, for instance – and many may bear marks that reveal something about the manufacturing process, such as fireclouds or the presence of non-obliterated coils. The occurrence of soot on external surfaces may suggest that we are contemplating the remains of cooking vessels. This project considered sherds to be 'diagnostic' when they provided additional information on form and/or decoration or surface treatment.

Analysis of ceramics from Sawre Muybu

At the Sawre Muybu site, we retrieved 68.47kg of pottery, totalling 12,239 sherds. These include bases, undecorated and decorated body sherds, undecorated and decorated rims, appendages, and fire dogs (fired lumps of clay). We cleaned, counted, weighed and sorted all of the site's pottery; sherds greater than $2cm^2$ received individual numbers.[1]

Pottery retrieved from Sawre Muybu site								
				Test pits				
						Excavation Area 1 – N1000		
	Augering programme	**Surface collections**	**Funerary Urn and associated sherds**	**N934/ E981**	**N1008 E1113**	**E958.5**	**E958**	**E957**
W	5.288	2.103	13.138	2.739	4.739	11.7	21.279	28.015
SC	868	27	944	512	920	2182	3414	3372

Table 1 Pottery retrieved from Sawre Muybu. W= weight (kg); SC= sherd count (includes sherds <$2cm^2$, excludes fire dogs).

In terms of both ceramic density and sherd count the N1000/E957, E958 and E958.5 test pits (collectively comprising Excavation Area 1) contained greater amounts of ceramic material and a thicker *terra preta* deposit than the N1008/E1113 and the N934/E981 excavation units. This can either point a longer period of occupation

[1] These consist of the site's initials, followed by provenience number (which usually pertains to a particular stratigraphic level or specific context within a test pit), followed by a unique and sequential digit, e.g. SM-509-02, SM-509-03. This time-consuming endeavour was only possible because of the help of dedicated UFOPA undergraduate students. Numbering means the sherds can be used as a teaching resource for undergraduate ceramic analysis courses from now on.

or/and to different patterns of deposition/discard of materials in comparison to N1008/E1113 and N934/E981.

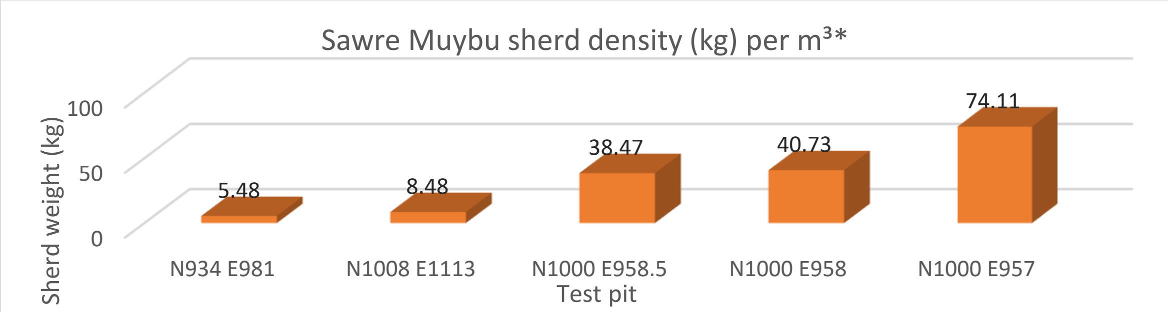
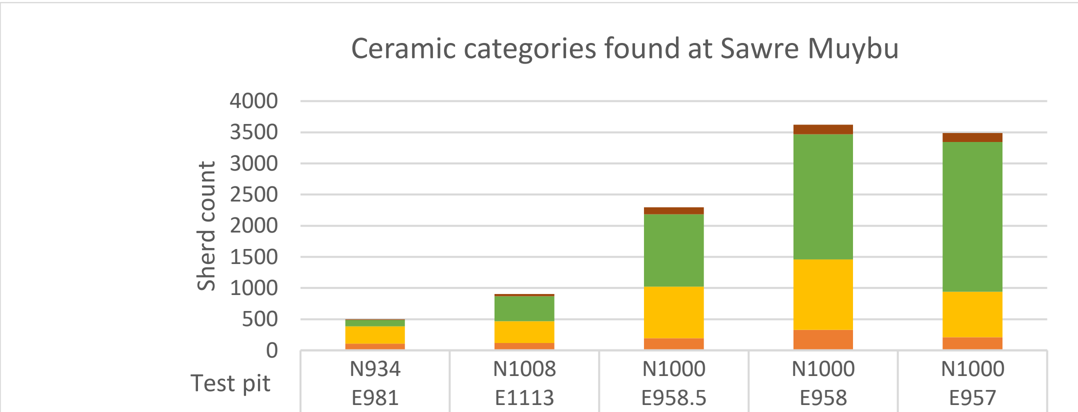


*Chart 1 Density of ceramic sherds at different test pits excavated at Sawre Muybu. *To obtain these values, the total weight of the pottery excavated from 1x1m units N934/E981, N1008/E1113 and N1000/E958 and from 1x0.5m unit N1000/E958.5 was considered in relation to the total weight excavated and to 0.5m depth of cultural layers whereas the ceramic density for N1000/E957 was calculated in relation to its 0.6x0.7m area and its depth of 90cm.*

Chart 2 shows the distribution of the different overall categories – diagnostic sherds, undecorated body sherds, sherds under 2cm^2 and fire dogs – among the excavated units.



Test pit	N934 E981	N1008 E1113	N1000 E958.5	N1000 E958	N1000 E957
Fire dogs	11	36	115	154	146
Sherds < 2cm²	102	399	1162	2009	2400
Undecorated body	277	348	825	1129	732
Diagnostic pottery	110	119	195	330	210

Chart 2 Absolute counts of overall ceramic categories present within units excavated at Sawre Muybu.

The best part of the sherds retrieved are either undecorated body fragments or sherds measuring less than 2cm^2. As can be seen in chart 2, proportions of the latter in relation to the other sherd categories vary among the different test pits excavated at the site; these proportions also vary within the different 10cm levels of these test pits. These diminutive pottery fragments can provide clues relating to the ceramics used within the site and to the post-depositional history of assemblages. Orton and Tyers (1990, p. 86) point out that larger or more fragile ceramics tend to break into a greater number of sherds because they have a greater value of brokenness than smaller or more robust vessels. They cite a study of early Roman pottery that found that since fine wares occurred as smaller vessels than coarse wares, coarse wares produced approximately three times as many sherds (Bedwin & Orton 1984). They also point out that “the longer and more complicated the post-depositional history of an assemblage, the more broken the pottery is likely to be, and the greater the brokenness” (Orton & Tyers 1990, p. 86).

Pottery sample analysed from Sawre Muybu site								
				Test pits				
	Augering programme	**Surface collections**	**Funerary Urn and associated sherds**	**N934/ E981**	**N1008 /E1113**	**Excavation Area 1 – N1000**		
						E958.5	**E958**	**E957**
E	868	27	944	512	920	2182	3414	3372
A	345	10	-	1*	5*	303	245	430

*Table 2 Pottery retrieved from Sawre Muybu. E = Excavated, A= Analysed. *Sherds included in formal, but not technological analysis.*

Unless otherwise stated, the data presented in the following sections is in relation to the universe of 988 analysed sherds. Of these, 548 are from the N1000/E958 and N1000/E958.5 contiguous test pits (treated as one entity), 430 are from the N1000/E957 subunit (or Feature F3), and ten sherds came from different areas of the site’s surface.[2] Thus, when writing of the “sample studied”, I will be referring to this material or to specific subsamples of it, rather than to the totality of pottery collected from the site. Of these 988 sherds, 378 are vessel rims, 564 are body sherds, 62 are bases and five are appendages. Thity-one are constituted by more than one section of the vessel (such as rim and body; rim, body and base; body and base or rim and base sherds in the case of griddles or plates). Forty-five of these sherds belong to eight different sherd families (or vessel lots).

In order to achieve an estimate of the measure of the amount of pottery in the Excavation Area 1 (N1000/E957, N1000/E958 and N1000 E958.5 test pits), we can

[2] For augured material, the provenience number (PN) series ranges from 01-299. For Excavation Area 1, PNs include numbers from 300-599. For N934/E981, PNs encompass the 400-499 sequence. For N1008/E1113, PNs range from 600-699. For surface collections, PNs include 700-799. For the funerary urn, PNs range from 900-999.

follow Orton & Tyers' (1990, p. 84) proposal for *estimated vessel equivalents* (EVEs), whereby the total number of rim sherds minus the number of rim sherds that belong to the same sherd family gives us an approximate 'floor' estimate – a number less than or equal to the minimum number of vessels represented in this location. Ceramic rims analysed from Excavation Area 1 add up to 373. By subtracting rims that belong to the same sherd family as other rim sherds (8), we arrive at 365 vessels as an approximate floor estimate of vessels represented in this area, which covers under 2m².

Although the analysis of the pottery tried to follow the sequential steps of the *chaîne opératoire* as closely as possible, the description to be presented below will not be entirely in accordance with the ceramic production sequence. Rather, attributes will be presented in relation to the different dimensions – technological, formal and style-related, inasmuch as such separations are possible. This should facilitate, in particular, the discussion of the technological dimensions, which involve the initial steps of production (temper) as well as its latter stages (firing and post-firing colour of the paste).

Technological dimensions

1. Temper

Tables 3, 4 and 5 summarise the number of times each type of non-plastic occurred as a primary, secondary and third-order tempers at N1000/E958-958.5, N1000/E957 and among the sherds collected around the site, on its surface.

Fig. 1 Magnified photographs. a) PN508.14 contains angular, milky quartz sand. b) PN508.22 shows densely packed cauixí and rounded, translucent grain of quartz. c) PN508.22 cauixí and sub-angular saibro with clear boundaries and ochre colour. Photos by Vinicius Honorato.

a. Primary tempers

Mode 1: Quartz sand was practically ubiquitous in the sample analysed. Small quantities may have already been present in the clay sources, but it seems likely that extra amounts were added intentionally. The high density of quartz within the ceramic fabrics has given a coarse aspect to most of the site's sherds – in particular, where layers of self slip or slip have been eroded from the sherd surfaces, or along surfaces that did not receive this treatment in the first place.

Mode 2: In terms of sherd counts, *cauixí* ranks a distant – but distinctive – second place in terms of primary tempers. When present, it was included at very high density – giving the sherds a distinctive, rough feel to the touch. The spicules tend to be oriented in the same direction. Sponge-spicule temper was found most often in level 30-40cm of N1000/E958-958.5, and in level 50-60cm of N1000/E957 (F3).

Mode 3: *Caraipé* and *caraipé* "B" were on occasion encountered as a primary temper. Despite their low numbers, the inclusion of *caraipé* and *caraipé* "B" as a mode is justified by the fact that its relatively limited appearance is related to its association with griddle forms. Although the comparatively large size of griddles would lead to a greater value of brokenness, the fact we found two of griddles *in situ* would suggest they were not moved as much as smaller vessels – consequently lasting longer, breaking less and leaving fewer sherds. Nowadays, there are several *caraipé* trees by the waterfront of the Sawre Muybu village (Chico Caititu, pers. comm., April 2016).

Primary (P), Secondary (S) and Third-order (T) tempers* at N1000/E958-958.5													
Level (cm)	***P, S, T***	***Quartz sand***	***Cauixi***	***Caraipé***	***Grog***	***Mineral***	***Hematite***	***Clay pellets***	**Saibro**	***Charcoal***	***Caraipé B***	***Not identified***	***N° sherds analysed***
0-10	P	37	1	-	-	-	-	-	-	-	-	-	38
	S	1	-	1	1	1	-	-	1	-	-	1	
	T	-	-	-	1	2	1	2	2	1	-	-	
10-20	P	58	11	-	-	-	-	-	-	-	-	-	69
	S	7	2	1	1	-	-	4	2	1	2	2	
	T	4	-	-	1	5	1	5	3	1	-	-	
20-30	P	85	16	2	-	-	-	-	1	-	1	-	105
	S	2	2	5	7	1	-	8	1	2	2	-	
	T	14	-	1	6	2	3	6	2	2	-	1	
30-40	P	146	22	6	1	-	-	-	-	-	-	-	175
	S	6	2	10	6	2	-	13	9	1	5	4	
	T	21	-	1	5	5	4	11	8	5	4	-	
40-50	P	56	7	1	-	-	-	-	-	-	-	-	64
	S	6	1	2	-	2	-	4	5	-	-	1	
	T	4	-	-	1	2	-	1	3	-	-	-	
50-60	P	37	3	-	-	-	-	-	-	-	-	-	40
	S	3	-	-	-	2	-	2	5	1	-	-	
	T	-	-	1	-	-	-	-	-	1	-	-	
60-70	P	10	1	-	-	-	-	-	-	-	-	-	11
	S	1	-	-	-	1	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	-	-	-	-	
70-80	P	18	3	-	-	-	-	-	-	-	-	-	21
	S	3	-	-	-	1	1	-	2	1	-	-	
	T	-	-	-	-	-	-	-	-	-	-	-	
80-90	P	20	3	-	-	-	-	-	-	-	-	-	23
	S	2	-	1	-	-	1	-	1	1	-	-	
	T	1	-	-	-	-	-	-	-	-	-	-	
90-100	P	-	-	-	-	-	-	-	-	-	-	-	0
	S	-	-	-	-	-	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	-	-	-	-	
100-110	P	2	-	-	-	-	-	-	-	-	-	-	2
	S	-	-	-	-	-	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	-	-	-	-	

*Table 3 Tempers at N1000/E958-958.5. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

Found only exceptionally as primary tempers, clay pellets and *saibro* are attributes that do not have modal value.

Primary (P), Secondary (S) and Third-order (T) tempers* at N1000/E957

Level (cm)	*Primary, Secondary, Tertiary temper*	*Quartz sand*	*Cauixi*	*Caraipé*	*Grog*	*Mineral*	*Hematite*	*Clay pellets*	*Saibro*	*Charcoal*	*Caraipé B*	*Not identified*	*N° sherds analysed*
0-10	P	21	-	-	-	-	-	-	-	-	-	-	21
	S	-	-	-	-	-	-	-	2	-	-	-	
	T	-	-	-	1	-	-	1	-	-	-	-	
10-20	P	44	-	-	-	-	-	-	-	-	-	-	44
	S	-	-	-	1	1	1	7	-	-	-	-	
	T	-	-	-	-	-	-	2	-	-	-	-	
20-30	P	48	3	1	-	-	-	1	1	-	-	-	54
	S	4	1	-	2	1	-	7	-	1	-	1	
	T	2	-	-	1	1	2	6	-	-	-	-	
30-40	P	51	6	-	-	-	-	1	-	-	-	-	58
	S	3	-	2	4	-	-	3	-	-	-	-	
	T	4	-	-	3	1	1	3	4	-	-	1	
40-50	P	61	6	-	-	-	-	-	-	-	1	-	68
	S	6	-	-	-	-	-	3	2	-	1	1	
	T	4	1	-	4	-	-	4	1	-	-	-	
50-60	P	94	9	-	-	-	-	-	-	-	2	-	107
	S	5	2	6	-	-	-	8	4	-	-	-	
	T	2	-	-	1	-	-	1	-	1	-	-	
60-70	P	34	1	1	-	-	-	-	-	-	-	1	37
	S	1	-	-	-	-	-	1	1	-	-	-	
	T	-	-	-	-	-	-	-	-	-	1	-	
70-80	P	26	6	1	-	-	-	-	-	-	-	-	33
	S	1	-	4	-	-	-	1	-	-	1	-	
	T	4	-	-	-	1	-	-	3	1	-	-	
80-90	P	3	1	1	-	-	-	-	-	-	3	-	8
	S	2	3	-	-	-	-	-	-	-	-	-	
	T	3	-	-	2	-	-	-	-	-	-	-	

*Table 4 Tempers at N1000/E957. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

Primary (P), Secondary (S) and Third-order (T) tempers* of surface sherds													
P, S, T	***Quartz sand***	***Cauixi***	***Caraipé***	***Grog***	***Mineral***	***Hematite***	***Clay pellets***	**Saibro**	***Charcoal***	***Caraipé B***	***Not identified***	***Voids***	***N° sherds analysed***
P	4	4	2	-	-	-	-	-	-	-	-	-	10
S	6	-	-	-	-	-	-	-	-	1	-	-	
T	-	-	1	1	5	1	1	-	-	-	-	1	

*Table 5 Tempers among ten surface sherds. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

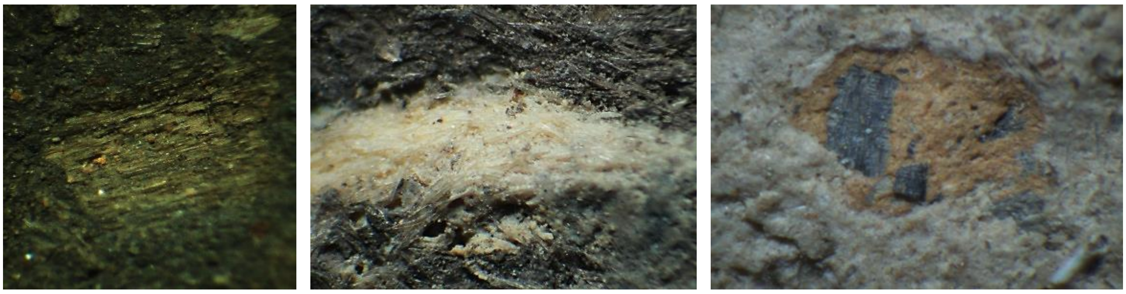


Fig. 2 Magnified photographs of tempers identified. a) PN567.12 caraipé temper. b): PN327.156 caraipé "B" temper. c): PN508.01 grog temper. Photos by Vinicius Honorato.

Primary temper among augered material			
Level (cm)	**Quartz sand**	***Cauixí***	***Caraipé***
0-20	138	11	-
20-40	110	9	-
40-60	47	7	-
60-80	17	2	-
80-100	3	1	-

Table 6 Primary temper among augered material at Sawre Muybu

Table 6 shows us that among the augered material sampled from across the site, overall *cauixí* appears to occur in smaller proportions in relation to quartz sand than it does in the sample from Excavation Area 1.[3] I can tentatively state this because

[3] The augured material was analysed by Hugo Lopes Tavares under the supervision of Bruna Rocha.

whenever available, Tavares selected sherds that contained further information on form or decoration for analysis, and as we shall see, sponge-spicule temper was more likely to be decorated than quartz sand tempered pottery. Thus there is a likelihood of, if anything, *cauixí* tempered sherds being over-represented in Tavares' sample.

b. Secondary tempers

There is a greater diversity of materials included as secondary non-plastics in comparison to primary tempers, and the distribution between these is more balanced. However, the number of specimens containing secondary tempers is low in comparison to the number of sherds containing primary tempers, so we cannot state whether these secondary tempers have modal value.

Secondary temper 1: *Caraipé* and *caraipé* "B" both occur as a secondary temper. Assuming that their performance characteristics were analogous and that the same community of potters made all pottery tempered with *caraipé*, this difference may result from seasonal availability of different tree species, or other environmental or social factors.

Secondary temper 2: Grog, or crushed sherd temper, is not common but because of its production process, we known its presence was intentional. Grog is associated to a specific recipe, which has *cauixí* as primary temper.

Unfired argillaceous inclusions – clay pellets and *saibro* – are found with notable frequency as secondary inclusions. It is likely they were not actively added as tempers. Their presence may however indicate a deliberate choice of a specific clay. Found in very low numbers, other secondary inclusions include quartz sand, unidentified minerals, hematite and specs of what may be gold. The presence of these particles may point to the targeting a particular clay with known performance characteristics. From the perspective of the central Amazon, Lima proposes that minerals (such as quartz and haematite) naturally present in the clay may have been deliberately left in it order to improve vessel heating capacity (2008, p. 181). The effect of haematite upon the colour of the paste post firing is an avenue to be investigated.

c. Third-order tempers

Within the dimension of third-order tempers, the following inclusions are present:

Third order temper 1: *Caraipé* and *caraipé* "B". *Caraipé "*B" overtakes caraipé as a third-order temper. Among the surface sherds, the void detected as a 'third-order temper' may have been an organic temper such as *caraipé*.

Third order temper 2: Grog or crushed sherd.

It is likely that many third-order tempers were impurities already present in the clay; this was likely the case with the quartz sand (when seen in small quantities) and with many – if not all – of the unidentified minerals, with the hematite, clay pellets and *saibro*.

The near absence of *cauixí* (only detected as a third-order temper once in the N1000/E957 unit) suggests that it was not a natural inclusion within the original clay sources, but rather added intentionally. The potters who used it knew that for it to be effective, a minimum amount of this non-plastic would have been required.

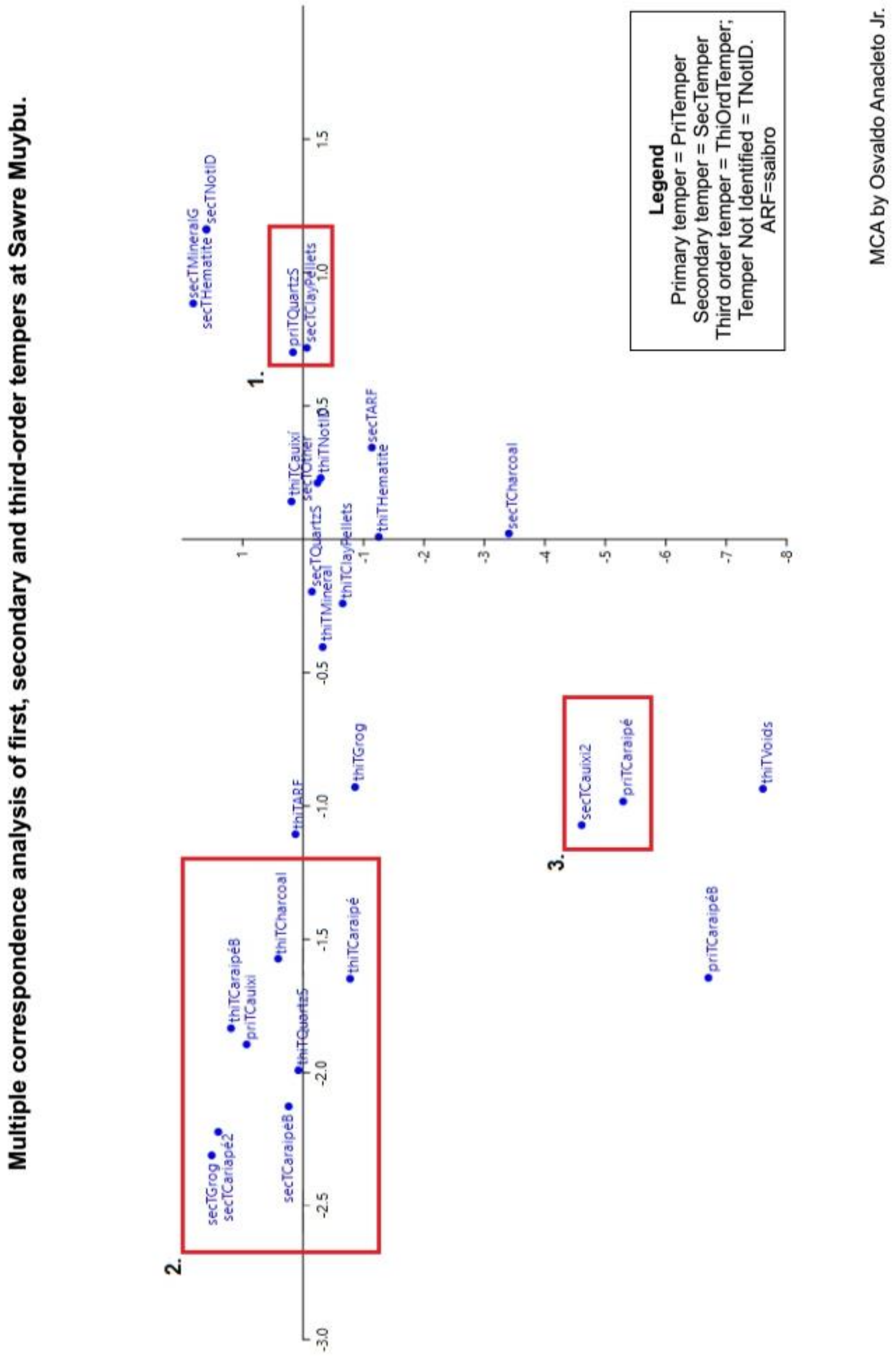


Fig. 3 Multiple correspondence analysis of first, secondary and third-order tempers at Sawre Muybu.

Fig. 3 illustrates the results of a MCA analysis for the 988 sherds analysed from Excavation Area 1 and from the surface collection. It shows three recurrent associations between different types of temper. We consider these to represent three modal combinations: 1) quartz sand (primary temper) and clay pellets (secondary inclusion, possibly already present in the clay); 2) *cauixí* (primary temper) and *caraipé*, *caraipé* B, grog, charcoal and quartz sand (secondary and third-order tempers); 3) *caraipé* (primary temper) and *cauixí* (second-order temper). These results are consistent with the temper mixtures observed during microscopic analysis, and indicate temper and paste recipes utilised by the makers of the ceramics studied.

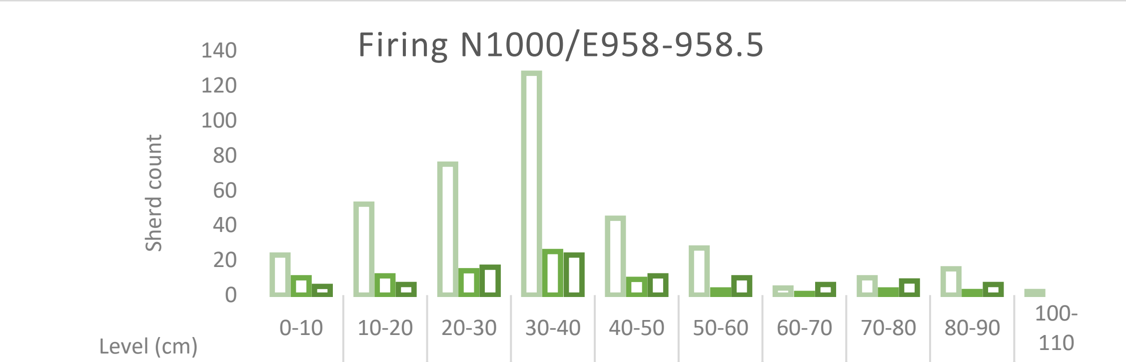
2. Firing

Two clearly defined modes are present within this dimension.

Mode 1: The majority (almost 72 per cent) of sherds analysed underwent oxidised firings.

Mode 2: Over eleven per cent of the sample displayed a blackened inner core, signalling a reduced firing atmosphere. As will be demonstrated, *cauixí*-tempered sherds are strongly associated to reduced firings.

Although just over 16 per cent of sherds were partially oxidised, there does not appear to be a clear pattern linking this type of firing to a particular temper or form; it seems more a product of accident than intentionality. On occasion, there is an association with griddle forms, however, partial oxidation in this case could also be a result of the enlarged dimensions of these forms and consequent unevenness of firing.



Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	100-110
Complete_Oxidised	23	52	75	127	44	27	4	10	15	2
Reduced	10	11	14	25	9	3	1	3	2	0
Partially oxidised	5	6	16	23	11	10	6	8	6	0

Chart 3 Firing of ceramics from N1000/E958-958.5 test pits.

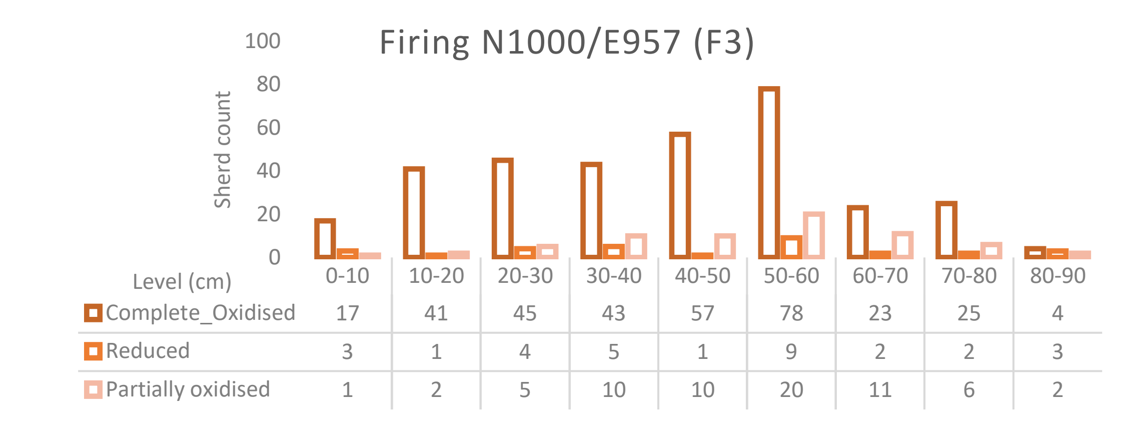


Chart 4 Firing of ceramics from N1000/E957 test pit.

Firing of surface sherds (interior and exterior)			
	Complete/Oxidised	**Reduced**	**Partially oxidised**
Surface collection	4	3	3

Table 7 Firing of surface sherds analysed.

Firing among augered material, Sawre Muybu site			
Level (cm)	**Complete/Oxidised**	**Reduced**	**Partially oxidised**
0-20	68	32	49
20-40	51	23	45
40-60	15	10	29
60-80	9	3	7
80-100	1	2	1

Table 8 Firing among augered material, Sawre Muybu site

Table 8 shows a greater proportion of sherds that display signs of reduced or partially oxidised firings in comparison to the sample from Excavation Area 1. This might be an indicator of differential firing conditions produced by different potters, if we assume that pottery production was household based.

Fireclouds are present on 66 of the sherds analysed from Excavation Area 1. In relation to these 988 sherds, they occur:

- forty-two times on sherds showing signs of oxidised firing atmospheres (i.e. on six per cent of oxidised sherds);
- thirteen times on partially oxidised sherds (i.e. eight per cent of partially oxidised sherds);
- eleven times on sherds displaying black inner cores (representing almost ten per cent of sherds revealing reduced firings).

Fig. 4 Fireclouds visible on PN537.50 base sherd. Photo by Vinicius Honorato.

3. Colour of the paste (post-firing)

On occasion, the colour of the paste could differ between interior and exterior sherd surfaces, suggesting an occasionally uneven firing process (see tables 9 and 10 below). Within this dimension, four modes occur.

Mode 1: Consists of varying hues and tones of brown – light, buff, orangey, dark – and makes up over half of the sample studied (fig. 5). It is likely that this represents a variety of clay sources.

Fig. 5 Examples of the shades of brown encountered in pottery analysed from Sawre Muybu

Mode 2: This mode comprises pale to strong orange colours.

Mode 3: Sherds with red-coloured pastes only appear in significant numbers from the 20-30cm and 30-40cm levels of N1000/E958-958.5 and in the 40-50cm and 50-60cm levels of the N1000/E957 (F3) subunit (see charts in Chapter 7).

Although the totality of sherds from these test pits would have to be verified before it can be securely stated that red pastes are localised within specific stratigraphic contexts, this may be an indication of related deposition contexts between N1000/E958-958.5 and N1000/E957 (F3).

Mode 4: Within the analysed sample, sherds with greyish brown coloured pastes occur more often in relation to N1000/E958-958.5 (particularly between the depths of 10-40cm) than in relation to N1000/E957 (F3).

Colour of the paste N1000/E958-958.5									
Level (cm)	Interior/ Exterior surface	White	Orange	Black	Red	Brown	Greyish brown	Pink	Grey
0-10	Int	-	14	-	-	21	1	2	-
	Ext	-	10	-	-	27	1	-	-
10-20	Int	7	17	-	1	37	4	2	1
	Ext	5	15	-	-	37	10	2	-
20-30	Int	3	21	-	11	48	15	4	3
	Ext	3	23	-	10	53	10	4	2
30-40	Int	8	30	1	20	98	13	1	3
	Ext	5	29	2	19	106	10	2	1
40-50	Int	8	13	-	5	36	2	-	-
	Ext	2	13	1	2	46	1	-	-
50-60	Int	1	11	1	1	25	1	-	1
	Ext	1	5	-	1	29	4	-	-
60-70	Int	1	1	-	-	9	-	-	-
	Ext	1	1	-	-	9	-	-	-
70-80	Int	-	4	-	2	14	1	-	-
	Ext	-	6	-	2	13	-	-	-
80-90	Int	-	6	-	2	14	1	-	-
	Ext	-	4	-	2	15	2	-	-
100-110	Int	-	-	-	1	1	-	-	-
	Ext	-	-	-	1	1	-	-	-

Table 9 Colour of the paste N1000/E958-958.5 (interior and exterior surfaces)

Colour of the paste N1000/E957 (F3)										
Level (cm)	**Interior/ Exterior surface**	**White**	**Orange**	**Black**	**Red**	**Brown**	**Greyish brown**	**Pink**	**Other**	**Grey**
0-10	Int	-	5	1	-	15	-	-	-	-
	Ext	-	2	-	-	19	-	-	-	-
10-20	Int	-	8	1	1	27	4	2	1	-
	Ext	-	6	-	1	33	3	-	1	-
20-30	Int	-	14	1	2	34	2	1	-	-
	Ext	-	7	-	1	41	5	-	-	-
30-40	Int	1	8	1	4	39	5	-	-	-
	Ext	1	6	-	2	47	2	-	-	-
40-50	Int	-	13	-	10	44	1	-	-	-
	Ext	1	9	-	10	48	-	-	-	-
50-60	Int	1	12	2	39	48	4	1	-	-
	Ext	-	6	1	30	66	4	-	-	-
60-70	Int	-	15	1	1	16	1	-	-	2
	Ext	-	13	1	1	20	-	-	-	1
70-80	Int	1	16	-	-	15	1	-	-	-
	Ext	-	5	1	-	27	-	-	-	-
80-90	Int	-	5	-	1	3	-	-	-	-
	Ext	-	1	-	1	7	-	-	-	-

Table 10 Colour of the paste N1000/E957 (interior and exterior surfaces).

Colour of the paste (interior/exterior) of selected surface sherds										
Sherd surface	**White**	**Orange**	**Black**	**Red**	**Brown**	**Greyish brown**	**Pink**	**Other**	**Grey**	**White**
Interior	-	6	-	-	3	1	-	-	-	-
Exterior	-	4	-	-	4	1	1	-	-	-

Table 11 Colour of the paste of surface sherds analysed (interior and exterior surfaces).

Colour of the paste (post-firing) among augered material			
Level (cm)	**Brown**	**Orange/Red**	**Grey**
0-20	56	30	63
20-40	55	18	46
40-60	24	4	26
60-80	8	2	9
80-100	-	1	3

Table 12 Colour of the paste (post-firing) among augered material, Sawre Muybu

Tavares used the Munsell Soil Colour chart to base his colour attributions from the auger points. Brown encompasses 7.5YR 5/6, 5/8, 6/6, 6/8, 7/8, 5/3, 5/4, 6/3, 6/4, 5/1, 5/2, 6/1, 6/2. Grey includes 7.5YR 3/1, 4/1, 5/1, 8/1, 8/2, 7/1, 7/2. Red/orange is equivalent to 2.5YR 4/6, 4/8, 5/6, 5/8, 6/6, 6/8, 7/6, 7/8.

There is a noticeable discrepancy between Tavares' results and the analysis from Excavation Area 1, as a greater proportion of sherds he analysed fall into the 'grey' spectrum. This might be explained by the use of different clay sources by different potters on the site, again suggesting the possibility of variations at household level, by a bias in his selection of sherds, or by another factor not yet considered.

Combinations of technological modes observed

Among the material from Excavation Area 1, we noted three main clusters of technological modes at Sawre Muybu. These empirical observations are largely borne out by the multiple correspondence analysis.

1. The most recurrent combination is of pottery mainly tempered with poorly-sorted quartz sand, which can include clay pellets or, less usually, *saibro*. This pottery mostly underwent oxidised firings. Although brown is the most regular colour, orange and red specimens are also present.
2. The second modal combination has *cauixí* as a primary temper*. Caraipé*, *caraipé* "B" and grog comprise secondary or third-order tempers of this group. These ceramics invariably underwent reduced firings. The colour of the paste varies from light orange to brown, to greyish brown.
3. The third cluster of modes, of which there are few examples, is predominantly tempered with *caraipé* or with *caraipé "*B". Secondary inclusions include *cauixí*. The firing of these fabrics is variable. The colour of the paste of the few available examples is most often grey or pink – further specimens are needed, however, for a more precise evaluation of this attribute. As mentioned above, this recipe seems to be related to unrestricted, shallow forms (griddles in particular).

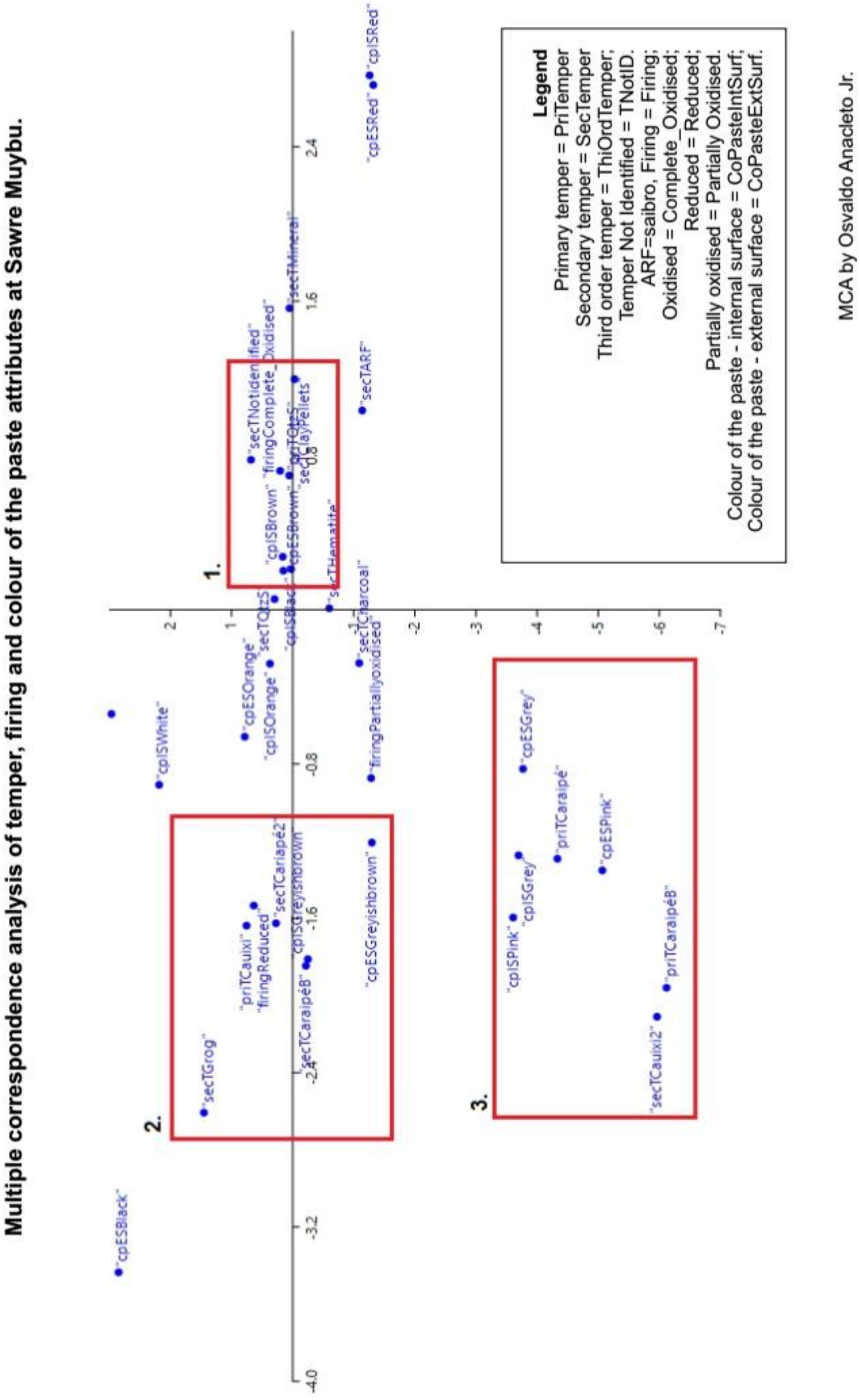


Fig. 6 Temper, firing and colour of the paste attributes analysed from 988 sherds from Excavation Area 1 and from the site's surface.

The plot above only displays attributes that occurred more than twice and illustrates these observations. Box 1 shows an association between quartz sand (primary temper), clay pellets (secondary temper), oxidised firing and brown coloured pastes. Box 2 shows a relationship between *cauixí* (primary temper), *caraipé*, *caraipé* B and grog (secondary tempers), reduced firing and greyish brown pastes. Box 3 shows some proximity between *caraipé* and *caraipé "B"* (primary tempers), *cauixí* (secondary temper), and pink and grey pastes. Some variables are located in between these clusters – notably, partially oxidised firing, and orange-coloured paste, indicating they are linked to more than one grouping. Red-coloured pastes are surprisingly distant from the clusters of attributes; from our analysis, we can state they occurred in association to cluster 1.

This points to a connection between the initial and final stages of the ceramic production sequence. The potters' choice of primary temper, and possibly clay, seems to have been connected to the type of firing undertaken at a later stage.

Dimensions related to form

The considerably fragmented nature of most of the sherds studied means that a projection of vessel forms was restricted to a limited portion of these materials (specific quantities are listed within each sub-section). At this point, we cannot yet say whether all body and rim forms listed in sections 5C and 5E respectively constitute modes: this would need confirmation from a more numerically representative sample. Pottery excavated from the other excavated test pits (N1008/E1113 and N934/E981) were included in the analysis of vessel body profile.

4. Vessel forming techniques

a. The use of leaves as supports

What often appears in Amazonian contexts and can be seen on eleven bases identified from Sawre Muybu, are leaf marks (see fig. 7), indicating that leaves were used as supports during vessel construction.

Fig. 7 Leaf marks on PN 310.83. Photo by Victor Rotiv Almeida.

b. Coiling

Although most of the time potters smoothed coils into each another, on occasion specimens examined displayed poorly bonded coils. I was unable to tell whether coiling consisted of ring building, segmental coiling or spiral coiling, but the examples seen consist of convex/concave coils.

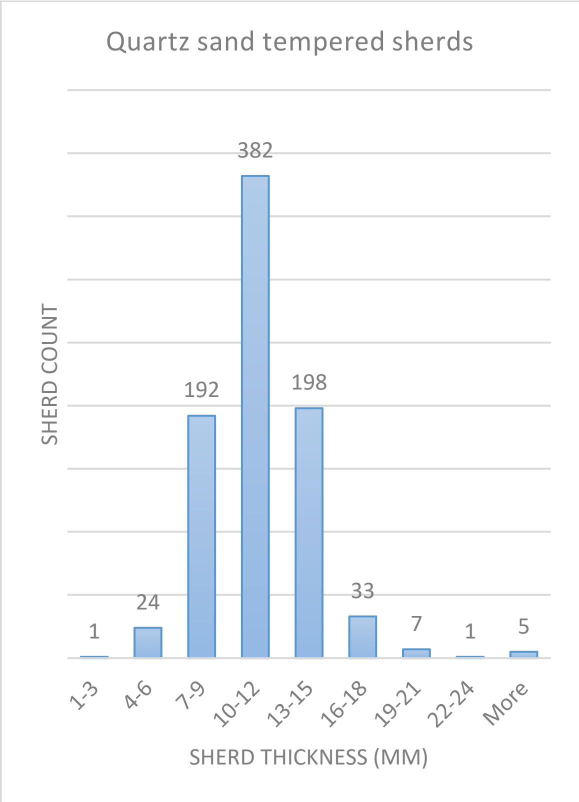
c. Modelling

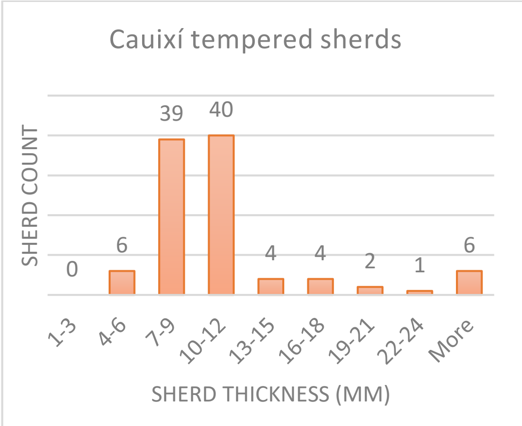
Bases and appendages (see subsection 5G) would have been formed by combinations of modelling, or pinching and drawing techniques. It is possible small vessels were also made in this way.

5. Vessel wall thickness

I measured the thickness of 986[4] sherds with a digital caliper at points deemed to be in between the thicker and thinner extremes of vessel walls. Nine hundred and sixty-four of these pieces were tempered primarily with quartz sand, *cauixí* or *caraipé*/caraipé "B". The histograms below illustrate the frequencies of vessel wall thicknesses in intervals of 3mm.

[4] The remaining five were reattached to another member of their sherd family and were not measured.





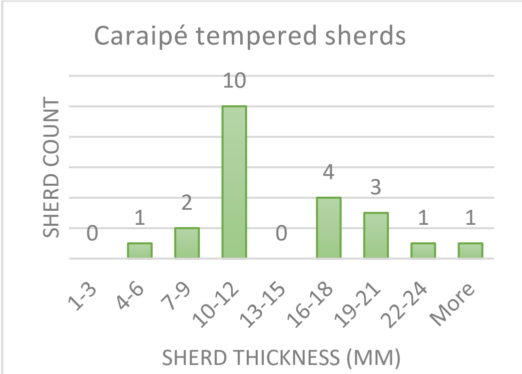


Chart 5 Histogram of vessel wall thickness of sherds tempered primarily with quartz sand. Chart 6 Histogram of vessel wall thickness of sherds tempered primarily with cauixí. Chart 7 Histogram of vessel wall thickness of sherds tempered primarily with caraipé and caraipé "B".

The thickness of sherds tempered with poorly sorted quartz sand tends to fall between 7-15mm, but peaks between 10-12mm. Rye states that "[i]f large, thick-walled vessels are being formed, larger inclusions are needed to prevent the vessels from collapsing under their own weight during forming" (Rye 1981, p. 21). Sherds tempered mainly with sponge spicules vary mostly from 7-12mm, indicating greater standardisation in comparison. Sponge-spicule sherds thicker than 24mm are related to griddles or plates. Although a greater number of *caraipé* tempered sherds fall between 10-12mm, the sherds that are thicker than 16mm are larger and misrepresented by sherd counts.

6. Vessel form

a. Horizontal cross section

There are three distinct forms of horizontal cross sections among Sawre Muybu pottery, however two of these are represented by unique specimens.

Mode 1: A circular horizontal cross section. Save the two exceptions below, all other analysed sherds large enough to warrant identification of horizontal cross section have circular horizontal cross sections.

Form 2: A part-circular, part straight form sits above a hemispherical vessel (SM-529-01a). Found in N1000/E957 (F3), this vessel is tempered primarily with sponge spicule temper and exhibits a painted motif of interlocking scrolls along its inner rim. *Unique specimen.*

Form 3: An elliptical vessel (SM-522), also excavated from N1000/E957 (F3). This vessel is again primarily tempered with *cauixí* and combines plastic and painted decoration along its rim and lip. *Unique specimen*.

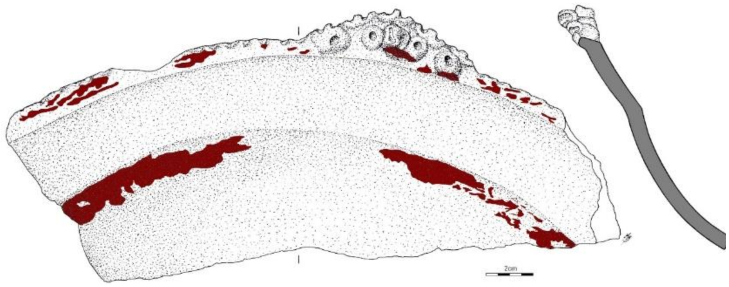


Fig. 8 PN529-01 – below the rim this vessel has a circular cross section, yet the vessel's mouth has curved (yellow arrow) and straight (red arrow) sides. Photo by Vinicius Honorato. Fig. 9 SM-522, an elliptical vessel. Illustration by Marcos Brito Castro.

b. Base form

Two forms of base form were uncovered at Sawre Muybu.

Mode 1: A flat base. The three bases analysed from the surface collection are flat, and the vast majority of identified excavated bases are also flat.

Form 2: A convex, rounded base. It is likely that the fragmented nature of convex base sherds has led them to be tallied as vessel wall fragments. The low number of specimens recognised as convex bases does not allow us to consider convex bases as a mode until more data becomes available.

Most usually the thickness of base sherds lies between 10-12mm. This shows that bases were not necessarily significantly thicker than vessel body walls (see table 13 and chart 8). The second most frequent thickness range is 16-18mm, which is, on the other hand, thicker than the average vessel body sherd. The frequency of bases that fall within the intermediary value between these two ranges (i.e., between 13-15mm) is lower, possibly suggesting a discontinuity in the range of variation. More specimens would be necessary for this assertion to be confidently expressed. The reduced quantity of thicker base sherds is likely related to the fact that larger, less mobile and thicker vessels lasted for longer than their lighter and thinner counterparts.

Quartz sand is the primary tempering agent of 30 of the 62 bases analysed while sponge-spicule temper is present as primary temper on 21 base sherds. *Caraipé* is the primary tempering agent of another six bases, and *caraipé* "B" of another five. This might suggest that, in contrast to vessel walls, potters often selected tempers other than quartz sand when manufacturing ceramic bases. This may be an artefact of our differential recognition of flat bases over convex bases – perhaps quartz sand was more commonly used in the latter case, meaning it is under-represented in our sub sample. The relationship of base form and temper is an area for further investigation. Table 13 shows how F3 contained the majority of base sherds identified in Excavation Area 1.

Base forms in Excavation Area 1				
Level (cm)	**E958/ 958.5**	**E958/ 958.5**	**E957**	**E957**
	Flat	**Convex**	**Flat**	**Convex**
0-10	-	-	1	-
10-20	4	-	3	-
20-30	8	-	2	-
30-40	9	-	5	-
40-50	-	-	1	-
50-60	-	-	8	-
60-70	-	-	4	1
70-80	-	-	7	-
80-90	1	1	5	-

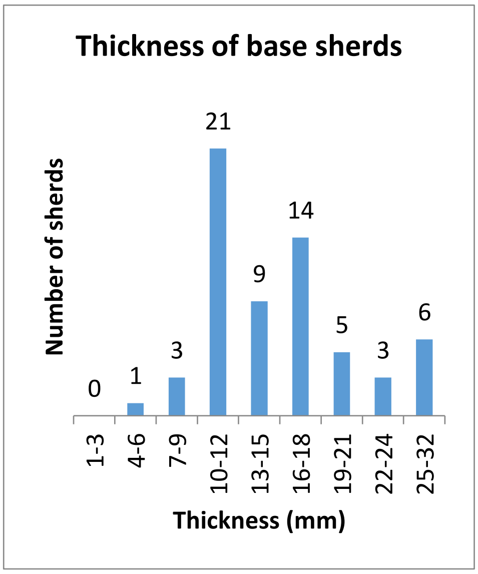


Table 13 Base forms in Excavation Area 1. Chart 8 Histogram showing thickness of base sherds Excavation Area 1.

c. Vessel body form (vertical cross section)

It was possible to establish vessel body form for 53 artefacts. Forty-four of these originate from Excavation Area 1, five from N1008/E1113, one from N934/E981 and three from our surface collection. We have identified eight recurrent forms and three unique specimens. Simple, unrestricted vessel contours are the most prevalent, and range from shallow griddles and dishes, to bowls of moderate depth. Independent and restricted vessels are also present. Although it is possible that simple and dependent restricted vessels were present, we did not identify any examples of this vessel body form. It is also possible that the functions attended by this form were served by vegetable gourds.

Form 1: These are shallow and flat griddles that have a simple contour and are unrestricted. Form 1 is associated to different stratigraphic contexts on the site: SM-625-04 came from N1008 E1113's 30-40cm level, and SM-323-02 from the 30-40cm level of unit N1000/E958 – the lower part of these levels are at the beginning of the site's *terra preta* layer. We retrieved SM-310-118 in level 20-30cm of N1000/E958, while SM-545 was located at approximately 70cm depth within N1000/E957 (F3).[5] Both SM-545 and SM-323-02 were placed directly over charcoal (and both disintegrated during the process of extraction). Munduruku villagers collected SM-709-01 and SM-708 from the surface of the site, near Cacique Juarez' house. This widespread vertical and horizontal dispersal points to a continuity in this form over time. Form 1 griddles were found to be tempered with *cauixí* (SM-545-1, SM-708, SM-709-01), *caraipé* (in the case of SM-323-02) and with quartz sand (SM-310-118). Soot is typically present on the underside of these artefacts.

Distribution of form 1 across the Sawre Muybu site				
Site surface	**Test pits**			
		Excavation Area 1		
	Level (cm)	**N1000/E958-958.5**	**N1000/E957 (F3)**	**N1008/E1113**
3	0-20	-	-	-
	20-30	1	-	-
	30-40	1	-	1
	40-60	-	-	-
	60-70	-	1	-
	70-90	-	-	-

Table 14 Distribution of form 1 across the Sawre Muybu site

[5] Remembering that the greater depth of F3 does not correspond to greater temporal depth, since the bottom of this feature postdates the bottom of the 30-40cm level in adjacent N1000/E958.

Form 1 is divided into a and b variants, determined on the basis of size. The diameters of Form 1a vary between 60-67cm, while the single specimen belonging to variant 1b, SM-708, has a diameter of approximately 35cm. SM-545, SM-709-01 and SM-708 display oblique, parallel and intersecting incisions on their inner rims. SM-708's incisions seem to have been executed when the clay was already dry, or even after firing, because the incised lines are not as clean as are those of its counterparts and as such might in fact be engraved lines. SM-625-04 from N1008/E1113 and SM-545-1 both have estimated diameters of 67cm. The thickness of SM-625-04 is 32.3mm however, while that of SM-545-01 is 19mm.

Form 2: An unrestricted, moderately deep bowl with a simple contour, shaped as an inverted, truncated cone. Found in the 20-30cm and 30-40cm levels of N1000/E958.5, through much of F3 and in F2, as well as in N1008/E1113 (20-30cm and 30-40cm levels), form 2 is the most recurrent form identified, with 16 specimens. Quartz sand temper is typically related to this form as a primary tempering agent, but sponge spicule temper also occurs; the two specimens belonging to form 2 tempered with *cauixí* were located either in N1000/E958.5 or in F2 (between N1000/E958 and N1000/E958.5). Form 2 has a mean vessel wall thickness of 9.46mm with a standard deviation of 1.9. The mean vessel mouth diameter for this form is 30.4cm, with a standard deviation of 7.9. Rim diameters range from 12cm to 40cm. There is discontinuity in size, as two specimens' diameter measure 12 and 14cm respectively, after which there is a gap until 25cm; then 13 rim diameters are estimated to measure up to 40cm (see histogram below). Again, a greater sample may eventually enable us to tell whether there was tighter clustering of these values, leading to a split based on size of mouth diameter. This form could have served a number of uses, from food preparation to serving. SM-529-01a is elaborately painted, indicating the latter function. Other coarse wares belonging to this form also display simpler decoration, such as is the case with SM-310-28.

Distribution of form 2 across the Sawre Muybu site			
Level (cm)	Excavation Area 1		N1008 E1113*
	N1000/E958-958.5	N1000/E957 (F3)	
0-20	-	-	-
20-30	4	1	1
30-40	2	2	1
40-50	-	-	-
50-60	1	2	1
60-80	-		
80-90	1	-	

*Table 15 Distribution of form 2 across the Sawre Muybu site. *The merged cells in this column are equivalent to feature F4, which extended from 50-81cm.*

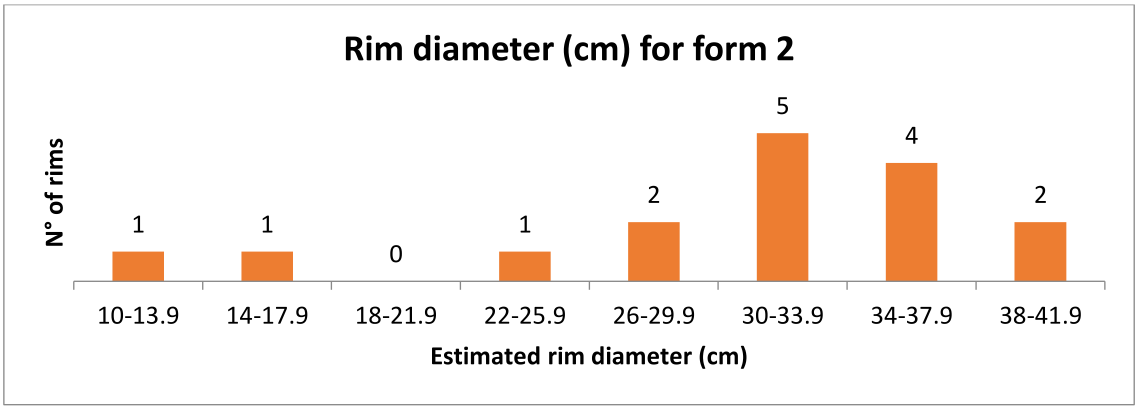


Chart 9 Rim diameters (cm) Form 2.

<u>Form 3</u>: This form represents an unrestricted, shallow dish with a simple contour. Form 3 was only located in the units comprising Excavation Area 1, particularly in the 20-30cm level. The mean thickness of vessel walls for form 3 is 9mm, with a standard deviation of 2.2. The mean vessel mouth diameter is ~31cm with a standard deviation of 3.4. One form 3 specimen (SM-384-1) has *cauixí* as its main temper, but most of these vessels have quartz sand as their main temper. It is likely this form relates to food serving.

Distribution of form 3 in Excavation Area 1		
Level (cm)	N1000/E958-958.5	N1000/E957 (F3)
0-10	-	1
10-20	-	-
20-30	4	1
30-40	2	1
40-80	-	-
80-90	1	-

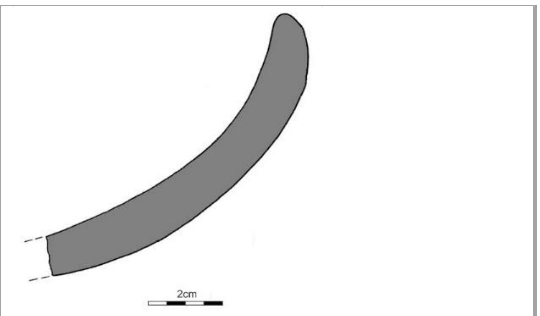


Table 16 Distribution of form 3 in Excavation Area 1. Fig. 10 SM-504-10b (form 3). Illustration by Marcos Brito Castro.

<u>Form 4</u>: This is an unrestricted, deep cylindrical vessel with a simple contour. We only identified two examples of this form, excavated from level 30-40cm of N1000/E957 (F3) (SM-508-04) and from F2, in between N1000/E958-958.5 (SM-384-30). Both these vessels were tempered with quartz sand. This form may be associated to food preparation. The average vessel wall thickness of these two vessels is 10.8mm. Although it is eroded, we estimate the rim of SM-508-04 to measure between 30-40cm. The vessel mouth diameter of SM-384-30 is estimated at 35cm.

Distribution of form 4 in Excavation Area 1		
Level (cm)	**N1000/E958-958.5**	**N1000/E957 (F3)**
0-30	-	-
30-40	-	1
40-80	-	-
80-90	1	-

Table 17 Distribution of form 4 in Excavation Area 1

<u>Form 5</u>: This is an unrestricted and shallow ovaloid dish with convex walls and simple contour. Form 5 occurred at the top and bottom of the cultural layers in N1000/E958.5. It has a mean vessel wall thickness of 8.45mm, however, there is distortion in this case because SM-354-1 could only be measured at a point where its wall was expanding to encompass its hollow rim (the vessel wall beneath this was not present). Otherwise, the value pertaining to vessel wall thickness would have been smaller. The mouth diameter of SM-354-1 is estimated to be 33cm while that of SM-371-56a is estimated at 40cm. Both specimens belonging to form 5 were tempered mainly with *cauixí*; this appears to be a serving vessel, with plastic decoration on the lip.

Distribution of form 5 in Excavation Area 1		
Level (cm)	**E958/958.5**	**E957**
0-10	-	-
10-20	1	-
20-50	-	-
50-60	1	-
60-90	-	-

Table 18 Distribution of form 5 in Excavation Area 1.

<u>Form 6</u>: This form includes a and b variants, which are also subdivided on the basis of their size. Although the mean vessel mouth diameter of form 6 is ~25cm, standard deviation is 13. Form 6a represents independent restricted, inflected globular to hemispherical vessels, and comes in small (Ø 10-16cm), medium (Ø 25cm) and large (Ø >50cm) sizes. Form 6b represents an independent restricted, necked, inflected globular to hemispherical vessel. The "S"-shaped contour of 6b tends to be more accentuated than that of 6a. Form 6b also has small (Ø 17-18cm), medium (Ø 25-30cm) and large (Ø 47cm) vessel mouth diameters. All specimens belonging to Form 6 vessels are tempered with large amounts of poorly sorted quartz sand. Form 6 has a mean vessel wall thickness of 8.8mm, with a standard deviation of 2.8.

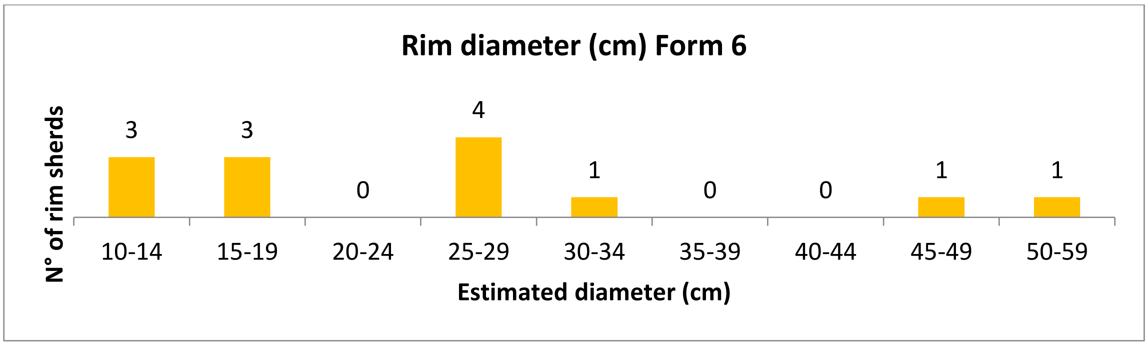


Chart 10 Rim diameter (cm) Form 6.

Forms 6a and 6b are associated to externally thickened or "folded' rims, which often display plastic displacement decorative techniques. SM-308-25 epitomises a formal style that brings together local elements and punctated, applied clay strips that signal a connection to the Incised and Punctate tradition. We located SM-367-01 in association to fire dogs in the 30-40cm level of the N1000/E958 unit. Because of their constricted orifices, these vessels would have been useful for holding liquids. I did not detect soot on the specimens analysed from this group.

Distribution of form 6 across the Sawre Muybu site								
Level (cm)	Excavation Area 1				N1008 E1113*		N934/E981	
	E958/958.5		E957 (F3)					
	6a	6b	6a	6b	6a	6b	6a	6b
0-10	-	-	-	-	-	-	-	-
10-20	-	1	-	-	-	-	1	-
20-30	-	-	3	-	-	-	-	-
30-40	1	1	1	-	-	-	-	-
40-50	-	-	2	-	-	-	-	-
50-60	-	1	-	1			-	-
60-70	-	-	-	-	-	1	-	-
70-80	-	-	-	-			-	-
80-90	-	-	-	-	-		-	-

*Table 19 Distribution of form 6 across the Sawre Muybu site *The merged cells in this column are equivalent to feature F4, which extended from 51-80cm.*

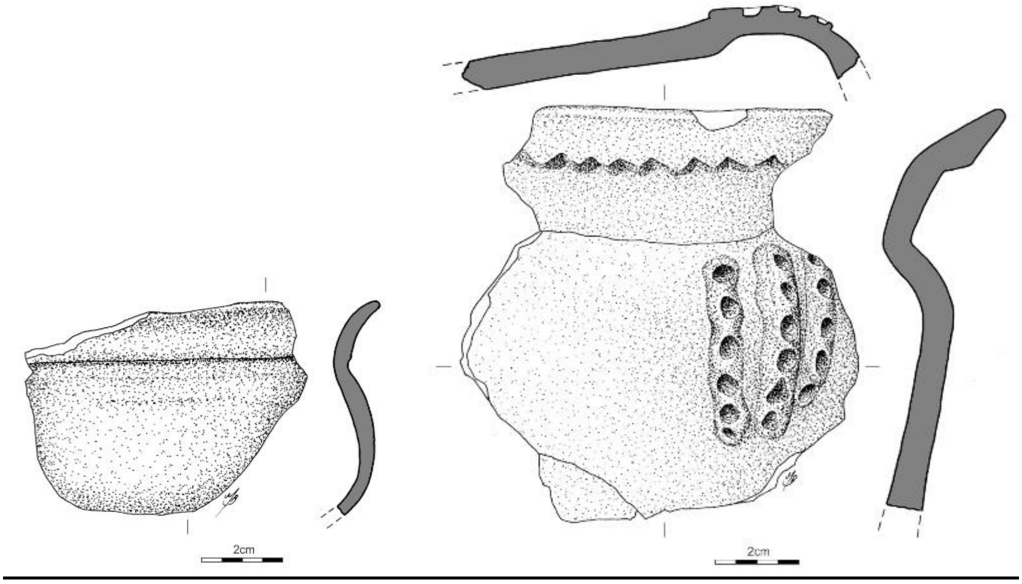


Fig. 11 SM-452-17 Form 6a. Fig. 12 SM-308-25 Form 6b. Illustrations by Marcos Brito Castro.

<u>Form 7</u>: SM-537-31 is a robust, hemispherical bowl of moderate depth and simple contour. We recovered it from the 60-70cm level of N1000/E957 (F3). Primarily tempered with quartz sand, it has an indeterminately thickened rim. Its average vessel wall thickness is 8.2mm and its rim diameter is estimated at 35cm. It displays a line of oblique, linear punctations along the top of its flat lip. *Unique specimen*.

<u>Form 8</u>: This is an unrestricted vessel of moderate depth with simple contour, whose walls are convex. We uncovered SM-522-1 from the 30-40cm level of N1000/E957 (F3). It has sponge spicules as its primary temper, its wall thickness is 5.9mm and its estimated vessel diameter is ~55cm (having an ellipsoid horizontal cross section means we cannot estimate its diameter precisely). The vessel's rim has a labial extension on which plastic additive and displacement embellishment techniques have been combined with painted techniques to form a design (see fig. 8). *Unique specimen*.

<u>Form 9</u>: This is an unrestricted bowl with a simple contour. SM-531-138a is tempered with quartz sand and has an internally strengthened rim. Its average vessel wall thickness is 8mm and its rim diameter is estimated to be 4.9mm. Its lip displays a line of left-oriented, oblique punctations. Vestiges of red paint can be seen on the exterior vessel body. It was found in N1000/E957's 50-60cm level. Although the attributes present on this piece are the same as in many others, it seems as if this could have belonged to a different complex. *Unique specimen*.

d. Neck modification:

Two forms of neck were identified at the site. Both are associated to form 6b.

Neck form 1: Straight with upright or lightly everted inclination

Neck form 2: Constricted (concave in cross section) with slight to accentuated curves.

e. Rim Form (modification):

Twelve rim forms have been identified among the Sawre Muybu pottery. They are listed below, and the number of times they appear in each level of Excavation Area 1 has been tabulated; levels containing greater concentrations of specific rim forms have been highlighted.

Our present data does not allow us to state that all of the rim forms listed below have modal value; our identification of rims was limited to those large enough for a confident projection of inclination. A significant amount of vessel rim sherds could not be confidently classified because of their reduced size, and/or because they have been eroded. These are listed first, so that the reader can bear this factor in mind while perusing the rest of the data on rim form. Further excavation and analysis of materials from the site will permit additional evaluations related to the distribution and frequency of rim forms at Sawre Muybu.

Eroded or undetermined rims - Excavation Area 1									
Level (cm)	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**	**80-90**
E958/958.5	3	17	9	12	3	4	1	-	1
E957 (F3)	1	15	6	4	4	6	-	-	1

Table 20 Undetermined rims - Excavation Area 1

Rim form 1: Zero modification. Also known as “direct rims”, which follow the vessel contour without changing the vessel wall inclination. This rim form was particularly recurrent in the 20-30cm level of N1000/E958-958.5and was present throughout the levels until 50-60cm of both N1000/E958-958.5 and F3, but only in low numbers.

Zero Modification rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
E958/958.5	1	1	13	3	1	1	-	-	1
E957 (F3)	3	1	1	4	5	1	-	-	-

Table 21 Zero Modification rims - Excavation Area 1

Rim form 2: Upright: these rims are inclined upward, regardless of vessel wall inclination. Mainly concentrated in the 0-10cm level of N1000/E958-958.5.

Upright rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
E958/958.5	11	-	3	2	1	-	-	-	1
E957 (F3)	-	-	-	-	-	-	-	-	-

Table 22 Upright rims - Excavation Area 1

Rim form 3: Bevelled rim. This form of rim would be produced by a straight-edged tool. The bevelled rims located have an everted inclination.

Bevelled rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	1	-	1	1	-	-	-	-	-
E957 (F3)	-	-	-	-	-	-	-	-	-

Table 23 Bevelled rims - Excavation Area 1

Rim form 4: Tapered rim. This rim form would have been produced by running the potter's indicator and thumb along the vessel orifice, thinning its outline towards the lip. This rim form is sufficiently recurrent to have modal value. It is present throughout the cultural levels of N1000/E958-958.5. One of the surface sherds analysed also has a tapered rim. The tapered rims found have an everted inclination.

Tapered rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	10	10	16	22	8	1	-	1	1
E957 (F3)	3	4	8	6	5	6	-	1	1

Table 24 Tapered rims - Excavation Area 1

Everted rims: During analysis, all everted rims were categorised as such, and only later was the separation made between form 5 (everted, folded out at slight angle) and form 6 (everted, curved outwards). Table 25 shows the number of times both these rim forms were identified in each level at N1000/E958-958.5 and N1000/E957.

Rim form 5: Everted rim, out folded at a slight angle: this consists of an outwardly inclined rim, set off from the vessel at an angle.

Rim form 6: Everted, out-curved rim. These rim forms maintain uniform thickness as they curve outwards.

Everted rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	3	8	8	10	5	-	-	-	2
E957 (F3)	1	1	4	2	6	9	2	2	-

Table 25 Everted rims - Excavation Area 1.

Everted rims that are either curved or set off from the vessel body at an angle occur particularly in between 10-40cm of N1000/E958-958.5, and in the 50-60cm level of F3.

Rim form 7: Small flange. A rim folded out at a sharp, 90° angle, resembling a small flange in profile. Though present in most of the cultural levels of N1000/E958-958.5, this distinctive rim form is infrequent.

Small flanges - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	1	-	3	1	1	1	-	-	-
E957 (F3)	-	-	-	-	-	-	-	-	1

Table 26 Small flanges - Excavation Area 1

Rim form 8: Internally thickened rim. These rim forms have extra coils on their interior. They occur rarely. Three of the analysed surface sherds possess this rim form.

Internally thickened rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	-	1	-	-	-	-	1	-	-
E957 (F3)	-	-	-	-	-	1	-	-	-

Table 27 Internally thickened rims - Excavation Area 1

Rim form 9: Externally thickened rim: These rims with external thickening give the impression of being outwardly "folded". They are distinctive, usually displaying the plastic decoration (particularly involving clay displacement), and are a hallmark of the site's ceramics. Their occurrence is reiterated in most of the levels of Excavation Area 1, peaking between 20-40cm of N1000/E958-958.5, while increasing in the 40-50 and 50-60cm levels of N1000/E957 (F3). This rim form is strongly associated to vessel body form 6. Rim form 9 displays a modal value, representing a shared concept of the makers of the pottery at Sawre Muybu. Two of the analysed surface sherds display externally thickened rims.

Externally thickened or folded rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	1	4	12	8	-	2	1	1	-
E957 (F3)	-	1	2	3	4	4	1	-	-

Table 28 Externally thickened or folded rim - Excavation Area 1

Rim form 10: Indeterminately thickened rim. These rim forms are exceptional.

Indeterminately thickened rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	-	-	-	-	1	-	-	-	1
E957 (F3)	-	1	-	-	-	-	1	-	-

Table 29 Indeterminately thickened rim - Excavation Area 1

Rim form 11: Hollow rim. This rim contains a hollowed, rounded interior, which causes its upper and lower surfaces to bulge. Great technical ability would be required to produce this rim form. The hollow area may have contained small beads in order to produce a rattle effect (J. Oliver, pers. comm., 01 August 2016). A hollowed rim was only seen once, on SM-354-1, which is *cauixí*-tempered. Hollow rims are a recurrent feature of Santarém pottery. Linné (1925, p. 129) proposes that the rapid expansion of air inside the spaces within hollow rims could lead to them bursting through the paste during firing. If apertures were not used, the vessels would have to be heated slowly and subsequently cooled carefully (In: Palmatary 1960, p. 63). Palmatary encountered hollow rims on pottery she classified as distinct from Santarém ceramics (1960, see Plate 85), although she concludes its makers would have been "familiar with Tapajós ceramic processes… [since] this sherd is hollow and the technique is excellent" (1960, p. 65). Both Almeida (2008) and Garcia (2012) repeatedly encountered hollow rims (known in Portuguese as *bordas vazadas* or *bordas ocas*) among the ceramics they investigated in the Tocantins-Xingu interfluves to the east of the Tapajós. Almeida and Rafael Machado conducted an experiment in manufacturing vessels with hollow rims (2008, p. 100-102), using a piece of liana vine to structure the rim. Two attempts were made, in which 1) the piece of liana was left in during firing and 2) removed. Although it seems that leaving the liana vine in during firing produced a better finished product, this would likely not allow for the possibility of the hollow rim being used as a rattle.

Hollowed rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	-	1	-	-	-	-	-	-	-
E957 (F3)	-	-	-	-	-	-	-	-	-

Table 30 Hollowed rims - Excavation Area 1

Rim form 12: Rim with concave inner surface Rim with concave inner surface. Specimens of this rim form have everted inclination. Seen in profile, this rim appears to have channelling on its upper rim. This rim form is present on SM-384-2 (which is also externally thickened). SM-384-2 was retrieved from F2 (N1000/E958-958.5) within the 80-90cm level.

Rim with concave inner surface - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	-	1	-	-	-	-	-	-	1
E957 (F3)	-	-	-	-	-	-	-	-	-

Table 31 Rim with concave inner surface - Excavation Area 1

Rim form 13: Internally thickened, griddle rims.

Internally thickened, griddle rims - Excavation Area 1									
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
958/958.5	-	1	-	1	-	-	-	-	-
E957 (F3)	-	-	-	-	-	-	1	-	-

Table 32 Internally thickened, griddle rims

Rim forms of surface sherds

Rim forms of surface sherds											
Zero modification	**Upright**	**Bevelled**	**Tapering**	**Flange**	**Everted**	**In-turning**	**Internally thickened**	**Externally thickened or 'folded'**	**Indeterminately thickened**	**Hollow**	**Internally thickened, griddle rims**
0	0	0	1	0	0	0	0	2	0	0	3

Table 33 Rim forms of surface sherds

f. Lip Form

Within the dimension of lip form, two modes are present at Sawre Muybu: rounded and flat. Even though there is a significant number of eroded lips, it still appears that rounded lips were the most popular mode of lip shape.

Mode 1: A rounded lip.

Mode 2: A flat lip.

Lip forms Excavation Area 1						
Level (cm)	**Mode 1: Rounded lips**		**Mode 2: Flat lips.**		**Undetermined (Eroded lips)**	
	958/958.5	E957 (F3)	958/958.5	E957 (F3)	958/958.5	E957 (F3)
0-10	18	2	5	1	10	3
10-20	23	10	5	10	16	2
20-30	35	8	14	5	17	6
30-40	21	8	19	6	17	4
40-50	9	6	4	7	6	5
50-60	4	12	4	4	1	11
60-70	2	1	0	3	1	2
70-80	0	4	1	0	1	2
80-90	3	1	5	1	1	1

Table 34 Lip forms - Excavation Area 1.

Surface sherds' lip form		
Mode 1: Rounded	**Mode 2: Flat**	**Eroded or Undetermined**
2	4	1

Table 35 Surface sherds' lip form

7. Appendages

Five different forms of appendage have been recognised at Sawre Muybu:

i. Vessel base supports. SM-538-02 is a single 'foot', probably belonging to a vessel with three or four similar supports.

ii. Protuberances. SM-602-59 is a protuberance at the midpoint of the vessel body, potentially acting as a handle or support.

iii. Handles. SM-707 possesses a looped, vertically orientated handle, which connects the upper body and neck of the vessel.

iv. Adornos. These are plastic modifications, involving modelling and appliqué, which are present on body walls. They are often pushed out from inside the vessel. SM-716 and SM-504-188 are examples.

v. Labial extensions. Labial extensions provide the platform for the application of decorative elements. They are uncommon at the site, and are related to *cauixí*-tempered ware. Examples include SM-314-02, SM-508-187, SM-522-1 and SM-546-29.

Other clay artefacts

Fire dogs: Amorphous baked clay of varying proportions (up to the size of a small lime) was found in association to griddle fragments.

Combinations of bases, bodies, necks, rims, lips and appendages

The combinations of forms observed and hypothesised for Sawre Muybu are summarised below in Table 36. Body forms 2 and 3 are seen to be combined with a considerable number of rim forms.

Observed and hypothesised combinations of vessel form dimensions at Sawre Muybu						
Form	**Base**	**Body**	**Neck**	**Rim**	**Lip**	**Appendage**
1a	1	1*	-	13	1	-
1b	1	1*	-	13	1	-
2	1, ?2	2	-	1, 3, 4, 5, 7, 12	1	?2
3	?1	3	-	1, ?3, 4, 10	1, 2	-
4	1	4	-	2	?1, 2	-
5	?1, ?2	3	-	7, 11	1, 2	-
6a	?1, ?2	5	-	6, 9	1	?1, ?4, ?3
6b	?1, ?2	6	1, 2	6, 9	1	?1, ?3, ?5

Table 36 Observed and hypothesised combinations of base, body, neck, rim, lip and appendages at the Sawre Muybu site. Hypothesised combinations are signalled by a question mark (?).

<u>Associations between vessel body form and temper, sherd thickness, rim diameter and context</u>

Three principal tempers were detected among the reconstituted forms: quartz sand, *cauixí* and *caraipé*. Quartz sand is the most prevalent, being associated to all specimens of forms 4 and 6 and to the great majority of specimens from forms 2 and 3. Forms 7 and 9, unique specimens, were also tempered with quartz sand. Quartz sand is consequently related to unrestricted vessel body forms with simple contours and to independent restricted, inflected vessel contours. On the other hand, the use of *cauixí* is related solely to unrestricted forms with simple contours, including forms 1, 2, 3, 5 and 8. The use of *caraipé* was only related to vessel form 1.

This indicates that different principal tempers could be chosen by the makers of the pottery excavated to produce similar forms. Yet we also find that vessels tempered with *cauixí* can have thinner walls and wider diameters than their quartz sand-tempered counterparts. The wall thickness of SM-522-1 is only 5.9mm, but its diameter is ~55cm, pointing to the greater flexibility afforded by *cauixí* and/or by the clay used for *cauixí*-tempered wares in comparison to those tempered with quartz sand. There appears to be a relationship, therefore, between temper and clay selection and vessel forms and proportions (thickness of vessel wall and diameter). Unsurprisingly, the smallest rim diameters belong to form 6, which represents independent restricted, often necked, vessels. The fragmented nature of sherds meant we could only rarely measure diameters at the major point of these vessels. Nonetheless, the variations in size inferred from the different estimated vessel diameters suggest that this form category could serve different needs depending on size.

<u>The distribution of forms across the site</u>

An evaluation of the distribution of forms based on the available data merits caution, since subunit N1000/E957, which is a feature, provided the greater part of the sherds that allowed for an exercise in reconstruction of vessel shape: out of the 53 reconstructed pieces, 20 were retrieved from N1000/E957. Adjacent units N1000/E958 and N1000/E958.5 yielded a further 19 specimens. The feature or bioturbation between N1000/E958 and N1000/E958.5 produced four reconstructible pieces while another sherd (SM-367-1) was found associated to fire dogs straddling these units. Five of the vessel fragments included in formal analysis come from test pit N1008/E1113 while unit N934/E981 rendered only one piece. Three sherds came from the site's surface. With this proviso in mind, it can be stated that:

- Forms 1a, 2, 3, 4, 6a and 6b, 7, 8 and 9 were encountered within N1000/E957 (F3), which means that almost all of the vessel body forms so far identified at Sawre Muybu are represented in this 0.6x0.7m area. We have a mixture of coarse and fine wares here, with simple and inflected contours, representing a range of different functions. The integrity of the pieces suggests this became a pit for secondary deposition of material broken nearby and disposed of in F3.
- Adjacent N1000/E958 (which includes part of F3 – the feature was excavated as part of this test pit before we were able to identify it, at the end of the excavation of N1000/E958) yielded forms 1, 2, 3 and 6b. Within N1000/E958.5 forms 2, 3, 4, 5 and 6 are represented – it is worth noting particularly that form 5 only has two specimens, and both were found here. Forms 2, 3 and 4 were found associated to feature F2 (which may in fact be a bioturbation, or may have suffered interference from biological agents after the feature's formation).
- Forms 1, 2 and 6b were encountered in N1008/E1113 and form 6a, in N934/E981. This does not mean, however, that other forms did not occur in these areas; the material from these units was more fragmented, which did not confidently allow for other reconstructions. Griddle sherds (form 1a and b) were also found next to cacique Juarez' house, on the surface of the ground.

The distribution of forms across the Sawre Muybu site					
Unit	**N1000/E957**	**N1000/E958-E958.5**	**N1008/E1113**	**N934/E981**	**Surface**
Form	1, 2, 3, 4, 6, 7, 8, 9	1, 2, 3, 4, 5, 6	1, 2, 6	6	1

Table 37 The distribution of forms across the Sawre Muybu site

Distribution of forms by depth (arbitrary levels)

The paucity of forms related to the first 20cm of Excavation Area 1 can be explained by the fact that most of the fragments were too small, since this was currently a passage area between houses, subject to trampling over the past few years. Specimens belonging to forms 2 and 3 are mostly concentrated in the 20-30cm and

30-40cm levels of Excavation Area 1 and in N1008/E1113. Yet again, the concentration of forms in N1000/E957 (F3) presents us with a problem: being a feature, we expect the deposition of many of these materials to have occurred over a shorter period of time – perhaps even in a single event. This problem also presents itself for features F2 (between N1000/E958 and N1000/E958.5 test pits) and F4 (N1008/E1113 unit), rendering a stratigraphic assessment of the presence or absence of certain forms within the arbitrary 10cm levels tentative at best.

Vessel body forms, contexts and dates at Sawre Muybu							
Level (cm)	**N1000/E957**		**N1000/E958**		**N1008/E1113**		**Forms**
	Layer	**C^{14} date BP**	**Layer**	**C^{14} date BP**	**Layer**	**C^{14} date BP**	
Surface							1
0-10	V, IV, F3?		V, IV		V, IV		3
10-20	IV, F3?		IV		IV		5, 6
20-30	IV, F3?		IV		IV		1, 2, 3, 6
30-40	F3		IV, III	1039±26	IV, II, F4		1, 2, 3, 4, 6, 8
40-50	F3		III, IIa, F3, F2		II, F4		6
50-60	F3		IIa, IIb, F3, F2		II, F4	865±30	2, 5, 6, 9
60-70	F3		IIb, F3, F2		II, F4		1, 6, 7
70-80	F3, II	913±30	IIb, F3, F2		II, F4		
80-90	II		IIb, I, F3, F2		Not excavated		2, 3, 4
90-100	Not excavated		I, F2, F3				
100-110			I				
110-120			I				
120-130			Not excavated				

Table 38 Vessel body forms, contexts and dates at Sawre Muybu. We attempted to equate the layers across the site.

The date of 1039±26 BP refers to the base of the occupation layer of the site; below this, there were significantly fewer archaeological materials and the soil transitioned to latossol. The date of 913±30BP comes from charcoal located beneath a form 1 griddle, whose rim is incised with oblique and intersecting lines, at the bottom of feature F3. Feature F4 is dated to 865±30 BP. This contained remains of what seems to have been a lithic 'workshop' at the eastern end of the site.

Dimensions of surface treatment and decoration

8. Surface treatment techniques

Surface treatment techniques observed among Sawre Muybu ceramics include smoothing, self slip, burnishing, smudging, polish and resin application. More than one surface treatment could be applied to the same vessel.

Table 39 presents the number of times the different surface treatments and decorative techniques could be seen among the sherds from Excavation Area 1. Interior and exterior surfaces were analysed individually so that we could observe whether they were treated differently.

Mode 1: Smoothing was constantly employed by the potters of Sawre Muybu as a technique of surface finish on exterior surfaces, and it was almost as popular on interior surfaces. On occasion, eroded sherds did not allow for an evaluation of whether any surface techniques had been applied; had this not been the case, we may have found that all sherds had been smoothed.

Mode 2: Self slip was frequently employed, particularly on outer vessel surfaces. Following firing and the ensuing shrinkage of the clay matrix, particles of quartz sand would have become pronounced, leaving vessels with a coarse feel, perhaps rough to handle. The layer of self slip would help avoid this and would be particularly useful among vessels that had to be constantly moved or handled, besides affording them a smoother appearance.

Smoothing and self slip were often combined on vessel sherds.

The other surface treatments identified are burnishing, smudging, polish and resin application; they are rare, however, and do not have modal value. One small speck of what appears to be resin was located on the internal surface of sherd SM.504.01.

Surface treatment Excavation Area 1

Level (cm)	Interior/exterior sherd face	E958/958.5					E957 (F3)						
		Smoothing	*Self slip*	*Burnishing*	*Smudging*	*N ° of sherds displaying surface treatment**	*Smoothing*	*Self slip*	*Burnishing*	*Smudging*	*Polishing*	*Resin*	*N° of sherds displaying surface treatment**
0-10	Int	35	1	-	-	35	20	4	-	-	-	-	21
	Ext	36	2	-	-	36	20	12	-	-	-	-	20
10-20	Int	67	10	-	-	68	37	7	-	1	-	-	37
	Ext	64	9	-	1	64	43	19	-	-	-	-	43
20-30	Int	100	13	-	-	101	51	21	-	-	-	1	51
	Ext	98	28	-	1	99	53	28	-	-	-	-	53
30-40	Int	148	31	4	-	153	54	34	3	-	-	-	57
	Ext	167	77	4	-	171	54	41	3	-	-	-	57
40-50	Int	55	16	-	2	55	61	25	-	-	1	-	61
	Ext	62	33	-	2	62	68	36	-	-	1	-	68
50-60	Int	37	14	-	1	38	67	22	-	-	1	-	67
	Ext	40	28	-	1	40	103	56	-	-	-	-	104
60-70	Int	10	6	-	-	10	24	14	-	-	-	-	14
	Ext	11	6	-	-	11	34	26	-	-	-	-	34
70-80	Int	19	9	-	-	19	19	5	-	-	-	-	19
	Ext	20	12	-	-	20	29	19	-	-	-	-	29
80-90	Int	21	10	-	-	21	8	2	-	-	-	-	8
	Ext	23	15	-	1	23	6	-	-	-	-	-	6
90-100	Int	-	-	-	-	-	-	-	-	-	-	-	-
	Ext	-	-	-	-	-	-	-	-	-	-	-	-
100-110	Int	1	-	-	-	1	-	-	-	-	-	-	-
	Ext	2	1	-	-	2	-	-	-	-	-	-	-

*Table 39 Surface treatment present among sherds from Excavation Area 1. *Note that surface treatments are not necessarily mutually exclusive, therefore the sum of the different treatments may surpass the sherd count for any particular level.*

As with other dimensions, it can be seen that the levels with greatest number of analysed sherds are the 30-40cm level for the N1000/E958-958.5 and the 50-60cm level for N1000/E957 (F3).

9. Decorative field

Exterior surfaces of body sherds make up the majority of decorated sherds among the analysed sub-sample. This is not surprising, since body sherds tended to be selected for analysis on the basis of presenting decoration, while all rim sherds – decorated or not – were analysed. Considering the total number of rim sherds, a larger proportion of rims was decorated. According to the analysed sample, the potters of Sawre Muybu more often chose exterior surfaces to apply decoration (which includes slips). Tables 40 and 41 summarise information pertaining to choice of decorative field. This is not separated by stratigraphic level for Excavation Area 1 because the tables that follow in this section will provide this information.

Decorative field – Excavation Area 1					
Sherd face	**Base**	**Body**	**Rim**	**Lip**	**Appendage**
Interior	1	131	70	N/A	N/A
Exterior	6	194	134	80	3

Table 40 Decorative field - Excavation Area 1

Decorative field – Surface sherds					
Sherd face	**Base**	**Body**	**Rim**	**Lip**	**Appendage**
Interior	-	-	5	-	N/A
Exterior	-	3	2	-	2

Table 41 Decorative field - Surface sherds

The following modes related to the dimension of decorative field have been discerned.

Mode 1: This entails applying one or more forms of decoration to the exterior surface of vessel rims.

Mode 2: This involves applying one or more forms of decoration to the exterior vessel body.

Mode 3: This includes decorating the interior surface of the vessel body with one or more forms of decoration.

Mode 4: This is manifested by the decoration of vessel lips.

Mode 5: This is expressed by the decoration of the interior of vessel rims.

Bases were only seen to be decorated in rare instances.

Decorative techniques

Decorated sherds represent a little over a third of the total pottery analysed from Sawre Muybu. Being overall techniques, these are not considered by us as modes as such; rather they give us an initial idea of the general practices employed by the makers of Sawre Muybu pottery. Table 42 demonstrates how – unsurprisingly – exterior surfaces generally received greater attention from potters.

Decorative techniques - Excavation Area 1

Level (cm)	Interior/exterior surface	E958/958.5					E957 (F3)				
		Paint	*Slip*	*Plastic displacement*	*Plastic additive*	*N° of sherds displaying decoration**	*Paint*	*Slip*	*Plastic displacement*	*Plastic additive*	*N° of sherds displaying decoration**
0-10	Int	-	1	2	-	3	-	3	-	-	3
	Ext	1	1	5	1	7	-	-	-	-	3
10-20	Int	2	2	3	-	7	-	3	-	-	3
	Ext	11	7	16	12	29	1	1	5	1	7
20-30	Int	2	10	3	3	15	2	7	1	1	9
	Ext	5	11	21	11	35	1	4	9	5	16
30-40	Int	7	33	-	-	38	2	3	1	1	5
	Ext	20	34	19	8	70	3	6	4	1	13
40-50	Int	-	7	-	-	7	4	15	1	-	18
	Ext	9	16	2	1	27	7	19	17	12	37
50-60	Int	2	3	-	-	4	4	16	2	-	18
	Ext	1	2	5	1	9	17	27	7	2	45
60-70	Int	-	-	-	-	-	-	4	-	-	4
	Ext	2	2	-	-	3	2	4	1	1	6
70-80	Int	2	2	-	-	4	-	1	2	1	3
	Ext	1	6	-	-	7	-	2	2	1	4
80-90	Int	-	3	-	-	3	1	-	-	-	1
	Ext	2	4	-	-	6	-	-	-	-	-
90-100	Int	-	-	-	-	-	-	-	-	-	-
	Ext	-	-	-	-	-	-	-	-	-	-
100-110	Int	-	-	-	-	-	-	-	-	-	-
	Ext	-	1	-	-	1	-	-	-	-	-

*Table 42 Decorative techniques - Excavation Area 1. *Note that decorative techniques are not mutually exclusive, therefore the number of times they were applied may surpass the sherd count for any particular level.*

In terms of overall decorative techniques, we can state that:

a. Slipping is the most routine decorative treatment encountered;

b. Decoration involving clay displacement – in particular, incisions and punctations – is relatively frequent among the material analysed;

c. Painting occurs on sherds from almost all levels, albeit in low frequencies;

d. Additive plastic decoration occurs less often. It can often be found combined with displacement techniques of plastic decoration in the form of punctated, applied clay strips.

The results of a multi-correspondence analysis of technological attributes (temper, firing, colour of the paste), surface finish and decorative techniques can be seen below (fig. 13). Box 1 shows an association between the use of quartz sand and accessory tempers, oxidised firings, brown and orange coloured pastes, smoothing and self slip surface treatments, as well as plastic (additive and displacement) decorations on the exterior of sherd surfaces. Box 2, on the other side of the plot, shows greater proximity between *cauixí* and related tempers, reduced firings, greyer or (uncommon) pink pastes, and decorative techniques on the interior face of sherds – involving paint, and both types of plastic decoration. These decorative techniques would most often be associated with the inner face everted rims. Box 3 emphasises some relation between *caraipé* temper, partially oxidised firing, and greyish pastes. The fact that few specimens are tempered with *caraipé* means the associations are looser. Exterior painted decoration occurs with the attributes and modes of both boxes 1 and 2. The reason for only including over-arching decorative dimensions (such as 'type of decoration – paint') rather than sub-dimensions (such as 'red paint,' 'white paint') was that there were too few specimens of each of the sub-dimensions, and the results of analysis with these more specific variables were not meaningful. A larger sample should permit this greater level of detail, however.

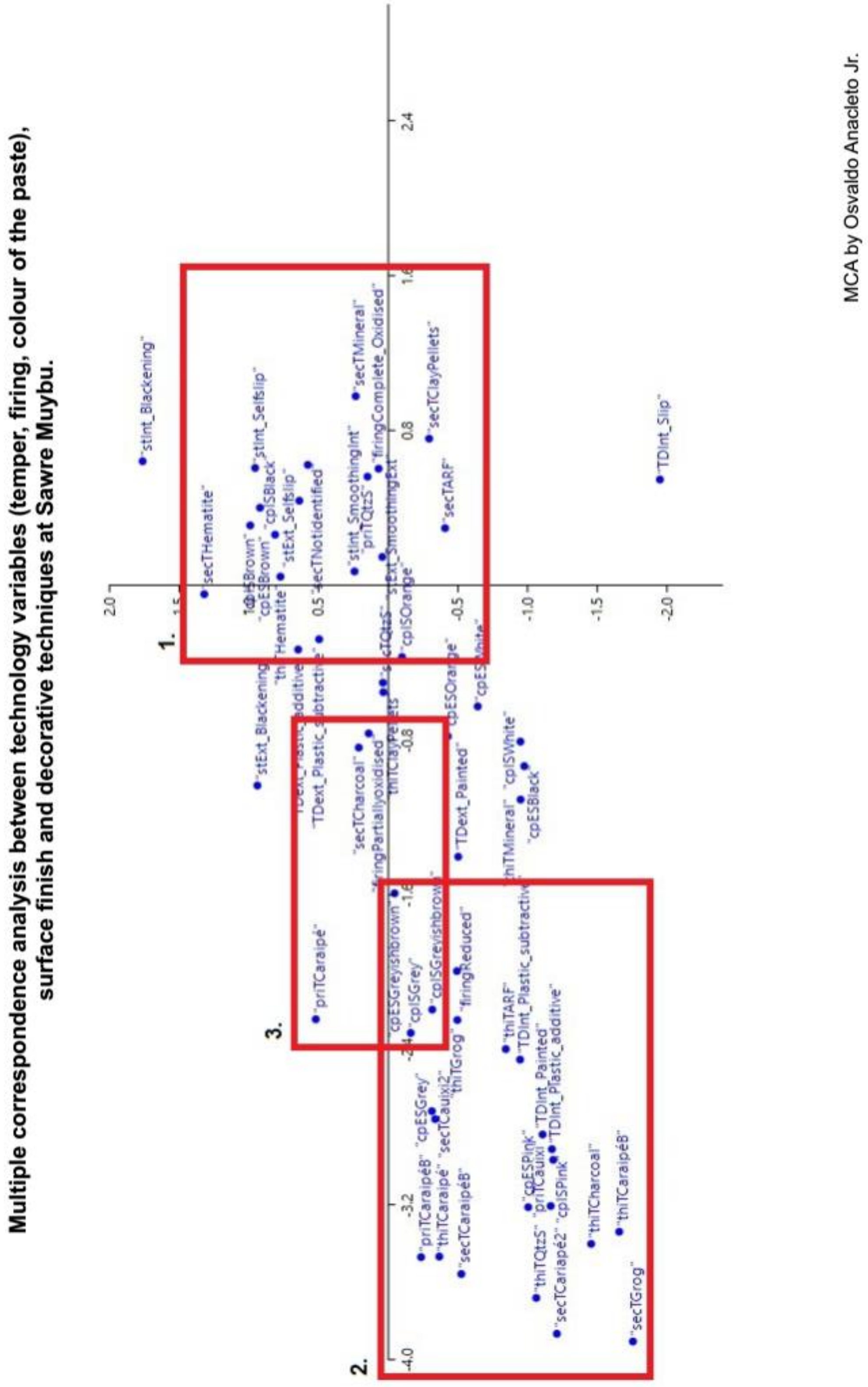


Fig. 13 MCA for technological, surface treatment and overarching decorative dimensions. The legend for the variables seen on the plots can be found at the end of this document.

10. Chromatic decoration

In the N1000/E958-958.5 test pits we can observe that chromatic decoration is particularly concentrated around the 30-40cm, although as always, caution is required in extrapolating from information derived from sherd counts. In the N1000/E957 (F3) subunit, chromatic decoration apparently increases in the 40-50cm and 50-60cm levels in comparison to the levels above. Slipping is found more commonly than paint. This may be related to the fact that paint would be applied to more restricted decorative fields in comparison to slip, which could be easily applied to entire vessels – translating into a far greater number of sherds covered by slip.

a. Slip colour

Mode 1: Reddish hues occur in greater frequency than other colours of slip. This may be related to environmental factors (a greater availability of red pigments) and to the preference for red by the makers and users of this pottery.

Other colours of slip found occasionally include maroon, orange, black and white. The latter two are rare. Yellow slip was detected only once.

Level (cm)	Sherd face – interior /exterior	Slip Colour - Excavation Area 1										
		E958/958.5					E957					
		W	M	O	R	B	W	M	O	R	B	Y
0-10	Int	-	1	-	-	-	-	1	-	1	1	-
	Ext	-	-	-	2	-	-	-	-	2	-	-
10-20	Int	-	-	1	1	-	1	1	-	1	-	-
	Ext	-	-	3	5	-	1	-	-	2	-	-
20-30	Int	-	8	1	1	-	-	3	1	3	-	-
	Ext	-	7	1	2	-	-	1	-	2	-	-
30-40	Int	3	3	5	21	1	-	-	2	1	-	-
	Ext	3	6	8	22	-	-	1	3	2	-	-
40-50	Int	-	1	-	5	1	-	3	4	8	-	-
	Ext	-	-	1	10	-	-	6	1	11	-	-
50-60	Int	1	-	-	1	1	2	1	1	9	3	-
	Ext	-	1	-	1	-	-	3	3	19	-	-
60-70	Int	-	-	-	-	-	-	2	-	-	2	-
	Ext	1	-	1	-	-	-	1	-	1	1	-
70-80	Int	-	-	2	-	-	-	-	-	-	-	1
	Ext	-	-	3	3	-	-	-	-	1	1	-
80-90	Int	-	2	-	1	-	-	-	-	-	-	-
	Ext	-	3	-	-	1	-	-	-	-	-	-

Table 43 Slip Colour - Excavation Area 1. W = white, M = maroon; O = orange; R = red; B = Black, Y = yellow.

b. Paint

Mode 1: Red was again the colour of choice among the potters of Sawre Muybu, and was encountered particularly on the external face of sherds. Honorato de Oliveira notes that at Pajaú, "a piece of red haematite showing pigment extraction marks" was located, "while two pieces of coarse-grained sandstone that served as whetstones for the extraction of this type of pigment were found at Sawre Muybu" (2015, p. 88). From this we can infer the use of mineral pigments for ceramic painting.

Other colours were also present, but were only identified exceptionally. They include maroon, black, white, orange, and yellow.

Paint - Excavation Area 1

Level (cm)	*Sherd face – interior/exterior*		E958/958.5				E957					
		White	**Maroon**	**Orange**	**Red**	**Black**	**White**	**Maroon**	**Orange**	**Red**	**Black**	**Yellow**
0-10	Int	-	-	-	-	-	-	-	-	-	-	-
	Ext	-	-	-	1	-	-	-	-	-	-	-
10-20	Int	-	-	-	1	-	-	-	-	-	-	-
	Ext	-	-	-	11	-	-	-	-	1	-	-
20-30	Int	-	1	-	1	-	-	1	-	1	-	-
	Ext	-	3	-	2	-	-	1	-	-	-	-
30-40	Int	1	1	-	4	1	-	-	-	2	-	-
	Ext	-	4	-	14	1	-	1	1	1	-	-
40-50	Int	-	-	-	1	-	1	1	-	1	-	-
	Ext	-	-	1	9	-	-	1	-	6	-	-
50-60	Int	-	1	-	1	-	-	-	-	3	-	-
	Ext	-	-	-	1	-	-	1	-	16	1	1
60-70	Int	-	-	-	-	-	-	-	-	-	-	-
	Ext	-	1	-	1	-	-	-	-	2	-	-
70-80	Int	-	-	-	1	-	-	-	-	-	-	-
	Ext	-	-	-	1	-	-	-	-	-	-	-
80-90	Int	-	-	-	-	-	-	-	-	1	-	-
	Ext	-	-	-	2	-	-	-	-	-	-	-

Table 44 Colour of paint used - Excavation Area 1.

11. Plastic decoration techniques

Table 45 displays the distribution and incidence of different plastic decorative techniques within Excavation Area 1 (N1000/E958-958.5 and N1000/E957). Both overarching types of plastic decoration techniques were used by the makers of the wares found at Sawre Muybu, however techniques involving clay displacement or removal occur more often. Although the identified techniques involving clay displacement or removal are diverse, punctations and incisions comprise the most typical practices. In terms of incisions, the thickness of the tool used varied, however fine incision is the most usual. Excision was found with some constancy while modelling and impressions were only seen infrequently. When I mentioned the possibility of impressions being executed using fingernails (ungulate impressions), Acelino Dace of Sawre Muybu informed me that, rather, the outer shell of a nut would be used. I thank Deuziano Saw for translating this information.

Plastic decoration Excavation Area 1														
	E958/958.5							E957 (F3)						
	Clay displacement or removal					**Addition of clay**		**Clay displacement or removal**					**Addition of clay**	
Level (cm)	**Punctation**	**Impression**	**Excision**	**Modelling**	**Incision**	**Nubbin**	**Clay strip**	**Punctation**	**Impression**	**Excision**	**Modelling**	**Incision**	**Nubbin**	**Clay strip**
0-10	4	-	-	-	3	-	2	-	-	-	-	1	-	-
10-20	9	2	3	2	5	1	10	2	2	-	-	2	-	-
20-30	13	-	5	-	10	5	9	2	-	2	1	4	2	2
30-40	3	-	7	2	7	-	6	-	1	2	-	3	1	1
40-50	1	-	-	-	1	1	-	11	-	1	-	5	2	11
50-60	-	1	1	1	2	-	-	4	1	3	-	3	-	3
60-70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70-80	-	-	-	-	-	-	-	1	-	-	1	1	1	1
80-110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 45 Plastic decoration Excavation Area 1.

Plastic decoration – surface sherds							
Technique involving displacement or removal					**Technique involving clay addition**		
Punctation	**Incision**	**Impression**	**Excision**	**Modelling**	**Nubbin**	**Clay strip**	**Appendage**
2	6	-	2	-	-	2	1

Table 46 Plastic decoration present on surface sherds.

One of the 'signature' embellishments for the pottery found at the site are applied and punctated clay strips, or ridges; this is the most obvious manifestation of the Incised and Punctate Tradition. These punctated strips of clay are present on both the *cauixí* tempered wares and on the quartz sand tempered wares. The overall appearance and finish of these two groupings is nonetheless distinct.

Punctated clay strips applied to quartz-sand tempered materials call to mind Cruxent and Rouse's (1958) description of similar features of the Matraquero style of the Arauquinoid series – they wrote that ridges were well worked into the surface but in a cruder, more irregular manner than in the Arauquin style. Many were punctated with a blunter tool, which made the sides of the ridges bulge, producing a chain-like effect. They also call to mind ceramics from the Valloid series (Tarble & Zucchi 1984). On the *cauixí*-tempered material, the clay strips and their concomitant punctations are finer. The distinction is similar to that between the Arauquín and Matraquelo styles, or the Arauquin style and ceramics from the Valloid series.

Variations in the shape of the stylus' tips and angle of application are also perceptible among Sawre Muybu ceramics. Most of the time, rounded styluses were used; however straight-edged styluses were recognised on nine occasions.

Applied nubbins occur less regularly and these are usually incised or punctated. One punctation identified on a nubbin may have been produced by impressing a hollow reed into the still plastic clay.

12. Lip finish

Potters at Sawre Muybu finished rim lips in a variety of ways. Table 47 displays the different choices taken in regard to this dimension. More than one technique could be applied to a single sherd, so a lip could be smoothed and punctated, for instance. Quantities of eroded lips are tabulated above in Table 34.

Level (cm)	Lip finish N1000/E958-958.5									Lip finish N1000/E957							
	Smoothing	Incision	Punctation	Nicking	Notching	Modelling	Paint	Slip	Impression	Smoothing	Incision	Punctation	Nicking	Notching	Modelling	Paint	Slip
0-10	29	-	-	1	-	-	-	-	-	6	-	-	-	-	-	-	-
10-20	28	2	1	1	-	1	-	-	1	21	-	-	-	-	1	-	-
20-30	46	2	4	6	2	5	1	1	-	17	1	-	1	1	1	-	-
30-40	43	2	-	8	2	5	1	-	-	15	-	-	2	1	1	-	-
40-50	15	-	-	2	1	-	-	-	-	15	3	-	2	-	3	1	-
50-60	7	-	-	-	-	1	-	-	-	16	-	1	2	-	-	-	1
60-70	2	-	-	1	-	-	-	-	-	3	-	-	1	-	-	-	-
70-80	2	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
80-90	5	-	-	2	-	-	1	1	-	2	-	-	-	-	-	-	-

Table 47 Lip finish techniques for Excavation Area 1.

Mode 1: Smoothing was the standard treatment applied to most, if not all lips. Rims found on the surface of the site only displayed smoothing as a form of lip finish.

Nicked lips are present in most levels and in greater numbers in comparison to other forms of lip finish (except for smoothing). Modelling of lips was the third most observed practice, followed by incision. Notching, leaving a "dentate" appearance, was occasionally detected. Impression is the least common plastic technique encountered. Chromatic (paint and slip) applications are also rare forms of lip finish. None of these practices can yet be said to constitute modes.

13. Design

A limited number of design elements can be verified among the ceramics analysed from Sawre Muybu. They are best understood by looking at illustrations and photographs, however tables 48 and 49 summarise the overall design characteristics observed. Some of the terminology used here is in accordance with that proposed by Marois, Scatamacchia and Serrano (1994).

Plastic and painted design elements – Excavation Area 1															
	N1000/E958-958.5							N1000/E957 (F3)							
	Rectilinear – made up of continuous lines or points/punctations						Curvilinear	Rectilinear – continuous lines or points/punctations						Curvilinear	
	Orientation			Relationship			Orientation, Relationship and Arrangement	Orientation			Relationship			Orientation, Relationship and Arrangement	
Level	*Horizontal lines – long*	*Oblique lines – short and medium*	*Vertical lines – short*	*Parallel*	*Intersecting (criss-cross lines)*	*Undetermined*	*Arcs, alternately open toward the top and toward the bottom, connected*	*Horizontal lines – long and short*	*Oblique lines – short and medium*	*Vertical lines – short*	*Parallel*	*Intersecting (criss-cross lines)*	*Undetermined*	*Arcs, alternately open toward the top and toward the bottom, connected*	*Interlocking scrolls open alternately towards the left and towards the right*
0-10	-	2	1	3	-	-	-	-	1	-	-	-	-	-	-
10-20	-	2	2	3	1	3	1	-	2	-	-	-	1	-	-
20-30	2	4	2	6	-	1	1	-	-	2	-	-	1	1	-
30-40	-	3	5	7	1	4	4	-	3	-	-	-	1	-	-
40-50	1	-	-	-	-	-	-	2	2	1	-	-	-	1	-
50-60	-	2	-	2	-	1	1	2	1	-	-	1	-	1	1
60-70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70-80	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
80-110	-	-	-	-	-	-	-	-	-	-				-	-

Table 48 Plastic and painted design elements – Excavation Area 1.

Design elements – surface sherds				
Orientation			***Relationship***	
Horizontal lines – long	**Oblique lines – short and medium**	**Vertical lines – short**	**Parallel**	**Intersecting (criss-cross lines)**
-	5	1	-	5

Table 49 Design elements – surface sherds.

In general terms, we can state that:

a. Designs composed by continuous incised or painted lines or by linear sequences of punctations/impressions or strokes (small incisions) are prevalent among Sawre Muybu ceramics. Furthermore:

   i. When sherd size allowed for a confident determination of orientation, oblique lines are encountered with greater regularity.

   ii. Lines of points produced by multiple punctations occur with some frequency in N1000/E958-958.5, particularly between the 10-20 and 20-30cm levels, while lines of parallel strokes occur most often between 20-30 and 40-50cm.

   iii. Within F3 (N1000/E957), lines of points were found especially in the 40-50cm and the 50-60cm levels, while lines of parallel strokes were seen on four occasions in the 20-30cm level of the feature.

b. Plastic or painted curvilinear designs are mostly composed of sections of arcs that are alternately open towards the top and bottom, connecting to form the design.

c. One design that stands out is that seen on SM-529-01, which is painted along the inner rim of the artefact. The design is composed of interlocking scrolls open towards the left and the right. Although much of the paint has faded from the piece the design is still visible and its contours can be made to stand out by increasing the contrast on the image.

On the combination of design elements present at Sawre Muybu

Three combined design elements stand out among Sawre Muybu ceramics:

1) Applied and punctated clay strips, described as 'chains' by Cruxent and Rouse (1958);
2) Applied and punctated or incised nubbins, which usually occur in pairs, producing the appearance of zoomorphic eyes;
3) Oblique, intersecting incised lines forming a criss-cross design.

The first two combinations were applied to both quartz sand as well as to *cauixí* tempered wares. They can be seen on vessel bodies in the case of quartz sand tempered wares and on labial extensions (on the inner face of everted rims) in the case of *cauixí* tempered vessels. The third design was found on ten occasions. It was applied to rims belonging to form 1. Sherds displaying this design are tempered with *cauixí* (6), *caraipé* (2) and quartz sand (1). Five of these sherds were found on the site's surface, and five were found within Excavation Area 1.

Although data on decoration were included in the MCA, the plots produced were not informative and did not yield useful results. An unexpected result was obtained from the following plot (fig. 14), however, which includes data on decoration and on stratigraphic level for N1000/E957 (F3). The three lowermost levels of this unit (60-70cm, 70-80cm and 80-90cm) are all located at ever-increasing distances from the concentrated decorative attributes and other levels of this test pit, indicating that the lower levels of the unit contained little decorated pottery (see tables 6 and 43 for sherd counts of pottery overall and decorated pottery collected from these levels).

This potentially corroborates our proposition that initially, this was not a pit destined for discard of materials, but rather, it was an area of food preparation, which is suggested by the large griddle at approximately 70cm depth placed on top of a significant quantity of charcoal. It would seem that only later did this become a pit for secondary disposal, which in turn is indicated by the considerable amount of relatively integral ceramic pieces recovered from here.

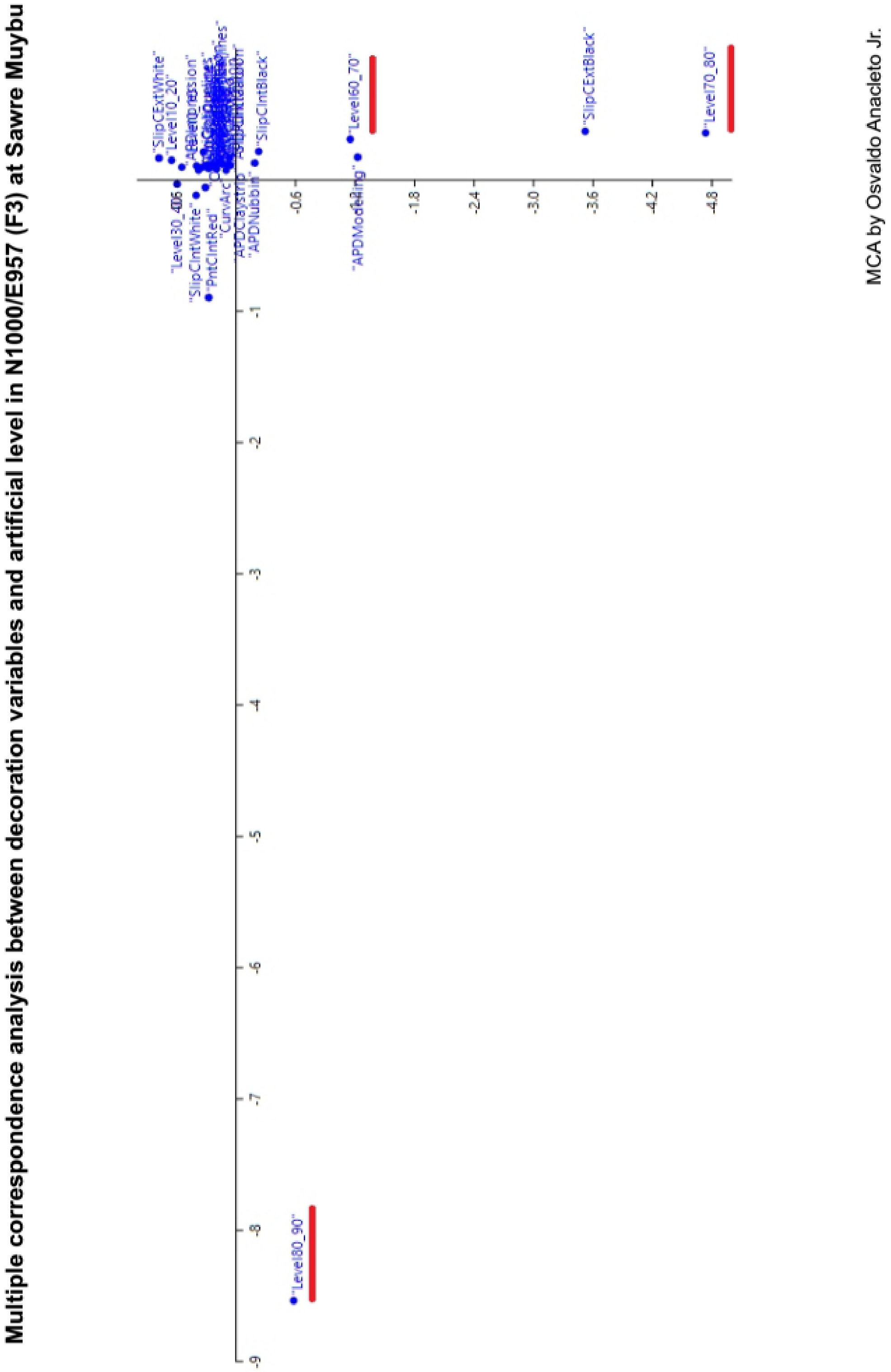


Fig. 14 MCA between decoration variables and level for pottery from N1000/E957

Summary of findings

From the preceding analysis, we can say that the material analysed demonstrates that:

- There is a marked degree of coherence observed among the technological dimensions studied from Excavation Area 1. The presence of quartz sand or *cauixí* as primary temper allows for a relatively confident prediction of whether firings will be oxidised or reduced, suggesting recurrent related technological practices at the beginning and end of the ceramic production sequence.
- Temper selection can partially predict vessel form: most forms have specimens primarily tempered with either quartz sand, sponge spicule or with tree bark temper. Exceptions to this are form 6, which is apparently exclusively associated to quartz sand, and form 5, which is only tempered with *cauixí*. Only two specimens of form 5 were found. *Cauixí* (and we imagine, specific clays) appears to be linked to serving vessels that had wider diameters and thinner walls and unorthodox forms. *Caraipé* is more closely associated to form 1, although it is not the only temper linked to this form;
- In terms of the decorative dimensions, there is overlap between techniques used in the quartz sand tempered wares and the *cauixí* tempered wares, particularly when it comes to applied and punctated clay strips; both of these groupings can also combine chromatic with plastic decoration. However, the final effect of is distinct: the *cauixí* tempered wares are more refined, their formal and stylistic attributes more controlled – even soberer in comparison to the rough-and-ready, less disciplined application of designs observed on the quartz sand-tempered material. Oblique and intersecting incised lines would be applied to rims of griddles, most of which are not tempered with quartz sand.

From the available evidence, it appears that the occupation of Sawre Muybu was continuous, but that it underwent different moments. We can think of the quartz sand materials as local coarse wares that served a variety of uses, and were in use continuously throughout the site's occupation. The *cauixí* material (excepting that related to form 1) can be understood as a fine ware, which was likely imported. The fact that neither flint nor fine sandstone seem to be local to Sawre Muybu (Honorato de Oliveira 2015, p. 75) seems to strengthen this hypothesis, demonstrating either direct sourcing of materials from distant areas or the involvement in trade relations with peoples from these areas. Participation in this far-reaching network would likely have occurred at a later moment in the site's occupation – this may be confirmed by C^{14} dating of a sample from the F3 feature, above the large griddle. A greater proportion of *cauixí* tempered ware seems to be concentrated in Excavation Area 1, where F3 contained semi-integral vessels; this is confirmed by the results of analysis of samples from the augered material, which seem not to contain a significant amount of sponge-spicule tempered pottery. This may either be related to differential access to these fine wares within the community, concentrated use in a specific place, or action related to discard in specific places. The production of the sponge spicule wares involved a greater degree of specialisation and the forms seen would have served more specific, serving functions.

One possibility is that the coarse wares encountered emulate the "chain" decoration of the fine wares. The apparent absence of the 'chain' motif from the deeper levels of the site may be an indication of a later incorporation of this element into the stylistic grammar applied by the site's potters. This remains a matter for speculation and needs to be tested, but could provide insight into the timing of involvement of this community with wider networks.

In terms of the griddles that display intersecting, incised lines, we can observe different degrees of ability of the technique. The less skilled application of the design occurs a quartz sand tempered sherd. Can this be an indication of a novice learning the design, or the emulation of an imported design? Can this, in turn, signal contact possibly related to makers of the Mangabal complex pottery (assuming Mangabal is representative of a wider phenomenon), where a design of incised, criss-cross lines is also present? Again, the presence of notched axe-heads at both Sawre Muybu and Mangabal show how this technology cut across areas with differing ceramic styles (Honorato de Oliveira 2015, p. 86-87) and reinforces the idea that potential cultural boundaries between these areas were permeable.

The Mangabal complex

We recovered a total of 20,638 ceramic sherds and 76 fire dogs from the Mangabal site, weighing 110.801kg in total. Collection of samples first took place in 2011, when we augered 11 post holes and opened up a 1x1m test pit at the N1074/E1000 point. We returned to the site in 2014 and opened up a further 61 augers and three test pits. The following section presents overall quantitative data on the site's pottery.

As can be seen in table 50, eleven post holes yielded 3.3kg of pottery in 2011, while 61 post holes produced under twice this amount in 2014; the difference in terms of sherd count is even smaller. The proportionately greater amount of debris collected in 2011 suggests that the area initially augered by the project covered the part of the site subject to the longest and/or more intensive period of occupation.[6]

Pottery retrieved from Mangabal site										
Year	**Augering programme**		**Test pits**							
			N1074/E1000		**N887/E1200**		**Mounded deposit**			
							N998/E973.5		**N998/E974.5**	
	W (kg)	SC	W (kg)	SC	W (kg)	SC	W (kg)	SC	W (kg)	SC
2011	3.330	1537	9.832	2152	-	-	-	-	-	
2014	5.491	1685	-	-	13.064	2562	38.051	6191	41.033	6511

Table 50 Pottery retrieved from Mangabal (weight and sherd count). W = weight, SC = sherd count.

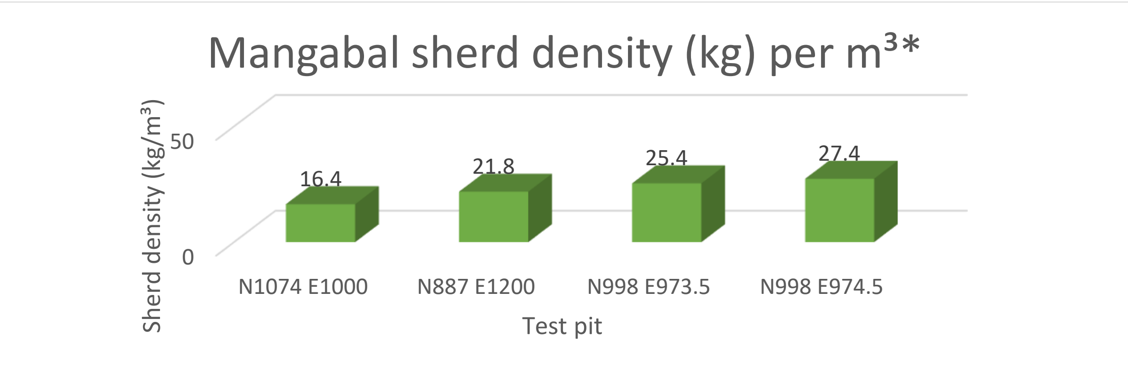
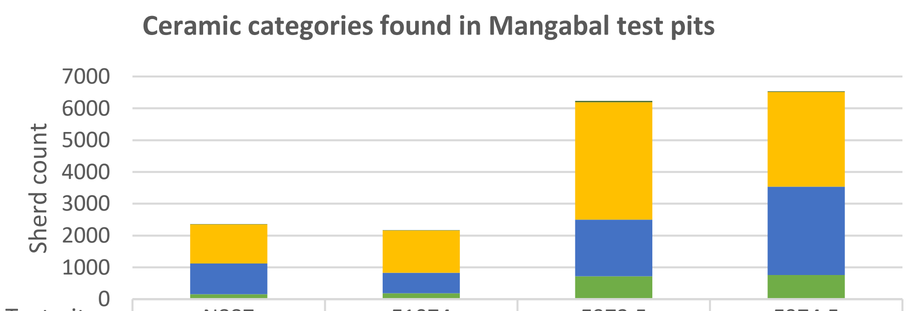


*Chart 11 Density of ceramic sherds at different test pits excavated at Mangabal. *To obtain these values, the total weight of the pottery excavated from 1x1m units N887/E1200, N998/E973.5, N998/E974.5 and N1074/E1000 was divided by the volume of each of these test pits. The volumes used in the calculation were based on the end of the cultural layers, which for the first two units occurred at 60cm and for the units situated in the midden, occurred at 1.5m.*

[6] As with Sawre Muybu, all of the site's pottery was cleaned and sorted, and much of it was numbered by undergraduate UFOPA students.

Chart 11 shows the density of ceramic sherds per m^3 for each test pit. It is possible the similarity between units N1074/E1000 and N887/E1200 would have been greater if the collection method had been the same between the 2011 and 2014 seasons. In 2011 excavated sediment was sifted through a 5mm wire mesh, while in 2014 we used 3mm meshes, resulting in the collection of more diminutive material. The higher density displayed by units N998/E973.5 and N998/E974.5 are explained by this being a mounded deposit, where refuse was accumulated at a greater rate than in the other areas excavated. The difference in ceramic density between the mounded deposit's two units partly results from N998/E974.5 being located at a slightly higher point than N998/E973.5, and because it contained a concentration of material including a number of heavy griddle fragments.



Test pit	N887	E1074	E973.5	E974.5
Fire dogs	2	6	45	23
Sherds <2cm²	1226	1323	3689	2971
Undecorated body sherds	967	652	1779	2784
Diagnostic sherds	158	183	723	756

Chart 12 Absolute counts of overall ceramic categories present within the excavated units at Mangabal.

Five hundred and forty-nine sherds from the N998/E973.5 test pit were analysed for technological, formal, surface treatment and decorative dimensions. Perhaps due to a one-time event rather than a slow accumulation, or to these pieces being more fragmented, N998/E973.5 comprises a greater number of decorated body sherds (275 compared to 189 for N998/E974.5) than N998/E973.5, particularly in N998/E973.5's 40-50cm level. Another 1408 sherds from this unit were analysed solely for surface treatment by Victoria Campos and Hugo Lopes Tavares under my supervision; Tavares also analysed thirty diagnostic sherds from N998/E974.5 for temper attributes. Seventy-one sherds excavated from the different test pits were included in the analysis of vessel body form; of these, 59 were retrieved from

N998/E974.5-E973.5, seven from N1074/E1000, four from N1200 E887, and one from auger point N976/E1050. From the augered material, 800 pieces were analysed by Hugo Lopes Tavares, mainly for technological attributes; when present, attributes relating to formal and stylistic dimensions, as well as post-depositional processes, were also examined by him, however this information is not included here.[7,8]

Pottery sample analysed from Mangabal site

	Augering programme		**Test pits**			
			N1074/E1000	**N887/E1200**	**Midden N998**	
	2011	**2014**			**E973.5**	**E974.5**
Excavated material	1537	1685	2164	2353	6235	6534
Analysed material	439	361	90*	4	549/1408	30/29

*Table 51 Pottery sample analysed from Mangabal. *Refers to material analysed in 2012 (see Rocha 2012).*

In the following section, the subsample of 549 sherds I analysed in greater detail from N998/E973.5 will be the main basis for our description of the different dimensions. The other subsamples referred to above will be mentioned when relevant. Of the sample of 549 sherds, 24 are base sherds, 217 are body sherds (which include points of inflection), 286 are rim fragments and seven are appendages. Fifteen are “composite” sherds: one piece includes both a base and rim, ten sherds comprise both vessel body and rim fragments, one is made up of both body and point of inflection, four are composed of rim and point of inflection and another, of body, neck and rim. I identified five sherd families among this material, to which 37 ceramic fragments belong. One of these sherd families consists of 33 fragments, which are present in the 10-20cm (five pieces), 20-30cm (26 sherds) and 30-40cm (two sherds) levels of N998/E973.5. Their presence through the three upper levels of the unit suggests a considerable degree of mechanical mixing; it may also point to a rapid accumulation of strata by the deposition of significant amounts

[7] At the Mangabal site, provenience number sequences are as follows: PNs 01-99 and 200-499 – augured material; PNs 100-199 – N1074/E1000; PNs 500-699 – N998/E974.5; PNs 1000-1199 – N998/E973.5; PNs 1500-1599 – N887/E1200.

[8] This work is part of Tavares’ Independent Study Project (Projeto de Iniciação Científica), mentioned in the previous section on Sawre Muybu. Hugo analysed almost all sherds from the 2011 post holes. From the 2014 post holes, he analysed five sherds per augured level. The exception to this is auger point N976 E1050 and other points that presented material of interest.

of debris. A further sherd family is made up of six sherds, while another two sherd families consist of three sherds each. One sherd 'family' consists of two pieces only. Once again, considering Orton & Tyers' (1990, p. 84) procedure for *estimated vessel equivalents* (EVEs), we have 423 rim sherds for the N998/E973.5 test pit. Of these, we know that 15 belong to the same sherd families. Thus our approximate 'floor' estimate of vessels for this squared metre is 408 vessels.

Technological dimensions

1. **Temper**

a. **Primary tempers**

Mode 1: Quartz sand was the primary temper of choice in just over 55 per cent of the subsample from N998/E973.5, and for much of the analysed augered material (see table 52 below).

Mode 2: *Cauixí* was regularly chosen as a primary temper. Within the analysed sample of N998/E973.5 it is present in approximately 39 per cent of the sample. Among the 30 sherds analysed from N998/E974.5, it was detected as primary temper in 29 pieces. When present, it was added in abundance and we can observe that the spicules tend to be aligned, following the potters' gestures when the vessel body was being formed.

Caraipé is uncommon and *caraipé B* is rare as a primary temper. Though its inclusion in the clay matrix was clearly intentional, the available data does not enable us to confer modal value to this attribute in the sub-dimension of primary tempers.

Mineral temper and clay pellets are not often observed as primary tempering agents.

Primary (P), Secondary (S) and Third-order (T) tempers* at N998/E973.5

Level (cm)	*P, S, T*	*Quartz sand*	*Cauixi*	*Caraipé*	*Grog*	*Mineral*	*Hematite*	*Clay pellets*	*Saibro*	*Caraipé B*	*Not identified*	*N° sherds analysed*
0-10	P	6	3	1	-	-	-	-	-	1	-	11
	S	4	-	-	-	1	-	-	-	-	-	
	T	-	-	-	-	-	-	1	-	-	-	
10-20	P	12	9	-	-	-	-	-	-	-	-	21
	S	4	-	1	-	-	-	2	-	-	-	
	T	1	-	-	-	-	-	1	-	-	-	
20-30	P	22	46	-	-	-	-	-	-	-	-	68
	S	29	2	-	-	-	-	6	1	-	-	
	T	-	-	-	-	1	-	-	-	-	-	

	P	36	27	-	-	1	-	1	-	1	-	
30-40	S	18	1	-	-	1	-	6	1	1	-	66
	T	2	-	-	-	-	-	-	-	-	-	
	P	27	16	3	-	2	-	-	-	-	-	
40-50	S	17	-	1	-	5	-	4	-	-	-	48
	T	1	-	-	-	-	-	1	2	-	-	
	P	18	21	1	-	1	-	-	-	-	-	
50-60	S	17	-	1	-	2	1	5	-	-	-	41
	T	1	-	-	-	1	-	-	-	-	-	
	P	32	25	2	-	-	-	2	-	-	-	
60-70	S	26	3	1	-	6	-	4	1	-	-	62
	T	1	1	-	-	1	-	3	-	-	2	
	P	17	6	-	-	-	-	-	-	-	-	
70-80	S	6	1	-	-	1	-	4	-	-	1	23
	T	-	-	-	-	-	-	-	-	-	-	
	P	23	5	-	-	-	-	-	-	-	-	
80-90	S	6	2	-	-	7	-	-	-	-	-	29
	T	-	-	-	-	1	-	-	-	-	-	
	P	23	12	-	-	1	-	-	-	-	-	
90-100	S	10	-	-	-	9	-	2	1	-	-	38
	T	-	-	-	-	-	-	1	-	-	-	
	P	19	4	-	-	-	-	-	-	-	-	
100-110	S	3	-	-	-	-	-	3	-	-	-	23
	T	-	-	-	-	-	-	1	-	-	-	
	P	21	9	2	-	-	-	-	-	-	-	
110-120	S	8	-	-	-	1	-	-	-	-	-	32
	T	-	-	-	-	-	-	-	-	-	-	
	P	12	4	-	-	-	-	1	-	-	-	
120-130	S	3	-	-	-	1	-	2	-	-	-	17
	T	-	-	-	-	-	-	1	-	-	-	
	P	12	11	2	-	1	-	-	-	1	-	
130-140	S	13	2	-	-	-	-	1	-	-	-	28
	T	-	-	-	-	-	-	-	-	1	-	
	P	16	13	-	-	-	-	-	-	-	-	
140-150	S	6	-	1	1	3	-	1	-	-	-	29
	T	-	-	-	1	1	-	3	1	-	-	
	P	7	3	-	-	-	-	-	-	-	-	
150-160	S	3	2	-	-	-	-	-	1	-	-	10
	T	-	-	-	-	-	-	-	-	-	-	
	P	1	1	-	-	-	-	1	-	-	-	
160-170	S	1	-	-	-	1	-	-	-	-	-	3
	T	-	-	-	-	-	-	-	-	-	-	

*Table 52 Primary (P), Secondary (S) and Third-order (T) tempers at N998/E973.5. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

Primary (P), Secondary (S) and Third-order (T) tempers* from diagnostic sherds N998/E974.5											
Level (cm)	***P, S, T***	***Quartz sand***	***Cauixi***	***Caraipé***	***Grog***	***Mineral***	***Hematite***	***Clay pellets***	**Saibro**	***Charcoal***	***N° sherds analysed***
0-20	-	-	-	-	-	-	-	-	-	-	-
20-30	P	-	2	-	-	-	-	-	-	-	2
	S	2	-	-	-	-	-	-	-	-	
	T	-	-	1	1	-	2	2	-	1	
30-40	P	-	2	-	-	-	-	-	-	-	2
	S	2	-	-	-	-	-	-	-	-	
	T	-	-	2	2	-	-	2	-	-	
40-50	P	-	1	-	-	-	-	-	-	-	1
	S	1	-	-	-	-	-	-	-	-	
	T	-	-	1	1	-	-	1	-	-	
50-60	P	-	10	-	-	-	-	-	-	-	10
	S	8	-	3	-	-	-	-	-	-	
	T	-	-	5	7	-	2	10	-	-	
60-70	P	-	7	-	-	-	-	-	-	-	7
	S	6	-	2	-	-	-	-	-	-	
	T	-	-	2	4	-	2	7	1	2	
70-80	P	-	1	-	-	-	-	-	-	-	1
	S	1	-	-	-	-	-	-	-	-	
	T	-	-	-	1	-	-	1	-	1	
80-90	P	-	2	-	-	-	-	-	-	-	2
	S	2	-	1	-	-	-	-	-	-	
	T	-	-	1	1	1	1	2	-	1	
90-100	P	-	2	-	-	-	-	-	-	-	2
	S	2	-	-	-	-	-	-	-	-	
	T	-	-	-	1	-	2	2	-	1	
100-110	P	-	1	-	-	-	-	-	-	-	1
	S	-	-	1	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	-	1	
110-120	P	1	1	-	-	-	-	-	-	-	2
	S	-	1	2	-	-	-	-	-	-	
	T	1	-	-	2	1	-	1	-	2	

*Table 53 Primary (P), Secondary (S) and Third-order (T) tempers of diagnostic sherds from N998/E974.5. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

The findings of the analysis of primary tempers from the sub-sample from N998/E973.5 is corroborated by Tavares' analysis of augered material. The 86 *cauixí*-tempered fragments from level 40-60cm presented in table 54 refer mostly to sherds belonging to a single vessel, from auger N976/E1050, and should not be understood as a sudden peak of *cauixí* tempered material in that level throughout the site. The findings are also reinforced by the analysis undertaken in 2012 by Rogério Andrade dos Santos with material from N1000/E1074 (Rocha 2012, p. 34). We can therefore state that the sub-sample selected for analysis from N998/E973.5 is representative of material from the rest of the site as far as the dimension of first-order tempers is concerned.

Primary tempers among augered material									
Level (cm)	Quartz sand			*Cauixí*			*Caraipé*		
	2011	2014	Total	2011	2014	Total	2011	2014	Total
0-20	59	53	112	39	28	67	5	5	10
20-40	64	34	98	47	49	96	1	3	4
40-60	72	58	130	46	86	132	7	5	12
60-80	25	9	34	29	10	39	2	1	3
80-100	19	9	28	8	10	18	1	1	2
100-120	12	-	12	2	-	2	1	-	1

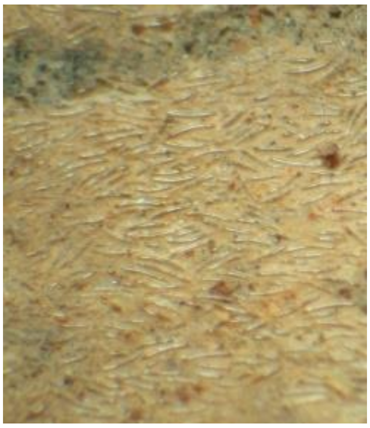


Table 54 Primary tempers among analysed augered material at Mangabal. Fig. 15 cauixí, photographed through the microscope lens; the abundance and alignment of the silicose spicules is evident.

The findings of the analysis of primary tempers from the sub-sample from N998/E973.5 is corroborated by Tavares' analysis of augered material. The 86 *cauixí* tempered fragments from level 40-60cm presented in table 54 refer mostly to sherds belonging to a single vessel, from N976 E1050, and should not be understood as a sudden peak of *cauixí* tempered material in that level throughout the site.[9] The findings are also reinforced by the analysis undertaken in 2012 by Rogério Andrade dos Santos with material from N1000 E1074 (Rocha 2012, p. 34). We can therefore state that the sub-sample selected for analysis from N998/E973.5 is representative of material from the rest of the site as far as the dimension of first-order tempers is concerned.

[9] It also worth pointing out that but because most of the augured points are not yet tied into topography, the levels of the various post holes do not necessarily equate to one other across the site, or indeed to the levels within each test pit; they only give us an initial sense that will have to be refined in future fieldwork.

b. **Secondary tempers**

Mode 1: Quartz sand was the most frequent second-order temper among the sherds analysed from N998/E973.5 and N998/E974.5.

Cauixí is unusual as a secondary temper. *Caraipé*, *caraipé B*, and grog would have been intentional additions. Haematite and unidentified minerals were probably already present in the clay. Among unidentified minerals, particles that resemble gold (see photographs below) can occasionally be detected as a secondary temper. The presence of these inclusions may have led to the selection of specific clays by the potters of Mangabal.

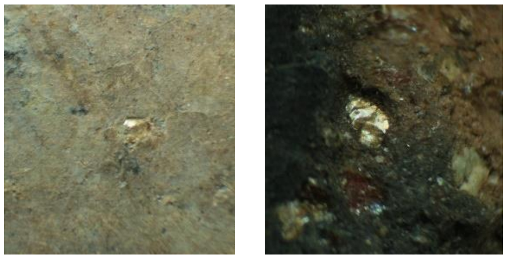


Fig. 16 An as-yet unidentified mineral found in the ceramic matrix, which may be found to be gold. The inclusion lends a glittery appearance to the pottery (a). (b) and (c) show particles magnified by the microscope. Photographs by Vinicius Honorato.

Third-order tempers include quartz sand, clay pellets, saibro, *caraipé,* grog, *caraipé* “B” and charcoal. Unidentified mineral tempers also occur. Because all of these non-plastics are seen relatively infrequently, they are not considered to display modal value.

A multiple correspondence analysis for the variables of temper at Mangabal were not particularly informative. It shows a weak association between quartz sand as a primary temper and other secondary inclusions, which may already have been present in the clay. Distant from this on the chart is *cauixí* as a primary temper, which has a loose association to *caraipé*, *caraipé* “B” and grog as secondary tempers, and *caraipé* and *caraipé* “B” as third order tempers. By including other technological dimensions within the analysis, the plot becomes more informative – this shall be presented following the section on post-firing colour of the paste, further below.

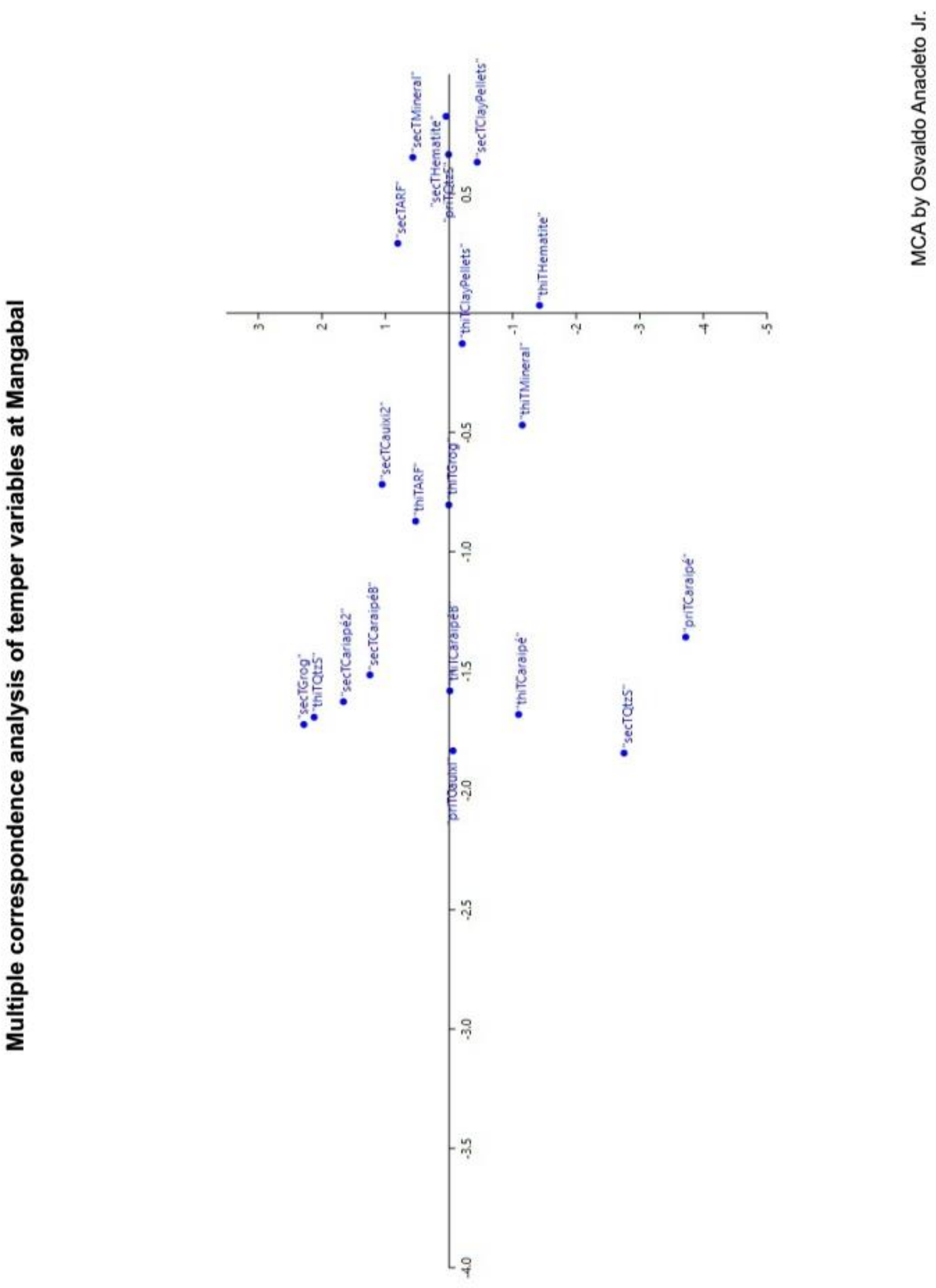


Fig. 17 MCA of primary, secondary and third-order tempers of sample analysed from N998/E973.5. See list of abbreviations at the end of this section.

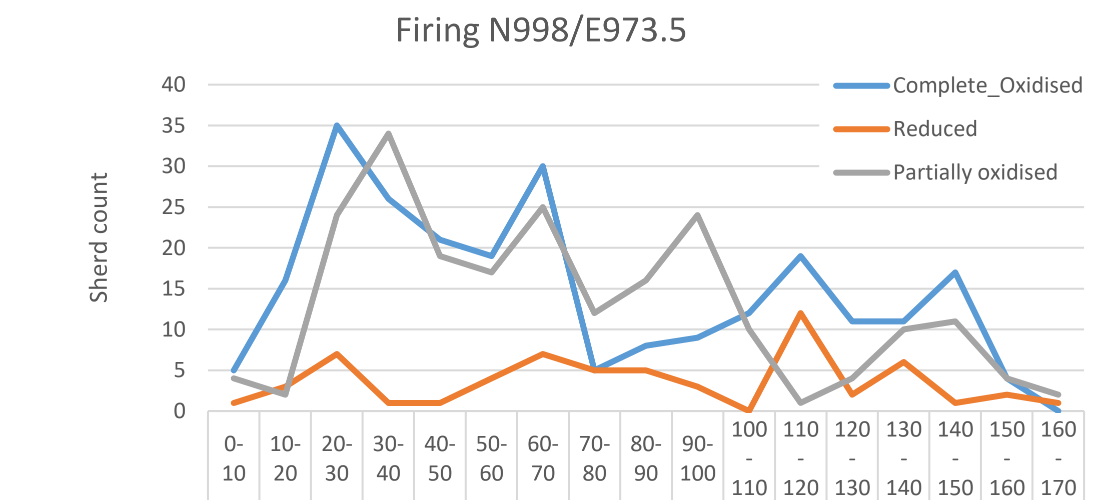
2. Firing

We can identify two modes within this dimension.

Mode 1: Oxidised firings are generally the most prevalent type of firing observed among the sherds analysed from the N998/E973.5 test pit.

Mode 2: Firings that resulted in incomplete oxidisation were common among the ceramics of Mangabal.

Reduced firings are also represented throughout the levels, however in comparatively reduced numbers.



	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
Complete_Oxidised	5	16	35	26	21	19	30	5	8	9	12	19	11	11	17	4	0
Reduced	1	3	7	1	1	4	7	5	5	3	0	12	2	6	1	2	1
Partially oxidised	4	2	24	34	19	17	25	12	16	24	10	1	4	10	11	4	2

Chart 13 Firing N998/E973.5

Firing among augered material from the Mangabal site									
Level (cm)	**Complete/Oxidised**			**Partially oxidised**			**Reduced**		
	2011	**2014**	**Total**	**2011**	**2014**	**Total**	**2011**	**2014**	**Total**
0-20	64	32	96	27	40	67	12	14	26
20-40	68	33	101	32	38	70	12	15	27
40-60	65	47	112	40	68	108	20	34	54
60-80	32	10	42	19	8	27	5	2	7
80-100	10	11	21	12	7	19	6	2	8
100-120	8	-	8	6	-	6	1	-	1

Table 55 Firing among augered material from the Mangabal site.

Fireclouds are only seen on six sherds of N998/E973.5. This extremely low figure results from the constant application of self-slip or of slip, which served to mask fireclouds and other perceived imperfections.

3. Colour of the paste (post-firing)

Mode 1: Brown was the most common post-firing paste colour among analysed sherds of unit N998/E973.5 and among sherds selected from post holes.

Mode 2: Though not particularly prevalent among sherds from N998/E973.5, grey is recurrently identified among ceramics from auger holes.

Mode 3: Orange and reddish hues recur among augered material.

Fig. 18 Examples of shades of brown found among the pottery of Terra Preta do Mangabal.

Colour of the paste N998/E973.5								
Level		**White**	**Orange**	**Black**	**Red**	**Brown**	**Pink**	**Grey**
0-10	Int	1	2	-	1	6	1	-
	Ext	-	1	1	1	8	-	-
10-20	Int	-	5	3	-	12	-	1
	Ext	-	5	1	2	13	-	-
20-30	Int	1	30	5	4	24	1	3
	Ext	-	28	6	1	30	-	3
30-40	Int	2	9	5	4	43	-	3
	Ext	1	11	2	4	45	-	3
40-50	Int	7	6	2	2	30	-	1
	Ext	4	5	6	2	31	-	-
50-60	Int	3	2	2	1	31	-	2
	Ext	2	2	2	1	31	-	3
60-70	Int	-	4	3	6	48	-	2
	Ext	-	3	3	5	50	-	2
70-80	Int	-	1	-	2	20	-	-
	Ext	-	3	-	1	19	-	-
80-90	Int	-	1	-	3	25	-	-
	Ext	-	2	-	2	25	-	-
90-100	Int	-	1	1	1	34	-	1
	Ext	-	1	2	3	32	-	-
100-110	Int	1	1	1	2	17	-	-
	Ext	1	1	-	2	17	-	1
110-120	Int	1	3	-	5	21	-	3
	Ext	1	2	1	2	20	-	7
120-130	Int	1	1	-	3	12	-	-
	Ext	1	-	-	3	13	-	-
130-140	Int	1	3	-	1	16	2	5
	Ext	3	-	-	-	21	1	3
140-150	Int	1	4	2	-	21	1	-
	Ext	1	3	1	1	23	1	-
150-160	Int	1	-	2	-	7	-	-
	Ext	-	-	-	-	9	-	1
160-170	Int	-	-	1	-	2	-	-
	Ext	-	-	-	-	3	-	-

Table 56 Colour of the paste N998/E973.5

Because of the lower potential of augered material in informing about form and decoration, Tavares devoted greater attention to colour, classifying these according to the Munsell Soil Colour Chart. I have glossed over these specifics in order for Tavares' data to be more easily comparable to mine. Tavares also merged "Orange" and "Red" into a single category (ranging from 2.5YR 4/6 to 7.5YR 7/8), which is why they are presented as such below.

Colour of the paste (post-firing) among augered material									
Level (cm)	**Grey**			**Orange and Red**			**Brown**		
	2011	**2014**	**Total**	**2011**	**2014**	**Total**	**2011**	**2014**	**Total**
0-20	21	31	52	25	8	33	57	47	104
20-40	42	41	83	15	8	23	55	37	93
40-60	61	123	184	26	15	41	38	11	49
60-80	32	15	52	11	3	15	13	2	19
80-100	15	8	23	9	3	12	4	9	13
100-120	7	-	7	3	-	3	5	-	5

Table 57 Colour of the paste (post-firing) among augered material from the Mangabal site.

<u>Fabric description</u>

At Mangabal, patterns for technological dimensions are not as clear cut as they are at Sawre Muybu: I did not observe a repeated connection between choice of temper, firing and colour of the paste during analysis. The multiple correspondence analysis partly corroborates this somewhat fuzzier picture, but it does also point to some associations.

There are two principal tempering agents (quartz sand and *cauixí*, respectively); their frequency is denoted by their placement near the x axis. Their distance from one another is significant, suggesting sherds containing either of these primary tempers share other attributes in common. The use of quartz sand as a primary temper is more closely related to reduced and partially oxidised firings, while *cauixí* as a primary temper is (loosely) related to complete, or oxidised, firings. This contrasts what we observed in relation to the Sawre Muybu ceramics, where c*auixí*-tempered pottery underwent reduced firings. The colour of the paste post-firing varies most often from brownish to greyish colours; the former is more closely associated to quartz sand while the latter is to *cauixí*. Reddish and orange pastes also occur at times, but they are not clearly associated to a specific primary temper or type of firing. Black coloured pastes occur at times, while white and pink specimens are rare – so rare that pink on exterior surfaces was not computed by the analysis below, since categories with frequencies less than two were excluded. *Caraipé* as a primary temper shares more associated variables in common with *cauixí* than with quartz sand as a primary tempering agent.

Thus, the available evidence does seem to suggest that there were three different temper recipes chosen by the potters. In contrast to the material analysed from Sawre Muybu, choice of temper cannot necessarily predict firing practice, however, though it may suggest a tendency towards certain post-firing paste colours.

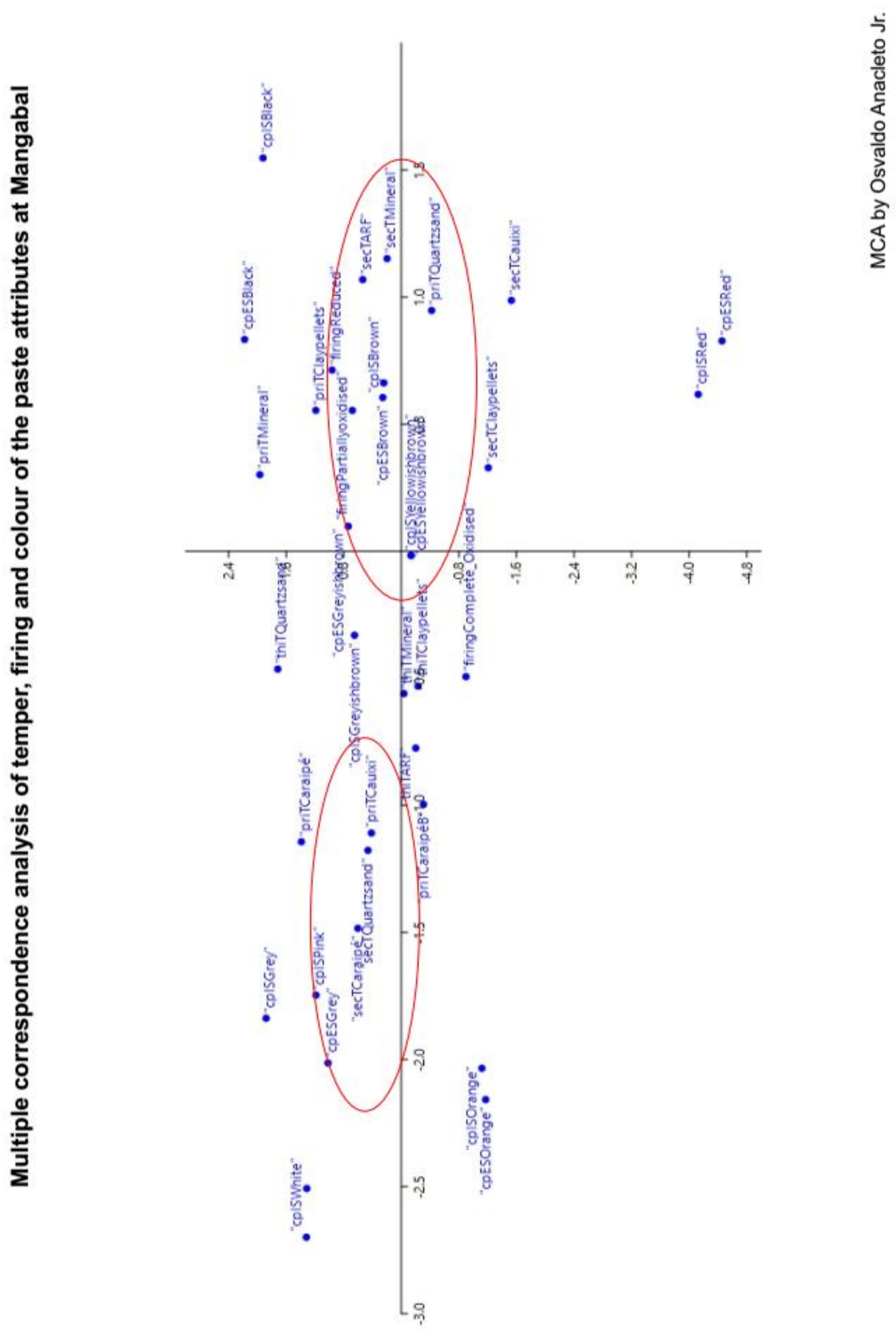


Fig. 19 MCA of attributes related to temper, firing and colour of the paste for sherds analysed from N998/E973.5. During analysis I separated "brown" into yellowish brown and greyish brown, but I merged these categories into "brown". See legend at end of section.

When we added variables related to the different arbitrary levels of the excavated unit, though there is still a clear distance between the two main primary tempers, the picture becomes more muddled, as illustrated below.

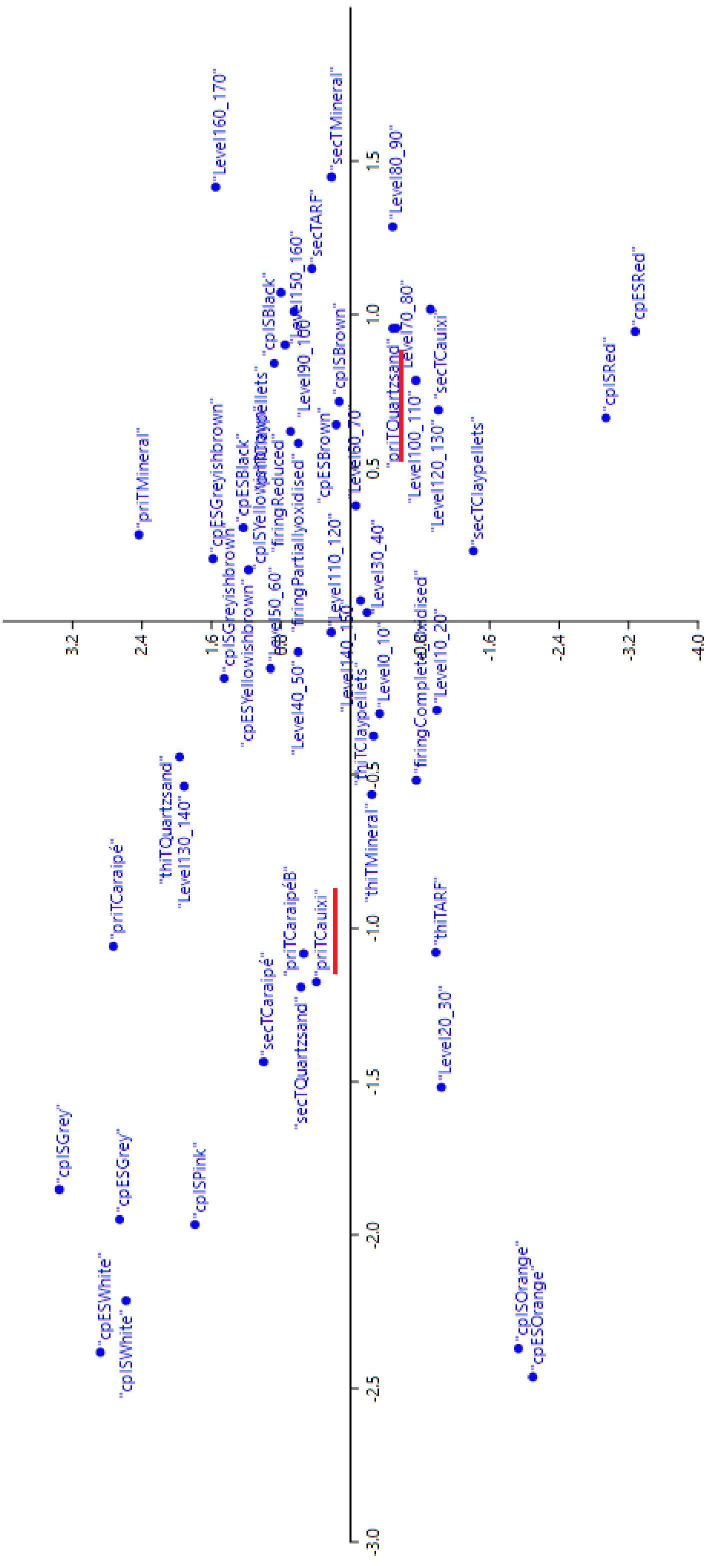


Fig. 20 Correspondence analysis of attributes related to temper, firing, colour of the paste and artificial level for sherds analysed from N998/E973.5. The two main primary tempers are underlined in red.

I interpret this as a reflection of the mixing of these materials through the different levels, meaning there is not a clear stratigraphic separation in this test pit.

Dimensions related to form

Our projection of vessel forms from the Mangabal site is based upon 69 sherds from the excavated test pits (N1200/E887, N1074/E1000, N998/E974.5 and N998/E973.5) and from one of the augered holes (N976/E1050). From this sample we can hypothesise that some of these forms display modal value.

4. Vessel forming techniques

a. Coiling

Potters at Mangabal took great care to produce smooth vessel surfaces; their use of coiling techniques can occasionally be inferred from unobliterated coils. The photograph below shows the negative of a detached coil that may have been attached according to the overlapping coil technique. Beside it we can observe a flat-based vessel, probably started off with a basal disc of clay after which coils would have been superposed.

Fig. 21 In terms of vessel forming techniques, unobliterated coils provide evidence of coiling. Fig. 22 A flat base. Photographs by Vinicius Honorato.

b. Modelling

Bases, appendages and other ceramic artefacts were made using modelling techniques; small vessels may also have been formed in this way.

5. Vessel wall thickness

I measured the thickness of 549 vessel body sherds from N998/E973.5 at what I estimated to be the point of average thickness. In contrast to what we saw with the material from Sawre Muybu, quartz sand temper does not automatically lead to thicker vessel walls; on the contrary, most quartz sand tempered material averages around 4-6.9mm, while *cauixí* tempered sherds are more evenly distributed between 4-6.9 and 7-9.9mm. Indeed, there are greater numbers of thicker sherds that are tempered primarily with *cauixí* than with quartz sand. Fourteen sherds analysed from this subsample are primarily tempered with either *caraipé* or with *caraipé* "B". The thinnest of these measures 4mm while the thickest measures 9.5mm. The mean thickness of this set of sherds is 8.8mm, with a standard deviation of 2.6.

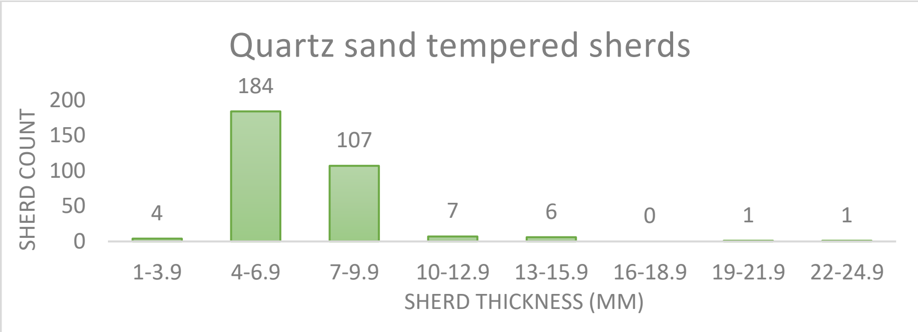


Chart 14 Histogram of vessel wall thickness of sherds tempered primarily with quartz sand.

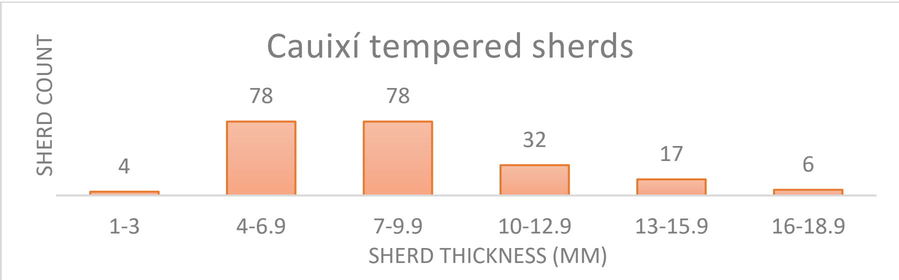


Chart 15 Histogram of vessel wall thickness of cauixí tempered sherds.

6. Vessel form

a. Horizontal cross section

Mode 1: A circular horizontal cross section. This was seen to be the case among all sherds from which it was possible to ascertain horizontal cross section. As such, this is what Lathrap termed a "non-productive mode", since this dimension seems only to possess this one mode (1962, p. 228).

b. Base form

Mode 1: A flat base. Out of the 25 identified bases, 24 are flat.

<u>Form 2</u>: One base has a concave-concave cross-section. The singularity of this piece (TPM-1056-01) lies not only in its form but also in the way the inside was painted.

Form 3: It is likely that convex bases were also present among the excavated material, however fragmentation would have led to their being mistaken for vessel wall sherds. This is at present a hypothesised form.

Of the 25 bases analysed from N998/E973.5, 21 are primarily tempered with *cauixí*, two are tempered with quartz sand and two are primarily tempered with *caraipé*. This may indicate that quartz sand tempered bases tended to be rounded (convex) and were not detected.

Base forms in N998/E973.5		
Level (cm)	**Flat**	**Concave-convex**
0-10	-	
10-20	1	
20-30	2	
30-40	-	
40-50	-	
50-60	-	
60-70	8	
70-80	3	
80-90	2	
90-100	2	1
100-110	-	-
110-120	2	
120-130	1	
130-140	3	

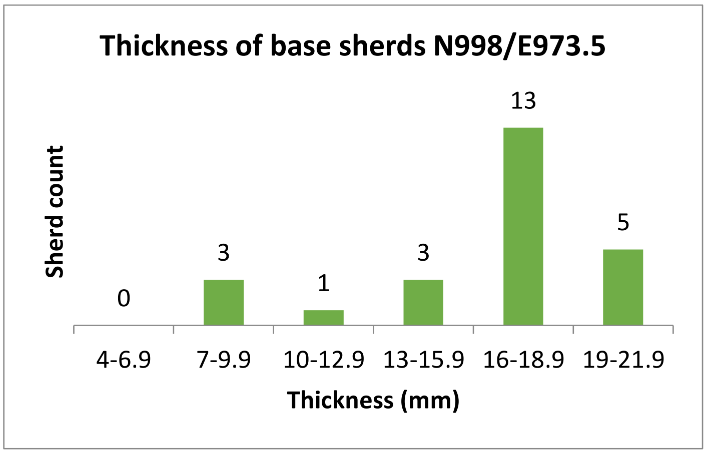


Table 58 The distribution and shape of ceramic bases through the stratigraphic levels of N998/E973.5. Chart 16 Thickness (mm) of base sherds from N998/E973.5.

c. Vessel body form (vertical cross section)

See illustrated plates included in Chapter 7.

Form 1: Being flat based griddles, specimens belonging to this form are unrestricted, with simple contours. Form 1 was found concentrated in the 50-60cm and 60-70cm levels of N998/E974.5 and at 39cm depth in N1074/E1000. We were not able to confidently estimate the diameters of most of these sherds, though we can see they would be divided into two variants, medium (55cm) and large (75cm). In N998/E974.5, griddle sherds belonging to form 1 were found possibly *in situ*, at approximately 60cm depth. The specimens found associated to this form are primarily tempered with *cauixí*. Rim form 9 (Internally thickened rim) is associated to form 1. The interior face of these rims is invariably incised. Designs encountered are composed by oblique and intersecting, or oblique and parallel lines, or by connected vertical and horizontal lines.

<u>Form 1:</u> Being flat based griddles, specimens belonging to this form are unrestricted, with simple contours. Form 1 was concentrated in the 50-60cm and 60-70cm levels of N998/E974.5 and at 39cm depth in N1074/E1000. We were not able to confidently estimate the diameters of most of these sherds, though we can see they would be divided into two variants, medium (55cm) and large (75cm). The specimens found associated with this form are primarily tempered with *cauixí*. Rims are internally thickened (rim form 9).

Distribution and estimated diameters of form 1 in Mangabal			
Level (cm)	**N1074/E1000**	**N998/E974.5**	**Ø (cm)**
0-30	-	-	-
30-40	1	-	? (TPM-160)
40-50	-	-	-
50-60	-	1	? (TPM-524-01)
60-70	-	3	? (TPM-534-1), ? (TPM-534-6), 75 (TPM-534.08-10), 55 (534-7), ? (TPM-536-02)
70-170	-	-	-

Table 59 Distribution and estimated diameters of form 1 through excavated test pits in Mangabal

<u>Form 2:</u> Form 2 is an unrestricted, moderately deep hemispherical bowl with a simple contour. It is associated to rim forms 1,2, 3, 4 and 10 (zero modification, upright, bevelled, tapered and externally thickened rims, respectively). It is fairly well dispersed through the site, being found in N1074/E1000 at 20-30cm depth and from 30cm in the three other test pits, through to 130-140cm depth in N998/E973.5. Because of the irregularity and/or small size of some of the rims associated to this form, we cannot precisely calculate a mean diameter. The smallest rim diameter found falls between 10-15cm and the largest, between 35-45cm, and the estimated mean for vessel diameter lies at 29cm. It is more useful however to group this form's representatives into three variants – small (Ø 10-15cm), medium (Ø 18-32cm) and large (Ø 33-45cm). *Cauixí* was the principal temper most commonly found associated to this form, but quartz sand was also used. This form likely attended to a number of functions, from storage to preparation to serving of food.

Distribution and estimated rim diameters of form 2 in Mangabal					
Level (cm)	N1200 E887	N1074/E1000	N998/E974.5	N998/E973.5	Ø (cm)
0-20	-	-	-	-	-
20-30	-	-	1	-	20 (TPM-506-11)
30-40	1	1	-	1	20 (TPM-1510-69), 30 (TPM-1010-01), 34-40 (TPM-1010-51), ~40 (TPM-111-57)
40-50	-	-	1	-	~18-20 (TPM-518-90)
50-60	-	-	1	1	15 (TPM-1024-65), 34 (TPM-527-302)
60-70	-	-	-		
70-80	-	-	2	1	23-25cm (TPM-1048-88), ~25-40 (TPM-542-73), 35 (TPM-543-01)
80-90	-	-	2	-	~25-35 (TPM-548-72), 27 (TPM-548-96)
90-100	-	-	3	-	25 (TPM-557.03-04), 30 (TPM-1110-02), 40 (TPM-1062-05)
100-130	-	-	-	-	-
130-140	-	-	1	-	35-45 (TPM-1082-18)
140-170	-	-	-	-	-

Table 60 Distribution and estimated rim diameters of form 2 in Mangabal

Form 3: An unrestricted, shallow dish with a simple contour. A number of rim forms are associated with this vessel body form: 1, 2, 3, 4 and 5 (zero modification, upright, bevelled, tapered and externally thickened rims). Form 3 was located in units N998/E974.5-973.5 as well as in N1074/E1000 and N1200/E887. It was always found beneath 30cm depth – this is likely explained by the greater fragmentation of sherds closer to the surface. Form 3 has three size variants, small (Ø ~15cm), medium (Ø 20-34.9cm) and large (Ø 35-47cm). So far we only have one specimen of the small variant (TPM-1024-65). Most of the time form 2 was found to be tempered with *cauixí*, but it can also be tempered with quartz sand. This form would probably have served a range of functions, from food preparation to serving; it likely has modal value.

Distribution and estimated rim diameters of form 3 in Mangabal				
Level (cm)	**N1074/E1000**	**N998/E974.5**	**N998/E973.5**	**Ø (cm)**
0-10	-	1	-	~30 (TPM-500-20)
10-30	-	-	-	-
30-40	2	1	-	30 (TPM-111-69), 38 (TPM-163-26, TPM-515-29),
40-50	-	-	-	-
50-60	-	-	1	? (TPM-1024-77),
60-70	-	1	-	36 (TPM-538-103-108)
70-80	-	-	-	-
80-90	-	1	2	10-15 (TPM-1048-89), 20 (TPM-1052-56), 25 (TPM-548-89)
90-100	-	1	-	47 (TPM-557-05)
100-110	-	1	1	20 (TPM-561-47), 37 (TPM-1064-69)
110-120	-	-	1	~35-40 (TPM-1073-12)
120-170	-	-	-	-

Table 61 Distribution and estimated rim diameters of form 3 in Mangabal

Form 4: Form 4 has an unrestricted, simple contour and relatively straight walls and upright rims that can be externally strengthened (rim forms 2 and 10). The depth and consequent ability to hold contents could point to food preparation or serving. The specimens identified are mostly tempered with sponge spicules. The available material suggests the presence of small (Ø 15cm) and medium-sized (Ø 24, 25cm) variants. There is a slight "overhang" at the end of the rims on TPM-1110-05 and TPM-1010-33, which are not convincing as flanges, but which do nonetheless point to a deliberate finish. The specimens identified are tempered with sponge spicules (3/4) and quartz sand (1/4).

Distribution of form 4 in Mangabal site			
Level (cm)	**N998/E974.5**	**N998/E973.5**	**Ø (cm)**
0-10	-	-	-
10-20	-	1	? (TPM-1003-24)
20-30	-	-	-
30-40	-	-	-
40-60	-	1	24 (TPM-1010-33)
60-70	-	1	15 (TPM-1042-72)
70-90	-	-	-
90-100	-	1	25 (TPM-1110-05)
100-170	-	-	-

Table 62 Distribution and estimated diameters of form 4 in N998/E974.5-973.5

Form 5: This form is composed of simple and dependent, restricted vessels whose in-turning walls can be more rounded, with convex sides, or less so. In-turning and externally thickened rims (rim forms 8 and 10) can be attached to this form. The available material encompasses small (Ø 9cm, 10cm) and medium-large (Ø 35cm) variants. The diameters of the vessel rims are considerably reduced in comparison to those of unrestricted vessels. These vessels would be useful for storage or serving. TPM-305-04 was located during augering. Decomposing bone material was associated to it – it was probably inside it (the auger broke through the vessel), meaning this is very likely to have been a funerary urn. The vessel displays an incised design of oblique, connected lines on its body, which is very similar to that of a vessel found inside the Tapajós by Josué Lobato Cirino. Form 5 is associated with rim forms 1, 8 and 10.

Distribution of form 5 in Mangabal site				
Level (cm)	**N998/E974.5**	**N998/E973.5**	**N976/E1050**	**Ø (cm)**
0-40	-	-		-
40-60*			1	35 (TPM-305-04)
70-80	1	-		9 (TPM-542-69)
80-160	-	-		-
160-170	-	1		10 (TPM-1098-13)

Table 63 Distribution and estimated diameters of form 5

Form 6: These are independent restricted, moderately deep, hemispherical bowls with mild "S"-shaped, inflected contours. Curvature of upper body to which everted, out-curving rims (rim form 6) are attached, varies from slight to more pronounced. Specimens belonging to this form were retrieved from most arbitrary levels of N998/E973.5, comprising layers II, III and IV. Form 6 occurs in three size variants: small (Ø 9-15cm), medium (Ø 20-33cm) and large (Ø 39-45cm). The uses these vessels were put to would have been partly determined by their size. The smaller variants could be used for by individuals, as cups, or to serve condiments, or as children's toys or learning devices for novice potters. The medium and large variants could have been used for preparation of food (such as cooking or the fermentation of beverages), serving, or storage (particularly if covered). The independent restricted contour of this form would have been particularly useful for containing liquids. Both sponge spicule and quartz sand were chosen as principal tempering agents when making this form. It stands out as a characteristic vessel body form found on the site and we predict it possesses modal value. Soot was noted on the exterior of TPM-1082-37 and TPM-117.

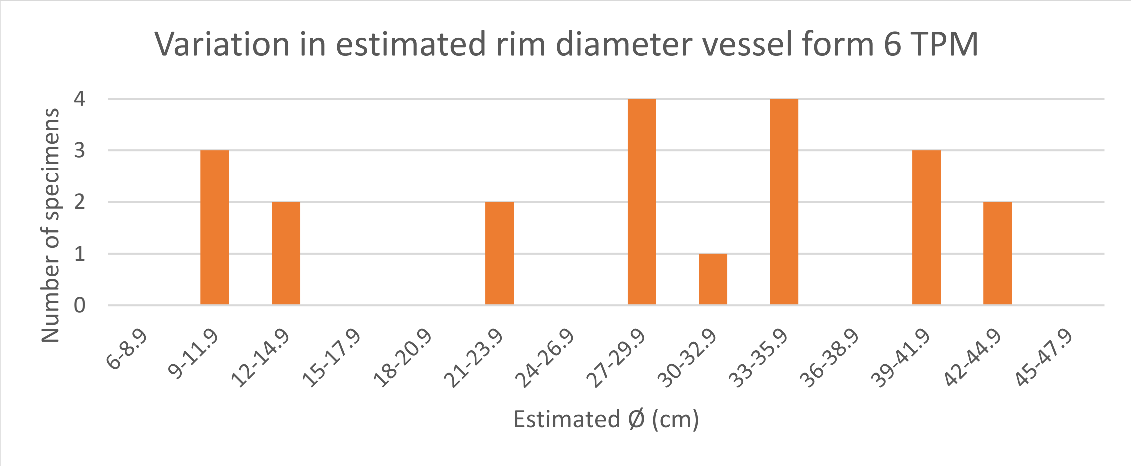


Chart 17 Histogram showing variation in estimated rim diameters associated to Form 6

Distribution and estimated rim diameters of form 6 in Mangabal					
Level (cm)	**N1200/E887**	**N1074/E1000**	**N998/E974.5**	**N998/E973.5**	**Ø (cm)**
0-30	-	-	-	-	-
30-40	3	1	1	-	~28 (TPM-515-35), 35 (TPM-117), ~40 (TPM-1510-28, TPM-1510-87, TPM-1510-117)
40-50	-		-	1	~10 (TPM-1020-34)
50-60	-		-	-	-
60-70	-		5	2	10 (TPM-538-60), 22 (TPM-538-92), ~29 (TPM-538-107), ~34 (TPM-534-02, TPM-534-03), 30 (TPM-1040-1), 42 (TPM-1109-1-2)
70-80	-		-	1	12 (TPM-1048.57-26)
80-90	-		1	-	13 (TPM-548-88)
90-100	-		1	2	23 (TPM-557-01-02), ~28 (TPM-1110-11), 33 (TPM-1104-17-18)
100-110	-		-	-	-
110-120				1	40-45 (TPM-1073-105)
120-130					-
130-140	-		-	1	25-30 (TPM-1082-37)
140-150	-		-	1	9-10 (TPM-1087-30)
150-170	-		-	-	-

Table 64 Distribution and estimated rim diameters of form 6 through excavated test pits in Mangabal

Form 7: An independent restricted, globular[10] vessel with inflected contour and constricted neck. The angle between neck and body is particularly accentuated. The specimens found have neck form 2 attached to them, but upright necks could hypothetically also be attached. Rim forms 2, 6 or 7 (everted, out-curved or flanged rims) are associated with form 7. Sherds attributed to this form were located in the N998/E974.5-E973.5 and in N1074/E1000. In N998/E974.5-973.5, specimens belonging to form 7 occurred between 20-50cm, comprising layers IV and V. Its absence from deeper layers may be a reflection of its tendency to fragment more at the join of body and neck (and thus elude confident identification). This form would be well suited to storing and pouring liquids. We lack the lower portions of these specimens, but what we do have does not present signs of soot, indicating this form may not have been used for cooking activities. TPM-1020-6 is polished. Both quartz sand and *cauixí* were used to temper form 7.

Distribution and estimated mouth diameters of form 7 in Mangabal				
Level (cm)	**N1074/E1000**	**N998/E974.5**	**N998/E973.5**	**Ø (cm)**
0-20	-	-	-	-
20-30	-	1	-	~18 (TPM-508-1)
30-40	1	1	-	~10 (TPM-515-23), 19 (TPM-111-66)
40-50	2	-	1	<12 (TPM-1020-6), ~22 (TPM-162-25), ?(TPM-119-03)
50-170	-	-	-	-

Table 65 Distribution and estimated rim diameters of form 7 in Mangabal

Form 8: Though its inflected contour resembles that of form 6, this unique specimen is an unrestricted vessel. It was retrieved from the 60-70cm level of N998/E973.5 and as such may be related to the ceramic concentration from N998/E974.5. Its diminutive size (Ø 7cm) suggests it could contain small portions of powder or that it could be a toy, or be a vessel made by a novice potter. It is tempered with *cauixí*. Its rim is everted and curved (rim form 6). *Unique specimen*.

[10] Although Anna Shepard would likely use the term “spherical” rather than globular, the literature of the region, particularly related to Santarém ceramics, commonly uses the term “globular”, which is why it has been preferred in this case. The two terms are interchangeable.

Points of inflection

The overwhelming majority of the points of inflection located are rounded, but on occasion angular (keels) were noted. This indicates that at least one other form, not described here (due to the lack of rims) is present among the site's pottery. Even so inflected contours appear to have been predominant over composite contours.

d. Neck modification

One form of neck was identified at the site.:

Neck form 2: Constricted (concave in cross section) with slight to accentuated curves. This neck form is associated to vessel body forms 6 and 7.

e. Rim Form (modification)

Within unit N998/E973.5, 302 rims were located. Within this sample, ten rim forms were identified and have been tabulated below. Further retrieval of material will be needed for us to be able to ascertain whether these forms present modal value. Table 66 shows the number of rims that escaped confident identification within N998/E973.5, on account of their being too small and/or eroded.

Eroded or undetermined rims N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	1	2	1	1	2	1	1	1	1	-	1	-	2	2	-

Table 66 Eroded or undetermined rims N998/E973.5. SC = Sherd count.

Rim form 1: **Zero modification.** This rim form does not present a change in inclination in relation to the vessel body. It is present in all but the uppermost (0-10cm) and deepest (160-170cm) levels of N998/E973.5. These rims are associated to simple and unrestricted vessels. I hypothesise rim form 1 has modal value.

Rim form 1/Zero modification N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	4	4	9	4	4	4	2	6	6	1	4	4	7	5	-	-

Table 67 Rim form 1/Zero modification rims present in N998/E973.5. SC = Sherd count

Rim form 2: Upright. Upright rims were found infrequently, appearing more in layer IV (40-70cm), but still in reduced quantities. They also occur in layer IV of N998/E974.5.

Rim form 2/Upright N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	-	-	3	1	2	-	-	1	1	-	-	1	-	-	2

Table 68 Rim form 2/Upright rims present in N998/E973.5. SC = Sherd count

Rim form 3: Bevelled. Bevelled rims were found below 50cm depth in N998/E973.5, in layers II, III and IV, becoming most popular around the transition of layers IV and III. I believe this rim form may be found to have modal value.

Rim form 3/Bevelled N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	-	-	-	1	2	3	3	1	3	5	3	2	2	-	-

Table 69 Rim Form 3/Bevelled N998/E973.5. SC = Sherd count.

Rim form 4: Tapering. Tapering rims are among the most common rim forms found at Mangabal; they probably have modal value. Most tapering rims have an everted inclination, though ten from the subsample tabulated below follow the inclination set by the vessel body contour (i.e., zero modification in terms of inclination).

Rim form 4/Tapering N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	1	-	2	3	5	10	11	6	5	7	2	4	1	5	4	1	-

Table 70 Rim form 4/Tapering N998/E973.5. SC = Sherd count.

Everted rims: During analysis, all everted rims were categorised as such, and only later was a separation made between form 5 (everted, folded out at slight angle) and form 6 (everted, curved outwards). Thus both of these forms will be presented simply as “everted” below.

Rim form 5: Everted rim, out folded at a slight angle: this consists of an outwardly inclined rim, set off from the vessel at an angle. These rims are associated to unrestricted vessel forms.

Rim form 6: Everted, out-curved rim. These rim forms maintain uniform thickness as they curve outwards. This rim form is often associated to independent restricted vessel bodies.

Rim forms 5 & 6/Everted N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	3	2	2	10	6	7	10	6	6	11	6	3	1	4	-	5	-

Table 71 Rim forms 5 & 6/Everted N998/E973.5. SC = Sherd count.

Rim form 7: This rim form is a flange. The flanges found at Mangabal are slightly wider at the top and are more elaborated than their counterparts at Sawre Muybu.

Rim form 7/Flange N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	-	-	-	1	1	-	1	-	1	-	-	1	4	-	-

Table 72 Rim form 7/Flange in N998/E973.5. SC = Sherd count.

Rim form 8: In-turning, or inverted rim. These rims are most often associated with simple and dependent restricted vessels. They can have an extra coil on their exterior.

Rim form 8/In-turning rim N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	1	2	-	-	2	1	2	3	1	2	-	1	1	-	-	-

Table 73 Rim form 8/in-turning rim in N998/E973.5. SC = Sherd count.

Rim form 9: Internally thickened rim. This rim form is often associated to griddles and its contour presents variations in profile. Within N998/E973.5 it was only identified in the upper levels (20-40cm) of the test pit. In N993/E974.5 it was found among the griddle sherds concentrated around 60cm. While the profile of TPM-534-1 resembles the shape of a leaf in profile, the profiles of TPM-536-02 and TPM-534-7 display a triangular appearance. TPM-534-07-08-09-10 (refitted sherds) have almost triangular profiles, were it not for the lack of smoothing between the rim coils, which has produced a channelled appearance on these pieces' lips, giving them a concave surface. TPM-534-6 displays a trapezoid profile. Griddle TPM-160, from N1074/E1000, also displays an internally thickened rim, which is raised and has rounded edges. This suggests that while thickening the interior of griddle rims was a recurrent practice that likely has modal value, there was a considerable amount of freedom as to how the rim's contour was subsequently defined (see plate 1).

Rim form 9/Internally thickened rim N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 74 Rim form 9/Internally-thickened rims in N998/E973.5. SC = Sherd count.

Rim form 10: Externally thickened. This form is unusual among the sample collected from the site. In N998/E973.5 it did not occur below 90cm depth; it was found within layers III, and IV. Different to the material from Sawre Muybu, Externally thickened rims do not give the impression of having been "folded". The inclination of these rims can vary from in-turning to upright (or mildly everted).

Rim form 10/Externally thickened N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	1	2	-	1	1	-	3	-	-	-	-	-	-	-	-

Table 75 Rim form 10/Externally-thickened rims, N998/E973.5. SC = Sherd count.

Rim form 11: Indeterminately thickened rims This rim form is unusual among the sample studied.

Rim form 11/Indeterminately thickened rims N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
SC	-	-	-	1	-	1	-	-	-	-	1	-	1	-	3	-	-

Table 76 Rim form 11/indeterminately thickened rims in N998/E973.5. SC = Sherd count.

f. Lip form

Both rounded and flat lips display modal value at Mangabal. What is noteworthy is that flat lips can be found more often than rounded lips; this is a distinctive feature of this site's pottery.

Lip form 1: A rounded lip

Lip form 2: A flat lip.

Lip form N998/E973.5																	
Level (cm)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	150-160	160-170
F	0	4	4	15	8	11	20	8	16	20	8	12	7	14	12	4	2
R	2	2	6	9	10	14	10	9	10	6	9	3	4	7	4	2	-
E/U	3	1	3	6	1	4	3	2	1	2	-	1	-	-	3	-	-

Table 77 Lip form in N998/E973.5. F=flat, R= Rounded, E/U=Eroded/Undetermined. Numbers represent rim sherd count.

7. Appendages

Four overall categories of appendages were observed among excavated pottery from Mangabal. See Ch. 6 for illustrations.

i. Protuberances/handles: Often placed near the vessel rim or the midpoint of the body, TPM-1006-47, TPM-1024-66, TPM-1077-30 and TPM-1062-69 probably acted as supports for handling the vessels, facilitating grip. They were formed through the addition of clay to the body exterior and could have a rounded or more linear shape. They could be the object of plastic decoration (incision or modelling).

ii. Adornos: These are zoomorphic representations. TPM-551-1 was produced by combining modelling (pushing the vessel wall outwards) and the addition of clay nubbins that were incised, punctated or hollowed out. TPM-1046-01 was created by adding clay to the vessel exterior and modelling, punctuating, excising and painting.

iii. Labial extensions: Very rarely, these were found at the site.

iv. Figurine: A hollow, modelled artefact, TPM-531-7, may have been an anthropomorphic figurine because of its general shape and a protruding element that resembles an arm.

Unidentified artefact: TPM-1071-01 may have belonged to a figurine. It has been shaped by modelling and by plastic displacement techniques. In cross-section it is triangular-shaped, however its edges are rounded.

Other clay artefacts

<u>Fire dogs:</u> Encountered throughout the excavation.

Combinations of bases, bodies, necks, rims, lips and appendages

The observed and hypothesised combinations of ceramic forms Mangabal ceramics are summarised below. Body forms 2 and 3 are seen to be combined with a considerable number of rim forms.

Observed and hypothesised combinations of form dimensions at Mangabal						
Form	**Base**	**Body**	**Neck**	**Rim**	**Lip**	**Appendage**
1	1	1*	-	9	1, 2	-
2	1, ?2, ?3	2	-	1,2, 3, 4, 10	1, 2	?2, ?3
3	?1, ?3	3	-	1,2, 3, 4, 5	1, 2	?2, ?3
4	?1, ?2	4	-	2, 10	1, 2	-
5	?1, ?2	5	-	8, 10	1, 2	?1, ?2, ?3
6	?1	6	-	6	1, 2	-
7	?1, ?2	5	?1, 2	?2, 6, 7	1, 2	?1, ?3

Table 78 Observed and hypothesised combinations of base, body, neck, rim, lip and appendages at the Mangabal site. Hypothesised combinations are signalled by a question mark (?).

Associations between temper, sherd thickness, vessel form, rim diameter and context

Table 79 shows the distribution of forms at different text pits in the site. Between them, units N998/E973.5 and E974.5 contain all forms identified at the site. Table 80 shows the results of charcoal dating alongside the different layers and forms detected within them. We initially expected the considerable depth of the N998/E974.5-973.5 units to reflect the passage of hundreds of years. This, and the possibility of mechanical mixing, led us to send eight samples from the site (seven from N998/E974.5 and E973.5 and one from N1074/E1000) for charcoal dating. However, all of the dates consistently fall between the mid-7th century AD and the early 9th century AD, encompassing a period of approximately 120 years, even if they do point to mechanical mixing, with the earlier dates in N998/E974.5-973.5 relating to shallower layers.

The distribution of forms across the Mangabal site					
Unit/auger point	N1200 /E887	N1074/E1000	N976/E1050	N998/E973.5	N998/E974.5
Form n°	2,6	1,2,3,7	5	2,3,4,5,6,7,8	1,2,3,5,6,7

Table 79 The distribution of forms across the Mangabal site

Vessel body forms, contexts and dates at Mangabal								
Arbitrary level (cm)	**N1200 E887**	**N1074/E1000**		**N998/E974.5**		**N998/E973.5**		**Forms**
	Layer	**Layer**	**C^{14} date**	**Layer**	**C^{14} date**	**Layer**	**C^{14} date**	
0-10	IV	V, IV		V		V		3
10-20	III	IV		V		V		4
20-30	III	III		V, IV	1265 ± 28 BP	V, IV		2, 7
30-40	III	III	1270 ± 30 BP	IV	1200 ± 30 BP	IV		1, 2, 3, 4, 7, 6, 7
40-50	III, II	III, II		IV		IV		2, 5, 6, 7,
50-60	II, I	II		IV	1151 ± 29 BP	III		1, 3, 5
60-70	I	II, I		IV, III		III		1, 2, 3, 4, 6, 8
70-80	I	I		III		III	1199 ± 26 BP	2, 5, 6,
80-90	I	Not excavated		III		III	1193 ± 26 BP	2, 3, 6
90-100	I			III, II		III, II		2, 3, 4, 6
100-110	Not excavated			III, II		III, II		3
110-120				III, II		III, II		3, 6
120-130				II, I	1243 ± 30 BP	II		-
130-140				II, I		II	1251 ± 28 BP	2, 6
140-150				II, I		II, I		6
150-160				I		II, I		5
160-170				I		II, I		-
170-180				I		Not excavated		-
180-190				I				-
190-200				I				-

Table 80 Vessel body forms, contexts and dates at Mangabal. Note that there is no equivalence between the layer numbers of units N1200/E887, N1074/E1000 and those of N998/E974.5 and E973.5. Only the latter have equivalence. From observing the contexts and the dates obtained, it is likely that Layer III of N1074/E1000 is coeval to Layer II of N998/E974.5&E973.5.

During analysis of the ceramic material from Mangabal, the limited sample at my disposal and the considerable degree of mechanical mixing observed within N998/E974.5-973.5 alongside the fact that continuities and similarities appear to be stronger than discontinuities or changes mean I have not noted marked changes in the development of this pottery by these generations. Although choice of temper varies, these different selections are largely masked by surface treatments and standardised forms.

Dimensions of surface treatment and decoration

8. Surface treatment techniques

Surface treatment - N998/E973.5								
Level (cm)	**Interior/ Exterior surface**	**Smoothing**	**Self-slip**	**Burnishing**	**Smudging**	**Polishing**	**Resin**	**N° of sherds displaying surface treatment***
0-10	Int	8	**2**	-	1	-	-	9
	Ext	9	2	-	3	2	-	11
10-20	Int	12	3	-	4	8	-	19
	Ext	12	2	-	3	8	-	19
20-30	Int	18	42	1	5	36	-	56
	Ext	13	32	4	9	46	-	67
30-40	Int	21	40	33	7	9	-	63
	Ext	22	48	33	7	10	-	65
40-50	Int	26	27	16	2	3	-	44
	Ext	17	27	21	7	6	-	44
50-60	Int	17	19	17	6	4	-	39
	Ext	22	22	16	2	2	1	41
60-70	Int	31	37	19	4	7	-	40
	Ext	27	37	20	3	4	-	52
70-80	Int	12	12	7	-	-	-	27
	Ext	10	15	9	-	-	-	27
80-90	Int	14	24	10	-	2	1	27
	Ext	11	23	10	1	3	1	26
90-100	Int	32	25	3	3	3	-	38
	Ext	28	24	5	3	4	-	37
100-110	Int	11	18	8	-	1	-	19
	Ext	7	19	12	-	1	-	22
110-120	Int	16	21	7	-	3	-	30
	Ext	17	22	8	2	8	1	32
120-130	Int	10	13	5	-	-	-	15
	Ext	9	12	6	-	-	-	15
130-140	Int	19	17	7	-	2	-	28
	Ext	10	31	12	-	3	-	25
140-150	Int	21	22	4	4	5	-	29
	Ext	21	21	3	4	5	-	29
150-160	Int	6	8	2	1	1	-	9
	Ext	6	8	2	-	-	-	8
160-170	Int	1	3	2	-	-	-	3
	Ext	2	2	1	1	-	-	3

*Table 81 Surface treatment among sub-sample of analysed sherds from N998/E973.5. *Note that surface treatments are not necessarily mutually exclusive, therefore the sum of the different treatments may surpass the sherd count for any particular level.*

The sample analysed for surface treatment includes the 549 sherds from N998/E973.5 plus an added sample, from the same unit, from the 50-60cm level through to its 160-170cm level. The reason for this added sample beginning at 50-

60cm is that I had already analysed potsherds on the basis of their containing surface treatment other than smoothing for the levels between 0-50cm. As a considerable number of sherds exhibited combinations of surface treatments for the levels between 50-170cm, but would not contribute new information on technology, I decided that the tabulation of data solely on surface treatment would be useful. This analysis was carried out by UFOPA students Vitória Campos and Hugo Tavares.

Surface treatment N998 E973.5 50-170cm					
		Smoothing + Self-slip	**Burnishing + self-slip**	**Polishing + self-slip**	**Smudging**
50-60	**Int**	25	84	4	4
	Ext	9	146	2	5
60-70	**Int**	15	61	2	2
	Ext	11	90	1	1
70-80	**Int**	127	29	2	-
	Ext	125	54	2	-
80-90	**Int**	71	18	-	-
	Ext	59	31	-	-
90-100	**Int**	48	49	9	21
	Ext	53	56	17	35
100-110	**Int**	137	21	1	-
	Ext	161	58	-	-
110-120	**Int**	54	36	13	27
	Ext	50	71	16	25
120-130	**Int**	101	20	1	-
	Ext	103	44	-	-
130-140	**Int**	10	4	-	-
	Ext	17	4	-	-
140-150	**Int**	29	26	6	21
	Ext	30	41	7	23
150-160	**Int**	38	17	1	10
	Ext	29	36	6	5
160-170	**Int**	8	2	-	2
	Ext	17	2	-	2

Table 82 Combinations of surface treatment techniques in N998 E973.5 50-170cm

Potters at Mangabal took great care in finishing vessel surfaces and were well in control of these procedures. This set of practices could be extremely well executed, and certainly embellished the finished products, giving them a refined and rather sober appearance. Surface finish, or treatment, is thus one of the hallmarks of this ceramic industry. Self-slip was frequently applied and smoothing is the most commonplace technique for evening vessel surfaces; burnishing is also relatively constant. Smudging is also recurrent, though less so. Polishing was constantly identified, though in reduced quantities. Resin was only exceptionally identified; this low figure may be related to poor preservation conditions and resin's biodegradability.

Mode 1: Smoothing was the most common technique of surface treatment chosen by the potters of Mangabal. At times interior surfaces would be smoothed while exterior ones would undergo other surface treatment.

Mode 2: Self-slipping was a very usual practice, lending vessel surfaces a smooth feel to the touch and masking any imperfections.

Mode 3: Burnishing could also be employed in the place of smoothing, giving vessels more lustre.

Smudging and polishing were not encountered sufficiently to be considered modes, but these surface treatments do stand out as a characteristic of Mangabal pottery. Future work should ascertain whether there is a relationship between vessel body form and specific surface treatments, or combinations of surface treatments. Another surface treatment technique occasionally observed, but not included in the tabulation, was 'striations' of the vessel surface. It is possible a spatula was employed to achieve this effect.

9. Decorative field

Similar to what occurs with the material from Sawre Muybu, decorated body sherds only appear to be the preferred decorative field when we look at sherd counts. Considering the total number of rim sherds, a larger proportion of rims was chosen by the potters of Mangabal as the decorative field in comparison to body sherds. Of course, these are not mutually exclusive; the same vessel could have both rim and body decorated. Table 83 presents information on the dimension of decorative field. The following sections will go into further detail about the stratigraphic distribution of different decorative techniques.

Decorative field – N998/E973.5					
Sherd face	**Base**	**Body**	**Rim**	**Lip**	**Appendage**
Interior	4	68	70	N/A	N/A
Exterior	2	228	50	61	8

Table 83 Decorative field of pottery from N998/E973.5

Mode 1: Consists of decorating the interior surface of vessel rims.

Mode 2: Comprises decorating vessel lips.

Mode 3: This involves applying one or more forms of decoration to the exterior surface of vessel rims.

Mode 4: This entails decorating the exterior vessel body.

Mode 5: Includes decorating the interior surface of the vessel body.

Decorative techniques

With regard to general decorative techniques, it can be stated that:

- Slipping, particularly on external surfaces, is the most common treatment found – however since slip tends to cover the entire vessel, while other types of decoration would only be applied to restricted areas, it was not necessarily the most common decorative technique;
- Decorative practices involving the displacement of clay or penetration of the vessel surface are found constantly in most levels of N998/E973.5;
- Techniques involving painting and additive plastic decoration are uncommon.

Decorative techniques N998/E973.5						
Level (cm)	**Interior/ exterior sherd face**	**Paint**	**Slip**	**Plastic - displacement**	**Plastic - additive**	**N° of sherds displaying decoration***
0-10	Int	-	4	1	-	4
	Ext	-	5	-	-	5
10-20	Int	-	10	1	-	11
	Ext	-	9	3	-	11
20-30	Int	-	4	1	-	4
	Ext	-	5	5	-	10
30-40	Int	-	5	-	-	5
	Ext	1	10	5	2	17
40-50	Int	-	1	-	-	1
	Ext	-	5	6	-	11
50-60	Int	-	11	-	-	11
	Ext	1	12	5	1	16
60-70	Int	1	3	1	-	5
	Ext	-	2	8	1	10
70-80	Int	1	1	-	-	1
	Ext	1	1	1	-	1
80-90	Int	-	-	1	-	1
	Ext	-	1	2	-	3
90-100	Int	1	2	1	1	4
	Ext	-	3	4	1	7
100-110	Int	-	1	-	-	1
	Ext	1	1	2	-	4
110-120	Int	1	1	-	-	2
	Ext	2	6	10	-	17
120-130	Int	-	2	1	-	3
	Ext	-	4	3	2	7
130-140	Int	-	2	1	-	3
	Ext	1	2	4	-	7
140-150	Int	1	5	4	-	10
	Ext	2	7	8	-	17
150-160	Int	-	-	-	-	-
	Ext	-	-	5	-	5
160-170	Int	-	-	-	-	-
	Ext	-	-	1	-	1

Table 84 Decorative techniques N998/E973.5 N998

10. Chromatic decoration

a. Slip colour

Mode 1: Reddish pigments (maroon and red) were often chosen as slips by Mangabal potters.

White slip is present through most of the stratigraphy, but only in small quantities. Orange is unusual and concentrated in the deeper levels. Yellow and gray are rare.

Level	Interior/ Exterior sherd face	Slip colour N998/E973.5					
		White	**Maroon**	**Orange**	**Red**	**Yellow**	**Grey**
0-10	Int	-	1	-	1	-	-
	Ext	-	1	-	2	-	-
10-20	Int	-	2	-	1	-	-
	Ext	-	3	-	3	-	-
20-30	Int	-	-	-	1	-	-
	Ext	2	1	-	3	-	-
30-40	Int	3	1	1	-	-	-
	Ext	4	1	-	1	-	-
40-50	Int	4	-	-	-	-	-
	Ext	4	1	-	2	-	-
50-60	Int	3	2	-	1	-	-
	Ext	2	2	-	-	-	-
60-70	Int	3	4	-	2	-	-
	Ext	2	3	-	3	-	-
70-80	Int	3	-	-	-	-	-
	Ext	2	-	-	-	-	-
80-90	Int	1	-	-	1	-	-
	Ext	1	-	-	1	-	-
90-100	Int	-	-	-	-	-	-
	Ext	-	-	-	1	-	-
100-110	Int	1	-	-	-	-	-
	Ext	-	-	-	-	-	-
110-120	Int	1	-	-	-	-	-
	Ext	1	-	-	-	-	-
120-130	Int	-	-	-	1	-	-
	Ext	-	-	-	1	-	-
130-140	Int	-	-	-	1	-	-
	Ext	-	-	-	2	-	1
140-150	Int	2	1	1	-	1	-
	Ext	2	1	1	-	1	-
150-160	Int	1	-	1	-	-	-
	Ext	1	1	1	-	-	-
160-170	Int	-	-	-	-	-	-
	Ext	-	-	-	-	-	-

Table 85 Slip colour N998/E973.5

b. Paint

Paint appears to have only been applied exceptionally to pottery in Mangabal, that is, if we can rely on the representativeness of our sample. Numbers related to chromatic techniques may also be smaller than what they would otherwise have been because of the gradual erasing of chromatic additions by post-depositional processes or even during the washing process.[11] In line with slip colour preference, reddish hues (red and maroon) occurred more frequently, followed by black and brown. Notwithstanding this low representation within the overall sample, some of the painted pieces recovered display intricate patterns requiring technical mastery.

Paint colour N998/E973.5				
Level	**Brown**	**Red**	**Maroon**	**Black**
0-30	-	-	-	-
	-	-	-	-
30-40	-	-	-	-
	-	-	-	1
40-50	-	1	-	-
	1	2	2	-
50-60	-	-	-	-
	-	1	-	-
60-80	-	-	-	-
	-	-	-	-
80-90	1	-	-	1
	-	-	-	1
90-100	-	-	-	-
	-	-	-	-
100-110	-	-	1	-
	-	-	-	-
110-130	-	-	-	-
	-	-	-	-
130-140	-	-	1	-
	-	-	-	-
140-150	-	-	-	-
	-	-	-	-
150-160	-	1	-	-
	-	1	-	-
160-170	-	-	-	-
	-	-	-	-

Table 86 Paint colour N998/E973.5

[11] Having said this, we took care not to leave sherds in contact with water for too long and only used paint brushes, rather than tooth brushes, during the cleaning process, as suggested by Silvia Cunha Lima.

11. Plastic decoration techniques

In spite of being numerically reduced, the repertoire of plastic decorative techniques is varied and the specimens recovered demonstrate skill in execution.

Decoration involving clay displacement

Within the realm of clay displacement techniques, incision prevails; impression, punctation, excision, modelling and channelling are infrequent. Clay displacement can also be combined with additive techniques, as shown by TPM-551.

Plastic decoration N998/E973.5								
	Displacement						Additive	
Level (cm)	Punctation	Impression	Excision	Modelling	Incision	Channeling	Nubbin	Clay strip
0-10	-	-	-	-	1	-	-	-
10-20	-	1	-	-	2	1	-	-
20-30	-	1	1	-	3	-	-	-
30-40	1	1	-	-	3	-	1	-
40-50	-	-	-	-	6	-	-	-
50-60	-	-	-	1	4	-	1	-
60-70	-	1	-	-	9	-	-	-
70-80	1	-	-	-	1	-	-	-
80-90	-	-	-	-	3	-	-	-
90-100	1	-	-	-	6	-	1	-
100-110	-	-	-	-	3	-	-	-
110-120	-	-	1	-	10	-	-	-
120-130	-	-	-	-	3	-	-	1
130-140	-	-	-	-	5	-	-	-
140-150	-	-	-	-	12	-	-	-
150-160	-	-	-	-	5	-	-	-
160-170	-	-	-	-	1	-	-	-

Table 87 Plastic decoration N998/E973.5

12. Lip finish/treatment

As with Sawre Muybu pottery, smoothed lips make up the overwhelming majority of cases studied. Nicked lips are relatively frequent and are characteristic of the site's pottery, being observed on rims from the different test pits. I could not be sure of the finishing technique in 21 instances; excised, slipped, painted and modelled lips are rare. Another form of finishing lips was to deliberately leave an "overhang" of clay on the outer edge.

Lip finish N998/E973.5							
Level (cm)	Smoothing	Nicking	Notching	Modelling	Paint	Slip	Excision
0-10	2	1	-	-	-	-	-
10-20	3	2	-	-	-	-	-
20-30	7	1	2	-	-	-	1
30-40	13	8	-	1	-	-	-
40-50	12	5	-	-	-	-	1
50-60	18	5	1	-	-	1	-
60-70	24	5	1	-	-	1	-
70-80	14	3	-	-	-	-	-
80-90	23	3	-	-	-	-	-
90-100	24	4	-	-	-	-	-
100-110	13	1	2	-	-	-	-
110-120	13	2	-	-	-	-	-
120-130	8	2	-	-	-	-	-
130-140	17	-	3	-	-	-	-
140-150	13	-	3	-	1	1	-
150-160	5	-	1	-	-	-	-
160-170	2	-	-	-	-	-	-

Table 88 Lip finish N998/E973.5. Eroded or undetermined lips are tabulated above in table 77 on lip form.

Mode 1: Smoothing was the 'default' way to finish lips.

Mode 2: Nicking was often applied to lips associated to rim form 7.

13. Design[12]

Rectilinear designs appear to have been the most commonly executed by the potters of Mangabal. Within the universe of decorated material from the site's test pits, what emerges as a common theme are intersecting, incised lines. These can either be oriented in vertical and oblique directions, or in opposing, oblique directions; if the angles are sufficiently acute the design resembles lozenges. These designs can appear on the interior face of griddle rims or on the upper body of composite vessels

[12] I have decided that a qualitative description will be more useful than a table of design elements observed on pottery from Mangabal.

(TPM-117) and were accomplished with varying degrees of expertise. TPM-117 may have been incised by two pairs of hands, one practiced and steady, while the other apparently had greater difficulty in navigating the vessel's in-curving upper body. This may be a vestige of transmission in practice, demonstrating the importance of this specific design and the necessity of learning it properly. I hypothesise this design represents a mode.

Other sherds display a design of oblique and converging lines, reminiscent of patterns produced by interweaving fibres in basketry. This was achieved through incision or through impression. Three refitting griddle sherds display alternating sets of obliquely oriented and parallel lines (TPM-534-07-10). This, again, seems to be a repeated theme, observed on much of the body of TPM-305 and hinted at in smaller fragments. This may also represent a mode within the dimension of design. Both of these designs are present on vessels found by goldminers diving in the vicinity, in the Tapajós River. The "lozenge" design was also noted on a griddle fragment during a cursory visit to the Itapel site, further upstream from the Mangabal site.

TPM-534-6 and TPM-1006-47 also appear to share a similar idea, exhibiting groupings of horizontal lines connected to three vertical lines.

Obliquely oriented, parallel lines are seen on the interior of TPM-534-x, a griddle rim. We cannot be sure whether these would converge with parallel lines oriented in the opposite direction or whether the entire rim would be covered with parallel lines oriented in the same direction, towards the left.

Rectilinear designs could also be painted with great expertise, though our sample suggests this to be rare.

Lines of nicks, notches or punctates were also applied to vessel lips or very occasionally, to ridges or keels. Although the techniques described are similar to what was observed at Sawre Muybu, the visual effect is altogether different.

Upon viewing some of these vessels at the Curt Nimuendaju archaeology lab in Santarém, Cecílio Kirixi Munduruku stated that different designs would have expressed different clan affiliations (Cecílio Kirixi Munduruku, pers. comm., 19 February 2016).

Curvilinear designs are less usual among our sample. An inflected vessel shape can make rectilinear designs appear slightly curved; perhaps this was the artist's intention. These designs can be composed of incised, oblique-oriented parallel lines converging to a line oriented horizontally (or in another direction – it is difficult to tell on some of the fragments).

Curvilinear designs can also be painted. Some compositions combined with plastic alterations to the clay create zoomorphic and possibly anthropomorphic figures (TPM-531-7 and TPM-1046-01). Another unique specimen presenting a painted curvilinear design is TPM-1056, which exhibits red (maroon) on white concentric circles outlined in black.

<u>Signs of use-wear</u>

Fifty-three exterior 19 interior sherd surfaces present soot; other signs of use-wear (such as friction) were not conclusive.

Summary of findings

The plot below is the result of multiple correspondence analysis undertaken by Dr. Osvaldo Anacleto with the data I generated from analysing Mangabal pottery. The variables included are related to the dimensions of technology, surface treatment and decoration; the arbitrary levels were also included. The more superficial of the arbitrary level variables are located on the left hand side of the plot while the deeper level variables are further to the right. This distance could suggest that material in the shallower levels shares attributes that are not as frequent in the material of the deeper levels. However, I was not able to observe this distinction during analysis. There is no clear pattern showing clusters of variables. I believe this reflects our findings during analysis: during the *chaîne opératoire* of this pottery, different alternatives were open to potters. The stratigraphy of unit N998/E973.5 is also mixed, which makes it difficult, if not impossible, for us to chart incremental changes over the approximately 150-200 years of occupation represented by this material.

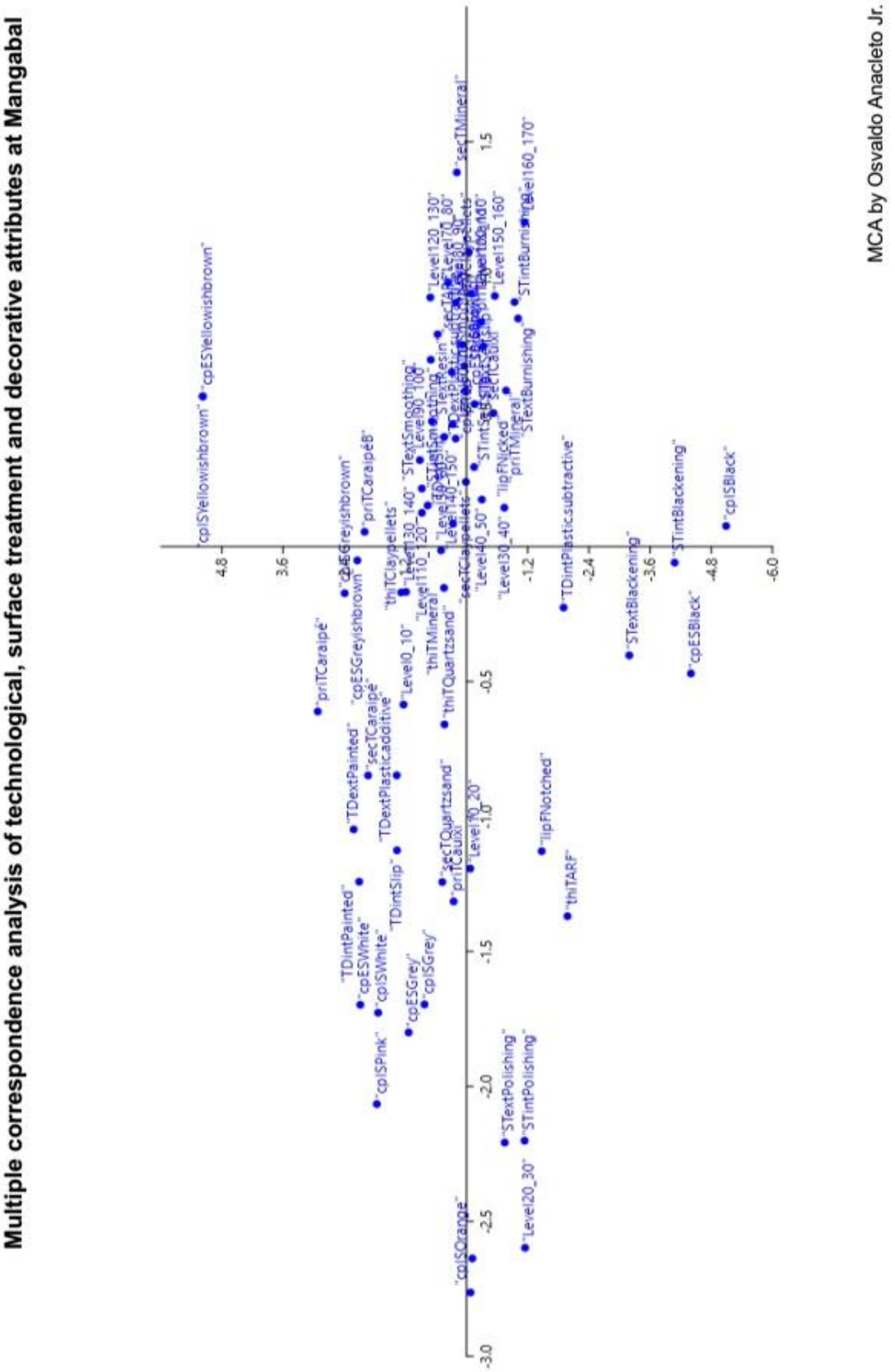


Fig. 23 Multiple correspondence analysis representing the relations between variables of arbitrary level, temper, firing, post-firing colour of the paste, surface treatment, decoration and lip finish.

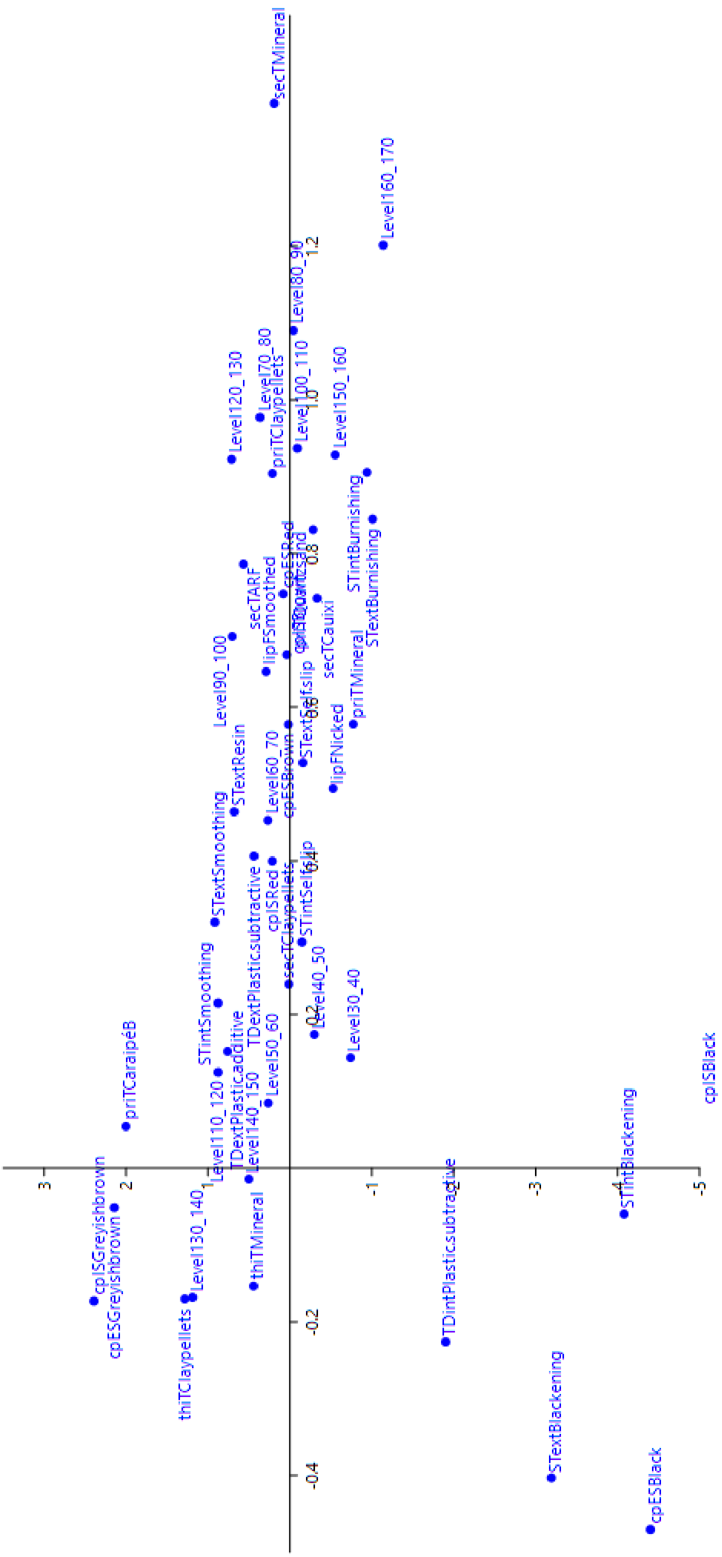


Fig. 24 This is the same plot as above, with the right-hand side of the plot zoomed in.

The analysis of ceramic material from the Mangabal site reveals that:

- Potters at Mangabal tended to select either quartz sand or sponge spicules as their primary tempers;
- The choice of temper did not predetermine vessel form;
- The shared standard for vessel walls was relatively thin vessel walls (falling between 4-10mm);
- Forms are relatively standardised;
- Surface treatments played an important role in embellishing the pottery, giving it a smooth and even appearance, suggesting this was another shared value. Self-slip was amply used alongside smoothing, burnishing, smudging and polishing (in decreasing order of popularity);
- Decoration tended to be “minimalist” on most occasions, being composed of mostly rectilinear designs, some of which are recurring. There are notable exceptions to this however, with examples showing highly accomplished painted and plastic embellishments. These sophisticated materials do not seem to have been imported, because they strongly resemble the site’s other analysed materials in terms of their technological modes and attributes.
- Firings varied mostly between oxidised and partially oxidised, with few reduced firings.

In sum, I propose that the ceramics from Mangabal constitute one assemblage, made by the members of a face-to-face community who apparently lived in the area from the late 7th century AD for ~200 years. As such it can be called the Mangabal complex.

Comparisons between ceramics from Mangabal and Sawre Muybu

Although the pottery from these two sites have isolated features in common, there are significant contrasts along the dimensions of variability and their respective *chaîne opératoires*. This is confirmed by the analysis of lithic materials from the two sites (Honorato de Oliveira 2015, p. 89). These differences suggest that the complexes belong to independent ceramic traditions.

In overall terms, what we have observed can be generalised like so:

SM-1. This represents a local coarse ware, with vessels suited for food preparation, serving and storage; within this category there are vessels that are embellished with “baroque” decorations, some of which apparently emulate SM-2, signalling participation in exchange networks extending northwards. Based on our analysis from Excavation Area 1, the general steps involved in the production of this pottery can be summed up as:

Quartz sand temper → thicker vessel walls → simple & unrestricted forms/independent restricted forms → smoothing, self-slip → slip/plastic decoration → oxidised firing.

SM-2. This represents a potentially imported fine ware, which bears decorative features strongly associated to Santarém pottery. These vessels would have been used for serving, probably on special occasions:

Cauixí temper → thin vessel walls → simple & unrestricted forms (possibility of wider diameters and unusual horizontal cross sections) → smoothing → painted and plastic decoration → reduced firing.

SM-3. It is not clear whether these griddles were locally made or imported. The design on their interior rims is reminiscent of designs seen at Mangabal, though the angles at which the lines intersect are wider. It is possible that this alludes to participation in an exchange network that predates the dissemination of the IPT (which is not to say that it did not continue and operate simultaneously into IPT ‘times’).

Cauixí or *caraipé* temper → thicker vessel walls → simple & unrestricted griddle forms → smoothing → oblique and intersecting incised lines on the interior of rims → partially oxidised/varied firings.

Mangabal. These wares were locally made, but their formal and decorative attributes suggest participation in extensive interaction networks to the west (see Ch. 7).

Cauixí or quartz sand temper → thin vessel walls → simple & unrestricted/dependent and restricted/independent restricted forms → smoothing/ burnishing/polishing, self slip/smudging → decoration involving clay displacement, occasional painted + plastic decoration → variable firings.

LEGEND FOR MCA PLOTS

Over-arching category	abbreviation	variable
Primary temper	PriTemper	Cauixi
		Caraipé
		Grog
		Mineral
		Hematite
		Clay pellets
		ARF**
		Quartz
		Charcoal
		Sand
		Gold
		Other
		Not identified
		Voids
		Caraipé B
Secondary temper	SecTemper	Cauixi2
		Cariapé2
		Grog
		Mineral
		Hematite
		Clay Pellets
		ARF**
		Quartz
		Charcoal
		Sand
		Gold
		Other
		Not identified
		Voids
		Caraipé B
Third order temper	ThiOrdTemper	Cauixí
		Caraipé
		Grog
		Mineral
		Hematite
		Clay Pellets
		ARF**
		Quartz
		Charcoal
		Sand
		Gold
		Other
		Not identified
		Voids
		Caraipé B
Firing	Firing	Complete_Oxidised
		Reduced
		Partially oxidised

Colour of the paste - internal sur	CoPasteIntSurf	White
		Orange
		Black
		Red
		Brown
		Greyish brown
		Pink
		Other
		Grey
Colour of the paste - external sur	CoPasteExtSurf	White
		Orange
		Black
		Red
		Brown
		Greyish brown
		Pink
		Other
		Grey
Surface treatment - internal	SurTreatInt	Smoothing
		Resin
		Blackening
		Burnishing
		Polishing
		Self slip
Surface treatment - external	SurTreatExt	Smoothing
		Resin
		Blackening
		Burnishing
		Polishing
		Self slip
Decorative field - internal	DecFieldInt	Rim
		Lip
		Body
		Base
		Lug
Decorative field - external	DecFieldExt	Rim
		Lip
		Foot
		Body
		Base
		Lug
Type of decoration - internal	TypeDecInt	Painted
		Plastic - additive
		Slip
		Plastic - subtractive*
Type of decoration - external	TypeDecExt	Painted
		Slip
		Plastic - additive
		Plastic - subtractive*

Slip colour - internal	SlipColint	White Maroon Orange Red Black Yellow
Slip colour - external	SlipColext	Red Maroon Black White Yellow Orange
Paint colour - internal	Paint colour - internal	Brown White Maroon Red Orange Yellow Black Negative
Paint colour - external	PaintColExt	Brown White Maroon Red Orange Negative Yellow Black
Additive plastic decoration	AddPlastDec	Nubbin Clay strip Lug
Subtractive* plastic decoration	SubPlasticDec	Impression Punctation_ straight-edged stylus Punctation_ Rounded stylus Dragged punctation Ungulate or nut impression Punctation_circular and hollow stylus Fibre impression Fine incision Excision Modelled Short incisions Thick incisions
Context	Context	Test pit Level

*'Subtractive' refers to technique of plastic displacement
** 'ARF' refers to *saibro*

Comparisons with ceramics from other sites on the Tapajós and beyond

Downstream from Sawre Muybu

Itapacurá I site (PA-ST-29)

The collection I analysed from this site contained three base sherds, 15 body sherds, 22 rims and five appendages (one rim sherd has an appendage related to it). There are further sherds belonging to this site's collection, which are represented by the sub-sample analysed. Fragments offering information on form or decoration were photographed and illustrated by Vinicius Honorato.

Sherds had been identified with numbers 560, 561 or 562. PRONAPABA workers usually excavated in levels of 20cm, therefore it is likely that catalogue number 560 represents surface sherds, 561 represents the 0-20cm level and 562 represents the 20-40cm level. Perota noted (1979) that the cultural layer came to an end below 30cm depth, so 562 may represent 20-30cm depth. Besides pottery, flaked and polished lithics were located at the site.

Dimensions of technology

Temper: As concerns temper, most material has quartz sand or *cauixí* as a primary temper, followed by clay pellets (which may consist of a naturally occurring inclusion) and, in a singular instance, *caraipé*.

Primary (P), Secondary (S) and Third-order (T) tempers* among Itapacurá I sample										
Provenience number	*Primary, Secondary, Tertiary temper*	*Quartz sand*	*Cauixí*	*Caraipé*	*Grog*	*Unidentified mineral*	*Clay pellets*	*Saibro*	*Caraipé B*	*N° sherds analysed*
560	P	15	12	1	-	-	2	-	-	30
	S	12	1	2	-	-	2	1	1	
	T	3	-	-	-	1	-	1	-	
561	P	7	2	-	-	-	-	-	-	9
	S	2	-	-	1	-	2	-	-	
	T	-	-	-	-	1	-	-	-	
562	P	3	1	-	-	-	-	-	-	4
	S	1	-	-	-	-	1	-	-	
	T	-	-	-	-	-	-	-	-	

Table 1 Primary (P), Secondary (S) and Third-order (T) tempers among Itapacurá I sample. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

It appears that temper selection parallels what we observed among the pottery of Sawre Muybu, with quartz sand tempering "coarse wares" and sponge spicules, "finewares". Sponge spicule temper appears to be proportionately more common here than at SM, but this might be attributable to the targeted selection of decorated sherds over plain ones during surface collection[1] and during my analysis, and the probable increased likelihood of decorated pottery being tempered with *cauixí*. The sherd that exhibits *caraipé* as its main temper is a base sherd, possibly of a griddle.

Firing: The association between temper and firing follows a similar general pattern but is not as clear cut as what we observed with the SM pottery. Most oxidised firings (11 pieces) were associated to quartz tempered sherds, but some others instead had *cauixí* (3) or *caraipé* (1) temper. Reduced and partially oxidised firings seem to have been achieved in roughly equal numbers. Of the partially oxidised sherds, ten were tempered with quartz sand as their main temper, and six with *cauixí*. Six of the sherds that had undergone reduced firings were tempered mainly with *cauixí* while three were tempered with quartz sand.

Firing among Itapacurá I sample				
Provenience number	*Oxidised*	*Reduced*	*Partially oxidised*	*N° sherds analysed*
560	11	6	13	30
561	4	2	3	9
562	2	1	1	4

Table 2 Firing among Itapacurá I sample.

Colour of the paste: Brown (including greyish and yellowish brown) is the most usual post-firing colour of the paste among the sherds analysed.

Post-firing colour of the paste among Itapacurá I sample							
Provenience number	*Interior/Exterior*	*White*	*Orange*	*Brown*	*Pink*	*Grey*	*N° sherds analysed*
560	Int	0	5	23	1	1	30
	Ext	1	5	23	0	1	
561	Int	0	1	7	0	1	9
	Ext	0	1	8	0	0	
562	Int	0	1	3	0	0	4
	Ext	0	1	3	0	0	

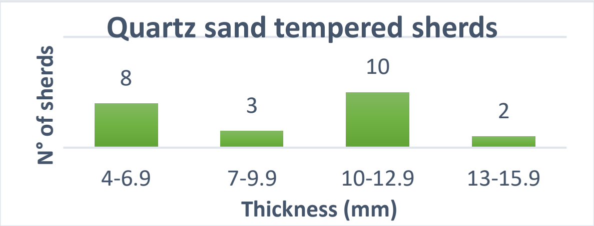
Table 3 Post-firing colour of the paste among Itapacurá I sample.

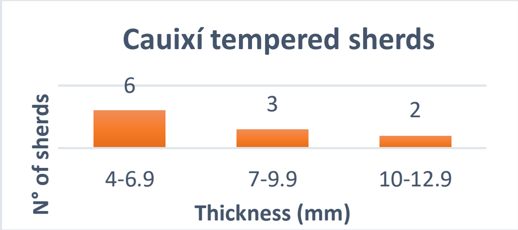
[1] Though I do not have confirmation that this occurred, the large proportion of decorated material would seem to suggest this.

Dimensions relating to form

Vessel forming techniques: Coiling is presumed to be the basic vessel forming technique; modelling was also employed.

Vessel wall thickness: Sponge spicules seem to be associated with thinner vessel walls while quartz sand tempered material varies more. The histograms below exclude the measure of the three base sherds.





Histograms of vessel wall thickness of sherds Chart 1 tempered primarily with quartz sand Chart 2 tempered primarily with cauixí at Itapacurá I site.

Horizontal cross section: The specimens observed would have belonged to vessels with circular cross sections.

Bases: Of the three base sherds examined, two are flat and one is annular. They are tempered with quartz sand (2) and *caraipé* (1).

Inflection point: Inflection points seen are rounded.

Vessel body form (vertical cross section): Given the restricted nature of the Itapacurá I sample, it likely represents only part of the potentially larger variety of forms produced and used by the people who once lived here. Simple and unrestricted vessels that were likely moderately deep hemispherical bowls are present among the collection. Simple and dependent restricted vessels – some of which have very constricted orifices – also occur. Inflected contours are found in association with unrestricted and with restricted orifices.

Rim form: Two rims are in-turning, four are upright and five are everted. Six rims are tapered (and inverted) while one is tapered and upright inclined. Two are indeterminately thickened and everted, and two are internally thickened, “folded” rims, a variation of the externally “folded” rims of SM. Both of these present clay pellets as their main inclusion, followed by quartz sand.

Lip form: Fifteen lips are flat; the remainder are rounded. This is another point of contrast with SM, where most lips are rounded.

Appendages: A number of appendages are included in the collection. They have *cauixí* as their main temper.

i. Protuberances: these are generally of indistinct form, possibly acting as handles, or can be comprised of small spheres applied to the ends of rims
ii. Appliqué: produced through modelling and punctation, appliqué was used to adorn exterior vessel walls.
iii. Tabs: Among the collection is a tab composed of clay additions and circular punctations, creating a zoomorphic representation (owl?).
iv. Undetermined: A modelled clay artefact of curved form which may or may not have been attached to a vessel.

Surface treatment and decoration

Surface treatment techniques: Smoothing was almost omnipresent. Self-slip can be seen, but only exceptionally. Burnishing is rare.

Decorative field: Exterior vessel surfaces are preferred for displaying decoration, in particular, the exterior body of vessels, followed by rims.

Decorative techniques: Techniques involving the displacement of clay are by far the most popular if our sample is to be considered representative of the site's pottery. Clay additions can be seen occasionally. Chromatic decoration is rare.

Plastic decoration techniques: Displacement of clay while in still damp state seems to have been the standard way to decorate vessels at Itapacurá I. Incision is the most observed technique, with fine styluses apparently being used more frequently on *cauixí* tempered sherds and thicker ones being applied to the coarser, quartz sand tempered material. Punctations are the second most observed form of decoration alongside the application of clay strips or spheres.

Lip finish: The majority of lips were smoothed; notches, nicks and punctations were observed on occasion; one lip was channelled.

Design: Rectilinear designs are most usually seen among the sample studied; their orientation can be oblique or horizontal. They can be parallel and/or converging, or in forming nested triangular designs. Curvilinear design elements are infrequent. One rim sherd displays a wavy design in composition with a protuberance near the rim. Another fragment displays what were likely to have been concentric circles. The application of clay spheres and their subsequent punctation and incision could also produce zoomorphic representations.

Itapacurá II (PA-ST-30)

The available ceramic collection from this site included seven bases, 28 vessel body sherds, 34 rims and one appendage (Cat. numbers 563, 564, 565, 566, 567, 568, 570 and 571). I could not ascertain whether more than one test pit was opened at this site or what the catalogue numbers relate to.

Dimensions of technology

Temper: The analysed sherds from the Itapacurá II site present a similar overall pattern to those of SM and Itapacurá I, with quartz sand and sponge spicules most usually being found as principal tempers. On occasion, clay pellets (or clays that already contained them) appear to have been favoured – caution is of course required in stating this because of the reduced sample size.

Primary (P), Secondary (S) and Third-order (T) tempers* among Itapacurá II sample									
PN	*P, S, T*	*Quartz sand*	*Cauixi*	*Grog*	*Unidentified mineral*	*Clay pellets*	*Saibro*	*Caraipé B*	*Nº sherds analysed*
563	P	6	7	1	-	1	-	-	15
	S	6	-	1	-	3	-	-	
	T	2	-	-	1	-	-	-	
564	P	3	1	-	-	3	-	-	7
	S	3	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	
565	P	-	1	-	-	-	-	-	1
	S	1	-	-	-	-	-	-	
	T	-	-	-	-	-	-	-	
566	P	6	5	-	-	-	-	-	11
	S	5	-	-	1	-	-	-	
	T	-	-	-	-	-	-	-	
567	P	1	5	-	-	7	-	-	13
	S	11	-	-	1	1	-	-	
	T	1	1	-	-	-	1	-	
568	P	5	3	-	-	-	-	-	8
	S	1	1	-	-	3	1	1	
	T	1	-	-	-	-	-	-	
570	P	6	1	-	-	-	-	-	7
	S	1	2	-	1	2	-	-	
	T	-	-	-	-	2	-	-	
571	P	5	1	-	-	-	-	1	7
	S	2	-	-	-	2	-	-	
	T	-	-	-	-	-	-	-	

Table 4 Primary (P), Secondary (S) and Third-order (T) tempers among Itapacurá II sample. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

Firing: Though most of the sherds displaying oxidised firings had quartz sand (20) as their main temper, a considerable number of *cauixí* tempered fragments (13) also underwent oxidised firing, while almost all analysed sherds containing clay pellets (10) above other inclusions had undergone oxidised firing.

Firing among Itapacurá II sample				
Provenience number	***Oxidised***	***Reduced***	***Partially oxidised***	***N° sherds analysed***
563	9	3	3	15
564	4	1	2	7
565	-	-	1	1
566	8	2	1	11
567	13	-	-	13
568	5	2	1	8
570	5	-	2	7
571	2	1	4	7

Table 5 Firing among Itapacurá II sample

Partially oxidised firings were evenly distributed among quartz sand (6) and *cauixí* (5) tempered pottery, while one fragment tempered principally with clay pellets and another with grog also displayed the achievement of partial oxidation during the firing process. Reduced firings were again distributed evenly between *cauixí* (5) and quartz sand (4) tempered pottery.

Colour of the Paste: As with the SM material, brown was the most frequently occurring post-firing colour of the paste.

Post-firing colour of the paste among Itapacurá II sample								
Provenience number	***Interior/ Exterior***	***White***	***Orange***	***Black***	***Red***	***Brown***	***Grey***	***N° sherds analysed***
563	Int	1	1	-	-	12	1	15
	Ext	1	-	-	-	13	1	
564	Int	-	2	1	-	4	-	7
	Ext	-	-	-	-	6	1	
565	Int	-	-	-	-	-	1	1
	Ext	-	-	-	-	-	1	
566	Int	1	-	-	-	10	-	11
	Ext	1	2	-	-	8	-	
567	Int	1	4	-	-	7	1	13
	Ext	1	5	-	-	7	-	
568	Int	-	2	-	-	6	-	8
	Ext	-	4	-	-	4	-	
570	Int	-	1	-	1	5	-	7
	Ext	-	2	-	-	5	-	
571	Int	-	-	-	1	6	-	7
	Ext	-	1	-	-	6	-	

Table 6 Post-firing colour of the paste among Itapacurá II sample

Brownish coloured pastes are by far the most usual, although orange is constantly present, even if in small quantities, within most of the numbered sets. In sum, in terms of technological dimensions, we can observe trends more similar to the Itapacurá I site than to SM, though the three sites are clearly within the same technological tradition.

Dimensions related to form

Vessel forming techniques: Coiling and modelling would have been used to form vessels.

Vessel wall thickness: Possibly because of the sample selected or because of its reduced size, at Itapacurá II the correlation between principal temper and vessel wall thickness is not as strong as at SM. On the other hand, if the sample is representative of the site's pottery and the dates obtained are indeed associated to the sample studied, could this be an indication that, with time, the vessel walls of coarse tempered wares tended to become thinner?

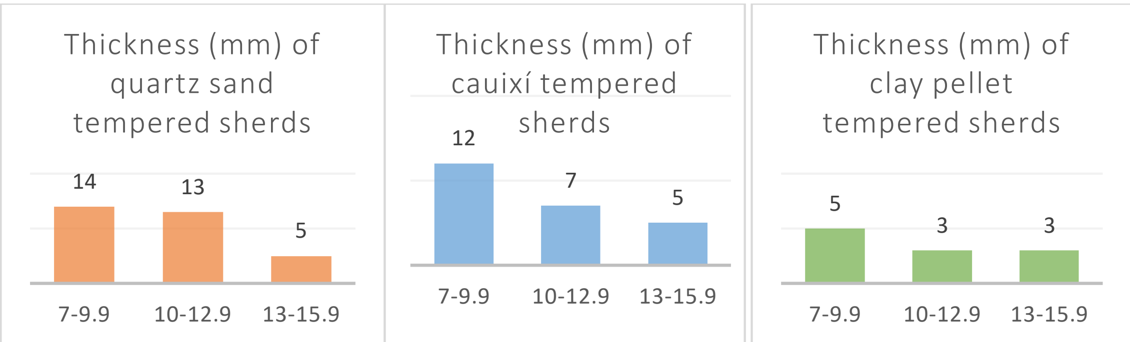


Chart 3 Histogram of vessel wall thickness of sherds tempered primarily with quartz sand. at Itapacurá II site. Chart 4 Histogram of vessel wall thickness of sherds tempered primarily with cauixí at Itapacurá II site. Chart 5 Histogram of vessel wall thickness of sherds tempered primarily with clay pellets at Itapacurá II site.

Horizontal cross section: The sample examined presented circular horizontal cross sections.

Bases: Six bases studied are flat and one is annular.

Vessel body form (vertical cross section): Simple and unrestricted vessel forms, including shallower "dishes" and moderately deep "bowls" of varying inclination can be seen among the sample studied. Simple and dependent restricted vessels are to be found. These are similar to analogous forms projected for Itapacurá I. Independent and restricted vessels also occur among these ceramics.

Rim form: Rim forms at Itapacurá II are apparently less varied than at SM. Rim forms with zero modification are common, and everted rim forms – curved outwards or, less usually, folded off at a slight angle – are also frequent; one small flange was located. An internally thickened and everted rim is also present. In-turning rims also occur, though more infrequently, and tapered rims are far less common than at SM. One rim has a familiar "folded" appearance with a not altogether smoothed additional, exterior coil that does not however include further interventions.

Lip form: Flat lips are more common than rounded ones by a small margin.

Appendages

<u>Protuberances</u>. On occasion, these are attached to exterior vessel walls near the rim, possibly acting as gripping supports. They can also be small "blobs" added to the edge of vessel rims, in which case their function seems to have been aesthetic.

Surface treatment and decoration

Surface treatment techniques: Smoothing is by far the most usual form of surface treatment on both interior and exterior surfaces. Self-slip is more frequent here than at Itapacurá I, seen on a little under a third of the fragments examined. Resin application and burnishing are rare.

Decorative field: Exterior vessel surfaces are far more commonly decorated than interior ones, and vessel body walls appear to be the preferred decorative field, followed by rims.

Decorative techniques: Itapacurá II apparently boasts a greater diversity of decorative techniques than its namesake. Though techniques involving the displacement of clay are the most usual, followed by additive plastic decoration, chromatic decorative techniques including the application of slip and paint are also significant. It is possible that this distinction is what led Perota to create two phases for the site.

Chromatic decoration: Painted decoration is more common than slipping among the sample studied; reddish hues were the preferred colour. Paint could be applied either in a "blanket" fashion covering sections of the vessels or as linear designs. Sherds displaying red paint are similar to those found at SM, having *cauixí* as their main temper, thinner vessel wall thickness and often blackened cores.

Plastic decoration techniques: Incision is again the prevalent technique; punctation is seemingly less common than at SM and Itapacurá I. Excision is not common, but is present. Additive plastic decoration occurs especially in the form of clay strips – which are not always punctated – and as applied blobs or spheres.
Lip finish: Smoothing is the most usual form of finishing lips; several others were notched or nicked, while some were punctated and a few were painted. One rim and lip displayed a series of applied blobs.
Design: Rectilinear designs predominate. The reduced size of sherds mean it was usually not possible to determine the orientation of lines. Oblique oriented lines seem to be most usual. In terms of arrangement, parallel and/or converging linear designs are most usual. The painted designs are similar to the incised designs. Designs composed of criss-cross lines were also noted, reminding us of those seen at SM.

In a map produced of the sites Perota registered and excavated around the middle Tapajós, Itapacurá I and II are referred to as containing material from more than one phase – the Curi "A" (1215/1010 bp) and "B" (695 bp) phase, and the "Jamanxim" (400/235 bp) phase –, suggesting Perota interpreted these sites as being multicomponent. I am at present unable to comment upon this possibility based on the sample I have seen; I could only identify a division between fine and coarse wares that could have been used by the same face-to-face community. The description of the site's stratigraphy would point to a reoccupation of the site, however, so this remains an open question.

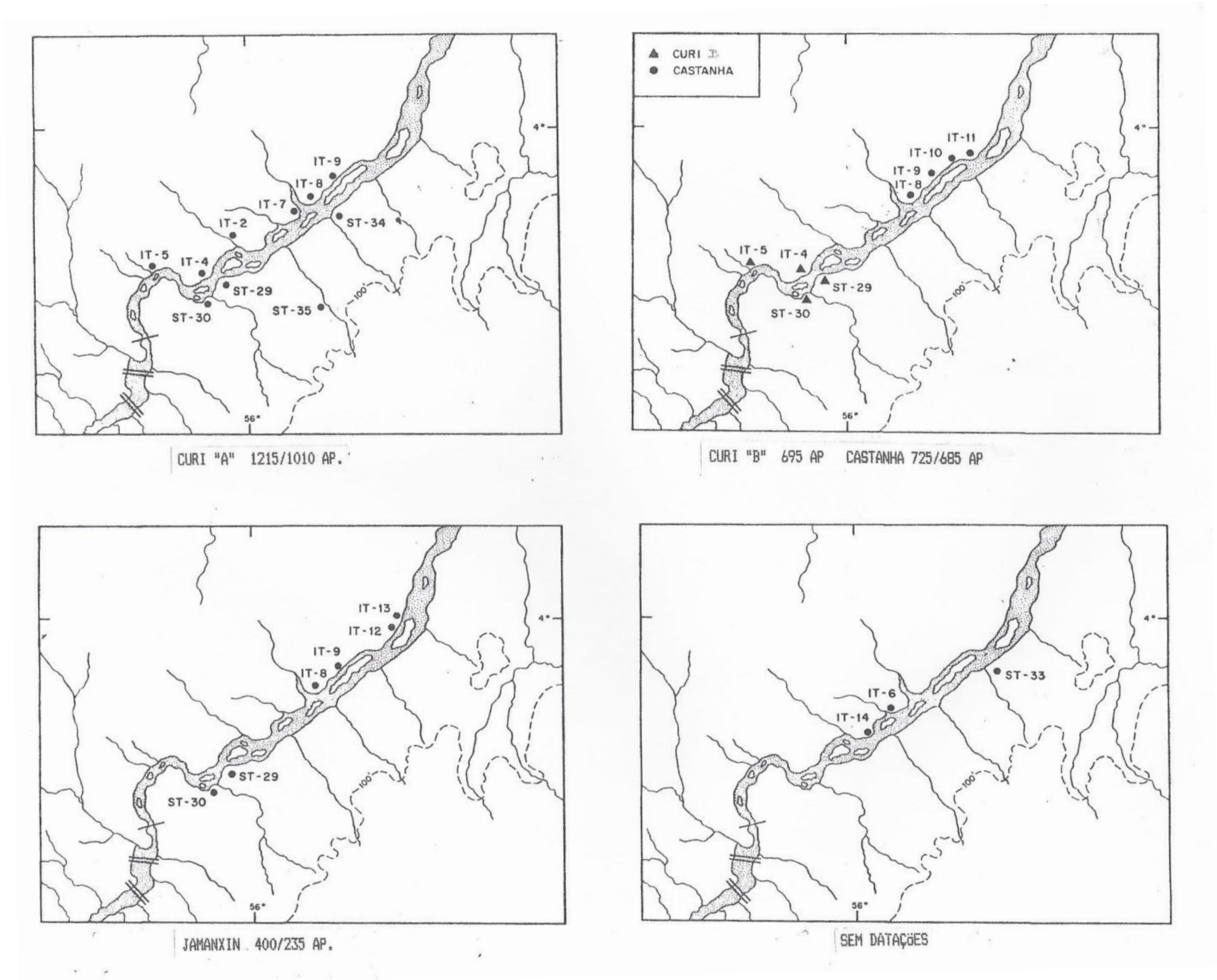


Fig. 1 Maps showing sites excavated by Perota near Itaituba and phases distinguished by him. Courtesy of Celso Perota.

Inland sites

Serraria Trombetas

Under the supervision of Prof. Denise Pahl Schaan, Crisitiane Martins carried out archaeological excavations at a site called Serraria Trombetas, located inland, some 100km to the northeast of Sawre Muybu. The project sought to test the extent of Tapajó influence or the southern limits of the Incised and Punctate Tradition on the Tapajós (Martins 2012a). At the Serraria Trombetas site, features excavated include a burial area, a vessel buried at considerable depth and a hearth structure (Martins 2012a, p. 67). Within these features, semi-intact vessels were located. Three of the C^{14} dates obtained for the site place its occupation within the expected chronological period of the Incised and Punctate Tradition: 890±30 BP, 780±30 BP and 580±30 BP. Another sample produced a far earlier date, of 2200±30 BP

(Martins 2012a, p. 156). There are similarities and contrasts between Serraria Trombetas pottery (hereafter, abbreviated to ST) and the material excavated from Sawre Muybu (SM).

Technological dimensions

In terms of temper, there are basically two principal tempers at ST: crushed rocks/minerals and sponge spicule. I believe that what Martins calls crushed rock is analogous to SM's quartz sand temper. *Caraipé* was not found among tempering agents at ST. In relation to firing, most of the sherds retrieved from ST had undergone incomplete oxidation. When found, oxidised firing was most usually observed among sherds tempered principally with crushed rock (Martins 2012a, p. 91). This stands in partial contrast to our observations, since pottery tempered mainly with quartz sand also had endured oxidised firings – but this made up the majority of our sample. Meanwhile, reduced firings are strongly associated to sponge spicule tempered material among SM ceramics and partially oxidised firings are the least commonly found.

Formal dimensions

Martins' method for classification of forms differs from ours, because she created sets according not only to morphology, but also size and inferred vessel function. Our comparison is only based on the morphological attributes of vessel body shape presented by Martins.[2]

Studying the associations between temper and vessel wall thickness, Martins observes that thinner (≤5mm) vessel fragments tend to be tempered with *cauixí* or *cauixí* and secondary tempers such as grog and sand; medium (5-9mm) sherds can either be tempered mainly with crushed rock or with *cauixí*, while thicker sherds (9-13mm and >13mm) are more often tempered with crushed rock temper (2012a, p. 90-91). This in part mirrors our findings with regard to SM pottery, where thinner vessel walls were often associated to *cauixí* temper.

At ST, there are similar and contrasting vessel forms to those encountered at SM. Universal forms occur with some frequency at both sites. These include flat griddle forms, simple and unrestricted vessel bodies with a hemispherical shape of

[2] Unfortunately, the digital file of this dissertation does not display Figure 82 (Form 5) and Figure 86 (Form 9).

moderate depth (see Martins 2012, figs 78 I, N, O, P; fig. 80; fig. 81 E), and simple and unrestricted shallow dishes. Martins also found independent restricted vessels; however, when necked, the neck curvatures are not as accentuated as those of SM vessels (see Martins 2012a, fig. 85). Another projected form has an in-turning neck (fig. 85, A).[3] Martins also found simple and dependent restricted vessels (see figs. 78 C, 88 A, 89) and, significantly, restricted and unrestricted composite vessels (see fig. 83 A; C and fig. 84 A for the former and fig. 84 C for the latter) – we have not identified these forms at SM. Composite forms such as these are more reminiscent of Santarém ceramics.

Though some basic rim forms are similar (such as zero modification rims, upright rims, bevelled rims and in-turning rims), Martins also displays rim forms that differ from what we encountered at SM. At ST tapering rims do not appear to be present. Neither are the characteristic, externally thickened, “folded” rims from SM. Although an externally thickened rim was located, its thick triangular profile is very different to what we found (see fig. 80 G in Martins 2012a, p. 120).

Martins also excavated integral vessels at the site, some of which contained human remains. These appear to be considerably smaller than the burial vessel encountered at Sawre Muybu and the osseous matter found consists of teeth, whereas we found bones potentially belonging to limbs at SM. The burial urns found by Martins do not have ‘lids’ as the one we found did. The deposition pattern of some of these intact vessels is of interest, because several were located upside down – this again being something we did not observe at Sawre Muybu.

Martins’ vessel n°5 is associated to the early date, of between 380-180 B.C. (2012a, p. 78-81). I would suggest the date be ‘put aside’ until further corroborating dates are produced, because although the charcoal sample was located in close proximity to the bottom of the vessel, the vessel was placed very close to the latosol/Layer I, and it techno-stylistic attributes (sponge-spicule temper and hollow rim) might point to a relation with the IPT (2012a, p. 78-81).

[3] I write ‘postulated’ because the projection in question is based upon a rim sherd that did not have a part of the body attached to it.

Dimensions of decoration

Martins notes that decoration was most often present on material tempered with *cauixí* or combinations of *cauixí*, grog, and sand (Martins 2012a, p. 92). At ST, plastic decoration techniques often involve incision, punctations, applied and punctated clay strips or applied nubbins, also present are notching, excision, channelling and appliqué, as well as less common techniques (Martins 2012a, p. 93-101). Sherds displaying more complex decoration or combinations of decorative techniques are usually tempered with *cauixí* (2012a, p. 101). Paint comprises red, black, and orange colours and slip is most usually white. Paint seems to have been applied in single colours. Some sherds display zoned painting; others exhibit designs that include rectilinear and curvilinear elements. The more elaborate applications of decoration can be seen on *cauixí* tempered material (2012a, p. 101-104). This reflects our findings at SM, whereby more elaborately decorated material is related to *cauixí* tempered fabrics.

In terms of design elements, though some recurrences with Itapacurá and SM designs (including rectilinear, oblique oriented parallel and connected elements composing triangular designs, and horizontally oriented lines of punctations) can be noted, there are also discrepancies. ST potters/consumers had a greater penchant for curvilinear elements and also for a combination of applied and punctated clay strips with incisions (rather than punctations) on the exterior vessel body (2012a, p. 98-99, figs. 56 & 57).

Parauá, lower Tapajós

Lago do Jacaré site

Technological dimensions

The main primary tempers present are *cauixí* and *caraipé*, and a long term continuity of these technological choices is suggested (Gomes 2005, p. 153). Secondary tempers include sand, *saibro* and crushed sherd (Gomes 2005, p. 153). *Cauixí* on its own and *cauixí* with quartz sand as a secondary temper are the most recurrent temper choices observed; *cauixí* and grog are also present in the sample. According to Gomes, grog is associated to later pottery in the region (2002 cited in: Gomes 2005, p. 153). *Cauixí* and *caraipé* also occur together. Other combinations are not as common (2005, p. 154). As concerns firing, incomplete oxidation prevails over complete oxidation (2005, p. 155).

Dimensions related to form

Base form: The most commonly identified base form is flat, followed by convex bases and annular bases; flat pedestal bases were found on occasion (2005, p. 161).

Vessel wall thickness: This mostly falls between 6-10mm (>41 per cent of analysed sample) and 11-19mm (>41 per cent of analysed sample); approximately 12 per cent of the sample measures between 20-30mm. Over four per cent of the sample measures between 3 and 5mm while under one per cent of material measures between 33-60mm. Though the bin intervals selected do not correspond to ours, we can see the LJ pottery is generally thicker than Mangabal material, but in part corresponds to the trends observed in relation to thicknesses among SM pottery (Gomes 2005, p. 159).

Vessel body form: at the LJ site, there are forms similar to and distinct from materials from Mangabal and SM (see Gomes 2005, Plate 1, p. 167-169). Simple and unrestricted hemispherical vessels occur in different sizes; shallower simple and unrestricted vessels with an ovaloid contour, as well as unrestricted and flat griddle forms, were all excavated from LJ. Independent restricted vessels are reminiscent of Mangabal's independent restricted, moderately deep, necked hemispherical bowls with mild "S"-shaped, inflected contours (see Gomes 2005, p. 168, Plate 1, form 6). Dependent restricted vessels, with simple and inflected contours also occur within the sample – neither of these are apparently present at Sawre Muybu. Simple and dependent restricted vessels were encountered at Mangabal; the dimensions of the material from LJ are larger however. A small, unrestricted and composite vessel form (2005, p. 169, form 10) that I did not encounter on the sites upstream can also be seen.

Gomes presents several estimates of vessel measures, including rim diameter, vessel height and vessel width (this likely refers to the maximum diameter of vessels) and base diameter (2005, p. 162-163), as well as volume and size (2005, p. 162-163). She uses these measures as a basis for calculations of volume (2005, p. 171-173). Over a quarter of the sample lies between 1.1-4l, while a similar number of vessels were estimated to have a capacity between 4.2-12l. The remainder of the sample is either small or exceptionally large (2005, p. 171).

Rim form: rims were classified as zero modification (in-turning), zero modification (upright), everted, zero modification (in-turning) with exterior strengthening, zero modification (everted), zero modification (interior strengthening), in-turning and cambered (2005, p. 160-161). Flat lips are more common than rounded lips. Thinned and bevelled lips are also present (2005, p. 160), which we might have described as flat or rounded.
Appendages: Vessel base supports ("feet") and adornos are found at the site.

Decorative and surface treatment dimensions

Smoothing is the most common form of surface treatment while polish is very rare (2005, p. 156). Regarding decoration, the decorative field tends to be on vessel rims – either on their exterior or, when everted, on their interior face. Incision is the most usual technique employed – producing designs in which rectilinear short, vertical or oblique-oriented elements are preponderant; this is a hallmark of the pottery of Lago do Jacaré. Other less frequent design elements consist of oblique lines, oblique and vertical lines and radial incisions. Sherds displaying rectilinear oblique, criss-cross elements also occur (2005, p. 156). In contrast, other techniques and design elements – applied and punctated or incised strips of clay – are associated by the author to the Venezuelan Valloid series (Gomes 2005, p. 158). Oblique-oriented incised lines along the rims of some of the vessels from the LJ site (see 2005, p. 240-241, Plate 4) remind us of similar decorations observed on the quartz sand tempered material of Sawre Muybu, even if forms of LJ tend to be more angular. Chromatic decoration is rare: red and white slip are found on under two per cent of the analysed sample (2005, p. 160).

Zenóbio site

Technological dimensions

Temper choices at Zenóbio were very similar to those of LJ: *cauixí*, or *cauixí* and quartz occur as main tempers, and combinations of *cauixí* and *caraipé*, and *cauixí* and grog are also seen (Gomes 2005, p. 185-186). Oxidised and partially oxidised firings are evenly distributed among sample (2005, p. 186-187).

Formal dimensions

Base form: Only flat and convex bases were found at the Zenóbio site (2005, p. 190).

Vessel wall thickness: Most fragments measure between 6-10mm (<43 per cent) or 11-19mm (<47 per cent). Few sherds are thinner (3-5mm) and thicker (20-30mm) (Gomes 2005, p. 185).

Vessel body form: There is less formal variation at Zenóbio than at LJ. Forms distinguished include simple and unrestricted hemispherical bowls, simple, dependent and restricted forms and independent restricted forms. Composite contours are absent; only inflected contours were found (see Gomes 2005, p. 194, Plate 2).

Vessel wall thickness: By a small margin this falls mostly between 11-19mm, seconded by 6-10mm. Few fragments are thicker (20-30mm) or thinner (3-5mm) than this (Gomes 2005, p. 189).

Rim form: this very similar to the LJ site; zero modification (in-turning), zero modification (upright), zero modification (everted), zero modification (in-turning) with exterior strengthening, everted, zero modification (interior strengthening), cambered, in-turning (2005, p. 189-190). Lip form varies from bevelled, rounded, flat, thinned and "bevelled/rounded", from greater to smaller quantities (2005, p. 189).

Dimensions of surface treatment and decoration

Smoothing is ubiquitous among the sample studied. As with pottery from LJ, incised decoration again prevails. Short, simple incisions and long, simple incisions are most usual. Other types of plastic decoration, such as applied spheres and strips, are atypical. The only expression of chromatic decoration is red slip, but it is not common (Gomes 2005, p. 187).

Terra Preta site

Technological dimensions

As with the other sites excavated by Gomes, sponge spicule, or sponge spicule and other secondary tempers (such as grog, quartz, clay pellets and *caraipé*) are most commonly found; rarely, *caraipé* and grog are seen as the sole temper of sherds analysed (Gomes 2005, p. 201-202). In contrast to the other two sites, a greater proportion of the sample selected for analysis contains grog as a secondary temper, this being an attribute Gomes relates to later industries, such as Santarém pottery (2005, p. 202). Just over a tenth of the sample analysed presents a combination of *cauixí* (primary) and quartz (secondary temper). Most of the pottery analysed from the TP site presents reduced cores while just over a third displays oxidised firing (2005, p. 203).

Formal dimensions

Vessel wall thickness: The majority (63 per cent) of vessels have thicknesses of 6-10mm; 11-19mm thicknesses occur on over 21 per cent of the sample; under eleven percent of material has a thickness of 3-5mm while under five percent of sherds measure between 20-30mm (Gomes 2005, p. 206).

Bases: Flat bases were the most commonly detected, followed by convex, annular and pedestal bases.

Vessel body form: (see Gomes 2005, p. 214-215, Plate 3) Simple and unrestricted forms, such as flat griddles (Plate 3, form 11), hemispherical bowls (Plate 3, form 2 excepting form with composite contour displayed on upper left), and ovaloid dishes (Plate 3, form 14) parallel Mangabal and Sawre Muybu material. Likewise, independent and restricted forms can remind us of Mangabal pottery (Plate 3, form 7 and 9) or, to a lesser degree, SM pottery. A deep, almost cylindrical vessel resembles forms observed at Sawre Muybu. A number of forms reconstructed by Gomes have not been identified on the upper Tapajós sites. These include unrestricted and restricted composite forms (Plate 3, forms 1 and 13 respectively), and dependent and restricted inflected contours (Plate 3, form 4).

Vessel wall thickness: Most (63%) sherds are between 6-10mm thick; 21.5% vary from 11-19mm, 10.6% from 3-5mm; in rare instances sherds are between 20-30mm and exceptionally (<1%) they can be 33-60mm.

Rims: Zero modification (in-turning), zero modification (upright), everted, zero modification (everted), zero modification (in-turning with exterior strengthening), zero modification with interior strengthening, cambered (Gomes, 2005, p. 207-208).

Appendages: Vessel base supports (“feet”) and adornos are found at the site.

Dimensions of surface treatment and decoration

Although smoothing is still preponderant among the vast majority of materials analysed, resin and polishing are also noted (Gomes 2005, p. 204).

Incision is again the predominant decorative technique utilised. Design elements in decreasing order of popularity consist of rectilinear, oblique or vertically oriented short elements; long simple incisions, radial incisions, criss-cross incisions and combinations of oblique and vertical incisions (Gomes 2005, p. 204-205). Other plastic decorative techniques mainly involve modelling (appendages), punctations, as well as applied spheres and strips (2005, p. 205). In contrast to the LJ and Zenóbio sites, chromatic decoration, particularly in the form of red slip, was detected on one third of the sample (2005, p. 206).

Upstream from Mangabal

The lower Juruena River: Maloca dos Índios site (MT-JU-1)

Dimensions of technology

Temper: Quartz sand predominates as primary temper, but other unidentified minerals are also present; this includes particles similar to those seen at Mangabal that may be mica but which I believe may be gold because of the aforementioned abundance of this mineral in the region.

Primary (P), Secondary (S) and Third-order (T) tempers* among Maloca dos Índios sample				
Provenience number	***Primary, Secondary, Tertiary temper***	Quartz sand	Unidentified mineral	N° of sherds analysed
680	P	13	4	17
	S	2	5	
	T	2	1	

Table 7 Primary (P), Secondary (S) and Third-order (T) tempers among Maloca dos Índios sample. *Note that not all sherds displayed secondary and third-order tempers. The table only shows the number of times tempers occurred as primary, secondary and third-order tempers. It does not show the relationship between the uses of different tempers.*

Firing*:* On most occasions the pottery studied was oxidised, though partially oxidised specimens were not uncommon. Only one fragment was seen to have been fired in a reduced firing atmosphere.

Firing among Maloca dos Índios sample				
Provenience number	***Oxidised***	***Reduced***	***Partially oxidised***	***N° sherds analysed***
680	12	1	4	17

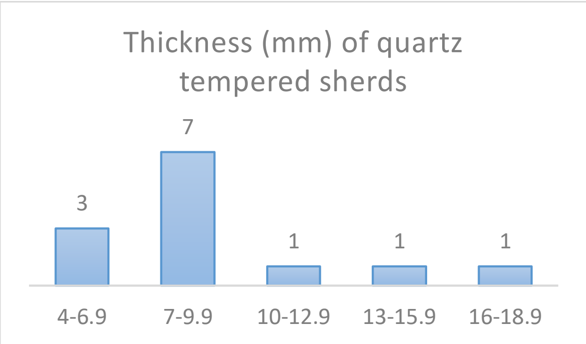
Table 8 Firing among Maloca dos Índios sample

Colour of the paste: At Maloca dos Índios, the post-firing colour of the 17 analysed sherds is brown.

Dimensions relating to form

Vessel forming techniques: Coiling would have likely been the preponderant vessel forming technique, often combined with modelling.

Vessel wall thickness: In spite of the low number of specimens, the ceramics from MI site cover a wide range of thicknesses. Some vessels are considerably thick and robust, while others have thin vessels walls. The four sherds tempered with the unidentified mineral temper thought to be gold display greater uniformity in vessel wall thickness. This may be related to the paste, which likely already naturally contained this inclusion.



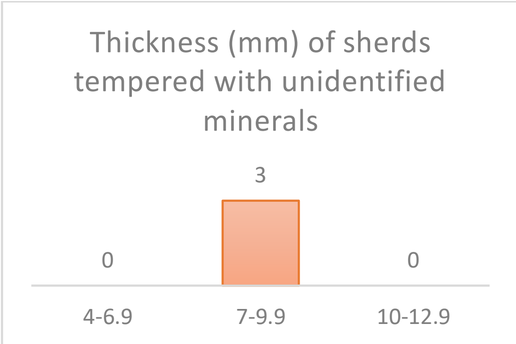


Chart 6 Histogram of vessel wall thickness of sherds tempered primarily with quartz sand.at MI site. Chart 7 Histogram of vessel wall thickness of sherds tempered primarily with unidentified mineral thought to be gold at MI site.

Vessel form

Horizontal cross section: All specimens have a horizontal cross section.

Base form: I did not have base sherds to examine.

Point of inflection: One keel is present among the collection.

Vessel body form (vertical cross section): Simple and unrestricted vessels (shallow dishes and moderately deep bowls) integrate the collection. A moderately deep bowl with thick vessel walls and corrugated decoration is suggested by one sherd but as this is not a rim sherd we cannot be certain if this would have been restricted or unrestricted. Simple and composite dependent restricted vessels occur among the collection. Though the rim for the composite vessel is broken, we can infer its contour. Independent and restricted vessels also belong to the collection. Contours can be inflected or composite.

Rim form: Rim forms found among the collection include: zero modification, upright, everted – curved outwards or folded off at a slight angle, in-turning, and externally thickened.

Lip form: Six lips are flat, three are rounded.

Appendages

Appliqué. Near the exterior rim of a vessel, modelling can be observed, though some of it has since detached/eroded from the sherd.

Surface treatment and decoration

Surface treatment techniques: All vessel surfaces had been smoothed. Self-slip can be seen on over half of the sample. One sherd presents corrugation on its exterior surface.

Decorative field: Exterior vessel walls were the preferred decorative field, followed by rims. One interior rim surface is decorated.

Decorative techniques: Slip is the most usual of these, seen on 9 occasions, followed by paint (5). Techniques involving displacement of clay were seen three times. Additive plastic techniques were observed twice.

Chromatic decoration: White slip was the only colour used for slipping (it is possible that some of the sherds containing white slip belong to the same vessel lot). It could be applied to specific zones. Painted decoration is red or brown.

Plastic decoration techniques: Clay displacement techniques include incision, corrugation (possibly by using finger digits) and modelling. Additive plastic decoration was seen with the application of a thin clay strip and with the addition of a zoomorphic representation shaped in clay.

Lip finish: The only form of lip finish observed was smoothing.

Design: The rectilinear incised design observed is oblique oriented, of parallel and converging lines. The corrugated design is made up of a line of oblique oriented depressions. A more complex geometric pattern can be discerned on the keeled sherd of the collection, overlaying white slip. Most of it has faded, but what can be seen is composed of rectangular shapes with rounded edges and interconnected lines. A zoomorphic representation in clay is attached to the upper half of a vessel, which apparently portrays a reptile (part of the figure has come away from the vessel, leaving only the front limbs and feet).

The lower Madeira

Regarding **technological dimensions**, *cauixí* is the principal temper of Axinim ceramics, followed by *caraipé*, grog and then by *caraipé* 'B'; sponge spicules are also common as second order tempers (2013, p. 127-128). Firing is mostly partially oxidised or reduced (2013, p. 138-140). Post-firing colour of the paste is usually brown or grey, followed by orange (2013, p. 123-124). In terms of **form**, based on Simões and Lopes' (1987) projections and on the material he collected, Moraes presents illustrations of Axinim types (2013, p. 203-210). Bases are flat or pedestal. As for vessel body form, simple contours predominate by far. Restrictive vessels are more common, by a small margin, than unrestricted ones (2013, p. 130-131).[4] Vessel body form ranges from simple and unrestricted griddles and shallow and moderately deep bowls, to simple, dependent and restricted spherical bowls, to independent restricted, necked vessels. Unusual vessel morphologies are also present, represented by single specimens, such as type 4 – an unrestricted and simple bowl whose horizontal cross section is not circular, but rather 'boat shaped', and type 14, which is simple and dependent restricted, constituted however of tripartite, bulging segments (see Moraes 2013, p. 209). Vessel wall thickness usually varies from 6-10mm (218 sherds), or even 1-5mm (187), followed by 11-15mm (118) to 16-25mm (85); sherds thicker than 25mm are rare (5) (Moraes 2013, p. 130). With respect to appendages, the presence of tripod vessel base supports is a notable feature, and adornos modelled from upper vessel bodies are also conspicuous. Most analysed rims have zero modification; then come tapered rims (these being by far the most common rim form for Paredão pottery) and in third place are expanded rims; in terms of inclination, the vast majority of rims follow the direction of vessel wall; everted rims also occur, but not as frequently, while in-turning rims are uncommon (2013, p. 132-133). Lips are

[4] This is because Moraes also has "vertical" as a possibility (2013, p. 131, graph 68); in our classification, we have considered cylinder-shaped/vertical walled vessels as unrestricted. Should we include the 'vertical' category with the 'unrestricted' one, the number of unrestricted vessels would overtake restricted specimens in Moraes' sample.

mostly flat, followed by thinned, then expanded forms (2013, p. 134).[5] Within the dimension of **decoration**, vessel bodies are the preferred decorative field (2013, p. 135), followed by bases, lips, necks rims and shoulders. Regarding types of decoration, slip is frequent and plastic decoration is also recurrent, especially represented by clay displacement techniques, such as incision, punctation and modelling (2013, p. 136-138). Combinations of types of techniques (e.g. plastic and painted) are unusual, but do occur. There is much variation in terms of design elements; most often these consist of incised, geometric motifs (see Moraes 2013, appendix/annex 28).

[5] It is likely that in our analysis we would have subsumed the “thinned/tapering” and “expanded” categories into “flat” or “rounded”, and “thinned/tapering” or “expanded” forms would be associated to the rim.

ASSOCIAÇÃO INDÍGENA PUSURU

Soat Puğtağma
(Caminhando Juntos)

ASSOCIAÇÃO INDÍGENA PUSURU-AIP

CIMAT – Conselho Indígena Munduruku do Alto Tapajós
CNPJ: 10.221125/0001-03

Prezados (as) senhores (as) do Iphan e do Ministério Público Federal

Nós, caciques e lideranças do povo Munduruku, reunidos na aldeia Sai Cinza, município de Jacareacanga, Pará, entre os dias 23, 24 e 25 de abril do ano 2013, tivemos conhecimento de fatos transcorridos na cachoeira das Sete Quedas, rio Teles Pires, Estados do Matogrosso e Pará, lugar sagrado para os Munduruku, para onde vão as almas dos nossos mortos, onde vive a Mãe dos Peixes e onde um dos nossos grandes guerreiros Muraycoko, pai da escrita, deixou registrada sua história para as gerações futuras do povo Munduruku.

Esses fatos preocupantes que recentemente chegaram ao nosso conhecimento dizem respeito a uma pesquisa arqueológica de licenciamento ambiental da Empresa Documento - Arqueologia e Antropologia, a serviço da Usina Hidroelétrica Teles Pires, em que foram achadas e retiradas de seu local urnas funerárias integrantes de um cemitério sagrado indígena do nosso povo, unanimemente reconhecido pelos nossos anciões e pajés Munduruku a partir do exame detalhado e coletivo de duas fotografias dessas urnas retiradas por um indígena Apiaká que chegaram ao nosso alcance. Situação esta agravada por não ter havido comunicação nem autorização de nosso povo para isto, que consideramos uma violação de nosso território sagrado e ancestral.

Diante do exposto, exigimos a imediata paralização da obra, especificamente dessa pesquisa arqueológica nas 7 Quedas, e, principalmente, a interrupção da retirada de nossas urnas funerárias e de quaisquer outras intervenções em nosso sítio sagrado arqueológico, até que o Instituto do Patrimônio Histórico e Artístico Nacional, bem como o Ministério Público Federal acompanhados por uma comissão de caciques, lideranças e Pajés Munduruku apurem esses fatos que nós consideramos da mais alta gravidade e desrespeito para nossas tradições milenares e nosso patrimônio cultural. Em nosso entendimento este lugar deve ser mantido intocável.

Assim, exigimos ao Ministério Público Federal do Matogrosso e Pará, que é o nosso advogado e arbitra em nossa causa, que tome as providências cabíveis urgentemente, pois sabemos que nosso maior lugar sagrado já se encontra sendo destruído pelas obras da Usina Hidroelétrica Teles Pires, e com isso já estamos perdendo parte importante de nossa história de origem ancestral. Além disso, a violação de nosso cemitério sagrado representa um grande risco espiritual, cultural, social e ecológico, não só para os Munduruku, mas também para os parentes Apiaká e Kayabi, que semelhantemente consideram as 7 Quedas um lugar sagrado para eles, bem como, relevante para o patrimônio cultural e histórico da sociedade brasileira como um todo.

Assinam este documento caciques, lideranças, guerreiros e povo Munduruku

Rua: Tenente Fernandes, n°010 Centro CEP:68.195-000 Cel. (93)9222-9225 E-mail:waldeliriomdkjcr@hotmail.com.br Jacareacanga - PA