



Communities in **contact**

Essays in archaeology, ethnohistory & ethnography of
the Amerindian circum-Caribbean

edited by
Corinne L. Hofman &
Anne van Duijvenbode



Communities in **contact**



Communities in **contact**

Essays in archaeology, ethnohistory & ethnography of
the Amerindian circum-Caribbean

edited by
Corinne L. Hofman &
Anne van Duijvenbode

ISBN 978-90-8890-063-1

© 2011 Authors

Published by Sidestone Press, Leiden

www.sidestone.com

Sidestone registration number: SSP60550001

Lay-out: P.C. van Woerdekom, Sidestone Press

Cover design: K. Wentink, Sidestone Press

Front Cover Credits

Foreground image: Coral artefact with human face in relief found at the site of Anse à la Gourde, Guadeloupe, AD 1000-1400 (Photo by J. Paupit).

Background image: Detail of feature layer with postholes cut into the bedrock at the site of El Cabo, Dominican Republic, AD 1000-1500 (Photo by A.V.M. Samson).

Back cover, left to right: Artistic, life-sized interpretation of the archaeological site El Chorro de Maíta, Cuba , AD 1200-1600 (Photo by A. van Duijvenbode). / Wooden stool or duho recovered from the island of Dominica, dated between AD 1315-1427. Catalogue number ECB40669, Economic Botany Collection, Royal Botanic Gardens, Kew, UK (Photo by J. Ostapkowicz). / Clay Figurine found at the Lavoutte site, St. Lucia, AD 1200-1500 (photo by M.L.P. Hoogland).

Front cover, left to right: Map of Guadeloupe published by Champlain in 1859 (Photo by A.J. Bright). / The Trio-Okomoyana village of Amotopo in the midwest of Suriname in 2007 (Photo by J.L.J.A. Mans). / Frontal view of the upper incisors and canines of individual 72B from the site of El Chorro de Maíta, Cuba, AD 1200-1600, showing intentional dental modification (Photo by H.L. Mickleburgh).

Contents

Preface	9
<i>Corinne L. Hofman and Anne van Duijvenbode</i>	
Foreword	11
<i>José R. Oliver</i>	
MOBILITY AND EXCHANGE	
Unravelling the multi-scale networks of mobility and exchange in the pre-colonial circum-Caribbean	15
<i>Corinne L. Hofman and Menno L.P. Hoogland</i>	
The social in the circum-Caribbean	45
Toward a transcontextual order <i>Alexander Geurds</i>	
Bringing interaction into higher spheres	61
Social distance in the Late Ceramic Age Greater Antilles as seen through ethnohistorical accounts and the distribution of social valuables <i>Angus A.A. Mol</i>	
Early phytocultural processes in the pre-Colonial Antilles	87
A pan-Caribbean survey for an ongoing starch grain research <i>Jaime R. Pagán-Jiménez</i>	
The circulation of jadeitite across the Caribbeanscape	117
<i>Reniel Rodríguez Ramos</i>	
‘This relic of antiquity’	137
Fifth to fifteenth century wood carvings from the southern Lesser Antilles <i>Joanna Ostapkowicz, Christopher Bronk Ramsey, Alex C. Wiedenhoef, Fiona Brock, Tom Higham, and Samuel M. Wilson</i>	
Much to choose from	171
The use and distribution of siliceous stone in the Lesser Antilles <i>Sebastiaan Knippenberg</i>	
Diverse origins, similar diets	187
An integrated isotopic perspective from Anse à la Gourde, Guadeloupe <i>Jason E. Laffoon and Bart R. de Vos</i>	
Trio movements and the Amotopaoan flux	205
<i>Jimmy L.J.A. Mans</i>	

CULTURE CONTACT

- El Chorro de Maíta** 225
A diverse approach to a context of diversity
Roberto Valcárcel Rojas, Darlene A. Weston, Hayley L. Mickleburgh, Jason E. Laffoon and Anne van Duijvenbode
- Conflicting cosmologies** 253
The exchange of brilliant objects between the Taíno of Hispaniola and the Spanish
Floris W.M. Keehnen
- In sickness and in health** 269
Possibilities for studying the social and cultural implications of treponemal disease in the Caribbean area
Rachel Schats
- Through the eyes of the chronicler** 281
Adriana I. Churampi Ramírez
- From Cayo to *Kalinago*** 291
Aspects of Island Carib archaeology
Arie Boomert
- “Removed from off the face of the island”** 307
Late pre-Colonial and early Colonial Amerindian society in the Lesser Antilles
Alistair J. Bright
- An ethnohistorical approach of the Carib through written sources** 327
The example of the *Relation* by Jacques Bouton
Bernard Grunberg
- De insulis Karaybicus relationes manuscriptæ** 343
Adrien Le Breton, the last Jesuit missionary in the Carib island of St. Vincent
Benoît Roux
- John Nicholl** 361
An Houre Glasse of Indian Newes (1607)
Eugénie de Zutter
- Pierre Pelleprat** 367
A missionary between the Lesser Antilles and the Continent
Emilie Chatrue
- The first missionaries and the evangelization of black slaves in the Lesser Antilles in the early years of French colonization (1625-1655)** 379
Eric Roulet

SETTLEMENT AND COMMUNITY

- Living islands of the Caribbean** 393
A view of relative sea level change from the water's edge
Jago Cooper and Richard Boothroyd
- Palaeoecology and human occupation during the Mid-Holocene in Puerto Rico: the case of Angostura** 407
Isabel C. Rivera-Collazo
- The most beautiful house in the world** 421
The archaeology of aesthetics in eastern Hispaniola
Alice V.M. Samson
- Plus d'une Langue (no more language / more than a language)*** 439
Archaeology, history and ethnography in the Guiana highlands
Renzo S. Duin
- Ethnoarchaeology of the Amazonian house** 455
Pre-Columbian and Jivaro continuity in Ecuador
Stéphien Rostain
- Contextualization of Amazonia artefacts** 475
Indigenous cosmologies and the Nature/Culture divide
Sonia Duin
- EPILOGUE**
- Scale, hybridity, and perspective in the Caribbean and beyond** 491
Michael J. Heckenberger
- List of Contributors** 505

PALAEOECOLOGY AND HUMAN OCCUPATION DURING THE MID-HOLOCENE IN PUERTO RICO: THE CASE OF ANGOSTURA

Isabel C. Rivera-Collazo

In the Caribbean there is increasing evidence that the mid-Holocene was a time of maritime travel, pan-Caribbean contact and active modification of island environments. However the uncritical application of “hunter-gatherer” as a paradigm has so far clouded our understanding of the period. Even though there is a growing trend to move away from this normative concept, we still need to gather more evidence and develop new models to reassess and formulate alternative interpretations of the period. Archaeomalacological and geoarchaeological analyses at the site of Angostura demonstrate that mid-Holocene populations had predictable patterns of mobility that supplied individual and social requirements at micro and macro levels that can be explained with a multiscale approach. The study also demonstrates that, within flexible systems, resource depletion is not an unavoidable outcome of sedentism, because diet broadening and diversification can be used as an alternative to overexploitation. These results highlight the complexity of human decision making in a deep-time perspective and reinforce the need to reconceptualize the period.

Según las más recientes investigaciones arqueológicas, el Holoceno medio en el Caribe fue un período de navegación marítima, desarrollo de lazos de interacción a nivel pan-caribeño y la modificación activa de los ambientes isleños. Sin embargo la aplicación paradigmática del concepto “cazador-recolector” hasta ahora empañado nuestra comprensión de la época. A pesar de las recientes tendencias a alejarse de este concepto normalizado, aún es necesario realizar más estudios y desarrollar nuevos modelos para reevaluar el período y formular interpretaciones alternativas. Estudios arqueomalacológicos y geoarqueológicos del sitio de Angostura (Barceloneta, Puerto Rico) demuestran que las poblaciones del Holoceno Medio tenían patrones predecibles de movilidad para abastecer las necesidades individuales y sociales a nivel micro y macro, las cuales se pueden explicar con un enfoque de escalas múltiples. El estudio también demuestra que, dentro de sistemas flexibles, el agotamiento de recursos no es un resultado inevitable del sedentismo, ya que la ampliación y diversificación de la dieta se puede utilizar como alternativa a la sobreexplotación. Desde una perspectiva de profundidad temporal, estos resultados resaltan la complejidad del proceso de toma de decisiones humanas y refuerzan la necesidad de reconceptualizar el período pre-Arahuaco.

Dans la Caraïbe, il y a une évidence croissante que l'Holocène Moyen fut une époque de voyage maritime, de contact pan-caraïbe et de modification active des environnements insulaires. Toutefois, l'application non-critique du chasseur-cueilleur comme un paradigme

a obscurci notre compréhension de la période. Même s'il y a une tendance grandissante de sortir de ce concept formalisé, nous avons encore besoin de collecter plus de preuves et de développer de nouveaux modèles pour reconsidérer et formuler des interprétations alternatives de la période. Des analyses archéo-malacologiques et géoarchéologiques du site d'Angostura démontrent que les populations de l'Holocène Moyen suivaient des modèles de mobilité prévisibles qui répondaient à des besoins individuels et sociaux à des micro- et macro-niveaux, qui peuvent être expliqués par une approche à différentes échelles. L'étude démontre également qu'à l'intérieur de systèmes flexibles, la diminution des ressources n'est pas un résultat inévitable de la sédentarité, parce que l'élargissement et la diversification de la diète peuvent être utilisés comme une alternative de la sur-exploitation. Ces résultats font ressortir la complexité de la prise de décision humaine dans une perspective à long-terme et soulignent le besoin de ré-conceptualiser la période.

Introduction

In sharp contrast with traditional discourses, there is growing evidence that the mid-Holocene in the Caribbean was a time of maritime travel (Callaghan 1995, 2003; Lathrap 1968; Sears 1977; Torres and Rodríguez Ramos 2008) pan-Caribbean contact (Oliver 2009:6-47; Rodríguez Ramos and Pagán Jiménez 2006; Torres and Rodríguez Ramos 2008) and active modification of island environments (Newsom and Wing 2004; Pagán Jiménez, 2007; Pagán Jiménez *et al.* 2005; Rodríguez Ramos 2007). However the blind application of the "hunter-gatherer" concept as a paradigm has so far clouded our understanding of the period (Oliver 2009:7-27; Rivera-Collazo 2011; Rodríguez Ramos 2008). This paradigm (Rivera-Collazo 2011) starts and ends with an assumed absence of ceramic technology, continues through unsupported assumptions of mobility and social simplicity, and leads eventually to the interpretation of ceramic in pre-Arawak contexts as intrusive. We have mostly moved on from this reasoning, but we still need to gather more evidence and develop models to frame the reassessment of the period.

Many approaches can be applied to this end. I have developed a model for the understanding of foragers on islands and in maritime contexts through the application and modification of the Theory of Adaptive Change, Maritime Culture and Human Behavioural Ecology. In this paper I present part of my results, proposing an alternative interpretation of this period using the site of Angostura and other pre-Arawak sites on Puerto Rico as case studies. I use the term **pre-Arawak**, following Rodríguez Ramos (2008), Oliver (2009:16) and Pagán Jiménez (2007). Echoing Rodríguez Ramos (2008, 2010:51), my use of the term pre-Arawak acknowledges the potentially wide cultural diversity of these early populations and its overlap with later processes. It is employed not as a category, but as a name to avoid the structural features imposed by the name Archaic. In this article, I use it as a temporal concept to address the earliest social contexts, differentiating them from the social processes occurring after the renewed migrations ca. 2.5 kya, identified archaeologically by new ceramic styles (Saladoid/Huecoid). I also acknowledge that the term **Arawak** itself is imprecise and can be misleading; modern Arawak groups are as similar to ancient ones as Italians are to ancient Romans or Egyptians are to their ancient counterparts.

Longue durée

Before continuing into the details of the site itself, we need to place it within its regional and environmental context (Cooper and Peros 2010). The mid-Holocene was a period of intense climatic variability (Braconnot *et al.* 2000; Schmidt *et al.* 2004; Wanner *et al.* 2008). The earth was in the early stages of the long process of adjustment to a post-glacial era. Greater insolation coupled with wind and sea surface temperature variations affected the location of the intertropical convergence zone (ITCZ), the low pressure rainband that regulates climate in the region (Haugh *et al.* 2001). This change in the ITCZ provoked increased precipitation, more acute seasonality and increased occurrence and intensity of hurricanes, supported by varied evidence from around the Caribbean basin (Bertran *et al.* 2004; Donnelly and Woodruff 2007; Hodell *et al.* 1991; Kennedy *et al.* 2006; Thunell and Tedesco 2003; Woodruff *et al.* 2008). Heightened moisture during the early Holocene promoted the expansion of forests, which peaked during the mid-Holocene (Newsom and Wing 2004; Higuera-Gundy *et al.* 1999; Islebe *et al.* 1996). Higher precipitation, coupled with rise in sea level (even possibly higher sea levels than today in some areas, Taggart 1992), affected also the water table levels, favouring the formation of freshwater springs and marshes, and reshaping the characteristics of the coastal geomorphology (Renken *et al.* 2002). After the lower sea levels of the Pleistocene, the river flood plains were less clogged with sediment leaving the basal surface lower than modern topography (Blum and Törnqvist 2000). Rising sea levels and more active springs would have drowned the coastal areas, creating conditions which favoured the development of rich coastal niches for the colonization of fish, molluscs, birds, manatee, and mangrove forests; all resources exploited by humans.

On the continent, rising sea levels drowned a significant portion of the coastal zone (Warne *et al.* 2002; Fleming *et al.* 1998). Even though human settlement patterns and social processes on the continent during the early and mid-Holocene are also in need of re-examination, the pattern that emerges suggests complex social processes that affected the venturing of people towards the Caribbean archipelago. Contrary to common assumptions in Caribbean archaeology, migrations are not single, unitary events triggered as a direct response to changes in simple factors. Migration is a process comprising multiscale levels of mobility that involve multiple factors, dimensions, and levels of decision making (Curet 2005:27-94). Other interests, aside from changes in population density, must have been at play to stimulate the venturing and exploration of the Caribbean Islands. Over 35 years ago Lathrap (1968, 1973) suggested the existence of complex long-distance trade networks on the Amazon basin of South America, especially along river channels. The speed of dispersion of domestic plants from central America, as Jaime Pagán has discussed (this volume; see also Pagán Jiménez 2007), reinforce the idea of very long distance contact and trade (Rodríguez Ramos and Pagán Jiménez 2006). Exploration of the Caribbean was incorporated into this network.

The distribution of early ^{14}C dates through the archipelago suggests that the process of exploration, exploitation and settlement did not necessarily follow the “stepping stone” model, but targeted the larger islands with more resource diversity. According to Callaghan’s computer simulations (Callaghan 1990, 1993, 1995, 2001, 2003; Callaghan and Bray 2007), which do not take into consideration conditions in the past, but can be used as a heuristic guide, the direct trip between mainland South America coast and the Greater Antilles (Puerto Rico, Hispaniola) would take only a few days (Callaghan 2001).

This voyage would have constant land markers within sight range as Torres and Rodríguez (2008) have pointed out recently. The trip requires medium to small sized dug-out canoes, moderate navigational skills, and a speed of around 2 knots (Callaghan 2001). The archipelago, therefore, was not an unreachable location with the technological and navigational capabilities of the Caribbean populations during the mid-Holocene (Sears 1977). Search and exploration ventures to the archipelago to expand and supply mid-Holocene trade and exchange networks would have been common even before more permanent settlements were established. The fact that most pre-Arawak sites are located on coastal areas, or slightly more inland locations within easy access to the coast, points towards the existence of maritime routes coupled with the exploration and exploitation of inland resources, possibly to supply trade. Identification of which objects were sourced on the archipelago still needs to be looked into, given that, as Lathrap (1973) pointed out; most of the traded objects would have been organic and perishable.

Angostura

Within this complex scenario, the earliest settlement of Puerto Rico occurred around 4.6 kya on the north and south coast of the island almost simultaneously (Figure 1). So far, the earliest evidence of human activity in Puerto Rico has been linked to increased charcoal particles in a sediment core from Tortugero Lagoon (Burney *et al.* 1994), interpreted as evidence of anthropogenic fires starting around 5.3 kya with a peak between 4-3.5 kya. The early date of the Tortugero Lagoon core supports exploratory ventures to the islands before more permanent settlements were established, as well as modification and use of the landscape after settlements became more permanent, including the widespread use of fire.

The site of Angostura (Figure 2) was discovered in 1988 during the construction of a highway and shopping centre. It is located on the north coast of Puerto Rico, adjacent to the Río Grande de Manatí, but is usually away from the river's normal flooding levels. The site covers an area of 6.2 hectares and consists of 4 topographic protuberances or mounds (identified as A, B, C and D) surrounding a lower central area reported to be clear of archaeological remains. There is also an intermittent lagoon or marshy area immediately to the south. Refuse accumulated over four natural rocky outcrops, or low *mogotes*, on the alluvial plain.

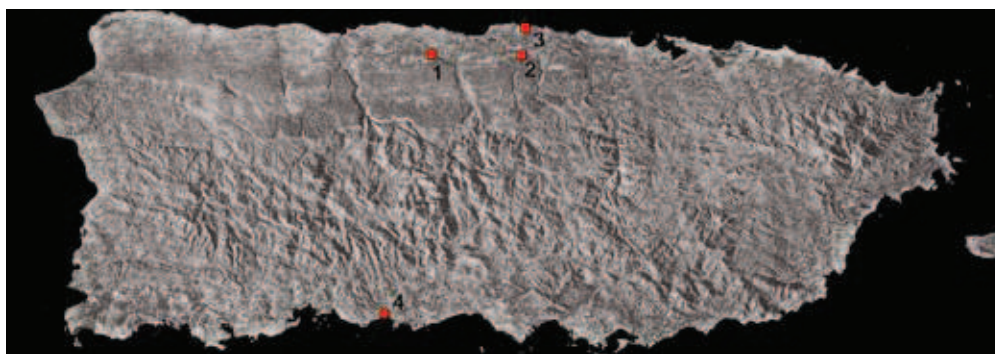


Figure 1 Location of sites mentioned in the text. 1) Angostura (4650 – 3749 cal BP). 2) Paso del Indio (4640 cal BP – post 1300 or 1400 AD). 3) Maisabel (no reported pre-Arawak elements, but maize phytoliths reported in core within layer dated to 2850 cal BP. See below). 4) Maruca (4570 – 2850 cal BP).

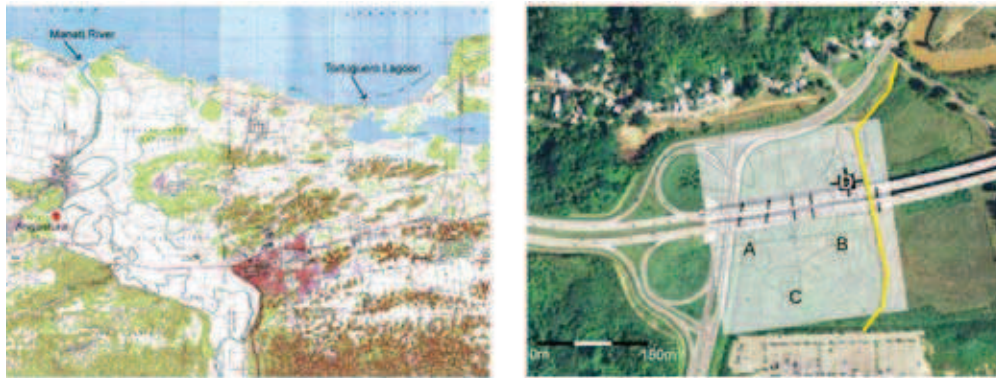


Figure 2 Left image: Detailed view of study area with site location. The rugged landscape to the south is the karstic range (mogotes) surrounding the site. Right image: View of Angostura with its mounds identified as A, B, C and D. Image shows the 1988 topographic map over the aerial photograph of the site. The black square on Mound D marks the extensive excavations there during the 1990s. The yellow line marks a drainage channel that has been considered site boundary since 1988.

The site has been excavated archaeologically several times, most intensively between 1988 and 1995 by Carlos Ayes-Suárez and Ovidio Dávila (Ayes-Suárez 1988; Ayes-Suárez and Davila 1993, 1995; Moscoso *et al.* 1999), and more recently by my own excavations in winter 2008 – 2009. Ayes-Suárez and Dávila's work on the site presents many serious methodological issues that I am not going to discuss in detail at this time, but which range from inconsistent to non-existent use of sieves, biased collection of remains and incomplete analysis and excavation reports. Their conclusions are also highly speculative and based more on gut-feeling than on hard data. For these reasons I will not use their conclusions, but re-interpret the strands of evidence that can be salvaged from the reports, and combine them with the results of my own excavations.

The site of Angostura is famous for one particular radiocarbon date of 5960 ± 250 uncalibrated BP (see S11E37St? in Figure 3). The median of this date after calibration is 6820 cal BP. However, a stratigraphic analysis of the other 10 radiocarbon dates of the site (Figure 3), taken from several units within the same mound (B), indicates that this date might be in fact anomalous. The rest of the dates, obtained from shell and charcoal samples, span from 4650-3750 cal BP. These dates suggest a continuous occupation of the site through a period of about 1000 years. Understanding the social processes within those thousand years is complicated by the fact that the stratigraphic and sedimentary descriptions of the early massive excavations are very poor, and my own high resolution documentation is very limited in size. However, Ayes and Dávila did consistently record the dominant mollusc species for each stratum. For this reason, I have developed a stratigraphic analysis and correlation based on mollusc species assemblage content.

Occupation phases of Angostura

Sixteen different shell species are registered on the mounds (Table 1), but only seven of these dominate the assemblages. These seven are present throughout the layers, but their abundance changes in the different phases, with the exception of *Crassostrea rhizophorae*, which eventually disappears. The analysis of the archaeomalacological assemblage, com-

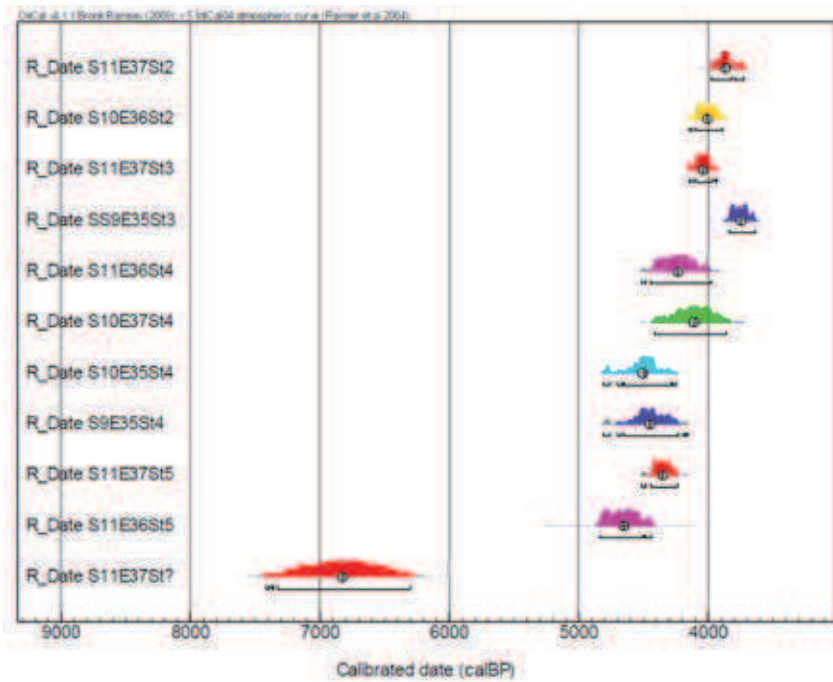


Figure 3 Calibrated radiocarbon dates of Angostura. All samples were analysed at Beta Analytic Laboratories. The sample marked S11E37St? was initially reported in Carlos Ayes (1988) but has no stratigraphic information. The rest of the samples were obtained from Mound B by Carlos Ayes during the same season S11E37St? was collected, but sent to analysis and interpreted by Jesús Vega (2002). In this graph the samples are arranged stratigraphically based on reported stratum from which the sample was obtained (e.g. St2, St3, St4, St5), and colour-coded based on the excavation unit they were retrieved from (red = S11E37; pink = S11E36; purple = S9E35; blue = S10E35; green = S10E37; and yellow = S10E35). All the units are contiguous 1 x 1m blocks of a 9 x 9m excavation. Calibration was calculated using OxCal 4.1.1 (Bronk Ramsey 2009) and the IntCal04 atmospheric curve (Reimer et al 2004). Marine reservoir = ΔR : 11, Standard Deviation: 48, Average Uncertainty: 10.

Most abundant species		Other marine molluscs		Land snails
Gastropods	Bivalves	Gastropods	Bivalves	
<i>Crassostrea rhizophorae</i>	<i>Neritina sp</i>	<i>Columbella sp</i>	<i>Tivela mactroides</i>	<i>Pleurodonte caracolla</i>
<i>Anomalocardia brasiliana</i>	<i>Cittarium pica</i>	Worm shell	<i>Glycimeris sp</i>	<i>Pleurodonte marginella</i>
<i>Phacoides pectinatus</i>		Barnacles	<i>Crassostrea sp</i>	<i>Pleurodonte sp</i>
<i>Mytilopsis sallei</i>		<i>Astraea sp</i>	<i>Nuculata acuta</i>	<i>Megalomastoma croceum</i>
<i>Tagelus sp</i>		<i>Nassarius albus</i>	<i>Chione cancelata</i>	<i>Austrocelenites concolor</i>
		<i>Strombus sp</i>		<i>Polydontes lima</i>
				<i>Alcacia striata</i>

Table 1 Mollusks of Angostura.

bined with the sedimentary descriptions and geoarchaeological analyses has allowed the identification of three separate phases of occupation. High resolution stratigraphic analysis of Mound C suggests that these phases were continuous and graded into one another.

Phase 1

In phase 1 refuse starts to accumulate on the rocky outcrops of Mounds A, B and D, covering the original clay and limestone surface of the low mogotes. The phase is characterized by the exploitation of mangrove resources, in particular *Crassostrea rhizophorae* and *Phacoides pectinatus* supplemented with estuary and river environments. The geoarchaeological analysis of a sample of this stratum for Mound B suggests that some sections of this layer could have been deliberately created. In this mound as well as sections of Mound D the layer contains shell of similar size range and almost nothing else, not even fine grained sediments. The chemical and microartefact analysis of a sample from Mound B suggests that aside from trampling, not many other activities affected the layer with the same intensity as other layers. It seems this layer was not an aleatory accumulation of food refuse, but a feature lain down possibly to create a better drained surface.

This shell layer was subsequently covered by a fine-grained loamy deposit of local origin. This deposit was originally interpreted as an abandonment phase or a possible flooding event of rising water table levels. However, the absence of this layer in other areas of the site undermines this interpretation. The geoarchaeological analysis suggests that this layer was in fact an occupation surface rich in bone and fragmented shells, with high magnetic susceptibility and phosphate content which can be considered a habitation surface. This designation can be further supported by layers of ash and burnt limestone over the loamy layer on Mound D. On Mound C, it is possible that the earliest habitation started at the end of Phase 1 or early Phase 2, directly over the clayey layer of the bedrock, without the layer of shells underneath.

Phase 2

Phase 2 is characterized by the exploitation of mostly estuarine and river environments as represented by the *Anomalocardia brasiliiana*, *Tagelus sp* and *Mytilopsis sallei*. Microlandscape use during this period becomes more complex and intense. The site experiences a growth, extending to reach Mound C. Midden layers with this type of mollusc species assemblage combination are present also in Mounds A and D. Mound B however seems to continue being used for habitation as a layer with Phase 2 characteristics was not reported for this mound. Surfaces with evidence of other activities are also identified surrounding the highest sections of the mounds, for example thick layers of what seems to be *terra preta*, the anthropogenic tropical soil associated with intensive, permanent human activity and occupation, are present near Mound B. Concentrations of burnt limestone and crushed shells mixed with the dark (possible *terra preta*) sediments are reported also for the central sections of Mound D at this time, suggesting the renewed use of this mound for occupation. Other areas with dark sediments have been observed associated to Mound C and to the remains of Mound A.

Phase 3

Phase 3 is characterized by a dominant focus on river and estuarine environments, as suggested by the combination of neritids and *Anomalocardia brasiliana*. This is evident in mounds A and B, as well as some sections of Mound D in association with dark sediments and ash layers. This layer is absent in Mound C, but, as the top section of this mound has been truncated, it is possible additional layers have been lost. Habitation surfaces expand later throughout the site, as the entire surface of Mound D seems to have been covered by dark sediments and similar deposits continue around Mounds B, C and A. The final sections of this period are disturbed by erosion, exotic earthworm activity (i.e. introduced species), tilling, and post-Colonial occupation.

Reconsidering the hunter-gatherer paradigm

Returning to the reconsideration of the hunter-gatherer paradigm, there are two important aspects that I would like to address: mobility and sustainability.

Regarding mobility, the shell analysis from the site suggests that the home range area used for exploitation was restricted to the area immediately surrounding it. All the resources observed in the shell heaps are available in modern environments within a 5 km radius of the site, and would have been much closer in the ancient landscape. These measures seem to be consistent with the daily mobility range reported by Mans (this volume) for the Amazon Trio dynamics. Energy investment towards the exploitation of this home range would have been greatly reduced by the use of maritime transport technology. This home range size provides further evidence of permanent, sedentary settlement, with processing camps nearby where prey could have been processed before bringing them to the site. Similar patterns are suggested by the mollusc assemblage of Maruca, a site contemporaneous to Angostura but on the south of the island (Pantel 1994; Rodríguez 2004. See Figure 1). The lithic assemblage of Angostura, however, indicates people moved beyond their home range. The presence of exotic rock types suggests there are other ranges of mobility beyond the immediate daily home range.

Mobility can be measured on different scales. Microscale mobility, applies to daily subsistence activities, where people would have remained within the small scale space around the site, including the processing camps. Mesoscale mobility would be expected on an 'every-few-months to every-few-years' basis, reaching distant areas of the island itself and adjacent islands, and would account for the exploitation of materials and resources sourced away from the site either through search and collection or trade. Finally, the procurement of very special symbolic and culturally important items and networks beyond the mesoscale spatial range could be expected to occur as macroscale mobility of once every few years or once a decade or generation, and could reach very distant locations. The entire group would not be expected to move every time there is a mobility event, and the larger the scale of mobility, the fewer people expected to execute it. These multiple mobility ranges would account for continued contact and cultural exchange with the mainland even though there were permanent, potentially sedentary, settlements on the islands.

The second aspect is the sustainability of sedentism. Sedentism has two implications: the need for problem solving and task management, and the increased exploitation pressure on available natural resources in a restricted location. Efficient problem solving and task management requires the development of more complex social organization struc-

tures, which need to be re-thought within pre-Arawak contexts. The presence of primary and secondary burials within the mounds in Angostura suggests the existence of ancestral ties with the landscape and a sense of territoriality. Similar statements can be made for Maruca. Secondly, permanent exploitation of fixed resources applies increased pressure on the locally available resources. In Angostura, the presence of grinding and plant processing tools, used to extract maximum nutritional value from plants, suggests that measures were being taken to support a large population with limited plant resources. With regard to the protein component of the diet it is generally assumed that humans exploit resources until depletion. The archaeomalacological record of Angostura suggests that depletion of protein sources was avoided by diversifying the diet, and incorporating resources that otherwise would have been overlooked, as suggested by the gradual shift from the *Crassostrea rhizophorae* to *Anomalocardia brasiliiana* to *Neritina* sp. This shift can be interpreted as an active and sustainable management of the resources and resilient adaptation to environmental change.

Angostura in history

Given the conditions of the site, we do not know for certain when and how Angostura was abandoned. Pre-Arawak settlements were initially established in ecotonal areas with good, easy access to a wide range of resources, which continued to maintain contact with maritime trade networks and routes. It is possible that, as the embayments and estuaries started to clog up with sediments continued occupation of the site was not profitable, and locations closer to the coast and within easier reach to the maritime trading routes were preferred, such as Maisabel (Siegel *et al.* 2005). Even though pre-Arawak layers have not been reported for this site, the presence of maize phytoliths in a mangrove core from a layer securely dated to approx. 2850 cal BP (Siegel *et al.* 2005:111) suggests the presence of people with domestic plants in the area later (but not much after) the latest date available from Angostura.

Maruca on the other hand, was inhabited for longer than Angostura, possibly because its location continued to provide easy access to the coast, even when the marshes and swamps around the site clogged with sediments. In contrast, Paso del Indio (Walker 2005), a site with pre-Arawak context inland from Maisabel, even though started not long after Angostura, the site was not abandoned, but instead changed over time. Exploration of the island might have created new opportunities, interests and priorities and, while maritime routes continued to be important as evidenced by new migrations of the early Arawak period, other processes were also being developed and need to be researched.

Concluding remarks

Long-existing preconceptions, in particular the “hunter-gatherer paradigm”, have clouded our understanding of the earliest occupants of the Caribbean. Evidence of cultural contact, social complexity and permanent settlement require us to reconsider and re-conceptualize the characteristics of the human occupations of the Caribbean during the mid-Holocene and the implications of the earliest colonization of the archipelago. At the other end of the period, analysis of lithic reduction protocols are suggesting complex plural social interactions and influences blurring the traditional boundaries between “the Archaic”, “the

Saladoid” and “the Huecoid”. The interaction between the “Arawak” (Ceramic Age) and the pre-Arawak groups needs also to be re-examined in detail, away from the “displaced or annihilated hunter-gatherer” concept.

Acknowledgements

This material is based upon work partly supported under a National Science Foundation Graduate Research Fellowship. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the author and do not necessarily reflect the views of the National Science Foundation. I would like to thank Professor Arlene Rosen for her comments on this article and the research in general; Dr. José Oliver and Professor Kenneth Thomas for their comments and suggestions and Alice Hunt for her help with my English grammar. All mistakes are my own responsibility.

References

Ayes-Suárez, C.M.

1988 *Evaluación Arqueológica Tipo Fase 2. Angostura, Florida Afuera, Barceloneta, Puerto Rico*. Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico, San Juan.

Ayes-Suárez, C.M., and O. Dávila

1993 *Angostura, un campamento arcaico temprano en el Valle del Manatuabon. Barrio Florida Afuera, Barceloneta, Puerto Rico. Informe Preliminar de la mitigación parcial del sitio*. Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico, San Juan.

1995 *Mitigación parcial del montículo A del yacimiento Angostura*. Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico, San Juan.

Bertran, P., D. Bonnissent, D. Imbert, P. Lozouet, N. Serrand, and C. Stouvenot

2004 Paléoclimat des Petites Antilles depuis 4000 ans BP : l'enregistrement de la lagune de Grand-Case à Saint-Martin. *C.R. Geoscience* 336:1501-1510.

Blum, M.D., and T.E. Törnqvist.

2000 Fluvial responses to climate and sea-level change: a review and look forward. *Sedimentology* 47:2-48.

Burney, D.A., L.P. Burney, and R.D.E. MacPhee

1994 Holocene charcoal stratigraphy from Laguna Tortuguero, Puerto Rico, and the timing of human arrival on the island. *Journal of Archaeological Science* 21:271-281.

Braconnot, P., S. Joussaume, N. De Noblet, and G. Ramstein

2000 Mid-Holocene and Last Glacial Maximum African monsoon changes as simulated within the Paleoclimate Modelling Intercomparison Project. *Global and Planetary Change* 26:51-66.

Brock Ramsey, C.

2009 Bayesian Analysis of Radiocarbon dates. *Radiocarbon* 51(1):337-360.

Callaghan, R.T.

1990 Possible Pre-Ceramic connections between Central America and the Greater Antilles. *Proceedings of the 11th International Congress for Caribbean Archaeology*, Puerto Rico, pp. 65-71.

1993 Passage to the Greater Antilles: an analysis of water-craft and the marine environment. *Proceedings of the 14th International Congress for Caribbean Archaeology*, Barbados, pp. 64-72.

1995 Antillean Cultural Contacts with the Mainland Regions as a Navigation Problem. *Proceedings of the 19th International Congress for Caribbean Archaeology*, San Juan, pp. 181-190.

2001 Ceramic Age Seafaring and Interaction Potential in the Antilles: A Computer Simulation. *Current Anthropology* 42:308-313.

2003 Comments on the mainland origins of the Preceramic cultures of the Greater Antilles. *Latin American Antiquity* 14:323-338.

Callaghan, R.T., and W. Bray

2007 Simulating Prehistoric Sea Contacts between Costa Rica and Colombia. *Journal of Island and Coastal Archaeology* 2:4-23.

Cooper, J., and M. Peros

2010 The archaeology of climate change in the Caribbean. *Journal of Archaeological Science* 37:1226-1232.

Curet, L.A.

2005 *Caribbean paleodemography: population, culture history, and sociopolitical processes in ancient Puerto Rico*. University of Alabama Press, Tuscaloosa.

Donnelly, J.P., and J.D. Woodruff

2007 Intense hurricane activity over the past 5,000 years controlled by El Niño and the West African monsoon. *Nature* 447:465-8.

Fleming, K., P. Johnston, D. Zwartz, Y. Yokoyama, K. Lambeck, and J. Chappell

1998 Refining the eustatic sea-level curve since the Last Glacial Maximum using far- and intermediate-field sites. *Earth and Planetary Science Letters* 163:327-342.

Haugh, G., K.A. Huguen, D.M. Sigman, L.C. Peterson, and U. Röhl

2001 Southward Migration of the Intertropical Convergence Zone through the Holocene. *Science* 293:1304-1308.

Higuera-Gundy, A., M. Brenner, D.A. Hodell, J.H. Curtis, B.W. Leyden, and M.W. Binford

1999 A 10,300 14C yr Record of Climate and Vegetation Change from Haiti. *Quaternary Research* 52:159-170.

Hodell, D.A., J.H. Curtis, G.A. Jones, A. Higuera-Gundy, M. Brenner, M.W. Binford, and K.T. Dorsey

1991 Reconstruction of Caribbean climate change over the past 10,500 years. *Nature* 352:790–793.

Islebe, G.A., H. Hooghiemstra, M. Brenner, J.H. Curtis, and D.A. Hodell

1996 A Holocene vegetation history from lowland Guatemala. *The Holocene* 6:265-271.

Kennedy, L.M., S.P. Horn, and K.H. Orvis

2006 A 4000-year record of fire and forest history from Valle de Bao, Cordillera Central, Dominican Republic. *Palaeogeography, Palaeoclimatology, Palaeoecology* 231:279-290.

Lathrap, D.W.

1968 The “Hunting” Economies of the Tropical Forest Zone of South America: An Attempt at a Historical Perspective. In *Man the Hunter*, edited by R.B. Lee and I. DeVore, pp. 23-29. Aldine de Gruyter, New York.

1973 The antiquity and importance of long-distance trade relationships in the moist tropics of Pre-Columbian South America. *World Archaeology* 5:170-186.

Moscoso, F., C.M. Ayes-Suárez, and O. Dávila

1999 *Arcaicos de Angostura: Pasado Remoto de Puerto Rico*. Sociedad de Investigaciones Arqueológicas e Históricas Sebuco, Inc, Vega Baja.

Newsom, L.A., and E.S. Wing

2004 *On Land and Sea: Native American Uses of Biological Resources in the West Indies*. University of Alabama Press, Tuscaloosa.

Oliver, J.R.

2009 *Caciques and Cemi Idols. The Web Spun by Taíno Rulers Between Hispaniola and Puerto Rico*. University of Alabama Press, Tuscaloosa.

Pagán Jiménez, J.R.

2007 *De antiguos pueblos y culturas botánicas en el Puerto Rico indígena. El archipiélago Borincano y la llegada de los primeros pobladores agroceramistas*. BAR International Series 1687. Archaeopress, Oxford.

Pantel, A.G.

1994 *Evaluación de Recursos Culturales de Fase II. Yacimiento Precolomino Maruca, Barrio Canas. Municipio de Ponce, Puerto Rico*. Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico, San Juan.

Reimer, P.J., M.G.L. Baillie, E. Bard, A. Bayliss, J.W. Beck, C.J.H. Bertrand, P.G. Blackwell, C.E. Buck, G.S. Burr, K.B. Cutler, P.E. Damon, R.L. Edwards, R.G. Fairbanks, M. Friedrich, T.P. Guilderson, A.G. Hogg, K.A. Hughen, B. Kromer, G. McCormac, S. Manning, C.B. Ramsey, R.W. Reimer, S. Remmele, J.R. Southon, M. Stuiver, S. Talamo, F.W. Taylor, J. van der Plicht, and C.E. Weyhenmeyer

2004 IntCal04 Terrestrial radiocarbon age calibration, 0 – 26 cal kyr BP. *Radiocarbon* 46(3):1029–1058.

Renken, R.A., W.C. Ward, I.P. Gill, F. Gómez-Gómez, and J. Rodríguez-Martínez

2002 *Geology and Hydrogeology of the Caribbean Islands Aquifer System of the Commonwealth of Puerto Rico and the U.S. Virgin Islands*. U.S. Geological Survey Professional Paper 1419. Virginia: U.S. Geological Survey. Reston.

Rivera-Collazo, I.

2011 The Ghost of Caliban: Island Archaeology, Insular Archaeologists and the Caribbean. In *Islands at the Crossroads: Migration, Seafaring, and Interaction in the Caribbean*, edited by L.A. Curet and M.W. Hauser. University of Alabama Press, Tuscaloosa, in press.

Rodríguez Ramos, R.

2007 *Puerto Rican precolonial history etched in stone*. Unpublished PhD Dissertation, University of Florida, Gainesville.

2008 From the Guanahatabey to the Archaic of Puerto Rico: The Nonevident Evidence. *Ethnohistory* 55:393-415.

Rodríguez Ramos, R., and J.R. Pagán Jiménez

2006 Interacciones multivectoriales en el circum-caribe precolonial: un vistazo desde las antillas. *Caribbean Studies* 34:103-143.

Rodríguez, M.

2004 *Informe Final. Excavaciones en el yacimiento Arcaico de Maruca, Ponce, Puerto Rico*. Un proyecto arqueológico auspiciado por el Instituto de Cultura Puertorriqueña.

Schmidt, G.A., D.T. Shindell, R.L. Miller, M.E. Mann, and D. Rind

2004 General circulation modelling of Holocene climate variability. *Quaternary Science Reviews* 23:2167-2181.

Sears, W.H.

1977 Seaborne Contacts between Early Cultures in Lower Southeastern United States and Middle through South America. In *The Sea in the Pre-Columbian World. A conference at Dumbarton Oaks, October 26th and 27th, 1974*, edited by E.P. Benson, pp. 1-15. Trustees for Harvard University, Washington, D.C.

Siegel, P.E., J.G. Jones, D.M. Pearsall, and D.P. Wagner

2005 Environmental and Cultural Correlates in the West Indies: a view from Puerto Rico. In *Ancient Borinquen. Archaeology and Ethnohistory of Native Puerto Rico*, edited by P.E. Siegel, pp. 88-121. University of Alabama Press, Tuscaloosa.

Taggart, B.E.

1992 *Tectonic and Eustatic Correlations of Radiometrically Dated Late Quaternary Marine Terraces on Northwaestern Puerto Rico and Isla de Mona, Puerto Rico*. Unpublished PhD dissertation. University of Puerto Rico, Mayagüez.

Thunell, R.C, and K. Tedesco

2003 High resolution tropical climate record for the last 6,000 years. *Geophysical Research Letters* 30:CLM 2-1-CLM 2-4.

Torres, J., and R. Rodríguez Ramos

2008 The Caribbean, a Continent Divided by Water. In *Archaeology and Geoinformatics. Case Studies from the Caribbean*, edited by B. Reid, pp. 13-29. University of Alabama Press, Tuscaloosa.

Walker, J.

2005 The Paso del Indio Site, Vega Baja, Puerto Rico: A progress report. In *Ancient Borinquen. Archaeology and Ethnohistory of Native Puerto Rico*, edited by P.E. Siegel, pp. 55-87. University of Alabama Press, Tuscaloosa.

Wanner, H.

2008 Mid- to Late Holocene climate change: an overview. *Quaternary Science Reviews* 27:1791-1828.

Warne, A.G., E.H. Guevara, and A. Aslan

2002 Late Quaternary Evolution of the Orinoco Delta, Venezuela. *Journal of Coastal Research* 18:225-253.

Woodruff, J.D., J.P. Donnelly, D. Mohrig, and W.R. Geyer

2008 Reconstructing relative flooding intensities responsible for hurricane-induced deposits from Laguna Playa Grande, Vieques, Puerto Rico. *Geology* 36:391.

THE MOST BEAUTIFUL HOUSE IN THE WORLD

The archaeology of aesthetics in eastern Hispaniola

Alice V.M. Samson

Indigenous aesthetics are retrievable in the archaeological record of the pre-Columbian houses of the Dominican Republic. This chapter presents evidence from thirty excavated houses spanning the ninth to sixteenth centuries from the coastal settlement of El Cabo. The excavations in El Cabo were part of the project “Houses for the Living and the Dead” funded by NWO (The Netherlands Organisation for Scientific Research). Here, natural wood, palm and bedrock materials were transformed into houses sharing similar architectural characteristics and life histories. The aesthetic choices of the inhabitants give insights into social dynamics, especially with respect to the intra-settlement ethos of harmony and community.

La estética indígena puede encontrarse en la arqueología de las viviendas precolombinas en la República Dominicana. En este capítulo se presenta evidencia de treinta casas excavadas del asentamiento costero de El Cabo, y datadas entre el siglo nueve y el inicio del siglo dieciséis. Las investigaciones arqueológicas en El Cabo forman parte de un programa a largo plazo, denominado “Vivir y morir en una comunidad Taína” financiado por el Fondo Holandés para Investigaciones Científicas (NWO). Aquí, los materiales naturales de la madera, palma y roca se transformaron en casas con similares características arquitectónicas e ciclos de vida. Las preferencias estéticas de los habitantes nos proporcionan información sobre la dinámica social, especialmente en lo referente a la ética de armonía y comunidad del asentamiento.

L'esthétique indigène est accessible dans l'archéologie de la maison précolombienne dans la République Dominicaine. Ce chapitre présente des données provenant de trente maisons du 9ème et 16ème siècles fouillées du site côtier de El Cabo. Les fouilles de El Cabo faisaient partie du projet “Maisons pour les vivants et les morts”, financé par NWO (Organisation néerlandaise pour la recherche scientifique). Ici, les matériaux naturels comme le bois, le palmier et la roche ont été transformés en maisons partageant les mêmes caractéristiques architecturales et cycles de vie. Les choix esthétiques des habitants donnent un aperçu de la dynamique sociale, en particulier en ce qui concerne l'éthique de l'harmonie et de la communauté.