5 Early horticulturalists of the southern Caribbean

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Introduction

The islands of the southern Caribbean and the adjacent coastal fringe of mainland Venezuela encompass a great variety of landscapes united by a relatively homogeneous geomorphology, physiography, climatic regime, biodiversity, and the presence of anthropic areas that remain minimally disturbed. These characteristics make this macroregion an appropriate setting to gauge deep-in-time paleoclimatic and paleoecological changes, and to study their interrelations within the context of long-term sociocultural and political-economic trajectories. In historical-cultural and cultural-ecological approaches, this macroregion has been portrayed as the crossroads of people, goods, and ideas between Amazonia, the Andes, and the insular Caribbean (Osgood and Howard 1943; Rouse and Cruxent 1963; Spinden 1916; Steward 1948; Wagner 1978; Willey 1960).

During the last decades, with the development of the deep-time perspectives of human ecodynamics and multidimensional approaches to biocultural evolution, research has become increasingly interdisciplinary. These approaches have also been informed by the realization that humans are not passive adaptors to their environment, but are rather creatively shaping it as a socio-natural landscape moulded through complex and dynamic biological, sociocultural, and environmental feedbacks (Balee 2010; Barton et al. 2011; Borrero 2015; Denovan 2001; Erickson 2003; Kirch 2007; Oliver 2008). Concomitantly with these broader theoretical shifts, aided as they are by increasingly sophisticated field and laboratory tools and techniques, the approaches to the origin of or transition to agriculture have also been substantially transformed (Langlie et al. 2014). As a result, 'agriculture' has been freed from the dependency on environmental determinism and decoupled from domestication and the production of pottery, while mixed economies have been increasingly considered instead of full agricultural intensification (Erickson 2008; Greaves and Kramer 2014; Pluciennik and Zvelebil 2008). Importantly enough, social complexity in its varied forms, as well as mobility, exchange, and communication have been (re)introduced into the Caribbean Archaic Age (e.g. Curet 2003; Hofman et al. 2006;
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challenging the persistent remnants of 19th-century progressive and unilinear cultural evolution that attributed these characteristics only to Neolithic (or Caribbean Ceramic Age) societies. Thus, the research has been ‘softened’ or even radically changed by the denial of any clear-cut distinction between forager and farmer modes of living and worldviews, and by incorporating perspectival and post-humanist ontologies into research agendas (Barker 2009; Terrell and Hart 2008; see also Grøn and Kuznetsov 2004). All in all, the origin or spread of horticulture or agriculture is no more perceived as a single-cause process but as a result of a confluence of environmental, socioeconomic, and ideological processes (Pluciennik and Zvelebil 2008: 471).

In this chapter, we discuss the current knowledge of the causes, dynamics, and timing of the processes involved in the transition from the Archaic Age gatherer-fisher-hunter economies to horticulture-based farming in the southern Caribbean. We begin with the geo-environmental presentation of this study region, followed by a brief overview of its earliest signature of human presence. The chapter will subsequently focus on selected case studies that explore the different processes of transition to horticulture in the region of interest. It will conclude by briefly discussing some avenues for future research.

Geo-environmental contexts of the southern Caribbean in the Archaic Age

To fully understand the human experience in the southern Caribbean, we must first envision the geographic and environmental contexts of the region, as a distinctive area within the broader insular and circum-Caribbean macroregion (see Figure 5.1).

The geological contexts of the southern Caribbean indicate a primary emphasis on the tectonic abrasion between the Caribbean and South American plates as the major factor for significant geologic events, rather than more recent volcanic activity that is characteristic of the eastern Caribbean. From Curacao to Los Testigos, this island chain is separated from the (now Venezuelan) mainland by the Bonaire Trench with a depth of over 1000 meters (Silver et al. 1975; Stock 1982). Within the southern Caribbean group of islands identified in this chapter, Aruba, Margarita, and Trinidad are not separated from the South American shelf; they became continental islands due to the post-Pleistocene sea-level rise (Schubert and Motitska 1972, 1973; Schubert and Valastro 1976). To the north of this island chain, the Los Roques Trench and the Curacao Outer Ridge isolate the islands from the oceanic Caribbean Basin. All of these features are the result of a Late-Cretaceous frictional grinding of the southern edge of the Caribbean tectonic plate as it moved west across the South American tectonic plate, this creating series of fault lines (Oca, Sebastian, Cuiza, etc.) along the northern South American coastline (Beets 1977). A significant consequence
of this unique geological context is the potential and actual presence of historical earthquakes and resulting tsunamis in the region. At least three major tsunamis are known to have occurred in this region between 3500 and 3000 BP (Engel et al. 2010; Scheffers 2002; Scheffers et al. 2009).

Like many localities around the world between 10–15 degrees north of the equator, the southern Caribbean has an evaporation rate that greatly exceeds precipitation (Boomert 2000; Gallagher 1976). Thus, these islands, with the exception of Trinidad, are primarily semi-desertic environments with xerophytic vegetation (Lahey 1973; Trewartha 1961). In view of the Holocene, it becomes much more relevant to understand the paleoenvironmental conditions of the region which affected the subsistence strategies and overall life-ways of early human populations. On the basis of palynological studies across northern South America, we have been able to gain some perspectives concerning the contexts of the natural vegetation available to the Archaic Age populations. These studies show a transition from warm and moist environments between 10000 and 5000 BP, some fluctuations to a very dry environment from about 3000 BP, to the present consisting of cactus and thorn-scrub vegetation (Rull et al. 2010; Schreve-Brinkman 1978; Sealey 2001; Van der Hammen 1978). These environmental conditions suggest that the Archaic Age peoples of the southern Caribbean had to develop certain responses to these fluctuations. One of these responses seems to have been the exploitation of the agave plant (*Agave cocui*), locally known as *maguey*, an amino acid-rich, xerophytic plant with multi-use functions, such as fibre production. In several archaeological contexts on both Curaçao and Bonaire, a specific shell tool has been associated with the shredding of the agave leaves for fibre extraction (Haviser 1987). This exclusively Archaic Age tool on Curaçao and Bonaire, has ‘nipple-tip’ use-wear on the apex of a *Lobatus gigas* columella gouge, while the tip diameter matches the space between the heavy fibres in the agave leaves (Haviser 1987). The xerophytic vegetation contexts of the region in the Archaic Age, with the exception of Trinidad, have also produced archaeological evidence that suggests that the Archaic Age population may have used other cactus and dry scrub plants (Gallagher 1976; Kidder 1944), as well as utilized mangrove estuarine resources (Haviser 1991). Other dry environment food sources in the Archaic Age, found in archaeological contexts of Archaic Age site locations and artefact assemblages, as noted on Bonaire (Haviser 2001; Haviser et al. 2011). This brief overview of the southern Caribbean considers the actuation of early indigenous peoples as an inextricable part of paleo-landscapes that were not merely detached backdrops for the playing out of human lives.

The earliest human footprints

Although the first immigrants into South America would have arrived without domesticated plants, their interactions with the native biota and management of plant resources were part of their socio-cultural heritage as early as the Pleistocene-Holocene transition (Borrero 2015: 130). Bottle gourds were used as containers and possibly other plants were also managed by these early hunter-gatherers (Erickson et al. 2005; Piperno 2006). Through the routine of seasonal gathering, processing, use, and discard, through the protection of selected species and introduction of new ones, as well as through soil modification and tilling and/or burning of woodland and grassland, the plants of the new regions became accustomed to human presence. Moreover, many became dependent on anthropogenic environments and entrapped within a web of often mutually beneficial relationships (Hodder 2012; Pluciennik and Zvelebil 2008: 470). Thus, in order to grasp the diachronic pulse of the growing entanglement between humans and plants, it is essential to consider deep-in-time beginnings of such interactions.

Paleontological remains, without associated proof of human presence, have been recovered across the entire mainland Venezuelan coastal zone facing the southern Caribbean islands, from the piedmont of Sierra de Perijá mountains to the west (McDonald et al. 2013), through the northwestern present-day state of Falcón (Gruhn and Bryan 1984; Sánchez-Villagra et al. 2010), the centrally located Lake Valencia Basin (Carrillo et al. 2008), and towards the easternmost situated state of Monagas (Rincón et al. 2009). Such remains have also been found at six localities in southwest Trinidad (Boomert 2000: 42). Thus far, the better researched sites, in which Pleistocene faunal remains were found together with signatures of human activity, have been reported from the coastal part of the Venezuelan state of Falcón. At the site of Muaco, abundant remains of mastodon, megatherium, glyptodont, wolf, horse, and other Pleistocene animals were found associated with ancient hunter-gatherer activities (Cruxent 1961; Rouse and Cruxent 1963: 35).
Muaco was interpreted as a kill site where lithic artefacts were scarce. Large animal bones, used as anvils or chopping blocks, show traces of intentional breaking, grooving, and cutting, while some other bones were purportedly burnt. In the adjacent site of Taima-Taima, additional evidence of human activity was found (Bryan et al. 1978). Here the paleontological and archaeological evidence together permitted the reconstruction of a kill site that was situated around a waterhole existing in late Pleistocene times. This waterhole attracted both megafauna and man. In 1976, the butchered remains of a juvenile mastodon in association with an El Jobo projectile point and a utilized jasper flake were found associated to vegetal matter, believed to be the stomach content of the animal. The latter was dated by radiocarbon to 14000-12500 BP (Ochsenius and Gruhn 1979). The El Jobo lithic tool kit was abundantly documented by José Maria Cruxent and his collaborators at the kill sites and lithic workshops dispersed along the Pedregal River in the north of Falcón State (Oliver and Alexander 1990; Rouse and Cruxent 1963: 27-31; see Veloz Maggiolo and Martin 1983).

Jaimes (1999) has reported additional data on Lithic Age or Paleo-Indian sites from the states of Falcón and Lara in the Venezuelan Andean piedmont region, and analysed a series of paleoenvironmental indicators for both areas. He found that the northern coastal regions might have had more arid (16000-14000 BP [Ochsenius 1980]) and the southern regions more humid Late Pleistocene-Early Holocene paleoenvironments. The radiocarbon dates of megafaunal remains from the south appeared to be younger than their above-mentioned northern counterparts: Quebrada Maraquta (10950-10450 BP), El Vano (10710±60 BP); El Palomo (7750±80 BP), Cerro El Palomo (5450 BP) [Tamers 1969], and La Fundacion (6840±190 BP) [Jaimes 1999]. Arguably, being less arid, the Andean piedmont could sustain the megafauna much longer than the northern coastal regions, which might have allowed a longer continuation of the mode of life of the hunter-gatherers in this area as well. The purported paleoenvironmental difference and the resulting differential availability of megafauna could have led to the adoption of different modes of life by the northern and southern Lithic Age groups.

Jaimes (1999) has suggested that various bands of hunter-gatherers had to be responsible for the dispersion of the El Jobo lithic artefacts across the some 40,000 km² between Falcón and Lara states (some 370 km from north to south). However, while multifunctional sites have been found in the north, semi-specialized and specialized sites were documented in the south. This difference may be related to the disintegration of local bands resulting from internal social tensions, the pressing of other groups, and/or environmental factors. These bands apparently exploited diverse eco-niches and types of raw materials, but maintained with their northern counterparts a common techno-morphologic conceptualization of a lithic industry that was simple and flexible (Jaimes 1999: 108).

Indeed, a flexible technology would have allowed the first colonizers of the South American continent to occupy diverse environments without marked preferences (Borrero 2015; Bryan 1973; Pearson and Bostrom 1998). However, while the hunting of mega-herbivores was a common denominator for these groups, not restricted to a specific season, the exploitation of previously unknown inlands with diverse and seasonally available plants and the hunting of small game were locally bounded subsistence strategies which required slowing down the tempo of trans-regional mobilization after the herds of megafauna. This slowing down was necessary in order to permit the accumulation of locally sensitive bio-ecological knowledge and to gain experience while occupying the paleo-landscapes. At the other end, due to the changes in sea level and concomitant climatic and bio-ecological fluctuations, coastal groups became more dependent on sea resources permitting the development of a more generalized Archaic Age mode of life along the coasts and on the islands. These local signatures suggest, according to Jaimes (1999), that the technoeconomy of the Joboid people showed generalized strategies that escape the narrow definition of an “Archaic style of life” (Dillehay et al. 1992), their consideration as hunters specialized in megafauna (being the product of rapid migration rather than slow colonization), and as bearers of an ancestral tradition evolved on the North American Plains (Haynes 1969; Martin 1973). These signatures seem to suggest that early local and regional specificities paved the way for developmental trajectories leading towards fully Archaic Age modes of life and further, probably, towards the transition to horticulture.

Thus far, artefacts representative of the transition period from the hunting of large mammals in the Late Pleistocene to hunting of modern fauna during the Early Holocene have not been recovered from unquestionable archeological contexts on the islands of the southern Caribbean. A bifacially chipped, stemmed spearhead has been reported from Biche site on Trinidad (Boomert 2000, figs. 6, 49) and similar artefacts are known from Margarita Island (de Booy 1916, figs. 10, 22; Cesari 1995). A proximal fragment of a lanceolate spearhead, made of milky quartz, was found in a Ceramic Age context dated to AD 1200 on Cayo Sal Island, and has been interpreted as an heirloom (Antczak and Antczak 1991: 348). Similar artefacts attributed to the Canaima complex, defined for the Upper Caroní River region in Venezuelan Guayana (Cruxent 1971; Cruxent and Rouse 1956, 1958; Rouse and Cruxent 1963), have been reported from across northern Venezuela from its western (Cruxent 1962; Sanoja 1982: 173, fig. 76) and central zones (Cruxent and Zuchi 1964; Dupouy 1945) to the Upper Orinoco (Barse 1989, 1990), and Gran Sabana in the southeast (Dupouy 1957, 1960). Most likely, incipient navigational technology, skills, and knowledge precluded the Lithic and Early Archaic Age peoples from sustained visiting or colonization of the islands most distant from the Southern Caribbean continental coast.

The Archaic Age sites on the southern Caribbean are typically associated with shell middens, consisting mainly of bivalves, fish bones, echinoderms, and other remains of marine animals. Bone projectile points used for fishing now largely replaced stone projectile points which were previously employed
for hunting land game (Rouse and Cruident 1963: 40). The sea-oriented Archaic Age populations from the circum-Caribbean mainland coast developed navigational technologies, skills, and knowledge of the sea to such unprecedented levels that they were able to colonize the islands of Aruba, Curaçao, Bonaire, Margarita, Cubagua, and Trinidad, and temporarily visited the island of La Blanquilla. Before focusing on these specific islands, let us briefly examine the mainland coast of the southern Caribbean, where human societies were already foraging the Archaic Age lifestyles.

On the western coast of Venezuela, the radiocarbon dates associated with Archaic Age populations begin between 5550±100 and 5190±120 BP at the Cerro Iguanas shell midden in the area of Tucacas. The midden site of El Henal in the western part of the central coast is younger, dating to 3400±120 BP. It is probably related to the barely known Cabo Blanco shell midden on the central coast (Rouse and Cruident 1963: 155). To the east of the central coast, a date of 2450±90 BP is associated with a series of shell middens at the Pedro García site (Rouse and Cruident 1963: 38). On the northeastern coast and islands, three Archaic Age complexes can be distinguished: Cubagua, Manicuare, and Punta Gorda, all of which are ascribed to the Manicuareoid series (see later).

Along the northeastern mainland coast a series of shell middens was encountered at No Carlos, Guayana, and Remigio (Sanoja and Vargas-Arenas 1999a: 147). The latter site yielded dates of 5270±110 and 4570±70 BP. However, its deepest layers may attest to an even earlier presence of Archaic Age peoples (ca. 7000–6000 BP), who exploited the mangrove areas and focused on marine resources (Sanoja and Vargas-Arenas 1999a: 149). According to Sanoja and Vargas-Arenas (1983, 1999a, 1999b; Sanoja 1982), the Archaic Age societies of northeastern Venezuela formed part of a horizon that extended from the Gulf of Paria to Trinidad and stretched along the coast of the Guianas as far as Brazil.

In southeastern Venezuela, a series of Archaic Age sites has been reported from the Caroni River region (Sanoja and Vargas-Arenas 2007: 181). Here, the earliest sites of the Caroni Tradition are dated to the Late Pleistocene and Early Holocene between 12000 and 9000 BP. The materials include robust choppers and unifacial flints made from ferrous quartzite and their bearers frequented the rapids of the river. It is followed by the Guayana Tradition (9200–7010 BP), characterized by peduncular projectile points, knives, perforators, and other artefacts made from quartz, chert, and chaledony (Sanoja and Vargas-Arenas 2007). The Caroni Tradition was oriented towards exploitation of the local resources of the Caroni River, swamps, and gallery forests, while the hunter-gatherers of the Guayana Tradition exploited resources of the forest and interior savannas. Beyond Venezuela, the Caroni Tradition resembles the Itaparica Tradition of Mato Grosso and Monte Alegre on the Lower Amazon, while the Guayana Tradition seems related to the Umbu Tradition of southern Brazil (Sanoja and Vargas-Arenas 1999a: 119, 122).

In the area of Puerto Ayacucho in southern Venezuela, Barse (1989: 12) recovered at least three sites with evidence of ‘preceramic’ occupations in stratified contexts on the alluvial terraces and relict channels of the Orinoco River. These ‘preceramic’ components allowed the definition of an Archaic Age Tradition for the Orinoquia, subdivided into Arches I (9200–7000 BP), characterized by flakes and scrapers related to the tropical forest, and Arches II (7000–4000 BP), associated with projectile points and flakes used in savannas and forests emerging with the drier climate of the Middle and Late Holocene (Barse 1993: 108). Based on the site locations, technological characteristics of the lithic toolkit and chronology, the Archaic Age people of Orinoquia had a broad-spectrum economy, collecting, hunting, and fishing in the savannas and forests, and were probably grouped in bands. Barse (1995: 112) suggests that the origin of the Arches Tradition should be sought in the Archaic Age complexes of the early post-Pleistocene of the Bogotá Plateau, Colombia. The settlers from the Bogotá Plateau (7000–6000 BP) were familiar with the exploitation of lowland resources. Importantly, from a macroregional perspective, we know that the Orinoquian Archaic Age peoples maintained connections between the highlands and lowlands and exploited different ecological zones (Gassón 2002: 266). Wagner (1993: 273; 1999) reported Archaic Age occupations at the Capacho and Lomas Bajas sites in Táchira State of the Venezuelan Andes. The first site is a shell midden while the second one yielded molluscs, scrapers, and animal bones.

All the above-mentioned sites of inland Venezuela are important in understanding the trajectories of Archaic Age human interactions between the basins of the Amazon and Orinoco rivers as well as between the Andean west and Antillean north. Bearing in mind the above-outlined scenario, we proceed to discuss the presence of Archaic Age peoples on the southern Caribbean islands.

**Trinidad**

Entering Trinidad from the mainland about 6000 BC, the first Archaic Age Amerindians of the island settled on hillocks at the edge of a major lagoon, characterized by an extensive mangrove stand, in the southwest of the island (Boomert 2000: 53–68; Boomert et al. 2013: 10–16, 59–67). Two major shell midden deposits are known here, Banwari Trace and St. John, both of which can be assigned to the Ortoioioid series. Banwari Trace yielded mainly freshwater to estuarine molluscs such as pond snails and nerites in its lower levels, dated to 6000 to 5100 cal BC and consisting predominantly of marine, mangrove-adapted species such as Caribbean oysters and West Indian crown conchs in its upper portion, which had accumulated between 5100 and 4000 cal BC. This apparent alteration in shell collecting habits can be correlated to the full submergence of the Gulf of Paria by about 5150 cal BC, as a result of which the distance
between the shore and the site lessened considerably. St. John is situated closer to the Gulf and consisted entirely of marine molluscs (Reid 2011). Concurrent with the shift in shell species gathered at Banwari Trace, an alteration took place in the intensity of exploitation of the two most extensively utilized ecosystems, the locally dominating deciduous seasonal forest and the marine, inshore/estuarine habitat of the Gulf of Paria. From primarily hunting terrestrial game such as monkeys, opossums, armadillos, spiny rats, agoutis, and red brocket deer, the Ortoiroid subsistence economy evolved to fishing mainly for carfish. A variety of crabs were also caught seasonally. The Ortoiroid stone and bone tools at both sites are highly distinctive, comprising various artefacts associated with hunting and fishing, including bone projectile points for tipping hunting and fishing spears, bipoined pencil fishhooks, and similarly used bevelled pecary teeth.

The Ortoiroid people of Trinidad had sizeable ground stone axes for cutting trees and the manufacture of dugout canoes while they used small, irregular flake and core tools made of quartz, flint, or chert for a variety of purposes, e.g. cutting meat, scaling fish, prying shells open, scraping skins, finishing wooden arrowshafts, and processing vegetable fibres for making baskets. Besides, small stone mortars were used for grinding red ochre in order to obtain pigment for, e.g. body painting. Conspicuously smooth and pointed antler tips and bone needles may have been used as perforators. Crude stone choppers were perhaps utilized as woodworking tools or wedges. All in all, the men and women of Banwari Trace and St. John had sophisticated technology to effectively exploit their environment and by so doing secure a balanced diet.

Habitation sites such as Banwari Trace and St. John functioned as the dwelling places (hamlets) where especially women and children of the band lived on a semi-permanent basis. Some group members, especially the men, probably departed temporarily in order to occupy small, sometimes seasonal, camps, quarry sites, or workshops to pursue specialized tasks such as building canoes, producing stone tools, collecting vital raw materials, or engaging in subsistence activities (Boomert 2000: 64–67). The raw materials for some stone implements at Banwari Trace and St. John, such as serpentinite, greenstone, andesite, and leucodiorite, were apparently procured during overseas voyages to the Venezuelan coast, Tobago, or the Windward Islands.

Banwari Trace has yielded the oldest human skeleton of the Caribbean, the famous ‘Banwari Woman’, dating back to about 5000–4350/4000 BP. Although originally identified as a male skeleton, its gracilir nature and pelvic structure suggest that it could be the remains of a woman, who, according to her dental characteristics, may have died at an age of approximately 25–30 years (Alfredo Coppa, pers. commun.). The body of this woman was carefully buried, deposited in flexed position (with bent knees) and positioned on the left side, along a northwest axis. Two mortuary gifts were found to be accompanying the skeleton. A smooth oval pebble was encountered close to the skull and a bone needle point by the hip (Peter O’B. Harris, pers. commun.). Of course, the latter find strengthens the likelihood that this (inhumation) burial represents a woman. Groups of human bones, apparently assembled and bundled for secondary interment after exhumation of the original burials, were found as well. They illustrate a belief in the afterlife and care for the remains of the ancestors.

**Blanquilla, Margarita, and Cubagua**

The western Venezuelan islands such as the Las Aves and Los Roques archipelagos and the La Orchila group revealed late pre-colonial archaeological materials, indicating that they were most probably not visited by earlier populations (Antczak and Antczak 2006). These are true oceanic islands, separated from the mainland by between 135 km (Los Roques) and 155 km (Las Aves) of open deep sea. Crossing such distances seems to have been beyond the technological capabilities of the early indigenous populations. However, the island of La Blanquilla, located approximately 160 km east of the island of Orchila and nearly 100 km northwest of the island of Margarita, seems to be an exception. It yielded a total of 15 archaeological sites (Antczak and Antczak 1991), and three of them, located on the flat plateaus that extend close to the small bays of the western coast, yielded only non-ceramic materials. Cultural deposits are thin with a maximum depth of 30 cm. Patches of dark soil contain remains of turtles, fish, chitonos, and fragments of molluscs, including a few entire but badly weathered *Lobatus gigas* shells. Lithics are composed of various quartz flakes of irregular shapes and different sizes. Similar objects were found in a few small patches dispersed along the south coast of the island. The only identifiable artefacts are three multifacial percutors obtained from quartz pebbles, rounded by frequent use. These artefacts, together with simple quartz flakes, were grouped under the Garantón complex label and are tentatively related to the Manicuaroid series, representative of the Archaic Age of northeastern Venezuela (Antczak and Antczak 1991; see Cruxent and Rouse 1958; Ginés et al. 1946). Bone projectile points, quartz flakes, and three micro-perforators, recovered from the Cuevas de la Cabececa on the southeastern tip of the Blanquilla Island, can be assigned to this same complex.

Moving south, Margarita, the largest Venezuelan island, has yielded a series of Archaic Age finds (de Booy 1916; Castañeda Malavé 2006; Cesari 1995; Naranjo 2007). However, their abundance masks the fact that they almost entirely come from unsystematic surface surveys made by amateurs or are isolated casual findings. The Paraguachoa complex has been proposed as a unitary label that comprises various quartz artefacts such as unifacial choppers (some of up to 2 kg in weight) and a large variety of more or less finely elaborated projectile points, including pedunculated arrowheads and...
dirt and spear points (Cesari 1995). However, this category lumps together materials collected from barely identified sites and contexts and as such is of little use for in-depth reconstructions of the Archaic Age populations' lifeways. In 2008, human bones and lithic material were accidentally unearthed by a machine on Margarita Island, allowing for the recovery of the relatively well-preserved remains of two individuals and associated cultural materials (Lemoine et al. 2015). The deepest of the excavated layers dates to 3670±30 BP (AMS 2 sigma, 4090 to 3900 cal BP on charcoal sample). The oldest human remains date to 2270±40 BP. The results of the osteological analysis show relatively tall individuals with long skulls (dolichocran) and with Sinodont dentition. These data support the claim for a marked anthropo-physical difference between the Archaic Age individuals and posterior settlers of this region characterized by brachicran or mesocran skulls (Lemoine et al. 2015). The associated archaeological materials include lithic tools, shell objects, and red ochre. Their contextual affiliations are consistent with similar Archaic Age finds reported from the Southern Caribbean and the Greater Antilles.

The archaeological materials recovered from the shell middens located at the site of Punta Gorda on Cubagua Island and in Manicuare on the mainland Peninsula of Araya, which are typical of the Manicuaroid series, suggest that the site’s occupants had a strong maritime orientation. It is remarkable, however, that this series is also characterized by the presence of flat milling stones, which, according to Rouse and Cruxent (1963: 45), might have been used with grinders to process the maguey plant as a source of food. The chronological record begins with the Cubagua complex on Cubagua Island (2325 BC), followed by the Manicuare complex on the Peninsula de Araya (1730 and 1190 BC), and ends at Punta Gorda on Cubagua Island, where the Archaic Age materials are intermingled with trade pottery of the El Mayal Saladoid style, dated to ca. AD 100–300 (Rouse and Cruxent 1963, figs. 6, 28). The main differences between the above three complexes were drawn from the increasingly frequent use of shell as a raw material for artefact production.

**Aruba, Curaçao, and Bonaire**

As early as 4500 BP, the ABC islands were exploited by fi shers and gatherers from the Venezuelan or maybe even Colombian littoral, who visited the islands for their rich shellfish (i.e. *Lobatus gigas*) beds. They established temporary campsites along mangrove areas and lagoons on Curaçao (Spanish Water and St. Joris), Bonaire (Lagun, Goto Lake, and Slag Bay), and Aruba (Spaans Lagoen), in rockshelters or caves on Curaçao (Rooi Rincon, associated with the largest fresh water source on the island, Ceru Boca and Tomasitu), Aruba (Arikok, Fontein, Sero Geel, associated with a fresh water source), and Bonaire (Spelonk), some bearing rock paintings executed with red pigment. However, the rock paintings may be of a later date as is suggested by the datings from the Fontein site of Aruba, which are situated in the transition period between the Archaic and Ceramic Ages. In other words, the rock art occurring in proximity of Archaic Age sites does not necessarily have a direct relationship with the Archaic period. Other early sites on Curaçao are located at high altitudes (St. Michielsberg, Seru Coral, and Veeris) (Haviser 2001; Hoogland and Hofman 2011). The assemblages found at these sites show similarities to the El Heneal material from the northwestern coast of Venezuela in their unifacial and bifacial flakes. However, the ground shell tools resemble the Manicuaroid series of Cubagua and Margarita islands, with a particular emphasis on ground stone, bone, and shell tools (Rouse and Allaire 1978), except for the ’nipple-tip’ gouge. Radiocarbon dates from the Rooi Rincon site on Curaçao suggest evidence of habitation on the island as early as 4490±60 BP (Haviser 1987: 48). These people were most likely hunters and gatherers, using stone tool assemblages described as a flake/pebble tradition and diagnostic shell gouges (Haviser 1987: 47–48). The sites are found mainly in the eastern half of Curaçao (Haviser 1987: 139). The shallow deposits and resource extraction sites have been described as the reflection of a more ’nomadic lifestyle’ (Haviser 1987: 139). The later Archaic Age site distribution on Curaçao corresponds closely to that of Bonaire (Haviser 2001).

Bonaire was first settled around 3500 BP, as evidenced by the Slag Bay and Lagun sites with ground shell and stone tools, hammerstones, and grinding stones (Haviser 1991; Haviser et al. 2011). At Lagun, a ’nipple-tip’ shell gouge, very particular to Archaic Age assemblages, was found; such artefact was also recovered on Curaçao, notably at the St. Michielsberg site (Haviser 1987). Haviser (1991: 40) has suggested that the occurrence of this specific type of gouge is related to the movement of Archaic Age groups from Curaçao to Bonaire around 3500–3300 BP. The somewhat later Gotomeer and Slag Bay sites have ground shell and coral tools, and hammerstones, but no ground stone tools. Similarly, the unique ’nipple-tip’ shell gouges have not been found here (Haviser 1991; Haviser et al. 2011).

On Aruba, a total of 22 sites have been classified as Archaic Age sites, with the oldest dates ranging around 3000 BP. These are shell scatters similar to those found on Curaçao and Bonaire. They are located in Rooi Bringga Mosa and along the banks of the gully or ’rooi’ providing evidence for the exploitation of the hinterland. Much later Archaic Age sites are Canashitu (100 BC to AD 100), Boca Urirama (AD 600) and Malmok. They functioned mainly as burial grounds, while most others are shell middens or specialized activity sites (Dijkhoff 1997: 25). Malmok is known as the latest pre-Ceramic site on the ABC islands and dates to AD 300–900, at a time when there were already Ceramic Age populations on these islands as well (Versteeg et al. 1990). Remarkably, the presence of charcoal deposits in sediment layers at Frenchman’s Pass (Spaans Lagoen) suggest slash/burn human activities at around 1000 BC (van Nooren 2008).
Transitions to horticulture

The seeds of the transition from Archaic to Ceramic times on the coasts and islands of the southern Caribbean should be sought for in a broader geographical perspective. Inland from the coast, the Archaic Age ways of life and economies dependent upon seafood gave way to hunting for land game, the collecting of wild vegetable foodstuffs, and riverine and lacustrine fishing. Indeed, gathering on the one hand, and domestication and incipient cultivation of plants on the other, are processes that require different knowledge and skills, but they may be closely interrelated to each other. Tight interplay between environmental and climatic factors and socially driven processes might have produced diverse forms, dynamics, and intensities of transitions from foraging to horticulture, with the imprint of space and time-related specificities. These specificities are still scantily documented in the southern Caribbean.

In part, this status quo is due to the already mentioned underrepresentation of Archaic Age deposits exposed for millennia to dramatic environmental hazards (earthquakes, tsunamis), the submergence of the coastal zone, bioturbation, and pervasive anthropogenic factors. The deficiencies of modern paleoenvironmental reconstructions and the archaeological recovery bias in the region are also culprits. Nevertheless, the overall paucity of evidence related to plant-managing and the presence of the footprint of the transition to horticulture may be expectedly 'light' (Lepofsky 2004) not only due to the predictably low demographies, but also to the existence of extensive unoccupied lands. The majority of the southern Caribbean islands were and still are predominantly arid with a relative shortage or absence of natural sources of freshwater. Horticulture of non-native species was hampered, or simply made unfeasible on dozens of low and sandy keys and on bare calcareous plateaus where small human groups could camp, but not cultivate. Native plants were undoubtedly in use as was the case of the above-mentioned indigenous exploitation of the agave plant (Agave cocui) on the ABC islands. It was from the mainland coast, that the horticulturalist know-how of non-native cultigens had to be selectively imported and put to trial on some of the larger southern Caribbean islands such as Trinidad, Margarita, and the ABC islands.

The ground stone tools of the Ortoiroid people at the Trinidad sites of Banwari Trace and St. John suggest that the processing of wild or even domesticated edible plants formed a major aspect of their subsistence economy which may have been highly diversified, resulting in a truly broad-spectrum diet. Apart from hunters, fishers, and gatherers, these Amerindians were true incipient horticulturalists (gardeners). Indeed, many of the stone implements used by the Banwari people were intended for the processing of plant foods (Boomert 2000: 58). Analysis of starch grains trapped in fissures and pores of stone pestles found at St. John yielded evidence that the Archaic Age inhabitants at this site consumed maize (corn), chili peppers, and ground provisions such as sweet potatoes, Indian shot (achira), perhaps Indian yam, and coontie (zamia) (Pagan Jimenez et al. 2015). The latter is a highly toxic, wild tuberous plant which was perhaps tended by the inhabitants of St. John. Processing coontie would have involved grinding the tubers into mash that had to be left to ferment until maggots appeared, which signaled their detoxification. Further research is necessary to deepen our understanding of the horticultural practices of the Banwari Trace occupants.

A combination of hunting, fishing, gathering, and incipient horticulture would characterize Trinidad's Amerindian subsistence practices until the end of the Archaic Age on the island, ca. 200 cal bc. Typically bottle-shaped stone pestles, anvils, axes, and grinding stones have been found at a possibly temporary (seasonal) camp site at Poonah Road in central Trinidad. They closely resemble similar tools encountered at the oldest Archaic Age sites of Tobago, belonging to the Milford complex, dated to 3500/3000 cal bc (Boomert 2000: 75–77). Several archaeological sites in Trinidad can be dated to the late Archaic Age. The best known of these are Ortoire and Cocal 1 shell middens, situated close to each other on top of a sand bar, close to the east coast of the island (Boomert 2000: 84–87; Boomert et al. 2013: 16–18). Both sites are made up of primarily marine bivalves at home in a muddy, sandy-bottom habitat, including trigonal tiveles and donax clams. The Ortoire site yielded several clay hearths showing abundant ash, charcoal, fire-cracked stones as well as burned shells and bones. Large quantities of red ochre pebbles and flat, tabular heating (cooking) stones of local sandstone were found at both sites. Apart from shellfish collecting, hunting, fishing, and probably incipient horticulture formed major subsistence activities. Ground stone tools include hammerstones, small stone mortars, occasionally showing red colouring due to the grinding of hematite, pitted anvils for the cracking of palm nuts, and grinding stones. Most of them are made of local quartzite, although the presence of pieces of blackish dolerite at Ortoire suggests precolonial contacts with Tobago. Pieces of quartz crystal are numerous at both sites. At present such quartz chips are prized shamanic charms thought to possess curative properties among the Warao and other Amerindian peoples of the mainland. Moreover, quartz or quartzite pebbles often serve as healing stones, symbolizing guardian spirits in the gourd rattles used by local religious specialists, the shaman, to contact the spirit world.

On Margarita Island, the presence of grinding stones recovered from the El Tirano site suggests the processing of plants and/or mineral ochre, colorants, and/or coarse salt by ca. 4000 bp. Whether other stone objects resembling large adzes with little or no use wear from this same site might have been used for horticultural purposes is disputable. Rouse and Cruxent (1963: 58) hypothesized that on Margarita the Archaic Age Manicuaroid gatherers-fishers-hunters continued their Archaic mode of life until the first centuries AD. It was after AD 300 that pottery-making Salado
horticulturists entered the islands of Margarita and Cubagua and replaced or merged with the local Manicuaroïd people (Rouse and Cruxent 1963: 58, figs. 6, 28; see de Booy 1916). Rouse and Cruxent (1963: 59) further suggested that the mountainous areas of northeastern Venezuela may have halted the advance of the riverine-oriented Saladoid people who proceeded down the Orinoco River. This delay could have permitted the Archaic Age peoples to survive in relative isolation from the rest of the country where agriculture and the pottery-making technology were already widespread (Rouse and Cruxent 1963: 59). A closer look at the more recent research on Archaic Age remains from the northeastern coast and farther inland may shed light on this issue.

Sanoja and Vargas-Arenas (1999a), synthesizing the historical processes on the northeastern coast of Venezuela between 7000–6000 and 2000 BP, distinguish three ‘modes of life’ characteristic of an increasing development and consolidation of social ties: (1) reciprocal solidarity, (2) organization of social labour, and (3) the emergence of a locus of authority. While the first two modes were linked to the typical Archaic Age traditions of gatherers-fishers-hunters, the third one was defined on the basis of evidence of transition from foraging to horticulture and sedentarism. The prime example of this mode of life is the Las Varas site, situated on the elevated paleoshores of the Campoma Lagoon, at the base of Araya Peninsula, in the state of Sucre and dated to ca. 2600 BC (Sanoja 1989: 529). The subsistence of its occupants depended on the exploitation of resources drawn from various ecozones—tempered on mangrove-associated food, tufa. Sanoja and Vargas-Arenas (1999a: 153) recovered a diversified assemblage of wood, bone, and lithic tools at Las Varas, including conical grinding stones (manos), adzes which were probably used for horticulture, small globular pottery vessels, stone and shell biomorphic carvings, and bird bone inhalers. From ca. 4000 BP onwards, close interrelations between the typical Archaic Age Manicuaroïd people and the occupants of Las Varas became established on the basis of barter between the mainland and the island settings. Purportedly, this intersocietal interaction—or even alliance—was responsible for the widespread presence of both the Las Varas lithic artefacts (including conical manos) and Manicuaroïd shell adzes and gauges (gubias) at sites along the Venezuelan coast and in the insular Caribbean (Sanoja and Vargas-Arenas 1999a: 154). To the west of the Araya Peninsula on the northeastern Venezuelan coast, early horticulture-related artefacts were found at the above-mentioned Pedro García site, dated to 2450 BP. The conical ꟔stone peyres and platters of this site resemble those recovered at Las Varas, while its shell gauges duplicate those from the Manicuare and Cubagua sites (Rouse and Cruxent 1963). Further west, similar artefacts have been recovered in the Lake Valencia Basin (see later). Sanoja and Vargas-Arenas (1999a: 155) conclude that the transition towards sedentarization and triballization among the foragers of the northeastern coast of Venezuela commenced towards 4600 BP. However, at this time, these societies appear to have already accumulated a rich experience in both managing and processing certain vegetal resources. The early Archaic Age populations of the northeastern coast of Venezuela, and, by extension, the adjacent southern Caribbean islands, were undoubtedly influenced by the populations of the Orinoco River Basin to the south. In the Lower Caroni River region, the Archaic El Espino tradition (ca. 8000–3750±80 BP) is characterized by artefacts made from milky or crystalline quartz that are lacking in projectile points. The bearers of this tradition inhabited open campsites and rock shelters along the margins of the river. In some of the shelters the first rock paintings appeared by 3500 BP (Sanoja and Vargas-Arenas 2007: 183). The transition from a hunter-gatherer economy to one based on horticulture began by 3000 BP when grinding stones (manos de moler), percursors, and axes began to appear. By 2810 BP these artefacts were ubiquitous in the region, signalling the end of the Archaic Age and the setting of groups of horticulturists and potters who arrived at the Lower Caroni by 3000 BP (Sanoja and Vargas-Arenas 2007: 183). A rough core-and-flake lithic industry (scrapers, drills, and choppers) ha, been found in the Cueva del Elefante rock shelter near the confluence of the Orinoco and Caroni Rivers. It was accompanied by grinding stones used for processing plant foods (graters, manos, and stone bowls), and has been dated to between 2440±85 and 2320±100 BP (Sanoja 1977).

In Orinoquia, the specificities of the transition to vegetal food-producing economies are well known. Rouse and Cruxent (1963: 51) set 1000 BC as the date for the beginning of the Neo-Indian epoch, arguing that this is the earliest date that attests to intensive agriculture in Venezuela. This date was associated directly with the presence of Saladero style pottery on the Lower Orinoco River. More recently, Sanoja and Vargas-Arenas (1999a: 123) have suggested that the final phase of the Archaic Age hunter-gatherer formations in the Orinoco Basin may be dated to between 5000–2500 BP, implying that the transition from foraging towards horticulture was already underway by these dates. According to Zucchi and Tarble (1984: 179), in the Middle Orinoco area incipient horticulture was probably practiced already by 2950 BP during the initial occupation of the Agüero site, accompanied by the manufacture of pottery and a subsistence economy based on hunting, fishing, and gathering. Barse (1995: 112) concludes that in the Upper Orinoco region the Archaic traditions could have remained until the appearance of horticulture, some 3000 or 4000 BP.

Any discussion of the post-Archaic Age developmental trajectories in the Orinoco Basin, as well as in the Venezuelan llanos and Andes is not possible in this chapter because of space constraints. Clearly, the trnsional processes from foraging to farming that had been taking place in these regions and their timing were synchronized with those occurring in the southern Caribbean. Our discussion now turns to north-central Venezuela, a region which, as we will argue below, played a pivotal role in experimemting, receiving, transforming, and retransmitting the horticultural
which may call for the ecodynamic (cf. following 2200 BP H. Schuberr 1980) Tl anon continued by the shoreline of the Penally m l a n d the only though v o l 30 Andrzej T. Antczak et al., oss- e en e e e e e e n c o l o g i c a l data for th e s e e o v e r p o l y p o l y c h r o m e painted designs and secondary burials in ceramic vessels. The Tocoyanoid groups originated somewhere in Lara State to the southwest and expanded into Yaracuy Valley, and then to the east along the central coast (Arvelo 1995; Cruxent and Rouse 1958; Oliver 1989, 1997). Their presence is limited to the central coastal zone (Ocumare and Cerro Machado sites [Antczak and Antczak 2006; Cruxent and Rouse 1958]), where they established settlements seemingly amidst local Archaic Age populations. Their interactions with and impact upon the Archaic Age marine-oriented groups is to date unknown. Around AD 200–300, a different horticulturalist group, the producers of the Barrancoid pottery, migrated from the middle-lower Orinoco River towards Lake Valencia (La Cabrera complex) and the Southern Caribbean coast in the area of Puerto Cabello (El Palito, Aserradero [Cruxent and Rouse 1958; Velázquez Romero 2014]). Elaborate plastic decoration is a hallmark of Barrancoid ceramics. It is the invasion of Barrancoid horticultural groups into the Lake Valencia area that broadly correlates with the above-mentioned significant decline of forest vegetation and the expansion of savanna grasslands suggesting that these shifts may be a direct consequence of the invasion and the related increasing human disturbances due to horticultural practices. Although Archaic Age populations of the Valencia Basin (e.g. Michela, Guacará) were not isolated from the innovative early
horticultural ideas that were already spreading across the Orinoco south and Andean piedmont to the west by 4000 BP (Arvelo 1995; Arvelo and Oliver 1999; Gassón 2002; Roosevelt 1980), the archaeological record indicates that this basin may have in fact been an 'ecosystem' or 'receptive' centre (Pearsall 1993). This poses interesting questions about the nature and dynamics of interactions between its Archaic Age residents, the invading Tocuyanoid and Barrancoid groups, and the dispersals of innovative ideas to the neighbouring areas, including the southern Caribbean coasts and islands. It also poses a pressing question as to whether any cultivars were used by Archaic Age populations before the agro-artisan incursion into the region.

The Archaic Age record on the ABC islands might have been related to the above-mentioned mainland processes. The ceramics found in the upper levels of the Slagbaai and Gotomeer sites on Bonaire are suggestive of a transition to the Ceramic Age (Haviser 1991: 40–41; Haviser et al. 2011). The Wanapa site on Bonaire also provided an early date of 1050 bc. It yielded heavily patinated shell artefacts and large Melongena melongena and Pecten ziczac shells, and may be demonstrative of the absorption of Archaic Age peoples into the Ceramic Age populations (Haviser 1991: 60). The first appearance of ceramics on Bonaire dates to around AD 470. However, the temporary campsites of the Spanish Water lagoon on Curacao provide evidence of pottery associated with otherwise Archaic Age toolkits and shell assemblages, dating to between ca. 500 bc and AD 200 (Hoogland and Hofmann 2011, 2015; Hoogland et al. 2015). The coarse fabric of this pottery is clearly different from the Dabajurid ceramics which typify the Late Ceramic Age on the ABC islands. It should be noted that Du Ry (1960: 94) and van Heekeren (1960: 115) reported pottery intermingled with Archaic Age assemblages on Aruba suggesting the possible survival of these early populations until the onset of the ceramic Age. Possible evidence for interactions between Archaic and Ceramic Age populations can be related to the presence of five potsherds decorated with incised cross-hatched line patterns found at the Sta. Cruz Ceramic Age site on Aruba, Rouse and Cruynt (1963: 110) considered these Rio Guapo style (AD 270) trade sherd s from the central-eastern coast of Venezuela, might have been considered as ancestral to, or an offshoot of, the Salado series. Oliver (1989: 3) speculated that this intrusive pottery could be the result of direct contact between Aruba's resident Archaic Age peoples and the Bearers of the Guajoid-Ronquinoid Tradition from the coast of Venezuela.

While some archaeological data from the ABC islands yield clear evidence of Amerindian plant use in the Archaic Age, others provide ambiguous results. Verwee et al. (1991) applied isotopic analysis of total bone collagen diet reconstruction of ancient populations in the Caribbean region and compared the consumption of three food categories (marine food, C3, and C4 plants) by the Malmok (Archaic Age), and Santa Cruz and Tanki Flip (both Ceramic Age) individual (both Ceramic Age) individual. The results of the analysis were puzzling as they showed uniformity between the Archaic and Ceramic Age samples, i.e. the isotopic composition of bone collagen did not change. Interestingly, Mickleburgh and Pagan Jimenez (2012: 2472) reported that an individual from the Archaic period site of Canashito on Aruba (ca 350 bc to AD 150) "yielded a relatively high number of maize starch grains, with evidence of grinding and baking."

Concluding remarks and future research

The long-term historical perspective used in this chapter allows us to perceive that the early ways of life and subsistence strategies in the southern Caribbean might have been the product of rather slow colonization processes, interspersed with episodes of rapid migration. Furthermore, the 'spread' of horticultural know-how across the southern Caribbean coasts and islands appeared not to be an advancing ' mega-wave', but could be better described as a mosaic of events—at times lengthy and at other times punctuated (see Leppard 2014). These complex developments were sometimes either enabled or constrained by environmental changes, regional characteristics, and seasonality. These developments were also mediated by the socio-cultural contingencies of local groups, although the vast majority of causal mechanisms that drove them remain undetermined. If we aim to understand the transition from foraging to farming in the southern Caribbean in terms of dated events rather than a general sequence of long chronological periods (see Barrett and Ko 2010: 289), we need to have at our disposal at least four sets of reliable data. These data comprise the building blocks necessary for the (re)construction of more robust and nuanced histories of the early developmental trajectories of the indigenous societies across the southern Caribbean region.

First, we need more radiocarbon dates and also more accurate dating. For example, the quantification of the local marine reservoir effect for the southern Caribbean region is crucial for establishing archaeological chronologies (Fitzpatrick and Rick 2015). The experience derived from the analysis of land and marine shells in the Brazilian shell middens or sambaquis for the purpose of calculating reservoir corrections and temporal variations may prove important to Caribbean research (Carvalho et al. 2015; Macario et al. 2015). However, addressing more general questions about what is actually being dated and for which reason, should be standard archaeological practice. Current chronology shows that since the onset of the Holocene, scattered groups of small-game hunters, fishers, and foragers were already present in the northern portion of the South American mainland. Their incipient plant resource management corresponds with similar signatures observed elsewhere on the continent (Borroto 2015: 130). However, significant temporal gaps arise among geographically not-so-distant southern Caribbean islands when we look at the earliest dated presence of the ceramic Age peoples: Trinidad ca. 7790 BP, Margarita 4000 BP, Curacao 4500 BP,
Bonaira 3500 BP, and Aruba 3000 BP. How can we explain the gap of ca. 3790 years between the earliest dates found on nearby Trinidad and Margarita, or of ca. 1500 years between adjacent Curaçao and Aruba? These gaps may be related to the above-mentioned adverse preservation conditions as well as to recovery bias, the timing of large-scale migratory movements on the adjacent South American mainland, the pace of local developments, or to a combination of these four factors. We should admit that we do not yet have sufficient control over dated events in the study region. But such control is necessary to inform deep-in-time perspectives and broader interregional generalizations.

An improved chronology should be tightly interwoven with the second set of data, namely reliable reconstructions of specific paleoenvironments in which and through which early settlers and their successors were shaping their everyday existence. The loci awaiting sediment coring lie not only within but also beyond the Archaic Age middens. Recovered samples from deep to shallow coring probe may help to detect and understand anthropogenic signatures of land use and their dating (Siegel et al. 2005, 2015). Stratified sediment core/aurage samples collected from each of the major ecological zones defined within a given study area should render a more comprehensive paleoecological and paleoenvironmental diachronic reconstruction of the southern Caribbean, especially as regards the presence or absence of habitats that might have been livable for early populations.

The third set of building blocks will result from attempts at disclosing the performances of the early human societies that were extant in the above-mentioned specific spatiotemporal frames. In particular, analyses utilizing next-generation sequencing (NGS) technologies represent a powerful tool for refining our understanding of past migratory movements, responses to environmental challenges, and processes that arose during Archaic-to-Ceramic-Age transitions in the study region (Moreno-Estrada et al. 2013; see also Olalde et al. 2015). Archaeogenetics can also shed light on the specific effects invading horticultural groups had on Archaic Age inhabitants. These processes are barely known in the southern Caribbean. In them is the diversity, though unspecified, of interaction. Notwithstanding the paucity of data, current explanations seem to support historical continuity rather than the replacement of the invaded by the invaders. Toro-Labrador et al. (2003) showed that almost 70% of Amerindian mtDNA on Aruba belongs to the same haplogroup, although the archaeological evidence seems to point another way, indicating that the Ceramic Age people who settled this island after AD 1000 were physically distinct from those previous Archaic Age populations. However, a recent study of a more representative sample (N=144) from Aruba showed that 53.3% consisted of Amerindian mtDNA (44% haplogroup D and 12% haplogroup C) (Carrero-González et al. 2010). The presence of the haplogroup C, representing pre-Ceramic or Archaic Age Amerindians, suggests that a symbiosis occurred between them and the Ceramic Age populations of Aruba. These data strongly suggest that
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Notes

1 By endowing the Southern Caribbean with characteristics originally attributed to the entire continent we are aware that human-related paleoenvironments on the northern Venezuelan coast and islands are better studied for the Archaic period (Bryan 1973; Oliver and Alexander 1990), while the island regions are known through wider time-span interrelations (Montoya and Rull 2011; Montoya et al. 2011; Rull et al. 2015).

2 In contra 1 to 'agriculture', 'horticulture' implies the use of hand tools to grow domesticated plants and does not require the use of draft animals or the application of complex irrigation or fertilizers (see Leach 1997; for horticulture as a low-level food production system, see Winterhalder and Kenneth 2006: 4). In tropical forest 1 to field horticulture may be seen as an 'opportunistic activity based sometimes on the intensive and sophisticated management with stone axes of gardens and forests under different stages of ecological succession' (Goes 1 eves 2013).

3 Roué and Cruxent (1963: 22) defined four subsequent 'epochs' connecting technology with 'habitat' strategies in Caribbean culture history: Paleo-Indian (15,000-5000 BC), Middle-Indian (5000-1000 BC), Neo-Indian (1000 BC to AD 1500 [sub-divided into three Periods]), and Indo-Hispanic (AD 1500 to present). Later, Roué and Cruxent (1997: 136-138) redefined the epochs in purely technological terms to 'ages': Lithic (4000-2000 BC), Archaic (2000-500 BC), Ceramic (500 BC to AD 1500) and Historic Age until the present. The latter scheme is adopted here.

4 Note that we include the island of Trinidad into the Southern Caribbean Region (cf. e.g. eabson and Wing 2004, figs. 4.1 and 5.1. 58).

5 It is important to note that the lands of Trinidad and Tobago were both connected to the South American mainland until the peak of the Wisconsin glaciation, ca. 18,000 years ago. Due to the posterior melting of the continental ice cap the eustatic tafm peeg ion interrupted the landbridge between Trinidad and Tobago during the Late Glacial Period, ca. 13,000-10,000 years ago. Trinidad remained connected to the mainland by a landbridge in the southwest until ca. 8,000 years ago; the Gulf of Paria became completely submerged by 6,200 years ago (Boomer 2000: 41-42, 44).

6 According to Sanoja and Vargas (1999a: 157), the Middle Orinoco migrants stabilized on the northeastern coast of Venezuela between AD 100 and 280, following their arrival a few centuries earlier.

7 The first mode was ascribed by Sanoja and Vargas (1999a: 150) to the aforementioned hill midden at No. 7: arlos and Remigio, while the second one would be related to the similar deposits at the Guayana, Manicuare, and Ucubagua, ites (the latter two originally reported by Giner et al. [1946] and Cruxent and Rouse [1958]).

8 Two main competing chronologies regarding the aloid origins are in vogue: (1) a "long chronology" that puts the date of the appearance of Saladoan white-on-red painted pottery at between 4450 and 2150 years ago (Rouse 1978; Rove evelt 1987, 1997), and (2) a "hort chronology" that argue for the aloid origins at 2,500 years ago and considers the painted pottery an intrusion from the west (Vargas -Arenas 1981, 1990; also Boomer [2000] and Gasson [2002] for summaries of Adirondack di crep- ancies with regards to the origin and patial di persio of Barranquid pottery.

9 In the Caribbean Culture Area, defined by Roobe (1962) as comprin ge central Guyana and Western Suriname, central Venezuela (of which its north-central) and east ern Venezuela, the Caribbean islands (West Indies) and the coas tal plain and east ern Venezuela, the Caribbean islands (West Indies) and the coastal plain (of which its north-central) has been considered as a transitional or portion discussed here is a pivotal part) has been considered as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here is a pivotal part) as a transitional or portion discussed here 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Animal domestication


