Reading the dental record : a dental anthropological approach to foodways, health and disease, and crafting in the pre-Columbian Caribbean

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Chapter 5 Materials

5.1 Introduction

This chapter presents an overview of the skeletal assemblages incorporated in this study, and the sites they are derived from. Figure 1.1 depicts the location of the 49 sites in the Caribbean region. Figure 5.1 shows the chronology of the individual sites and skeletal assemblages. Contextual information on these sites is presented in this chapter, and broadly placed within the regional cultural framework discussed in Chapter 3.

The selection process of skeletal assemblages used for the purposes of this study requires some explanation, as the reader will immediately notice a disparity in the numbers of individuals representing the various sites. In an ideal world of course, skeletal assemblages used in the study of the human past in large cultural and chronological areas would consist of hundreds of individuals, with equal numbers of males and females, and a perfect distribution of sites across time and space. Although this is never the case in archaeology, this scenario appears to be even less applicable to the Caribbean archipelago. Certain islands in the region have enjoyed a very long history of archaeological research, with a heavy focus on human skeletal remains and mortuary practices (i.e., Cuba and the Dominican Republic), but on others very little skeletal material has been excavated, studied, or securely dated to a particular timeframe. Furthermore, the lack of larger numbers of skeletons (pertaining to a single site and/or occupation phase) considerably hampers statistical analyses of burial populations with regard to their demographic composition and other characteristics such as pathological conditions. Research at some of the larger burial sites in the Caribbean (i.e., Punta Candelero) has shown that although the entire burial population pertaining to a particular occupation phase in some cases is quite considerable, the chances that any of the individuals actually lived at the same time are small (Pestle 2010). This means that defining a culturally and socially representative burial population for a single settlement, or the various phases of occupation thereof is difficult. This especially affects those skeletal assemblages for which no or few radiocarbon dates are available (which, as we will see, is often the case), and which are dated on the basis of ceramic typologies, as these generally lead to a broader time range for the material and have the added complication of being subject to change and redefinition. The statistical analyses used in this study are discussed in detail in Chapter 4 (section 4.3).

5.2 Sites

Discussed here are the 49 sites from which the samples incorporated in this study are derived per island. Table 5.1 presents an overview of the numbers of males, females, individuals of unknown sex, and juveniles per site. Appendix A contains a complete table of the 458 individuals included in this study, listing sex, age, and relative or absolute dating where known. Below, background information on the

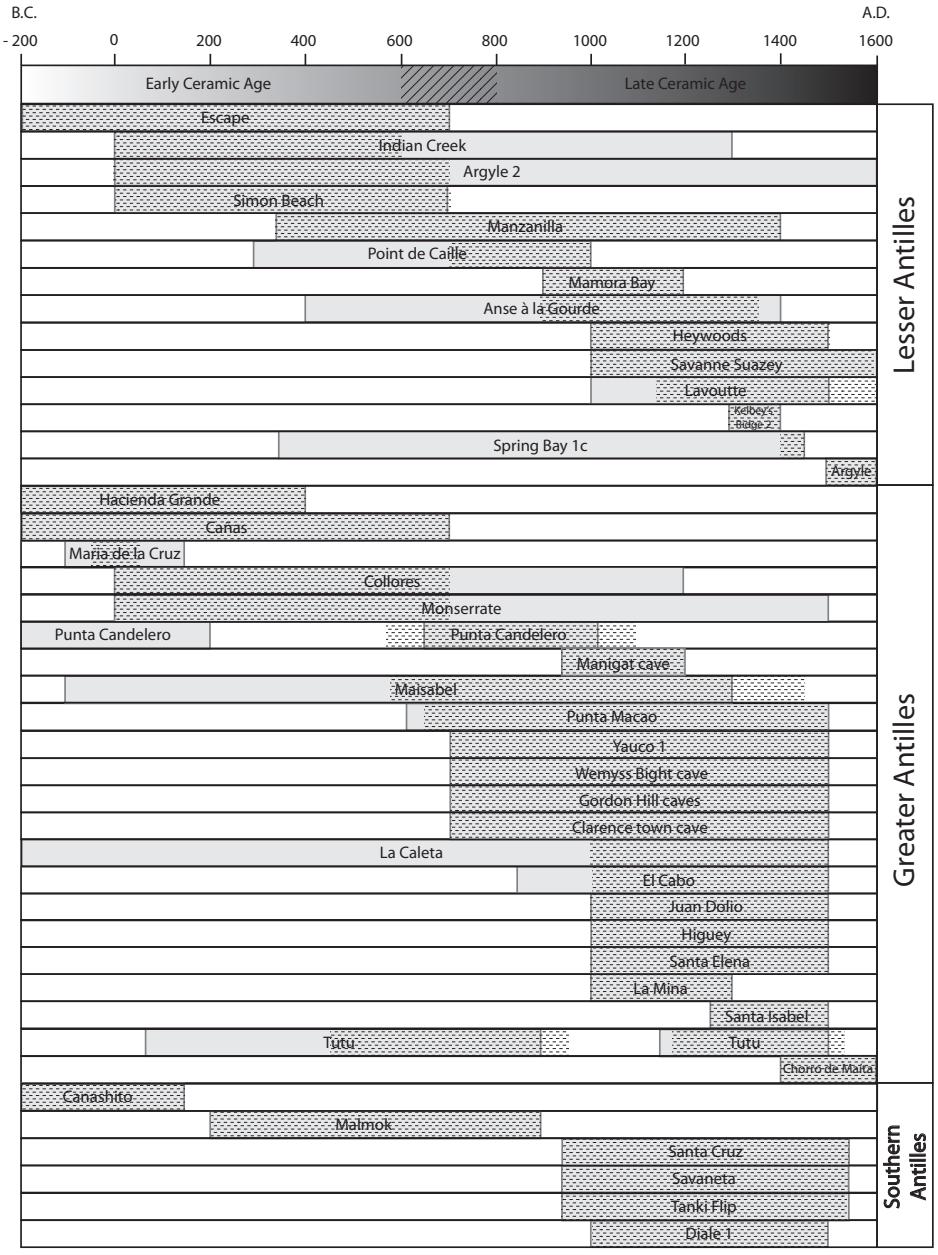

Figure 5.1 Diagram depicting the chronology of the sites and skeletal remains.

natural and cultural setting, the history of excavations and research, and the skeletal population, is given for each site. Considering the different histories of research at the various sites, this information is in some cases highly detailed, and in others superficial.

5.2.1 Aruba

Canashito

Canashito is an Archaic Age limestone rock-shelter site in the central part of Aruba, close to the Late Ceramic Age (Dabajuroid) settlement of Santa Cruz. Archaeological remains recovered at the site comprise predominantly shell food remains which appear to have been washed down the slope leading to the entrance of the rock-shelter, and a small number of human skeletal remains. Radiocarbon dating of one of the skeletons revealed a date of 1960 ±65 B.P. (cal. A.D. 83–394). This, together with the lack of ceramic material at the site, led investigators to believe Canashito is exclusively associated with the Archaic Age occupation of the island (Wagenaar Hummelinck 1959). Some shell material was collected during later investigations from the base of a slope in the rock-shelter and radiocarbon dated, however the results gave a very broad time range, most likely due to the intermixture of material from different phases through slope wash (Gould 1971).

Skeletal remains

Five burials were excavated at Canashito by Ringma in 1950. Similar to the slightly later Malmok burials, four of the Canashito the burials appear to have been arranged in a cluster around a central male (burial C2) [Versteeg et al. 1990]. Like at Malmok, one of the burials was found to be associated with a large limestone rock. The burial position of all five individuals is strongly flexed, while three individuals have one hand placed on the head/face.

Osteological analysis of the remains was undertaken by Tacoma (1959). His findings also indicate similarities with the Malmok burial population, based on morphometrical characteristics of the skeletons. Specifically, the generally dolichocranic (long) and acrocranic (high in relation to breadth) shape of the Canashito skulls, a characteristic also observed among the Malmok skeletons was taken as evidence of some kind of association between the populations.

Malmok

Malmok is an Archaic Age cemetery site situated on north-western tip of Aruba, in the modern town of Malmok. The site is bordered by a salina to the east and the coast facing the Caribbean Sea to the west, ideally positioned to exploit a variety of ecological zones. A brackish water source was found around 1 km to the east of the site, which would have been partly supplied by rainwater, perhaps indicating the closest source of drinkable water in the vicinity of the site. Investigations at the site show that the cemetery was used during the first millennium A.D.

Although the site is considered to have functioned as a formal burial area, an oval shaped shell midden of approximately 20 m in length was found just north of the cemetery. The midden consisted of a very shallow deposit of food remains, and was thus thought not to have been the result of long-term exploitation of the area or permanent habitation at this location. Radiocarbon dating of shell material from

Site	Island/Country	Male	Female	Unknown	Child	Total
Anse à la Gourde	Guadeloupe	24	34	3	8	69
Argyle	St. Vincent			2		2
Argyle 2	St. Vincent	2		1		3
Buccament West	St. Vincent			1		1
Cañas	Puerto Rico		1	2		3
Canashito	Aruba	2	1	1		4
Chorro de Maíta	Cuba	26	26	3	18	73
Clarence town cave	Long Island, Bahamas	1	1			2
Collores	Puerto Rico		1		1	2
Coto	Puerto Rico			1		1
Diale 1	Haiti	2	3		2	7
El Cabo	Dominican Republic	1	1			2
Escape	St. Vincent	2	6	16	1	25
Esperanza	Vieques, Puerto Rico				1	1
Gordon Hill caves	Crooked Island, Bahamas	1		1		2
Hacienda Grande	Puerto Rico	1	1			2
Heywoods	Barbados		1	2		3
Higuey	Dominican Republic	1				1
Indian Creek	Antigua		1			1
Juan Dolio	Dominican Republic	3	4			7
Kelbey's Ridge 2	Saba	1	2		3	6
La Caleta	Dominican Republic	1				1
La Mina	Vieques, Puerto Rico		1			1
Lavoutte	St. Lucia	11	10	7	3	31
Maisabel	Puerto Rico	15	8	3	6	32
Malmok	Aruba	1	1	2		4
Mamora Bay	Antigua			4		4
Manigat cave	Île de la Tortue, Haiti	1		2		3
Manzanilla	Trinidad	10	4		4	18
María de la Cruz cave	Puerto Rico			1		1
Monserrate	Puerto Rico	1		1		2
Point de Caille	St. Lucia	2	2			4
Punta Candelero	Puerto Rico	20	11	19	6	56
Punta Macao	Dominican Republic	6	6	3	4	19
Saladero	Venezuela			3		3
Santa Cruz	Aruba	1	1	2	2	6
Santa Elena (Toa Baja 2)	Puerto Rico		1		1	2
Santa Isabel (Cayito)	Puerto Rico	1				1
Savaneta	Aruba	2	3		2	7
Savanne Suazey	Grenada	2	2		1	5
Simon Beach	Grenada			1		1
Spring Bay 1c	Saba				1	1
Unknown	St. Croix, USVI	1				1
Unknown	St. Kitts	1		1		2
Tanki Flip	Aruba			2		2
Tocorón	Venezuela	3	1	2		6
Tutu	St. Thomas, USVI	6	14	1	5	26
Wemyss Bight cave	Eleuthera Island, Bahamas	1				1

Site	Island/Country	Male	Female	Unknown	Child	Total
Yauco 1	Puerto Rico			1		1
Total	**49**	**153**	**148**	**88**	**69**	**458**

Table 5.1 List of the samples per site.

the centre of the midden initially provided a date roughly contemporary with the dates obtained from shells from the cemetery area, however, at a later stage the investigators concluded that the midden area pre-dates the burials by at least two centuries. Open-plan excavation of the area revealed no soil features indicating any form of permanent structures (Versteeg 1991, 1993; Versteeg et al. 1990).

Skeletal remains

The cemetery area stretches approximately 200 m in north-south direction along the salina, and is around 50 m in breadth. In this area, 40 burials were excavated by Versteeg and Tacoma in 1989. Previously, two skeletons had been excavated in the same area by Diemont in 1968 (Versteeg 1991). In 1972 Boerstra excavated 16 skeletons. The individuals included in this study are derived from Boerstra's excavations. In total 60–70 burials had been identified at the site up to 1989 based on observations during both excavations, however not all individuals were excavated. Osteological analysis of the individuals recovered during the 1989 excavations was undertaken by Jouke Tacoma (Versteeg 1991, 1993; Versteeg et al. 1990).

Most individuals were buried on the side (usually the right side), in a strongly flexed position. A very small number of individuals were found in a flexed supine position. Over half of the individuals had one or both hands positioned on the head or face. The majority of skeletons were oriented in east-west direction, with the head directed toward the east. Around half of the excavated individuals had large amounts of red dye on or around the back of the cranium. Many burials were covered with a number of large limestone blocks which were procured in the close vicinity of the site, and a small number were buried on or under a turtle carapace. The investigators suggest that the stone grave coverings signified the social status of the individuals buried underneath (Versteeg 1991, 1993; Versteeg et al. 1990).

The burials were distributed over the entire cemetery area, although several clusters were distinguished. One cluster comprising seven burials in close proximity to one another was found in the northern part of the site. A similar cluster of ten burials was found in the southern part of the site. Smaller 'satellite' clusters comprising two to five individuals were found around the larger southern cluster. Most clusters were comprised of a central male figure, around which females and other males were placed, leading the investigators to suggest that the clusters reflect household or band ties, with the central males likely being band headmen. The spatial patterning was thought to have resulted from the different successive headmen marking their own space within the cemetery area (Versteeg 1991, 1993; Versteeg et al. 1990).

Santa Cruz

Santa Cruz is a primarily Late Ceramic Age (Dabajuroid) habitation site covering around 10 hectares and located approximately halfway between the windward an leeward coasts of Aruba, close to and between the contemporaneous sites of Tanki Flip and Savaneta. While most radiocarbon dates indicate the main period of use of the site was during A.D. 950–1250, it is thought to have been inhabited up to the arrival of the Spaniards in the early 16th century. The site is situated near the confluence of two guts (rooien), on arable land, making this area particularly attractive for agriculture in the dry Aruban environment (Versteeg 2001).

Skeletal remains

Human skeletal remains were recovered at the site during excavations by Boerstra in 1971 and by Versteeg in 1991–1992. Looters are thought to have disturbed and damaged some of the burials, and some skeletal remains (particularly skulls) may have been removed.

Excavations by Leiden University and the Archaeological Museum Aruba in 1991–1992 under the direction of Aad Versteeg uncovered 31 burial features in nine clusters. Many burial features contained the skeletal remains of multiple individuals. Burial position and orientation was variable, and a relatively large number of the graves contained burial goods, often items of personal adornment (Versteeg 2001). Osteological analysis of these remains was undertaken by Jouke Tacoma.

The individuals included in this study are thought to derive from the excavations by Boerstra in 1971 (Raymundo Dijkhoff, personal communication 2010).

Savaneta

Savaneta is a primarily Late Ceramic Age (Dabajuroid) habitation site located on the south-western coast of Aruba. It is one of the largest Late Ceramic Age sites on the island, together with the contemporary village sites of Santa Cruz and Tanki Flip. The main occupation of the site is thought to have taken place between A.D. 950–1250, but there is evidence that it was still in use upon the arrival of the Spaniards in the early 16th century. The site is situated on a limestone substrate, in the middle of an area with some of the best land for agriculture in the south of Aruba (Versteeg 2001; Versteeg and Rostain 1997; Versteeg and Ruiz 1995). Human skeletal remains were recovered at the site during excavations by Boerstra in the early 1970's. Sadly, most of Boerstra's field notes and reports were lost in a fire, meaning little information on the context of these remains is available (Raymundo Dijkhoff, personal communication 2010).

Tanki Flip

Tanki Flip is a primarily Late Ceramic Age (Dabajuroid) habitation site in the north-western part of Aruba around 3 km form the west coast, and is one of the largest ceramic age sites on the island, together with the contemporary sites of Santa Cruz and Savaneta. The main occupation of the site is thought to have taken

place between A.D. 950–1250, although it may have been in use up to the arrival of the Spaniards in the early 16th century (Versteeg 2001; Versteeg and Rostain 1997). Excavations at the site were undertaken by Leiden University and the Archaeological Museum of Aruba in 1994–1995, under the direction of Aad Versteeg. Thirteen oval and circular house structures were reconstructed, based on spatial patterning of the documented postholes. The site is situated on moisture-retaining diorite subsoil, making it particularly suited to agriculture in the predominantly dry Aruban environment. The site borders a number of guts (rooien) to the north, south and west. At least one gut and a number of its sub-channels and gullies appear to be man-made, suggesting the inhabitants of the site actively engaged in irrigation of the site surroundings for agricultural purposes. Next to being an ideal location for agriculture, the site is located only 3 km from the coast, allowing easy access to marine resources (Versteeg and Rostain 1997).

Skeletal remains
Seven burial features containing human skeletal material belonging to 15 individuals were excavated during the 1994–1995 excavations. The degree of diversity in burial practices at the site is striking. Most features contained the remains of multiple individuals. Some features contained inverted 'burial urns', associated with either adults or children. One feature comprised a burial urn covered by an inverted bowl with the skeletal remains of at least 7 individuals inside. Four of the 7 graves were associated with one of the house structures. Earlier excavations at the site under the direction of E. Boerstra in 1977 also uncovered the remains of a large number of human skeletons (Versteeg and Rostain 1997). The individuals included in this study were most likely derived from these excavations (Raymundo Dijkhoff, personal communication 2010).

5.2.2 Antigua

Indian Creek
Indian Creek is a multi-component Ceramic Age habitation site located on a gentle slope just west of a creek of the same name in south-eastern Antigua, around 800 m from the coast (Faber Morse and Rouse 1997). The site is characterized by five large mounded middens which are not contemporaneous, but represent occupation of the site from A.D. 35–1305 (Faber Morse and Rouse 1997; Nicholson 1994; Petersen et al. 1999; Rouse 1974; Rouse and Faber Morse 1999).
Large scale excavations at the site in 1973 by Yale University and the Antigua Archaeological Society under the direction of Benjamin Irving Rouse, revealed the site was occupied during three distinct phases throughout the Early and Late Ceramic Ages, characterized by pottery complexes: Indian Creek (A.D. 1–600), Mill Reef (A.D. 600–900), and Mamora Bay (A.D. 900–1100) (Faber Morse and Rouse 1995, 1997; Nicholson 1994; Rouse 1974; Rouse and Faber Morse 1999). Most deposits pertain to the Indian Creek phase.

Skeletal remains
The Yale Peabody Museum of Natural History, New Haven, Connecticut, holds the fragmented remains of an adult human skeleton of unknown sex (catalogue number: ANTPA 254343), which were recovered from Excavation 6, level 3, section P2 of the Indian Creek site. No human burials or bone fragments are mentioned in any publications on the site, which may be due to the fact that Rouse was taken ill at the time of the excavation of this pit, and consequently very little is known of the context of materials recovered from it (Rouse 1974; Rouse and Faber Morse 1999). It is known, however, that levels 3 to 6 of this pit pertain to the Indian Creek period of occupation of the site, and therefore the remains of the single individual incorporated into this study can be assigned to this period, i.e., the Early Ceramic Age (Rouse and Faber Morse 1999).

Mamora Bay
Mamora Bay is a multi-component Ceramic Age habitation site located on the south-eastern coast of Antigua, close to the site of Indian Creek, which lies to the west of Mamora Bay. The site gave its name to the Mamora Bay ceramic complex, which is the most common pottery found at the site. Due to its similarities to Santa Elena style pottery from eastern Puerto Rico, Rouse placed the Mamora Bay complex in the Elenoid series, i.e., the Late Ceramic Age. The main period of habitation at the site took place between A.D. 900–1200 (Faber Morse and Rouse 1999; Murphy 2004; Nicholson 1994; Rouse 1976). The site was discovered in 1960 by Fred Olsen and subsequently excavations under the direction of Charles Hoffman took place prior to the construction of a The Mamora Bay Hotel in 1963. During these excavations a small number of human skeletal remains were uncovered. Burial positions were semi-seated, with the legs drawn up to the chest (Nicholson 1994).

5.2.3 Bahamas

Clarence Town caves, Long Island
The Clarence Town caves are situated close to Clarence Town along the north-eastern coast of Long Island, the Bahamas. Excavations at the site by Froelich G. Rainey took place in 1934 (Yale Peabody Museum of Natural History archive). Rainey unearthed the skeletal remains of two individuals in the caves (an adult male and an adult female), which he interpreted to have served both as a habitation and burial area (Drew 2009; Yale Peabody Museum of Natural History archive). Since the Bahamas were not populated until the Late Ceramic Age (around A.D. 700–1500), the skeletal material is assumed to pertain to this period (Keegan 1982; Morsink 2012).

Gordon Hill caves, Crooked Island
The Gordon Hill caves are situated along the north-eastern coast of Crooked Island. The caves are positioned on a limestone ledge about 500 m from the shore.

Excavations at the site by Froelich Rainey took place in 1934. During extensive excavations covering 47 m2, Rainey unearthed the skeletal remains of three individuals in two different chambers of the caves (Granberry 1978). Since the Bahamas were not populated until the Late Ceramic Age (around A.D. 700–1500), the skeletal material is assumed to pertain to this period (Keegan 1982; Morsink 2012).

Skeletal remains
Two adult inhumations were uncovered in chamber 1 (these are the individuals incorporated into this study), and another in chamber 3. The burials in chamber 1 consisted of two primary depositions. One individual was found on its left side, with the legs partially flexed, and the hands placed on the pelvis. The other skeleton, found at the south end of the cave, was highly damaged and burial position was not recorded (Granberry 1978).

Wemyss Bight caves, Eleuthera Island
The Wemyss Bight cave is located close to the town of Wemyss Bight, on the western coast of the southern tip of Eleuthera Island, the Bahamas. Excavations at the site by Froelich G. Rainey took place in 1934 (Yale Peabody Museum of Natural History archive). Rainey unearthed the skeletal remains of a single adult male in the caves (Drew 2009; Yale Peabody Museum of Natural History archive). Since the Bahamas were not populated until the Late Ceramic Age (around A.D. 700–1500), the skeletal material is assumed to pertain to this period (Keegan 1982; Morsink 2012).

5.2.4 Barbados

Heywoods
Heywoods is a multi-component habitation site located along the western shore of the northern tip of Barbados. The occupation of the site spans the Archaic Age through to the Late Ceramic Age which is characterized at Heywoods by Suazoid ceramics (Drewett 1993). During the Early Ceramic Age (Saladoid) occupation the site developed into a large village. Three round house structures dating to the Saladoid/Troumassoid period have been identified, yielding the waterlogged remains of wooden posts. A number of burials were associated with the house structures in the Saladoid portion of the site, and a number of burials were found in the Late Ceramic Age (Suazoid) part of the site. Construction work at the site revealed a remarkable number of stacked pottery deposits, which would have functioned as wells, trapping freshwater. Most of the pottery stacks seem to date to the terminal (late) Saladoid (A.D. 400–600/800), although they appear to have been in use for a few hundred years at least. One of the pottery stack wells had been used as a grave pit for the burial of an individual dated to A.D. 210–420 (Drewett 1991; Drewett and Bennell 2000).

Skeletal remains
Human skeletal remains were excavated at the site during a number of consecutive field seasons between 1995–1999 under the direction of Peter Drewett and Maureen Bennell. Burial positions are generally flexed, supine, with the legs drawn up to the chest. Grave goods are extremely rare, with only one (Suazoid) burial yielding grave goods in the form of two stone beads which were apparently worn on the chest (Drewett and Bennell 2000).
The three individuals included in this study were excavated during the 1998–1999 field season. During this season a large 95 x 25 m area of the site was excavated. This part of the site contained an area of Saladoid habitation, and an area of Suazoid use. It is unclear where precisely the three individuals studied here were located within the 1998–1999 unit, and thus is it unclear to which phase of occupation they belong (Drewett and Bennell 2000).

5.2.5 Cuba

Chorro de Maíta
Chorro de Maíta is a habitation and cemetery site located in the province of Holguín, approximately 4 km from the northeast coast of Cuba on the slope of a hill known as Cerro de Yaguajay. The site belongs to the cultural type known locally as Etapa agroalfarera (Tabio and Rey 1984) or Fase agricultores (Guarch Delmonte 1988). Ceramics found at the site belong to a local variant of the Meillacan Ostionoid subseries (Rouse 1992; Valcárcel Rojas 2002), however the site and cemetery are known to have been used up to and during the Contact period (in the 16th and 17th centuries). The focus of studies and excavations at the site has been the cemetery area in the central western part of the site, although some non-funerary spaces were also investigated. In both areas, small quantities European materials, primarily ceramics and pig remains were found together with indigenous materials (Guarch Delmonte 1996). European ceramics known to have been used between A.D. 1490–1650 have been recovered in recent investigations of non-funerary spaces (Persons et al. 2007; Valcárcel Rojas et al. 2007).

Skeletal remains
Recent osteological analysis of the skeletal material from the site by Darlene Weston revealed a total of 133 individuals (Valcárcel Rojas et al. 2011; Weston in prep.). Seventy three individuals are incorporated into this study (the disparity in numbers is due to the lack of dental material in many individuals). European materials (i.e., metals) were found in some of the burials, and a number of individuals were found in an extended supine position as opposed to the typical flexed position found in most pre-Columbian Amerindian burials in Cuba and the Caribbean in general. Furthermore, some highly elaborate bodily ornaments have been recovered from a small number of the graves. The restricted distribution of these ornaments has been interpreted as an indication of clear social differentiation at

the site, perhaps associated with the cacical elite (Valcárcel Rojas and Rodríguez Arce 2005).
Radiocarbon dates and other contextual information have been used in an attempt to define temporal variation in the burial populations of the site. Most radiocarbon dates, however, span the period immediately before and immediately after contact (cal. A.D. 1420–1640), and therefore do not help distinguish pre-Columbian individuals from Contact period individuals. Based on the presence of European materials in some burial pits, and the burial of a number of individuals in a 'Christian type' position (extended, sometimes with the arms folded over the chest), 32 individuals can clearly be placed in the Contact period occupation. The remaining individuals cannot be securely placed in the pre-Columbian period based only on the lack of European influences in the mortuary treatment, and Valcárcel Rojas has suggested that there is a distinct possibility that the entire burial population pertains to the Contact period (Valcárcel Rojas 2012). For these reasons, comparison of early and later patterns of dental wear and pathology at Chorro de Maíta are not deemed possible, making an estimation of changes in diet and subsistence over time impossible.

5.2.6 Dominican Republic

El Cabo

El Cabo is a Late Ceramic Age habitation site on the coast of the eastern tip of the Dominican Republic. The site was occupied from around A.D. 850 to approximately two decades after first contact with Europeans. Excavations at the site revealed a very large number of postholes cut into the bedrock, allowing the reconstruction of over fifty round structures, many interpreted as houses (Samson 2009, 2010, 2011). El Cabo would have comprised a town consisting of a number of clusters of houses arranged along the coastline (Samson 2009, 2010, 2011).

Skeletal remains

Four human burials were uncovered at the site. One consisted of the deposition of a neonate (84-29-F261) in a posthole dug into the bedrock. Three other burials of adult individuals were found, one within the confines of house 6 (although association with this structure is unclear), and two in the midden areas (Samson 2010). None of the skeletons have been radiocarbon dated, however based on their contexts they are thought to post-date the 10th century. One of the burial pits, 85-34-F06, contained a deep pink bead, made of Chama sarda shell. This individual was found in flexed position in a small oval burial pit dug into the Ostionoid midden of the site and the underlying the bedrock in the northern part. A boat-form vessel was recovered in an earlier field season, which was later thought to have been associated with this individual. Individual 85-40-F17 was interred in a small, pit covered with stones. This person was interred in a flexed position. Finally, burial 85-31-F01 was found in an oval burial pit cut into the bedrock in the northern part

of the site (Samson 2010).

Higuey

This represents the incidental find of a single pre-Columbian human cranium obtained from a private collector (Dario Yune), and found somewhere near the modern day city of Higuey in the eastern Dominican Republic, approximately 35 km from the site of El Cabo to the (south)east. The cranium is currently housed at the Museo del Hombre Dominicano, Santo Domingo. The precise provenance and context of this individual is unknown, although it is thought to pertain to the Late Ceramic Age occupation of the region (Glenis Tavarez María, personal communication 2011).

Juan Dolio

Juan Dolio is a Late Ceramic Age habitation site, located on the southern coast of the Dominican Republic, approximately 70 km to the east of the capital city of Santo Domingo. It is known as one of the most important Boca Chica complex sites in the southern and south-eastern Dominican Republic, however, as excavations at the site focused predominantly on the cemetery area little is known about the house structures and material culture at the site. The large number of skeletal remains uncovered at the site during excavations in 1974 reportedly date predominantly late 15th century (Drusini et al. 1987; Veloz Maggiolo 1972).

Skeletal remains

One hundred and two burial contexts were identified during excavations at Juan Dolio under the direction of Fernando Luna Calderón in 1974, however, many of these individuals were comprised of only a few fragmentary bones. Further analysis of the skeletal assemblage yielded and estimated MNI of 78 persons, of which 31 adult males 29 adult females, 18 individuals of unknown sex, and 11 juveniles (Drusini et al. 1987; Veloz Maggiolo 1972).

La Caleta

La Caleta is a multi-component habitation site with a large burial population situated in the town of La Caleta, approximately 17 km east of Santo Domingo, Dominican Republic. The site was inhabited during the Archaic Age, with radiocarbon dates indicating occupation at 545 B.C., and throughout the Early and Late Ceramic ages, with the most recent radiocarbon dates at A.D. 1280 (Morbán Laucer 1979; Ortega 2005). Numerous excavations have been undertaken at the site over the years, uncovering at least 373 human skeletal remains (Morbán Laucer 1979). Most of the latter were excavated in 1970–1971 by Chanlatte Baik and Morbán Laucer among others.

Skeletal remains

The human skeletons excavated at La Caleta are now housed at the Museo del

Hombre Dominicano, Santo Domingo. At some point in the 1980's the dentitions (including mandibles and maxillae) of most of these remains were removed for a dental study by Morbán Laucer, and their current whereabouts is unknown. For this reason, only a single adult male individual is included in this study, as the teeth of this person were still present.
Individuals were interred both as primary and secondary depositions in the midden area and other parts of the site. Primary interments consisted mainly of flexed, supine skeletons, with the legs drawn up to the chest. In a small number of cases, individuals were interred in a seated, flexed position. A large number of juvenile skeletons (foetuses and infants) were recovered from the site. In one case, two juveniles pertaining to the Ostionoid occupation of the site, were found buried with seven ceramic vessels of different sizes and a dog. Other grave goods include sherds of Ostionoid pottery, stone axes, shell amulets and vomiting spatulas, and the remains of marine foods. Secondary burial of juveniles sometimes consisted of interment in a ceramic vessel. Some individuals, both adults and juveniles, were found buried with a ceramic vessel placed over the head and/or face (Morbán Laucer 1979).

Punta Macao
Punta Macao is a multi-component but predominantly Late Ceramic Age habitation site on the north-eastern coast of the Dominican Republic, in the province of La Altagracia. The site is situated on a rocky promontory called El Morro, and is near the modern day town of Macao. The site is mentioned in Las Casas' Apologética Historia, in which he claims to have visited the town and notes that a large population inhabited the area (de las Casas 1992; Olsen 2004). Excavations at the site were undertaken by De Booy in 1915, Rainey in the 1940's, Veloz Maggiolo and Ortega in 1972, and a team from the Museo del Hombre Dominicano in 2004. The site has been extensively looted over the decades (Atiles 2004; Olsen 2004; Veloz Maggiolo and Ortega 1972).
Evidence for a number of round (house) structures was found at the site, with postholes cut into the underlying bedrock, similar to those documented at the Late Ceramic Age site of El Cabo, Dominican Republic, and the Ceramic Age site of Anse à la Gourde, Guadeloupe (Menno Hoogland, personal communication 2012; Hofman et al. 2001b; Samson 2010).

Skeletal remains
Fifteen burial pits containing the remains of 26 individuals were excavated by the Museo del Hombre Dominicano in 2004. Most burial pits contained the remains of a number of individuals, who seemed to have been deposited simultaneously in primary depositions. The majority of the individuals were males (11) and juveniles (8), with only 6 females present. Bodies were generally interred in small round or oval burial pits in supine positions, or reclined on the side. All skeletons were flexed, with the legs drawn up to the chest. Grave goods were rare: in total 9

individuals were found with materials, mostly ceramic fragments, faunal remains, and unworked lithics. Burial 2 was found interred with a large Chicoid ceramic vessel placed upside down on the head. The majority of the burials were located in the southern part of the site, leading investigators to suggest this part of the site comprised the cemetery area. Many burials remained unexcavated in this part of the site, which has since been transformed into a golf course (Atiles 2004; Olsen 2004; Tavarez María 2004).

Radiocarbon dates were obtained for three of the skeletons (it is not clear which three) excavated in 2004 (Table 5.2). These dates, along with ceramic finds associated with the burials, indicate a predominantly Late Ceramic Age, Ostionoid and Chicoid, chronology for the burials. However, some Spanish colonial ceramics (majolica) were found in the cemetery area of the site, perhaps indicating that the cemetery was still in use during the early contact period. The precise relation between these ceramic remains and the burials is unclear.

Burial	Lab code	uncal. B.P.	cal. A.D. 2σ
?	1-Beta-198072	790 ±60	1160–1300
?	5-Beta-198073	1240 ±40	640–770
?	6-Beta-198074	1070 ±40	820–1030

Table 5.2 Punta Macao radiocarbon dates of human skeletal remains (Hofman et al. 2007).

5.2.7 Grenada

Savanne Suazey

Savanne Suazey is located on the north-eastern end of Grenada. The site is comprised of three distinct physical environments, an elevated area in the north, a medium elevation in the south, and a low valley in between which extends toward the beach. The ceramic assemblage recovered from the site was characterized by Bullen (1964) as belonging to the Suazey series, with a small Caliviny component, which he thought to be earlier than the Suazey material. The southern part of the site, where five human burials were found, is considered to have been used to a much later date, with fragments of iron and Spanish olive or olive oil jars indicating the site was occupied in the Contact period. The site is thought to have been inhabited by Amerindians during the early colonial period, and some of the Suazey pottery – Suazey Finger Indented – was assigned to the colonial period occupation (Bullen 1964). Later, both Suazey and Ciliviny were assigned the same chronological period, and identified as perhaps representing a ceremonial wear and common wear belonging to the same series (Bullen and Bullen 1972). Later still, Suazey was no longer recognized as a distinct series, but as a continuation of many Troumassoid traits, and was therefore allocated to the subseries Suazan Troumassoid. Caliviny was considered by many to be merely a decorative mode, which persists

over an extended period of time throughout the Late Ceramic Age (Bright 2011). Currently, many researchers have realized that the distinctions between the earlier Troumassan Troumassoid and the later Suazan Troumassoid are much less apparent than originally thought, and most pottery originally classified as one of these subseries is now all placed under the nomer of 'Suazoid'.
The site thus dates to around A.D. 1000–1500, i.e., the Late Ceramic Age, but potentially existed well into the colonial occupation of the island in the 17th and even 18th centuries (Bullen 1964).

Skeletal remains
Five individual skeletons were excavated at the site, all of which potentially date to the period spanning first contact with Europeans. Nonetheless, burial practices and grave goods all appear indigenous, with all five individuals buried in small pits in flexed positions, and grave goods consisting only of stone beads found with two individuals.
The skeletal remains were in poor, fragmentary condition. Osteological analysis was performed by Adelaide K. Bullen, William F. Enneking, J.L. Kirkland, and L.J. Marchand. This analysis revealed a high percentage of caries in all individuals, which Bullen interpreted to possibly be the result of the introduction of sugar cane to the island in the 17th century (Bullen 1964:13–17).

Simon Beach
Simon Beach is an Early Ceramic Age habitation site on the east coast of Grenada. Bullen (1965) characterizes the site as a pre-Arawak habitation site that was purposefully selected for is proximity to good agricultural land, with Saladoid-Barrancoid pottery (or Modified Saladoid) (Boomert 2000; Bullen 1965). A single human skeleton, presumably excavated by Ripley P. and Adelaide K. Bullen, is currently stored at the Florida Museum of Natural History, Gainesville (catalogue no. 98025).

5.2.8 Guadeloupe

Anse à la Gourde
The multi-component Ceramic Age habitation site of Anse à la Gourde is located on the eastern tip of the limestone island of Grand-Terre, Guadeloupe. The site, which covers approximately 4.5 hectares, is situated on the lower coastal limestone terrace in a large bay facing north into the Atlantic Ocean. It seems that its location was strategically selected for maritime activities such as travel to other locations and fishing (Delpuech et al. 1999; Hofman and Hoogland 2011).
A number of occupation phases, between roughly A.D. 400–1400, are distinguished at the site based on ceramic styles and radiocarbon dates. The Early Ceramic Age occupation of the site dates to around A.D. 400–600/800, and is represented by a Cedrosan Saladoid ceramic assemblage. The parts of the site pertaining to the

Saladoid period are located closer to the sea, and have been severely damaged by coastal erosion. The presence of burnt house posts and ash layers suggest that the site was suddenly abandoned after the Saladoid period, and was later re-occupied. In the period around A.D. 600–1000 the coastal environment changed due to a rise in sea level (Delpuech et al. 1999; Hofman and Hoogland 2011; Hofman et al. 1999; Hofman et al. 2002). The Late Ceramic Age at Anse à la Gourde spans the period between cal. A.D. 900–1400. Radiocarbon dates indicate this period of occupation can be divided into three main phases: cal. A.D. 900–1100, cal. A.D. 1100–1250, and cal. A.D. 1250–1350. Throughout these phases the ceramic assemblage is characterized by Mamoran/Troumassan Troumassoid to early and late Suazan Troumassoid materials. Some ceramics displaying Cayo and Morne Cybele traits were recovered (Delpuech et al. 1999; Hofman et al. 1999, 2001b). The ceramics revealed a great diversity of influences from both the northern and southern Lesser Antilles, which the investigators interpret as the result of the site's unique position in a "transition zone between two influence spheres, where ceramic styles of different origins amalgamated" (Hofman and Hoogland 2011:26).

The remains of around 24 round and oval houses, ranging between 5 and 12 m in diameter were found at the site in the form of postholes which were carved into the underlying bedrock. The houses were extremely densely spaced within the occupation area, most likely indicating the rebuilding of the same house structures at the same location over time. The settlement or village area, comprising the remains of houses, hearths and refuse pits, drying racks, hammock supports and barbacoas, encircled what would have been an open place at the centre, which likely functioned as a plaza. The village area was surrounded by a doughnut-shaped refuse midden (Hofman and Hoogland 2011).

Artefacts recovered from the site include exotic materials and objects, such as a range of lithic artefacts such celts, axes, adzes, scrapers and polishing stones of non-local origin (Knippenberg 2006). Some ceremonial objects showed similarities to those found in Late Ceramic Age cultures of the Greater Antilles (Hofman and Hoogland 2011).

Skeletal remains

Approximately 83 graves containing a total of 92 individuals were excavated at Anse à la Gourde. Human skeletal remains excavated at the site pertain only to the Late Troumassoid period occupation (A.D. 1000–1350). Radiocarbon dates of most burials fall between A.D. 1000–1400 (Menno Hoogland, personal communication 2012). The graves were located within the habitation area, and were distributed in clusters of 3 to 10 individuals. Many graves were closely associated with the postholes dug into the bedrock, most likely indicating that some individuals were buried under the floors of the houses, or just outside a house structure. Some individuals were interred in postholes, perhaps indicating household ties with older (ancestral) constructions (Bright 2003; Delpuech et al. 1999; Hofman and Hoogland 2011; Morsink 2006). A great variety in mortuary treatment

of the dead was observed at Anse à la Gourde, with primary, secondary, single and composite burials, and post mortem manipulation of the remains. In many cases the dead seem to have been wrapped in some kind of perishable container (most likely a hammock), sometimes after the body was desiccated. There are indications that many individuals were interred in an open or partially open grave. The pit remained open during (at least part of) the decomposition of the soft tissues. At a later stage, certain bones were removed or reburied (Hofman et al. 2001a, 2001b; Hofman and Hoogland 2011; Hoogland et al. 1999).
The burial population is largely comprised of adults, with children clearly underrepresented. The excavators interpret this as a reflection of clear differences in social status between children and adults. Children were most likely disposed of in a different manner or buried elsewhere (Hofman and Hoogland 2011). Based on stable isotope studies, a large proportion of the adults were found to be of non-local origin (Hoogland et al. 2010; Laffoon 2012; Laffoon and de Vos 2011). Some differentiation in burial gifts was observed, with some non-local individuals being buried with materials of non-local origin (e.g., greenstone artefacts from St. Martin, flint from Long Island, Antigua) (Hofman et al. 2001a, 2001b; Hofman and Hoogland 2011; Hoogland et al. 1999).
Stable isotope analysis of human bone collagen samples from Anse à la Gourde found indications of a mixed diet of terrestrial food resources combined with an extensive amount of reef fish estimated at around 50%), with the rest of the protein being obtained from terrestrial C3 sources. No differences were found between males and females (Laffoon 2012; Laffoon and de Vos 2011; Stokes 1998).

5.2.9 Haiti

Diale 1

Diale 1 is a Late Ceramic Age habitation site located in the Fort Liberté area on the south-eastern shore of the large Baie de Fort Liberté, in north-eastern Haiti. The site is characterized by 29 large mounded shell middens and Meillacoid pottery. Rainey excavated a large part of middens 1, 2, 5, 6, 8, and 17 in 1934–1935. Some human burials were excavated in the 1934 field season. The following year excavations in midden 5 produced a number of human burials, which were deposited in the shell refuse layer all within 50 cm from the surface (Rainey 1941; Rouse 1939).

Skeletal remains

Burial 1 contained the remains of an adult female in flexed position lying on the left side, next to a juvenile whose burial position could not be determined due to damage. Burial 2 likewise contained the remains of two individuals, both primary interments of adult males in flexed positions. Burial 2 also contained some secondary bone deposits, and an intact ceramic vessel. Burial 3 contained the remains of an adult female in supine, highly flexed position. Burial 4 consisted of the remains of an infant, interred in extended supine position. Burial 5 was a secondary deposit

of an adult (Rainey 1941; Rouse 1939).

Manigat cave, Île de la Tortue

The Manigat cave is located on the southern coast of Île de la Tortue, a small island around 6 km north of the north-western coast of Haiti. The cave is situated at 4 mamsl in a limestone rock formation, only 8 m from the shore. The cavern is around 11 x 8 m large, and roughly circular in shape. Excavations led by Paul Barker took place in the cave in 1959–1960. Over 50.000 human bones and bone fragments were recovered from the cave, and although the precise number of individuals was difficult to determine, Barker mentions at least 168 individuals. The cave yielded only a small assemblage of pottery (mostly undecorated), however, Barker suggests that it appears similar to Meillacoid pottery collected by Rouse in Cuba (Barker 1961).

Skeletal remains

Barker uncovered an enormous amount of human bone material from the Manigat cave in 1959–1960. Most of the material was disarticulated and dispersed across the cave. Barker indicates finding evidence for both primary and secondary burial, despite the disarray in which the remains were found. He established a MNI of 168 based on the number of complete mandibles that were found. The material was thoroughly studied, with particular attention for pathological conditions (including dental pathology), and demographic composition. Barker notes a high frequency of caries and ante mortem tooth loss. He also mentions large accumulations of dental calculus, which was present in many of the recovered dentitions.
Barker furthermore notes that the number of juvenile remains is relatively low, where he expected it to be high "dans les cultures primitives" (Barker 1961:54). He suggests either low infant mortality, disposal of juvenile remains in another manner, or poor preservation of small juvenile bones as potential causes.

5.2.10 Puerto Rico

Cañas

Cañas is a large, multi-component Ceramic Age habitation site located on the south central coast of Puerto Rico, in the municipality of Ponce. The results of large scale excavations at the site in 1934 led by Froelich G. Rainey played a key role in the development of his Crab–Shell culture dichotomy theory. Rainey found clear stratigraphic differences between deposit layers of predominantly crab remains associated with elaborated decorated white-on-red painted pottery, and layers of mainly shell remains associated with unpainted, rough, incised pottery at Cañas, and subsequently at the sites of Coto and Monserrate too. This led him to conclude the two 'cultures' represented two phases of occupation of Puerto Rico. Later work revealed that the association of food remains and pottery styles was a local phenomenon (Rainey 1935, 1940; Rodríguez Ramos 2010; Rouse 1952b).

Skeletal remains

Rainey excavated 24 skeletons from the mounded midden areas of the site in 1934 (Crespo Torres 2010; Rainey 1940; Rouse 1952b). The two individuals included in the study here are derived from the earlier 'Crab culture' occupation phase, or in other words, the Saladoid period (Drew 2009). The location of the remaining 22 skeletons is unclear.

Burial practices observed by Rainey consisted mainly of primary flexed interment, although he mentions a small number of primary extended burials. Also, there were a few secondary interments. None of the burials yielded grave goods (Rainey 1940; Rouse 1952b).

Collores

Collores is a multi-component habitation site located in the municipality of Juana Díaz, along the south central coast of Puerto Rico. Excavations were undertaken there by Froelich G. Rainey in the 1930's (Rouse 1952b). The surface of the site is covered with marine food refuse and pottery sherds. Rainey found two large mounded middens containing charcoal, shell, faunal remains, and predominantly Ostiones style pottery. Two burials were encountered in the lowest layer of Midden A (Rouse 1952b).

Skeletal remains

The two individuals included in this study pertain the Early Ceramic Age ([late] Saladoid) occupation of the site, based on Cuevas style pottery found with one individual, and observations by Rainey on the stratigraphic position of the other ('red culture layer'). The first burial consists of an adult female in flexed position on the left side. The second consists of the poorly preserved remains of an infant which were found close by (Drew 2009; Rouse 1952b).

Coto

Coto is a large, multi-component Ceramic Age site located on a low hill on the northwest coast of Puerto Rico, between the city of Isabela and the mouth of the Guajateca river, in the municipality of Isabela. The site had already been extensively looted by the time Froelich G. Rainey started large scale excavations there in 1934. Similar to the sites of Cañas and Monserrate, he identified different cultural layers which he assigned to the 'Crab culture' and the 'Shell culture' (Rainey 1940).

Skeletal remains

Rainey uncovered 60 burials from highly disturbed (due to looting and slope erosion) refuse deposits and the sterile subsoil of the site in 1934 (Crespo Torres 2010; Rainey 1940; Rouse 1952b). The single individual included in the study here is derived from the later 'Shell culture' occupation phase, or in other words, the Late Ceramic Age. The location of the remaining skeletons is unclear.

Burial practices consisted mainly of primary flexed interment, on the side or back, and in one case in prone position. Rainey observed that many of the bodies appeared to have been tightly bound upon burial. A single secondary 'bundle of sticks' burial was found. Also, a single urn burial of an infant was recovered, which Rainey interpreted as a secondary interment, since the vessel would have been too small to contain the fleshed remains of a child. Three burials were found with intact pottery vessels, and a number of artefacts of worked bone and stone, and beads were found associated with the skeletons (Rainey 1940).

Esperanza, Vieques

This represents the incidental find of juvenile human skeletal remains during excavations prior to works on the sewer system on the site of Esperanza, on the south coast of the small island of Vieques to the east of Puerto Rico. Previous finds close by include numerous human burials, stone artefacts, and shell middens. Ceramic materials at the site formed the basis for the identification of the Esperanza ceramic style of the Chican Ostionoid subseries of Eastern Puerto Rico (Rouse 1952b).

Hacienda Grande

Hacienda Grande is a multi-component Ceramic Age habitation site in north-eastern Puerto Rico, around 25 km east of San Juan by the mouth of the river Loíza. The site lies between two hills at a distance of approximately 2 km from the north-eastern Atlantic coast, and is bordered to the south by the Old Oxbox lake, which would have provided fresh water to its inhabitants (Roe 1985; Rouse and Alegría 1990). The site gave its name to the Hacienda Grande ceramic complex of the Cedrosan Saladoid, as it served as the type site for this style. The Hacienda Grande period of occupation at the site dates to between 200 B.C. and A.D. 400 (Rouse and Alegría 1990).

Excavations at the site focused mainly on the midden areas, and attempted to deal with the extensive stratigraphic damage to the site due to looting, agricultural ploughing, and the use of the area as a coconut plantation. As a result, little is known about the house structures and village layout (Roe 1985; Rouse and Alegría 1990).

Skeletal remains

Skeletal material has been excavated at Hacienda Grande during various excavations by trained archaeologists, amateurs, and looters over the last century or so (Roe 1985; Walker 1985). The current whereabouts of much of this material is unknown, such as the 18 skeletons excavated at the site by Alegría in 1948 and 1954. The two individuals included in the current study are housed at the Laboratory of Forensic Anthropology and Bioarchaeology at the University of Puerto Rico. It is unclear from which excavations these individuals are derived, and it is therefore not possible to assign them to a particular phase of occupation (Hacienda Grande, although type site for the early Saladoid pottery of the same name,

is a multi-component habitation site, presumably including burials related to the Ostionoid period). It is possible, however, that these two individuals are derived from the later period of occupation of the site, i.e., post-Hacienda Grande period, as both crania display modification in the fronto-occipital parallel type (Anne van Duijvenbode, personal communication 2011), which has been suggested to have been a post-Hacienda Grande phenomenon, possibly related to the La Hueca culture (Crespo Torres 2005a; Rodríguez Ramos 2010).

La Mina, Vieques

La Mina is located around 500 m from the site of Esperanza, on the south coast of the small island of Vieques to the east of Puerto Rico. The site is characterized by a number of shell middens of varying sizes. During excavations in 1938 Rouse recovered predominantly Santa Elena style pottery of the Elenan Ostionoid subseries, and subsequently placed the site in the his Period IIIb, or around A.D. 1300–1400 (Rouse 1952b). A single pre-Columbian human skeleton from La Mina is currently housed at the Yale University Peabody Museum of Natural History, New Haven, Connecticut. The context of this skeleton is unknown.

Maisabel

Maisabel is a multi-component Ceramic Age habitation site located on the central-northern coast of Puerto Rico, approximately 30 km to the west of San Juan. Initial excavations at the site by Ovidio Dávilla in 1979–1980, of the Instituto Cultura Puertorriqueña, revealed a large Saladoid component, with several middens. Dávilla excavated the largest Saladoid midden deposit. In 1985 Peter Roe conducted large scale excavations at the site in cooperation with the Centro de Estudios Avanzados de Puerto Rico y el Caribe (CEAPR) and the Centro de Investigaciones Indigenas de Puerto Rico (CIIPR). Later excavations under the direction of Peter Siegel, together with the CIIPR, revealed Saladoid (Hacienda Grande [100 B.C. – A.D. 400] and Cuevas [A.D. 400–600]) and Ostionoid (Monserrate [A.D. 600–900] and Santa Elena [A.D. 900–1200]) components, showing the site was occupied continuously for approximately 1200 years (Siegel 1992, 1996).

A large roughly rectangular plaza and cemetery area, measuring approximately 90 x 60 m, was found at the centre of the site. Twenty-four Saladoid and Ostionoid period burials were found in the central plaza, indicating a continued use of this ceremonial part of the site as a cemetery (Siegel 1992). AMS dating of burials in the cemetery area indicated it was in use from cal. A.D. 210–1148 (Siegel 1992:178). Ten burials were recovered outside of the central occupation zone, in an area described as the "macroblock" (Siegel 1992:168). These were thought to be associated with a single house structure dated to the Ostionoid period, as postholes were found near these burials (Siegel 1992:126). With the exception of two secondary burials, all interments were primary. Of the primary burials, 22 individuals were buried in a flexed position, 5 were placed in an extended supine position, and 6 had burial positions which were unrecorded. The skeletal remains are currently

stored in San Juan, in the care of Mike Roca, director of the Puerto Rican newspaper El Vocero.

Skeletal remains

Osteological analyses of the human skeletal remains have been undertaken by Linda Budinoff (1991) and Darlene Weston (Weston and Schats 2010). The original osteological assessment recorded a total of 34 individual skeletons, however, recent re-analysis of the material revealed that burial 18 contained the remains of a foetus, next to the adult individual. Based on this finding, the MNI of the skeletal sample has been changed to 35 (Weston and Schats 2010).

Most of the material is poorly preserved, showing severe fragmentation, erosion, rodent gnawing and damage due to burrowing fauna.

Siegel (1992) distinguishes a Saladoid period group of burials and an Ostionoid group of burials, based on uncalibrated radiocarbon dates from human skeletal material. Here, these radiocarbon dates have been calibrated using Calib 6.1.0, producing the calibrated dates shown in Appendix A. While the re-calibrated dates differ from the dates originally presented by Siegel (they are all around 150–200 years later), a distinct division between burials belonging to an early and a late phase is still clear. These phases are A.D. 600–950 and A.D. 950–1250. The individuals originally assigned by Siegel to the Saladoid now fall within the Early burial population (A.D. 600–950), while Siegel's Ostionoid individuals are now part of the Late burial population (A.D. 950–1250) (Siegel 1992:179, 247–266).

The majority of individuals recovered from the cemetery area were assigned to the Saladoid or Early period of occupation, although there were number of individuals found in the cemetery who dated to the Ostionoid or Late phase of occupation. Siegel (1992, 1996) interpreted this as an indication that the cemetery represented an important sacred and ideological central point of the village throughout its occupation. Burials found outside of the cemetery area, were mostly associated with the Late phase of occupation. In the interest of potentially distinguishing culturally or temporally distinct groups for comparison, a chi-square test was performed, to test whether there is any significant difference between the location of the burials in the Early and Late phases of occupation. The results indicate that there is a significant difference between the distribution of early and late individuals across the cemetery and non-cemetery areas (Table 5.3; $\chi 2 = 5.1341$ $p = 0.02$). This difference is interpreted here as a confirmation that the cemetery area was used throughout

	Early (A.D. 600–950)	**Late (A.D. 950–1250)**
Cemetery	11	8
Non-cemetery (macroblock)	2	10

Table 5.3 Maisabel number of skeletons by period and location.

the occupation of the site (i.e., both phases), while interment outside of the central plaza area was a predominantly late phenomenon (Hofman and Hoogland 2004; Righter 2002; Siegel 1999; see also Curet and Oliver 1998). In this study, therefore, comparisons are made between the Early and Late burial populations, and the cemetery versus non-cemetery burials.

María de la Cruz cave

The María de la Cruz site is a large rock shelter located around 500 m west of the Hacienda Grande site in the northeast of Puerto Rico, near the town of Loíza, in the municipality of Loíza. Excavations at the site were undertaken by Alegría in 1948 and Alegría and Nicholson in 1954. The site was identified as belonging to the Archaic Age occupation of Puerto Rico (specifically it was attributed to the Coroso culture), thus dating it to between 1000–200 B.C., although radiocarbon dating of charcoal remains at the site revealed two dates from 90 B.C. – 150 A.D, and 60 B.C. – 140 A.D. (Alegría et al. 1955; Rodríguez Ramos 2010; Rouse and Alegría 1990). In the past 5 years Rodríguez Ramos has undertaken new excavations at the site in order to determine the relation between the Archaic Age populations of the island and the earliest Ceramic Age people.

Skeletal remains

Two burials were excavated by Alegría and Nicolson in 1954. One comprised a primary interment, in an extended supine position. The comprised a highly fragmented secondary burial. The excavators note that both individuals had unmodified crania (Alegría et al. 1955; Rouse and Alegría 1990). The burials date to between cal. 50 B.C. – A.D. 40, again indicating that the Archaic Age cultural remains identified by Alegría and colleagues overlap temporally with the later Hacienda Grande occupation (Rodríguez Ramos 2010).

Monserrate

Monserrate is large multi-component Ceramic Age habitation site located in the municipality of Luquillo in north-western Puerto Rico at the mouth of a small lagoon, close to the town of Luquillo. The site was first discovered by Froelich G. Rainey, who excavated there in 1934–1935 (Rainey 1935, 1940). The site is situated in a shallow bay, which is protected from the Atlantic Ocean by a reef. The site extends around 300 m along the shore and 200 m inland, and is characterized by marine food refuse, and potsherds which are scattered across the area. Five mounded shell middens (not contemporaneous) were identified at the site, of which three were partially excavated by Rainey in 1934. Human burials were found in the lower levels of the mounded middens (Rouse 1952a). The site forms the type site for the Monserrate style of the Elenan Ostionoid subseries as defined by Rouse (1992).

Skeletal remains

Rainey (1935, 1940) reports finding numerous human skeletal remains in the

lower levels of the mounded middens which he excavated in 1934–1935. These remains were very densely deposited, and burial practices were diverse, with primary flexed interments, prone burials, and burial urns with juvenile skeletal material inside. The two individuals incorporated into this study are thought to have derived from Rainey's excavations, and one is thought to date to the Early Ceramic Age (Saladoid) based on Cuevas ceramics found with the skeletal remains (Drew 2009).

Punta Candelero

Punta Candelero is a multi-component Ceramic Age habitation site located on the south-eastern coast of Puerto Rico. The site was occupied during two periods, the first associated with La Hueca complex ceramics, and the second with Cuevas ceramic complex of the Cedrosan Saladoid. The Rio Candelero, currently positioned approximately 0.5 km from the site, would have bordered the settlement during its occupation (Pestle 2010b). The site is optimally situated to exploit surrounding freshwater and marine environments and the adjacent coastal plain.

From approximately 350 B.C. to A.D. 210 the village evidently comprised a number of houses placed in linear arrangement along a dune, and was characterized by La Hueca ceramics, with predominantly zone incised crosshatched (ZIC) decoration. Between A.D. 660–1010 the village developed a semi-circular configuration, with houses situated around a central plaza. During this period, ceramics at the site belong to the Cuevas style and are generally plain, with some painted sherds (Pestle 2010b).

Skeletal remains

In total 106 human burials were recorded in the field, all of which appear to be clearly associated with the Cuevas cultural component,[6] however, Crespo Torres (2000) describes only 78 individuals. This discrepancy in numbers was apparently caused by field documentation methods (Edwin Crespo Torres, personal communication 2011; Pestle 2010b). Most of the skeletons have been radiocarbon dated, showing that individuals were buried at the site over a period of eight centuries (A.D. 388–1206). The majority of the burials comprised primary interments, although there were a number of secondary interments. Around half were single interments and half multiple interments, some of which contained the remains of 10 individuals. Most individuals were found in a highly flexed position, on the back or on the side, with the legs drawn up to the chest, suggesting the bodies had been wrapped tightly prior to burial. A smaller number of individuals were found

6 Edwin Crespo Torres mentions an individual (Burial 13, Block B?, Pozo B-1, Area Huecoide) who may pertain to the La Hueca occupation at the site, however, the context of the burial does not allow for a secure identification, and radiocarbon dating puts this individual in the later (Cuevas) period of occupation at the site along with the other burials (Edwin Crespo Torres, personal communication 2011; Pestle 2010). Incidentally, Pestle (2010) mentions that the only burials that, based on context and location, were associated with the earlier La Hueca component consisted of six dog interments, one of which was radiocarbon dated to the La Hueca period of occupation.

in flexed, ventral position (i.e., face down). Grave goods are rare, and generally consist of pottery, with some cases of lithic materials and one individual found with the remains of a freshwater turtle carapace (Crespo Torres 1991, 2000; Edwin Crespo Torres personal communication 2011; Pestle 2010b).
Overall the burial population at Punta Candelero consisted of a relatively small number of sub-adult individuals, and a larger number of males than females. This has been interpreted as evidence for the site having been inhabited by a founding community (Crespo Torres 2000; Curet 2005; Pestle 2010b).

Santa Elena (Toa Baja 2)
Santa Elena is a multi-component habitation site located close to the town of Toa Baja, in the municipality of Toa Baja, around 5 km from the northern coast of Puerto Rico, and around 12 km to the west of San Juan. The site was visited by Rouse in 1937 and 1938, when he excavated four 2 x 2 m test pits. The site, as defined by surface scatter of faunal material and pottery, covers an area of around 5 acres, and is semi-circular in shape. The Santa Elena pottery style of the Elenan Ostionoid subseries was named after this site, which has a significant Santa Elena component (Rouse 1952a).

Skeletal remains
Rouse uncovered the remains of three human burials, all of which pertain to the Santa Elena division of the site. Burial 1 consisted of young female in flexed position lying on her right side. Burial 2 consisted of an infant in flexed position lying on its right side who appeared to have been deposited between the arms and legs of a flexed adult lying on its left side (this was discovered too late to be documented adequately). Burial 3 similarly consisted of a flexed adult lying on its right side with a poorly preserved infant placed between its arms and legs. Rouse mentions that the adult skeleton appeared to be that of a male, which is corroborated by recent osteological analysis by Drew (2009). No grave goods were found with the remains (Rouse 1952a). The juvenile remains from burial 2 and the adult remains from burial 3 are incorporated into this study.

Santa Isabel (Cayito)
Santa Isabel or Cayito is located on Punta Cayito, around 2 km southwest from the town of Santa Isabel, in the municipality of Santa Isabel on the south central coast of Puerto Rico. The site is characterized by a thick layer of shells and Boca Chica style pottery, placing it in the Late Ceramic Age, which is more commonly found in the Dominican Republic. Surface scatter extends over around 6 acres, however the precise extent of the site could not be determined due to modern habitation of the area. Rouse dug a 2 x 2 m test pit at the site in 1936, recovering large amounts of Boca Chica pottery, faunal remains, and human bones including eight tibias and fibulas, tarsals, metatarsals, phalanges, and fragments of mandible and ribs. The bones were interpreted as the remains of a secondary interment of numerous

individuals. No grave goods were found (Rouse 1952b).

Yauco 1
Yauco 1, also known as Diego Hernandez, is a Late Ceramic Age site located in the foothills adjacent to the coastal plain around 4 km north of the town of Yauco in the municipality of Yauco on the south-western coast of Puerto Rico. Rouse visited the site in 1937 and excavated a small test pit in the densest part of the midden area. The site has reportedly yielded a rich repertoire of stone objects, including beads, pendants, and threepointers, leading Rouse to suggest the inhabitants of the site may have been specialized in stonework, although he does not mention the presence of stone debitage from the production process or tools related to stonework. The site is situated on a flat hilltop, which according to Rouse may have functioned as a ball court area. A single human burial was recovered from the lower levels of the midden. Rouse dates the site to his Period IIIa, around A.D. 1200–1300 (Rouse 1952b). The single human burial of an adult of unknown age and sex was excavated at the site. The skeleton was found in a flexed position on the left side. The cranium was destroyed, presumably during ploughing activities. No burial goods were found (Rouse 1952b).

5.2.11 Saba

Kelbey's Ridge 2
Kelbey's Ridge 2 is a small 14th century habitation site situated on a plateau 140 mamsl in the north-eastern part of the small volcanic island of Saba. The elevated position of the site allows for a clear view of neighbouring islands and approaching seafaring traffic, while its occupants had the large fishing grounds of the Saba Bank at their disposal. The site is thought to have been a short-lived eastern outpost of the Taíno, potentially specializing in the exploitation of the valuable marine resources of the Saba Bank and controlling a 'gateway' for interaction between the Greater and Lesser Antilles. Material remains at the site reflect Taíno influences, with an assemblage of locally manufactured pottery with Chican Ostionoid decoration, and a jadeite axe head and a snuff-inhaler of manatee bone with distinct Greater Antillean influences (Hofman, personal communication 2012; Hofman and Hoogland 1991, 1993b; Hoogland and Hofman 1999).
Five round houses, between 5– 8 m in diameter were identified. Based the slope of the terrain and differences in depths of postholes, the houses appear to have been placed on elevated platforms. Over the approximately 50 years of occupation at the site house structures seem to have been repeatedly rebuilt and moved, with at least 4 phases in the household trajectory (Corinne Hofman, personal communication 2012; see also Samson 2010).

Skeletal remains
Seven grave pits containing the remains of at least 11 individuals were excavated.

Five graves were closely associated with some of the house structures; the other two graves were associated with hearth features. The individuals were buried in small round or oval burial pits in a seated, strongly flexed position with the legs flexed toward the chest. Mortuary practices at Kelbey's Ridge 2 are unique for the Caribbean, with the only documented case of cremation in the Lesser Antilles, and the secondary interment of (cremated) infants with older adults (Corinne Hofman, personal communication 2012; Hoogland and Hofman 1999; Weston 2010). Osteological analysis of the skeletal material revealed that the inhabitants of Kelbey's Ridge 2 led a strenuous lifestyle, with heavy physical activity. Trauma on the skeletal frame of a female individual (F148) indicates interpersonal violence, perhaps during inter-group raiding and attacking, or alternatively from domestic violence (Weston 2010).

Spring Bay 1c

Spring Bay is a multi-component Ceramic Age habitation site, which was abandoned and reoccupied a number of times after its initial settlement around A.D. 350. The site is situated adjacent to the 14th century site of Kelbey's Ridge 2, and consists of an extensive midden area, comprised predominantly of faunal food refuse, particularly crab. The single burial of an infant was recovered from the upper levels of one of the trenches. The child was found in flexed, seated position, with the legs drawn up to the chest. Chican Ostionoid type pottery was found associated with the skeleton, and radiocarbon dating of this individual indicated a date of 535 ±85 B.P., or around A.D. 1450, making it roughly contemporaneous with the Kelbey's Ridge 2 occupation (Hofman and Hoogland 1991, 1993a, Hoogland and Hofman 1999; Corinne Hofman, personal communication 2012).

5.2.12 St. Lucia

Lavoutte

Lavoutte is a Late Ceramic Age habitation site characterized by predominantly Suazoid ceramics located in the northern part of the bay of Cas-en-Bas on a promontory which partly blocks the bay entrance, in the north-eastern tip of St. Lucia. Original investigations at the site by Bullen and Bullen (1970) led to the interpretation of Lavoutte as a 'Carib ceremonial center' with considerable (long-distance) contact and exchange networks with Taíno groups in the Greater Antilles, as reflected in a number of artefacts recovered from the site which appear to emulate Taíno decorative modes (Allaire 1999). Investigations at the site during the mid-1980s by the University of Vienna, under the direction of Dr. Herwig Friesinger, uncovered four human burials close to or in the midden area (Fabrizii-Reuer and Reuer 2005).

Recent investigations at the site between 2009–2010 by researchers from Leiden University and the St. Lucia Archaeological and Historical Society (SLAHS) revealed a large number of human burials mostly located in the habitation and ad-

jacent cemetery area, which were heavily damaged by erosion at the site as a result of recent hurricane activity and construction works in the vicinity (Hofman and Branford 2011; Hofman et al. 2012).

Skeletal remains

Including human burials excavated by the University of Vienna in the mid-1980's, a total of 48 graves with at least 53 individuals have been excavated at the site. Although a number of posthole features were recorded, reconstruction of (house) structures was hampered by the severe erosion and damage to the site. Nonetheless, the close association between a number of the buried individuals and the posthole features suggests that some may have been interred in (or near) the houses, as has been documented elsewhere in the Caribbean (Hofman et al. 2001b; Hofman et al. 2012; Hoogland and Hofman 1999). Some degree of uniformity in burial practices is evident at the site, particularly when contrasted with other (contemporaneous) sites in the region (e.g., Anse à la Gourde, Guadeloupe). Individuals were generally interred in small round or oval burial pits, in a seated or supine flexed position. Most skeletons were positioned facing east, northeast, or southeast, with all east facing individuals dated to the middle period (cal. A.D. 1300–1400). Seven cases of secondary interment were identified: three solitary depositions, and four depositions with an existing primary interment. There are taphonomical indications that some of the burial pits were left open after deposition. Twelve skeletons were radiocarbon dated (Appendix A), leading investigators to distinguished three main periods of deposition of the human burials at the site: cal. A.D. 1150–1300, cal. A.D. 1300–1400, and cal. A.D. 1400–1600 (Hofman et al. 2012).

Point de Caille

The Ceramic Age habitation site of Point de Caille (also known as Saltibus Point) is situated on the south-eastern coast of St. Lucia, at the southern tip of a promontory, to the west of which lies the large Savannes Bay. Several fresh water ponds are now present in the vicinity of the site. Excavations in 1983 and 1984 led by researchers from the Österreichischen Akademie der Wissenschaften, Vienna, revealed the site originally comprised a settlement of around 300 by 400 m, with a number of large buildings with midden areas location around them. Based on faunal remains recovered from the midden areas, the inhabitants of Point de Caille consumed a predominantly marine oriented diet. Based on ceramic styles recovered at the site, investigators date the site to A.D. 300–1000, with an early component from A.D. 300–700, and a later component from A.D. 700–1000. The burials are thought to pertain mainly to the later phase of occupation (Fabrizii-Reuer and Reuer 2005; Friesinger et al. 1986).

Skeletal remains

Burials were recovered from both the house and midden areas. A certain degree of clustering was observed in the locations of the grave pits, leading investigators to

conclude that the clusters may have represented individuals with family ties. Most individuals were interred in extremely flexed position on the back or on the side, with the legs drawn up to the chest. Investigators concluded that the bodies must have been wrapped in a highly flexed position prior to burial. Some individuals were buried in a flexed semi-seated or upright seated position. The majority of burials appear to have been primary, single interments (Fabrizii-Reuer and Reuer 2005; Friesinger et al. 1986).

5.2.13 St. Thomas, U.S. Virgin Islands

Tutu

The multi-component Ceramic Age habitation site of Tutu is located in the inland valley of the Turpentine Run river, about 1.75 km from the eastern coast St. Thomas, U.S. Virgin Islands. Tutu was inhabited during two major occupation phases: an Early Ceramic Age (Cedrosan Saladoid) occupation between cal. A.D. 65–900 and a Late Ceramic Age (Chican Ostionoid) occupation between cal. A.D. 1150–1500. During both phases the village consisted of a central plaza/cemetery area, surrounded by houses, behind which the refuse areas were located. The site, which comprised about 2.2 hectares of pasture land, is situated in one of the few areas of flat land on the volcanic island of St. Thomas, providing fertile soil for agriculture. Various lines of evidence have indicated that the inhabitants of Tutu subsisted on a mixed diet, with root crops serving as a staple food (Righter 2002).

Skeletal remains

A total of 42 individuals were excavated, 22 of which are adults and 20 of which were sub-adults. Twenty-seven individuals were radiocarbon dated, revealing the burials were clearly associated with both occupation phases. Nine individuals were associated with the early period and dated between cal. A.D. 450–960, while a further 18 individuals were dated to the later phase between cal. A.D. 1170–1535. These dated individuals are distributed across the chronological time frames distinguished, indicating it is highly unlikely that they were alive at the same time. Interestingly, based on its radiocarbon date burial 39 dates to the Contact period, however this subadult was found interred with a late Ostionoid vessel (Righter 2002; Sandford et al. 2002). Osteological analysis of the Tutu skeletal remains was undertaken by Sandford et al. (2002).

Mortuary treatment at Tutu is characterized by distinct differences between the early and late phases of occupation. In the earlier phase, all individuals were buried with one or more ceramic vessels, and burials were located in a central cemetery area and the habitation area. In the later phase, only a small group of individuals (only subadults) were buried with ceramic vessels, and the burials are clearly associated with the house structures, with clusters of burials arranged around structures. Investigators interpret the early mortuary practices as a structured by kinship relations, while the late phase appears to express increased social (sociopo-

litical) complexity, with increasing importance of individual households.
Investigators furthermore identified a shift toward a higher degree of status differentiation in the later occupation phase. The latter was not reflected in dietary patterns, as the results of stable isotope analysis suggest that in both phases individuals had equal access to the range of available foods (Righter 2002).
There is evidence of stress in the skeletal remains, with indications of on-going iron deficiency and hard physical labour. Also, they played host to treponemal diseases which resulted in bone lesions and diffuse pitting. The mean number of lesions associated with treponemal disease per individual increases in the later phase of occupation. Also, more locations in the skeletal frame appear to be affected. However, this does not necessarily mean that the later group were more severely affected by this disease. Although the number and type of lesions recorded for the later group may indicate more severe infection, the differences may be influenced by the Osteological Paradox (Wood et al. 1992), and likely reflect changes in the relation between disease and host, i.e., resistance (Righter 2002; Sandford et al. 2002).

5.2.14 St. Vincent

Argyle

The site of Argyle is located on the southeast coast of St. Vincent, on a ridge of around 15–20 mamsl, facing the Atlantic Ocean. The site area and the surrounding landscape are known to have been intensively used throughout prehistory and in colonial times. The site dates to the late pre-Columbian and early colonial period, and is interpreted to have been an Island Carib village, comprising a small number of small round houses and a larger oval structure which is thought to have been the men's house (Hofman, Hoogland and Roux 2011). The larger Saladoid sites of Escape and Argyle 2 are adjacent to Argyle, to the north and south of the site.
European materials dating to the 16th and 17th centuries were recovered at the site, and were found in association with Cayo pottery, supporting earlier identifications of this type of pottery as belonging to the colonial period Island Carib occupation (Allaire 1994; Boomert 1986; Hofman, Hoogland and Roux 2011).

Skeletal remains

The preservation of organic materials at the site was extremely poor, meaning hardly any food remains and bone were recovered. However, based on the size and shape of a number of features located within the house structures, it is thought individuals were interred at the site. In two of the features the highly fragmented and weathered remains of two adult human dentitions were recovered, confirming the interpretation of these pits as graves. Only the enamel of the teeth survived, however partial analysis of dental wear and pathology was possible.

Argyle 2

Argyle 2 is a large multi-component Ceramic Age site on the southeast coast of St. Vincent bordering the Argyle and Escape sites, and extending from the coast around 1 km inland and 0.5 km north to south. The amount of cultural remains (including numerous postholes; some of which may have been part of a long house structure; see section on the Escape site) and the size of the site, along with the close proximity to other important archaeological sites, may indicate that Argyle 2 was a significant settlement from the Early Ceramic Age (Saladoid) onward (Guzman and MacKay 2011).

Skeletal remains

Six human burials were identified by Kathy Martin and Royden Lampkin of the St. Vincent and the Grenadines National Trust at the site between May 2010 and January 2011, including the three individuals skeletons incorporated into this study. Burial positions were flexed, and a number of zoomorphic beads were recovered from the burial pits. In 2011, as a part of the SVG Public Archaeology Program at the Argyle 2 site a large number of features were mapped and 21 human burials were identified (11 excavated). Burial practices of these 13 individuals were diverse, with secondary interment, prone interment, and flexed and extended positions recorded. A rich array of burial goods was recovered, including numerous stone artefacts, body ornaments, and debitage, and a complete Saladoid period ceramic vessel (Guzman and MacKay 2011). The latter indicates these burials most likely belonged to the Saladoid occupation of the island, between A.D. 150 and 600/800.

Buccament West

The site is located in the Buccament Bay and valley area on the south-western coast of St. Vincent. Previous excavations in this area by the Bullens (among others) have revealed that this part of the island was occupied throughout Ceramic Age. A single human burial was excavated by Kathy Martin and Royden Lampkin of the St. Vincent National Trust. The individual was interred in a large, undecorated ceramic vessel, with some faunal remains perhaps belonging to a dog (Kathy Martin, personal communication 2010).

Escape

Escape is a multi-component habitation site, occupied during both the Early and Late Ceramic Age, as shown by the presence of the early and modified Saladoid, and Suazoid ceramics in different areas of the site. The site and the surrounding archaeological landscape were under threat from landscaping works for the construction of a new airport along the south-eastern coast of St. Vincent. Excavations at the site took place between 2009–2010 by a team from the University of Calgary, Canada, under the direction of Dr. Richard Callaghan, and Kathy Martin of the St. Vincent and the Grenadines National Trust.

Researchers excavated a large number of posthole features, and identified seven oval structures and one large rectangular structure, which they suggest may be the first documented long-house in the Caribbean. Alternatively, it has been suggested that this structure is a colonial period tobacco drying house or another colonial period structure of some sort (Arie Boomert, personal communication 2010; Petitjean Roget, personal communication 2011; Moravetz and Callaghan 2011).

Skeletal remains
Excavations at Escape revealed 36 human burials. The burials were all found in a central, possible cemetery area of around 20 x 25 m. In this same area, investigators identified a number of possible house structures, perhaps indicating burial close to or in the houses. Most burials were primary interments, with a small number of secondary depositions. At least two individuals were interred in a flexed, dorsal position, while the rest were buried in a flexed to highly flexed position, on the back or on the site with the legs drawn up to the chest. A number of burials yielded grave goods, including highly decorative body adornments, such as stone and shell beads and pendants, and in one case a St. Lucia Zoned Incised (Saladoid) bowl place next to the skull of one of the primary, flexed interments. One extended individual was found buried with items of personal adornment, four axes, and a number of stone flakes, which were deposited between the feet. The stone flakes were refitted to the core, showing they were most likely purposely fabricated in one sitting for the burial of this individual. In the absence of radiocarbon dates, it is assumed in this study that the burials all pertain to the (late) Saladoid period of occupation, based on the grave goods that were recovered from the Escape burials (Moravetz and Callaghan 2011).

5.2.15 Trinidad

Manzanilla
Manzanilla is a multi-component habitation site with at least four habitation areas – some of which may have existed simultaneously – occupied during both the Early Ceramic Age (Late Palo Seco period [A.D. 350–650]) and Late Ceramic Age (Arauquinoid period [A.D. 650–1400]). The site is located on the central-eastern coast of Trinidad, in the county of St. Andrew, close to the small town of Lower Manzanilla. The location of the site is ideal for the exploitation of a variety of ecological zones. It borders two geologically distinct zones; the Central Range of Cretaceous hills to the south-west of the site, and the Miocene and Pliocene sandstone Naparima plains and Nariva swamp to the south. Where the Central Range meets the site, the inhabitants would have had access to a forested area. North of the site, the l'Ebranche river provides a freshwater habitat with mangrove tidal forest formation, while the larger freshwater environment of the Nariva swamp is located to the south. Lastly, the site's proximity to the beach and Atlantic Ocean, allows access to marine resources (Boomert et al. 1997; Dorst et al. 2003).

The period of habitation at the site and use of the cemetery area (A.D. 350–1400), largely spans the period of horticulturalist habitation of the island, represented by the Saladoid and Arauquinoid ceramic series. Ceramic styles found at the site belonged to the Saladoid Late Palo Seco complex (A.D. 350–650) and the Arauquinoid Bontour complex (A.D. 650–1400). The Palo Seco complex, divided into an early (A.D. 1–350) and a late component (A.D. 350–650), is characterized by clear stylistic influences from the Barrancoid ceramic style of the Orinoco region in the South American mainland. Influences from the Barrancoid complex increased during the Late Palo Seco period (Boomert et al. 1997; Dorst 2008; Dorst et al. 2003). The Arauquinoid complex, starting around A.D. 600–650, differs greatly from the preceding Late Palo Seco complex, however despite the apparent dramatic change in ceramic style influences it appears that pronounced social and cultural relationships between Manzanilla and areas of the mainland were upheld in the later phase of occupation at the site (Boomert et al. 1997; Dorst 2008; Dorst et al. 2003). A number of stone artefacts found in the (probably) Arauquinoid midden on the south western hill slope are thought to show clear influences from mainland groups. During the Late Palo Seco/Arauquinoid transition phase, and throughout the Arauquinoid period, the inhabitants of Manzanilla either engaged in exchange with mainland communities, obtained objects from this region, or copied the stylistic traits of such objects (Boomert 2000:315; Dorst 2008).

Skeletal remains

A large number of burials were found associated with both the Saladoid and Arauquinoid components of the site. The Saladoid period burials were found in and around a midden area, while the Arauquinoid period burials were associated with two house structures (Boomert 1984, 1985; Dorst 2000, 2006, 2008; Dorst and Altena 2005). The human skeletal remains (n= 21) used in this study were excavated during the 2006 and 2007 field campaigns. Preliminary osteological observations were made in the field, including identification of age, sex, and pathological conditions (Dorst 2008). In-depth osteological analysis has been undertaken by Darlene Weston (in prep.).

Mortuary treatment at the site is varied, with a number of primary single interments, primary multiple interments, secondary interments, and mixed primary and secondary interments. Most individuals were buried in a flexed, supine or semi-seated position, with the legs drawn up to the chest, however a small number of individuals were interred in extended supine position. The investigators suggest that the extended burial position may be associated with the Late Palo Seco phase of occupation. Grave goods are rare, with one individual found buried with a shell bead, and one juvenile found with a fragment of quartz, and a piece of Strombus gigas shell carved into the shape of a dog or jaguar tooth (Dorst 2008).

5.2.16 Venezuela

Saladero

Saladero is a large multi-component habitation site located along the Lower Orinoco River, around 40 km to the northeast of the modern day city of Guayana in Venezuela. The site is the type site for Saladoid pottery, as this style was first identified there, although it appears to have begun slightly earlier at the site of Ronquín on the Middle Orinoco around 1200 B.C. Saladoid pottery makers later introduced this pottery style to the Caribbean islands (see also Chapter 3). Excavations were undertaken at the site in 1950 by José M. Cruxent and Benjamin Irving Rouse. The excavators specifically mention not having found any human burials during their excavations, meaning the material incorporated into this study, currently housed at the Yale Peabody Museum of Natural History, New Haven, Connecticut, must have derived from other excavations. The museum catalogue does not specify how the material was obtained, but it is assumed here that it must have been excavated by Osgood and Howard who surveyed and excavated in the area in 1942 (Cruxent and Rouse 1958/1959; DaRos and Colten 2009). Consequently, the context of the material is unknown.

Tocorón

Tocorón is a large Valencioid (A.D. 900–1500) habitation site on the south-eastern shore of the Lake Valencia in northern Venezuela. This area is thought to have been part of the 'Valencioid Interaction Sphere' (Antczak and Antczak 1999), which included the Lake Valencia Basin, and the islands offshore (e.g., Los Roques). The site is characterized by numerous large mounds. Yale University was invited to survey and excavate sites in the Lake Valencia region by the president of the Venezuelan Republic in 1933. Consequently, Cornelius Osgood undertook excavations in one of the mounds (number 53) at the site in 1933. The site is close to a similar site, La Mata, which had previously been excavated by the American Museum of Natural History (DaRos and Colten 2009; Osgood 1943). Osgood wished to compare his results with this previous study. He retrieved the remains of a small number of human burials from mound 53, which are currently stored at the Yale Peabody Museum of Natural History, New Haven, Connecticut. Little is known of the context of these burials, save for the fact that some elaborate grave goods, including body ornamentation, were found with them (Osgood 1943).

5.3 Samples for Scanning Electron Microscopy

A small sample of teeth was sent for analysis by Saskia M. Kars using Scanning Electron Microscopy (SEM) at the Free University, Amsterdam. These teeth were selected for their patterns of wear which were indicative of the use of the teeth as tools. The aim of this study was to obtain further information on the type of materials being processed by the teeth, and the precise action (i.e., direction of movement, degree of

force) involved, and to potentially link specific wear patterns to certain activities and or materials. To this end, ten teeth were selected that presented with LSAMAT (see Chapter 6 and Chapter 7), and with other types of non/alimentary wear (Table 5.4).

Site	Burial	Tooth	VU Amsterdam lab code	Wear pattern
Anse à la Gourde	430	1.1		LSAMAT
Anse à la Gourde	430	1.2		LSAMAT
Anse à la Gourde	2215	2.1		LSAMAT
Punta Macao	1	1.1	PM1 bovenkaak tand B1	Severe lingual and incisal edge abrasion; severe dentine exposure; almost complete loss of enamel
Punta Macao	1	2.2	PM1 bovenkaak tand A1	Labial 'dent' (no dentine exposure); lingual abrasion with some dentine exposure
Punta Macao	1	3.1	PM1 onderkaak tand A1	Labial and incisal abrasion; dentine exposure
Punta Macao	1	4.2	PM1 onderkaak tand B1	Labial and incisal abrasion
Punta Macao	11	1.1	PM11 Upper jaw dent A1	Severe rounded abrasion of entire occlusal surface; enamel completely worn away
Punta Macao	11	1.2	PM11 Upper jaw dent B1	Groove along labial/incisal edge
Spring Bay 1C	1	5.1		LSAMAT

Table 5.4 Samples sent for analysis with Scanning Electron Microscope.

5.4 Chronological, Sociopolitical, and Geographical Comparisons

Broad scale chronological comparisons of dental wear and pathology are restricted by the resolution of available dates for sites and human skeletal remains. As is clear from the above, and as stated in Chapter 1 (section 1.4), the skeletal remains incorporated into this study vary considerably with regards to the amount of available contextual information. At some sites, large numbers of the individual human skeletons have been radiocarbon dated, while at others, dating of the skeletons is based on general site dating and associated material culture. The latter have been a matter of debate in the past few years, as researchers in the region have been critically reassessing the established cultural chronology in the region (Keegan 2010a; Pestle 2010b; Rodríguez Ramos 2010; Rodríguez Ramos et al. 2010). In attempting to divide the sample into temporal groups, I was constrained by differences in resolution (i.e., absolute radiocarbon dates of individuals versus broad time periods assigned to sites or burials based on pottery style), and the lack of available Archaic Age material. Broadly speaking, the majority of the material pertains to the Late

Ceramic Age, although a significant proportion pertains to the Early Ceramic Age. At many sites, the dating resolution reflects precisely this dichotomy: either Early

	Site	Island	Dating
Early Ceramic Age	Argyle 2	St. Vincent	Saladoid
	Cañas	Puerto Rico	"Crab culture"
	Canashito	Aruba	A.D. 100–400
	Collores	Puerto Rico	Saladoid
	Escape	St. Vincent	Saladoid
	Indian Creek	Antigua	Indian Creek period
	Maisabel	Puerto Rico	A.D. 600–950
	Malmok*	Aruba	A.D. 200–900
	Manzanilla	Trinidad	Late Palo Seco
	María de la Cruz	Puerto Rico	50 B.C. – A.D. 40
	Monserrate	Puerto Rico	"Crab culture"
	Punta Candelero	Puerto Rico	Early: 400–600 Middle: 600–800
	Simon Beach	Grenada	Saladoid / pre-Arawak
	Tutu	St. Thomas	Early: A.D. 450–960
Late Ceramic Age	Anse à la Gourde	Guadeloupe	A.D. 1000–1400
	Argyle	St. Vincent	A.D. 1500–1700
	El Cabo	Dominican Rep.	A.D. 1000–1500
	Chorro de Maíta	Cuba	A.D. 1400–1600
	Clarence town cave	Bahamas	A.D. 700–1500
	Coto	Puerto Rico	"Shell culture"
	Diale 1	Haiti	Meillacoid
	Gordon Hill caves	Bahamas	A.D. 700–1500
	Higuey	Dominican Rep.	Late Ceramic Age
	Juan Dolio	Dominican Rep.	Boca Chica
	Kelbey's Ridge 2	Saba	A.D. 1300–1400
	La Caleta	Dominican Rep.	Ostionoid
	La Mina	Vieques, Puerto Rico	Santa Elena
	Lavoutte	St. Lucia	A.D. 1150–1600
	Maisabel	Puerto Rico	A.D. 950–1250
	Mamora Bay	Antigua	Elenoid
	Manigat cave	Île de la Tortue, Haiti	Meillacoid
	Manzanilla	Trinidad	Arauquinoid
	Punta Candelero	Puerto Rico	Late: A.D. 800–1200
	Punta Macao	Dominican Rep.	Ostionoid / Chicoid
	Point de Caille	St. Lucia	A.D. 700–1000
	Santa Cruz	Aruba	A.D. 950–1250
	Santa Elena (Toa Baja 2)	Puerto Rico	Santa Elena
	Santa Isabel (Cayito)	Puerto Rico	Boca Chica
	Savaneta	Aruba	A.D. 950–1250
	Savanne Suazey	Grenada	A.D. 1000–1600
	Spring Bay 1c	Saba	A.D. 1450
	Tanki Flip	Aruba	A.D. 950–1250
	Tocorón	Venezuela	Valencioid
	Tutu	St. Thomas	Late: A.D. 1170–1535
	Wemyss Bight cave	Bahamas	A.D. 700–1500
	Yauco 1	Puerto Rico	Ostiones / Period IIIa

Table 5.5 The sites per chronological group.

Ceramic Age or Late Ceramic Age, while at other sites individual skeletons can be assigned absolute dates. This has led me to divide the assemblages into two groups. One represents the Early Ceramic Age, and incorporates sites that based on their absolute and/or relative dating can be assigned to the period between 400 B.C. and A.D. 600/800. This group also represents sites (or particular occupation periods at sites) that can arguably be assigned to the Early Ceramic Age sociopolitical type of organization as described in Chapter 3, i.e., village-based and kinship oriented organization. This means that in some instances individuals will be incorporated into the early period, while their radiocarbon dates do not concur with those defined for it. An example is the early group at Tutu. These individuals have been radiocarbon dated to between A.D. 450 and 960, which is in part slightly later than the Early Ceramic Age group defined here (i.e., 400 B.C. – A.D. 600/800). But since contextual information from the site (e.g., burial location and material culture, including Saladoid pottery) indicates these individuals belonged to a village-based community in which kinship formed the basis of social organisation, they are incorporated into the early group.

The other group represents the Late Ceramic Age, and similarly incorporates sites that based on their absolute and/or relative dating can be assigned to the period between A.D. 600/800 and 1500/1600. This group also represents sites (or particular occupation periods at sites) that can arguably be assigned to the Late Ceramic Age form of sociopolitical organization as described in Chapter 3, i.e., ingrained hierarchical status differentiation, institutionalized inequality – with an elite class – and regional scale political organisation in (complex) 'chiefdoms'.

Table 5.5 presents the sites in each of the two temporal groups for the entire dataset. This division into groups is not just a sociopolitical and chronological division: it partly coincides with a geographical and geological division. The Early Ceramic Age groups in the sample are all located in the Lesser Antilles and the southern Caribbean Islands and a small part of the eastern Greater Antilles. No assemblages from sites in the Greater Antilles, such as some 'proto-agroalfarero' sites documented in Cuba, that based on absolute or relative dating, or on socio-political organization could be included in the Early Ceramic Age group were available for analysis. The Late Ceramic Age sites in the sample are located throughout the Greater and Lesser Antilles, the southern Caribbean Islands, and the Bahamas. As a 'chronological entity' the Late Ceramic Age pervades the entire region, however the sociopolitical organization associated with it, as described above and in Chapter 3, is associated predominantly with the Greater Antilles, although parts of the northern Lesser Antilles may have been involved in the chiefdom structure of the Greater Antilles. This is very important in the context of dietary studies, since the biogeography and geology of the region has been shown to influence dietary practices (Laffoon 2012; Laffoon, Valcárcel Rojas, and Hofman 2012; Newsom and Wing 2004; Stokes 1998). Next to chronological, sociopolitical, and geographical differences between the Early and Late Ceramic Age groups, there are clear environmental and geological differences between the two areas (Chapter 3).

	Site	Island	Dating
Early Ceramic Age	Argyle 2	St. Vincent	Saladoid
	Canashito	Aruba	A.D. 100–400
	Escape	St. Vincent	Saladoid
	Indian Creek	Antigua	Indian Creek period
	Malmok*	Aruba	A.D. 200–900
	Manzanilla	Trinidad	Late Palo Seco
	Simon Beach	Grenada	Saladoid / pre-Arawak
Late Ceramic Age	Anse à la Gourde	Guadeloupe	A.D. 1000–1400
	Argyle	St. Vincent	A.D. 1500–1700
	Kelbey's Ridge 2	Saba	A.D. 1300–1400
	Lavoutte	St. Lucia	A.D. 1150–1600
	Mamora Bay	Antigua	Elenoid
	Manzanilla	Trinidad	Arauquinoid
	Point de Caille	St. Lucia	A.D. 700–1000
	Santa Cruz	Aruba	A.D. 950–1250
	Savaneta	Aruba	A.D. 950–1250
	Savanne Suazey	Aruba	A.D. 1000–1600
	Spring Bay 1c	Saba	A.D. 1450
	Tanki Flip	Aruba	A.D. 950–1250

Table 5.6 The Lesser and Southern Antillean sites per chronological group.