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

Mickleburgh, H.L.

Chapter 3 The pre-Columbian Caribbean: foodways, health and disease, and crafting

3.1 Introduction

The human dentitions used in this study were recovered from a range of archaeological sites in the Caribbean, distributed throughout space and time (see Chapter 5). Understanding how similarities and differences between these sites inform us

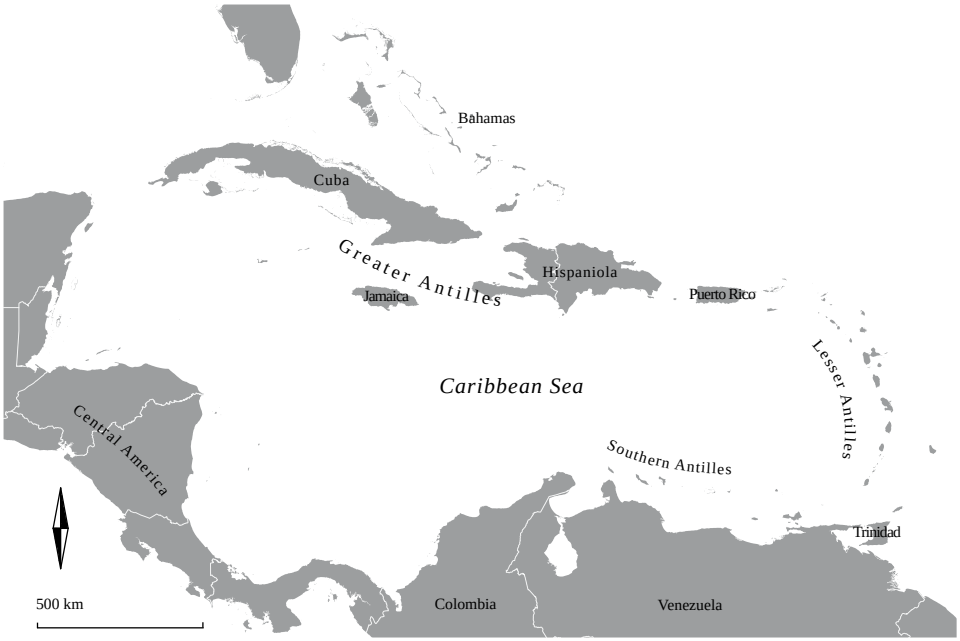

Figure 3.1 Map of the Caribbean (Pepijn van der Linden and Hayley L. Mickleburgh).

on past Caribbean peoples, requires an understanding of the sociocultural setting from which they derive. In this chapter the general development of social, cultural, and biological characteristics of the pre-Columbian Caribbean is outlined. The geographical and geological setting of the region is briefly introduced in section 3.2. The sites incorporated in this study, although selected mainly on the basis of available skeletal assemblages, represent communities that witnessed and took part in some of the main cultural and social developments in the region from the Early Ceramic Age occupation of the islands to the earliest contact with Europeans, as outlined in section 3.3. In this section, I also deal with the topic of social organization in the pre-Columbian Caribbean, as this research has profoundly influenced our understanding of past subsistence practices. The latter are elaborated on in section 3.4, explaining the relation between studies of social organization and foodways in the region. This section furthermore deals with our current knowledge of food and subsistence in the different periods of occupation of the pre-Columbian Caribbean. Section 3.4 also briefly reviews current knowledge on pre-Columbian

Caribbean foods and foodways. In the remaining part of this chapter our current knowledge on pre-Columbian craft activities (3.5) and health and disease (3.6) is reviewed, and the implications hereof for this study are discussed.

3.2 Geography, Geology, and Climate

Geographically, the Caribbean archipelago, or the West Indies, is divided into four main areas: the Greater Antilles, the Lesser Antilles, the Bahamas, and the Southern Caribbean Islands (or Southern Antilles) (Figure 3.1). These groups differ in their biogeography and geology. A large part of the insular Caribbean is situated on the Caribbean tectonic plate, with the exception of the north-western part of Cuba and the Bahamas, which are situated on the North American plate, and are therefore not part of the geological Caribbean. The Caribbean plate is moving eastward, where it borders with the South American plate, which is positioned to the east and to the south of the Caribbean plate. Along the eastern boundary of the Caribbean plate, the South American plate is being subducted under it. In this subduction zone the islands of the Lesser Antilles were formed during the Eocene to Miocene. The Lesser Antilles comprise a mix of (mostly) volcanic islands and low-lying limestone islands. From Guadeloupe northward the Lesser Antillean arc splits, with volcanic islands in the inner arc and composite volcanic and limestone plateau islands in the outer arc. The inner arc and the islands south of Guadeloupe were formed when radial cracks in the subduction zone allowed the plastic interior to escape and rise to the surface. The outer arc was formed in a similar way, however here the islands were submerged and covered with limestone sediments before being lifted again by tectonic movement. Barbados formed as the result of sediments from the subducting South American plate collecting at the subduction zone and eventually being forced upward and covered in reef limestone as the amount of sediment increased (Dillon et al. 1987; Hedges 2001; Knippenberg 2006). Geographically speaking the Lesser Antilles include Trinidad and Tobago. Geologically and biogeographically these islands form a part of the South American mainland, from which they were separated relatively recently (Tobago in the Late Glacial and Trinidad in the post-Pleistocene) due to a rise in sea-level (Boomert 2009).

The Greater Antilles are geologically older than the Lesser Antilles, and consist of continental rock which formed from the Upper Jurassic onward in a complex succession of volcanism, marine sedimentation, and metamorphism (Knippenberg 2006). The Greater Antilles support a more diverse flora and fauna than the Lesser Antilles, due to their greater size and age, meaning there is a larger variety of habitats available.

The Lesser Antilles are smaller, with less habitat diversity, and have never been attached to the mainland, meaning that the range of endemic species is relatively restricted. No mammals larger than small rodents such as rice rats occurred there naturally in pre-Columbian times, although the Amerindians did introduce hutía

to various islands from Hispaniola, and dogs and agoutis from the South American mainland. The islands of the Lesser Antilles vary in their ecological conditions, with islands like Dominica and Trinidad being covered with dense forest, while other islands like Antigua are more arid (Newsom and Wing 2004; Rouse 1992; Wilson 2007).

The Bahamas are located on the North American tectonic plate, and comprise the youngest geological formation of the West Indies. The Bahamas comprise a series of low limestone islands that formed during the Jurassic period due to marine sedimentation. Limestone areas of the Bahamas became exposed when the sea-level dropped in the Pleistocene (Gerrace et al. 1998).

The Southern Antilles, which include the islands of Aruba, Bonaire, Curacao, Margarita, and Los Roques, consist of limestone and volcanic rock, and formed as the result of volcanic activity and subsequent submergence, limestone sedimentation and rise, as the Caribbean plate moved eastward past the South American plate to the south (Meyer 1998; Pors and Nagelkerken 1998).

The current climate in the Caribbean is generally categorized as subtropical, even though a large part of the region lies in the tropics (i.e., south of the Tropic of Cancer). Mean sea-level biotemperature below 24 °C indicates a subtropical climate in some parts of the region. Climate, particularly precipitation, has fluctuated over time, affecting the distribution of flora and fauna across the region. The Holocene witnessed a general rise in precipitation levels between 8500–3000 B.P. Drought episodes have been recorded in more recent times, with a particularly long and severe drought documented between A.D. 800–1000 (Brenner et al. 2001; Curtis and Hodell 1993; Curtis et al. 2001; Higuera-Gundy et al. 2009; Hodell et al. 1991). Precipitation levels vary locally throughout the region, although all areas are affected by seasonal variation in precipitation. As a whole the region experiences a wet season between June and November, although the timing of the wet season may vary per island. Elevated areas, such as the mountainous parts of Jamaica, Hispaniola, and Puerto Rico, are cooler and moister, while lower areas are hotter and drier (Newsom and Wing 2004).

3.3 Caribbean prehistory

The islands in the Caribbean Sea, also referred to as the insular Caribbean, were first colonized around 6000 years ago, when people from the surrounding mainland areas of Mesoamerica and South America travelled across relatively large open waters to the islands, and subsequently spread throughout the region. The first migrants are referred to as Lithic and Archaic peoples respectively, and their socioeconomic organization is thought to have been characterized by a semi-mobile lifestyle, exploiting terrestrial and marine fauna, along with small-scale plant cultivation, and producing an array of lithic and shell tools and some simple pottery (Keegan 1994, 2006; Newsom and Wing 2004; Pagán Jiménez et al. 2005; Rodríguez Ramos et al. 2008; Wilson 2007; Chanlatte Baik 1995). Traditionally,

it was thought that these peoples were non-ceramic producing hunter-gatherers who were displaced by later migrants into the islands starting around 500 B.C., with some of them marginalized and pushed into the periphery of the insular Caribbean, such as western Cuba, where they lived up to first contact with Europeans (Rouse 1964, 1986, 1992). The new migrants came from the South American mainland, from the Lower Orinoco, and brought with them a characteristic material culture, notably including highly decorative and refined ceramics (Petersen et al. 2004), referred to as the Saladoid series (Rouse 1986, 1992). This marked the start of the Early Ceramic Age in the region (400 B.C. – A.D. 600/800). The precise manner and route of the dispersion of Saladoid material culture (and by extension the associated cultural groups) is still a matter of debate. Two principal hypotheses have been supported by scholars in the region: the northward 'stepping-stone' hypothesis and the southward route hypothesis.

The first assumes that Saladoid groups originating in the Lower Orinoco entered the chain of islands from the south, and moved northward from island to island in a stepping-stone fashion, eventually reaching Puerto Rico and perhaps even the eastern Dominican Republic (Lathrap 1970; Rouse 1986, 1992). The second sees a direct long distance migration from the South American mainland to Puerto Rico, where Saladoid culture settled and developed for some time, and eventually colonized the chain of Lesser Antilles from north to south, i.e., the 'southward route hypothesis' (Callaghan 1995; Fitzpatrick 2013; Fitzpatrick et al. 2010; Keegan 1995, 2004, 2006). Recently, some researchers have posited that the appearance of Saladoid material culture and society was an insular development from Archaic populations, which later spread to the South American mainland (Fitzpatrick and Callaghan 2009). More recently, some have posited a less rigid approach to the colonization of the islands, with communities upholding long-distance ties with their homeland area for extended periods of time, and with continuous interaction and repeated migration between the two areas ('to-ing and fro-ing'). This model not only provides a more nuanced view on the social processes which underlie human migration and mobility, but it also goes some way in explaining the degree of variation in Early Ceramic Age (Saladoid) material culture which has arguably been concealed by the so-called 'Saladoid veneer' (Hofman, Boomert, Bright, Hoogland, Knippenberg, and Samson 2011; Keegan 2004). Whatever the true manner of its migration or development, most Caribbean scholars now accept that the appearance and development of Saladoid material culture and society in the Caribbean from about 500 B.C. onwards does not reflect a simple displacement of the already present Archaic population in the region. Some degree of social, cultural and biological interaction and acculturation took place between the Archaic groups and the Ceramic migrants, perhaps over a substantial period of time. However, the nature and extent of these interactions is debated. Changes in our perception of the Archaic Age populations and culture in the Caribbean are related to a number of relatively recent discoveries, such as probable Archaic Age pottery and plant cultivation (Keegan 2006; Rodríguez Ramos et al. 2008; Veloz Maggiolo

et al. 1976), that have suggested that Archaic Age technology and food economy may have been very different to what we once thought. Some scholars have posited that Archaic Age groups persisted for hundreds of years in the Greater Antilles (particularly Hispaniola and Cuba) after the arrival of Saladoid groups in the Puerto Rico, and were either responsible for the later development of ceramic styles and technologies of the Ostionoid and Meillacoid (and eventually 'Taíno' societies) in the Greater Antilles (Keegan 2006), thus signalling the beginning of the Late Ceramic Age in this region (A.D. 600/800–1500), or played a significant role through multifocal development of Archaic ('pre-Arawak') peoples and interaction with Saladoid peoples (Rodríguez Ramos et al. 2008). These Ostionoid and Meillacoid material culture traditions were previously assumed to have either developed from the Saladoid over time, expanding from Puerto Rico westward and northward (Rouse 1964, 1986, 1992), or to have arrived in the islands with yet another migration from the South American mainland (Veloz Maggiolo et al. 1981). Current theories on the origins of the Meillacoid include the development through interaction between early Ostionoid immigrants and Archaic populations on Hispaniola (Jorge Ulloa Hung, personal communication), or the development through increasing marine orientation of certain Hispaniolan groups with Archaic roots and connections with the South American mainland (Sinelli and Keegan 2011). These material culture traditions are followed in some areas of the Greater Antilles by so-called Chicoid styles, which represent an increasing local diversification in material culture expressions (Siegel 2004). In the Lesser Antilles the widespread Saladoid ceramics and other material culture of the Early Ceramic Age was similarly replaced by significant diversification at local and interregional levels during the Late Ceramic Age, producing a variety of subsequent pottery styles characterized as belonging to the Suazoid, Troumassoid, or Cayoid series (Bright 2011; Hofman and Hoogland 2004; Petersen et al. 2004).

3.3.1 Social organization in the pre-Columbian Caribbean

Significant developments in social organization in the Caribbean islands are thought to mark the transitions from the Lithic/Archaic Age to the Early Ceramic Age, and subsequently to the Late Ceramic Age (Wilson 2007; Rouse 1992). The Lithic/Archaic Age is thought to have been characterized by a hunter-gatherer-forager food economy and social organization without formalized social or political roles, although it has recently been suggested that people had developed "complex social and political organization" by this time (Keegan 2010b:18). The Early Ceramic Age is believed to have brought village-based sociopolitical organization to the region, with permanent settlements, a food economy based on horticulture and hunting-fishing, and somewhat more formalized social and political roles, although leadership is thought to have been achieved rather than ascribed (Boomert 1999; Siegel 1992). There was generally little social differentiation, and sociopolitical organization did not extend beyond the village. The Late Ceramic Age is believed to have witnessed changes in social organization which in the Greater An-

tilles and parts of the northern Lesser Antilles included ingrained hierarchical status differentiation, institutionalized inequality (i.e., there is a non-producing elite population), and regional scale political organization in (complex) 'chiefdoms' (Curet 1992; Hoogland and Hofman 1999; Keegan 2000; Wilson 1997, 2007). In the Lesser Antilles, particularly the windward islands, Late Ceramic Age societies are currently understood to have continued in smaller scales of social organization with no evidence for institutionalized hierarchies, although considerable local and inter-regional diversity in material expressions arose, in contrast to the relative 'uniformity' of the Early Ceramic Age in this region (Bright 2011; Hofman and Hoogland 2004; Hofman et al. 2007; Hofman, Boomert, Bright, Hoogland, Knippenberg, and Samson 2011).

However, excepting (large ceremonial) ball courts documented in Puerto Rico, Hispaniola, and the Virgin Islands, the region has not produced the kind of 'clear cut' archaeological evidence for increasing social complexity over time that is seen in other parts of the Americas, such as the strong status differentiation between elite and commoners in for example burial practices or monumental architecture. The notion that somehow, somewhere during the Late Ceramic Age, prehistoric Caribbean societies in the Greater Antilles developed into (paramount) chiefdoms is largely built on descriptions in ethnohistoric sources of the first five decades or so of contact with and colonization by the Europeans (Curet 1992; De las Casas 1875, 1992; Fernández de Oviedo y Valdés 1851). These accounts do not necessarily accurately reflect social organization prior to European invasion of the area, and overreliance on these sources has been said to obscure the degree of variability in social organization over space and time in the region (Curet 2002, 2003). Currently, archaeological evidence for growing social complexity brought forward by scholars in the region consists of settlement patterning (size, distribution), increasing population density, and site hierarchies (Bright 2011; Crock 2000; Curet 1992, 2005; Keegan 2000), site structure (burial location, and presence of ceremonial architecture such as ball courts and central plaza areas) (Curet and Oliver 1998; Siegel 1992, 1996, 1999, 2010), and exchange of prestige objects (Bright 2011; Crock 2000; Hofman et al. 2008; Mol 2007, in prep.; Oliver 2009).

3.4 Food and Subsistence in the pre-Columbian Caribbean

Research on food and subsistence in the Caribbean has revealed the incredible degree of diversity, flexibility, and aptitude with which Amerindian populations used and managed their environments. Analysis of faunal and botanical remains has shown how indigenous peoples influenced their environment through their subsistence activities, for example in wood collection for fuel and construction, the clearing of vegetation in and around habitation sites, and in exploiting terrestrial and marine food resources (Carlson and Keegan 2004; Grouard 2001, 2002; Newsom and Wing 2004; Wing 2001a, 2001b; Wing and Wing 2001). These studies, while revealing a highly detailed picture of resource exploitation, includ-

ing preferred species, exploitation techniques and environmental impact, have infrequently dealt with the sociality of food (Pestle 2010b). As noted by Pestle (2010b:47–51) they generally follow broad temporal and cultural categories and base interpretations of these on a relatively small number of sites per category. This has meant that based on these data changes in subsistence practices over time are principally apparent when contrasting the Archaic Age with the Ceramic Age. The latter period has been characterized as a dynamic phase in which various species were introduced into the islands, for which the precise timing is hard to define, and when intensification of food procurement activities (especially agriculture/horticulture) took place. The influences of increasing sociopolitical control toward the Late Ceramic Age are inferred, but the precise relation between the process of change in subsistence practices and social organization over time remains unclear. For instance, Newsom and Wing (2004) propose that the overexploitation of certain food resources over time, which led to changed or intensified subsistence techniques in the Late Ceramic Age, may be related to increasing social complexity. However, they indicate that climate change between A.D. 800–1000 may have equally affected food procurement (Beets 2003; Beets et al. 2006; Brenner et al. 2001; Curtis and Hodell 1993; Curtis et al. 2001; Higuera-Gundy et al. 2009; Hodell et al. 1991; Newsom and Wing 2004). Other studies have found that marine resource exploitation remained the same or similar over hundreds of years throughout the Early and Late Ceramic Ages, without leading to overexploitation of certain species (Carder and Crock 2012; Carder et al. 2007; Grouard 2001, 2002). Serrand (2007) emphasizes the fact that invertebrate marine food procurement activities diversified over time in the Lesser Antilles, and that the effects of climate change were not felt equally throughout the archipelago. She concludes that changing foodways must have therefore been related to processes of social change, rather than environmental or climatic circumstances. Petersen (1997) notes a general increase in the consumption of marine foods throughout the region in the Late Ceramic Age, which he interprets as the result of populations adapting from a food economy that mirrored the tropical forest model of the South American mainland, to the broad range of marine protein available in an island setting (see also Haviser 1991; Watters and Rouse 1989).

Outside of zoological and paleobotanical studies, our understanding of the subsistence practices in the pre-Columbian Caribbean is for an important part derived from models and understandings of social organization. Froelich G. Rainey's early research, in which he identified different cultures (and migrations) by their different food remains (the 'crab-shell dichotomy'), effectively attached different levels of social organization to the Crab and Shell 'cultures' (Rainey 1935, 1940). In later research by Rouse, subsistence practices were assumed to parallel certain forms of social organization, meaning for example that the shift from a village-based to regional polity type organization was understood to entail some form of agricultural intensification – to support larger numbers of people, a group of craft specialists, a non-producing elite, and the complex system of exchange and/

or tribute upheld by the (paramount) chief – directed by a central authority. Rouse saw evidence for this agricultural intensification and complex farming techniques, and thus for higher social complexity, in the form of prehistoric terracing in Hispaniola and Puerto Rico (Rouse 1992). Parallels to this idea can be found in the work of Latin American, in particular Cuban, Dominican, and Venezuelan, archaeologists (e.g., Guarch Delmonte 1978; Veloz Maggiolo 1984; Veloz Maggiolo et al. 1981; Vargas-Arenas 1998). Building on Marxist historical materialism their work is characterized by the concept of 'modos de vida', an approach which centralizes the strong link between subsistence practices and social organization (i.e., recolectores-cazadores, agro-alfareros). Where proponents of the modos de vida approach saw subsistence practices as the basic structuring factor in social organization, others simply assumed that certain forms of sociopolitical organization entailed certain types of subsistence practice (i.e., tribe = home gardening, chiefdom = agriculture). Support herefore was drawn from ethnohistoric accounts by De las Casas and Fernandez de Oviedo y Valdés, which describe the practice of irrigation in southern Haiti, the use of the slash and burn technique, and the construction of earthen mounds or conucos throughout Hispaniola to aid drainage for plants that prefer well drained soils (such as manioc). Similarly, the existence of clear categories of social status, such as Taíno elite and commoners (nitaínos and naborías), expressed among other things through differential foodways, provided evidence for the significance of food in social complexity (De las Casas 1992; Fernandez de Oviedo y Valdés 1851; Lovén 2010).

More recent research sought to clarify the relation between social organization and subsistence. In the Maunabo Valley in Puerto Rico, Curet (1992) found that carrying capacity had not been reached at the start of growing complexity, indicating agricultural intensification was not born out of necessity (i.e., to feed a growing population). He concludes that increasing social complexity in this part of Puerto Rico is not due to ecological factors, but rather ideological shift over time, and notes that "it is important to recognize that correlation does not necessarily imply causality" (Curet 1992:339–340). Based on research into social complexity in the northern Lesser Antilles Crock (2000) has argued that subsistence production comprised only one of many ways in which sociopolitical control could be exerted. These studies have reacted to ideas from cultural ecology, which seeks to explain the differences between and development of human societies through environmental factors (Meggers 1971; Steward and Faron 1959). This critique has shown that the ability to produce a staple food surplus (as determined by for example the fertility of the environment), does not necessarily mean that increase in social complexity and centralized control will follow (see also Heckenberger 2005). Nonetheless, these approaches continued to emphasize a clear-cut association between subsistence practices and sociopolitical organization.

The implicit notion that subsistence practices in the Caribbean defined, or were defined by, social organization is similarly apparent from the recent urges to reconsider what we know of Lithic/Archaic social organization based on new findings

on subsistence and technology (Curet 2003; Pagán Jiménez et al. 2005; Pagán Jiménez and Rodríguez Ramos 2007). Other recent research has focussed on the role of particular food items as markers of social identity and status, and how this may be distinguished in the archaeological record. Curet and Pestle (2010) have recently broached the subject of elite foods, what characterizes these foods as desirable and by extension socially exclusive, and how such foods may be recognized in the archaeological record. They define a large number of characteristics by which foods suitable for elite consumption may be selected, including scarcity and abundance, labour intensity, exoticness, diversity, and 'tastiness'. Consequently, defining the evidence for these criteria in the archaeological record, and using ethnohistoric accounts, allows these researchers to distinguish elite foods at the ceremonial centre of Tibes (A.D. 700–1200), Puerto Rico. In a similar vein, Morsink (2012) identifies certain physical aspects of salt that allow this food item to accrue sociopolitical and ideological significance, playing an important role in exchange and negotiation of power relations. In contrast, Crock and Carder (2011) present evidence of social differentiation during the Late Ceramic Age on Anguilla, based on differences in quantities of marine food remains at different contemporary sites on the island and association with elite paraphernalia. While the faunal assemblages were very similar in composition, with the exception that at the site of Sandy Hill there appeared to be slightly more 'dangerous' fishes present (i.e., riskier to catch), the differences in quantities and associated material culture indicated elite control of food sources in feasting activities.

Worldwide studies into social complexity have long recognized the significant role of foodways in social change and increasing complexity (e.g., Dietler and Hayden 2001). In the Caribbean, this subject is currently particularly thought-provoking in the light of recent research. The boundaries once perceived in the occupation history of the Caribbean, such as the dichotomy between the simple, nomadic hunter-gatherer-foragers of the Lithic/Archaic period and the increasingly organized and complex horticulturalists/ agriculturalists of the Ceramic Age, are fading (Keegan 2006; Rodríguez Ramos et al. 2008) not in the least concerning subsistence practices. As we will see below in more detail, Lithic/Archaic period inhabitants of the islands engaged in (early forms of) horticulture, which alone raises questions of the true dietary and subsistence differences between the different periods of occupation and forms of social organization in the region. New studies of the role of food continue to characterize foodways by their role in social organization, e.g., as a means of social differentiation and power. This development stands to benefit from a better grip on temporal and spatial differences in the data. As we start to reconsider some of our assumptions on diet and subsistence practices in the Caribbean, we must search for new ways of examining changes over time. As described in more detail in Chapters 1 and 4, this study approaches this problem through a unique perspective, which is focussed on the evidence for foodways in individual human dentitions, and the traces of dietary change in groups spanning large periods of time.

3.4.1 Fauna

Lithic/Archaic Age

During the Lithic Age, in Cuba and parts of the Dominican Republic, the main focus of faunal food procurement was large animals such as giant sloths (now extinct), hutia, seals, manatee and sea turtles. There is some evidence for the collection of shellfish, but as yet none of fishing during this earliest period of occupation of the region (Díaz-Franco 2011; Keegan 1994; Wilson 2007). In the Archaic Age the chief focus of faunal food procurement in the Caribbean archipelago was marine resources. Throughout the region, despite the ecological differences between the Greater Antilles, the Lesser Antilles, and the Southern Antilles, human populations settled close to the shore and relied heavily on reef fishes and molluscs, which were most likely caught in traps made of plant fibres or using hook and line techniques. On some islands, birds were also an important food resource, and there are indications that rock iguanas were also exploited. As yet, there is little evidence for the exploitation of terrestrial animals in the Greater Antilles, although remains of rice rats are abundant in Archaic Age sites from the Lesser Antilles. No animals appear to have been introduced into the archipelago by humans during this period (Newsom and Wing 2004; Wing 2001b; Serrand 2007).

Ceramic Age

Evidence has been found for (extensive) overexploitation of various animal species in certain sites throughout the archipelago in both the Early and Late Ceramic Age, in the form of clearly visible changes in the composition of faunal assemblages at sites over time (Allen et al. 2009; Carlson and Keegan 2004; LeFebvre 2007; Newsom and Wing 2004; Wing 2001a, 2001b; Wing and Wing 2001). One of the most striking changes in fauna exploitation known for the region was first documented by Froelich G. Rainey (1935). Rainey noticed that the number of land crab remains at sites in Puerto Rico declined sharply at the end of what later became known as the Saladoid period. He subsequently devised a chronology distinguishing an early 'Crab culture' and a later 'Shell culture' (Rainey 1935, 1940). Later, it became apparent that the dramatic decline in land crab remains was a mostly local phenomenon, resulting from overexploitation. A steady decline in the relative abundance and size of reef fishes in the Late Ceramic Age at sites throughout the islands, similarly indicates overexploitation. The decrease in number and size of reef fishes appears to be the result of 'growth overfishing' (Murawski 2000; Newsom and Wing 2004), where certain types of fish, such as the less shy reef carnivores, are preferred, leading to depletion of the population. The fish are caught before they have time to grow, which is reflected in the decreasing sizes of these types in the faunal assemblage. In the Caribbean growth overfishing of reef fishes resulted in an increase in exploitation of offshore fish types in the Late Ceramic Age, for which watercrafts are needed (Newsom and Wing 2004).

Some small animals were intentionally introduced to the archipelago by humans

in the Ceramic Age, such as the agouti, which was brought to the Lesser Antilles (particularly the windward islands), the hutía, which was introduced to Puerto Rico, and the opossum which has been found in sites in the Lesser Antilles. While these animals sometimes comprised an important part of the diet at certain sites, they were never fully domesticated (Newsom and Wing 2004). Next to these species, other animals were important contributors to the meat portion of the diet, including a variety of birds, manatee, sea turtles, and sea turtle eggs (Newsom and Wing 2004).

While some animal foods were clearly overexploited throughout the Early and Late Ceramic Age, other animals were increasingly exploited without leading to a clear decline in their abundance and size. At various sites throughout the Virgin Islands and northern Lesser Antilles garden hunting (the exploitation of small fauna such as rice rats that are attracted to agricultural/horticultural plots), specifically for rice rats, increases in Late Ceramic times, perhaps due to intensification of horticulture during this period and the resulting improvement of environmental conditions for rodents (Newsom and Wing 2004; Wing 1999, 2008). There is also evidence for the continued sustainable exploitation of marine resources at certain sites throughout the Ceramic Age, indicating that some communities did not overexploit these resources (Carder and Crock 2012; Carder et al. 2007; DeFrance et al. 1996; Grouard 2001, 2002). In the Lesser Antilles, similarities in food exploitation strategies (of invertebrate fauna) have been found in Early Ceramic Age sites, where in the Late Ceramic Age food procurement strategies diversified (Serrand 2007).

The overexploitation of land crabs and fishes and the increase in exploitation of other faunal resources in certain areas of the archipelago seem to accompany an intensification of horticulture/agriculture during the Late Ceramic Age, which is particularly visible in the Greater Antilles. For the Lesser Antilles, there is some tentative evidence for horticultural intensification in the form of a change in the fuel wood assemblages on Nevis and St. Martin in the Late Ceramic Age. The increased use of pelagic fishes and horticultural/agricultural produce appears to have been linked to human population growth and a more 'intensive occupation of the islands' (Newsom and Wing 2004; Wing 2001b; Wing and Wing 2001).

Contact period

Ethnohistoric accounts of animal food procurement in the earliest period of contact pertain mainly to Hispaniola and Cuba. Marine foods are described as a very important component in the diets of both Greater and Lesser Antillean communities. Columbus, De las Casas, and Fernandez de Oviedo y Valdés describe various fishing and collecting methods employed by the inhabitants of the Greater Antilles, including collecting molluscs and shellfish by hand, catching of sea turtles on the beach by turning them over with a stick, gathering sea turtle eggs from the beach, fish poisoning in riverine environments, shooting fish with arrows or spears or harpoons, using a line and bait, using a hook and line, with baskets or station-

ary fish weir, and using fish nets (De las Casas 1875, 1992; Fernandez de Oviedo y Valdés 1851; Sauer 1966). These same chroniclers describe hunting practices such as catching hutias after the burning of the agricultural fields, the capture of geese by approaching them from under water, and the gagging and tying up of iguanas (De las Casas 1875, 1992; Fernandez de Oviedo y Valdés 1851; Lovén 2010).
For the Lesser Antilles, ethnohistoric accounts of animal food procurement pertain predominantly to the 17th century, since the colonization process started later in these islands, and the Island Carib of this region resisted complete European colonization until the late 18th century. The Island Carib diet appears to have been heavily marine food oriented, with a substantial land crab component. Fishing techniques included collecting molluscs and shellfish by hand, diving for lobsters from boats, catching sea turtles with harpoons, fish poisoning in riverine environments, using a line and bait, and using a hook and line. The Island Carib are also said to have been excellent hunters with bows and arrows, which with they caught lizards and perhaps agouti (Breton 1999; Lovén 2010; Rochefort 1665; Vérin 1968). Animal food processing techniques that have been described in the ethnohistoric sources include the cooking of a stew of vegetables, meat or fish, spices, and cassareep (a non-toxic, boiled manioc juice condiment) known as pepperpot (De las Casas 1992; Lovén 2010). Meat and fish were also dried or roasted over a fire on wooden racks, referred as boucan or barbacoa, a term that gave rise to our current use of the word barbecue (Jesse 1968; Sauer 1966; Vérin 1968).

3.4.2 Flora

The study of plant food exploitation in the prehistoric Caribbean region was for a long time convoluted by the region's (sub)tropical climate, which hampers the preservation of both macro- and microbotanical remains. Early research in the Caribbean therefore relied heavily on descriptions of plant use in ethnohistoric sources from the contact period and ethnographic accounts of subsistence practices in the South American tropical lowland (Sauer 1966). Research over the past few decades has demonstrated the successful application of palaeobotanical research in the Caribbean: a large array of macro- and microbotanical remains can be retrieved despite the Caribbean climate (Newsom 2008; Newsom and Pearsall 2003; Pagán Jiménez 2011).

Lithic/Archaic Age

The Archaic Age inhabitants of the Greater Antilles introduced a variety of wild fruit bearing trees and smaller seed bearing herbs into the archipelago. Some of the most prominently present species, such as wild avocado and yellow zapote (eggfruit), originate in areas of the mainland (Mexico and Central America), and are associated there with home garden cultivation. Various woods, notably palm wood, were also exploited during this period, for construction, fuel, and wooden tools and other objects (Davis 1988; Newsom 2008; Newsom and Pearsall 2003; Newsom and Wing 2004). Starch grains on the surface of stone grinding imple-

ments from Archaic sites in Puerto Rico, Vieques and Cuba show that maize (Zea mays), beans (Fabaceae, Phaseolus sp.), sweet potato (Ipomoea batatas), manioc (Manihot esculenta), and other (wild) tubers were systematically exploited as early as 3000 B.C., and perhaps even earlier (Pagán Jiménez 2005, 2009, 2011; Pagán Jiménez et al. 2005; Pagán Jiménez and Rodríguez Ramos 2007). In contrast to the traditional notion that horticulture was brought to the insular Caribbean by the Early Ceramic Age migration(s), it now appears that horticulture (or at least its precursors) was established very early on in the occupation history of the region. The currently available evidence points toward a semi-sedentary lifestyle and the use of home gardens and open plots for the cultivation of plants previously domesticated on the mainland and brought into the islands. Wild local plants were also exploited (Pagán Jiménez 2011).

Plant food preparation techniques certainly included stone grinding of root crops and maize, as evidenced by stone grinding tools from Archaic Age contexts with adhering starch grains, indicating that refined foods (i.e., highly processed, relatively non-abrasive foods) such as bread were consumed early in the occupation history of the region (Pagán Jiménez 2011).

During the Archaic Age in the Lesser Antilles fruit bearing trees and various seed bearing plants were exploited, alongside the use of wood – chiefly for construction and fuel. Some researchers have suggested that Archaic Age plant use in this region was largely opportunistic, lacking the early 'horticultural focus' of the Greater Antilles (Newsom and Pearsall 2003; Newsom and Wing 2004), however, recent microbotanical studies have found evidence for the exploitation of cabbage palm (Prestoea montana), maize (Zea mays), marunguey (Zamia sp.), and arrowroot (Maranta arundinacea) at the archaic settlement of Plum Piece on Saba, (Hofman et al. 2006; Nieuwenhuis 2008; Pagán Jiménez 2009, 2011; Jaime Pagán Jiménez, personal communication 2012).

Paleobotanical evidence from the Archaic Age in the Southern Antilles is generally sparse, in the sense that no edible plant macroremains have as yet been identified in either Archaic or Ceramic Age sites in the area. Well preserved carbonized wood remains have been recovered from a number of sites. The Southern Caribbean islands were most likely more densely forested during the prehistoric period, offering plenty of material for construction and fuel. Based on the types of wood that have been recovered, it seems various fruit bearing trees would have been available (Newsom and Pearsall 2003; Newsom and Wing 2004). Microbotanical investigations have offered some preliminary insights into plant use in this region. The study of starch grains found adhering to stone tools from the site of Saint John, Trinidad (5300 B.C.) have revealed that maize and some other domesticated starch crops (Jaime Pagán Jiménez, personal communication 2011) were exploited. Also, maize starch grains, showing evidence of grinding and baking, were retrieved from the dental calculus of a single individual from Canashito, Aruba. Although this individual has not yet been radiocarbon dated, a closely associated burial was dated to between cal. 350 B.C. and A.D. 150 (Mickleburgh and Pagán Jiménez 2012).

Ceramic Age

The Ceramic Age presents an altogether different picture in the Greater Antilles than the preceding Archaic Age. Palaeobotanical evidence from Ceramic Age sites in this region indicates a huge growth in both the cultivation of fruit trees and crops and the number of species being actively managed. Various fruits were exploited, prominent among which are the guava, soursop, papaya, star apple (caimito), and genip. Some of these species which became increasingly important during the Ceramic Age, were introduced into the Caribbean islands from the mainland, such as papaya and genip. The latter, for example, originates on the South American mainland. Papaya most likely came from Central America, although there are a number of varieties which are native to various regions (Newsom and Wing 2004). Originally, maize was also believed to be imported from the Central and Mesoamerican mainland into the Caribbean archipelago during the Late Ceramic Age. It was thought not to have been consumed as a staple food in the Caribbean, but rather as a ritually significant plant, or perhaps a high-status food type (Berman and Pearsall 2000, 2008; DeFrance et al. 1996; Lane et al. 2008; Newsom 2006, 2008; Newsom and Deagan 1994; Newsom and Pearsall 2003; Newsom and Wing 2004). This view is now changing. It appears people were exploiting maize far earlier than originally thought, and that the plant may have been consumed more frequently than first suggested, perhaps during communal activities such as feasts (Berman and Pearsall 2000, 2008; Mickleburgh and Pagán Jiménez 2012; Pagán Jiménez 2005, 2009, 2011; Pagán Jiménez et al. 2005; Pagán Jiménez and Rodríguez Ramos 2007).

The Ceramic Age in the Greater Antilles is largely characterized by the great variety of plants that were cultivated in home gardens. Plant use was flexible, and differed according to the locally available resources and environment. Staple food crops mostly comprised tubers including manioc, marunguey, cocoyam, and sweet potato. Manioc consumption has traditionally been inferred in Caribbean archaeology from the presence of large numbers of griddle fragments in Ceramic Age contexts throughout the region. The griddle was assumed to have been used to grill manioc bread (Rouse 1992; Keegan 2000). However, recent research has demonstrated that griddles were used for the preparation of a variety of plant foods including tubers and even meat and fish, but not manioc (Rodríguez Suárez and Pagán Jiménez 2008).

Next to the staple food crops, hallucinogenic plants such as evening primrose and cojóban and spices such as wild pepper were in common use. Also, the range of trees used in construction and for fuel, but also for wooden tools and other objects increased greatly. Plants were also important for the manufacture of baskets and nets, which in turn allowed the capture of for example molluscs and fish (Newsom 1995; Newsom and Pearsall 2003; Newsom and Wing 2004; Ostapkowicz 1998). In the Late Ceramic Age agricultural practices in the Greater Antilles intensified, as evidenced by both palaeobotanical evidence and for example evidence for agricultural terracing in Puerto Rico (Newsom and Wing 2004; Ortiz Aguilú et al. 1991).

In the Bahamas, which remained uninhabited until the Late Ceramic Age, local vegetation (specifically wood types) was used for the manufacture of (hard)wood items, such as a small canoe recovered on Andros Island and a wooden bowl recovered from Major's Cave. The presence of basketry impressions on pottery indicates plant fibres, most likely from palm or grass leaves, were used for the manufacture of baskets and/or mats. Certain types of pottery (griddles) also indicate the use of starchy staple crops, such as manioc or marunguey. Some remains of carbonized and desiccated seeds have shown that fruit bearing trees were also exploited (Newsom and Pearsall 2003; Newsom and Wing 2004). Starch grain analysis on chert microliths has shown that by at least A.D. 800 and perhaps earlier, the inhabitants of this region used maize (Zea mays), chilli (Capsicum), and perhaps manioc (Manihot esculenta) and other tubers (Berman and Pearsall 2000, 2008).

Plant use in the Lesser Antilles during the Ceramic Age is also characterized by home gardening and the cultivation of a variety of fruits and staple crops. As in the Greater Antilles, manioc, marunguey, cocoyam, and sweet potato are thought to have comprised the main staple crops. With regard to the collection of wood for construction and fuel, the inhabitants appear to have focussed their efforts on locally available dry forest trees. Subtle changes in the constitution of the floral assemblage during the Late Ceramic Age in this area indicate increased human pressure on the local environment. There are some indirect indications that horticultural practices intensified during the Late Ceramic Age, although the evidence is far less clear than for the Greater Antilles (Newsom and Pearsall 2003; Newsom and Wing 2004). New evidence from starch grain analysis of human dental calculus from Late Ceramic Age sites in the Lesser Antilles[3] confirm the consumption of sweet potato, and show that beans and maize were also a part of the diet. No evidence for manioc consumption was found (Mickleburgh and Pagán Jiménez 2012).

Our knowledge of plant resource exploitation in the Southern Antilles is rather sparse, for both the Archaic and the Ceramic Ages. While we know from plant macroremains that fruit bearing trees were exploited, there is little other macrobotanical evidence for the Ceramic Age. Generally, it has been inferred that the Southern Antilles were particularly attractive due to their extremely rich marine resources, leading investigators to assume marine foods formed a far more important part of the diet than vegetable foods (Newsom and Pearsall 2003; Newsom and Wing 2004). Nonetheless, recent research based on starch grains recovered from dental calculus has revealed that maize and marunguey, part of the spectrum of staple plant foods elsewhere in the archipelago, were consumed at the Late Ceramic Age site of Tanki Flip (Mickleburgh and Pagán Jiménez 2012).

Plant food preparation techniques in the Ceramic Age continued to include stone grinding of root crops and maize and the production of refined foods such as bread, which would have been baked on burénes or griddles. Furthermore, the presence of stone grater flakes in numerous habitation settings indicates that stone

3 Anse à la Gourde (Guadeloupe), Kelbey's Ridge 2 (Saba), and Point de Caille (St. Lucia).

grater boards (with inlayed stone grater 'teeth') were used to grate and shred plant foods (e.g., Berman 1995; Righter 2002; Rostain 1995; Walker 1983). From archaeological and ethnographic contexts in the South American mainland it is known that such grater boards are generally used for the preparation of manioc and other (root) crops (Mowat 1989; Perry 2004).

Contact period

The ethnohistoric accounts of agricultural practices and cultivated plants in the earliest period of contact pertain mainly to Hispaniola and Cuba. De las Casas describes how women in Hispaniola and Cuba created small heaps or mounds of earth using wooden digging sticks, in which they planted various (root) crops. Large areas of land with such agricultural mounds, or montones, were observed by De las Casas in the Vega Real region of Hispaniola and east of the city of Santo Domingo (De las Casas 1875; Lovén 2010). Fernandez de Oviedo y Valdés similarly describes the practice of constructing montones in Hispaniola, however for wooded or mountainous areas of this island he describes a slash and burn practice, with crops being planted directly in the loosened soil (Fernandez de Oviedo y Valdés 1851). For the Lesser Antilles, ethnohistoric accounts of crop cultivation pertain predominantly to the 17th century. The Island Carib also used montones, in which they planted a range of root crops, particularly manioc (Breton 1999; Lovén 2010; Rochefort 1665).

Important (staple) crops mentioned in the sources are manioc (Benzoni 1857; De las Casas 1992; Fernandez de Oviedo y Valdés 1851; Rochefort 1665), sweet potato (Benzoni 1857; Fernandez de Oviedo y Valdés 1851), arrowroot and/or leren (Fernandez de Oviedo y Valdés 1851; De las Casas 1992), maize (Benzoni 1857; Fernandez de Oviedo y Valdés 1851), and beans (Breton 1999; De las Casas 1875; Fernandez de Oviedo y Valdés 1851). Root crops, particularly manioc, were used to bake a type of dry and hard bread, which was grilled on a ceramic griddle. This bread usually formed the staple of the diet and was consumed together with pepperpot, a dish of various stewed vegetables, meat or fish, spices (particularly pepper), and cassareep (a non-toxic, boiled manioc juice condiment) (De las Casas 1992; Lovén 2010).

Next to (staple) crops, the sources mention a number of fruits which were exploited by early contact period Amerindians. Some belonged to wild trees, while others were kept in and around the settlement or house gardens. Fruits mentioned prominently in the sources are pineapple, guava, papaya and star apple (caimito) (De las Casas 1992; Fernandez de Oviedo y Valdés 1851).

The ethnohistoric sources also suggest that social differentiation may have been expressed through foodways. De las Casas mentions differentiation in food consumption between common people and caciques (chiefs). More refined manioc cakes, so-called xauxau, which were reserved for consumption by the cacique, contained more finely ground manioc and were whiter due to their higher starch content (De las Casas 1992; Fernandez de Oviedo y Valdés 1851). Interestingly, the

distinction between elite and common food made here does not involve restricted access to a particular plant or animal food, but rather to a certain food preparation technique. De las Casas further mentions having seen caciques eating from the same dishes as common people, apparently indicating that caciques also ate 'regular' foods, and that status differentiation did not necessarily affect the communal use of utensils (De las Casas 1992; Lovén 2010).

3.5 Health and Disease in the pre-Columbian Caribbean

The bulk of the information that can be acquired on health and disease in the past is derived from skeletal material or documentary evidence. When written sources are lacking, human skeletal material may be used to, for example, study the effects of specific social and cultural developments, such as the introduction of agriculture. However, the study of past (trends in) health using human skeletal remains is subject to fundamental disadvantages. The foremost among these is the fact that most diseases do not affect the skeletal system (or at least leave visible traces on it). Nonetheless, palaeopathological work has for decades produced coherent interpretations of patterns of ancient health, and particularly in the case of large scale social and cultural processes has proven to be highly valuable.

With regards to the Caribbean, research into ancient health has generally been sparse and has rarely focussed on disease patterns for (larger parts of) the region. Most palaeopathological research that has been done, has focussed on skeletal assemblages from individual sites. Extrapolating these data to the entire region is problematic, due to the small number of individual skeletons which must be taken to represent large time frames and broad units of sociopolitical organization. Furthermore, there is a clear disparity in numbers of skeletons representing the different regions and occupation phases in the Caribbean islands. The numbers of human remains recovered from the Lesser Antilles are small when compared to the large numbers excavated in the Greater Antilles. Archaic (and even Early Ceramic Age) skeletal material is similarly very scarce. Nevertheless, some general trends can be observed in the light of the palaeopathological research that has been done in this region to date. Certain infectious diseases, most notably treponemal disease or yaws, are known from throughout the area, although in many cases the diagnosis is tentative. The distribution of known cases of treponemal disease across the islands appears to show a concentration of cases in the Greater Antilles in the Late Ceramic Age, however as yet this seems most likely to be the result of the smaller numbers of skeletal remains that are available for study in the Lesser and Southern Antilles (Schats 2010, 2011). Treponemal disease has been reported in various pre-Columbian Caribbean skeletal collections, including Anse à la Gourde (Guadeloupe) (Weston 2011b), Atajadizo, La Cucama, and Narrangjo Arriba (the Dominican Republic) (Luna-Calderon 1993; Rothschild et al. 2000), Bull Savannah (Jamaica) (Santos et al. 2013), Cueva Calero (Cuba) (Vento and Gonzalez 1996), Lavoutte (St. Lucia) (Weston 2011a), Paso del Indio (Puerto Rico)

(Crespo Torres 2005b, 2008, 2009), and Tutu (St. Thomas) (Sandford et al. 2002; Sandford et al. 2005). At the latter site the mean number of lesions per individual increased from the Early to the Late Ceramic Age (Sandford et al. 2002; Sandford et al. 2005). However, this does not necessarily mean people were more severely affected by the disease in the later phase of occupation at the site, as longer survival throughout the course of development of the disease may indicate the population had developed increased resistance to the disease over time. Skeletal remains from numerous sites in the Dominican Republic dating to the Late Ceramic Age show evidence of treponemal disease, while the remains from two Archaic sites studied show no trace of treponematosis, perhaps indicating the disease did not arise until the (Late) Ceramic Age (Rothschild et al. 2000).

Numerous cases of tuberculosis have been identified in skeletons from Eleuthera Island in the Bahamas, although some of these cases may in actual fact be treponemal disease, as the cause of the skeletal lesions proved difficult to interpret. Due to the proximity of the Bahamas to Florida and North America, it has been suggested that the tuberculosis observed in skeletal material there may have derived from this region, where a form of endemic tuberculosis is known to have been present during pre-Columbian times (Drew 2009). Other cases of tuberculosis have been mentioned for the site of Cueva Maria Sosa, in the Dominican Republic (Luna Calderón 1982).

Evidence of so-called deficiency diseases in the form of for example dental hypoplasia and cribra orbitalia has been found throughout the Caribbean region (Luna Calderón 1977; Coppa et al. 1995; Crespo Torres 2010), although Drew (2009) suggests that Early Ceramic Age groups and groups occupying the smaller islands were affected more frequently than Late Ceramic Age groups living on the larger islands. Evidence from the Puerto Rican site of Paso del Indio points to a link between the greater agricultural focus (intensification) of the Late Ceramic Age due to increasing social complexity and growing physical stress as indicated by dental hypoplasia, cribra orbitalia, porotic hyperostosis and osteomyelitis (Crespo Torres 2008). By contrast evidence from pre-Ceramic and Ceramic Age assemblages from the Dominican Republic has shown that, based on a decrease in frequencies of enamel hypoplasia, life conditions improved over time. Nutrition deficiencies reflected in the presence of enamel hypoplasia at these sites was found to likely be related to weaning stress (Coppa et al. 1995). Luna Calderón (1982) links the presence of Harris lines, numerous enthesopathies, and the extremely small stature in skeletons from the Archaic Cueva Maria Sosa site to the harsh local environment, presumable occupation stress and the lack of adequate foods. Evidence for occupational stress is found among most skeletal assemblages from the region, indicating that certain hard physical labour activities were habitually engaged in, resulting in stress markers on the bones where muscles and ligaments were attached (Drew 2009; Hofman et al. 2012; Weston 2010, 2011a, 2011b, 2012, in prep.).

Although it is not strictly speaking a form of pathology, evidence of trauma has also been found throughout the region, although the small number of individuals

involved and the types of trauma documented point to accidental trauma or interpersonal violence as opposed to larger scale warfare (Budinoff 1991; Crespo Torres 2008, 2010; Hofman and Hoogland 2011; Luna Calderón 1976; Schaffer et al. 2012; Weston 2010, 2011a, 2011b, 2012; Weston and Schats 2010).

Finally, the most ubiquitous pathology found throughout the pre-Columbian Caribbean is dental pathology in its various forms. This is rather unsurprising as dental pathology is the most frequently documented type of pathology found in human skeletal remains worldwide (Waldron 2009). Extreme dental wear and caries are the most commonly occurring cases of dental pathology observed in Caribbean skeletal assemblages, followed by ante mortem tooth loss and periodontal disease (Coppa et al. 2012; Crespo Torres 2008; García-Godoy 1980; Hofman et al. 2012; Luna Calderón 1980; Mickleburgh 2007, 2011, 2012; Morbán Laucer et al. 1977). Changes in dental pathology over time, as observed in dental material included in this study, are discussed in the following chapters.

Although there is relatively little evidence to go on for the moment, it seems there are some trends for changes in health and disease patterns in the Caribbean over time. Differences have been noted between the pre-Ceramic Age and the Ceramic Age, and between the Early Ceramic Age and the Late Ceramic Age. From what we currently know, environmental, biological, and nutritional circumstances were affecting population health over time. Some of the evidence is contradictory, for example whether skeletal evidence for disease was greater in the Early or Late Ceramic Age, however these results may reflect local variation and local environmental conditions. Furthermore, the paucity of Archaic Age skeletal remains means that this period in the history of the Caribbean is sorely underrepresented with regard to skeletal pathology. It is clear that a comprehensive and comparative study is needed to elucidate whether apparent contradictions in the data represent local differentiation, or result from the small sample sizes used to represent large populations over extended periods of time.

3.6 Craft Activities in the pre-Columbian Caribbean

Early theoretical approaches to socioeconomic development, such as V. Gordon Childe's theory of the origins and development of civilization, paid special attention to craft production, particularly craft specialization, as a key aspect in the sociopolitical development of state societies and resultant status differentiations. While more recent research has shifted its focus toward the social and cultural identity of artisans and the meanings attached to the goods they produced, studies into craft production have largely been characterized by a clearly social evolutionary perspective (Patterson 2005). This viewpoint works from the premise that craft specialist activities are linked to – or made possible by – the production of agricultural surpluses (and therefore also to the technological advances which made these possible), and as a consequence inherently assumes that craft specialists did not engage in food production (Stein 1996). Concomitantly, a great deal of attention

has been given to the relation between craft specialization and the emergence or maintenance of a powerful elite class, who effectively controlled craft production in order to validate and support their political power. Such research has focussed heavily on craft production of such items as personal ornamentation and exotic exchange goods, as these would have been actively sought after and adopted by elites as a highly visible emblem of their power and authority (Peregrine 1991).

The main aim of much research into craft production in archaeology has been to elucidate the organizational structure of the production process; with the power relations between the various actors in the production sequence, and the role of craft products in the sociopolitical arena frequently taking precedence over material and functional aspects of the product, and social role and identity of the producer (except regarding status). This significance attributed to the organization of craft production is also reflected in more recent work in this field, such as Cathy Lynne Costin's (1991) influential model which categorizes the organization of production. She distinguishes four parameters: context, concentration, constitution, and intensity.[4] Using these parameters, Costin distinguishes eight types of craft specialization which differ in the social, political, economic and environmental circumstances that gave rise to them, in an attempt to shed light on the social role of the artisan in the organization of production (Costin 1991; Costin and Hagstrum 1995).

As we will see further on in this work, almost all sites under study here include individuals, who based on their dental wear (i.e., dental evidence for the use of the teeth as tools), could arguably have been craft specialists in the sense that they provided a service for which a large degree of knowledge, training and expertise was needed; but there is no evidence to suggest that their social identity fits that of a craft specialist as set out in the social evolutionary perspective (Patterson 2005). Uniquely, this study's dataset presents a situation in which the craft product is unknown (or cannot be precisely determined), but the craftsman or woman is known. This requires a completely different approach to craft production and producers: one that is not focussed on the role of the producer in the greater picture of social organization, but on the producer's identity as an individual crafts(wo)man. Very little is known about the circumstances under which craft specialists worked in the pre-Columbian Caribbean. For the early contact period – and thus, it has been argued, for the latest phase of the Late Ceramic Age – we know that regional leaders, or caciques, controlled the circulation of certain religious paraphernalia: for example, Peter Martyr D'Anghera (1912: decade I, book V) describes how the

4 Context in this sense refers to the difference between attached and independent specialization; in other words whether the craftsmen produce goods which serve to reinforce political and social power of an elite class, or whether they produce utilitarian goods which circulate outside of the realm of political control. Concentration refers specifically to the spatial distribution of craftsmen, i.e., dispersed throughout the community versus clustered together in one location. Constitution describes the nature of the production unit, such as the group size and social relations between individuals in the group. Intensity refers to the amount of time craftsmen spend on their craft activities, as these are not necessarily full-time jobs (Costin 1991).

cacica Anacaona held a house full of wooden 'idols', including duhos and bowls made of a black wood, thought to be ebony (see also Ostapkowicz 1998; Sauer 1966). Implicitly, it is assumed that the production of such items also lay under chiefly or elite control. Some archaeological evidence has been found, which may serve to endorse this notion. Berman and Hutcheson (2000) have for example suggested that basketry may have functioned as trade, tribute, or gift exchange items expressing shamanic authority and power relations in Lucayan-Taíno society in the Bahamas. Based on impressions in pottery, they found evidence for complex designs and inter-site variation in technology and style of weaving patterns. Similar research on basketry impressed pottery from Antigua and Montserrat, mostly dating to the Early Ceramic Age, has indicated that the technology and weaving patterns used may be an expression of ethnicity (Petersen et al. 1999). The manufacture of shell beads at the Late Ceramic Age site of Governor's Beach on Grand Turk was interpreted by Carlson (1995) as a specialized craft activity, with part-time Taíno specialists of high social ranking producing highly uniform shell beads (Carlson 1995; Littman and Keegan 1993). Stone bead manufacturing sites specializing in the production of certain types of beads have been identified at the Early Ceramic Age sites of Trants on Montserrat and Pearls on Grenada, presumably indicating some form of central organization of craft production in this earlier period too (Cody 1991; Watters and Scaglion 1994). However, aside from this, the current evidence does not justify working explicitly from the assumption that craft activities were controlled by a politically elite class, especially in the earlier period. It is not discounted here that crafts(wo)men may have achieved a higher status through crafting and the associated ritual knowledge (Spielman 2002); such non-formalized social differentiation may be present in all forms of social organization. Still, the data used in this study do not allow for such an approach. It is not intended here to explore the intricacies of the organization of production and hierarchical control. The objective of investigating craft activities in this research is not centred on attempting to expound whether individuals could be considered 'specialists', in the sense that their contribution to the economy was strictly non-food related, and regulated by a central authority. Nor will I attempt to define whether production was performed on a full-time or part-time basis. Whether production was attached or independent is equally outside of the scope of this research. The aim here will be simply to investigate which individuals in the dataset show signs of craft production, and what materials they were most likely fabricating. The age, biological sex, dating, mortuary practices, and any other information, including for example pathology, provide an informed picture of the identity of crafts(wo)men.