Indigenous adornment in the circum-Caribbean: The production, use, and exchange of bodily ornaments through the lenses of the microscope

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Conclusion

The present research had, from the outset, two interconnected goals: to develop an approach for studying collections of ornaments from diverse origins and to assess the biographies of bodily adornment in the pre-colonial Caribbean. This resulted in the four chapters previously presented. Chapters 2 and 3 were aimed to address this first goal, designing an approach to the study of ornaments and their biographies. The second goal was broken down in three research questions: 1) what were the patterns in the ways people dealt with ornaments? 2) How did these patterns relate to the social roles of ornaments? 3) What new insights did technological and use patterns provide on our understanding of the exchange of ornaments across the Caribbean Sea? Two case-studies from the pre-colonial Caribbean were selected: the early part of the Early Ceramic Age in the Eastern Caribbean and the later part of the Late Ceramic Age in the Greater Antilles. They were chosen because they provide the contexts with the largest degree of ornament production and circulation known for the pre-colonial history of the archipelago. Chapters 4 and 5 thus focused on the application of the approach developed in the first chapters to the two case-studies. Each chapter ended with a discussion and conclusion that focused on the implications of the identified patterns for understanding ornament biographies in the relevant region and time period.

6.1. Bodily adornment through the lenses of the microscope: evaluating the approach

The approach to the study of bodily adornment used here was first outlined in Chapter 1, where it was connected to recent theories about its role in society. Microwear analysis was proposed as empirically-based avenue to assess the biographies of ornaments. This approach was further developed in the first two chapters, while Chapters 3 and 4 outlined the specific protocol of analysis used.

Chapter 2 singled out the specific challenges involved in the study of (old) collections, in particular from museums. Identified limitations were connected to the lack of detailed information about the archaeological context of the studied collection and to the poor state of preservation of certain artefacts. This chapter further dealt with the complexities of interpreting the palimpsests and micro-stratigraphies of traces formed on the surface of figurative ornaments as a result of multiple production stages, use episodes, post-depositional processes, and curatorial modifications. Despite challenges, we were able to successfully analyse the artefacts and generate new insights into their production and use in the Valencia Lake Basin. This study helped us set up the approach and protocol of analysis that was used for the case-study chapters. Chapter 3 reflected on archaeological interpretations of use in bodily adornment, dealing with questions such as reconstructing specific string configurations, establishing degrees of use, and making sense of the absence of use-wear. It delved into the wear-traces formed on individual artefacts made of diverse raw materials as a result of their incorporation into real (composite) objects of bodily adornment. We looked at a variety of ethnographic ornament types and with a broad range of attachment systems, including items directly attached to the body, with different string configurations, and involving contact between neighbouring beads. A unique reference collection was thus formed, which can be used by researchers interested in use-wear formation on ornaments or even on other artefact types that are subjected to similar conditions (such as being attached through a string). The chapter not only presented detailed descriptions of traces per raw material, but also was extensively illustrated through the use of three types of microscope. This study also provided us with the chance to reflect on the biographies of composite ornaments and on how they may differ from our archaeological expectations of homogeneity and complementarity.

Chapters 2 through 5 demonstrated the usefulness of the selected approach and method in assessing the different modifications ornaments undergo, in spite of the diverse nature of the collections they belong to. Having been (at least partially) conducted in the Caribbean, the research presented in Chapters 4 and 5 often had to deal with time and equipment limitations. Furthermore, other limitations in the research carried out in this dissertation should also be acknowledged. The lack of contexts of production or associated toolkits in most studied contexts has meant that all data concerning ornament making had to be generated from the study of the ornaments themselves. I

have focused on multiple ornament raw materials, namely lithic materials with strikingly different physical properties (i.e. different hardness, toughness, and brittleness) and, for the Late Ceramic Age, also non-lithic materials (notably, marine shells). However, it is not common for a same researcher conducting technological, microwear, or experimental research of ornaments to focus on such a broad range of materials (although exceptions to this can be noted, *e.g.*, Alarashi 2016; Bains 2012; Gurova et al. 2013; Van Gijn 2006). But, as illustrated by many of the ethnographic ornaments studied in Chapter 3, multiple raw materials can and often coexist in composite objects. In this sense, the choice for this broad range of materials was guided by the desire to provide a more holistic view of adornment practices for each Caribbean case-study. This has, however, limited the breadth of insight that could be obtained concerning each material and the ways it was worked and more generally treated. In particular, more experiments need to be performed in order to provide greater insights into production technologies and modes of use. A more systematic comparison between archaeological traces and those experimentally-produced also needs to be done, for instance by focusing on the sequential grinding experiments in order to assess how the different ornament raw materials wear according to different conditions. The identified tool raw materials require new experimental assays that focus on their mechanisms of application and performance (*e.g.*, string sawing and incising/drilling with bone or wooden tools). In spite of the abundance of insights generated by the study of ethnographic objects as a use-wear reference collection, we could not reconstruct specific ornament compositions. This is largely due to the paucity of archaeological ornaments found in groups and in closed contexts. The recovery of groups of ornaments *in situ* remains essential for further interpretation regarding the arrangement of individual pieces and composite ornament types. Despite the identified limitations, the contributions of Chapters 4 and 5 for Caribbean archaeology are revisited in the following section. They are discussed in a broader perspective, with particular attention given to their impact on past exchange networks.

6.2. Exchange networks viewed through technology and use-wear

As stressed throughout this dissertation, a highly interconnected image of the pre-colonial Caribbean has emerged in recent scholarship (Boomert 2000; 2007; Breukel 2019; Cody 1993; Curet and Hauser, eds. 2011; Hofman et al. 2006; 2007; 2008; 2010; 2011; 2014; 2019; Hofman and Van Duijvenbode, eds.

2011; Keegan and Hofman 2017; Laffoon et al. 2013; 2014; Mol 2007; 2013; 2014; Morsink 2013; Rodríguez Ramos 2010; Rodríguez Ramos and Pagán Jiménez 2006; Watters 1997). Given the extensive contacts through mobility and exchange of people, materials, and ideas between communities in different islands and regions, one may expect a considerable degree of interaction between craft practitioners and the long-term exchange of technical knowledge. The movement of craftspeople within networks of exchange, inter-marriage, or other forms of interaction may have led to different degrees of transfer and transformation of technical knowledge (Brysbaert 2007, 333-335). Craftspeople may also have undertaken trips in pursuit of esoteric knowledge and materials from afar (as extensively discussed by Helms 1988). However, it remains to be demonstrated how this connectivity influenced the ways in which crafts were practised, transmitted, and shared across the Caribbean. Researchers in the region have indeed highlighted the importance of foreign and shiny materials among early colonial indigenous communities of the Caribbean, in particular for their exotic and supernatural character (Berman 2011; Helms 1987; Keehnen 2011; 2012; Oliver 2000; Saunders 1999). For instance, producing a highly developed polish on the surface of lithic and wooden artefacts has been noted as an important activity that would bring forth the inner characteristics of a material, both physical and ideational; and that, more importantly, involved polishing formulas that we do not entirely understand and that were most likely not widely shared across the region (Berman 2011, 130; Breukel 2019; Helms 1987, 75). This stresses that craft practice and technologies should be indispensable topics of investigation in contexts of circulation of people, ideas, and things. However, as argued previously, studies that focus on both craft technologies and the circulation of materials have been rather few in number, in particular when non-ceramic artefacts are considered (here I refer the reader to *e.g.*, Breukel 2019; Knippenberg 2007; Martinón-Torres et al. 2012; Rodríguez Ramos 2010). In the following, I discuss how the biographical approach, marked by its focus on technologies of production and use-wear, has contributed new insights to our understanding of the social roles and networks of circulation of bodily ornaments in the pre-colonial Caribbean.

6.2.1. Early Ceramic Age ornaments in the Eastern Caribbean (400 BC – ca. AD 400)

A detailed study of a large assemblage recovered from the site of Pearls on eastern Grenada was presented in Chapter 4. It entailed a typo-technological analysis of the entire assemblage (n=1273), in addition to the microwear analysis of a sample set (n=100). This study allowed us to characterize ornament making strategies at the site, in spite of limitations connected to the origins of the collection. We identified a wide range of lapidary materials being worked, which arrived at Pearls from different sources. In the same vein, we showed which technical procedures were most likely carried out locally and, by proxy, the stages in which each material likely entered the site. Acquisition and production logics of lapidary materials varied according to ornament raw material and type. Amethyst was brought as raw material to the site[1], worked locally, and redistributed to other eastern Caribbean islands. Pearls was not specialized solely in amethyst bead manufacture; instead, it should be seen as a workshop for the working of macro- and microcrystalline quartz varieties. However, it remains unclear whether amethyst and quartz were directly procured or acquired through exchange. Carnelian was sourced and primarily worked in the northeastern Caribbean, but arrived in large numbers and in different technical stages to Pearls. Diorite and turquoise ornaments were imported in large quantities, but largely as finished beads. Jadeitite was obtained in large quantities and accompanied by a large production output of, primarily, pendants. Carnelian, jadeitite, and diorite were brought to the site in different production stages, further modified, and possibly redistributed to the Windward islands. Based on the large numbers of materials arriving as raw materials or in early production stages, we can hypothesize that, in addition to being a lapidary workshop, Pearls was a central place (sensu Renfrew 1977, 85). This hypothesis is based on the evidence for directional trade of large amounts of materials towards the site from multiple source communities. In other words, the site was supplied preferentially in comparison to other settlements in the region (Renfrew 1977, 85). It is also based on the idea,

1 It was also brought in the early production stages, if we consider the evidence from the site of Grand Anse. According to Cody (1990), most early stages of amethyst working took place at this site on the southwestern coast of Grenada. Amethyst crystals and debitage were recovered there, suggesting that it was a "trading centre" for amethyst crystals believed to come from South America (Cody 1990, 10). However, the few units excavated at Grand Anse showed a highly disturbed stratigraphy (Hanna 2017, 105-106).

supported by our pilot use-wear study, that many of such materials were not locally used, but further exchanged (i.e. redistributed). In turn, the low numbers of finished and unfinished ornaments in most other lithologies, alongside high stylistic variability, suggest a different pattern of acquisition (*e.g.,* nephrite, other metamorphic rocks with tremolite, metamorphosed ultramafics). They were likely not obtained by direct procurement; rather, they seem to represent the acquisition of varied "greenstones" through down-the-line exchange. This would explain the presence of small quantities of various rock types in multiple production stages. Unfinished specimens were further transformed, often into pendants, by use of the local technical repertoire. Geographical distance between the geological sources of each of these materials may not have been known or may not have been conceived in a linear sense. This is to say that different mechanisms were in operation giving rise to the extremely diverse nature of the studied collection. However, we should be aware of the limitations intrinsic to the interpretation of patterns stemming from the study of a collection without documentation regarding specific contexts of recovery.

Here my aim is to illustrate how this evidence can be related to previous ideas about exchange mechanisms and the social contexts affording them. As mentioned in Chapter 1, Cody (1993) proposed the "gateway community" model to explain the patterns she noted when excavating and studying the materials from Pearls. She argued that the role of lapidary workshops in the Early Ceramic Age should not be regarded as that of "central places", because of the linear arrangement of the West Indies (Cody 1993, 210). This stepping-stone distribution of islands would be in opposition to the symmetrical arrangement of sites and uniform distribution of population and resources expected for the central place model—also considered to be rather unrealistic (Hirth 1978). However, I am here less interested in the specific conditions defined by the model; rather, I use the concept of central place to draw attention to the dynamics of preferential supply, redistribution, and maintenance of horizontal connections between similar centres. Connections between different lapidary workshops have been previously proposed, notably between Pearls and the site of Trants on Montserrat (Watters 1997). This pattern of differential distribution of exchanged materials across the eastern Caribbean would be the result of a hierarchy between exchange partners (Renfrew 1977). Our results show that Pearls was one of main lapidary workshops and trading centres of the Caribbean, but not only for amethyst. Its location on the opposite end of the archipelago in

relation to the large workshops in Puerto Rico and Vieques further stresses its crucial role. However, this does not necessarily imply the presence of chiefs and a hierarchical system of socio-political organization during this period (see also Ibáñez et al. 2016). More recently, it has been suggested that lapidary workshops functioned as social hubs, where the display and redistribution of valuable materials took place as part of public competitive feasts between aspiring big men (Boomert 2000; 2001; 2007; Hofman et al. 2007; 2014; 2019). Ceremonial exchanges in small-scale societies are known to occur in feasting contexts (Dalton 1977; Mauss 2003[1925]; Spielmann 2002).

The patterns identified during our study indeed suggest that Pearls would be a centre not only for redistribution of ornaments made of multiple materials, but also for the gathering of people and the sharing of knowledge. This latter hypothesis can perhaps be illustrated by our evidence: the abundance of different styles[2] and of different techniques for working ornaments at Pearls may be a product of the arrival of materials from different origins to the site. In particular, we noted, on the same raw material, the use of different sawing techniques for blank acquisition and carving or of multiple types of grinding and polishing. This technological variability may have corresponded to 1) the (partial) production of some artefacts in other sites or 2) the co-presence of craftspeople belonging to different technological traditions.[3] In this latter scenario, craftspeople from different places would be gathering at Pearls on certain occasions to, among others, produce and exchange lapidary materials. In this period, lapidary making technical knowledge seems to have been present across the region. This is suggested not only by the presence of multiple sites that functioned as lapidary workshops, but also by more restricted evidence for lapidary working in other sites, such as Morel and Gare Maritime on Guadeloupe, Tutu on St. Thomas, and Hacienda Grande on Puerto Rico. We can speculate that ornament production in a site like Pearls was not exclusively connected to the production of surplus prior to and for ceremonial display and exchange; it was perhaps also carried out

2 A good example of this stylistic variability is the fact that no single frog carving is the same. This is probably the case not only for specimens retrieved at Pearls, but across the archipelago. While three different stylistic groupings have been defined (Cody 1991; Turney 2001), there is still considerable variability within each of them. The most homogeneous group seems to be the typically Huecoid "segmented frog" type, a few of which are found in the Pearls collection.

3 As mentioned above, the origins of the collection pose a severe limitation to such interpretations, in particular considering that the observed variability may be connected to a development taking place within the centuries of occupation of the site.

as ritual performance in such contexts of social gatherings (see also Hull 2014). Skill, creativity, and the esoteric knowledge associated to crafting colourful and shiny materials from afar may have been central elements in their valuation (Helms 1987, 74-75; 1988, 111-118). The importance of technical performance and variability in lapidary ornaments in Early Ceramic Age contexts can be further stressed by comparing them to any other ornaments of later or previous time periods from across the archipelago. However, we cannot, at this stage, distinguish between the two proposed scenarios, i.e. lapidary products from activities carried out in different sites coming to Pearls or a congregation of people at Pearls to work lapidary materials in the context of, for instance, a feast. It is also not unreasonable to think that both practices took place, as people could bring with them materials in different stages of modification.

The contexts of use and display of the lapidary materials retrieved from Pearls remain elusive in our study due to the lack of contextual information and the predominance of specimens associated to ornament making. Nevertheless, by providing insights on the distribution of lapidary materials in different technical stages across the Caribbean Sea, the *chaîne opératoire* approach demonstrated that production and circulation cannot be understood as discrete phenomena. They do not happen independently from each other. Instead, technological modifications happened at different stages along the life trajectories of certain lapidary materials. These insights feed directly into our understanding of the dynamics behind interaction and exchange networks. We demonstrate how these networks involved not only the circulation of valuables, but also the modification of materials at different locations after being received and prior to further exchange. Therefore, the exchange of lapidary materials in the Early Ceramic Age cannot be understood just as a linear movement of material from one place (the source community) to the other. In this sense, exchange, production, and use should not be regarded as discrete phenomena when it comes to Early Ceramic Age lapidary. In fact, if we look at lapidary materials as recurring elements in prestige-good exchange systems, their exchange is an intrinsic part of their use life, rather than just a mechanism for distribution of differentially available resources or products. As the artefacts can be exchanged prior to the completion of their production sequences, the transformations artefacts undergo at different points become part of their exchange/use life as well. New technological operations carried out on partially worked artefacts become themselves forms of inter-cultural dialogue performed on the surfaces

of lapidary materials. Such activities are recorded in the micro-stratigraphy of stigma on their surfaces. While we placed greater focus on technologies of production when approaching the lapidary from Pearls, this approach allowed us to note important aspects of their emergent biographies as exchanged social valuables. In Chapter 1, I discussed the biographies of ornaments and the need for not imposing artificial linearity when reconstructing them through artefact studies. As Spielmann (2002) notes, social valuables are not finished (immutable) products, but may undergo changes during their lifetime. Such physical changes generally bring forth an object's particular biography and are thus associated to an increased value (also Gosden and Marshall 1999; Pollard et al. 2014). In this scenario, the performance of lapidary production (and not only its exchange or display) becomes a means of activating and enacting their social roles, perhaps providing at the same time grounds for competition between individuals.

6.2.2. Late Ceramic Age ornaments in the Greater Antilles (AD 800 – ca. 1500)

Assemblages of ornaments from five sites located on the Dominican Republic were studied in Chapter 5. While the number of studied sites was larger than in the previous chapter, the total amount of ornaments was smaller (n=312).[4] The sites were settlements, most of which presented no evidence of ornament making being a recurrent activity. In this sense, the narratives we can build around ornaments and their biographies are, as expected, rather different from the Early Ceramic Age. The chapter started by referring to the main ideas that researchers have put forward concerning bodily adornment in the Late Ceramic Age Greater Antilles. Such hypotheses have been built with marked reliance on ethnohistoric accounts about the early colonial "Taíno" peoples encountered by the Spaniards. Notably, a connection between certain types of bodily adornment and the figure of the *cacique* has been stressed. Primary attention has been given to materials that can be characterized as shiny, reflective, and/or colourful, such as mother-of-pearl, gold, *guanín*, feathers, and glass. Exoticness, generally equated with a distant source, is also presumed to have rendered materials laden with meaning and power. However, when faced with the studied Late Ceramic Age assemblages, one cannot fail to notice that these widely appreciated properties are not particularly conspicuous among them. First, their colours are

4 That said, the number of ornaments analysed through microwear analysis was larger, as all artefacts could be examined through microscopy.

rather monotone and dull in comparison to shiny metals or colourful feathers. Second, most lithic materials are available close to the studied areas. In sum, brilliance and exoticness do not appear to be important features of beaded constructions from the studied sites. One could still argue that combinations of beads from certain raw materials can result in a multi-coloured composite ornament, especially if including perishable materials (such as seeds, nuts, or feathers). The few studied ornaments displaying more varied colours, such as those made of greenstones, *Chama sarda*'s pink shell, and resin, are witnesses of a broad repertoire of ornament types and raw materials that would be placed on different sectors of the body (Alegría 1995; Lóven 1935). However, the evidence for such colourful materials among the material culture of the five sites is pale in comparison to the white and beige colours predominant in calcite, plutonic rock, shells, and skeletal materials. It is likely that there would be an important visual and aesthetic component to the placement of ornaments on the human body, particularly in combination with body paint. Nonetheless, as shown in Chapter 5, there are many other characteristics that contribute to the biographies of ornaments to which we should pay close attention.

Through careful examination of all recovered beads, pendants, plaques, and earplugs, we were able to define morpho-technical groups for each raw material. Microwear analysis allowed us to track the biographies of these ornament groups, in connection to their production, use, and deposition. When the patterns identified for each site are considered in combination, they provide us with insights on the circulation of ornaments across the region. The study of the site assemblages showed us that a certain degree of ornament making technical knowledge was present among the communities inhabiting each site and that suitable raw materials could often be locally found. Household-level production of certain ornaments seems to have happened occasionally, but it was not the primary mode of ornament acquisition. The absence of substantial evidence for ornament production is an indication that people chose to obtain ornaments through networks of exchange. However, the patterns identified thus far do not offer us insight into mechanisms of exchange, such as down-the-line or directional trade. Nevertheless, we can propose specific aspects of ornament circulation on the basis of our data. In particular, ornaments primarily circulated as "finished" products (in the case of lithic ornaments and shell beads) or raw materials (certain shells and coral). In this sense, it is possible that beads were exchanged already strung as composite ornaments, although we cannot truly

assess this with the data at hand. There is no evidence for the circulation of rough-outs or preforms, which stands in stark contrast with the lapidary networks of the Early Ceramic Age. This can be an indication that *specialized* ornament making knowledge was not widely distributed across the region. If we consider only lithic ornaments, we note that locally produced specimens differ markedly from the most typical morpho-technical groups.[5] We suggested in Chapter 5 that double-perforated tubular beads presented some degree of standardization, being likely produced in still unknown archaeological sites functioning as workshops. In other words, technical knowledge necessary for the production of such recurrent ornament types was not widely shared among communities.

In conclusion, we can propose that ornament *making* did not have a performative role in the engagement between communities or in the act of exchange itself, in contrast to the Pearls case-study. The passing down of "finished" ornaments or unmodified non-local raw materials (mainly, marine shells and coral) seems to have been the norm. Furthermore, the existence of site specialization in ornament production does not seem to follow from the control over rare material resources, again in contrast to what has been generally observed for the Early Ceramic Age.[6] Therefore, other social mechanisms must have mediated the process, guaranteeing that specialized communities would hold this position. We can suggest that the exchange of ornaments and certain raw materials functioned as a mechanism for the creation and maintenance of social bonds between different communities, rather than resulting from a dependence on the supply of scarce resources (see also Morsink 2013). Ethnohistoric sources do mention the role of strings of beads in social prestations, particularly in the establishment of alliances between *caciques* and as bride price (Las Casas 1992, 611, 1288; Lóven 1935, 478-479). Among some indigenous communities of the lowlands of South America, village specialization in certain crafts or horticultural products is a necessary element of a complex system of regional

5 Even in Playa Grande, where ornament production was more recurring, the specimens produced not only do not match the most common ornament types in the region, but also seem coarsely made, displaying many technical errors.

6 This observation should be regarded with caution: availability of shell raw materials was arguably the main reason for the location of the shell bead making workshop sites in Grand Turk (Carlson 1995; Keegan et al. 2008). Furthermore, proximity to the San Juan River and accessibility to materials used for celt production, notably jadeitite, seem to have been relevant factors guiding the location of the site of Playa Grande (Breukel 2019; López Belando 2012; Knippenberg 2012). The issue of control over key raw material sources should be reassessed once other Late Ceramic Age ornament workshop sites are recognized in the Greater Antilles.

interdependence, involving marital alliances, reciprocal exchanges, feasting, and even conflicts (*e.g.*, Agostinho 1967; Butt-Colson 1973; Chagnon 1977, 100-102; Oliveira 2017). A similar scenario has been put forward regarding groundstone celts in the Dominican Republic, although both rough-outs and finished products were being circulated (Breukel 2019). This idea is based on a model of reciprocal exchange among egalitarian societies, which may be argued to be inadequate for conceiving of patterns among so-called late pre-colonial chiefdoms of the Greater Antilles. For instance, Sahlins (1963) refers to redistribution as a mechanism for material circulation in Polynesian chiefdoms, as opposed to Melanesian big men collectivities. Such an exchange mechanism based on the accumulation and redistribution of wealth would resound with ideas regarding storehouses containing the social valuables of a *cacique* (Mol 2007, 86-87; Ostapkowicz 2018). However, as discussed for the Pearls case-study, the direct association between an exchange mechanism and a type of socio-political organization may provide only a partial and static view of past practices. Furthermore, the production and circulation of valuables are also circumscribed by regional social and political hierarchies in the ceremonial exchange systems of the Upper Rio Negro (Hugh-Jones 2014; Oliveira 2017). Archaeologists have more recently shied away from a monolithic view of past societies of the Greater Antilles, stressing instead the existence of great ethnic and socio-political plurality (*e.g.*, Curet 2003; 2014; Ulloa Hung 2013; Wilson 2007). The studied ornaments from across the Dominican Republic can also be seen in such a light: they challenge dichotomous social stratification schemes and testify to greater plurality of social formations in the past.

Finally, discard patterns in this period also differ from those identified for the early part of the Early Ceramic Age. As noted in Chapter 5, there was a concern with not disposing carelessly of ornaments. We suggested that this was the outcome of care for and repairing of ornaments. In contrast, large numbers of lapidary materials, debris, and ornaments have been found in middens of the Early Ceramic Age. This earlier period is marked by the presence of large-scale production activities in lapidary workshops and of production of a smaller scale in other site types. Their large accumulation can thus be connected to such intense ornament making activities. Late Ceramic Age bead making contexts in Grand Turk also produced extremely large quantities of shell debris and ornaments in multiple production stages (Carlson 1993). In this case, site type and the corresponding activities that took place locally must not be overlooked.

In contrast with rich burial assemblages and production contexts, the low presence of ornaments in settlement contexts can be connected to people's will to keep usable ornaments with them when they leave a settlement (for instance, see Van Gijn 2006; 2008; 2017). Specimens retrieved at such sites would be the result of occasional loss or discard of broken and unusable pieces. In the studied contexts of the Dominican Republic, a similar dynamic seems to have been in place, even if recovered specimens were generally not broken or unusable.

We, therefore, note a different attitude towards ornaments in the final centuries of the Late Ceramic Age, as opposed to the Early Ceramic Age. Ornaments may have followed a dynamic of displaying and concealing: whenever not on display or not on circulation, they were hidden or stored away. This may have also been reflected in socially-prescribed practices of structured deposition. The caches of ornaments recovered from Puerto Rico and the Dominican Republic may be examples of this attitude, although it is not clear whether they were votive in nature or examples of safeguarding for future exchange (see also section 6.3.2 of the present chapter). This careful attitude towards bodily ornaments was likely connected to their perceived potencies and social role. Leaving them laying around or mishandling them in any way may have entailed severe consequences for the individual or community involved.[7] For instance, among the Maimandê from Central Brazil, beaded necklaces made of *tucum* nut are intrinsically connected to their owners: storing them incorrectly or loosing them may lead to illnesses and even death (Miller 2009). A careless attitude towards ornaments may have not been desirable or may even have been perceived as dangerous. This may also justify why ornament making in large scale was not a widespread activity outside of specialized sites. As discussed in Chapter 1, technology does not exist in an isolated form from other social phenomena (*e.g.*, Dobres 2010; Pfaffenberger 1988). Specialized technical knowledge may have not only been restricted to certain communities, but also accompanied by esoteric knowledge about the potencies (and dangers) of ornaments and materials.[8]

7 The practice of maintaining house areas as spaces clean of debris noted to have taken place regularly at El Cabo and El Flaco can perhaps also be understood in connection with such a concern (Hofman and Hoogland 2015; Hofman et al. 2016; Samson 2011).

8 Another parallel from the lowlands of South America is that of the production of ceremonial bodily ornaments in the Upper Rio Negro. Considered to be a dangerous task inherited from the gods and primordial ancestors, their production requires not only specialized technical knowledge, but also knowledge of sets of ritual procedures and other forms of prescribed behaviours (Oliveira 2017; also Hugh-Jones 2014).

6.3. Avenues for future research

In the remainder of this chapter, future research avenues are proposed, building upon the research that has been carried out in this dissertation. They aim to follow or expand the current approach, addressing at the same time some of limitations noted above. While all the proposed avenues relate to components of the present research, each of them requires further in-depth investigation in its own right.

6.3.1. Technological and microwear studies of other Early Ceramic Age sites

Different types of assemblages from each time period need to be investigated in order to provide a more thorough understanding of ornament biographies. In this sense, there are many avenues deserving further investigation that could be explored. First, as pointed out in Chapter 4, it would be interesting to apply a similar approach to collections from the other Early Ceramic Age lapidary workshops and contrast them to lapidary recovered in other types of sites or in contexts that are not connected to production, such as burials and domestic middens. A more holistic approach would aid us in moving from the exclusive focus on production technology and material exchange to modes and contexts of usage. This approach would also allow us to better assess the connection between lapidary materials and specific social events, such as feasting. In this sense, artefact research needs to be conducted on assemblages recovered in modern controlled excavations. While we hope to have demonstrated that collections without detailed provenience information can provide us with a wealth of information, addressing more complex research questions requires us to situate lapidary ornaments and materials in their spatio-temporal contexts. Second, it would be important to carry out more in-depth studies, enabling us to address specific questions regarding craft practice and technological sophistication in this time period. In particular, it would be important to develop further experiments to better understand craftsmanship and toolkits of production. The incorporation of other analytical instruments (*e.g.*, SEM, micro-CT scanning, and confocal microscopy) would be crucial for the systematic investigation of drilling and surface treatments. Third, an investigation of associated tools recovered at production sites could provide supporting evidence for interpretations concerning the contact materials used in ornament production, alongside a more thorough view of technical systems in this period.

6.3.2. Ornament caches from the Late Ceramic Age

In order to further investigate the ideas advanced in section 6.1.2 about the biographies of ornaments in the Late Ceramic Age Greater Antilles, the next step would be to examine groups of ornaments recovered from closed contexts, such as caches and burial assemblages. Some assemblages of hundreds of ornaments have been recovered from caches in Puerto Rico and the Dominican Republic, being now held at institutional repositories. While not the product of modern excavations, they generally present a certain degree of information concerning their contexts of recovery. Alongside such caches, studies of groups of ornaments from other closed contexts, such as burials, would also be relevant. The large number of ornaments from such contexts would provide insights into assemblages that perhaps match more closely the traditional ideas about ornaments in the region. Composite objects including thousands of beads have been studied, such as the Pigorini idol and the belt from Vienna (Ostapkowicz 2013; Ostapkowicz et al. 2017), but with a different approach and goal in mind. Our goal with such a study would rather be to assess issues such as modes of attachment, use duration, reuse, recycling, and perhaps even the maintenance of ornaments as heirlooms. It will be interesting to assess how the biographies of ornaments from caches and burials differ from those of the ornaments studied in Chapter 5, which were recovered from across settlement sites. This study would provide information on the processes through which certain ornament groups are removed from circulation and contexts of use in order to be deliberately deposited. In Chapter 1, I referred to studies in which detailed examination of assemblages of artefacts (among which, ornaments) provided unprecedented insights on how they were manipulated, assembled, and disassembled in order to perform socially (Gaydarska et al. 2004; Van Gijn 2017; Woodward and Hunter 2015). The data generated through such a study could also be compared to ethnographic objects studied in Chapter 3, providing a reflection on the biographies of ornaments both as composite and individual pieces. Finally, the interpretation of these ornament assemblages could be contrasted to descriptions and illustrations of composite ornaments in ethnohistoric sources.

6.3.3. Experiments on use-wear formation on (lithic) ornaments

A thorough experimental programme should be carried out to shed light on the formation and characteristics of use-wear on ornament materials that have not been extensively experimented with, notably lithic materials. Such a study

could also encompass an investigation of use-wear development on figurative ornaments and beads with double perforations. In this sense, it would include calcite and diorite ornaments, but also the hard lithic materials typical from the Early Ceramic Age. Use-wear formation on ornaments in such materials remains understudied. Ornament use-wear studies have been largely focused on soft lithic materials or hard animal materials. It thus remains to be assessed whether harder lithic materials develop use-wear in similar ways when included in composite ornaments. The study of the ethnographic quartz pendant in Chapter 3 suggests they do. However, the low presence of use-wear on some of the studied ornament materials from Pearls in Chapter 4 could also be linked to the need for different use conditions or greater use lengths for the development of recognizable wear on harder and brittle materials. Such a reference collection would be useful not only for future studies of ornaments from the Caribbean, but also from other contexts worldwide where lapidary materials have been abundantly recovered, such as Mesoamerica, Lower Central America, the Middle East, and East Asia.

6.3.4. Investigating ethnographic collections of indigenous bodily ornaments

Another potential research avenue is an investigation of ethnographic and historical collections housed in museums as a means of pursuing indigenous histories (Ribeiro 1985; 1988; Ribeiro and Van Velthem 1992). Similar studies have been carried out with the intent of understanding indigenous responses to colonial processes, investigating the development of material repertoires over time, and/or assessing the function of objects *vis-à-vis* written records (*e.g.*, Akerman et al. 2002; Cristiani et al. 2008; Kononenko et al. 2010; Torrence and Clark 2016). The biographical approach we used in the present research for studying composite ornaments can play an important role in such an effort, especially if directed at more narrowly defined assemblages: specific artefact types and raw materials across a given region or ornament repertoires from a single ethnic or linguistic group. The object-based study would be combined with the reading of early ethnographies and/or ethno-historic sources for the studied region to shed light on their recorded use lives and contrast them to traces and residues observed.

…

The present research advanced an approach for the study of bodily ornaments from diverse types of collections, giving primary attention to the succession of traces formed on the surface of the artefacts themselves. The insights thus acquired were used to formulate new hypotheses concerning the ways ornaments were produced, dealt with, and regarded by people during the pre-colonial history of the Caribbean. This work demonstrates how the careful, yet time-consuming, study of each bead can provide us with a wealth of new information that help us build better-informed narratives that do some justice to the diversity of past indigenous societies.

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