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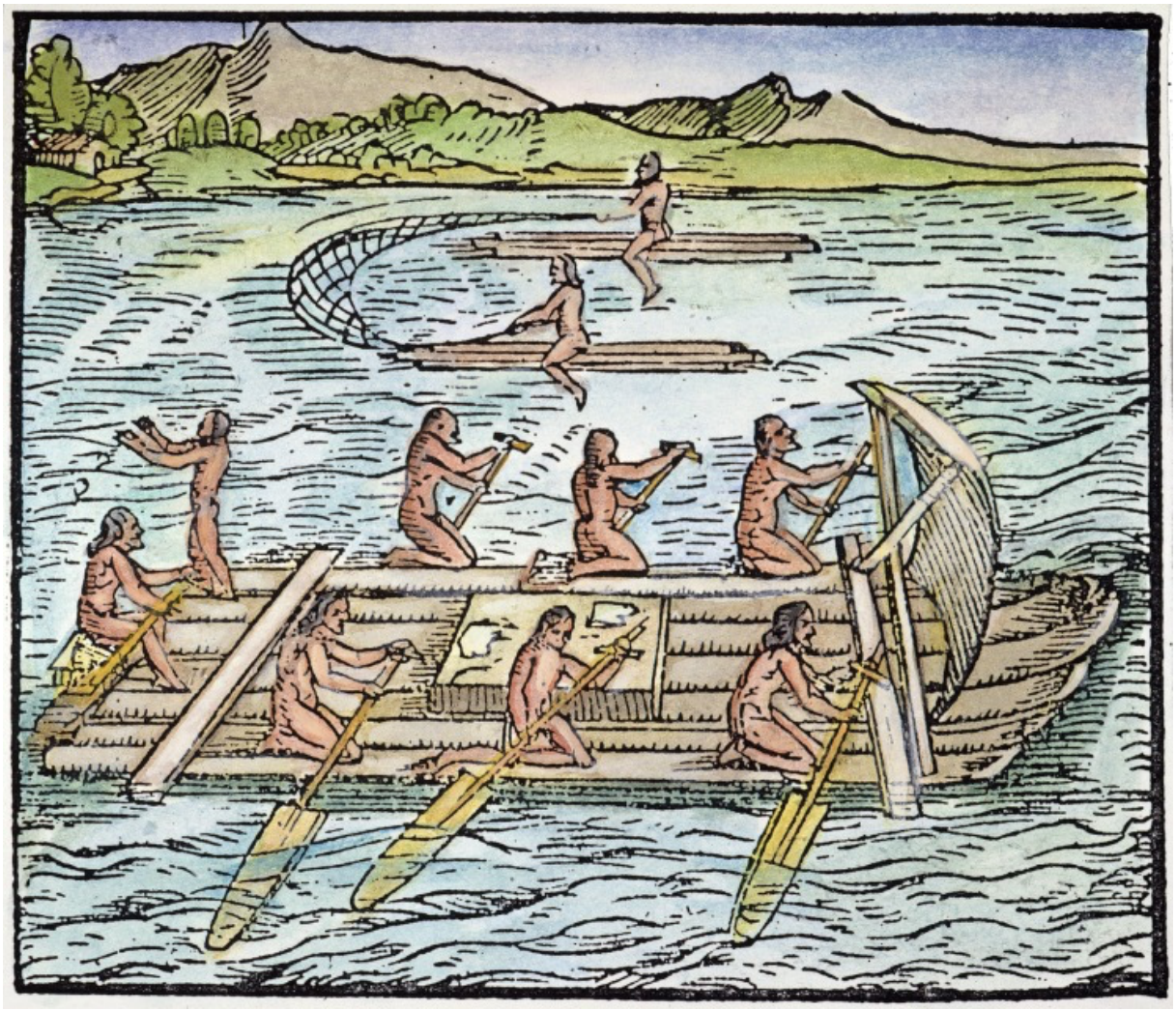

Jeroen Huizer

Picture on the cover: A depiction of Caribbean fishermen fishing with nets and hook and line fishing techniques, while the rest of the crew manage the boat.
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Fishing for knowledge:

A comparative analysis of the Pre-Columbian Caribbean shell fish hook

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Chapter 1: Introduction

§1.1 Background Information

Shells were an extremely important material in the tool kit of the Indigenous people of the Caribbean. They first appeared in the archaeological record in the Archaic period (approximately 5000 BC) (Keegan & Hofman, 2016, p. 34). The usage of shell as a raw material grew and became more important, as shells are easy to obtain in an island environment. Various shell tools and other objects connected to food processing and wood working are currently known in the archaeological record, such as fish hooks, knives, hammers, and chisels (Ciofalo et al., 2020, p. 363; Lammers-Keijsers, 2008, p. 31-116; Keegan, 1989, p. 24). This emphasizes the importance of shells in Indigenous Caribbean societies, as it was cheap and easy to obtain and, in addition, versatile in its usability.

Fish hooks in particular are interesting to study because they can tell us something about the subsistence economy of these Indigenous peoples. Within this subsistence economy, the inhabitants of the Caribbean produced, hunted, and gathered for their own community survival, meaning no market economy was present where commodities could be bought and sold. Native Caribbeans were for a large part dependent on the ocean for its resources. Gathering mollusks and applying multiple fishing techniques to catch a variety of fish were an essential part of the subsistence economy (Newsom & Wing, 2004, p. 61-71). One of the reasons for this focus on marine resources is that larger mammals are unable to travel to, and thus inhabit, the various islands in the Caribbean (Silberman et al., 2012, p. 258). The availability and abundance of marine resources which could be collected easily by the Indigenous peoples is another important reason for this focus on marine resources (Keegan & Hofman, 2016, p. 57). People living in island environments in the Caribbean lacked the availability of meat that other Indigenous peoples living on the mainland did have access to. This resulted in the former group of people turning towards the sea for similar protein-rich resources. Several fishing strategies were employed in which shell fish hooks were one of many tools used to catch these fishes.

Recent advances in archaeological research, methods, and techniques, as well as insight in traditional knowledge practices through ethnohistoric and ethnographic studies, have helped us to better understand the ways of life of the local inhabitants of the Caribbean, including the manufacture, function, and use of their tools. This thesis will explore the shell fish hook in particular, showing how important it is to study this tool when trying to recreate the everyday life in the pre-Columbian Caribbean.

§1.2: The Research Problem

Nowadays, little is known about pre-Columbian shell fish hooks encountered in the Caribbean. During excavations, little to no attention is paid to these shell fish hooks. The fact that these are not often researched may be due to their low occurrence in the archaeological record (Newsom & Wing 2004, p. 208). However, it has been suggested that fishhooks might also have been made from wood or bone, although their large absence from the archaeological record is possibly due to their disintegration through time (Bochaton et al., 2021, p. 16). There might be three different reasons for the lack of research into the shell fish hooks of the Caribbean, of which several can be true. The first is that they are simply overlooked during excavations. The second reason is that they also might not be present in the archaeological context. Finally, the shell fish hook appears in the archaeological record, but not as a whole. Due to taphonomical processes it could have been broken into little pieces and might, thus, not be recognized as a fish hook. If they are recognized, studies mention them in general terms and often as part of larger analysis of shell tools. These shell fish hooks are always whole, emphasizing the previously stated reasons for a lack of recognition. This all is in sharp contrast with other island settings of the world, such as Hawaii, Australia, and California. Here, similar fish hooks have been found in archaeological contexts that have been studied in detail.

§1.3: Research Goal and Questions

The goal of this research is to overcome the aforementioned problem, in which the importance of Pre-Columbian Caribbean shell fish hooks is not recognized as opposed to fish hooks from other regions across the globe. This thesis aims to gain more knowledge on the pre-Columbian shell fish hook in the Caribbean. The focus will be on the manufacture of shell fish hooks to study the intentionality of the raw material, function, and use, in addition to various fishing techniques that were employed by the Indigenous people of the Caribbean with these shell fish hooks. Furthermore, it also aims to increase the awareness of the importance of the shell fish hook in archaeology in the hopes that in future research more attention will be brought to the recognition of (fragmented) shell fish hooks.

The main research question that will be answered in this thesis will be:
'What new knowledge can be obtained of pre-Columbian shell fish hooks in the Caribbean when comparing it to shell fish hooks from Australia, Hawaii and California, North America?'

In addition to the main question, two sub-questions have been devised to aid in answering the main question:
'What is already known thus far on pre-Columbian shell fish hooks in the Caribbean?' and

‘What is the current knowledge of the shell fish hook in Hawaii, Australia and North America?’

§1.4: Structure of The Thesis

Chapter two will go into research previously done into the pre-Columbian shell fish hooks of the Caribbean and the Caribbean itself. The process of manufacturing will be highlighted. This is followed by research conducted on the fishing practices, including which fish were caught by the Indigenous Caribbeans.

Chapter three will discuss the methodology that is used in this research. It will contain information on how the research in this thesis will be commenced and which methods will be applied to do so. It will also clarify which sources are used and why. The importance of the comparison to other societies using the shell fish hook in their toolkit will be explained.

Chapter four includes the results of the study of the pre-Columbian shell fish hooks in the Caribbean. The sample consists of fishhooks made of *Cittarium pica* coming from the islands of Grenada, Dominican Republic, St. Eustatius, and Guadeloupe.

Chapter five will discuss fishhooks from three regions: Hawaii, Australia, and North America. In these regions there will be looked at the state of research of the fish hooks on the aspects of manufacture and material, gender, and where available, typology.

Chapter six is the discussion chapter and will answer the questions posed in chapter one by comparing the data from the Caribbean with the available data from Hawaii, Australia, and North America. First, the most important information of the research will be summarized shortly. Then, the meaning and relevance of this information is discussed and how this contributes to the wider research of shell fish hooks. This comparison will show the similarities and the differences of the manufacture and use of the fish hooks for various fishing strategies in these regions. The chapter will end with the gaps that can be filled about the Caribbean shell fish hooks by applying the results of the comparative research.

Chapter seven is the conclusion of this thesis in which the main question stated in the introduction will be answered. The answers to the sub-questions will be repeated shortly as an aid for answering the main question. Finally, suggestions are given for further research.

Chapter 2: Historical Background

Extensive archaeological research of the pre-Columbian periods in the Caribbean have uncovered a lot of information on the Indigenous inhabitants of the islands. Examples include the way they ate, their material culture, and how their daily life looked like. This chapter will include information on the research that has been conducted previously to this thesis to establish the current state of knowledge on the Indigenous cultures, the manufacture and usage of shell fish hooks and employment of fishing techniques in the Caribbean.

§2.1: Indigenous Cultures

In this subchapter, an overview will be given on the Indigenous cultures that were present in the Caribbean through different stages of time. A focus will be laid on the Lesser Antilles, more specifically on the Windward and Leeward islands because all the Caribbean fish hook examples used in this thesis come from this region.

§2.1.1: Archaic Age

The Caribbean Archaic Age (5000 – 200 BC) is an indication of the earliest migration of human population into the Antilles (Fitzpatrick, 2011, p. 595; Keegan & Hofman, 2016, p. 10). The earliest archaeological evidence of human colonization in the Antillean chain of islands is dated to as early as between 5000 and 4800 BC (Fitzpatrick, 2011, p. 595). During this period, the Archaic people first arrived and settled in Cuba, Hispaniola, and Puerto Rico. Although it is counted as the first occupation of the Antillean chain of islands, the island of Trinidad in the south of the Caribbean was settled even earlier, at around 6000 BC (Fitzpatrick, 2011, p. 595; Pagán Jiménez et al., 2015). However, it is important to note that although nowadays Trinidad lies 12-22 km from the mainland, in the past this island was connected to the mainland due to lower sea levels. Occupation of the Lesser Antilles occurred sometime later at around 3000 BC (Fitzpatrick, 2011, p. 596). The Archaic cultures are represented by their shell and lithic tools. Ceramics were not yet used in this period, meaning that shell tools were one of the preferred type of tools used by the Archaic people.

§2.1.2: Ceramic Age

The Caribbean Ceramic age (500 BC – AD 1500) is strongly represented by archaeological evidence. From this period onwards, ceramics started to be used and can be found in abundance in the archaeological record (Hanna, 2018, p. 651). Researchers have been able to identify trends concerning the different pottery styles (fig. 2.1) throughout the Ceramic age and have been able to divide the Ceramic age into the:

- Early Ceramic age (500 BC- AD 750), and

- Late Ceramic Age (AD 750 – 1500).

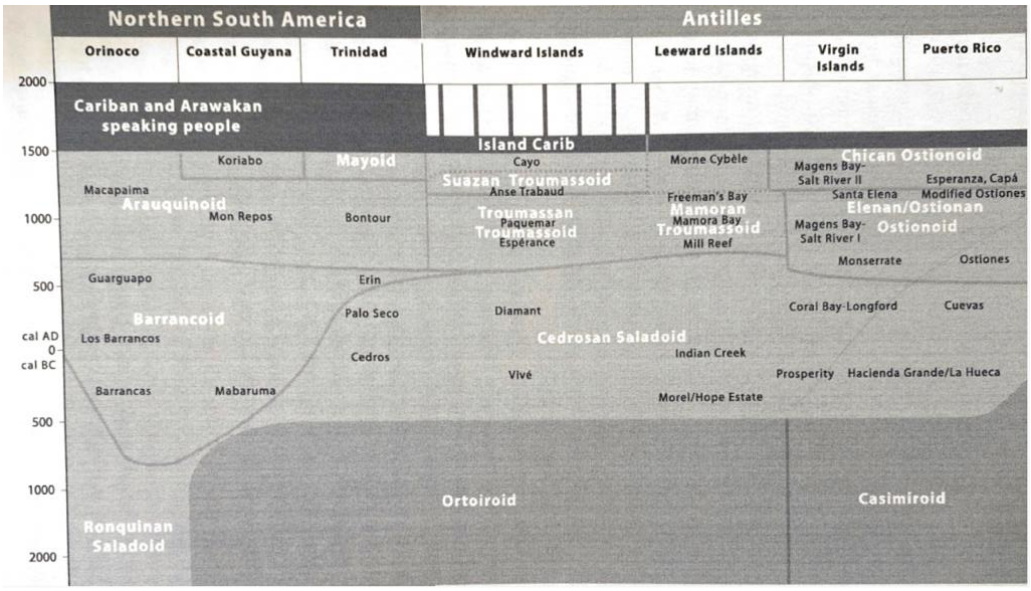

Figure 2.1: An overview of the ceramic cultures from Northern South America and the Antilles. (after Fitzpatrick & Ross, 2010, p. 6).

The Early Ceramic Age starts with the migration of people from Coastal South America into the Leeward Islands, Northern Lesser Antilles, and Puerto Rico (Keegan & Hofman, 2016, p. 59). The people who migrated into these regions belonged to a culture which has through archaeological evidence been associated with the Cedrosan and Huecan Saladoid ceramic assemblages from Coastal South America (Keegan & Hofman, 2016, p. 63) The Southern Lesser Antilles were largely skipped by the groups making these types of ceramics, until around AD 200-300 when a second substyle of Saladoid pottery arrived in the Caribbean named the Saladoid-Barracoid style, which was a variant of the Cedrosan Saladoid substyle (Hanna, 2018, p. 651). This new substyle of Ceramic has been assumed to indicate a later Saladoid phase of Barrancoid migrations into the Caribbean (Keegan & Hofman, 2016, p. 76).

The Saladoid societies are assumed to have been egalitarian tribal-based society (Keegan & Hofman, 2016, p. 76). Their material culture was simple, and evidence have been found for wood, stone, shell, and bone working. The manufacture of artifacts made from these materials was mostly done by the households themselves, although there were also specializations necessary for the more complicated artifacts and tools, such as the canoe building (Keegan & Hofman, 2016, p. 74). At the moment,

generalizations concerning the Saladoid culture is difficult, since new information is pointing towards more differences between islands and sites, as opposed to the Saladoid being a homogenous culture (Keegan & Hofman, 2016, p. 82).

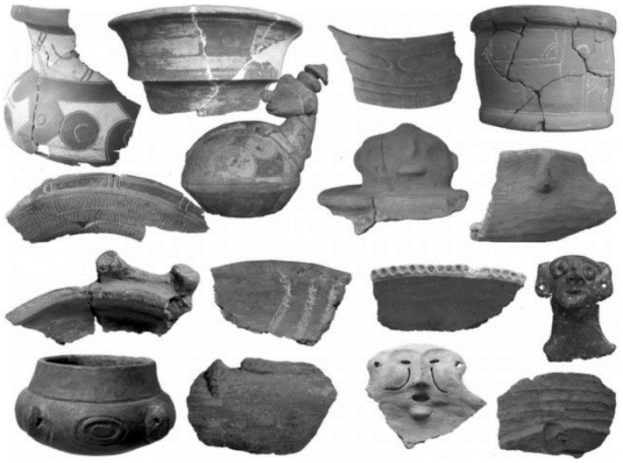

Figure 2.2: Ceramic assemblages of the Lesser Antilles, top left corner Saladoid pottery, top right corner Troumassan Troumassoid pottery, bottom right corner Suazan Troumassoid pottery, bottom right corner Mamoran Troumassoid pottery (after Hofman et al., 2008, p. 20).

The Saladoid-Barracoid ceramics started to disappear around AD 750, marking the start of the Late Ceramic age (Hanna, 2018, p. 651). With the disappearance of the Saladoid-Barracoid (fig. 2.2) ceramics, the ceramic assemblages diversified in the region and a major divide started to occur between the assemblages of the Greater Antilles (Ostionoid ceramic series) and the Lesser Antilles (Troumassoid ceramic series) (Hanna, 2018, p. 651). The Troumassoid of the Lesser Antilles is split up further into various ceramic traditions. The Mamoran Troumassoid (fig. 2.2) ceramic series of the Leeward Islands indicate a greater influence from the Ostionoid series of the Greater Antilles, while the Troumassan Troumassoid (AD 750 – 900) (fig. 2.2) and the Suazan Troumassoid (fig. 2.2)(AD 900 – 1650) ceramic series of the Windward islands reveal a greater influence from the mainland (Hanna, 2018, p. 652). During the Late Ceramic age, cooking traditions started to change towards more highly processed foods (Keegan & Hofman, 2016, p. 134). This can for instance be seen in the *Cittarium pica* consumption. In the Early Ceramic period, the Indigenous peoples extracted the animal from its shell using destructive methods, while in the Late Ceramic period they had switched to non-destructive methods of animal extraction (Keegan & Hofman, 2016, p. 221). The Late Ceramic age is also known for its horticultural system in which house gardens were utilized (Keegan & Hofman, 2016, p. 92).

§2.2: The Fish Assemblage and Fishing Techniques

§2.2.1: The Fish Assemblage

During archaeological research, vast amounts of material have been found that can give an insight into the lives of the Indigenous peoples of the Caribbean. An important percentage of this material concerns the remains of the foods that the Indigenous peoples ate. Archaeology has shown the remains of the fishes that the Native Caribbeans consumed. By making use of the technological advances, researchers have been able to determine which fish species were being caught and incorporated into the diet of the Indigenous peoples. Newsom and Wing (2004) have given insights into the diets of the peoples during the Archaic and Ceramic Ages. To enlighten this, the data in figure 2.3

gives an overview of the fish that were caught and probably consumed by the Indigenous peoples of the Greater Antilles and the Virgin Islands. This can help with illustrating an overview of the general trends of the fish species the subsistence economy of Native Caribbeans was based upon.

Coral Reefs							
Epinephelus sp.	grouper	15	11.5	0		2	7.7
Mycteroperca sp.	grouper	1	0.8	0		0	
Lutjanidae	snappers	16	12.2	1	2.9	1	3.8
Anisotremus surinamensis	black margate	0		0		1	3.8
Haemulon sp.	grunt	2	1.5	0		0	
Halichoeres sp.	wrasse	2	1.5	0		0	
Lachnolaimus maximus	hogfish	1	0.8	0		0	
Labridae	wrasses	2	1.5	0		0	
Scarus sp.	parrotfish	6	4.6	0		0	
Sparisoma sp.	parrotfish	60	45.8	4	11.8	0	
Balistidae	triggerfishes	2	1.5	0		0	
Diodontidae	porcupinefishes	2	1.5	5	14.7	0	
Subtotal		109	83.2	10	29.4	4	15.4
Total		131		34		26	

Figure 2.3. Insights into the Mean Number of Individuals (MNI) from the Greater Antilles and Virgin Islands (after Newsom & Wing, 2004, p. 125).

Already in the Archaic age, people had specific techniques to fish for certain targeted species. In due time, fish stocks would become depleted of that species because of overfishing and the indigenous people had to change their fishing techniques to be able to survive. By looking at the archaeological evidence of fish remains, researchers have been able to establish that at certain times reef carnivores were predominantly targeted, while in later times a shift towards an equal abundance of reef carnivores, reef herbivores, and omnivores took place (Newsom & Wing, 2004, p. 111). In earlier deposits, for instance, at the site of Hichman's on St. Martin, the carnivorous fish species occur twice as much as herbivorous species, while in later deposits the abundance decreases (Newsom & Wing, 2004, p. 111). This can be explained by the fact that the more easily caught and frequently primary fishes used for food were the reef carnivores (Newsom & Wing, 2004, p. 111). As the fish stocks of the targeted species depleted, Indigenous people had to adapt their fishing techniques to catch other species, which required them to look for new avenues and methods for their food procurement. When the reef population fish stocks eventually exhausted because of a growing population (who, of course, all needed to be fed, ergo more fish had to be caught), the Indigenous people had to adapt by venturing deeper into the sea and started fishing in the pelagic zone (Newsom & Wing, 2004, p. 132).

This is clearly visible in the fish assemblage of Hope Estate on St. Martin. The early deposits of this site show no evidence of fishing for tuna (*Scombridae*), a fish species that inhabits deeper waters, while in later deposits tuna dominates the faunal sample (Newsom & Wing, 2004, p. 104). These changes in the fishing stocks and the depletion of a few of these stocks meant that the Native

Caribbeans had to keep changing their fishing techniques and possibly had to abandon certain fishing techniques when they were no longer useful because the number of fish species that were targeted with such techniques had become depleted.

§2.2.2: Fishing Techniques

Fishing techniques employed by the Indigenous peoples of the Caribbean were varied and serve as a perfect example to show the creativity of the Natives in developing techniques for the procurement of food from the sea. One of these techniques, simultaneously the most important for this thesis, is the hook and line technique. This thesis focuses on fish hooks made from shells, but other materials, like wood and fishbone, were also found in archaeological contexts (Giovas, 2013, p. 70; Loven, 2010, p. 427).

However, the fishing techniques used by the Indigenous peoples range quite a lot further, with some remarkable examples. One of the remarkable techniques that illustrate just how clever the Indigenous peoples were in developing fishing techniques is one that originated in Cuba. Here, the indigenous peoples were using remoras, a suckerfish that often appear with sharks, with a rope tied to it (Loven, 2010, p. 425). These remoras would suck themselves onto a, for instance, turtle that, then, would be pulled up and caught. With this technique, and by using several remoras, they could even pull up and catch a shark (Loven, 2010, p. 425). However, in most cases, simpler techniques were employed, but this last example serves as a perfect illustration of the creativity of the Indigenous peoples of the Caribbean.

Techniques necessary for fishing have been researched extensively by Grouard (2019) who has divided the fish into four categories in her study, that each have different techniques with which they were caught. The first category is the pelagic fish, the deep-sea fish. These are the largest fishes, such as tuna and mackerels, that were likely caught by using harpoons, bows and arrows, large nets and longlines (Grouard et al., 2019, p. 463).

The second category is the rocky bottom fish, such as the grouper. These fishes were caught by using hook and line, bow and arrow, nets and traps (Grouard et al., 2019, p. 464). The use of the hook and line technique, in which herbivores are less likely to bite, was mostly aimed at the aggressive carnivorous fish (Keegan, 2009, p. 242). It is also due to their aggressive and carnivorous nature that these were usually the first category of fish to be overfished by human predation (Keegan, 2009, p. 242). The line with the shell (or bone) fish hook would be thrown into the water from a boat. The boat would be managed by two people, who held the boat in place, while a third man would manage the lines that were attached to the hooks (Guillou & Lagin, 1997, p. 170-180).

The third category is the smaller fishes like the parrot fishes. To catch these smaller fish, seine nets, fine mesh nets and the usage of traps were several techniques employed by the indigenous groups (Grouard et al., 2019, p. 464).

The fourth, and last, category is the mangrove and sandy bottom fish, including the younger specimens of grunt and snapper fish. These fishes were likely caught by more severe methods, such as poisoning the fishes, which puts them in a docile state and makes them easier to catch (Grouard et al., 2019, p. 464).

§2.3: Fish Hooks in The Historical and Archaeological Record of The Caribbean

There was never much doubt whether ancient cultures have used fish hooks as a tool to catch fish with. However, the question in the Caribbean keeps arising if the hooks that the Indigenous peoples used were made from bone, wood, shells, or all of the above. When Columbus arrived on the northern coast of Cuba during his first voyage, he was able to see firsthand that the Native Caribbeans were fishing using fish hooks (Loven, 2010, p. 426). However, according to Columbus, the fish hooks were made from horn. It is nowadays assumed that he must have mistaken the material and that the fish hooks were rather made from fish bone (Loven, 2010, p. 427). Unfortunately, historical records that originate from the Caribbean, like Columbus' journal, are scarce. Fish hooks made from bone, or even wood have been suggested as materials, but these materials are perishable and often do not survive in the archaeological record (Bochaton et al, 2021, p. 16). Fortunately, fish hooks from another raw material, shells, have been excavated in the Caribbean. However, it should be noted that the lack of wooden and bone fish hooks does not imply that pre-Columbian fish hooks were solely crafted from shells.

Examples of shell fish hooks include the ones excavated in Guadeloupe (Lammers-Keijsers, 2008, p. 121). These fish hooks have been researched extensively for use-wear and manufacture traces. They were most probably manufactured on a coarse sandstone, or a finer stone with added material such as sand or shell material (Lammers-Keijsers, 2008, p. 121). Nevertheless, these are not the first shell fish hooks encountered in Caribbean archaeology. Herbert W. Krieger already encountered shell fish hooks during the excavations of Monte Cristi in the Dominican Republic in the early twentieth century (Loven, 2010, p. 426). Sporadically, fish hooks made from wood and bone are also recovered (Bochaton et al., 2021, p. 16). Fish hooks made from shell, wood and bone are known from the Saladero Site (the site after which the Saladoid pottery is named), however, from, for instance, Trinidad only bone fish hooks are known (Boomert, 2000, p. 335). Shell fish hooks are, nonetheless, an often-overlooked artifact in archaeological research in the Caribbean and, therefore, merit attention.

Chapter 3: Methodology

In this chapter, the methods will be discussed that will aid in answering the research questions posed in chapter one. This research is based on a database compiled from archaeological, ethnohistorical and ethnographical sources.

§3.1: Archaeological Data

Archaeozoological data gives an insight into the diets of the Indigenous peoples of the Caribbean. By counting the fish and shell remains and simultaneously identifying these remains that are encountered archaeologically, researchers have been able to construct databases of the fishes and shells that were caught by the Indigenous peoples. These types of sources allow to create a connection between the dietary evidence (e.g. fish bones) and the various fishing techniques that were employed in the past. The fishing techniques, in turn, are a helpful source to illustrate the subsistence economy of the Native Caribbeans.

The manufacturing process is a vital aspect of the *chaine opératoire* of an artifact, in which various steps in the production phase are studied to identify the lifecycle of an object: where its raw material was sourced, how it was created into the object it was, how it was (re)used, and how, when and why it was deposited. This thesis largely focuses on the manufacture of the shell tools to study the intentionality of the fish hooks, i.e., if (and why) the crafters intentionally chose this type of material and form to catch various species of fish. The manufacturing process of the shell fish hooks will be investigated through studies that have employed use-wear analysis (e.g. Lammers-Keijsers 2008). Use-wear analysis is furthermore essential for the comparative part of this thesis, as it allows for a comparison between the manufacturing process in the Caribbean and the other regions that will be discussed further on in this thesis. The shell fish hooks crafted in these other regions are well-known, as opposed to the lesser-studied Caribbean shell fish hooks, creating an opportunity to make use of this better-known manufacturing process.

Finally, published archaeological reports on specific sites within the Caribbean will also be an important source for this thesis. These sources contain direct information about the find location and the various contexts in which the shell fish hooks were found. Archaeological contexts are crucial in supplying information on these pre-Columbian fish hooks, as it shows how the Indigenous people in the Caribbean might have lived, and how and where the shell fish hooks played a role within this daily life. Unfortunately, not all shell fish hooks are equally well documented.

§3.2: Ethnohistoric Data

Ethnohistoric sources are important for this research for multiple reasons. These sources are, first and foremost, used to supply us with information on the fishing techniques that were used by the Indigenous peoples of the Caribbean. Through written records by the Spanish colonizers of the Americas in the 16th century, there is extensive information available about the Native populations that were encountered by the Spanish. There will be primarily looked at the Spanish conquistador records because they were the first colonizers and, thus, reported the activities of the Native Caribbeans without any European influences. This means that assumably only they have been able to see the Indigenous peoples as they lived before the widespread colonization into the Americas by the various European countries. However, a note of caution must be offered, as these written records are often biased and have a western perspective. The Indigenous people are often not described in an objective manner, but they are rather seen as 'primitives' and uncivilized. This prejudice by Europeans about distant, unfamiliar people is a bias which must be kept in mind when dealing with sources of this kind (Keegan & Hofman, 2016, p. 257) and by contrasting the ethnohistoric information with archaeological and ethnographic data it is hoped to contribute to a more nuanced picture and local perspective on the lifeways of these first inhabitants of the Caribbean archipelago.

§3.3: Ethnographic Data

Ethnographic sources are used from researchers that have investigated the Indigenous population by interacting with their descendants. Often, stories and histories are passed on orally from the parents to their children, and so on. In this way, knowledge on, for example, the fishing techniques has been passed on for centuries and is still employed nowadays by the Indigenous groups. This information is useful for this thesis, as it enables the opportunity to study the fishing techniques of the early 16th century people by looking at contemporary Indigenous groups using similar shell fish hooks. Guillou & Lagin (1997) did something likewise by studying how 18th century Caribbean fishermen from St. Martin caught and prepared the fish. Sources such as these can be used to deduce how pre-Columbian fisherman caught their fish and can give us insights into the fishing techniques employed in early periods of Caribbean civilization.

§3.4: Comparative Analysis

A comparative analysis including shell fish hooks from other regions, including Hawaii, Australia, and North American California will be conducted. As more is known about the fish hooks from these

three regions, a comparison by using archaeological, ethnographical and ethnohistorical sources is useful to discover similarities and differences between the fish hooks from various regions across the world. This will aid in the study of Caribbean shell fish hooks, as after this comparative analysis more can be concluded on the manufacturing process and usage of the shell fish hook. When information on certain aspects regarding shell fish hooks in the Caribbean is lacking there will be looked at other regions of the world where these aspects occur. They will, then, be applied to the Caribbean case studies where these aspects might have been very similar in nature as other regions in the world. Thus, by looking at how other societies in various periods and regions have manufactured and used the fish hook the problem of a hiatus of knowledge of Caribbean fish hooks might be solved. In order to be able to make the comparative analysis, first, an as-complete-as-possible overview of the shell fish hooks of the Caribbean will be created. Essential in this overview is the focus on the raw material, how the fish hook was crafted, and how it was used.

Chapter 4: The Caribbean Fish Hook and Indigenous Fishing Techniques

This chapter will include an overview of what is currently known about the Caribbean shell fish hook and the fishing techniques that were employed by the Native Caribbeans. The author has chosen various shell fish hook as case studies to be discussed in detail. These fish hooks are from various island in the Caribbean and are chosen due to the availability of literary sources describing them. Special attention will be given to the size estimations, use-wear traces, and the context in which they were found. However, not every fish hook can be described with as much detail as the other, as not every fish hook is documented in a similar, detailed manner. Still, the aim is to give as much information as possible on the existing fish hooks, so a clear overview can be given of what is known and, thus, what knowledge is lacking. It is, of course, possible that more fish hooks have been excavated in the Caribbean than the case studies that will be discussed in this chapter, but these have not been documented well enough, if at all, to be discussed. This chapter will end by looking at the fish assemblages and the fishing techniques that were employed by the Indigenous peoples of the Caribbean.

§4.1: Sample of Shell Fish Hooks That Have Been Studied in The Context of This Thesis

Number of fish hooks found	Archaeological site	location
2	Monte Cristi Province	Dominican Republic
1	Sabazan	Carriacou, Grenadine islands
2	Grand Bay	Carriacou, Grenadine islands
2	Golden Rock	St. Eustatius
9	Anse à la Gourde	Guadeloupe
1	Morel	Guadeloupe

Table 4.1: An overview of all the shell fish hooks with their provenance that will be discussed in this chapter (after the author, 2022).

Table 4.1 includes an overview of all the shell fish hooks that will be discussed in detail. This sample has been chosen based on the availability of data, meaning that shell fish hooks are not often discussed in isolation in literature. Fig. 4.1 illustrates the locations on which the shell fish hooks of the sample were found within the Caribbean. Other shell fish hooks that originate from the

Caribbean might as well exist, but these were not mentioned well enough in contemporary literature to be a usable case study. Each fish hook will be described by looking at the context in which they were found, the material (i.e. which shell species was used as the raw material), and the size estimations. Furthermore, if available, information will also be given concerning the manufacturing traces that have been found on the fish hooks themselves.

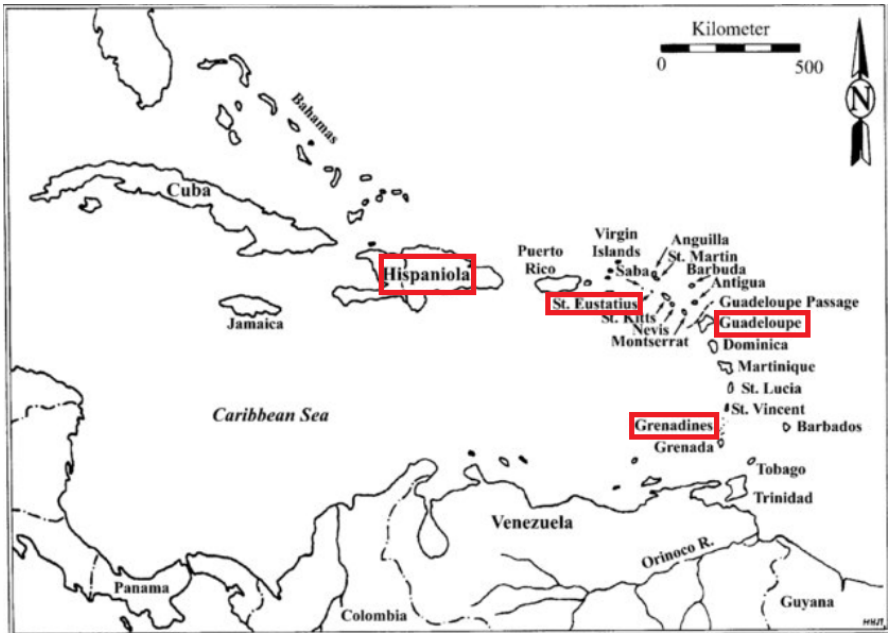

Figure 4.1: Map of the Caribbean with the islands on which the shell fish hooks were found highlighted. Hispaniola is Dominican Republic (after Fitzpatrick & Keegan, 2007, p. 32, edited by the author, 2022).

§4.1.1: Monte Cristi Province, Dominican Republic

Two fish hooks are described by Loven (2010) to have come from the Monte Cristi area in the northern Dominican Republic. Little is known about the two fish hooks, but it can be stated that the points were broken off, so it is not known whether they had barbs or not. Even though the hooks are not in perfect condition, it can, furthermore, be deduced that the two hooks differed from one another. One had a head at the top to hold the line in place, while the other had an enlargement at the top for the same purpose (Loven, 2010, p. 426). The definitive shape of both fish hooks is not known, as the remains are too fragile to determine it. It is, however, known that shell must have been the raw material the hooks were made from. The species of the shell, unfortunately, cannot be determined due to a lack of documentation. No further records exist about the fish hooks found in the Monte Cristi province in the Dominican Republic, therefore, no measurements can be made for the size estimations of these fish hooks.

Figure 4.2: Two shell fish hooks that were excavated at Carriacou, one of the Grenadine Islands (after Giovas, 2013, p. 96). The left fish hook was found at the site of Sabazan, whilst the right was excavated at Grand Bay.

§4.1.2: Sabazan, Carriacou

A total of three fish hooks were found on the two sites located on Carriacou, which is a part of the Grenadine Islands. One fish hook comes from the site of Sabazan (fig. 4.2). This is a Late Ceramic Age site dated to AD 400-1400. The fish hook was found inside a trench, no further information on the precise context is available. The fish hook is made from the shell of the *Cittarium pica*. The dimensions of the fish hook are approximately 35mm x 15mm. Unfortunately, little else is known about the context in which the fish hook was found.

§4.1.3: Grand Bay, Carriacou

Two other fish hooks were excavated at the site of Grand Bay which is culturally similar to the Sabazan site and is also dated to the Late Ceramic Age (AD 400 – 1400). The two fish hooks from Grand Bay were found in dense midden deposits (Giovas, 2010, p. 78). These fish hooks were made from the shell of the *Cittarium pica* and are quite small. They measure approximately 15 x 5 mm, making them the smallest fish hooks investigated in this thesis. No further information about the context in which the fish hooks were found is known.

Figure 4.3: The heavily damaged fish hook found at the Golden Rock site, St. Eustatius (after Versteeg et al., 1993, p. 114).

§4.1.4: Golden Rock, St. Eustatius

Two complete fish hooks were found at the Golden Rock site, St. Eustatius that can be dated to approximately AD 300-500 (Versteeg et al., 1992, p. 113). The fish hooks that were found differed from one another in shape. One fish hook had a hook and a knob at opposite ends. For this fish hook, no measurements are available. The second fish hook (fig. 4.3) is heavily damaged, so no certain conclusion can be made whether it had a knob at the end. Both fish hooks were made from the shell of the *Cittarium pica*. This fish hook was measured at a length of 26,5 mm. In addition, another possible shell fish hook was found, although this might be an unfinished fish hook (fig. 4.4). Versteeg et al. (1992) believe this is the case because this piece originates from the same part of the shell from which fish hooks are generally made. Unfortunately, no further information concerning the context in which the fish hooks were found is available.

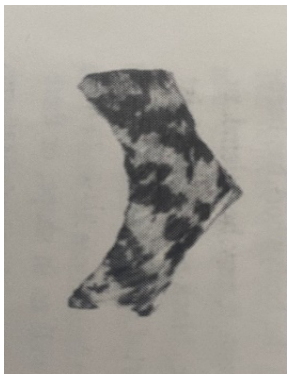

Figure 4.4: An unfinished fish hook excavated on the Golden Rock site, St. Eustatius (after Versteeg et al., 1992, p. 114).

Figure 4.5: Eight of the nine shell fish hooks excavated at Anse a la Gourde, Guadeloupe. (after Lammers-Keijsers, 2007, p. 90).

§4.1.5: Anse à la Gourde, Guadeloupe

The fish hooks from Guadeloupe are the best researched shell fish hooks from the Caribbean done by Lammers-Keijsers (2007). On the site of Anse à la Gourde (fig. 4.5), nine shell fish hooks have been found. The nine *Cittarium pica* fish hooks all showed traces of being highly polished into shape and had cut marks from flint on the inner curve of the fish hook (Lammers-Keijsers, 2007, p. 90). Out of these nine fish hooks, two types can be discerned. One type can be distinguished by the round hook and relatively large size (40 x 19 mm on average), while the other type can be distinguished by the pointed hook and a relatively smaller size (21 x 6 mm on average) (Lammers-Keijsers, 2007, p. 90). Six of these fish hooks were found in features, of which one was found in context with a burial of a non-local female (Hoogland et al., 2010, p. 156; Lafoon et al., 2019, p. 138). This is peculiar, as in general it is assumed by Western researchers that women were not involved with fishing activities (Lammers-Keijsers, 2007, p. 90-94).

§4.1.6: Morel, Guadeloupe

The fish hook found on Morel (fig. 4.6) during the 1999 excavation has also been researched by Lammers-Keijsers (2007), but the results of this research will be dealt with further along in this chapter. This fish hook has been manufactured out of the shell of the *Cittarium pica*, like all the fish hooks discussed above. The fish hook measures about 35 x 10 mm and through use-wear analyses rough manufacturing traces were found that indicate that it was ground on a coarse sandstone. It is striking that only a few of these examples have been found, it is assumed that because of this, other fishing techniques were more common.

Figure 4.6: The *Cittarium pica* fish hook found at Morel, Guadeloupe. (after Lammers-Keijsers, 2007,

§4.2: Material and Manufacture of The Caribbean Shell Fish Hook

§4.2.1 Material

In the Caribbean, the shell fish hook is generally made of the *Cittarium pica* shell. This species is a mollusk that is common in the Caribbean region. On most Pre-Columbian sites located on islands, it is also the most common shell found during excavations (Versteeg et al., 1992, p. 113). The shell of the *Cittarium pica* (Fig. 4.7) is dark purple to black with white bands. It, furthermore, has a broad body-whorl with a flat apex and a round aperture. The *Cittarium pica* was an important species for the Indigenous people of the Caribbean, as is evident from the large number of West Indian top shells that have been found throughout the Caribbean (Versteeg et al., 1992, p. 113; Newsom & Wing, 2004, p. 80-181). The *Cittarium pica* lives near the coast which makes it very easy to collect and, therefore, a very important source of protein for the Native Caribbeans (Versteeg et al., 1992, p. 113). The shell is one of the few species in the Caribbean with an inner shell layer of nacre, also known as the mother of pearl (Lammers-Keijsers, 2007, p. 121). Regardless, some researchers have called the *Cittarium pica* less suitable for the manufacture of artifacts due to the scaly structure of the shell (Versteeg, 1992, p. 113). Quite a lot of artifacts have indeed been made of the *Cittarium pica*. Among them, and most importantly for this thesis, is the fish hook, but other artifacts include

Figure 4.7: An example of a *Cittarium pica* (West Indian Top shell) (after Keegan et al., 2018, p. 3).

containers, beads, spoons, and scrapers (Lammers-Keijsers, 2007, p. 93-121; Keegan et al., 2018, p. 14).

§4.2.2: Manufacture

The best-researched shell fish hooks from the Caribbean originate from Guadeloupe. Lammers-Keijsers (2007) has studied various fish hooks from two sites discussed above: Anse à la Gourde and Morel. She looked at microscopic use-wear and manufacturing traces through a low power and high-power microscope. She found traces on the *Cittarium pica* fish hooks that were interpreted as marks that were created during the production process. The fish hook from Morel was also studied using this same method. The manufacturing traces indicate that this fish hook was probably made by grounding it on a course sandstone or a finer stone but with the addition of sand and/or shell material (Lammers-Keijsers, 2007, p. 121). This is in line with the traces found on the identified unfinished fish hook from Golden Rock, St. Eustatius. This fish hook included traces of being roughly ground on three sides (Versteeg et al., 1992, p. 114).

§4.3. The Use of The *Cittarium pica* Fish Hook

As easy as working on shell sounds, the contrary is rather true: shell is not an easy material to work with (Lammers-Keijsers, 2007, p. 121). However, the features of the *Cittarium pica* fish hook might make the manufacturing effort worth it. As mentioned before, the West Indian top shell has an inner layer that contains the mother of pearl. This shiny material on the inner layer of the *Cittarium pica* has the advantage of attracting fish to it by the reflection of light (Lammers-Keijsers, 2007, p. 121). This reflection of light simulates the same reflection of light that emanates from the scales of fish swimming. Still, as useful as this may seem to catch fish, it is important to emphasize that it would only attract carnivorous fish since they would be out on the hunt for other fish. This means that the *Cittarium pica* fish hook could have been employed to catch reef carnivores and pelagic carnivores. Another beneficial feature of the *Cittarium pica* as a material for the fish hook, is that it is sturdy enough to use as a fish hook (Lammers-Keijsers, 2007, p. 121). The abundance of the West Indian top shell might also be a reason for why this shell was used, since the shell was always readily available and its procurement in the shallow waters near the shore was rather easy to accomplish (Versteeg et al., 1992, p. 113). Though with all its benefits, it did also have some disadvantages. As mentioned before, it was only useful for capturing carnivorous fish, and, therefore, hook and line cannot have been the only fishing technique employed by the Indigenous people of the Caribbean.

The shell fish hooks of the Caribbean might have been under-researched to some degree but, luckily, shell fish hooks are better known from other regions of the world. Shell fish hooks from Hawaii,

Australia, and California have received more extensive research. Shell fish hooks from these regions will be explored in the following chapter.

Chapter 5: Comparing Fish Hooks: Evidence from Hawaii, Australia, and California

Shell fish hooks from other regions, including Hawaii, Australia, and California, have received more attention compared to the Caribbean shell fish hook. The societies in these regions had a subsistence economy which, to some degree, is comparable to that of the Native Caribbean societies. This means that the societies from these regions were to a large degree also dependent on the marine resources for survival. By studying the manufacturing process and the use of the shell fish hooks from these regions, an opportunity arises where knowledge can be gained on the Caribbean shell fish hooks. This chapter will discuss the better-researched shell fish hooks from Hawaii, Australia, and California.

§5.1: Hawaii

§5.1.1: Manufacture and Material

The fish hooks found in the Hawaiian Islands were made from a variety of raw materials. These materials were mostly wood, shell, or bone (Manoa, 2016, p. 28). What is also noticeable is that the usage of a certain type of raw material differed between various islands in Hawaii. On Hawaii Island, for example, eighty percent of the fish hooks were made of human bone (Manoa, 2016, p. 28). However, on the islands of O'ahu and Kaua'I only 40-50 % of the fish hooks were made out of human bone. Here, the fish hooks were more often fashioned out of pearl oyster shell, which was abundant on these islands (Manoa, 2016, p. 28). Compared to the human bone fish hooks, the oyster fish hooks were small, as the oysters here are relatively small.

In time, the fishermen of Hawaii discovered that they could make stronger and larger fish hooks by combining parts and materials with one another (Manoa, 2016, p. 28). This was made possible by, for instance, using a strong femur (upper leg) bone for the shank and then lashing a second straight or curved piece of either bone or shell to the end of the shank (Manoa, 2016, p. 28). As on most of the islands in Polynesia, the pearl shell (*Pinctada margaritifcru),* was the preferred material to manufacture the fish hook because it is easy to shape it into the desired form (Allen, 1996, p. 103). Still, fish hooks have been found that were made from a different shell, namely the turbo shell (*Turbo setosus)* (Allen, 1996, p. 103). Eventually, the pearl shell was most probably overexploited, hence the Hawaiians had to turn to another shell species: the turbo shell. When comparing the two shell species to one another, it is noticeable that both contain a nacreous inner layer. Still, the turbo shell is more difficult to work with than the pearl shell (Allen, 1996, p. 109). Bone has also been compared with the pearl shell and, although opinions differ between the two materials, some researchers argue

that shell is brittle and less resilient. Others, however, argue that the cross-laminated structure of the shell makes it stronger in the important areas, like the curve (Allen, 1996, p. 109).

As the form and size of the fish hooks changed over time, the techniques to manufacture them also changed. One of the ways in which the fish hooks were produced is by cutting a square piece out of a pearl shell. From this, they start cutting a piece from the center of the square to give it a U-shape. Then, the U-shaped piece was further shaped into its final shape as a fish hook (Manoa, 2016, p. 180). The cutting and abrading tools used to make the fish hooks were fashioned out of shark skin, as the rasp-like structure of the sharkskin made the tools quite effective (Manoa, 2016, p. 180). Another manufacturing technique was by using a bow drill to bore a hole in the middle of the shell and then enlarge the hole (Manoa, 2016, p. 180). By using this technique, the Hawaiians were able to make fish hooks that had inward curving points. In addition, a file made from sharkskin or coral sometimes was used to create the desired shape. They used this file to cut into the shell and to finish the manufacture of the point and the shank (Manoa, 2016, p. 180). Finally, another technique was to drill two holes in the shell and then removing the part in between the holes. By doing this, the Hawaiians already had the beginnings of a fishhook with a point that curved sharply inward (Manoa, 2016, p. 180). As there are many techniques to produce these Hawaiian shell fish hooks, the importance is simultaneously stressed. As will be shown below, this importance is stressed further through the large variety of these fish hooks that existed of which even a typology could be based upon.

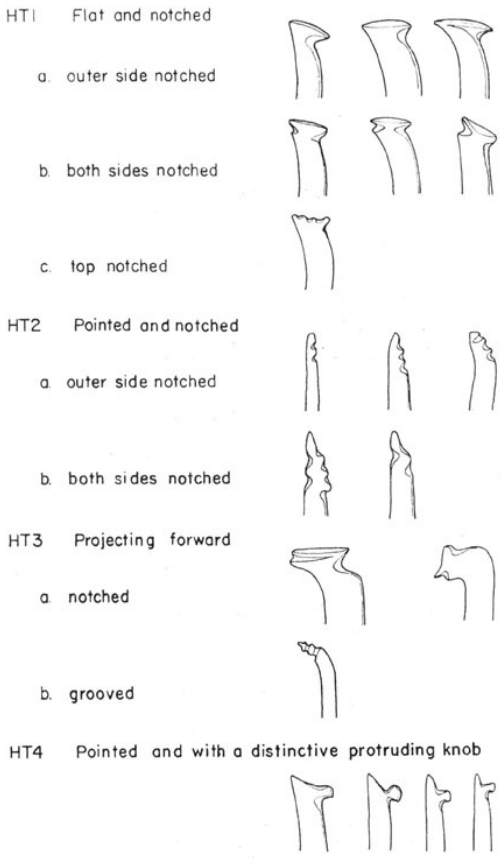

Figure 5.1: An overview of the various forms the head of a one-piece Hawaiian fish hook (after Sinoto, 1962, p. 163). The heads can generally be divided into four different

§5.1.2: Typology

As opposed to most places in the world, Hawaii has no pottery to use as a diagnostic artifact (Manoa, 2016, p. 25). It is due to this reason that very little knowledge about Hawaii's prehistory came from archaeology up until the mid-1950s (Manoa, 2016, p. 25). Without diagnostic artifacts, it was regarded as impossible to date sites in Hawaii. Even when there were artifacts, such as stone adzes, that did survive the strain of time, there was little variation between the artifacts, making them unusable as diagnostic artifacts (Manoa, 2016, p. 26). However, while excavating at Ka Lae, Sinoto (1962) found dozens of fish hooks every day (Manoa, 2016, p. 26). Upon further inspection of these

fish hooks, he noticed that the forms of the fish hooks varied from one another. Some shanks were curved while some were straight, some of the fish hooks had barbs while others did not. Fish hooks are one of the most encountered artifacts found during excavations in Eastern Polynesia (Sinoto, 1962, p. 162). The study of 3000 Hawaiian fish hooks, coming from three different sites, led to the first attempt to establish a relative chronology by using the fish hooks as diagnostic artifacts (Sinoto, 1962 p. 162). Although at first the head forms were not considered as important, later publications proved that the head forms of the fish hooks were important when comparing the fish hooks with one another (Sinoto, 1962, p. 163). Figure 5.1 shows the variability in the heads of the fish hooks and based on these divisions a relative chronology was created for the Hawaiian Islands with the fish hook as a diagnostic artifact (Sinoto, 1962, p. 163-168).

§5.1.3: Gender

In Hawaii, men and women had a specific role to play in the subsistence economy. Women were the primary suppliers of invertebrate marine resources (Connors, 2009, p. 26). They collected the largest share of the food provided by mollusks, sea urchins, and other invertebrates of the coastline. The large fish and deep ocean resources were associated with the tasks of men. The activities and tools, such as the fishing gear, including fish hooks, for the open ocean, that were associated with men were restricted for women (Connors, 2009, p. 20). When women were to touch the fishing gear that was associated with men, it was believed that the power to catch fish was taken from that gear (Connors, 2009, p. 22). This superstition meant that activities and gear that were associated with males also had to be made by males. The material from which the fish hooks were made from could be collected by females, but the males were responsible for the manufacture of the fish hooks out of the raw material (Connors, 2009, p. 81).

§5.2: Australia

§5.2.1: Manufacture and Material

The shell fish hooks of Australia have been documented thoroughly in the historical sources written by the British first fleet journalists in the late 18th century (Attenbrow, 2010, p. 16). When they arrived, they quickly realized that fishing was an important subsistence activity of the Aboriginal people living in Coastal Sydney. The main fishing techniques employed by the Aboriginal societies include fishing with multi-pronged spears and the hook and line technique (Attenbrow, 2010, p. 18).

As the first fleet journalists describe it, the hooks were made from a pearly shell (Attenbrow, 2010, p. 23). Archaeological evidence confirms this and narrows the raw material down to the turban shell (*Turbo torquata)* (Attenbrow, 2010, p. 24). This is a shell that has a pearly nacreous surface on the inside of the shell. This shell was the preferred material for the fish hooks because of the nacreous inside, although some fish hooks were occasionally also fashioned out of the talons of birds, wood, and bone (Attenbrow, 2010, p. 22). The manufacture of the fish hooks has been observed and documented by the first fleet journalists. First, the manufacture of the fishhook was done primarily by females according to the first fleet journalists. They described the manufacturing procedure of the fish hooks (fig. 5.2) in detail. First, the shape of the hook was cut out of the pearl shell with a stone. Then, the hook was ground against rocks to smoothen and thin it into the desired shape and thickness (Attenbrow, 2010, p. 23). In the final step, the necessary sharp hook was created.

Figure 5.2: The various stages of the manufacture process of a shell fish hook (after Attenbrow, 2010 p. 24).

The Aboriginals of the south coast of Australia are assumed to be the first to produce a fish hook out of shells in Australia (Shamsi et al., 2020, p. 4). The shell fish hooks of the Aboriginal people were curved and bent inwards. The hooks were described as not being bearded or barbed (Attenbrow, 2010, p. 23), as in, for example, Hawaii. The method of manufacture described above is not the only method that was employed by the Aboriginal peoples. Stone files have been found at archaeological sites in Australia that must have been used to sharpen the points of the fish hooks (Attenbrow, 2010, p. 24). These files were found within the same range as the range the fish hooks themselves have, namely the New South Wales and the South and Central coast. Residue analyses have proven that they were a multi-purpose tool used also on bone, wood, and other plant material and, therefore, the presence of these stone files does not automatically indicate the manufacture of shell fish hooks (Attenbrow, 2010, p. 24). Thus, caution must be taken with the interpretation of the manufacture of shell fish hooks in Australia when stone files are involved.

§5.2.2: Gender

In Australia, there was a strict division of labor within the subsistence activity of fishing based on gender (Shamsi et al., 2020, p. 4). Fishing was done by both females and males, but the fishing techniques they employed were quite different from one another. As the manufacture of the fish hooks was done by women, so too were they the ones who fished with them (Attenbrow, 2010, p.

16). Males fished with multi-pronged fishing spears from rock platforms in shallow waters or from bark canoes. The women, however, were the ones who used the hook and line technique from bark canoes in the estuaries and their tributaries. They also fished from rock platforms with this technique, but this was less common than fishing from bark canoes (Attenbrow, 2010, p. 16). An eyewitness account of a first fleet journalists has been documented in which a woman fished from a canoe while having a child in her lap (Shamsi et al., 2020, p. 4). The reason for this division might be because the collection of shells was an activity executed by females throughout the whole of Australia (Attenbrow, 2010, p. 30). This division of labor in fishing activities in Coastal South-eastern Australia, however, was not a common phenomenon in Australia. In other areas, such as in South-eastern Queensland, the fishing was solely done by the males (Attenbrow, 2010, p. 30). Identifying the reason behind the division of labor through the archaeological record remains very difficult, as methods to recognize such behavioral changes have not been invented yet. A plausible explanation might be that this division in labor came to be because women were already associated with the collection of the raw material: shellfish. As the women would collect the shells, it would be easier to let them modify the shells too. In turn, the men might have crafted their own toolkit as well.

§5.3: California, North America

§5.3.1: Manufacture and Material

Figure 5.3: Examples of the shell fish hooks occurring in South Central Californian coast and islands. (after Heizer, 1949, p. 91).

The shell fish hook was a common tool in the toolkits of the Native Americans living on the coast of California. The fish hooks employed by them were made from shell and/or bone (Heizer, 1949, p. 89), as similar hybrid forms exist comparable to Hawaiian hooks. Archaeological research has determined that the fish hooks that were made of shell (fig 5.3) were manufactured from the abalone (*Haliotis*), the mussel (*Trochus* and *Mytilus*), and the turban snail (*Turbo*) (Fujita, 2014. p. 129; Heizer, 1949, p. 89). All of these shells have an iridescent inside of the nacre, a similar trait that can be found in the raw material used for fish hooks in Australia and Hawaii. The manufacture of these fish hooks has been researched extensively by archaeologists (Heizer, 1949, p. 89). The first step in the manufacture was to perforate the thickest part of the shell with a punch or drill made from rock, shell, or coral (Fujita, 2014, p. 133). This perforation was then enlarged to the desired diameter of between 10 and 35 mm by abrading the shell with a polished stone and with coral that was soaked in water. The edges of the preform would then be retouched to a circular form by using a thin abrader or hammerstone of porous rock or coral to form the C-shaped opening of the

shell fishhook (Fujita, 2014, p. 133). The last step of the manufacturing process would be to abrade the surfaces of the hook until the desired form and uniform thickness was achieved. An alternative method for the manufacture of the fishhook, was to perforate the preform after it had been abraded into an oval.

§5.3.2: Typology

The Californian fish hooks have been studied extensively and researchers have been able to create a typology for these fish hooks as has been done in Hawaii. As can be seen in figure 5.4, the material of the fish hook has also been included in the typology. The fish hooks are, namely, either made from bone or shell, of which shell fish hooks occur more often. This is especially illustrated by fish hooks of type 1 and type 4, as these only occur with shell as the raw material. In types 2, 3, and 5 a combination of bone and shell was used (Heizer, 1949, p. 90), something that also occurs in Hawaii. Through extensive research on these fish hooks not only a typology has been devised but attempts to connect California with other regions through these fish hooks have also been made. Similarities between the single-piece fish hooks of California and Hawaii have been suggested to imply indications of cultural encounters between the two regions (Jones & Klar, 2005, p. 459). Likewise, similarities between the curved fish hooks of California and Chili show the same thing. However, it is still unclear whether the invention of the shell fish hooks in these regions is due to the diffusion of the artifact, suggesting cultural encounters between the regions, or if they were independent inventions by people living in these regions. Although the idea of prehistoric contact between California and Polynesia is certainly not new, the part that the fish hook plays in this discussion might just prove important (Jones & Klar, 2005, p. 459).

Typology Used in Present Study	*Material*		*Concordance of Types*			
	Shell	*Bone*	*Irwin*	*Gifford*	*Robinson*	*Orr*
1. Knobbed shank, simple point	×		Knobbed	AT2c	1	
2. Grooved or notched shank, simple point	×	×	Grooved	AT2c	1	
3. Simple pointed shank, simple point	×	×	Simple curve	AT2a	2	X2
4. Notched pointed shank, simple tip	×		Simple curve	AT2b	3	
5. Grooved shank, exterior barbed tip	×	×				X3
6. Notched pointed shank, exterior barbed tip		×	Barbed			

Figure 5.4: Typology of the Californian fish hooks of shell and bone of South-Central Californian coasts and islands (after Heizer, 1949, p. 90).

§5.3.3: Gender

A division of labour has been noted amongst the populations of the Native Americans in California as well, as was also the case in Hawaii and Australia. In California, Native American women were ethnobotanists: they tested, selected, and tended much of the plant world (Kat Anderson, 2005, p. 41). Men, meanwhile, were the ethnozoologists of the society, as their knowledge of the animal world was applied to their hunting, fishing, and fowling strategies (Kat Anderson, 2005, p. 41-42). However, the plant world was not the only domain in the subsistence economy which was associated with women. Women were also the primary collectors of shellfish, although men could have possibly aided with this task as well (McGuire & Hildebrandt, 1994, p. 47). However, another possibility arises that paints a less gender-divided picture. Most of the food that was procured came from plant

resources, while large game meat was consumed to a lesser degree. This leads to questions about whether there was a division of labor between genders in most of the subsistence activities (McGuire & Hildebrandt, 1994, p. 47-48). There is also a likelihood that men were not the only providers of animal protein, but that women, children, and the elderly each assisted in the procurement of animal protein, such as the previously mentioned shellfish (McGuire & Hildebrandt, 1994, p. 47).

As has been shown in this chapter, there is quite some information about the shell fish hooks from Hawaii, Australia, and California. In the following chapter, it will be discussed how this information from these other regions can fill the knowledge gaps of the Caribbean shell fish hooks.

Chapter 6: Discussion

In this chapter, all the data from chapter four and five will be discussed in more detail. Interpretations shall be given based on the data that has been presented about the Caribbean shell fish hook and the comparative research of Hawaii, Australia, and California. These interpretations will be used to answer the main research question posed in chapter one:

'What new knowledge can be obtained of pre-Columbian shell fish hooks in the Caribbean when comparing it to shell fish hooks from Australia, Hawaii, and California, North America?'

Although relatively little is known about the shell fish hook of the Caribbean, chapter four has shown that through archaeological research some knowledge can already be gained. This chapter gives an answer to the first sub-question stated in chapter one:
'What is already known thus far on pre-Columbian shell fish hooks in the Caribbean?'
Researchers have been able to determine the species from which the shell fish hooks used as case studies in this thesis were made. All of these fish hooks, with an exception for the Dominican fish hooks, were made out of the *Cittarium pica*. This indicates some intentionality in the selection of the raw material for the manufacture of the fish hook. The advantages of using the shell of the *Cittarium pica* are evident as well. It seems that the Indigenous peoples of the Caribbean used this species as raw material because of the shiny nacreous inside to lure fish, as well as the strength of the shell and the relative ease with which they could manufacture the fish hook out of the shell. Besides the intentional choice of raw material for the shell fish hooks by the Native Caribbeans, there is still more to learn about these fish hooks which can be done by looking at fish hooks from other cultures.

The second sub-question that will be answered goes as follows:
'What is the current knowledge of the shell fish hook in Hawaii, Australia, and North America?'

In Hawaii, there was a heavy reliance on shell tools and shell fish hooks are, as opposed to the Caribbean, common artifacts in excavations in Hawaii. Here, the importance of the shell fish hook, as has been put forth in chapter five, is unequaled when comparing it to the rest of the world. Researchers had to rely on the shell fish hook as a diagnostic artifact to develop a relative chronology for Hawaii. Hopefully, the Caribbean shell fish hook will be recognized to be as important as it is in Hawaii. Developing a typology of the shell fish hooks originating from the Caribbean might open up new revenues for research and might help put it in a better context for researchers to understand the subsistence

economy of the Indigenous peoples of the Caribbean. Typologies can also provide help by looking at the migration of peoples into new areas, which will be discussed down below.

The comparative study of Australia also put the shell fish hook of the Caribbean in a new perspective. Australian shell fish hooks were made by female Aboriginals, who also gathered the raw material. Information such as these gender-divided roles in Australia puts the shell fish hook of Anse à la Gourde, which was found in a non-local female burial, in a new perspective. Up until now, Western researchers have assumed that females were not involved in fishing, although this might not necessarily be the case. Still, it can be said with certainty that women played a vital role in Caribbean society. When looking at the data not only from Australia but also from Hawaii and California, it is evident that females from these regions were involved in certain important parts of the subsistence economy. In these regions, females were responsible for the collection of the marine invertebrates and, therefore, also for the collection of raw material for these fish hooks and other tools. Women were sometimes also even responsible for the manufacture of the fish hooks. Data from these regions, thus, calls for a reassessment of the female role in the pre-Columbian society in the Caribbean.

The analysis of shell fish hooks from California has also resulted in the extraction of important information. Here, typologies have also been created and these lay in the foreground of the possibility of prehistoric contact between peoples from Polynesia and California (Jones & Klar, 2005, p. 458-459). By studying the relationship between Caribbean and Californian fish hooks, new connections might be revealed that were previously unknown. The same goes for Hawaii, which, if all connected together, might even give answers concerning (prehistoric) human diaspora, what researchers have been desperate to find for a long time.

When comparing the four regions with one another, one interesting similarity keeps popping up. This is the similarity in the preferred raw material. In the Caribbean, all the shell fish hooks that have been found in the Caribbean were made of the *Cittarium pica* shell. This is, as mentioned in chapter four, a shell with a nacreous inner layer. The preference for the raw material for the fish hooks in Australia, Hawaii, and California was also a shell with a nacreous inner layer. However, the shell species used for the fish hooks were different in every region due to their provenance. It is clear that all cultures were specifically looking for species which had similar features ascribed to them, such as the strength of the shell, the nacreous inner layer, and the relative ease with which they could produce fish hooks out of them. This similarity in the raw material is also noticeable during the manufacturing process of the shell fish hooks. From the Caribbean, researchers must solely rely on the manufacturing traces left on the fish hooks themselves, which can certainly give us hints on how they were made. It is,

furthermore, known that the shells were ground on coarse sandstone, or on sandstone with the addition of sand or shell material. Although when looking at the manufacturing processes of Australia, which have been documented in great detail, similarities arise since they were also ground on a sandstone. This can hint at the possibility that the manufacturing processes of the Caribbean might not have been that different, although to say anything with certainty the artefact in various phases of the production process of both regions should be compared with one another and studied in more detail in future research.

The non-local female grave at Anse a la Gourde which contained a shell fish hook, hints at the possibility that females were more involved in the subsistence economy than has been previously argued. The fact that she was buried with a shell fish hook and she was non-local can also indicate a change in fishing technology that arose as new people arrived. Especially given the fact that this site is known for having a large non-local portion, as more than 25% of the population of Anse à la Gourde originally came from a different area (Hoogland et al., 2010, p. 156; Laffoon et al., 2019, p. 137). It might be important for future research to investigate the changes in the subsistence economy that followed as people migrated and assimilated with the Indigenous inhabitants. Therefore, developing a typology of these fish hooks might open the possibility of roughly tracing where the newly arrived people came from, since shell fish hooks from areas close to another are more likely to be similar than compared to fish hooks crafted in overseas areas.

To repeat the main research question:

'What new knowledge can be obtained of pre-Columbian shell fish hooks in the Caribbean when comparing it to shell fish hooks from Australia, Hawaii, and California, North America?'.

From the areas of Australia, Hawaii, and California we can learn a great deal of new information. The female role in pre-Columbian society should, after seeing the role in the other regions, be reassessed in the Caribbean. Typologies should be made for the Caribbean shell fish hook to recognize trends in the subsistence economy of the indigenous peoples of the Caribbean and to simultaneously open up new avenues in tracing human migrations into, but also within, the Caribbean. Thus, the manufacture of the shell fish hook can be described in great detail by looking at the manufacture of the fish hooks in these other regions, like Australia, Hawaii, and California.

Chapter 7: Conclusion

The goal of this thesis was to see what new knowledge could be obtained about the Caribbean shell fish hook by looking at a variety of sources. Most of these sources were archaeological in nature and from other, but comparable, regions that produced shell fish hooks as well. As it appears, a lot of new information could be obtained by comparing the Pre-Columbian Caribbean fish hook with other shell fish hooks from Hawaii, Australia, and California.

Through the comparative analyses of the shell fish hooks from other regions, it appears that research on the Pre-Columbian Caribbean fish hook has fallen behind. In Hawaii and California, an entire typology solely based on these fish hooks was created. For Hawaii, the shell fish hook is even the most important artifact that can be found in the island group, as ceramics were not yet in use.

It is evident that for the Caribbean shell fish hook, a typology should be constructed by comparing the forms and sizes of the fish hooks that are found within the Caribbean. The construction of such a typology will enable future researchers to recognize the human diaspora into the Caribbean and within the Caribbean. It can also prove to be useful in connecting the Caribbean into a more global context if these typologies can be connected to shell fish hook typologies of South and/or North America.

The role of women in the Pre-Columbian societies of the Caribbean should also be reevaluated. Up until now, Western researchers have assumed that women did not participate in the fishing activities of their societies, although this might not necessarily be the case. As the other regions showed that women in their respective societies had a bigger part to play concerning the fishing activities, such roles might also apply to women in the Pre-Columbian societies in the Caribbean. Whether this was a more fluent gender role division in which in difficult times only women participated in the fishing activities, or they had a fixed part to play in the fishing activities, is still unknown. By reevaluating the female role in Pre-Columbian society, researchers can get away from the western, biased point of view in which there are fixed gender roles. A new opportunity arises to study the role of the woman in the Caribbean in its own unique context.

Finally, future research on the Pre-Columbian shell fish hook is highly recommended. This thesis should be regarded as one of the first attempts to demystify the production process, the use, but also the role in society of the shell fish hook. It is recommended to explore the similarities of fish hooks further between the Caribbean region and other regions in the world, as fish hooks were also used in Africa and Asia. It is also highly suggested to conduct experimental archaeological research regarding shell fish hooks, in which various shell species are modified to test their usefulness. Then,

researchers will perhaps finally be able to determine exactly what steps were taken to manufacture the Caribbean shell fish hook.

This thesis has hopefully shown that the Pre-Columbian Caribbean shell fish hook is a much more important artifact than previously recognized. By studying its production process and use, a lot of knowledge can be gained on Pre-Columbian societies. On a final note, researchers, archaeologists in particular, must be more careful during their investigation in the Caribbean by being aware of the possible presence of shell fish hooks. Caution must be taken during excavations, as probably a lot of valuable information is already lost on this artifact, whilst this could have been avoided. One goal in the future is to create a similar typology of Caribbean fish hooks as has been done in Hawaii and California, although it remains to be seen if this is a true possibility.

Abstract

Fishing played an important role in the subsistence economy of the Indigenous people of the Caribbean. Therefore, a lot of research has focused on the fishing techniques and tools that were used by these peoples before 1492. Already, a lot is known about which fishes were caught, how they were caught, and which tools were used to catch these fishes. However, one particular tool has often been overlooked and, thus, received little attention as of yet. As this thesis will show, Pre-Columbian Caribbean shell fish hooks are a relevant artifact of which its importance needs to be recognized. The gaps of knowledge that current are strongly present in Caribbean shell fish hook literature will be filled up by the means of a comparative analysis. There will be looked at shell fish hooks from three other regions: Hawaii, Australia, and California. The shell fish hooks from these regions have been studied more thoroughly than the Caribbean fish hooks, meaning that a comparison will prove useful. Within this comparison, special attention will be given to the manufacturing process of the shell fish hook, its use, the created typology and the role of men and women in relation to the artifact. It has become clear that certain aspects of the Pre-Columbian shell fish hook, of which the role of males and females is most notable, must be re-evaluated. The role of females in Pre-Columbian society is largely studied with a western bias in mind, something that researchers must stop doing. Women from all the other regions have played a large role in the collection of marine resources and sometimes also the manufacture of shell tools, meaning that the role of women must not be underestimated. It can be concluded that there is a lot of information to be gained of the largely unstudied Pre-Columbian Caribbean fish hook by looking at similar fish hooks from various regions across the globe. These results, furthermore, are expected to result in a more attentive focus on the recognition of the Caribbean shell fish hook during research. This thesis can be the starting point of further detailed research into the Indigenous peoples of the Caribbean through the analyses of the Pre-Columbian Caribbean shell fish hook. This tool can be used to track the diaspora of peoples into the Caribbean and can, furthermore, be explored even further in attempts to connect the Caribbean with mainland South and North America.

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