

Human-Sharks interaction in chroniclers' accounts from the XVIth and XVIIth centuries: A rich source of information for Brazilian zooarchaeological studies

Interacciones humanos-tiburones en libros de crónicas de los siglos XVI y XVII: Una rica fuente de información para los estudios de zooarqueología brasileños

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ABSTRACT: Sharks teeth are abundant in Brazilian coastal archaeological sites. The interaction between natives and sharks, including the capture and differentiated use of this resource, however, has been little discussed probably due to the lack of consistent material evidences and methodologies of analysis that supports more elaborate inferences. In the face of gaps in the data obtained for archaeological contexts, the use of travelling chroniclers' accounts of sixteenth and seventeenth centuries as a rich source of information is a common methodology among social scientists who study the past. The objective of this article is to present the reports available in the traveller's literature about the interaction between native groups of the south and southeast Brazilian coast and sharks, demonstrating their importance as useful data sources for discussions on the matter.

KEY WORDS: ZOOARCHAEOLOGY, CHRONICLERS, HUMAN-SHARK INTERACTION, BRAZIL

RESUMEN: Dientes de tiburón son abundantes en los sitios arqueológicos costeros de Brasil. La interacción entre los nativos y los tiburones, incluyendo la captura y el aprovechamiento diferenciado de este recurso, sin embargo, ha sido poco discutida probablemente debido a la ausencia de evidencias materiales consistentes y metodologías de análisis que soportan inferencias más elaboradas. Ante las brechas en los datos obtenidos para los contextos arqueológicos, el uso de relatos de cronistas viajeros de los siglos dieciséis y diecisiete como una rica fuente de informaciones es considerada una metodología común entre científicos sociales que estudian el pasado. El objetivo de este artículo es presentar los relatos disponibles en la literatura de viajeros sobre la interacción entre los grupos nativos de la costa sur y sudeste brasileña y los tiburones, demostrando su importancia como fuentes de datos útiles para discusiones sobre el tema.

PALABRAS CLAVES: ZOOARQUEOLOGÍA, CRONISTAS, INTERACCIÓN HUMANO-TIBURÓN, BRASIL

RESUMO: Dentes de tubarão são abundantes nos sítios arqueológicos litorâneos brasileiros. A interação entre os nativos e os tubarões, incluindo a captura e aproveitamento diferenciado deste recurso, no entanto, tem sido pouco discutida provavelmente devido à ausência de evidências materiais consistentes e metodologias de análise que suportam inferências mais elaboradas.

Diante das lacunas de informação para os contextos arqueológicos, o uso de relatos de cronistas viajantes dos séculos dezesseis e dezessete como uma rica fonte de informações é considerada uma metodologia comum entre cientistas sociais que estudam o passado. O objetivo desse artigo é apresentar os relatos disponíveis na literatura de viajantes sobre a interação entre os grupos nativos da costa sul e sudeste brasileira e os tubarões, demonstrando sua importância enquanto fontes de dados úteis para as discussões sobre o tema.

PALAVRAS CHAVES: ZOOARQUEOLOGIA, CRONISTAS, INTERAÇÃO HOMEM-TUBARÃO, BRASIL

INTRODUCTION

It is correct to say that sharks contribute to much of the faunal remains found in archaeological sites of the south and southeast coast of Brazil, especially the teeth, due to the high mechanical resistance of the enamel, composed mainly by the mineral fluorapatite. Not uncommon, archaeological series are composed of hundreds and even thousands of shark teeth, which may or may not show signs of human alteration (e.g.: González, 2005; Cardoso, 2011; Pavei *et al.*, 2015; Borges, 2016; Mayer, 2017). Even so, over the last few decades the relationship between native groups and sharks in precolonial context has been little discussed, probably due to the absence of consistent material evidences and methodologies of analysis that support more elaborate inferences. Thus, shark fishing techniques has been undersized in the discussions, with its capture associated with strandings, especially in relation to the bigger and more aggressive species (González & Amenomori, 2003). Even if this hypothesis seems the least likely (Mayer, 2017). Likewise, in general, shark teeth have been interpreted only as adornment, probably due to the attention given to findings in funerary contexts around the necks and waists of the buried individuals.

Given the gaps of information and the complexity of the matter, which deals with the interaction of man and the environment from cognitive, functional and symbolic aspects not available to scholars, ethnohistorical analogies can be a promising path to discussions and hypothesis making (Fausto, 2006; Prates, 2009, Franco, 2011). In this sense, the use of travelling chroniclers' reports of sixteen and seventeen centuries as a rich source of data is a common, fundamental and accepted methodology among social scientists who study the past, espe-

cially archaeologists (Prates, 2009; Aguiar, 2010; Franco, 2011). Double-crossing and homogeneity in narratives are good parameters for considering these documents as important sources of information. However, it should be always accompanied by a critical sense, as the authors were influenced by their time, culture and motivation (Aguiar, 2010; Franco, 2011; Junqueira, 2011; Deminicis, 2011, 2015).

The absence of discussions on a frequent e intentional interaction between humans and sharks in pre-colonial contexts is probably also related to the idea that, because of the high risks, it would not be common among native populations. The risks associated with catching these animals were not only due to the aggressiveness of many species, but also due to the fact that the interactions occur in their natural environment, giving disadvantages to humans.

Sharks are aquatic animals present in all kind of environment but mainly associated with salted water. They belong to the taxonomic class Chondrichthyes and are member of the Elasmobranchii subclass, which also includes the rays. Participating with 500 species in this subclass, the sharks are divided in nine different orders (Ebert *et al.*, 2016). Modern form of sharks are present on earth as early as the Jurassic period, 200-145 million years ago (Ebert *et al.*, 2016). The knowledge about shark migration and social interactions improves recently, offering a more complex picture of the behaviours of this top food chain predator (Ebert *et al.*, 2016). Their physical aspect is characterized by a cylindrical shape, although some are flattened, and by the presence of five to seven paired gills on the sides of the head. They also show pectoral fins, a large caudal fin, and one or two dorsal fins. As evolved predators, they have highly sophisticated senses of sight, hearing, smell and taste, as well as the capacity to feel pressure and electrical field (Ebert *et*

al., 2016). The jaws of the shark are equipped with a great number of teeth which present the particularity to be continually formed during the shark lifetime. The rhythm of this replacement changes from a specie to another but could be as quick as every eight days (Ebert *et al.*, 2016).

The objective of this article is to present the reports available in the travellers' literature about the interaction between native groups of the south and southeast Brazilian coast and sharks, demonstrating their importance as useful data sources for discussions on the matter.

THE CHRONICLERS AND THEIR TEXTS

Hans Staden (1525-1576, both dates in the current Germany), raised as a trader, became a gunner at the service of the Portuguese crown and travelled to Brazil in the year of 1547. He stayed in Brazil between 1547 and 1555, when remained captive of the Tupinambá natives for nine months. His report is the first well organized eyewitness source of many aspects of the culture and lifestyle of these native groups (Baldus, 1954; Deminicis, 2011; Duffy & Metclaf, 2012; Whitehead, 2012; Pansu, 2014).

Gabriel Soares Souza (*ca.* 1540 Portugal-1590 Brazil), a successful colonist, had direct contact with the Tupinambá and wrote in 1587 the 'Tratado Descritivo Do Brasil'. He described the culture of these and other native groups, but the accounts gained great notoriety only centuries later with the studies of Alfred Métraux and Florestan Fernandes (Baldus, 1954; Monteiro, 2003; Oliveiri & Villa, 2009; Deminicis, 2011).

André Thevet (1516-1590, both dates in France) travelled through Brazil for only ten weeks between 1555 and 1556. He published three books that are more than simple reports of his staying in Brazil, but are compilations and transcriptions of numerous texts written by other chroniclers, which make them a very rich source of first-hand information, although it is a secondary historical source (Baldus, 1954; Lestringant, 2003; Oliveiri & Villa, 2009; Deminicis, 2011; Whitehead, 2012).

Jean de Léry (1534 France-1611 Switzerland), a French cobbler who became a Calvinist pastor, lived in Rio de Janeiro between 1557 and 1558. *Archaeofauna* 28 (2019): 157-167

During these years, he lived with the Tupinambá. It is a quite detailed text, considered a great source of information about the costumes of native groups, especially on the issue of anthropophagy among the Tupinambá (Baldus, 1954; Lestringant, 2003; Oliveiri & Villa, 2009; Deminicis, 2011; Whitehead, 2012).

Anthony Knivet (*ca.* 1560 England-1649) was the illegitimate son of an English nobleman who went to Brazil in 1592 with the expedition of Thomas Cavendish in the hope to make fortune. Captured and enslaved by the Portuguese until his escape and return to England in 1601, he spent ten years in Brazil with frequent contact with natives, living two months as a captive among the Tamoyo (a group of Tupinambá), learning their culture and language. This story is an excellent source of information since Knivet, as an eyewitness, showed a real interest in the culture of the natives and described objectively the experienced events (Baldus, 1954; Lestringant, 2003; Monteiro, 2003; Giron, 2007; Deminicis, 2011).

Simão de Vasconcellos (1597 Portugal-1671 Brazil) was a Jesuit priest. He came young to Brazil with his family and lived in Bahia and Rio de Janeiro, where he published four books, always containing descriptions of the natives' culture. In the biographical book of 1655 he describes the relationship between humans and sharks (Baldus, 1954; Lestringant, 2003; Soares, 2007; Domingues, 2010; Deminicis, 2011; Silva de Freitas, 2014).

Fernão Cardim (*ca.* 1548 Portugal-1625 Brazil), also a Jesuit priest, travelled to Brazil in 1583 as part of the entourage of Father Cristóvão de Gouveia. He lived in Rio de Janeiro for several years. During a journey to Brazil in 1601, his manuscripts were stolen, partially translated and published in English, until the all-manuscripts were printed for the first time as a book in 1925 with the title «Tratados Da Terra e Gente do Brasil» (Baldus, 1954; Lestringant, 2003; Oliveiri & Villa, 2009; Deminicis, 2011).

The Goitacá And Tupinambá Groups

The aim of this section is not to produce an anthropological analysis of these two native groups but just to offer a contextualisation background.

The Goitacá

The Goitacá is a poorly known group even if often quoted in the old literature. All the information about them has been summarised by Métraux in his article of 1929. The lack of better knowledge comes by the fact that they were almost eradicated during wars against the Portuguese and the Tupinambá, their traditional enemies, before more information could have been recorded (Métraux, 1929, 1946). A small number of these people could have survived near Campos and Cabo Frio (Rio de Janeiro state) as long as until the first half of the 19th century (Métraux, 1946). In truth, what happened to them after the war against the Portuguese for the possession of their traditional territories in 1630 seems unclear. They could have mixed themselves with the Koropo in Minas Gerais state and/or be grouped in villages by Jesuits. Wied-Neuvid (1820-1821) wrote that he met with the direct descendants of the Goitacá people in the São Lourenzo and São Pedro dos Índios villages near Rio de Janeiro, but at that time they had already lost the memory of their own past.

According to Vasconcelos (1882) and Thevet (1878), the Goitacá groups were subdivided in four subgroups called by the Tupi, Goitacas-mopi, Goitacas-yakorito, Goitacas-wasu and Goitacas-miri, who lived at war against each other (Vasconcellos, 1658; Métraux, 1929).

The exact traditional territory cannot be defined with details as the different historical sources do not always coincide, but all agree to situate them in the current Campos dos Goitacazes, with evidence of occupation in a more extensive coastal area, which means a territory between the states of Rio de Janeiro and Espírito Santo in the Brazilian southeast region.

Almost nothing is known about their language at the exception that they did not speak the tupi-guarani macro language, as their neighbours. In the past it was common to classify their language as macro Jê, although without any real proof (Métraux, 1929), as well as in recent studies (Silva Neto, 2007). These difficulties occur because no word of that language has ever been recorded and, therefore, the association is only done by the geographical proximity of the Goitacá groups with another macro Jê speakers: the Purí, Koropó and Coroado groups, all members of the Purí family language (Métraux, 1929, 1946; Silva Neto, 2007).

Some elements of the Goitacá culture is described in these old literatures and compiled by Métraux (1929, 1946), like the physical appearance, lifestyles, the practice or not of anthropophagy, dwelling designs, etc. Unfortunately, the sources are often contradictory, which makes the understanding of the Goitacá lifestyle a bit more difficult. Some of these contradictions could be explained as the result of the adoption of some customs of Tupi-Guarani groups by some of the Goitacá (Métraux, 1929, 1946), such as the existence of two kinds of haircut. Actually, Léry (1578) and Knivet (1906) described the Goitacá with long hanged hair while Vasconcellos (Mello Moraes, 1882) e Soares de Souza (1938) attributed them a haircut more similar to the tupi one, with forehead shave and hair hanged to the shoulder at the back of the head.

About their physique, Vasconcellos (Mello Moraes, 1882) said they were big, robust and strong. This description could be complemented by Soares de Souza (1938), which described them as whiter than the other groups, and by Knivet (1906), who wrote they were bigger than the Tupinambá.

In relation to dwellings, Vasconcellos, Soares de Souza, and Knivet agree with the lack of hammock for sleeping and with the fact that they seem to sleep straight on the floor, or on a leaf mattress. But about the houses themselves, the more complete description is offered by Vasconcellos, who pictured them as small huts in the manner of stilts due to the presence of water, in which it was necessary to enter by crawling because the doors were very small (Vasconcellos, 1658, Livro IV, Capítulo XII *apud* Mello Moraes Filho, 1882: 126).

The question of the practice or not of anthropophagy by these groups is clearly the most complicated question to solve. Indeed, after the publication of Hans Staden's book, anthropophagy is the most appointed stereotype of native groups. Vasconcellos, Knivet and Thevet gave a clear description of this practice, while Soares de Souza, without denying the anthropophagy, said they were not great eaters of human flesh. Métraux (1929) interpreted these two different reports as a variation in the practice inside the own Goitacá groups, while some of them can have taken the custom of eating human flesh from their neighbours Tupi groups. Another possibility is that Thevet has borrowed the description from a Tupinambá group and applied it to the Goitacá.

The Tupinambá

The Tupinambá is the generic name given to all the Tupi-Guarani speaker who dominated the Brazilian coast in 16th century from the Amazon river to Cananéia (south of São Paulo State). The Tupi-Guarani linguistic family was composed of several groups that shared a common language and homogeneous culture, which did not prevent them from waging war against each other (Métraux, 1948; Fausto, 2006). The term *Tupinambá* could be really confusing as it is used indistinctly as the generic name for all of these groups, and also as the name of a particular group. In general, the Tupinambá may be some of the best known native groups in the old literature, as they were in early and constant contact with the first European who arrived in the actual Brazilian coast (Fausto, 2006). They were the subject of description of several authors, and with great details by Staden. In truth, most knowledge over the other groups came through the stories told by the Tupinambá on their allied or enemy neighbours, and have been reported by the travelling chroniclers.

Members of the Tupi-Guarani macro linguistic roots could be qualified as semi-nomads' horticulturalists, as their food intake was not only based on hunting and fishing, but also on the horticulture, mainly of the manioc, and no-consumable plants. Also, they lived in protected villages with great oblong communal houses with central places, which were abandoned when the crop began to decrease, which seemed to be after four-five years. The population of these villages, according to the texts, was between 500 and 3.000 individuals (Métraux, 1948; Fausto, 2006). Their ornaments, hairstyle, tools, etc. are also well-known, as are so many other details of their lifestyle and social behaviour, for example, for a zooarchaeological interest, the presence of several domestic animals (see Métraux, 1948 to a good introduction of this matter).

THE HISTORICAL ACCOUNTS OF THE HUMAN-SHARK RELATIONSHIP

The historical writings quoted in this paper could be divided in two categories: accounts about the Goitacá shark fishing techniques and accounts

about the Tupinambá use of shark teeth as arrow-head. As the aim objective of this work is the relationship between humans and sharks, it seems more interesting to separate the discussion according to this matter, and not in function of the ethnological definition.

Shark fishing techniques

Four texts give us a description of the capture of sharks by the Goitacá groups. Two of them, Vasconcellos's (1882) and Soares de Souza's (1938), are second-hand testimonies as the authors were not the direct witnesses of the scene, but reproduced descriptions they received from others, in this case, probably from their native allies. The other texts are primary documents, since Knivet (1906) and Staden (1930) were the witnesses of the records. Based on Knivet's testimony, Métraux (1929) wrote that the fishing of sharks was a reality among natives in the sixteenth century.

The descriptions made by Vasconcellos (1882) and by Soares de Souza (1938) are the most detailed and could be considered as a same fishing technique, with few variations. On the one hand, Vasconcellos reported that the Goitacá were skilled shark fishermen, who entered shallow waters with small sharp wood sticks on hand to encircle and attack, and therefore killed them by entering the stick in the animal's mouth and carried choking sharks to the shore.

[...] 3. *Eram tão insignes no pescar, que se dizelles (se é para dar credito) que se ajuntavam em certas paragens baixas do mar, e com páos nas mãos, curtos e agudos, de uma e outra parte punham em cerco os tubarões e arremettiam a elles, e quando ia ao abrirem a boca ilhes metiam nella a mão e o páo, e engasgados os traziam á terra.* [...] (Vasconcellos, 1659, Livro IV, Capítulo XII in Mello Moraes Filho, 1882: 126).

On the other hand, Soares de Souza (1938) portrayed the same shark fishing technique among the Goitacá by telling that they used to swim in the sea and waited for the sharks with a very sharp stick in their hands. When the Goitacá were attacked, they beat the sharks and thrust the stick so hard into their throat that they drowned and were killed. Then the sharks were brought ashore.

[...] *Costumavam estes bárbaros, por não terem outro remédio, andarem no mar nadando, esperando os tubarões com um pau muito agudo na mão, e, em remetendo o tubarão a eles, lhe davam com o pau, que lhe metiam pela garganta com tanta força que o afogavam, e matavam, e o traziam à terra, [...]* (Soares de Souza, 1938, chapter LXV: 83).

Both authors agree on the kind of weapon used for this activity, which is a simple sharp wood stick, and also agree on the fact that the natives were using the sharks' power and behaviour against them. In the first narrative, the Goitacá, in interaction with the environment, provoked a natural reaction in the shark to escape the trap, which is to attack. In the second one, the Goitacá used the predatory instinct of the shark.

The description given by Vasconcellos (1882) is particularly interesting as it could picture a shark fishing technique in nursery areas, since many species of sharks breed in shallow waters. This hypothesis was formerly proposed by Lopes and co-authors in their study of archaeological shark remains from archaeological sites of the Rio de Janeiro coast (Lopes *et al.*, 2016).

None of these two authors mentioned the size of the captured sharks, but Knivet's testimony (1906), who described them as 'great', and the narrative of Soares de Souza (1938), who emphasizes the danger of these kinds of fishing, suggest that not only small, young and newborn sharks were taken.

[...] *I have seene them take great dog-fishes by the taile, and dragge them ashoare. [...]* (Knivet, 1906: 252).

The next texts offer information not only on fishing ability of natives with arrows, but also on the regularity of contacts between them and sharks. In his description of the Rats Island in «Les singularitez de la France Antarctique», André Thevet (1878) mentions a shark fishing by an undefined native group. He wrote that when the group captured a shark still alive, they killed it with arrows to avenge past attacks.

[...] *Aussi ils se gardent bien de manger de ce poisson, ains s'ils le peuuent prendre vif, ce qu'ils font quelque fois pour se venger, ils le font mourir à coups de fleches. [...]* (Thevet, 1878, about the rat island: 351-352).

In the excerpt below, Thevet mentions the fear of the natives during the *Houperou* fishing, carried out frequently, because of their ferocity and powerful bite.

[...] *Pres ceste isle se trouue semblablement une sorte de poisson, et sur toute la coste de l'Amérique, qui est fort dangereux, aussi craint et redouté des Sauvages: pour ce qu'il est rauissant et dangereux, come un lion ou un loup affamé. Ce poisson nommé Houperou en leur langue, mäge l'autre poisson en l'eau [...] dont les Sauvages quād ils pechet tous nuds, ainsi qu'ils font ordinairement, le craignent, et nō sans raison, car s'il les peut atteindre, il les submerge et estragle, ou bien où il les touchera de la dent, il emportera la piece. [...]* (Thevet, 1878, about the rat island: 351-352).

Finally, Staden (1930) described, in the most concise report of all, without specific mention of sharks, the same fishing technique with bows and arrows for the Tupinambá from Rio de Janeiro.

[about hunting and fishing with arrows] [...] *Do mesmo modo perseguem os peixes á beiramar e têm uma vista muito penetrante. Mal apparece um peixe atiram e poucos tiros erram. Si acaso ferem algum, atiram-se na agua e nadam atrás delle. Certos peixes grandes, quando feridos, vão para o fundo, mas elles seguem atrás, mergulham até seis braças, e os colhem. [...]* (Staden, 1930, chapter VII Como são destros em caçar animais e peixes com flechas: 138-139).

Shark teeth as arrowhead

Three manuscripts offer reports of the use of shark teeth by Brazilian coastal groups as arrowhead. In this sense, Soares de Souza's text (1938) is quite revealing since he describes that the main objective of shark fishing among the Goitacá was precisely to extract the teeth and use them as arrowheads. Still according to the report, they would not put themselves in such a danger if the goal was to catch the shark to eat it. Once again appears the suggestion that natives did not catch only young sharks, since their teeth would not be big enough to be used as arrowheads.

[...] *lhe davam com o pau, que lhe metiam pela garganta com tanta força que o afogavam, e*



FIGURE 1

Example of five shark teeth worked on the root and crown found at the Rio do Meio site (Florianópolis, SC, Brazil). Collection MArquE-UFSC. Photograph by Simon-Pierre Gilson.

matavam, e o traziam à terra, não para o comerem para o que se não punham em tamanho perigo, senão para lhes tirar os dentes, para os engastarem nas pontas das flechas [...] (emphasis added) (Soares de Souza, 1938, chapter LXV: 83).

In another part of the report, Soares de Souza (1938) described the weaponry used by the Tupinambá, remarking the presence of shark teeth as arrowheads.

[...] e levam na mão esquerda seu arco e flechas, com dentes de tubarão; [...] (Soares de Souza, 1938, capítulo CLV: 372).

Staden (1930), as an eyewitness, reported the use of shark teeth as arrowhead by the Tamoyo when they were preparing for war.

[...] Têm ells os seus arcos, e as pontas das flechas são de ossos que aguçam e amarram; também fazem-nas de dentes do peixe a que chamam Tiberaun (135) e que apanham no mar [...] (Staden, 1930, chapter XXVII como se armam para a guerra: 159).

Finally, Cardim (1939), in his description of Brazil, acknowledged the use of the shark teeth by the natives, without specification of the ethnological group.

[...] e dos dentes usam os índios em suas flechas por serem muito agudos, cruéis, e peçonhentos, e raramente saram das feridas, ou com dificuldade. [...] (Cardim, 1939, chapter XIV, Paragraph about shark: 75).

DISCUSSION

The existence of chroniclers' accounts about human-shark relationship on the Brazilian coast is, without doubt, valuable in many points for the study of the daily lifestyles and interaction with the environment in the past among native people. It is especially interesting for the archaeology of 'sambaquis' (shellmounds) and shallow sites, whose groups did not have direct contact with Europeans and from which, therefore, we have limited information.

These testimonies bring a really interesting enlightenment on the main issue related to the interaction between humans and sharks: the existence of catching strategies. Unlike what has even now been imagined, the travellers' narratives clearly state that the capture of the sharks by the natives was a frequent and well-organized activity. Therefore, the widely accepted scenario of fortuitous recollection of stranded animals should be discarded.

In relation to the techniques used by the natives, the above texts are quite relevant since they describe maneuvers never reported to any groups around the world, which does not require any special technological apparatus: to insert a stick into the shark's throat and kill it by suffocation and drowning. This one seems to be a particular technique used by the natives of the Brazilian coast.

Indeed, the descriptions show fishermen not need to go far from the shore to catch sharks, even 'great' sharks, as described by Knivet. In this sense, Staden (1930: 156) provides a short description of

the Tupinambá navigation and writes that they do not go further than two miles ($\pm 3,2$ km) from the shore, which could be enough to attract species as *Carcharhinus obscurus* (Dusky shark), which is known to follow the boats (Ebert *et al.*, 2016). This shark is born with a size between 69 and 100 cm and reaches an adult size between 250 and 300 cm, with a maximum size recorded of 400 cm (Ebert *et al.*, 2016). These proportions make them, undoubtedly, 'great' sharks in terms of size.

The 'shallow water technique' described above could have been undertaken in shark reproduction areas, which suggests the presence of newborn and young individuals, but also adults during their parturition time. Once again, the narratives show that there was no need for vessels with complex technology for deep sea incursions, even for the capture of great sharks, common in the archaeological record of the Brazilian coast.

Besides their value as reliable testimonies of the practice of shark fishing, the described techniques could be linked, as already noticed, with recent zooarchaeological studies of elasmobranch remains in the study of Lopes and co-authors (2016) and in the study of the shallow site Rio do Meio (still in progress but for preliminary data see Gilson & Lessa, 2018), which suggest precisely a fishing practice in nursery areas.

Another important contribution of these historical documents is the possibility of interpreting shark teeth found in archaeological Brazilian sites otherwise than only in terms of ornaments, as they have usually been interpreted even when found in differentiated contexts (e.g. Rohr, 1959, 1977; Schmitz, 1990; Silveira, 2001; Fossari, 2004, Escórcio & Gaspar, 2005; Plens, 2010). The above reports offer another perspective for the use of shark teeth, as weapons or at least part of weapons. In fact, it would be a waste not to use them to make weapons and tools, given their natural characteristics. The dental enamel has high mechanical strength, greater than that of the bones of birds and mammals, with which the arrowheads and spears were usually made; the dental crown is naturally shaped to serve as an arrowhead or indented tool, in addition to having sharp edges; the dental crown is strongly attached to a bone base that is wide enough to provide stability to the piece when engaged to the rest of the weapon.

A broader interpretation of these artefacts, possibly used as tools, was previously mentioned by Du-

arte (1968) and Rohr (1959, 1966). Many decades later González (2005) addressed this issue in more depth, but he presented ethnographic data from quite culturally distant groups, especially Polynesians and Africans, as examples of shark teeth uses.

It is true that the general primary functions attributed to artefacts used by distant historical groups, and those reported by chroniclers for artefacts of Brazilian coastal natives are similar: weapons and instruments. However, any ethnographic analogy becomes a more plausible piece of information to be considered within the studied context when the compared groups lived in the same environment and were not chronologically separated over a long period of time. In this sense, it is important to note that some later precolonial coastal groups could have interacted with Tupiguarani groups, and exchanges in various cultural aspects may have occurred (Corrêa, 2014; Bonomo *et al.*, 2015; Silva & Noelli, 2017).

Finally, these travellers' narratives provide the opportunity to think about the role of sharks among these native groups. Staden (1930) had reported the use of shark teeth only in association with war weaponry. Naturally, nothing proves that the Tupinambá equipped their arrows with shark teeth only for war situations. It is also possible that they have used these arrows for another purposes, or that the arrows used against enemies have been made with another materials. However, it is correct to assume that this specification made by Staden is related to the importance of the war in the lives of the Tupinambá. This inference is consistent with Soares de Souza's account (1938), that the main goal of shark fishing among the Goitacá was to extract their teeth. Both testimonies suggest that shark teeth were a really valuable material for native groups.

One last question can be thought about the man-shark relationship: the use of meat in the protein diet of the coastal natives. As already underlined, Soares de Souza (1938) points out that the flesh was not the main purpose for shark capture among Goitacá, and Thevet (1878) suggests that the Tupinambá did not even eat the flesh. This report made by Thevet should be regarded with precaution since this fishing practice has been reported by several authors in a short time period of one century. This regularity made the shark meat a potential source of protein, which waste could only be explained in the light of taboos and symbolic aspects not known to us.

It is an interesting fact that the little knowledge about the lifestyle of the Goitacá makes them closer to what can be thought about the 'sambaquis' and shallow sites groups. For these precolonial coastal groups, recent studies with isotopic analysis indicate the regular consumption of top food chain marine animals, probably sharks (Bastos *et al.*, 2014, 2015).

FINAL REMARKS

Although the short excerpts presented above represent narratives of travelers who viewed the world through the lens of their own time and culture, these texts can open a valuable window to the past. Their direct observation and words have evidenced some aspects of the relationship between human groups and sharks along the Brazilian coast, thus, they offer new perspectives for reflections on many issues related to shark remains, commonly found in coastal sites dating from 8.000 BC until the contact between natives and Europeans. If the well-known distant examples of Polynesia do not allow for consistent discussions or formulations of verifiable hypotheses in relation to precolonial Brazilian groups, the same situation is not true for the examples discussed here, provided by geographically and chronologically close native populations. Brave fishermen, fierce sharks, curious travellers. Lucky archaeologists, they were all on those same beaches.

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