

Pre-Hispanic Navigation in the Andean Region

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Abstract

Offshore and inland waters in the Andean region were crossed by boats of various types made of different materials. These were related mainly to fishing activities, but also were involved in long-distance trade of luxury goods, rituals, passengers and even war. Construction technologies and development of these vessels varied depending on available resources and the capacity of societies to solve navigational problems. In that sense a variety of types and forms of vessels have been identified, and although not all boats are "complex" as the Europeans, it is clear that they evolve and had changes over time that perfected them. Despite this plentiful of technologies, the archaeological record of actual watercraft is almost nonexistent. As a result the approach to these technologies is through other evidence as the iconography found on pottery, textiles and wall friezes, as well as sculptural references not to mention references recorded by Spanish chroniclers and ultimately post-Conquest survivals. The aim of this paper is to recount these technologies through indirect evidence and elaborate some hypotheses about the use and success of the same in the pre-Hispanic Andean world and its survival after the conquest.

Keywords: Prehispanic, Navigation, raft, boat, andean

Introduction

The Peruvian coastal environment consists of two related ecological zones, the Pacific Ocean with its adjacent shoreline and the river valleys that wind through the coastal desert creating linear oases. The coast of Peru, due to its complex natural environment generates a constantly renewed of marine food supply. The source of this large supply is the Peruvian Coast Current, also known as Humboldt Current, which is the easternmost segment of the counter clockwise circulation of the Pacific Ocean (Bawden, 1996). The archaeological evidence for the Middle Archaic (6000-3000 BC¹) in the Andean area allows us to think that sedentary groups develop in the Andean valleys and the slopes each with their own neolithisation process. These societies

depended on mixed economies however the coastal ones placed greater emphasis on the extraction of marine products (Shady, 2003b). The particular richness of the Peruvian coast allows the subsistence of larger groups of people and early complex coastal societies in pre-ceramic times as suggested by Moseley. Evidences of these can be found in Caral, Supe, and other sites, from the same period such as Huaynuna, Las Haldas, Ancon and La Paloma (Bearez and Miranda, 2003). Ever since the large marine resources could support the development of early complex societies, an increasing amount and more efficient marine exploitation was critical causing the development of new technologies to go further into the sea and complement the shoreline exploitation. Shellfish, Sea Mammals, Fish, and later the guano from off shore islands and long distance trade of sumptuary items, require a constant evolution and specialization on, fishing hooks, fishing nets and ultimately marine vessels (Rostworowski, 1989).

Evidences for navigation

The invention of floating devices in pre-Hispanic times is not a matter of discussion even though the lack of direct archaeological evidence of such devices. All evidences related with ancient navigation are based on historic and ethnohistorical references, experimental archaeology and indirect archaeological evidences such as iconography, models and artifacts. All of these sources face their own validation problems and subsequent debate.

From all these sources it is clear that along the Andean region rafts of different complexity were the principal navigation tool, with the exception of the reed boat for Moche² times in the northern coast and Titicaca Lake³ (Ausejo, 2011).

Archaeological evidence

Actual rafts or boats have been elusive for archeologists, however the best evidence for them can be seen in a collection of wooden raft models found in southern Peru and northern Chile dated to the Late Intermediate Period (1000 – 1350 AD), belonging to the Chiribaya culture. The models are found on individual burials as burial offerings among others (Ortiz, 2003).

Other evidences are depictions of seafarers on mud friezes and sculpture or painted pottery. Depictions of seafarers on friezes are very rare, however Huaca Las Balsas, part of the Tucume complex in La Leche valley, dated prior to the arrival of the Chimu rule over the area shows a frieze (2.20m x 1.60 m) with two reed boats or rafts, each with two figures holding oars or paddles (Heyerdahl, 1995). Another wall frieze shows a similar depiction with four figures, two over a balsa log raft and two divers collecting spondyllus shell (Vicente Cortez, personal communication). The balsa raft appears to have sails. Likewise Moche fineline paintings on pottery show navigation depictions with complex reed boats (Ausejo, 2011). Besides the Moche other societies also represented navigation related representations such as the Sican, Chimu and Chancay (Cordy-Collins, 1990).

The final archaeological evidence, which implies navigation, is the presence of archaeological remains in the off shore islands during the extraction of guano⁴ on the second half of the XIX century. The most interesting finds are wooden figures representing nude seated prisoners associated with Moche pottery (Kubler 1948). For San Lorenzo Island in the central coast, extensive cemeteries with complex burials have been reported, as well as hunting and fishing stations (Hudtwalcker and Pinilla, 2006).

Historical Records

The body of these records is composed by the chroniclers' accounts, administrative and judicial documents and travellers' accounts from the XVIII and XIX century. Despite the variety of information available from them, these records must be used with care and analysed critically; the chronicles, -texts written by Spanish observers- where written at a time when the indigenous people were seen as idolaters or sub-humans, therefore the preconceptions preclude any reasonable understanding of the Andean culture (Bawden, 1996).

The earliest report come from Fray Bartolome de las Casas, around 1512, provided by the son of a Kuna⁵ chief telling about people from a rich kingdom, other than the Spaniards navigating with ships or vessels a little smaller using sails and paddles (Heyerdahl, 1995). The second and more famous report is from 1527, by Bartolome Ruiz, Pizarro's pilot, about the encounter with a little vessel tacking northward against

the Northern current. The vessel was already passing the Ecuador when the Spaniards following the current southward into unknown waters intercepted it (Heyerdahl, 1995).

Evidently the balsas were still in use and even of importance at the arrival of the Spaniards and during the rule of the Incas (Heyerdahl, 1995). Therefore some chroniclers and administrative documents refer to times before and during the Inca's rule. An account classified as historical, but without references, is the naval battle fought by Atahualpa, who allied with the Curaca of Tumbes to declare war against the Puná Island. Having been defeated and wounded, Atahualpa withdrew to Quito and Tumbes was conquered and burned by the Curaca of Puná. That is why Pizarro changed the name of Tumbes to Puerto Quemado (Burned Harbour) (Rostworowski, 1999). Another account is related with a brief conversation between Pizarro and Atahualpa he asked the Inca ruler why the Curaca of Chinchá was carried on a stretcher, and he responded that it was a very good friend and great man of the coast, and he had available a hundred thousand rafts at sea (Hocquenghem, 1999; Rostworowski, 1989)

The most interesting and controversial document is a manuscript file, called "Aviso", from the Royal Palace of Madrid; the document mentions that before the Inca expansion, the Chinchá lordship had thirty thousand farmers divided in twelve thousand farmers, ten thousand fishermen and six thousand "traders in the Indian way", each with reasonable wealth (Rostworowski, 1999). They used two routes, a land to highland, from Chinchá to Cusco and Collao and another maritime, on rafts to Mantas and Puerto Viejo in Ecuador (Rostworowski, 1989). The controversy is because Rostworowski interprets the "traders in the Indian way" as merchants engaged in maritime long distance trade and therefore the use of boats capable of long distance travel, such as described by Bartolomé Ruiz of the raft and the specificity of the contents similar to those referred in the "Aviso" (Rostworowski, 1989).

Ethnohistorical Evidence

The Incas, as well as other previous societies, didn't have a writing system, so they rely in oral tradition to keep records of their history. The Spaniards later recorded these stories or legends during the earlier years of the conquest or later. Therefore just like the historical records, and because they refer to events several years before the arrival

of the Spaniards, legends recorded by the chroniclers must be used with discretion and critically.

The northern coast of Peru before the Inca rule in the area has two foundation myths about the Chimu, very similar to each other but with different points of arrival. Naylamp arrives to Lambayeque and Tacaynamo to Trujillo (Rostworowski 1999). In either case the myth refers to a group capable of navigation systems and probably long distance traffic.

Miguel Cabello de Balboa describes Naylamp's arrival to the Lambayeque valley (Ravines, 1980): "The natives of Lambayeque say, that in ancient times who cannot number them, came from the northern part of this Piru with large fleet of rafts with a father of campaigns, a man of great value and quality called Naylamp and brought many concubines, but the principal wife was called Ceterni, brought within his company many people who as captain and leader were following him, but what was the most valuable among them were officers who were forty ... " (Cabello Balboa, [1576] 1951: 327-330).

Another myth, in this case referred to the God Viracocha, is of particular interest. The God after finishing the creation of the world leaves to Ecuador, apparently Manta or Puerto Viejo, and embarks with his servants into a sea voyage without return (Hocquenghem, 1999).

In the case of the Incas we found only two specific stories specifically related with Tupac Yupanqui, an Inca ruler several years before the arrival of the Spaniards. The first story is related with the use of balsa log rafts in the tributaries of the Amazon River transporting large number of soldiers and people with success. The second, and the famous, is his journey into the Pacific Ocean to the legendary islands of Auachumbi and Nina Chumbi. Apparently by the experimental use of balsas it seems that the islands referring in the Tupac Yupanqui story are Easter Island (for Ninachumbi) and Kava (for Avachumbi) according with the information of distance and direction provided by Sarmiento (Heyerdahl 1995). What's more interesting is the references in Polynesian manuscripts noted by Sir Peter Buck, about a visitor in Mangareva called Tupa, and also tells that Tupa before going back to his country told them it was a vast land full of people and ruled by powerful kings (Heyerdahl, 1995).

Type of Vessels

In this section we'd like to discuss and define the type of navigation vessels use at the time and before the arrival of the Spaniards. The main problem we face typifying and defining marine, as well as lake or river, vessels is that some writers, whether is a reed or balsa log boat, use the term "Balsa" "Boat" or "Raft" indifferently to any kind of marine or water vessel they encountered and reported (Cordy-Collins personal communication). So to keep clear the terms we will use the definition of raft as a non-watertight made of individual floating elements (McGrail, 1985). Although all pre-Hispanic vessels can be describe into this definition, we'll make one exemption with a specific reed craft, called Tule Boat (Cordy Collins, 1972), or Reed Boat (Donnan and McClelland, 1979), found only in iconography depictions. The differences between a raft and a boat are base in comparisons with similar complex reed crafts use nowadays in the Titicaca Lake. After reviewing the available resources of information we can identify at least five types of vessels define by their building materials.

Gourd Rafts

The simplest vessel is made of gourds tied to each other, although it isn't mentioned it should have some kind of simple deck; apparently it was used to cross rivers in flood seasons or particular coastal rivers with a constant and high flow the whole year (Rostworowski, 1981). Such is the case of the Santa River, south of Chao, the longest and mightiest of coastal rivers. Since the sixteenth century, is mentioned as "the greatest river, the toughest of these valleys and plains, it is cross using ugly rafts of gourds called mates ... " (JudíoPortugués, 1958: 27 in Ravines, 1980)

Skin Raft

Another simply vessel is made with sea lions skins inflated as floating devices, they are reported between Ica, in Peru, and San Antonio, Chile (Paez 1986). This practice has been lost in the whole area, however in 1958 Hans Niemeyer reported one last man who remembered the construction technique of these vessels. The construction was simple, made of two inflated sea lion skins tied together with leather straps. A set of beams connected the skins, and over them wooden planks formed a simple deck (Rostworowski, 1981). A single person seated or kneeling with a double bladed paddle

manned it. These raft were use for fishing, carrying goods and passengers, as well as Niter Paez, 1986).

Balsa Log Raft

The balsa logs vessels are the most common type of deep - sea vessel found by the Spaniards (Fig. 1 - 4). These traditions cover an area that includes Ecuador, Peru and northern Chile (Valdivia 1974). They are made of thick long logs of balsa wood (Genus Ochroma) tie together with ropes.



Figure 1: Wall frieze of balsa log raft at Huaca Las Balsas, northern coast of Perú. (Photo by: Vicente Cortez)



Figure 2: Wall frieze of balsa log raft with sail and divers at Huaca Las Balsas, northern coast of Perú. (Photo by: Vicente Cortez)



Figure 3: Modern balsa log raft at Mancora, northern coast of Perú. (Photo by: Ericka Cicchini)



Figure 4: Modern balsa log raft at Mancora, northern coast of Perú. (Photo by: Carlos Ausejo)

The logs are always in odd numbers, being the middle log the longest, and over them other logs as crosspieces to tight the construction. Over the logs a framework of canes was laid and provisions and cargo were kept in an elevated cabin to protect it from the

sea washouts (Heyerdahl, 1995). The balsa log vessels size seem to be variable, but most accounts reveal that could carry a considerable cargo in men and horses and also carried stone anchors resembling millstones on the deck (Heyerdahl, 1995).



Figure 5: Totora Raft known as “Caballito de Totora” o “Totora Reed Horse”. (Photo by: Vicente Cortez)

Two different kinds of sails were use with the balsa log vessel: First, the lateen or triangular sail, as reported by Fernandez de Oviedo; and second, the square sail on a double mast, both types survived until modern times. The square sail on a bipod mast is also found in reed vessels on the Titicaca Lake (Heyerdahl, 1995).

One last technology to note on the balsa logs vessels, and perhaps the more interesting is described first by the Dutch admiral Spilbergen about the use of broad boards inserted vertically in the cracks of the logs. The system called “Guaras” was use by the indigenous people for deep - sea navigation. But it was in

1736 when two Spanish naval officers, G. Juan and A de Ulloa, describe in a better way the guara system and their advantages (Heyerdahl, 1995):

“Hitherto we have only mentioned the construction and the uses they are applied; but the greatest singularity if this floating vehicle is that it sails, tacks, and works as well in contrary wind as ships with keel, and makes very little leeway. This

advantages derives from another method of steering than by a rudder; namely, by some boards, three or four yards in length, and half a yard in breadth, called guaras, which are placed vertically, both at the head and stern between the main beams, and by thrusting some of them deep in the water, and raising others, they bear away, lift up, tack, lay to, and perform all the other motions of a regular ship.”

Reed Raft

The raft is a single or double manned vessel made of a reed fiber called Totorá (*Scirpus Californicus*), it grew in abundance in marshes and lakes, natural or artificial, along the coast (Rostworowski, 1981) and It is also known in modern days as “Caballito de Totorá” or Reed Horse (Fig. 5). They seem to had different characteristics according to the area, for example Huanchaco, north coast, have only the bow pointed upward and turn up; in Lurin, central coast, three bundles were made with the central bundle being slightly longer than the others. In the case of Moche and Chimú ceramics representation they seem to have both pointed ends upwards (Rostworowski, 1981). Strong continuities of this tradition exist, as shown by the survival of the “Caballito de Totorá” in the north coast, and have been convincingly shown through ethnographic research into modern and recent societies of the north coast region (Bawden, 1996).

Reed Boat

This type of boat can only be seen at the Titicaca Lake nowadays (Fig. 6). This particular reed craft, although by definition might be considered as a raft, will be considered a boat in this paper. It consists of massive bundles of Totorá forming a high floating hull (although it's not empty and not watertight), over the “hull” the surface is dry and protected contrary to the washed surfaces of rafts. Depending on the size it could carry several people as mentioned by Cobo which described that major balsas were made over gathering reeds bundles on which they could sail up to twelve people and when they were joined two it was able to carrying cattle and beasts (Rostworowski, 1981). Larger boats can be made by sewing two of these and have a second deck made of lighter cane as well as sails. This is the type of craft being represented in Moche pottery as double deck reed boats capable of transporting cargo and in some cases passengers (Cordy-Collins, 1999; Ausejo 2011). This boat building tradition didn't

survive in the coast like it did in the Titicaca Lake probably replaced by the balsa log vessel tradition (Ortiz, 2006) However, it is unclear yet the origin of this construction technique in the Titicaca lake. Nevertheless complex reed crafts have proven to be worthless for long distance sea travels during the voyage made by Gene Savoy in 1969 from the Salaverry port in Peru to (Rostworowski, 1981).



Figure 6: Totorá reed boat in Lake Titicaca, southern highlands, between Perú and Bolivia. (Photo by: Vicente Cortez)

Conclusion

As we can see societies in the Andean region successfully developed different types of watercraft using available resources for construction and adapted for different activities. Although archaeological evidence has been hard to find or identify most of these traditions are still alive as proof of their efficiency and success. This paper is a summary of most watercraft known for the Andean region and as such it's an invitation for further research in the topic. We still have the great question of where can we find these vessels in the archaeological record, and then for every type of vessel we still have unanswered questions like when and where the sail appeared. Or why the reed boats disappeared in the northern coast, etc. The topic is broad and we haven't even looked at the watercraft traditions in the Amazon basin.

Acknowledgements

I'd like to thank the organizing committee of the 2014 APCONF, especially to Hans Van Tilburg and Veronica Walker, and the session presenters, for making possible this session.

Endnotes

1. Georgian Calendar designation that starts at year one, from the birth of Jesus Christ of Nazareth, with every year since added by one.
2. Between 400 B.C. and 600 A.C. (Rowe, 1945)
3. The Titicaca Lake is located in the border of Peru and Bolivia in the Altiplanic region.
4. Guano is the excrement of seabirds and seals found in the offshore islands of the Peruvian coast. It is an effective fertilizer due to its high levels of phosphorus and nitrogen (Shimada, 1994)
5. The Kuna lived in northern Colombia and the Darien region of Panama at the arrival of the Spaniards (Bartolomé and Barabas, 2004).

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Biography

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