The outfitting and sailing of early sixteenth-century vessels in the Pacific: The Loaysa and Saavedra expeditions (1525-1536)

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Abstract

This paper examines the information provided by primary written sources in relation to the outfitting and sailing of the ships used in the Loaysa and Saavedra expeditions, which took place between 1525 and 1536. On July 24, 1525, seven vessels, under the command of Garcia Jofre de Loaysa, departed from La Coruña, Spain, to take the Moluccas for the king of Spain, Charles I. Only one nao reached its destination where the Spanish managed to thwart the Portuguese for several years with the help of the natives. In 1527, Hernán Cortés sent Alvaro de Saavedra with three ships from New Spain to find Trinidad, a ship from the Magellan's expedition, and to find out the outcome of the Loaysa expedition. He never returned. A close examination of eleven documents written by survivors of both expeditions revealed one hundred and twelve references regarding the use of nautical technology and operational aspects of seafaring in the Pacific Ocean in the early sixteenth century. This data includes ship typology, rigging, navigation techniques, equipment, provisions and containers, ballast, hull maintenance, seagoing disasters and their remedies, ordnance, and naval warfare. This type of information is useful for nautical archaeologists since it can be compared with the data provided by contemporary nautical and shipbuilding treatises and be used to interpret the archaeological data. The analysis of such primary documents is analogous to the way an archaeologist approach an excavation site – the data is gathered and then interpreted by the nautical archaeologists.

Keywords: Loaysa, Pacific Ocean, Outfitting, Saavedra, Sailing

Introduction

This paper examines the information provided by primary written sources in relation to the outfitting and sailing of the ships used in the Loaysa and Saavedra expeditions, which took place between 1525 and 1536. Between 1825 and 1837, Martín Fernández de Navarrete, a Spanish Navy Officer and historian, published a collection of five volumes about the voyages and discoveries of the Spanish since the fifteenth century.

The original documents used for this collection were compiled and transcribed by Navarrete in different Spanish archives and libraries since 1789.The Loaysa and Saavedra expeditions were narrated in the fifth volume published in 1837. The account was based on the original manuscripts written by members and survivors of both expeditions and published as an appendix in the same volume. Navarrete cited thirty-seven documents to narrate both expeditions although only eleven of them provided references related to ship outfitting and sailing in the Atlantic and Pacific Oceans (Table 1). The data gathered includes references to ship typology, rigging, navigation techniques, equipment, provisions and containers, ballast, hull maintenance, seagoing disasters and their remedies, ordnance, and naval warfare.

Loaysa and Saavedra expeditions (1525-1536)

On July 24, 1525, seven vessels, under the command of García Jofre de Loaysa, departed La Coruña, Spain, where a *Casa de las Especias* (House of Spices) was briefly established (Spate, 1979). The objective of the expedition was to occupy the Moluccas and to control the spice trade. The expedition was a succession of disasters and only one ship, the *nao Victoria*, reached its destination where the Spanish managed to thwart the Portuguese for several years with the help of the natives. In 1527, Hernán Cortés sent Alvaro de Saavedra with three ships from New Spain to find the *nao Trinidad*, a ship from the Magellan's expedition, and to find out the outcome of Loaysa's expedition. He never returned. In 1532, the Spanish survivors learned through the Portuguese that king Charles I had sold his rights on the Spice Island to the king of Portugal in exchange for 350.000 ducats in 1529 (Pigafetta, 2002). Between 1534 and 1535, the last survivors of both expeditions were taken to Cochin (India) and from there to Lisbon, where they finally arrived in 1536.

Types of ships

The ships that took part in Loaysa and Saavedra expeditions are the typical oceanic vessels of this period such as *naos* and caravels although there are also a *pataje* and a *bergantín* (brigantine) (Table 2). However, the term *nao* (ship) is also applied to all these vessels in a generic manner. Moreover, the caravel *Parral* is defined as a galleon in some documents while Saavedra's ship, *Florida*, is named caravel in another document (Fernández de Navarrete, 1837). With respect to the other two ships of

Saavedra expedition, they are simply called *navíos* (vessels) without providing any other details about them (Fernández de Navarrete, 1837).The documents also refer to two *fustas* built at the Moluccas by the Spanish, and one *galera* (galley) used by the Portuguese in a naval combat. The variety of definitions for the same types of vessels reminds us that the debate about sixteenth-century ship typology still needs to be addressed. Additionally, the Spanish and Portuguese also adapted local boats from the Moluccas such as *paroles* (prahu) and *caracoras* (kora-kora).

Sails

The types of sails mentioned in the documents are the main, fore and mizzen sails. These references provide useful information about the sailing techniques during this period. For instance, all ships used the fore course for sailing while the *nao Victoria*'s main mast or *Parral*'s mizzen mast were repaired (Fernández de Navarrete, 1837). Moreover, the *nao Victoria* sailed 20 leagues only using the fore and mizzen sails while crossing the Pacific Ocean due to the bad weather (Fernández de Navarrete, 1837).The documents also inform us about the sailcloth carried on board the ships. The *nao San Gabriel* transported *cañamaza* (hemp canvas) and *holandesa* (Dutch canvas) which might be used to tailor new sails during the voyage (Fernández de Navarrete, 1837). During this period sailcloth was known in Spain as *olona* because a large proportion of sails mentioned on shipbuilding contracts came from Brittany's towns such as Nantes and Olone (Smith, 1993). The word *holandesa*is indicating a Dutch origin for this material. The *San Gabriel*'s pilot also tells us about the ship's rigging lifespan that he estimates up to seven years (Smith, 1993).

Navigation

In his logbook, the pilot of the *nao Victoria* mentions that the position of the sun was measured every day at noon to determine the latitude. This routine was only interrupted when the sun was not visible because of the clouds. However, he does not indicate the type of instrument used for the observations, probably an astrolabe. In the same document there are several references to the use of sounding leads. This instrument was used to measure the depths and to identify the type of seabed. This data was crucial when ships navigated close to shore and it also helped to establish the position of the ship in relation to the coast (Fernández de Navarrete, 1837).

An emergency communication system was proposed by Elcano before the fleet crossed the Atlantic (Fernández de Navarrete, 1837). If any ship got separated from the fleet before reaching the Strait of Magellan because of the weather, or any other reason, it would have to wait for twenty days at All Saints' Bay (Brazil). After that time, a letter would be placed inside a clay pot buried under a cross placed on a visible spot. Then the ship would continue the voyage until the next meeting point where it would leave another message. This system was employed by the *pataje Santiago* which left a letter at Santa Cruz River that was found by the *naos Victoria* and *San Gabriel*. The letter informed the other ships that the *Santiago* and the rest of the fleet were on their way to the Cape of the Eleven Thousand Virgins (Fernández de Navarrete, 1837).The same system was employed in the Pacific by Saavedra. On his way to the Moluccas he left a letter buried in an island of the Marshals where his ship got separated from the rest of his fleet (Fernández de Navarrete, 1837). Richard Hawkins used a similar system during his expedition to the South Sea in 1593. He left the messages inside a musket barrel place on the top of a hill instead of in a pot (Hawkins, 1970).

Ships equipment

The documents often mention the ships' pumps although they do not indicate their type. Pumps are normally cited in plural so it is possible that the ships were equipped with two pumps or carried a spare pump in case the main one failed during the voyage. Two pumps were recovered from the *Sancti Spiritus* wreck at the Cape of the Eleven Thousands Virgins (Fernández de Navarrete, 1837), and the *nao Victoria* used two pumps while crossing the Pacific Ocean because of the heavy leaking of its hull (Fernández de Navarrete, 1837).It has to be noted that the House of Trade issued an ordinance during the reign of Charles I which made mandatory for oceanic vessels to carry two pumps, one of them as a spare (Consejo de Indias, 1943). On the other hand, archaeology provides examples of ships equipped with two operational pumps such as the Highborn Cay shipwreck, an early sixteenth century caravel, and the Emanuel Point I wreck dated in 1559 (Oertling, 1996). Saavedra also mentions how exhausting was working at the pumps and how he had to transfer men to his ships to helpwith the work (Fernández de Navarrete, 1837). In the same way, the *naos San Gabriel* and *Victoria*kidnapped natives from various islands to work at the pumps (Fernández de

Navarrete, 1837). This could indicate that the ships were equipped with burr pumps that require a lot of manpower to ensure their effectiveness in comparison with the suction pumps.

The documents also include references to small service boats such as*esquifes* and *bateles*. According to O'Scanlan (1974), these terms were equally used to name both types of boats although *bateles* were larger than *esquifes*. During the Loaysa expedition, *esquifes* were used to carry people and messages between ships, to explore the shore and provisioning, and to transport materials and equipment from one ship to another such as during the salvage of the *Sancti Spiritus* remains (Fernández de Navarrete, 1837). The loss of a small boat meant that the crew of a ship could not go ashore to get provisions because the larger ships were unable to anchor in shallow waters. In that case, the crews depended on the natives to get food and supplies which was often uncertain. That was the case of Saavedra's first attempt to return to New Spain across the Pacific. He had to return to the Moluccas because of the contrary winds and the loss of the *batel* that prevented him to get provisions during the journey (Fernández de Navarrete, 1837). Moreover, various ships had to share one *esquife* after theirs were lost during a storm in Bay of la Victoria (Fernández de Navarrete, 1837).

The references to the ground tackle provide information about the number of anchors carried on board the ships, their effectiveness, and strength. In several occasions, anchors started to drag even when more than one had been deployed. That was the case of the *nao Victoria* that ran ashore in Bay of la Victoria despite deploying five anchors (Fernández de Navarrete, 1837). A few days later, the same ship was at risk again in Gallegos River when its anchor broke near the stock and had to set sail to Santa Cruz River (Fernández de Navarrete, 1837). Saavedra's ship also experienced difficulties with its ground tackle while anchoring at the Marshalls. In this case, two anchor cables were damaged due to the rocky bottom and the ship had to kedge off to abandon the anchorage (Fernández de Navarrete, 1837). Moreover, a few days later the natives stole one of the two anchors he had deployed without a marker buoy (Fernández de Navarrete, 1837). On the other hand, there are no references to the weight and dimensions of the anchors.

ges	Doc. number	Title
-115	IX	Relación que dio Juan de Areizaga de la navegación de la armada de Loaisa hasta desembocar el estrecho y de los sucesos de la nao Santiago que se separó allí y aportó á Nyeva-España (Arch. De Ind. En Sevilla, Leg. 6 de Patronato real).
-233	X	Relacion de Francisco Dávila, sobresaliente de la nao S. Gabriel, as de la navegación de Loaisa desde la Coruña hasta el estrecho de Magallanes, como de los acaecimientos particulares de aquella nao después que se separó de la armada (Arch. De Ind. En Sevilla, Leg. 2 de Autos del Consejo).
-238	XI	Carta de D. Rodrigo de Acuña á un Señor de estos Reinos con fecha de Pernambuco á 15 de Junio de 1527, sobre algunos acontecimientos del viage de Loaisa (Coipa en la colec. De Muñoz del orig. que se halla en la Torre do Pombo. Gav 15, 10, 30, y la nota final Gav. II. m. 8.)
-313	XIV	Derrotero del viage y navegación de la armada de Loaisa desde su salida de la Coruña hasta 1 de Junio de 1526; sucesos de la nao Victoria después de separada de la armada; y descripción de las costas y mares por donde anduvo: dirigido todo al rey por Hernando de la Torre. (Arch de Ind. En Sevilla, Leg. 1 papeles del Mauco desde 1519 á 1547).
-360	XX	Relacion de Hernando de la Torre de lo ocurrido en las Molucas contra los Portugueses de la isla de Terrenate, desde su ingreso en aquellas islas hasta el fin del año 1533 (Orig. en el arch. de Ind. en Sevilla, leg. I. papeles tocantes al Maluco desde 1549 á 1547).
-376	XXIII	Declaracion de Francisco de Paris, marinero de la nao Victoria, sobre el viage de Loaisa y las ocurrencias que tuvieron los que iban en aquella nao con los portugueses durante su permanencia en las Molucas (Orig. en el arch. de Ind. en Sevilla, Leg. I. papeles del Maluco de 1519 á 1547.)
-400	XXV	Noticia deducida de las declaraciones que dieron algunos testigos ante el Consejo de las Indias, sobre varios acontecimientos del viage de Loaisa. (Arch. de Ind. en Sevilla, leg. I., papeles del Maluco de 1519 á 1547.)
-439	XXVI	Relacion escrita y presentada al Emperador por Andres de Urdaneta de los sucesoso de la armada del Comendador Loaisa, desde 24 de Julio de 1525 hasta el año 1535. (Orig. en el Arch. de Indias en Sevilla, Leg. I., papeles del Maluco desde 1519 á 1547.)
-441	XXVII	Cédula del Emperador á Hernan Cortes para que despache desde los puertos de la costa occidental de Nueva-España algunas embarcaciones al Maluco para saber el paredero de las que fueron con Magallanes y Loaisa. (Copia en la Acad. De la Historia.)
-475	XXXVI	Relacion del viage que hizo Alvaro de Saavedra desde la costa Occidental de Nueva-España á las islas del Maluco. Está sacada del libro que trajo Francisco Granado, escribano de la armada. (Copia de aquel tiempo, pero defectuosa y de mala letra, en la Bibliot. alta del Escorial, Cod, en fol. de Miscelaneas 2. & 7. fol. 373 al 381.)
-486	XXXVII	Relacion que presentó en Madrid el año 1534 Vicente de Nápoles sobre los sucesos de la armada de Saavedra que salió de las costas occidentales de Nueva –España al descubrimiento de las islas del Maluco (Arch. de Ind. en Sevilla, leg. I. de papeles del Maluco desde 1519 á 1547.)

Table 1. List of documents containing references to ships outfitting and sailing. (Navarrete, 1837)

Provisions, containers and ballast

These types of ships could not carry all the provisions needed by the crews to sail across the Atlantic and Pacific Ocean. The documents tell us how the Loaysa's fleet had to get provisions from various islands before crossing the Atlantic and once they reached the American coast, the crew of *nao Victoria* killed a sea lion in Santa Cruz River to get fresh meat (Fernández de Navarrete, 1837). After leaving the Strait of Magellan, the fleet got separated. The crew of the *pataje Santiago* realized that part of their provisions was carried on board the *nao Victoria* because its hold as too small. The ship only carried four *quintales* of biscuit and eight *pipas* of water that were insufficient for a journey of 2,200 leagues (12,100 km) across the Pacific Ocean. Moreover, the ship had lost its *esquife* getting provision before arriving at the Moluccas seemed almost impossible. For that reason the crew decided to abandon the expedition and to sail to New Spain that was only 1,000 leagues away (Fernández de Navarrete, 1837). Finally, when Saavedra arrived at the Marshalls, he ordered to fill some *pipas* with saltwater to be used as variable ballast (Fernández de Navarrete, 1837). This was an unusual procedure because this type of ballast generally consisted of cobbles and pebbles of rock, or even sacks of sand (Smith, 1993).

Hull maintenance

Although the documents indicate that emergency repairs were carried out on the ships of both expeditions, these references are not common. The lack of facilities such as shipyards, tools and materials limited the type of repairs that could be made. For example, the *nao Victoria* had to be abandoned in Moluccas because its hull was so damaged that it could not be repaired. Frames and knees were broken after running aground at Bay of la Victoria, the seams between planks were opened while navigating across the Pacific, and the vibrations produced when the naval ordinance was fired on board (Fernández de Navarrete, 1837). Additionally, the documents also indicate that the ships carried materials for hull maintenance such as the cauldron of pitch that caught fire on board the *nao Victoria* (Fernández de Navarrete, 1837).On the other hand, the expedition members adapted local materials to repair their ships or to build new vessels. That was the case of the solution provided to mitigate the effects of the ship worms on the hull of Saavedra's ship before departing from the Moluccas to New

Spain. A sacrificial planking layer was added to the ship's hull with a coat of local bitumen used by the natives to caulk their own boats (Fernández de Navarrete, 1837).

Ships of the Loaysa Expedition	
Name	**ShipType**
Santa Maria de la Victoria	Nao
Sancti Spiritus	Nao
Anunciada	Nao
San Gabriel	Nao
Santa Maria del Parral	Caravel, nao, galleon
San Lesmes	Caravel, nao
Santiago	Pataje, nao
Ships of the Saavedra Expedition	
Name	**ShipType**
Florida	Bergantín, nao, caravel
Santiago	Navío
Espiritu Santo	Navío

Table 2. Types of ships used in the Loaysa and Saavedra expeditions. (Navarrete, 1837)

Seagoing disasters and their remedies

The demanding sailing conditions of the oceanic voyages increased the chances of seagoing disasters. The texts provide several examples and also show the vital importance of the ships' carpenters in these expeditions. Carpenters were sent on

an*esquife* from the *Sancti Spiritus* to fix the mainmast of the *nao Victoria* when it broke after departing from La Gomera. It took them three days to repair it. Meanwhile, the *nao Victoria* rammed the stern the caravel *Santa Maria del Parral* and, once again, an *esquife* with carpenters and planks was sent to repair the ship (Fernández de Navarrete, 1837).

Storms could also disperse damage or sink the ships. The caravel *Lesmes* was driven south by a storm before arriving at the Cape of the Eleven Thousand Virgins, and probably saw Cape Horn before rejoining the fleet (Fernández de Navarrete, 1837). The *nao Victoria* run aground during a storm near the Cape of the Eleven Thousand Virgins and damaged the rudder, keel and sternpost. The carpenters used planks and lead sheathing to fix the keel and sternpost and put the rudder back in place (Fernández de Navarrete, 1837). This situation demonstrates that these ships carried on board enough spare materials to face this type of incidents, at least for limited period of time. Finally, another storm separated the *Victoria*, *Lesmes*, *Parral* and *Santiago* when they were leaving the Strait of Magellan (Fernández de Navarrete, 1837), and due to rough seas, the hull of the *nao Victoria* started to leak. In fact, the crew worked continuously at pumps until the ship reached the Moluccas Islands. Various members of the crew died of exhaustions due to the work and the food shortage (Fernández de Navarrete, 1837).

Ships ordnance and naval combats

The members of Loaysa's and Saavedra's expeditions fought during several years against the Portuguese at the Moluccas with the help of the natives. For that reason, there are also references to ship's ordnance and naval combats in the documents. While sailing across the Pacific, the ordnance was probably stored in the hold of the *nao Victoria* and it was only put on deck when they were approaching the Moluccas, in case they encountered the Portuguese (Fernández de Navarrete, 1837). The ordnance had no use in the Pacific because the possibility of finding enemy vessels was highly unlikely. In addition, if the artillery was carried in the hold, its weight improved the ship's stability. The documents also mention the combat between *the nao Victoria* and various Portuguese vessels, including one *fusta*, one *batel* and several *prahus*. The vessels were equipped with pieces of artillery as they intended to sink the Spanish ship. Part of the ship's ordnance had been disembarked to defend the Spanish base on land

(Fernández de Navarrete, 1837). The lack of weight made the ship's deck float too high on the water, making its artillery quite ineffective despite of the crew spending twelve *quintales* of gunpowder in firing the cannons. The cannon recoil caused more damage to the already weakened ship's structure than the three shots taken from the Portuguese (Fernández de Navarrete, 1837). After this combat, the *nao Victoria* was abandoned and two *fustas* were built using local timbers (Fernández de Navarrete, 1837). The Spanish carpenters ignored the characteristics of the local timbers and only one *fusta* was finally used because the other rotted before being launched (Fernández de Navarrete, 1837).The documents also refer another naval combat between the Spanish *fusta* and a Portuguese galley. This reference includes the typical pieces of artillery of this period such as bronze *pedreros*, *sacres*, *versos* as well as iron *versos*, large *falconetes*, and *culebrinas* (Fernández de Navarrete, 1837). The ordnance was very versatile and could be used in different types of ships or on land. Finally, during the sixteenth century, the proportion of foreign *condestables* and gunners in the Spanish fleets was important although the number of Spanish gunners increased by the end of the century (Pérez-Mallaína, 1998). This situation is also reflected by the documents which mention the presence of Flemish constables between the Spanish crew (Fernández de Navarrete, 1837).

Conclusions

The analysis of these eleven documents written by the survivors of the Loaysa and Saavedra expeditions reveal numerous references regarding the use of nautical technology and operational aspects of seafaring in the Atlantic and Pacific Ocean in the early sixteenth century. This data includes ship typology, rigging, navigation techniques, equipment, provisions and containers, ballast, hull maintenance, seagoing disasters and their remedies, ordnance, and naval warfare. On the other hand, most of the information is provided in an indirect manner because the authors do not intend to teach us outfitting methods or techniques. They were just describing the situations in which they become involved and how they solve the difficulties encountered while traveling to the other side of the world. This type of information is extremely useful for nautical archaeologists because it can be compared with the data provided by contemporary nautical and shipbuilding treatises and archaeological data. The accounts also contain

practical descriptions about the use and maintenance of numerous elements of the ship's outfitting. However, the data is not provided in a direct manner as a nautical treaty does. The analysis of such primary documents is analogous to the way an archaeologist approach the excavation of an archaeological site – the data is gathered and then interpreted by the nautical archaeologists.

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Biography

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