CERVANTES: THE LIFE AND LEGACY OF AN AMERICAN WHALER

By: Taylor Gray

Cervantes:

The Life and Legacy of an American Whaler

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Title figure: "Capture of a sperm whale in the Pacific Ocean" 1835, engraved, printed and coloured by J. Hill based on a sketch by Cornelius B. Hulsart (Hill 1835).

Abstract

Despite being vital to the development of early Australian colonies, whaling in the nineteenth century is an understudied area of Australia's history. This thesis aims to provide some information on a small part of that history to help fill the gap in knowledge by focusing on one shipwreck: *Cervantes*, a nineteenth-century American whaler wrecked off the coast of West Australia. Historical research was used to build a vessel history, using a maritime cultural landscape approach to filter relevant information. Archaeological investigations, using X-ray fluorescence and wood species identification and basic recording methods, were used to give specific information on construction materials. Present day connections between the ship and local communities were analysed using interviews, site visits and government documents. By utilising various approaches, the history and impact of will be told as completely as possible. By combining the study of the physical artefacts and research into the social facets connected to the site this study provides a holistic view of *Cervantes*, including the materials used in construction, crew demographics, routes, personal stories and modern-day interactions with the site. These various aspects, tangible and intangible, are used to broaden the study of the shipwreck; to take the research past measurements and data and to allow a site to tell a story of the people and places to which it is connected.

Declaration of Candidate

I certify that this thesis does not incorporate without my acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person where due reference is made in text.

Taylor Gray

2018

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Contents

List of Figures

List of Tables

Chapter One: Introduction

The whaling industry was vital to the success and growth of both American and Australian colonies. The interactions between American whalers and the Australian colonies near popular hunting grounds were the beginning of a connection between the two countries that has lasted centuries (Peet 2003:193). During the nineteenth-century the American whaling fleet was the dominant presence in Australian waters. Western Australia in particular became popular due to it being a preferred location of sperm and right whales, as seen in Matthew Maury's whale chart published in 1851 (Figure 1) (Maury 1996).

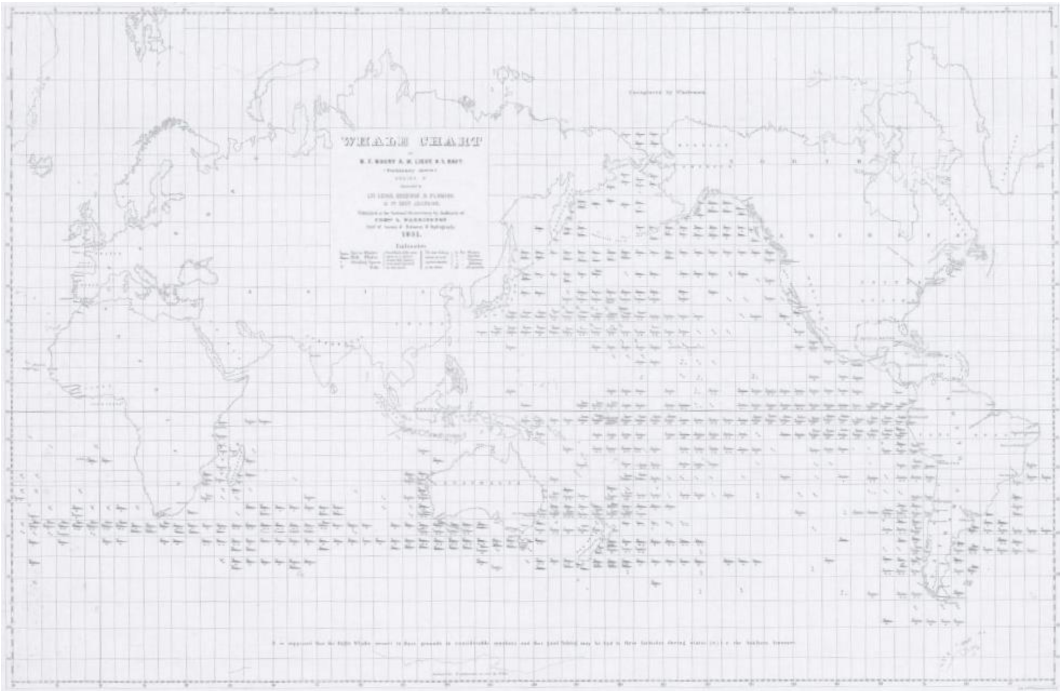


Figure 1: Preliminary Sketch of whale chart by Matthew Maury, naval oceanographer (Maury 1996).

The oil and other whale products processed from these hunting voyages were used in daily life by those in both the American and Australian colonies and played a major role in the success of the economy (Blainey 1966:115). Despite whaling being an important part of the history of both nations, little research has focused on the social implications of American whalers wrecked in Western Australian waters. Of the eight American whalers known to have wrecked in the area, four have been located and subjected to archaeological study (Anderson 2016b; Anderson and McAllister 2012; McAllister 2013:12). These projects have focused primarily on excavation and identification and have not included a study of relationship between the wreck and local areas. This project aims to add to the study of these vessels through an analysis of the history, material culture and influence of one of those wrecks on the town which bears its name: *Cervantes*.

Research Question and Aims

Primary Question

- How did the nineteenth-century American whaler *Cervantes* influence local and regional communities of Western Australia, past and present?

Aims

In order to answer the primary research question, the following aims need to be addressed:

- Determine the composition and origin of materials used in the construction and possible repairs of the vessel;
- Establish a vessel history including crew, cargo, and locations visited;
- Establish a timeline of the town Cervantes;
- Record the connections between the town and the wreck it was named after;
- Establish the influence of foreign whaleships on the local economy; and
- Determine the fate of items salvaged and auctioned after the wrecking event.

Methods

Historical Research

Historical sources were accessed for this study to understand the history of the town of Cervantes within its regional context as well as the history of *Cervantes* wrecking nearby. These sources included published historical studies of popular whaling ports—such as Fremantle and Albany—newspaper articles, crew logs, shipping records, auction records and government documents. These sources were gathered from state archives, museum archives, online archives, and local history groups. Historical research of this nature allows for the understanding of the influence that foreign whalers had on the local communities and their economies. It will also aid in the compiling of a history of the ship.

Interviews

Where applicable, interviews, conducted by the Western Australian Maritime Museum in 2018, are utilised to gain an understanding of how residents in the town of Cervantes perceive the town's current identity in relation to the wreck site. The inclusion of interviews in the research aids in expounding past perceptions of wrecked whaling ships and how those perceptions changed as the wreck went from being tangibly useful to a historical site.

Artefact Analysis

Artefacts from *Cervantes* were analysed to aid in the creation of a vessel biography. Each artefact was photographed and a description was recorded including any standout features and state of preservation. Measurements will be taken of every artefact, barring where it is impractical, and will include (where applicable) length, width, height and diameter. Wood samples will be taken from a representative sample of artefacts to be sent to an outside expert for wood species identification. This will allow for investigations into the timber used in its construction or repairs made with wood not native to North America. X-Ray fluorescence, hereafter called XRF, will be used to analyse the metal composition of relevant artefacts in order to establish the types of metal used by shipwrights in the construction of the vessel.

Discussion

The data recovered from analysing the artefact collection will be studied using the context gathered from the historical and ethno-historical research and background research. This allows for the wreck site to been seen in a broad context and connect the site to its historical roots in the United States of America, those who were directly affected by the ship's activities and those in the town named after the ship.

Limitations

Interviews and oral histories are limited to those conducted through the Western Australian Maritime Museum. Although the community of Cervantes was given the opportunity to participate, being made aware of the option to take part through various sources, only a small number of residents chose to do so. Having only a limited sample of interviews could skew results pertaining to past and current perceptions of connections between local areas and the wreck site as it could limit the range of views to that of only a few people instead of a sample of the entire community.

It was not possible to access some of the artefacts in the museum collection. For example, some materials were in the conservation lab receiving treatment and therefore cannot be studied. This results in the incomplete analysis of the collection and further study will have to take place at a later date when conservation treatment has finished.

Compiling a history of a vessel requires historical accounts, documents and records. Not all historical sources that would be necessary to create a full vessel history have survived to present day and therefore a full account cannot be made, despite all efforts to do so. Furthermore, traveling outside of Australia was not within the scope of this project which limited sources to those either in Australia or able to be sent electronically from the United States.

Significance

As previously stated, whaling was a vital aspect of the growth and survival of both American and Australian colonies. Consequently, the study of the whaling industry is important to the understanding of the development of the colonies. Whaling is also the first link in a long history of the connection between the two countries. *Cervantes*, as an American whaler that visited and eventually sank in Australian waters, is a tangible example of the connection between American whalers and the Western Australian colonies. Despite the vital role whaling played to both countries, relatively little work has been done to study the social aspects of American whalers wrecked in the waters of Australia.

As the *Cervantes* material culture has yet to be studied in depth, this research project will provide more knowledge on the shipwreck and materials related to the whaling industry in the nineteenth century. It will also provide further information on construction materials favoured by the American whaling industry in the nineteenth century. This project will add another source of information for future research into American whaling as well as the early connection between the United States of America and Australia.

Most previous studies on nineteenth-century American whalers wrecked in Western Australian waters have focused on excavation and identification. As such, the study of the *Cervantes* collection will apply a maritime cultural landscape approach to the vessel's excavated material remains, broadening the scope of study typically used for archaeological sites of this nature.

A valuable outcome of this project is a catalogue of all the available artefacts from *Cervantes* held in the maritime archaeology collection of the Western Australian Museum (Appendix two). The catalogue includes photographs as well as description of each artefact. The information gathered will provide a modest reference collection for others researching whaling and related subject matters.

Chapter Outline

This thesis is divided into seven chapters, this introduction being chapter one. The second chapter is the background chapter. The background chapter includes a brief and broad history of the beginnings of whaling, and the American and Australian whaling cultures. It also includes an overview of the tools and processes used in whaling in the nineteenth century. This chapter gives context to what life was like onboard *Cervantes* while it was hunting whales and what the attitudes, worldwide and in Western Australia, towards whaling vessels were at the time.

The third chapter of this thesis is the literature review. The literature review will give an overview of previous research nineteenth-century American whaling ships. It will then move on to a discussion of the theoretical approaches used in this research. The information included in this chapter will identify the gap in current research which this project begins to fill.

The fourth chapter covers the methods used for this thesis. The methods for each data gathering process are outlined, including tools and equipment settings that were used. Limitations that were specific to the methods used, as opposed to the broader limits for the entire project, are also included at the end of the chapter.

The fifth chapter will lay out the data gathered during the research for this project. The sixth chapter is a discussion of the results laid out in chapter five. This is done in a timeline format in order to give the full scope of the history of the ship in the most simple and understandable way possible. The timeline chronicles the life of *Cervantes* from when it was built, through its voyages and wrecking, to its role in the community that is named after it.

The seventh chapter is the conclusion where the implications of the research will be put forth. In this chapter the aims and research question will be revisited and each one addressed individually. The chapter ends with recommendations for future work and research into *Cervantes* and the whaling activities of the nineteenth century.

Chapter Two: A History of American Whalers in Australia

The purpose of this chapter is to provide background and context for the *Cervantes* site. A brief history of how the practice of hunting whales became profitable is followed by an overview of the different uses for whales. The variety of uses for whale bone and oil was the driving force behind the two whaling voyages that *Cervantes* undertook; these products also made up the cargo of the two journeys. The different types of whaling are described to give definition and context to terms used in this thesis. The tools and processes utilized while hunting and processing whale products are explained in order to give general details of what activities would be taking place onboard *Cervantes* during the whaling voyages. Furthermore, this provides information on what might have been in the stores that were auctioned off with the hull of *Cervantes* in 1844. To gain a better understanding of why *Cervantes* was in Australian waters and how its presence may have impacted local populations a history of the relationship between American whalers and Australia is given, followed by a brief account of the end of large scale, world-wide whaling practices.

Beginnings of Whaling

Although it is unknown when humans first took to the water to hunt whales there is evidence that dates as far back as 10,000 B.C. in the form of Scandinavian rock carvings which depict a whale being harpooned (McAllister 2013:25). The first group credited with practicing modern whaling were the Basques of Biscay, in Spain and France; their whaling activities peaking in the twelfth and thirteenth centuries (Brito 2011:287; King 1975:90; McAllister 2013:25; Tower 1907:9). The Catholic Church at that time did not allow for the consumption of what they considered 'hot' meat—or meat that came from animals who spent most of their time on land—during the religious holidays that took up 166 days of the year (Dolin 2007:22–23). This provided the Basques with a relatively steady market for whale meat—which was considered a 'cold' meat as whales live in the water—not just in Spain, but throughout Europe (Dolin 2007:23). The Basques' industry grew so much that they eventually set up whaling stations across the Atlantic Ocean (Brito 2011:288; Logan and Tuck 1990:65)

The demand for whale meat and other products, such as oil and bone was so high across Europe that by the end of the 1500s other countries—such as Great Britain, Iceland, France and Norway—had begun their own whaling industry to meet local demands (Dolin 2007:11; Tower 1907). France became the next power in the whaling world after the Biscayans, although the Biscayans were still highly valued as crew members (Tower 1907:11, 15). The English trailed the French after the discovery of the Spitzbergen fishing grounds, but were closely followed by the Dutch (Tower 1907:13). Although there were an abundance of whales in these fishing ground in the seventeenth century, competition between countries was frequent and at times resulted in physical conflict (Tower 1907:14). The whaling in the Spitzbergen and Greenland grounds was so successful that the Dutch required empty ships to take home the excess oil and whalebone (Tower 1907:17). By 1620 whaling had become an important and lucrative trade, which could be seen in the activities of the American colonies, whose whaling practices developed much later than other countries but would become the biggest whaling nation in the world (Tower 1907:20). It was that whaling powerhouse that would eventually employ *Cervantes*.

Whale Products

Although whale meat was a lucrative industry at the time of the Biscayians, other products would eventually match or exceed the use of whales as a food source. Baleen from filter feeding whales, classed as whalebone, would be used for a variety of purposes including umbrellas, women's corsets, whips and—due to its pliability and ability to keep its shape when moulded with heat—shafts and springs (Maran 1974:13–14). With its various uses, whalebone has been equated to the use of modern day plastics (Maran 1974:14). Teeth from mammal and fish eating whales were used in a unique art style: scrimshaw (Dolin 2007). By far the most useful, popular and lucrative whale by-product was oil. Whale oil burned cleaner than other alternatives and smelled better than fish oil or tallow candles (Dolin 2007:35). The oil would be used in soaps, makeup products, lubricants, and in the preparation for wool, leather and cordage, as well as many other uses in daily life (Figure 2) (King 1975:89; Maran 1974:13). The highest quality oil—and most prized—was spermaceti. Spermaceti comes from the head cavity of a sperm whale (Dolin 2007:85). Oil refined from sperm whale blubber was also preferred over oil from other whales, like right and bow head, which is evident in the cargo records (Dolin 2007:85). Whale oil was described as just that, but sperm whale oil was often put in its own category; setting it apart in such a way shows that it was of a higher quality.

Figure 2: Various labels and advertisements for products using whale oil and bone. top left: Scrimshaw by Frederick Myrick c.1829. Top right: soap made with whale oil. Bottom left: Spermaceti candle label. Bottom right: Advertisement for corsets made with whale bone (Dolin 2007)

Whaling Techniques

Several types of techniques have been used throughout the history of whaling. There is a general pattern that is followed by most whaling enterprises, with each consecutive phase moving further away from shore and bringing in more products and profits (Tower 1907:25). The following covers the different types of whaling for further understanding of the history of the practice.

Drift Whaling

Taking advantage of whales that had ended up on shore, either from washing ashore after it had died or from beaching, is known as drift whaling (Figure 3) (Maran 1974:7). Drift whales appeared irregularly and unpredictably, but was still seen as a profitable resource (Dolin 2007:41). So profitable, in fact, that some governments, including that of the American colonies, deemed it important enough to regulate (Dolin 2007:41)

Figure 3: A depiction of a drift whale, engraved by Jacob Matham after a painting of the 1598 incident near Katwijk by Hendrik Goltzius (Dolin 2007).

Shore-based Whaling

The next development in whaling was shore-based whaling, also known as boat whaling. Shore whaling used small open boats to hunt whales seen from shore (Raupp 2015:4). Once captured and killed, the whales were towed back to shore for processing at a permanent processing station (McAllister 2013:27; Raupp 2015:4). These hunting trips rarely went out of sight of land.

Bay Whaling

Bay whaling describes whaling activities that took place in bays and sheltered inlets (McAllister 2013:27). This term could be applied to pelagic whalers who would anchor in bays during the winter months as well as whaleships which would target the sheltered areas known to be on whale migration routes (McAllister 2013:27). Bay whaling would require a mobile, temporary processing station or try works on the vessel itself.

Pelagic Whaling

Pelagic whaling, or deep-sea whaling, is the most well-known form of whaling and was by far the most profitable. Pelagic whaling voyages could last several years (McAllister 2013:27). A large, sturdy ship was used as a base for all operations (McAllister 2013:27). Small, open boats were launched from the main ship to chase the whale, which was then towed back to the main vessel for processing (Figure 4) (McAllister 2013:27; Pearson 1983:41). These ships also functioned as processing plants, storage facilities and living quarters; they had little reason to return to land during the voyage other than to restock fresh foods or to sell unnecessary gear at the end of the trip. The self-contained nature of these ships made them far more lucrative than the previous methods of whaling as they were able to partake in longer voyages without having to return to shore to process and store their catch (McAllister 2013:27). It was this type of whaling—pelagic whaling—that *Cervantes* took part in.

Figure 4:"South Sea whalers boiling blubber, with whale alongside" oil painting by Oswald Brierly c. 1876. (Brierly 1876).

Whaling Processes and Tools

The processes and tools involved in whaling have changed very little in the century containing whaling's golden years. The processes that go into hunting and extracting oil and other products from whales is similar whether it is shore-based or boat-based whaling which means that these would be the same processes and tools utilized on *Cervantes* (Pearson 1983:41).

Whaling Vessels

The most important piece of equipment used in the hunting of whales are the vessels themselves; without the whaleships and small open boats the extraction of whale oil and bone would rely solely on drift whales. Whaleships varied in size, typically between 150 and 400 tons (Pearson 1983:41). The rigging of these vessels also varied, from schooners to full ship-rigged vessel, but the most common rigging styles were barque rigging for smaller and ship rigging for larger vessels due to their ease of use (Pearson 1983:41). At 231 tons *Cervantes* was on the smaller side and had barque rigging for the duration of its whaling career.

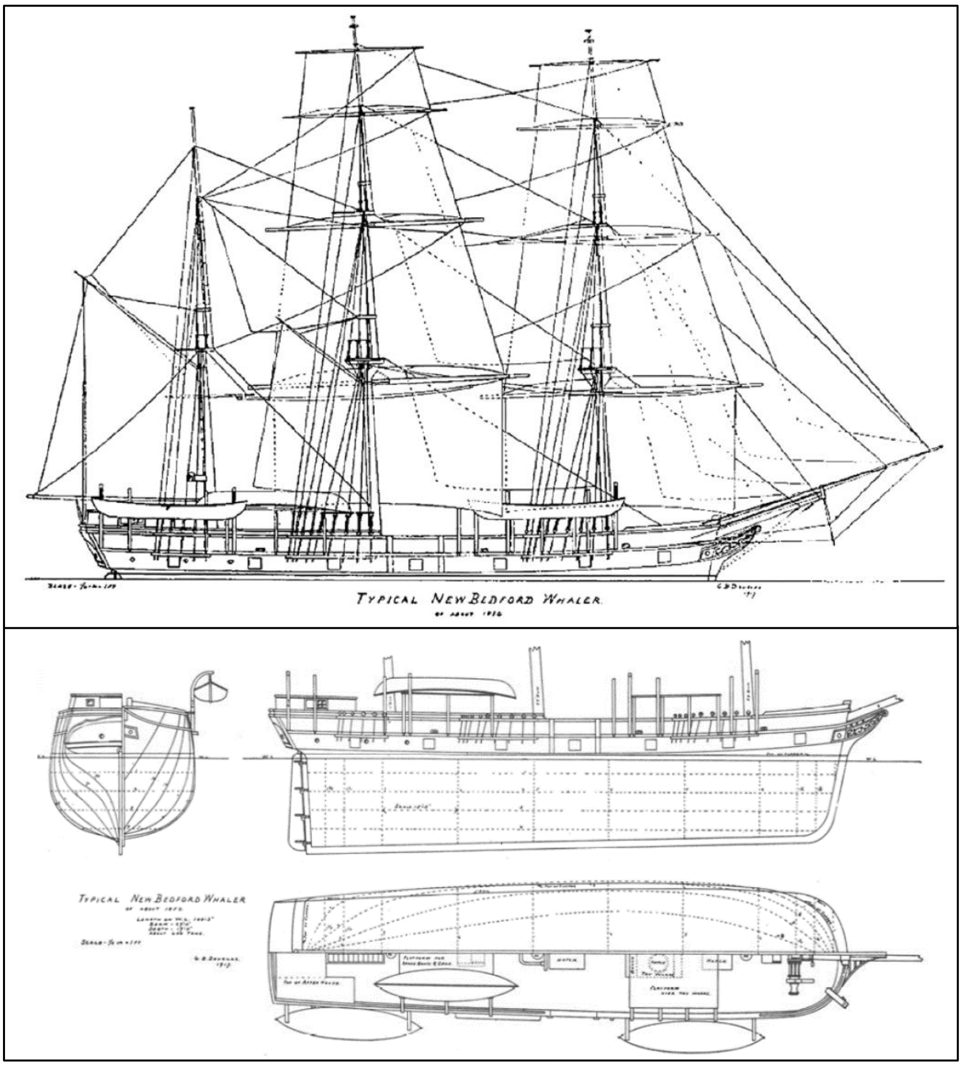


Figure 5: Illustration showing the ship plans of a typical whaler by Charles Desmund. Above shows the ship profile, below shows the longitudinal lines and ship deck plan (McAllister 2013).

Whaling ships were not concerned with speed or agility, as they did not chase the whales themselves. The most important attributes of a whaleship are sturdiness and the ability to hold a large cargo (Pearson 1983:41). The ships needed to be able to survive long voyages, lasting up to four or five years, and have enough space to hold a large cargo of whale oil and bone as well as the necessary whaling gear, processing equipment, food and drink stores and still have space for the crew to live. These requirements resulted in the ‘typical’ whaler (Figure 5) being broad beamed ships with a bluff bow and oversized construction components (McAllister 2013:43). Another necessary feature on pelagic whaleships was a larger than normal windlass placed just behind the bowsprit (McAllister 2013:45). The windlass, which is usually used for raising and lowering the anchor, would have a second function on whaling vessels: to lift the whale carcass from the water when the blubber was being removed (Figure 6) (McAllister 2013:45).

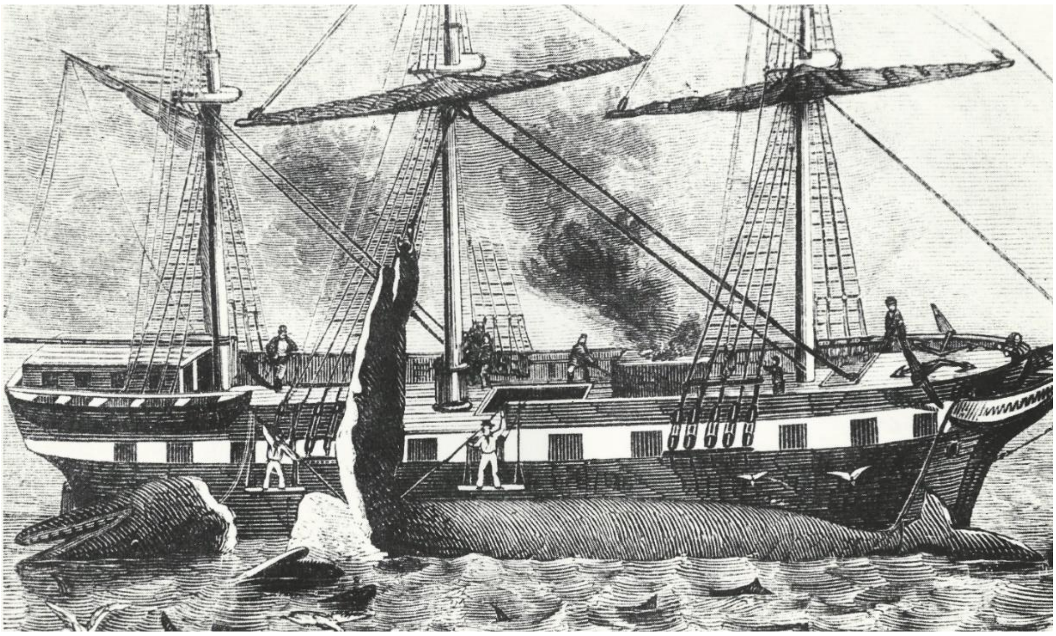


Figure 6: Image showing the removal of blubber from a sperm whale on a pelagic whaler (Hosking 1973).

Whaleboats, not to be confused with a whaleship, were small open vessels that were launched from either the whaleship or the shore (Figure 7). Although a sail could be used to propel these vessels, they were typically designed as row boats and had thwarts for five to eight oarsmen plus the headsman, who stood at the stern to steer the vessel with a long steering oar (Pearson 1983:43). The boats were very light weight and it is said that at full speed it was possible to halt all movement within one of its own length using one backstroke of the oars; a useful trait when chasing fast, agile and often aggressive whales (Pearson 1983:43). There were several features of the whaleboats that were specific to their purpose and set them apart from other open rowing boats. A loggerhead was found at the stern of the boat around which the whaleline ran: at the bow a notch with a peg was found that held the whale line in place, making sure that the boat would always be towed by a harpooned whale bow first and would not sweep across the crew (Pearson 1983:43).

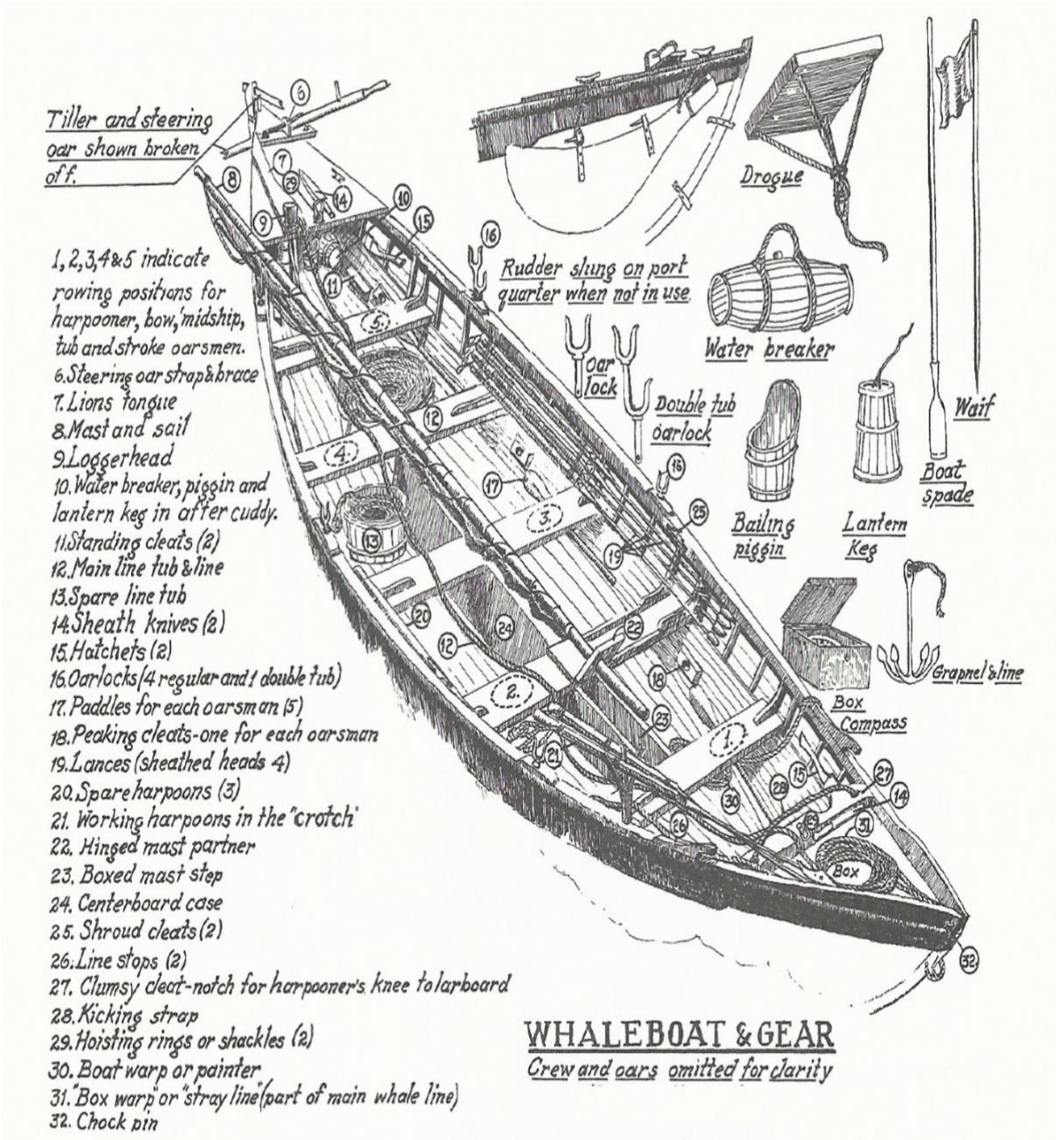


Figure 7: Diagram of a typical whaleboat and gear (Leavitt 1973).

Also at the bow was the thigh board: a thwart with a semicircular notch removed into which the harpooner would place his thigh to steady himself before throwing the harpoon (Pearson 1983:43). These boats were known for their seaworthiness, but due to the conditions in which they were used, they rarely lasted more than one journey (Tower 1907:86). The whaleboats used on *Cervantes* were part of the auction in 1844 and were among the first things to be salvaged from the wreckage (Anon. 1844e).

Hunting

After a whale was spotted, from a look out on land or the top of a mast on a whaleship, the whaleboats would be lowered into the water and the chase would begin. Upon reaching their prey, one of the experienced crew, known as the harpooner would throw his harpoon at the whale. The harpoon was attached to the whaleline, a 200 to 300 fathom long line traditionally made of hemp and infused with vapor of tar (Hohman 1928:175; Pearson 1983:46). One popular practice was to have two harpoons attached to the same whaleline, a short distance apart, to aid in anchoring it to the whale (Pearson 1983). The line was coiled in tubs and would unwind rapidly when the whale would dive, so rapidly that water would have to be poured on the loggerhead to prevent fire catching due to friction (Pearson 1983). If trouble arose and the whaleline needed to be cut, boat knives and a hatchet were kept nearby (Pearson 1983:46).

Once the whale had tired itself out and could no longer dive or swim at fast speeds the next task was to incapacitate it; this was done with lances and spades (Hohman 1928:175; Pearson 1983:46). Lances were driven into the whale's vital organs, killing the animal. A spade is about the size of a man's hand and was the shape of a spade with a sharp leading edge (Pearson 1983:46). The spade was used to sever the ligaments in the whales tale, preventing violent tail thrashing that could damage the boat and even kill the crew (Pearson 1983:46). Once the whale had been captured and killed the carcass was towed back to the whaleship, or to shore, for processing.

Processing

On pelagic whalers such as *Cervantes* all processing was done onboard the ship. This required there to be the equipment necessary to remove the blubber from the whale, render the blubber and store the resulting oil. The removal of the blubber from the whale carcass was known as 'cutting in'(Pearson 1983). A common methods for the removal of blubber was to cut strips of blubber and essentially peel them off of the carcass (Pearson 1983:48). Different cutting patterns were used for different whale species (Figure 8). A hook was inserted into the leading edge of the first strip and long handled cutting and bone spades cut away the blubber (Pearson 1983:48). The windlass was used to lift the strips, called blanket pieces, onto the ship so they could be further cut down to more manageable sizes for trying out (Pearson 1983:48).

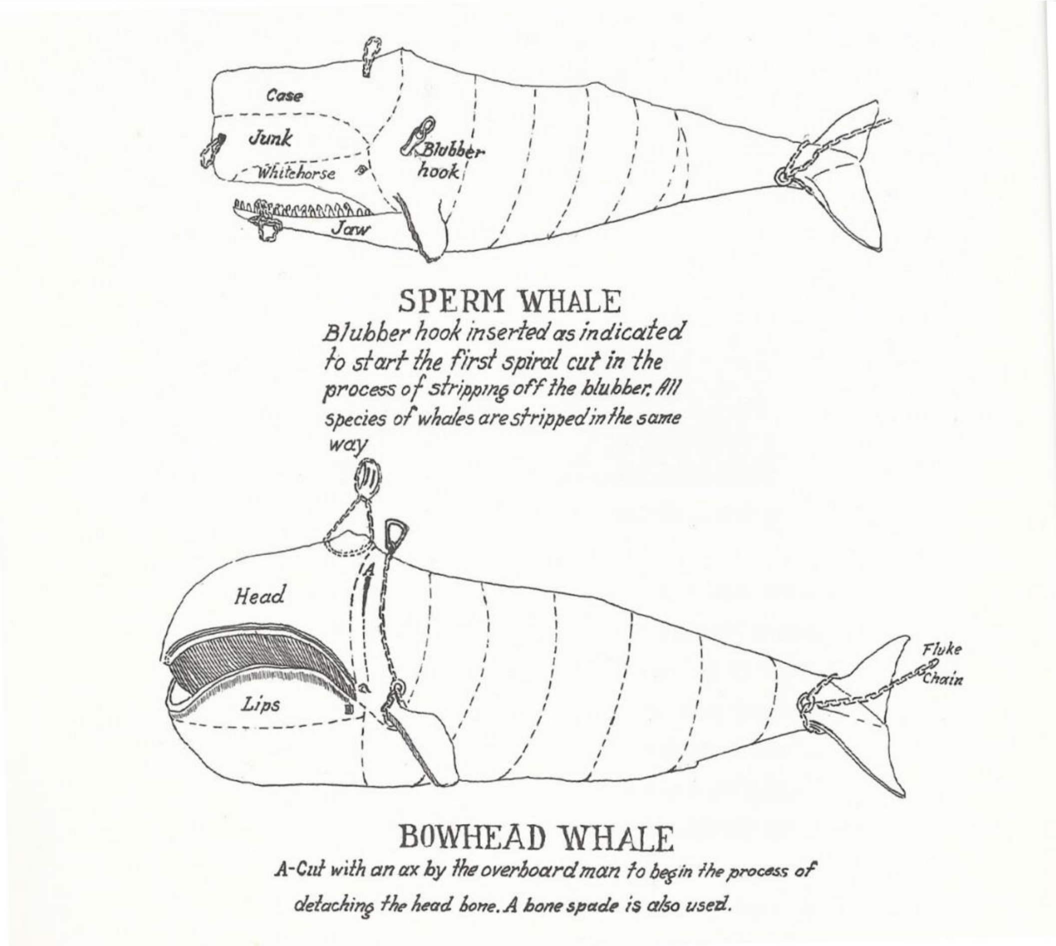


Figure 8: Cutting in patterns of Sperm and Bowhead whales (Leavitt 1973).

Next came the horse pieces (Figure 9); so named because of the wooden horse that they were placed on to be cut down to about 15x4 inch pieces (Pearson 1983:48). Then cuts were made along the width of the horse piece, almost cutting all the way through but not quite; these were called sliver pieces or bible pieces (Pearson 1983:48). Once the blubber was cut down to bible pieces, they were ready for trying out.

Trying out is the process of rendering the blubber and extracting the oil. The apparatus for trying out was built on the ship at the beginning of every journey. A brick base was built, upon which iron grates were placed to hold the try-pots—large mouthed, round iron cauldrons—and then a brick wall was erected around the pots, with an access door to tend the fires (Figure 10) (Pearson 1983:48).

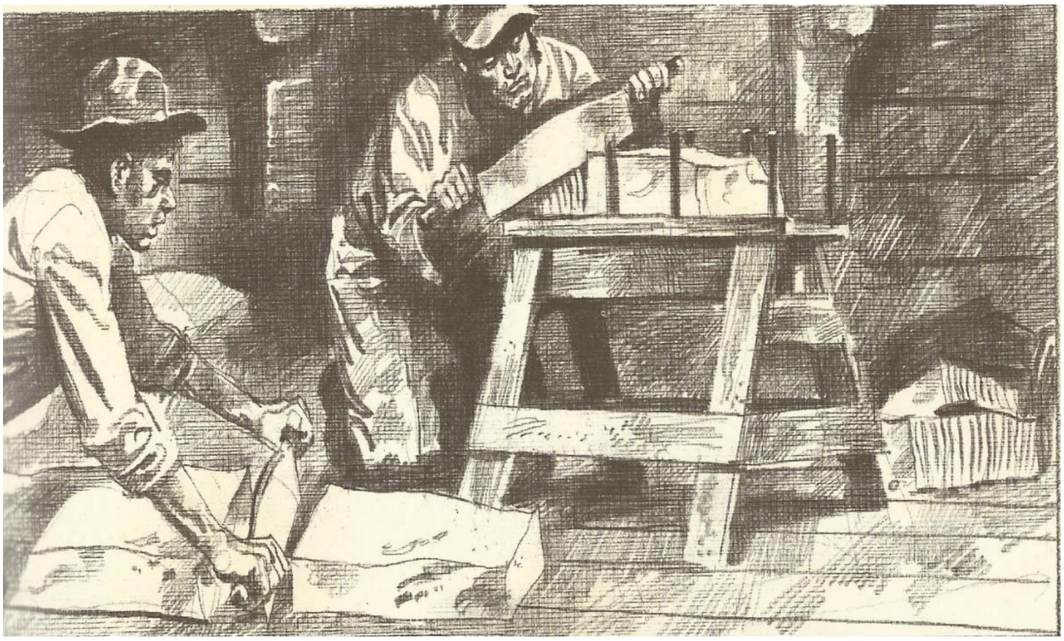


Figure 9: Image showing blanket pieces being cut into horse pieces (Left) and then into bible pieces (right) (Whipple 1979).

There were usually two to three try-pots on a whaleship, each with the capacity to hold 150 to 200 gallons (Pearson 1983:48). The bible pieces were moved to the try pots using two pronged forks known as blubber forks (Pearson 1983:48). Stirring poles were used to prevent blubber and rendered oil from burning at the bottom of the pot and discolouring the oil (Pearson 1983:48). Skimmers—ladles with holes drilled into them—were used to remove the scraps of blubber that rose to the surface which would be used to feed the fire and resulted in the foul smell associated with whaling activities (Pearson 1983:48). Once the oil had rendered out from the blubber, ladles were used to transfer it to large metal tanks to cool (Pearson 1983:48). The cool oil was then transferred to barrels for storage.

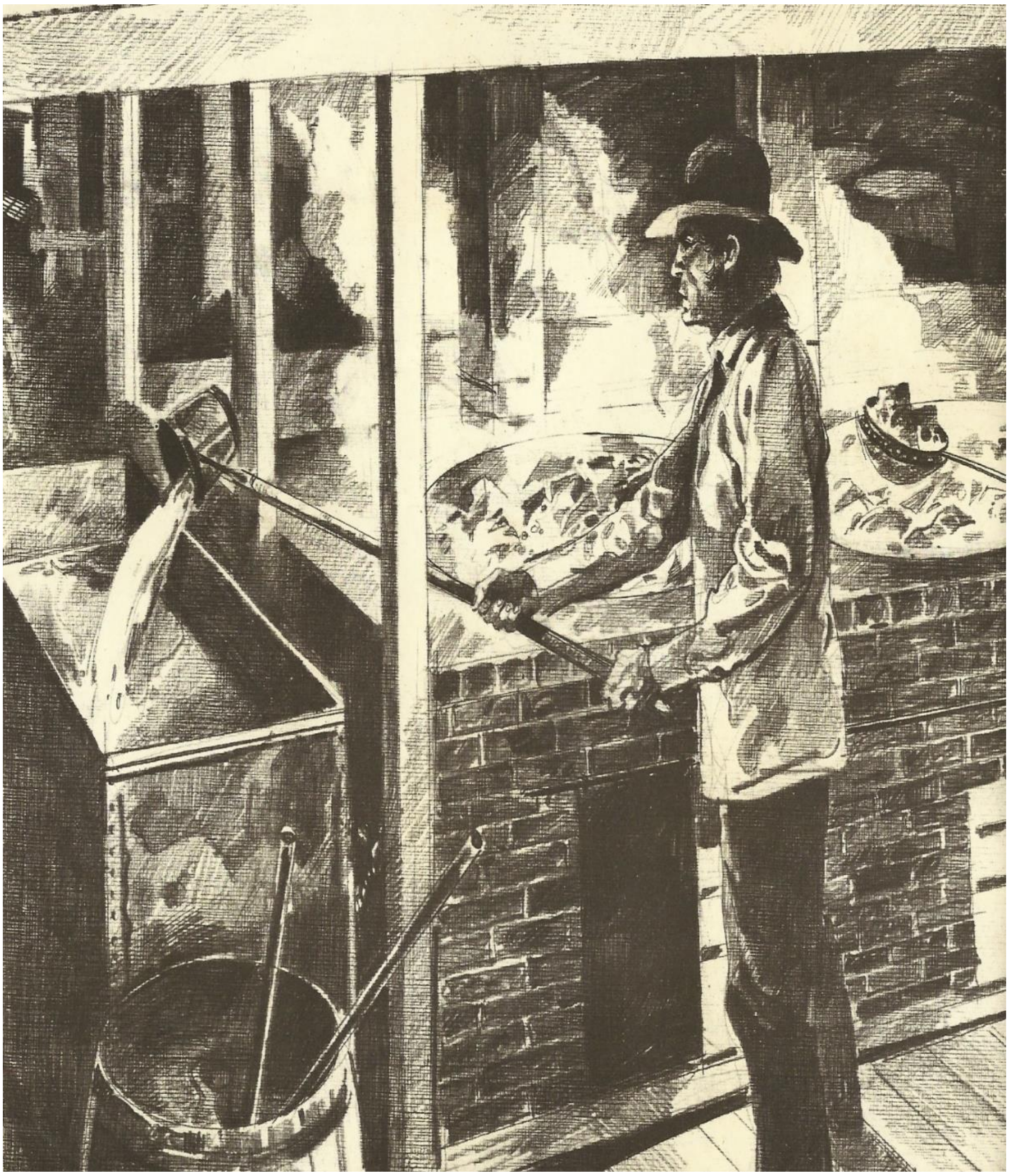


Figure 10: Image showing onboard tryworks, including the brick wall, access door and cooling tank (Whipple 1979).

American Whalers in Australia

The American whaling industry is said to have begun when Captain John Smith tried, unsuccessfully, to hunt whales along the new England coast in 1614 (Dolin 2007:25; McAllister 2013:28). The early American colonists picked up the practice of drift whaling from the Native Americans (Dolin 2007:41). The move from drift to shore based whaling had begun in the colonies by 1647 (Dolin 2007:46). By the end of the seventeenth century shore based whaling was a growing source of overseas revenue (Dolin 2007:53). Humpback and southern right whales were the target of these hunts due to their tendency to travel close to the shore (McAllister 2013:27). After the accidental capture of a sperm whale in 1712 pelagic whaling began in the United States (Dolin 2007:71; McAllister 2013:28; Tower 1907:26). Once it was realised that the oil produced from sperm whales was a much higher quality than the humpback and southern right whales they became a high priority target (McAllister 2013:28). Larger vessels were constructed so that whalers could travel further out to sea where the sperm whales tend to spend their time (McAllister 2013:28).

The first American whaling ships to visit the west coast of Australia were *Asia* and *Alliance* in 1792 (McAllister 2013:32). The visit took place out of the optimum whaling season, however, so it was believed for a time that the waters in the area were not ideal for whaling (McAllister 2013:32). It was not until the 1830's that real interest was shown in the nearby fishing grounds (McAllister 2013:33). American whalers became a common sight along the west coast, particularly in the winter months when foreign whale ships set up 'home ports' in sheltered bays where they would practice opportunistic bay whaling (McAllister 2013:33).

The presence of the foreign whalers allowed for trade in the rarely visited western settlements. Fresh food, water and other supplies were traded for products as well as unused whaling gear once a voyage was over (McAllister 2013:33). Although this trade was incredibly important to the settlements, foreign whalers fishing in the vicinity also caused tension. It was believed by many that American whalers, as well as other such as the French, were not allowing the local whaling industry to develop (McAllister 2013:34). When officials requested help and advice on competing with, or forcing out, the foreigners the reply from the government was to instead promote trade and commerce (Gibbs 2000:9).

Despite the views of some who lived in the colonies, American whalers did contribute to the development of the Australian whaling industry and the settlements themselves (Gibbs 2000:10; McAllister 2013:34). Not only did they provide trade and support when little was given from their own government, but many whalers would stay in Australia after a contract was over, or if they fell ill (Gibbs 2000:10–11). This allowed for the local shore-based industry to gain highly skilled men and equipment which, due to the lack of resources in the western colonies, could not be obtained elsewhere without an incredibly high price tag (Gibbs 2000:10–12). When a whaler was wrecked along the coast but remained salvageable, much like *Cervantes*, the ship and its contents were often put up for auction and purchased by those who either wanted to start a whaling venture of their own or thought they could resell the gear for profit (Gibbs 2000:11). The last American built whaling ship seen in Western Australian waters was *Platina* in 1888 (McAllister 2013:36).

The Decline of Whaling

There are several factors that played a role in the decline of whaling practices. Due to the high demand for whale products over the years whales had been hunted mercilessly, causing them to not only become more timid, but increasingly scarce (Logan and Tuck 1990:66; Maran 1974:33). A lack of whales would cause voyages to be less successful and therefore less appealing. The California gold rush in the 1850s was also a factor; trying their luck looking for gold was more appealing to would be whalers than another risky, dangerous and possibly unsuccessful whaling voyage (King 1975:90; McAllister 2013:36). The final nail in the coffin, as it were, was the discovery of petroleum in Pennsylvania in 1859 (Raupp 2015:85). Petroleum became a cheaper, more easily extracted source of oil than whale oil and quickly rose in popularity (Raupp 2015:86). Whale bone products were able to keep the industry viable into the 1870s as there was no good substitute to use in dress and corset making, but as whales became more scarce, the prices for whalebone increased (Maran 1974:52). By the end of the nineteenth century the size of the whaling fleets had diminished greatly, and the last ship actively hunting whales from what was once the greatest whaling nation in the world sank in 1924 (Maran 1974:53).

Chapter Three: Literature Review

The range of archaeological work undertaken on American whalers in Western Australia ranges from limited surveys to full, detailed excavation(Anderson 2016b; Anderson and McAllister 2012; McAllister 2013). The details of these studies are outlined in this chapter. By demonstrating and discussing what work has been done on sites of this type, gaps in knowledge can be identified; specifically, that cognitive—or intangible and social— aspects have not fully been considered.

The second part of this chapter discusses the framework that will guide this thesis: maritime cultural landscape. This approach allows for the project to move beyond the study of artefacts to include intangible and cognitive aspects of *Cervantes*. The differences between landscapes and seascapes are highlighted as there is some disagreement on the use of the terms and these debates will factor into the framework of this study. Several studies that draw on a maritime cultural landscape approach are discussed to show how a range of sources are able to provide a broader, more holistic understanding of a site and how this approach is applicable to a wide range of site types. Finally, a brief history of whaling in Australia will be discussed to show the differing opinions on the extent of the impact of the whaling industry on early Australian colonies.

Archaeological studies on American Whalers in Western Australia

Table 1:List of American whaleships historically known to have wrecked on the West Australian coast (Anderson 2016b; Anderson and McAllister 2012; McAllister 2013:12)

Vessel Name	Built	Wrecked	Located	Type of study
North America	USA (date unknown)	Koombana Bay (1840)	No	N/A
Samuel Wright	Portsmouth, Maine (1824)	Koombaba Bay (1840)	Yes	Excavation
Governor Endicott	Salem Massachusetts (1819)	Geographe Bay (1840)	No	N/A
Avis	Bath, Maine (1827)	Two Peoples Bay (1842)	No	N/A
North America	New York, New York (1804)	Koombana Bay (1843)	Yes	Survey/limited excavation
Cervantes	Bath, Maine (1836)	Jurien Bay (1844)	Yes	Survey/limited excavation
Halcyon	Philadelphia, Pennsylvania (1806)	Geographe Bay (1844)	No	N/A
Day Dawn	Fairhaven Mass. (1851)	Careening Bay (1886)	Yes	Excavation

There are eight American whaling ships known to have wrecked along Australia's west coast (McAllister 2013:12). Four have been located and subjected to archaeological study, ranging from survey and limited excavation to full excavation and study (Table 1) (Anderson 2016b; Anderson and McAllister 2012; McAllister 2013:12). A brief summary of the archaeological study undertaken for each of the located American whaler sites follows.

Samuel Wright

In 1847 a government surveyor, Henry Ommaney, used the visible main mast of the wrecked vessel *Samuel Wright* as a survey point while planning out the future layout for the town of Bunbury (Anderson 2016b:40). One hundred forty seven years later a surveyor from the town used Ommaney's field notebook to recreate the original plans, which had since been lost (Anderson 2016b:40). The plans revealed the locations of freshwater beach wells that had been dug by the American whalers who visited the bay, a whaler's grave, whaling lookouts and three shipwreck sites (Anderson 2016b:40). The ship wreck sites were believed to be three American whaleships: *Samuel Wright* and *North America*, both of which wrecked in the same storm in 1840, and another whaler by the name of *North America* which was blown ashore near *Samuel Wright* three years later in 1843 (Anderson 2016b:40).

Samuel Wright was a 372-ton ship built in 1824 in Portsmouth, New Hampshire (Anderson and McAllister 2012:16). The Western Australian Museum conducted magnetic surveys in 1981 and 2009 to aid in locating buried sites (Anderson 2016b:40). An excavation of Koombana Bay took place in 2011 that was intended to last eight days (Anderson 2016b:39). On day eight the location of *Samuel Wright* was investigated using water probes, which showed that timber remains were present between four and six metres below ground level (Anderson 2016b:40). Further water probing took place in 2015 to define the site limits and a more involved excavation began in 2016 (Anderson 2016b:41). Pumps were needed to lower the water table around the site by five metres to aid in excavation (Anderson 2016b:41). Significant finds from the excavation included: leather shoes, buttons, clay pipes, tryworks bricks and a wooden lid to a cask (Anderson 2016b:41). The ships structure was carefully measured and recorded and both metal and timber samples were taken to aid in dating and provenance (Anderson

2016b:43). Although it was assumed that the wreck was indeed *Samuel Wright* samples were sent to the Western Australian Museum for analysis to confirm the identification (Anderson 2016b:43). At the end of the excavation the wreck was covered in geotextiles, reburied and the pumps were turned off allowing the wreck to be inundated (Anderson 2016b:43).

North America (1843)

The 285-ton ship North America (1843) was located during the same archaeological investigations as *Samuel Wright* (Anderson and McAllister 2012:16). The vessel was built twenty years prior to *Samuel Wright* in 1804 in Warren, New York (Anderson and McAllister 2012:16).The wreck site that was eventually identified as North America (1843) due to its location, associated artefacts and timber provenance, was originally uncovered in 1962 by Cable Sands Company (Anderson and McAllister 2012:19). Ian Crawford from the Western Australian Museum recorded the dimensions of the site and took photographs as well as collecting timber samples and several artefacts (Anderson and McAllister 2012:19). The photographs taken by Crawford, along with others taken by locals in the 1960s, were used in 2015 to identify the location of the wreck of North America (1843) as it had since been covered by sediment (Anderson and McAllister 2012:26).

Cervantes

Cervantes was a nineteenth-century American whaler that was built in 1836 in Bath, Maine (McAllister 2013:106). The vessel was originally built as a one decked, two-masted brig but was converted to a barque in 1841 (Henderson 2007:273). Six months into its second voyage, on 20 June, 1844 *Cervantes* was caught in a storm and ran aground at Jurien Bay (Figure 11) (McCarthy 2012:106). As the wreck was in fairly good condition and thought to be salvageable the *Perth Gazette* advertised it for auction on 13 July 1844 (Henderson 2007:273–274; McCarthy 2012:107). The wreck and its contents were sold for £155 and the chronometer sold for £23 (Henderson 2007:274; McCarthy 2012:107). Although the equipment and stores were able to be removed, the hull could not be refloated and was left to the elements (McCarthy 2012:107). *Cervantes* was visible in 1847 during a survey of the coast by J.W. Gregory, but its modern relocation is dated to December 1969 (Henderson 2007:275). The outline of the wreck was observed by Laurie Walsh while out in a dinghy (Henderson 2007:275; McCarthy 2012:107). The site was reported to the staff of the Western Australian museum who undertook an archaeological survey in 1970 and Graeme Henderson, a graduate assistant at the Western Australian Museum in 1988, was able to identify the wreck as *Cervantes* (Henderson 2007:275).

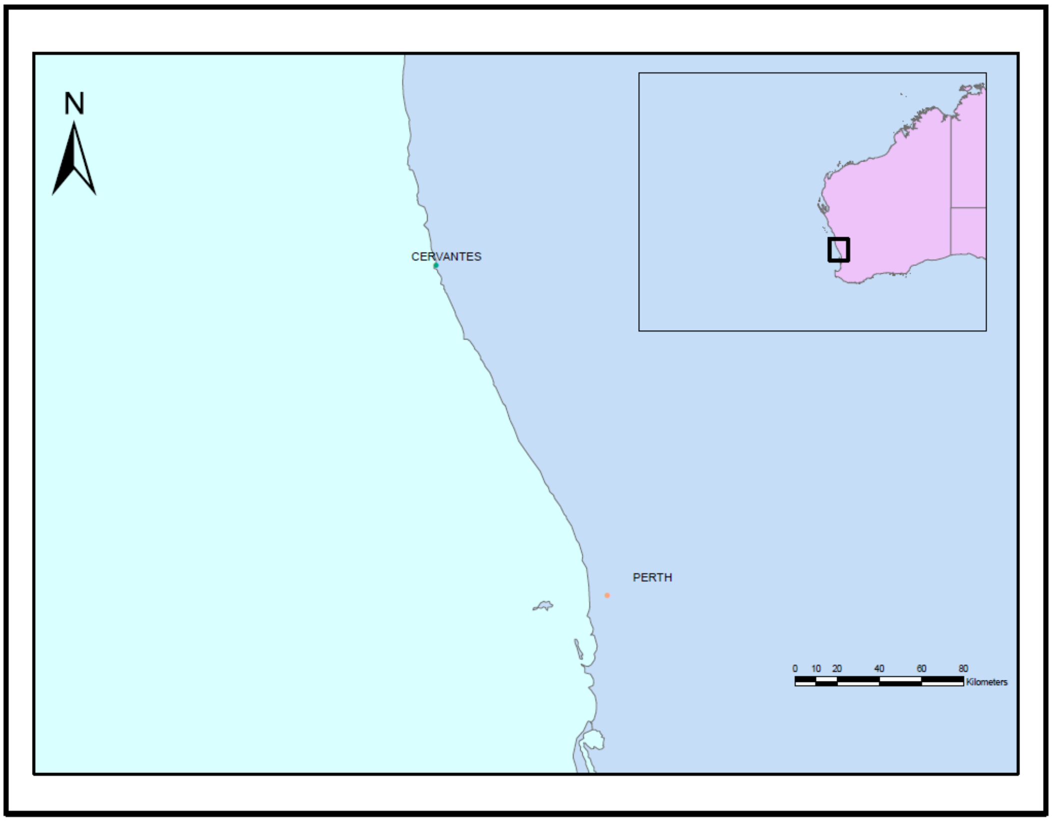


Figure 11: Map showing location of Cervantes relative to Perth (Map created by Taylor Gray using ArcGIS).

Henderson found a clear match between the wreck site and the historical records of the vessel *Cervantes* mainly through information on its location as mapped by Gregory in 1847, the nature of the archaeological remains and a relative assessment of their date (Henderson 2007:275). Henderson pointed out that Gregory refrained from naming the wreck in his survey charts, but it was the only vessel reported to have wrecked in that area before 1850 and therefore was highly likely the site is the shipwreck of *Cervantes* (Henderson 2007:275). Investigations into the shipwreck site continued in May of 1988 with an extensive survey of the site and limited excavation (Henderson 2007:275; McAllister 2013:16; McCarthy 2012:107). While taking profiles of timbers in order to determine the shape of the vessel, it was found that the timbers had eroded significantly, dwindling from over

110 feet in the first survey in 1969 to just over 30 feet (Henderson 2007:275; McAllister 2013:16). Thirty-three artefacts were raised from the wreck, including try-works bricks, pearl shell, hammers, anvils and timber (Henderson 2007:275; WAM). Further site investigations were conducted in 2004, but archaeologists have not undertaken any additional investigations to date (Henderson 2007:275; McAllister 2013). Detailed site plans and section profiles in addition to a basic report are all in draft form and to date remain unpublished (McAllister 2013).

Day Dawn

Day Dawn was a two-decked, three-masted, ship-rigged American whaler built in Fairhaven, Massachusetts in 1851 originally under the name *Thomas Nye* (McCarthy 1980:28–29). The vessel went on three whaling voyages and was then sold to a Boston merchant and disappeared from the record until 1867 when the ship appeared under the name *Day Dawn* (McCarthy 1980:28). By 1887 *Day Dawn* was registered as wrecked (McCarthy 1980:29). Similar to *Cervantes*, after the wrecking event the ship was sold and stripped of anything deemed valuable or reusable (McCarthy 1980:30; Wolf 1988:7). *Day Dawn* ended its career beached and burned to its waterline at Careening Bay, Western Australia (Wolf 1988:7).

The wreck was located in 1976 during development works on a naval base located on the west coast of Australia (McAllister 2013:12; McCarthy 1980:10). It was decided that in situ conservation measures would be taken as the timbers were in excellent condition (McCarthy 1980:10). To protect the site from the dredging that was scheduled to take place, a deep trench was dug beside the site and the wreck was allowed to slide into it (McAllister 2013:13; McCarthy 1980:10). The vessel was recorded, photographed and its dimensions measured (McCarthy 1980:24). Material deemed archaeologically relevant was raised and accessioned into the collection of the Western Australian Museum (McCarthy 1980:24). It was found that its shipwrights had used oak and fir timbers for its construction, applied pine pitch for waterproofing, sheathed the hull with Muntz metal and applied Muntz metal washers on the vessel’s copper fastenings (McCarthy 1980:29). Four jarrah planks had the name *Day Dawn* burned into them and the capstan, after concretion was removed, was found to have the makers name, A.D. Taylor, and the manufacturing location, Boston, inscribed (McCarthy 1980:17, 24). The inscriptions found on the planks and capstan made it possible to positively identify the wreck as *Day Dawn* (McAllister 2013:13; McCarthy 1980:34). In 1990 the site was moved yet again to a location two kilometres away (McAllister 2013:15).

Maritime Cultural Landscapes

Human interactions, from SCUBA divers to contact with machinery, with maritime sites such as shipwrecks are often seen as destructive forces in site formation and cause for concern (Duncan and Gibbs 2015:7). It was pointed out by Keith Muckelroy (1978:4) that archaeology is not simply the study of objects, but instead the study of the insights that objects provide into the lives of those associated with them. Brad Duncan and Martin Gibbs (2015:7), among others, argue that the interactions between people and sites extend beyond the moment when the site was created to present day connections to the landscape. The continuing interactions with archaeological sites can therefore be included in the cultural landscape of archaeologically significant places (Ford 2011:3). Christer Westerdahl (1992:5) expanded on the idea of cultural landscapes to include both terrestrial and underwater sites calling it a maritime cultural landscape (Duncan and Gibbs 2015:8; Ford 2011:4; Wilkinson 2013:8). A cultural landscape approach, and by extension a maritime cultural landscape approach, is able to move past the study of objects for the objects sake and connect artefacts to the people who produced and used them.

The maritime cultural landscape approach allows for the connection of terrestrial landscape and seascape. There is debate around the use of the term seascape and its definition. Some authors use the term to define landscapes as viewed from the sea (Ford 2011:4; Fowler 2015:25). As the aspects used in this definition of seascape are a part of the land, even if they are submerged, it is argued that they are part of the landscape and not the seascape (Ford 2011:4). According to Ben Ford (2011:4) the purest definition of a seascape is the aspects which allow one to understand their location at sea without having a view of land, such as stars, phosphorescence, birds and currents. Madeline Fowler (2015:37) utilises Ford's definition of a seascape in her study and considers the seascape as a component of the maritime cultural landscape. This study will, likewise, use a definition of maritime cultural landscape that encompasses cultural landscapes and seascapes in order to gain a more holistic view of the cultural landscape of the vessel including the wreck site, terrestrial areas it came in contact with, and its routes and activities while at sea.

As shown in several studies, looking at sites from a maritime cultural landscape perspective allows for the study of interaction between populations and significant sites by using physical objects and features, local tradition, toponomy, historical documentation and ethno-historical sources (Ash 2007; Duncan and Gibbs 2015; Fowler 2015; Straiton 2015; Wilkinson 2013). Ford (2011:2) stated that even smell and noise perceived by observers are included in the landscape as well as nearby places that one can imagine. In this way the maritime cultural landscape includes both material and immaterial, or cognitive, aspects (Anderson 2016a:50; Fowler 2015:27; Westerdahl 1992:6). By using a variety of sources to gain information on perceptions of archaeological sites by people, past and present, the links between the physical and cognitive aspects can be better understood (Anderson 2016a:50).

This project aims to use this approach to better understand the history of *Cervantes* and its impact on the area surrounding the wreck site. The study of artefacts from *Cervantes* will be folded into a greater story of the ship and the people who interacted with it, as told by the people themselves. A maritime cultural landscape approach allows for the understanding of the species of wood used in the construction of a ship, but it also can explain who paid for the wood, who walked across the timber made of that wood, what goods were carried by it, who salvaged it, and who currently protects it. By including as many aspects of the maritime cultural landscape as possible the history, and story, of each artefact becomes larger and more personal. Extending the maritime cultural landscape to present day acknowledges that there is still a relationship between *Cervantes* and the nearby population in some form. The town of Cervantes is an important part of the current cultural landscape of the ship. Including research into the town in this study gives a unique insight into cultural, social and emotional connections to *Cervantes.*

Maritime Cultural Landscape Case Studies

Aiden Ash (2007) used a maritime cultural landscape and seascape approach while studying Port Willunga of South Australia. Archaeological survey, both underwater and terrestrial, were used to map the four main features of the area (Ash 2007:17). Historical sources and oral histories were heavily utilized in this project (Ash 2007:18–20). The main purpose of his project was to show the effectiveness of maritime cultural landscape theory in bridging the gap between maritime and historical archaeology (Ash 2007:2). Ash demonstrated, through his study of the port, that using a theory that includes a cognitive facet to connect sites to the people associated with them allows for a more holistic understanding of maritime archaeological sites (Ash 2007:66). The idea central to Ash's thesis is also a key factor in this project: including intangible and social aspects of a site can enhance the study of an archaeological site.

Danielle Wilkinson (2013) applied a maritime cultural landscape approach to study the changes, both the physical degradation and patterns of use, of Robb Jetty, which played an important role in the development of the industrialisation of Fremantle, Western Australia in the late nineteenth century. Both historical and archaeological studies were done on Robb Jetty and the other features on C. Y. O'Connor beach (Wilkinson 2013:5–6). Interviews and questionnaires were used in order to understand the changing local perceptions of the area (Wilkinson 2013:5–6). It was found that both economic and geomorphic factors influenced the changes in the jetty from an industrial site to a recreational one (Wilkinson 2013:104). With the changes in use also came a change in knowledge of the site. Few who visited the beach had an understanding of the historical significance of the area (Wilkinson 2013:104). Based on the information gathered, recommendations were made to aid in restoring knowledge of the sites (Wilkinson 2013:103). This project will utilize similar sources to Wilkinson, such as interviews and both historical and archaeological studies. Wilkinson focuses on the change in the way a site is perceived, which is a cognitive aspect of the *Cervantes* site that will be studied in this project.

Peta Straiton (2015) used similar methods and theoretical approaches in her archaeological examination of Normanville Beach. The beach was the site of a port and, as argued by Straiton (2015:25), was an important factor in the growth of the surrounding area. To study the impact of the port on the neighbouring community several different methods were employed. Historical sources were used to compile a history of the area and analyse the effect of the port on nearby growth (Straiton 2015:46). Archaeological examination, both terrestrial and underwater, determined the extent of the archaeological record in situ (Straiton 2015:49). Interviews and local involvement were utilized to understand the role of the site to the community and to understand the limits of the communal memory, or a collective memory of those in the community past and present (Straiton 2015:48). A maritime cultural landscape approach was only one of several theoretical frameworks used; community and public archaeology also factored heavily in the project (Straiton 2015:44). Using these approaches allowed for the study of the tangible, the physical remains of the port structures, as well as the intangible, the emotional connections and perceived importance, on a site where social implications had not previously been analysed (Straiton 2015:18). The methods, specifically the use of maritime cultural landscape approach and inclusion of archaeological and community sources, and aims of Straiton's (2015) work are relevant to this project as it will be working under a similar framework, use some of the same methods and sources, and also connects present day social implications to a historical site.

Ross Anderson (2016a) undertook a comprehensive study of the whaling and sealing practices of the southern coast that focused on the Archipelago of Recherche. The project used a maritime cultural landscape approach as well as other general theoretical approaches such as cultural materialism, cultural ecology, neo-marxist ideas and frontier theory in order to create a more holistic understanding of the activities that took place in the area in the nineteenth century (Anderson 2016a:44). Archaeological study including survey, geographic information system, hereafter known as GIS, mapping and excavation was paired with historical research of primary and secondary sources (Anderson 2016a:117–127). The broad range of source types included in the study allowed for the causes and results of cross-cultural contact and its importance to be highlighted in a way that had previously not been done for this geographic area (Anderson 2016a:45). Anderson (2016a:402) argues that not only are sealing and whaling linked, where previous scholars saw them as distinctly separate, but those industries are also linked to the early economy, trade, settlement patterns and cross-cultural contact. Anderson's study is relevant to this project in many ways; as background research into whaling activities but also as a demonstration of what new information can be gathered by employing a broad approach to research. By using new approaches, including maritime cultural landscape, new connections came to light that link sites to new people places and activities. Like Anderson's work, this project aims to use a broad range of sources to better understand the connections between the site and other locations and populations.

The aforementioned studies are examples of how a maritime cultural landscape approach can take the understanding of maritime archaeology sites past shipwrecks and past simply recording artefacts. Projects that take this approach are an answer to Muckleroy's (1978:4) reminder that archaeology is the study of people through material remains, as opposed to just the analysis of artefacts. Utilising a wide range of sources, such as oral histories, primary and secondary historical sources, interviews and archaeological data it is possible to connect the tangible and intangible aspects of a landscape. A maritime cultural landscape approach can be used to better understand a variety of archaeologically significant sites such as vessels, coastal communities and maritime commercial sites (Anderson 2016a; Ash 2007; Straiton 2015; Wilkinson 2013). As the cultural landscape of *Cervantes* includes the wreck site, the places visited by the vessel, and those who came in contact with the ship and its crew, the methods used in these studies are highly applicable to this study.

The Influence of Whaling on Early Australia

There is little debate about whether or not whaling influenced the early days of the Australian colonies; the discrepancies lie in the questions of when and how much (Blainey 1966; Gibbs 2000, 2010; Kerr and Kerr 1980; Pearson 1983). Geoffrey Blainey (1966:103) stated that whaling had little influence on Australia's economy until Australia gained its own whaling fleet. Several authors point out that the influence of whaling extends beyond the economy to the beginnings of the colonies of Western Australia (Gibbs 2000:3; Kerr and Kerr 1980:9–10). Margaret and Colin Kerr (1980:9–10) argue, based on firsthand accounts from the period, that whaleships travelled to areas where merchant ships would not go and thereby aided the locating of lands viable for colonisation. The abundance of whales seen off the west coast of Australia, along with the already noticeable activity of French and American whaleships, was an added incentive in the creation of settlements in the remote area (Gibbs 2000:3). Fears of foreign crews laying claim to land and natural resources, including the whales and seals which many saw as property of the British government as they were in Australian waters, were evident in the discussions pertaining to establishing colonies near the Swan River (Gibbs 2000:3) As American whaling voyages lasted for several years the ships would restock by trading goods brought from America for fresh fruit, vegetables and meat (Peet 2003:193–194). Although some authors establish that the trade would not have impacted the eastern colonies much, the western colonies were much more isolated and therefore the visits from whaleships would have been vital to the survival of the rarely visited settlements (Gibbs 2000:3, 12).

The isolation of the western colonies also came in to play as colonists attempted to set up local whaling ventures. With no means of manufacturing their own whalecraft, gear that is used to hunt whales, all necessary equipment needed to be imported (Gibbs 2000:10, 2010:14). Michael Pearson (1983:42) believes that the prices for importing whalecraft were sometimes exaggerated in order to make a case for disposing of duties on colonial oil. Although this may have been accurate for the eastern colonies, which Pearson (1983) drew his information from for his study of whaling technology, Gibbs (2010:14) points out that fitting out a whaling venture in the western colonies cost a great deal more. American whaleships would often sell off unused gear at the end of a voyage which would be a welcome injection of relatively inexpensive equipment into the local industry (McAllister 2013:33). Despite the cooperation and comradery that occurred between the Western Australian colonies and American whalers, many locals also believed that the presence of foreign whaleships in the waters nearby hindered the growth of the Australian industry (Gibbs 2000:9; McAllister 2013:34). This led to tension, the request of intervention by the British government on behalf of the colonists, which was denied, and altercations between the local government and foreign vessels (Gibbs 2000:9).

The main point of contention between the different modern opinions seems to be due to the different situations between the east and west coast, with the west coast being far more isolated and therefore relying more heavily on visiting ships. Whaling played a role in the growth of the local economy, the selection process for settlement locations and, according to some, it was vital to the survival of the remote western colonies.

Conclusion

As seen in the previous work on nineteenth-century American whalers in Western Australia, little has been done to study the effect that each individual ship has had on the region; the focus has been on locating and identifying ships, not connecting the sites to their broader historical context or individual histories. Studies into the early days of whaling in Australia show that whalers were important to the survival and growth of the colonies, though the extent is debated. Authors do agree that whaling was an important aspect of Australia's history, however, and is therefore worthy of in-depth study.

A maritime cultural landscape approach allows for the combination of archaeological study through excavation and artefact analysis as well as the study of the social, cognitive and intangible aspects of the vessel. Studies undertaken using this approach have shown that looking into the intangible facets connected to a site allow for a broader, more holistic understanding of archaeological sites, both terrestrial and submerged. This approach will be vital to understanding the history and legacy of the nineteenth-century American whaler *Cervantes* as it will allow for the study of how the vessel impacted communities before and after the wrecking event as well as how current local communities identify with the site.

Chapter Four: Methods

This chapter first discusses the approach used when gathering data for this project, including how relevant data was sorted and how the theoretical framework of maritime cultural landscapes was applied. It then details how historical and background research was conducted and where various sources came from. Lastly this chapter will detail the specific methods used for recording and gathering data from the *Cervantes* artefact collection at the Western Australian Museum.

Approach

A maritime cultural landscape approach was used for this project, as described in detail in chapter three. This approach guided what information was deemed relevant when researching the town of Cervantes and the vessel after which it is named. Data that was deemed relevant included that which pertained to the construction, ownership and purpose of the ship. It also extended to those who were on the vessel, the places to which it travelled and its cargo. Research into the wrecking event and the fate of the crew and ship was also found to be important. These aspects of the life of the vessel help to understand the maritime cultural landscape of the ship. As the maritime cultural landscape approach allows for the inclusion of modern day cultural landscapes, research into the development of the town of Cervantes and its connection with the wrecked vessel is an incredibly relevant aspect of the study (Duncan and Gibbs 2015:7; Ford 2011:3).

Historical Research

Historical research is necessary for this project in order to compile information pertaining to *Cervantes* as well as the whaling industry in general. First, general background research was conducted using peer reviewed articles, published first-hand accounts of whaling journeys, and broad histories of the whaling industry. More detailed research into *Cervantes* specifically was done at the Western Australian Museum. The museum curates an online shipwreck database as well as hard copy files, a maritime library and a map room, all of which were utilised. Files at the museum contained data gathered from previous work on this wreck site including excavation notes, scans of newspaper articles pertaining to *Cervantes*, and information on the town of Cervantes. The shipwreck database provided basic information on the size of the ship, as well as a brief overview of the wrecking event. The museum library contained information on a range of related subjects such as a history of Bathe, Maine—where *Cervantes* was built—and sources on the history of land use in the early days of the Western Australian colonies.

Online archives and databases were searched as well. Specifically, the online libraries, archives and databases of maritime museums of the east coast of the United States were searched for primary and secondary sources pertaining to voyage records, crew lists, newspaper articles and reports. The Mystic Seaport Museum was particularly useful in this regard. The results from these searches varied greatly. Other online data sources included, but are not limited to: The New Bedford Whaling Museum, the National Maritime Digital Library, the Library of Congress and Trove.

Research into the town of Cervantes began at the Western Australian Maritime Museum. Information on the town was available through previous research conducted on the wreck site. Interviews with residents of Cervantes done through the museum were integral to the maritime cultural landscape approach used for this project. Further research into the town was conducted through government websites, such as LandGate, and through a site visit to the town.

Photography

Each artefact in the collection held by the Western Australian Maritime Museum was photographed. Photographs were taken in a photography room at the Shipwrecks Gallery of the Western Australian Maritime Museum using a Nikon D90 camera. The camera was connected to an adjustable stand to limit movement. Several stand lights were used to minimise shadows, although all shadows could not be eliminated. Two lamps were used to create a softer, more natural light which diminishes the harshness of the flood lights. Each artefact was photographed with a label containing its museum registration number as well as a scale. Materials that were light in colour and did not stand out enough from the default white background were placed on a black fabric background for photographs. Artefacts that were too large to fit in the photography room were photographed without the assistance of the adjustable stand in a different location. Artefact photographs were added to the artefact recording sheets.

Artefact Recording

To record the collection each artefact's relevant dimensions, such as height, thickness or diameter, were measured. Where a registration number contained several pieces, such as the flaking Baylor shell, the main pieces were measured. The dimensions that were measured were length, width, and height. For cylindrical objects the diameter was measured as well as height or thickness. Specific features of some artefacts were also measured. For example, the diameter of treenail holes in planking and other timber pieces were recorded where possible. Measurements were taken using a calliper for smaller objects and a tape measure for objects that had measurements in excess of 10 centimetres. Measurements were recorded on an artefact recording sheet along with the condition of the artefacts. Catalogue sheets from the museum artefact database were used for reference, but any information contained in the database was rechecked.

X-ray Fluorescence

X-ray fluorescence, XRF, is a process by which materials are irradiated with x-rays to determine the composition (Brouwer 2010:10; McAllister 2012:40). XRF is a reliable method of determining the makeup of a variety of materials including metals, which is the material analysed by XRF for this project (Brouwer 2010:8). Elements in the material hit by the primary x-rays are excited and produce secondary radiation that is specific to the element from which it originated (Brouwer 2010:10; McAllister 2012:40). There is a margin of error associated with this method, as it cannot account for composition changing factors such as contamination from the artefacts depositional environment or the leeching of elements from corrosion (McAllister 2012:37). Furthermore, each analysis is only representative of the single area tested, not the entire object as metal alloys have discontinuous compositions (McAllister 2012:37). XRF is unable to provide truly quantitative data, but can give a semi-quantitative analysis of the presence of elements by weight percentage (McAllister 2012). The semi-quantitative data can then be compared to provide a qualitative assessment of the material composition.

In order to better understand the materials used in the construction of *Cervantes* XRF was used on several copper pieces from the collection. Three bolts and three spikes were chosen from the artefact collection. These spikes and bolts were selected based on fragility, ability to find appropriate areas to clean and surrounding materials. Close up photographs from several angles were taken of each spike and each bolt. A Dremil rotary tool was used with a sand paper attachment to clean two areas on each item, past any surface corrosion to get a clean reading of the original material (Figure 12). The cleaning work was overseen by John Carpenter and Kalle Kasi from the Western Australian Maritime Museum. Photographs, including close ups of the cleaned areas, were taken in order to show changes before and after the cleaning.

Figure 12: The cleaning process with the Dremel (Photography by John Carpenter, 2017).

The spikes and bolts were taken to The Commonwealth and Industrial Research Organization (CSIRO) where Margaux Le Vaillant performed the XRF analysis while the author took notes. The XRF analysis was done using an Olympus Vanta handheld XRF. The work took place in the same environment, in a single session, with the same settings, using a single operator. The portable XRF machine used a rhodium tube source and used two beams for 20 seconds each. Multiple readings were taken on each cleaned area, however the number of readings taken was not consistent between areas. The sample spikes and bolts were returned to the museum collection after the analysis was finished.

XRF has been done previously on the Copper Spike from CV335, a group of copper spikes in the *Cervantes* collection (WAM file 409/71). These results can only be loosely compared to the results gathered in this project, as the previous results were obtained from work that was completed in different circumstances. Specifically, it was gathered with a different brand machine, completed in a different environment and with a different operator. These differences could cause the results to differ slightly from one data set to the next. As previously stated, the area was cleaned of any corrosion materials for this study. In the previous XRF analysis no cleaning took place, but the areas tested was chosen based on their relative lack of corrosion and patina (WAM file 409/71).

Wood Samples

To aid in the understanding of the construction of *Cervantes* samples of wooden components of the vessel were analysed for species identification. Species identification of historic wood can be difficult because of degradation and other environmental processes (Timar et al. 2012:12) Abrasion from floating sediment can degrade wood as well as fungus and bacteria, however the main cause of wood degradation is marine borers, specifically *Teredo navalis*, or ship worm (Bjordal et al. 2011). As explained in conservation reports and evident in the wooden artefacts contained in the collection *T. navalis* was active in the area where *Cervantes* is located at a point in time when the site was uncovered and had degraded the vessel (Carpenter 2012). The evidence of shipworm activity, a maze of bored holes throughout the wood, factor into the selection of sample pieces and the species identification results.

The collection was examined, and it was decided that CV534, which consisted of several wood pieces from the *Cervantes* collection, contained a good representative sample (i.e. treenail, ceiling plank). Wood species identification had previously been done on CV3358, a framing timber with a copper bolt. Due to this previous work, framing fragments would not be sampled in this project. A treenail piece and fragment of a ceiling plank were chosen from CV534. A grant for destructive analysis from the Western Australian Museum was obtained to take samples from the two pieces (Appendix one). These individual pieces were photographed closely from several angles. The selected pieces had samples removed from them with a hand saw by Jon Carpenter from the Department of

Materials Conservation at the Western Australian Maritime Museum (Figure 13). Close up photographs were taken of the artefacts after the samples were taken to show before and after changes. The samples were labelled and sent to Jugo Ilic at 'Know Your Wood' for wood species identification. The structure of the samples were examined and compared to references to determine genus and likely species (Timar et al. 2012:12). There is a margin of error associated with this technique as differentiating between some species based on microscopic structure alone is impossible.

Figure 13: John Carpenter using a hand saw to remove a wood sample from CV534 treenail (Photograph by Taylor Gray).

Limitations

One limitation to the processes by which the collection was analysed was the state of the wood pieces in the collection. Many of the artefacts that contained wooden aspects were affected by shipworm. When taking wood samples for species identification it is best to avoid sections that are heavily degraded by shipworm as it can make it difficult, if not impossible, to identify the species. Although the sample was taken from the treenail without incident, taking a sample from the ceiling planking proved to be more difficult; the planking began to crumble as it was being sawn, and several attempts were made before a section could be sampled that had enough wood intact that could be identified.

A second limitation pertains to the cleaning of the copper spikes. A few of the areas that were cleaned on the copper spikes were done in areas that were not the most ideal for analysis with the handheld XRF and due to this, readings were taken several times in order to get as clear results as possible.

Chapter Five: Results

This chapter lays out the results of the research undertaken during this project. The research on crew lists and cargo are compared between the two voyages made by *Cervantes* to aid in comprehension of the circumstances of the trips and the vessel's maritime cultural landscape. The XRF analysis produces information on the types of spikes and bolts used in the construction of the vessel and the wood species identification adds to the knowledge of the types of wood used to build this ship.

Historical Research

The crew lists for the two whaling voyages undertaken by *Cervantes* give unique insights into the makeup of the crew. When completing a crew list, several pieces of information about each crew member was recorded; this included: name, place of birth, place of residence, the country of which they are citizens, age, height, complexion and hair colour (Appendix three) (Lund and Smith 2018). An analysis of the crew lists shows the demographics of each voyage which leads to a better understanding of the dynamics onboard between those who interacted with *Cervantes* while the vessel was active. There were instances where names on the crew lists were crossed out. There are no indications on the crew lists as to the reasoning behind eliminating the names. These names are only included in the analysis to show the number of crossed out entries in each crew list and are grouped with entries that have provided illegible information in parts.

By looking at the cargo lists for the whaling ventures undertaken by *Cervantes*, specifically the first voyage, it is possible to see how successful the trips were, and what types of whales were encountered most often based on the oil obtained. As the second voyage resulted in the ship being lost early on into the trip, and therefore having obtained minimal cargo, there is little comparison between the two cargos. The numbers reported are still included, however, for reference to the context of the two voyages.

Age

The ages of the crew are broken grouped in five-year increments. The age range from the first voyage is 13–40 with the average age between 23 and 24 (Figure 14). It should be noted that one crew member did not give any information other than name, complexion and hair colour. The range and average ages for the first voyage does not include this crew member due to the lack of information; only 20 of the 21 crew entries for the first voyage are used. For the second voyage, with 23 crew in total, the ages ranged from 15–49, the average being 25. Although the average age of the two voyages are only two years apart, the second voyage employed almost twice as many teenagers than the first voyage, and more 15–19 year-old crew than any other age category. The second voyage also hired the eldest crew member by five years, and nine years older than the eldest crew member of the first whaling trip. The first voyage hired the youngest crew, with three 13 year-old boys aboard (Lund and Smith 2018).

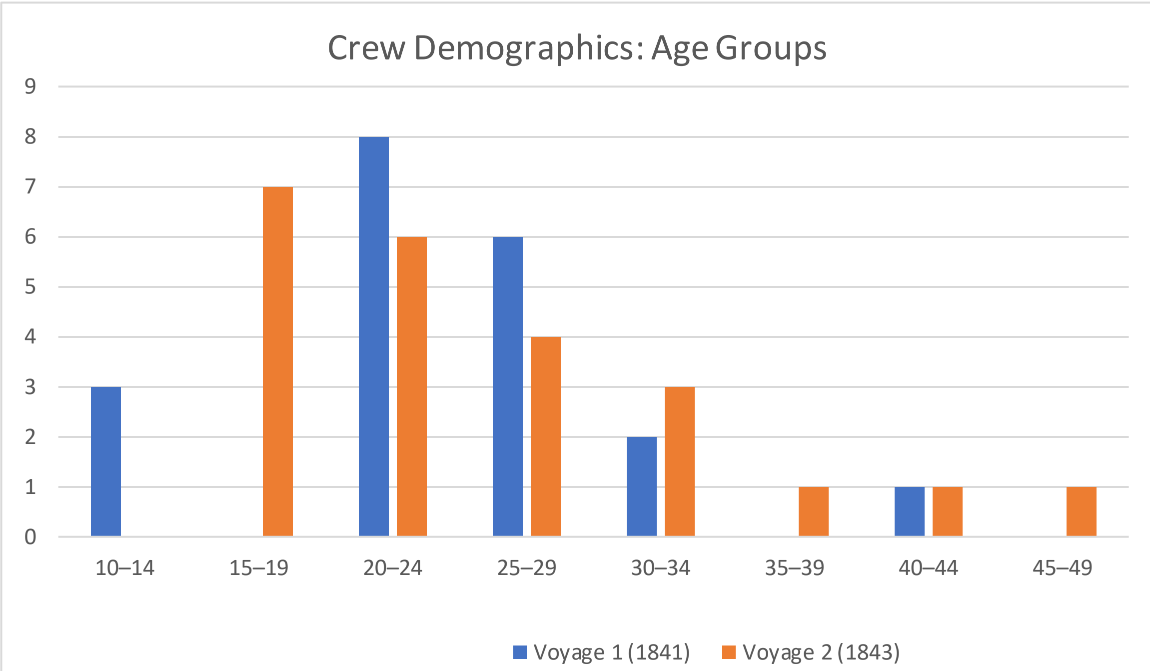


Figure 14: Chart showing the number of crew in each age group based on voyage (Lund and Smith 2018).

Place of Birth and Citizenship

Cervantes was an American ship, and as expected the majority of the crew on both voyages were born in the United States. The second most common country of origin was Portugal, with five crew members of the first trip coming from the Western Islands or the Azores (Figure 15). There was one entry, John Morrison, whose place of birth was illegible. It is possible that the entry states 'W. Canada'; this correlates with the country that Morrison states citizenship for, England, as Canada was a British colony beginning in 1763. Without more definitive proof, however, this entry was classed as illegible. The other entry in this group is that of the crew member who only provided a name, complexion and hair colour (Lund and Smith 2018).

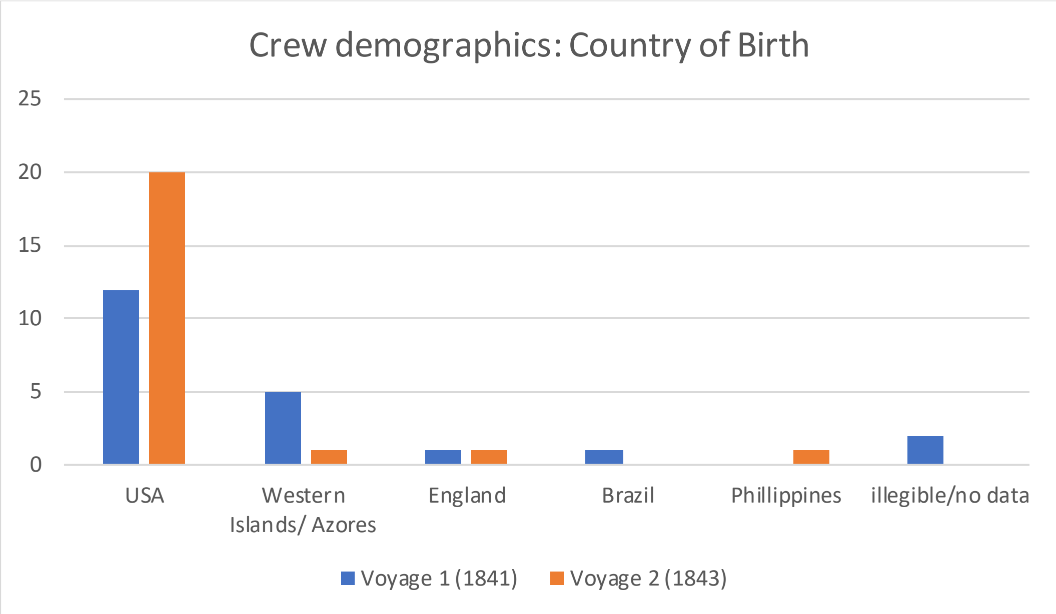


Figure 15:Chart showing the number of crew members born in a certain place, separated by voyage (Lund and Smith 2018).

The differences between the number of crew born in the United States and those who claim to be citizens or subjects comes from a crew member who was born in the Western Islands but is a citizen of the United States (Figure 16). One entry that was classed as illegible/no data had a legible entry for English citizenship (Lund and Smith 2018).

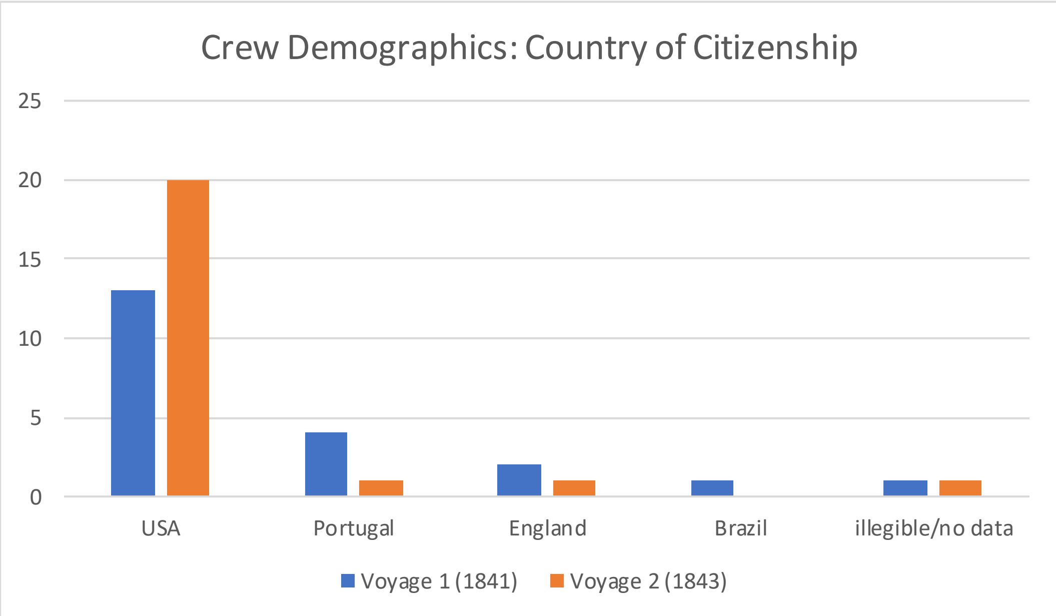


Figure 16: Chart showing the number of crew members that are citizens of different countries, separated by voyage (Lund and Smith 2018).

The only entries from each crew list that could have been the same person were those of James Jones and George Sands. The birthplace for Jones is spelled differently with ‘Wooster’ England being on the 1841 crew list and ‘Worchester’ England being on the 1843 crew list. Both list residency as New London, and both have citizenship in England. At the time of signing onto the crew in 1841 Jones was 23, at the time of the second journey in 1843 Jones was 25. The physical descriptions match, with some variation in wording and one inch in height difference.

There are more discrepancies with George Sands, one being the lack of ‘s’ at the end of the surname on the 1843 crew list (Lund and Smith 2018). On the 1841 crew list Sands lists his birthplace as Groton, Connecticut and current residence as Springfield. The birthplace listed on the 1844 crew list is Springfield, with the current residence being New London (Lund and Smith 2018). Like Jones, the physical descriptions match with some variation in wording and growth of four inches (Lund and Smith 2018). Assuming the information given is accurate, the difference in age can be accounted for if Sands was born between the 10th and 20th of June,1827. This would mean that Sands was 14 on the 10th of June, 1841, but would be 17 on the 20th of June 1843 when the second crew list was made. Based on these similarities it can be postulated that James Jones and George Sands were the only crew members from the 1841 voyage to sign up for the second whaling venture in 1843.

Complexion

Complexion, or skin colour, was recorded on the crew lists. There were a variety of responses, including dark, black, light and yellow (Figure17). On the first voyage, nine of the crew identified as having light complexion, with nine identifying as dark and three as black. The second voyage had 11 crew that identified as light, five as dark, six as black and one as yellow. On both voyages, those with a darker complexion outnumbers those with light complexions (Lund and Smith 2018).

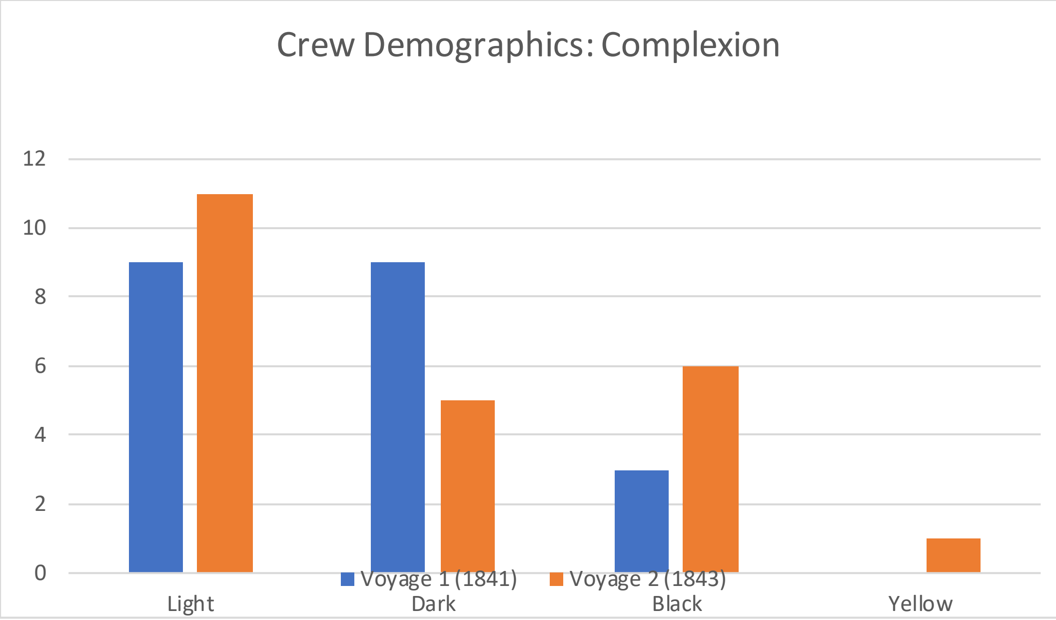


Figure 17: Chart showing the number of crew who identified as a certain complexion, separated by voyage (Lund and Smith 2018).

Cargo

The first voyage began in June of 1841 and returned home in May of 1843. In that time the crew managed to hunt enough whales to fill their ship with 300 barrels of sperm whale oil, 700 barrels of whale oil (Figure 18) and 5000 pounds of whale bone (Lund and Smith 2018:379; Starbuck 1964). Although the official records count the cargo of the second trip as having nothing, Henderson (2007:273) states that at the time of the wrecking event the ship had 10 barrels of whale oil for the year that it spent at sea hunting.

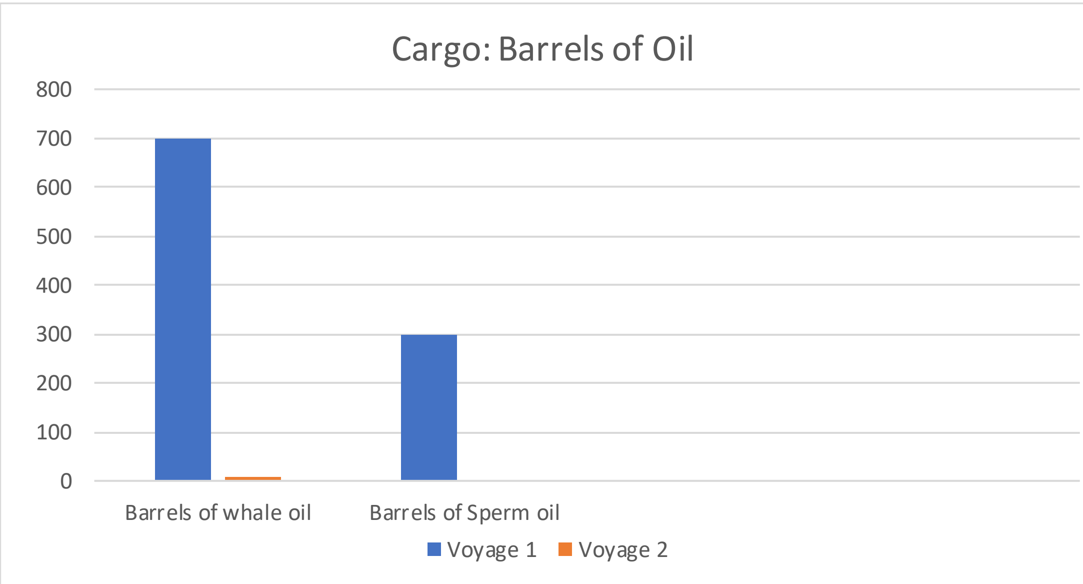


Figure 18: Chart showing the barrels of oil obtained on each voyage (Lund and Smith 2018).

Copper-Alloy Fasteners: XRF Results

Three bolts and three spikes were chosen from the collection for XRF analysis. The individual pieces were chosen from different artefact registration numbers based on lack of fragility, first and foremost, and to reflect the variety of bolts and spikes available. Only one piece was chosen from each registration number.

The Olympus Vanta portable XRF analysed the selected bolts and spikes for all elements. Using this method, it is easy to obtain data that includes partially corroded metal if the area on the spike being analysed was not cleaned enough (Macleod 1987:280). Readings taken that were deemed erroneous were excluded from the data analysis (Appendix four). Copper based alloys, of which all spikes and bolts in the collection were, from historic shipwrecks are known to have similar major and trace components (Macleod 1987:280). The major elements found in historic copper alloys are: copper (Cu), tin (Sn), lead (Pb), and Zinc (zn) (Macleod 1987:280). The trace elements usually found are: iron (Fe), arsenic (As), antimony (Sb), silver (Ag), nickel (Ni), and bismuth (Bi) (Macleod 1987:280). These major and trace elements were the focus when analysing the raw data from the portable XRF. The mean and standard deviation were found for each sample for the nine major and trace components; both rounded to the fourth decimal place.

CV356A: Timber with Copper Bolt

Figure 19: Artefact CV356A (Photograph by Taylor Gray).

Figure 20: Areas one (left) and two (right)before cleaning (Photographs by Taylor Gray).

Figure 21: Areas one (left) and two (right) after cleaning (Photograph by Taylor Gray).

This artefact was a timber piece with a copper bolt running through one end (Figure 19). The bolt was round sectioned with a length of 12.24 in (31.1 cm) and a diameter of 0.67 inches (1.7 cm). Based on the levels of copper in each of the four readings done between the two test areas (Figures 20 and 21) three readings were included. There were no zinc or silver levels detected and iron was present in only one sample (Table 2). With only trace amounts of tin and lead, the bolt is classified as a copper bolt. Impurities to the copper can be introduced from the parent ore or in the foundry through the ladle or crucible (Macleod 1987:281).

Table 2: Average percent of the major and trace elements in CV365A with standard deviation.

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	92.356	0.045	0.092	0.0	0.032	0.341	0032	0.0	0.06	0.0
Standard Deviation	1.2364	0.0058	0.0285	0.0	0.0	0.0213	0.0035	0.0	0.0061	0.0

CV3347: Copper Alloy Spike

CV3347 is a square sectioned copper alloy spike (Figure 22). The length of the spike was 0.21 in (.54 cm) and the head of the nail 4.55 in (11.55 cm). Only two of the six readings from the two cleaned areas (Figure 23) were included in the analysis (Table 3). Issues arose when attempting to completely cover the window of the portable XRF with the cleaned areas on the spike as the spike was quite thin. As a result, many of the readings were erroneous and needed to be left out of calculations. All ten major and trace components were found in this spike. The composition of this copper alloy is classified as a low-leaded tin bronze.

Figure 22: Artefact CV3347 before cleaning (Photograph by Taylor Gray).

Figure 23: Artefact CV3347 after cleaning (left), with close up of cleaned areas (right) (Photograph by Taylor Gray).

Table 3: Average percent of the major and trace elements in CV3347 with standard deviation.

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	66.027	7.49	0.667	5.159	0.055	0.329	0.033	0.083	0.051	0.011
Standard Deviation	2.8535	0.0346	0.0363	0.067	0.0003	0.0061	0.0005	0.01	0.0029	0.0948

CV3355: Copper Bolt

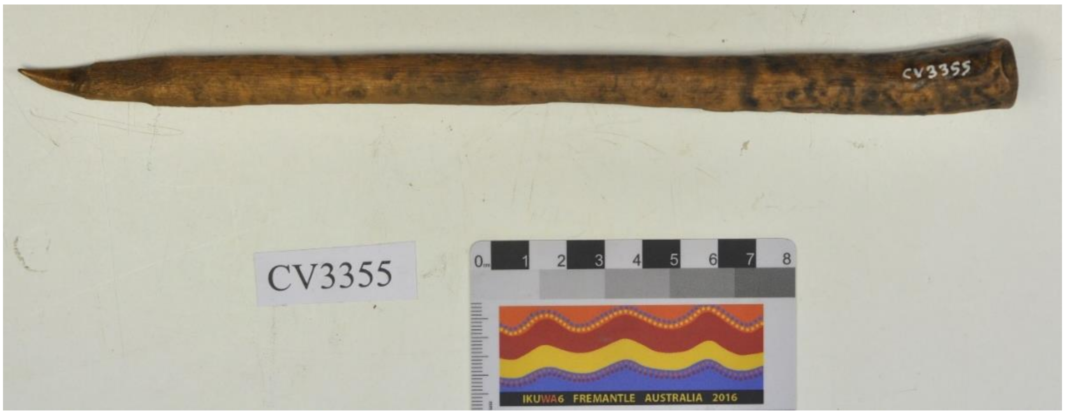


Figure 24: Artefact CV3355 before cleaning (Photograph by Taylor Gray).

Figure 25: First cleaned area (left), with a close up (right) (Photograph by Taylor Gray).

Figure 26: Second cleaned area (left), with close up (right) (Photograph by Taylor Gray).

This artefact is a round sectioned copper bolt (Figure 24). The bolt is heavily eroded, but its' current length is 10.2 in (25.9 cm) and diameter is 0.54 in (1.36 cm). Four readings were taken between two cleaned areas (Figures 25 and 26), three of which were included in the data analysis. All the major and trace components were present except for bismuth, but zinc and iron were only present in one of the samples included and therefore no standard deviation is available (Table 4). Although the major alloying metals are present in the bolt, it is likely that these are due to impurities from either the ore or foundry pick up and would be classed as pure copper as truly pure copper was not available until after the time of *Cervantes* (Macleod 2018).

Table 4: Average percent of the major and trace elements in CV3355 with standard deviation.

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	96.959	0.036	0.164	0.023	0.014	0.16	0.028	0.043	0.009	0.0
Standard Deviation	0.3476	0.0126	0.0259	0.0	0.0	0/0235	0.002	0.0047	0.0006	0.0

CV3363

Figure 27: Photograph of both sides of CV3363 before cleaning (Photograph by Taylor Gray).

Figure 28: Photograph of cleaned area on first side (left), with close up (right) (Photograph by Taylor Gray).

Figure 29: Photograph of second cleaned area (left), with close up (right) (Photograph by Taylor Gray).

This artefact is a square sectioned spike, still attached to a piece of timber (Figure 27). The spike was quite thin and therefore caused problems while taking samples (Figures 28 and 29). Only one of the four readings were able to be used and consequently only represents an imperfect sample (Table 5). No standard deviations were able to be calculated. Despite the limited useable data, the data that is able to be used could be categorized as a heavily leaded zinc bronze. This spike also shows evidence of a corrosion and erosion cycle in a low oxygenated setting. In such circumstances, selective corrosion of the tin rich phases occurs. In flowing seawater that is introduced to more oxygenated seawater the copper rich phases are corroded (Pers. Comm Macleod 2018). The corroded metal is then eroded by the abrasive materials in the moving seawater, exposing the spike further.

Table 5: Average percent of the major and trace elements in CV3363 with standard deviation.

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	72.223	9.666	1.476	4.753	0.035	0.288	0.0	0.098	0.044	0.140
Standard Deviation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CV3364

Figure 30: CV3364 before cleaning (Photograph by Taylor Gray).

Figure 31: After cleaning of area one on CV 3364 (left), with close up (right) (Photograph by Taylor Gray).

Figure 32: Second cleaned area on CV3364 (left), with close up (right) (Photographs by Taylor Gray).

This artefact is a round sectioned copper bolt with a clinch ring attached (Figure 30). The bolt measures 15.8 in (40.2 cm) in length and 0.73 in (1.85 cm) in diameter. The clinch ring was not analysed as it was too thin and would not get a proper reading (Figures 31 and 32). There were no significant levels of zinc, iron or bismuth in this sample. This bolt is classed as an arsenical copper (Table 6). Arsenic was added to copper to harden it and to minimize corrosion. The other elements are found in trace amounts that are consistent with normal impurities.

Table 5: Average percent of the major and trace elements in CV3364 with standard deviation.

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	95.452	0.041	0.16	0.0	0.0	0.285	0.059	0.044	0.011	0.0
Standard Deviation	1.2732	0.0073	0.0277	0.0	0.0	0.025	0.0069	0.0036	0.0019	0.0

CV3365

Figure 33: Photographs of CV3365 before cleaning (Photograph by Taylor Gray).

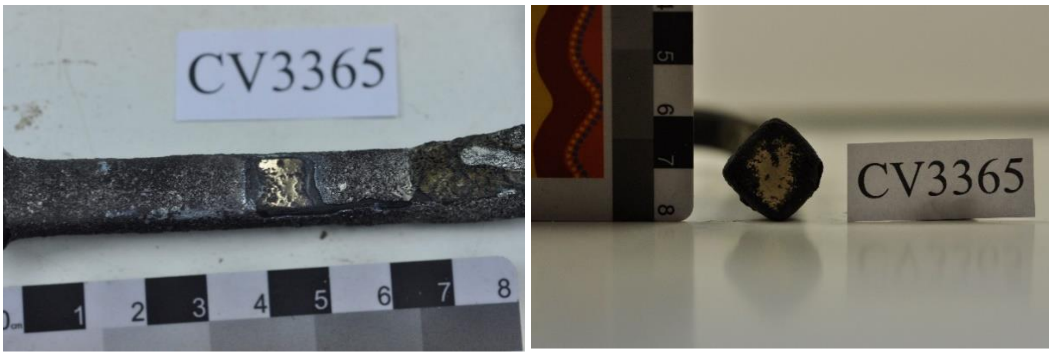


Figure 34: Close up photographs of the cleaned areas (Photography by Taylor Gray).

This artefact is a robust square sectioned spike (Figure 33). the length of this copper alloy spike is 4.6 in (11.78 cm) with a width of 0.46 in (1.18cm). Of the four readings taken from two cleaned areas (Figure 34), two were included in the data analysis. All ten typical elements were found in this spike, with higher levels of copper and tin, as well as significant levels of lead and zinc (table 7). The composition of this metal is classed as a heavily-leaded zinc bronze.

Table 6: Average percent of the major and trace elements in CV3365 with standard deviation

Element	Cu	Sn	Pb	Zn	Fe	As	Sb	Ag	Ni	Bi
Percent	75.445	7.697	1.952	2.964	0.051	0.535	0.043	0.0743	0.065	0.176
Standard Deviation	1.1749	1.244	0.0585	0.5045	0.0044	0.1282	0.0049	0.0193	0.0065	0.0745

Timber Remains: Wood Species Identification

Figure 35: CV534. Pieces chosen for samples outlined in red (Photography by Taylor Gray).

Two samples were taken from the wooden pieces in CV534 (Figure 35). The samples were sent to a wood species identification expert to determine the type of wood used in the construction of *Cervantes* (Appendix Six). As a wood species identification has been provided for a framing timber from previous studies, the two pieces chosen were a treenail and a ceiling plank. The samples were identified based on structure. There can be ambiguity between species in the same genus and therefore in some cases the specific species cannot be identified. In the case of the two samples from *Cervantes* used in this study, neither could be definitively identified on the species level but likely possibilities were noted. Both samples were found to come from a genus that occur in Europe as well as North America.

CV534 Sample One: Treenail

Figure 36: Photograph showing where the sample one cut was made (Photograph by Taylor Gray).

Figure 37: Photography showing close up of cut side of sample one from CV534 (Photograph by Taylor Gray).

A sample was taken from one end of the treenail selected from CV534 (Figure 36 and 37). This sample was sent to Jugo Ilic at 'Know Your Wood'. Based on the structure of the wood it was determined by Ilic that sample one is made from *Quercus alba*, a type of white oak (Appendix six). White oak is a hardwood that is native to North America (Abrams 2003:927). White oak has the largest range of the eastern oaks, covering most of the eastern portion of the United Sates, and was the dominant species in the forests of eastern North America (Abrams 2003:927; Goldblum 2010:73). White oak produces hard, strong, straight grained, durable wood that made it ideal for use in construction, flooring, barrel making and shipbuilding (Abrams 2003:927; Steffy 1994:258)

CV534 Sample Two: Ceiling Plank

Figure 38: Photograph showing where sample two was cut, as well as a piece above that detached in the process of taking the sample (Photograph by Taylor Gray).

Figure 39: Photograph showing a close up of the cut side of sample two (Photograph by Taylor Gray).

A second sample was taken from a ceiling plank selected from CV534 (Figure 38 and 39). Like the treenail, this sample was sent to Jugo Ilic at 'Know Your Wood'. This sample was identified as part of the Spruce genus, *Picea* (Appendix six). Although the specific species cannot be identified in this case based on structure, the likely species is Norway spruce, *Picea abies* (Appendix six). Norway spruce is native to northern and central Europe, but was introduced to North America when Europeans settled in the area (Little 1961:1). Although most notably used for Christmas trees, Norway spruce is often used for timber. Norway spruce has been planted mainly in the north-eastern region of the United States (Little 1961:2).

Chapter Six: Discussion

The purpose of this chapter is to lay out the history of *Cervantes*, from when it was built to the present day, by piecing together the data gathered from historical research, XRF analysis, wood species identification, and research into the town of Cervantes. The history of Cervantes is shown by breaking the timeline down into sections and delving into the important details of each period. By presenting it in such a way, this chapter brings in the maritime cultural landscape approach by giving insight into the context of the ship and the experiences of those who interacted with it, such as the crew and local communities both in the United States and Australia.

October 1836–June 1841

The building of *Cervantes* ended in early October, or just before, 1836 in Bath Maine; it was registered there beginning on 4th October of that year (Anon. 1836; Henderson 2007:273; McAllister 2013:106; McCarthy 2012:106). *Cervantes* was built as a 231 48/95 ton vessel (Anon. 1836). Its length was 91 feet and 9 inches with a breadth of 24 feet 5.5 inches and a depth of 11 feet 8 inches (Anon. 1836). *Cervantes* had one deck and two masts with brig style rigging (Figure 40) (Anon. 1836:273; Henderson 2007). The hull had a square stern and a billet head, a decorative piece that fits onto the bow of the vessel (Anon. 1836). The hull had double planking and was sheathed with Muntz metal (WAM file 409/71). The knees were placed about 18 inches apart and both treenails and copper spikes and bolts were used as fastenings (WAM file 409/71).

The metal fasteners were all copper or copper alloy, which was common at the time and would have been described as pure copper in 1836; truly pure copper wasn't available until well after *Cervantes* was built (pers. Comm. Ian Macleod). Copper can obtain impurities in several different ways. Elements tend to be deposited together and impurities can come from parent ore bodies (pers. Comm. Ian Macleod). Other impurities, such as iron impurities, can be picked up in the foundry from the equipment. A range of metal compositions were used in the production of the fasteners for *Cervantes*. Copper was sometimes laced with arsenic to make arsenical coppers like CV3364. Copper is very ductile and adding arsenic hardens the metal (pers. Comm. Ian Macleod). Adding Zinc to a copper alloy helps to stabilize the tin in the alloy, strengthening the metal (pers. Comm. Ian Macleod).

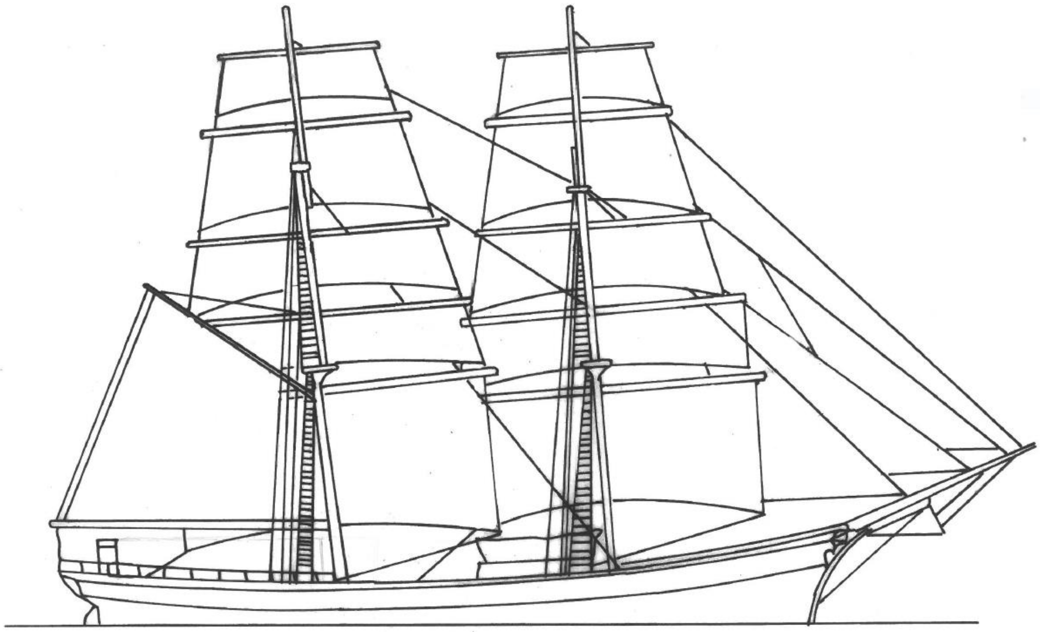


Figure 40: Depiction of what Cervantes likely looked like rigged as a brig (WAM file 409/71).

Three examples from *Cervantes* are CV3347, CV3365, and CV3363, all with relatively similar levels of zinc and tin. So close, in fact, are the composition of CV3347 and CV3365 it could have been made in the same foundry on the same day. The element that sets them apart, however, and indicates that they were not made at the same time is the lead. CV4437 has low lead levels and is a low leaded zinc bronze (pers. Comm. Ian Macleod). CV3365 and CV3363 are heavily leaded zinc bronzes, which makes them self-lubricating metals, as well as very strong fittings (pers. Comm. Ian Macleod). There are also 'pure' copper fastenings with expected levels of impurities from parent ore bodies and foundry pick up, such as CV356A and CV3355 (pers. Comm. Ian Macleod).

Wooden treenails were also used to fasten the ship timbers. The treenails were made of white oak, a wood commonly used in ship building. Although white oak can also be found in Europe, it is far more likely that the wood used originated in North America. This species has made up a large portion of the forests of eastern North America since before Europeans settled in the area (Abrams 2003:927). By the time *Cervantes* was built much of the forests on the east coast had been decimated by logging activities, so it is possible that the wood was sourced from further inland (Ravenswaay 1970:62).

The ceiling planks were made of a type of spruce. Although it cannot be confirmed by structure analysis alone, it is likely that the species of spruce is *Picea abies*, commonly known as Norway spruce. This species of spruce is a soft wood that is native to Europe, and was introduced to Britain in the 1500s (Little 1961:10). This does not necessarily indicate that repairs were made in Europe or that the wood used was imported. As Europeans settled North America they brought with them seeds of popular trees from their home country, Norway spruce being one of those popular trees (Little 1961:2). It is more likely that the ceiling planks were made from the Norway spruce that had been introduced to North American than the material coming from Europe. The framing was constructed using a type of maple; the species of maple used is unknown. The genus of maple, *Acer*, is native to North America, Europe and western Asia (WAM file 409/71).

Although it is not known who built *Cervantes*, its registered owners as of 14th October 1836, just ten days after it was first registered in Bath, were Richard McManus, from Brunswick, Maine, and Frederic Thurston, of New York, New York (Anon. 1836). Six months later, on the 15th of April 1837, McManus and Thurston moved the ship to New York, New York where it was registered at a merchant vessel (Anon. 1837; Holdcamper 1968:116).The ship being registered as a merchant ship and not specifically a whaling vessel gives cause for speculation that it was not intended as a whaling vessel when built and was converted to fit this purpose later on, as often happened (McAllister 2013:6). *Cervantes* stayed in New York for just over four years; no further records of its activities in New York have been found.

June 1841–May 1843

10th June, 1841 *Cervantes* changed ownership. McManus and Thurston sold *Cervantes* to a group of six men: Benjamin Brown, Johnathan Coit, John W. Brown, Benjanim F. Brown, Amos Willetts and Samuel Willetts; all were based in New London, Connecticut except the last two who were from New York (Anon. 1841). The purpose of *Cervantes* under its new owners was to undertake whaling expeditions. The first whaling voyage of *Cervantes* departed on the 12th

of June, 1841 (Lindsey 1843a; Starbuck 1964:379). Before that date, at some point in the six months prior to the departure, the ship was converted from a brig to a barque with three masts (Starbuck 1964:379). This rigging set up means that the main and fore masts were square rigged with the mizzen mast rigged fore and aft. This change was often made to smaller ships being converted to whalers as it was found that a bark could be more easily controlled than a brig by a small crew.

Benjamin Brown, one of the six owners of the vessel, was also the captain on the 1841 voyage (Lund and Smith 2018). Brown, aged 29 years, was in charge of 20 crew members, youngest being two 13 year olds from the United States, the oldest a 40 year old American man (Lund and Smith 2018). Two thirds of the crew were from the United States, with the remaining third coming from England, Portugal, and Brazil; most coming from the Western Islands (Lund and Smith 2018). The majority of the crew identified as black or dark; a fact that seems to indicate a difference of opinion compared to the prevailing attitudes towards those who were not light skinned in the United States, where slavery was legal until 1865 (Vorenberg 2004:1). The crew would have been made up of mostly unskilled laborers. On the crew would also be those skilled and experienced sailors and harpooners, as well as coopers and cooks. Most of the crew had been residing in New London, Connecticut, or in a neighbouring state (Lund and Smith 2018). There are five names on the crew list that have been crossed out from those intending to join, but deciding otherwise, for unknown reasons. On the 12th of June 1841 *Cervantes* and the 21 crew departed for a two-year voyage in the South Seas from New London, Connecticut (Lindsey 1843a).

Henry Lindsey began publishing The Whaleman's Shipping List and Merchant Transcripts on the 17th of March 1843, three months before the end of the 1841 whaling voyage (Lindsey 1843a). In that first issue it was printed that *Cervantes* had given word on the 19th of February, 1842 that the ship was in the Indian Ocean and had so far collected 120 barrels of Sperm oil and 50 barrels of whale oil (Figure 41) (Lindsey 1843a). The next communication, dated to the 10th of July 1842, did not include a location, only that they had obtained 350 more barrels of whale oil (Lindsey 1843b). Four months later the ship had made its way to New Holland and on the 25th of November 1842 reported to be off of Cape Leeuwin with 120 barrels of sperm oil and 500 barrels of whale oil (Lindsey 1843c). The last update published in The Whalemen's Shipping List from the journey was from the 24th of March 1843 when the ship had sailed from Saint Helena with 800 barrels of oil total (Lindsey 1843d).

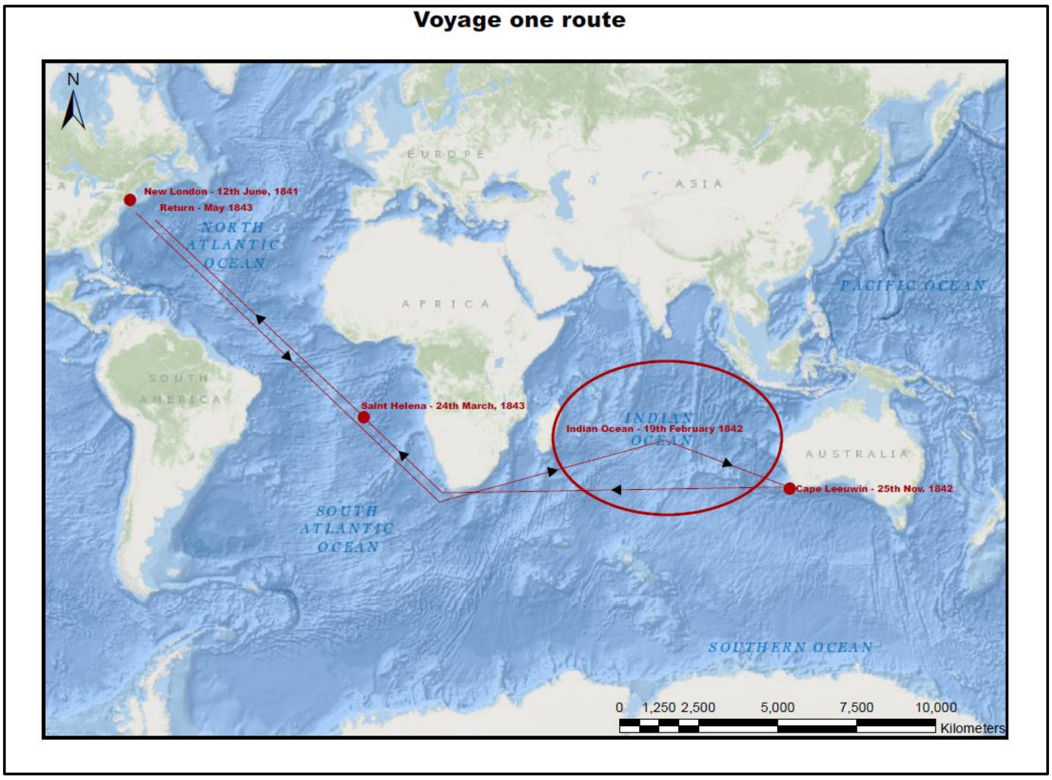


Figure 38: Map showing know locations and dates from Cervantes' first whaling voyage based on publications from Henry Lindsey. (Map produced by Taylor Gray using ArcGIS).

In May of 1843, after two years of living the hard, and often dangerous, life of a whaler, *Cervantes* returned to New London. The hunt had been successful, bringing in 5000 pounds of whale bone, 700 barrels of whale oil and 300 barrels of sperm whale oil (Starbuck 1964:379). Prices around that time, based on contemporary recorded sales of whaleship cargo, put whale oil at $10.70 a barrel, sperm whale oil at about $29 a barrel and whale bone around $0.20 a pound (Starbuck 1964:146). Using these numbers, the whale bone would have brought in $1,000; the whale oil would have sold for $7,490; the sperm whale oil for $8,700. In total this would bring the price of the entire cargo to $17,190. This trip would have been considered mildly successful, and based on the size of cargo brought in by other whaling ships with similar tonnage, would not have been a full cargo (Starbuck 1964).

May 1843–June 1844

After returning from the first trip in May of 1843 the ship was quickly refitted for another voyage. All the whaling gear, including whaleboats and tryworks setup, made of brick (Figure 42), were replaced (Anon. 1844h, 1844m). Ownership changed slightly on the 20th of June 1843, with John W. Brown and Benjamin F. Brown leaving the group and Sylvanus Gibson and Nathan Belden, both of New London, joining (Anon. 1843).

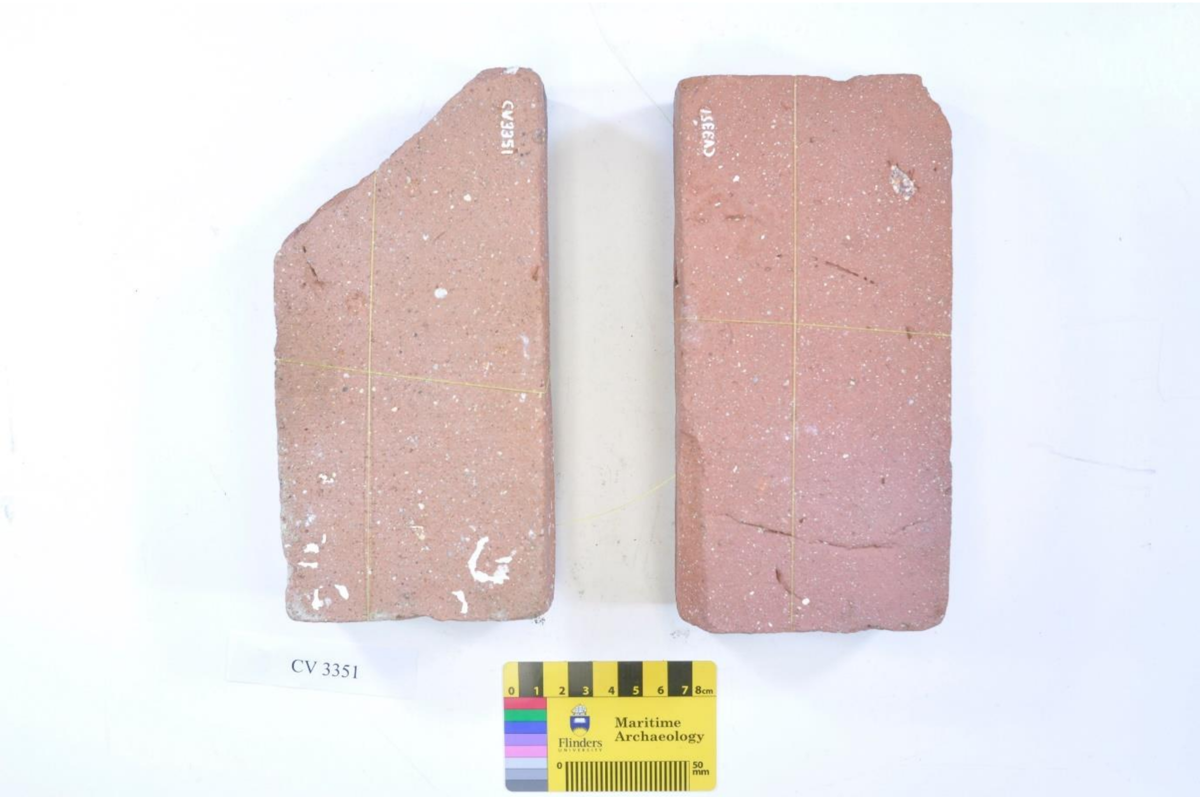


Figure 39: CV3351: Tryworks bricks recovered from the Cervantes *site (Photograph by Taylor Gray)*

This change in ownership came three days before the departure for the second whaling voyage on 23rd of June, 1843. Benjamin Brown was no longer the captain of the ship despite still owning shares; instead another partial owned, Sylvanus Gibson, took over the role of captain (Lund and Smith 2018). Gibson, age 36, was in charge of 22 crew ranging in age from 15 to 49 (Lund and Smith 2018). The vast majority of the crew were born in the United States, with only three crew members coming from foreign countries; these being England, Portugal and the Philippines (Lund and Smith 2018). It is likely that two crew members from the first whaling voyage signed up to be on the crew for the second. James Jones from Worchester, England, now living in New London, was 23 at the time of the first trip in 1841 and was 25 when he signed up for the second journey (Lund and Smith 2018). George Sands from Connecticut was 14 at the beginning of the first voyage and had just turned 17 before he set off on the second trip (Lund and Smith 2018).

The destination for the second voyage was the south Atlantic (Figure 43) (Lindsey 1843b; Lund and Smith 2018). Three weeks later, on the 14th of July 1843, the crew of *Cervantes* made contact from Flores in Indonesia (Lindsey 1843b). Along with their location they gave word that, as of yet, the voyage was 'clean', meaning they had caught no whales (Lindsey 1843b). The ship would not send word again until the 1st of November; they were still clean and had just sailed from the Crozet Islands in the southern Indian Ocean (Lindsey 1844). Five months later, in April 1844, they sent word one more time. No location was included, only that they had caught 5 whales (Lindsey 1845).

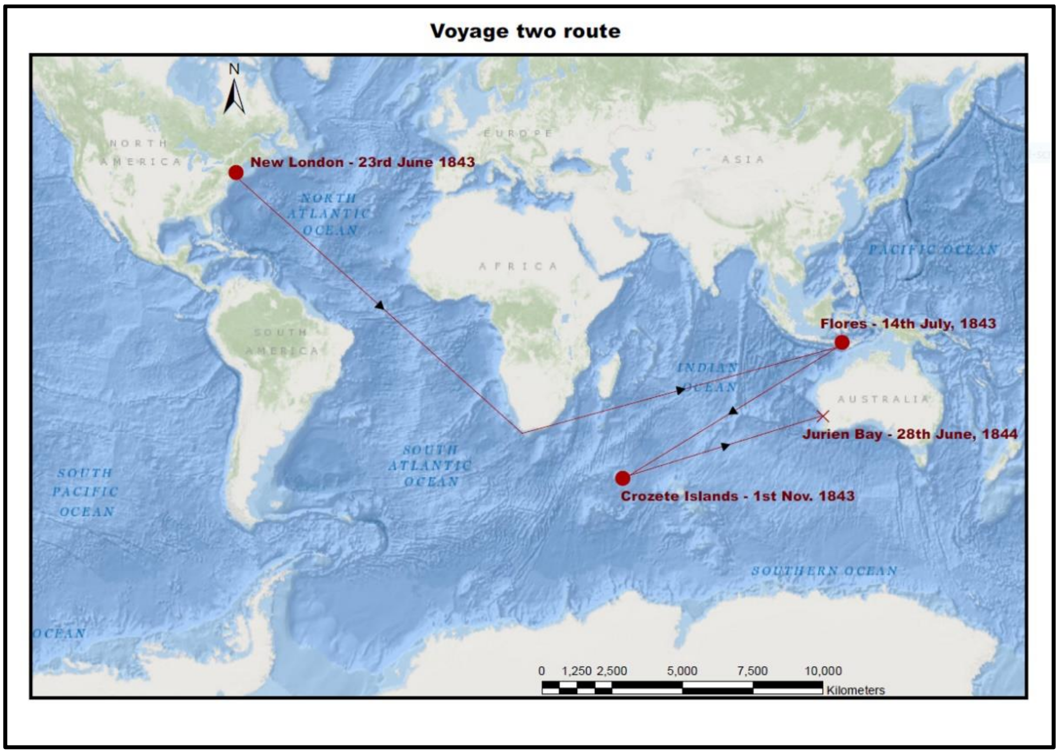


Figure 40: Map showing know locations and dates from Cervantes' second whaling voyage based on publications from Henry Lindsey. (Map produced by Taylor Gray using ArcGIS).

This voyage was quite unsuccessful in terms of capturing whales. In the time they were at sea, from the end of June 1843 to June 1844, only enough whales were caught, killed and processed to fill 10 barrels of oil (Anon. 1844h). At this point in the journey the previous whaling crew of the 1841 voyage had already captured enough whales to fill 400 barrels of whale oil and 120 barrels of sperm whale oil.

At some point in the few times that *Cervantes* crossed the Indian Ocean near northern Australia, it is likely that they spent some time there or traded with someone from that area. Among the artefacts recovered from the shipwreck were northwest pearl shells (Figure 44) (Henderson 2007:275; McCarthy 1989:165). Pearl shells that contain mother of pearl, a thick durable lustrous layer, can be found in north western Australian waters, specifically the Nickol Bay and Broome regions (McCarthy 1989:151).

Figure 44: CV3357: example of northwest pearl shell recovered from Cervantes

Mother of pearl was used for decoration in the nineteenth century, and was seen in cutlery handles, ashtrays, fans and buttons (Jordan 2015; McCarthy 1989:151). The presence of pearl shell on the ship indicates either trade with someone who has contact with the northwest region of Australia, or a visit there themselves. As the market for pearl shell was already established, it is quite possible that the shell was collected in the hopes to eventually create a profitable enterprise. It is also possible that it was collected for personal use. Without some documentation mentioning the shell and its intended use its purpose will remain unknown. It should be noted, however, that had *Cervantes* made it back to New London with the pearl shell it is possible that the dramatic growth of the pearling industry in Western Australia could have begun sooner than the late 1960s (Jordan 2015:8; McCarthy 1989:165). By the end of June 1844, *Cervantes* had found itself about 16 miles offshore from a sheltered bay on the west coast of New Holland, now Western Australia (Anon. 1844f, 1844g).

Wrecking Event and Aftermath

On the 28th of June, 1844 *Cervantes* was outside Jurien Bay, off the coast of Western Australia about 16 miles, when some inclement weather picked up (Anon. 1844j, 1844i, 1845c, 1845e, 1845f, 1845g, 1845h). Gibson directed the vessel into an area sheltered by a few small islands (Anon. 1845c, 1845e, 1845f, 1845g, 1845h). In the morning, on the 29th of June, the weather had cleared up and *Cervantes* began to move on as the wind picked up once more (Anon. 1844h, 1844i, 1844k, 1844l, 1845c, 1845e, 1845f, 1845g, 1845h). Before the crew was able to take precautionary measures, the ship was struck against rocks and was run aground on a shallow sand bar (Anon. 1844h, 1844i, 1844k, 1844l, 1845c, 1845e, 1845f, 1845g, 1845h). The sandbar was located between the northern of two main islands and outcropping now called Thirsty Point, on the inside of a reef system (Carpenter 2012). There are some discrepancies with the precise date of the wreck, with some newspaper articles, and authors citing those newspaper articles, stating that the event happened on the 20th of June 1844 and the United States National Archives stating the 29th of June (Anon. 1841). The date, as typed in the newspaper article, is not fully clear, and comparing it to the numbers nine and zero in the text of the same article lends some doubt to the situation. This doubt is cleared up, however, as contemporary news articles have first-hand accounts from the crew of the boat still being afloat on the 28th of June (Anon. 1845c, 1845e, 1845f, 1845g, 1845h).

The following morning, the 30th of June 1844, all crew members were able to leave the ship and make it to shore (Anon. 1845c, 1845e, 1845f, 1845g, 1845h). As the location was quite remote, it was decided that the crew would make their way to Fremantle, which was about 100 miles south of the location of the shipwreck (Anon. 1844h, 1844i, 1844k, 1844l, 1845c, 1845e, 1845f, 1845h). A rumour that has manifested in the current Cervantes community about the journey from the ship to Fremantle is that when the crew left, among the items they took with them was a cask of rum (WAM file 409/71). Upon stopping for the first night the crew realized that they would not be able to carry the rum with them without considerable struggle and so decided to finish off the cask that night. The next morning the group woke having hangovers and the bay was then called Hangover Bay (WAM file 409/71). Six of the 23 men, after walking a while, decided that they would have an easier time reaching Fremantle by boat, and turned back to the ship to retrieve one of the whaleboats; whether this was before or after the rumoured stop in Hangover Bay is unknown. On the 6th of July three men reached Fremantle, exhausted, and gave word of the ships wrecking (Anon. 1845c, 1845e, 1845f, 1845g, 1845h). Three days later Gibson arrived with the rest of the crew, save the six who thought to try their luck in boats and one who could not continue any further due to hunger and exhaustion, and was left about 30 miles north of the Moore River, about a third of the way through the entire trip (Anon. 1845c, 1845e, 1845f, 1845g, 1845h). Gibson asked the government for assistance in sending a boat, *Champion*, back to the wreck to gather up the captain and crews' belongings and to search for the missing crew members (Anon. 1844h, 1844i, 1844k, 1844l). The crew members in Fremantle were taken care of by the resident magistrate, R. M. B. Brown (Anon. 1844h). When the man who was left north of the Moore River, due to the inability to continue, was found he was already dead and eaten by wild dogs (Anon. 1845c, 1845e, 1845f, 1845g, 1845h). This man was the only casualty associated with the disaster.

As the location of the ship was remote and far from Fremantle, the only place where repairs could be done, Gibson decided to put the wreck up for auction. Gibson explained that the ship had merely 'broken its back', but would still be in good condition for a while; he also pointed out that the area in which the ship wrecked was abundant with seals (Anon. 1844e, 1844h, 1844i, 1844k, 1844l). Messers L. and W. Sampson, who owned an auction house in Fremantle, would conduct the auction on the 16th of July 1844 (Anon. 1844a, 1844b, 1844d, 1844e, 1844j, 1844i). The event was advertised in several different newspapers but was not expected to make much money (Anon. 1844h, 1844j, 1844i, 1844k, 1844l). The ship was to be sold in two lots: the chronometer on its own as the first and the ship, as it stands with all contents besides the crews' personal belongings, as the second (Anon. 1844a, 1844b, 1844d, 1844e, 1844j, 1844i). The fact that the whaling gear had been refitted before this journey and that they had not used it much, as evidenced in the lack of oil, was publicised as a way to bring in more interest (Anon. 1844b, 1844d). It was suggested that the ship and gear could be used to start up a whaling and sealing venture near where the wreck occured and this seemed to be the intent of the man who purchased it (Anon. 1844e, 1844h, 1844j, 1844i, 1844k, 1844l). Mr Wicksteed bought the hull and its contents for £155 (Anon. 1844a, 1844e, 1844j, 1844i). It was speculated in one report of the auction that Wicksteed was not the actual buyer after suspicions arose when he paid the down payment of 20 sovereigns, and the next day paid the rest with notes and sovereigns, which was considered unusual at the time (Anon. 1844a, 1844e). The chronometer was sold for £23, showing how valuable the piece of equipment was as it went for almost one seventh of the price of an entire ship, its gear and stores (Anon. 1844a, 1844e, 1844j, 1844i).

Shortly after Wicksteed bought the wreck he sent a team to investigate and begin recovery (Anon. 1844e, 1844j, 1844i). They found the wreck as described by the crew (Anon. 1844e). Their return was reported in the *Perth Gazette* on the 10th of August 1844, explaining that they had already recovered cables, anchors, a boat and some provisions and by their description Mr Wicksteed stood to gain more than triple the amount he paid at the auction (Anon. 1844e). Unfortunately for Wicksteed, *Cervantes* had suffered a broken keel and could not be refloated. Despite intentions of starting a whaling venture near the wreck site, no evidence of the equipment being used for such an undertaking has been found. The hull, after being stripped of anything worthwhile, was left in the shallow water to degrade.

On the 22nd of July Gibson put an ad in the *Inquirer*, a newspaper based in Perth, extending thanks from himself and his crew for the kindness that was shown to them by the government and various individuals after the ship had wrecked (Anon. 1844c). The loss of the ship was published in several newspapers throughout Australia, often in conjunction with the ship *Halcyon*—another American whaler lost on the coast of Western Australia— although some newspapers misspelled the second ship's name by dropping the 'H' (Anon. 1844f, 1844g, 1845c, 1845d, 1845b, 1845a, 1845e, 1845f, 1845h; Bateson 1972).

Between the Wrecking Event and the Town

The ship, stripped of anything thought to be worthwhile settled into the shallow water in between the reef and the shore (Figure 45). The water depth in that location is typically around two meters deep (Carpenter 2012:5). As the ship deteriorated the shifting sediments would have abraded, covered and uncovered parts of the wreck. The west coast of Australia goes through cycles of sand deposition and removal seasonally between winter and summer (Carpenter 2012:1). Intense storms and rough sea conditions are also likely to move sediment (Carpenter 2012:4). The sediment is made up of fine white sand that covers a limestone substrate (Carpenter 2012:3).

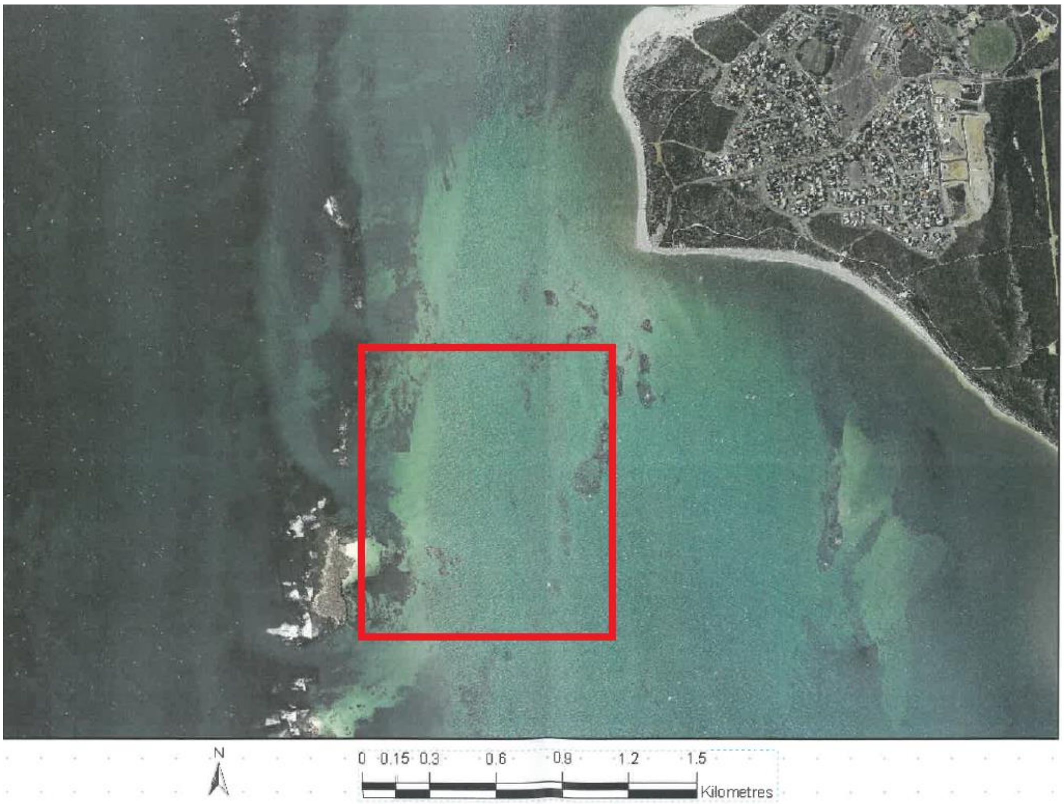


Figure 41: Photograph of location of Cervantes. The area containing the site is outlined in red and intentionally left vague to protect exact site location. Photograph modified by Taylor Gray from WAM archive (WAM file 409/71).

Copper alloy bolts that protruded from the sediment showed signs of a pattern of abrasion caused by floating sediment moving with tides and currents, then corrosion from contact with the seawater, then abrasion again (Carpenter 2012:11). The site is protected by the limestone reef that partially encloses the bay

(Carpenter 2012:3). Sea grass and algae form patches sporadically throughout the area (Carpenter 2012:3).

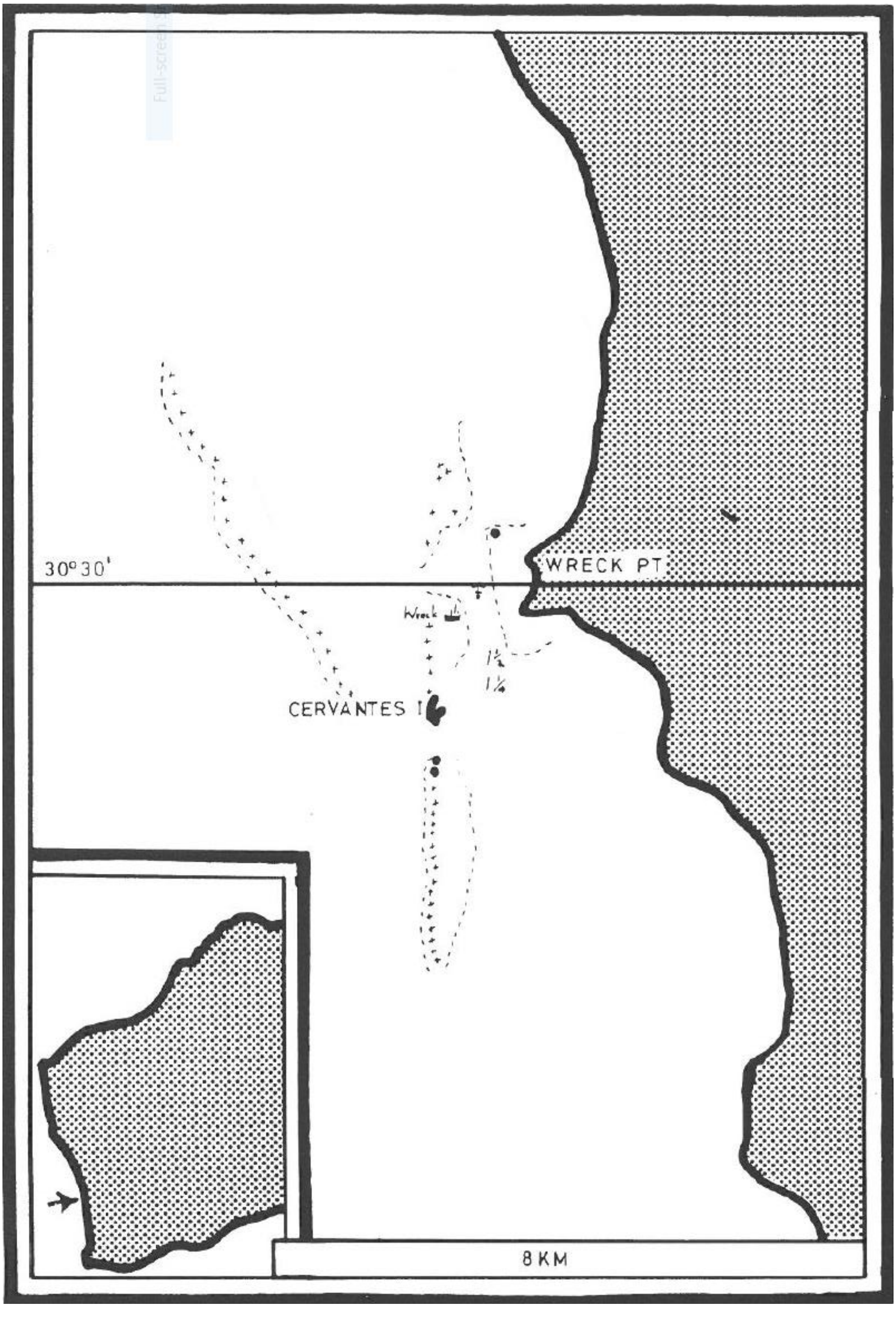


Figure 42: Map showing location of Cervantes islands and wreck site from J. W. Gregory's 1844 survey (WAM file 409/71).

The covering and uncovering of the ship by sediment allowed for another marine living organism to affect the site. During parts of the year the water temperature is within the range that allowed for shipworm to thrive (info 2018). Having a covering of sediment creates an oxygen deficient environment which stops bacteria and shipworm from destroying shipwrecks. Being uncovered fairly regularly allowed the shipworm to infest the timbers of the ship, leavings hollow tracks and wood with compromised structure (Carpenter 2012:5). Remains of the hull were still visible above water in 1947, when J. W. Gregory surveyed the west coast (Figure 46). He never explicitly stated the name of the ship he saw, though it must have been known as it was on this survey that the islands off the coast, which *Cervantes* used for shelter, were named after the ship that ran aground there (Henderson 2007:275; Passfield 2013:17).

The Development of a Town

In 1962 a 505-hectare section of Nambung National park, which is situated on the west coast of Australia, was marked out for the purpose of a new town (WAM file 409/71). Gazetted the following year in 1963 the town took its name from the nearby islands, Cervantes (Passfield 2013:17). This area was already used for fishing and fishing shacks dotted the coast (Passfield 2013:17; WAM file 409/71). It seems to be the case that it was always known that there was a shipwreck in the area, but not much interest surrounded it as it had nothing of value on the site (WAM file 409/71).

Two years after the town was gazetted a 14-year-old local boy named Laurie Walsh was out in a dinghy, chasing a turtle (Henderson 2007:275; McCarthy 2012:107; WAM file 409/71). This chase took him to the north of the Cervantes islands where he saw the outline of *Cervantes* in the shallow water. Walsh and his father then got in touch with the Western Australian Museum to inform them that the location of a shipwreck had been found (WAM file 409/71). In some cases, a small reward is offered when a shipwreck is located, however because this shipwreck was essentially common knowledge no reward was given (WAM file 409/71).

The museum, after being informed of the location, sent out a team to undertake investigations into the site in 1970, and again in 1988 (Henderson 2007). Graham Henderson, then a graduate assistant at the museum, was able to identify the ship as *Cervantes* due to the type of artefacts found and historical research paired with Gregory's survey map (Henderson 2007:275). The excavation in 1988 also showed the effects of the mobile sand that covers the area as the site shrank by about 90 feet since the first investigation in 1970 (Henderson 2007:275; McAllister 2013:16). The site was recorded using hand drawn site plans as well as photomosaic and several artefacts were recovered (Carpenter 2012; WAM file 409/71). On the 5th of February, 1971 *Cervantes* was entrusted to the Western Australian Museum on behalf of the government under the Museum Act of 1969 (WAM file 409/71). Further investigations took place in 2004 and a conservation survey in 2012 when several samples and artefacts were raised (Carpenter 2012). The site continues to change and timbers can be seen slowly moving away from the main site (Figure 47).

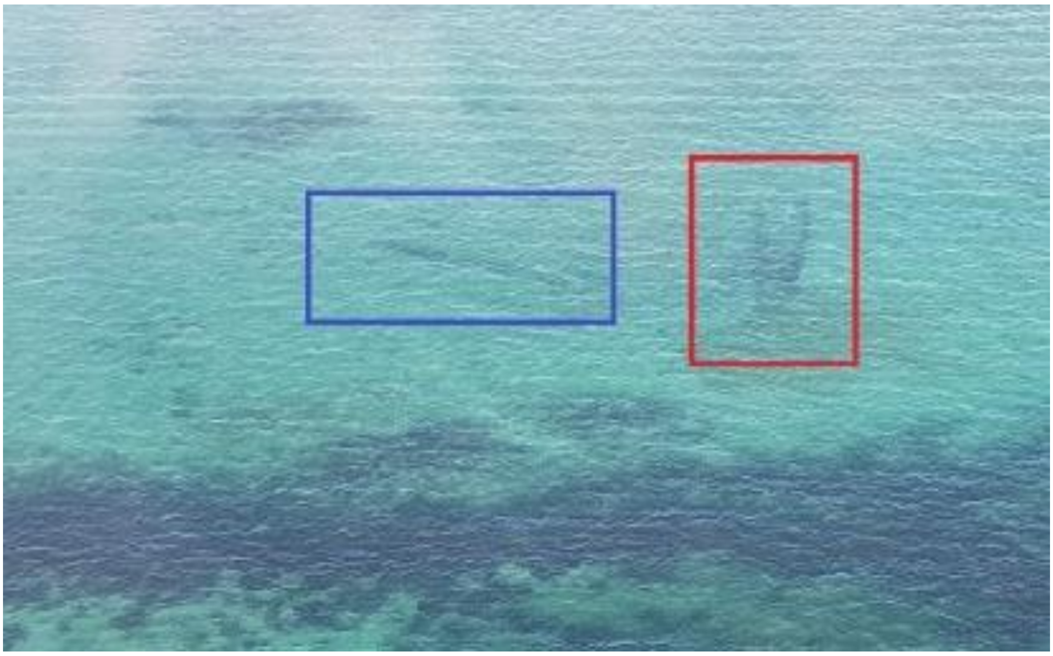


Figure 43: Photograph taken in 2018 showing a large piece of timber (blue) moving away from the main site (red) (Photograph taken by Taylor Gray)

Current Connections

The town of Cervantes is relatively young, only being gazetted in 1963, 119 years after the wreck of the ship *Cervantes* (Landgate 2018). There are still locals who are active in the community who were in the area before it became an official town, when it was used only as a base for fishermen and their families. These residents testify to the fact that the area has always been known as the Cervantes area, and there has always been a general knowledge of the existence of the shipwreck (WAM file 409/71). As Cervantes grew from fishing shacks into a town the issue of naming streets arose. Several of the streets were named using the names of important or prominent people and families (Passfield 2013:121). For the rest of the streets the town looked to its namesake. This was problematic, however, as it had been thought that the islands were named by a French expedition in 1801 after the Spanish author Miguel Cervantes, the creator of the famous man of La Mancha: *Don Quixote* (Landgate 2018; Passfield 2013:122). Due to this mix up, it was suggested that the streets be named after places mentioned in the seventeenth century literary work (Passfield 2013:122; WAM file 409/71).

A few years ago, the sediment shifted enough to expose a portion of the site; word quickly spread amongst local divers and it became a relatively popular dive site for a time (WAM file 409/71). One diver suspects that several large, one-meter long copper keel bolts were taken from the site when it was uncovered (WAM file 409/71). The conservation report written in 2012 corroborates the fact that there were once large bolts and now there are not, however the conservators did not notice any signs that indicated salvage (Carpenter 2012). It was conceded in the report though, that deterioration could have masked such signs (Carpenter 2012).

The connection between the town and the ship is no secret. The origin of the towns name is explained on most information packets at the local accommodation, and on business websites. All contain basic information about the ship and how it wrecked. The Cervantes Historical Society has more in-depth details of the vessels history that is displayed in their pop-up museum. The wreck site location is known to the locals but is not openly advertised to visitors.

Figure 44: Examples of connections between the town of Cervantes and Don Quixote. (top left) Door to the Don Quixote restaurant at the Lobster Lodge in Cervantes. (top right) Wind vane depicting Don Quixote, Sancho and a rendition of the ship Cervantes. (bottom) Don Quixote themed decoration at the Lobster Lodge. (Photograph by Taylor Gray)

Although the connection to the whaling ship is well known, it seems to have been taken a bit further. As was previously stated, when choosing road names, it was thought that the islands were named after the Spanish author and the road names reflect that. The Miguel Cervantes theme has continued throughout the town, with Don Quixote specifically. Features such as a Don Quixote wind vane, restaurants named after Don Quixote with Don Quixote doors and other various Don Quixote decorations (Figure 48). Some locals also feel a particular kinship with the fictional character and feel it fits well with living in the town (WAM file 409/71).

Chapter Seven: Conclusion

Research Questions Revisited

Before determining the answer to the main research question, the aims will be addressed. The accomplishment of each aim will be described in detail before using the information gathered while completing these aims to look at the implications of the main research question.

Aims

- *Determine the composition and origin of materials used in the construction and possible repairs of the vessel.*
    - The ship was made of wood and fastened with both wood and metal fastenings. The metal fastenings were spikes and bolts, made out of copper and copper alloys. Besides the pure copper, or what was considered as close to pure as possible at the time, there was also low leaded tin bronze, heavily leaded zinc bronze, and arsenical copper.

      The wooden treenails were made from white oak, the ceiling planks from spruce and the framing timbers from maple. These three types of wood can be found in North America as well as in Europe (Little 1961:10) Although likely from North America, the exact origin of the wood cannot be confirmed and, therefore, it cannot be said with any degree of certainty that the wood samples came from repairs made to the vessel.
- *Establish a vessel history including crew, cargo, and locations visited*
    - The history of *Cervantes*, from when it was built in 1836 to when it was abandoned in 1844, has been laid out in detail in chapter six of this thesis. The crew ranged in age from 13 to 49 years old (Lund and Smith 2018). Most of the crew was born in the United States, with the remainder coming from Portugal, England, the Philippines and Brazil (Lund and Smith 2018). The first whaling voyage made around $17,000 for its cargo of whale bone, whale oil and sperm oil. The second voyage supposedly had only ten barrels of oil when the ship was lost (Anon. 1844h; Henderson 2007:273). The whaling voyages mainly stayed in the southern Atlantic Ocean and

the Indian Ocean, based on the reports given by the crew to the newspapers (Lindsey 1843b, 1843a, 1843c, 1844, 1845).

- *Establish a timeline of the town Cervantes*
    - Cervantes was surveyed in 1962 and gazetted in 1963 (Passfield 2013:117). The town was named after the islands just off shore of the site, thought to have been named in 1801 after the Spanish author but actually named after the shipwreck by J.W. Gregory in 1847. The area transitioned from squatters' shacks to a town to support the cray fishing industry. Presently the main industries of Cervantes are cray fishing and tourism. Tourists visit Cervantes when coming to see the pinnacles of Nambung National Park and often use Cervantes as a base of operations and visit the various sites around the town.
- *Record the connections between the town and the wreck it was named after*
    - As previously mentioned, it was believed at the time that the town was named that the islands off shore were named after Miguel Cervantes by the Bodouin expedition of 1801 (Landgate 2018:122; Passfield 2013). The islands were in fact named after the wrecked whaling ship in 1847 by J.W. Gregory (Henderson 2007; Passfield 2013:275). It is now known that the whaling vessel is the islands true namesake, but the connections often continue on to the ships namesake, and the false namesake of the islands: Miguel Cervantes. References to Miguel Cervantes' seminal work Don Quixote can be seen throughout the town. The connection with the ship is advertised locally; most welcome information papers have a small section explaining where the town got its name and basic details about when and how the ship wrecked. The Cervantes Historical Society has photographs and information on the ship for visitors to educate themselves.
- *Establish the influence of foreign whaleships on the local economy*
    - The importance of whaling to the early Australian, especially Western Australian, colonies is often understated. When it comes

to the economy of Australia in the nineteenth century, the focus tends to be on wool and livestock, when whale oil was the country's first true export (Blainey 1966:115). American whalers, and other foreign ships as well, frequented the fishing ground surrounding Australia. There were mixed feelings about these foreign ships at the time. Some saw their presence as competition; taking away resources that rightfully belonged to England (McAllister 2013:34). The foreign whaleships however, also brought with them a chance to trade when little help was offered elsewhere (McAllister 2013:33). The whaling ships were also able to inject highly sought-after whaling gear and equipment into the Australian whaling industry. A vessel could sell off unwanted gear at the end of a voyage or if a ship wrecked along the coast its hull and contents were often auctioned off (McAllister 2013:33). These auctions could be very lucrative for the buyers, who may sell the items again for profit, or use the gear to set up a new whaling station. It was suggested, for example, that Mr Wicksteed would triple the cost of buying *Cervantes* based on the value of the stores onboard (Anon. 1844e).

- *Determine the fate of items salvaged and auctioned after the wrecking event.*
    - The ship and all its stores were sold at Auction by Messers L. and W. Sampson from Fremantle; the chronometer was sold as a separate lot in the same auction (Anon. 1844a, 1844b, 1844d, 1844e, 1844i, 1844j). All the bedding and personal effects of the crew were returned to them. A Mr Wicksteed purchased the ship and its stores for £155. It seemed to be the intent of the buyer to start up a new shore based whaling station at the location of the *Cervantes* wreck site. There is no evidence that this ever happened and no further evidence of what happened to the rest of the stores from the ship. The hull could not be floated and was left where it lay. The chronometer was sold for £23. The identity of the buyer and details about what happened to the chronometer is as of yet unknown.

Main Research Question

- How did the nineteenth century American whaler *Cervantes* influence local and regional communities of Western Australia, past and present?
    - Although not tied to any major historical event, *Cervantes* had its own small part to play in the nineteenth century. Originally registered as a merchant ship, in 1841 *Cervantes* joined an industry that would become one of the most important parts of the economy at the time. The activities of *Cervantes* and other whaling ships of the era decimated the whale populations to an extent from which they are yet to recover; all the while producing products that fuelled the economy and drove exploration.

      The importance of wrecked vessels such as *Cervantes* can be seen in the varied mentions in newspapers. The news of the ship wrecking was not only published in Perth and Fremantle, but in cities like Sydney and Hobart as well, making it a nationwide event. When looking at the obstacles that prospective Australian whalers needed to overcome when it came to obtaining gear and other necessities, the importance of wrecked foreign whale ships becomes understandable. Sold at auction, these vessels could become very profitable for the buyer; such as Mr Wicksteed, who is thought to have tripled what he paid at auction upon retrieving his lot. As Wicksteed did not set up a whaling station near the wreck site, it is probable that he either sold the gear, or put it to use at a whaling station elsewhere. With either option, the equipment salvaged from *Cervantes* is likely to have made its way into the stores of a Western Australian whaling operation.

      More recently, *Cervantes* has influenced the creation of a town. Being a naturally desirable place for cray fish, a town was needed to support the burgeoning cray fishing industry. The town name was taken from the islands named after the American whaler, and it has always been known that the ship was nearby. Although it is not a large tourist attraction and its exact location is not openly advertised to visitors, it still becomes a popular dive site with locals when it becomes uncovered.

Recommendations

Cervantes *Conservation*

It is evidenced from the inspection reports that the sands are very mobile in the area where *Cervantes* wrecked (Carpenter 2012). Mobile sands in the area means that *Cervantes* will continue to be uncovered and recovered; exposing it to the elements which will increase the rate at which the site degrades. As seen in a multitude of cases where in situ conservation methods have been applied, covering what is left of the wreck would be a cost-effective way to aid in the preservation of the site for future study. As the site is in quite shallow water as well as being near a high traffic area for commercial fishing boats consideration of the impact of the conservation methods would be essential. Sand bags and artificial sea grass would be efficient and cost-effective in situ conservation methods and are both proven to be effective ways to trap sediment and cover the site (Manders 2008:187). Long term monitoring of the site would be necessary to ensure continued effectiveness of the conservation methods.

Cervantes *Research*

There is still much research to be done into *Cervantes.* Further XRF analysis into the spikes and bolts in the collection would be useful in the future study of materials used in construction of the vessel. The reasoning behind the pearl shells on board is still unknown and could be significant to the study of the pearling industry of north west Australia. Further research into the early days of the career of *Cervantes* would fill gaps in the vessel history, but would require in depth research at museums and archives on the east coast of the United States; an endeavour that was not possible for this project.

Public Awareness

There is a level of public awareness about *Cervantes* and its connection to the town that shares its name. Most visitor services, such as accommodation and food, have information available on the ship and what happened to it. With all the Don Quixote references, however, the meaning of the town name can become muddled. An interpretive sign in a high traffic area that explains the ship, how it wrecked and its connection to the area would go a long way in raising awareness about the historical site nearby.

Future Study of Early Whalers in Australia

Whaling is a fairly overlooked subject when it comes to early Australian history. As briefly shown in this thesis, whaling was a vital part of the economy and even survival of the early colonies, particularly in Western Australia. Although more scholars are publishing on the subject, more research needs to be done into this area of study to bring awareness to whaling as an important part of the nation's past.

References

Abrams, M.D. 2003 Where has all the white oak gone? *BioScience* 53(10):927–939.
Anderson, R. 2016a Beneath the colonial gaze: modelling maritime society and cross-cultural contact on Australia's Southern Ocean frontier - the Archipeligo of Recherche, Western Australia. Unpublished PhD thesis, school of social sciences, University of Western Australia,
Anderson, R. 2016b Searching for Samuel Wright: an American whaleship far from home. *Signals* 115(Jun–Aug):38–43.
Anderson, R. and M. McAllister 2012 *Koombana Bay foreshore maritime archaeological survey and excavations 21–28 November 2011*. Report no. 286, Western Australian Museum.
Anon. 1836 *Certificate of registry*. Washington, D.C.: National archives and records service. 41.
Anon. 1837 *Certificate of registry*. Washington, D.C.: National archives and records service. 41.
Anon. 1841 *Certificate of registry*. Washington, D.C.: National archives and records service. 41.
Anon. 1843 *Certificate of registry*. Washignton, D.C. : National archives and records service. 41.
Anon. 1844a. *Inquirer*. 17 July 1844:2.
Anon. 1844b Advertising. *Inquirer*. 10 July 1844:2.
Anon. 1844c Advertsing. *Inquirer*. 24 July 1844:2.
Anon. 1844d Classified Advertising. *The Perth gazette and Western Australian journal*. 13 July 1844:1.
Anon. 1844e Local. *The Perth gazette and Western Australian journal*. 27 July 1844.
Anon. 1844f Multum in parvo. *The star and working man's guardian*. 26 October 1844:3.
Anon. 1844g New South Wales. *Launceston examiner*. 13 November 1844:6.
Anon. 1844h Sales by auction. *The Perth gazette and Western Australian journal*. July 13th 1844.
Anon. 1844i Shipping intelligence. *The Australian*. 28 October 1844:2.
Anon. 1844j Shipping intelligence. *Colonial times*. 9 November 1844.
Anon. 1844k Western Australia. *The Sydney Morning Herald*. 25 October 1844:2.
Anon. 1844l Western Australia. *The shipping gazette and Sydney morning general trade list*. 26 October 1844:209.
Anon. 1844m Wreck of the"Cervantes": to be sold by auction. *Inquirer*. July 10th 1844.
Anon. 1845a Advertising. *The Sydney morning herald*. 6 February 1845:1.
Anon. 1845b Advertising. *The Sydney morning herald*. 7 February 1845:1.
Anon. 1845c Advertising. *Lauceston examiner*. 15 February 1845:2.
Anon. 1845d Advertising. *The Sydney morning herald*. 3 February 1845:2.
Anon. 1845e Imports. *The Sydney morning herald*. 28 January 1845:2.
Anon. 1845f Launceston. *The shipping gazette and Sydney general trade list*. 1 February 1845.
Anon. 1845g miscellaneous shipping. *The Tasmanian and Austral-Asiatic Review*. Feburary 20th 1845:3.
Anon. 1845h Shipping intelligence. *Colonial Times*. 18 Feburary 1845:2.
Ash, A. 2007 The maritime cultural landscape of Port Willunga, South Australia. Unpublished honors thesis, Department of Archaeology, Flinders University, Adelaide.

Bateson, C. 1972 *Australian shipwrecks: including vesels wrecked en route to or from Australia, and some strandings: volume one: 1622–1850.* Artarmon, Sydney: A. H. & A. W. reed PTY LTD.
Bjordal, C.G., D. Gregory and A. Trakadas 2011 *Wreckprotect: decay and protection of archaeological wooden shipwrecks*. Oxford: Archaeopress.
Blainey, G. 1966 *The tyranny of distance*. victoria: sun books.
Brito, C. 2011 Midieval and early modern whaling in portugal. *Anthrozoos* 24(3):287–300.
Brouwer, P. 2010 *Theory of XRF*. Netherlands: PANalytical BV.
Carpenter, J. 2012 Cervantes *shipwreck site October 2012: conservation report*, Western Australian Museum.
Dolin, E.J. 2007 *Leviathan: the history of whaling in America*. New York: W. W. Norton & Company, Inc.
Duncan, B. and M. Gibbs 2015 *Please God send me a wreck*. New York: Springer Science+Business Media.
Ford, B. 2011 *The archaeology of maritime landscapes*. New York, NY: Springer NY.
Fowler, M. 2015 'Now are you going to belive this or not?': addressing neglected narratives through the maritime cultural landscape of Point Pearce aborigional mission/Burgiyana, South Australia. Unpublished PhD thesis, Department of Archaeology, Flinders University, Adelaide.
Gibbs, M. 2000 Conflict and commerce: American whalers and the Western Australian colonies 1826–1888. *The Great Circle: Journal of the Australian Association for Maritime History* 22(2):3–23.
Gibbs, M. 2010 *The shore whalers of Western Australia: historical archaeology of a martime frontier*. Sydney: Sydney University Press.
Goldblum, D. 2010 The geography of white oak's (Quercus alba L.) response to climatic variable in north America and speculation on its sensitivity to climate change across its range. *Dendrochronologia* 28:73–83.
Henderson, G. 2007 *Unfinished voyages: Western Australian shipwrecks, 1622–1850*. crawly, W.A.: UWA Press.
Hill, J. 1835 *The capture of a sperm whale in the Pacific Ocean*, .
Hohman, E. 1928 *The American whaleman: a study of life and labor in the whaling industry*. New York: Longmans, Green and Co.
Holdcamper, F.R. 1968 *List of American-flag merchant vessels that recieved certificates of enrollment or registry at the port of New York 1786-1867*. Washington, D.C.: the national archives and records servies. 1.
Info, S.t. 2018 *Cervantes water temperature today*. Retrieved from <https://seatemperature.info/australia/cervantes-water-temperature.html>.
Jordan, C. 2015 Here, there and everywhear: development of a provenance technique for mother of pearl buttons. Unpublished Masters thesis thesis, Department of Archaeology, Flinders University, South Australia.
Kerr, M. and C. Kerr 1980 *Australia's early whalemen*. Adelaide: Rigby.
King, A. 1975 Whales and the whaling industry. *Long Range Planning* 8:89–94.
Landgate 2018 *Town names*. Retrieved from <https://www0.landgate.wa.gov.au/maps-and-imagery/wa-geographic-names/name-history/historical-town-names#C>.
Leavitt, J. 1973 *The* Charles W. Morgan. Mystic, Connecticut: Mystic Seaport, The Marine Historical Association, Inc. .
Lindsey, H. 1843a. *Whalemens shipping list, and merhants' transcript*. 17 March 1843.
Lindsey, H. 1843b. *Whalemen's shipping list, and merchants' transcript*. October 17, 1843.
Lindsey, H. 1843c. *Whaleman's shipping list, and merchants' transcript*. 4 April 1843.

Lindsey, H. 1843d. *Whalemen's shipping list, and merchants transcript*. 16 May 1843.
Lindsey, H. 1844. *Whalemen's shipping list, and merchants' transcript*. April 9, 1844.
Lindsey, H. 1845. *Whalemen's shippinglist, and merchants' transcript*. Februrary 25, 1845.
Little, E.L.J. 1961 *Sixty trees from foreign lands*. Washington D.C.: Forest Service. 212.
Logan, J. and J. Tuck 1990 A sixteenth century Basque whaling port in southern Labrador. *the journal of preservation technology* 22(3):67–72.
Lund, J. and T. Smith 2018 *American whaling voyages*. Whaling History: New Bedford Whaling Museum and Mustic Seaport.
Macleod, I.D. 1987 *Secondhand metal: conservation anf industrial archaeology of shipwreck artefacts*. Canberra: The Australian national university, department of prehistory, research school of pacific studies.
Macleod, I.D. 2018 *personal communication*.
Manders, M., Gregory, D. J., Richards, V 2008 *the in situ preservation of archaeological sites underwater: an evaluation of some techniques*. Heritage, microbiology and science, microbes, monuments and maritime materials conference, Portsmouth, UK: RSC Publishing.
Maran, M. 1974 The decline of the American whaling industry. Unpublished unpublished PhD dissertation thesis, department of Economics and History, University of Pennsylvania,
Maury, M. 1996 *Whale chart by M.F. Maury (preliminary sketch; series F constructed by Lts. Leigh Herndon and Fleming and PD. Mid. Jackson*. Retrieved from <https://nla.gov.au/nla.obj-232188644/view>.
McAllister, M. 2012 Preliminary analysis of copper aloy fastenings from an unidentified shipwreck in Koombaba Bay, Western Autralia. *Bulletin of the australasian institute for maritime archaeology* 36:36–43.
McAllister, M. 2013 Stout, sturdy and strong: a typology for early nineteenth-century American whalers. Unpublished Master thesis, Department of Archaeology, Flinders University, South Australia.
McCarthy, M. 1980 *Excavation of the barque Day Dawn*, Western Australia Museum, Perth, W.A.
McCarthy, M. 1989 Charles Edward Broadhurst (1826–1905): a remarkable nineteenth century failure, marime archaeology department, Murdoch University, fremantle.
McCarthy, M. 2012 *Shipwrecks of Australia's West Coast*. Welshpool: Western Australian Museum.
Muckelroy, K. 1978 *Maritimearchaeology*. Cambridge: Cambridge University Press.
Passfield, A. 2013 *Nambung: here we come*: Gateway print LTD.
Pearson, M. 1983 The Technology of Whaling in Australian Waters in the 19th Century. *the Australian Journal of Historical Archaeology* 1:54.
Peet, L. 2003 Two centuries of American connections with Western Australia. *Early days: Journal of the Royal Western Australian Historical Society* 12(3):193–206.
Raupp, J. 2015 “And So Ends this Day’s Work”: Industrial Perspectives on Early Nineteenth-century American Whaleships Wrecked in the Northwestern Hawaiian Islands. Unpublished Ph. D thesis, Department of Archaeology, Flinders University, South Australia.
Ravenswaay, C.V. 1970 *America's age of wood*. Worchester, Massachusetts: The American Antiquarian Society.
Starbuck, A. 1964 *History of the American whale fishery from its earliest inception to the year 1876*. New York: Argosy-antiquarian LTD.

Steffy, J.R. 1994 *Wooden ship biulding and the interpretation of shipwrecks*. College Station: Texas A&M University Press.
Straiton, P. 2015 1, 2, 3, 4, I believe I thought I saw: a preliminary examination of Normanville Beach. Unpublished masters thesis thesis, Archaeology, Flinder University, Bedford Park.
Timar, M.C., L. Gurau and M. Porojan 2012 Wood species identification, a challance of scientific conservation. *International journal of conservation science* 3(1):11–22.
Tower, W. 1907 *A history of the American whale fishery*. Philidelphia: University of Pennsylvania.
Vorenberg, M. 2004 *Final freedom: the civil war, the abolition of slavery and the thirteenth amendment*. Cambridge: Cambridge University Press.
WAM *Cervantes*. Retrieved 1 april from <http://museum.wa.gov.au/maritime-archaeology-db/artefacts/search/cervantes>.
Westerdahl, C. 1992 The maritime cultural landscape. *the International Journal of Nautical Archaeology* 21(1):5-14.
Wilkinson, D. 2013 From beef to reef: the maritime cultural landscape of Robb Jetty. Unpublished Master thesis, Department of Archaeology, Flinders University, South Australia.
Wolf, A. 1988 *Management of the historic shipwrecks of* Day Dawn *and* Dato *at Careening Bay, Garden Island, Western Australia*. Environment working paper no. 6, Department of Defense (Navy Office), Canberra.

Appendices

Appendix One: Grant for Destructive Analysis from the Western Australian Museum

GOVERNMENT OF WESTERN AUSTRALIA

WESTERN AUSTRALIAN museum

THE WESTERN AUSTRALIAN MUSEUM

and

TAYLOR GRAY

THIS Grant for Destructive Analysis *(Object/s not to be returned)* is made

The 22nd day of May 2018

BETWEEN

THE WESTERN AUSTRALIAN MUSEUM a body corporate constituted under section 7 of the *Museum Act 1969 (WA)* of 49 Kew Street, Welshpool, Western Australia *["Museum"]*

AND

Taylor Gray, Masters Student, Flinders University, Department of Maritime Archaeology, South Australia *["Grantee"]*

Definitions - In this *Letter of Agreement*, unless the context otherwise requires, these terms have the definitions here given to them:

a). *Grant* - is the permanent physical transfer of specimens, or samples of specimens from the Museum to another organisation involving the destruction of the specimen or sample for research purposes. The Museum would not expect to have the specimen or sample returned, but may require, data, or the results of the research to be provided as a term of the grant.

b). *Primary type specimens –* are those zoological and fossil specimens designated as holotypes, syntypes, neotypes or lectotypes as defined in the International Code of Zoological Nomenclature and the International Code of Botanical Nomenclature (for plant fossils).

c). *Type specimens* - are mineral or meteorite specimens designated as holotypes, cotypes or neotypes as approved by the International Mineralogical Association and the Nomenclature Committee of the Meteoritical Society, respectively.

d). *Invasive and/or destructive analysis* - including dissection for research purposes, generally involves irreversible changes to the object or specimen involved and may include its complete destruction. Where specimens or samples are loaned for scientific research and subjected to invasive analysis, the Museum may require the remains of the specimen or parts of the specimen (including slides and tissue samples) to be returned with data resulting from the research. If the remains of the specimen are not to be returned, the transfer of the specimen is considered a 'grant', rather than a loan (see above definition of grant).

e). *Object/s* means those items (or any one or more of those items) described in Item 1 of the *Schedule.*

Agreement

1. The *Museum* will grant and the *Grantee* will receive:

   (a) the *Object/s* specified in *Item 1* of the *Schedule* hereto ("Schedule") ("Specimen/s");

and the *Grantee* shall ensure that the *Object/s* are:

(b) used solely for the *Purpose/s* set out in *Item 2* of the *Schedule* ("Purpose/s").

2. The *Museum* will be responsible for the transporting the *Object/s* from the *Museum*'s premises to the *Grantee*'s premises.

3. The *Grantee* bears the liability and risk related to the *Object/s* whilst they are in its control or possession (including transportation).

4. The *Grantee* shall, in respect of research into the *Object/s*, publicly acknowledge the *Museum*'s assistance via the granting of the *Object/s* to the *Grantee*. Without limiting the previous sentence, if any particular *Method/s of Public Acknowledgement* is/are set out in *Item 3* of the *Schedule*, the *Grantee* shall carry out such *Method/s*.

5. The *Grantee* shall provide the *Museum* with the details and results of any research carried out on the *Object/s* by the *Grantee* as soon as the research and results have been finalised. The *Museum* may use such details and results for its own lawful purposes, but may not commercialise the same.

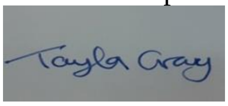
6. The *Museum* neither makes nor gives any representation or warranty as to the fitness for purpose, suitability, usefulness or safety (or otherwise) of the *Object/s*. The *Grantee* takes possession and control of the *Object/s* entirely at its own risk.

7. The *Special Conditions*, if any, set out in *Item 4* of the *Schedule* form part of this *Agreement* between the *Parties* and are therefore enforceable in accordance with their terms.

8. The laws of Western Australia apply to and govern this *Agreement* between the *Parties*. Western Australian courts shall hear and adjudicate on disputes between the *Parties*.

9. In this *Letter of Agreement* ("*Letter*") - *"Parties"* means the *Grantee* and the *Museum*; "*this Agreement*" means the agreement evidenced by this *Letter*; and a reference to "transporting" includes transporting by post.

Executed for the *Grantee* by its duly authorised representative:



Signature

TAYLOR GRAY

Full Name of Representative

(Block letters)

Masters Student at Flinders University

Position Title of Representative (Block letters)

22/05/2018

Date

Executed for the *Western Australian Museum* by its duly authorised representative:

Signature

JEREMY GREEN

Full Name of Representative

(Block letters)

HEAD OF DEPARTMENT, MARITIME ARCHAEOLOGY

Position Title of Representative (Block letters)

22/05/18

Date

SCHEDULE – Grant for Destructive Analysis

Western Australian Museum

49 Kew Street, Welshpool, WA 6106

Locked Bag 49, Welshpool DC, WA 6986

tel: 9212 3700 fax: 9212 3882 email: reception@museum.wa.gov.au

Taylor Gray

Item 1 – *Object/s*

Name	Registration No.	Description
Framing with copper bolt	CV536AB	1x copper - cleaned for XRF
Copper bolt	CV3355	1x Eroded copper bolt – cleaned for XRF
Copper bolts	CV3364	1x copper bolt, cleaned for XRF
Copper spikes	CV3365	1x copper square sectioned spike, cleaned for XRF
Copper spikes with wood	CV3363	1x copper spikes with wood, cleaned for XRF
Copper spikes	CV3347	1x copper spike, cleaned for XRF
Wood samples	CV534	1x piece of ceiling planking and 1x treenail used for wood samples

Item 2 –*Purpose/s* of Grant

Part destructive cleaning for XRF analysis on 3 bolts and 3 spikes

Part destructive – taking wood samples for species identification on 4 wood pieces

Item 3 –*Methods of Public Acknowledgement*

Public acknowledgement in Masters thesis

Item 4 – *Special Conditions*

Samples must be returned to the museum as well as any reports.

A report of results is to be provided to the Museum.

Clear photographs must be taken before and after samples are taken and provided to the Museum.

Appendix Two: Artefact Catalogue

Registration No: CV534

Measurements:

Longest (top left):	Widest (top right):	Longest treenail:	Shortest treenail:
Length: 17.50 cm	Length: 15.07cm	Length: 16.40 cm	Length: 11.95 cm
Width: 6.60 cm	Width:7.94 cm	Diameter: 2.55 cm	Diameter: 2.61 cm
Height:4.21 cm	Height: 4.55 cm		

Description:

Ten pieces of wood, plus many small fragments. Two pieces are larger portions of ceiling planks, the largest has treenail holes. The two long round pieces are treenails. The remaining pieces show treenail holes but their specific function is unknown. The ceiling plank on the right was sampled for species identification. The results indicate a species of Spruce, possible Norway Spruce. The treenail on the right was sampled for species identification. The results indicate White Oak.

Registration No: CV535

Measurements:

Smaller:	Larger:
Length: 9.30 cm	Length: 23.50 cm
Width: 10.50 cm	Width: 21.00 cm
Height: 5.5 cm	Height: 8.90 cm

Description:
Two separate conglomerates with many shells and other debris encased.


CV 535
Flinders
Maritime
Archaeology

Registration No:CV356A

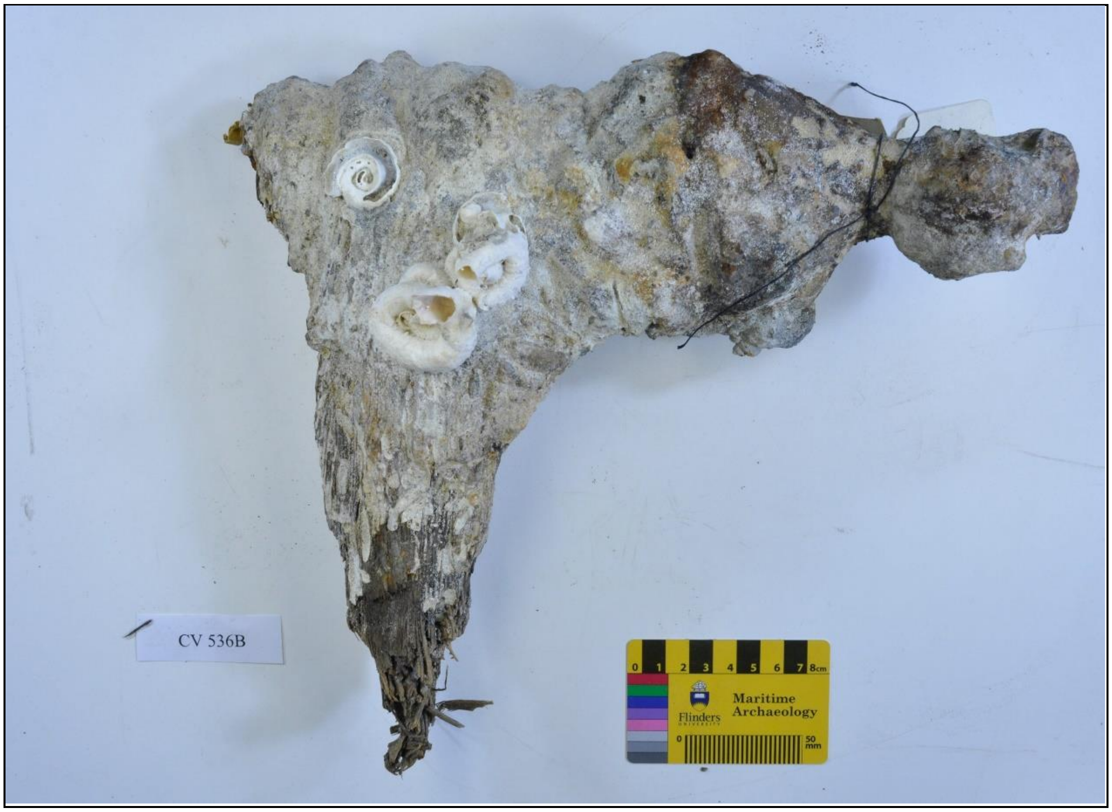
Measurements:

Wood:	Bolt:
Length: 65.90 cm	Length: 31.10 cm
Width:10.50 cm	Width: 1.70 cm
Height: 8.70 cm	

Description:
Timber piece with a round copper bolt. The timber is heavily affected by *t. Navalis.* The copper bolt was sampled for XRF analysis. The results indicate this bolt is pure copper.

Registration No.: CV536B

Measurements:
Length: 32 cm Width: 29.5 cm Height: 7.5 cm
Description
Timber with iron, surrounded by concretion.



Registration No.: <u>CV3347</u>

Measurements:

Spike 1 (bottom):	Spike 2 (low mid):	Spike 3 (top):	Spike 4 (top mid):
Length:14.10 cm	Length: 13.64 cm	Length: 14.52 cm	Length: 11.55 cm
Width: .75 cm	Width:.91 cm	Width: .51 cm	Width: .54 cm

Description:
Four square-sectioned copper Spikes, bottom three. The bottom spike was sampled for XRF analysis. The results indicate that it is a low-leaded tin bronze.

Registration No: <u>CV3351</u>

Measurements:

Brick 1 (full):	Brick 2 (broken):	
Length: 20 cm	Length (full side): 19.80 cm	Length (broken): 13.50 cm
Width: 10 cm	Width (full side): 9.70 cm	Width (broken): 2.30 cm
Height: 4.88 cm	Height: 5.00 cm	

Description:
Two bricks that would have been used in the construction of the tryworks.

Registration No:CV3353

Measurements:
Length: 11.05 cm handle diameter: 2.04 cm
Width: 3.42 cm
Height: 3.44 cm

Description:
A hammer head; both ends smooth compacted and showing less signs of degradation. The wood from handle is very fragile.

Registration No.:CV3354

Measurements:

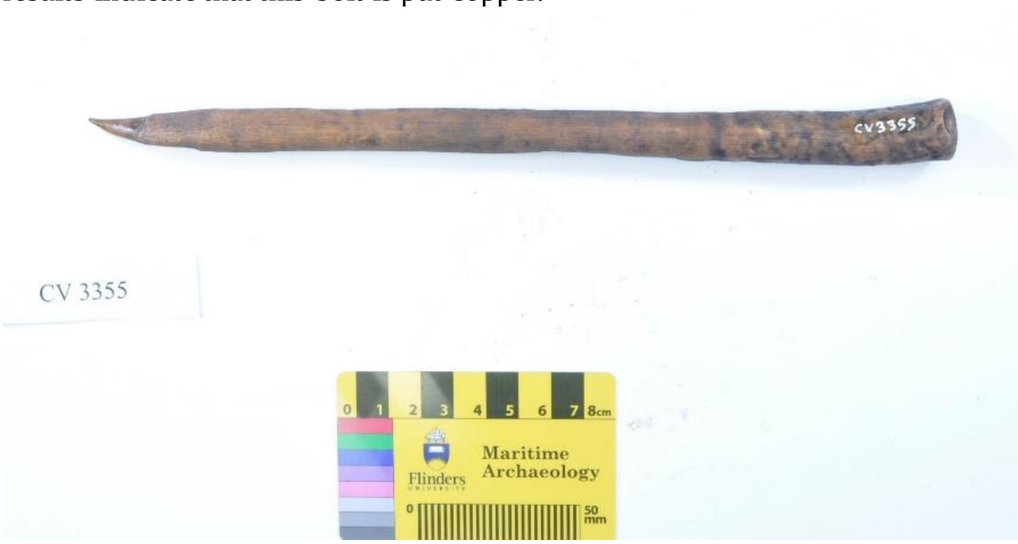
Large:	Medium:
Length: 20.10 cm	Length: 13.98 cm
Width: 15.80 cm	Width: 8.65 cm
thickness: 2.16 cm	Thickness: 1.93 cm

Description:
Fragmented northern Pearl shell.

Registration No.:CV3355

Measurements:
Length: 25.90 cm
Diameter: 1.36 cm

Description:
A round copper bolt, very eroded. This bolt was sampled for XRF analysis. The results indicate that this bolt is put copper.



Registration No:CV3356

Measurements:
Length: 38.4 cm
Width (base): 16.3 cm Width (top): 8.50 cm
Height: 19 cm Heading hole Diam: 1.9 cm

Description:
An anvil with heading hole.

Registration No: CV3357

Measurements:
Length: 20 cm
Width: 15.50 cm
Thickness: 1.69 cm

Description:
Very fragmented Northern Pearl shell. Many small flakes were not pictured as they were too small. This indicates contact, either directly or through trading, with the northern Western Australia region.

Registration No: CV3361

Measurements:
Widest diameter: 3.91
Smallest diameter: 3.60 cm
Thickness: 0.28 cm

Description
Fragile leather washer. Small indentations from use can be seen on both sides.

Registration No.: <u>CV3362</u>

Measurements:

<u>Main:</u>	<u>fragment</u>:
Length: 8.85 cm	Length: 1.92 cm
Width: 2.25 cm	Width: .87 cm
Height: 2.28 cm	Height: .49 cm

Description:
Hammer head, very light and very fragile. Found associated with stones and a metal cylinder.

Registration No:CV3362A

Description:
43 stones found associated with hammerhead CV3362.

Registration No.: CV3363

Measurements:

Spike 1 (top):	Spike 2 (bottom):
Length: 16.37 cm	Length: 15.37 cm
Width: 4.74 cm	Width: 4.74 cm
Height: 2.77 cm	Height: 2.77 cm

Description:
Two Copper alloy spikes, both with wood attached. Both show evidence of *shipworm* The bottom spike was sampled for XRF analysis. The results indicate that it is a heavily-leaded zinc bronze.


CV 3363
0 1 2 3 4 5 6 7 8cm

Registration No: CV3364

Measurements:

Long:	Clinch ring:	Short:
Length:40.20 cm	inside diam: 2.11 cm	Length:33.80 cm
Diameter: 1.85 cm	outside diam: 3.22	Diameter: 1.52
	Thickness: .25 cm	

Description:

Two copper ally bolts. The longer bolt has a clinch ring attacked and is hammered in at both ends, making it a through bolt. The shorter of the two has been hammered in at one end and not the other, indicating it did not reach all the way through the into which it was inserted. The bottom bolt was sampled for XRF analysis. The results indicate the bolt is made from arsenical copper.

Registration No.: <u>CV 3365</u>

Measurements:

Spike 1 (bent):	Spike 2 (straight):
Length: 11.78 cm	Length: 15.90 cm
Width: 1.18 cm	Width: .86 cm
Height: 1.13 cm	Height: .95 cm
Head width: 1.77 cm	Head width: 1.57 cm

Description:
Two square-sectioned copper alloy spikes, one bent. The top spike was sampled for XRF analysis. The results indicate the spike is made of heavily-leaded zinc bronze.

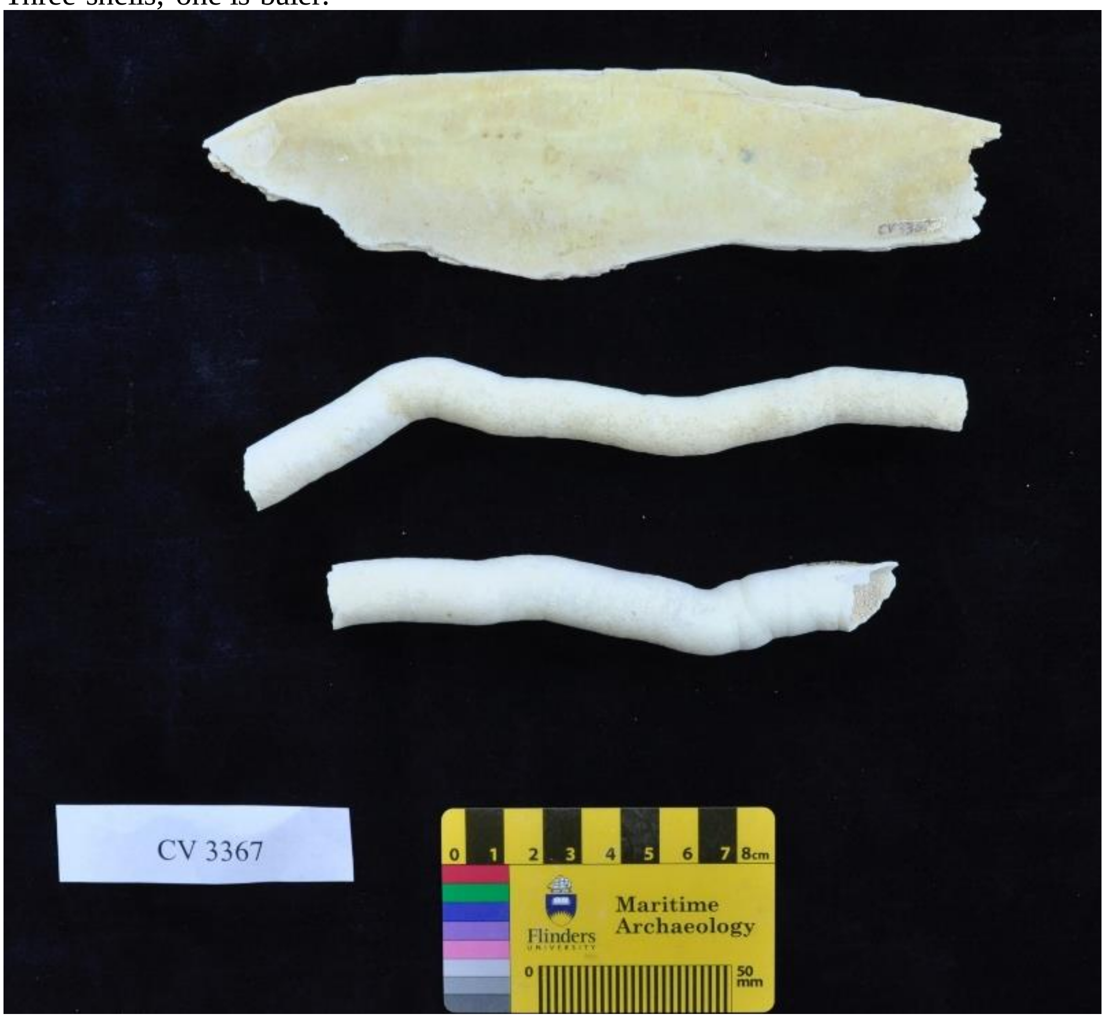
Registration No.: CV3367

Measurements:

Balor shell:	Tube 1 (mid):	Tube 2 (bottom):
Length:18.5 cm	Length: 17.70 cm	Length: 14.29 cm
Width: 5.22 cm	Diameter: 1.44 cm	Diameter: 1.68 cm
Thickness: 0.52 cm	Thickness: 0.18 cm	Thickness: .23 cm

Description

Three shells; one is baler.



Registration No: <u>CV3954</u>

Measurements:
Length: 11.90 cm
Width: 4.68 cm
Height: 4. 16 cm

Description:
A conical sounding lead with a concave bottom. Used when checking depth and sediment type.

Registration No: CV3352A

Measurements:

Section 1 (top):	Section 2 (middle):	Section 3 (bottom):
Length: 3.35 cm	Length: 11.28 cm	Length: 11.39 cm
Diameter: 1.65 cm	Diameter: 1.55 cm	Diameter: 1.65 cm

Description:
Iron bolt associated with wooden pully sheave CV3352B.

Registration No: CV3352B

Measurements:
Diameter: 9.88 cm
Height: 2.31 cm
Diameter of centre hole: 2.81 cm

Description:
-wooden pully sheave, cracked.


CV3352
CV 3352B
0 1 2 3 4 5 6 7 8cm

Registration No: CV3358

Measurements:

Timber:	treenail holes:
Length: 135 cm	2.75 cm
Width: 29.5 cm	2.67 cm
Height: 14.5	2.45 cm

Description:
A slightly bent timber, which indicates a frame. One copper alloy spike and three wooden treenails remain in the timber frame, and there are three empty holes for missing treenails. The timber has previously been sampled for wood species identification and the results indicated a species of Maple.

Registration No.: <u>CV3362B</u>

Measurements:
Length: 22 cm
Outer Diameter: 8.81 cm
Inner Diameter: 4.76

Description:
A heavy metal cylinder with indents on each end with signs of deterioration similar to the anvil. The purpose of this artefact is yet unknown.

Appendix Three: Crew Lists

The following crew lists were transcribed from images of the original crew lists, provided by Mystic Seaport Museum, with the database at whalinghistory.org used for reference.

Crew List for Cervantes Voyage one under Captain Benjamin Brown 10th June, 1841							
L. Name	**F. Name**	**Birthplace**	**Residence**	**Country**	**Age**	**Complexion**	**hair**
Brown	Benjamin	New London, CT	New London, CT	USA	29	Light	Dark
Antony	Nicholas	Flores, Western Islands	New London, CT	USA	34	Dark	Dark
Bartholomew	Manuel	Fayal, Western Islands	New London	Portugal	29	Dark	Dark
Sawyer	Manuel	Gracioza, Western Islands	New London, CT	Portugal	26	Dark	Dark
Roderick	John	Pico, Azores	New London, CT	Portugal	26	Dark	Dark
Jose	Manuel	Flores, Western Islands	New London	Portugal	33	Dark	Dark
Jones	James	Wooster, England	New London	Great Britain	23	Light	Light
Clark	Joseph	South Berwick, ME	South Berwick, ME	USA	23	Light	Light
~~Harris~~	~~Jesse~~						
Ferreira	Domingo	Bahia, South America	New London, CT	Brazil, South America	22	Dark	Dark
Simpson	William	New Bedford, MA	New Bedford, MA	USA	21	Black	Black
~~Manuel~~	~~Joze~~	~~Fayal, Western Islands~~	~~New London, CT~~	~~Portugal~~	~~19~~		
Benson	James	New York, NY	New York, NY	USA	25	Light	Dark
Wooley	James	Philadelphia	Williamsburg, NY	USA	20	Light	Dark
Morrison	John	Ophe (?), West Canada(?)	New London, CT	England	22	Light	Dark
Maddison	Isaiah	Salem, DE	Great Egg Harbor	USA	21	Black	Black
Simmons	William					Light	Light
Hoscott	John	Montville, CT	Montville	USA	40	Dark	Black Indian
~~Anthony~~	~~John~~	~~Flores, Western Islands~~	~~New London, CT~~	~~Portugal~~	~~17~~	~~Light~~	~~Dark~~
Warner	William	Hartford, CT	Hartford	USA	27	Light	Light
~~Howard (?)~~	~~Ebenezer~~						
Wiggins	William	Philadelphia	Philadelphia	USA	24	Dark	Dark
Morgan	William	Groton, CT	Groton, CT	USA	13	Light	Light
~~Noyes~~	~~James~~	~~Norwich, CT~~	~~Norwich CT~~	~~USA~~	~~13~~	~~Dark~~	~~Black~~
Sand	George	Granby, CT	Springfield	USA	14	Black	Dark
Noyes	James	Norwich, CT	Norwich, CT	USA	13	Dark	Black

Crew List for Cervantes Voyage two under Captain Sylvanus Gibson 20th June, 1843							
L. Name	**F. Name**	**Birthplace**	**Residence**	**Country**	**Age**	**Complexion**	**Hair**
Gibson	Sylvanus	Windham, VT	New London, CT	USA	36	Light	Light
McKinstry	Thomas		East Hartford, CT	USA	33	Dark	Dark
Bartlett	Henry	Easton, MA	Wareham, MA	USA	22	Light	Dark
Sands	George	Springfield, MA	New London, CT	USA	17	Black	Dark
Blowers (?)	Salter (?)	Eastport, ME	New London, CT	USA	32	Light	Brown
Clark	Henry	Durham, CT	Durham, CT	USA	33	Light	Brown
Jones	James	Worchester, England	New London, CT	Great Britain	25	Light	Brown
Chappell	Moses	New London, CT	New London, CT	USA	26	Light	Light
Ovington	Charles	New York	New York	USA	19	Black	Black
Gardener	Thomas	Groton, CT	Groton, CT	USA	20	Black	Black
Price	Thomas	Oxford, PA	Oxford, PA	USA	22	Black	Black
Francine	Mariano	Manila	New London		27	Yellow	Black
Tyler	John	Flores, Western Islands	New London	Portugal	15	Dark	Dark
Howard	Emilus (?)	Providence, RI	Providence, RI	USA	17	Light	Dark
Brewster	Albert	Norwich, CT	New London	USA	22	Dark	Dark
Chapman	Joseph	Waterford	Waterford, CT	USA	18	Light	Dark
Thomas	James	Otsego Co., NY	Oxford, NY	USA	25	Black	Black
Crary	Horace	Windsor, CT	Windsor, CT	USA	16	Light	Brown
Perine (?)	Antone	New Orleans	New London	USA	49	Dark	Gray
Bolles	William	New London	New London	USA	15	Light	Dark
Barnes	Reubin	Middletown, CT	Middletown	USA	42	Dark	Dark
Hammond	William	Philadelphia	Philadelphia	USA	21	Black	Black
Holdredge	G.	Mystic, CT	Mystic, CT	USA	23	Light	Dark

Appendix Four: X-ray Fluorescence Raw Data

The raw data gathered for XRF analysis follows. Elements that did not appear in any amount in any reading for each sample were excluded from these tables for clarity. Light elements are not included in the data. Data readings that were not able to be used are highlighted in red and are not include in the average or standard deviation calculations.

CV356A						
element	**Reading one**	**Reading two**	**Reading three**	**Reading four**	**average**	**Standard deviation**
Mg	0	2.69157	3.90496	1.99338	3.298265	0.857996
Al	0.40936	0	0.1853	0.38377	0.212483	0.142648
Si	0.37177	0.09652	0.16916	0.26382	0.212483	0.142648
S	5.54754	0.66689	2.06765	4.88846	2.760693	2.51305
K	0.23191	0.7217	0.42667	0..53155	0.460093	0.2466
Ca	0.5428	0.51986	0.55226	0.74383	0.538307	0.016661
Fe	0.03197	0	0	0.01269	0.03197	0
Ni	0.06683	0.05979	0.05457	0.05268	0.060397	0.006152
Cu	91.84395	93.76569	91.45715	89.9987	92.3556	1.236396
As	0.36174	0.34308	0.31918	0.31026	0.341333	0.021334
Ag	0	0	0	0.00822	0	0
Sn	0.02929	0.04091	0.0345	0.02823	0.0319	0.003446
Sb	0.02828	0.03228	0.03514	0.03372	0.0319	0.003446
Pb	0.07059	0.08195	0.12455	0.11766	0.092363	0.028447
Th	0.46397	0.97975	0.66892	0.63302	0.704213	0.259695

CV3347								
element	**Reading one**	**Reading two**	**Reading three**	**Reading four**	**Reading five**	**Reading six**	**average**	**Standard deviation**
Mg	0	0	0	2.84246	0	0	0	0
Si	0.09844	0.11789	0.10645	0.09481	0.08822	0.22865	0.09333	0.007227
S	5.48411	2.14621	3.02035	0.93222	6.09788	2.10858	5.790995	0.434001
K	1.56354	0.32009	0.49798	1.07106	1.64341	1.02474	1.603475	0.056477
Ca	4.20634	5.66443	4.9747	3.71571	6.12984	8.09159	5.16809	1.36012
Ti	0	0	0	0	0.02637	0.03359	0.02637	0
Mn	0	0	0.0045	0.00592	0.00589	0.00888	0.00589	0
Fe	0.05507	0.02319	0.0286	0.03404	0.0556	0.04822	0.055335	0.000375
Ni	0.04865	0.01216	0.01462	0.04209	0.05274	0.04278	0.050695	0.002892
Cu	68.04433	12.03694	24.02509	54.46998	64.00884	42.79142	66.02659	2.853522
Zn	5.11123	1.021	1.58132	3.50832	5.20608	3.31148	5.158655	0.067069
As	0.32509	0.06454	0.08636	0.20117	0.33376	0.1851	0.329425	0.006131
Se	0	0.00091	0.00149	0	0.00459	0.00262	0.00459	0
Ag	0.09012	0.0187	0.03635	0.03251	0.0759	0.03793	0.08301	0.010055
Sn	7.51582	1.53629	2.36593	4.02701	7.46695	3.87246	7.491385	0.034556
Sb	0.03303	0	0.01056	0	0.0323	0	0.032665	0.000516
Pb	0.64095	0.16788	0.16717	0.44752	0.69225	0.40369	0.6666	0.036275
Bi	0.03876	0.03904	0.05184	0.04737	0.1728	0.12683	0.10578	0.94781
Th	0.4734	0	0	0	0	0	0.04734	0

CV3355						
element	Reading one	Reading two	Reading three	Reading four	average	Standard deviation
Mg	2.10659	0	0	0	0	0
Si	0.1514	0.09439	0.23751	0.17918	0.17036	0.071967
S	0.85889	0.28192	1.32782	0.55477	0.721503	0.542519
K	0.60105	0.56703	0.62745	0.71352	0.636	0.073618
Ca	0.51472	0.46617	0.4349	0.40713	0.436067	0.029537
Fe	0	0	0.01417	0	0.01417	0
Ni	0.00923	0.00991	0.0087	0.00901	0.009207	0.000629
Cu	94.4158	97.07646	96.56722	97.2317	96.95846	0.347601
Zn	0	0	0.02304	0	0.02304	0
As	0.16953	0.18685	0.14427	0.14833	0.159817	0.023499
Ag	0.03752	0.04207	0.03846	0.04783	0.042787	0.004726
Sn	0.03548	0.05065	0.02825	0.02964	0.03618	0.012551
Sb	0.02339	0.02968	0.02562	0.02789	0.02773	0.002035
Pb	0.18114	0.19368	0.14446	0.15512	0.16442	0.025894
Th	0.89521	1.00119	0.37812	0.4959	0.62507	0.33101

CV3363						
element	**Reading one**	**Reading two**	**Reading three**	**Reading four**	**average**	**Standard deviation**
Mg	4.19569	3.35403	2.77695	1.84494	4.19569	0
Al	0.23612	0.23537	0.37044	0.42696	0.23612	0
Si	0.28963	0.18816	0.15139	0.17356	0.28963	0
P	0.10677	0	0.1282	0.09426	0.10677	0
S	0.9057	0.40226	0.89609	0.82462	0.9057	0
K	1.92318	1.12102	1.91078	1.15215	1.92318	0
Ca	3.36497	8.71371	5.2777	3.92138	3.36497	0
Ti	0.05109	0.05346	0.07283	0.02049	0.05109	0
Mn	0.01312	0.00898	0.00626	0.00816	0.01312	0
Fe	0.03511	0.03142	0.03014	1928	0.03511	0
Ni	0.04411	0.02503	0.01751	0.01118	0.04411	0
Cu	72.22317	31.82646	36.39333	36.39333	72.22317	0
Zn	4.75275	2.21691	2.37818	1.50008	4.75275	0
As	0.48798	0.15758	0.46601	0.3124	0.48798	0
Se	0	0	0.00686	0.00686	0	0
Ag	0.08864	0.03091	0.07331	0.06038	0.08864	0
Sn	9.66568	3.46512	7.43944	5.65036	9.66568	0
Pb	1.47614	0.39924	0.92491	0.80772	1.47614	0
Bi	0.14017	0.09176	0.11458	0.0718	0.1417	0

CV3364							
element	Reading one	Reading two	Reading three	Reading four	Reading five	average	Standard deviation
Si	0.08503	0.08874	0.11088	0.13657	0.12357	0.108478	0.025536
S	0.48695	0.58246	0.99034	2.26708	4.05783	1.84858	1.68458
K	0.78686	0.78534	0.24371	0.47736	0.37248	0.605485	0.21285
Ca	0.50084	0.50552	0.21426	0.38928	0.56867	0.491078	0.074582
Ti	0	0	0.02218	0	0	0	0
Ni	0.01044	0.01011	0.00586	0.00892	0.0134	0.010718	0.001904
Cu	96.37759	96.32484	54.35198	95.4557	93.65074	95.45222	1.2732
As	0.28955	0.25081	0.14882	0.28977	0.3108	0.285233	0.025019
Ag	0.04461	0.03869	0.02998	0.04674	0.04674	0.043933	0.003602
Sn	0.04902	0.04581	0.01193	0.03335	0.03722	0.04135	0.007298
Sb	0.06164	0.05753	0.02379	0.04748	0.04871	0.05384	0.006861
Pb	0.18784	0.17352	0.07568	0.12351	0.15705	0.16048	0.027672
Th	1.11972	1.13665	0.20234	0.72527	0.61279	0.898608	0.26913

CV3365						
element	Reading one	Reading two	Reading three	Reading four	average	Standard deviation
Al	0	0.25266	0.42409	0.24586	0.24926	0.004808
Si	0.20359	0.23647	0.31151	0.44688	0.341675	0.148782
S	4.14483	4.69757	3.16817	4.97185	4.83471	0.193945
K	1.1757	1.106	1.7519	1.30836	1.20718	0.14309
Ca	5.782	2.38491	2.8558	6.28879	4.33685	2.76046
Ti	0	0.0288	0.03626	0	0.0288	0
Mn	0.01514	0.00901	0.00908	0.01008	0.009545	0.000757
Fe	0.03267	0.05388	0.06509	0.04762	0.05075	0.004426
Ni	0.06102	0.06951	0.06062	0.0603	0.064905	0.004426
Cu	63.44428	76.27554	66.5451	74.61393	75.44474	1.174936
Zn	2.36889	3.32034	2.7777	2.60685	2.963595	0.504514
As	0.3976	0.62592	0.56909	0.44466	0.53529	0.12817
Se	0.00587	0.00622	0.0037	0	0.00622	0
Sr	0	0	0	0.00374	0.00374	0
Ag	0.06496	0.08801	0.05816	0.06067	0.07434	0.019332
Sn	6.2296	8.57632	6.22531	6.81676	7.69654	1.244197
Sb	0.02453	0.04648	0.03271	0.0395	0.04299	0.004936
Pb	1.76652	1.99322	1.81158	1.91048	1.95185	0.058506
Bi	0.24356	0.22913	0.13562	0.12367	0.1764	0.074571

Appendix Five: Wood Species Identification Analysis Results

KNOW YOUR WOOD
19 Benambra Street, South Oakleigh,
Victoria 3167, AUSTRALIA
Phone: 03 95127523
Mobile: 0499 300 208
Email:knowyourwood1@gmail.com
Provider of wood identification services.

14th August, 2018

WOOD IDENTIFICATION RESULTS

Dr Wendy van Duivenvoorde
Associate Professor in Maritime Archaeology
Flinders University
GPO Box 2100
Adelaide SA 5001

Dear Wendy,

Re: Identification of two wood samples from the Cervantes shipwreck; Your request – 10th August, 2018.

Following microscopic examination, in my opinion the structure of the wood specimens is consistent with[1]:

Sample Number & Location	Description	Scientific name	Commercial or Trade name + Remarks
1, *Cervantes*	CV534, treenail	*Quercus ?* [2]*alba*	WHITE OAK GROUP
2, *Cervantes*	CV534, ceiling plank	*Picea ?* [2]*abies*	SPRUCE

I hope the information will help with your research and evaluation process.

Best regards,

Jugo Ilic

Jugo Ilic MSc, Dr(Forest)Sc, FIAWSc

[1] *Disclaimer*: The content of this letter is provided in good faith and whilst Dr Jugo Ilic has endeavoured to ensure that the information contained in it is correct and accurate at the time of preparation, he does not accept any liability arising from its use whether provided directly by the above-named client or indirectly from the client providing it to a third party in this or any other format.

[2] "?" indicates that there are other similar species which cannot be differentiated on the basis of wood structure.