

A Research Design to Conduct Archaeological Investigations at the Site of the “Beeswax Wreck” of Nehalem Bay, Tillamook County, Oregon

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INTRODUCTION

The identification of the “Beeswax Wreck” on the beach of the Nehalem River spit has long been a subject of conjecture and controversy. Noted since the early years of the 19th century and identified over time by various persons as either a Chinese, Japanese, Portuguese, or Spanish vessel, the only agreement to date is that the vessel was a ship probably wrecked in the 17th century. An eastbound Spanish galleon heading from Manila to Acapulco is often cited as the most likely vessel, as the galleons of Spain regularly traveled between Mexico and the Philippines for two hundred and fifty years, carrying cargos of silks, other cloths, beeswax, porcelain, and spices. While this long span of regular voyaging makes a Spanish origin of the wreck seem most likely, at times Portuguese traders plied between Japan and China carrying similar cargoes and Dutch and English raiders roamed the Pacific taking whatever valuables they could from the ships of other nations. The nationality, year she wrecked at Nehalem, and whether or not any remains of the ship still lie buried in the sands of Nehalem Spit or offshore remain unknown. If remains of the ship’s structure, cargo, and artifacts identifying the ethnicity of the crew can be found, these questions may be answered. In addition, broader anthropological and historical interests could be addressed such as the impact of the cargo and any survivors on the culture and economy of the Northwest Coast prior to regular Euroamerican contact. For example, the availability of tons of beeswax provided the Tillamook with a new trade good, which was almost certainly integrated into the Native coastal trade system before contact with Euroamericans.

This research design proposes to conduct archaeological investigations to establish the location and identity of the beeswax wreck on Nehalem Spit. Historical records combined with the recollections of local informants hint that parts of the hull structure may still be buried under the sands of the spit just offshore, with a second portion of the vessel (or perhaps the remains of an unrelated one) buried in a stabilized back-dune area of the beach in the general area of the Nehalem airstrip.

The first section of this research proposal summarizes documentary and archaeological evidence regarding the wreck. The second discusses this evidence and presents the research design, including testable hypotheses regarding the origin of the wrecked vessel, site formation, and distribution of wreckage. These hypotheses will serve to guide the investigations and the methods that are proposed to conduct archaeological surveys of locations that have the potential

to contain intact remains of the ship, utilizing a combination of remote sensing and geotechnical testing. The third part describes the research team's goals for public outreach and education as part of the project, as well as potential funding sources. The curriculum vitae for the research team are included in an appendix.

NEHALEM BAY ENVIRONMENT

Nehalem Bay is located on the coast of Tillamook County in northwest Oregon. The following physical description is taken from Losey (2002:418-421), who conducted an extensive study of the cultural, historical, and archaeological resources of the Nehalem area for his doctoral studies. He notes that Nehalem Bay is the sixth largest estuary on the Oregon Coast, excluding the Columbia River estuary, and is fed by the largest watershed on the Oregon Coast north of the Umpqua River. He goes on to note that:

The northern margin of the watershed at the beach is marked by Neahkanie Mountain, an impressive headland that rises abruptly from the ocean to an elevation of 497 m. A long sandy beach extends south from the mouth of Nehalem Bay to the entrance of Tillamook Bay. The west margin of the bay is composed of a 4km long sandspit, about 600 m wide at its widest point, with its tallest sand dunes reaching 7 to 8 m in elevation. The sandspit is now partially vegetated with introduced European beach grass and Australian shore pines but was completely unvegetated as recently as the 1950s (Minor 1991b:3).

The north shore of Nehalem Bay from the beach to about the town of Bayside Gardens is composed of the Manzanita dune sheet, a mass of active and long-stabilized dunes... Because most of the archaeological sites recorded at Nehalem Bay are found along its north shore within the dune sheet, some details about its structure and formation are relevant. Cooper (1958:78-9, plate 2)...identified the large (and at the time unvegetated) low-lying area to the west of Cronin Point as an extensive deflation plain... [and] identified the then unforested area extending north from Cronin Point as the active windward slope of an active parabolic dune.

The outer beach at Nehalem Bay has experienced considerably less destructive erosion than the outer beach at Netarts Bay. The most significant changes in the beach followed the construction of the jetties at the mouth of the river in the 1910s (Dicken 1961:65). The jetties appear to have arrested the longshore movement of sand on the beach and have caused progradation in some areas, particularly along the south side of the south jetty.

Today, all of the sandspit and land fringing the north shore of the bay from approximately Bayside Gardens Road east is part of Nehalem Bay State Park and is managed by Oregon State Parks. The sandspit is heavily vegetated and the dunes are stabilized by introduced beach grass, with only the active beach being unvegetated. The park camping areas and the Nehalem Bay

airstrip are located in the back-dune portion of the spit, and areas within this back dune contain shallow, standing water. To date, small pieces of beeswax are still reported as being found on the beach (<http://nwcoast.com/articles/article.asp?articleid=5001>, accessed Sept. 5, 2006).

DOCUMENTARY AND ARCHAEOLOGICAL EVIDENCE

The earliest accounts of Euroamerican settlers on the Northwest Coast refer to a wrecked vessel at the beach of Nehalem, which was the source of an abundant supply of beeswax that the local Indians used and traded prior to the time of Euro-American settlement (Hult 1960; Lee and Frost 1968; Swan 1998; Erlandson et al. 2001). In addition to finds along the spit, blocks of beeswax have been found in Indian house sites and burials that date prior to Euro-American settlement (Woodward 1986: 221). Native oral histories and accounts written down in the early years of Euroamerican settlement and the latter half of the 19th century refer to the wreck: some of these indicate there were survivors who integrated into Indian society and left descendants, later encountered by early Euroamerican settlers and explorers (Hult 1960; Cook 1973). However, it is obvious that many of these early accounts mix different stories, add embellishments, and incorporate the biases and cultural viewpoints of the recorders. In light of this, the historical documents are critically evaluated below because documents are artifacts, not authorities, and that all documents contain biases and the potential for errors.

Nineteenth Century Accounts

The first written accounts of the wreck come from Alexander Henry in 1813 (Henry 1897, cited in Hult 1960), who reported being visited by an Indian man who had red hair and who was “supposed” to be descended from a survivor of a ship that wrecked near the Columbia River “many years ago,” and that great quantities of beeswax were dug out of the sand at the spit and that the Indians brought the wax to Astoria to trade. Prior to Henry’s account, Sgt. John Ordway of the Lewis and Clark expedition reported in his journal entry of March 9, 1806 that several Clatsop Indians “came to the Fort [Clatsop] with Some Small fish and a little bears [bees] wax to trade to us” (Moulton 1995:276). Moulton clearly treats Ordway’s account of “bears” wax as a spelling or manuscript problem and indicates that the meaning is bees wax. This wax was certain to have come from the wreck at Nehalem because there were no native honeybees west of the Rockies at that time.

Franchere (1967:51), writing in 1811, provides an interesting account of meeting the descendant of a Spanish survivor of an unknown wreck. While traveling up the Columbia River in the west of Vancouver Point (probably in the vicinity of Bonneville Dam), Franchere reported:

The next day, the eighth, we had not proceeded far before we encountered a very rapid current. Soon afterward, we saw the hut of some Indian fishermen and we stopped for breakfast. Here we found an old, blind man who gave us a cordial reception. Our guide said that he was a white man and that he was called Soto. We learned from the old man himself that he was the son of a Spaniard who had been wrecked at the mouth of the river; that some of the crew on this occasion had got safely to land, but they had all been massacred by the Clatsops with the exception of four who were spared and who married native women. Disgusted with the savage life, the four Spaniards, of whom the father of this man was one, had attempted, overland, to reach a settlement of white men, but had never been heard from again. When his father and companions left the country, Soto was quite young.

Franchere's mention of meeting Soto and his claim to be the son of a shipwrecked Spaniard is especially interesting in relation to the beeswax wreck. His record of meeting Soto in 1811 is before any written documentation of the beeswax or the wreck from Nehalem by Euroamericans. He also noted that his guide (a Chinook Indian from the village of Wahkiakum) claimed Soto to be a white man and that Soto said he was the son of a Spaniard who survived a wreck at the mouth of a river. Whether this refers to the Columbia River, or another (possibly the Nehalem) is unclear. This account raises several explanations of the Spaniard in Oregon: 1) assuming Soto was not especially long lived, an unknown Spanish vessel wrecked at the mouth of the Columbia in the 18th century and had nothing to do with the Nehalem vessel; 2) Soto was the grandson or other descendent of a Spanish sailor from an earlier wreck, possibly the one at Nehalem, and Franchere got the translation wrong; or 3) Soto was old enough and was the son of a Nehalem wreck survivor.

The first explanation seems unlikely as no later Spanish wrecks are known from the area, and while it is possible that Franchere misinterpreted Soto's relationship to the wrecked Spaniard there is no compelling reason to think that this is so, as he makes it clear that Soto said he was the son of the wrecked Spaniard. It is certainly possible that Soto was more than 70 years old, and was the son of a sailor who survived a wreck at Nehalem around the turn of the 18th century and who did not have Soto until some years (or decades) later. Franchere's record of the son of a Spanish sailor who survived a wreck at the mouth of a Northwest river predates accounts by Nehalem settlers of Indian legends of wreck survivors, which often tied similar stories into tales of the Neahkanie treasure, dueling ships, and large parties of survivors.

Lewis and Clark reported a fair-skinned Clatsop Indian they believed was half European (Thwaites 1905) that they saw during their time in Oregon. The fact that descendants of European sailors were living among the coastal Indians is substantiated by a report in 1814 of a Clatsop man with the name “Jack Ramsey” tattooed on his arm. He was said to be the son of an English sailor of the same name (Hult 1960: 5). Exactly who these sailors were and when they wrecked or deserted their ships is unknown.

In 1844 one of the early missionaries to the Oregon Territory, Daniel Lee (Lee and Frost 1968), wrote:

About thirty or forty miles to the south of the Columbia are the remains of a vessel which was sunk in the sand near shore, probably from the coast of Asia, laden, at least in part, with bees-wax. Great quantities of this wax have been purchased by the Hudson’s Bay Company and individuals; the writer also obtained a number of pounds of the same article from them while there, and was informed by them, that whenever the south-west storms prevail, it is driven on shore. While living on the banks of the Columbia, an Indian girl who lived in the family brought in a piece one day which had drifted around with the tide, and lodged upon the beach of the river; this was as large as a man’s fist, and having been lodged in the mouth of some small stream, which enters the ocean somewhere to the south of the river, and stuck between stones, or wood, as was evident from the prints remaining in it, it was completely petrified.

In 1857, Swan (1966), writing of his residency from 1852 to 1855 at Shoal Water Bay in Washington, noted:

There is also a tradition among the Indians that a Chinese or Japanese junk was wrecked years ago on Clatsop Beach, south of the Columbia. Part of her cargo was bees'-wax. And, to prove the correctness of this tradition, there are to this day occasionally, after great storms, lumps and pieces of this wax found on the beach. There are no wild honey-bees west of the Rocky Mountains, consequently the wax was not the product of that part of the continent, but must have been brought as the Indians state. I have had some of this wax given me by an old Indian doctor, who had picked it up on the beach. The crevices were still full of sand, and the action of salt water and sun had bleached it nearly white. This specimen was sent by me to the California Academy of Natural Sciences.

Writing in 1895 in the publication *Lewis and Dryden’s Marine History of the Pacific Northwest*, E. W. Wright (1961) said of the wreck:

In 1772, according to well-authenticated stories and traditions, one of Spain’s Oriental fleet, while on a voyage from China, laden with beeswax and Chinese bric-a-brac, was blown to the northward and wrecked near the mouth of the Columbia. Most historical writers have given the location of this wreck as being on the north side of the Columbia, but there is a strong probability that the scene of the wreck was near the mouth of the Nehalem River, at which place large

quantities of beeswax have been and are still being found. Aside from the presence of the beeswax *and other traces of the wreck* [emphasis added], the Tillamook Indians have had the story handed down with considerable accuracy. Adam, a Tillamook chief, who died at Tillamook a few years ago, and who was a remarkably intelligent Indian, told the writer that his father, when a young man, had witnessed the wreck, and that all of the crew were drowned. As Adam was over one hundred years old at the time of his death, there is no reason to doubt that the Nehalem beeswax ship, of which so much has been written, was identical to the one wrecked in 1772.

Wright's story illustrates that by the end of the 19th century, various accounts and oral traditions were already being mixed together to produce widely varying accounts of where the wreck was located (e.g., along the Columbia or at Nehalem) and when it wrecked. There is no other account of a Spanish ship wrecking on the coast in 1772, although Wright suggests that this occurrence was "well authenticated." Wright noted his informant, whose credentials were that he was a "remarkably intelligent Indian," said that the wreck occurred during the time of his father or about 1772. This is much later than any other accepted account for the Nehalem wreck, even among Tillamook oral traditions. It might include the period of Soto's supposed father from Franchere's account but Franchere described Soto as "very old and nearly blind" which doesn't suggest someone less than 40 years old (which Soto would have been if his father wrecked in 1772). The vessel referred to as having wrecked around 1772 is likely a distortion of earlier stories of the beeswax wreck.

The Beeswax

The beeswax found on the beach at Nehalem occurs as candles and blocks, some of which are reported to weigh up to 125 pounds (Tillamook Pioneer Association 1972). Some of the blocks have Arabic numerals and other symbols carved onto them (Marshall 1984: 182). Hult (1960: 37) cites the claims of Schurz that the marks resemble ownership marks found on galleon manifests in Spanish archives. According to Lévesque (personal communication, 2006), the author of a comprehensive history of Micronesia and European activities in the Pacific (Lévesque 1992-2002), Schurz' work is full of inaccuracies and that no such connection to Spanish manifests has been demonstrated to date. These marks may help determine which port or from which nationality the cargo originated if a systematic study of the marks or cargo marks in galleon manifests can be undertaken. Although studies of similar marks from other recovered galleon cargos have suggested they are personal owners' marks that combine a variety of symbols (Mathers et al. 1990:444-445) and therefore may not prove that valuable for identifying the



Frank J. Kumm, custodian of the Pioneer Museum of Tillamook, holds a choice specimen of beeswax, 1952. (Courtesy of the Salem Public Library website, accessed November 28, 2006 at http://photos.salemhistory.org/cdm4/item_viewer.php?CISOROOT=/max&CISOPTR=791&REC=10)

wreck. Mathers et al. (1990:445) noted, however, that such marks were exclusively a Spanish custom that was not practiced by other nations at the time.

Local Nehalem residents during the 19th century were well aware of a shipwreck and the presence of wax teak lumber, and a hull structure. Another well known fact was the the beeswax was a widely traded item before and after Euroamerican contact (Hult 1960; Erlandson et al. 2001). Throughout the late 19th and early 20th centuries, various local publications and newspaper accounts refer to the beeswax wreck and to the collection of beeswax by local residents. During the 19th and early 20th centuries, teak wood from the spit also became a commodity of trade among the local residents. Woodward (1990) noted that “between 1890 and 1916, one wreck with exposed ribs, a keel, and teakwood decking was partially stripped of its wood, which was then used locally to make furniture and souvenir walking canes.” Mrs. Ben Lane (Tillamook Pioneer Association 1972), writing in 1938, noted that in about 1910 her father-in-law, Mr. Edmund Halley Lane, had three piles of teakwood planks “as high as the woodshed roof,” and that this lumber was scattered over the years into the farms and homes of the local residents when hard wood was needed for some project.

One metal artifact has been recovered from the offshore wreck: a small silver oleum (oil) jar with lid. John E. Tuttle, who was digging for wax during a very low tide in 1898, discovered this oleum jar. It has been identified by Dutch silver experts as being one of a set of three jars used in various Catholic rites, and is of a style that was used in the 17th century (possibly the second half) and later. It has a stamped “O” on the lid, for oleum, and is of a style that could have been made either in Europe, one of the Spanish colonies, or Asia. Its presence in the wreck suggest that a Fransican monk or priest was aboard, according to the curator at the Museum Catharrijneconvent, the Dutch nation museum on Christianity (Lujit, personal communication via e-mail, 2006). This silver vessel is now housed at the Tillamook County Pioneer Museum.

Thomas Rogers (1899) wrote an article for a McMinnville paper noting that after a “lapse of 25 years” the wind had again exposed the remains of wreckage at Nehalem, “600 yards back from the beach in the basin of sand jutting out from the base of Necarny [Neahkanie] on the south.” He notes that part of the hull was present, but was not upside down as others had reported, suggesting he viewed a portion of the hull that was intact enough to determine orientation. This portion he described as being “far down in the muck and sand.” Rogers goes on to describe many

other pieces of wreckage in the basin, “soggy and wet and heavy” and from “five to ten feet in length,” including a large mast step. He noted that much wax was also found in this basin.

20th Century Accounts

In 1929 in two nearly identical articles, the newspapers *Wheeler Reporter* (1929), the newspaper of the town of Wheeler on the east side of Nehalem Bay, and *The Oregonian* of Portland (1929) reported that a Mr. E.M. Cherry had “definitely located the wreck” about 300 yards in from the sea wall (the dune front) and was making plans to excavate the remains. This wording suggests that by that date, the location of the wreck was not a well known piece of information. The story notes that “It is a known fact that the ship is buried in the sand and that part, if not all of it, was teak and other hard woods, that nearby the largest deposits of beeswax have been discovered.” The article also noted that the remains of the wreck had not been visible for the last three years, indicating it was buried by 1926 but that prior to that it was visible. Cherry never did raise the funds to build the coffer dam and dredge the sand away from the wreck, either due to the stock market crash of 1929 or due to the disinterest of any investors willing to commit to the sum of \$30,000.

Both of these articles indicate that at times the sands of the spit shifted and wreckage was exposed, and that at least some of this wreckage was teak wood that had wax associated with it. It must be noted, however, that teak was a common wood used in maritime construction for centuries and was used by many different cultures in a variety of vessels, so that its presence as lumber in the sands at Nehalem does not give any indication as to the age or origin of the vessel(s) wrecked there (unless the wood is radiocarbon dated). Nor does the presence of wax and scattered lumber in the back-dune basin necessarily mean that the items are from the same wreck, since such back-dune areas are natural basins for deposition. The earliest accounts of the wreck refer to the offshore portion, and it seems that the inland portion (or portions, 300 and 600 yards inland) are only mentioned by later writers after much wax prospecting had been conducted.

In the 1950s and 1960s, Eb Giesecke interviewed about a dozen surviving members of several long-time families of Manzanita Beach. They told him about playing in the ribs and members of wrecks on Nehalem beach, and indicated several locations where they thought the wrecks lay. These locations, combined with the historical accounts, are scattered in several areas on the Nehalem spit but cluster into three distinct areas (with a few outliers), suggesting one of two possibilities: 1) the residents played on the remains of different vessels, any one of which or

none of which was the beeswax wreck; or 2) the wreck split into two or more pieces. Of the three location clusters, one is offshore near the middle of the spit, one is in the back dune area of the beach where debris would be expected to collect during storm or tsunami events, and one is just over the dune ridge near the north end of the spit.

DISCUSSION

The best determination of potential age for the beeswax wreck comes from the historical records of missing galleons. The galleons were the economic lifeline of the Manila colony and a major part of the economy of the Spanish empire, and detailed records were kept of the sailings and fates of the annual voyages. These historic records are augmented by the archaeological record, which consists of various artifacts recovered from the beach at Nehalem, an offshore wreck, and nearby archaeological sites, and includes Asian ceramics, the silver oleum jar, teakwood planking and wooden rigging blocks, and the beeswax. In addition, there is a suite of radiocarbon dates obtained from teak planks, one of the wood rigging blocks, and various pieces of beeswax. The historic records of galleon voyages and wrecks are discussed in detail in the following Research Design section. In the paragraphs below, the archaeological record is summarized and the radiocarbon dating is discussed.

Potential Locations

The earliest and most definitive accounts of the wreck place it just offshore, where it was accessed at low tide by local residents. This is the wreck that the first wood pulley block and the wood for the teak canes came from; this is also where the silver oleum jar was found. Later accounts of the wreck, such as Rogers (1899), the *Wheeler Reporter* (1929), and *The Oregonian* news articles, mention an inland wreck or wrecks—Rogers placed his sighting in 1899 600 yards inland from the beach, while Cherry in 1929 placed his 300 yards inland. However, these observations were by people who were not residents of the area, and it is possible that they saw wreckage from some other vessel and assumed it was the beeswax wreck.

While Rogers' wrote that he saw part of a hull "far down in the muck and sand" his account raises several cautionary flags. Scattered across the same basin were other parts of the wreck, including a large mast step and, as he had been told by local informants, the mast itself that once stood upright in the basin before being cut down and hauled away to be dumped in the bay. It is impossible that a mast would have remained upright in sand, separated from the rest of the vessel, for 200-300 years. It is also unlikely that wind would blow away saturated sand to

reveal a hull lying “far down in the muck” since wind can only move dry sand and has little effect on saturated muck (although perhaps local residents had exposed the wreck in the muck in efforts to dig out wax). Rogers himself was a great booster of the “mysteries” behind the beeswax wreck and the supposed treasure of Neahkanie Mountain.

Cherry had apparently visited Nehalem several times before the 1929 articles were written, but never saw the wreck since it had not been visible for three years prior. He was, according to the articles, pointed to a location 300 yards inland by local informants. Whether a portion of the wreck actually was at that spot, or Cherry was purposefully or unintentionally misled or misleading the reporter (to prevent others from finding the wreck before he could excavate it) cannot be known. Ben Lane, the son of the family that owned much of the Nehalem spit around the town of Manzanita and who was a young boy when Cherry was trying to raise money, told Eb Giesecke in the 1950s that Cherry had told him that the location of the wreck was closer to 600 yards inland, not the 300 yards reported in the news article.

Porcelain sherds have been recovered from archaeological sites at Nehalem and Netarts Bay to the south. Analysis of these sherds suggests the most likely date they were manufactured and shipped was the first half of the 17th century (Woodward 1986), although some styles were manufactured into the early 18th century. Woodward believes that most of these ceramics were destined for Asian markets, rather than European ones, but this is dismissed by Scheans (1991). Scheans and Stenger (1990) believe that the ceramics from Netarts and Nehalem represent two different cargos, suggesting two wrecks from Asia. Giesecke has collected informant information of additional blue-on-white sherds collected by individuals from unknown locations around the bay (see also Losey 2002:434), as well as silver coins. If these finds can be located and studied, they may shed additional light on the origin of the wreck and the nature of the differences between the Nehalem and Netarts ceramics.

Wax blocks have been found all over the spit and up the Nehalem River, sometimes associated with either the offshore wreck or the back-dune basin, and often times not. A Mr. Lovell, cited in the October 1900 edition of the *Oregon Native Son* (1900: 224), noted that wax was found on the beaches as far north as False Tillamook Head and as far south as Cape Meares, a distance of about 15 miles. Hult (1960: 32-33) noted that “chunks of wax have been discovered far up the [Nehalem] river” and seemed to realize that this was odd for a shore wreck. She offered her own explanation for this distribution, relating the tale of a settler named Baker and his

technique of prospecting for wax “lying on a thin layer of clay-like sediment” often with decaying wood. He prospected the dunes until he found this clay layer, and following that he made his “greatest wax discoveries.” Her explanation for this widespread distribution of wax was to note that “a storm from the ocean at the time the Nehalem was in flood would have carried wax to places normally considered to be far beyond the storm-tide limit. Too, Indians and early white men were continually carrying wax away from the beach. Doubtless they dropped pieces in out of the way places.” She does not go on to wonder why, after taking the trouble to collect the wax, Indians or settlers would then carry it to “out of the way” places to drop it for others to find later, or how a storm from the ocean combined with a river flood would have resulted in the wax being deposited on or in the “thin layer of clay-like sediment.”

The widespread distribution of wax far beyond the storm-tide limit and its occurrence in a “clay-like layer of sediment” has a simpler explanation than relying on flood tides and large storms. The earthquake and related tsunami of AD 1700 would spread wax from a near shore wreck throughout the Nehalem drainage, as the tsunami waves moved over the spit and seiche waves oscillated back and forth within the bay. Such an event would also cause the deposition of sand and sediment layers, especially within the partially enclosed bay.

A suite of six radiocarbon dates is associated with the wreck, including three obtained from wax samples and one each obtained from the wood rigging blocks found on Nehalem Beach and one from a teak cane made of wood from the offshore wreck (Gilsen 1988; Erlandson et al. 2001:47-48) (Table 1). When calibrated to two standard deviations, these combined radiocarbon dates indicate the wood and the wax date to sometime between 1520 and 1640 although the wax dates, which generally have higher error factors, do cover a wider range of time. Erlandson et al. (2001:48) consider the most likely calendar range represented by the dates to be between about 1620 and 1650, based on three factors: 1) an average of four of high precision dates taken from various materials; 2) the ages of the ceramics recovered from Nehalem and Netarts Bays; and 3) and the lack of any wax or European good from Site TI-57 at Cronin Point, which is radiocarbon dated to occupation between 1300 and 1600.

Table 1. Radiocarbon dates associated with the Nehalem wreck.

Dated Material	Uncorrected ¹⁴ C Date	Lab Number	Calibrated Calendar Age	Primary Reference
beeswax	390±80	Beta-27530		Gilsen 1988
beeswax	280±110	?	AD 1475 (1640) 1945	Woodward 1986
beeswax	300±30	LJ-5646	AD 1520 (1640) 1645	Woodward 1986
rigging block	310±20	?	AD 1520 (1630) 1640	Woodward et al. 1990:63-64
teak cane	312±21	?	AD 1520 (1630) 1640	Woodward et al. 1990:63-64
rigging block	316±13	QL-4918	AD 1522 (1632) 1637	Peterson and Erlandson 1997
Average of four high precision dates	310±10		AD 1520 (1630) 1635	CALIB 4.3

Note: Table from Erlandson et al. (2001:47) with one addition. Calibrations were done with CALIB 4.3 and calibrated ages show ranges at 1 sigma (66%).

It is important to note several facts about the radiocarbon dates. First, even with high precision radiocarbon dates it is impossible to narrow the calibrated calendar age of a radiocarbon date to something less than several decades, which is of limited use to determining when the vessel in question sank other than to a particular half of a century. Second, the radiocarbon curve has a lot of variation over the last 500 years, resulting in multiple intercepts for dates from this recent period and making it difficult to determine what years within the calibrated range are most likely to represent the true date. Finally, the radiocarbon dates do not indicate when the vessel sank, but provide a calibrated calendar range of when the wood was alive and the wax was made by the bees. The actual sinking of the vessel was certainly several decades if not a century or more after the dates provided by the wood, because a ship built of large timbers with the outer growth rings cut off would produce calibrated radiocarbon date ranges decades or even centuries older than the year the ship was actually built (and teak is a long-lived wood, with specimens known to live over 600 years).

While beeswax should not have such a large built-in dating bias, it is possible that it could have an in-built age of two decades or more. While it is unlikely that beeswax was stockpiled for years before being shipped out (due to the volumes of wax known to be shipped from the Philippines every year), Spanish records indicate that large and abundant hives were present in the Philippine Islands (Blair and Robertson 1903-09). Beeswax can preserve for long

periods even in the wild, and large hives could have been built up by generations of bees, leaving portions of the wax several decades old.

Still, the wax dates should provide a better age estimate of the wreck of the vessel than the wood dates. There are three radiocarbon dates on pieces of wax from the wreck: two from a single piece first dated by Shell Oil Co. in 1961 and dated again in 1982 (reported by Woodward 1986:221; Erlandson et al. 2001:47) and one dated by Gilson in 1988 (Table 1). The errors on two of these dates are rather large, and when calibrated at two sigma (95% probability) using the CALIB 5.0 program (Stuiver et al. 2005) they provide calibrated calendar ranges from AD 1400-1670 and AD 1430-1830. The wax date with the smaller error factor provides a calibrated calendar age of AD1480-1660. Woodward (1986:262) cites an article by T. Linnick in the journal *Radiocarbon* (Volume 24, pp. 103-150) as the source for this date with the low error factor, but such a reference could not be located in *Radiocarbon*. The Volume 24 reference is to an article that does not list Linnick as an author, nor does it seem to list the date, and examining the contents of volumes 23 and 25 did not reveal any articles by Linnick.

RESEARCH DESIGN

While suggestions for origins of the beeswax wreck have ranged from drifted Chinese or Japanese junks, through British or Dutch privateers, to Spanish coastal vessels missing from Peru or New Spain (Mexico), the artifacts in various collections and the radiocarbon dates are consistent with a European vessel from the 17th century Pacific trade. This rules out Asian junks and Spanish coastal vessels, and the quantity of wax indicates that the vessel was not a Portuguese trader carried on the Japan current to the Oregon coast or a Dutch raider that had sunk another vessel and plundered its cargo.

The radiocarbon and ceramic dates suggest a vessel from the mid 17th century to the turn of the 18th century. The most active traders at this time were the Spanish and their Manila galleons. These vessels traveled across the North Pacific from Manila in the Philippines, to Acapulco, New Spain between 1572 and 1817. While many were lost to shipwreck and a few to combat, five are definitely known as “missing” according to Spanish accounts. Dates for the known vessels missing on the eastbound voyage, which could have inadvertently placed one of them on the Oregon Coast with a cargo of beeswax, are 1578 (*San Juanillo*), 1586 (*San Juan*), 1604 (*San Antonio*), 1693 (*Santo Christo de Burgos*), and 1705 (*San Francisco Xavier*). The 16th century wrecks, although falling within the period indicated by the radiocarbon dates are too early

for the period indicated by the ceramics (primarily 17th century). The *San Antonio* falls within the general ranges for both the radiocarbon and ceramic dates, although it is on the early side for both sets of data and possibly too early for the overall ceramic collection. Of the *San Antonio*, this is what is recorded of her loss (Dahlgren 1916: 56-57):

The *Nuestra Señora de los Remedios* and the *San Antonio* sailed from Manila in June, under the command of General Don Diego de Mendoza. The first named vessel encountered a storm in 32 degrees latitude and was forced to cut away the mainmast and toss overboard much cargo before returning to Manila after four months at sea.

The *San Antonio* had a very valuable cargo and many passengers. That great ship, which also encountered those storms, was swallowed up by the sea with a complete loss of life and cargo. A few days after the other galleon had returned to Manila word arrived that a great amount of cargo had floated ashore on the northeast coast of Luzon.

Rotten timbers were blamed for that loss as related in a letter from Friar Rios Coronel to the King which was published by Blair and Robertson, op. cit., Vol XVIII, p. 322.

The cargo that floated ashore on the northeast coast of Luzon was assumed to be from the *San Antonio* and that she went down somewhere near there, but it is perhaps possible that some of the washed-ashore cargo was either that tossed from the *Nuestra Señora de los Remedios* or was tossed off the *San Antonio*, and that she continued on to North America and was wrecked at Nehalem. The time of her disappearance falls within the range of time indicated by the radiocarbon dates on the beeswax and the majority of the ceramics.

However, the *Santo Christo de Burgos* and the *San Francisco Xavier*, wrecked only 12 years apart and appear to be likelier candidates for the wreck at Nehalem for several reasons. These include that they fit within the range of the ceramics and the manufacture of the silver oleum jar, and fall within the end range of the radiocarbon dates if in-built ages are considered. Also, both of these wrecks disappeared without a trace. Spanish accounts of the *Santo Christo de Burgos* and the *San Francisco Xavier* (cited in Dahlgren 1916:98-99, 111) state that:

...it [the *Santo Christo de Burgos*] not only failed to reach port, but was wrecked, without our gaining the least knowledge of the place where that occurred. There were some suspicions that it was destroyed by fire, for at one of the Mariannes were found fragments of burned wood, which were recognized to be woods that are found in the Philippines only. Careful search was made for many years along the coasts of South America, and in other regions; but not the least news of this ship was obtained (Bl. & Rob. [Blair and Robertson 1903-09] XLII, p. 309).

The galleon “San Francisco Xavier”, General Don Santiago Zabalburu, sailed from Cavite in August. “Nothing is known of its fate; not a fragment, no object whatever, large or small, has ever been found to serve as evidence or support for even a conjecture as to its fate, whether it was shattered on some unknown rock or was swallowed by the waves, crew and all—commander, seamen, and passengers, among whom were whole families of high rank. The ocean has kept the secret of this terrible tragedy.”

If one of these two vessels is the ‘beeswax wreck’ at Nehalem, and since they were wrecked only twelve years apart, a crucial event to understanding which vessel is the wreck and how the wreckage got deposited across the Nehalem spit is the great Cascadia earthquake of January, 1700 and its resulting tsunami (Atwater et al. 2005). Based on Eb Giesecke’s interviews with local informants and early written accounts, there seem to be two wrecks or two sections of one wreck on the Nehalem spit, caused by the wreck grounding in shallow water and then breaking up with part of it being washed over the dune and deposited in the back-dune area. Since it is very unlikely that two Spanish galleons managed to wreck at Nehalem in the 17th or 18th centuries, it seems likely that one vessel broke into two substantial pieces. Given the construction techniques of galleons, this would not be unreasonable: the lower portions of galleons were heavily built, to hold the large cargos and to support the more lightly built superstructure that formed the upper part of the vessel.

Working Hypotheses

If the wreck is the *Santo Christo de Burgos* and she was wrecked prior to the earthquake and tsunami of AD 1700, then sections of the wreck were washed over the dunes and deposited in the back-dune basin of the spit and wax was deposited all over the spit and up into Nehalem Bay by the tsunami waves, in association with a tsunami-deposited layer of sediment (the “fine clay-like sediment” for which Hult claims the most successful wax prospector searched) and above the range of flood tides. Perhaps the *Santo Christo de Burgos* wrecked on the spit at Nehalem and her lower hull was buried in sand. If the wreck survived six years of winter storms, then the tsunami of AD 1700 might have ripped the upper portion of the wreck loose from the lower stronger hull and carried it and a large part of the wax cargo onto the spit and into the bay, continuing to carry the wax far up the Nehalem River. The back-dune area, as a natural basin of deposition, would also be a natural collection area for pieces of wreckage and blocks of wax. The lower portion of the hull and any heavy items such as ballast, cannons, or anchors would have remained behind and offshore, to be buried and occasionally exposed by shifting sands at extremely low tides. While this hypothesis explains the distribution of wax high above normal tide line and in the back

reaches of the bay and its association with a clay-like layer of sediment, it seems doubtful that a wooden-hulled vessel could survive six years of winter storms without breaking up and scattering the wax and wreckage prior to the AD 1700 earthquake. However, the scattering of the wreckage and the wax may have been caused by winter storms prior to the tsunami, with the tsunami serving to scatter material around further.

An alternate hypothesis is that if the wrecked vessel was the *San Francisco Xavier*, she would have wrecked at Nehalem after the tsunami of AD 1700. If so, perhaps the tsunami had lowered the spit and, after the vessel wrecked in the shallow water offshore, winter storm waves may have broken her upper section and washed it and the majority of the wax cargo over the low dune and into the back-dune basin. This does not explain how the wax came to be found in areas of Nehalem Bay above the high flood tide levels, however, unless Hult was correct in assuming that winter storms combined with high tides might have been the agent for such deposition.

A third hypothesis is that the vessel is the *San Antonio*, wrecked in 1604. For the wreck to be either the *San Antonio* or the *Santo Christo de Burgos* a substantial portion of the hull would have had to have survived the effects of the tsunami of AD 1700, which is possible if the vessel was buried in sand. If the vessel is the *San Francisco Xavier* it would not have been affected by the tsunami.

The tsunami, then, is key to understanding which vessel is wrecked at Nehalem since it provides an event of known date and widespread magnitude. Whether or not the relationship of the wreckage to tsunami deposits can be discerned is unknown. Losey's (2002) investigations of archaeological sites around Nehalem Bay revealed how difficult it is to differentiate tsunami deposits from other fluvial deposits in the bay environment. Losey (2002:34-35) has also pointed out that the direct effects of the tsunami wave are unknown, as the height of the wave run-up is not known nor is the force with which the wave impacted the spit.

Other possible origins for the vessel at Nehalem that have been discussed in print are that it is either an unknown galleon from the period between 1620 and 1650 (Erlandson et al. 2001: 48) or a vessel of another nationality, such as Portuguese (Woodward 1995). However, Lévesque (personal communication, 2006) discounts these alternatives, noting that galleons were of such economic and social importance that galleon sailings and losses were well documented and that Spanish records are very detailed throughout the period of trade, including the period between

1620-1650. He also notes that the Portuguese plied mostly safer coastal routes between China and Japan, and while it is possible that one of these vessels may have been driven to North America by storm and current, it is unlikely it would have been carrying such a large cargo of beeswax as this article, while exported to Japan, did not have the value there that it did in the New World. Large cargoes of beeswax are hallmarks of Spanish trade, not other nationalities.

The working hypothesis on the identity of the vessel is this: the ship was an eastbound Spanish galleon and is one of the known missing vessels, likely either the *Santo Christo de Burgos* or the *San Francisco Xavier* but possibly (although very unlikely) the *San Antonio*. The vessel wrecked offshore of the Nehalem sandspit in shallow water, and was subsequently broken into (probably) two substantial portions, one of which remains buried offshore and the other which washed over the fore-dune and was deposited and buried in the back-dune basin of the spit. Exactly which vessel was wrecked cannot be determined unless datable artifacts are recovered or evidence of the wreck's relation to the tsunami of AD 1700 can be established. Of the three, the *San Antonio* seems to be the least likely, given the ceramics and (and possibly Franchere's account of meeting the son of a wreck survivor in 1811). The *San Francisco Xavier* was known to be carrying 75 tons of beeswax on her final voyage, although wax was a common commodity and it is likely that the other galleons were also carrying large loads.

POTENTIAL LOCATIONS

Of the portions of wrecks referred to in newspaper accounts and by Giesecke's informants, one is believed to be buried inland in the low area between the Nehalem airstrip and the ocean shore. The second portion, likely containing the ship's ballast and any heavy items, should be just offshore. That substantial portions of a wreck or wrecks, consisting of intact framing, planking and probably the keel, are present in one area of the spit and possibly two is supported by both early historical accounts and the recollections of the local informants. Exactly what wreck or wrecks these might be is more problematic, but the agreement of the radiocarbon date from one of the teak canes said to be made from the beeswax wreck to the dates from the wax and the rigging blocks, and the finding of the silver oleum jar in the offshore wreck, suggest that at least this location, if not both, contains the remains of the vessel that carried the wax.

Figure 1 shows three likely locations where substantial portions of the wreck are believed to remain, based on review of the historical documents and Eb Giesecke's interviews with Nehalem residents. Two inland locations are shown, indicating the uncertainty of the location of

Figure 1. has been removed from the web-site. .

RESEARCH QUESTIONS

The following questions are posed to guide research into the Nehalem “beeswax wreck.” Methods to address these questions are described in the following section.

1) Does any portion of the wreck remain intact offshore of Nehalem Beach?

A galleon that wrecked in shallow coastal water and broke up, such as during a storm, would be likely to leave a concentration or scatter of heavy items even if the wood structure of the vessel was broken to pieces. Such items would likely include ballast stones, the anchors, and cannons as well as associated personal and domestic items. At the very least, any cannon or anchors aboard the vessel are likely to still be buried offshore, as none have ever been reported among the findings at Nehalem.

2) Are there two sections of one wreck, or multiple wrecks present at Nehalem?

The historic and informant accounts suggest that two relatively intact sections of the wreck existed, at least as of the late 19th and into the early 20th century. One portion was located offshore and occasionally exposed at very low tides, although this portion has apparently not been seen in more than 110 years. Another portion or portions may exist in the back-dune area of the spit, either 300 yards inland or 600 yards inland from the “sea wall” or foredune crest. An inland portion of a wreck attributed to be part of the same vessel as the offshore wreck was apparently visible off and on until 1926, when it was last seen.

3) What vessel is the ship at Nehalem, and what year did the wreck occur?

If additional artifacts from the wreck can be located, they may indicate the origin or identity of the vessel or help identify what year it wrecked.

METHODS: FIRST PHASE

To answer the research questions posed above, some portion or portions of the wreck will have to be located. The first goal of the project is to use remote sensing technologies to locate

potential wreckage or artifact clusters for later identification. To accomplish this end, it is proposed that two separate areas be examined using two different remote sensing methods.

Remote Sensing

Area 1- Offshore Location: Based on Giesecke's interviews with local informants, we have defined a relatively limited area offshore that may contain either a buried portion of intact wooden structure or the heavier artifacts from the wreck, such as anchors or cannon. Such artifacts should be detectable with magnetometers at low tide. This method will have the least impact to wildlife in the area and park users, and is safer than towing a magnetometer from a boat in the surf. A Geometrics hand-carried Cesium Magnetometer will be used to survey a grid pattern over the area. Data will be integrated with a portable GPS system and processed through computers to identify the magnetic signature of the search area. While large iron objects, such as cannon and anchors would give off the strongest anomalies, more subtle magnetic anomalies can be recognized from anything that has altered the local magnetic field. This includes magnetic "voids" created by timber which may have a lower signature than the surrounding sands.

Area 2- Inland Location: An inland area that has the potential to contain intact wooden superstructure has also been identified through Giesecke's informants and historic documents. Parts of this area are overgrown with established trees and a groundcover of Scotch broom and grass, with portions within small wetlands with shallow standing water during the spring. Other portions, especially around the airstrip, are more open. Nearby powerlines will make it difficult to use magnetometers in this area, and so we propose to initially try ground penetrating radar (GPR). If the salt water level is deep enough, GPR will be able to penetrate to the salt layer and may reveal either large wax concentrations or portions of a vessel's superstructure. Technological limitations are presented by the unknown depth of the salt water layer under the ground water, and the possible need to clear brush in order to run grid patterns over chosen sites.

Another remote sensing method that will be tried is an *Accumeter Super Pro VI* underground Geo/Surveyor, which is designed to detect areas of dense material within and adjacent to a defined survey area. The method consists of placing four pins in the ground. They are wired together and to the instrument console which emits an electrical pulse. The pulse is interpreted on a display panel that indicates the area of density concentration. This may prove useful in determining an area of concentrated wax or hard wood, buried in sand.

Archival Data

The primary archival work will consist of organizing and cross-indexing the various primary historical records. Mr. Giesecke of Olympia has a large collection of historic references to the wreck and the beeswax, and referencing this material into a database will help to access it. Additional archival work will be done to compare the markings on the beeswax blocks to Spanish records to see if they match any recorded shipping marks or owners' marks.

Artifact Catalog

Artifacts known to have come from Nehalem and attributed to the beeswax wreck site are housed in various museums, universities and private collections and include wax, shards, wood, and the silver oleum jar. As part of this project they will be documented, photographed, and cataloged into a database. The various analyses done on the ceramics from Nehalem and Netarts will be reviewed by the project ceramic specialists, and if additional ceramics can be obtained from local, unprovenanced collections these will be recorded and analyzed. If permission can be obtained, wood species identification will be done on both rigging blocks found at Nehalem.

METHODS: SECOND PHASE

If the remote sensing reveals anomalies or targets that may represent pieces of wreckage such as wood superstructure, cannons, anchors, ballast scatters, or wax concentrations, the investigations will move into Phase II. Phase II will require excavation permits to test some of the anomalies detected by the remote sensing employed during Phase I. The scale of the Phase II ground-truthing will depend on the number and quality of the targets revealed during Phase I, and the area they are in.

It is assumed that targets in the Area 1 - Offshore Location will be the most difficult to ground truth, because of the volume of sand that is likely to be covering any remains and the limited time available to work at the periods of lowest tides. If a solid target that is indicative of a large metal object such as a cannon or anchor is found, the depth of the target will determine the likely excavation method. A shallow object may be recoverable with hand excavation by shovels, but a deeper target is likely to require the use of heavy equipment to recover and restore the excavation unit. This will have to be determined on a case-by-case basis in consultation with State Parks staff and the office of the Oregon SHPO. A curation plan will have to be developed to treat any wood or metal artifacts that may be recovered.

If targets are located in the Area 2 - Inland Location, they can first be investigated using a “water drill” to minimize any impact to the object and the surrounding deposit. A water drill consists of a half-inch steel pipe hooked by a hose to a small pump, which forces water down the pipe. This setup can be used to bore holes in sand, until something hard (such as a wood plank) is encountered. By carefully ‘feeling’ around a target with the water drill, the approximate size and shape of the buried item can be determined. This will help sort out potential buried stumps or logs from buried sections of a wreck, if any are present. As with Area 1, if a target is located that is determined to be of enough interest to excavate, consultation with State Parks and SHPO staff will be undertaken and an excavation permit will be applied for. A major difficulty to overcome if excavation is undertaken is how to handle water that will need to be pumped out of the excavation units.

Another method that may be attempted, depending on permitting and quality of potential targets, is taking core samples with a coring device. This would allow retrieval of samples, which could be used to determine wood types (teak wreckage versus naturally deposited local logs and driftwood). The drawback to this method is that it will damage whatever is sampled, although if subsurface teak is found this way that would confirm its location and allow for later retrieval through controlled excavation.

The goal of the remote sensing and any subsequent subsurface testing is to establish the location and nature of wreck deposits, and to assist in preparing a more comprehensive data recovery plan. Provenience information for all potential targets and all test locations will be maintained using GPS equipment, and all remote sensing and testing efforts will be documented in daily field notes and with photographs. A master catalog of all documents will be maintained so that each can be cross-referenced to other project documents, and target locations will be plotted on master maps of the search locales.

If subsurface sampling is undertaken, standard conservation measures appropriate for waterlogged and salt-saturated remains will be followed and the provenience of all samples and artifacts will be maintained in the master catalog. Arrangements will be made with the archaeology laboratories of either South Puget Sound Community College in Olympia, Washington, or the Oregon State Museum of Anthropology (OSMA) in Eugene, Oregon, to work with their students and conservation facilities to treat waterlogged wood samples (both

institutions have experience with conserving such remains). Curation standards for all recovered samples and documents will be to the requirements of OSMA for final curation of archaeological materials.

PUBLIC PARTICIPATION

The research team is committed to public education and outreach throughout all phases of the project, subject to the discretion of Oregon State Parks staff. This project should not impose any additional, unfunded workload onto Parks personnel such as having to deal with increased traffic or the possibility of unauthorized excavations by artifact collectors following the path of the research team. The project is likely to be of great interest to the local residents of the area, and a balance must be reached that both protects the environment of the park and any potential cultural resources and still allows for public outreach. The first phase of the research is likely not to be “exciting” to the public at large, and so specific questions and proposals for public outreach and involvement may be best handled if potential targets are identified and subsurface recovery is undertaken.

Regardless of the outcome of the project, the archival findings and the results of any specialized analyses and the remote sensing will be documented in a professional-quality report for submittal to State Parks and SHPO, and will be summarized for publication in appropriate archaeological and historical journals as well as our website at www.nagagroup.org.

FUNDING

The research group is currently exploring several options to fund the proposed research on the wreck. To date, the project has been a voluntary effort by the researchers involved, but funding will be sought for the first phase of research as proposed in this research design. If subsurface targets determined to be promising are identified by remote sensing, additional funding will be sought for a second phase of research.

CONCLUSION

In the final analysis, the best potential for identifying the wreck lies with the offshore portion, as it is likely to have heavy items such as cannons and anchors and possibly ballast stones. It is also likely to contain any metal artifacts, since none of these items have ever been reported being found on the beach (with the possible exception of silver coins, which has not

been confirmed). In fact, the only metal item ever reported to be found is the silver oleum jar, which came from the offshore wreckage.

The beeswax wreck is more than a mystery that has intrigued residents and visitors to the Oregon coast for over a century: it has the potential to be an archaeological site that can help answer research questions on a variety of topics, from early European contact on the Northwest Coast to the adoption and trade of exotic goods by Native peoples prior to European contact. If any portion of the wreck or diagnostic artifacts remain to be recovered, either offshore or in the back-dune area, they have the potential not only to address these and other research questions, but to engage the public in part of the history of Oregon and the Northwest Coast.

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