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HISTORY OF SHIPPING OF MARTHA'S VINEYARD

An Interactive Qualifying Project Report

Submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

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Approved:

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Abstract:

The Martha's Vineyard Historical Society Museum maintains a specialized collection of shipping related books and artifacts. Using this collection, the group examined the role of shipping in the Vineyard Sound in the Nineteenth Century. The group created a database to improve access to the museum's collection by presenting photographs and allowing searching of two boarding logs. Statistical searches of the boarding logs show a change from general maritime shipping in the Vineyard Sound to industrial shipping in the period from 1840 to 1875.

Authorship Page:

The background, history except for the steamship section, database, and implementation chapters were primarily written by Matthew Hilt. All work related to the steamship section was written by Pete Gonzalves. The results chapter was co–written by Matthew Hilt and Jim Stickney. The entire group collaborated on the introduction. Matthew served as the chief editor for the final report.

The database was written and debugged by Jim Stickney. The entire group tested the database. Matthew and Pete scanned the images for the database. Pete formatted the images once scanned. Jim entered the majority of the boarding records into the database.

Acknowledgments:

The group would like to acknowledge the staff, interns, and volunteers at the Martha's Vineyard Historical Society that helped us with this project. Specifically, we would like to thank Peter Van Tassel and Louis T. Becker from the library for their help with finding books and other items in the collection. We would like to thank Jill Bouck for her guidance during our work at the museum. We would like to thank Arthur Railton for his insight into Nineteenth Century maritime culture.

Chapter 1 – Introduction:

The Martha's Vineyard Historical Society maintains a museum in Edgartown on the island which houses the bulk of the records relating to the island's history, with the library alone having over 15,000 items, including books, photographs, maps, and manuscripts. Within the collection are volumes of books and photographs relating to shipping and the sea. Before the group closely examined the holdings of the museum, no reliable record of the collection existed to guide potential research. Accessibility to the primary sources needed improvement.

As the group examined the contents of the museum, the group became interested on the impact of Nineteenth Century coastwise shipping on the Vineyard. Materials found at the museum would allow the examination of types of ships and cargo seen in the Sound at various time periods in the Nineteenth Century. This information would tell the group what goods and types of vessels routinely passed the island. To facilitate access to the necessary data, a computerized database was written and implemented . As shipping has played a vital role in the history of the island, to study maritime history is to study the culture of Martha's Vineyard.

Over the course of the project, the group wrote a database to store information related to both a photograph collection and to a collection of boarding logs. These records contain information on specific ships, dates, and cargoes. Using the database, the group could gather statistical data showing any patterns in Nineteenth Century shipping.

From the island's birth, Martha's Vineyard has been linked with the sea. Formed out of glacial deposits from the last Ice Age, Martha's Vineyard has grown into a popular resort island. From the earliest human inhabitants to the current residents and tourists, the people of the

Vineyard have relied on sea transport for passage and supplies. As the Vineyard lacks a bridge to the mainland, shipping has forged the lifeline to and from the island.

For thousands of years, humankind has enjoyed the island of Martha's Vineyard, off the coast of Cape Cod, Massachusetts. Lying approximately five miles off the mainland, the Vineyard is accessible only by boat, and more recently by aircraft. As a result, the Vineyard boasts a proud maritime tradition, beginning with Native Americans and continuing to modern vacationers and fishermen. For the past 300 years, the waters near the Vineyard have provided fertile fishing grounds and safe harbor for commercial traffic along the eastern seaboard.

Ships represented one of man's earliest technological triumphs. Through mastery of the sea, humankind extended his boundaries across vast oceans to each of the seven continents. Faster ships and better navigation techniques slowly shortened the gaps of the great oceans, allowing the growth of global empires. Research into various hull designs led to increased stability and larger cargo capacity. Ships have evolved into highly specialized designs, specific to both function and region of operation.

Halfway between New York and Portland, Maine, Martha's Vineyard represented a common stopping point for coastwise shipping on the East Coast. Before the completion of the Cape Cod Canal in 1917, ships could either sail around the Vineyard and Nantucket through the open ocean or they could pilot the Vineyard Sound, the channel of water between the island and the mainland which has many sandbars and shoals. As glacial deposit comprises most of the island, large rocks and boulders form the island's foundation and hazardously litter the Vineyard Sound. Because an accurate chart of the tides and the channels through the Sound was not published until Elbridge's in 1884, ships often hired local sailors to pilot their vessels through the sound. This linked the Vineyard to one of the most vital trade routes in the country.

Few primary sources remain from the Vineyard's earliest shipping history. Ship's

ledgers and account books lived a perilous life constantly exposed to the elements. Those that survived their tenure at sea often returned home to remain on shelves until being reused as scrapbooks. The tabular format of the account books made for easy markup for pasting newspaper clippings and other odd articles in neat fashion. Few of these records survived to be added to the collection of historical society museums, such as the Martha's Vineyard Historical Society Museum. These museums provide the vital service of protecting accounts of historical maritime technologies.

Museums link technology and society in many ways. Museums preserve historic artifacts, ancient technological innovations, so that present and future generations can study these devices. Written and visual records preserve personal views on the world, providing a glimpse at cultures past. Using modern preservation technologies, the technologies and cultures of the past live on.

Chapter 2 – Background:

The Martha's Vineyard Historical Society Museum in Edgartown, Massachusetts, is a small, privately funded museum staffed primarily by volunteers. Founded in 1922 and incorporated in 1923, the Martha's Vineyard Historical Society – formerly the Duke's County Historical Society – operates the museum. The museum's roles include documenting, preserving, and presenting the history of Martha's Vineyard.

Conservation:

The museum has a limited budget and in turn has limited technological resources. Conservation of artifacts is of utmost importance. Volunteers and staff follow special procedures to handle the artifacts to minimize the risk of damage.

The museum follows a "conserve–as–you–go" policy. The museum lacks the budget to pay for conservationists to routinely patrol the collection and correct problems. The museum relies on the researchers to perform these functions. When any problems are encountered while working with a source, the problems should be corrected. For example, if books are misfiled, the discoverer should properly file the books and correct any erroneous catalogue cards.

The artifacts are stored in the basement of the library. Air conditioners and a humidifier regulate the temperature and humidity of the room. As high heat and humidity damage and destroy old books and papers, these measures are necessary to protect the records from the warm and humid weather on the island.

Most paper is made using some form of acid to treat the pulp. Over time, the acid used

to create the paper will gradually destroy the paper. The yellowing of old paper comes from acid damage. Proper storage and maintenance of the records requires compensation to minimize spread and introduction of acids.

Gloves are essential any time an old document is handled. Acids from the hand can further break down paper. Wearing gloves while handling primary sources reduces contact of acid with the paper.

In addition to the risk of acid damage, handling can cause other damage to books. Care must be taken in pulling books from the shelves, while transporting them and while using them. The books typically have fragile spines. If not supported while the book is used, the spines can crack, causing the book to fall apart.

Exposure to light, specifically through photocopying, can also damage documents. Careless photocopying can put additional stress on the spine of a book, eventually breaking it. The high intensity of light from most photocopiers also accelerates the breakdown of paper.

Occasionally additional documents are found mixed in with other documents. Thumbing through the account books, one sometimes finds receipts or notes wedged between the pages. The letter written by William Cottle (Appendix B) was discovered in this manner. Not only do such documents typically contain a higher acid content than the books, they need to be flagged so that later researchers will find them. To properly separate documents, one must place acid–free paper around the other documents. In addition to using acid–free spacer pages, the museum staff is slowly transferring the collection to acid–free boxes for storage.

Beyond the hazards of time, storage and manufacture, primary sources undergo other fates. In an early form of recycling, people often used old ledgers and account books as a basis for scrap books. In addition to knowing how to handle the collection, the group needed to know about the contents of the collection. To identify ships in unlabeled photographs, the group

needed to learn about the different classes of sailing ships and the distinguishing features.

Types of Ships:

Historically, sailing ships are categorized by the number of sails and by the design of the sails and rigging. The ships range in size from small cat–boats to massive square–riggers. Part of the collection examined during the project included a large collection of photographs of sailing ships. In order to better sort and file these photographs, the group learned to identify the ships through line drawings and descriptions such as these that follow. With the exception of the cat–boat image, the line images come from Chapelle's *The History of American Sailing Ships.* The descriptions are adapted from *The Oxford Companion to Ships and the Sea.*

Cat–boats:

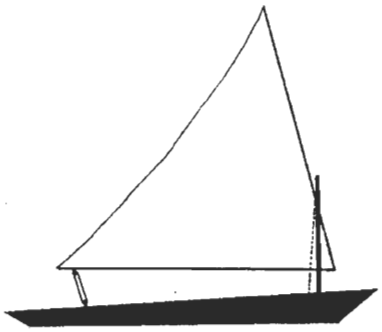

Illustration 1A Cat–Boat

The cat–boat has one mast and sail. The cat–boat sail has a triangular shape with booms across both the bottom and top. These two booms distinguish the cat–boat from other single sail boats. The single sail allows easy sailing with no crew and little training. The simple and inexpensive design has made the cat–boat a popular boat in the waters around Cape Cod. The cat–sloop adds a jib to the basic cat–boat design. The cat–sloop offers more versatility in rigging and better control in uneven winds.

Sloops:

Perhaps the most common private sailboat today, the sloop has one mast and two sails. The main sail is the larger of the sails and is located to the rear of the boat. The smaller sail is known as jib. While the main sail has a single boom across the bottom, the jib has no boom. Instead, it is restrained only by rigging lines. Since the jib requires little maintenance, one person can pilot a sloop, though it requires some experience.

Yawls:

In the class of two mast ships, the yawl is the simplest. Yawls have a large mast and main sail amidships, much like the sloop. However, the yawl also has a small mast and sail behind the rudder. The additional mast allows greater flexibility in choosing sails, which permits operation in different weather conditions. The additional sails and longer length require a small crew.

Ketches:

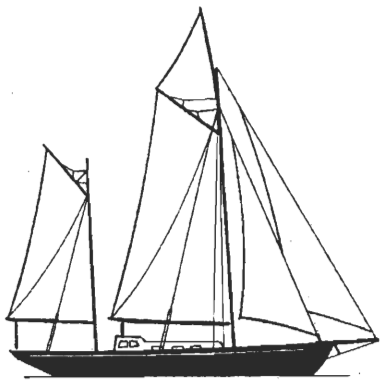

Illustration 2A Ketch

One step larger than the yawl is the ketch. The ketch also has two masts, with the main mast rigged the same as the previous two ships. The second mast in the ketch is larger than the second mast in the yawl, and is located before the rudder. The area of the jib and rear sail combined is equal to the area of the main sail of the ketch. The ketch requires a larger crew and is intended for sailing over long distances.

Schooners:

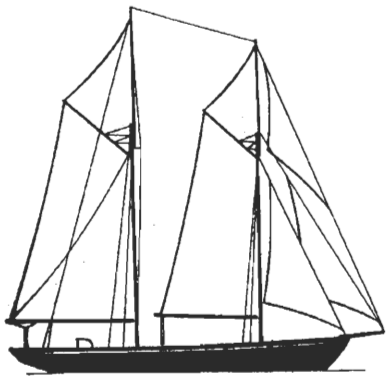

Illustration 3A Schooner

The schooner, a mainstay of coastal shipping, comprises the next larger category of ship. The schooner again has a minimum of two masts, though some designs have ranged up to six masts. The schooners used for extensive coast–wise shipping often had three masts. Schooners are further classified by the type and rigging of the sails. The hulls range from 45 feet to well over 100 feet in length.

The following are examples of ocean going vessels,often listed under the more general classification, ship.

Brigs:

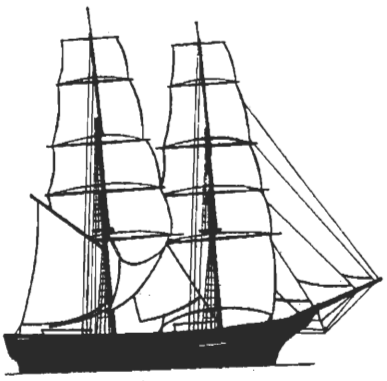

Illustration 4A Brig

The term brig describes the rigging of the ship. Typically brigs were larger vessels that

schooners intended more for crossing oceans than use for coastal shipping.

Barks:

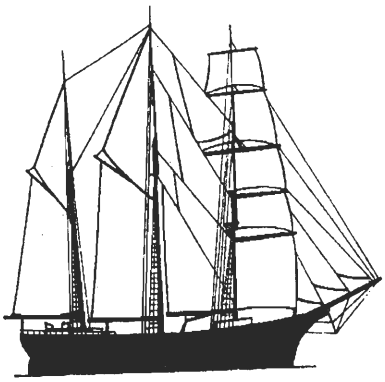

Illustration 5A Bark

The bark served as the primary vessel in the whaling fleet. Smaller boats, or launches, would actually hunt and harpoon the whales. The barks would then retrieve the whales and process the bodies for oil and blubber.

Revenue Cutters:

The United States Revenue Cutter Service patrolled the coastal waters in the days before the Coast Guard was established. Operating from 1789 through 1849, the Revenue Cutters maintained the lighthouse stations, assisted with maritime accidents, and inspected ships for illegal cargoes. The Revenue Cutters have always been a distinct class of ship based initially upon the schooner and operated only by the USRCS and later the Coast Guard. As the Revenue Cutter Service gradually converted its fleet to steamships, one of the last sail–powered cutters, the *Hamilton*, operated off the coast of Massachusetts.

The *Hamilton*, launched in 1833, is a typical cutter, displacing 112 tons and carrying an armament of four 6–pound cannons (King). Between the years of 1838 and 1844, Commander

Josiah Sturgis captained the *Hamilton*. The museum library contains the boarding log of the *Hamilton* while it was under Sturgis' command. The boarding log lists the type of vessel, the master's name, the origin, the destination, and the cargo with occasional comments. In these six years, the *Hamilton* boarded 1488 ships in the waters off the coast of Massachusetts.

The two most common routes investigated by the *Hamilton* were the routes between New York and Portland and between Boston and ports in the Gulf of Mexico. The vessels typically carried foodstuffs from the south and natural resources, such as stone and lumber, from New England.

Chapter 3 – History of the Vineyard and its Maritime Traditions:

Though archeological data suggests that the island has been inhabited for over 30,000 years, Martha's Vineyard was first visited by European explorers in 1004.

Officially, the island is the County of Dukes County, Massachusetts. The repetitive name comes from the history of the island. Martha's Vineyard was initially claimed by the colony of New York. New York named its coastal counties Kings County, Queens County, Princes County, and Dukes County. When Massachusetts took control of Dukes County, the County was renamed in accordance with the naming structure of Massachusetts. Officially, Massachusetts counties are named as the County of, such as, the County of Worcester. As a result, Dukes County became the County of Dukes County (Sibley).

Charles Banks has written the best history of Martha's Vineyard is his three–volume *History of Martha's Vineyard, Massachusetts.* Though written in 1911, this anecdotal account gives an accurate account of early island history.

Early exploration:

The first recorded sighting of the Vineyard comes from the saga of Thornfinn Karlsefne, told in 1006. The saga tells of an island surrounded by strong currents, overrun by ducks. The Vikings named the island Straumey, meaning Stream Island. In 1524 the Italian explorer Giovanni da Verrazzano sailed past the island on his voyage to Newfoundland from North Carolina. Though he never set foot on the island, he named it Luisa.

Bartholomew Gosnold, an English explorer, named Cape Cod on his landing there on May 14, 1602. The name came from a bountiful catch of cod fish that day. Gosnold has the distinction of being the first European to spend time on the Vineyard. Though uninhabited, the island showed signs that natives used it as a fishing ground. In his log book, Gosnold recorded the entry "The first Island called Marthæs Vineyard." (Banks 62) Though there is some dispute that Gosnold describes the Island, he built a house at Buzzard's Bay and lived there for three weeks. On his return voyage, he took with him furs, skins, sassafras, cedar and other goods. Later explorers passed by the island, but it was not settled until 1641 when Thomas Mayhew began his missionary work. As people began to settle the island, they looked towards the resources of the ocean, namely fishing and whaling, for profitable venture.

Whaling on the Vineyard:

While the natives are believed to have hunted whales from boats shaped like double canoes, the first recorded whalers hailing from the island date to 1702. The Edgartown Records list John Butler and Thomas Lothrop as having killed three whales (Banks 430). As Edgartown was rather small in the eighteenth century, most of the whalers from the Vineyard contracted their services to ships from Nantucket and New Bedford.

Whaling brought significant amounts of money to the Vineyard. A large whale could be worth as much as £70 per ton. Drift whales, dead whales that drifted ashore, were of sufficient value that they were "reckoned a part of the common rights of the proprietors of the soil." (Banks 432) The first local whaleboats were launched from land when whales were sighted. Whaling gradually expanded into the Atlantic, with boats sailing as far as Brazil by 1774 (Banks 435). Thomas Jefferson's report to Congress showed the incredible profits from only Arctic whaling. Between the years of 1771 and 1775, the Vineyard outfitted an average of 12 ships per

year averaging 60 tons each. They brought back an average of 900 barrels of sperm oil and 300 barrels of whale oil. These figures set the average income from Arctic whaling at $32,000 per year.

Whaling peaked between the 1820s and the 1850s. The industry operated throughout the Atlantic and into the Pacific, after Captain George Bunker's 1791 voyage to Callao, Peru. The ships had grown too large for the shallow waters around Nantucket. Most whaling vessels hailed from Edgartown and New Bedford. The first whaling boat from Edgartown, the *Apollo*, set sail on July 5, 1816. The *Hector*, considered the luckiest whaling ship in the fleet, sailed from 1826 until 1853 under seven different captains. She took 19,697 barrels of oil in her 25 years of service. An Edgartown man, Captain Charles Fisher, took the largest recorded sperm whale, yielding 168 barrels of oil, on an 1884 voyage of the *Alaska* (Banks 445).

After the 1850s the industry began to dwindle. Oil from western Pennsylvania wells supplanted the need for whale oil. Crews became harder to staff, "as the whales became scarce and the 'shares' less profitable, the owners were obliged to fill the forecastle with the 'floaters' along the docks." (Banks 448) Whaling no longer yielded the profits of the previous century; as a result, mainly the bums along the dock could be enticed to crew the boats. The biggest blow to the industry came in September of 1871. Thirty–one ships were lost in an Arctic storm, including two from Edgartown, the *Mary* and the *Champion.* Though an important embarkation point for whaling voyages, the Vineyard also outfitted many coastwise and other merchant vessels. The role of steamships has also increased during the past 150 years to the point where they forge a vital link to the island.

The Cape Cod Canal:

The Cape Cod Canal, built from 1914 to 1917, has provided a direct route between New

York and the Northern New England coast by bypassing the Vineyard Sound. With the opening of this new waterway, the steam powered voyage from New York to Boston was shortened by twelve hours. Not only did this save time, the shorter distance saved fuel and avoided the treacherous waters near the Vineyard. With more of a financial disadvantage to pass through the Vineyard Sound, it is sensible to speculate that the sea traffic through the Sound was exclusively bound for the island.

Steamship History:

At the heart of every steamship is the steam engine itself. Early experimentation with steam power began around 1705 with a man by the name of Thomas Newcomen. Newcomen experimented with the concept of the steam powered pump for several years until he presented a working model in 1712. This pump immediately entered service in a mine shaft expelling water from the bottom of the mine. While this early incarnation of the steam engine was ungainly and inefficient, it paved the way for a whole new type of power generation.

The double acting steam engine consists of three main components. The boiler produces the steam used to drive the piston, the piston assembly that actually generates linear motion, and some sort of a power output device that's used to take advantage of the piston's motion. The double acting engine is so named because it applies the high pressure steam to both sides of the piston head by way of an actuating valve that alternates each side of the piston between pressure and exhaust manifolds. This cyclic action is responsible for the distinctive chugging sound of the steam engine. Through the use of simple mechanisms, the back and forth linear action of the output can easily be converted to rotary motion compatible with driving paddle wheels. (www.howstuffworks.com)

During the 19th century, most steamships drew their power from some variation of the Boulton and Watt steam engine. Just such an engine powered the *North River*. The *River* received one of only three engines exported from Britain built by Watt and his partner Boulton. The first major innovation to the steam powered engines typically used in steamships was a purely mechanical change. The drive lever was located above the engine in the earlier models, but British experimentation relocated that drive lever to the side of the engine. This allowed for the engine to be mounted lower in the hull. This led to several advantages, including more space and a lower center of mass. The lower center of mass yielded a significant improvement in stability on rough seas. (Johnston)

Around 1850, researchers developed another variation of the steam engine called the oscillating engine. This engine, like its name, is based on rotary motion of its drive components as opposed to rocking levers. It was an early incarnation of the modern piston engine, using enclosed cylinders around a crankshaft to produce its power. About the same time, steam engines also mutated into multiple chambers instead of a single boiler. This proved to be a great increase in efficiency by reusing the compressed steam several times before condensing it and recycling it back to the boiler. Perhaps the most technologically advanced version of the steam engine was the steam turbine. It made more overall horsepower and was slightly more efficient than other steam engines, but was more costly and difficult to manufacture. It also required higher pressure steam, this due to the mechanics of the engine. High–pressure steam is produced and then rushed across impeller blades mounted on a rotary shaft enclosed in a chamber. This turns the drive shaft, thus producing power. However, the steam had to be very high pressure, and great care must be taken in manufacturing to ensure precision in the impellers. Such precision requirements only drove up the cost, thus making the steam turbine impractical for most marine applications. Shortly after, around 1910, the diesel engine hit the power plant

market. Diesel fuel is very stable, relatively inexpensive, and diesel engines are more efficient and much more powerful than any steam predecessors. It was for these reasons that it quickly replaced steam power in island steamers. After about 1912, most island steamers were propeller driven and powered by diesel engines. The power and efficiency upgrades drastically decreased travel time between ferry points and increased effective load capabilities, thereby helping to secure the place of the ferry service across Vineyard and Nantucket Sounds. (Johnston)

As far as the drive output of the propulsion system goes, side mounted paddle wheels were all but universal on the early ocean faring steamships. The sidewheel design is in some ways more practical than the rear mounted wheels of the riverboats, most notably in efficiency of power transfer. It is far easier to transfer power to a wheel that rotates on the same axis as the motor output than using pulleys or gearboxes and shafts to change the direction and location of the drive wheel. Around 1840, tinkers created an innovation to the paddle wheel which ensured that the blade of the wheel would be perpendicular to the water surface during it entire stroke. Called a feathering mechanism, this device marginally increased the efficiency of paddle wheels. However, the greatest efficiency for ship propulsion lay on a different path. During the 1830s, there was heavy experimentation in Britain with an ancient concept. When Archimedes invented his screw for raising water in about the 15th century, the idea of the modern propeller was born. While Archimedes wrapped a tube around a shaft to convert the rotational motion of the shaft into linear motion, more recent researchers used curved and angled surfaces to convert the motion of the drive shaft. When the propeller was finally patented in Britain in 1838, the efficiency increase over the older paddle wheel was significant enough to mark a revolutionary change in ocean vessel propulsion. Prop driven boats were not affected by rough seas nearly as much as their senior counterparts. On rough seas, paddle wheels would sometimes lose their

contact with the water as the boat pitched and rolled on the ocean. Under similar conditions, the propeller never leaves the water. Such certainty of propulsion not only increased speed and shortened travel time, but also bolstered reliability in an already deeply rooted business market. (Johnston)

These new technological developments and their subsequent advantages reaffirmed the steamers' place in Vineyard history. Shorter ferry trips between the island and the mainland meant more trips, and thus more traffic. With an increase of shipping on and off the island, trading of goods and services becomes easier and less expensive.

Around 1830, a Nantucketer by the name of Peter Ewer found a way to combat the sandbars that were becoming more and more of a problem for whaling ships approaching Nantucket harbors. Loaded whaling ships would often strike these bars and run aground, requiring the assistance of a steamer to tow them off. To avoid this issue, Ewer designed a device to keep the whaling vessels from running aground. Called camels, the apparatus consisted of two large boxes connected by chains to float the ships out of the water. The main purpose of this undertaking was to allow ships to draw less water when entering the harbor. Constructed on the island, the boxes measured 135 feet in length, 20 feet wide at the top, 29 feet wide at the bottom, with curved inner surfaces to support the hull of a large ship. When a ship needed to enter the harbor, the camels were towed via steamer to the waiting vessel. The camels then filled their internal water tanks with sea water to submerge and position them. The engines then pump out the tanks to float the subject out of the water. When tested, the camels drew only one foot of water when loaded with 200 tons, and could support approximately 800 tons in total. This proved to be more than adequate, as steamers towed several large whaling ships into the harbor by means of the camels. The camels represented only one of several technological

improvements on water transportation that took place during the 19th century. (Steamship Authority)

The first successful commercial steamboat in the United States was officially named the *North River.* More commonly known as the *Clermont*, she was launched 1807. She operated on the Hudson River, both in New York and New Jersey. The *River's* mission included carrying cargo up and down the river on a fairly consistent schedule, making her the first regular steamer service on American waters. (Morris)

The first steamboat to cross Nantucket Sound was the *Eagle*, unofficially named the *John Hancock.* Launched April 9, 1817 in Norwich, Connecticut, she was 92 feet long, had a beam of 17 feet 8 inches, and a hold depth of 6 feet 8 inches. She made her first steam to Nantucket May 5, 1818 from New Bedford. The Eagle shuttled passengers and cargo between the mainland and Nantucket for the summer until September. Service was discontinued on the twenty first of that month due to lack of patronage. (Morris)

Steamer service to Nantucket was not restored until the steamship *Connecticut* ran to the island on May 5, 1824. She ran sporadically for four years, but failed to turn a steady profit margin and was forced to discontinue service. (Morris)

A few short years later, in the spring of 1828, the *Hamilton* began regular service from New Bedford to Nantucket. Her captain was a man by the name of Luce from Vineyard Haven. The *Hamilton* was built in Mount Holly, NJ in 1824. She was officially christened the *Lafayette*, after the French General's visit to the United States shortly before construction. After nearly eleven years of service, her 60 tons broke up at Eastport in 1835. (Morris)

Around the same time the *Hamilton* entered service, the more successful *Marco Bozzaris* arrived on the scene. Built between 1828 and 1829 by Jacob Barker, she was named after the

title of a poem written by one of Barker's employees. She made her first Nantucket run on April 4, 1829. The captain of the steamer was a man by the name of Edward Barker, a nephew of builder Jacob Barker. Perhaps even more noteworthy, the *Bozzaris* made the first steam powered trip into Edgartown Harbor in July of 1830. This marked the beginning of steamer service to Martha's Vineyard. (Morris)

The *Telegraph* was a sidewheel steamship built in 1832 for the Nantucket Steamship Company. She weighed 171 tons, and as it turned out was an outstanding icebreaker. Running between Nantucket and New Bedford, she made frequent stops at Vineyard Haven. When caught in a freeze–up, passengers would often be requested to move to the rear of the deck as the captain maneuvered the front end of the hull onto the edge of the ice. Once in position, the passengers would move to the front of the deck to add their collective weight to that of the ship. This was generally sufficient to clear a path and make headway. (Morris)

Another popular boat around the Vineyard and Nantucket was the *Island Home*, built in 1855. She was launched on September 5 of that year. She made frequent trips between the islands, Woods Hole, Hyannis and New Bedford. Her first trip to Nantucket took place the day of her launching under Captain Thomas Brown. Her main duties fell under ferry service, but she also took part in a great number of rescue operations. Towing stranded or grounded ships and transporting their crews to shore was a regular occurrence once steamships became a transportation mainstay on Vineyard Sound. Captain Brown retired in 1860 after five years of service, thereby passing command to one Nathan H. Manter.

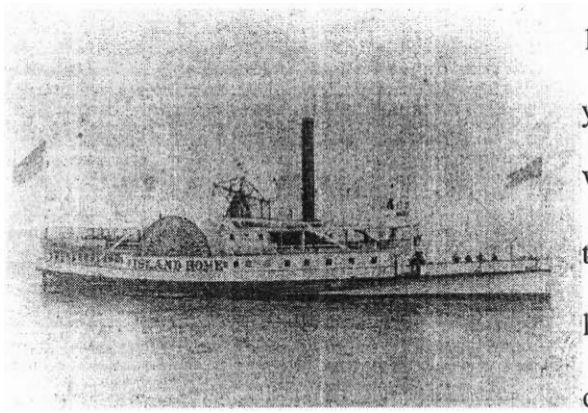

Illustration 6Island Home

In the midst of ever changing ferry service, a shift occurred from the older wharf on the eastern side of the Vineyard to the Oak Bluffs dock. Construction of the new facility took place in 1867, and currently exists today as the Steamship Authority port just to the east of the existing Oak Bluffs Harbor. This new facility provided a more centralized location for transport, and the larger wharf could accommodate larger and multiple steamships simultaneously.

After the loss of the *Eagle's Wing* in 1861, the *Monohansett* was constructed as a replacement in 1862. The *Monohansett* was a side paddle wheel driven steamer, in keeping with the current design trends. In order to reduce the overall cost of the *Monohansett*, the builders used the original drive shafts from the *Eagle's Wing*. This forced the designers to lessen the width of the hull by about 2 feet in order to accommodate the shorter drive shafts. An unfortunate drawback to cutting this corner was a noticeable sacrifice in open sea stability.

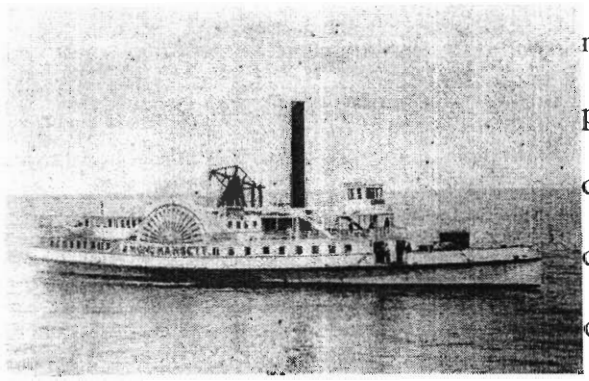

Illustration 7Monohansett

During the Civil War, the *Monohansett* saw action in the Union effort as a courier to the Atlantic fleet. Several smaller craft were put into service around the islands to substitute in the *Monohansett's* absence during the war. She was promptly returned to the island route at the close of the conflict.

Around the turn of the century, the *Monohansett* changed roles somewhat. She was bought by the New Bedford, Martha's Vineyard, & Nantucket Steamboat Co. and put into service around Boston ports. She stayed at this post until she was wrecked and finally given up as a total loss in June of 1904 just off Misery Island outside Salem Harbor. (Turner)

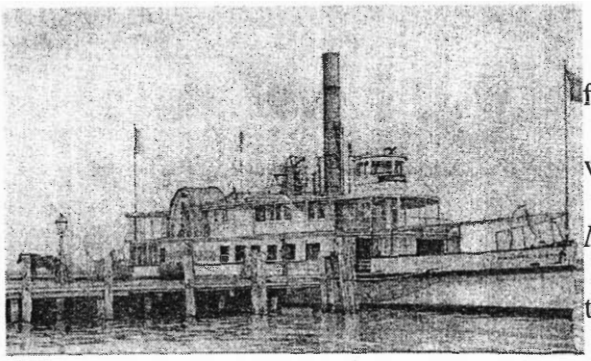

Illustration 8Martha's Vineyard

Between 1860 and approximately 1870, ferry service to the Vineyard saw several different vessels that came and went sporadically. The *Martha's Vineyard* was built in 1871, specifically to handle the island ferry routes. She was a very fast boat, and held several records for fastest time on ferry routes. She could run from Oak Bluffs to New Bedford in one hour and thirty six minutes. The *Martha's Vineyard* held the New Bedford to Nantucket record for nearly twenty years, clocking the voyage at three hours and forty five minutes. (Morris)

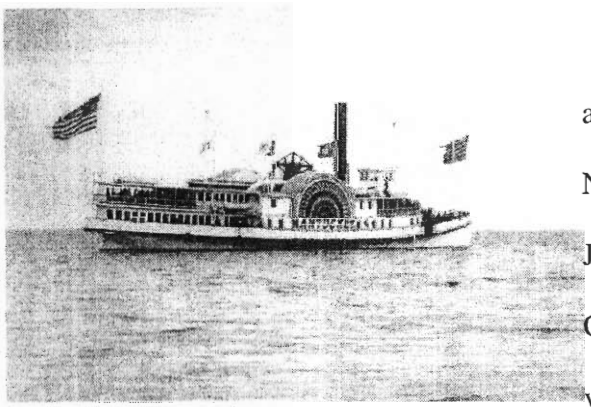

Illustration 9Nantucket

The *Nantucket* was built 1886 for service around the island that was her namesake. The Nantucket Steamboat Company launched her on July 31, 1886. Under command of Captain Charles C. Smith, she served as a ferry and utilitarian vessel on Nantucket and Vineyard Sounds for several years. (Morris)

The *Gay Head* was built in 1891 for island route service. She weighed 701 tons, measured 203 feet in length, and 34 feet at the beam. She was an encased paddle wheel steamer, as opposed to the open wheel design of her predecessors. This particular design innovation brought several notable advantages to steam propulsion. It significantly reduced the occurrence of spray from the wheels, as well as their ambient noise production. This was more comfortable

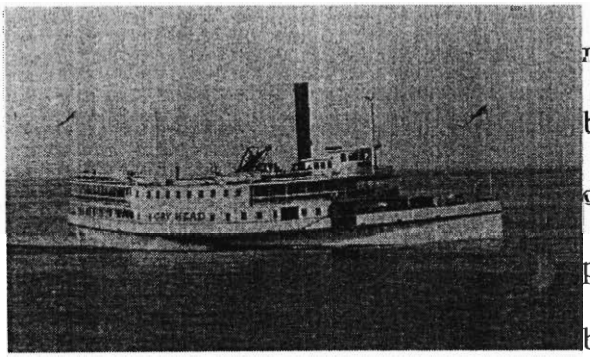

Illustration 10Gay Head

for passengers, and thereby more profitable for the owners. In addition, enclosing the drive wheels enabled a much more convenient placement of the drive shafts with respect to the corridors. Instead of ducking to avoid head trauma due to the shaft housing, passengers could simply step over the newly placed shaft housing. (Turner)

A noticeably larger steamship than other craft regularly servicing the area, the *Gay Head* was ideally suited for service to, from, and around Nantucket. Her primary purpose was freight and passenger service to and from the island, but she made routine detours to pull smaller craft free from sandbars and other obstructions in the waters surrounding Nantucket and Martha's Vineyard. (Turner)

The *Uncatena* was built in 1902 to be used in island service applications. The first steel boat in island service, she weighed in at 652 gross tons. She measured 187 feet long and 31 feet at beam. In accordance with a new theory concerning use of space aboard steamers, the *Uncatena* was "designed with reference to obtaining as much freight space as possible, yet reserving all the essentials of passenger convenience." This new arrangement of space aboard the steamer substantially increased cargo area without encroaching on passenger space and comforts. While the *Uncatena* was of a smaller stature than most other steamers of the time, she could actually carry more cargo than ships of greater size. (Turner)

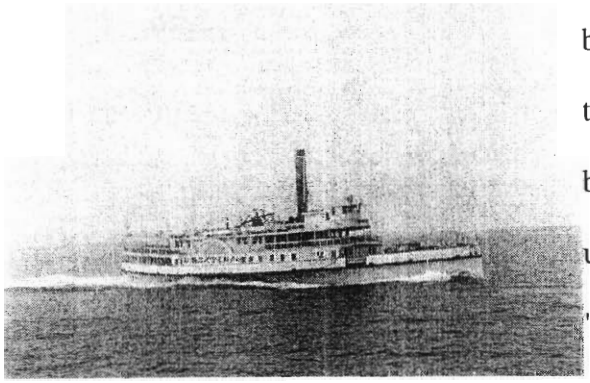

Illustration 11Uncatena

The steamship industry saw its birth in the early 1800s with the *North River* and continued to develop throughout the 19th and 20th centuries. Eventually, as technology progressed, the steamship companies became more trusted among the populous and were able to run scheduled and expanded services. The more that technology and the stability of steamers

progressed, the more activity they could bring to the island. With the steady shift toward steam power and the advent of regularly scheduled service and faster steamers carrying larger loads, activity on the island was able to grow into the present day Vineyard society.

Chapter 4 – Scope of the Project:

While examining the collection, it became evident that the museum needed a better system for organizing the collection and presenting the data to researchers. First, the museum needed a better system of classifying the collection of shipping related photographs. Second, they needed to have the shipping records analyzed with the possibility of a display resulting from the research. A computer database was chosen to create a display and improve access to the collection. While the second portion of the project was attempted as an IQP several years earlier, the person working on the project abruptly left as a result of illness and no record exists of his work.

The shipping photographs are currently classified only as shipping photographs and are located in several large omnibus folders, split between the headings of "Steamship," "Ships and Boats," and "Cat–boats." The photos of steamships have the most information provided, such as the name of the ship and the approximate date of the image. The photos of the boats and ships often lack details beyond the information presented in the image. The cat–boat collection is considered reasonably segregated and beyond the scope of this project. One likely scheme of furthering the classification would be to organize the ships by type, designation, and if possible, date.

The additional shipping records consist mostly of log and account books. The account books document all of the financial transactions of the ship and its crew. These records provide such information as the contents of the ship's stores, the wages paid to the crew, and the ports visited by the ship. Account books exist for both whaling ships and coastal shipping vessels.

Other information may exist in the collection of customs house records, lighthouse keeper's logs, and personal diaries. The ultimate goal for the research with the shipping collection is to create a potential display for the library's gallery.

The display will fill a glass display case and express some aspect of a theme, discovered by our research. Typical displays present several artifacts and have some information cards providing some insight into the artifacts presented. One consideration for a display would present a coastal schooner and describe a typical voyage, examining such aspects as cargo, route, and crew. In order to preserve the artifacts examined, several aspects of conservation must be considered. A more practical solution for our purposes is an electronic display. Our goal is to create a database of the photographs in the collection and burn it to a CD that the museum staff may run on a public computer that will serve as a display.

The Collection:

The museum's collection has two parts, the collection of images and the written records . The image collection contains 300–350 photographs. Approximately half of the images relate to steamships while the other half relate to general images of ships and shipping. The photographs are currently filed in manila envelopes under the general classification of ships. The museum assigned the folders for the steamship collection folders 805 and the folders for boats and ships folder 810. These numbers were chosen because the museum keeps photos related to transportation in the 800–series. While this scheme allows easy access to a particular category of image, the museum's current classification system does not allow easy access and referencing for specific photographs.

While almost all of the steamship photos identify the ship and an approximate date, over half of the images from the regular boats and shipping folder have little to no description

provided. The bulk of the information gathered from these photographs comes from the information presented in the image itself. While the type of ship, such as "schooner" or "cat–boat," is often clear, names or approximate dates of the photographs can rarely be determined without the aid of a caption. To properly file and catalog these images, the consideration of amount of known information is crucial.

An ideal catalog and classification scheme for the images would need to store all known information about a particular image and then allow easy searching and sorting of known information.

Chapter 5 – Databases:

The group developed for the museum a more accessible scheme for cataloging the shipping photographs and a basis for a display relating to shipping through the Vineyard Sound. Information contained within the photographs and on the captions can identify distinguishing features of the photographs. This information can include types of ship, identified either visually or through the caption, the name of the ship, the location the photograph was taken, the date, or sometimes information about any people in the photograph. Written records, such as the account books of merchant ships or boarding logs of the Coast Guard and Revenue Cutter Service, provide such information as the type of ship, the ship's master, the ship's point of origin, the destination, and the cargo carried on board. Account books can even provide specific details on the cargo itself. To keep track of this information and to allow easy searching or cross referencing, a good data management system is needed.

Database software functions like a large card catalog in a library. In a card catalog, a book is broken down into a description typically consisting of its call number, title, bibliographical information, subject headings, and a brief summary. In a good card catalog, records are sorted by call number, title, author, and subject, with each book having a card for each sorting method. While an effective means for sorting and searching for records, even the best physical card catalogs have a limit of searchableness not present with electronic databases. By expanding the capabilities of the card catalog, electronic databases allow easy storage, retrieval, searching and presentation of a wide variety of information.

On the most basic level, databases store and retrieve information, which can consist of

text, numbers, images, or any other type of computerized information . The actual database consists of a list of records indexed by the software. For example, a database of vegetables might contain the records: corn, green beans, lettuce – where each record corresponds to a number that tells the database where to look for a particular record.

The term database refers to all information stored within the database. Specific records are stored in tables. In tables, different data fields are arranged into columns, where each column corresponds to a different piece of data. Each row in the table contains all of the data specific to one record. In a table of ships, the columns would contain such data as name and type of ship, captain of the ship, and home port of the ship. The image below shows a sample table.

Illustration 12A Sample Table

In order to make good use of a database, one needs a means of adding new records and displaying existing records. The software that appends, displays, and searches the database is called the user interface or the front–end. The front–end interprets the commands of the user

and subsequently accesses the database. The concept of folders on a Windows desktop exemplifies a front–end. The folder is in actuality just an address on the computer hard drive that gives the location of files and other folders. The image of a folder and ability to move files between folders provide a pictorial means of executing the commands necessary to move files. When a folder is opened, Windows reads the file types and displays icons that interpret the file. Windows interprets the movement of the file icons and properly adjusts the address whereat the files are stored. The front–end of databases perform the equivalent operations.

Though database software dates back to the earliest mainframe computers, the use of database software and number of database programs continually expand. While the simplest databases consist merely of lists, nearly all databases have higher level functions. Due to the requirements of the project, a relational database was used for the project. Relational databases store information in cross–referenced tables for easier access and searching. Ideally, information stored in a relational database occurs in only one table; therefore, when an entry changes, all instances of the record change immediately. Most relational databases use Structured Query Language (SQL), which allows easier searching of records.

Because of its many advantages, My SQL was chosen as the database software for the project. My SQL is an open–source relational database. Open–source means that the program has been voluntarily released into public domain. Users may freely use, modify, and distribute My SQL, provided that they charge only for the distribution costs, such as the cost of burning a CD. The museum has an extremely limited budget, especially for such expenses as technological improvements. Open–source software has no licensing fees, ideal for use with a limited budget. My SQL is also a highly portable language, meaning that other operating systems can readily use the database with little or no modifications in the software's code. Finally, My SQL is an efficient language for creating databases. My SQL databases do not

require copious amounts of processor power. Since any technology resources of the museum's library would most likely be donated, any database may need functionality on slower and outdated systems.

My SQL does not have the capability to directly display the database documents. To display the documents, a web browser, such as Netscape Communicator or Microsoft Explorer, interprets the SQL file and displays it on the screen. All recent versions of Netscape and Explorer can interpret SQL files. Since Explorer comes standard with the Windows operating system, the SQL files were written using the Explorer protocols.

My SQL manages only the database, requiring some type of middleware program. Middleware interprets the commands of the user into the instruction used by the database. PHP was chosen for the project. Like My SQL, PHP is an open–source program, meaning that PHP carries the same cost advantages as My SQL. My SQL and PHP require still a higher level program as a user interface. PHP creates a web document, viewable by almost any web browser, such as Netscape or Microsoft Explorer. As most computers have some web browser installed, almost anyone can access a My SQL/PHP database, regardless of the user's operating system or computer type.

In addition to its broad support on the user's end, My SQL has broad support in the developers end. SQL is the standard database language; therefore, SQL has the greatest support and compatibility of any database language. Thousands of programmers use My SQL and they constantly add new implementations and features. This means that the capabilities of My SQL constantly expand. Because of My SQL's open–source policy, these new features become available for use immediately and require no expensive software upgrades or license renewal. Though not yet as powerful as the high dollar database software packages provided by companies such as Oracle, My SQL provides continually increasing functionality free to the

programmer.

Though there are other database software design packages on the market, they do not provide the best solution for the museum's requirements. The two major databases are Oracle System's software and Microsoft's Access database. Both of these databases provide greater overall functionality, more features, and an easier programming interface than My SQL; however, those advantages come at a significant price tag. The programs not only start around $500 for basic packages, they generally require higher end computers on which to run. Also, these program packages support features that the museum most likely would never use, such as support for e–commerce applications. While the museum may at one point consider an online gift shop, it would most likely not occur in the near future.

Using My SQL/PHP, we created a database consisting of three primary tables. The first primary table functions as a card catalog. The second stores all information regarding the photos. The third primary table stores the information pertaining to the written records, such as the boarding logs and the customs records. Though only three tables are evident from the interface, a host of smaller tables operate behind the scenes, including tables of ship types, specific ships, cargoes, and voyages. These tables work together to create a web–based reference of shipping data.

To create the database, we used a total of seven tables, each acting as a building block. The two most basic tables store information on types of cargo and types of ship. These tables do not reference any other table, making these tables the lowest level tables. The cargo table records the name and a brief description of a type of cargo. Whenever a higher level table has an entry for cargo, it goes to the cargo table to check to see if the cargo already exists. If the cargo does not exist, it can be entered into the table. For example, if a table tries to reference the cargo "coal" and "coal" does not exist, the database brings up a field to describe "coal."

Similarly, the table of ship types records information on different classes of ship and a small example image. The next level of table references these two table in addition to other data.

The next level table records specific ships. This table references the ship type from the previous table and adds the information of captain, earliest known date (ideally the date built), home port, and a description. For an image of the island steamer *Island Home*, the ship table would find the ship type "steamship" and the user would enter in any additional known information.

The next level of tables include the table of photographs and the tables of voyages. The photograph table references the ship and ship type database and adds the specific image and a description. The ship voyage and voyage cargo tables reference the ship, ship type, and cargo databases. The ship voyage table briefly describes a voyage made by a specific ship. The table lists the ship, ship type, origin of the ship's voyage, destination of the ship, and the primary cargo found on board. This information comes from the customs house records and Revenue Cutter Service boarding logs. The voyage cargo table provides a detailed look at a specific voyage. The voyage cargo database records all of the cargo on board a specific ship and allows entry of such information as cost and retail value of a cargo and transit time of a ship.

Four different types of command can act on a table. First, a table can be appended. New records are added to the existing records through a submission form. By the same process as filling out a survey, a submission form records data for the different columns in the table and adds the data to the table. Second, a table entry can be updated by replacing an existing record with new data. Third, a table or table entry can be deleted. Finally, a table can be searched. Searching requires a special set of instructions known as a search engine. Search engines interpret information supplied by the user and output resulting information that matches search criteria set by the search engine. For example, to search for images of schooners, a user could

type "schooner" into a search engine and the search engine would look for any reference to the word "schooner" in the different tables of the database. Any matches would be returned with links to the record.

Though basic, the front–end for our database provides powerful tools for creating and maintaining photographic and written records. The index page, shown below, gives the option of selecting a primary table, creating a new primary table, or searching the database. Once retrieved from the database, the primary tables present the option of appending the table or viewing all of the information contained in the table. The view option retrieves the entire table from memory and displays a summary of each in the table. In the case of the photographic table, the view button brings up a table of thumbnail images. Each thumbnail image links to the complete record, including the full–sized image and any information about the photograph. Once a specific record is retrieved, it can be edited or deleted.

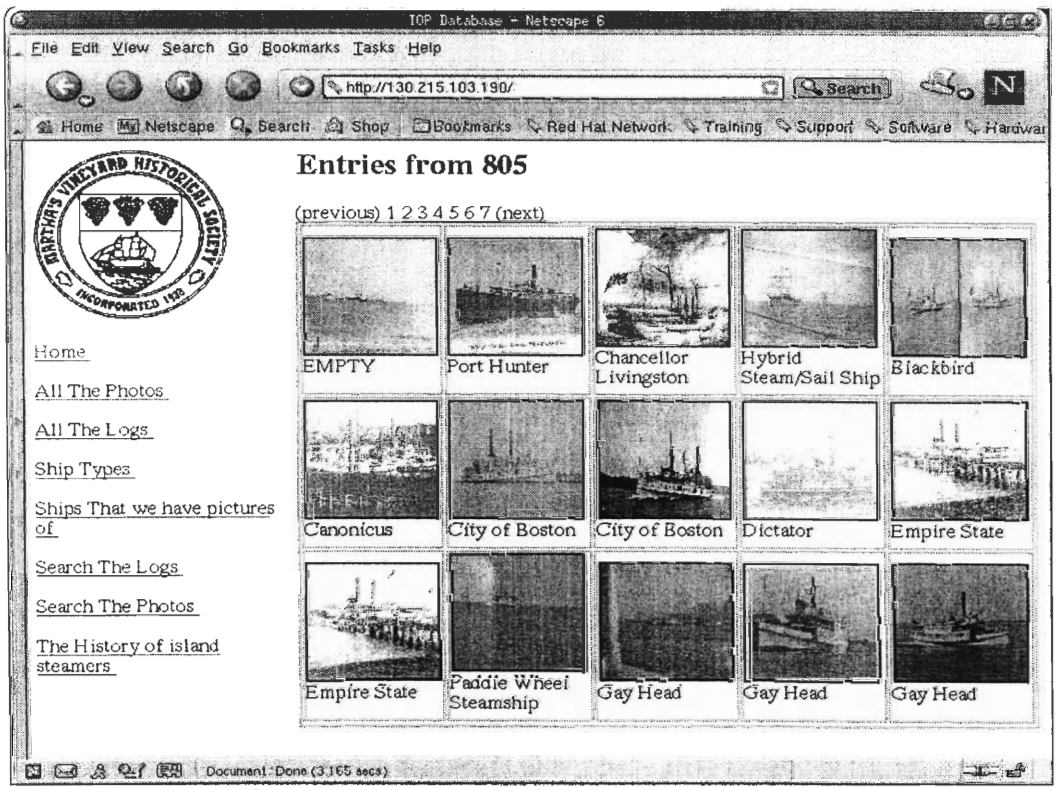

Illustration 13A Sample of the Photograph Display

Ideally, this database would be slightly modified to create a web–based exhibit. By slightly changing the front–end of the photo collection tables, the existing database can be used solely to browse the collection. By removing the buttons from the front–end that allow editing and deleting records, the front–end could only retrieve the records stored within the database. Users could click through the image collection as they could any web page. The database could run on either a simple computer terminal in the library, or it could be made available for Internet access. As the front–end can run on any web browser, any online user could access the collection. Internet use, however, presents the added challenge of security.

The database was created specifically for the records in the museum's shipping collection. As a result, the database cannot easily be implemented for recording other types of written records or photographs, for the data fields chosen describe, sort, and identify ships and boats. The databases serve primarily as a tool for future researchers. Using the photograph database, a researcher can search for images of types of ship, specific ships, or noteworthy events, such as a yacht race or a particular dock. The database of written records allows a researcher to search for trends in shipping, such as prevalence of types of ship or cargo.

Chapter 6 – Implementing the Project:

Ultimately, the group wanted to examine the patterns of shipping through the Vineyard Sound in the Nineteenth Century. To get a more complete picture of shipping in the Vineyard area, the research began by examining the collection of the Martha's Vineyard Historical Society Museum for possible sources. The investigation brought to light several different types of written records. In addition, the collection of shipping related photographs was made available. A database was implemented to sort and classify the photographs and to assist in the processing of information from the written records.

The first task consisted of searching the collection and identifying all sources connected with shipping. The books in the museum's library are filed by Dewey Decimal call numbers and referenced in a physical card catalog by call number, author, and subject heading. The cross–referencing in the card catalog is often sporadic, increasing the difficulty of searching for general records. It is also believed that several items in the collection have never been added to the catalog (Bouck). After searching the existing records in the catalog, the stacks themselves were searched for relevant sources.

The stacks comprise approximately a dozen shelves split between the basement and first floor of the library. Some of the rarer books in the collection are kept in three fire resistant safes in the basement for added protection. Without a reliable cross–reference as a guide, most of the information about the content of the museum's holdings came from physical examination of the documents.

The records relating to ships fell into three primary categories. The first category

contained account books of specific ships. The second category contained log books from ships. The third category contained the personal records of individual sailors.

The account books contained all of the financial dealings of the ships. These records were often kept by the First Mate of a ship and delivered to the financier of the voyage as a backup to the captain's account of a voyage. Captain's had a tendency to cover up any losses or other personal dereliction's of their duty(Railton). Having the additional record assured the financier of a voyage that he received his full percentage of the profits. The mate recorded every purchase made for the ship and every transfer of cargo and stores into the ship's hold. All dispersing of wages and shares of the ship's profits were recorded as well. The logs typically also contained a page for the personal transactions of each crew member with the ship's purser, usually the First Mate for a vessel with a small crew.

The log books recorded the position and actions of a ship. The museum has two types of logs, navigational logs and boarding logs. The navigational logs had accurate measurements of the ship's position taken every one to two hours. This would ensure that the vessel remained on course during a long voyage across the open ocean. None of the records were found for the coastwise shipping vessels, the vessels that would frequent the Vineyard Sound. Most coastwise vessels ventured no more than 100 miles from shore, so accurate positions were not necessary. The boarding logs recorded every instance wherein a vessel was boarded. As only government have the legal right to board ships, these records come only from government sources. The two boarding logs found came from a Revenue Cutter and Customs houses along the Vineyard Sound.

Though usually consisting of diaries, the personal records contained some surprises. The diaries tended to remain intact from their use on ships. Many account books became personal records through the practice of scrap–booking. Of the more interesting finds, during the search

of the collection, an insurance adjustment from storm damage to a vessel in 1888 turned up as well as a letter from a Vineyard captain dating to the War of 1812. The text of the letter can be found in Appendix B. After evaluating the written sources found, the group created a database tailored to record and analyze the data within that source.

The portion of the photograph collection examined in this IQP has approximately 350 images of sailing ships and steamships. The museum has separate portions of the collection for images related to whaling and for cat–boats. Part of the sorting of the image collection filtered the cat–boats and any other stray images from the collection of sailing ships and steamships. While wanting to keep the cat–boat and whaling images separate, the museum did not determine the internal ordering of these images essential. In order to make this collection easier to search and use, the remaining 300 images of the ships needed to be classified and sorted.

In the collection of sailing ships, ships were sorted by type and then the name of the ship, if known. Some of the images had captions, giving some of these details, or adding others such as date of the photograph or the area in which it was taken. Most images, however, had only the information presented in the picture. Because the different classes and riggings of ships is so distinct, one could usually readily recognize the type of ship from the image. In some cases, one could also read the name of the ship from on the ship or from a caption. The steamship collection presented fewer difficulties with identification and allowed a higher level of sorting.

In addition to allowing the group to gather statistical data on the shipping routes through the Vineyard Sound, the work done on the museum's collection will allow the museum to offer greater access of its collection to later researchers and the public. Until now, the shipping records have remained virtually untouched, except for some minor cataloging work, presumably when the items first came into the possession of the museum. The survey of the collection

conducted by the group is the first documented and available as a stepping stone for future work.

While the raw data would make a poor display, the database of the photographs presents the images in a manner suitable for an interactive display. This would move the photographs beyond their entombment in the basement of the museum's library and into a visible forum. The museum needs only a bottom end computer set up in the library to run the display. The software is completely self contained does not require network access, ensuring the security of the information stored in the databases. Patrons and researchers now have the ability to seek images of specific ships. This display will enhance the physical collection in the basement, by improving access and minimizing risk to the images. In addition to permitting the examination of shipping data in the Sound, the creation of the database has the added benefit of facilitating researcher and visitor interest in the museum's holdings.

Data Entry:

After examining the documents in the collection and implementing the database, the data needed to be entered into the computer. To accomplish this task, a separate web page, tailored to the specific needs of data entry, was written. Data entry consisted of two phases, the scanning and entry of the photographic records and the entry of listings from the boarding records.

The search for sources resulted in a few unexpected discoveries. Old receipts and other small scraps of paper turned up, tucked away between the pages of some of the old account books. Once protected with a sleeve of acid–free paper, these supplements to the ledgers were returned to the books. While reading the account book of the Ship *Acastus*, a letter was found dated from the middle of the voyage. Previously undiscovered, the letter was cataloged and the text was transcribed for possible use in the historical society's monthly newsletter, the *Duke's*

County Intelligencer. The edited and annotated text of this letter can be found in Appendix B.

The two boarding logs found in the collection did not yield quite so much insight on the maritime community on the Nineteenth Century as they did on shipping routes in the Vineyard Sound. As a result, the data found extends beyond the scope of the Vineyard. As many of the ships passed through the Sound, without stopping to discharge cargo, the information on the boarded ships provides an insight on the economy of the entire Eastern Sea Board.

The boarding logs set up by the USRCS and the Custom's department record the same information: the date boarded, the nation of ship's registry, the type of ship, the name of the ship, the master's name, the origin of the ship, the destination of the ship, the cargo and any additional remarks. The additional remarks column was frequently blank or had a count of sailors taken off the ship and placed under arrest. As a result, this field was not used for the database. The nationality of the ship's registry almost always was American or British. As Canada was still a province of Britain through the end of the Nineteenth Century, most of the ships with British registry hailed from Canada. Because of this, the nationality field was also omitted. The database entry form for the data from the boarding records reflected the choice of sources considered important and is shown on the top of the next page.

The data from the written records were entered manually. This task proved exhausting as it required the reading, and in some cases deciphering, of writing over 150 years old. The hand writing of the Nineteenth Century, though refined and often exceptionally uniform from person to person, required a learning period to read it quickly and accurately. Some entries did suffer from shaky penmanship or physical damage which prevented their use. This did not present a problem as each source had over 1500 total entries and a sample of 500 entries was taken.

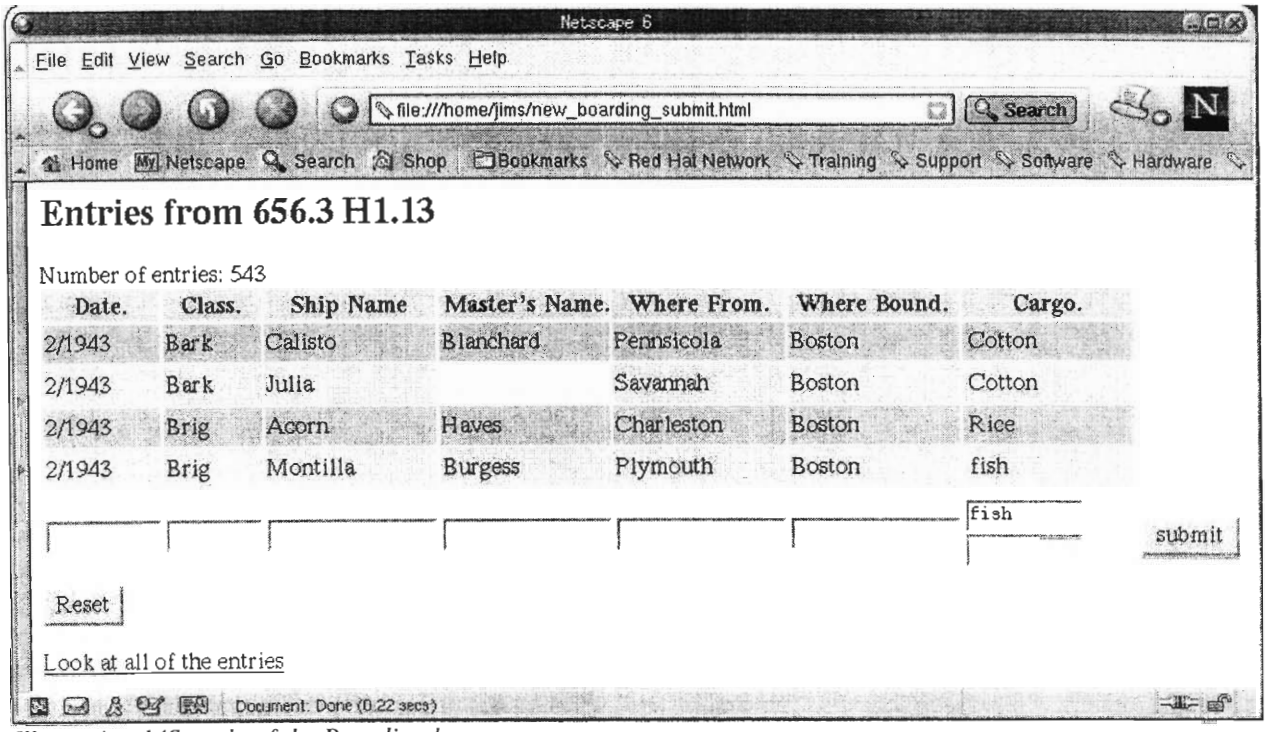

Illustration 14Sample of the Boarding log

In addition to delays stemming from unfamiliarity with the penmanship, accuracy of the data entry presented some problems. Most of the difficulties were foreseen in the planning stages of writing the data entry web page. To allow the typist to quickly find the place in a record, the web page displayed the previous six lines entered in addition to the fields for entering the next record. Several fields, such as date, type of ship, and cargo, were often repeated in the boarding records. To facilitate entry in these fields, the database automatically echoed the previous entry in the date, type of ship, and cargo columns into the entry blanks for the respective categories. The web page provided no easy means of correcting an erroneous entry once submitted; as a result, the typists needed to constantly proofread each line. As an additional measure of safety, a scrap of acid free paper was used as a straight–edge to mark the current entry in the boarding log.

The photographs presented less of a challenge to scan in the sources, but required a bit

more physical and computer work to generate a presentable database. The photographs were stored in four large folders with no order outside of subject heading. After looking through the collection, several distinguishing features became evident. In most of the photographs, the type of ship photographed could be recognized from the image itself or from the caption. About half of the images of the sailing ships had names of the ships in the captions. Dates of the photographs and other information sometimes presented themselves as captions on the back of the images. These categories were synthesized into the database entry form for the photographs.

The photograph database entry form included fields for entry of the image file, the known information about the image, and a field for a descriptive caption. The layout of this form later became the layout for the form displaying the data. The form allowed basic editing of the information.

To store the information for the photograph database, the images were scanned and saved on a computer. Any captions or distinguishing marks from the backs of the photographs were recorded for use in the caption fields of the database.

In addition to scanning the images, the photograph collection required further processing of the files. The scanner stored the image at full–size. While this ensured no loss of information from the picture, it presented the problem of storage capacity. An 8½ X 11" photograph scanned in full color with a resolution of 300 dots per inch (dpi) takes up 27 Megabytes of disk space. To store the database on a self contained CD–ROM for later use, this would limit the database to 24 images. Most of the photographs were black and white, so those images were scanned in black and white and only the color images were scanned in full color. Most of the photographs were smaller than 8½ X 11", though the empty space scanned took up as much storage space as the filled space. Each scanned image was cropped using Adobe Photoshop and rotated so that the image was in the correct orientation. With these measures in place, the images still took up

almost 600 Megabytes of hard disk space. To reduce this number, the images were resized to the approximate size of 640 X 480 pixels and stored in the ".jpg" format. The ".jpg" format is a common, universally supported format that partially compresses the information of the database to save hard disk space.

Once the data entry of the photograph database finished, the collection was sorted electronically by a search routine. The database sorted the images by the type of ship. Then, within the type field, the database sorted the images by the name of the ship, if known. Sorting not only provided a logical means of browsing the collection, it found all images of specific ships and grouped those images together. Previously, the images were split haphazardly amongst four folders. The database has provided a sequential order for these images, allowing easier retrieval of the physical records. The database could also print out a series of cataloging cards to provide a physical catalog of the images in the collection.

Chapter 7 – Results:

With the raw data stored in the database, the software needed modification to allow analysis. Rudimentary searching functions were added to the code of the database to permit the finding of patterns. With the data in a searchable database, some changes in nineteenth century shipping could be examined.

For this project, only rudimentary searching functions were added to the database. As this database primarily serves as a research tool to study a limited aspect of shipping, the group did not find it necessary to build in higher level searching. The searches necessary to analyze the data taken on cargo routes only required use of the basic search command lines.

My SQL can support complex searching like that available in a web search engine such as Yahoo. However, these search engines represent complex programs that interpret the user input and uses it as a filter to scan its list of resources. If a user wanted to correlate data between the databases, or run searches to find specific ships without browsing the database, the user would need to enter the information in terms of the search variables used by the database. Because images are highly browsable and the cargo data would not make an interesting display in its raw form, the group left the searching capabilities at the bare minimum.

The group ran two searches on the tables from the two data sets, the 1840s and mid–1870s. The types of cargo and types of ship from each database were searched and compiled into a pie chart. These two data sets provide the broadest picture of Nineteenth–Century shipping. These tables tell what people shipped and what vessels shippers employed.

The first set of pie charts show the cargoes shipped in the two time periods examined. To save space, specific cargoes were merged into general classes of cargo: agricultural, seafood, raw materials, trade goods, ballast and other. Agricultural goods included all fruit and produce shipped. Seafood, though primarily cod fish, included all types of fish in addition to lobsters and oysters. Raw materials consisted of all goods used for construction and manufacturing, such as lumber, cement, and stone. Trade goods included all manufactured goods as well as products such as kerosene, hides, or whale oil. Ballast consists of the ships which carried no cargo. To balance the ship in rough seas, the sailors added stones or sand to the cargo hold.

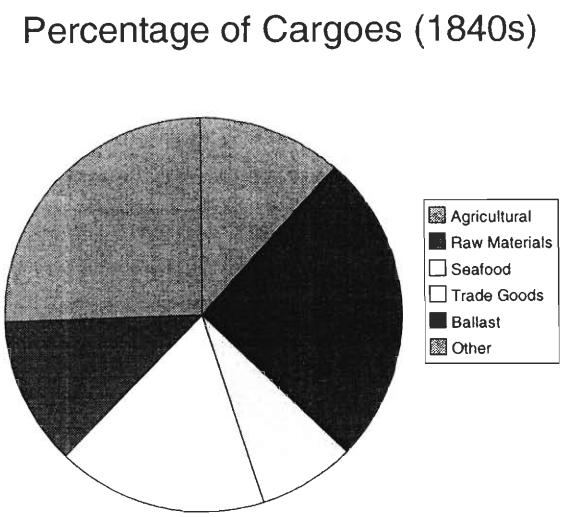

Illustration 16Chart 1

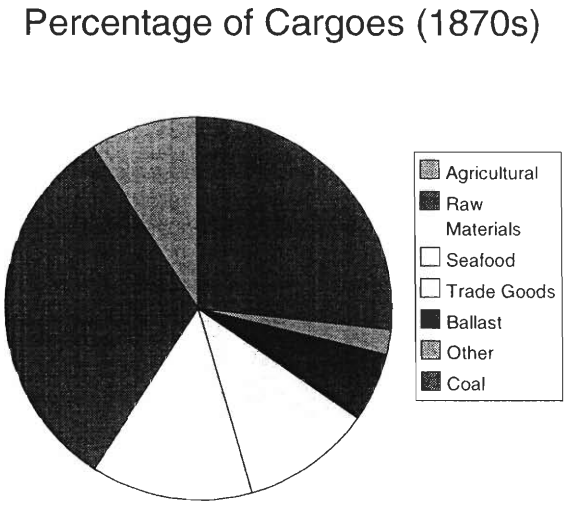

Illustration 15Chart 2

Chart 1 shows the percentage of cargoes in the 1840s and Chart 2 shows the percentage of cargoes in the 1870s.

Though only accounting for less than 0.5% of the total cargoes inspected in the 1840s, coal made up 26% of the total cargo inspected in the 1870s. Though technically a raw material, this marked increase by the 1870s merited a separate entry. Nearly a quarter of the ships

inspected in the 1840s carried ballast while another quarter carried agricultural goods. These percentages decreased markedly in the 1870s figures. Raw materials accounted for nearly half of the cargo carried in the 1870s with coal accounting for half of the raw materials. The percentage of agricultural goods decreased as well as the number of empty ships. The relative percentages of boats carrying seafood and trade goods remained the same.

These data do not show surprising findings given the changes that took place in the thirty–five years between the two times. The mid–1840s marked the start of the American Industrial Revolution. New advances in transportation and manufacturing sprung up almost overnight. In the 1840s goods shipped over land could travel almost exclusively by wagon. Few railroads linked only the most major of cities. Inland and coastal waterways provided the best access between markets.

After the Civil War, extensive well regulated railroads criss–crossed the northern states. Perishable goods such as produce could rapidly travel between cities. By the 1870s there was little financial gain by transporting agricultural products, with the exceptions of bulk grains, by sea. As the northern states experienced a vast industrial boom, they needed extensive quantities of coal. Large schooners could carry over 50 tons of coal in one trip, making sea transit of coal economical. Also during the 1870s the nation was rebuilding from the war, explaining a high demand for building materials such as lumber, plaster, and stone.

To examine any possible changes in types of vessels, the group searched the database and compiled the percentage of ships boarded in both the 1840s and 1870s based on specific types of ship. Charts 3 and 4 show the results.

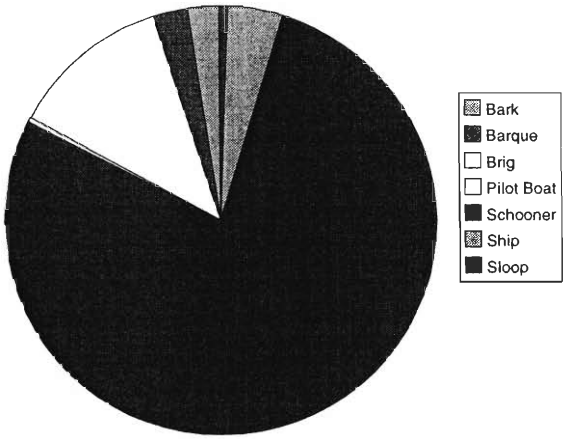

Illustration 17Chart 3

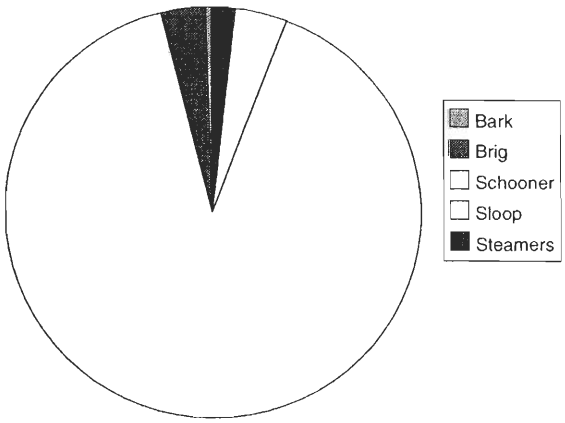

Illustration 18Chart 4

Charts 3 and 4 show the frequency of types of ship in the 1840s and 1870s respectively.

In both sets, schooners account for the majority of ships inspected. In the 1840s schooners accounted for 77% of the ships while in the 1870s, schooners accounted for 90% of the ships. This increase is most notable as the other types of ship, with the exception of steamers, drastically decreased. The barks all but disappeared by the 1870s. As New Bedford whaling had all but died by this time period, this is understandable. Shipping was moving to larger coastal vessels. With the faster steam travel available, profits hinges on shipping larger volumes of goods. Nearly all of the vessels inspected were vessels rigged for coastal work, which excludes most of the pleasure boats and other boats that would be found locally.

The data examined has many limitations. First, the sample space, the set of data record was limited. The group could find only two sources and from those sources, the group logged five entries each. This limitation comes mostly from the lack of primary sources. Only two records were discovered that contained information on type of ship, cargo, and route for a large number of ships. While other records may exist at similar historical societies, data came from

only these two sources.

In addition to the limitations from sample space, the number of ships inspected during these time periods remains uncertain. David McCoullough cites that as early 1815, more than 150 ships a day passed by the Gay Head lighthouse (*Vineyard Gazette,* August 2001). Using this as an estimate for total number of ships in the Sound per day, and a conservative estimate of five ships per day inspected, this translates to an inspection rate of 3%. The database took roughly one–third of the entries from the boarding logs. All things taken into account, these charts represent at most 1% of the total maritime traffic in the Sound. This does not, however, completely trivialize the findings.

With a focus on the commercial traffic in the Sound, the traffic from pleasure boating can be disregarded as this study focuses on the impact of commercial shipping. The customs house would not inspect these vessels unless they transported any cargo and the Revenue Cutter service would not inspect the vessels unless they appeared abandoned or a legal problem arose on board the ships. The records examined provide the best basis for research into the commercial shipping trends as the customs and revenue cutter services focused their efforts on commercial traffic.

Though unfortunate, the existence of only two boarding logs in the museum's collection does not invalidate the historical information the logs contain. The broad patterns discovered supplement what historians know. History comes only from records, written, physical or oral. The effects of time, such as loss and degradation of records, force researchers to ignore data that at one time existed. This is the fine line between history and speculation. The examination of the smallest of sources sheds new light onto an otherwise forgotten segment of the past.

These records confirm the economic history of the times. The whaling industry practically left the Cape Cod region by the end of the Nineteenth Century. Industry and

railroads required a vast network of resources to fuel the growing economy. Cape Cod consistently remained a fertile fishing ground. The Vineyard Sound served as a vital conduit for the expanding industry of the Eastern Sea Board. The building blocks of the Reconstruction Era economy sailed through the Vineyard Sound. Through the waters near Martha's Vineyard sailed the material that rebuilt America.

Recommendations for Future Projects:

The database built from the data in the boarding logs and customs house records can provide later researchers with a starting base for future research projects. While the database allows searching for references to ships in both the image collection and the boarding records, the database does not contain any record of the collection of accounting records and personal journals. The data from the boarding logs were examined primarily for statistical figures on types of cargoes and relative directions. Later work could focus on frequencies of specific ships or routes between specific ports.

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Account book of the Ship *Acastus* kept by Captain William Cottle, 1812–1816.

Boarding log of the USRCS *Hamilton* kept by Commander Josiah Sturgis, 1838–1844.

Boarding log of the Vineyard Haven, Edgartown, and Tarpaulin Cove Customs Houses kept from 1874–1875.

Appendix A: Glossary

Terminology:

Several terms, explained below, appear regularly in shipping. Except where noted, they are adapted from *The Oxford Companion to Ships and the Sea*, edited by Peter Kemp.

Aft – The rear of a ship.

Asail – Term describing a ship traveling solely by the power of the wind.

Asteam – Term describing a ship powered solely by steam engines. In recent times, this term has been expanded to include any type of engine.

Bill of Lading – Memorandum by which the master of a ship acknowledges the receipt of goods specified on the bill and promises to deliver them in the same condition as received to the consignee or his order at the end of the voyage.

Fore – the front of a ship.

Jib – Small forward sail on a ship.

Mizen Mast – The rear–most mast on a ship.

Port Side – the left hand side of the ship when facing the bow aboard the ship.

Starboard Side – the right hand side of a ship when facing the bow aboard the ship.

Appendix B:

A Vineyard Captain Abroad: A letter from the 49–month voyage of the ship *Acastus*

On July 11, 1811 Captain William Cottle (1775–1830) set sail from Holmes Hole for Petersburg, Virginia, aboard the Ship *Acastus*. In Petersburg, Cottle took on a full cargo of tobacco and set sail for France, arriving in Paris several months later. Continental Europe had languished under fifteen years of Napoleonic Wars. England, armed with the world's largest navy and the assurance that French and German mercenaries would remain safely across the sea, sought to retake its wayward colonies.

As Cottle auctioned off his precious cargo, England attacked the United States. The British Navy presented too great a danger for an American merchant vessel to cross the Atlantic. American ships faced the risk of sinking, capture, and at the minimum, impressment and the kidnaping of captain and crew from one ship to staff another ship. Were the *Acastus* to leave the neutral port of Paris, it would almost certainly have fallen prey to the British.

Because of the great risk, Cottle chose to spend the duration of the War of 1812 in France. On August 23, 1813, 26 months after leaving Holmes Hole, Captain Cottle wrote a letter home to his wife, Mary, expressing his concerns and anxiety from the war.

[The printed text below is a literal transcription of the original document. The variations on spelling are genuine and all corrections in spelling follow Cottle's notations.]

Paris August th 23 y 1813

Dr Mary

I have again to write you from this place and when I shall get clear of it I cannot say but am determined to go home this winter war or no war

Mr's. Galitin & Beard[1] went from Copenhagen on the
Sixth of July for St. Petersburg Russia to settle Peace
with England but I have never been able to hear how
they ^are like to suceed but am in hopes that ^they will arange
a Peace. but if that happy Day arrives I shall make
the best of my way home with the Acastus but on the
contrary I shall leave the Acastus here with the Mate
and take passage in some fast sailing vessel from the
Bay of Biskey[2] as soon as I hear that their negotia–
tions are broken off and am in hopes to imbrace you
and our darling boy once more before the month
of January passes away for beli^eve me this long absence
of 26 months wears tedious more especially as I never have
had a line from you since I have been in this country
and only one from our dear boy and one from your brother
Wm. Give my respect to your brother Wm, and tel him
I thank him verry kindly for his letter imbrace our
Willm, for me and tel him I want much to see him give
my love to Brother Edmund say to him I promise my
self much pleasure in smoking a pipe with him this
Winter. My love to all brothers and sisters & friends
take a share ^to yourself tel Brother John that
I expect to eat a piece[3] of Lamb with him on the
Mirino Hills before long– may God preserve you
in Health as this leaves me is the prayer of your
ever afectionate and true Husband until Death

Wm Cottle

[1] Albert Gallatin (1761–1849) and James Bayard (1767–1815) (Cottle spells these incorrectly) were two Senators serving as America's two highest ranking diplomats in the negotiation of the Treaty of Ghent, which ended the War of 1812. The reference shows that Cottle remained well informed of events in America though stranded in Paris.
[2] Bay of Biscay, the body of water between Great Britain and the Iberian Peninsula
[3] In the letter, Cottle appears to have initially written peace instead of piece, suggesting that the separation from the war was causing great anxiety.

England finally reached a peace with the United States in April of 1815. The *Acastus* set sail across the Atlantic in May of 1815 with brief stops in Amsterdam and London. The ship arrived in Philadelphia in August of 1815. William Cottle eventually retired to the Vineyard and was appointed Postmaster of Holmes Hole in 1828 until his death in October of 1830.