1. NAME OF PROPERTY

Historic Name: The Portland Observatory

Other Name/Site Number:

2. LOCATION

Street & Number: 138 Congress Street Not for publication:

City/Town: Portland Vicinity: N/A

State: Maine County: Cumberland Code: 23 Zip Code: 04101

3. CLASSIFICATION

Ownership of Property		Category of Property	
Private:	___	Building(s):	X
Public-Local:	X	District:	
Public-State:	___	Site:	
Public-Federal:	___	Structure:	
		Object:	

Number of Resources within Property

Contributing	Noncontributing	
1	___	buildings
___	___	sites
___	___	structures
___	___	objects
1	___	Total

Number of Contributing Resources Previously Listed in the National Register: 1

Name of Related Multiple Property Listing: N/A

4. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ____ nomination ____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ____ meets ____ does not meet the National Register Criteria.

Signature of Certifying Official Date

State or Federal Agency and Bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria.

Signature of Commenting or Other Official Date

State or Federal Agency and Bureau

5. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:

___ Entered in the National Register
___ Determined eligible for the National Register
___ Determined not eligible for the National Register
___ Removed from the National Register
___ Other (explain):

Signature of Keeper Date of Action

6. FUNCTION OR USE

Historic:	Transportation	Sub:	water-related
Current:	Recreation and Culture	Sub:	museum

7. DESCRIPTION

Architectural Classification: Early Republic, Federal Period (1807)

Materials:

Foundation:	Stone
Walls:	Wood
Roof:	Cooper
Other:	Lantern: Glass, wood, copper, canvas

Describe Present and Historic Physical Appearance:

The Portland Observatory is a maritime signal tower located on Munjoy Hill in Portland, Maine. It remains at its original location, although the area outside its fenced yard has changed—a cow pasture when the Observatory was constructed in 1807, Munjoy Hill has evolved and grown to become one of Portland's most diverse and thriving neighborhoods.

The Portland Observatory is still composed of its original materials—wood and stone—much of which dates from 1807. It is a seven-story octagonal structure approximately 86' in height. It was constructed of eastern white pine using the post-and-beam method. The Observatory is a skeletal structure consisting of three layers: timber frame, sheathing, and shingles, which cover the building's exterior. At its base, the building is 32' in diameter, gently tapering to 8' in diameter in the top ("lantern") level. The tower rests upon a foundation of stones mortared together. Holding the tower in place are approximately 122 tons of stone rubble, which rest atop the foundation beams and act as ballast, weighing the building down. Stairs and entrance deck take visitors to the door on the first level.

The interior of the building consists of the timber frame, sheathing boards, and floorboards. The frame is composed of timbers of varied sizes, and the tower's eight primary vertical timbers (cant posts) are each 65' 4" long. Two parallel beams form the floor plates, and are rotated on each successive level. Diagonal bracing strengthens every plane at each floor. Sheathing boards are wide planks placed horizontally across the frame to which the shingles are nailed. The distance from floor to ceiling varies at each level, with floor-to-ceiling height becoming progressively shorter near the top of the tower. Stairs run along the wall up the tower and into the lantern level. At the lantern level, observers can step out onto a railed observation platform. In 1807 there were two flagpoles, with a third added sometime during the 1830s.

The current condition of the Portland Observatory is excellent, having recently undergone a $1.2 million restoration. During this restoration, valuable research regarding the building's past appearance was conducted. The year 1900 was chosen as the date of interpretation because there was photographic and architectural documentation, including the 1936 Historic American Buildings Survey (HABS) drawings, to substantiate the building's appearance during that period. During the years of use as a signal tower (1807–1923), little is known about maintenance and repairs, but it is believed that the tower received no major repairs between 1807 and 1939.

The first comprehensive restoration effort was made by the Works Progress Administration (WPA) in 1939, at a cost of about $6,000. Major components of this restoration included the installation of center posts on the first through fifth floors (which still remain), installing several additional windows, plus complete shingling and painting (the exterior was painted gray and remained so until 1983). All replacement timbers at this time were joined by toenailing rather than by the original mortise and tenon method.

The next restoration project took place in 1975-76, when $10,000 was appropriated for a new railing and walkway around the lantern observation deck. In 1983 the white pine foundation timbers were replaced with fir, and numerous windows and shingles were replaced. Shingles were stained to give the appearance of a "brown tower." The lantern roof was covered with a rubber membrane known as EPBM. In 1985 exterior lights were placed at the tower for nighttime illumination.

The most recent restoration, which lasted from 1998-2000, was necessary because of a Powder Post Beetle (anobiid) infestation, which was detected in 1994. The insects found the building's excessive moisture a suitable environment in which to thrive. Soon afterwards, the tower was deemed unsafe and closed to visitors; it was feared that the Observatory was on the verge of collapse. In 1997, Portland Observatory Restoration Trust (PORT) was chartered in order to raise funds for an ambitious restoration of the ailing structure. The primary aim of the restoration was the repair of all original salvageable components, and the in-kind replacement of those that could not be repaired. No element of the structure avoided scrutiny, and all restoration work conformed to *The Secretary of the Interior's Standards for the Treatment of Historic Properties.*

Scientists conducted moisture readings and employed several methods to test for decay. A great fear prior to restoration was that one or all of the eight cant posts would have to be replaced, which would have necessitated a complete dismantling of the Observatory. Tests proved that the damage was not as great as anticipated, and that the tower could be repaired in place. Each timber was measured and assigned a number. Fourteen percent of the timber frame was replaced. All cant posts were sound and received only minor repairs. Replacement timbers of white pine were joined according to the time period in which the timbers they succeeded were added: pre-1939 timbers were mortise and tenon, while post-1939 timbers were toenailed. New timbers were left unstained to distinguish them from older timbers, which were stained in 1939.

Pine sheathing boards were fragile from numerous nail holes due to previous shingling, and twenty-five to thirty percent of the sheathing was replaced. In order to prevent further damage, increase air flow, and keep both sheathing and shingles dry, new shingles were attached to wooden strapping. Strapping was attached to sheathing, and then shingles were attached to strapping. Although this is a new design element, it improves durability without altering the appearance of the Observatory. Like frame and sheathing, floorboards were tested, repaired, and replaced. Electrical wiring was concealed between the floorboards and sub-floor.

Analysis determined that the foundation had been previously repointed. For restoration purposes, all loose mortar was removed, and the foundation again repointed. Some of the ballast stones underneath the tower had to be moved during the restoration for the replacement of one timber. The stones were immediately returned to their original positions to maintain the tower's balance.

Although the tower has been several colors over the years, historically it has been referred to as the "Brown Tower." Paint analysis was conducted on original shingles, and it was determined that the shingles were originally a reddish brown. Western red cedar shingles, sawn, kiln-dried, and stained to match the original color were chosen over pine shingles. Shingle exposure was modified from 8" to 5."

The lantern level was removed with a crane during restoration. Six of the eight posts supporting the lantern were replaced with white oak (the original material), while the other two were repaired. HABS drawings indicated that the original roofing material was canvas, but it was replaced with a rubber membrane in 1975-76. Restoration struck a compromise between the two materials; the new lantern roof is a rubber membrane adhered to sheathing boards. Over that layer, mahogany veneer bonded to marine plywood was added. Canvas was sized, glued with acrylic polymer, and its seams secured with brass tacks. The canvas was painted white with a dark undercoat that will indicate when repainting needs to occur. Exterior walls of the lantern

were shingled below the windows in 1939. All shingles were removed, and lead-coated copper was affixed to the lantern, replicating its original appearance. The lantern framing does extend into the tower, but the lantern's exterior walls and tower roofing are now sheathed as one piece with lead-coated copper. Since there is no change of material at the seam where the tower and lantern come together, the chance of moisture infiltration is significantly reduced.

A metal finial ball has decorated the top of the Observatory since 1807, and the current ball, dating most likely from 1939, was restored and reused. Lantern deck railing was reconstructed according to the HABS drawings, but was modified to meet current safety codes in regard to height (now 42") and spacing of balusters. None of the three original flagpoles were intact in 1999; however, the bases of two poles remained, and markings for a third indicated its location. Three new fir poles were set in place and fitted with lightning rods to protect the Observatory. The exterior lantern walls, railing, canvas roof, and flagpoles were all painted blue-gray, a color which paint analysis proved to be the original.

There are four windows on each floor, on alternating frames. First and second-story windows are twelve over eight lights, third and fourth-story windows are nine over six, and fifth and sixth-story windows are six over six. Windows were added during the WPA project of 1939, but historical photographs revealed that they originally numbered thirty-three. They have been restored to their original number and appearance, with muntin profile taken from an 1806 publication. The glass of the window panes are reminiscent of glassmaking techniques of the early nineteenth century.

Historical photographs indicated that the entrance deck had wrapped around three sides of the building. The deck was reconstructed to extend around the building, and the single step at the door was eliminated by raising the level of the deck. There was also a second entrance in the early twentieth century, and this was the only feature not restored to 1900. The deck railing was recreated to match historical photographs, and to comply with current safety-codes. A stronger metal railing was constructed inside the wooden railing. To set it apart, it was painted a dark blue-green. In addition to reconstructing the entrance stairs, a second set of stairs was installed in the rear of the building in conjunction with a lift for handicapped accessibility. The lift remains underground until use so as not to detract from the tower's historical appearance.

Acts of vandalism are easily detected within the tower but do not affect the Observatory's historical integrity. During the restoration, a decision was made to preserve as much of the graffiti as possible. Although some of it is vandalism according to our current definition, some examples of the graffiti date to the 1830s and prove to be an intriguing record of the Observatory's past.

New facets of the restoration dealt with issues which had not previously been addressed, such as fire, moisture, and safety. The threat of fire prompted the installation of a dry-pipe sprinkler system. A new ventilation system was installed to answer concerns about excessive moisture. For visitor safety, new handrails were placed at all levels, as well as stanchions around the stairwells to protect visitors from accidental falls down the stairs. Because the Observatory is a tourist destination and museum, it was outfitted with new interior lights and educational exhibits on both the first and second floors. Exterior lights consist of four pole lights on the ground, and four canister lights on the observation deck which illuminate the lantern. The City of Portland affixed a "webcam" onto the lantern, so the view from the Observatory deck can be experienced

via the internet; it has been since shut down as a protective measure by the Department of Homeland Security.

The Portland Observatory retains integrity from its period of significance. The tower atop Munjoy Hill, with its lantern and flag poles, remains essentially unaltered. Captain Moody's original architectural conception for the property is clearly evident, and it is a testament to his ingenuity and craftsmanship that the tower has withstood 197 years of sometimes-violent Maine storms. Modifications made after the period of significance were corrected during the restoration of 1998-2000, which returned the building to its appearance from a century earlier and also improved the chances that the structure will stand sentinel over Portland Harbor for another two centuries. While no longer serving its primary purpose—as a ship-to-shore communication station—the Observatory is used to teach visitors both the role Portland played in the maritime history of the United States and the art of "signalizing" as conduct by Captain Moody and those that came after him. Today, when visitors stand atop the tower they are able to view many of the same sights that Captain Moody and other Observatory keepers did—the city, lighthouses, islands, mountains, and a vast, open ocean.

8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties:
Nationally: X Statewide:__ Locally:

Applicable National Register Criteria:	A X B__ C X D
Criteria Considerations (Exceptions):	A__ B__ C__ D__ E__ F__ G
NHL Criteria:	1
NHL Theme(s):	V. Developing the American Economy 3. Transportation and Communication 6. Exchange and Trade
Areas of Significance:	Maritime History
Period(s) of Significance:	1807-1923
Significant Dates:	1807
Significant Person(s):	N/A
Cultural Affiliation:	N/A
Architect/Builder:	Lemuel Moody (1768 – 1846)
Historic Contexts:	XII. Business D. Trade 1. Export-Import L. Shipping and Transportation XIV. Transportation B. Ships, Boats, Lighthouses and Other Structures

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.

Introduction

Built in 1807 on Munjoy Hill by sea captain-turned-entrepreneur Lemuel Moody, the Portland Observatory served a vital function, not only for the city of Portland and what would become the state of Maine, but for a young republic whose economy was dependent on maritime trade. It served as a maritime signal station for Portland's bustling harbor, with Moody identifying vessels entering Casco Bay and conveying this information to the citizens, and more importantly, to the city's merchants and businessmen. Moody's signaling system, which employed both flags and colored balls and was unique to the Observatory, can be traced to visual communication systems that began in the ancient world.

The Observatory operated for over 100 years from 1807 until 1923—when the prevalence of radio communication between ship and shore made it a relic of the past. After 1923 the tower sat empty for a number of years, falling into disrepair for lack of use, until it was restored by the City of Portland with a grant from the Works Progress Administration in 1939. The tower was again called to duty during World War II when it served as a lookout tower for enemy vessels and aircraft, a role it had played in previous wars. Following the war, it resumed its life as a tourist attraction and local museum, recalling Portland's heyday when vessels still relied on sails and the wireless telegraph and radio were unheard of.

The Portland Observatory, when constructed, was one of many maritime signaling stations operating in port towns along the East and West coasts and in other maritime countries around the world. Today, it is the only known extant example of a maritime signal station in the United States. As the only remaining station, the Portland Observatory plays a vital role in educating the nation about the importance of maritime commerce to the U.S. economy and how the signal stations aided in the trade process. Its association to the maritime history of the U.S. as well as to long-distance communication makes it worthy of NHL designation.

American Maritime Commerce

During the Colonial era, the American economy was almost entirely dependent on international trade.

> The whole theory of mercantilist economy envisaged the colonies as producers of commodities needed by the home country and in turn as purchasers of the latter's goods and services. This of necessity developed active commercial relations. Certain products of the forest and field were wanted in England, and the colonists in a new country desired the manufactured goods of the more advanced nations. [1]

Trading was done almost exclusively by water and as a result, early American towns were situated around harbors and business revolved around the seaport. Even local transportation of goods was much more economical by water than by the early roadways, which were few and primitive making overland transportation both slow and dangerous. For example, travel over the

[1] Harold Underwood Faulkner, *American Economic History* (New York: Harper & Brothers Publishers, 1924), 75.

one road between Portland and Boston (the King's Highway) with a load of lumber could take five days, whereas a trip with the same load by schooner took only one day.

Following the Revolution, during the formation of a new government under the Constitution, it was understood that the American economy would be one based on its maritime activities. One of the first laws enacted by the newly formed government was the Tonnage Act of July 20, 1789. With this Act, Congress effectively eliminated foreign merchants from coastal trade and set into place the development of the American merchant marine. By 1795, ninety-two percent of all imports and eighty-six percent of all exports were carried on American flag vessels; the resurgence of American maritime trade was the result of both the re-establishing of old trade routes as well as the opening of new ones. The European wars, the first beginning in 1792, offered further opportunities with the United States becoming the "neutral carrier" for the western world.[2]

Unfortunately for American merchants, the early years of the nineteenth century would not be lucrative ones. In 1807—the same year the Portland Observatory was completed—President Thomas Jefferson signed the Embargo Act, which forbade all international trade to and from American ports. Between this act and the ensuing War of 1812, the United States only would see unimpeded foreign trade for slightly over a year. In Portland, as in many port towns, once-prosperous businessmen were financially ruined, unemployment skyrocketed, vessels rotted and sank at anchor, and the wharves were so rarely used that grass grew upon them.[3] With the signing of the Treaty of Ghent in 1815, the U.S. port cities and towns were poised for more than thirty years of increased maritime trade.

The Importance of Visual Communication and Early Signaling Systems
With maritime commerce of such importance to the development of the new nation, having a way to communicate between ship and shore was vital. In a 1829 letter from the president of the Merchant's Exchange—a commodity exchange for buying and selling goods located in New York City—to Secretary of the Treasury Samuel Ingham requesting the permission of the Lighthouse Service to erect a semaphore tower at Navesink, he states,

> The importance of this facility of communication to the commerce of the country is very obvious and to the revenue of the United States it is often equally essential. If a vessel is cast ashore and relief is not speedily given, the cargo is plundered and goes into the general consumption without paying duties; but by means of a rapid telegraphic communication, assistance may be immediately rendered with a fair prospect that the property of individuals and the duties to the Government may be saved and the lives of the persons on board preserved.[4]

Visual communication between ship and shore meant that merchants and ship owners could both receive and send messages to their vessels several hours before the vessel reached the port. In

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[2] K. Jack Bauer, *A Maritime History of the United States: The Role of America's Seas and Waterways* (Columbia: University of South Carolina, 1988) 53-66 and 104.

[3] Susan Gold and Jill Cournoyer, *The History of Union Wharf 1793-1998* (Saco, ME: Custom Communications, 1998), 30.

[4] Correspondence dated October 24, 1829, from the president of the Merchant's Exchange to Secretary of the Treasury Samuel Ingham, National Archives, Record Group 26, Entry 17F, "Miscellaneous Letters Received (Alphabetical), 1801-52."

this way owners could learn of problems the vessel might have encountered on its travel such as damaged cargo or being boarded by pirates. A ship owner was also able to redirect his vessel to another port if the cargo it carried had been sold since the ship master first received his orders several weeks or months prior. In addition, these vessels carried important news from Europe, from other states, and from other vessels it had come in contact with during its travels. This news could be conveyed to the shore prior to a vessel's arrival in port or, if it was passing near enough to a signal station in the course of its travel to another port.

Visual signaling, as was performed at Moody's tower, has a long and quite complex history. The earliest methods included both mirrors (heliographs) and flags. However, these methods were generally limited to wartime activities transmitting a predefined message at a specific time—one-way communication rather than two-way. The first person reliably known to develop a telegraphic system was Aeneas Tacticus, an ancient Greek author who lived around 350 BCE and wrote on the art of war. The water table designed by Aeneas, while an improvement on earlier methods, was still only capable of conveying a limited number of messages. Later Greeks would develop a system whereby messages could be spelled out letter by letter using torches. However, little progress was made in the way of signaling systems over the first eight centuries of the Common Era with fire beacons remaining the usual way of signaling. It was not until the invention of the telescope in the seventh century that signaling systems would again begin to evolve and improve.[5]

By the early 1800's both the British and the French had been developing and refining systems of visual communication for many years. In 1793, the French Chappe brothers developed and constructed a two-armed manual semaphore machine, which was called the "telegraph."[6] Visual telegraphs based on the Chappe design were erected throughout Europe, and some stations were equipped with more than two arms in order to convey more complex messages.

At the same time land-based visual communication systems were developing, flag signal systems were refined for vessels at sea with the British at the forefront of this effort. One of the earliest flag signal systems in the United States was that developed by J. M. Elford of Charleston, South Carolina. He received a U.S. patent for the "Universal Marine Telegraph" system around 1818. Consisting of seven flags—six representing the numbers 1 through 6 and a "conversion" flag—the Elford telegraph system could be used to convey 7,569 signals—1,387 specifically for the merchant service—with only two sets of the flags. In his introduction, Elford states that merchants and owners may be informed of the earliest arrival of their vessels and acquainted with every circumstance related to them.

J.R. Parker of Boston, Massachusetts expanded on Elford's system, publishing American Signal Book, or *The United States Telegraph Vocabulary*, in 1832. In this book Parker, added the Holyhead and Marine Telegraph Numerals, the British system of signaling, as well as an appendix specific to the port of Boston. On the front cover of the publication are agents of the signal system who could supply flags, books and "designating signals." Among those listed is "Lemuel Moody, Observatory, Portland."

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[5] Gerard J. Holzmann and Björn Pehrson, *The Early History of Data Networks* <http://vvv.it.kth.se/docs/early_net/toc.html>, Chapter 1.

[6] *Encyclopedia Britannica* Volume 28; Encyclopedia Britannica, Inc., 485.

At a minimum, two dozen systems or variations of systems were published in the first half of the nineteenth century alone. By 1855 the First International Code of Signals was drafted by the British Board of Trade and regarded by most seafaring nations as the standard in maritime signaling. The original publication contained 70,000 signals using eighteen flags, part of which was specific to British interests and another part that contained universal signals to be used by all nations.[7]

American Maritime Signaling Stations

When constructed, the Portland Observatory was one of many maritime signaling stations operating in port towns along the east and west coasts of America. Today, it is the only known extant example of a maritime signal station in the United States as changing technology rendered the stations obsolete.

One of the first signal stations to operate in America was at the port of New York. A "marine telegraph" was erected on a hill across from the Narrows. A white flag raised on a pole signaled merchants that a vessel was approaching.[8] Later the Battery, at the southern tip of present-day Manhattan, had small towers that looked like "butter churns," which raised flags for passing vessels.[9] By the 1830s, there were several other semaphores or telegraph poles in the New York City vicinity, including Staten Island, while another semaphore graced the top of the Merchant Exchange.[10]

About 1854, the telegraph line from New York was extended to Sandy Hook, a spit of land at the northern most point of New Jersey where the waters of the Atlantic and those of New York Lower Bay merge. The tower at Sandy Hook was a wooden structure nine-stories tall—30 feet square at the bottom tapering to 10 feet square at the top—and anchored by wire cables. By 1889, it was owned and operated by the Western Union Telegraph Company, and while the operators would signal the Maritime Exchange, in the Produce Building, New York via electric telegraph, as late as 1909 they were still communicating with vessels at sea via a flag signaling system.[11]

In 1797 a lookout tower was constructed on Federal Hill in Baltimore, Maryland by the Maritime Exchange, an organization of Baltimore shipping interests. Outfitted with a telescope, the tower operator communicated with the waterfront through a system of semaphores and over 100 signal flags. Baltimore's tower was in use until 1899.[12]

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[7] *International Code of Signals, As adopted by the Fourth Assembly of the Inter-Governmental Maritime Consultative Organization in 1965, For Visual, Sound, and Radio Communications*, United States Edition, 1969 (Revised 2003), (Bethesda, MD: National Imagery and Mapping Agency, 2003), iii.

[8] WPA Federal Writers' Program, *A Maritime History of New York* (Garden City, New York: Doubleday, Doran and Co., 1941), 34.

[9] Edwin G. Burrows and Mike Wallace, *Gotham: A History of New York City to 1898* (New York: Oxford University Press, 1999), 319.

[10] Ibid., 440.

[11] Henry Tyrrell, "Sandy Hook," *Frank Leslie's Popular Monthly* Vol. XXVIII, No. 5 (November 1889); and W.S. Quigley, "Sentries of an Ocean's Highway: The Marine Observers of Sandy Hook, who take the Visiting-Cards of Passing Craft," *Harpers Weekly*, 24 July 1909, 12-13.

[12] Federal Hill: Development and Renovation (Baltimore, Maryland, n.d), [1]; and *Maryland A Guide to the Old Line State*, Complied by workers of the Writer's Program of the Work Projects Administration in the State of Maryland (New York: Oxford University Press, 1940), 253.

A number of telegraph stations are reported in histories of eastern Massachusetts. For example, a semaphore station was erected on Nantucket circa 1800 with the station funded through subscription.[13] Another telegraph system from Martha's Vineyard to Boston was said to be in use by 1802. This relay system was composed of semaphores, which indicated letters and phrases. [14] In Boston, the first floor of the Old State House was once the center of merchant activity, especially Samuel Toplif's News Room, where information was received via signal from Long Island in Boston Harbor.[15] In Boston Harbor a station for receiving signals occupied a building on Central Wharf, completed in 1819. The warehouse at the end of the wharf had an octagonal cupola outfitted with a telescope. Signals were received by the "Semaphore Telegraph Company" from Telegraph Hill in Hull, Massachusetts. It originally employed the letter arm semaphore system, but later utilized up to 112 flags representing Boston's merchants. [16]

Later, on the West Coast, a signal tower was built in San Francisco in 1850, lending its name to Telegraph Hill. A signal pole had been there in 1846, but the station replaced it. In 1851 it was joined by another station closer to the Golden Gate at Point Lobos. After only three and a half years of use, the electric telegraph replaced the signal station in 1853. It was then outfitted with a telescope to become a tourist attraction.[17]

In an age when telephone, radar, and radio did not exist, the flags and armed semaphore machines provided a means of conveying simple facts such as vessel owner, vessel type, vessel distance, and number of vessels approaching. Yet this signaling could provide a ship owner with the chance to efficiently sell his cargo at the best terms, alert a course change for a crew, or even mean the difference between life and death for the crew of a sinking vessel. The major deficiency, of course, with all visual signal systems was that they were effective only in good weather; inclement weather could render a visual signaling system worthless. Nonetheless, when they were in use, maritime signal towers greatly aided waterfront traffic allowing incoming vessels to signal for a pilot or to request that a merchant whose good the vessel carried by notified of its eminent arrival.

Construction of the Portland Observatory

Blessed with a deep and sheltered harbor, Portland became an important link in the chain of American maritime commerce. By the close of the eighteenth century, Portland was a burgeoning seaport. The largest staple import for almost a century was molasses, which came from vigorous trade with the West Indies. Exports consisted mainly of fish and lumber products

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[13] *Historic Nantucket* (Nantucket, Massachusetts: Nantucket Historical Society, 1917), 43.

[14] Charles Edward Banks, *The History of Martha's Vineyard; Dukes County, Massachusetts* (Boston: GH Dean, 1966), 465.

[15] WPA Federal Writers' Program, *Boston Looks Seaward: The Story of the Port, 1630-1940* (Boston: Bruce Humphries, Inc., 1941), 98. Hereafter cited as *Boston Looks Seaward.*

[16] Samuel Eliot Morison, *The Maritime History of Massachusetts, 1783-1860* (Boston: Houghton Mifflin Co.; Cambridge, Massachusetts: The Riverside Press, 1961), 229; W.H. Bunting, compiler and annotator, *Portrait of a Port: Boston, 1852-1914* (Cambridge, Massachusetts: Belknap Press, 1971), 42; *Boston Looks Seaward*, 101; M.F. Sweetser, *King's Handbook of Boston Harbor* (Cambridge, Massachusetts: Moses King, 1882), 38.

[17] David F. Myrick, San *Francisco's Telegraph Hill* (Berkeley, California: Howells-North Books, 1972), 27-29.

such as barrels and masts.[18]

In order to protect the commerce of the port, the federal government established a light station on a piece of land in South Portland which jutted into the Atlantic Ocean, and in 1791, the Portland Head Light began safely guiding vessels into the harbor. In addition, several strong fortifications to protect the harbor were constructed in the early 1800s to prevent Portland from becoming a military target for the young nation's enemies.[19]

To further aid the maritime commerce of Portland, Captain Moody, along with other concerned citizens, formed an association known as the Portland Monument Ground. On March 20, 1807, the parameters "For a Marine Lookout" were transcribed: "The subscribers do agree to build on some elevated part of Mountjoy Neck [Munjoy Hill] a House for the purpose of a Lookout … sixty feet high to be built of wood & ...to be furnished with a good telescope …"[20] The total cost was not to exceed two thousand dollars, and it was ordered that one hundred shares be sold at twenty dollars each.[21] Within a month, the association had procured a plot of land on Munjoy Hill measuring 5x16 rods.[22]

Moody was both the architect and supervisor of construction of the Observatory. He relied heavily on his maritime background when designing the structure. Much like a ship, the tower was anchored down with 122 tons of ballast stone, set on wooden cribworks. The eight supporting posts are each 65'4" mast-like white pine timbers that were cut in Windham, Maine and floated down the Presumpscot River to Portland Harbor. On the top of the six-story frame sits the lantern, a small windowed structure in which Moody watched and signaled.

Moody's System

Moody's tower operated much like other systems both in the United States and abroad. By constructing the Observatory on Munjoy Hill, at the eastern end of the Portland peninsula, Captain Moody was afforded a fine view through his powerful Dollond telescope (65x) of Casco Bay and the primary shipping channel past Portland Head Light. Portland's waterfront district is situated in a way that does not allow for those on the wharves to obtain a clear view of the waters of Casco Bay. The Observatory is not quite at the crest of the hill. However, at 140 feet above sea level at its base, when Moody stepped out onto the observation deck of the tower, he was 210 feet above sea level.[23]

He scanned Casco Bay looking for sailing vessels on the horizon. Once he distinguished a vessel's features, he kept detailed notes of each of its attributes in a journal. Each vessel was

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[18] Gold and Cournoyer, 21.

[19] Augustus F. Moulton, *Portland By The Sea* (Augusta, ME: Katahdin Publishing, 1926), 163.

[20] Lemuel Moody Collection, Maine Historical Society, folder I. Hereafter cited as Moody Collection.

[21] Ibid. Moody later raised the price to $50.

[22] Moody Collection, folder 5.

[23] William Willis, *The History of Portland* (1865; reprint, Somersworth, New Hampshire: New Hampshire Publishing Co.; Portland, Maine: Maine Historical Society, 1972), footnote 1,574.

subsequently entered into the book in alphabetical order by name and accompanied by descriptions of class, rigging, head, etc. In the 1822 edition of *American Coast Pilot*, a "Notice to Masters of Vessels" stated

> Masters who sail from Portland, or points adjacent, are informed, that from the OBSERVATORY, on Fort hill [Munjoy Hill] by means of a Telescope placed there, vessels approaching the coast may be discovered at 15 leagues distance; and their colours or private signals can be distinguished 8 leagues, if the weather should be clear and the colours hoisted, or suspended in such a manner as to present them to the Observatory![24]

Moody did not use arm semaphores as did many of the shore stations operating in the United States but instead relied on a flag system for signaling. Initially there were two flagpoles on the tower and Captain Moody devised his own signal codes, which he often changed. The signal flags were divided into two broad classifications—general and private. General signals were flown for any vessel arriving in port and conveyed what class of vessel was approaching (ship, bark, schooner, etc.). Portland merchants had the option of purchasing a subscription from Moody, who would upon sighting a merchant's ship fly that company's private flag.[25]

To further aid those on the waterfront, Moody used the southeastern staff for flags relating to ships and barks, while the northwestern staff was reserved for flags designating brigs.[26] This system of signal flags evolved in conjunction with trends in maritime traffic. A third staff for steam vessels was added after 1833.[27] In Moody's early codes, he had placed red, white and black balls on the lanyards, but with an additional staff came additions to the signal system. By 1863, modifications included black balls hanging over the side of the tower below the observation deck beneath the staff representing the distance of steamers or schooners. Each black ball meant a half hour's travel for a steamship. White balls on the lanyards were used to indicate a vessel requesting a tow, with each ball representing three miles distance.

The Observatory's role in the sea commerce of the region was an immensely positive one. The "signalizing" improved the efficiency of Portland harbor by alerting merchants to approaching vessels. Merchants could then reserve a berth on the wharves, and hire a crew of stevedores to be poised and ready to unload and reload the vessel in a timely fashion.

Portland Harbor and the Observatory

In the 1840s, Portlanders saw an opportunity for further maritime growth as the city and Boston began dueling for the role of Montreal's winter port. Since the Canadian city's harbor was frozen for much of the winter season, it needed a winter port to receive its goods and ship them via railroad to the North. Businessman and booster John A. Poor lobbied staunchly on behalf of Portland. His rhetoric capitalized on Portland Harbor's natural advantages—it provided a deep

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[24] Edmund M. Blunt, *The American Coast Pilot*, Tenth Edition (New York: Edmund M. Blunt, 1822), 144.

[25] John K. Moulton, *Captain Moody and His Observatory* (Falrnouth, Maine: Mount Joy Publishing, 2000), 34.

[26] *Directory of Portland*; 1847-48 (Portland, Maine: Thurston and Co., 1847-48), 163-64.

[27] *Portland Observatory Signal Book*, 1833. Maine Historical Society.

entrance and shelter from storms, remained ice-free for the winter, and was a half day closer to Liverpool than either New York or Boston.[28] Portland won the bid, and construction of the Atlantic and St. Lawrence Railroad line from Portland to Montreal commenced in 1846, with completion in 1853. At the same time, Portland served as terminus for an increasing number of packet steamship lines, connecting it with Boston, New York, and eastern Canada.[29] The Observatory played a part in helping Portland to become Montreal's winter port, by enabling efficient loading and unloading of cargo.

By the middle of the nineteenth century, Portland's imports and exports had changed somewhat. Rail connections with Canada meant that items such as Canadian grain and cattle came through Portland.[30] Staple exports such as lumber and fish were now joined by lime, ice, and granite.[31] The importation of molasses and manufactured goods continued, while coal and salt became increasingly important.[32] Other imports were flour, cotton products, leather goods, meats and tea.[33] People also became an import with the Irish potato famine in the late 1840s, and Maine's connections with Liverpool brought many Irish to Portland.[34] Through all of these nineteenth century changes, the Observatory eased the stress put upon busy Portland harbor, and continued to make more efficient the maritime commerce of the region.

Apart from signalizing commercial vessels, the Observatory became important to national defense as a watchtower for enemy craft during times of war, beginning with the War of 1812. During this time, Moody kept a keen eye on Casco Bay for British war vessels. In September 1813, a battle between the US Brig *Enterprise* and the British Brig *Boxer* took place off Monhegan Island. Moody was the first to view the vessels coming into Portland Harbor after their skirmish.[35] During the Civil War, Moody's son, Enoch, spotted Confederate raiders, and alerted the authorities, leading to a capture of the rebels.[36] During World War I, a new enemy, the submarine, plied the waters of the Atlantic Ocean, and it was feared that they would strike vessels bound for and departing from Portland. During World War II the threat came not only by water, but also by air. Portland served as the departure point for many trans-Atlantic convoys, and due to the harbor's importance, the inner islands of Casco Bay were guarded by submarine

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[28] Ibid., 60.

[29] Augustus Moulton, 200,201,203.

[30] Robert G. Albion, William A. Baker, and Benjamin W. Labaree, *New England and the Sea* (Mystic, Connecticut: Mystic Seaport Museum, 1972), 120.

[31] Ibid., 135.

[32] Gold and Cournoyer, 80.

[33] Albion, et al., 124.

[34] Ibid, 121.

[35] Ibid, 57-59.

[36] Augustus Moulton, 213.

nets. The Observatory was used by the Air Warning Service to notify Portland of approaching enemy aircraft.[37]

Unlike other maritime signal stations, which in many cases were parts of larger networks like those of New York, the masters of Portland Observatory did not turn to electric methods of communication but persevered in their use of flags and balls to communicate with vessels. Its keepers were adaptive however, staying abreast of the changing times by outfitting the Observatory with a telephone in 1879, which was used to notify merchants when their ship was to arrive. A short article reprinted in the *Washington Post* in 1891 noted that long experience had enabled the keeper to estimate a time of arrival to within five minutes. [38]

Yet its obsolescence was only a matter of time. By the early 1900s, radio equipment was recognized as essential for passenger ships with cargo vessels and smaller craft soon following suit. The Marconi Company's *The Yearbook of Wireless Telegraphy & Telephony* for 1913 contained an article devoted to "Wireless Telegraphy and the Mercantile Marine." The article stated that "Valuable time and tons of coal can be saved by the facilities [radio] with which owners of a vessel can get into touch with her for purposes of changing her course when once she has cleared, and profit not seldom gained by the ability to order a vessel home at top speed to take a special cargo on a sudden rise in freights for a prompt steamer;" and the 1916 edition of *Brown's Signaling*, a British publication on the International Code of Signals, noted that "Any book dealing with signaling in general is incomplete without a reference to wireless telegraphy which, for mercantile signaling, offers so many advantages over other methods of signaling."[39] In addition, after the First World War, maritime traffic to Portland began to decline lessening the need for the Observatory. The tower would cease to operate in 1923 after 116 years of service.

The Portland Observatory Today

From the time of its construction until 1937, ownership of the Observatory passed through the Moody and York families. In 1937 Captain Moody's great-great grandson, Edward H. York, allowed the Observatory to be acquired by the City of Portland, on condition that the city kept the building in good repair.[40] Just prior to this exchange, the structure was part of the Historic American Buildings Survey (HABS) project in 1936, during which the first architectural and engineering drawings were made of the Observatory.[41] In 1939 the Observatory's first complete restoration was performed under the auspices of the Works Progress Administration (WPA), and in June of that year, it was opened to the public as a museum. The Observatory reopened to the public after World War II, and has served as a tourist attraction and museum since then. In 1982, the city struck an agreement with Greater Portland Landmarks (GPL) to lead tours at the tower. Although GPL's volunteer docents thought only leaking water was harming the tower, further

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[37] Joel Eastman, "Casco Bay and World War II" (www.cascobay.com/history).

[38] John Moulton, 40; and "The Individuality of Ships Lewision (Me.) Journal," *The Washington Post*, 19 October 1891, pg 4.

[39] *The Year-Book of Wireless Telegraphy & Telephony* (London: Published for the Marconi Press Agency Ltd. By The St, Catherine Press, 1913), 323-326; and *Brown's Signaling,* 20th Edition (Glasgow: James Brown & Son, Nautical Publishers, 1917), 213.

[40] Cumberland County Deed Book # 1539.

[41] John Moulton, 105. The HABS drawings were the groundwork for both the 1939 and 1998-2000 restoration efforts.

inspection revealed the clandestine work of powder post beetles. Restoration was precipitated primarily by private efforts, including the non-profit Portland Observatory Restoration Trust (PORT), which was chartered by Greater Portland Landmarks for the sole purpose of cultivating restoration funds. The Observatory was closed for restoration until June 2000, when it was reopened to the public. It is once again a prime historic site and museum.[42]

Conclusion

Captain Moody and the citizens of Portland built the Observatory to aid maritime commerce not only for the city of Portland and what would become the state of Maine, but for a young republic whose economy was intrinsically tied to maritime trade. It served its primary function—a maritime signal station—for over a hundred years, while also serving as a look-out tower during times of war. Despite technological changes that made other maritime signal stations relics of the past, the Portland Observatory persevered. As the only known extant example of a maritime signal station in the United States, it stands not only as a tourist attraction but also as a monument to the past attesting to Portland's important role in the maritime commerce of the United States. The Portland Observatory has long been the symbol of Portland, Maine and demonstrates the ingenuity of Lemuel Moody. It has been the subject of engravings, photographs, paintings, and poems. The Observatory is a seemingly indelible part of not only Portland's maritime heritage and landscape, but of the nation's as a whole.

[42] Ibid, 69-72.

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Previous documentation on file (NPS):

__ Preliminary Determination of Individual Listing (36 CFR 67) has been requested.
x Previously Listed in the National Register.
__ Previously Determined Eligible by the National Register.
__ Designated a National Historic Landmark.
x Recorded by Historic American Buildings Survey: Project no. 65-1715
__ Recorded by Historic American Engineering Record: #

Primary Location of Additional Data:

x State Historic Preservation Office
__ Other State Agency
__ Federal Agency
x Local Government
__ University
x Other (Specify Repository): Maine Historical Society; Greater Portland Landmarks – Frances Peabody Research Library

10. GEOGRAPHICAL DATA

Acreage of Property: Less than one acre

UTM References:	**Zone**	**Easting**	**Northing**
	19	399354	4835457

Verbal Boundary Description: City lot 16G-14

Boundary Justification: The boundary includes the parcel of land and building that has been historically known as the Portland Observatory that maintains integrity.

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July 27, 2006