



**Lightship Overfalls
LV118/WAL 539**

Ship Tour Guide Manual

**Overfalls Foundation
Updated October, 2010**

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FOREWORD

This document is meant to be an aide to the Ship Guides on the Lightship Overfalls. It cannot be a script that is always followed because every guide will have a unique way of telling the Overfalls story. In reality, each time the story is told, even by the same guide, it will vary as it is tailored to the audience and conditions at that time. The intent of the document is to bring a degree of standardization and factual accuracy to the story in order to give the visitor the best possible experience.

The material in the document contains both factual descriptions and personal accounts of events. The personal accounts will vary depending on how they affected the person involved. In these, two different people could have experienced the same event and related to it in entirely different manners, thus there are two legitimately different accounts. Material presented as factual descriptions are subjected to a more stringent standard. Many “factual descriptions” have come to the Foundation in the context of sea stories. Unless the Foundation was able to corroborate them thorough some other source material, they have generally been viewed as suspect and omitted. In cases where the sea story contained “factual descriptions”, no matter how vividly told, that conflicted with highly credible sources, the sea story was totally omitted.

A wealth of other information is available that the Ship Guides can use to add depth to their presentations. The Archives section on the Foundation’s web site contains several documents that give additional information about our ship, the Foundation and lightships in general.

One particularly valuable resource is *The Big Lift and Beyond*, The story of saving an historic ship and putting her in a setting worth of her past and the crews who served aboard her.

Further, Wayne Kirklin’s book, *LIGHTSHIPS, Floating Lighthouses of the Mid-Atlantic*, which is available in the Ship’s Store is well researched and a good source. The important thing to keep in mind is, no matter how long you are a Ship Guide, it is always possible to improve your presentation with more information.

Section 1: Ship Tour Basics

First a word about being a ship guide. All of our ship guides may have at one time or another given out false information. If you are with a group and another guide is making the presentation, NEVER correct a fellow guide during the presentation, no matter how bad the error. It destroys the guide's continuity and reflects badly on the ship and the Foundation. After the visitors are gone, that is the time to critique the presentations and compare notes. If the guide making the presentation wants help with an aspect, s/he will ask for it. Also, the guide giving the tour may want to give a joint tour with two guides; if invited in that manner, by all means participate.

Tour begins standing at the bow (upper deck). Introduce yourself, try to put the group at ease, and tell them you'll be showing them around both the upper and main decks.

Before getting into the interesting aspects of the ship, take a minute to go over some points that will ensure that the folks have a safe visit. Start by saying that the ship has gear installed where it was needed and it may present a tripping hazard, "so please constantly watch your step". As you stand on the foredeck, pointing to cleats and a fairlead are good examples. (If they have small children, suggest that they may want to hold the child's hand.) Mention that, as we go below, we will go through many watertight doors with high thresholds, so step high because the thresholds are hard on shins and toes. Mention also that, as they go down the ladder, they should face the ladder and use both hands on the rails. Then, throughout the tour, keep a close eye to see that safety procedures are being followed and that all hazards are being avoided.

Consider asking if they know what a lightship is and why they were built. They are floating lighthouses that were built as navigational aids and placed where it was impractical to build a lighthouse; such as on shifting shoals.

Then cover some key points in whatever order works best for you:

1. Lightships were named based on their stations and their names changed as their stations changed. The only unique ship identifier was a number assigned to them (LV under the U.S. Lighthouse Service command and WAL under the U.S. Coast Guard command).
2. The Overfalls (LV118/WAL539) never served at the Overfalls Station at the mouth of the Delaware Bay, but took the name when it came to Lewes in 1973. It previously served at Cornfield Point, CT (on Long Island Sound), Cross Rip, MA (near Martha's Vineyard) and Boston, MA (about 6 miles east of the entrance to Boston Harbor).
3. Two of the four lightships (all named Overfalls) that served at the Overfalls Station from 1898 until 1960 still exist today as museums open to the public at Portsmouth, VA and Oakland, CA.

4. Point out the 7,000 pound mushroom anchor (on shore) similar to the one used to anchor the ship and the 3,000 pound auxiliary anchor on the rail at the bow of the ship.
5. The Overfalls was built in 1938 by the Rice Brothers Shipyard at East Boothbay, ME.
6. Some ship specifications:
 - Cost: \$223,900
 - Diesel powered by a 400 HP Cooper-Bessemer 8 cylinder engine
 - 7'2" propeller
 - Maximum speed 9 knots (between 10 and 11 MPH)
 - 114' long, 26' at beam (middle), draft of 13'4", and weighs 422 tons
 - Navigational aids: 1) single mast light rated at 15,000 candle power (about 1,000 watts) with a 12 mile range on a clear night which flashed every 3 seconds from dusk until dawn, 2) radio transmitter (active 24/7) with a 25 mile range, and 3) fog horn (dual air diaphones) with a 5 mile range
7. It was decommissioned by the Coast Guard in 1972 and donated to the Lewes Historical Society in 1973 and then to the Overfalls Maritime Museum Foundation in 2001 (since renamed Overfalls Foundation). Lewes is very fortunate to have one of only 7 lightships that still exist and are open to the public as a museum. We want future generations to be able to experience an important part of maritime history.

Now begin your tour of the upper deck if there are no questions.

Walking along the starboard (right) side toward the stern (rear) point out the following:

- **Yellow gasoline can** that could be jettisoned in case of fire, with a line attached to retrieve it after the fire danger was over.
- Point out the **fog horn** and discuss how loud it was. We are told that the fog horn was so powerful that if a seagull was within 50 feet of the horn when it sounded it would break the seagull's wings, from the vibration, and often dead seagulls were found floating near the ship in foggy weather.
- Point out where the **launches** were kept on board (3 sets of davits- 1 davit missing on starboard side).
- Mention the **deck mounted windless** (air powered) that could raise and lower heavy items, help guide the ship during docking, and assist in other tasks back aft that required mechanical force.
- Go to the very rear and point out the **diesel fuel and water connections** and explain the ship was re-supplied every 10 to 14 days. Also mention that the tanks hold 12,400 gallons of diesel fuel and 6,500 gallons of water. Also point out that the ship has ballast water tanks that were emptied by the general purpose pump in the auxiliary engine room which was powered by compressed air.
- Show **the top of the rudder post** and point out the **large red wrench** that was used to steer the ship in an emergency.

Now proceed up the port (left) side to the main entrance and the below decks area.

As you enter the main entrance mention the **flag locker area** and point out the **radio transmitter and backup transmitter**. Redundancy was important on a ship that was stationary and had to be self-reliant.

Descend the main ladder (all should **descend backwards for safety reasons**) and gather in the crew's day room. Point out the enlisted men's cabins – 2 men per cabin. Point out the red light and see if anyone knows why it is red. Explain that at 10 PM all white lights below deck were turned off and only the red lights remained. This was done to protect night vision so that sight would not be temporarily impaired when they went to the upper deck.

Explain that there were 14 men assigned to the ship – 10 enlisted and 4 officers (a chief warrant officer and 3 either chief or first class petty officers). The officers' quarters are in the stern. Lightships used a 24 hour/7 day schedule and worked 2 increments (weeks or months) and then had 1 increment off. For example, you could be onboard for 2 weeks and then on shore leave for 1 week or you could be on a schedule where you were onboard for 2 months and then on shore leave for 1 month. Many combinations existed for lightships. This resulted in a typical onboard crew size of about 8 to 10 for the Overfalls.

Proceed into the focastle area (extreme front). Here is where the anchor raising equipment (**air powered windless**) is located for both the main and auxiliary anchor. It also includes the **crew's head** (bathroom), the **laundry area** (with an original 1969 wringer washing machine), and **freezers**.

This is a good time to mention the great work of the “**dirty hands gang**” and give the participants a feel for what this area (and the whole ship) looked like before the Overfalls Foundation took over the ownership of the Lightship Overfalls. It was all rust and peeling paint and a real eyesore.

You can also point out that all of the electricity was provided by generators and was 220 volts (D.C.) throughout the ship.

Proceed along the starboard side of the ship to the mess area. This is where the enlisted men took their meals and spent some of their spare time.

Point out the galley (kitchen) where the cook prepared the meals. Food was important to maintaining morale where both space and activities were limited. The stove is original and was converted from coal to diesel fuel soon after entering service, to eliminate the need to store coal. 1938, when the ship was built, was during this country's art deco era and the design of the locker doors reminds me of a New Jersey diner back in the day.

Proceed toward the stern and enter the officers' quarters. Here the "skipper", usually a chief warrant officer, assisted by 3 chief petty officers, had their quarters. Each had a separate cabin/bunk and took their meals here in the ward room.

Point out the table which is bolted to the deck and the O rings attached to the table to keep the chairs in place. Also point out the officers' head and the ship's office. The safe in this office was placed onboard during WWII to store codes. This was one of the few lightships that stayed on station during WWII (no armament). This is where the large volume of paperwork was handled.

Proceed to the extreme rear and point out the rudder post in the center stern of the ship and the connecting cables on each side that connect to the ship's wheel on the bridge. Behind the rudder post are storage cabinets.

Now proceed out of the officers' quarters on the port side into the machinist's work area. Since lightships stayed on station for long periods of time, it was necessary for the crew to make repairs on station.

The caged area just outside the galley was a pantry. You should also point out the CO2 cylinders in the passageway and engine room vestibule for fighting fires. Along the way, point out the engine room where the 400 HP Cooper-Bessemer diesel engine is located and the auxiliary engine room where the diesel generators and air compressors are located.

Now proceed up the main ladder to the bridge which was the control center of the ship. The bridge and the auxiliary engine room were manned at all times.

Point out the 5 major pieces of equipment located on the bridge:

1. The binnacle which housed the compass (red and green balls are for calibrating the compass, to compensate for the steel in the ship that would distort it)
2. The ship's wheel
3. The engine room telegraph
4. The Army surplus RCA radar unit put onboard in 1943
5. The ship to shore and ship to ship radios

Also point out:

1. The navigation chart of the lower Delaware Bay with the position of the Overfalls Shoal
2. Pictures of the "super" buoy and Texas Tower that replaced lightships

Close the tour here if there are no questions but point out the donations tank. We ask for a \$2 donation (\$1 children). If they liked the tour, it's common that extra money is dropped into the tank.

Note: If you sense interest, encourage them to join the foundation and get a brochure with membership form at the ship's store. Tour should take about 30 minutes.

Section 2: Lightships in General *

The first lightships appeared over 2,000 years ago. The Romans put open framework baskets at their mastheads which sometimes contained a fire to guide and protect incoming vessels into their harbors and deter pirates, since they were manned by an armed crew. But lightships, as we know them, have been around for less than three centuries.

The first modern lightship dates back to 1731, when the Nore was built in England. After it proved successful, lightships became common off the coasts of European seafaring nations.

While **lighthouses** date back to colonial times in the U.S., the first **lightship** did not appear here until 1820. It was stationed off Willoughby Spit, VA, as an aid to Chesapeake Bay commerce. However, it had to be moved to safer anchorage near Norfolk, since it couldn't handle the storms and heavy seas at its original location.

The first "outside" lightship, anchored in the open sea instead of in a bay or inlet, entered service off Sandy Hook, NJ in 1823.

During the period 1820-1983, 116 lightship stations were established on three coasts and the Great Lakes and 179 lightships were built or converted through 1952. The U.S. lightship era ended in 1983 when the Nantucket Shoals Lightship was replaced with a large navigational buoy.

Lightships started as small wooden schooners that needed to be towed to and from their stations. They evolved into propulsion by sail, steam, and then diesel. Lightship hulls evolved from wood to iron to steel and their optics became more powerful over the years. Another major development was the radio beacon in the 1930s which provided a non-visual long distance bearing to the lightship's station. This also caused many collisions and near misses as large ships did not always redirect their headings soon enough.

The U.S. Lighthouse Service designated its lightships sequentially as LV#### and of course they were named after whatever station they occupied. After the U.S. Lighthouse Service was made part of the U.S. Coast Guard in 1939, the LV#### remained until 1947 when the Coast Guard changed the designation to WAL####. After 1965, lightships were designated WLV####.

Lightships performed a dangerous mission and constitute a proud segment of America's maritime heritage. There are 237 official records of lightships being blown adrift or dragged off-station in severe weather or moving ice, with five being lost under such circumstances. There are also 150 documented collisions with lightships, resulting in five being sunk.

* Based on A History of U.S. Lightships by Willard Flint and Lightships in the U.S. by James P. Delgado.

Section 3: Life Aboard a Lightship

- Life aboard a lightship is described as both good and bad, depending on the crew member responding.
 - Most tours lasted from 18 months to 2 years but some did multiple tours
 - Most viewed the duty as boring and monotonous during normal times. There was both limited space and activities
 - Spare time was filled with various activities such as playing cards, watching TV, fishing, writing letters, and sleeping
 - The most pleasant aspects of lightship duty seem to have been the friendships that developed and the amount of time off associated with the duty – 2 on, 1 off.
 - Morale was typically good except during bad weather and fog, with the rough seas and the fog horn blaring.
 - Crew members generally got along well
 - Ages of crew members tended to range from 17 to 50, with the officers and senior enlisted at the higher end
 - Saluting did not occur onboard except during inspections and upon arrival at the ship
 - Seasickness was not a general problem but was experienced by some, especially during bad weather and upon return from shore leave until they regained their “sea legs”.
 - Discipline was normal military but on the casual side
 - The food is generally described as somewhere between good and excellent
 - The biggest danger of being on a lightship by far was the possibility of a collision. There were 150 officially reported collisions during the lightship years and many more near misses, with the loss of 5 ships. Bad storms were the next biggest danger along with boarding and leaving the ship in rough seas.

Section 4: Lightship Stories

Note: It is intended that we will add to this section as new stories are received

1. Can't Sleep without the fog horn?

It was reported by a lightship crew member that he was awakened one night from a deep sleep when the fog horn stopped. As amazing as this sounds, his body had adjusted to the loud 3 second blast every 30 seconds and missed it when it ended.

2. Can seagulls get seasick?

A lightship crew member witnessed a seagull standing on deck an inordinate amount of time. He then saw a fellow crew member approach the bird and pick it up and throw it in the air. The bird then flew away. Other than the seagull being seasick, how else could you describe this highly unusual event?

3. Do Sunday papers just appear on deck?

Every Sunday, a local yachtsman used to throw the Sunday newspaper onto the deck of the Lightship Boston. His will contained a \$10K donation to fund the continuation of this tradition.

4. Do dying sharks scare off ocean birds?

A crewman on the Lightship Boston watched a fellow crewman throw a sand shark that had been sliced open overboard and the cook throw some garbage over the fantail in the same vicinity. The involuntary final movements of the shark kept the birds away from the garbage until it stopped moving. Normally the birds would have been instantly all over the garbage.

Section 5: Opening and Closing the Overfalls

In the unlikely event that Chuck Oakes is not onboard, it might be possible that you may have to open or close the ship.

Opening the Ship

1. Uncover the open sign which is attached to the bottom of the lightship sign located at the entrance to the parking lot on the road near the tennis courts.
2. Unlock the gate to the gang plank
3. Unlock the port side door to the ship
4. Unlock the starboard side door
5. Turn on the lights
6. Open some port holes throughout the ship for ventilation as needed
7. Walk the ship to check for anything that could be a safety issue like tools or materials left by work parties
8. Put up the OPEN flag at the entrance to the gang plank
9. Put up the ship's flags. They should be raised at the beginning of the first shift on Friday and left flying all weekend until the end of the last shift on Sunday.
 - The stars and stripes (ensign) at the stern
 - The union jack (stars on a blue background) at the bow
 - The ship's call letters (WAL 539) – six attached flags with the red, white, and blue flag at the top on the starboard side
 - State of Delaware and City of Lewes flags on the port side
10. Put the signs on the ladders leading to the weather deck (the one with no pictures goes on the port side)

Closing the Ship

1. Take down the open flag located at the entrance to the gang plank
2. **Last Sunday shift**, take down the main flags flying from the various ship masts
3. Turn off the lights
4. Close open port holes and tighten all 4 dogs on each
5. Take down the signs on the ladders leading to the weather deck
6. Close and lock starboard side door
7. Close and lock port side door
8. Lock the gang plank gate
9. Put up the closed sign attached to the bottom of the lightship sign at the entrance to the parking lot on the road near the tennis courts

Section 6: Ship Terminology

The terminology for ships may seem foreign at first but it comes out of centuries of tradition. Although it also may seem arcane, it is still used by people in the marine environment today. By our guides using this terminology, our tours will give a better impression of the ship and our program. A short section in this guide will not necessarily make all of our guides “old salts” but it moves us in the right direction. Also, keep in mind that, like English, there are all sorts of exceptions, but the information below should help.

A. Some Dos and Don'ts

| We Don't Have | We Do Have |
|---------------|-------------|
| Floors | Decks |
| Walls | Bulkheads |
| Ceilings | Overheads |
| Stairs | Ladders |
| Closets | Lockers |
| Hallways | Passageways |
| Beds | Bunks |
| Bathrooms | Heads |
| Kitchen | Galley |
| Windows | Portholes |

B. Basic Directions

The front of the ship is the

Bow

The back is the

Stern

The right side (looking toward the bow)

Starboard side (always)

The left side (looking toward the bow)

Port side (4 letter in both port and left)

C. Expressing Directions

Going toward the bow

Going (up) forward

Going toward the stern

Going (back) aft

On the main deck going down

Going (down) below

In the living spaces going up

Going up on deck

Section 7: Engine Rooms

There are two engine rooms on the Overfalls, the main engine room and the auxiliary engine room.

Main Engine Room

The main engine room is the one toward the stern and contains the ship's propulsion power equipment, 1) a **400 HP Cooper-Bessemer diesel engine** (8 cylinders), 2) **four air flasks/tanks** whose compressed air was used to start the diesel engine (starboard/stern), and 3) **two air compressors** started with electric motors (used to provide the compressed air to the air flasks/tanks).

The Cooper-Bessemer engine would run only when needed; i.e., when underway, to return the ship to station if blown off station by a storm, or occasionally to help stabilize the ship in very rough seas.

Auxiliary Engine Room

The auxiliary engine room is the one toward the bow and contains the ship's power components, other than propulsion.

There are **two air compressors**, powered by diesel engines which are started by gasoline. The air compressors (lower part toward bow) are 6 cylinders and the diesel engines (higher part toward stern) are 4 cylinders.

There are also **three generators** forward of the air compressors which are powered by 2 cylinder GM diesel engines (71 cubic inches per cylinder). Only one generator would be in operation at a time.

The **ship's furnace** is also located in the auxiliary engine room in the middle on the stern side. It produced steam heat.

In the middle of the auxiliary engine room is a large, general purpose pump powered by compressed air. Depending on how the valves on each side were set, it could function as a fire pump, bilge pump or it could exhaust the water out of the ballast water tanks.

Section 8: Frequently Asked Questions

Many of these are covered elsewhere in the manual so there is a degree of redundancy here. All ship guides are asked to add more FAQs to this section. If you often get questions that do not appear in this section, write them up with the answers and include them here. The FAQs appear in random order and in some cases don't apply to the ship.

How many in the crew? The total crew was 14 and they were broken into three sections and worked on a weekly rotation. So, the duty was two weeks on and one week off. With a third gone on liberty and others may be away for training, on annual vacation, etc., aboard at any one time would be 7-10 men.

What organization staffed the ship? The ship was the last built for the U.S. Lighthouse Service (USLHS, a federal civilian agency) in 1938. In 1939, the USLHS and all of its assets (lightships, lighthouses, etc.) were merged in the Coast Guard. So, for almost all of its service life it was a Coast Guard ship.

Did the officers eat with the men? Usually the officers would eat at the table back in the ward room but on occasion they would eat at a table in the mess decks.

How did the helmsman see where he was going? When the ship was underway, especially in close quarters, the skipper would be up on the weather deck above the pilothouse giving orders over a phone to the helmsman. On long voyages in open water the helmsman could stay on course by using the horizon and the compass. On those occasions a lookout would be posted to ensure that they didn't run over anything.

What did the crew do all day? There were always two persons on watch 24/7. Those off watch during working hours would be doing maintenance tasks and generally keeping the ship shipshape. The ship carried two cooks with the intent of almost always having at least one aboard. The cooks did not stand watch but their day started at 5:30 am and didn't end until the galley was squared away after the evening meal, usually about 6:30 pm.

Why are the bunks in the crew's cabins so short? They are longer than they look, a little over six feet. People used to be shorter than they are now; it used to be that a six footer was a tall person.

Where was the Overfalls station? It was right in the mouth of the Delaware Bay. The ship served as a mid-channel marker; inbound ships went on one side of her and out bound ships went on the other side. This was much closer to the Delaware side than the New Jersey side.

What does the word "overfalls" mean? It is a waterfall beneath the surface. As the current goes over a place where there is a steep drop off beneath the surface it creates turbulence on the surface.

What is that rack, is it a paddlewheel off a steamboat? Back in the 1950-60s, Lewes was the biggest fishing port in the country by tonnage of fish caught. The fish were menhaden, used for perfume products and fertilizer. The menhaden swam in large schools so the fishery sent airplane spotters out to locate the fish and then the boats would go out with nets up to a mile long and scoop up the fish. The rack is for drying the nets. Do you see the four boards going around the rack? (*Wait for a positive response.*) Now you see the little boards inside of those going across? (*Again, wait for a positive response.*) They would put four men inside, one on each board, and

they would walk. The boards going across were their toe holds and as they walked they were supplying the power to wind up the nets. Imagine being one of the men inside in the winter with the cold, fishy water dripping on you!

What is that little thingy hanging down in the pilothouse? That is the lanyard to toot the ship's whistle. It won't work right now because we are not running the air compressor. But, if you come back on New Years Eve, during the boat parade or other festivals, we will have the compressor running and you might toot it.

Section 9: Lightships – Historical Background and Willard Flint

Willard Flint was a maritime historian for the U.S. Coast Guard and is still considered the preeminent expert on U.S. lightships. Mr. Flint published *Lightships and Lightship Stations of the U.S. Government* in 1986 and published a revised addition two years later. Mainly this is a reference document in two separate sections: one with factual information about each lightship in a standard two page format, and the other with a similar format for each lightship station. In the front of the book is an excellent overview of lightships and their evolution in the United States. As this is very good background material and knowledge of it will make our ship guides much more confident in their presentations, Mr. Flint's passage is reprinted, in its entirety, below. The Foundation has a copy of this book that is available for ship guides wanting to look up various aspects on individual lightships or stations.

LIGHTSHIPS - HISTORICAL BACKGROUND

To provide a setting, significant historical events directly related to development and use of lightships in this country has been briefly summarized below.

During the period 1820-1983, one hundred sixteen lightship stations were established by the Federal government at one time or another. This figure includes those stations which were renamed and moved to a different position to better serve the same purpose, and also includes those later taken over by Canada. The number of stations existing at any one time reached maximum in 1909 when 56 were maintained. By 1927, 68 stations had been discontinued - replaced by lighthouses or buoys, taken over by Canada, or considered unnecessary. In 1939, when the Coast Guard assumed responsibility for aids to navigation, the number of stations had been reduced to 30, and although three additional stations were established during the 1954-1965 period, the total number of lightship stations continued to decline steadily until 1983 when replacement of the Nantucket Shoals lightship with a large navigational buoy marked the end of lightship usage in this country.

As a seamark, the lightship satisfied multiple requirements. It could be moored near shifting shoals where no fixed structure could be placed; stationed in deep water many miles from shore to serve as a landfall or point of departure for trans-oceanic traffic; and could be readily positioned to suit changing needs. In these roles, the lightship served as a day beacon, a light platform by night, a sound signal station in times of reduced visibility, and around the clock as a transmitter of electronic signals for bearings and distance finding. Outages or difficulties with any of its systems and equipment could be immediately detected and corrected on a spot by the crew. During their era, lightships evolved into highly sophisticated and efficient aids to navigation.

Although there is mention of "floating lights" being used in this country in the 1790s, lightships of the sort we remember today came into being with the 1819 Congressional authorization for construction of three light vessels. This was far behind Britain where lightships had been put in service in 1731, with development there and in European countries being well along by the early 1800s.

Our first lightship, placed temporarily off Willoughby Spit in the lower Chesapeake Bay during the summer of 1820, was unable to withstand sea conditions at that location, and was soon moved to a more sheltered location in the Elizabeth River. This position, near Craney Island, was the

first lightship station formally established, and marked the approaches to the ports of Norfolk and Portsmouth VA.

Progress and development in these early years was woefully inadequate, due primarily to organizational and management deficiencies which were allowed to persist for many years. Initially, little consideration was given to suitable design and construction characteristics for the lightships. Early light vessels were largely a product of opinion and arbitrary judgment on the part of builders who were often ignorant of the true purpose of the vessel or its harsh operating environment. For 30 to 40 years, therefore, the lightships were exceedingly poor light platforms; their full body, shoal draft, and light displacement combined to cause undue rolling and violent pitching, which in turn resulted in frequent loss of moorings and breakage or damage to the lanterns. By present day standards, crew accommodations would be judged uninhabitable. Ultimately, scientific advances in hull design; the use of bilge keels and adoption of improved ballasting techniques produced more stable vessels.

Supervisory responsibility for lightships, as well as all other navigational aids was assigned in 1820 to the Fifth Auditor of the Treasury Department, with control being exercised through what was known as the Lighthouse Establishment - a loosely structured organization administered at the local level by the Collectors of Customs. These individuals operated independently, deciding on their own what requirements were to be satisfied, acquiring material and equipment, and contracting for construction of lighthouses and lightships. They also hired and fired personnel, paid their wages, and either carried out or arranged for annual inspection of existing aids to navigation. Inspection reports, together with recommendations based largely on personal preference and opinion, were then forwarded to Fifth Auditor.

Stephen Pleasonton, the Fifth Auditor, had no familiarity with the nature of his maritime involvement, and little interest in requirements for assisting mariners; distancing himself entirely from the events in progress. Control was exercised in single-handed fashion by arbitrary findings based on review of the inspection reports, and by miserly control of the purse strings. This resulted in a host of misguided decisions, shoddy and unsafe construction, and a system of navigational aids which was inadequate to the need, behind the times, and technically inefficient.

In 1838 the situation was improved somewhat when Congress divided the Atlantic Coast into six Lighthouse Districts and the Great Lakes into two, with a Navy officer assigned to each District, and a revenue cutter or leased vessel made available for conducting inspections. The reports generated by this organization structure gave evidence of large scale mismanagement, low morale, incompetence among personnel, and irresponsible performance by contractors. The final summary report document for 1838 was extremely critical, pointing out that many of the lightships were extensively rotted and poorly maintained; that their lighting equipment was inadequate; and that entire crew complements were often absent for lengthy periods. Also criticized was the practice of hiring farmers and other landsmen as officers and crew members, who in some cases hired stand-ins to perform their duty. Much was made of the fact that the published range of visibility for all lights was erroneous; that there was no uniform system for coloring, numbering or otherwise identifying floating aids; that the positions of many lightships had been poorly selected; and that additional light vessels were required. Pleasonton, understandably, was displeased. Although making a few minor concessions, he continued to side-step any worthwhile remedies, and remained unduly concerned with the costs for improving the situation.

Due largely to the meager funds made available, lightship development continued to lag far behind progress being made in Europe. Although some standardization had been achieved, by

1842 the 30 lightships in service ranged from 40 to 230 tons burden, constructed entirely of wood, poorly rigged in many cases, and seldom with any means at all for propulsion. Illuminating apparatus was limited to multiple-wick sperm oil lamps of poor visibility, and mounted in lanterns which had to be raised and lowered to the deck for servicing. Ground tackle was inadequate, and hull design still had failed to consider the weather and sea conditions encountered by these small vessels. Neither tenders nor relief vessels were available at the time, and as a consequence, when the vessels were frequently blown adrift, stations remained unmarked for periods measured in weeks and months.

Congress eventually became aware of the serious disarray and, using competent and qualified inspectors, carried out an investigation in 1851. A voluminous but meaningful report resulted; highlighting many of the same discrepancies reported in 1838, and focusing attention on managerial, organizational, and procedural defects. Adoption of the report's comprehensive and specific recommendations led to formation of the Lighthouse Board in 1852 as a separate Branch of the Treasury Department. This was a nine member committee composed of officers of the Navy and Army Corps of Engineers, plus several civilian scientists.

The Board, guided by conclusions and recommendations of the 1851 investigation, acted at once to take advantage of available technology, to upgrade equipment, and to revise contracting procedures. The District structure was drastically overhauled to provide seven on the Atlantic coast, two on the Gulf coast, and two on the Lakes and one on the Pacific coast - each with a Navy officer as District Inspector. Separate subcommittees were established to address all requirements for aids to navigation. These included finance and contract management, design and engineering, light vessels, lighting, and a subcommittee to test and evaluate new equipment, determined requirements, and develop maintenance procedures.

By 1855, this had led to construction of several lightships of new and more or less standard design; installation of new and more efficient illuminating apparatus on most existing vessels; and investigation of the merits of various types of sound signals, illuminants, and methods of marking or otherwise distinguishing one lightship from another.

At this time lightships were identified only by the name of the station which they occupied, and no specifications or directive existed for color or markings. Although station names were painted on the sides of lightships at about this time, neither numbers nor letters were used to identify individual vessels until 1867.

As progress in the technical area continued, so did efforts to upgrade the caliber and competence of lightship crews. Wages, benefits, accommodations and food remained rather spartan, however, with the 1852 ration allowance for lightship crew members being set at 20 cents per day.

At the District level, a professional engineer was assigned to assist the Inspector and, as time progressed, each District established a depot for supply and maintenance of its own equipment. Modern equipment continued to be introduced, and supervision and general effectiveness was improved.

There is little question that the Lighthouse Board caused noteworthy progress, however, the committee organization did not lend itself to prompt action on day to day operating matters, and translating plans and recommendations into accomplishment continued to be a cumbersome and diffuse process.

Congress again stepped in, considering that the Board structure was unwieldy, and hindered by undue military influence and bickering. Feeling the need for an improved command structure and an organization capable of functioning as an entity responsive to a single civilian authority, the lighthouse Board was disbanded in 1910 and a Bureau of Lighthouses was established in the Department of Commerce, having as its operating agency the United States Lighthouse Service. Heading up the Bureau, a commissioner of Lighthouses reported directly to the Secretary of Commerce, and also directly controlled the day to day operations of the Service. For the first time, lightships as well as all other aspects of aids to navigation had found a place in a service-oriented agency with an adequate command structure.

Under the able and progressive leadership of Commissioner George Putman, the Bureau moved rapidly to the forefront worldwide among agencies engaged in developing and maintaining aids to navigation. Although technological advances were highlighted during Putman's tenure, his most valuable contribution was probably in the area of organization and personnel administration - emphasizing competence, demanding professional performance from all employees, and remedying many long standing problems with pay, benefits, living conditions, and a safe and efficient work environment.

This organization prospered for nearly 30 years, developing and perfecting the use of the radio beacon, modernizing illuminants and optical equipment, improving fog signaling methods, advancing the use of automated aids, and demonstrating the feasibility of unattended and radio controlled light vessels and lighthouses. The lightship itself, through innovative engineering and naval architecture, was developed into an effective vessel specifically built to handle its environmental requirements, and with propulsion and auxiliary systems adequate to its needs. Watertight integrity and a variety of other safety features were also highly developed in lightships of the late 1930s.

In 1939 the mission of the Coast Guard was expanded to include responsibility for aids to navigation, and resources of the former Lighthouse Service were transferred at that time. Lightship officers and crews as well as other civilian employees were offered two choices - integration into the Coast Guard with military rank commensurate with existing salary; or retention of civilian status under Coast Guard command. Exercise of these options resulted in about a 50-50 split. For lightships, many operated initially with either an all military or an all civilian complement. Later this gave way to a mix of military and civilian personnel. The mixed crews were in evidence well after World War II, and a few of the Lighthouse Service civilian employees were still active into the 1970s. In 1967, the Coast Guard became part of the Department of Transportation.

From 1939 until the end of the lightship era in 1983, the high standards of professionalism and technology introduced by the Lighthouse Service were carried forward and improved upon by the Coast Guard - well in keeping with its long history of dedication to the interest of mariners.

Life aboard the lightships, aside from being viewed as monotonous by many, was exposed to many hazards. The Diamond Shoals lightship was sunk by surface gunfire from German submarine in 1918. Dangers posed by weather and collision were ever-present. The records contain 237 instances of lightships being blown adrift or dragged off station in severe weather or moving ice. Five lightships were lost under such conditions, but the majority, despite heavy damage to hull and superstructure on many of these occasions, regained station unassisted. This attests to a high order of seamanship, and commendations for bravery and outstanding ship handling often resulted.

Without regard to frequent minor bumps, sideswipes and near misses, 150 collisions with lightships are documented. Most of these involved sailing vessels, but long tows of multiple barges accounted for a sizeable number. Damage ranged from superficial to severe. In at least one case, the lightship came out unscathed, with the colliding vessel going down nearby. On another occasion when a lightship was struck by a "passing" vessel, the impact was sufficient to knock the on-watch lightship crew from their feet, and shattered all 16 lamp chimneys in the masthead lanterns. In 1909 a lightship was dismasted when rammed by a four-masted schooner. Unfortunately, five lightships were sunk as the result of being rammed, with injury and loss of life involved in some cases. Although fog was a factor in many of these collisions, most occurred under conditions of reasonably good visibility. Attempting to cross the bow of the lightship without making due allowance for current and leeway was frequently found to be the cause.

Although improved upon to some extent in later years, a variety of factors caused the lightships to be veritable targets for all traffic. Many were positioned in mid-channel. Early charts were overprinted with dotted lines running from lightship to lightship giving the course and distance, and sailing directions in early Coast Pilots openly encouraged passing lightships close aboard. Ship's officers handling coasters during the 1800s were by and large sadly deficient in both theory and practice of piloting and navigation. Charts were often either not carried at all, or were not used for plotting. Instead, reliance was placed on listings of courses, bearings, and distances found in a variety of government and commercial publications, or simply passed on by word of mouth. Little wonder that lightshipping carried with it a large measure of apprehension.

Most of our decommissioned lightships are long gone. Quite a few were sold and served in coastwise and harbor roles. Two provided bonfires at Fourth of July celebrations, and several were used as target ships by the Navy. A few were transferred to other countries for use as lightships, some were used as floating clubhouses by various organizations, but the majority ended up in a ship breaker's yard. However, 16 surviving lightships remain accessible to the public, the three oldest built in 1904. Fourteen of these veterans were restored for use as museums or exhibits, two served as floating restaurants, and one has been used as the charter trade.

This brief history cannot end with the traditional look to the future of lightships, for there is none. However, we can be assured that the vessels themselves and certainly all those who served in them constitute a unique and proud segment of our maritime heritage - sometimes overlooked perhaps, but never to be forgotten.