

Myths, Misnomers & Mistakes

Straightening some of the twisted ideas about lighthouses

By James Woodward



This article is an attempt to correct some of the myths that have been perpetuated for some time concerning lighthouse locations, lighthouse structures and, most importantly, the illuminating apparatus used in them. I have little expectation that I will put an end to such tales but if I can correct any of the confusion that exists about lighthouses then this will have been a worthwhile effort. My only purpose in penning this article is to inform, and it is in no way intended to attack or diminish anyone's personal thoughts or beliefs.

I have worked with lighthouses and lenses for the better part of 43 years. I have been so fortunate and I am very grateful for being able to have a career that has been such a rewarding and exciting experience. During my career I have met many people who had a tremendous amount of knowledge about lights and lighthouses. But I also met a few who either repeated stories that they had heard without verifying the facts or simply created a "logical" answer to a question when they actually had no experience or knowledge in the field on which to base their explanations. Whether it is a myth, a misnomer or a mistake I will address each of them, first, and then provide a factual explanation.

I welcome any and all dubious lighthouse facts or stories from readers. I will try to provide written replies to anyone who would like to send me their questionable lighthouse tales.

Mistake: A local story has persisted around the Apostle Islands, Wisconsin in Lake Superior that Michigan Island had dual ownership that was shared by the States of Michigan and Wisconsin. At least one account said that the state line ran right through the center of the Michigan Island light tower.

Fact: This story has always held a fascination for me. Michigan Island is a pleasant enough spot but it has no silver nor gold nor ore. I could not fathom why any legislators in the early to mid 1800's would have wanted to divide the 75-acre parcel between 2 distinct governances. After a fair amount of research I

found that, indeed, they never had. Allow me to take you on a relatively quick trip amongst the various names that were once held by the lands that we now call Michigan and Wisconsin. The geographical setting is the state boundary between Michigan and Wisconsin along the south shore of Lake Superior.

Prior to 1763 the area was part of the Province of Quebec, Canada. In 1783 the British ceded the land to the United States and it becomes part of the western Claims of New York, Virginia, Massachusetts and Connecticut. In 1787 Congress removes these claims and the area becomes the "Territory Northwest of the Ohio River" or what more commonly known as the Northwest Territory. In 1800 another division takes place that encompasses some of the land that will become Michigan along with Wisconsin, Illinois and Indiana This division became known as the Indiana Territory. In 1805 the Michigan Territory was defined as all of the Lower Peninsula that we know today but only the eastern half of what will become the Upper Peninsula. From 1816 to 1818 the lands to the west including Illinois, Wisconsin and part of Minnesota become the Illinois Territory. Then, in 1818, the area of what is now Michigan, Wisconsin and the eastern part of Minnesota became the Michigan Territory. In 1837 Michigan becomes a state and its boundaries are exactly as they are today. The Wisconsin Territory is created but it still includes part of Minnesota. Finally, in 1848 Wisconsin becomes a state with the same boundaries that it has today and the lands of Minnesota go on to become a separate state in 1858.

This is the only geography myth that I will discuss. There is no historic evidence to support the story of any shared ownership of the island. The Michigan-Wisconsin border is and always has been, 12 miles to the east of the island. I have seen a map, though, that shows a dashed line dividing the island but it turned out only to be a hiking trail and not a state boundary.

Misnomer: That all light vessels were named for the stations at which they served, such as "NANTUCKET, DIAMOND SHOAL, PORTSMOUTH etc.



From top to bottom, the five variations of the Michigan-Wisconsin border over time. Maps courtesy of the author.

Fact: It is a fact during the first half century of the U. S. Light-House Establishment light boats or light vessels were named by the location name where they served. There were not too many of them early on and they tended to remain at the stations that they were built for. That was fine in 1819 and it seemed to work pretty well until the end of the Civil War. However, by 1867 it was found that having permanent names on light ships was creating problems. Moreover, these names were permanent names and to change them required a significant amount of paperwork and a lot of recordkeeping. There are instances of light ships with one name serving at a different location. Imagine the confusion

when the mariner was looking at the White Shoal light ship marking Grays Reef! For a brief period the alphabet was going to be the answer and instead of having location names light vessels become "A", "B", "C" and so on. This system also became quite burdensome as the number of vessels increased and the inventory contained light vessel "A", "AA" and "AAA". With the end of the national conflict in 1865 there was a return to the more mundane issues of the USLHS and in 1867 it was decided that instead of station names or letter designators every light vessel would be given a numeric designator that it would carry for its entire career regardless of station location. This policy was never changed in the USLHS and it carried on into the Coast Guard years. The only Coast Guard change was to number the ships in accordance with the already established system within that service and instead of LV the designator was changed to WAL. So the next time that someone refers to the "Chesapeake" lightship you might remind them they could be talking about LV 46, 49, 72, 80, 101 (WAL-524) or LV 116 (WAL-538) depending on what timeframe is being discussed.

Myth: There is a comprehensive list of all classical lenses and the Coast Guard has a warehouse full of Fresnel lenses.

Fact: This is a very simple one to deal with. First there are some good lists of lenses being developed by some very dedicated individuals. There will never be a complete list of all lenses or a list of where they all served. Many of them were not individually identified with manufactures' marks or serial numbers. Many of the 4th, 5th and 6th Order fixed lenses were virtually identical. Occasionally, there were years in the late 19th century when numerous fixed lenses of the same Order were delivered to Staten Island for distribution around the country. Once removed from the lighthouse where they served it is very difficult, if not impossible, to discuss their provenance with any certainty. As to the famous warehouse there is none. The Coast Guard does maintain a warehouse where many artifacts are stored but a Fresnel lens is rarely seen there and it does not usually stay there very long. The demand for the loan of lenses, today, far exceeds the number of lenses that the U. S. ever purchased.

Myth: The design of the 1866 lighthouse in Marquette, Michigan was patterned after a Spanish mission.



Lightship CHESAPEAKE LV-116, WAL 538. Photo courtesy of the author.

Fact: There is no evidence to support this claim. This pattern of lighthouse was constructed after the Civil War in many locations around the Great Lakes and constructed of brick, stone and wood depending on the locally available materials. The design crossed over Lighthouse District boundaries and was actually a reflection of the Greek Revival roofline that was still in vogue at the time. It could be argued that viewing such a structure with its tall tower at sunset or in a light fog, perhaps, might inspire thoughts of a romantic mission building near Barcelona. However, if that is the rationale to be used then I know of some Greek revival fire stations that must have been patterned after that same Spanish mission, as well.

Myth: That the range light system was invented at Saginaw River Light station by the unnamed son of an unidentified lighthouse keeper.

Fact: This story can be seen in print in more than one source and has the potential to actually become history. As the story goes, the keeper's son placed 2 sticks in the ground and observed that as his eye approached them the front stick visually grew in size and finally obscured the rear one. By placing a light on his sticks he reasoned that he could create a "range" that would warn the mariner when one channel was ending and that a change of course was necessary. The concept is true and correct; however, it was not invented at Saginaw River. The first lighthouse at this

location was established in 1841. At that time there were already range lights in service in the United States. In the 1839 edition of *Lighthouses, &c. of the United States* there are many references to both twin lights and twin beacons along our coasts. In most cases these twin beacons were ranges and the differing heights between the front and rear towers are given in the listing. These, however, are certainly not the earliest range lights. There are numerous references and illustrations of range systems in D. Alan Stevenson's book *The World's Lighthouses from Ancient Times to 1820*. Notably, there are citations for the Budonness Range towers that were established about 1600 and the Liverpool Ranges of the mid-1700s. Therefore, it is well documented that both the concept and practice of range towers and lights had been extant for at least two and a half centuries when the unnamed keeper's son "invented" them.

Misnomer: The shaft built into many lighthouse walls is a dumbwaiter or elevator for taking oil up to the lantern room.

Fact: These shafts that are built into the walls are the weight ways. With only a few exceptions towers were constructed with some type of a conduit for the weights to fall through in the event of the installation of a rotating optic in the lighthouse. Some were never used. If the light was "fixed" in character then there was no need for the optic to rotate and, therefore, no need for a weight driven clockwork.

This conventional “built in” weight way can be easily identified by a door, usually of wood, just below the lantern floor in the tower wall. Beneath the door is a horizontal slot with a shelf that can slide in and out. Quite often, today, the shelf is missing because it was removable and therefore made a wonderful souvenir. Directly beneath this door, but at the base of the tower, is another door that is usually made of cast iron. If you see these doors then you are looking at the weight way. In operation a cable from the clockwork passed through the lantern floor around a pulley and then went to the tower wall and into the cabinet. The weight was suspended from the cable. Every morning the keeper would wind the weight up to the top of the tower and slide the shelf in beneath it to hold it in place. At sunset he would light the lamp and then slide out the shelf allowing the weight to begin its trip to the bottom powered only by gravity. Usually, one winding a day would suffice although in very short towers or where the lens turned very quickly multiple windings during the night might be necessary. Inside the cast iron door at the base the keeper stored extra plates so that the weight could be adjusted to keep the clockwork in time.

This was the only use for these shafts. They did not contain little elevators or dumbwaiters so that the keeper could avoid carrying his oil or his tools or anything else to the top to



Door at the top of the weight shaft. Note the slot at bottom for the (missing) shelf. Photo by the author.



Two views of the weight shafts built into the walls of many lighthouses. Above, looking down the shaft, and below, looking up the shaft in another tower. Photos by the author.



the tower. Can you just picture the keeper explaining how the fire in the tower started because his can of kerosene spilled on the elevator because he did not want to carry it up the tower?

In addition to the weight ways discussed above there were a few other variations. One is where the weights dropped down the center post of the spiral staircase and another is where the weights dropped down the center of the tower guided by rails such as at Cape Hatteras.

I could continue with other musings about lighthouses, in general, but my specialty is classical Fresnel lenses and that topic probably has more myths and misconceptions than any other single field within the subject of lighthouses. Therefore the balance of this article will deal with the subject of illuminating apparatus.

Mistake: All lighthouse lens prisms are made of “lead or leaded crystal”.

Fact: That is not correct, especially in relation to French lenses. Although you

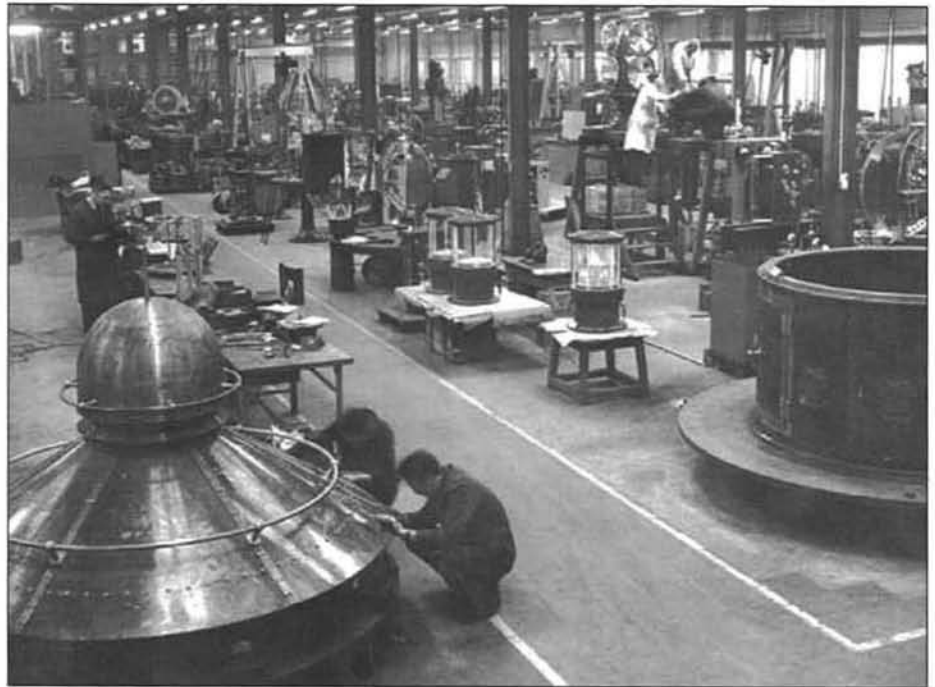
might find some lead crystal that belonged to your grandmother, you will not find any in a lighthouse lens. Between the two major lens-manufacturing countries, France and England, there were two distinct types of glass used. The French used "crown glass" that did not contain lead. It was made with a silica sand that contained a small amount of iron and it gave the glass in French lenses a slightly greenish color. The English, on the other hand, used "flint glass" that did contain lead. Flint glass was also known as lead glass or Crystal glass. It varies in color from brownish to yellow to pink. These colors are imparted from the pulverized flint used in the English glass mixture. Due to the lead content of English lenses they will eventually take on a purple color in the prisms. This color change is caused by a reaction between the lead and the ultraviolet rays of the sun.

The next three myths are among the best of the classic myths about lighthouse lenses or their manufacturers.

Myth: Every lens was handmade by an individual artisan and if he were to die during the making of a lens then the unfinished lens would be destroyed since no other individual could complete it.

Fact: Lenses were assembled by a team of very talented craftsmen. No one individual constructed the entire assembly. The factories of the great lens makers such as Lepaute, Barbier, Sautter & Chance Brothers each had individual shops that provided individual parts and skills that, when combined, had the ability to produce a classical Fresnel lens. Every factory had glass and metal working shops and an array of assembly shops that had the capability of taking those individual parts and creating a lens. The glass shop using pre-manufactured glass billets, re-melted them and then made slightly oversized "rough" castings of the individual prismatic shapes. When the castings were cooled and annealed they were then guided by the hands of specialists on belt powered polishing machines that were originally developed by Augustin Fresnel. The excess glass was ground away using grinding and polishing compounds on wheels made of rubber and felt. After these processes were completed a final surface polishing was done by hand with a fine rouge to finish the surfaces of the lenses and prisms. This final polishing steps are said to have been done utilizing the fine touch of women's hands that specialized in this particular phase of the finishing process.

The metal shops made the bronze and iron



Inside the Stone-Chance lens factory showing the wide array of machinery used to grind, polish and assemble lenses. Photo courtesy of the author.

castings for the pedestals and lens frames and other associated pieces and then they were machined to tolerance, drilled and tapped and assembled with fasteners that were made onsite. A fastener from a Lepaute lens could not be used in a Barbier or Sautter lens and vice versa. In the lens assembly rooms the glass prisms were fitted into the individual panels, focused and finally seated and sealed into place. The castings, frames and lens panels were then assembled and fitted into place. The final fitting process slightly modified the shapes of the individual pieces and from that point on they would only fit correctly into that one location. Once the apparatus assembly was completed each component was marked with an inscription or mark that identified its location in the overall assembly. Finally, the apparatus was disassembled and crated for shipment. A single lens could take from six months to two years to create. If this amount of work had been done by one individual it would have taken a lifetime to accomplish a single lens and it would have required a range of varying talents that were not possessed by more than a very few individuals, if any at all.

Myth: Lens prisms were polished by women working in farm fields who would work on them when they took rest breaks. Whenever I hear this one, it always brings to my mind the wonderful paintings of the mid 19th century artist Jean-Francois Millet whose

works depict men and women farmers toiling in the fields of France. Then I try to picture the women in these paintings lugging a five to 15 pound chunk of extremely brittle lens glass



Jean-Francois Millet's painting of French women working in the fields. A very unlikely place to be polishing a Fresnel prism! Illustration courtesy of the author.

in their apron pocket along with a few fine polishing felts and a box of fine English rouge.

When the church bell chimes and a break is in order these lovely ladies who have spent the mornings digging in the gravelly or sandy soils sit down in the field. Then they pull out an almost finished lens prism, a perfectly clean polishing felt and some rouge and get to work putting the final glaze on these virtually perfect optical lenses. When their break is over they rewrap the piece of glass, making certain that they don't get a grain of scarring sand or soil into the package, drop it pack into their apron

pocket and continue on with their plowing, hoeing, reaping or harvesting. Moreover, by utilizing this early form of multi-tasking, the corn was grown and the lenses were made at the same time.

Fact: This one may be the most repeated of all of the commonly heard lens myths and unfortunately it is often told by people who should know better. My guess is that it is repeated because it is just such a quaint story. History tells us that women were used to do the final hand polishing of the lenses and prisms after they came off the polishing machines. This would have been a very precise, tactile exercise requiring a deft touch, a lot of concentration and a clean work area. The only thing on the polishing felt could have been rouge if a finely polished surface were to be attained. To have tried to accomplish the precise level of this work in a farmer's field is beyond imagination. One grain of sand or one particle of soil would have damaged a prism beyond repair. So, done by woman – yes, in the farm fields – no. The formula that was used for making this glass created a product that was of optical grade but was also very brittle and sensitive to shock. No lens maker in their right mind would have ever let these valuable prisms out of the factory until they were complete and part of the finished lens and on their way to the purchaser.

Myth: The curtains, lens covers and shades were used in lantern rooms because Fresnel lenses could start forest fires.

Fact: Well this one is not only incorrect but it is impossible. The shades were required in lantern rooms for two reasons. The first was the regulation that required the keeper to clean and refill his lamp in the morning and place in the lens so that it would be ready to light at sunset. The second was that the ultraviolet rays of the sun would cause the degradation of the litharge that helps to hold the glass prisms in place and could discolor the glass prisms and lenses. A Fresnel lens works by taking the light that is generated at the focal center of the lens by the lamp and reflecting or refracting it so that the rays are bent and focused in straight, horizontal lines that will be visible to the mariner at great distances. During the daytime the light source, the sun, is external to the lens and the prisms will work in the reverse to the way they work at night and the sun's rays are bent and focused back to the focal center of the lens. Unfortunately that is the location occupied by a lamp full of volatile oil. Therefore if

the keeper forgot to pull the shades or close the curtains then the rays of the sun would collect on the lamp causing it to overheat and then the oil would explode. And to paraphrase Thucydides "a fire in your lantern room can ruin your whole day". On at least one occasion in the mid-1800s a light keeper on the Great Lakes forgot this point and destroyed the new Fresnel lens in his care along with his career. As much as I don't care to admit it, on more than one occasion, I have been inside of a lens and lost track of where the sun is. This has caused two shirts and one ladder to ignite. It does not affect the lens but it sure does sting.

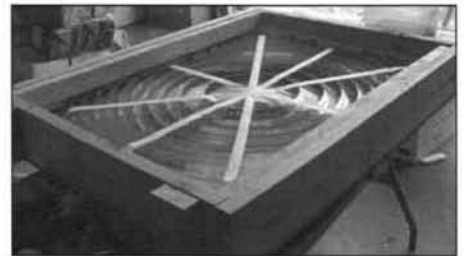
The knowledge that sunlight degraded litharge was very well known in the 19th century. In the epic volume *Memoir Upon the Illumination and Beaconage of the Coasts of France* 1876, M. Leonce Reynaud clearly states that sunlight will damage the structural integrity of a Fresnel lens and that it must be shielded from exposure to the damaging rays at all times during daylight hours.

So what has happened to all of those shades, curtains and lens covers? After the Lighthouse Service was absorbed into the Coast Guard the practice of closing the lantern room slowly disappeared. With the transfer of responsibilities from one service to the other, the knowledge of the lampists about lenses was quickly lost. They knew that sunlight damaged the litharge but it wasn't a well-publicized fact. Since the maintenance and safety of the lenses rested with the lampists there was little reason for them to share their knowledge with other members of the service. They were the nucleus who knew why things were the way they were. Then, in 1939 that knowledge base was removed,

much to the peril of the lenses that served the mariner. At about that same time the oil lamps were giving way to the electric light bulb and everyone knew that a light bulb would not blow up when exposed to sunlight. It was the combination of these two separate events that caused the demise of the use of shades in lantern rooms. Although it took many years to manifest itself, the damage caused by the ultraviolet rays of the sun can now be seen on many of the lenses and unless they are properly repaired they will face even more significant damage in the future.

Myth: Lenses were shipped from the factories in Europe in barrels of molasses. The molasses providing a cushion to absorb shock.

Fact: It is difficult to imagine how this one was thought up. Most of the myths are based, at least, in some tidbit of logic or fact. Lenses were shipped in wooden crates not casks of molasses. Lenses of the smaller Orders were generally shipped in single boxes, and they came fully assembled. Most of the 4th, 5th and 6th Order lenses cannot be disassembled into individual panels since adjacent sides of



Above – A First Order bullseye in packing case. No molassas!
Below – A complete First Order lens crated and ready for shipment. Photos by the author.



the lenses share common vertical frame members. This was fine since the smaller Order lenses were fairly light, weighing less than 200 lbs. Keep in mind that this is the weight of the lens and doesn't include the pedestal that could add another 100 to 250 lbs to the overall weight of the apparatus. This extra weight would be dependant on whether the lens was fixed or rotating which would include a chariot assembly and clockwork along with the basic iron pillar pedestal. The larger Orders – 1st, 2nd, 3rd and 3½ were heavier and more complicated. They were made up of individual panels that were manageable in size when the lens was disassembled.

The wood crates that were used were only slightly larger than the finished lens panels. The panels would be placed in their crate and fixed with wedges and blocks so that they couldn't move and then all of the void spaces between the glass prisms and the bronze frames and the crate were packed with excelsior that acted as the shock-absorbing ingredient. The record for safe arrivals was quite good. One notable exception was the packaging of the Barbier & Fenestre, 1st Order, 24 flash panel lens that was installed at Point Reyes, California. This lens took a rather circuitous route to its final destination and the sturdiness of the crating was not quite up to the task. When the lens arrived in California it required repairs that were well beyond the norm. This event prompted a very strongly worded letter from the Lighthouse Board to Messrs. Barbier & Fenestre letting them know, in no uncertain terms, that if they could not devote more energy to the task of crating their lenses for safe passage then their services may no longer be required.

Now back to that molasses for a moment. Can any reader imagine the sticky mess you would have on your hands if a Fresnel lens had been soaking in a barrel of molasses for the extended trip across the Atlantic? How would you ever remove it? Remember that a lens is a very delicate, optical instrument and it wouldn't stand up well to being sprayed down with high-pressure steam to remove this sticky mess. I won't even get into the weight issues that would be associated with such a packaging scheme. Suffice it to say, this is one of the better myths, but that is all that it is.

Myth: The 1-4-3 characteristic of Minots Ledge Light stands for "I love you".

Fact: Indeed, the characteristic of Minots Ledge is 1-4-3 but it stands for something com-

pletely different from the whispers of romance. In the early 1890's Capt. F. A. Mahan, Engineering Secretary of the Lighthouse Board, proposed a new method of distinguishing certain lights in areas where the approaches were exceptionally difficult or an excessive number of background lights would be confusing to the mariner. The entry to Boston was one such area and another was at Cape Charles marking the entrance to Chesapeake Bay and the busy ports of Norfolk, Newport News and Portsmouth. Capt. Mahan's idea was to create a specific number pattern to the flashes of these lighthouses so that they could not be misidentified by the mariner. These patterns were easier to create by utilizing the recently introduced mercury float bearings that were capable of rotating lenses at a faster speed than had ever been possible before.

The Lighthouse Board adopted Mahan's concept and authorized the purchase of two of the new mercury float lenses, one of the 1st Order and one of the 2nd Order. These were two of the first mercury floats purchased by the United States. They were built by Barbier, Benard & Turenne of Paris and they were first displayed at the 1893 World's Columbian Exposition in Chicago before going into service. They were very unusual looking lenses with numerous flash panels spaced in ways that had not been seen before. The 1st Order lens, which can be seen today at the Mariner's Museum in Newport News, VA, had flash panels spaced in such a way that it showed "4 flashes and then 5 flashes". It was installed in the Cape Charles lighthouse. The 2nd Order lens showed "1 flash, 4 flashes and 3 flashes" and was installed in the Minots Ledge lighthouse near Boston. Unfortunately, this lens was seriously damaged by vandals and most of the glass panels were destroyed. What remains of it can be viewed in a reproduction lantern room on Government Island in Cohasset, Massachusetts. The 1905 *Atlantic Coast List of Lights* gives the characteristics of the two lights as "4-5" and "1-4-3".

Although the Mahan System did work it was cumbersome and required lenses that were very expensive due to the numerous and unusual flash characteristics that were required to produce these unconventional flashes. The bottom line of the story is that Capt. Mahan selected the flash patterns to create lights that would be very noticeable against their backgrounds and he didn't assign any word des-

ignations to go with them. If he had assigned 1-3-4 to Minots Ledge then it might have been called the "I you love" light or whatever else an active, romantic imagination could create. As myths go this is a nice harmless one, it just shouldn't be taken to be historic fact. Once again, I invite readers to contact me if they have any stories about lighthouses, lenses or the USLHS that seem just a little too cute or strange to be true.



Above – Minots Ledge Lighthouse in Massachusetts Bay. Photo by Rusty Nelson.

Below – Replica of Minots lantern room with what remains of the original lens. Photo courtesy of the author.

