

# CAPE ANN Museum

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### ANNE'S EYES: THE HISTORY OF CAPE ANN LIGHT LECTURE FINDING AID & TRANSCRIPT

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#### Video Description

This lecture by Rockport resident Paul St. Germain was held at the Cape Ann Museum to celebrate the gallery installation of the first-order Fresnel lens that used to reside in the south lighthouse on Thacher Island, which is located off the coast of Cape Ann. At the time of the lecture, Paul St. Germain was president of the Thacher Island Association and is also the author of *Twin Lights of Thacher Island, Cape Ann*. The lens had arrived at the museum and was being assembled

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by a team of “lampists” - installed temporarily in the Maritime Galleries until placement in a special gallery built for it as part of the 2014 renovation of the museum. The lecture began with an explanation for the designation “Anne’s Eyes,” relating to Cape Ann being named for the mother of King Charles I of England. The remainder of the talk included information about lighthouse technology before the invention of the Fresnel lens in 1821, some history of the administration of lighthouses in the United States, a description of the six lighthouses on Cape Ann, more discussion of Thacher Island itself, some details about the different types of Fresnel lenses, and a discussion about the ways in which lighthouses have been modernized. Finally, a time-lapsed video was shown of the reassembly of a first order Fresnel lens at Pigeon Point in California. The questions that followed included a query about ownership of Thacher Island, one about training of lampists, and one about lighthouse keepers.

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### Subject list

Aime Argand	Thacher Island
Winslow Lewis	First-order Fresnel lens
Augustin-Jean Fresnel	Dioptric prism
Louis Sautter	Catadioptric prism
Augustin Michel Henry-Lepaute	U.S. Lighthouse Board
Maria Bray	Cape Ann Light Station
Paul St. Germain	U.S. Coast Guard
Thacher Island Association	Argand Lamp
Cordouan Lighthouse	Stephen Pleasanton
Jim Dunlop	Jim Woodward
Kurt Fosberg	Maria Bray
Navesink Light	Pigeon Point Light
Annisquam Light	Ten Pound Island Light
Eastern Point Light	Straitsmouth Island Light
Anne’s Eyes	Lampist

## Transcript

00:20

Martha Oaks:

Welcome. And thank you to everybody for coming. My name is Martha Oaks, and I'm the curator of the museum. And I just wanted to introduce a couple of the museum people. And then, Paul, you'll have to introduce your people.

Ronda Faloon, the director of the museum is here, I think setting up for the reception we're having immediately after. And Gerry Herbert, the development director, is here, near the back. And Courtney Richardson, who is the head of the education department here at the museum. These are names you've probably heard, but you don't always get to put faces to.

1:00

More than a year ago, the museum was approached by the Thacher Island Association about starting a partnership to bring the sole surviving Fresnel lens from from Thacher's Island back to Cape Ann. And it was just too good of an offer for us not to jump on it. And now, after a year of fundraising, and endless meetings, and lots of hard work by everybody, the lens is here under our roof, and I hope this afternoon you'll have a chance to go up to the second floor and take a look at it. It's having conservation work done on it, and by the end of next week, it will be assembled in our maritime gallery. And a year from now, the three lampists, who are in the back row, who I'm going to ask to stand up next... they'll be back to take the lens apart and move it across the hall into a brand-new gallery designed and constructed just to exhibit the lens.

After clapping, Martha continues:

These are the three lampists, in the back row – Jim Woodward, Jim Dunlap and Kurt Fosburg, and they are doing a wonderful job.

02:12

Earlier this week we heard from Jim Woodward about the history of the Fresnel lens and the history of lighthouses, and today we're going to hear from Paul St. Germain, who most of you probably already know, he's the president of the Thacher Island Association. He is also the author of this book, which I think you can get signed copies of, if anyone would like to afterwards, just outside. And he is responsible for getting the Thacher Island and the Cape Ann Light Station designated on the National Historic...as a national historic landmark in 2000, which is not an easy process to do. So, Paul, it's all off to you.

03:01

Paul St. Germain:

Thank you, Martha, I appreciate it. Good afternoon, thanks to everyone for coming. We've stacked the audience with a lot of members of the association.... Peter...Bill...Joe.... a whole bunch of people.

You may be a little curious about the title of my talk. The fact is that in when the first lighthouses were built on Thacher, Cape Ann residents began referring to them as "Anne's Eyes." A little bit of background history to that, is that, in 1614, when King Charles of England sent John Smith over to explore the coast of Massachusetts, he, Smith, drew a map of the entire area and he named the cape area "Cape Tragabigzanda," which was the name of a princess of the Ottoman Empire, who had helped him when he was captured at one time.

04:26

Anyway, he brought the map back to King Charles, and said, if you want to change any of the names, you can do that – you're the king. And so, King Charles decided to name it Cape Ann after his mother, who was the queen of Denmark. So that's the genesis of Anne's Eyes. Over the years, people ...residents of Cape Ann would always refer to Thacher Island and the two lighthouses there as "Anne's Eyes." So that's a little bit of the background.

05:04

Before I talk about the Fresnel lens and how it finally came back to Cape Ann on a permanent basis, I think it might be helpful for me to give you some background on the lighthouses of Thacher Island first, and how these lenses became a significant factor in the history of the island. The lights in the two towers have seen an amazing number of events transpire in and around the island in the past 150 years.

05:34

The building of the new granite lighthouse towers on Thacher was no small event in the history of Rockport and Cape Ann. The lighthouse service decided to replace the original, rather short 40-foot-tall towers, which were built in 1771, and to build these solid granite twin goliaths to stand 124 feet tall and sit on the ledge that cast their light 160 feet above the water. In the mid-1800s, the U.S. Navy had done some survey work that showed that no fewer than 70,000 vessels passed by Thacher in any one given year. The construction confirmed the vital importance of this light station and how important it was to the fishing, shipping and marine interests on Cape Ann.

6:28

Also, the fact that the towers were the very first to indicate a dangerous spot in the ocean, and not just a light that simply marked the harbor entrance, also enhanced their importance. Construction began in 1859 and was completed in 1861. This is also the year that the first order Fresnel lenses were installed in both towers. When the notice to mariners was published on July 29, 1861, announcing that the lights would be first there exhibited on October 1, there was great excitement in the town and surrounding maritime communities. Imagine the events and

the storms, the shipwrecks and the people that these twin lights have been witness to over the years.

7:18

They were completed at the outbreak of the Civil War. At the time, only 34 states existed. Abraham Lincoln had just been elected president. And these lights have seen 29 presidents take office since then. Rockport was incorporated only 20 years prior in 1840, while Gloucester had not yet been incorporated until 12 years later, in 1873. I just find it interesting to note that both towers... both towns considered lighthouses so important that they included them as central elements on each of their town seals. That's Eastern Point Lighthouse on the Gloucester seal, and Thacher Island on Rockport's seal.

08:06

The major element that made these towers important and valuable to the maritime community was the installation of first order Fresnel lenses into each one of them. Now, consider what the lighthouse community was dealing with prior to the invention of the Fresnel lens. The original 1771 towers used candles on a chandelier similar to this. How much light could that really generate, especially when they had to replace these candles every three hours?

8:37

Then along came something called hand lamps. These lamps, these boxes were filled with fish oil, and each one of these little wicks sat in the fish oil. A series of these pans or boxes were hung on chains in the lamp room, from the ceiling of the lamp room. They were used from about 1789 'til about 1812 out on Thacher's, as a matter of fact. They were highly inefficient, used great amounts of oil, and produced smoke and fumes and soot, and really became intolerable.

This system proved expensive and also inefficient, because the light that was generated by this method lost 97% of its generated light, since it would only be dispersed in all directions and not necessarily focused in one direction pointing out to sea.

9:37

Along came a gentleman by the name Aime Argand, who was a Swiss-born physicist living in France, He invented a much more effective, they called it a double draft burn lamp, which obviously became known as the Argand lamp, in 1782. This is a photo of the lamp that is currently in the Smithsonian Institute collection of lighthouse artifacts. You notice the oil reservoir here and then this is the lamp itself that feeds it. A slight improvement to these Argand lamps happened — they put small mirror-like reflectors, were installed behind the lamps to redirect the light from escaping the back of the tower.

10:30

Later a former sea captain by the name of Winslow Lewis came up with a variation of Argand's lamp. Lewis eventually became a major contractor for the U.S. government, and went on to

build many, many lighthouses here on the East Coast. What he did is he added a chimney to the lamp, as well as a reflector and a hollow woven wick, which burned brighter and cleaner. He also added a lens on the front of it. He tested it in the South Tower of Thacher in 1850 for the U.S. government's lighthouse establishment. They were so pleased that they paid him \$20,000 for his patented invention.

11:11

He eventually got the government contract to equip the remaining 49 lighthouses in the nation at that time. This contract was worth about over \$26,000, and back then that was a very big contract. Thacher had ten Argand lamps hung on a circular framework in two tiers. Each had a 20-inch reflector to help brighten the light. These reflectors were plated with 15 ounces of silver. Well, the drawbacks of this, when the keepers cleaned these mirrors, over time, they would rub off the silver and they wouldn't reflect anymore. Still... only a small percentage of the light needed, even with this improvement using this method, it still lost about 40% of dispersed light.

12:01

Finally, in 1822, a French physicist by the name of Augustin Fresnel designed an innovative lens system that would forever revolutionize the history of nautical navigation. In that year, Fresnel put his design skills into finding a solution to how dispersed light could be captured, intensified, optimized and focused to a higher degree than contemporary means, so it could serve lighthouses much more effectively.

12:37

Fresnel's invention, obviously known as the Fresnel lens today, created a way where only 17% of the light source would be lost. By creating a lens that completely surrounded the light source, with concentric rings of glass prisms and mirrors, Fresnel designed a way to take a dispersed light source, heading in multiple directions, and redirect it through collected prisms by bending and redirecting the light beams. This bending of the beams through a Fresnel lens pointed all the light source in the same direction, to create a very intense focused light beam. This light beam could be seen 20 miles to sea using just a single oil lamp. It created a solid disk of light 360 degrees to the horizon.

13:30

Fresnel worked out a number of formulas to calculate the way light changes direction, or refracts, while passing through glass prisms. Working with some of the most advanced glass makers of the day, he produced a combination of prism shapes that together made up the lens. The Fresnel lighthouse lens used a large lamp at its focal point – focal plane – as a light source, but also contained several panels of glass surrounded above and below like concentric rings of prisms and mirrors, all angled together the light, intensified it and projected it out.

14:08

Now, the first Fresnel lens was installed in this elegant Cordouan tower lighthouse. This lighthouse is on France's Gironde river. He did this in 1822, and it is visible to the horizon, again, 20 miles away. Cordouan, by the way, is one of the most beautiful lighthouses in the world. It's the 10th tallest lighthouse, standing 223 feet, and it was completed in 1611. It even has a royal chapel in it, as well as a room reserved for the King of France when he came to visit. Pretty cool lighthouse. Here you can see the lens is also partially covered with a red lens to give her light flashing...a two-color flashing characteristic.

15:03

Fresnel lenses soon shone along the ragged coastlines of Europe. But surprisingly, America was slower to see the light. (Sorry!) As mariners came to depend on Europe's powerful new lights, they complained bitterly about the puny lamps lighting America's coasts. Despite the clear superiority of Fresnel lenses, the parsimonious bureaucrat in charge of federal lighthouses, Stephen Pleasonton, considered the cost prohibitive. As Jim said in his talk the other night, he was a bean counter, and not much more. Finally, the uproar became so great that in 1838, Congress launched an investigation, of course. It was not until then that Congress coughed up the cash to import a few Fresnel lenses.

15:51

The first were installed in 1841, inside the two towers at Navesink lighthouse. This lighthouse stands on a high promontory on the coast of New Jersey that overlooks the approach to New York Harbor. Each of these towers is about 73 feet high. In the tower on the left, they installed a first order lens. It was a fixed light, and it could be seen, once again 20 miles to sea. In the north tower, they installed a second order rotating lens. Only after 1852, when the United States created the Lighthouse Board, made up of eminent scientists and mariners, did the great lenses really begin to light America's coastline. By the Civil War, nearly all lighthouses in the United States had Fresnel lenses. Thacher Island and Cape Canaveral were two of the last lighthouses to have a first order Fresnel lens installed, in 1861.

16:53

Now, Fresnel began his work on the development of various sizes to suit the needs of different locations. You should know that there were seven classifications of Fresnel lenses. These classifications were known as orders, which basically meant the size of the lens. The higher the order number, the smaller the lens. This chart shows the seven primary orders which he developed. The order of the lens to be used at a specific lighthouse would be determined by the specific needs of each individual location — smaller lenses being used in locations like harbors, inlets and rivers. The larger ones maybe were used more on coastal lighthouses and island lighthouses. As you know, the lamp we have upstairs is the largest, first order Fresnel lens. It can be seen 22 miles out to sea. It stands about seven feet, 10 inches tall.

17:54

The cost of the first order lens in 1850 was approximately \$6,800 dollars each, while the second order lens cost about \$4,400 dollars. The smaller orders obviously were proportionately less. In today's market, a first order lens is probably valued somewhere between one and two

million dollars — although if anyone's interested in buying one, they're not for sale and are all in museums for the most part.

18:27

There were two major manufacturers of Fresnel lenses, both of them located in Paris. The first was Louis Sautter, whose factory was actually located in the Champs D'Elyses in Paris. Sautter was the first maker of fixed Fresnel lenses, and he actually made the ones for Navesink. He also made the one at Thacher that is sitting upstairs right now. This is the nameplate that is actually still attached to the pedestal that is still in the South Tower at Thacher.

19:00

The other manufacturer was Augustin Michel Henry-Lepaute, who came from a major clock-making family in Paris. In fact, they were official clock makers to the kings of France. Lepaute worked with Fresnel to design clockworks to power rotating lenses for lighthouses. Lepaute eventually contracted with a glassmaking facility to make the crystal prisms that Fresnel would need.

Now, the federal government had a very even-handed approach to purchasing Fresnel lenses. They basically split their purchases among the various manufacturers. So, in fact, at the North Tower of Thacher, the lens was made by Henry-Lepaute, while the South Tower lens which is upstairs was made by Louis Sautter. Lepaute, by the way, sold the U.S. Lighthouse Board 336 Fresnel lenses in the seven years between 1853 and 1860.

20:02

How's the lens constructed? Well, the earliest prisms were made of leaded crystal glass. That was found to chip very easily, it was very brittle. So, sodium was added to the glass making process, and a new product was invented called crown glass. It has a slight greenish hue to it, but is much less likely to chip, although you couldn't prove that by the one you've got upstairs, right Jim? Jim has figured out that the lens upstairs went through some horrible times. He'll explain that if anybody wants to go up there later on, what he's discovered while he's been working on the lens — actually all three of the guys.

20:46

There are four main components that are assembled together to make a Fresnel lens: the metal framework, which is fashioned in bronze; a set of prisms; some little wooden wedges; and a material called litharge, which I'll get to. The size of the frames vary, obviously, depending on the size of the order of the lens. Now bronze was used because at the time it was the only metal that would resist corrosion, maintain its strength and shape in the humidity and salty air that surrounded coastal lighthouses.

21:22

The individual prisms were set in a framework and temporarily restrained while the frame was being assembled. The frame would be assembled in hand-numbered sections, so that when it



was received at a light station, it could be quickly assembled. Obviously, the other reason was that some of these lenses were so big, there was no way they were going to be able to carry the entire lens up to the top of some of these lighthouses, so they had to take them up in pieces.

The frame would be assembled... I'm sorry. After the individual frame panels were set together, they were held in place at the base, at the bottom, by a bronze collar, and at the top of the framework— actually at the top, was a bronze collar that stabilized the entire frame. And once the framework was assembled, the individual prisms were then focused using these little wooden wedges that I spoke about. These wedges were made of walnut. Once they were focused, the prisms were secured using litharge. Now, litharge is a type of lead-based pipe that was used to seat the glass prisms into the brass frame. And it provided an extremely tight and long-lasting bond between prism and the brass framework.

22:46

Just a little explanation of the basic operation of the lens: The light from general light source, candle, lamp or lantern, would be admitted and collected by the dioptric set of prisms assembled in the center of the lens. The dioptric prisms would then refract the light, increasing the distance the light could be seen.

Later on, catadioptric prisms were added. The upper and lower prism groups collect the light as well, then refract and reflect the light so that the light coming through the prisms in a vertical plane is as unified and far reaching... provides a unified and far reaching beam. It's important to note that there is really no magnification in the operation of a Fresnel lens. Magnification is really the act of increasing the available light; and the Fresnel lens only redirects what light is available.

23:43

Not only were Fresnel lenses available in different sizes, but they also came in a number of different styles. The most common and widely used style of the lens is sometimes referred to as a beehive lens, like the one we have here. In this style, a series of vertical panels were placed side by side, or attached to one another, forming the curve for a beehive shaped frame, which is set down around the light source.

24:12

Another type of Fresnel lens design is known as a bi-valve, or clamshell lens. This is a second order lens that was actually installed in Navesink in the north tower. Another style of Fresnel lens used is known as a drum style. This lens style is the least commonly used and consists of a cylindrical-shaped frame and set down around the light source. This frame is filled with prisms and generally gave off a consistent and fixed characteristic. The style of lens was most often used in light ships. There are also other styles of lenses, a hyper-radiant lens, a box-shaped lens, and others.

24:59

Now the question is — fixed light or flashing? What is a characteristic? Some lenses like the ones in Thacher were in fact fixed lights. They didn't rotate and they didn't flash. They had a constant beam that shone out over the sea. And like this one here on the left ...all this rotated, they have circular bulls-eye lens sections; and these bulls-eyes are called flash panels on that one there.

Some of these flashing lenses had anywhere from 8 to 24 flash panels — that's what these panels are right in here. As the lens rotated around the light source, each bulls-eye passed between the light and the eye of the viewer, and gave the appearance of a bright flash. The timing between apparent flashes would indicate to the mariner which lighthouse he was actually looking at. These varying patterns are called the light's characteristic. Now, some blink, some flash, some are different colors, some change colors, and some, like Thacher, are just big and bright.

26:28

The lighthouse designers had to come up with a way to rotate the bulls-eye lenses to make use of this ingenious design. Given the various weights and the sizes of the lenses, it was seemingly a difficult task, yet the answer was in fact quite simple. The lenses would be secured to a rotating stand, which was set a-top a series of brass chariot wheels, which you can see right here.

26:59

A clockwork-type mechanism similar to a grandfather clock was located between the rotating stand and attached to the stand by a series of gears located along its base. The weights were suspended down the center of the lighthouse by a series of cables. These cables were wrapped around a drum attached to the clockwork mechanism. Gravity pulled the weights toward the ground floor of the lighthouse, and the drum was turned by the cable, which in turn, turned the gears attached to the rotating stand. As the rotating stand turns so that the lens... In order to keep the lenses rotating, though, the lighthouse keeper had to periodically crank that weight back up to the top of the lighthouse. As electricity became available in the light stations, electric motors replaced the weight-driven systems.

27:52

Now what about the other lighthouses on Cape Ann? Well, there are six lighthouses, as you all probably know, along the coast of Cape Ann — two on Thacher and of course these four — Annisquam, Straitsmouth, Eastern Point and Ten Pound Island.

Annisquam was built in 1801. It's probably one of the oldest lighthouses in Massachusetts, next to Thacher's. Each of the lighthouses on Cape Ann, by the way, have been rebuilt at least three times in their history. Annisquam was rebuilt in 1851, and used a fifth order lens. It was again rebuilt in 1897, which is the lighthouse that stands there today. In 1922, a stronger fourth order lens replaced the smaller fifth order lens at Annisquam.

28:53

Ten Pound Island, which was built in 1821, had its birdcage lamp removed. It only used Argand lamps initially. Most of you know where Ten Pound Island is, in the outer harbor of Gloucester. When it was rebuilt in 1881, they constructed a cast iron tower. Here you can see that the keeper's house was actually attached right to the tower, so the keeper didn't even have to go outside to maintain the light in bad weather. They installed a fifth order lens that looked like this one.

It's interesting ...when the Ten Pound Island lighthouse was decommissioned by the Coast Guard in 1969, the lens was removed and is now sitting up at the Maine Lighthouse Museum up in Rockland, Maine. I personally saw it myself this summer.

29:51

Eastern Point, at the mouth of Gloucester Harbor, was first built in 1832. It, too, used Argand lamps with reflectors in the early years. It was rebuilt in 1848 by Winslow Lewis, who I mentioned earlier. Here you can see the fog bell tower. Now, the keeper had to climb this tower on foggy days to wind the clockwork mechanism that struck the foghorn.

In 1857, it was supplied with a fourth order lens that could be seen up to 13 miles out to sea. In the early days, this lighthouse was called the "Ruby Light" because they had put French red plate glass in the lamp room in front of the lens. The light was originally a fixed red light and was eventually changed to a flashing red, which is what you see today. The current lighthouse that's out at Eastern Point was rebuilt in 1890. The lens shown here is actually right upstairs here in the museum, right next to the first order lens. It is a box-shaped lens with four bulls-eye prisms in it, in a bronze case.

31:05

Straitsmouth.... The original tower was built in 1835 and rebuilt in 1857. The original also had a classic birdcage lantern. And the final rebuild of that tower was done in 1898 which is the one that stands there today. Straitsmouth was built to mark the entrance to Rockport Harbor, as well as mark the lethal Avery's Ledge where Anthony Thacher is believed to have wrecked before being swept towards Thacher Island in 1635.

With this picture, you can see how close Thacher is to Straitsmouth. When Straitsmouth was rebuilt in 1857, it used a sixth order lens like this one. This is a real small lens, it only stands about a foot and a half high. It is also been removed from that tower, but the light that's there now is a flashing green light.

32:04

Now, none of the Cape Ann lights have a Fresnel lens today. All of them have been replaced with modern optics and solar power. In 1939, President Roosevelt signed legislation transferring the jurisdiction of the nation's lighthouses to the Coast Guard. As technical advances such as fog detectors, sub relays, electricity, became widely accepted, more and more

stations were automated, really eliminating the need for lighthouse keepers. Aero beacons and other modern optics were also being built. These modern optics were smaller, more cost effective to use and maintain, and began replacing the Fresnel lens in the lamp rooms across the nation.

While most Fresnel lenses have been removed from lighthouses, a number of the classical Fresnel lenses have been saved and are on display at lighthouses and maritime museums across the country – Cape Ann Museum being one of them.

33:04

Before the Thacher Island lens was removed, it was electrified in 1932 with two 250 watt lights inside the lens. This then gave the light the ability to flash, using a timer that automatically flashed a particular pattern. In 1980, the Coast Guard automated Thacher. They removed the Fresnel lens to their Museum at the U.S. Coast Guard Academy in New London, Connecticut.

33:39

The lens was supplanted by two huge foot and a half diameter rotating back to back aero beacons with thousand-watt halide bulbs, which the Coast Guard once reported could be seen 44 miles away. That was actually in a report. I think that claim might be a little bit fishy. The horizon really drops off at what - 20-22 miles, due to the curvature of the earth. So, what they may have been seeing is something called the lumen of light, which is the light reflection in the sky, similar to what you see around here if you're in a dark area driving to a large city, you can see it's kind of lit up overhead. So that may have been what these Coasties saw out there.

34:26

In fact, these lights when they put them in, they were so bright that the Coast Guard had numerous complaints from residents who live along the shore facing the island. The light was shining into their living rooms and bedrooms, so they eventually had to install these black shades on the land side, right here, to block the light from shining into their homes.

Now, because of modern day navigational aids such as LORAN and GPS, lights are of minimal value to the modern mariner. In the 1990s, they changed the South Tower to a red flashing light. This is it, that's up there right now. Today this light up in the South Tower is powered by solar panels. The solar panels can be seen to the lower right over here, and on the other side, on this side here, you can see the fog signal. Those solar panels power both the light and the fog signal of the South Tower.

35:29

The fog signal building over here in the lower left...This was the original fog signal building that housed a steam whistle, and later a foghorn. It is called a whistle house because originally, they had a steam whistle that was actually a train whistle on the roof of that building. The Thacher Island volunteers have been restoring this building over the past three or four years and hope

to get the old foghorn running again to use as a demonstration piece for the island visitors who come out in the summer.

36:04

The South Tower still maintained as an official aid to navigation operated by the Coast Guard, although the tower itself is owned by the Town of Rockport. North Tower is lit by a solar-powered LED lamp. There are 120 LED lights in this little array here at the top, that's only about six inches in diameter, and it can be seen about six miles out to sea. It gives off an amber-colored light that resembles the original whale oil light of the past. It's also maintained by the Thacher Island Association as a memorial to mariners, and of course the local fishermen like to see the light as many of them fish nearby at night.

They continue to be the first lighthouses seen by travelers coming from Europe on their way to the United States. These two sentinels remain unique in that they are in fact the last two remaining twin lights still in operation in the nation, and continue to attract over 3,000 visitors who climb their stairs each summer.

37:11

There are only 512 Fresnel lenses remaining in the country today. At one time, there were over 1,000 lighthouses, range lights, buoy markers and harbor lights that once existed. Today only 84 of these are operational Fresnel lenses that are actually in lighthouses. Most of them have third, fourth, fifth and sixth order size lenses. First order lenses are extremely rare. The Lighthouse Board originally had contracted for 57. Today only 40 remain—15 are in lighthouses and 25 are in museums. Many, including the North Tower lens of Thacher, are lost to time. I have a whole story about that.

38:01

There are only three first order lenses in all of New England....one up in Seguin, Maine; another one on Block Island, Southeastern Light in Rhode Island. Both of those still have the first order lens in the towers. And the final one is Gay Head Light in Martha's Vineyard, which has been removed from that tower and it now sits in the museum in Edgartown, on Martha's Vineyard.

But the great news is that we now have our own lens right here back at Cape Ann, where she belongs. This is a photograph of what the lamps looked like when they were set up the Coast Guard Museum down in New London. They had a nice little fence with all kinds of information around it. But we're going to do a much better job here at the museum. We have fabulous plans for this thing. It's going to have this whole new gallery.

38:59

So, I want to introduce the three gentlemen, which we already did, who will be working on the lens for the next week or two. These men are called lampists, and are basically experts in Fresnel lens technology. Jim Dunlap and Jim Woodward are ex-Coasties, having had long careers with the Coast Guard, and their main responsibilities were to maintain the hundreds of

Fresnel lenses across the country. Kurt Fosburg is a metals expert who restores and creates the frameworks. He also recreates many of the oil lamps that we use inside these lenses. We're all really lucky to have them. They have each worked on numerous lenses. I think Jim's resume says over 100 lenses in his career. They worked on lenses in Cape Hatteras, in North Carolina, Fire Island in New York, St. Augustine in Florida, Pigeon Point (California) where they're off to after this project, off to Point Conception in California.

40:05

Now, when this team was doing the Pigeon Point project back in 2011, the California Department of Parks and Recreation produced this short time-lapse video of both the disassembly and the re-assembly for their new visitors' center. So, I thought that you might be interested in seeing what all these men are going to be doing for the next two weeks.

Audience member: asks a question that is lost in the crowd noise — perhaps “How long will this whole project take?”

St. Germain: About three months.

Time-lapse video plays, showing men re-assembling the lens.

St. Germain: What did you say, Kurt, was this about six weeks?

Kurt Fosburg: We did this in twelve days.

40:57

St. Germain: Here, they put in the lower catadioptric lenses, prisms. Now they're working on the flash panels, up above. This, lens, they took it actually took it out of the tower and brought it down and they're rebuilding it in the fog signal building there on Pigeon Point.

The chain falls and everything else, the upper catadioptrics up here.

As the complex assembly continues on the video, Paul jokingly comments “This will only take a minute.”

Audience member: Where is Pigeon Point?

St. Germain: It's in California.... south of San Francisco. Video continues.

I thank Jim Woodward, by the way, for getting this video. That's our 3 characters, right there (pointing them out in the photo of the entire crew, at the end of the video).

One of the lampists: The usual suspects...

St. Germain: The usual suspects, right.

42:22

St. Germain:

So, the towers stood a little taller when they were named to the Register of Historic Places back in 1981. And even more so when they were designated as a National Historic Landmark in 2000, one of only two National Historic Landmarks here on Cape Ann, the other being the Adventure, across the street. They have stood proudly as they became a symbol of the Thacher Island Association's growth from a small committee of eight, started by Ned Cameron back in 1980, to a group of over 50 regular volunteer workers who go out to work on the island every Wednesday during the summer. And all of these folks belong to a membership organization 700 strong. By the way, I expect everybody here to join tonight. Anyhow, they continue to watch over the Cape Ann coastline during the winter days of sea smoke and storms; serve as a backdrop during the summer for vacationers and beach goers; even watch over the seals on the Dry Salvages right off Thacher and Straitsmouth.

43:35

I'm going to shamelessly promote my book again, and these commemorative T-shirts, all available in the Cape Ann Museum gift shop, downstairs.

We don't get anything for this — All the money, all the proceeds from the book as well as T-shirts, go back to the lens restoration projects. I hope you'll consider buying them — I'll be happy to sign the books, if you buy one.

43:58

So, I really hope I've piqued your interest in our island, and we hope that you can come visit us. So, check our website for our launch schedule; we start launch trips, June 15 — you have to make reservations to do it. So, at this point I'll be happy to answer any questions. Clapping.

I must have answered all the questions....

Yes...

44:34

Audience member: There's something I don't understand. To make a flashing light, you have to rotate the two-ton light rather than rotate a lightweight shade that would pass in front of the light source somehow. Can you explain why? Why do you have to rotate a big heavy light?

44:54

St. Germain: I can't explain it. I have no reason. It has to do with those flash panels, and as one passes by, it'll blink because the eye of the beholder is the one that makes the flash even though there really isn't a flash. So, it has to pass in front of the lens. And the whole idea is to trap a light inside this lens. As it turns, it just doesn't, you know, it's... the dispersed light hits



those prisms and then bounces and as I said before, it's like a 360-degree disc of light that can be seen from that point

45:35

Audience member: Could you explain the ownership of the island and the two towers because I'm a little confused on that? There are various parties involved, I know.

St. Germain: Oh, sure. The southern end of the island that includes most of the structures, the keepers' houses, and the South Tower, is owned by the Town of Rockport. The Town of Rockport accepted it from the Coast Guard back in 20\_\_ – I think it was in 2000. So, they own the southern end of island. The northern end of the island is owned by the U.S. Fish and Wildlife Service, and they maintain the north end of the island as a wildlife refuge for birds. They also own the North Tower. We manage the North Tower for them, but they physically own that end of the island. The island is about 54 acres, and it's split roughly evenly between the two parties.

46:38

Audience member: And who owns the South Tower — the Town of Rockport?

St. Germain: Yes, the Town of Rockport, as well as the two keeper's houses and the other. the whistle house structures. There's also a helicopter pad that the Coast Guard uses, that they had built. And there's a cistern, a 25,000-gallon cistern — that's the only way we get water up there. We don't have wells, so we have to have a rainwater catchment system.

47:08

Audience member: On behalf of the Cape Ann Amateur Radio Association, I would like to thank you for allowing us to have an activation at Thacher Island, which I believe this year is scheduled for the second weekend in August. We'll be broadcasting from the two carriers.... there are designations of the two towers and also the island, so that when we activate the radio out there, the radio amateurs can not only contact the stations, but they get credit for the two lighthouses and the island for various awards that they can get.

St. Germain: That's great.

Audience member: So we're very proud and thankful to you for doing that.

St. Germain: We love having you guys out there. This is, what, I think the fifth or sixth year of you coming out?

Audience member: Yeah, I think this is the fifth year.



St. Germain: Yeah, it's a good group of guys, and women, that come out there. I remember one year somebody was at the top of the North Tower with his antenna broadcasting from there, which is...

Audience member: Well, we...sometimes we'll hook up antennas to the top of the tower...it's not unusual.

48:28

Audience member: I just wanted to say I want to thank you all on behalf of the artists. We go out, usually, the first Saturday and then the following Wednesday in August. As long as you stay on the paths, the seagulls are not too aggressive.

St. Germain: Usually by August, the seagulls are pretty quiet. What you have to watch out for is the poison ivy. But we keep the trails clear, so as long as you stay on the trails, you are safe.

Audience member: There's a question over here, too.

St. Germain: Yes...

49:00

Audience member: Since the Coast Guard started mechanizing systems and lighthouses back in the 30s, around that time, how did the lampists get their training?

St. Germain: I know Jim was trained by a gentleman who was with the original Lighthouse Service, which was the organization that managed lighthouses across the country before it was handed over to the Coast Guard in '39, I think. The automation process really just started I guess .... You were involved, Jim, back then, in the '70s, '80s?

One of the lampists: Automation really took hold in the '70s, through the '80s. Right. And then they were done, and the people were gone.

49:58

St. Germain: The Coast Guard were not big fans of the Fresnel lenses, because they required so much maintenance. But that's where Jim learned his trade, in doing that. But as the automation proceeded, the Coast Guard would take the Fresnel lenses out of the towers, and either put them in museums, and in some cases like the North Tower, back we're not sure exactly when this happened, but it was in the 50s and 60s, the Commandant of the Coast Guard ordered the Coasties who were at that station on Thacher to remove the lens of the North Tower. They used the gravity method — just threw it over the side. So, we have we have pieces of prisms that we found in the rocks over the years that it's in our little museum out at Thacher's right now. So luckily, by the '80s when they were removing this one they were told, you don't throw it over the edge. Now that they realize they're worth a million to \$2 million apiece, you don't see them getting rid of those lenses anymore.

Yes...

51:13

Audience member: Can I ask you to talk a little bit about the history of people who lived on the island?

St. Germain: I mean, the most famous person out there that has been written about a number of times is a lady by the name of Maria Bray. She was out there with her husband in 1861, '64. Alexander Bray was one of the first keepers who tended the new lighthouses in 1861. He had to go off the island one day. One of his assistants was ill and he had to take him to the doctor's, and rowed him ashore, and left his wife and his wife's nephew, I think, on the island. Well, he couldn't get back that night because a storm blew over, a winter storm. And for three days and three nights, they had something like eight feet of snow. It was one of the worst snowstorms in the 1800s.

52:16

So, he couldn't get back to the lighthouse, and Maria literally walked 300 yards between each lighthouse; had to go up 157 steps with oil to keep the lights lit. She did...she had to do this four times every evening, on both towers. So finally — this was in December — and finally, Christmas Day, the weather turned, and Alexander was able to row back out, to see his wife asleep at the bottom of one of the towers, with her nephew. But she kept the lights lit for those three nights during that winter storm, which is pretty amazing. That's the time that you want a light to be lit, during storms. On a nice clear evening, you don't really need them.

53:14

She was a real heroine. So much so, that about three years ago, four years ago, the Coast Guard called me. They wanted the history of Maria Bray - where she lived. She lived right here in Gloucester, as a matter of fact. And they asked if I knew about Maria Bray. I said, yes, I have some research that I've done. They had absolutely nothing, but they wanted to name a Coast Guard cutter after her. They were building the Coast Guard cutter up in Wisconsin. And so, I pulled together all the history and sent it all out to them.

They designed a logo for their ship, which included the two towers of Thacher, and when they brought the new ship through the St. Lawrence Seaway and they came down the coast, they called me by telephone from the ship and said, we're going to pull into Gloucester harbor in the next night or two and we'd like to have you and some of your associates come up, who want to lay wreath in her honor off of Thacher. So, we did that and it was great. I think Dottie Cameroon was on board, as a matter of fact. Dottie's here today. She was a keeper for four or five years — she and her husband lived on the island. So, if you want to ask questions about life on the island, Dottie's got all the answers for you.

OK?

Thank you.

54:43

End of recording