

Life-size lens on display at keeper's cottage



Docent Jackie Bell explains the details of the new Fresnel lens exhibit.

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The St. George Lighthouse Association has added a life-size reproduction of the Cape St. George Light's lens to the historical materials on display at the keeper's cottage.

The original lens was lost. It is known to have been deinstalled in 1949 and moved to a warehouse somewhere in New Orleans for storage, but there the trail goes cold.

“We felt that the lighthouse without the lens was like an engagement ring without the diamond. It just wasn’t right,” said Bob Heide, an association board member.

After attempting to discover the whereabouts of the 1800-pound third order glass Fresnel (pronounced fray-nell) lens for about 10 years, the lighthouse association board decided to go to “Plan B” and began searching for somebody who could create a reproduction.

They found engineer Dan Spinella.

In 1992, he sold art through the St. Augustine Lighthouse gift shop. When the lighthouse lens was shot out by “a kid with a rifle,” Spinella, who works fulltime for Disney, volunteered to look into replacing the damaged equipment and a second career was born.

By the way, the young marksman’s parents were identified and billed \$56,000 for the damage. Since it was a glass lens, Spinella said that would be a bargain at today’s prices.

Now, in his spare time he reconstructs lighthouse lenses and he has produced them for houses all over the lower 48 and even two in Hawaii.

Spinella subcontracts the work of machining and polishing the prisms.

He labored for eight months on the lens for the St. George Island Light which is an assembly of 149 prisms set in brass framework based on photographs of standard lenses. Installing a single prism can take up to two hours.

The model stands 68-inches tall and 42-inches in diameter and produces light for all 360 degrees. It contains an electric bulb in a replica brass lamp which imparts warm yellow glow to the museum exhibit. Like the original, the model contains a door that would have been used to allow the keeper to tend the kerosene lamp contained in the original.

The reproduction of the Fresnel lens is constructed of acrylic, unlike the original glass.

Glass lenses cost about 10 times as much as acrylic and a single prism can have a \$20,000 price tag. Glass is also much heavier than acrylic. The original lens weighed about a ton. The model tips the scales at around 600 pounds.

The opening of the new exhibit was celebrated by association members and other VIP at a gala reception Thursday, April 28 in front of the museum. To view a gallery of the event, go to www.apalachtimes.com.

‘A technological marvel’

The Fresnel lens was a technological marvel at the time of its invention.

By the middle of the 18th century, the "state of the art" in lighthouse optics consisted of single or multiple whale oil burning lamps placed in the lantern at the top of a tower. Only 3 percent of the light ended up being visible at any given point at sea. The only way to increase visibility was to increase the size of the flame, thus burning more fuel, and making the light more labor-intensive and costly to operate.

By the beginning of the 19th century, US lighthouse optics had progressed to the use of a silvered-metal parabolic reflector placed behind the whale oil lamp, known as the Argand Lamp. With this arrangement, not only was the light source itself directly visible at sea, but the parabolic reflector captured the light that would have been lost behind the light, and concentrated it out to sea in the desired direction.

While this was a vast improvement over the simple lamp, only 39 percent of the light was transmitted in the desired direction. The visible distance was still limited to a maximum of a 15 to 20 miles in clear conditions. By the time a vessel saw such a light, they would have little time to turn away from the impending danger.

With shipping increasing throughout the world, an optical system was desperately needed whereby the light could be cast many miles out to sea, providing ample advanced warning.

In 1819, the French government commissioned 34-year-old Augustin Jean Fresnel to develop an improved lighting system for French lighthouses. A physicist well-known for his experimentation with the theories of light reflection and refraction, Fresnel began investigating ways glass lenses could be used to concentrate the light source. Since a single lens of sufficient strength would be too large to be practical, Fresnel began looking at multiple lenses that would surround the light source, capture the light rays emitted and direct them into a narrow horizontal beam

With Fresnel's optic array, output was increased dramatically from the old reflector systems, with as much as 80 percent of the light transmitted over 20 miles out to sea.

The idea of creating a thinner, lighter lens by making it with separate sections mounted in a frame is often attributed to Georges-Louis Leclerc, Comte de Buffon. The marquis de Condorcet (1743–1794) who proposed grinding such a lens from a single thin piece of glass. The first Fresnel lens was used in 1823 in the Cordouan lighthouse at the mouth of the Gironde estuary in France; its light could be seen from more than 20 miles out to sea.

The first St. George Island light was built just 29 years later in 1852. As most county residents know it originally stood on Little St. George Island but was felled by erosion on a sunny afternoon in 2005. A group of lighthouse enthusiasts salvaged material from the wreckage and raised the funds to erect the tower in its current place of honor at island center on St. George Island.

The lens exhibit, located in the keeper's house just west of the lighthouse, will be on display during regular museum hours; Monday, Tuesday, Wednesday, Friday and Saturday from 10 a.m. to 5 p.m., Sunday from noon to 5 p.m. The museum is closed on Thursdays.