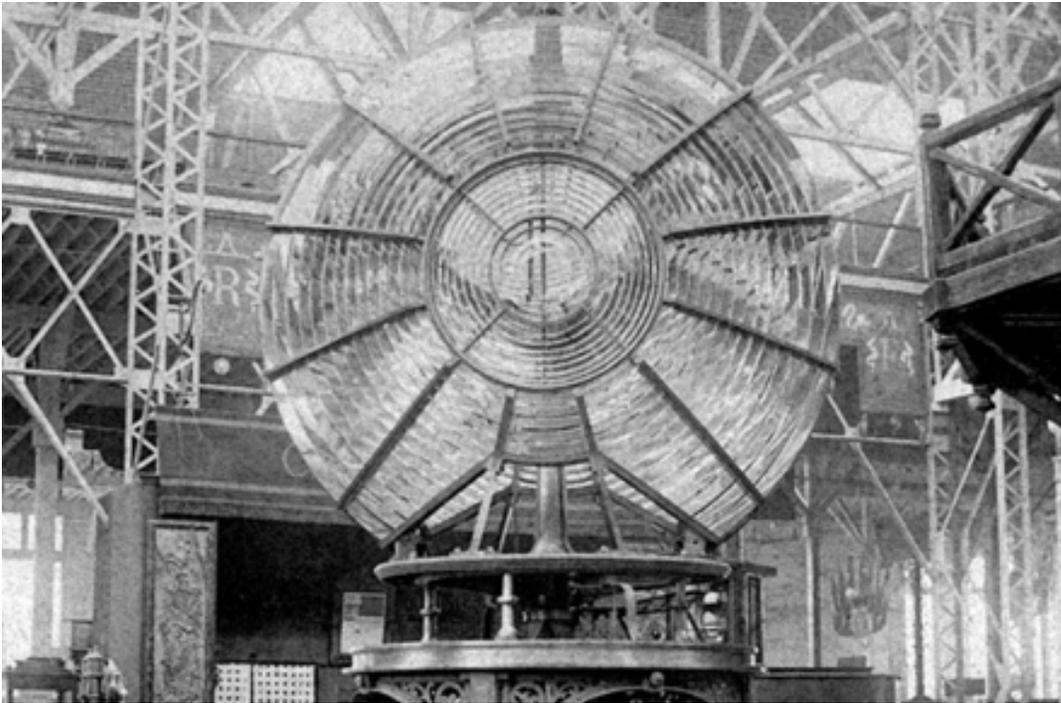


Lighthouse Optics

Optical Allusions



Few developments in human history have had a more profound or longer-lasting impact than the science of Optics. The understanding of light's properties and behavior touches our daily lives in more ways than we can possibly imagine. The computer screen at which you are seated right now is a result of these advances. Somewhere between the Twin Lights and your computer, the information you are reading has traveled on a beam of light. If you are viewing the screen through eyeglasses or contact lenses, you can thank the science of Optics.

During the 1800s, the study of Optics in the United States lagged behind the rest of the western world. A critical turning point in this timeline occurred in 1841, when two Fresnel lenses were installed at the Twin Lights—a "first-order" light in the South Tower and a "second-order" light in the North Tower. These first Fresnel lenses were brought from France by U.S. Navy Commodore Matthew C. Perry. Developed by French physicist Augustin Fresnel, they were far superior to any navigational lighting apparatus being used in the United States at that time. They bent light in ways American industry had only begun to understand.

The Twin Lights lenses resembled huge beehives of glass surrounding a light. The light of the illuminant was reflected and refracted into an intense beam drawn to a magnifying glass in the center of the lens. That process made it capable of producing 6,000,000 candlepower. Sailors reported seeing the light's glow in the night sky as far as 70 miles at sea.

The machinery used to rotate the light was driven by a 700-pound weight of the clockwork mechanism. It had to be rewound every six hours. The lens revolved every ten seconds and flashed every five seconds. In 1898, the original South Tower lens was replaced with one of the largest bivalve lenses ever produced. In that year the South Tower lens was electrified, marking the first time an American lighthouse to be powered by electricity. The brilliant electric light produced 25,000,000 candle-power and was the most powerful light installed in a lighthouse in the United States. At the same time, the light in the North Tower was discontinued, although kept in place if needed.

In 1917, it was necessary to replace the electric arc light because it was so costly to operate. It was decided to install an incandescent oil vapor light. That resulted in a decrease of candlepower to 710,000, but it was still powerful enough to guide shipping off the coast of New Jersey. In 1931, the light was converted back to electricity and its candlepower increased to 9,000,000, thus making it again America's most powerful light. Three 500-watt bulbs served as the light source for the lens.

To Boston and Back



With advances in technology during the years after World War II, the Twin Lights no longer qualified as a vital navigation aid. They were decommissioned by the Coast Guard in 1949 and, two years later, the Boston Museum of Science acquired the South Tower lens and placed it on exhibit.

After more than a quarter-century in Boston, an effort was launched to get the lens back and place it on display in the Twin Lights Generator Building. Thanks to a concerted effort on the part of the Twin Lights Historical Society, Rumson Garden Club and the New Jersey Division of Parks and Forestry, the Fresnel lens was safely returned home in March of 1979.