United States Coast Guard
U.S. Department of Homeland Security

HISTORICALLY FAMOUS LIGHTHOUSES

CG-232

CONTENTS

New London Harbor Lighthouse

DELAWARE

Cape Henlopen Lighthouse

Fenwick Island Lighthouse

FLORIDA

American Shoal Lighthouse

Cape Florida Lighthouse

Cape San Blas Lighthouse

GEORGIA

Tybee Lighthouse, Tybee Island, Savannah River

HAWAII

Kilauea Point Lighthouse

Makapuu Point Lighthouse.

LOUISIANA

Timbalier Lighthouse

MAINE

Boon Island Lighthouse

Cape Elizabeth Lighthouse

Dice Head Lighthouse

Portland Head Lighthouse

Saddleback Ledge Lighthouse

MASSACHUSETTS

Boston Lighthouse, Little Brewster Island

Brant Point Lighthouse

Buzzards Bay Lighthouse

Cape Ann Lighthouse, Thatcher’s Island.

Dumpling Rock Lighthouse, New Bedford Harbor

Eastern Point Lighthouse

Minots Ledge Lighthouse

Nantucket (Great Point) Lighthouse

Newburyport Harbor Lighthouse, Plum Island.

Plymouth (Gurnet) Lighthouse

MICHIGAN

Little Sable Lighthouse

Spectacle Reef Lighthouse

Standard Rock Lighthouse, Lake Superior

MINNESOTA

Split Rock Lighthouse

NEW HAMPSHIRE

Isle of Shoals Lighthouse

Portsmouth Harbor Lighthouse

NEW JERSEY

Navesink Lighthouse

Sandy Hook Lighthouse

NEW YORK

Crown Point Memorial, Lake Champlain

Portland Harbor (Barcelona) Lighthouse, Lake Erie

Race Rock Lighthouse

NORTH CAROLINA

Cape Fear Lighthouse "Bald Head Light’

Foreword

Under the supervision of the United States Coast Guard, there is only one manned lighthouses in the entire nation. There are hundreds of other lights of varied description that are operated automatically. And, as technology improves, more and more lighthouses are being operated without a full time crew. Indeed, many of the isolated lighthouses described in this booklet are scheduled for automation.

In the course of our history as a nation, and before that as British colonies, we have built hundreds of lighthouses, some of which still stand though now inactive, having been sold for private residential or other use. Many have been rebuilt and not a few have succumbed to the ravages of time. The history of our lighthouses thus parallels the history of our nation.

Since 1716, when the Province of Massachusetts built Boston Light, scarcely a year has passed that has not seen a new light structure erected somewhere along our sea coasts, on our navigable rivers, or along our lake shores. To tell the story of these lighthouses would be a major undertaking. These stories of some of them, however, have been selected chiefly for their historical interest. Others have been included because their unique locations or types of construction are of more than usual interest.

The lighthouse typifies maritime safety. As part of our early coastal defense system, they played a major role in important Coast Guard duties related to military readiness. Additionally, the light's strategic locations along our coasts aided another early Coast Guard function, law enforcement, by making it possible for cutters to judge their distances from the coast and so prevent smuggling operations within the three-mile limit.

The stories of *56* lighthouses have been told here. The stories of hundreds of others, of equal interest, could have been included had space permitted.

The oldest lighthouse described is the Boston Light built in 1716. The newest in this booklet is Buzzards Bay Light which is located some five miles off the Massachusetts coast, replacing a lightship that had been there for many years.

The distance these lights are visible has been given in the geographical range. The theoretical visibility of a light in clear weather depends upon two factors, the height of the light above water, and its intensity. The height controls what is known as the geographic range, while the intensity controls what is known as the luminous range. As a rule, for the principal lights the luminous range is greater than the geographic, and the distance from which such lights are visible is limited by the earth's curvature only. Under some atmospheric conditions the glare or loom of these lights, and occasionally the light itself, may be visible far beyond the computed geographic range. On the other hand, and unfortunately more frequently, these distances may be lessened by fog, rain, snow, haze, or smoke.

Some of the terms in this booklet may be new to readers. A short glossary of terms follows:

Candlepower-The luminous intensity of a light expressed in candles.

Lantern-The glassed-in enclosure on the top of an attended lighthouse which surrounds and protects the lens. Sometimes the entire piece of illuminating apparatus is referred to as the lantern.

Prism-A device for refracting light.

Radiobeacon-Electronic apparatus which transmits a radio signal for use in locating a mariner's position.

Reflector-An optic which by reflection changes the direction of a beam of light.

Classification of lenses-Lenses are classified as to size by "order", the first order being the largest and the sixth order the smallest. The actual size of a lens is expressed by its inside diameter. The following is a list of the standard lenses:

Size	Inside diameter (inches)	MM	Approx. Height

1st	72 7/16"	1840	7' 10"
2nd	55 1/8"	1400	6' 1"
3rd	39 3/8"	1000	4' 8"
3 1/2	29 1/2"	750	3' 8"
4th	19 11/16"	500	2' 4"
5th	14 3/4"	375	1' 8"
6th	11 3/4"	300	1' 5"

The numbers in parentheses in the text refer to source of information as indicated in the bibliography on page 88.

Lighthouses are arranged alphabetically by states and by the name of the light within the state.

THE COAST GUARD

The United States Coast Guard is a unique service. It is one of the five branches of the armed forces of the U. S. During time of peace it operates under the Department of Transportation. During time of war, or at the direction of the President, it operates under the Secretary of the Navy. The Coast Guard is responsible for a number of missions, including search and rescue, oceanographic research, maintenance of aids to navigation, icebreaking, merchant marine safety, port safety, law enforcement and military readiness.

ALASKA

CAPE SARICHEF LIGHTHOUSE, UNIMAK ISLAND

Two primary lighthouses mark Unimak Pass, the principal passage through the Aleutian Islands into the Bering Sea. One of these, Cape Sarichef- originally built in 1904, is the only manned lighthouse on the shores of the Bering Sea. It is located on the west end of Unimak Island and with Scotch Cap Light Station, 17 miles away, is conceded to be one of the most isolated light stations in the Service. The only neighbor to the keepers, for many years was a trapper, 10 miles away.

The original light was on a wood tower on an octagonal wood building 45 feet high. The light was 126 feet above the sea. Although quarters were originally provided for them, families were not permitted to live at this and Scotch Cap Light, because of their isolation. The civilian keepers were granted 1 year’s leave each 4 years. Coast Guard personnel now serving at the light serve a year at a time at this isolated location. At the end of his year’s tour each man is transferred to a new duty station.

The reservation on which Cape Sarichef Light is built is 1,845 acres of primeval wilderness. The first lighthouse cost $80,000 to build. The tower has now been rebuilt and incorporated with a loran station.

The 700,000 candlepower, 375-millimeter electric white light is lit for 25 seconds and eclipsed for *5* seconds. There is also a fog horn and a radiobeacon. (1)(2)

ALASKA

CAPE SPENCER LIGHTHOUSE

At the entrance to Cross Sound.

Cape Spencer Lighthouse, Alaska, is a primary light, fog signal, and radio-beacon station, marking the northerly entrance from the Pacific Ocean into the inside passages of southeastern Alaska. It is on a route much frequented by vessels seeking to avoid the often stormy outside passage. Cape Spencer is one of the most isolated of Alaskan lighthouses, where the keepers must go 20 miles for their mail, and where the nearest town of any size is 150 miles away. The station was commissioned in 1925, and is fitted with the most modern types of signalling equipment. From the top of the tower is shown a light of *500,000* candlepower, and in time of fog a diaphone fog signal is sounded at regular intervals. The radiobeacon, established in 1926, and the first radiobeacon in Alaska, is of high power, with a range of 200 miles and more at sea. The station buildings are of reinforced concrete construction. (1) (2)

ALASKA

SCOTCH CAP LIGHTHOUSE, UNIMAK ISLAND

Scotch Cap Light was built in 1903. It consisted of a wood tower on an octagonal wood building 45 feet high and was 90 feet above the sea. It was located on the southwest end of Unimak Island and on the east side of the Unimak Pass into the Bering Sea. It was the first station established on the outside coast of Alaska. Prior to the introduction of the helicopter, access to the stations was so difficult that it was impractical to arrange for leave of absence in the ordinary way. Instead each keeper got one full year off in each 4 years of service. Coast Guard enlisted personnel now man this isolated unit on a rotating one year tour of duty.

During an earthquake and tidal wave of April 1, 1946, Scotch Cap Lighthouse slid into the sea and all five persons on the station were lost.

A temporary unwatched light was established in 1946, consisting of a small white house exhibiting a light of 300 candlepower maintaining the former station characteristic of flashing white every 15 seconds, flash 3 seconds, eclipse 12 seconds. A radiobeacon was temporarily reestablished at the radio direction finder station.

The new permanent structure was completed in the early part of 1950 and the temporary light and radiobeacon discontinued. The new station consists of a 800,000 candlepower light exhibited from a white rectangular building with flat roof, a diaphone fog signal, and a radiobeacon. (1) (2)

CALIFORNIA

FARALLON LIGHTHOUSE

Offshore, 25 miles off the Golden Gate.

This lighthouse, on the highest peak of the southeast Farallon, was built in 1855 in the busy days which followed the gold rush, when clipper ships and other sailing vessels were sailing in to San Francisco in large numbers. That there was need for a light on these dangerous rocks is evident when clippers like the *Golden* City which sailed from New York in 1852 reported that she was detained *5* days off the Farallons in fog. Stone for the construction of the lighthouse was quarried on the island and inside this masonry was a lining of brick. The extremely sharp slopes of the island and the jagged nature of the rock were serious obstacles to construction work. The bricks used in the tower were carried up the rock in bundles of four and five on the backs of men. After the completion of the tower a mule was kept on the island for years to carry supplies between the various parts of the station. At one time this mule was the oldest inhabitant. A number of years ago the gathering of birds' eggs, which were sold on the San Francisco market, was carried on here extensively and seals were also hunted commercially. These practices were finally terminated by the Federal Government. The Farallon Light Station is now equipped with a radiobeacon as well as with a powerful light and fog signal. (1) (2)

CALIFORNIA

MILE ROCKS LIGHTHOUSE

One-half mile off Landsend, in the Golden Gate.

This lighthouse was completed in 1906, after considerable difficulty caused by the heavy seas and strong currents occurring at this point. The rock upon which the lighthouse is built measured only 40 by 30 feet at high water. The base of the tower is a large block of concrete protected by steel plating. Steel and concrete in the foundation alone weighed 1,500 tons. The superstructure is of steel, and houses the fog signal apparatus and the quarters for the keepers, with the lantern above. It was on this rock that the *Rio Janeiro* was wrecked shortly before the building of the lighthouse. One hundred and twenty-eight persons out of a total of 209, lost their lives when the *Rio Janeiro* went down on February 2, 1901. The wreck has never been found. In 1966, the tower was removed, and the light automated. (1) (2)

CALIFORNIA

PIGEON POINT LIGHTHOUSE

On Coastal Highway, *5* miles south of Pescadero.

Pigeon Point Lighthouse is one of the most picturesque lighthouses on the Pacific coast, the 115-foot white masonry tower standing on a rocky promontory long a landmark for ships approaching San Francisco Bay from the southward. This lighthouse was built in 1872, and is equipped with a lens of the first order producing a light of 500,000 candlepower. The station also has an electrically operated fog signal. This headland, and hence the lighthouse, took its name from the ship *Carrier Pigeon* wrecked here many years ago. (1) (2)

CALIFORNIA

ST. GEORGE REEF LIGHTHOUSE

Off shore, 6 miles off Point St. George, near Crescent City.

This lighthouse, built on a small rock only 300 feet in diameter, is one of the most exposed lighthouses on the Pacific coast. Extreme difficulties were encountered in constructing this tower, and 10 years were required before the work was completed. The total cost was $702,000 making it one of the most costly lighthouses ever constructed. The light was first displayed in 1892. The base of the tower is a solid block of concrete and granite, and the tower above is also built of granite blocks. The stone was quarried from granite boulders found on Mad River near Humboldt Bay. Probably the most violent storm experienced at this lighthouse was that of 1923, when huge seas from a northwesterly direction broke on the platform of the tower, 70 feet above water, with such violence as to tear the donkey-engine house from its foundation. Several men have been injured, and several men killed in transferring to this light by small boat. (1) (2)

CALIFORNIA

TRINIDAD HEAD LIGHTHOUSE

On headland near town of Trinidad.

This low, square, brick tower, painted white, was built in 1871. The light is only 20 feet above ground, but the headland on which it stands gives it an elevation of 196 feet above the sea. The location is one of the most picturesque on the California coast. Despite the great height of the tower above the sea, heavy seas have been known to reach it. In 1913, the keeper made the following report: "At 4:40 p. m. I observed a sea of unusual height. When it struck the

bluff the jar was very heavy. The lens immediately stopped revolving. The sea shot up the face of the bluff and over it, until the solid sea seemed to me to be on a level with where I stood in the lantern. The sea itself fell over onto the top of the bluff and struck the tower about on a level with the balcony. The whole point between the tower and the bluff was buried in water." (1) (2)

CONNECTICUT

NEW LONDON HARBOR LIGHTHOUSE

The original New London Harbor Lighthouse was built on the west side of the entrance to New London Harbor in 1760. The original lighthouse was probably of masonry. It apparently was completely removed when the stone tower which stands today was built in 1801. Following the act of August 7, 1789, the lighthouse, built in 1760, was ceded to the United States, according to the following "Memoranda of Cessions" by Connecticut:

"1790, May. Lighthouse at New London and certain rocks and ledges off against the harbor of New London, called Race Rock, Black Ledge, and Goshen Reef, together with buoys."

On May 7, 1800. Congress appropriated $15,700 "for rebuilding, altering, and improving the lighthouse at New London, Conn.," of which $15,547.90 was spent for the purpose in 1801, the balance being carried to the surplus fund.

On November 22, 1838, Lt. George M. Bache, U. S. N., made a report on the light which he described as a stationary light, situated on a rocky point to the westward of the entrance to the River Thames, and 2 miles from the town of New London. "It is of great importance as a leading light for vessels going in and out of the harbor of New London, which, on account of its position and security, is much resorted to during the heavy gales of winter."

"The light is shown from an elevation of 111 feet, which, in clear weather, should render it visible 1612 miles. *** The tower is a substantial building of freestone, smooth hammered, and laid in courses; it is 80 feet in height, and is ascended by an interior stairway of wood, having landings at convenient distances. **"

"The lighting apparatus consists of 11 lamps, with parabolic reflectors, disposed around 2 horizontal tables so as to throw the lights from WSW south about to N by E. The reflectors are 13 inches in diameter. This apparatus was furnished in 1834."

In 1855 a fourth-order lens to illuminate 315 degrees was recommended. In 1863 new dwellings for keepers were provided. In 1868 a road was opened by the city of New London across the lighthouse grounds, the road being fenced on both sides.

In 1874 a second-class fog signal with two 18-inch engines and a Daboll trumpet was installed. It was in operation 553 hours during 1875. In 1883 a first-class fog trumpet was substituted. On December 21, 1896, an improved fog signal consisting of two 3 1/2-horsepower Hornsby-Akroyd oil engines, air compressors etc., was installed operating the first-class Daboll trumpet.

A fog-signal house was built in 1903 and 13-horsepower oil engines, with trumpet, siren etc., were installed in the following year. The fog signal was discontinued on September *5,* 1911. On July 20, 1912, the light was changed to acetylene, unattended.

The lighthouse is a white, octagonal pyramidal tower, 90 feet above ground and 89 feet above water, the light being visible for 15 miles, and located on the west side of the entrance to New London Harbor. The light is a 6,000-candlepower fourth-order electric light flashing white every 4 seconds, with a red 1,300-candlepower sector from 0 degrees to 41 degrees, covering Sarah Ledge and the shoals to the westward. (1) (2)

DELAWARE

CAPE HENLOPEN LIGHTHOUSE

Cape Henlopen Lighthouse was completed in 1767, part of the funds to erect it being raised by a £3,000 lottery. Even though the structure was within the limits of Delaware, the 200 acres on which it was erected was granted by the late proprietors of Pennsylvania to the Board of Wardens for the purpose of erecting a lighthouse on Cape Henlopen." The estimated cost of the original lighthouse was £7,674/3/2.

In 1777 the lighthouse was practically completely burned down by the British. On the return of peace in 1783, the wardens proceeded to repair the damage and it was relighted in 1784.

On September 28, 1789, the lighthouse together with all beacons, buoys, and public piers, lands, tenements and jurisdiction was ceded to the Federal Government by the State of Delaware in accordance with the act of Congress of August 7, 1789.

As early as 1788 evidence of wind erosion in the sandy area in which the tower was constructed, had been noted and steps taken, by planting "underwood and weeds of every kind," to prevent the sand from blowing away. There seemed to be no encroachment from the sea at that time.

Abraham Hargis was the keeper from 1797 to 1813 and his successor John Ware served until 1827. Following him Kendall Baston served until 1838, with a Mr. McCracken serving for a short period, until December 1839, when Asa Clifton, of Lewes, Del., took charge. William Elligood took over as keeper in 1849.

In 1851 sand was reported advancing toward the tower and the keeper's house. A first-order lens was installed in 1856 due to the "numerous accidents that have occurred in consequence of the inferiority of the lighting apparatus from confounding a light which, from position, should be one of the principal seacoast lights, for the lightship off Five Fathom bank.

In 1863 a new keeper's dwelling was built, "the old one being threatened with destruction by the speedy progress in that direction of a remarkable sand hill, which has been moving inflexibly in a certain course at a constant rate of speed for many years, presenting in its existence and movement a most singular natural phenomenon."

In 1868 "the big sand hill" situated at the north of the tower, formed of drifting sand, was found to have moved southward at the rate of 11 feet a year. The application of brushwood to exposed places was thought to have stopped the movement by 1872.

In 1883, the sea, in a storm, encroached upon the ocean side of the station, until the high water line came under the lighthouse and the question of the protection of the structure was taken under consideration. In that year the bark *Minnie Hunter* came ashore 550 feet north of the lighthouse and acted as a jetty so that the level of the sand under the lighthouse structure was raised some 20 inches. Erosion continued, however, and by 1885 the beacon, which had become unsafe from undermining, had to be removed to Delaware Breakwater.

In 1897 the sand dune surrounding the tower was reported to be steadily blowing away and by 1905 'several tons of brush were placed about the tower and oil house to prevent the foundations and brick walls from being undermined by the drifting away of the sand."

All measures to protect the tower failed, however, and on April 13, 1926, a northeast storm undermined the tower and caused it to fall seaward. Its value to shipping, however, had already been superseded by the light and fog signal station on the Delaware Breakwater and by the lightships and lighted buoys marking the entrance to Delaware Bay. (1) (2) (7)

DELAWARE

FENWICK ISLAND LIGHTHOUSE

Congress authorized the erection of a lighthouse on Fenwick Island, Del., in 1856. The site for the light adjoined the south boundary of Delaware on the Delaware-Maryland boundary line in the vicinity of Fishing Harbor. Immediately behind the storehouse of the light station is a stone monument or marker, apparently of granite, having the arms of William Penn carved on the north side and the arms of Lord Baltimore on the south side. This stone is the first stone erected in connection with the Mason and Dixon's line survey. It is the only and original first stone set up in 1751.

When King Charles of England granted Penn his 29,000,000 acres in 1681 which now form the State of Pennsylvania, a controversy immediately began with Lord Baltimore, who owned the Maryland territory, as to the boundary line. As Penn acquired, also, what is now Delaware, it affected the line of that territory as well. This controversy raged through three or four generations and was not finally settled until 1768. By 1750, however, the only line the disputants were not quarreling over was the lower east-west line, so they appointed two surveyors to go the spot, determine the compass variation, and start the survey of the line, which was and is the present lower line of Delaware State. The surveyors arrived at Fenwick Island in December 1750. They drove a stake at a point 139 perches west of the "Main Ocean" at a group of four mulberry trees where the lighthouse now stands. Then they measured east to the "Verge of the Ocean" and began the line there. They could put no permanent mark at the water's edge, but they measured some 6 miles west and then quit for the weather was bad, their cabin had burned up, and the exposure was great.

In April 1751, all hands again met at Fenwick Island. The commissioners were shown the work of the previous December and approved it and on April 26, 1751, a stone was set where the stake had been, having the arms of Lord Baltimore on the south side and of Penn on the north. This is the stone that stands there today.

Other stones were erected at 5-mile intervals and the west line of the State of Delaware was set up. Soon after this Lord Baltimore died and his death delayed things. Nothing was done for about 10 years, when under a new agreement in 1760, between the then generations of Penns and Baltimores, surveys were started again on this north line, the object being to lay it out so as to hit the 12-mile circle, 81 miles above, determined upon as the northern boundary of Delaware, with New Castle as its center. The surveyors made such a poor job of it, despite several efforts, after 3 years, that Penn and Baltimore in England hired Mason and Dixon, two engineers of note, to go over to America, take charge and do the job. They arrived in 1763, accepted the lower or east and west line across the peninsula as correct, reran the north line and ran the line from the northeast corner of Maryland west, for about 223 miles. This is the generally understood Mason and Dixon's line. They also ran the north and south line which is the western boundary of Delaware. Five years were occupied in this and not until 1768 was the last stone set, which ended the controversy of nearly a century.

By 1857 the site for the lighthouse had been selected and marked and the tower was completed early in 1859, being first lit on August 1, 1859. The total cost was $23,748.96.

In 1932 a strip of land 60 feet wide, extending east and west across the site, was deeded to the State of Delaware for roadway purposes and in 1940 about three-fourths of the site was sold including the entire northern wooded half and 2.71 acres of the southern half.

The white lighthouse tower now stands 0.3 mile inshore on the coast, the tower being 83 feet above water and the top of the lantern 87 feet above ground. A 25,000-candlepower light flashes white every 3 seconds and is visible 15 miles at sea. (1) (2)

FLORIDA

AMERICAN SHOAL LIGHTHOUSE

Off shore, visible from Overseas Highway at Saddlebunch Keys.

As early as 1851 plans were made for the erection of a series of great offshore lighthouses to mark the dangerous Florida Reefs. These towers, all of skeleton iron construction, to resist hurricanes, were eventually built one at a time over a period of years, that on American Shoal

completed in 1880, being the most recently constructed. The ironwork for this light .was fabricated in the North, and along with other necessary supplies and materials, was shipped to Key West. which was made the base of operations. The site of the lighthouse was

15 miles to the eastward, on the outermost reefs, and was covered with 4 feet of water. Construction continued for about 2 years, and the tower when completed cost about $94,000. The lighthouse was first lighted on the night of July 15, 1880, and has since helped to bring about a substantial reduction in the number of shipwrecks occurring along this dangerous coast. The light is 109 feet above the water, and is visible on a clear night for 16 miles. American Shoal Lighthouse is almost exactly like the Fowey Rocks Lighthouse situated near Miami. (1) (2)

FLORIDA

CAPE FLORIDA LIGHTHOUSE

The Cape Florida Lighthouse was completed in 1825. It was 65 feet high, of solid brick, *5* feet thick at the base. For years it guided the mariner as he passed the dangerous Florida Reef and led him into Cape Florida Channel to a safe anchorage from violent gales in the lee of Key Biscayne.

During the Seminole War, on July 23, 1836, John W. B. Thompson was the assistant keeper. It was on that day that the lighthouse was attacked by Seminoles. "About p.m**."** Thompson writes "as I was going from the kitchen to the dwelling house, I discovered a large body of Indians within 20 yards of me, back of the kitchen. I ran for the lighthouse, and called out to the old Negro man that was with me to run, for the Indians were near. At that moment they discharged a volley of rifle balls, which cut my clothes and hat and perforated the door in many places. We got in, and as I was turning the key the savages had hold of the door." Thompson stationed the African-American at the door and then began firing his three muskets loaded with ball and buckshot, at them from a window. They answered with war cries and musket balls.

Thompson fired at them from some of the other windows and from the top of the lighthouse. "I kept them from the house until dark," he related. "They then poured in a heavy fire at all the windows and lantern; that was the time they set fire to the door and to the window even with the ground. The window was boarded up with planks and filled with stone inside; but the flames spread fast, being fed with yellow pine wood. Their balls had perforated the tin tanks of oil, consisting of 225 gallons. My bedding, clothing, and in fact everything I had was soaked in oil."

Thompson took one musket with powder keg and balls to the top of the lighthouse, then went below and began to cut away the stairs about half way up from the bottom. "I had difficulty in getting the old Negro up the space I had already cut, but the flames now drove me from my labor, and I retreated to the top of the house."

The keeper covered over the scuttle that led to the lantern, which kept the fire from him for some time. "At last the awful moment arrived," he went on, "the crackling flames burst around me. The savages at the same time began their hellish yells. My poor Negro looked at me with tears in his eyes, but he could not speak. We went out of the lantern and down on the edge of the platform, 2 feet wide. The lantern was now full of flame, the lamps and glasses bursting and flying in all directions, my clothes on fire, and to move from the place where I was, would be instant death from their rifles. My flesh was roasting, and to put an end to my horrible suffering I got up and threw the keg of gunpowder down the scuttle. Instantly it exploded and shook the tower from top to bottom."

"It had not the desired effect of blowing me into eternity, but it threw down the stairs and all the wooden work near the top of the house; it damped the fire for a moment, but it soon blazed as fierce as ever.

The African-American man called out, "I'm wounded." Then spoke no more. Those were his last words. By this time, Thompson had also received many wounds and was literally roasting alive. He decided to jump off the tower.

"I got up, went inside the iron railing, recommending my soul to God, and was on the point of going head foremost on the rock below when something dictated to me to return and lie down again. I did so, and in 2 minutes the fire fell to the bottom of the house."

A few minutes later a stiff breeze sprung up from the southward that was a great relief to the heat-tortured keeper. The Indians, thinking him dead, left the lighthouse and set fire to the dwelling and began carrying their plunder to the beach, where they made off with it in the keeper's sloop about 2 a. m.

"I was now almost as bad off as before," the keeper continued, "a burning fever on me, my feet shot to pieces, no clothes to cover me, nothing to eat or drink, a hot sun overhead, a dead man by my side, no friend near or any to expect, and placed between 70 and 80 feet from the earth with no chance of getting down."

The old Negro's body had literally been roasted but there was a piece of his trousers that had escaped the flames by being wet with his blood. With this Thompson made a signal. Some time in the afternoon he saw two boats, with his sloop in tow, coming to the landing. They were the boats of the U. S. schooner Motto, Captain Armstrong, with a detachment of seamen and marines under the command of Lieutenant Lloyd, of the sloop-of-war *Concord.* They had retaken Thompson's sloop, after the Indians had stripped her of sails and rigging. They had heard the explosion, 12 miles off, and had come to his assistance, scarcely expecting to find him alive.

The problem now arose of how to get the keeper down. During the night they made a kite thinking to fly a line to him but to no effect. Then they fired twine from their muskets, made fast to a ramrod, which the keeper received and with it hauled up a tail block, making it fast around an iron stanchion, enabling two men to be hoisted up from below. The keeper was then lowered and was soon on terra firma. He was taken to the military hospital.

Rebuilding of the Cape Florida Light, authorized in 1837, was not completed until 1846 because hostile Indians remained nearby in the Everglades. In 1855 the tower was raised to 95 feet.

The lighting apparatus was destroyed in 1861, during the Civil War, and was not restored until 1867.

Cape Florida Light was discontinued in 1878 when Fowey Rock Light was established, and the tower and property sold to Mr. James Deering of Chicago, Ill. (8)

FLORIDA

CAPE SAN BLAS LIGHTHOUSE

The Cape San BIas Lighthouse was completed in 1849 with an appropriation of $8,000 made 2 years earlier. The shoals running out from the cape extended 4 or *5* miles and made it dangerous for all vessels nearing the coast. If the light had been high enough it could have been seen for 20

miles and afforded protection to vessels going to and from Tortugas to New Orleans, but the light from the 85- or 90-foot tower was visible only half that distance. The site was "deemed to be entirely secure from overflow or inundation" by the collector of customs at Apalachicola, Fla., who selected it, with the assistance of "two of our most experienced pilots."

The lighthouse erected in 1849 "fell down during a gale in the autumn of 1851" and on August 31, 1852, Congress appropriated $12,000 for rebuilding it. The new structure was completed in 1856.

It had been completed only a few months when during the severe storm of August 30, 1856, it too was totally destroyed. "The sea rose so high," the Lighthouse Board reported, "that the waves struck the floor of the keeper's dwelling, elevated 8 feet above the ground, and about 14 feet above the ordinary tides. A lagoon now occupies the site of the lighthouse."

On March 3, 1857, Congress, for the third time, appropriated money for a lighthouse at Cape San BIas. This appropriation was for $20,000 and the new lighthouse was first lighted with a third-order lens on May 1, 1858.

The light station sustained serious damage at the hands of Southern troops during the Civil War. The keeper's dwelling was completely destroyed and the door frames and sashes of the tower were torn or burnt out. Repairs were made, a new illuminating apparatus was provided, and the light was re-exhibited on July 23, 1865.

In 1869 the beach in front of the lighthouse was reported to be washing away and would need protection against encroachments of the sea during heavy storms. In 1877 Congress appropriated $2,000 for protecting the site after the Lighthouse Board had reported 2 years earlier "The base of the tower is very nearly at the same level as the sea, which is but little more than 150 feet distant, the shore being of shifting sand. In a violent hurricane, it is feared, the tower may be undermined." The Board had asked for $5,000 to protect the site and reported in 1879 that, as it was found "impracticable to build a jetty for $2,000 that can protect the site from the encroachment of the sea, no further action has been taken in the matter."

Finally in 1881 the Board reported "The sea has been encroaching on this tower until its base is in the water. Brush mattresses were made, pinned down to the sand with small iron screw piles, covered with sand and occasionally blocks of concrete, to further check such encroachment, but the almost constant surf, beating against the mattresses, tore them to pieces. An appropriation for a new tower, further inland is badly needed. It is recommended that a skeleton iron tower be erected; then if the sea again encroaches, it could be taken down and reerected. The new tower will cost $25,000." The following year the Board noted "No appropriation was made; the site remained unprotected and on July 3, 1882, the tower was overthrown and completely destroyed." The Board strongly recommended that the tower be replaced on a safe site at an early date, there being no intervening light between San BIas and Pensacola, 120 miles distant.

An appropriation for a fourth tower was made available in 1883. The remains of the third tower were then 400 feet distant from the shore, and the sea continued to erode the beach. By 1885 a fourth tower, a skeleton tower of iron, and two dwellings for keepers had been erected and the light was first displayed on June 30, 1885. The light had a third-order lens, showing alternate red and white flashes with 30 seconds intervals. The focal plane, 98 feet above sea level, lit the entire horizon.

In 1887 the sea was reported again gradually cutting away the shore and during the year had washed away about one-third the distance to where the new tower had been built (300 feet). Two years later only 200 feet of beach remained and the Board reported "It is more than probable that this will be mostly washed away in the next 4 months." It was, therefore, recommended "that the tower and dwellings be taken down and removed to a point on the inside of the peninsula a little

less than 1 1/2 miles, about northwest from its present position where there is a good site and 8 1/2 feet of water, in St. Joseph's Bay, within 400 or 500 yards of it. This location is such that the bearing of the San Blas Shoals will be the same as now, and the increase of 1 1/2 miles in the distance from the shore will be of little importance so far as its value as a coast light is concerned. It is estimated that to make the change will cost $20,000. The present site cannot be saved except at great cost."

Nothing had been done, however, by Congress and by early 1890 the tower was only 144 feet from the sea at high water mark. Later that year, however, an appropriation of $20,000 was made to remove the tower and dwellings to the point inside the peninsula. Condemnation proceedings to obtain title to the new site, however, dragged on until 1894 when on October 8 and 9 a gale badly damaged the lighthouse extinguishing the light and wrecking the keeper's dwelling. So much of the cape was washed away that the tower now stood in the water.

Before the tower could be removed to the new site, it was decided in 1895 to remove the station to Black's Island, in St. Joseph's Bay, which the President ordered reserved for lighthouse purposes. The work of dismantling the skeleton iron tower was begun in February 1896 and carried on until April 30 of that year when it was stopped because the appropriation was exhausted. The two keeper's houses had been relocated on Black's Island, the foundation for the tower was in place and three-fourths of the concrete work had been done, when it was estimated that $4,500 more would be required to finish the work. This was appropriated in June 1897.

Four months later, however, the light had been reestablished in the old tower, now in the water at the south point of Cape San Blas. In 1899 the Board reported "after careful consideration of all the conditions affecting the choice of a proper site, the Board has concluded that the light should be reconstructed on the shell ridge about 13 s miles N. by W. from its present location. It is estimated that this can be done at a cost not exceeding $15,000." This sum was appropriated on June 6, 1900, at which time the Board reported: "that the property and material stored at Black's Island was being cared for by a watchman appointed for the purpose."

By 1901 nothing had been done about moving the tower and the Board reported "the advisability of removing the station to a new site is being considered, or of building a permanent keeper's dwelling in place of the present temporary buildings, repairing the present light tower and permitting it to remain in the old location. The point of land on which the tower stands has made out until the beach at the nearest point is 100 or more feet distant from the tower. As this movement is increasing, it may become necessary to move the structure of the station to a new site." In 1903 the Board sought and obtained authority from Congress to use $7,000 of the $15,000 appropriated for moving the tower, to erect two keeper's dwellings at the old site. These were completed in 1905.

The light remained in the old tower until 1919. In 1916 it was reported "The sea is again making inroads on the station and a project for its removal has been tentatively approved." The new site was one-fourth mile north of the old tower on the peninsula and on land heretofore reserved for military purposes, which the President forthwith reserved for lighthouse purposes. The tower was moved to this site in 1919.

In 1923 the Black's Island reservation was sold. There were no buildings on the island at the time.

The light is now in a white, square skeleton tower, enclosing a stair cylinder, with the lantern 96 feet above ground and 101 feet above water. The 800,000 candlepower 3' 2-order electric light flashes white every 20 seconds and is visible 16 miles. A radiobeacon was established at the station in 1939. (1) (2)

GEORGIA

TYBEE LIGHTHOUSE, TYBEE ISLAND, SAVANNAH RIVER

Tybee Light was under construction by the State of Georgia when that State became part of the Federal Union in 1788.

The lighthouse was believed to have been ceded to the Federal Government in December 1791, although no records to substantiate this are available.

In 1791 it appears that the tower was in commission under a keeper named Higgins and that spermaceti candles were being used in the lantern.

In 1838 the lighthouse was described as being "a fixed light, 15 lamps, 15-inch reflectors. Height of lantern above the sea, 100 feet. Height of tower from base to lantern, 95 feet." The light was refitted with 16-inch reflectors in 1841.

In 1857 the light was renovated and fitted with a second-order lens. In 1862, during the Civil War, the interior of the tower and the lantern were destroyed by fire and the lens was removed. By 1865, the beacon had been relighted but not the main light.

In 1866, $20,000 and, in 1867, $34,443 more, was appropriated for rebuilding the tower and keeper’s dwelling. "The work was progressing satisfactorily" the Lighthouse Board reports "until the 18th of July 1866, when all labor was interrupted by panic among the workmen, caused by the arrival of a detachment of U. S. troops on the island, with cholera prevailing among them. The foreman in charge of the work, and four of the mechanics died of the epidemic and the work was suspended. The troops, while on the island, did much damage to the lighthouse establishment; an additional appropriation for this work is therefore desired."

Tybee Light had formerly been a second-class station but in reestablishing it, it was made into a first-order light, having a focal plane 150 feet above the sea. "When the rebels extinguished the light" the Lighthouse Board reported in 1867, "they attempted to destroy the old tower by fire, but without complete success, and it was found that a considerable part of it could be used. It was consequently torn down to the proper point, and the new masonry carried up from there to the requisite height." The new light was first exhibited October 1, 1867. The old tower had been finished in wood. The new one consisted of masonry and METAl only and was completely fireproof.

In 1869 Tybee beacon was moved back 165 feet as the site was threatened "by washings of every gale."

In 1871 gales, which had caused great damage along the southern coast, had so greatly damaged the lighthouse tower as to render it unsafe "and require the speedy erection of a new tower." The tower was reported cracked and liable to fall at any time. "Its great age (78 years), the frequent necessary repairs to it during the time it has been standing, and its total neglect during the war of the rebellion, render it impossible to properly repair the present tower.

The encroachment of the sea upon the southerly point of Tybee Island made it necessary to remove the front beacon, a skeleton frame structure, and set it back 400 feet on a new foundation in 1873. It had to be moved still farther back in 1879.

Between 1871 and 1879 the recommendations for a new structure were repeated annually by the Lighthouse Board. In 1879 the Board reported "During the September 1878 gale, the tower vibrated to an alarming extent and the cracks, which had been pointed up, opened and extended."

Nothing, however, was ever done to replace the structure and it stands today as it was rebuilt in 1867.

In 1884 the illuminating apparatus was changed to burn mineral instead of lard oil.

The earthquake of August 1886 extended the cracks in the tower but not to any dangerous extent. The quake displaced the lens and broke the attachments to its upper ring.

The octagonal brick tower now rises 145 feet above ground and 144 feet above water, exhibiting a fixed white electric light of 70,000 candlepower from a first-order lens visible for 18 miles. (1) (2) (7)

HAWAII

KILAUEA POINT LIGHTHOUSE

On the northernmost point of Kauai Island.

This important landfall light, providing a leading mark for ships bound to Honolulu from the Orient, was built in 1913. The tower is of reinforced concrete, and is but 52 feet high, but it stands on a cliff which elevates the light to 216 feet above the water. The moving parts of the lens weigh 4 tons, and this mass turns on a mercury float, making a complete revolution every 20 seconds and giving each 10 seconds a double flash of 1,000,000 candlepower. The lens was built in France and cost about $12,000. Kilauea Lighthouse is also a radio-beacon station providing radio signals for the guidance of ships.

This light was the first landfall made in the first flight by aeroplane from the Pacific coast of the United States to the Hawaiian Islands, in 1927, it being picked up from the air at a distance of 90 miles. (1) (2)

HAWAII

MAKAPUU POINT LIGHTHOUSE

On the eastern extremity of Oahu Island.

All the commerce from the west coast of North America bound to Honolulu passes Makapuu Lighthouse. The largest lens in a lighthouse of the United States known as a hyper-radiant lens, is in use at this lighthouse. The inside diameter is 8’2 feet, sufficient for several men to stand within. Although the tower is only 46 feet high the light is 420 feet above the sea. The 115,000 candlepower light can be seen for 28 miles. The effectiveness of this lighthouse has been greatly

increased in recent years through the establishment of a radiobeacon at the station. The radio signals may be heard two hundred and more miles at sea. (1) (2)

LOUISIANA

TIMBALIER LIGHTHOUSE

On August 3, 1854, Congress appropriated $15,000 "for a light station to mark the entrance to Timbalier Bay and for coast purposes." The lighthouse was reported completed in 1857.

During the Civil War the light was discontinued. Upon the occupation of the southern portion of Texas by Union forces in 1864, application was made by the military authorities for the reestablishment of the Timbalier light. Measures were promptly inaugurated to ascertain the condition and necessities of the station and suitable illuminating apparatus was sent to be put in position when requisite repairs had been completed.

The tower was described in 1867 as built upon a low sand beach near the point of Timbalier Island which, by that year, had been encroached upon by the sea until it was entirely surrounded by water. By February 1867 the tower was in danger of falling and workmen were sent to take down the lens and establish a beacon on top of the dwelling. On the 29th and 30th of March 1867, during a hurricane, the dwelling, together with the tower, and everything about the station was leveled to the ground and covered with 3 to 6 feet of water. The keepers barely escaped with their lives and lived for some days in on iron can buoy.

Congress appropriated $50,000 for a new lighthouse on March 3, 1869, followed by two similar amounts in 1871 and 1873. A final appropriation of $15,000 was made in 1874. With $120,000 of these appropriations a new iron screw-pile lighthouse, with focal plane 125 feet above sea level, was completed by January 1875. The new lighthouse was placed in the water inside the island, which acted as an effective breakwater. The design was a skeleton frame work with a spiral stairway, enclosed by sheet iron, giving access to the lantern and provided with a keeper’s dwelling in the lower part of the tower. The lens was a second-order, showing a fixed white light varied by red flashes.

In 1894 the light tower was undermined by the scouring of the channel and on the morning of January 23, 1894, it canted over. The illuminating apparatus was saved but was in damaged condition. An attempt was made to take the dismantled tower to pieces and save it, but owing to the inability of the lighthouse tender to approach near enough to the wreck, the work was discontinued and the lighthouse was abandoned. The lighthouse Board decided that requirements of navigation were not such as to justify the rebuilding of the tower, but decided to use instead a lens-lantern light.

The present structure was rebuilt in 1917. It is a white square tower on a wooden dwelling built on piles and stands in 6 feet of water off the north side of the east end of the island. The light was changed to unwatched operation in 1939 and consisted of an 850-candlepower light which was 56 feet above the water and could be seen 13 miles, flashing white every 4 seconds. The building is now used as a daybeacon. (1) (2)

MAINE

BOON ISLAND LIGHTHOUSE

President James Madison authorized the building of Boon Island Lighthouse during the War of 1812. A new lighthouse tower was erected near the old tower in 1855, consisting of a gray granite conical tower, 133 feet above the water, 6’2 miles off the coast of Maine.

As Boon Island is a very flat piece of land, well surrounded by ledges, the tower appears at times to be springing up from the sea from a submerged ledge, especially when low clouds are flying. One of the most isolated stations off the Maine coast, it is also one of the most dangerous.

One story is told of how the keepers were once marooned on the island for several weeks because of storms and rough weather. Their food supplies were low and starvation seemed to be staring them in the face. Just at the point of desperation a boat appeared and they signaled for help. The keeper’s message in a bottle was picked up by the passing schooner which hove to and anchored until the sea went down. Then the crew packed some food in a mackerel barrel and set it afloat. It drifted right into a little cove on the island and then the sea caught it and bounced it well up on the bank, out of the way of the surf. The hunger of the keepers was appeased until they were able to go ashore and get supplies at the village of York.

Today the fixed white electric light on Boon Island shows its 120,000 candlepower from a second-order lens for a distance of 18 miles. (6)

MAINE

CAPE ELIZABETH LIGHTHOUSE

Two rubblestone towers were first erected on Cape Elizabeth in 1828 at a cost of $4,250. President John Quincy Adams appointed Elisha Jordan as the first keeper in October 1828 at a salary of $450 per year. In 1855 Fresnel lenses were installed and in 1869 a giant steam whistle was set up for use in foggy weather. In 1873 the rubble towers were taken down and two cast-iron edifices erected, 300 yards apart. One was a fixed and one a flashing light. A fog siren replaced the locomotive whistle.

One of the most thrilling episodes in the history of the lighthouse occurred on January 28, 1885, when Keeper Marcus A. Hanna saved two crew members of the schooner *Australia* which had grounded on the ledge near the fog signal station. The two men had taken to the rigging and were coated with ice, unable to move. The captain was drowned as a huge comber washed the deck. Keeper Hanna, securing a heavy iron weight to the end of a stout line, attempted time and again to reach the men with it. Suddenly a towering wave struck the schooner and smashed her against the rocks, putting her on her beam ends.

Keeper Hanna again threw his line and watched it land on the schooner. One of the seamen managed to reach it and bent it around his waist. Then he jumped into the sea and the keeper, with great effort, pulled him up over the rocky ledge. The keeper now heaved the line a second time and finally it reached the second seaman who wound it around his icy body. Then he too jumped into the ocean. Just as the keeper’s strength was exhausted in trying to haul ashore the second man, help came in the shape of the keeper’s assistant and two neighbors, who helped haul the man to safety.

In the 1920’s the west tower of Cape Elizabeth Light was dismantled.

The light, at the south entrance to Portland Harbor, is equipped with a 1,800,000 candlepower light visible for 17 miles. The white conical tower is 67 feet above ground and 129 feet above water. *(5)*

MAINE

DICE HEAD LIGHTHOUSE

On the tip end of the peninsula that forms the mouth of the Penobscot River stands the now unwatched Dice Head Lighthouse. Built in 1829 and remodeled in 1858, the lighthouse is now just one more monument to the historic "Pentagoet" region. Here the first white settlers of 1614, French traders under La Tour, gave way to the British from the Plymouth colony led by Isaac Allerton in 1629. The French retook Castine in 1635 only to be again driven out by the British in 1654. Sixteen years later Hubert d'Andigny once more occupied this strategic key town to the Penobscot River for the French. In 1674, a Flemish corsair captured the garrison. Two years later the wealthy and adventurous Baron de St. Castine took over the town, which still bears his name. Married to the daughter of the Indian Chief, Madoca-wando, he became a powerful influence among the Indians and the town became a thriving shipping port.

Six years after the original light was built in 1829 Capt. Henry D. Hunter of the United States revenue cutter *Jackson* inspected it. "This light," he reported, "should be located on the northern head of Holbrook Island, at the eastern entrance to Castine Harbor. It would then answer as a guide up the Penobscot River and a harbor light." The lighthouse was rebuilt in 1937 and is now a white skeleton tower on the north side of the entrance to Castine Harbor, 27 feet above water. Its 8,000 candlepower acetelyne light flashes white every 4 seconds and is visible for 10 miles. (6)

MAINE

PORTLAND HEAD LIGHTHOUSE

George Washington engaged two masons from the town of Portland in 1787, while Maine was still part of the colony of Massachusetts, and instructed them to take charge of the construction of a lighthouse on Portland Head. They were Jonathan Bryant and John Nichols. George Washington reminded them that the colonial Government was poor and that the materials used to build the lighthouse should be taken from the fields and shores. They could be handled nicely when hauled by oxen on a drag, he said.

The old tower, built of rubblestone, still stands as one of the four colonial lighthouses that have never been rebuilt. Washington gave the masons 4 years to build the tower. While it was under construction the Federal Government was formed in 1789 and it looked for a while, as though the lighthouse would not be finished. But the first Congress made an appropriation and authorized Alexander Hamilton, Secretary of the Treasury, to inform the mechanics that they could go on with the completion of the tower. The tower was completed during the year 1790 and first lighted January 10, 1791.

During the Civil War, raids on shipping in and out of Portland Harbor became common place, and because of the necessity for ships at sea to sight Portland Head Light as soon as possible, the tower was raised 8 feet.

Today Portland Head Light stands 80 feet above ground and 101 feet above

water, its white conical tower being connected with a dwelling. The 200,000

candlepower, second-order electric light, is visible 16 miles. An air-chime diaphragm horn blasts every 20 seconds, for 4 seconds during fog. (6)

MAINE

SADDLEBACK LEDGE LIGHTHOUSE

Built in 1839, Saddleback Ledge Lighthouse is one of the most lonely outposts on the Maine coast. I. W. P. Lewis, .who inspected the lighthouse in the early fifties characterized it as "the only establishment on the coast of Maine that possesses any claim whatever to superiority. The sea breaks quite over the lantern in a southwest gale **...** it is the most economical and durable structure that came under my observation**...** the only one ever erected in New England by an architect and engineer."

"The weirdest experience I have had since being in the service," reported Keeper W. W. Wells in 1935 "was the bombardment we got on a February night way back in 1927, when to my surprise I picked up 124 sea birds around the tower. They were ducks and drakes. Some were alive but the most were dead. Darkness had come on and with it came all the evidence that we were going to get a sou'easter. As the storm struck so did the cannonading **...** Crash. . and a bird came sailing through a pane of glass, dropping at my feet. He began fluttering around the floor with one wing broken and his bill telescoped almost through his head. He did not live long. In came another and away went another windowpane. The phenomenon was repeated again and again until the birds began to pile up like a mound."

"Just when I thought the cannonading had ceased, one big sea drake struck the plate glass in the tower lantern and came through without asking for a transfer. When he struck he broke up the works. Before he stopped he put out the light and broke prisms out of the lens. The bird weighed 10 pounds."

After he had made repairs and got the light burning again, a strange sight greeted the keeper. At the base of the tower was a tremendous heap of sea birds, some dead others alive. "Those that were just dazed" he recounted "and needed to recuperate, we placed in the boathouse and next day they went on their way."

The conical gray tower, with a white base stands 42 feet above ground and 54 feet above water. The 2,000 candlepower, fourth-order incandescent oil vapor fixed white light is visible for 13 miles. (6)

MASSACHUSETTS

BOSTON LIGHTHOUSE, LITTLE BREWSTER ISLAND

The first lighthouse established in America was on Little Brewster Island in Boston Harbor and was first lit September 14, 1716. A tonnage tax of 1 penny per ton on all vessels, except coasters, moving in or out of Boston Harbor, paid for maintaining the light.

The first keeper, George Worthylake, with a salary of £50 a year, also acted as pilot for vessels entering the harbor. In 1718 he and his wife and daughter, with two men, were drowned when the lighthouse boat capsized as they were returning to the island from Boston. Young Benjamin

Franklin, then a printer in Boston, wrote a ballad about the incident entitled "Lighthouse Tragedy" and sold it on the streets of Boston.

The pay of Keeper John Hayes was raised to £70 in 1718 so that he would not be obliged to entertain mariners on the island for extra money which he found "prejudicial to himself as well as to the town of Boston." In 1719 he asked "That a great Gun may be placed on Said Island to answer Ships in a Fogg" and one was supplied that year on which the date 1700 was engraved. The gun is shown on a mezzo-tint engraving of Boston Light made by Burgess in 1729.

Hayes' successor in 1734 was Robert Ball who petitioned the general court for preference in piloting vessels into the harbor. The court designated him as "established pilot" of the harbor for the next 3 years. In 1751 the lighthouse was badly damaged by fire so that only the walls remained.

In 1774 the British took over the island and in 1775 the harbor was blocked and the lighthouse became useless. On July 20, 1775, a small detachment of American troops under Major Voss visited the island and burned the wooden parts of the lighthouse. The British began to repair it under a marine guard, when General Washington dispatched Major Tupper with 300 men in whale-boats on July 31, 1775, who defeated the guard and destroyed the repair work done. They were intercepted on leaving by British small boats and attacked. A direct hit on one of the English boats by an American field piece on Nantasket Head, caused the British to retire to their boats with comparatively heavy losses. Only one American was killed. Major Tupper and his men were commended by General Washington.

When the British left Boston, March 17, 1776, a number of their ships remained in the harbor. On June 13, 1776, American soldiers landed on Long Island, Boston Harbor, and at Nantasket Hill and opened fire on this fleet who were soon at their mercy. Before sailing away, the British sent a boat ashore at Boston Light and left a time charge which blew up the lighthouse. The top of the old lighthouse was used to supply ladles for American cannon.

In 1783 the Massachusetts Legislature supplied £1,450 to erect a new lighthouse on the site of the old. This new lighthouse, which still stands, was 75 feet high with walls 71 ***2*** feet thick at the base, tapering to 2 feet 6 inches at the top. The octagonal lantern was 15 feet high and 8 feet in diameter. Thomas Knox was appointed keeper.

On June 10, 1790, the Boston Light was ceded to the new Federal Government. In 1811, Jonathan Bruce became keeper. He and his wife witnessed the thrilling encounter between the American ship *Chesapeake* and the British ship *Shannon* on June 1, 1813, when Captain Lawrence, of the *Chesapeake* muttered the immortal words "Don't give up the ship," as he was being lowered, mortally wounded, through the companionway. Nine minutes later, however, his crew was forced to surrender.

While Captain Tobias Cook of Cohasset was keeper in 1844 a "Spanish" cigar factory was set up on the island, with young girls brought from Boston to work in it, in an effort to deceive Boston smokers that the cigars manufactured there were imported. This business was soon broken up, however, as a fraud.

In 1856, the height of the tower was raised to 98 feet and it was listed as a second-order station. On November 2, 1861, the square rigger *Maritana,* 991 tons, which had sailed from Liverpool 38 days earlier, with Captain Williams, ran into heavy seas in Massachusetts Bay and approached Boston in a blinding snow, driven by a howling southeaster. At 1 o'clock in the morning of Novemher 3, she sighted Boston Light and headed for it, but crashed on Shag Rocks soon after, with passengers and crew ordered into the weather chains after the crew had cut the masts away. The ship broke in two and Captain Williams was crushed to death, but seven persons

floated to Shag Rocks atop the pilot house, while five others swam to the ledge, as fragments of the wreckage started coming ashore on both sides of Little Brewster Island. A dory from the pilot boat rescued the survivors from the rocks. When the *Fanny Pike* went ashore on Shag Rocks in 1882, Keeper Thomas Bates rowed out and took the crew safely off the ledge.

In 1893 the Massachusetts Institute of Technology sent 20 or 30 students to live on the island, while experiments were made with various types of foghorns in an endeavor to find one that would penetrate the area known as the "Ghost Walk" 6 or 7 miles to the east.

On Christmas Day 1909 the five-masted schooner *Davis Palmer,* heavily loaded with coal, hit Finn's ledge and went down with all hands.

When the U. S. S. *Alacrity* was wrecked on the ice-covered ledges off the island on February 3, 1918, Keeper Jennings and his assistants made four attempts to shoot a rope to the doomed ship but each time the rope parted. Jennings brought the lighthouse dory to the shore, and, assisted by two naval reservists, pushed it over the ice and into the surf. Twenty-four men were clinging to the wreck in perilous positions when he reached it after a dangerous trip. Flinging a line aboard, they began the rescue of the half-frozen sailors, four times running the gantlet of ice, rocks, and surf until all 24 men were saved. For this Jennings received a letter of commendation from Secretary Redfield.

During World War II the light was extinguished as a security measure, but was again placed in operation July 2, 1945. The station is equipped with a 1,800,000 candlepower light visible for 16 miles. (5)

MASSACHUSETTS

BRANT POINT LIGHTHOUSE

According to all available records, the lighthouse at Brant Point, located on the south side of Nantucket Harbor, Mass., has been rebuilt seven times in addition to three beacons, since it was originally established in 1746. At a town meeting at Nantucket on January 24, 1746, the sea captains of the island spoke out for a lighthouse and 200 English pounds were voted for the purpose "in supposition that the owners of or others concerned in, shipping will maintain a light therein." However, the expenses of maintaining the light were actually defrayed by the town. This earliest lighthouse was destroyed by fire in 1758.

At another town meeting held shortly afterward, the rebuilding of the light was agreed to and another light was built in 1759. This stood until 1774. In the March 12, 1774, issue of The Massachusetts Gazette and the Boston PostBoy and Advertiser appears this item: "We hear from Nantucket that on Wednesday the 9th of March Instant (1774) at about 8 o'clock in the Morning, they had a most violent Gust of Wind that perhaps was ever known there, but it lasted only about a Minute. It seemed to come in a narrow Vein, and in its progress blew down. and totally destroyed the Light-House on that Island, besides several Shops, Barns, etc. Had the Gust continued fifteen Minutes it is thought it would not have left more than half the Buildings standing, in the Course that it passed. But we don't hear of any Persons receiving much hurt, nor much Damage done, except the loss of the Light-House which in every respect is considerable."

Two weeks later the citizens met and agreed to rebuild the lighthouse for the third time "as High as the former one that blew down lately at the Town's Expense." As many of the captains from other ports objected to the system of lighthouse dues, the townsmen petitioned the General Court of Massachusetts for permission to levy tonnage dues, and, beginning August 1, 1774, that court ordered that any vessel over 15 tons was subject to a charge of 6 shillings the first time each year

it entered or left Nantucket Harbor. In 1783, the lighthouse was burned to the ground in a third disaster.

The first three lighthouses had been cheaply constructed, but the fourth light, for economy's sake, was practically nothing but a beacon built even more cheaply. A wooden lantern, with glass windows was hoisted, in 1783, between two spars, with grooves to protect and steady the lantern. This lamp gave a very dim light often compared by mariners to a lightning bug; hence it received the name "bug light." This "bug light" did not prove satisfactory.

A fifth beaconlike light was substituted for this in 1786. It was merely a frame, fitted at the top for lamps. This outfit was wrecked in a heavy storm in 1788.

In August 1789 Congress passed the act transferring the colonial lights to the Federal Government. Some time between 1788 and 1795 another lighthouse was erected on Brant Point. According to a "Memoranda of Cessions by Massachusetts," dated 1795, "The lighthouse on Brant Point with the tenements and land thereto belonging, owned by the State, was ceded to the United States in 1795."

This building, the sixth to be erected on this site, grew old with the years and was condemned in 1825.

A small tower framework, the seventh light, was built on top of the keeper's dwelling in 1825. This had eight lamps arranged in a double row, six in the lower series and two in the upper tier. Behind each of these lamps were 12'2inch reflectors.

On November 9, 1853, C. A. Ogden, Major, Topographical Engineers, recommended to the Lighthouse Board the erection, as the eighth light, a sixth tower for a second-class lens light at Brant Point, Nantucket, at a cost of $15,000. "The frame of the light tower at Brant Point is so completely rotted as to require reconstruction with the least possible delay," the letter continued, "and believing it to be the wise policy of the Board to make all its future construction permanent, I have asked the above amount for the tower. The dwelling house is much decayed, but has a nearly new roof and weather boarding on it, and may last for some years yet." A similar recommendation to the Board dated October 22, 1853, from Even W. Allen, collector and superintendent, district of Nantucket, reads in part "The whole establishment at Brant Point is very much out of repair, and from the age, material, and construction of the building, I should not consider it good economy to repair it; the interests of the Government and all concerned, seem to demand a more permanent and commodious structure." Accordingly, on August 3, 1854, Congress appropriated $15,000 "for rebuilding the lighthouse at Brandt's Point, Nantucket, State of Massachusetts." This appropriation was spent, $6,383.85 in 1856 and $8,616.15 in 1857, for the erection of the new tower. The following is a description of this tower. "The foundation of the tower is of concrete cement 2 feet thick, and 18 feet in diameter. The base is of hammered granite, laid in courses 2 feet thick to the height of 12 feet. The interior of the base forms a cistern, where water may be caught for household purposes. The column forming the tower is of brick laid in cement, with an airspace within the walls for ventilation. The lamp is of cast iron, with 12 lights of plate glass. A circular iron stairway winds its spiral way up to a floor of iron, where rests the lantern, 58 feet above the foundation and 47 feet above the ground."

The lamp was a catadioptric apparatus of the fourth order, commonly called the Fresnel light. The light was first exhibited December 10, 1856.

In 1900 a fixed red lens-lantern beacon light was installed at the extremity of Brant Point, 600 feet from the tower, it having been found necessary to move the light outward, owing to changes in the channel leading into the harbor of Nantucket. This was the ninth light to be located on the Brant Point site.

In 1901 a new tower, the tenth light and seventh tower, was built at the extremity of the point, and the light exhibited there for the first time on January 31, 1901. This is still in use as a white cylindrical (wooden) tower, with foot bridge to shore on which is a 1300 candlepower, fourth-order electric light, fixed red, 26 feet above the water, visible 10 miles. This is the lowest lighthouse in New England. It is located on the west side of the entrance to Nantucket Harbor. A fog bell completes the equipment at this station.

A long-standing dispute begun in 1887, over the boundaries of the land constituting the lighthouse site, which belonged to the United States, was finally settled in 1901 when five lots, embracing 5.9 acres, on which three summer dwellings and part of a hotel were located, were sold, as no longer needed for lighthouse purposes and the proceeds paid into the Treasury. (5)

MASSACHUSETTS

BUZZARDS BAY LIGHTHOUSE

In 1960 the Coast Guard announced that it was replacing certain lightships with fixed offshore structures. The structures they noted, would provide more efficient optics and would provide greater luminous range than was possible with lightships.

The first lightship to be replaced was the Buzzards Bay Lightship located in Buzzards Bay approximately five miles south of Gooseberry Neck, Mass., in 61 feet of water. The station was commissioned on November 1, 1961.

The underwater portion of the structure is a framework consisting of four 33 inch steel pipe members cross braced with 16 inch and 18 inch diameter steel pipe horizontally and diagonally. Through each of the 33 inch main pipe members, 30 inch cylindrical steel piles were driven and seated to bed rock at a depth of 268 feet below mean low water. A portion of the piles is filled with concrete.

The platform above water rises 66 feet above mean low water. The platform is two decks high, the lower deck housing fuel and water tanks and the upper deck consisting of quarters for the five Coast Guardsmen who man the station. The structure is equipped with a helicopter landing deck.

The light at the station is 101 feet above water. A light of 5,000,000 candlepower is shown during periods of low visibility while a 400,000 candlepower light is normally in operation. The light can be seen for 16 miles. The station is also equipped with a radiobeacon and a fog horn. The piles are floodlighted from sunset to sunrise.

Since this first offshore structure, the Coast Guard has placed five more lights of this type in operation.

MASSACHUSETTS

CAPE ANN LIGHTHOUSE, THATCHER'S ISLAND

Thatcher's Island was named for the Rev. Anthony Thatcher who, on the night of August 14, 1635, was shipwrecked there. Of the 21 persons on board, including his 4 children, only the minister and his wife were saved.

On April 22, 1771, the Province of Massachusetts Bay Council authorized the erection of twin lighthouses on Thatcher's Island. Captain Kirkwood was appointed keeper on December 21, 1771, but, being a Tory, was removed from the island by the Minute Men during the early days of the Revolution. The lights remained dark all during that war.

The lighthouses were among those turned over to the Federal Government under the act of August 7, 1789. From 1792 to 1814 Capt. Joseph Sayward was keeper and he was succeeded by Aaron Wheeler, who served 20 years. One of Wheeler's tasks was to clear the 300 yards between the towers of large boulders and surface down the smaller ones. A bonus of $100 was paid him for this work. Charles Wheeler, who succeeded him served until 1845. A fog bell was installed in 1853.

In 1859 Congress authorized the rebuilding of the two lighthouse towers and two new towers, of cut granite, were built in 1860-61. Each was 124 feet high and fitted with a Fresnel lens of the first order.

A Civil War veteran named Bray was appointed keeper in 1865 and on the day before Christmas, that year, took his assistant, who was running a fever, ashore. While he was away a heavy snow storm came up and he could not return. His wife, with two babies, alone on the island, fought her way between snow drifts, to keep the lights in the two towers burning. When her husband returned Christmas morning, it was only because she had, by almost superhuman effort, kept the lights burning that he was able to find his way and not miss the island altogether in the blinding storm.

In 1891, Mr. John Farley, assistant keeper, was killed while landing at the station in a heavy sea. In 1919, when President Wilson was returning to the United States on the S. S. *America,* the great vessel narrowly escaped the rocks on the island in a fog. Only the fog horn, heard at the last minute, enabled the captain to change his course in time.

In 1932 the light on the northern tower was discontinued and that in the southeast tower was electrified by means of a 6,000-foot submarine cable to the mainland.

A gray stone tower, 124 feet above land and 166 feet above water, now houses the 70,000-candlepower first-order electric light, which is visible 19 miles. An air-diaphone fog signal is also located at the station. (5) (7)

MASSACHUSETTS

DUMPLING ROCK LIGHTHOUSE,

NEW BEDFORD HARBOR

The appropriation act of May 23, 1828, provided "That the Secretary of the Treasury be empowered to provide by contract, for building a lighthouse on Dumpling Rock, south of the mouth of Aponegansett River, in the State of Massachusetts-$4,000." Of this amount $3,832.47 was spent in 1829 in the construction of a light on a keeper's dwelling 43 feet above sea level. Ten years after it was built, Lt. Edward W. Carpender, USN, reported: "It is a useful light in guiding vessels into Dartmouth Harbor." "The keeper and his family," the report says, "were in danger of being drowned out, until the Government built a wall around the dwelling. Since then they have lived in safety. Located, as this light is, on a small barren rock, with fewer advantages to the keeper than perhaps any other light in the district, it would seem proper that I should notice the fact of the salary being smaller by $50 than that of many others."

During the early days of the light the keeper had arranged a signal to his friends whenever a homeward-bound vessel was sighted approaching New Bedford Harbor. An arm on a post near the lighthouse tower was raised and lowered so that the merchants could send their representatives out to the incoming boat to sell their wares.

In 1890 the old stone dwelling, built in 1828, was torn down and replaced upon the same foundation by a frame dwelling surmounted by a wooden tower with a modern fourth-order lens. For its protection against the sea, a bulkhead 90 feet long was built of hard pine timber heavily bolted to the rock and reinforced by dry masonry from the stones of the old dwelling. A Daboll trumphet, operated by an oil steam engine, was established on October 12, 1897. The following year a telephone line was run through a cable from the mainland at

Nonquitt, Mass. In 1905 a short breakwater was built to protect the landings. Keeper Fred Bohm participated in many thrilling rescues during his term as keeper.

The New England hurricane of 1938 damaged the lighthouse seriously. In 1940 the frame house was replaced with a skeleton tower and the light changed to unwatched. The 400 candlepower light can be seen for 8 miles. The light is located on a rock off Round Hill Point. (5)

MASSACHUSETTS

EASTERN POINT LIGHTHOUSE

On east side of entrance to Gloucester Harbor.

For over 100 years the fishermen of Gloucester have been guided back to their home port by a lighthouse on Eastern Point. The present brick tower, painted a gleaming white, and standing on the long rocky point forming the eastern side of the harbor, was built in 1890, replacing, on the same foundation the original tower built in 1832. Before 1832 a still older lighthouse, on Ten-Pound Island well inside of the harbor, had served as an entrance light, but this light was never visible until ships had actually found the entrance, hence the building of a lighthouse on the Eastern Point where it could be seen from far offshore.

Eastern Point Lighthouse is equipped with a power light and a fog signal. Coast Guardsmen also control the radiobeacon, located on the end of the breakwater. (1) (2)

MASSACHUSETTS

MINOTS LEDGE LIGHTHOUSE

Minots Ledge is one of the "Cohasset Rocks which had been the scene of countless wrecks since earliest times. Between 1832 and 1841 there were 40 wrecks on this and neighboring reefs. Between 1817 and 1847, it was estimated that 40 lives and $364,000 in property had been lost in shipwrecks in the vicinity of Minots Ledge, off Cohasset, Mass.

In 1843, Inspector I. W. P. Lewis, of the Lighthouse Service, emphasized the great need for a lighthouse on Minots Ledge and his judgment was sustained by Capt. William H. Swift, of the United States Topographical Bureau, who recommended an iron-pile lighthouse as offering less resistance to the waves than a stone tower.

The ledge was barely 20 feet wide and was exposed at low tide, being dry only 2 or 3 hours a day. On this narrow rock construction was begun in the spring of 1847 of a 75-foot open-work iron light structure. The men could only work on very calm days when the tide was at its ebb. The work was conducted from a schooner which remained near the ledge, unless the sea was rough, with the workmen sleeping on board. If a storm threatened, the schooner put into Cohasset Harbor until it was over.

Nine holes were drillied into the solid rock, each 12 inches wide and ***5*** feet deep. Eight were placed in a circle, 25 feet in diameter, with the ninth in the center. Iron piling, 10 inches in diameter were then cemented into each hole. Four men worked in 20-minute shifts at the drilling from a triangle, set on heavy spars, which supported a platform high above the ledge, on which the drilling machinery was installed.

All the apparatus was swept from the rock by two different storms in the summer of 1847. Workmen were swept into the sea several times, but none was drowned. Work had to be stopped for the winter in October 1847 and begun again in the spring of 1848, but by September of that year the nine holes had been drilled and the nine iron piles placed. The outer piles started toward the center to a 14-foot circumference, 38 feet above the uneven surface of the ledge. These were braced horizontally by iron rods at 19-foot intervals. Braces planned to strengthen the lower part of the tower were omitted on the theory that they would lessen rather than increase the over-all security of the edifice. However, it was where these braces were planned to go, that the structure actually broke off later.

A cast-iron spider, or capping, weighing ***5*** tons was secured to the top of this piling. The keeper's quarters were erected on top of this. Finally a 16-sided lantern room at the very top, housed a Fresnel lantern, with ***15*** reflectors. The light, a fixed beacon with an arc of 2100, was first lighted January 1, 1850.

The first keeper, Isaac Dunham, was confident the light structure was not safe and wrote Washington requesting that it be strengthened. When no action resulted he resigned on October 7, 1850.

Capt. John W. Bennett, who succeeded him openly scoffed at his predecessor's fears. He hired new assistants including an Englishman named Joseph Wilson and a Portuguese named Joseph Antoine. Two keepers remained at the light at all times.

The braces of the structure were soon showing signs of strain, however, and were constantly having to be removed, taken to the mainland and strengthened and straightened. A terriffic northeast storm a few weeks after he took charge, changed Bennett's mind and he officially reported the tower as in danger. A committee, delegated to investigate, arrived during a perfectly calm sea and returned to Boston, deciding nothing should be done.

On March 16, 1851, during another terrible storm, the keepers deciding the lantern room was unsafe, retreated down into the store room, where they cowered for 4 days and nights, only occasionally climbing to the lantern to repair some damage done by the storm. The violent pitching and swaying of the tower almost knocked them off the rungs of the ladder, when they did. A relatively calm spell followed during which the braces were tightened.

Then easterly winds began blowing around April 8, 1851. Bennett departed for the mainland 3 days later and this was the last time he saw his two assistants alive. When he sought to return next day, too heavy a sea was running at Minots Ledge to permit the attempt. The storm increased in fury and, by the 16th, was causing considerable damage ashore. At Minots Ledge, the two assistant keepers kept the bell ringing and the lamps burning, but just before midnight on the 16th they cast a bottle adrift containing a message for the outside world in case they failed to

survive. The high tide at midnight sent wave after wave through the upper framework of the weakened structure. What actually happened then will never be known. Probably about 11 p.m. the central support snapped off completely, leaving the topheavy 30-ton lantern tower held only by the outside piling. Then just before 1 a.m. on April 17, 1851, the great Minots Ledge Lighthouse finally slid over toward the sea. One by one the eight iron pilings broke until only three remained. The keepers, probably realizing that the end was near, began pounding furiously on the lighthouse bell. This was heard by residents of the Glades. With the tower bent over, the remaining supports now gave way and the great tower plunged into the ocean.

The body of Joseph Antoine was washed ashore later at Nantasket. Joseph Wilson managed to reach Gull Rock, probably mistaking it for the mainland. Here he apparently died of exhaustion and exposure.

Between 1851 and 1860 Minots Ledge was guarded by a lightship. Plans for a new stone edifice were meanwhile drawn up for the Lighthouse Board by Gen. Joseph B. Totten; model makers built the proposed new structure in miniature; the same location was decided upon; and Barton S. Alexander, of the United States Engineers, startedto work on its construction in April 1855.

The ledge had to be cut down to receive the foundation stones and space was not available for a regular cofferdam. In June the old stumps of the first tower were removed. Meanwhile cutting and assembling of the granite was done on Government Island, near Cohasset. Seven granite blocks were to form the foundation. Permanent iron shafts, 20 feet high, were set in eight of the holes in which the old lighthouse piling had been, while the ninth or central hole was left open, to form a cavity for the base circle. Later a well for drinking water was built up from this cavity through the middle of the new tower.

The framework structure disappeared during a severe storm on January 19, 1857, when the barque *New Empire,* which later went ashore at White Head, struck the temporary tower and demolished the iron scaffolding. So in the spring of 1857 the work had to be started all over again.

The first stone was finally laid July 9, 1857. Temporary cofferdams were constructed from sand bags, so that the foundation blocks, laid more than 2 feet under the surface of the lowest tide, could be cemented to the rock face of the ledge. Strap iron between the courses kept the 2-ton stones apart while the cement was hardening.

The total appropriation of $330,000 was all spent, except a small surplus, in the construction. By the end of 1859, the thirty-second course, 62 feet above low water had been reached, and 377 actual crew working hours had been consumed. The final stone was laid June 29, 1860, the whole granite structure having thus taken ***5*** years to complete, lacking 1 day. The new lighthouse was finished by mid-August 1860 and the light first exhibited August 22, 1860. The light was not regularly shone, however, until November 15, 1860, when Joshua Wheeler, the new keeper, and two assistants entered upon their duties.

The new stone tower has withstood every subsequent gale. The strongest waves cause nothing but a strong vibration. On some occasions the seas have actually swept over the top of the 97 foot structure with no more damage than that caused by a few leaky windows or a cracked lamp or two.

On May 1, 1894, a new flashing lantern was installed, with the characteristic of a one-four-three flash, which lovers on shore soon found contained the same numerical count as the words "I love you." Minots Ledge has thus become known up and down the coast as the "Lover’s Light."

The light was made automatic in 1947. Today its 45,000 candlepower light, 85 feet above water, can be seen for 15 miles. (5)

MASSACHUSETTS

NANTUCKET (GREAT POINT) LIGHTHOUSE

In 1770 the town fathers of Nantucket chose a committee to ask the General Court to erect "a lighthouse on the end of Sandy Point of Nantucket." Later the committee idea was abandoned, however, and the local Nantucket representative in the General Court was instructed to "use his influence in the General Court to get a Light House on our Point according to his own discretion." This method proved effective, for on February 5, 1784, the General Court of the Commonwealth of Massachusetts passed a resolution providing for the erection of the Great Point Light at Nantucket as soon as possible. On November 11, 1784, Richard Devens, the commissary general, was granted 1,089 pounds, 15 shillings, and 5 pence in addition to 300 already paid out "for the erecting a lighthouse and small house at Nantucket" (Massachusetts Resolves, 1784, No. 81, Laws of Massachusetts). The lighthouse was erected that same year. On June 10, 1790, the "lighthouse, land, etc., on Sandy Point, county of Nantucket," was ceded to the United States in accordance with the act of August 7, 1789.

The keeper in 1812 was Jonathan Coffin. There was no keeper's dwelling on the point and in order to reach the light each evening the keeper had to make a long journey. Albert Gallatin, Secretary of the Treasury, accordingly raised his salary to $166.67 per year and preparations were begun to build him a dwelling near the tower.

In November 1816, however, the lighthouse was entirely destroyed by fire. Some said the fire was purposely set, but no positive proof was ever forthcoming. On March 3, 1817, Congress appropriated $7,500 "for rebuilding the lighthouse at Nantucket, recently destroyed by fire" and $7,385.12 of this was expended in 1818 in erecting the handsome stone tower which still stands today.

A petition signed by many citizens and shipowners of Nantucket in 1829 called for the removal of Captain Bunker, who was then keeper, because of his intemperate habits, but Stephen Pleasonton, Fifth Auditor of the Treasury, wisely refrained, after an investigation, from taking any action in the matter. The petition had suggested George Swain as a replacement for Bunker and such petitions, circulated by ambitious candidates for a keeper's job, or by disgruntled and disappointed applicants, were far too numerous to be acted upon without careful consideration of the source and the motive.

In his report of November 1, 1838, Lt. Edward W. Carpender, USN, noted that the light was in a stone tower 60 feet high and 70 feet above sea level. It consisted of 14 lamps, 3 with 15-, and 11 with 16-inch reflectors, arranged in two circles parallel to each other and to the horizon. The lantern was 8'2 feet high and 9 feet in diameter. The tower and dwelling were connected by a short covered way "which, among these sand hills, where the snow must drift in winter, is a security that the light will be well attended."

In 1857 Fresnel lenses were installed at Great Point and in 1882 mineral oil was substituted for lard oil. In 1889 a red sector was inserted in the light to cover Cross Rip Shoal and the shoals south of it.

Between 1863 and 1890 there were 43 shipwrecks within the jurisdiction of Great Point Light. A number of vessels mistook Great Point Light for the *Cross Rip* Light Ship. The schooner *William Jones* was wrecked for this reason on the clear moonlit night of April 17, 1864, when together with

two other vessels she went ashore on Great Point Rip. All three eventually got off, however, at high tide. Another schooner hit the bar in a heavy gale on October 12, 1865, but the captain was able to get his wife and three children, together with the crew into the vessel's long boat and row to Great Point Beach, where the keeper had a carriage waiting for him. Arriving at the lighthouse the survivors watched their ship go to pieces shortly afterward. The schooner *Leesburg* struck Great Point Rip in September 1866, and the crew were rescued by the island steamer. The following month, on October 4, 1866, the brig *Storm Castle* mistook Great Point Light for Handkerchief Light Ship. The brig was towed into Nantucket Harbor 3 weeks later, after her cargo of lumber had been jettisoned. A sugar and molasses brig struck Great Point Rip the day after Christmas 1866 and was a total loss, though the crew reached shore safely. The same thing happened to another schooner in May 1867, and to one in December 1867. Still nothing was done about the confusion in the lights. Wrecks continued. There were two in 1869, one in 1877, and two in 1878. In 1880 the *West Wind* hit the east end of Nantucket Bar, 4 1/2 miles from the lighthouse with a cargo of ice. The vessel soon went to pieces, the crew being picked up later.

In February 1881, the keeper sighted the *U. B. Fisk* caught in an ice floe. The crew had abandoned ship but were unable to make shore. The keeper waded out into the water, up to his armpits, and threw them a small line. With

this he sent them a heavier line which he used to pull their boat ashore, as their schooner was being crushed in the ice pack.

Other wrecks occurred in 1887, 1889, and in 1890. It was not until 1889 that the red sector in the Great Point Light was inserted to mark Cross Rip Shoal and the other shoals south of it. From then on the wrecks were less numerous although in 1915 the Marcus L. Oran was wrecked on the Wasque Shoal and keeper Norton at Great Point helped rescue "13 men, a woman, and a cat." He was given a life-saving medal for this performance.

Nantucket (Great Point) Lighthouse is described as a white tower 71 feet above ground and 70 feet above water, visible 14 miles, and located on the point at the north end of Nantucket Island. It is equipped with a 25,000-candlepower third-order electric light, fixed white, with a 5,000-candlepower red sector which covers Cross Rip and Tuckernuck Shoals. (5)

MASSACHUSETTS

NEWBURYPORT HARBOR LIGHTHOUSE, PLUM ISLAND

On November 16, 1787, the Massachusetts Assembly authorized the building of two lighthouses on the north end of "Plumb Island" and the original towers were erected the following year. On June 10, 1790, they were ceded to the newly formed Federal Government.

Because of the shifting sand bars at the mouth of the Merrimac River, these lights have since been moved many times.

In 1830 the Lady Howard was wrecked in the vicinity, and during the storm of December 22, 1839, the Pocahontas and Richmond Packet both came to grief. The former bound from Cody to Newburyport was swept to destruction on the sand bar off Plum Island and all hands were lost. The latter was driven ashore and began to break up on a point of rocks. Captain Toothaker jumped overboard with a line and reached the rocks, where he made the line fast. Then he

signaled his wife to come in on the line, but before she could do so the line snapped and she was lost. The crewmembers were all saved, however.

Forty-one of the one hundred and thirty vessels that had taken refuge in Newburyport Harbor were damaged in this storm, which struck so suddenly that the keeper of the light, who had left the tower for a few hours for the mainland, was unable to return. That night there was consequently no light at the entrance to the harbor.

In order to conform to changes in the river channel the "bug" light was removed to a new position in 1864, and, again in 1867, the range light was moved 90 feet to mark a new channel formed by a shifting of the bar. In 1869 the beacon was moved ne-third of a mile northeast. In 1870 a more powerful light was recommended, but in 1874 the towers on Plum Island had to be moved 75 feet southward "owing to the encroachment of the sea." Sand and thatch embankments were erected to protect their foundations in 1876. In 1887 a new stone tower was built for the range light but by 1890 the position of the river channel across the bar had so shifted that the lights no longer served as a guide through it. Meanwhile jetties were being built to better control the shifting channel and in 1898 the rear light tower was rebuilt.

Today only one white conical tower built in 1788 and rebuilt in 1898 remains on Plum Island. It is 50 feet above water and the 3,000-candlepower, fourth-order electric light is visible for 13 miles. (5)

MASSACHUSETTS

PLYMOUTH (GURNET) LIGHTHOUSE

One of Massachusetts' two minor peninsulas, extending north and south into the sea between Scituate and Plymouth, extends far south along a great stretch of sand dunes which end at the Gurnet.

In 1606 Champlain landed here and watched the Indians fishing for cod with fishhooks made of wood, on which a spear-shaped bone was fastened. The lines were made of tree bark.

The Pilgrims called the land "the gurnett's nose." The place was apparently named after several similar headlands in the English channel, many of them being called for the fish of that name which is caught along the coast of Devonshire.

The Plymouth (Gurnet) Lighthouse was first established in 1768 by the Massachusetts Legislature. The first keeper was John Thomas on whose land the original lighthouse was built, and for which rent of 5 shillings per year was paid him by the colony. Later Hannah, his widow, was keeper. Both had received $200 per annum for their services. The lighthouse cost £660 to erect, was 30 feet long, 20 feet high, and 15 feet wide with a "lanthorn" at each end of the building, holding two lamps each.

During the Revolution, the three towns of Plymouth, Duxbury, and Kingston had erected a fort on the Gurnet. In the midst of an engagement between the fort and the British frigate *Niger,* which had gone aground on Brown's Bank, a wild shot from the ship pierced the lighthouse. Later the vessel got off and escaped. The Gurnet Light, however, is thus the only United States lighthouse known to have ever been hit by a cannon ball.

In 1778 the armed brigantine *General Arnold* was caught in a blizzard while less than a mile from the light and the captain anchored his vessel rather than risk the treacherous waters of

Plymouth's inner harbor without a pilot. The vessel dragged anchor and hit on White Flats. Seventy two of the crew died most of them freezing to death in the below-zero temperature before they could be rescued. The keeper of Gurnet Light was unable to go to their aid because the harbor was blocked with ice. A causeway had to be built over the ice to rescue the survivors.

In 1783 the damage done to the lighthouse during the Revolution was repaired. In a terrible December snowstorm in 1786, a coasting sloop from Boston to Plymouth was caught off Gurnet. Only one man was hurt when the ship struck a sand bar and all landed safely. Several miles from any habitation two men finally reached Gurnet Lighthouse and Thomas Burgess, the keeper, dispatched his assistant to help the others reach the lighthouse safely.

Under the act of August 7, 1789, the United States accepted cession of the lighthouse by Massachusetts on June 10, 1790, including "the interest of the Commonwealth in the lighthouse land, etc., on the Gurnet Head, west of Plymouth."

On July 2, 1801, the lighthouse was completely destroyed by fire. The merchants of Plymouth and Duxbury erected a temporary beacon at their own expense. On April 6, 1802, Congress appropriated $270 to reimburse them. At the same time Congress also appropriated $2,500 "for rebuilding the lighthouse on Gurnet." Twin lights were built and the Thomas family was paid $120 for the land on which the new lighthouses were constructed.

Joseph Burgess succeeded his father as keeper on October 16, 1812, and remained in charge of the light until 1851.

Congress appropriated $5,000 in 1836 "for preserving the point of land leading to the fort and lighthouse at the Gurnet, in Duxbury, by hurdles or double ranges of piles."

Lt. Edward W. Carpender, USN, reported on November 1, 1838, that the Gurnet light beams were horizontal rather than perpendicular as other lighthouse beams were. "They require to be double to distinguish them from the single light at Barnstable. They are in separate towers, 22 feet high and 30 feet apart. They consist of a single series of six lamps each, with old 8 1/2-inch reflectors, arranged in a circular form, so as to suit the harbor as well as sea navigation. Their elevation is 70 feet above the level of the sea, enabling them to be seen 19 miles."

Carpender pointed out that the lights were too close together, causing them to blend and appear as a single light at a short distance. Also being horizontal they "were likely to come into a range with each other, by which .they also appear single." Carpender's remedy for this was to convert them from horizontal to perpendicular beams, but his suggestion was never carried out.

In 1842 the Gurnet lighthouses were rebuilt and the new structures, while still of wood, each had a distinctive design. In 1871 the lights were of the sixth order and were declared by the Lighthouse Board to be "entirely too small" and "readily mistaken for the lights in a dwelling house, when they can be seen at all." Their distance apart was also too short to afford an efficient range. Nothing ever came of the recommendation that they be replaced with fourth-order lights "separated by a proper distance for an effective range.

After 1851, Thomas Treble followed Joseph Burgess as keeper. His successors were William Sears, Milton Reamy, Edward S. Gorham, Henry L. Pingree, and A. S. Eisener. Keeper Davis in 1929 had a long list of rescues to his credit, and keeper Reed rescued the crew of the mine sweeper U. S. S. *Swan* stranded on Gurnet Beach on November 28, 1930.

Gurnet Light had lost its importance as a light as Plymouth Harbor lost its shipping traffic over the years. Not until Cape Cod Canal was opened in 1914 did the lighthouse again become an important coastal beacon.

In 1924 the northeast tower was discontinued and the station is now described as a white, octagonal, pyramidal tower, with white dwelling, 39 feet above ground and 102 feet above water. Its 700,000 candlepower, fourth-order electric light shows group flashing white every 20 seconds and is visible for 16 miles. An air diaphragm horn blasts for 3 seconds every 15 seconds during fog. (5)

MICHIGAN

LITTLE SABLE LIGHTHOUSE

East shore of Lake Michigan.

Little Sable Lighthouse, a white brick tower, 107 feet in height, connected to the keeper's dwelling, and surrounded by a picturesque group of trees, stands on a point about 10 miles south of Pentwater. The lighthouse was built in 1874, and the light now shown from the tower is fixed and flashing white, the flashes being of 40,000 candlepower. Several miles to the northward is Big Sable Lighthouse, on the point of that name, distinguished at night from Little Sable by having a fixed white light, and by day by the color of the tower, banded in black and white. Big Sable Lighthouse is the same height as the tower at Little Sable, but was erected in 1867. (1) (2)

MICHIGAN

SPECTACLE REEF LIGHTHOUSE, LAKE HURON

The Spectacle Reef Lighthouse cost $406,000 and is the best specimen of monolithic stone masonry in the United States. The work on the lighthouse, which stands on a submerged limestone reef off the eastern end of the Straits of Mackinaw, was commenced in May 1870. It was planned and built by Maj. 0. M. Poe, who was General Sherman's chief engineer on his march to the sea. The light was first exhibited from the finished structure in June 1874. The available working time on the structure was, however, only about 20 months, because no work could be done on it during the winter months.

The nearest land to Spectacle Reef is Bois Blanc Island, 1012 miles away. The stone for it was prepared at Scammon's Harbor, 16 miles distant and one of the items in its cost was the purchase of a steamer to convey the materials to the site.

The waves at Spectacle Reef have a fetch of 170 miles to the southeastward and the ice fields, which are moved by a current and are thousands of acres in area, are often 2 feet thick. These had to be especially provided for because when they move in mass, they have an almost irresistible force. This force was overcome by interposing a structure against which the ice is crushed and by which its motion is so impeded that it grounds on the 7-foot shoal, which thereby forms a barrier against other ice fields.

The tower, in the shape of a frustrum of a cone, is 32 feet in diameter at the base and rises 93 feet above the base, which is 11 feet below the water. The focal plane is 4 feet 3 inches above the top of the parapet, making it 97 feet 3 inches above the top of the submerged rock and 86 feet 3 inches above the surface of the water. For 34 feet up the tower is solid and from them on up it is hollow. In it are five rooms, one above the other each 14 feet in diameter, with varying heights. The walls of the hollow portion are *5* feet 6 inches at the bottom, tapering to 16 inches at the spring of the cornice.

The blocks of stone below the cornice are 2 feet thick, and those of the solid portion of the tower are cut to form a lock on each other in each course, and the courses are fastened together with wrought iron bolts 2 1/2 inches thick and 2 feet long. The tower is bolted to the foundation rock with bolts 3 feet long which enter the bed rock 21 inches, the other courses receiving the bolts for 9 inches. Each bolt is wedged at both ends, and the bolt holes, which were made with a diamond drill, after the stones were in place, are plugged with pure portland cement, now as hard as the stone itself. Hence the tower is, in effect, a monolith.

The stones were cut at the depot at Scammon's Harbor, 16 miles away, and fitted, course by course, on a platform of masonry. The stones were so well prepared that a course could be set, drilled, and bolted in 3 days.

The foundation, 11 feet under water, was laid in a cofferdam protected by a crib work of 12-inch timber, built upon ways at the depot, as a ship might have been, than launched and towed by a number of steamers to the reef and grounded on the site. This crib was 92 feet square and 24 feet high. This afforded a protected pond for the cofferdam, a landing wharf, and quarters for the men all 12 feet above water. The cofferdam was then pumped out until the bedrock was exposed and on this bedrock the masonry courses were laid.

A severe gale in September 1872 did considerable damage, though only of a temporary character, exposing the east face of this crib at a point where it had not been sheathed to protect it from the ice during the winter. It swept away the temporary cribs and nearly destroyed the workmen's quarters.

After the winter of 1873-74, when the keepers returned to the newly completed tower, they found the ice piled against it at a height of 30 feet, or 7 feet higher than the doorway, and they could not gain entrance until they had cut away the iceberg of which the lighthouse formed the core.

The light now flashes alternately white and red, every 60 seconds, the white light being 400,000 candlepower and the red light 80,000 candlepower, both second-order electric, and visible for 17 miles. There is also a 100 candlepower white winter light which flashes every *5* seconds. An air-diaphone fog signal is also located at the station. (1) (2)

MICHIGAN

STANNARD ROCK LIGHTHOUSE, LAKE SUPERIOR

Stannard Rock, lying about 23 miles southeast of Manitou Island, was for years the most serious danger to navigation in Lake Superior. The rock was first marked by a day beacon in 1868, but by 1871 the rapid increase in commerce between Duluth and the lower lakes demanded the construction of a lighthouse on the rock. The construction of Spectacle Reef Light, that presented a similar problem had been started in 1870 and it was believed that all the costly apparatus and machinery purchased for that job could be made available for constructing a lighthouse on Stannard Rock.

In 1873, when the Spectacle Reef construction was three-quarters completed, Congress appropriated $10,000 for a preliminary survey. This indicated that a structure would be needed of the most substantial and costly kind, that it would probably be located in 11 feet of water and would cost $300,000. As a matter of fact the final cost was $305,000.

It was not until 1877, 4 years after Spectacle Reef Lighthouse had been completed, that Congress appropriated $50,000 for commencing the construction of the lighthouse. All the machinery that had been used in constructing Spectacle Reef was moved to the depot at Huron Bay where necessary quarters, docks, shops, etc., were erected. The tower was to be similar to that of Spectacle Reef, with the addition of a permanent protective crib. This crib was begun at Huron Bay in July 1877 and taken out to the rock in August, where soundings were made to fit it to the bottom. It was then returned to Huron Bay and built up to 14 courses and in August 1878 was taken out and placed in position at Stannard Rock. By October it had been filled with concrete and stone mined from a quarry opened on Huron Island. Congress had meanwhile appropriated another $100,000 for this work.

By June 1879 the iron casting for the concrete pier was in place and the pier had been built up to the surface of the water with another $50,000 appropriation. By midyear 1880 the work was 14 feet above lake-level. The tower was completed and the light first exhibited July 4, 1882, with another $123,000 made available.

Work on the tower and its various appliances continued in 1883. The light is exhibited 102 feet above water and shows a 20,000 candlepower flashing white light of the second order, visible about 18 miles. There is also an air diaphone fog signal at the station. (1) (2)

MINNESOTA

SPLIT ROCK LIGHTHOUSE

In township of Split Rock, north shore of Lake Superior.

Picturesquely located at the top of an imposing rock jutting out into Lake Superior is Split Rock Lighthouse. The station derives its name from the appearance of the rock as it is approached from the open lake. The octagonal brick tower 54 feet in height was built in 1910. Because of the height of the rock, the light was 168 feet above the level of the lake and could be seen for 22 miles. An incandescent oil-vapor lamp was used inside the third-order lens, producing a light of 450,000 candlepower. The station was also equipped with a compressed air-operated diaphone fog signal, sounding a blast every 20 seconds in time of fog. Split Rock Lighthouse is one of the most frequently visited lighthouses in the United States. The light was discontinued in 1969. (1) (2)

NEW HAMPSHIRE

ISLE OF SHOALS LIGHTHOUSE

Capt. John Smith discovered the rugged, storm-swept Isles of Shoals off the coasts of Maine and New Hampshire in 1614. The first settlers were Robert, John. and Richard Cutts who came across the seas from Wales to build their huts on the islands. Later Sir William Pepperell established the fishing industry there and laid the foundation for a fabulous fortune. The Pepperell Mills at Biddeford, Maine, stem from this beginning and Sir William was closely associated with Gen. George Washington and Gen. Knox during the Revolution. The largest of the island group was originally called Hog Island, but this was later changed to Appledore. This island contains about 4 acres and its greatest elevation is 75 feet above the sea. In 1641 the 40 families living on the island incorporated it into a town and here the first church in the Province of Maine was erected, under the direction of the Reverend John Brock. The town flourished through its fisheries and enjoyed an extensive trade with the Spaniards. In 1670, during trouble with the Indians, the inhabitants moved to Star Island, for greater protection.

Smutty Nose, earlier known as Haley's Island, lies close to Appledore and at low tide Cedar and Malaga Islands are connected with the latter by a breakwater, built, it is said, by Captain Haley with the proceeds from four bars of silver found among the rocks. He also erected a salt works, built a rope walk and set up a windmill. Each night he kept a lamp lighted from the sunset to sunrise to aid the mariners into the harbor formed by the breakwater. Notwithstanding this aid to navigation, the ship *Sagunte* from Cadiz was wrecked on the southeast point of the island on January 14, 1813, and stones marking the graves of those lost can still be seen.

It was on Star Island that Captain Kidd was said to have buried some of his treasure. During the colonial period, the Indians swept down upon Star Island in their canoes and killed or carried off every inhabitant except a Mrs. Moody, who hid herself and her two children under the rocks. Unable to keep them quiet, the mother killed them with a knife she was carrying rather than let them fall into the hands of the Indians.

The first Isle of Shoals Lighthouse was erected on White Island, 51/2 miles off the coast of New Hampshire in 1821. It was a stone tower with the lantern about 90 feet above the water. In 1835 Capt. Henry D. Hunter of the United States Revenue Cutter *Jackson* inspected it and reported "The lanthorn is old and wants a new one. The whole establishment is dirty and in bad order."

Thomas B. Laighton, who was defeated for Governor of New Hampshire in 1839, sold his business in Portsmouth and became keeper of the Isle of Shoals Light. Five years before, he had purchased Appledore, Smutty Nose, Malaga, and Cedar Islands, across the boundary line in Maine, from Capt. Samuel Haley. When Laighton retired as keeper in 1847, he had built a large hotel, the Oceanic, on Star Island. During the Civil War, because of the danger from blockade runners and Southern gunboats, the lighthouse was entirely rebuilt of granite, with walls 2 feet thick. One night in 1873, Louis Wagner, knowing that the men were away from Smutty Nose Island, rowed all the way across from the mainland to rob fisherman Houtnet's residence. Caught and recognized by the women, Wagner killed two of the three females on the island. Then he returned to his dory and rowed back to the mainland. Later he was captured, tried, and hanged.

Today the white conical tower rises 58 feet above ground and 82 feet above the water, and the 170,000-candlepower second-order incandescent oil-vapor light, flashing white every 15 seconds, is visible for *15* miles. An air diaphragm horn blasts for 3 seconds every 30 seconds during fog. (5) (6)

NEW HAMPSHIRE

PORTSMOUTH HARBOR LIGHTHOUSE

In 1771 the first wooden tower at Portsmouth Harbor was built on a point of land running out into the harbor. This early colonial tower was one of the 12 lighthouses turned over to the Federal Government under the act of August 7, 1789. The original tower was replaced by another wooden tower in 1804. In 1877 this second tower was removed and a cast-iron beacon erected 1,000 feet east of the first station. This was on ground known as Newcastle. In reaching the lighthouse by land one has to pass through the "Old Fort" yard before arriving at the lighthouse reservation. For 30 years after its first settlement in 1623, this area was known as "Strawberry Bank" because of a large patch of wild strawberries on the bank of the river.

In 1789 George Washington visited the Portsmouth Lighthouse and remained in Portsmouth 4 days. Earlier in 1782 General Lafayette had been a lighthouse visitor. Daniel Webster practiced law here in 1807, and was a frequent visitor at the lighthouse during his 9 years of residence in Portsmouth.

Today the lighthouse is a white conical tower, with a fog signal house attached, built on Fort Point. It rises 52 feet above the water and its 3,000 candlepower fourth-order electric light flashes a green light visible 13 miles. During fog a bell strikes once every 10 seconds. (5) (7)

NEW JERSEY

NAVESINK LIGHTHOUSE

Navesink Light, N. J., on Navesink Highlands, south of the entrance to New York, was established in 1828. It consisted originally of two rubble towers. In 1862 two brownstone towers replaced these, the north tower being octagonal and the south tower square. They are 73 feet high and connected by a dwelling. The present light is exhibited from the south tower only and shows a flashing white light every *5* seconds, 246 feet above water and visible 19 miles. The light in the north tower was discontinued in 1898.

In 1841 the first Fresnel lens to be used in this country was imported from France and installed in the south tower. In 1898 an electric arc lamp replaced oil lamps in the south tower, this being the first primary lighthouse in the United States to use electric light. The electric arc lamp was equipped with a bivalve lens of the new lighting type. This lens, weighing over 7 tons, revolved in 10 seconds, and gave a flash every *5* seconds, lasting 0.3 seconds. The Navesink Light was the only shore station having a plant for generating electricity. Its estimated candlepower was 25,000,000 making it the most powerful coast light in the United States. Although on account of the curvature of the earth, the light itself could not be seen more than 22 miles, its beam was reported to have been observed in the sky at a distance of 70 nautical miles.

After the establishment of this electric flashing light many complaints were made by residents of the neighborhood of the great discomfort and annoyance caused by the brilliancy of the flash. This was remedied by darkening several of the lantern panels on the landside. The light was later changed to an electric incandescent light of 9,000,000 candlepower. With the improvement in floating aids, however, this lighthouse lost some of its early importance, and the candlepower was reduced to 5,000 candlepower. It was changed to unwatched in 1949. The light was discontinued in 1952 and used as a daybeacon until 1963. (3) (4)

NEW JERSEY

SANDY HOOK LIGHTHOUSE

The Sandy Hook Light tower is the oldest original tower still standing and in use in the United States. The light in this tower was lighted for the first time on June 11, 1764. Originally called the "New York Lighthouse," it was built by Mr. Isaac Conro of New York City with money collected by a group of New York merchants and maintained by tonnage dues of 22 pence per ton paid to the port of New York "By order of an Act of the Colony." The location of the lighthouse on New Jersey land eventually caused dissension between the two States. It was one of the 12 lighthouses built by the colonies which, by the act of August 7, 1789, were ceded to the United States. The new Federal Government agreed to maintain them thereafter.

The lighthouse was described in 1764 as follows: "This House is of an Octagon Figure, having eight equal sides; the Diameter of the Base 29 feet; and at the Top of the Wall 15 Feet. The Lanthorn is 7 feet high; the Circumference 15 Feet. The whole Construction of the Lanthorn is Iron; the top covered with Copper. There are 48 Oil Blazes. The Building from the Surfaces is Nine Stories; the whole from Bottom to Top 103 Feet."

A lot of about 4 acres "at the point of Sandy Hook, in Monmouth County," was ceded to the United States by the State of New Jersey on November 16, 1790, and on March 1, 1804, the State of New Jersey "consented to the purchase of a lot on the north point of Sandy Hook, for the purpose of erecting a beacon." Appropriations for a beacon "to be erected on the north point of Sandy Hook" were made in 1804 ($2,000), 1805 ($6,000), 1807 ($1,200) and 1817 ($1,200). In 1832 there were two beacons on the Hook, "one on the north point, ranging with the light and buoy of the upper middle; and the westernmost one and light ranging with the buoy on the SW. spit, in both of which are lamps."

In 1852 the Lighthouse Board reported "The tower of Sandy Hook main light was constructed in 1764, under royal charter, of rubblestone, and is now in a good state of preservation. Neither leaks nor cracks were observed in it. The mortar appeared to be good, and it was stated that the annual repairs upon this tower amount to a smaller sum than in the towers of any of the minor lights in the New York district. The illuminating apparatus is composed of 18 21 inch reflectors, and Argand lamps which were fitted new, according to the best information on the subject, in 1842."

The light is a 60,000-candlepower, third-order electric light, fixed white, in a white stone tower, 85 feet above ground and 88 feet above water, visible for 15 miles. (1) (2) (7)

NEW YORK

CROWN POINT MEMORIAL. LAKE CHAMPLAIN

In 1858 a light was placed on a 7-acre site at Crown Point, on Lake Champlain, near the historic Grenadier Battery, historic ruins of French and English fortifications. The base of the tower was 57 feet above water and the focal plane was 86 feet above water level. A fixed fifth-order, white light was there in 1894.

In 1888 a steamboat wharf had been built to accommodate visitors by water to the fortifications. In 1926 the light was discontinued and the site conveyed to the State of New York. The States of New York and Vermont, as part of the commemoration of the three hundredth anniversary of the discovery of the lake by Samuel de Champlain, removed the old tower and built in its stead an ornamental cylindrical tower of cut granite blocks, surrounded by eight Doric columns. On the pedestal is an heroic group in bronze with Champlain as the central figure, presented by the Republic of France. The bronze group was designed by Rodin, the famous French sculptor. (3)

NEW YORK

PORTLAND HARBOR (BARCELONA) LIGHTHOUSE

SOUTH SHORE OF LAKE ERIE

Congress appropriated $5,000 on May 23, 1828, "for building a lighthouse at a proper site, at or near Portland, on Lake Erie, in the State of New York." The site was purchased for $50 and contract was made to erect a lighthouse and dwelling which cost $3,456.78. The first keeper appointed May 27, 1829, was Joshua Lane, a "deaf, superannuated clergyman, having numerous female dependents" whose salary was $350 per annum.

The first light apparatus was described in the contract as 11 patent lamps with 11 14 inch reflectors and 2 spare lamps. There were double tin oil butts for 500 gallons of oil. No mention was made at that time of equipment for burning natural gas.

On January 1, 1831, a contract was made to provide the light with natural gas "at all times and seasons" and to keep the apparatus and fixtures in repair at an annual cost of $213. This was described at the time as follows:

"The Lighthouse at Portland Harbor in the County of Chautauqua and State of New York, is now illuminated, in the most splendid style, by *natural carburetted hydrogen gas.* Ever since the first settlement of the country about Portland, it has been known that an inflammable gas constantly issued from the fissures of a rock, which forms the bed of a little brook that empties into Lake Erie, near the harbor, in such quantity as to be easily set on fire by applying a flame to it. This fountain of gas was known to the early settlers of the country by the name of the 'burning spring.' No valuable use, however, was made of this gas until Mr. W. A. Hart, an ingenious gunsmith of the village of Fredonia, and some other young mechanics, five or six years ago, collected a quantity of similar gas from the rocky bed of Canadaway creek in a reservoir, and conveyed it from thence to all the principal stores, taverns, and shops in the said village, where it is still used instead of lamps."

In the fall of 1829, on completion of the lighthouse at Portland Harbor, several persons associated together for the purpose of conveying the gas from the "burning spring" to the lighthouse. They dug into the rock at the place where the largest quantity of gas was found, in the form of a common well, about 40 or 50 feet in diameter and 3 feet deep. Over this well they erected a cone of solid mason work, so tight as to contain the gas which should collect within it, and at the same time exclude the water around it. They inserted a pipe at the base of the cone; bent down the end toward the bottom of the well; and then extended the pipe along on the bed of the brook to its termination below the dam. From that point it was conducted by pipes buried in the ground the distance of 230 rods to the lighthouse.

A stand of lamps adapted to the reception, emission, and burning of the gas was next invented and constructed by Mr. Hart. These consisted of several horizontal arms extended like the radii of a semicircle, at the end of each of which a brass pipe was attached. The quantity of gas consumed by each burner was regulated by a stopcock. Each burner had a large and suitable reflector. There were two tiers of these lamps, seven on the lower tier and six in the upper, interspaced so that, when viewed from the lake at night, the whole tower represented one complete, constant and unwavering blaze.

"Altogether" the account continues "this is one of the greatest natural, philosophical and mechanical curiosities which the country can produce. As a light for a lighthouse it exceeds, both in quantity and brilliancy, anything of the kind I ever saw."

In November 1838 it was reported, however, that "Owing to a failure of gas, that may be attributed to the excessive draught, oil is now substituted. It is presumed, however, that the fall rains will replenish the stream from which the fountain is supplied, and thus prevent the escape and loss of the gas."

In 1851 the report read: "We have one lighthouse at Portland on Lake Erie, lighted with natural gas, carried a distance of 2 miles in pipes to the tower; and even here we are obliged to keep oil and lamps, as water frequently collects in the pipes, over which the gas will not pass, and whilst they are being taken up and freed from water, oil light has to be used. We have a contract for supplying this gas at the annual cost of the oil which would be required, if lighted with that material."

The Portland Harbor (Barcelona) Light was discontinued in 1859 and in 1872 the buildings were sold to the highest bidder. (1) (2)

NEW YORK

RACE ROCK LIGHTHOUSE

Race Rock Lighthouse, in Long Island Sound, 8 miles from New London, Conn., was built under great difficulties. The builder was Captain Scott. His engineer was F. Hopkinson Smith, who later became famous as a writer of lighthouse stories. Race Rock Lighthouse is off Fisher's Island Sound, at the mouth of the Race, where the waters of the Sound rush both ways, according to the tide, with great velocity and force, and where, in heavy weather, the waves run high. By 1837 eight vessels had been lost in 8 years on Race Point reef.

In 1838 Congress appropriated $3,000 for erecting a lighthouse at Race Rock but the money was never expended. In 1852 the Lighthouse Board reported:

"Various efforts have been made, and numerous appropriations expended, in endeavoring to place an efficient and permanent mark on this point. Buoys cannot be kept on it, and spindles have hitherto only remained until the breaking up of the ice in the spring." In 1853 $7,000 was appropriated "for a beacon on Race Rock." This took the form of a daybeacon completed in 1856.

In 1854 Congress appropriated $8,000 for a lighthouse but only $1,600 of this was spent, mostly in surveys. In 1869 $90,000 was appropriated "for a lighthouse at or near Race Point, Fisher's Island, Long Island Sound." After preliminary surveys costing *$6,52857,* an additional appropriation of $10,000 was made in 1870, after the Board had estimated that $200,000 would be required to build the lighthouse. In 1871 $150,000 more was provided by Congress.

Construction of the riprap foundation began in April 1871. In all 10,000 tons of granite were used in the foundation. "The proposals for the construction of the foundation and pier of this structure were so excessive in rates" the Board reported in 1872, "and so much above the amount of the appropriation on hand *($95,539.66* had been expended out of $261,000 appropriated to June 10, 1872) that no more than the landing and the enrockment of the foundation, and two courses of the pier, could be contracted for."

In 1873 Congress appropriated a further $75,000 and the lighthouse was completed at an additional expenditure of $175,048.09 between 1873 and 1878. The total cost of the lighthouse was $278,716.33.

The ledge on which the lighthouse is built is under water and three-fourths mile from Race Point Reef. It has one large and several smaller spurs of rock rising above the general surface. The least depth at mean low water on the principal spur or Race Rock proper, is 3 feet. The greatest depth at mean low water, within the circle of 69 feet, is 13 feet.

The ledge was, with the help of divers, made approximately level with small broken stone and riprap. Upon this was placed a circular-stepped mass of concrete, 9 feet thick, built in 4 concentric layers. The lower layer is 69 feet in diameter and 3 feet thick. To form the layers of concrete, cylindrical bands of half inch iron, of the height and diameter required for the respective layers, were used. The upper surface of the concrete, 8 inches above mean low water, carries a conical pier, 30 feet high, 57 feet in diameter at the base, and crowned by a projecting coping *55*

feet in diameter. The pier is made of heavy masonry backed with concrete, in which cisterns and cellars are located.

The pier is surmounted by a granite dwelling one story and a half high. From the center of its front the granite light tower ascends. A landing-pier, 53 feet long and 25 feet wide, built of heavy masonry, gives access to the lighthouse. The whole structure is surrounded and protected by riprap. The tower, which is square at the base and octagonal at the top, carries a fourth-order alternating flash white and red electric light of 90,000 candlepower, being 67 feet above sea level and 45 feet above land, and visible 14 miles at sea. (1) (2)

NORTH CAROLINA

CAPE FEAR LIGHTHOUSE, "BALD HEAD LIGHT"

On December 14, 1790, the State of North Carolina ceded to the United States 10 acres of land on Cape Fear Island, in response to the invitation held out by the act of August 7, 1789, for the States to make cessions to the Federal Government of "lighthouses, beacons, buoys, and public piers, and lots of land for lighthouses, etc."

On April 2, 1792, Congress appropriated $4,000 and provided "that the Secretary of the Treasury, under the direction of the President of the United States, be authorized, as soon as may be, to cause to be finished in such manner as shall appear advisable, the lighthouse heretofore begun under the authority of the State of North Carolina, on Bald Head, at the mouth of the Cape Fear River in said State." Three further appropriations totalling $7,359.14 were made between 1793 and 1797 and the light was completed and first shone in 1796.

Between 1813 and 1817, $16,000 was appropriated "for rebuilding Bald Head Lighthouse."

On July 1, 1834, Capt. Henry D. Hunter of the revenue cutter Taney inspected Bald Head Light which he described as having 15 lamps, 109 feet above the level of the sea, showing a fixed light. Two years later he again inspected the light. "The keeper is an old revolutionary soldier," he reported "and is unable from sickness to give the lighthouse his constant personal attention. The light, however, shows well from a distance."

A Jones fog bell was placed near Bald Head Lighthouse in 1855. In the same year the Lighthouse Board recommended the substitution of "a third-order lens, larger model, 3600 for the present apparatus." It also recommended a fixed light, light, varied by flashes "to distinguish this light, under all circumstances, from Federal Point Light."

The range lights on the upper jetty of Cape Fear River, which had been installed in 1856, "were extinguished by the rebels in 1861, and the structures entirely destroyed."

In 1866 Bald Head Light was discontinued after a new lighthouse had been built at the mouth of the Cape Fear River to replace Federal Point Light. In 1880, however, Federal Point Light had been rendered useless and was discontinued because of the closing of the New Inlet Channel by the Engineer Department. Bald Head Light was relighted at that time and, together with a small stake light on the beach in front of it, served as a guide through the 16- to 18-foot Oak Island Channel across the bar.

The shore on the inside was reported in 1881 as being "rapidly abraded by the action of the sea, which is doubtless increased by the augmented flow of water through Oak Island Channel due to the closing of New Inlet." In the following year it was noted, "Some means of protection must

soon be used, or the lighthouse will be destroyed." In August 1883 a stone jetty, 150 feet long, was authorized for the protection of the foundation of the tower. This work was completed, in time probably, to save the tower from destruction in the hurricane of September 1883. In 1885 the jetty was extended another 50 feet.

In 1889 the Lighthouse Board reported that the shoals forming the continuation of Cape Fear for about 18 miles to the southeast were dreaded by ship masters only a little less than those at Cape Hatteras. The lightship, near the outer extremity of the shoals, warned vessels of danger and gave them a good point of departure, but was not sufficient to insure adequate protection because of the small area lighted by it, and its liability to being set adrift from its moorings during violent storms, at the very time it was most needed. The Cape Fear Light (Bald Head), on account of its inland position and want of height, did not cover the shoals and therefore did not give sufficient warning to vessels in case the lightshin should drift from her moorings. The Board, therefore, recommended a first-order lighthouse, with a radius of 18 1/2 miles of light, about 150 feet high and costing $150,000 to be built on the pitch of Cape Fear.

This recommendation was made each year thereafter until 1897, the estimate being revised downward to $70,000 in 1893. On July 1, 1898, Congress appropriated $35,000 for the new lighthouse, with authority to contract for another $35,000, followed by an appropriation for a similar amount on March 3, 1901. A new skeleton tower was completed in 1903 on Smith Island and furnished with a first-order flashing lens apparatus.

Upon completion of the new Cape Fear Light the old Cape Fear Station (Bald Head) was changed to a fourth-order fixed light and its name changed to Bald Head Light Station. The station was discontinued in 1935. A radiobeacon was established on the site in 1941. (1) (2) (7)

NORTH CAROLINA

CAPE HATTERAS LIGHTHOUSE

On July 10, 1797, Congress appropriated $44,000 "for erecting a lighthouse on the head land of Cape Hatteras and a lighted beacon on Shell Castle Island, in the harbor of Ocracoke in the State of North Carolina." The Cape Hatteras Lighthouse cost $14,302 to build and the Shell Castle Island Lighthouse was built from part of the surplus. Both were completed in 1803.

The Cape Hatteras light marked very dangerous shoals which extend from the cape for a distance of 10 nautical miles. The original tower was built of dark sandstone and retained its natural color. The original light consisted of 18 lamps; with 14-inch reflectors, and was 112 feet above sea level. It was visible in clear weather for a distance of 18 miles.

In July 1851, Lt. David D. Porter, USN, reported as follows:

"Hatteras light, the most important on our coast is, without doubt, the *worst* light in the world. Cape Hatteras is the point made by all vessels going to the south, and also coming from that direction; the current of the Gulf Stream runs so close to the outer point of the shoals that vessels double as close round the breakers as possible, to avoid its influence. The only guide they have is the light, to tell them when up with the shoals; but I have always had so little confidence in it, that I have been guided by the lead, without the use of which, in fact, no vessel should pass Hatteras. The first nine trips I made I never saw Hatteras light at all, though frequently passing in sight of the breakers, and when I did see it, I could not tell it from a steamer's light, excepting that the steamer's lights are much brighter. It has improved much latterly, but is still a wretched light. It

is all important that Hatteras should be provided with a revolving light of great intensity, and that the light be raised 15 feet higher than at present. Twenty-four steamship's lights, of great brilliancy, pass this point in one month, nearly at the rate of one every night (they all pass at night) and it can be seen how easily a vessel may be deceived by taking a steamer's light for a light on shore."

The improvement in the light referred to had begun in 1845 when the reflectors were changed from 14 to 15 inch. In 1848 the 18 lamps were changed to 15 lamps with 21-inch reflectors and the light had become visible in clear weather at a distance of 20 miles. In 1854 a first-order Fresnel lens with flashing white light was substituted for the old reflecting apparatus, and the tower was raised to 150 feet.

In 1860 the Lighthouse Board reported that Cape Hatteras Lighthouse required protection, due to the outbreak of the Civil War. In 1862 the Board reported "Cape Hatteras, lens and lantern destroyed, light reexhibited."

Between 1867 and 1870 Congress appropriated $167,000 in three annual sums, for rebuilding Cape Hatteras Lighthouse. The new tower, from which the first-order light was first exhibited December 16, 1871, was the highest brick lighthouse tower in the world. It was 193 feet above ground and the focal height of the light 191 feet above water. The old tower "being no longer of any use and in danger of falling during some heavy storm" was blown up and totally destroyed in February 1872.

In the spring of 1879 the tower was struck by lightning. Cracks subsequently appeared in the masonry walls, which was remedied by placing a METAl rod to connect the iron work of the tower with an iron disk sunk in the ground. In 1912 the candlepower of the light was increased from 27,000 to 80,000.

Ever since the completion of the new tower in 1870, there had begun a very gradual encroachment of the sea upon the beach. This did not become serious, however, until 1919, when the high water line had advanced to about 300 feet from the base of the tower. Since that time the surf had gnawed steadily toward the base of the tower until in 1935, the site was finally reached by the surf. Several attempts were made to arrest this erosion, but dikes and breakwaters had been of no avail. In 1935, therefore, the tower light was replaced by a light on a skeleton steel tower placed farther back from the sea on a sand dune, 166 feet above the sea, and visible for 19 miles. The old tower was then abandoned to the custody of the National Park Service.

The Civilian Conservation Corps and Works Progress Administration erected a series of wooden revetments which checked the wash that was carrying away the beach. In 1942 the Coast Guard reassumed its control over the tower and manned it as a lookout station until 1945. The old tower was now 500 to 900 feet inland from the sea and again tenable as a site for the light which was placed in commission January 23, 1950.

The new light consists of a 36-inch aviation-type rotating beacon of 250,000 candlepower, visible 20 miles, and flashing white every 15 seconds. The skeleton steel tower has been retained to guard against the time that the brick tower may again be endangered by erosion and thus require that the light again be moved. (1) (2)

NORTH CAROLINA

CAPE LOOKOUT LIGHTHOUSE

The Cape Lookout Lighthouse was completed in 1812 at a cost of $20,678.54 and had one wooden and one brick tower.

The station was described in 1850, when William Fulford was keeper, as having 13 lamps, new lighting apparatus having been installed in 1848. The keeper was obliged, in 1850, to keep wheeling away sand from the front side of the keeper's dwelling to prevent the sand from covering it up. "The sand banks," the report reads, "are now higher than the tops of the windows; and only a few feet from them, at high water mark. On the sea side, it has washed away about 100 feet last year by abrasion and sea flows."

In 1851 Cape Lookout Lighthouse was reported as one of nine coast lights "which require to be improved.

The towers of each of them should have an elevation of 150 feet above the level of the sea and should be fitted up in the best manner with first-order lens apparatus, to insure a brilliancy and range adequate to the wants of commerce. These lights are not sufficiently well distinguished, but a general plan for all the seacoast lights will best accomplish this object."

On March 3, 1857, Congress appropriated $45,000 "for rebuilding and fitting out with first-order apparatus the lighthouse at Cape Lookout, North Carolina." The new lighthouse was completed and first lighted on November 1, 1859.

During the Civil War, in 1862, the tower was damaged and the lens, etc., removed, but by 1863 the lighthouse had been refitted and the light reexhibited. A third-order lens was placed in use temporarily until the first-order lens, "injured by the rebels" could be repaired and restored in 1867.

The lighthouse is now a black and white diagonally checkered tower, 169 feet above ground and 156 feet above feet water and shows a group flashing white electric light every 15 seconds of 80,000 candlepower, visible 19 miles, from a first-order lens. (1) (2)

NORTH CAROLINA

OCRACOKE LIGHTHOUSE

As a consequence of the invitation held out by the act of August 7, 1789, and other similar acts of Congress, various cessions of lighthouses, beacons, buoys, public piers, and lots of land for lighthouses were made from time to time by the various States, vesting the property, jurisdiction, and sometimes both, or right of occupancy in the Government of the United States. On February 7, 1795, land necessary for a lighted beacon on Shell Castle Island (later known as Beacon Island) was turned over to the United States by the State of North Carolina and in a deed from J. G. Blount and John Wallace bearing the date of November 29, 1797, for a lot on Shell Castle Island, it was stipulated "that no goods should be stored, no tavern kept, no spirits retailed, no merchandise to be carried on, and that no person should reside on, or make it a stand to pilot or lighter vessels."

The first lighted beacon at Ocracoke was built on Shell Castle Island in the year 1798, and was erected in connection with the lighthouse on Cape Hatteras. This was authorized on July 10, 1797. Further appropriations for this beacon were made in 1800, 1803, and 1808.

On May *15,* 1820, Congress appropriated $14,000 "for building a lighthouse on Shell Castle Island, in the State of North Carolina, or, in lieu thereof, a light vessel to be moored in a proper place near said island if, in the opinion of the Secretary of the Treasury, the latter shall be preferred."

A total of $6,625 was spent in 1820 and 1821 for this purpose. "In process of time" Mr. S. Pleasonton, Fifth Auditor of the Treasury, later wrote "the channel leading in and out of Ocracoke left the lighthouse the distance of a mile, so as to render it altogether useless. The fact being made known to Congress, an appropriation was made of $20,000 for building another near the channel, and this was built in 1823, by Noah Porter, of Massachusetts, for $11,359.35."

This light was built on Ocracoke Island under a congressional authorization dated May 7, 1822. It was built on 2 acres of land sold to the United States for *$50* on December *5,* 1822, by Jacob Gaskell, jurisdiction being ceded to the United States by the North Carolina General Assembly on December 28, 1822.

The 1854 report of the Lighthouse Board indicated that at Ocracoke Island a fourth-order Fresnel fixed white light was substituted for the old reflecting illuminating apparatus. In 1857 the Board reported "The Ocracoke channel light vessel and the Beacon Island lighthouse, at the same place have, several times, been reported by this Board as useless and their discontinuance recommended. The erection of a small beacon light at the Ocracoke main light station, to serve as a range light, at a cost, if authorized, of not over $750*,* and to form a part of the present light station at Ocracoke, will fully subserve the wants of the present and prospective navigation of that inlet much better than by keeping up the Ocracoke Channel and Nine Feet Shoal light vessel, and Beacon Island lighthouse, at an annual saving of between $5,000 and $10,000." Congress appropriated the $750 for the beacon range light on Ocracoke Island on March 3, 1859, "provided that the lighthouse on Beacon Island and Ocracoke Light vessel be discontinued after the erection and exhibition of the aforesaid beacon light." In 1862 the Beacon Island light tower was still standing but the lens had been removed. Meanwhile new Franklin lamps had been substituted for valve lamps in the Ocracoke Lighthouse. In 1899 new model fourth-order lamps were supplied. The present white tower, on Ocracoke Island built in 1823, stands 76 feet above the ground and 75 feet above water and the 8,000-candlepower, fourth-order fixed white electric light is visible for 14 miles. (1) (2)

OREGON

TILLAMOOK ROCK LIGHTHOUSE

One mile off shore, at Tillamook Head.

Tillamook Rock, one of the most exposed stations on the Pacific coast, has received many batterings by violent storms. Although the lantern is 133 feet above the level of the sea, the protective glass has on more than one occasion been shattered by stones hurled by giant waves. During the building of the station a lighthouse engineer lost his life during an attempted landing on the rock. While extensive repairs were being made to the lighthouse following a disastrous storm, a keeper and a workman were taken seriously ill as the result of exposure. A lighthouse tender attempted to remove them from the rock, but after several efforts to send a boat to the rock it was necessary to remove the men by means of a breeches buoy. Other men were landed on the rock in the same manner to take the place of those who were ill. In 1957 the light was discontinued and the island sold.

RHODE ISLAND

BEAVERTAIL LIGHTHOUSE

On the south end of Conanicut Island. Beavertail Lighthouse was the third lighthouse to be built in what is now the United States, the original tower having been constructed in 1749. Its erection was authorized as early as 1738 by the General Assembly of the Governor and Company of the English Colony of Rhode Island and Providence Plantation; but nothing was then done because of war breaking out between England and Spain. The first lighthouse has now been gone for nearly a century, but there stands in its place a more sturdy structure, built of granite, which was built in 1856. Almost from its first erection, Beavertail has been a sort of proving ground for various types of signaling equipment, many of which were here first tried out. One of the most curious of these was an early air-operated fog signal, for which a horse was kept on hand for the purpose of operating the air compressor. At the present time Beavertail is equipped with an electric lamp set inside a fourth-order lens. It also has a compressed-air-operated siren. (1) (2)

RHODE ISLAND

PRUDENCE ISLAND LIGHTHOUSE

In 1862 a white octagonal tower for a lighthouse was built on Sandy Point on the east side of Prudence Island, R. I. With the tower was built a keeper’s dwelling.

During the terrible September hurricane of 1938, five persons, including the wife of the lighthouse keeper, were carried out to sea and drowned, when the dwelling house on the lighthouse reservation was swept away by the savage fury of the tropical gale. The keeper was also thrown into the sea, but another wave swept him back ashore. The light itself is only 28 feet above water and is visible for 10 miles, flashing green every 6 seconds. The light is now unwatched, being a 1,400-candlepower fourth-order electric. A bell renders one stroke every 15 seconds during fog. (5)

SOUTH CAROLINA

CHARLESTON LIGHTHOUSE. MORRIS ISLAND

The Charleston Light, located on Morris Island, at the entrance to the harbor of Charleston, S. C., was one of the colonial lights turned over to the Federal Government under the terms of the act of August 7, 1789. The light was in a brick tower, built by the Colony of South Carolina in 1767. On May 7, 1800, Congress appropriated *$5,000* for repairing the lighthouse.

In 1838 the light was described as a revolving light, the tower being 102 feet from the base to the lantern. A new first-order lens was installed in the tower on January 1, 1858.

On December 20, 1860, on receiving reports from the lighthouse inspector at Charleston regarding the probable seizure of the lighthouse property by the Confederacy, the Secretary of the Lighthouse Board wrote the Secretary of the Treasury that he would not recommend "that the coast of South Carolina be lighted by the Federal Government against her will." Ten days later the inspector at Charleston informed the Board that "the Governor of the State of South Carolina has requested me to leave the State. I am informed that forcible possession has been taken of the lights, buoys, etc., of this harbor, and that similar measures will be adopted in regard to all lights in the State." Early in January 1861, the Rattlesnake Shoal Lightship was towed into Charleston and the lighthouse tenders were seized. By the latter part of April 1861, practically all lights were extinguished, lightships removed, and other aids removed or destroyed from the

Chesapeake to the Rio Grande, with the exception of some of the lights on the Florida coast and reefs.

In 1862 the Lighthouse Board reported "Charleston, lens and lantern destroyed." In all, 164 lights were forcibly discontinued during the Civil War on the southern coasts. These were relighted from time to time, and by 1866, the greater part had been restored. The Charleston Channel was re-marked promptly on the occupation of the city by Union troops in February 1865.

In 1865 the Lighthouse Board reported "that an almost total change had taken place, leaving no channel in the harbor as it was in 1860, and opening new ones. Under this altered state of things it became necessary to establish lights temporarily at such places as would be useful guides through existing channels and omit all other.

On March 3, 1873, Congress made the first of three appropriations for a new lighthouse on Morris Island. $60,000 was granted on that date for "commencing the rebuilding of a first-order seacoast light on Morris Island destroyed during the war." Two other appropriations totaling $90,000 in 1874 and 1875 were for completing the work. The new structure was to be at or near the same spot as the old tower, 150 feet high and built of brick, with a first-order flashing light. Foundation piles were driven and the space between them filled with concrete 8 feet thick. The new tower, when completed in 1876, was 161 feet in height and the cost was $149,993.50. A first-order Fresnel lens was installed. In 1884 the illuminating apparatus was changed for the use of mineral oil instead of lard oil.

The cyclone of August *25,* 1885, destroyed the rear beacon of the Morris Island range, overturned part of the brick wall which enclosed the tower and dwelling of the main light, carried away the bridge between the beacons, and destroyed a large part of the plank walks connecting the several lights and dwellings, and overturned the boathouse. The range was reestablished 3 days later by a temporary beacon. A new wooden skeleton structure 40 feet high was built in 1885.

The earthquake of August 1886 threw the lens of the main light out of position and cracked the tower extensively in two places, but not so as to endanger its stability. The lens was replaced and the cracks repaired without delay.

Erosion of land caused the Coast Guard to begin construction of a new lighthouse in 1960. The new light was commissioned on June 15, 1962. The tower stands 163 feet high on the north side of Charleston Harbor entrance on Sullivans Island. (1) (2) (7)

TEXAS

POINT ISABEL LIGHTHOUSE

When Fort Polk was abandoned, after the Mexican War, the site was transferred to the Treasury Department and on September 28, 1850, Congress appropriated $15,000 "for a lighthouse and beacon light at Brazos, Santiago." The tower was completed in 1852 and was lit by four lamps, 57 feet above the ground and 82 feet above sea level. By 1854 the light had 15 lamps and 21 reflectors and was visible 16 miles. A third-order lens was installed in 1857, and the fixed light was varied by flashes.

At the conclusion of the Civil War, when the southern portion of Texas was occupied by Union forces, the light station was overhauled, refitted, and relit February 22, 1866.

In 1879 the Lighthouse Board reported the tower in a dilapidated condition. During a rain it was impossible to keep the lens and lamps dry as the lanternleaked "in every direction." By 1881 a new iron lantern had been erected on the tower and the following year mineral oil lamps were fitted.

In 1887 a question as to the title of the United States to the land occupied by the light station was raised, and, upon investigation, it was found that the United States had no title to the land. It had been occupied by General Taylor as a camp and depot at the outbreak of the Mexican War. As no title to the land could be established, the light was discontinued on May *15,* 1888, and the station abandoned.

Evidence was soon presented to the Lighthouse Board that a light was needed at Point Isabel and that it would be necessary to purchase land for a site at an estimated cost of $8,000. "Upon the discontinuance of the present light" the report continues "the possession of the light structures went to the owners of the land upon which they were built. These buildings are worth considerably more than the sum for which the owners offer to sell the present site, including improvements, to the United States." Congress accordingly, in 1889, appropriated $8,000 for reestablishing the light and the purchase of land on which it stood. The owner offered to sell the site on which the station was situated for $6,000 but the United States attorney reported adversely on the title and he was directed to commence proceedings in condemnation to acquire title. When the case was called for trial in 1891 the district engineer, under instructions from the Lighthouse Board, declined to turn over the requisite amount until the title had been approved by the Attorney General. The sale was finally consummated in 1894 for $5,000 and the Board reported "The purchase has at last been consummated. The title to the site is now in the Government. The light will be shown at an early day." The light was finally reexhibited on July *15,* 1895, but 10 years later, in 1905, discontinued for good. In 1927 the site was sold to the highest bidder for $2,760. (1) (2)

VIRGINIA

CAPE CHARLES LIGHTHOUSE

The original lighthouse on Smith Island, near Cape Charles, Va., at the entrance to Chesapeake Bay was completed in 1828, at a cost of $7,398.82. In 1856 Congress appropriated $35,000 for "rebuilding the Cape Charles Lighthouse upon a proper site and fitting it with proper illuminating apparatus. This sum was spent in 1858 and 1859 and on June 20, 1860, an additional $10,200 was appropriated for a keeper’s dwelling. Only about $1,890 of this was spent, however. Before the new tower was finished it was completely destroyed by "a party of guerrillas" in the Civil War then raging.

"In August last (1862)" the Lighthouse Board reported "the lighthouse at Cape Charles was visited by a party of guerrillas, who completely destroyed the light, carrying away such portable articles as they deemed valuable. The new tower authorized for that station had, at the outbreak of the rebellion progressed in construction to a height of 83 feet, the greater part of the materials to complete the tower to its proper height (150 feet) being on the ground, stored, ready for future use. During the rebel occupancy of this part of the peninsula, the articles which had been stored were subjected to indiscriminate pilfering and spoliation, so that a new provision will have to be made."

In 1864 Congress appropriated $20,000 for rebuilding the lighthouse and the tower was completed forthwith, the light being first exhibited on May 7, 1864. "Owing to the liability of this important light to an attack from the enemy the Board reported on June 30, 1864, "a competent military guard for its protection has been asked for."

The encroachment of the sea upon the shore at this station had been in progress for many years by 1883 and about 300 feet had been washed away since 1857. By that time (1883) the waterline was within 300 feet of the tower and still nearer the keeper's dwelling. The average annual encroachment was then about 30 feet. As a result, Congress in 1885 appropriated $10,000 to be used for "jetties of stone resting upon heavy timber mattresses to prevent too rapid sinking into the sand."

However, further congressional action was believed necessary in that year to authorize the purchase of additional land needed for the three large jetties and $30,000 was asked for this purpose. By 1886 about 120 feet of brush mattresses of this shore protection were completed and partially loaded with stone and about 80 feet of one jetty was finished extending from the shore to about low water mark. The jetty had already gathered much sand but had washed away somewhat at the sea extremity. In 1889, as steps were being taken to extend the protection, a heavy northeasterly gale washed away about 75 feet of the jetty and undermined the south end of the protection wall, and, at one time, the station was entirely surrounded by water. The retreat of the shore was not local but was general along the island. Any protection works, therefore, would have to extend a long distance to the northeast and be very expensive. It was, therefore, thought to be more economical to build a new light station where it would not be exposed to any danger. This would cost about $150,000.

Measures were meanwhile taken to construct four jetties at right angles to the shore protection and a protection wall in front of the one still standing. These were begun in February 1890. An appropriation of $150,000 for a new tower was made on August 30, 1890. The new jetties were finished in April 1891.

The contract for a new iron tower on a new site was signed in June 1893 and the structure was completed December 21, 1894. A first-order lens was installed and the light first exhibited August *15,* 1895.

The tower is an octagonal, pyramidal skeleton structure, 191 feet above land and 180 feet above water. The 1,200,000 candlepower first-order electric apparatus is unwatched and is visible 20 miles. (1) (2)

VIRGINIA

CAPE HENRY LIGHTHOUSE

Provision for building a lighthouse at Cape Henry, at the entrance to Chesapeake Bay, was included in the first appropriation made for lighthouses by Congress on March 26, 1790. The amount was for $24,076.66. The project had already been undertaken by the State of Virginia and Governor Randolph had written President Washington on December 18, 1789:

"The State, some years ago, placed upon the shore of Cape Henry nearly a sufficient quantity of materials to complete such a lighthouse as was at that time thought convenient, which have been, in the course of time, covered with sand. Measures are being taken to extricate them from this situation."

The Governor offered to sell these materials to the Federal Government and to cede the necessary land for the lighthouse to the United States.

The tower which was constructed under contract for $15,200, was an octagonal sandstone tower, the materials for which had undoubtedly been brought from abroad as ballast. The light, which was first shown in 1792, first consisted of oil lamps burning in turn fish oil, sperm oil, colza oil, lard oil, and finally kerosene after the discovery of petroleum in Pennsylvania in 1859.

In 1857 the lighthouse was provided with a dioptric Fresnel lens. Great difficulty, however, was experienced in distinguishing between lights along the coast in the 1840's because of the numerous fixed white lights, such as Cape Henry's. It was not until 1922 that the Cape Henry light's characteristic was changed to a distinctive group flashing light.

During the Civil War the lantern of Cape Henry lighthouse was destroyed, but it was back in operation by 1863 being protected by a military guard detailed from Fortress Monroe. All the light vessels from Cape Henry southward had either been removed, sunk or destroyed by the Southern forces.

In 1872 the Lighthouse Board recommended the building of a new tower, stating that the old tower was in an unsafe condition and that there was no way of repairing it satisfactorily. "It is in danger of being thrown down by some heavy gale." It was not until 1875 that Congress appropriated $75,000 "for rebuilding and remodeling the lighthouse at Cape Henry."

In 1879 a contract for a new iron lighthouse, consisting of cast-iron plates backed by masonry walls, was entered into and after two more appropriations of $25,000 each in 1880 and 1881, the new tower was completed and the light first shown on December 15, 1881.

The old tower remained standing and became one of the antiquities of the State of Virginia, serving as a monument commemorating the landing of John Smith.

The new structure was 170 feet in height and the lantern was equipped with a first-order lens, the lamp having five concentric wicks. A steam siren fog signal was also established. An incandescent oil-vapor lamp, burning kerosene vapor, replaced the wick lamp in 1912. This increased the intrinsic brilliancy, but decreased the area lit. The candlepower, however, was increased from 6,000 to 22,000. The candlepower has now been increased to 80,000 for the white light, with 16,000-candlepower red sector covering the shoals outside the cape and the middle ground inside the bay. The light is 164 feet above water and visible 19 miles. This station is also equipped with a diaphone fog signal and a radiobeacon. (1)(2)

WASHINGTON

CAPE FLATTERY LIGHTHOUSE

Off shore, on Tatoosh Island.

Cape Flattery Lighthouse was built in 1857, but only after great difficulties with the Indians. Before commencing the lighthouse, it was necessary to build a blockhouse, and 20 muskets with ammunition were furnished for protection against Indians from the Canadian side of the Strait. Shortly after the light was completed the keeper resigned because he was annoyed by the numerous Indians who used the island as a fishing and whaling station. Cape Flattery Lighthouse is now electrified, and is fitted with a diaphone fog signal and a radiobeacon.

The light can be seen for 19 miles and is 165 feet above water. (1) (2)

SOURCES

1) INSPECTION REPORTS BY ARMY, NAVY, REVENUE CUTTER OFFICERS AND SPECIAL AGENTS OF THE TREASURY DEPARTMENT-The National Archives, WASHINGTON, D. C.

2) ANNUAL REPORTS OF THE LIGHTHOUSE BOARD, 1852-1910.

3) LIGHTHOUSES AND LIGHTSHIPS OF THE UNITED STATES (1917 and 1933). By George R. Putnam-Houghton-Mifflin Co. (by permission).

4) SENTINEL OF THE COASTS (1937). By George R. Putnam-W. W. Norton Co., Inc., New York (by permission).

5) FAMOUS NEW ENGLAND LIGHTHOUSES (1945). By Edward Rowe Snow-The Yankee Publishing Co., 72 Broad Street, Boston, Mass. (by permission).

6) LIGHTHOUSES OF THE MAINE COAST *(1935).* By R. T. Sterling-Stephen Daye Press, Brattleboro, Vt. (by permission).

7) THE LIGHTHOUSE SERVICE-ITS HISTORY, ACTIVITIES, AND ORGANIZATION (1926). By George Weiss-The Johns Hopkins Press, Baltimore, Md.

8) CAPE FLORIDA LIGHTHOUSE. A paper presented to a joint meeting of the South Florida Historical Association and the Florida Historical Society at Miami in April 1949 by Lt. Comdr. Charles M. Brookfield, USCGR.