

REMARKABLE LIGHTHOUSES THE WORLD OVER

MOST of us have at some time felt a certain brief sentimental interest in the lighthouse, that last lonely outpost of civilization that bids us farewell on leaving or welcomes us on the return to the home land, and some among us have seen the twilight fall upon sea and land, and watched the long fingers of light creep out across the waters; but how many have stopped to think that during every minute of the twenty-four hours, somewhere in the world these warning lights are always shining. That when the sun has gone down in a blaze of glory far to the westward of the Golden Gate, and the sentinel light on the Farallones is guiding the approach to San Francisco, that on the other side of the world the lights are going out along the Persian Gulf; that when Singapore is awakening to another monotonously perfect day, the lights upon the Carolina coast are beginning their vigil through another stormy night; that when the myriads of beacons are beginning to twinkle out their friendly signals on every point and headland along the Mississippi, dawn is stealing in over the Indian Ocean, and Trincomalee has ceased to burn. But this care for the safeguarding of ships is comparatively recent, for in 1789 there were in all Europe only 28 lighthouses. France alone now supports over seven hundred. In 1715 Boston possessed the only lighthouse in the American colonies. At the present time the United States Government maintains 1495 lighthouses and beacons, 61 lightships, 147 gas-lighted buoys, 456 fog signals, 1875 post lights, 162 whistling buoys, 14 bell buoys and between 5000 and 6000 buoys of other descriptions. Today in the protection offered mariners visiting her coast, the United States leads the world.

Eddystone.

Probably the most widely known lighthouse of modern times is the Eddystone. The present structure is the fourth to be built on its rock foundation. The first was destroyed in a storm in 1703, its builder, Henry Winstanley, and the keepers going down with it. The second tower was burned in 1755; and the third, built by Smeaton, stood until 1881, when the gradual action of the water upon the rock rendered the tower unsafe and the present structure was erected upon another of the Eddystone rocks nearby. This famous tower guards the entrance to Plymouth, England, being 14 miles from that port and 10 from the nearest land, Ram's Head. The first structure was erected through the ingenuity and generosity of Henry Winstanley, who not only built a splendid tower, but ornamented it in numberless odd and beautiful ways. The faith of the builder in the strength of the tower is shown by his presence there, one winter night toward the close of the year 1703, when the lighthouse fell and all in it perished. Following the destruction of the light came the wreck of the Winchelsea, a great man-of-war, homeward bound from the Americas. Several hundred seamen were drowned. The second lighthouse was erected by John Rudder at the expense of the British government, and withstood the winter gales for over thirty years, to be destroyed in the end by fire. John Smeaton, a mechanical engineer, built the great Eddystone lighthouse, the fame of which was known the world over, and which served as a model for all lighthouses built since that time upon a rock foundation. It was Smeaton who first dovetailed the rocks of a structure into each other. Upon one of these was engraved, "Except the Lord build the house, their labor is vain that build it. Psalm cxxvii." The light was completed in the summer of 1759 and for over a century guarded the lives and property of those who passed up and down the English Channel. No flaw was ever discovered in the tower itself, but the work of the waves at length undermined its foundation, so another site was selected close by, and on this was erected a tower which has been in use since 1881.

Most Famous Light in France.

The most wonderfully constructed lighthouse in France is that of Armen, whose foundation is one of three wicked looking rocks on the coast of Seine. Surrounding these rocks is a veritable maelstrom of conflicting currents. An incalculable number of vessels have been lost here, and the bed of the sea around them is a vast cemetery. The idea of placing a torch upon this group of rocks was agitated for years before engineers could be brought to see even a possibility of such an undertaking. After lying in wait for weeks for the most favorable weather, two men were at length landed from a fishing lugger. Provided with life preservers, they lay flat upon the rocks, grasping the anchor with one hand and a peculiarly contrived punch and hammer in the other, which they worked with feverish activity between the waves that broke over them at regular intervals. When the suction of a back wave drew them off, as was sometimes the case, they were protected by the life preservers. At the end of the season the rocks had been approached seven times, eight hours' work had been done and 13 holes had been drilled. The following year 18 hours' work, in which cramp irons were fastened to the rock, was a long step toward its final completion. The construction of the tower went on at intervals during nine years, and the lantern was first lighted in 1881. The light is visible 20 miles, and is the last one seen on leaving Europe. The total cost was \$182,700, or \$158 per cubic yard of masonry.

Minot's Ledge.

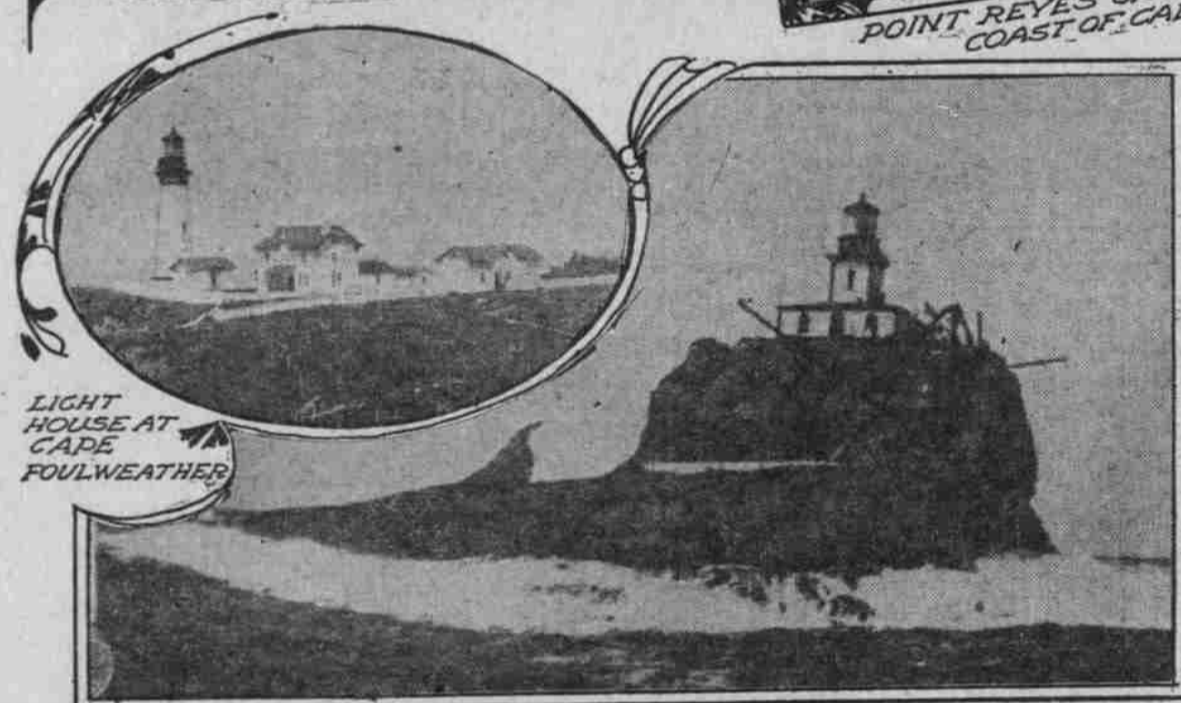
The most famous lighthouse in America, Minot's Ledge light, in the lower end of Massachusetts Bay, has been twice destroyed by storms, with all lives lost. The present tower was completed in 1859 by Captain Alexander and five years' work under enormous difficulties. The site was a slimy, black ledge of rock about 17 miles south of Boston. At high tide these jagged rock teeth were completely hidden by the water. In the early days, when Boston was the headquarters of the great East India trade, over 25 ships, tea clippers and European merchantmen, were lost on Minot's Ledge, the greater number with all on board. A powerful iron structure was built in 1849 on this ledge, but in one April night two years later this beacon was wrenched from its foundation carrying with it to destruction the keepers. The present structure is of granite 88 feet high, the first 40 feet being solid rock. The results of the first two years' hard work, a temporary platform above the water, was destroyed in a night by a vessel, swept for upon the rock in a storm. But in the face of these discouragements the work went on and



BONITA POINT WITH HIGHEST NATURAL FOUNDATION IN THE WORLD.



MINOT LEDGE LIGHT



LIGHT HOUSE AT CAPE FOULWEATHER

TILLAMOOK LIGHTHOUSE

three years later was completed at a cost of \$300,000. Being now equipped as a wireless telegraph station, it is no longer cut off entirely from the world, as was formerly the case for months at a time.

Tillamook Rock.

The most famous lighthouse on the Pacific Coast is that of Tillamook Light, 20 miles south of the entrance to the Columbia River, built by Colonel George L. Gillespie. The rock on which it stands rises abruptly 92 feet above the sea, and yet in the winter gales the spray falls upon the crest of the rock. Even in summer the sea rages around its base. Several attempts were made before a landing could be accomplished. One of the earliest of these was made by an English engineer named Tremwain, who was drenched in jumping from his boat to the rock. Workmen were finally landed upon this huge boulder by means of breeches buoys, which traveled on a hawser between the island and the mast of a ship lying off at a safe distance. The hazards of this trip were so great that some time elapsed before a large enough crew could be secured to begin the work, and these men were exposed to great privations and suffering during the first winter, when most of their food and equipment were washed away in a terrific gale in February, and months followed before relief could be sent from the mainland. Though the focal plane of the lantern was erected at 135 feet above the sea level, yet 11 panes of glass three feet long and half an inch thick were crushed by rock fragments torn from the ledge and hurled through the lantern by the force of the water, which also put out the light. Following this catastrophe six feet of masonry was added to the height of the tower, surmounted by a heavy concrete roof.

Spectacle Reef.

Spectacle Reef, in Lake Huron, is another example of marvelous engineering skill, which, in spite of the gravest fears and predictions for its safety, has been (during the months while the lake is open) in use since 1872. Not only does this structure have to withstand the terrific force of the lake gales, but also the tremendous pressure of the ice pack. All this had been foreseen and guarded against by the designer and builder, General O. M. Poe, known to fame as chief engineer to General Sherman in the celebrated March to the Sea. The tower is built of masonry blocks dovetailed together, and surrounded by an outer stone embankment, which receives the first impact of the ice, much of which lodges between the two structures until it, in turn, becomes a protection

from other ice. At some seasons the ice piles up over 10 feet high, surrounding the tower. Situated ten miles from the nearest point of land, Spectacle Reef light safeguards in the short, but crowded season, the large and ever increasing fleet upon the lake.

St. George's Reef.

The boundary line between Oregon and California is marked by one of the most dangerous points along the Pacific coast, and about seven miles out to sea on the Seal Rocks is situated St. George's Reef light station. A number of wrecks have occurred here, the most notable of the Brother Jonathan, lost with 179 passengers and crew about 50 years ago. A square gray tower of solid masonry rises from one end of an oval pier built of huge stone blocks, dovetailed together and into the rock upon which it stands. The construction of this light tower, designed and built by Captain Payson, is considered a remarkable piece of engineering, and required eight years for its completion, as there were only a few months in each year when work could be done. Each stone was cut and fashioned for its ultimate position in the quarry at Humboldt Bay, and brought 60 miles up the coast by sea. Nearly 20,000 tons of stone went into this structure, the whole costing \$770,000, up to this time the most expensive beacon in the world.

Though vessels pass up and down each day, keeping well to the westward, St. George's Reef is the most desolate station in the Pacific, for landings at the reef are difficult at any season of the year and communication with Crescent City, the nearest port, 12 miles away, is sometimes cut off for months. The light is of the first order, visible 18 miles in alternate red and white flashes.

Diamond Shoals Light.

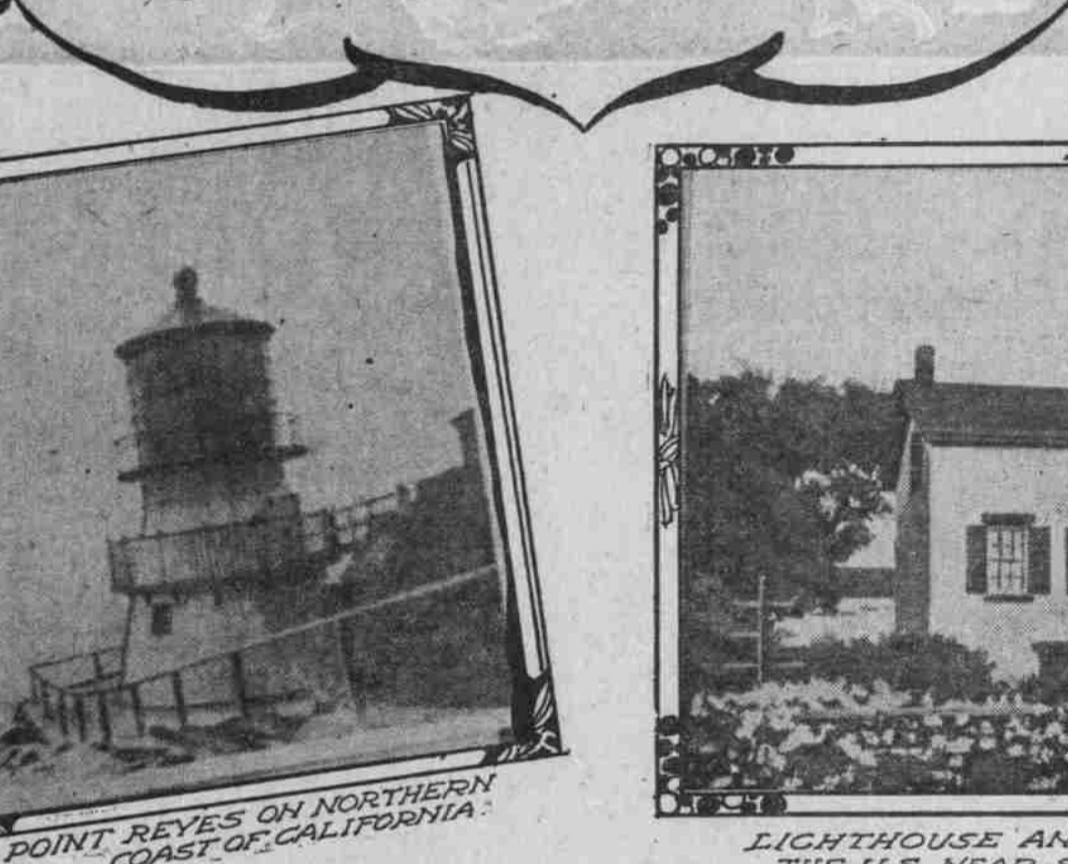
"If the Bermudas let you pass, then look out for Hatteras," is the time-honored jingle among sailors, and the very name of that point of storms, jetting out from North Carolina, is enough to conjure horrors with among the coastwise traders of the Atlantic. Although there are lifesaving stations every five miles along the sand banks, and a lightship is anchored over the shifting sands of the Diamond Shoales, yet that sea-serpent, the Cape, has exacted a toll on the average of one vessel every three months for the last 50 years, and millions of dollars worth of property, and uncounted lives have been lost.

Two unsuccessful attempts have been made to build a beacon on Diamond Shoals, the last disastrous venture being made in 1905, and that same year Captain Alfred Dells obtained permission from the Government to make a third attempt. After 12 years' arduous strug-

No Parallel to Tillamook Rock on the Oregon Coast, Near the Columbia's Mouth

New Light on Point Arena the First Reinforced Concrete Structure in America

Historic Lighthouses Whose Erection Involved the Highest Engineering Skill and Bravery



POINT REYES ON NORTHERN COAST OF CALIFORNIA



FOUNDATION READY FOR CONCRETE, RODS IN PLACE. POINT ARENA LIGHT STATION.



POINT ARENA - TOWER IN COURSE OF CONSTRUCTION, SHOWING STAGING.

gle for this permission Congress at length granted Captain Dells the right to build, equip and maintain for one year at his own expense, a lighthouse upon the Diamond Shoales. Then for four years following the light will be maintained under the direction of the United States Lighthouse Board, and if at the end of these five years the beacon has proved satisfactory, Congress has agreed to pay Captain Dells \$750,000.

The foundation of this structure will be a huge steel caisson now building in a shipyard in Pennsylvania. Some time during the early summer when at length the most favorable weather has arrived, the caisson, a huge steel tank, filled with hydraulic machinery, will be towed out to the Diamond Shoales, scuttled and sunk upon a sand bar. Sand and water will be pumped out by means of the machinery until the caisson is deeply imbedded, when the lower section will be filled with cement and the solid foundation will then be ready to build the tower upon. The completed caisson will weigh 20,000 tons, and will support a 150-foot tower, equipped with a first-class light, wireless and submarine telephone apparatus. The progress of this most hazardous undertaking is awaited with the keenest interest on the part of the engineering profession all over the world.

Point Arena.

About 12 hours' sail north from San Francisco, Point Arena thrusts its ugly head a long way out to sea, directly in the path of vessels bound to and from the Columbia River and Puget Sound. Fogs are frequent, and heavy currents sweep by always, making this point one of the most dangerous between San Diego and British Columbia.

At Point Arena the axis of the earthquake of 1906 passed from the land into the sea, utterly destroying the lighthouse and shattering the great lens, worth thousands of dollars. In its place the Government has lately completed a new tower of reinforced concrete, the first to be built in America, although Uncle Sam had erected one previous to this in the Philippines. The Point Arena tower stands 70 feet high at focal plane on a promontory 25 feet above mean tide. The internal diameter of the tower at the base is 19 feet 10 inches, and tapers to a diameter of 9 feet 4 inches at the lantern. The walls are 18 inches thick, pierced by three windows. The lantern is of the first order with a lens nine feet high which was made in France at a cost of \$16,000 and is now on its way to this country.

The old light was fixed; the new one is to be a revolving double white flash every six seconds.

William Black Memorial.

On Duart Point, near Oban, in the Western Highlands of Scotland stands a tall stone tower built as a memorial to the late William Black, the novelist. Quite late the money raised for this purpose came from the United States.

where the author of "McClod of Dare" and "Far Lochaber," has long been held in great affection. Duart Point in the Sound of Mull is a bad place in winter gales. Two wrecks occurred there only the year previous to the building of the beacon. The tower was designed by the famous English engineer, William Leiper, and its first cost without equipment was \$5000. Since its completion in 1903 the lighthouse has been visited by hundreds of tourists, including many Americans, who make yearly pilgrimages to the Hebrides and Oban, places already dear and familiar through Black's stories.

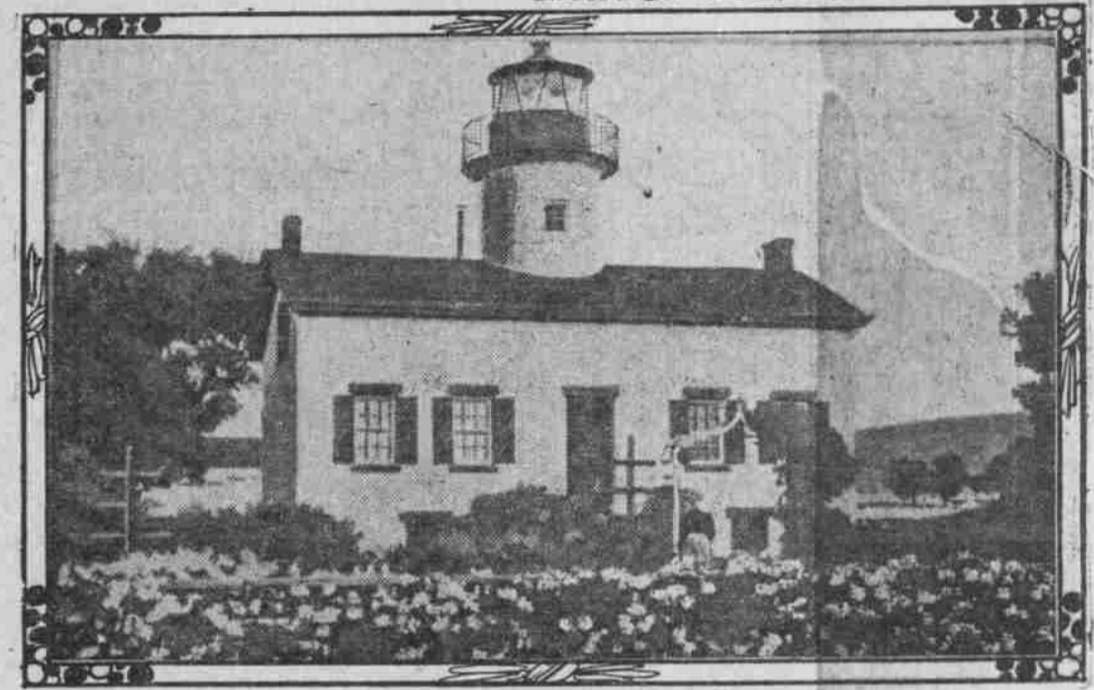
was built between 1807 and 1810 by Robert Stevenson, the grandfather of Robert Louis Stevenson.

Few women hold the position of lighthouse keepers for obvious reasons. But Mrs. Julia E. Williams, widow of the first keeper of the light at Santa Barbara, Cal., has chosen to carry on her husband's work. Mrs. Williams has been guardian of the light since 1884, and nightly for over 40 years this little woman has climbed the tower that rises from her low white cottage, and waiting until the last ray of the sun has disappeared into the blue Pacific, has watched the light flash from her tower across those waters now sodden gray in the twilight. The Santa Barbara light is of the first order, a fixed white light, visible 17 miles.

On a small island near the western end



BELL AT SOUTHAMPTON SHOALS LIGHT STATION, SAN FRANCISCO BAY



LIGHTHOUSE AND OLDEST WOMAN TENDER IN THE U.S. NEAR SANTA BARBARA



POINT ARENA LIGHTHOUSE COMPLETED. FIRST REINFORCED CONCRETE LIGHTHOUSE IN AMERICA!

of the Straits of Magellan, that great highway of imposing beauty and loneliness, is situated the Evangelista light. Winter and summer the mountains, rising sheer and rugged from either side of the Straits, are covered with snow. In some seasons there are rare bright days when these mountains are hurled down in blowing through the passes and the waters of the Straits boil and seethe in the conflict between tides and winds. Blinding snow squalls are hurled down from the mountains shutting out even the outlines of the land, and making a ship's position in the racing currents of the strait uncertain and hazardous in the extreme. And to the anxious officer on the bridge at night in weather like this to see at least between the equals the light gleaming out from Evangelista brings a feeling of almost passionate gratitude toward those guiding rays and the faithful service attending them.

Evangelista Island belongs to Chile, and the beacon is visited once or twice a year by the supply ship from that country, but there is a story current among the ships which pass in the straits that the light on Evangelista is kept by an American, the master of a clipper ship, who killed a man in a drunken quarrel in Santiago, and was sentenced to be shot. Now previous to this the government has found it very difficult to maintain the Evangelista light because of the great loneliness which drove several Chilean keepers mad. The American mate, Fox, was given his choice of execution or of keeping the Evangelista light for a period of 15 years. At the expiration of this time if the light had not been reported out he would be free. He was permitted to marry and take with him the little Chilean girl, the woman in the case. She had been betrothed to the dead man, but willingly followed her Gringo lover into exile on that desolate island. Many summers and winters have passed, but each night the light has shone bravely out, the sign that together, in faithful service, the man and woman are working out their ultimate salvation and happiness.