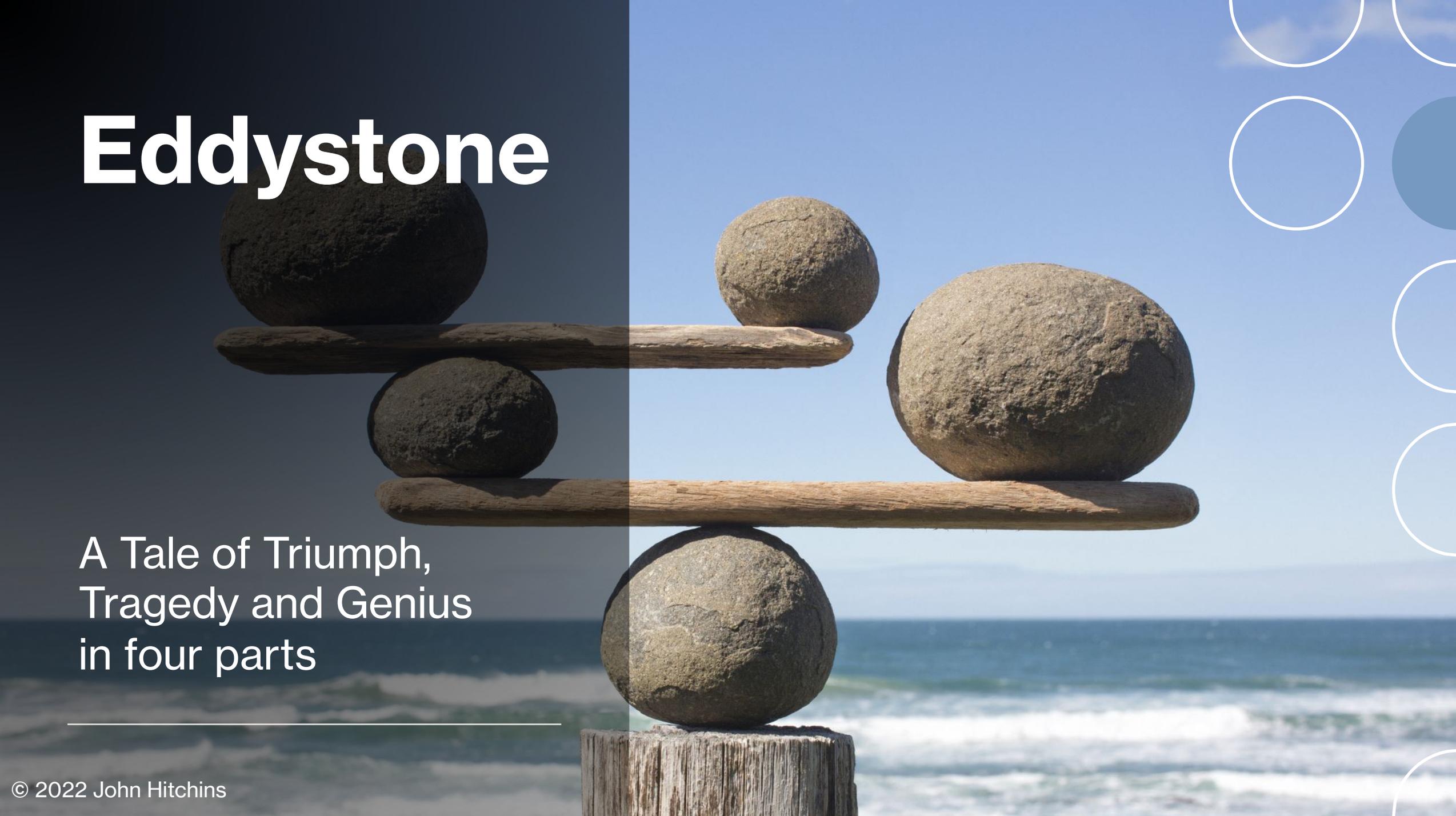


# Eddystone

A photograph of a stone balancing act on a wooden post by the sea. The structure consists of a vertical wooden post with a large, smooth, grey stone balanced on top. Two horizontal wooden beams are stacked on top of the stone. The top beam has a small, light-colored stone balanced on its right end. The middle beam has a dark, smooth stone balanced on its left end. The background shows a blue sky and a blue sea with white waves. On the right side of the image, there are several white circles of varying sizes, some overlapping a solid blue circle.

A Tale of Triumph,  
Tragedy and Genius  
in four parts

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# The Reefs

- When they stand at the entrance to a busy port hidden rocks are particularly dangerous.
- In good visibility and with accurate navigation, the three Eddystone reefs thirteen miles off Plymouth could be avoided.
- But at night dozens of ships and hundreds of men were lost as commercial and naval traffic grew in the 17<sup>th</sup> century.



# The Problem

*In the entrance to this bay lyes a large and most dangerous rock, which at high water is cover'd but at low tide lyes bare, where many a good ship has been lost, even in the view of safety, and many a ship's crew drown'd in the night, before help could be had for them.*

..

*Daniel Defoe*

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# An Impossible Task

- Building a lighthouse out at sea had never been done before
  - A proposal to build on the Eddystone had first been made by two Plymouth gentleman 1664 but nothing happened
  - Everything changed when two more ships were wrecked on the reef with the loss of all hands
  - The ships belonged to Henry Winstanley, an eccentric Essex businessman.
-



# The Saffron Walden Showman

A more unlikely builder of Britain's first offshore lighthouse it is difficult to imagine

His father was a Steward at Audley End House, the grand home of the Earl of Suffolk and at the age of 25 Henry Winstanley became Clerk of Works to the estate.

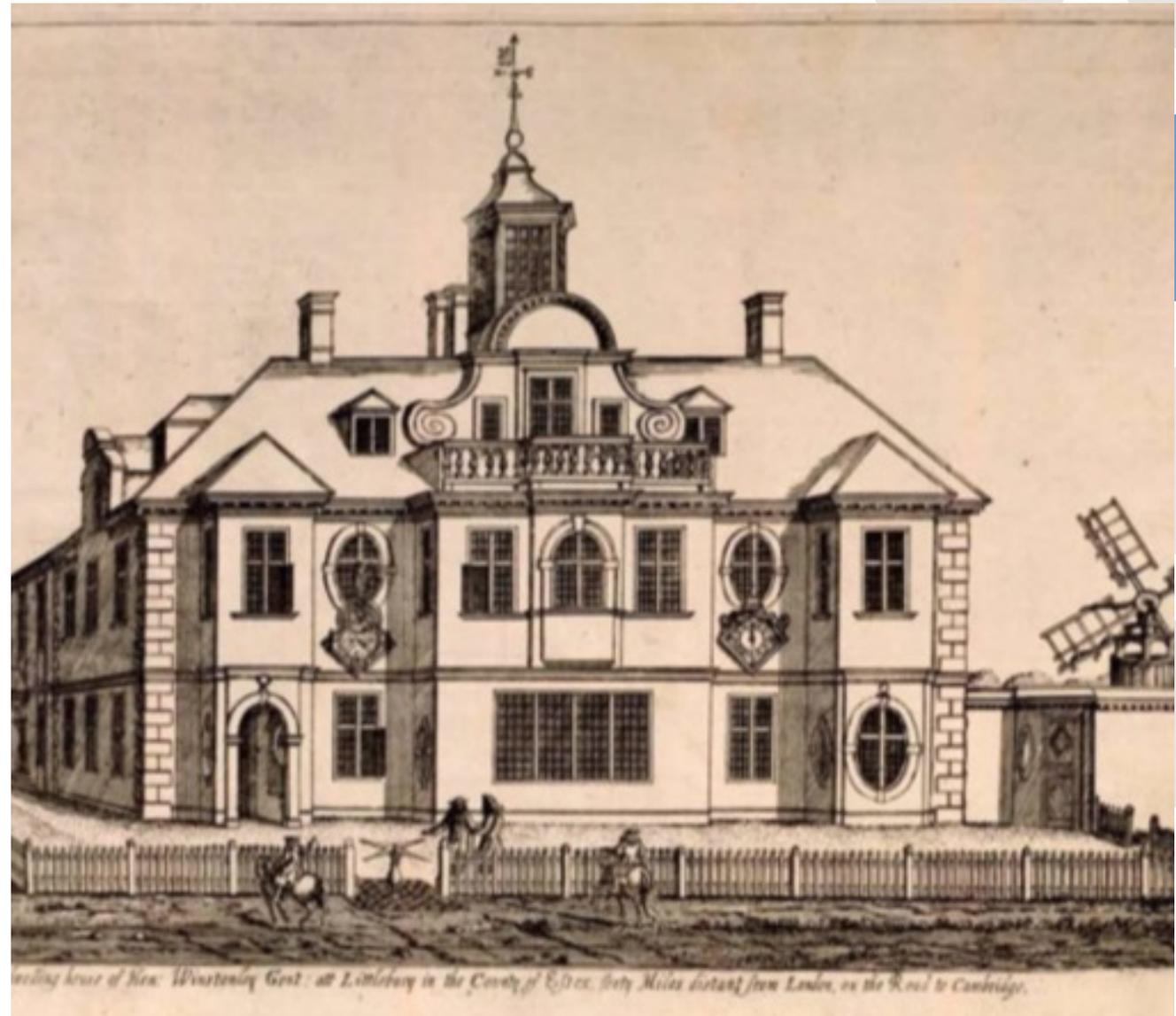
He was a fine draughtsman but he was also an inventor and an entrepreneur with a taste for entertaining people

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# Winstanley's Wonders

Winstanley built a house near Saffron Walden where visitors paid a shilling to enjoy jokes and tricks.

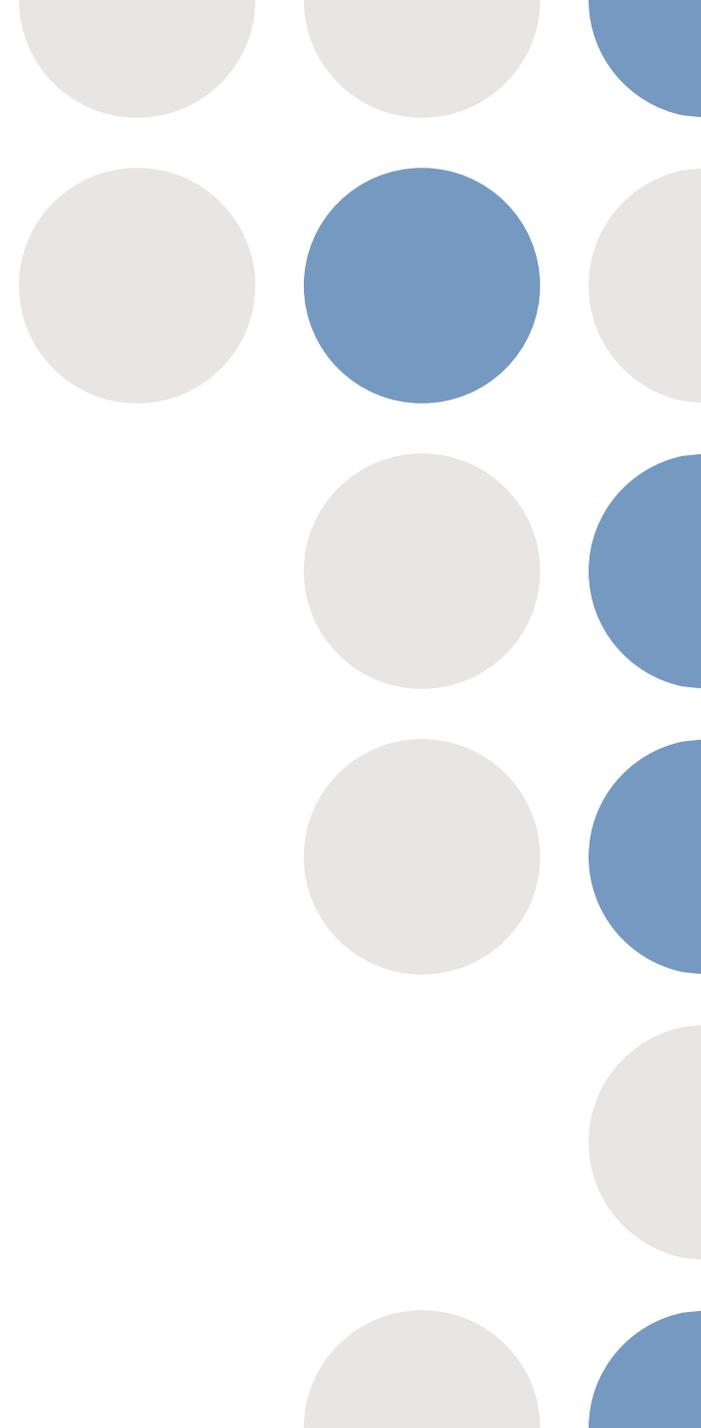
**One visitor described the experience:**



*Seating house of Ben: Winstanley Gent: at Littlebury in the County of Essex, fifty Miles distant from London, on the Road to Cambridge.*

# Winstanley's Waterworks

- His next project was a funfair of fountains and waterspouts at Hyde Park in London. It drew crowds for 30 years.
  - Proceeds from his commercial ventures may have helped meet the costs of his next waterworks - the Eddystone lighthouse.
  - But nothing could have prepared him for the difficulties he now faced at Plymouth.
- 



# Building at Sea

Winstanley paid £5,000 to join a syndicate of investors

Biggest problem was getting out to the Eddystone when the reef was exposed

Three hours' work and six hours to get there and back was common

In the first year they only managed to drill 12 holes and iron rods as anchors

**He set out the difficulties himself:**

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# Captured by French Pirates

- The following year (1697) a group of French pirates, hoping for ransom, kidnapped Winstanley and his workmen from the rock and took them back to France
- Louis XIV, the Sun King, was furious. He knew the danger that the Eddystone Rocks posed to French as well as English ships
- “I am at war with England but not with all mankind,” he said, and ordered the return of the captured men



# Winstanley's Whimsical Tower

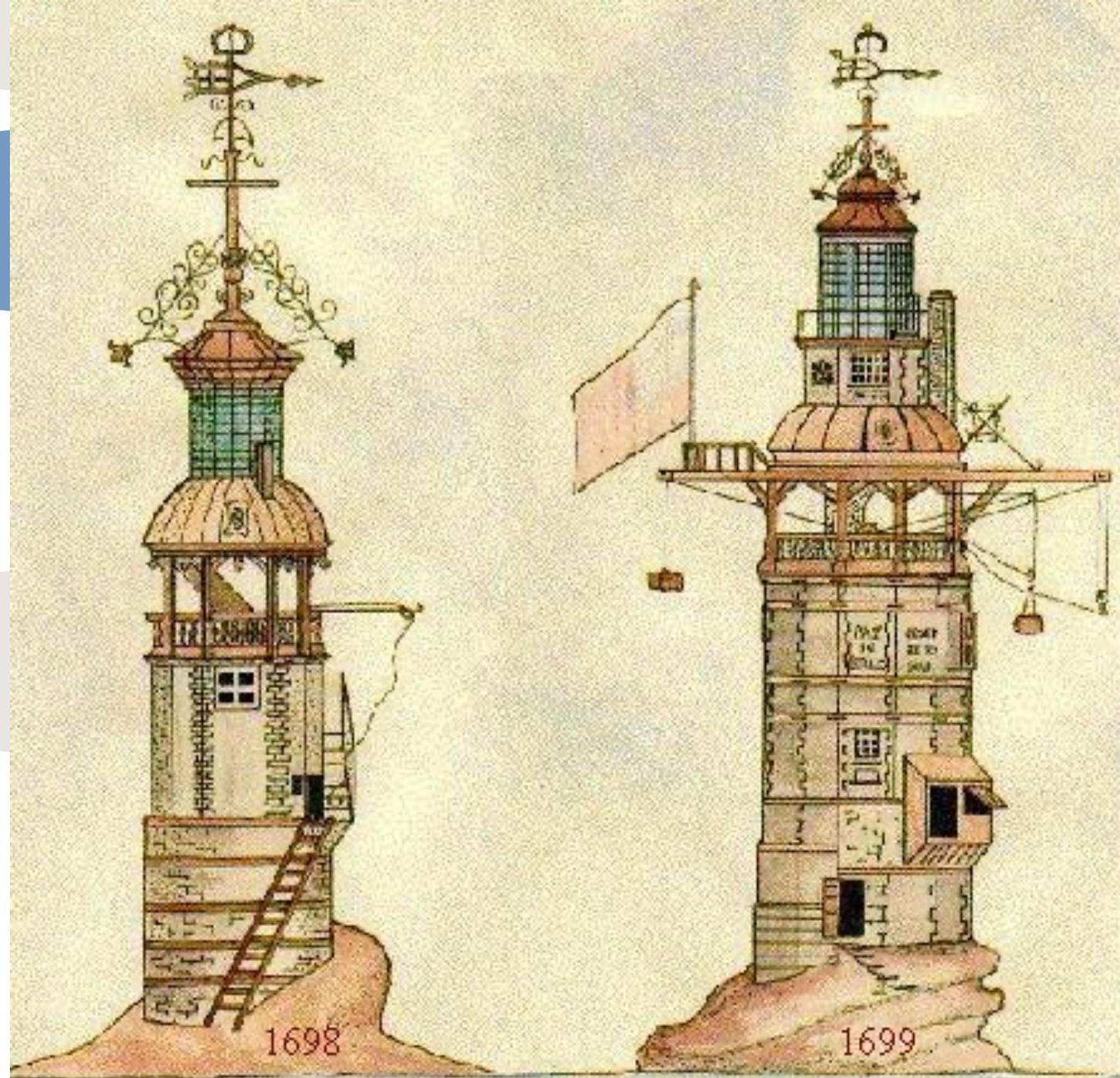
By the end of the next year a large octagonal tower had been raised

Sixty candles were lit for the first time on November 14<sup>th</sup>, 1698

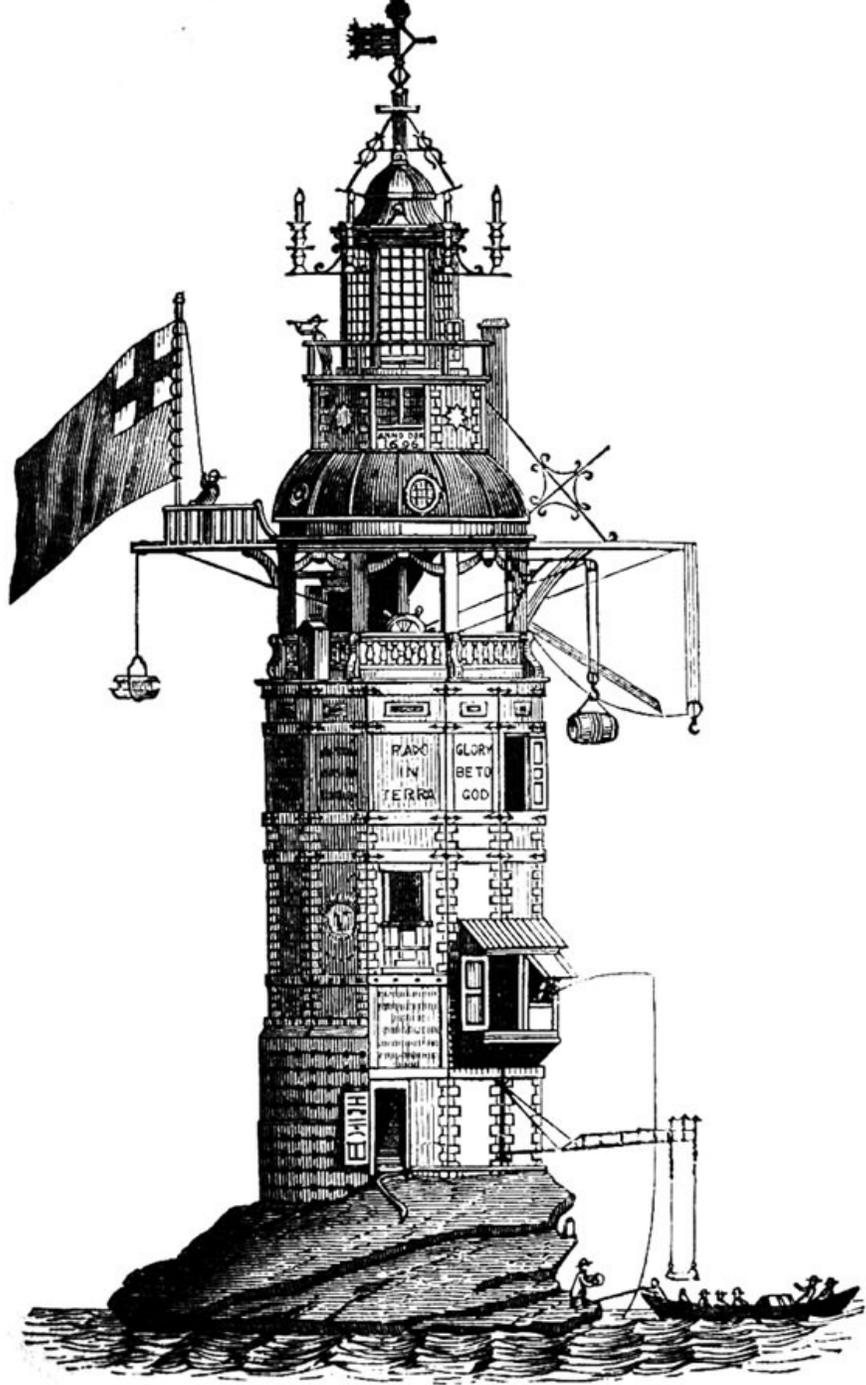
The following year Winstanley widened the base and raised the light by forty feet

He made it even more flamboyant with platforms, ornamental ironwork and Latin inscriptions

Inside, to use his own words, was a “very fine bedchamber with a chimney and closet, the room being richly gilded and the outside shutters very strongly barred”



# The Great Storm



Winstanley was so proud of his creation that he sold his own drawing of the lighthouse and included himself fishing from the upstairs window.

The whimsical structure survived four winters and its builder was confident enough to declare that he would like to be inside it during the fiercest storm nature could muster.

He soon had his wish fulfilled. In Plymouth in 1703 to carry out repairs he went out to the lighthouse after two weeks of terrible gales.

**They only got worse, as Daniel Defoe set out:**

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# After the Storm

A few days after Winstanley and his lighthouse had been destroyed a merchant ship called the Winchelsea, bringing tobacco from Virginia to Plymouth, sank on the Eddystone

Her skipper had been looking for a light that was no longer there, and the vital role of the light was demonstrated yet again

Cornishman John Rudyerd took charge of building another lighthouse. He was a silk merchant by profession, but he had the assistance of two shipwrights from Woolwich dockyard.

This time the new structure resembled what we know as a lighthouse. Conical, built of stone and oak, and slotted into the reef by 36 iron rods.

Just in case, the Navy deployed four warships to deter French incursions

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# The Wooden Lighthouse

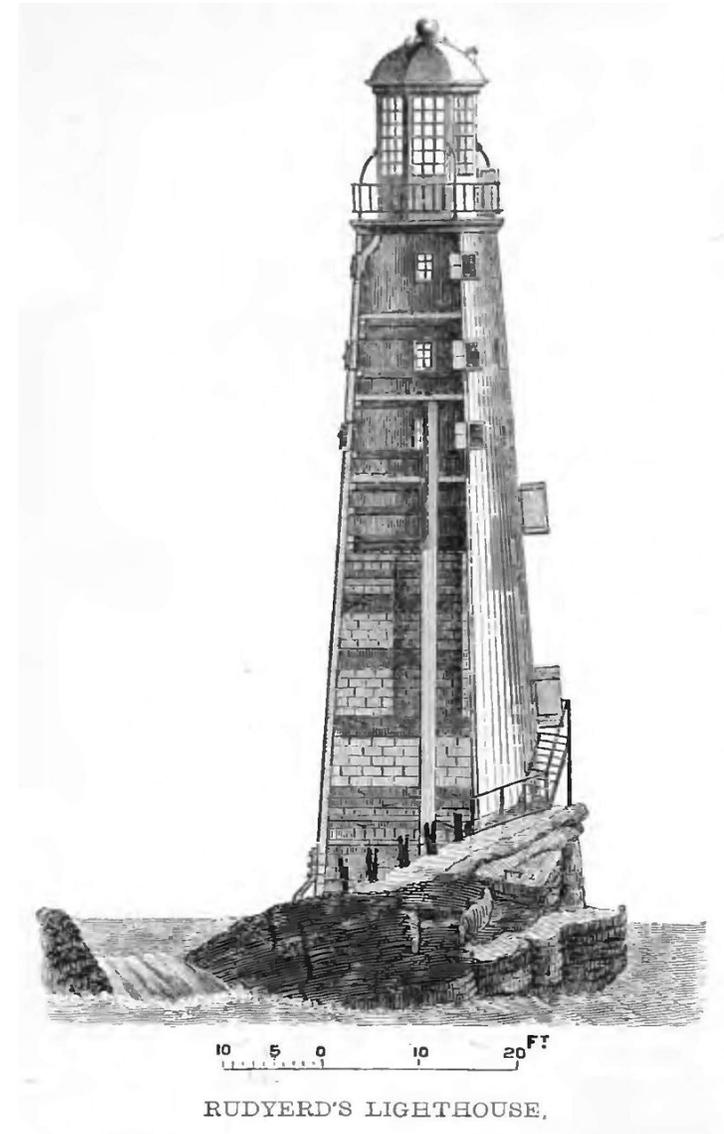
The whole structure was covered in wooden timbers, waterproofed like those of a ship, which enabled it to flex with the waves.

The lighthouse did its job for almost fifty years, despite the need to constantly replace the timbers damaged by woodworm.

What did for the Eddystone light this time was not storms but fire.

In December 1755 a blaze started in the wooden lantern room. It destroyed the top of the lighthouse and forced the keepers to escape to the reef.

The fire burnt for five days and the lighthouse was completely destroyed.



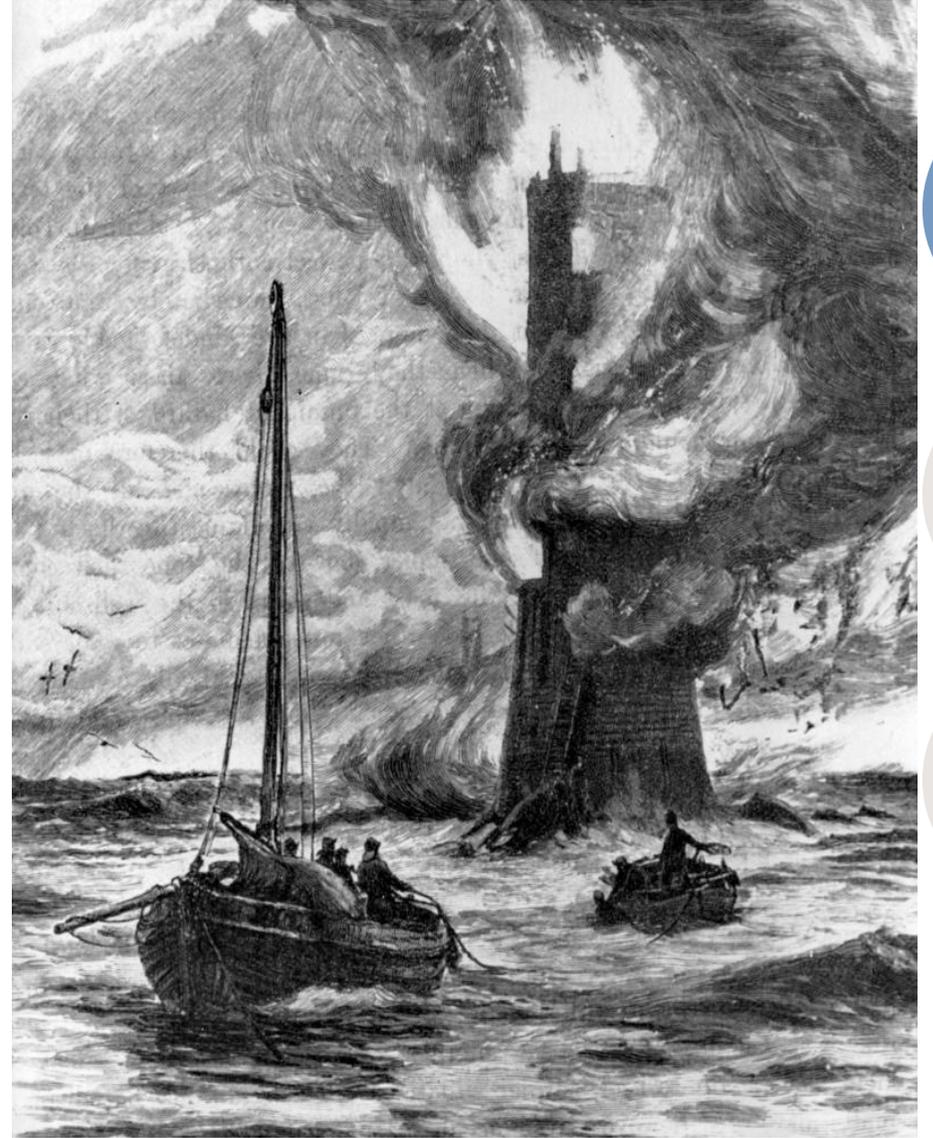
# The Keeper's Tragic Life

One of the keepers was Henry Hall, who was 94 and had been the first keeper of the Winstanley lighthouse 60 years earlier.

As the fire grew out of control the lead of which the cupola was made melted and some dripped into the old man's mouth as he was throwing water onto the flames.

Hall survived 12 days. An autopsy found a piece of solidified lead in his stomach weighing seven ounces.

**He had already been traumatised years earlier.**



# Britain's first Civil Engineer

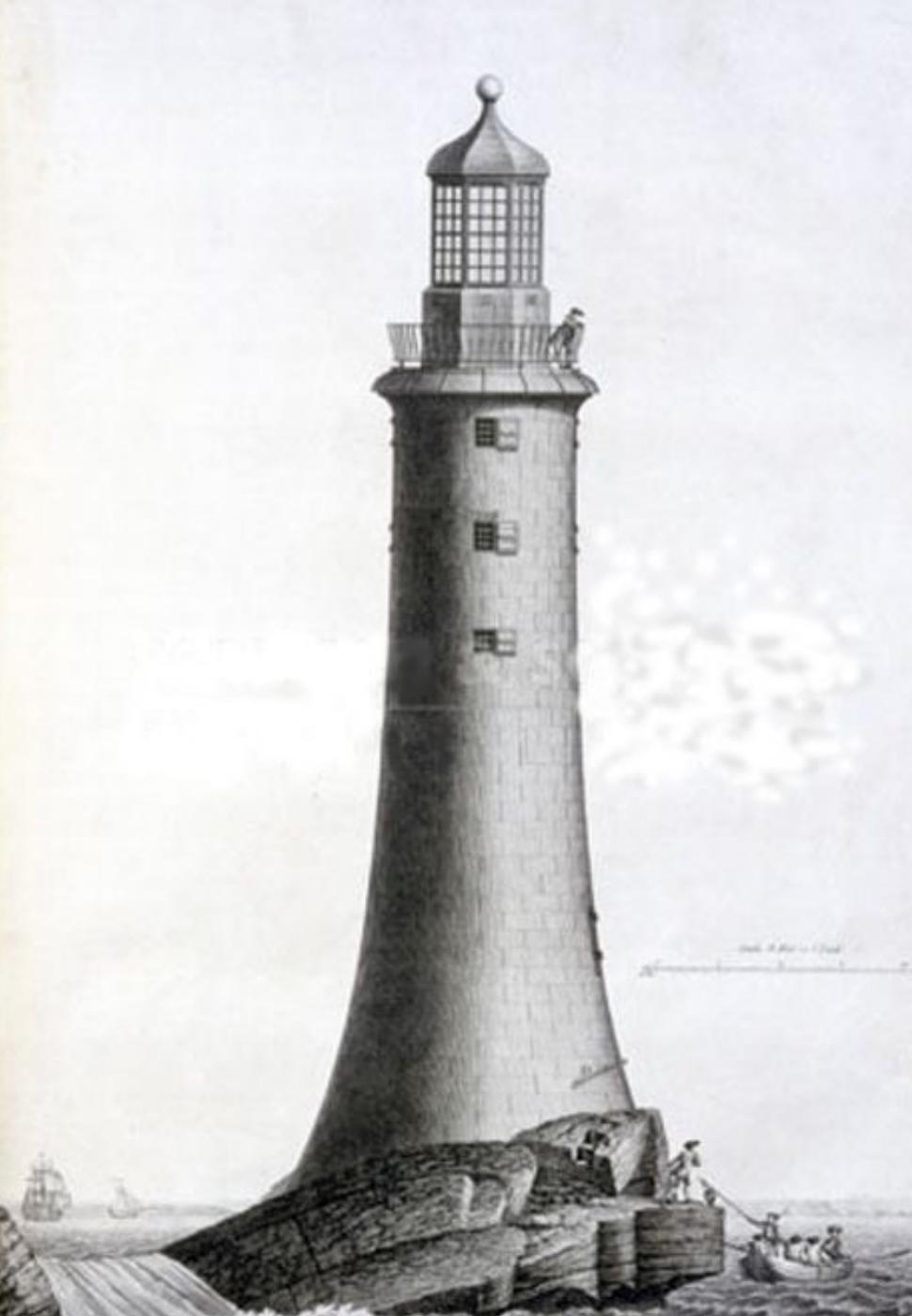
Yorkshireman John Smeaton had already designed canals, bridges and harbours and been elected a Fellow of the Royal Society for his investigations into wave and wind power.

The Eddystone now had a “professional” in charge after two gentlemen amateurs. He looked carefully at the strengths and weaknesses of the first two buildings.

Winstanley's elegant tower offered too many corners where the waves could take hold. Rudyerd's timber-clad light was too combustible.

Smeaton followed nature. He saw that a mature English oak, wide at the bottom and tapering above, withstood the worst storms. The oak tree became the template for the new lighthouse.





# Strong as Granite

Smeaton decided to build in one of the heaviest stones - granite. At Millbay in Plymouth he built a dedicated yard and a jetty. Granite from Bodmin Moor was chiselled into blocks weighing up to five tons.

To give added strength he decided the blocks must be interlocked, an idea he took from London kerbstones.

The masons who carved the shaped blocks were given Eddystone tokens by the Admiralty to signify the importance of their work to stop them being pressed into naval service.

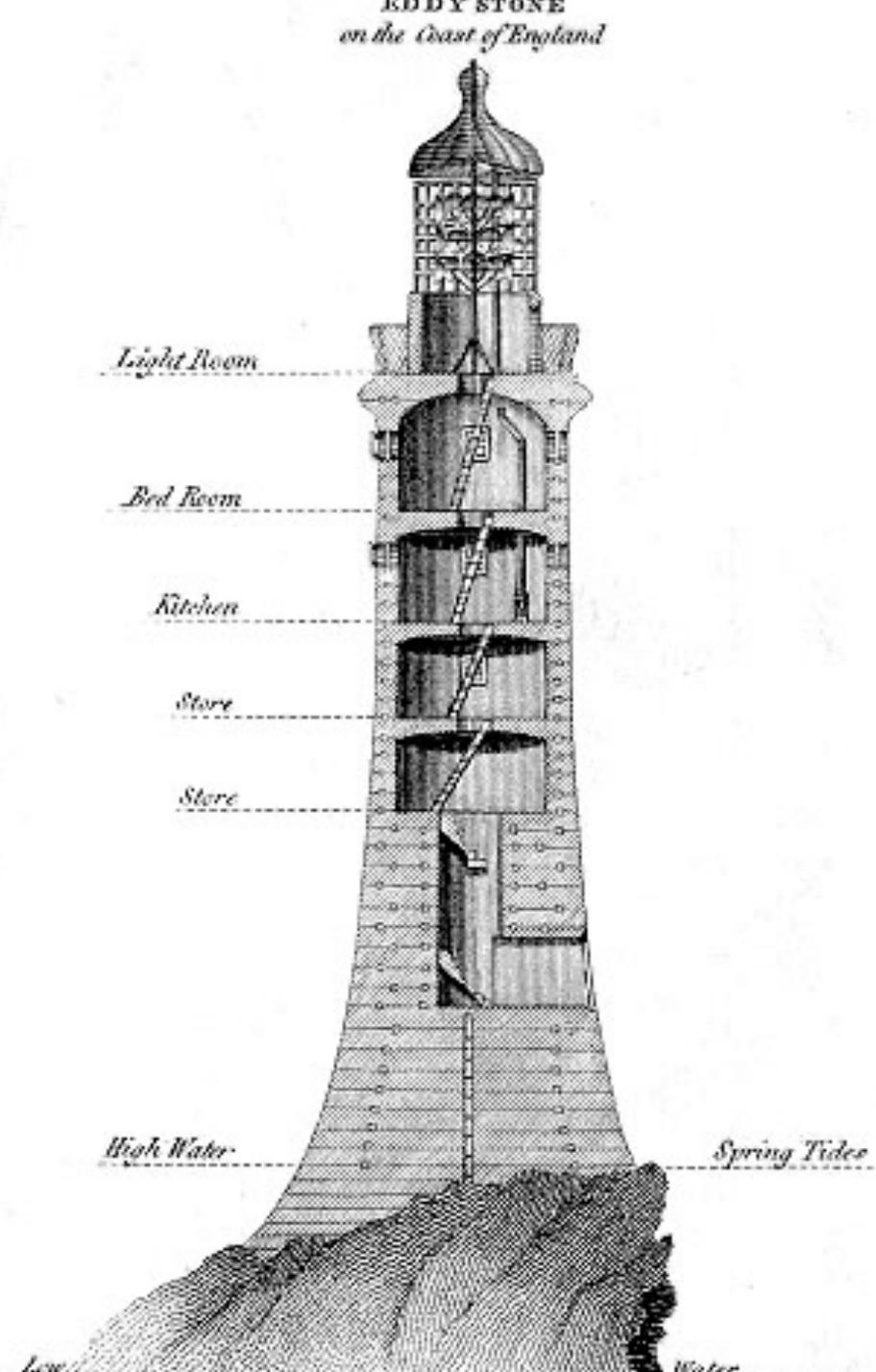
Cornish miners were employed to move the granite from quarry to masons yard to the Eddystone reef, a journey of fifty miles.

The operation had echoes of the construction of Stonehenge, using nothing but ropes, pulleys and hard labour.

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# The Prototype Lighthouse

- At the bottom granite blocks were fixed into specially shaped steps cut into the reef
- Above, the stone courses were joined with marble dowel pins and layers of mortar. Four simple rooms were joined by narrow stairs
- An elegant lantern with 24 candles was lit for the first time on October 16<sup>th</sup> 1759.
- It had taken three years to build and became the model for most rock lighthouses around the coast of Europe. It stood for 120 years.
- During the build Smeaton developed a form of quick-drying concrete known as 'hydraulic lime' which would set in sea water.



# From Sea to Land

A hundred years later the tower was painted with the now familiar broad red and white horizontal bands to make it more visible in daylight.

After 120 years it was cracks in the reef, not the lighthouse, which led to its replacement. Erosion to the rocks caused it to shake from side to side whenever large waves hit the building.

There was already a daymark on Plymouth Hoe and Plymouth Council petitioned for Smeaton's tower to be dismantled and put up in its place.

Trinity House agreed and the lantern and the upper four rooms of the old Smeaton's tower have been the city's most famous landmark ever since



# The First Automated Lighthouse

William Douglass was asked by Trinity House to build the current lighthouse which was completed in 1882.

One hundred years later it was the first Trinity House rock lighthouse to be converted to automatic operation. To enable the work to be carried out a helipad was built above the lantern.



The base of the old Smeatons tower remains on the reef – which makes it easier for ships to identify the hazard during the day.

