Leading lights

Lighthouses have provided hope in the darkness and a call to home since ancient times, and they're still as relevant today

For a sailor on a stormy sea, there can be few sights more comforting than the flare from a lighthouse sweeping the horizon. Despite modern satellite systems, mariners are taught to always use more than one form of navigation, meaning the lighthouses that dot coastlines around the world are as vital and potentially life-saving as ever. Most are now automated rather than manned, but while the technology has moved on, their significance remains unchanged.

'Lighthouses aren't just iconic,' says Lynda McGuigan, manager of the Museum of Scottish Lighthouses, in Fraserburgh, Scotland. 'They are a call to safety and a symbol of hope, strength, solitude, guidance and resilience through the darkest, roughest nights.'

History meets modernity

It's impossible to know when our seafaring ancestors hit upon the idea of a beacon to mark the shoreline, but doubtless it wasn't far behind the first fishing vessels. The earliest known lighthouse structure was the Pharos of Alexandria, built by the ancient Egyptians around 280BCE, but as Lynda explains, they weren't the only ones to have the thought. 'The Romans and the Vikings also created lights for their ships,' she explains. 'Sometimes it was as simple as building a fire on top of a hill. Later, fuels like whale oil and paraffin were used – that was before the invention of modern lenses. Throughout history, fishermen have known they were coming home when they saw the light.'

In Ireland, a fifth-century monk, Saint Dubhán, kept a beacon burning at Hook Head in County Wexford, to help prevent ships coming aground on the rocky coast, and the site is now home to Ireland's oldest functioning lighthouse.

In fact, many of the so-called modern lighthouses still operational today are hundreds of years old, which can pose a challenge for those responsible for their upkeep.

Irish Lights is tasked with maintaining safety and navigation services – known as 'aids to navigation' or ATNs – around Ireland, including 64 lighthouses. Chris Scully, operations and property manager for the organisation, explains that a number of them are offshore. 'The fact that people built these structures in very inhospitable locations out on the rocks hundreds of years ago, and they're still weathering the storms today, is just phenomenal,' he says.

But it can pose unique challenges for the engineers who look after them. Irish Lights runs an annual maintenance programme, with engineers accessing some sites by helicopter and staying on site for up to three weeks at a time, to ensure equipment is continually updated and renewed every 20 years.

'At Hook Head the tower is 800 years old, one of the oldest in the world, and it can be a quite a task to maintain modern equipment in such an old building,' says Chris.

Standing out

According to The Lighthouse Directory (on public view at ibiblio.org/lighthouse), there are more than 24,600 lighthouses around the world. Many have unique features, such as Cape Hatteras Light in North Carolina with its distinctive black-and-white candy-cane stripes, the tallest in the US at 60.5 metres, or the Stafnesviti light in Iceland, a squat, square concrete tower painted bright orange. In December 2024, Lynda was invited to visit the lighthouses of Baku, in Azerbaijan, and was delighted to find 'beautiful classical imagery on utilitarian buildings', similar to the classical imagery on some Scottish lighthouses designed by Alan Stevenson. 'A lighthouse in Absheron had carved lions' heads holding copper piping in their mouths to run the water off the roof,' she says. 'We have lionheads and goddess heads on some Scottish lighthouses too.'

Lighthouse design in Scotland owes much to the Stevensons, the great family of engineers led by Robert and his stepfather and mentor Thomas Smith. Thomas was the son of a boat skipper who drowned when Thomas was young. Encouraged

into a land-based career by his mother, he specialised in street lighting but went on to build several lighthouses, including Kinnaird Head and Start Point in Orkney. It was Thomas who invented the revolving light that became a universal standard.

A universal language

Despite their differing features, ages and history, the language of lighthouses is universal and gives a wealth of information to sailors. 'The most crucial information to a mariner is their position,' says Chris. 'They're trained to rely on more than one form of aid to navigation, taking account of things like radar and satellite, water depth and visual aids. When land is within sight that might be a church steeple or a lighthouse.'

He explains that each lighthouse has an unique 'flash character' – a specific number of flashes over a given time – which corresponds with navigation charts. They may also flash different colours, such as red, white and green, providing additional information for ships to follow as they safely navigate into port. The ways that lighthouses are painted, perhaps with a red or black stripe, also help mariners identify them and pinpoint their location during daylight hours.

Keeping her lit

The most important thing for any organisation maintaining operational lighthouses is keeping the light on. Chris explains there are three categories of lighthouse, classed by their significance for safe navigation: category one is vital for safety, two is important and three is necessary. Category one lighthouses must be lit 99.8% of the time.

'Physical aids to navigation are still vital because things like satellite radar and GPS are prone to error or vulnerable to interference in our current geopolitical climate,' he explains.

In January 2025, the coast of Ireland was hit by the highest recorded wind speeds during Storm Eowyn, leaving 25 lighthouses without mains power, but the lights kept shining. 'Our back-up systems kicked in and not one single lighthouse went down,' says Chris. 'Following the storm, our maintenance team inspected a number of lighthouses, accessing some by helicopter, to assess the damage but incredibly – despite the weather and the fact that some of them are more than 150 years old – there were very few problems.'

In Scotland, there are 208 functioning lighthouses, and in England and Wales more than 60. The fact that their running costs are covered by light dues – fees paid by the vessels themselves – shows how much they are still valued. Lynda says: 'So many mariners and fishermen say they love to see the light flashing. There is something so special and comforting about it.'

To the lighthouse

Mariners aren't the only people who love lighthouses. As a light in the darkness, safety in a storm, their symbolism holds a universal fascination.

'You only have to look at the number of charities and mental health groups who use lighthouses in their name or logo, the books written, the art and movies inspired by lighthouses,' says Lynda. They are also evocative places to visit. 'There's something about being at a lighthouse – the wildlife in these remote places, the crashing waves and wind blowing in off the sea.'

Marine and lighthouse tourism is a developing field, bringing valuable interest and income into areas where traditional industries such as oil, gas and fishing are in decline. 'Tourism in rural coastal areas is very important economically,' says Lynda. 'Lighthouses have a really universal appeal for visitors. You get the people fascinated by the technology and the design of the lenses, people who love the beauty and symbolism, people who like to find out more about the building and engineering, and people who just love to see the light flashing.'

Words: **Jade Beecroft**

For more information visit lighthousemuseum.org.uk; irishlights.ie; greatlighthouses.com. Keep up to date with lighthouse news on the Lighthouse Directory's new Bluesky feed @lhdirectory.bsky.social

ILLUSTRATIONS: CLAIRE GILL

LIGHTHOUSE GLOSSARY

Aids to navigation (ATNs). As well as lighthouses, other static devices such as lightships and buoys provide information to mariners and navigators through light, colour, shape and even radio signals.

Daymark. The characteristics of a lighthouse building that serve as a visual aid during the day, such as shape and bands of colour. Lighthouses were often built to be seen against the horizon.

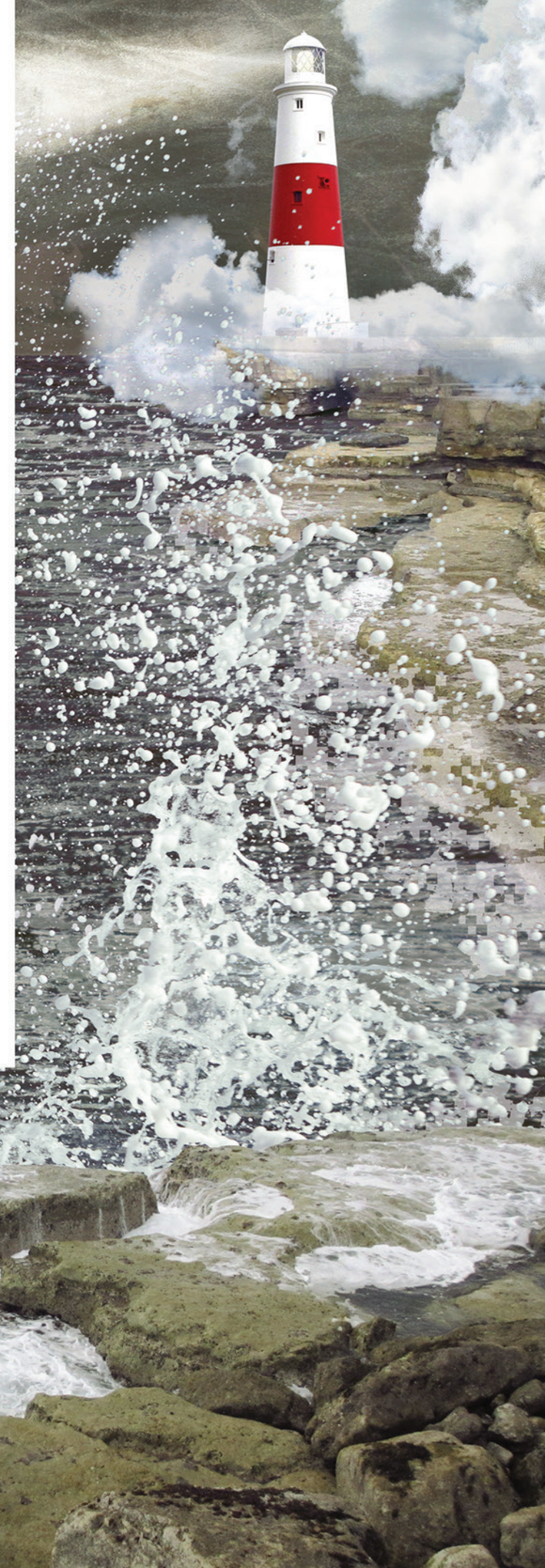
Fresnel lens. The most common lens used in today's lighthouses. It was designed in 1822 by French physicist Augustin Fresnel and is a collection of multiple glass prisms that bend and magnify light so it's visible up to 28 miles away.

Lantern. The glass and metal room at the top of a lighthouse tower that encloses the light, sometimes called a 'wickie' or 'beacon' by keepers. Below is the watch room, which traditionally provided a sheltered space to observe conditions.

Signalling. In bad weather a flashing light cannot always be seen, so some lighthouses also house foghorns and have the ability to send out radar and radio signals to passing ships. In days gone by, they even used cannons!

The List of Lights. A publication that assigns a number to each lighthouse and describes its identifying characteristics, such as its appearance and flash sequences, which can be fixed, occulting (on for longer than off), flashing, alternating colours or even Morse code.

Turn over to find out why Scotland's first lighthouse is inside a castle



A LIGHTHOUSE IN A CASTLE

The story of Kinnaird Head, Scotland's first ever lighthouse

On a windswept clifftop in Fraserburgh, at the north-east corner of Aberdeenshire, stands one of the most unique lighthouses in the world. Kinnaird Head was the very first lighthouse on mainland Scotland, and was built straight through the middle of a castle. The unusual structure has now been preserved as a living museum, with the Museum of Scottish Lighthouses built alongside it. More than 35,000 objects tell the story of the Northern Lighthouse Board, lighthouse engineering and lives of lighthouse keepers in Scotland.

Museum manager and fundraiser Lynda McGuigan came to the lighthouse 11 years ago after a long career in Scottish heritage. 'The architecture here is completely unique in the world,' she says. 'It was the only time [Scottish civil engineer] Robert Stevenson built a lighthouse straight through the middle of an existing castle. The circular structure of the lighthouse runs straight up through the middle of the Great Hall, which was once used as a storage space for paraffin to keep the light running.'

The castle itself was built in the 1570s by the Frasers, who were lairds of the surrounding lands and gave the coastal town its name. By the 1700s it was out to general lease and was deemed the perfect spot to establish a lighthouse – and charge passing ships a fee. In 1787, a lantern was put on the roof, visible 12 miles out to sea. Lynda takes up the story: 'By the 1820s the castle was in a state of disrepair and a lighthouse tower was proposed. Sir Walter Scott did an inspection voyage in 1821 and persuaded Robert Stevenson not to knock the castle down, but to build the lighthouse up through the building instead.'

In 1991, a smaller lighthouse was built in front of it, so that it could maintain its function as an ATN once the castle and original lighthouse became a museum in 1997. Now the main tower light – known to staff as 'the big light' – is lit by the team to mark special occasions, such as a gathering of former lighthouse keepers in 2018. 'It's pretty special when you see the two lights flashing together,' says Lynda.

PHOTOGRAPH: SHUTTERSTOCK.COM