Silvery Light Sailing

Maritime Heritage Information Pack

Made possible with Heritage Fund

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Introduction to Traditional Boatbuilding

Boatbuilding is simply the design and construction of boats and their systems. So what then, is traditional boatbuilding? On this project we'll be defining traditional boatbuilding as the special ways boats can be made out of wood.

Up to the 19th century, all ships were made out of wood. However, in the 1800s, iron and steam ships started to be introduced and sails started to be replaced with steam engines instead. A few decades later, and there were virtually no new, big, commercial ships being made out of wood. This meant the wooden boatbuilding industry got much, much smaller – and became 'traditional' instead of mainstream.

Today, we still make smaller, leisure boats out of wood – but still much fewer than in the past. This means that the skills used to design and construct a wooden boat are at risk of being lost, especially as some of the traditional materials and tools become harder to find.

Restoring older wooden boats, looking after them and keeping them sailing today is a fantastic way to keep these special skills alive – and it's something anyone can get involved in if they are interested.

Maritime Heritage as Local Heritage

One thing you will come across when looking at traditional working vessels is that they are often specific to the area that they were built in. Two boats could have the same rig (gaff rigged) and be for the same job (like trawling for example) but have subtle differences in the overall design and shape to best fit with the needs of local sailors and the seas they were working in. Over time, these boatbuilding styles become known to a place or even to a specific boat yard – hence the appearance of categories like '*East Coast Smack*' and '*Brixham Trawler'*.

For us today looking back, it can mean that once an area stopped producing traditional boats at scale, the boatbuilding knowledge specific to that area is almost straight away at risk of being lost. Not that the commercial industry has moved on to modern materials and building styles - it's often only through surviving examples of these vessels we know as much as we do about how these vessels were originally designed, built and run.

So when we work to protect these old boats, we are also protecting the history of the places the boats came from, and the skills of the people who lived and worked there too.

Excelsior (left) and Pioneer (right) are both 'Smacks' (traditional fishing boats) but there are subtle differences in shape and design to account for the difference seascapes they worked in – even though both were based on the east coast of England

Nearer to home, Galway Hookers are specific to the Conamara/Connemara region of the west coast of Ireland. They were built to transport people and goods in a region where there no roads. They were built by highly skilled individuals from families such as the Caseys, Jennings and Clohertys.

These skills were passed down through the families and through the generations and each had their own characteristics. Galway Hookers have experienced a revival since the 1970's and can be seen at summer regattas around Galway Bay. They are a wonderful sight to behold particularly when racing.

Photo credit:
Declan Colohan Photography

Galway Hooker
Realt na Gaillimhe
(Star of Galway)

Newly restored in 2021 by Bádóirí an Chladaigh, and purchased by Taylor's Bar (Dominick St.) to be used as an educational and instructive tool.

Photo credit:
Anthony. Mac Donnacha

Galway Hookers race in Caladh Thaidhg in An Cheathru Rua (Carraroe)

Traditional boatbuilding techniques and styles

For thousands of years, people have used boats to fish, travel, trade and fight. Throughout all of this time, the design of these vessels has changed dramatically – both to make them faster and safer – but also because of the materials and tools available at the time.

For example:

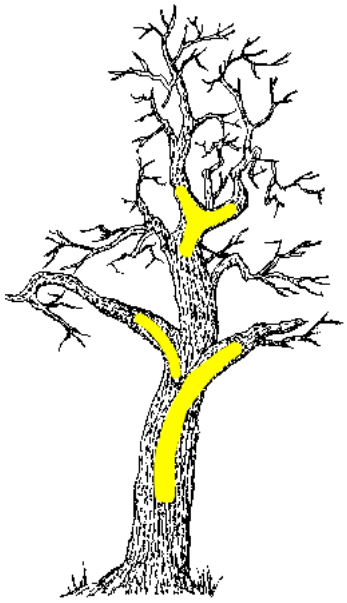
'*Skin Boats*' (like kayaks, coracles and currachs) were developed in places where there was little wood.

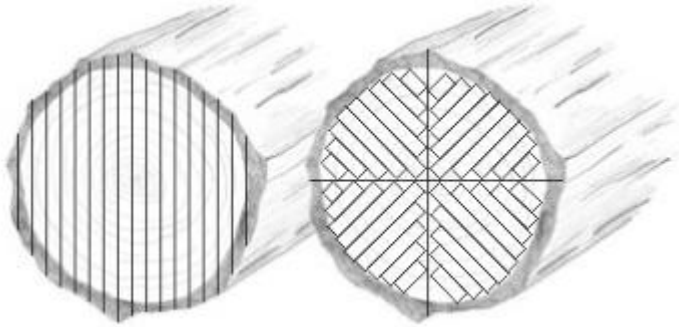
'*Rafts*' were made where wood was available, but not enough for a more substantial boat (like in Egypt)

'*Dugouts*' were made where trees grew large enough that one trunk could be carved out into a seaworthy boat (North America, Polynesia)

In places where wood supply was plentiful, boatbuilders would try and get as many of the pieces they needed out of large, single pieces of timber – because while they didn't have the technology we have today to process trees into much smaller pieces – they did have access to massive trees, some hundreds or thousands of years old.

Here you can see highlighted in yellow how one tree could be cut to produce curved frames for a large boat. Today, we could create the same size of frame by using much thinner pieces of timber, but glued together and bent into shape in a process called lamination.





Plainsawn Quartersawn

Modern timber processing technology also means we can use up more of the tree, and less of it will go to waste. However, the quality of the grain and what each piece of wood could be used for will be different depending on from where in the tree trunk it was cut.

Q. How many trees do you need to build a boat?

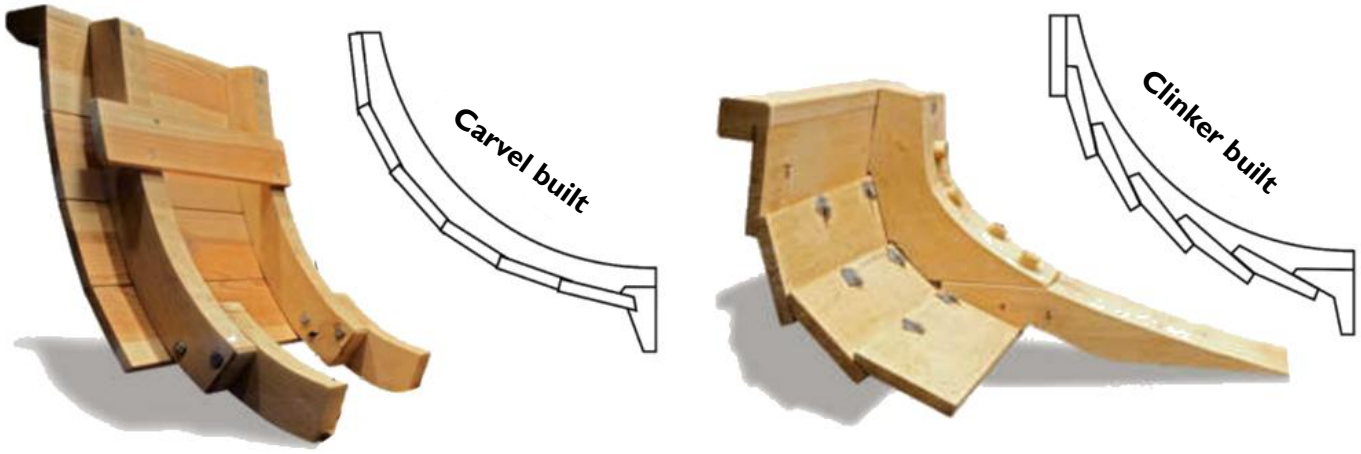
A. It depends! While a dugout canoe is made out of one tree, a large warship like HMS Victory took over 6000 trees to complete...

Dugout canoe

HMS Victory

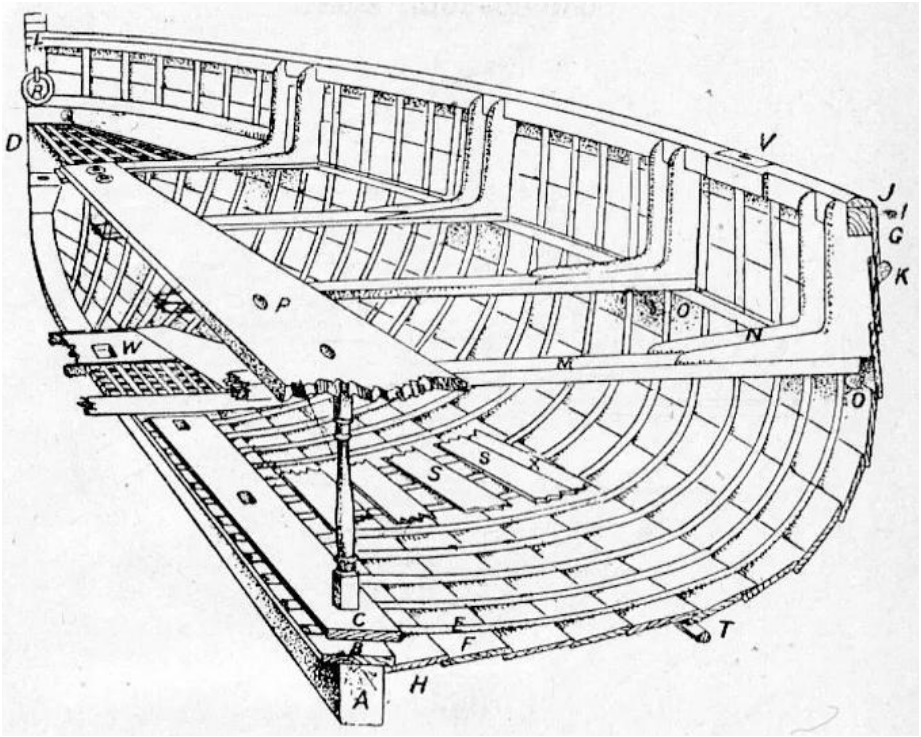
Clinker versus Carvel

When it comes to building dinghies – the term for any small *open* boat (i.e. one without a deck) – there's 2 main designs to follow.



Carvel built wooden boats and tall ships are made by fixing planks to a frame with all the planks butting up against one another. This creates a smooth hull that's stronger than a clinker built hull. However, the tiny gaps between the planks need to be filled in (caulked).

Clinker built vessels are lighter as they have less internal framing, with the planks overlapping along their edges. As they're lighter, they displace less water allowing them to move faster through the water. Clinker vessels are less rigid than carvel constructions, limiting the type of sailing rigs the vessel can take. The planks on a clinker boat are connected together using roves – these are small copper rivets which are hammered through one side and then secured with a washer.



Here is a more detailed view of the inside of a clinker built dinghy. You can see how thin the many frames are inside – making it possible to keep the vessel light but still strong enough for purpose.

While carvel built vessels are more often seen in the Mediterranean, in more Northern areas – the clinker dinghy is more popular.

The right tools for the job

What tools are used in boatbuilding has changed over time too, with new electric versions of old classics (electric screwdriver, electric plane) or other jumps in technology (like compressed air, laser levels and plasma cutters). Here's some of the hand tools we use in traditional boatbuilding today.

An **adze** is a tool which looks similar to an axe, but the cutting edge is at a different angle than what you might expect. This allows for very controlled, sweeping cuts – perfect for creating the curved edges of a bowsprit or a spar.

Pictured is a traditional **wood plane,** and a modern **No. 4 plane** which you can buy in shops today. No. 4 refers to the size, which ranges from 1 (smallest) to 8 (largest). Planes are used to straighten, smooth, and remove wood to achieve the desired shape for the job. The blade (traditionally called an iron) can be removed for sharpening and eventually replaced.

A **block plane** is a smaller plane, which is used to smooth the end grain of a piece of wood. It may just look like a mini version of the No. 4 plane – but if you look closely you'll see the blade sits up at a lower angle to the bottom of the plane, and that's what makes it ideal for end grain, as it's less likely to damage the wood.

This is a **rip saw**, used to cut planks down to size. Due to the way the teeth (sharp cutting edges) on the saw are arranged, rip saws are meant to cut across the grain of the wood. It's strong but slightly flexible, as the back of the saw isn't reinforced with anything.

Very different in appearance from the rip saw, a **coping saw** is usually much smaller, and can be used to cut around corners – like at the bottom of a dovetail joint. You can also use it to cut shapes out of the middle of a piece. It's made of a sharp piece of thin steel or tungsten (which can be replaced) stretched on a metal frame.

This is a **marking gauge**, which is designed to mark out lines on wood using a small, sharp needle. You use it by setting the length to the measurement you want, and then dragging the tool down the piece of wood, using the block to keep it steady against the edge as you go. This will scribe a line you can use as a guide for joints/cutting that is paralell to that reference edge.

Chisels are probably the most common hand tools for shaping, carving or cutting wood. They come in a large range of sizes, usually in a set. They have a sharp cutting edge, and you can control the depth you want to cut to by raising or lowering the handle as you go. The edge needs to be sharpened regularly, as contact with the wood will dull the sharp edge over time, and make the chisel harder to work with and less precise. You can sharpen chisels, planes and knives etc. with a whetstone.

This is a **whetstone**, used to sharpen tools. You use it by dragging the tool in a steady, consistent, back and forth motion over the stone, which will break off any small imperfections in the blade leaving it sharp and ready for use. You can also buy guides to place your tool in before you drag it over the stone, to ensure you get the angle of bevel you want.

While some tools have completely fallen out of fashion – no longer needed for the very specific job they were designed for – some other tools have stuck around, almost totally unchanged from their first appearance. Below is the example of a **spokeshave**: you can see how although the materials have modernised and the design adapted, it is fundamentally the same tool. A spokeshave is a hand tool used to smooth and shape wood – you can push or pull it along the surface, holding the spokeshave in 2 hands by the handles.

Antique spoke shave, likely made by the boatbuilder who used it

Contemporary spoke shave, available to buy in hardware shops today

Keeping the deck watertight

Next we will look at one example of how one job on board was done without any of the modern tools or materials we enjoy today.

On a larger boat, like LEADER, there's a flat deck to stand on which also covers up everything below the deck (like the galley, engine room, and passenger berths). But planks laid down side by side don't make a very watertight barrier against the elements. So to stop the deck constantly leaking water into the boat, boatbuilders found a way to create a watertight barrier using the materials available to them at the time.

Oakum is the name of a special stringy material made up of jute fibres that have been twisted together and treated with pine tar to make it a little bit sticky. When pushed into the gaps between the planks with a mallet and iron, the oakum swells up and seals the joint. Then to make sure it's a good seal, hot runny pitch is poured over the oakum-stuffed seams. When the pitch cools down and sets, it becomes very hard and protects the oakum underneath. The modern alternative to pitch is an elastic sealant like Sikaflex.

This process is called 'paying the seams'

All the tools you need to caulk the deck seams. This is a caulking mallet, caulking irons and a bundle of oakum. You would roll this into thinner strips first.

A boatbuilding student practices her skills on a pretend piece of deck. Here you can see how the tar is poured over the seams between the deck planks.

LEADER

Brixham Trawler

Length: 45.72m (105ft)

Beam: 5.79m (19ft)

Rig: Gaff Ketch

Built in 1892, she's the pinnacle of the evolution of the sailing trawler

The Brixham Trawler, as a class of fishing boat, has its origins in the late eighteenth century. In 1785 there were seventy-six decked boats working out of Brixham, County Devon. The Brixham boats then evolved as types of fishing also changed and developed from drift netting to trawling. They also evolved in terms of size. The earliest boats were 46ft overall. LEADER is 105ft overall and is considered to be one of the largest of the Brixham trawlers. It is certainly the largest still in existence.

The rig of these also evolved from being single-masted to the 2-masted ketch rig we see on LEADER today.

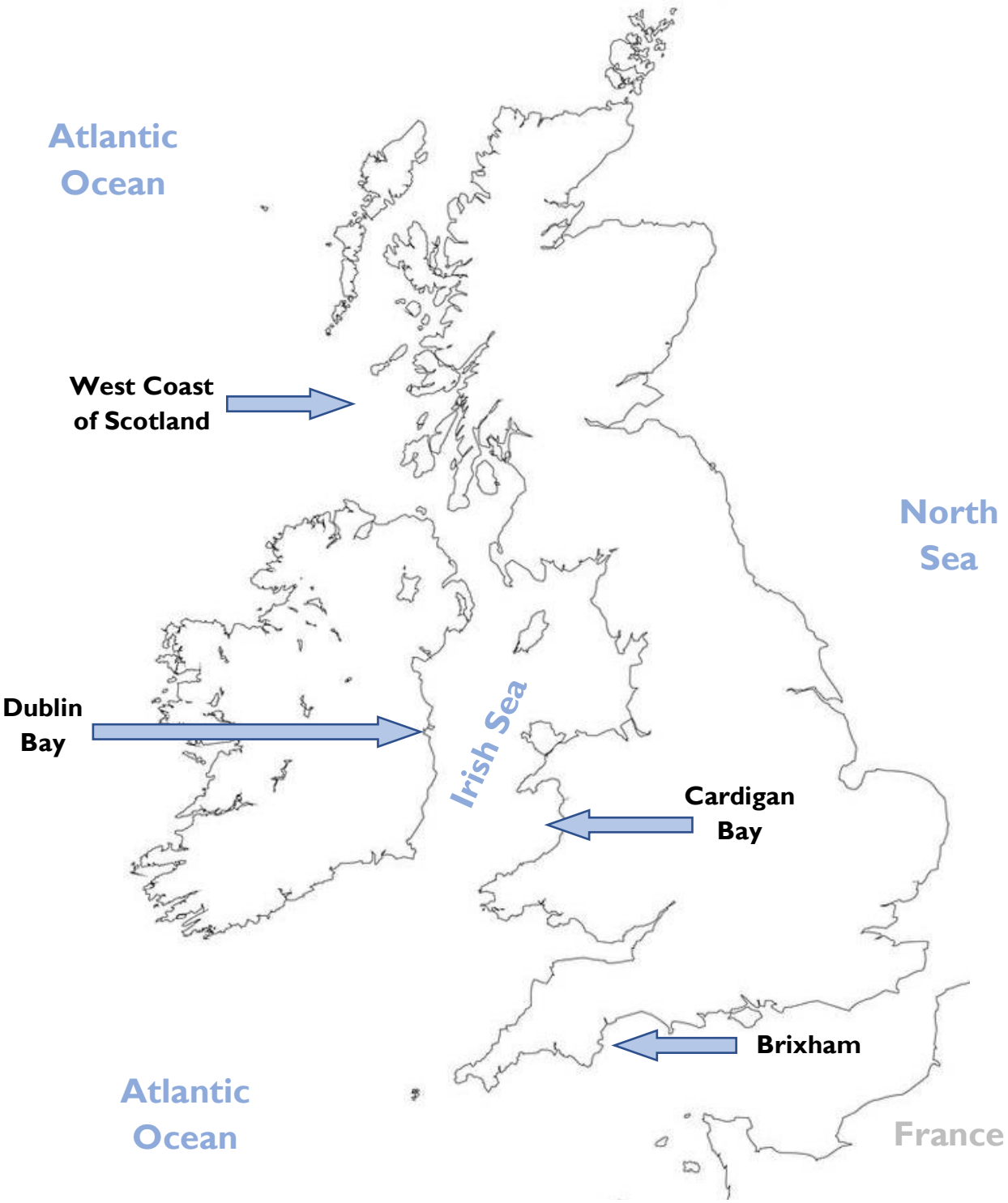
All traditional fishing boats reflect their function and in many instances their location. LEADER is full in the stern, the purpose of this is to support the trawl unlike the finer-sterned drifters. LEADER is a powerful vessel, it could pull a 2 ton trawl.

It was also fast by the standards of the day. It had to be, as every hour lost at sea had an economic consequence for the owners, skippers and crew.

LEADER is on the National Register of Historic Vessels. Compiled by National Historic Ships UK to keep track of what historic vessels we still have today. (NRHV #604)

The design of traditional fishing vessels were influenced by their fishing grounds. If fishing boats are working seas that have choppy characteristics (e.g., the North Sea) their shape will be suited to these conditions.

Equally, if fishing in more open swells, such as the Atlantic Ocean the vessel will incorporate this in its design. The design of LEADER reflects the fact she would be working the Atlantic, Cardigan Bay, Dublin Bay and further north up to the west coast of Scotland.



LEADER was built in 1892 at Galmpton on the river Dart, Devon by A. W. Gibb. One of the largest Brixham Sailing Trawlers built, she fished in UK and Irish waters until 1907. LEADER was then sold to Swedish owners and continued to fish until 1953 when she operated as a coastal trader.

The Swedish Sea School, based in Gothenburg bought her in the 1970's. LEADER was converted and operated for sail training until 1985. She then worked as a charter vessel in the west coast of Scotland as LORNE LEADER and after this reverted to her original name, LEADER, when Trinity Sailing Foundation acquired her as part of their sail training and charter fleet. Silvery Light Sailing acquired LEADER in 2022 which was only made possible by the generous contribution by the National Lottery Heritage Fund..

Length on deck: 80ft
Length overall: 105ft
Beam: 19ft
Draft 10ft 6in
Tonnage: 110 tons

Meeting the coding requirements for Category 2 (*may operate up to 60 miles from a safe haven*) with the Marine and Coastguard Agency (MCA) - she is planked with a mix of larch and oak, fastened to heavy sawn oak frames with galvanised boat nails and is decked in pine.

LEADER has approximately 15 tons of internal iron ballast.
The wheel steering is connected by rack and pinion to a large solid wooden rudder.

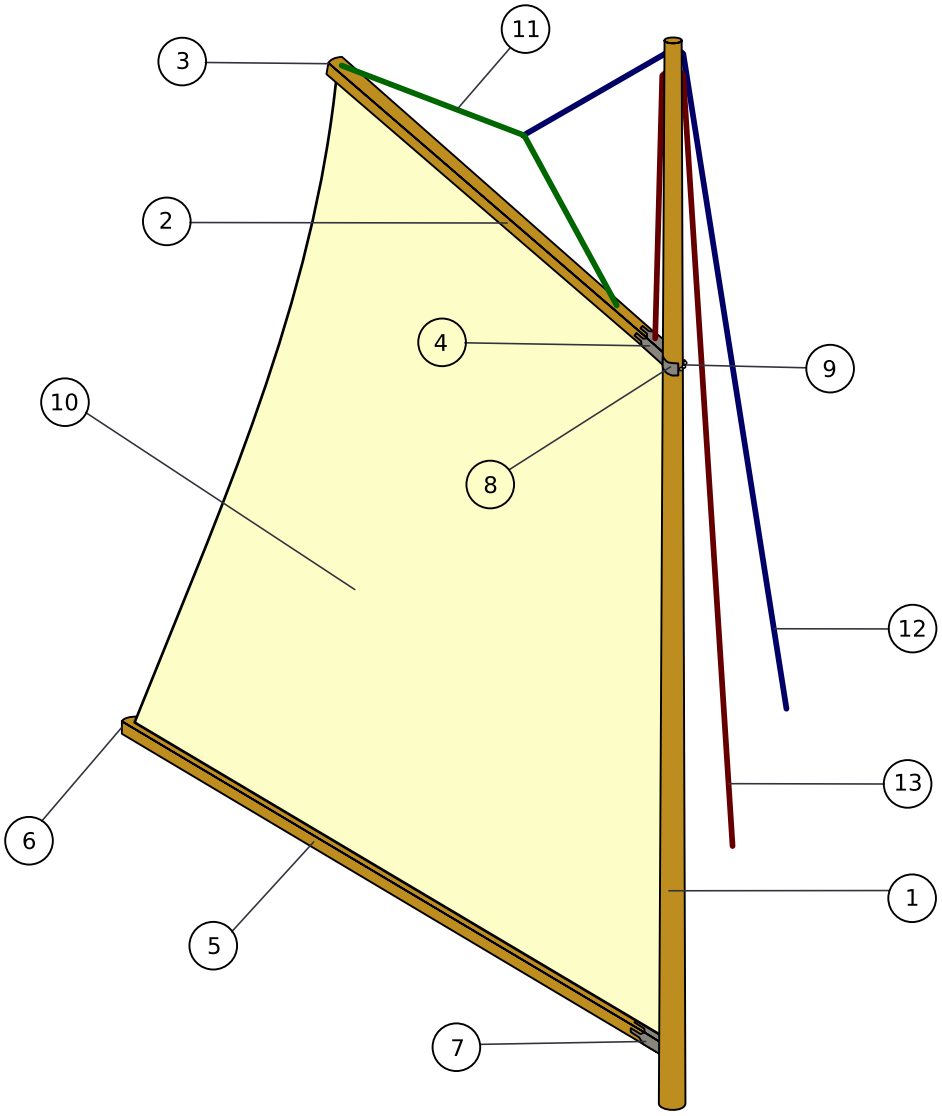
The accommodation on board has 17 single berths for crew and guests. The galley features a cooker and stove, refrigerator and freezer as well as hot and cold water. There is a chart table for navigation purposes. Going forward, there is large saloon table, main sleeping accommodation, two heads (toilets) and a shower.

Wheel steering

Saloon, and view into the galley

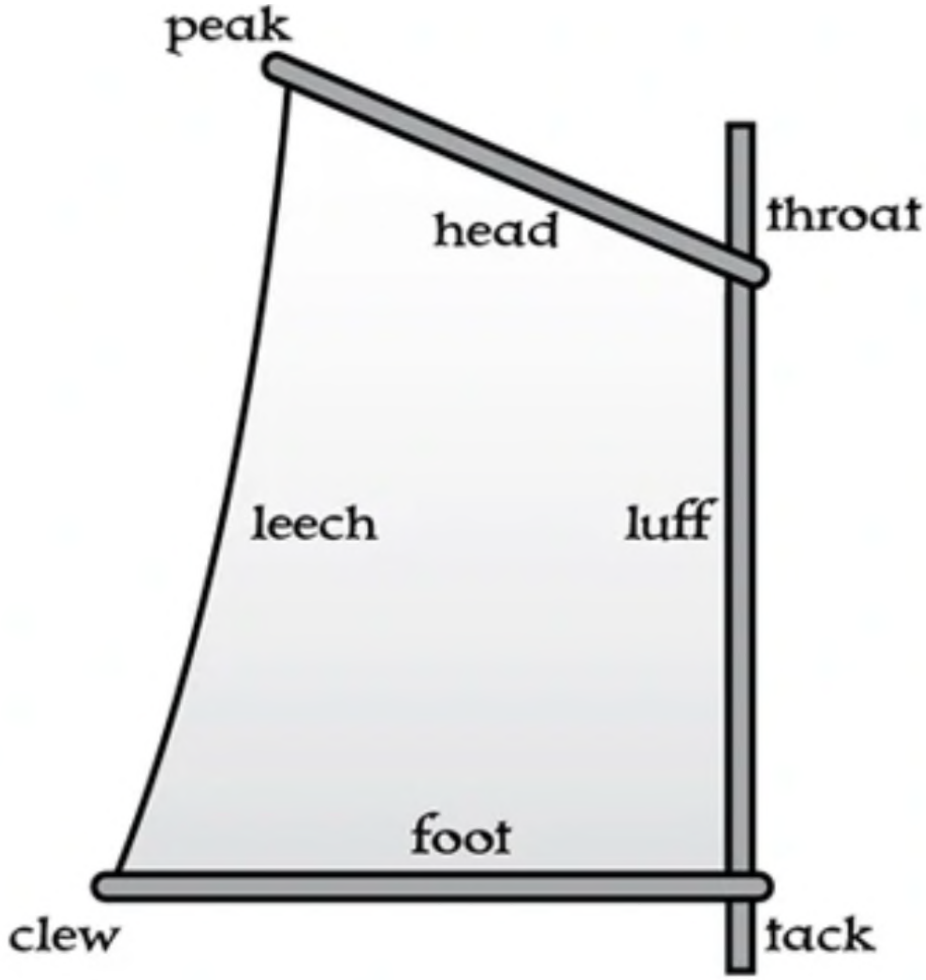
As mentioned previously, LEADER is a ‘gaff ketch’. The ‘gaff’ in ‘gaff ketch’ means that she is gaff-rigged, meaning that at least the mainsail has four corners, and is held up by a gaff – a long spar which usually covers the entire head (top side) of the sail, and is raised and lowered with the sail attached to it.

Parts of a gaff rig:

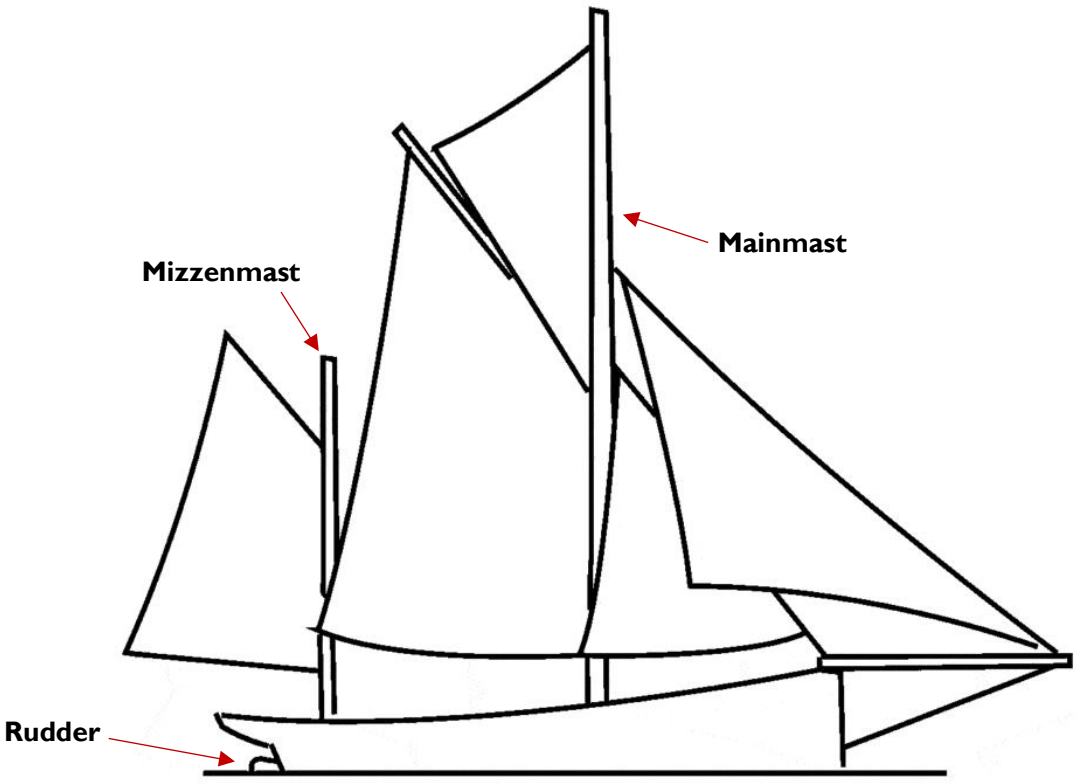


1. Mast
2. Gaff
3. Peak
4. Throat
5. Boom
6. Clew
7. Tack
8. Jaws
9. Parrel
10. Sail
11. Bridle
12. Peak halyard
13. Throat halyard

Parts of a gaff sail:



LEADER being a 'ketch' means she has two masts - a larger, main mast towards the front of the vessel, and a smaller mizzenmast at the back - but still in front of the rudder.



Powered by a maximum of 8 sails, LEADER has a hull speed of 6.5 knots. Apart from the anchor winch, all the running rigging is human powered. This requires cooperation and teamwork. The spars (masts, booms and gaffs) are wood and the engine is 160 horsepower. Modern electronics run the ships navigation systems.

Looking up at the mainsail, gaff and mast

Teamwork on the mizzen halyard

Sailing onboard LEADER is a 19th century maritime heritage experience with 21st century safety features and comfort.

Charter guests relax on deck with a volunteer crew member and the Skipper

BALLYHOLME INSECT

Clinker dinghy

Length: 4.27m (14ft)

Beam: 1.63m (5ft 4ins)

Rig: Bermuda Sloop Fractional

14ft clinker built class raced at Ballyholme Yacht Club, Bangor, Northern Ireland

The Ballyholme Insect class refers to a group of specially designed and built 14ft dinghies which were used for sailing, learning to sail and racing in the club.

All with appropriately insect inspired names (Moth, Grasshopper...) this fleet is very different from what you'd find at the Ballyholme Yacht Club today. Dinghy racing is a much more competitive field now that it used to be, and modern boats have been honed down to sleek, light designs using modern materials such as carbon fibre, plastic and resin.

Ballyholme Bay has an open shape, and is very exposed. Just at the edge of Belfast Lough, there is no shelter to the north/north east at all. When the tide is out, there aren't many features to the shoreline – it's quite plain. But when the tide is in – the higher water would create little rock islands, particularly on the east end of the bar which could be navigated through by the small Insect dinghies. This provided a great learning opportunity for young sailors, and added a sense of exploration and adventure to taking the Insects out for the day.

Copy of a Postcard. *'Local boatmen, Tyrella* [near Newcastle], *County Down'*
"DB418. Hull Lines remarkably similar to Insect that s on display in Bath Street though rig is Lug whereas Insect is Gunter"

One of the Insects in Groomsport Harbour
Photo: W M Nixon

Young people out for a day sail
Photo: W M Nixon

DRONTHEIM

Double-ended clinker-built boat

Length: 5.49m (18ft) to 8.23m (27ft)

Beam: 2.18m (7ft 2ins)

Rig: Spritsail or Lug

Also known as a 'Greencastle yawl' or 'north coast yawl'

Credit: Robin Ruddock

The drontheim is a clinker built open boat that is double-ended and was usually between eighteen and twenty four feet in length. They were originally sailing and rowing boats but were adapted to carry engines when these became available in the inter war years. In the eighteenth century Norwegian trading ships carrying ice and timber to Ireland brought clinker built yawls to this area as deck cargo to sell to the local fishermen.

The name for the boat is a corruption of the name of the Norwegian town of Trondheim where this type of fishing boat originated from.

Local boat builders eventually copied the design which has many similar construction features to the Viking longships and developed this clinker built boat type to suit local conditions.

The Hopkins, McCann and the Kelly boatyards in Portrush produced many of these drontheim boats for the fishermen of Donegal, Antrim and Argyll. Kelly also built top class sailing yachts some of which were exported worldwide. There are other photographs of Portandhu with as many as a dozen drontheims hauled out and with some afloat in the harbour.

The drontheim boat was light enough to be hauled clear of the water at the end of the day by the crew after the catch had been landed and the ballast stones removed.

Drontheim boats in Portandhu Harbour around the turn of the century. *Photo copied from an old postcard.*

Bronze Sculpture of Drontheim Sprit Sails by Holger Lonze at East Strand Portrush. *Photo R Ruddock.*

The bronze sculpture of drontheim sprit sails at the East Strand by Holger Lonze is a fitting tribute to the boatbuilders and to the fishermen of Portrush . The creases in the sails can also represent waves breaking on the shore which is appropriate for the sculptures location by a surf beach. The boatyard of James Kelly was located on the site of the current Water Sports Centre at the East Strand and the machine shop was located in the now derelict yard adjacent to a newly built apartment block.

The 24' Drontheim 'James Kelly' sailing off the Mull of Oa on Islay.

The *James Kelly* was built in 'McDonalds Boatyard' in Moville in 1998 for the Causeway Coast Kayak Association and is now sailed off the north coast.

The drontheim boat was used for fishing with long lines and for drift netting for salmon, lobster fishing, transporting people and animals, transporting seaweed, and for racing in regattas at the end of the fishing season.

The 22' Drontheims 'Lady Florence' and 'Evelyn M' sailing to Rathlin Island 2019.

Photo Robin Anderson

The drontheims pictured above are copied from the '*Elizabeth CE 117*' that was built for the Wilkinson family of Ballintoy in '*Kelly's Boatyard*' in Portrush in 1935. The Wilkinsons used the '*Elizabeth*' for fishing for lobster as well as for tending their fixed salmon net at Larrybane and during the summer for taking tourists out sightseeing.

There are now at least a dozen boats in use today copied from the '*Elizabeth*' and the skills of sailing and rowing these traditional boats of the north coast are being kept alive. The Coast Office working out of Portballintrae Boathouse in association with the Traditional Yawl and Drontheim Society offer the chance to get involved in the fitting out and sailing of this type of boat.

Basic Glossary of Boatbuilding Terms

Adze	An adze is an ancient and versatile cutting tool similar to an axe but with the cutting edge perpendicular to the handle rather than parallel.
Beam	The width of a boat at its widest point
Bilge	The lowest part of the inside of the hull
Boom	One of the spars, supports the bottom of a sail and is connected to the mast.
Bottom boards	Boards placed over the curved bottom of a boat that you can stand on. We can't call this the 'floor', because that word has another meaning on boats.
Bowsprit	A spar that extends out past the front of the boat to support a jib
Carvel	As in 'carvel built' or 'carvel planking' is a method of boatbuilding where the planks of the hull are put in edge to edge (not overlapping) and then attached to a strong frame
Caulking Irons	Tool used for packing oakum into the deck seams (partial gap between planks)
Caulking	A process where a fibrous material, like cotton or oakum, is hammered in to the gap between two planks. This makes the gap watertight, as the fibre will expand when wet.
Clinker	As in 'clinker built' or 'clinker planking'. The northern European tradition of building a wooden hull where the planks overlap. Once these overlaps are nailed an riveted together, the result is a light, strong hull.
Gaff	One of the spars, supports the top of a square sail on a gaff rigged vessel
Gaff rig	Rig in which the main sail has four corners, is attached to the boat by the front and back and (usually) has a spar going along the full top side of the sail
Halyard	A rope used for raising and lowering a sail, yard or flag on a sailing ship. Say ‘haul-yard’
Hull	The bottom and sides of the boat
Jib	Triangle shaped sail, it has 3 sides.
Lug rig	A brilliant rig for small boats, it involves a lugsail which is a four sided sail, suspended from a spar called a yard. When the sail is raised it overlaps with the mast
Mast	A large, vertical spar which supports the sails
Mizzen	The aftmost (closest to the back) mast and sail
Oakum	Stringy rope made out of flax fibres, treated with tar and used to help make the gaps in the deck waterproof

Pitch	A thick, black tar. It becomes runny when heated up and can be poured over the gaps in the deck to waterproof these seams
Rig	The arrangement of sails and masts.
Rowlock	These support the oars and allow you to row with them. It's a U-shaped fitting that can be set on the sides or the back of a boat.
Scull	Similar to an oar, and does the same purpose.
Sculling	Using a single oar located at the back of the boat to propel it along.
Sheet	A rope that controls the angle at which a sail is set in relation to where the wind is coming from. The mainsheet controls the mainsail, the jib sheet controls the jib (and so on) Can also be used as a verb, e.g. "We sheeted in" means "We pulled the sheets"
Spar	A length of timber, with a cylinder-like shape, that supports a sail/the sails. Spars include the mast, boom, gaff, yard & bowsprit
Sprit Rig	A brilliant rig for small boats, it involves a spritsail which is a four sided sail, supported at its highest points by the mast and a diagonally running spar known as the sprit
Stern	The aftmost (closest to the back) part of a boat
Tiller	A forward facing lever that's attached to the rudder that allows you to steer the boat.
Transom	A vertical part of the hull at the stern
Yard	Horizontal spar that's fitted to the forward side of the mast

How can I get involved with maritime heritage?

If you would like to spend more time learning about local maritime history and working on traditional vessels, get in touch with Silvery Light Sailing about future volunteering opportunities.

office@silverylightsailing.com

For more information about Silvery Light Sailing's programme and how you can support our work, visit our website.

silverylightsailing.com

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