



The evolution of rigs

From spritsail, lugsail and square sail rigs to gaff, Bermudan and gunter, Peter K Poland traces the differing configurations of spars and sails up to the present day



Cornish luggers sailing out of Mevagissey in the days when fishing fleets were all sail

Once asked a well-known yacht designer if we could meet up to discuss the evolution of modern rigs and the continuing popularity of some older ones. However, I didn't fancy driving all the way from the South Coast to his distant base near the Broads (and back) in one day: a double dose of M25 and A12 mayhem did not appeal. 'No problem,' he replied. 'I'll see you at Goodwood.'

Luckily, designer Andrew Wolstenholme and I share an interest in vintage cars, the ones that emerge from their cotton wool and actually race – flat out – around the old Goodwood circuit. So there we were, relishing the roar of elderly engines, sniffing the exotic aroma of Castrol R and marvelling at millions of pounds worth of Ferrari GTOs, Shelby Cobras, ERAs, Bugattis, Astons et al as they hurtled – often three abreast and sideways – around Woodcote Corner. Then, when the racket subsided between races, we talked about boats in general and gaff rigs in particular, of which Andrew is an aficionado.

'The gaff', Andrew said, 'still has much to recommend it. With stiffer yet lighter carbon fibre spars, it can offer bigger benefits than it ever did in the past.' Andrew's latest sailing design illustrates his point – but more on that later.

It is generally accepted that the gaff evolved from the spritsail rig, which in turn is related to the lugsail and square sail rigs. The lugsail, which held sway for centuries and can still be seen in areas like Brittany where retired fishing luggers take tourists on trips round the bay, attaches to a spar that is hoisted at an angle, with some of the spar and sail protruding ahead of the mast. As a result it has a defined leading edge that enables the boat to sail to windward.

The evolution of the lugsail probably started when someone worked out that by setting a square sail at an angle – with one end of the yard pointing down towards the deck – the sail could set closer to the wind. Then, with the halyard attachment moved from the centre of the yard to a point closer to one end and with the sail's

ABOUT THE AUTHOR



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shapes made of modern materials is attractive. The proven shape thing is, I think, important; a hull shape that owes its genes to whales and fish is going to feel at home in the water better than one that owes its shape to a Formula One car or a skateboard, and this is certainly the case with Roxanes and Romillys – they quite simply feel comfortable and safe at sea, which for me is important. They are also pretty, which means that when you arrive anywhere the blokes on the dock say “that’s a pretty boat” and help you with your lines, whereas when you arrive in a gin palace you either get ignored or stared at with grumpy resentment.

‘As to the rig, the lightness of the carbon spars aloft undoubtedly makes a difference to stability, and the lack of standing rigging makes for exciting moments when you instinctively reach out to grab a nonexistent shroud. The rig works and sails really nicely, but I have to admit that I and another owner are working with Nigel to investigate a conversion to two Bermudan masts – still unstayed – with fathead sails [more on these later]. The aim, from my point of view, is purely one of convenience. I don’t expect to go faster, but I do hope to be able to raise and lower the sails more quickly and easily.’

If you prefer to try a very small lugsail boat, give the ubiquitous scow a go. It’s widely sailed in the UK and the best known is probably the **Lymington scow** (first built in the early 1900s). There are also fleets on the Isle of Wight, in Chichester Harbour, at Christchurch and elsewhere around our coast. Originally built in clinker, scows are now also moulded in GRP by companies such as John Claridge Boats. As an active racing class boat that doubles up as a tender, general potterer and floating classroom for grandchildren, the humble little 3.4m (11ft 4in) scow has a lot to offer.

Spritsail craft

The spritsail is another rig evolution. It appeared on small Greek craft in the Aegean Sea way back in the 2nd century BC. The Romans followed suit with spritsail-rigged merchant ships. Over the centuries, the rig became more sophisticated. The luff of the sail sat behind the mast while the sprit went from the base of the mast to the peak of the sail, so the luff was long and straight and the boat could sail closer to the wind – especially with leeboards to reduce sideways drift and a foresail to increase the sail area up front (both said to be Dutch innovations).

Perhaps the most famous spritsail-rigged workhorses were the Thames sailing barges. Famously crewed by a man, a boy and a dog, these large flat-bottomed craft crisscrossed our estuaries, slid across sandbanks and travelled our coastline carrying cargo.

They often had to lower their masts to ‘shoot’ bridges before unloading, 



ABOVE the Nigel Irens-designed **Roxane** is a yawl-rigged lugger

MAIN PHOTO Assorted rigs of various shapes and sizes

LEFT The **Lymington scow** is one of the smaller boats on which you’ll find a lugsail

luff and leech lengthened, most of its area sets aft of the mast. It can therefore be sheeted flatter when the wind’s ahead of the beam. Some say it was called a ‘lug’ because it looks a bit like an ear (or lug!), which is backed up by the French term ‘voile aurique’ (ear-like sail).

Roxanes, Romillys and scows

If the lugger appeals, you can still find modern interpretations of this classic rig. British designer Nigel Irens is most famous for his multihulls such as Dame Ellen MacArthur’s record-breaking and globe-girdling trimaran, but he also has an eye for the attractive and the unusual: and in the 1990s he came up with a couple of crackers. His first was the **Roxane**, an 8.8m (29ft) yawl-rigged lugger loosely inspired by an old Shetland Islands fishing boat – but her unstayed carbon fibre spars and yards are pure modern technology. He followed this with the

smaller 6.7m (22ft) **Romilly**, again a yawl-rigged lugger and ideal for trailer-sailing. Both models can be bought new from CoCoBe in the Netherlands (www.romilly.nl).

While researching the Roxane I came across sailmakers McKillop, whose handiwork adorns many fine and unusual yachts. They put me in touch with Sir Richard Stilgoe: musician, poet, composer and comedian extraordinaire, and a leading light in the charities Orpheus Centre, MERU and YouthMusic. Sir Richard owns a Roxane, and told me: ‘I first sailed a Roxane at Southampton Boat Show in 1995 when Nigel introduced her, and was immediately beguiled. Almost all sailors have a sense of history, and boats whose design is obviously part of that history have instant and visceral appeal.

‘Sailors also like fiddling about with things to try making them better and easier, so the combination of proven

and the mind boggles at the skill required.

There aren't many spritsail craft around these days, although of course almost every small child to take up sailing starts off in a mini spritsail dinghy – the

Optimist. This shoebox of a boat was designed in 1947 by an American, Clarke Mills, to offer low-cost sailing for young people. He drew a simple pram that could be built from three sheets of plywood, then the design was slightly modified and introduced to Europe by Axel Damsgaard.

The Optimist is now sailed in around 120 countries by more than 160,000 youngsters. At the 2012 Olympics, nearly 80% of skippers were former Optimist dinghy sailors: so the humble spritsail is still at the very heart of the sport of sailing.

The gaff rig

The gaff rig – so extensively used on workboats of all sorts before the infernal combustion engine relegated sails to the leisure industry – was a logical progression. The sprit was replaced by a spar that slid up and down the mast, so now two sides of the mainsail were permanently attached to solid spars.

The later addition of a boom improved performance but made lowering and raising the rig to shoot bridges trickier. An effective solution was found by fitting the

boom's gooseneck to the top of a tall tabernacle in which the mast hinged instead of bolting it to the mast. This way the mast, gaff and sail could stack neatly on top of the boom.

The gaff rig definitely improved the versatility of workboats, and the increased ability to make to windward diluted the sailor's deep dread of a lee shore. Andrew Wolstenholme summed up the situation: 'Boatbuilders developed craft to meet the needs of the local fishermen – men who may have travelled no more than 10 miles up and down the coast in their lifetime...'

While the ongoing development of today's rigs is driven by sales to the leisure sailor, the early gaff rigs were

Boatbuilders developed craft to meet the needs of local fishermen

developed for commercial purposes and had to meet the utilitarian needs of impecunious fishermen.'

The gaff rig then held sway on small to medium-sized working craft, as well as on growing numbers of leisure yachts, until the Bermudan rig gained ascendancy.

Rise of the Bermudan

Originally developed in Bermuda for smaller vessels then adapted to the larger oceangoing Bermuda sloop, this rig

features a triangular mainsail hoisted to the top of the mast. The traditional design featured tall raked masts and booms, long bowsprits and clouds of sail. Then Marconi's idea of using wire rigging to hold up tall and spindly radio masts spread to sailboats. The more performance-oriented yacht designers soon stole his idea and hoisted large three-sided 'leg of mutton' mainsails on tall and well-supported masts. As a result, the mainsail now had a long and straight leading edge, producing a quantum leap in windward performance.

Predictably, yacht racing encouraged the proliferation of these 'Marconi' rigs. Metre boats and ocean racers in the early 20th

century were quick to forsake their gaffs and go for large mainsails and smallish headsails set on tall masts. But as sporting sailors moved over to the Bermudan rig, working boats such as fishing smacks, Bristol Pilot Cutters, Itchen ferries and Falmouth oyster dredgers stuck to their four-sided mainsails held aloft by gaffs, as did several leisure yachts. Why? What are the advantages of the four-sided mainsails that still grace our shorelines with their beautiful silhouettes?

While most gaff rig addicts concede that its close-windedness is inferior to that of the Bermudan rig, they maintain that it's a clear winner in the cruising stakes. They point out that even though a gaffer's mast is relatively short, more sail can be set because the gaff puts more area at the top of a mainsail than you get beneath the diminutive headboard on a Bermudan 'leg of mutton' triangle. On a reach or a run, this provides plenty of power.

Design expert CA Marchaj says a low aspect ratio mainsail is more efficient than a high aspect ratio equivalent when sailing off the wind. And if you want to lengthen the luff and pile on more horsepower in light airs, the gap above the gaff can be filled with a topsail. You can even experiment with one of the new-fangled topsails that are actually an integral part of the mainsail, with a stiff tubular batten replacing the gaff.

All done with Mirrors

Even now – in the 21st century – modern gaffers are popular. Thousands of novices enjoy sailing in a ubiquitous and simple little boat with a gaff: the Mirror dinghy. The Mirror's gaff slides up parallel to its short stumpy mast rather than sticking out at an angle, so it's 'gunter-rigged' – and it offers many benefits. The mast and gaff are each much shorter than a one-piece Bermudan rig mast, so they are easy to handle and transport when the boat is on a roof rack or road trailer. Yet windward performance is good, thanks to the straight luff that continues from the tack to the head at the top of the 'gunter gaff'. The original Mirror rig is a well-proven success, so it's mystifying that the class has now introduced a Bermudan rig.

Andrew Wolstenholme attributes much



ABOVE The Optimist dinghy is one of the few boats you'll see using a spritsail nowadays

LEFT Tony Smith explores shallows and swathways in his gaff cutter-rigged Shoal Waters. Read more from page 86



Covey Island Boatworks

of the credit for the popularity of the gaff rig in contemporary cruising yachts to Cornish Crabbers. True, some pink-trousered traditionalists will say 'there's nothing naffer than a plastic gaffer', but these boats have sold in large numbers. Designer Roger Dongray drew the original and attractive **Cornish Crabber**, and beneath a near-flush deck there's a surprising amount of accommodation. Although her windward performance never sets the pulse racing, she offers safe sailing for short-handed cruisers and a topsail for the purists.

Then her smaller sister, the 5.8m (19ft) Cornish Shrimper, hit the jackpot. She looks good and sports a nicely balanced gaff rig with a sizeable roller genoa tacked to a bowsprit. More than 1,000 have been sold and she's still in production to this day, with an inboard diesel or outboard in a well. Subsequent 22, 24 and 30ft Dongray-drawn Crabbers also sold well, and now David Thomas has designed a new 26 that lifts Crabber performance (and space down below) to new heights.

After the Shrimper's rise to popularity, Andrew Wolstenholme designed the Norfolk Gypsy for Charlie Ward's East Coast firm. She is small enough to trail and easy to launch and rig, thanks to the short mast, yet she's tough enough to stand up to a bit of weather. And the attention to detail and quality of finish that Ward lavished on these little yachts make them objects of beauty. You get what you pay for – especially with gaffers – and the Gypsy remains in demand.

Exotic 'new' gaffers

Boat buyers considering a gaff can contact the 1,500-strong Old Gaffers Association, whose Peter Farrer says: 'The OGA was formed in 1963 with the aim of encouraging interest in traditional gaff rig seamanship and comradeship. Although by the very nature of the rig many members have old boats, and there is an interlinked interest in any old boats, there are many newer – and plastic – boats in the membership. The newly formed trailer section probably has a majority of plastic boats amongst its members: Kittiwake,



David Harding

Memory, Winkle Brig, Shrimper etc. As a "rig association" the OGA welcomes development of the rig: indeed, the Solent and East Coast areas have one or two exotic gaffers sailing.'

One of these exotic 'new' gaffers is called **Alice III**, designed by Simon Rogers. Chris Spencer-Chapman, whose company McKillop Classic Sails was involved in the rig and sail plan, says: 'The combination of the light [carbon] rig and deep fin and bulb keel allows an enormous sail area which would not be possible with a conventional hull and spars. She is interesting and exciting in light conditions, but the windage can be an issue to windward in heavier conditions.

'Off the wind she is always very fast...

Some pink-trousered traditionalists will say there's nothing naffer than a plastic gaffer

For easy cruising the Bermudan rig will win, but there will always be the aficionado who likes the features of traditional rigs. Unless you are a real purist, why not take advantage of modern materials?'

Stephen Akester, who co-owns *Alice III*, told me she is 'light displacement at 7.5 tonnes. In light airs and no sea she readily outperforms "normal" Bermudan rigs but to windward in a blow she loses out due to windage and not being as close-winded. She has much less weight aloft and a very different motion to a classic gaff-rigged heavy displacement vessel. We opted for a gaff rig for the fun of it... there are no fancy fittings involved, it is not highly stressed and we can maintain all



P. Kilgour

ABOVE *Alice III* features a light carbon mast and her gaff rig makes her easy to sail and maintain

ABOVE LEFT The schooner-rigged *Maggie B* looks traditional but is actually a modern interpretation of a gaffer

LEFT Roger Dongray's *Cornish Crabber* is probably the archetypal modern gaffer

the parts without a boatyard or extra help. 'Further refinements using modern materials mean we can set up the rig for single-handed sailing with headsails and topsail on rollers and boom bags to catch main and mizzen.'

Another dramatic 'modern gaffer' was the Nigel Irens-designed **Maggie B**. At 63ft (19.2m) she's beyond most sailors' means, but she's full of fascinating innovations. The designer, the builder (Covey Island Boatworks) and the owner (Frank Barr) called her a 'fusion' yacht – meaning she fused modern materials with traditional ideas. Her schooner rig features short, high-peaked gaffs and sits happily on the sweeping sheer that Irens gave to the slippery and almost plumb-stemmed shoal-draught hull beneath.

But appearances deceive: this is no throwback boat. The spars are carbon and held up by Vectran fibre shrouds tensioned by special deadeyes. Not dissimilar, in fact, to the materials used for the rigs on state-of-the-art IMOCA 60 racers. Vectran costs more than wire, but the weight reduction is huge – as is the cost saving on fabrications to attach wires to the mast and on rigging screws to tension them. The weight reduction aloft meant that 600kg worth of ballast was saved down below. Imagine the effect this had on performance and righting moments, then add an efficiently shaped pivoting centreplate that lives inside *Maggie B's* elegant long keel and you have a modern cruiser that is as bewitching as she is beautiful.

Sadly, this amazing yacht was



damaged by fire having completed a circumnavigation, but has been succeeded by **Farfarer** – another Irens-designed and Covey Island Boatworks-built masterpiece that features an unstayed rig with ‘fathead’ mainsails, where a stiff top batten does the job of a mini gaff and adds to overall sail area.

Kite and BayRaider

Andrew Wolstenholme’s 6.4m (21ft) **Kite** is another modern gaffer to take full advantage of new materials. He says: ‘My aim is to keep her light and simple... the sail plan is generous and set on lightweight carbon fibre spars. I want her to sail really well in light and moderate winds – not just in a blow. I want to tow her behind a normal 1.8-litre saloon, not some gas-guzzling 4x4.’

The Kite is now being built in GRP by Demon Yachts, and I reckon there will be a queue of buyers. Andrew told me that at the OGA’s 50th anniversary event at Cowes there was a constant stream of people showing an interest in her... Being overall winner of the big race on the Saturday didn’t do any harm either. The little boat flew in Force 5-6 wind over tide in the western Solent.

Matt Newlands of Swallow Boats is another designer to bring gaffs into the modern age, then go further. He says: ‘The gunter rig was what we did, and still do, for customers who prefer it, because having shorter spars makes trailer-sailing easier for two reasons – less length to trailer, and it’s easier to physically raise the mast.’

‘But in my opinion, it has been made almost obsolete by two developments. One is carbon fibre masts, and the other is fathead mainsails. Carbon masts on trailer-sailer-sized boats are so light that it is easy for even elderly gents to raise a full-length mast, if the bottom is in a tabernacle. The mast length problem is cured by using a so-called ‘fathead’ mainsail, which reduces mast length – by as much as 1m on our boats – while maintaining the same sail area and improving lift/drag ratio: in crude terms, more like a Spitfire wing.’

‘On our **BayRaider 20** this results in a mast that is only 1m longer than the boat, so only half a metre sticks out each end... This new rig has many advantages over the gunter, but chief among them is ease of reefing... I love quirky rigs, and we have had much fun experimenting with a lot of them. But it is hard to beat the Bermudan mainsail setup.’ Especially with a fathead main on a carbon mast.

It is interesting that Cornish Crabbers came to the same conclusion and now offer a faintly ‘fathead’ mainsail Bermudan rig on the new Adventure range. Not as pretty as varnished ‘gaffer’ spars of course, but more efficient.

Quirks and character

All of which brings us to the ‘bread and butter’ Bermudan rigs on today’s

production cruisers. Most have moved on from the RORC-inspired masthead sail plan. I asked rigging expert Nigel Theadon of Rig Magic whether he preferred masthead or fractional, and he replied: ‘I don’t think that it matters much to a cruising yacht provided the boat is designed well to balance with whichever rig; and provided the rig is well constructed, maintained and properly stayed and tuned.’

‘Generally speaking, modern swept-back spreaders provide a “safer” rig without the need for a babystay or forward lowers to stabilise the mast’s middle sections, particularly when deep-reefed. Forestays are now higher up the mast than in years gone by, so the modern fractional rig is closer to a masthead than it once was. Fractional rigs are probably more attractive to look at and do not need expensive and

powerful backstay adjusters.

‘When buying a new boat, talk about what you really want from the rig. Discuss options with an experienced rigger or yachtmen. What comes as standard may be better being upgraded from new. When buying a used boat, get a rigger to carry out a mast inspection, because the hull surveyor rarely looks above eye height.’

Whether you opt for a gaff- or Bermudan-rigged boat, this seems sound advice. Nigel sails a fractionally-rigged X332 fast cruiser, which offers the best of most worlds: its well-balanced ultra-modern rig works as well for a small cruising crew as it does for keen racers. But don’t let this put you off a modern gaffer if you enjoy its quirks and character. Our coastline would be a boring place if we all sailed the same sorts of boats. **PBO**



Tim Wright



David Harding

ABOVE Farfarer features an unstayed rig and ‘fathead’ mainsails

ABOVE RIGHT Dehler 36 sports a modern fractional Bermudan rig with aft-swept spreaders

RIGHT The gaff-rigged trailable Kite is built of modern materials

BELOW Swallow Boats’ Bay Raider is another trailer-sailer using either traditional (gunter) or ultra modern (‘Fathead’) rigs



Peter Chesworth

