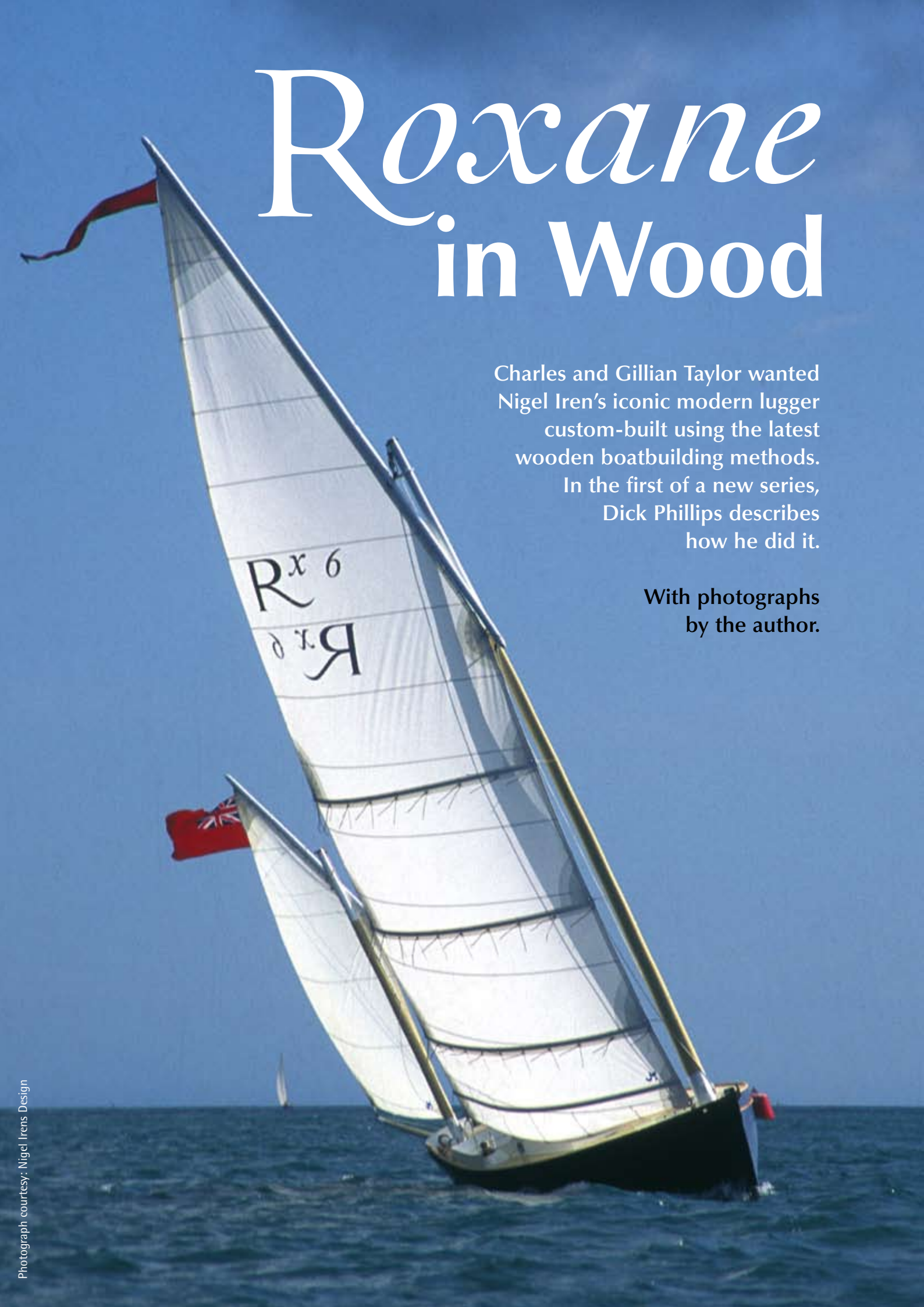
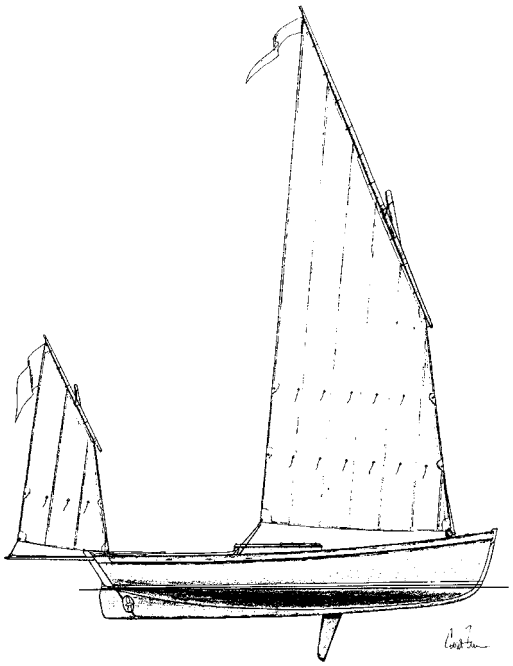
Roxane in Wood

Charles and Gillian Taylor wanted Nigel Iren's iconic modern lugger custom-built using the latest wooden boatbuilding methods. In the first of a new series, Dick Phillips describes how he did it.

With photographs by the author.



Photograph courtesy: Nigel Irens Design



What do you get when you cross a 32' (9.8m) yacht with a 19' (5.8m) gaffer? No, there's no punch line; it's a real question and the answer is Roxane, a blend of traditional lines and rig design with the modern application of technology and materials. This was the conclusion that my customers, Charles and Gillian Taylor, arrived at after deciding that they wanted a new boat. Both are experienced sailors in their own right. Gillian has spent most of her sailing experience afloat in cruiser/racers, most recently on a Contessa 32, whilst Charles has more experience in dinghy sailing and still sails his Memory, a modern gaffer, competitively. So Charles and Gillian's choice as a hybrid of the Memory and the Contessa 32 was Roxane, which at a shade under 30' (9.1m) gives the capability to race with the traditional fleet and go cruising in reasonable comfort.

When you mention the name Nigel Irens in most sailing clubs, everyone nods reverently and conversations turn to record breaking trans-oceanic passages, circumnavigations and usually Ellen MacArthur's name is mentioned. In other circles, very successful power boat designs are discussed and the *iLan Voyager* and *Cable & Wireless Adventurer* record breakers are recalled. Amongst lovers of traditional boats, his name evokes the Westernman pilot cutters and of course, those two elegant luggers, Roxane and Romilly. In fact, Nigel is the epitome of the all-round designer who is capable of draughting world beating shapes for all kinds of water craft. As well as their undoubted functional efficiency, they are also beautiful; all of the designs have enough fineness of line and fairness of shape to make you catch your breath, a noticeable reaction from all who see Roxane's lines when they visit my workshop.

Roxane is the result of Nigel Irens's intention to create his own ideal boat and the design has evolved over many years. His first thoughts were to create a strictly traditional hull, complete with gaff sloop rig and galvanised rigging; a reaction, perhaps, to all that hi-tech multihull design which has earned him his worldwide reputation. By the time Roxane became a reality, he had decided upon maintaining the essence

Top: *CNC router cutting a plywood boat kit at Jordan Boats.*
Above: *On ply kits, part-cut webs hold the components in place for shipping.*
Below: *The building moulds for Roxane arrive at Dick's Dorset workshop.*

of tradition in hull shape and rig design but utilising more up-to-date techniques and materials which old-time seafarers would have surely used if they had been available. The design is about efficiency with simplicity, resulting in a clean set of lines with a basic, functional layout and a strikingly simple rig. The unstayed masts are made from carbon fibre which dramatically reduces weight aloft allowing the hull to remain slim while carrying a respectable sail area.

As one would expect from a leading modern designer, all the drawings are now on computer and as such are instantly transferable. This means that a drawing from the design office can be emailed to the builder and then forwarded to the customer or a contractor or indeed any permutation of the above. As the builder, it is necessary for me to work with hard copies of the design, therefore I take the drawing on a CD to the local print shop and have it printed off in a short time. The other great advantage of digitised drawings is that the files containing the information can be sent to CNC – computer numeric control – machines which are capable of producing the items exactly as drawn. The most obvious example of this is obtaining a set of body moulds by sending the file of the body plan to a CNC router operator, who can produce them from sheet materials.

Enter the redoubtable Alec Jordan of Jordan Boats of Fife who produces CNC-routed boat kits. Give him the right computer files and Alec can create anything from a simple transom pattern to a full set of plywood parts including all the planks from which to build your boat. These methods have been around for many years but the cost of the equipment has meant that it was only available to high budget projects such as race-boat producers or high volume manufacturers. Now the balance has tipped and the cost of producing a set of moulds by this method is far less than setting up a loft floor and lifting patterns from the full-size lofted lines. The changes have occurred gradually; for some time designers have been able to produce full-size plans on paper for small boats and on Mylar for larger craft. Mylar is a plastic film which. unlike paper, is unaffected by moderate changes in temperature and humidity.

So it was that a designer in Devon sent an email to Scotland resulting in a set of body moulds, a stem pattern and a transom pattern being delivered to my boatshop in Dorset. The body moulds had been modified slightly to allow us to assemble them more easily. When I was teaching boatbuilding, I met a student called Stuart Weatherall who, with a background in the printing industry, is far more computer literate than I am. His main purpose in attending the course was to have gain expertise and take advantage of some space to develop his ideas on how modern technology should be adapted for building boats, to my mind an important function of further and higher education. He came up with a method of assembling the building jig using 'I' section TJI joists to connect them together.

TJI joists are made by iLevel from OSB – orientated strand board – beams which are glued top and bottom to laminated sections grooved on to the edges forming an I beam. Made for the building trade to "reduce problems of shrinking, cupping, bowing, twisting and splitting", TJI joists are light in weight and very stiff in edge plane, so when inserted through the moulds, they hold them rigidly on the same plane. I contacted builder's merchants Travis Perkins Ltd and found that I could download the sectional dimensions of the joists from the iLevel website. Isn't technology wonderful! Having chosen the appropriate section, I emailed it to Alec so that he could router the holes in each mould in exactly the same position in relation to the centreline and waterline.

I decided to use three joists, two set horizontally equidistant either side of the centreline on the 500mm (20") waterline and one vertical on the centreline above datum waterline. This allows three 8m (26') lengths of joist to pierce all but the

Facing page: *Assembling the building jig began by threading the moulds on to the central vertical TJI joist.*

This page top: *Then the two horizontal joists were inserted. Note that at this stage, the moulds are simply standing on the workshop floor.*

Inset: *Such was the accuracy of the CNC cutting that the joists came through with very fine clearances.*

three moulds furthest forward – moulds 0.5, 1 and 1.5 – which only the centre joist reaches. Incidentally, the joists come in lengths up to 15m (49') subject to safe handling requirements, they say. This distribution of the beams is the best compromise for providing good support at the body mould extremities while piercing as many moulds as possible. The forward moulds, being smaller, are much easier to hold in position more conventionally using cross poles and braces.

When the beams arrived I checked them for consistency of sectional shape so that the moulds would thread on to them easily. I found that the beams were slightly wider than planned and that the thickness of the OSB needed a little more clearance. This board is joined at regular intervals with wavy joints and has scribed circles along the full length which are used for passing pipes and electric conduit through them when used as joists in buildings. It took very little time for us to cramp the three beams together and run the power plane along the edges so that they were at their 302mm (12") width and their edges were cleaned up for setting out the mould positions.

The station spacings of 750mm (29.5") are marked out on the beams when they are still cramped together. The golden rule when setting out body moulds is to ensure that the appropriate face of the body mould sits on the station line. By this I mean that the line of the planking, when wrapped around the building jig, sits at an angle to the mould edges. As the planks curve in towards the bow and stern from the mould with greatest beam, they naturally sit on the edges of the moulds. For this reason, it is vital that this edge of the mould is exactly on the station line so that the hull is faithful to the design shape. So we position the forward edges of the forward moulds and the after edges of the aft moulds on the station lines. These lines were then set out along the beams' edges and squared across to the other side. With the station positions marked along the beams, we were ready to start assembling the building jig.

We started with the amidships mould, number 6 and passed the vertical central joist through it until it sat on the appropriate mark on the joist. We then threaded the next one aft, mould 7, on to the joist in the same way and so on until we had all of the aftermost moulds on the joist. At this stage we did not fix any of the moulds in place but raised the amidships mould on packing and supported the beam aft with a saw

trestle. After some discussion with my fellow boatbuilder Luc, we decided to insert the other two joists through their slots in the moulds from astern. This entails pushing or tapping the joist forward while methodically moving the moulds aft where they tend to move forward.

With all of the aft moulds in place, we then threaded the forward ones on to the three joists, which proved to be a relatively straightforward job. The joists were well supported with more saw trestles which we had to move as each mould reached them but with two pairs of hands even this was easy. We next fastened the moulds to the joists in their correct position. This was done by screwing 25mm (1") square grounds to the joists on the pre-marked lines and screwing through the moulds into the grounds to hold them in place. I avoided using glue at this point because I am hoping that the moulds can be disassembled after use, allowing us to store them. Threading them all together and effectively assembling the jig took all of four hours!

Of course, the jig is not yet finished as we still have to raise it up off the floor and level it up but it is already surprisingly rigid with all of the waterlines and centrelines in perfect alignment. The workshop in which we are building Roxane was previously a stock shed with a floor which slopes to one side and towards the door, so supports have to be rigged to hold the jig with its waterline on a horizontal plane. To achieve this, we first jacked up the jig with a combination of bottle jacks, hi-lift jacks and trolley jacks until the level plane was reached. We checked the line with a laser level set up abreast of the jig at the correct height and double checked with a water level fore and aft and athwartships.

Once the jig was level, support was provided by fitting legs to each mould and fixing them to a ladder frame sitting on the floor. This frame was made up of lengths of 225mm X 75mm (9"x3") softwood joined lengthways with shuttering ply butt-straps. Once the frame was checked for squareness by taking diagonal measurements, we braced it diagonally with two braces.

This method of setting up a boatbuilding jig has saved a substantial amount of time and is an excellent use of available technology. Alec Jordan is already suggesting using the general arrangement for cutting out bulkheads and decks. Watch this space to find out how far we take it.

CONTACTS

Dick Phillips, Lewesdon, Silver Street, Lyme Regis DT7 3HT
Tel: +44 (0)1297 442884/ +44 (0)7828 911757
www.dickphillips.co.uk

Roxane plans: Nigel Irens Design, Tanners Yard House, St Lawrence Lane, Ashburton TQ13 7DD
Tel: +44 (0)1364 652554 www.nigelirens.demon.co.uk

CNC cutting: Jordan Boats, Orr Cottage, 8 School Wynd, East Wemyss, Kirkcaldy, Fife KY1 4RN. Tel: +44 (0)1592 560162
www.jordanboats.co.uk

TJI joists: iLevel, Perry Mill Farm, Birmingham Road, Hopwood B48 7AJ Tel: +44 (0)121 445 6666 www.iLevel.com

Roxane in GRP: Concord Beheer BV, dr Schaepmanlaan 27, 4836 AR Breda, Netherlands tel: +31 768 883552
www.romilly.nl