

# A Cheap Boat Shelter

— by George Cadwalader —  
 Photographs by James Marlinski



*The author's bowed-frame temporary boat shed attached to the back of his workshop. The bowed rafters allow the width of the building to be carried higher than that of an A-frame structure.*

One winter I set about rebuilding the galley on our boat. She lay at the time at a pier about 200 yards across the pond from my shop, and I thought it would be easy enough to row back and forth from the shop to the boat.

I must have rowed that trip a thousand times. No sooner would I arrive at the boat than I would remember some indispensable tool that I'd left behind and

back I'd go. Templates that fit perfectly produced parts that did not, so it was once again into the skiff, across the pond, tie up the skiff, recut the part, back into the skiff, back across the pond, retie the skiff, climb under the winter cover, and the damn thing still wouldn't fit. Never again, I decided, would I undertake a job of any size unless the boat were right outside the shop.

Some time later I undertook a bigger modification



below, and having learned my lesson, moved the boat into the yard. There I built a frame on deck, covered her with canvas, and spent the rest of that winter performing Houdini-like contortions trying to get in and out from under the frame. After that experience, I resolved to take the time to build a proper shed. The additional cost, I concluded, would be more than repaid by the time I'd save.

In due course another major job presented itself, and I began thinking about the most inexpensive way to build a temporary structure to accommodate a 41-foot-long deep-keeled sloop with a 9½-foot beam and measuring 12 feet from keel to housetop, and still have enough room left over to work all around her. My yard was wide open to winter gales, and my neighbor was acutely sensitive to unsightly alterations to her view, but the biggest problem was that I had only \$500 to spend on materials.

While pondering these difficulties I recalled a laminated stem piece I'd once made. I had felt certain that the whole thing would spring straight again as soon as I unclamped it from the mold, but of course it hadn't, since as long as the glue held and the adjoining strips couldn't slide relative to one another, the curve was locked in. Why, I wondered, couldn't the same principle be used to build bowed rafters for my shed? Allowing 18 inches for the trailer the boat would be delivered on, I needed a minimum width of 10 feet at a height of 10 feet to allow clearance for the point of maximum beam. The advantage of bowed rafters was that they would carry the width of the building considerably higher than could straight ones on a structure of the same overall height.

#### A Design in Progress

As an experiment, I used a couple of 16-foot lengths of 1-inch by 3-inch spruce strapping left over from the winter cover. Lying one of these on edge on a relatively flat part of the lawn, I pounded a stake into the ground about 2 feet from one end to allow for the end

to pull toward the center as the piece bent. At the midpoint and on the opposite side from the first stake, I pounded in a second one. Then proceeding to the opposite end, I began very cautiously to bend the strap against the center stake. When ominous crackling announced that the strap was near the breaking point, I stopped and secured the end with a third stake. The result was a rather pleasant curve.

I bent the second strap to the first one and, after clamping the two together at a number of points, lifted them off the stakes. The curve held fine but the assembly seemed a bit too limber for my purposes. To correct this I cut a 2 by 6 into 8-inch blocks and placed these at intervals between the two straps to form a girder, which added enough rigidity.

Using the first girder as a pattern, I pounded a lot more stakes along the periphery of the curve. To make a second girder required only that I draw another strap up against the stakes, lock it in place, distribute my blocks along the inner face, draw the inner strap up against the blocks, and nail the whole thing together with 6-penny common nails driven into the blocks from both sides. Had I thought of it at the time, I would have done better to space the blocks at 2-foot intervals to provide nailers for the purlins we later nailed across the rafters. And I could have saved later grief had I made the block at the upper end extra long and placed my nails to allow for cutting the angle to the ridge pole.

The width of my driveway dictated that the shed be no wider than 16 feet. The height of the shed was governed by my intention to run the ridgepole under the rakeboards on the gable end of the shop. Doing so would permit a tight seal between the buildings. By butting the two end to end, I'd also avoid having to frame up the back of the shed and would gain direct access from the shop to the shed.

Since the curve of the rafters was dictated by the breaking point of the strapping rather than by mathematics, I wasn't sure I'd get enough width at the required height and still stay under the rakeboards. To find out, I spread the lower ends of my two rafters 16 feet apart, butted the tops together, and shoved the whole works up as high as I could get it under the overhanging roof of the shop. Happily, the random curve gave the width I needed at 10 feet but didn't leave me much height above the side decks at the point of maximum beam. I decided I could live with this in exchange for the convenience of abutting the shop. Obviously, someone putting up a free-standing building using the same technique could end up with any combination of height and width he wanted. The arch achievable from bending 16-foot straps could probably span up to 20 feet at its base and still retain adequate pitch to shed snow.

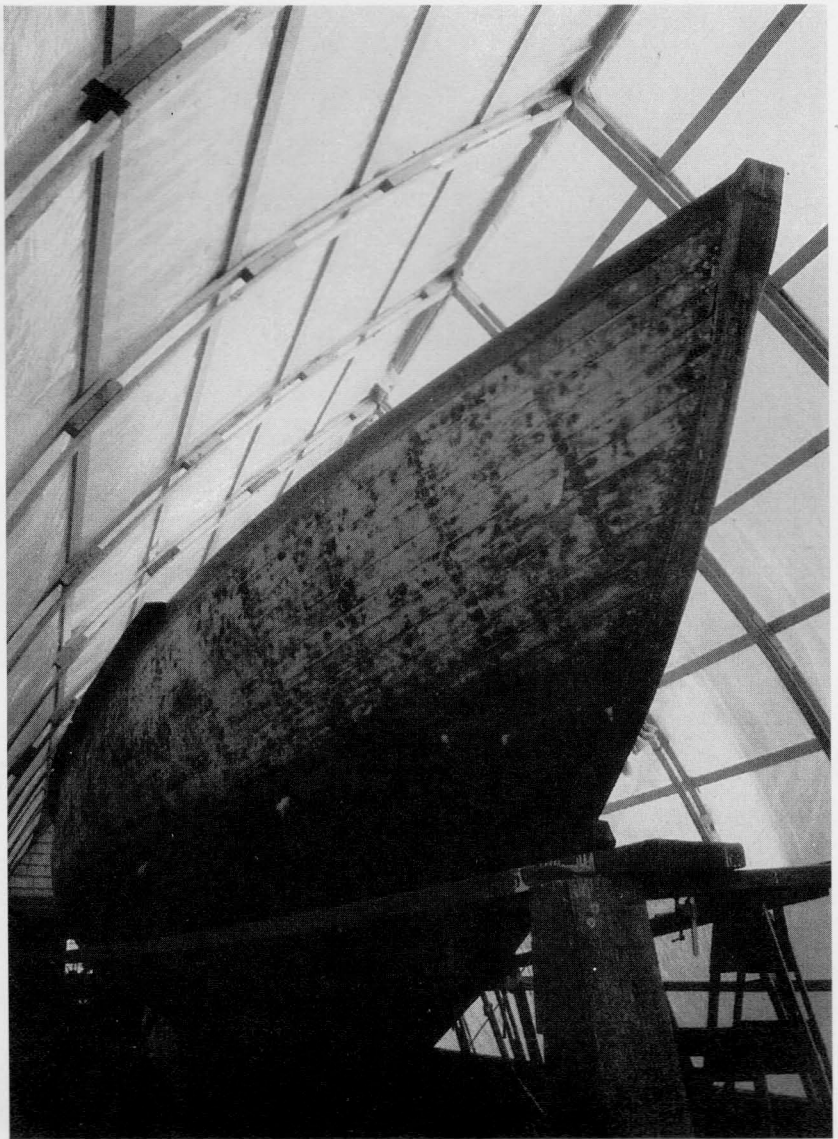
While the first two rafters were still in position against the shop, it was easy enough to establish the angle to the ridgepole using a level to mark off a vertical line at the point where the top ends butted. The marked rafter became the pattern for the rest, which were cut on the flat. When bending the strapping, the inside piece ended up being longer because of its tighter curve. Rather than cut the bases flush, I left the inner strap long to form a lip against the plate.

My driveway slopes away from the shop at an incline of roughly 1 foot in the 48 feet I planned as the length of the shed. The easiest way to build a knee wall of changing height seemed to be to set posts in the ground at 4-foot intervals and then cut them all off level. I wasn't much concerned about these posts rotting in the year or so that the shed would stand, so I decided 6-foot lengths of green scrub oak would do fine and cost nothing if I cut them myself. Before I had the chance to do so, a friend came by with some creosoted timbers salvaged from an old pier, and we used these instead. Another friend produced four doubled-up 16-foot 2 by 4s that had become too chewed up to use for his pump jacks; these did fine as a plate to span the posts. To sheath the knee wall I scrounged bits and pieces of plywood from old concrete forms. None of this cost anything.

My luck ran out when it came to finding more strapping, and this I had to buy. Spacing the bowed rafters at 4-foot intervals required 12 pairs, or a total of 48 16-foot straps. Strapping can be bought by the bundle where I live. Usually only about half of every bundle proved clear enough for bending; we put aside the rest for purlins. I got a lot of 2-inch scraps of various widths from construction jobs and cut these down to make the necessary 2 by 3 blocking.

### Erecting the Shelter

Two friends, John McRoberts and David Masch, helped put the building up. Bending, nailing, and cutting the rafters took us one full day. We then spent the better part of two more days getting up the knee walls. The slowest part of this job was digging the post holes.

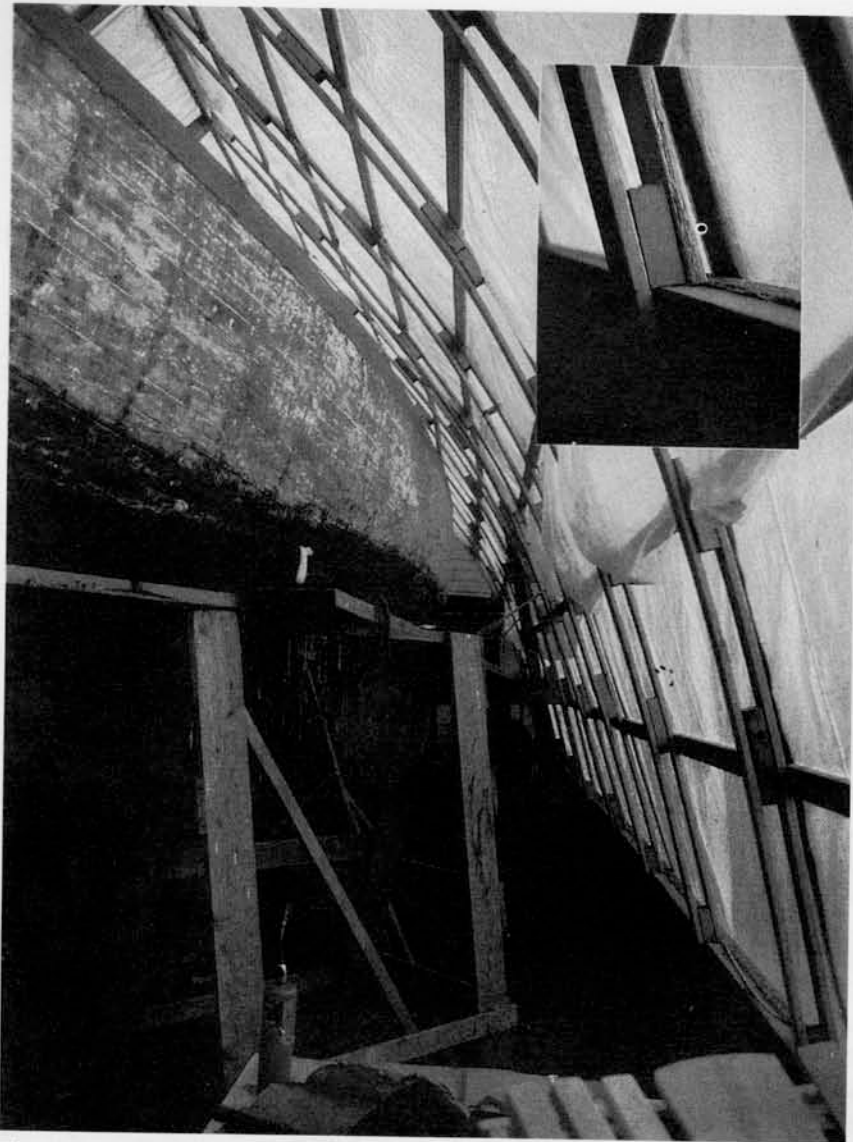


*At ground level, the shed provides plenty of room for maneuvering, and the 10-foot width at a height of 10 feet allows adequate clearance for the maximum beam of the boat.*

Our rented power post hole digger proved more effective at whirling the operator around the auger than it did at penetrating the hard-packed gravel in the drive, so we ended up using shovels.

The boat itself seemed like the perfect scaffold from which to raise the rafters. Consequently we waited to finish the job until the boat was delivered by hydraulic trailer to my yard. Then, with John as high man atop the boat and David and me passing rafters from either side, we were able to raise the roof in one afternoon.

I made two mistakes here. One was to use strapping for a ridge pole. Although I was able to stiffen this by capping it with a second piece to form a T, I still wish I'd used something heavier. The second mistake was not taking the time to better match up the pairs of rafters. Using knotty spruce for bending stock



*The rafters are made of two pieces of strapping held apart by 2-inch by 3-inch blocking. Inset: The inner straps are left long to form a lip against the plate.*

resulted in a fair amount of variation among individual rafters, and I should have stacked the 12 sets on the flat and rearranged them then to minimize wandering. As it was, the purlins, which we nailed up on 2-foot centers, helped to fair things up a bit, but not enough to eliminate all the dips and humps that later caused problems when we tried to pull the wrinkles out of the plastic covering.

### The Covering

For advice on the best plastic to use, I turned to Dr. Cam Gifford who runs our local nursery. Glass has pretty well given way to plastic on greenhouses and as a result, nurserymen are apt to be the best sources of local knowledge about covering large structures with plastic sheeting. Our greenhouse men were using

an envelope of double-thickness plastic, sealed around the edges, and inflated with a constantly running blower to form a largely free-standing, surprisingly rigid structure. This system is generally erected over a framework of light steel box girders but could be adapted to a wooden structure such as mine. Its great advantage is that two thicknesses with air between them insulates against heat loss and is less prone to sweating on the inside than a single sheet.

As I write this the temperature outside is -5 degrees F, and the idea of an insulated structure seems mighty appealing. However, it's also blowing a gale from the north, the lights are flickering on and off, and we may be in for yet another power failure. God knows what would happen to a shed with blown-up walls should the electric blower fail in these conditions. Cam tells me that loose plastic will stand up to quite a flogging as long as there are no rough edges for it to tear against, but nonetheless I'd be pretty worried that, with the flimsy framework this type of structure is usually built over, the whole works might collapse if it lost the rigidity provided by the inflated walls.

Still, if you had a backup generator and could be sure you'd always be around to hook it up if needed, an inflated shed is unquestionably

more comfortable to work in and easier to erect than the single-sheet type. But remember, if considering this type of structure, that the metal arches are designed for greenhouse use and probably won't give you the height you need for a boat unless you extend the frames with welded pipe or else build higher sidewalls.

These considerations, along with the fact that I couldn't afford it, led me to abandon thoughts of a double-walled shed. As an alternative, Cam suggested a type of covering that consisted of a laminated triple-layered polyethylene, with the middle layer being a rip-stop weave of glass fibers that controlled puncturing and resisted brittleness and shattering in cold. It had been developed by a greenhouse man in the northern plains. I decided to go with that product, which came in 10-foot widths and which could be sewed together

or joined with a special plastic channel and insert strip. (For sources of this type of covering or something similar, check with your local nursery.)

Under Cam's imperious direction, we raised the plastic by throwing lines over the ridgepole and tying these to bunched-up sections of the cloth, which we had previously laid out flat next to the shed. With three of us pulling on the lines and Cam issuing muffled orders from beneath the cloth where he had stationed himself to prevent snags, the plastic slid smoothly up one side and down the other. We then nailed one edge down under battens and rolled the opposite edge around another batten, which we used to draw it up tight. This operation is best performed on a warm, calm day or else you'll find yourself borne aloft by a 40- by 50-foot spinnaker. Warmth is preferable, since the cloth will contract and tighten as the temperature drops.

I was reluctant to tack down the cloth with battens nailed to the purlins for fear of creating leaks. As an alternative I passed lengths of old fire hose over the

ridgepole and nailed these fast to the knee walls after drawing them down as tightly as possible. These have proved reasonably effective in reducing the wave effect that high winds create under the plastic, but there remains more flapping than would exist were the plastic itself nailed down. I may eventually have problems with the panel stitching tearing out, but so far so good.

The shed has withstood a good many days of gale force winds and subzero temperatures. I've had to shore up the knee wall with flying buttresses in places to resist the spreading force created by the downward pressure of the rafters. Guy lines inside the building reduce racking at the expense of hindering mobility.

When the temperature rises above freezing it literally rains inside as the frozen condensation that forms on the plastic begins to melt. This, together with the leaks from along the sewn seams, are my only complaints. However, an occasional shower seems a small price to pay for the convenience of bringing the boat right into the shop.