GOOD OLD BOAT™

The sailing magazine for the rest of us!

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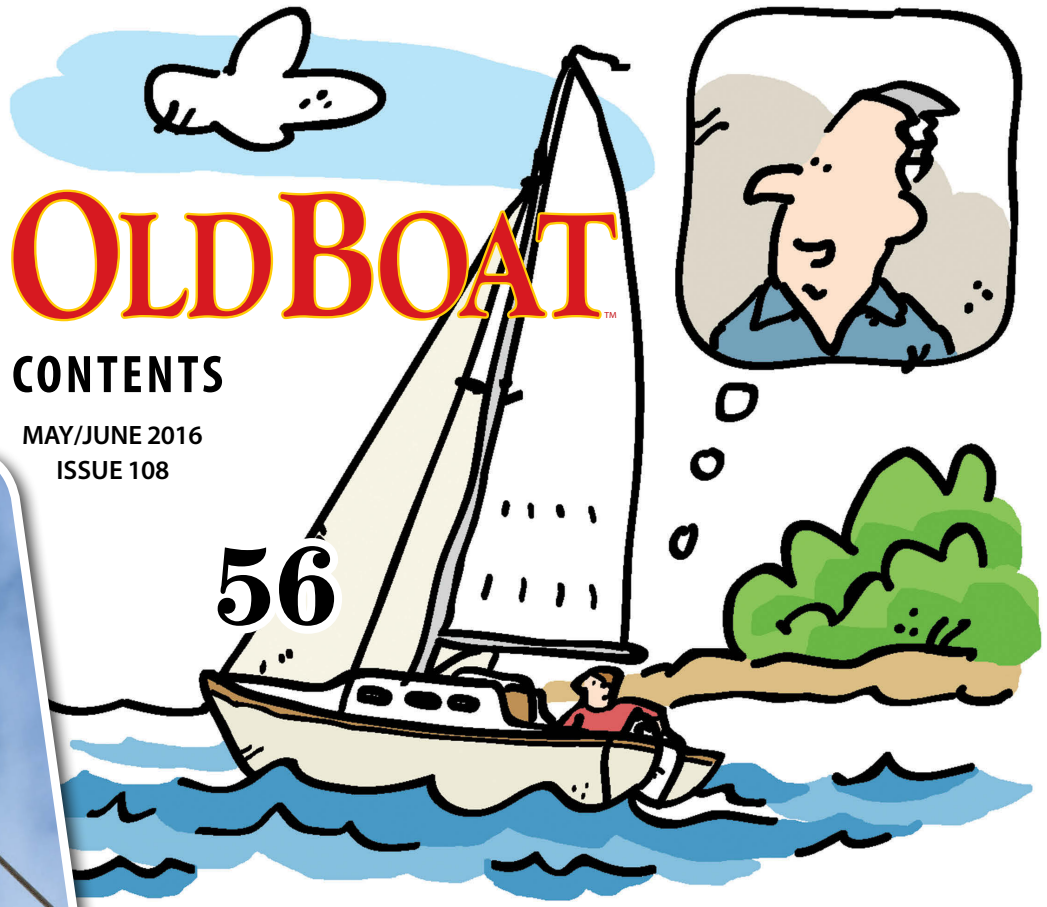

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This is the second of his boats that Dale Falk has managed to get on our cover. *Elnora* is a 1995 Pacific Seacraft Crealock 37. He took the photograph in Quicksand Cove, Aialik Bay, Kenai Fjords National Park, Alaska, where he says that most mornings there's a bear on the beach.

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Which cap looks best on you?

It all started with the classic denim ball cap we've offered for years. Not too long ago, we thought it would be cool to offer the same cap in khaki. We added those. Then we said, "Hey! What about khaki caps with denim bills? Or wait! How about denim caps with khaki bills?"

We were on a roll by then, so we purchased limited numbers of the two-tone caps to test our readers' demand for them. If one or the other of these suits your fancy, order it quickly. We'll re-stock the two-tone caps based entirely on how quickly they sell out. Find them at www.goodoldboat.com/books_&_gear/clothing.php.

AudioSeaStories.com

Dream on!

Nothing tells the story of the affordable dream quite so well as the Refit Boat articles that have been appearing in *Good Old Boat* since the earliest days. After 107 issues (and counting!), this winds up being a lot of inspiring tales of boats brought back from a slow decline or sudden disaster such as a fire, hurricane, or sinking. While focusing on what was done to salvage sailboats from destruction or disuse, these articles are truly the tales of the can-do rescuers, the sailors who made the affordable dream come true.

We are pleased to offer two collections of refit tales that began with blood, sweat, and tears (and any number of dollars, too, don't forget) and ended in glorious time spent afloat in comfortable and seaworthy vessels. These downloadable collections are called (what else?) Refit Boats 18 – 27 footers and Refit Boats 28 – 42 footers. They're available for $25 each. You'll find them at the *Good Old Boat* download site — www.audioseastories.com — in the Archive eXtractions section. If you're in the midst of a major refit or know someone who is, these digital books are sure to offer the encouragement needed to continue through the tougher times.

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A prescription for health

Take one tabloid six times a year

BY KAREN LARSON

PHOTO BY TOM WELLS

When we hang out in our booth at boat shows, subscribers stop to resubscribe, of course, but we're amazed by the number of times they tell us, "I'm here to renew my prescription." I usually do a double-take. Subscription? Prescription? Well, maybe it *is* a prescription. How many times have we all been told that God does not deduct any day spent sailing from our total time on Earth? Perhaps, then, reading *Good Old Boat* is a prescription for better health afloat.

Maybe we should call ourselves the *Good Old Boat* Magazine and Wellness Foundation. Our goal is to help our readers maintain their boats in a way that makes them proud, in a way that keeps them safe on the water, and in a way that gives them the security that comes of knowing what might go wrong and how to deal with it if or when it does.

> "Call it the confidence that comes with competence. As we restore and enjoy our boats, we (the caretakers) are likewise restored."

All this leads to a comfortable feeling of self-assurance aboard and that has to be healthy. Call it the confidence that comes with competence. As we restore and enjoy our boats, we (the caretakers) are likewise restored.

Sailing is a healthy activity no matter how you analyze it. When you motor out of the marina, raise the sails, and turn off the engine, the peaceful feeling that follows must surely be a powerful prescription against anything that ails you. Non-sailors will never appreciate that intense calm. It must be experienced.

We've all heard stories of individuals who, when told they had only a few months left to live, decided that what they'd most like to do in their remaining time was go sailing. The kicker, of course, is that they often lasted well beyond the number of months predicted. The cruising lifestyle is so healthy, some lived for years beyond their physicians' predictions.

I'll argue that if sailing is a healthy treatment and cure for all kinds of problems, *Good Old Boat* is a prescription for health: yours and that of your boat. At the boat shows, we welcome all who want to renew a subscription that guarantees they'll receive our kind of prescription for several more years.

One other theme has emerged and often been repeated over the years: that of joining a club. Our readers have frequently told us they want to renew their "membership." I like that concept as well. From the very beginning of this magazine, we've talked about being a "community of sailors." By that we meant that we are regular folks of the sort you're likely to meet on the dock. We don't pretend to have rounded all the great capes or raced in the America's Cup. We admit that there's a lot to learn about sailing and about taking care of sailboats. We don't know it all, but within our vast "community of sailors," we have all the bases covered. Every reader brings something to the mix and we are grateful for every one of you.

This allows us to do what we do best: we let your voices be heard. Most of our articles are written by subscribers who get in touch to ask us if an article on this project or that one might be of interest to other sailors, their fellow readers. What's different is that they do these projects themselves. We don't sit around at an editorial board meeting and decide that the September/October issue is coming up so therefore we need to assign someone to go forth and write a series of articles about haulouts and winterizing.

We don't hire someone to write a "what-if" article using assumed equipment in a pretend refit. Our readers take their boats apart, put them back together, and then write about their experiences. I'm more than a little leery about a refit that goes according to plan anyway. Have you ever heard of one that came in on time and under budget?

Whether they buy a prescription or a membership — or even a plain old subscription — our thanks go to all who are part of our "community of sailors." We are all better together.

Katnip in aquarelle,

Katnip framed

When editor Karen Larson offered payment for my refit article about *Katnip* (March 2016), she said maybe it would buy something *Katnip* needed. Now she has it. A friend converted a couple of sailing photos into a watercolor and our daughter had it put in a beautiful frame with a brass plaque. It is now proudly displayed in our "boat room."

–George Damerel, Oak Ridge, N.J.

Herreshoff honeymoon

Thank you, thank you for publishing George Damerel's wonderful piece on the Herreshoff America in the March 2016 issue. Just seeing that sail made our week and brought tears to our eyes. Ellen and I had to look very carefully at the photos because it appeared that George had somehow purchased our *Drummer Buoy*, until we noticed the different hull number in the text.

The America was my first boat (hull #171). This wonderful boat was a gem and a great first boat, especially for a noodnik novice like me. She took care of me despite my lack of skill and taught me so much.

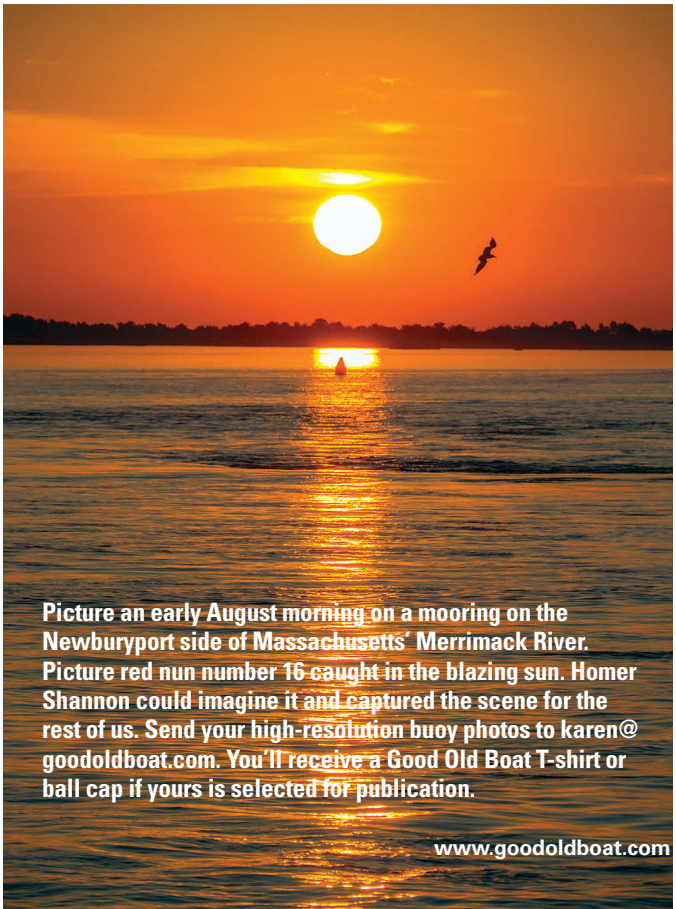
When we began construction of *Entr'acte*, our Nor'Sea 27, a dear friend "forced" us to sell *Drummer Buoy* to him, and to this day he maintains her as if we still owned her. Whenever we visit him and go for a sail, it is as if we never left. Ellen and I spent our honeymoon on *Drummer Buoy* and, as they say, "the rest is history."

–Ed Zacko, Sun City West, Ariz.

Eau de bateau

In "Scent of a Good Old Boat," March 2016, Michael Robertson suggested formulating and canning the scent of good old boats. I've found just the ticket. It came about as a result of sailing many a year and sea-mile on the brig *Lady Washington* as chief mate and captain. Back home once more, I experimented to find how I could bring that wonderful smell of hard-tarred rigging and decks to my 39-year-old 37-foot Island Trader ketch, *Avanti*.

I came up with a mixture of Daily's Seafin Teak Oil (one pint) and The Right Stuff Stockholm Tar from the Port Townsend Wood Boat Festival (one heaping spoonful). I call it Boat Candy and use it on my decks and down below. The aroma lingers throughout the whole vessel. Granted, it is a bit



Picture an early August morning on a mooring on the Newburyport side of Massachusetts' Merrimack River. Picture red nun number 16 caught in the blazing sun. Homer Shannon could imagine it and captured the scene for the rest of us. Send your high-resolution buoy photos to karen@goodoldboat.com. You'll receive a Good Old Boat T-shirt or ball cap if yours is selected for publication.

eau de bateau, and Zulu zzz …

sticky at first, but it hardens up. I am even replacing much of the outside varnish with it. The pine tar seems to make the teak oil last longer.

I've even gone so far as to formulate pine tar hand lotion by thinning the tar with a smidgen of turpentine and mixing a teaspoonful with unscented lotion from the drugstore. Someone suggested it might not be too smart to put turpentine on one's hands, but it doesn't take much and always reminds me of what the old poet Carl Sandburg said, "Whether you handle honey, tar, or dung, some of it sticks to the fingers."

–Tommy D. Cook, Port Angeles, Wash.

Note: *For those looking for ready-made boat-scented items, American Rope & Tar sells hand soap and hand cream with the fragrance of Stockholm Tar: www.tarsmell.com* ***–Eds.***

Zulu zone out

I enjoyed reading the article " Surface Weather Maps, Part 1" in the March issue and look forward to the continuing series. I offer a small correction to the chart converting Zulu/GMT time to local time (it's probably been noted by many):

In the columns for Zulu minus 5 hours (Eastern and Central time zones), the times for 1800Z should be 1:00 pm (not am), and for 2100Z should be 4:00 pm (not am).

In the columns for Zulu minus 7 hours (Mountain and Pacific time zones), the times for 1800Z should be 11:00 am (not pm).

In the column for Zulu minus 8 hours (Pacific time zone) the time for 2100 Z should be 1:00 pm (not am).

Perhaps this is an argument for using 2400 time instead of am and pm for weather, as well as for navigation and the log book.

–Jim Philpott, Annapolis, Md.

Mark replies

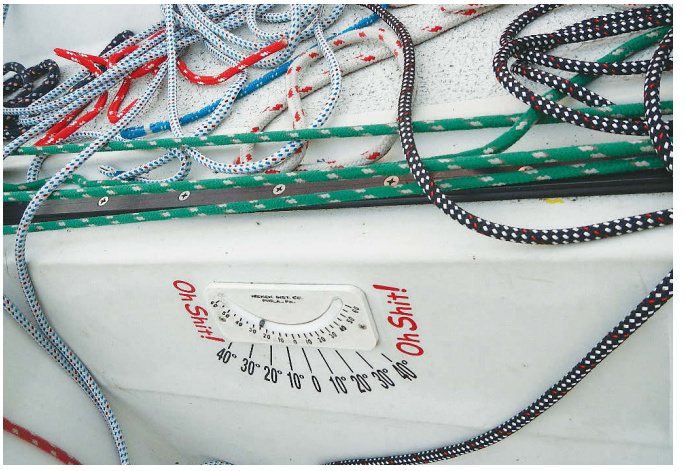
Thank you for catching the typographic errors in the Zulu/GMT conversion table. The corrected version of the table is at the foot of this page.

Using the 24-hour clock referred to as military time would certainly make using weather maps easier, but it wouldn't allow all of the meteorological agencies around the world to coordinate their observations and forecasts.

–Mark Thornton, Westlake, Ohio

Telling it like it is

In a bout of whimsy several years ago, I created an image file and sent it to a sign maker. Vinyl graphics were eventually applied to the boat's inclinometer so those of us with older



eyes could actually read the degree of heel from anywhere in the cockpit.

My friend Webb Chiles (yes, a gratuitously dropped name!) coined the term associated with the jpg file, hoping we'd never have to invoke the "Angle of Expletive," which stuck. This image showing 25 degrees of heel was captured during last year's Chicago Yacht Club Race to Mackinac.

–Jay Grizzell, Park Ridge, Ill.

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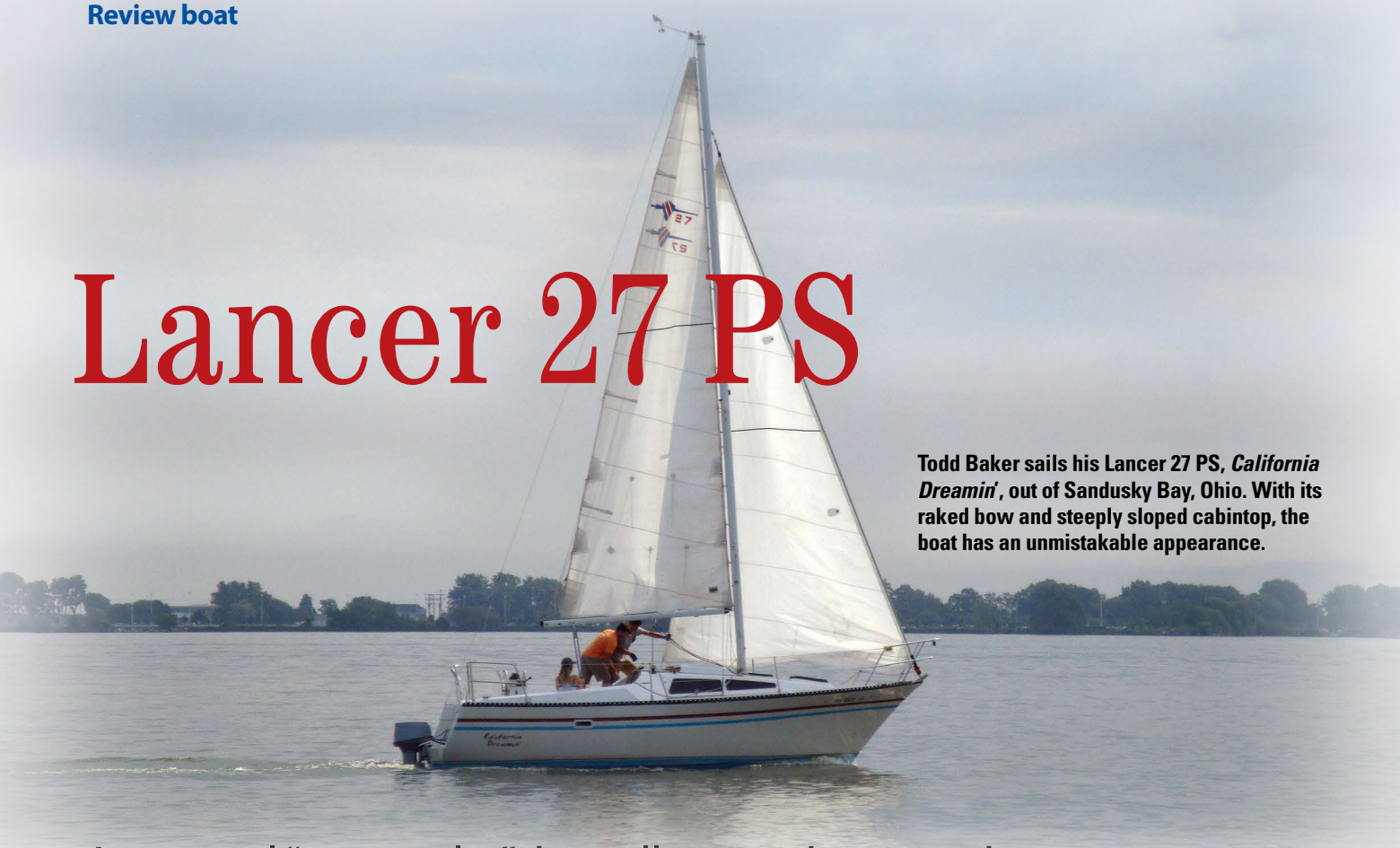
Zulu/GMT to local time conversion table

	Eastern time zone		Central time zone		Mountain time zone		Pacific time zone	
Zulu/GMT	(Zulu minus 4 hours)	(Zulu minus 5 hours)	(Zulu minus 5 hours)	(Zulu minus 6 hours)	(Zulu minus 6 hours)	(Zulu minus 7 hours)	(Zulu minus 7 hours)	(Zulu minus 8 hours)
0000Z	8:00 pm	7:00 pm	7:00 pm	6:00 pm	6:00 pm	5:00 pm	5:00 pm	4:00 pm
0300Z	11:00 pm	10:00 pm	10:00 pm	9:00 pm	9:00 pm	8:00 pm	8:00 pm	7:00 pm
0600Z	2:00 am	1:00 am	1:00 am	12:00 am	12:00 am	11:00 pm	11:00 pm	10:00 pm
0900Z	5:00 am	4:00 am	4:00 am	3:00 am	3:00 am	2:00 am	2:00 am	1:00 am
1200Z	8:00 am	7:00 am	7:00 am	6:00 am	6:00 am	5:00 am	5:00 am	4:00 am
1500Z	11:00 am	10:00 am	10:00 am	9:00 am	9:00 am	8:00 am	8:00 am	7:00 am
1800Z	2:00 pm	1:00 pm	1:00 pm	12:00 pm	12:00 pm	11:00 am	11:00 am	10:00 am
2100Z	5:00 pm	4:00 pm	4:00 pm	3:00 pm	3:00 pm	2:00 pm	2:00 pm	1:00 pm

Lancer 27 PS



Todd Baker sails his Lancer 27 PS, *California Dreamin'*, out of Sandusky Bay, Ohio. With its raked bow and steeply sloped cabintop, the boat has an unmistakable appearance.

An unusual "powersailer" that will get you home in a hurry

BY GREGG NESTOR

Richard "Dick" Valdes, founder and former chief executive officer of Columbia Yachts, established Lancer Yachts of Irvine, California, in 1974. In the dozen or so years that Lancer was in business, its product line totaled 20 models ranging in size from 25 to 65 feet and included both sailboats and high-speed motorsailers.

Dick contracted the design team from C&C Yachts to draw the lines for the bulk of Lancer's sailing yachts and commissioned W. Shad Turner to design the company's trailerable sailboats. With the majority of the company's product line in good hands, Dick perceived that he could market a motorsailer that could be sailed or powered. He teamed with German-born Herb David, one of the few boat designers around with a master's degree in naval architecture (from the University of Hamburg) and a taste for Italian styling. The results of this union performed tolerably well under sail but their high-horsepower engines helped them achieve speeds in excess of 15 knots when under power. They called them "powersailers."

In 1983, Lancer Yachts was sold to Bally Manufacturing Corporation of Chicago, which held the company for only two years. In October 1985, Lancer's then president, Saul Padeck, and partner Bill Mead reached a verbal agreement to purchase the company from Bally. Saul stated that the company would shift its emphasis from mass-produced sailboats to special-order custom motorsailers. "The sailboat industry has almost disappeared, so you have to find yourself a niche in the market," he said. "The guy who used to buy a boat for $25,000 is done because his discretionary income has decreased. We want customers who are buying million-dollar boats."

No Lancers were built after 1986.

Design

Herb David adapted computer-aided technology used in aircraft design to develop the hulls, keels, and rudders of the Lancer powersailers. His efforts resulted in a unique underwater design that employs two molded lift strakes running from aft of amidships to the stern. Lancer called these little wedges "finite ventilating surface-piercing foils." Although small, at high speeds they are quite effective in preventing the hull from squatting, and appear to generate enough dynamic lift to raise the boat's displacement hull onto a plane. They do add a modest amount of wetted surface.

The hull of the Lancer 27 PS is a novel blend of both sail and power. Since a more conventional bow caused the bow wave to rise up to deck level when under power, the bow on the 27 PS is flared. The sheerline is straight, the topsides are high, and the maximum beam is carried all the way aft. Underwater, the forward portion of the hull is all sailboat, including a ballasted fin keel. Starting just aft of amidships, the bottom begins to flatten out much like a powerboat's and the two foils create a hard chine toward the stern. Completing the picture is a spade rudder and, aft of it, a combination engine well and swim platform that extends the boat's waterline.

Construction

While the design of the Lancer 27 PS is unconventional, its construction is quite typical for the era. The hull is constructed of solid hand-laid fiberglass-

With *California Dreamin'* on her trailer, above, the fin keel, spade rudder, and the flat, chined aft quarter of the hull are easily visible. The "finite ventilating surface-piercing foils" that enable the hull to plane and achieve double-digit speeds resolve into an unusual shape at the stern, at right.

reinforced plastic (FRP) using layers of fiberglass mat and woven roving. It is not cored, and the thickness of the hull ranges from 0.3 inch in the topsides to 0.43 inches at the bilges.

The deck is also hand-laid but with the addition of a core of end-grain balsa to reduce weight while increasing stiffness. Fir plywood is substituted for the balsa in those areas where greater compression loading is anticipated, such as beneath hardware. The deck thickness is in the neighborhood of 0.6 inch.

The deck is epoxy-bonded to an inward-facing flange on the hull. The joint is capped with a black-anodized aluminum slotted toerail that's secured with polysulfide sealing tape, then mechanically fastened, through the top and the side, on 6-inch centers.

The Lancer 27 PS utilizes a one-piece molded hull liner that's a combination of solid laminate and cored areas where additional stiffness is required. Bulkheads are bonded to the liner, which functions as an integral structural member, providing transverse and longitudinal stiffening.

Because the fin keel is an integral part of the hull, there are no keel bolts to deal with, as the 1,700 pounds of lead ballast is glassed into the bottom of the hollow keel. The spade rudder is foam-cored FRP.

Deck features

With the exception of the stemhead fitting with its light-duty anchor roller, the anchor locker's hasp, and a pair of open-throat cleats, the foredeck is relatively clutter-free. A stainless-steel bow pulpit, double lifelines, and light gray non-skid make the area a fairly secure base on which crew can make sail changes and perform mooring and anchoring tasks.

As the deck rises to form the wedge-shaped cabintop, there is a 2-foot-square, smoke-gray translucent hatch. Farther aft, the companionway hatch is fitted with a seahood. Smoke-gray dead-lights, two on each side of the cabin trunk, are styled to mimic the forward slope of the cabin. The sidedecks are relatively free of hardware and are comfortably wide — 16 inches at the beginning of the cockpit and becoming wider going forward.

One of the most striking features of the Lancer 27 PS is the cockpit. It is 8 feet long, with seats 20 inches deep. The coamings are properly sloped and quite high — 11½ inches at the lowest and rising to 17½ inches. The footwell is 28 inches wide and 15 inches deep. Forward, there's a 26-inch-deep bridge deck and aft, a pair of 2-inch drains.

Cockpit seat hatches on either side of the binnacle provide access to the cavernous area between the aft cabin and the transom. Even though this area houses the 46-gallon aluminum fuel tank, two batteries, and the battery charger, there's still plenty of room for

The Lancer's cutaway transom, above, allows easy access to the swim platform in the scoop stern for swimming and dinghy boarding. The cockpit, at left, has long seats with high, well-angled backrests and a wide bridge deck. The controls for the outboard motor are on a post next to the pedestal.

In the multifunctional forward cabin, far left, the dinette converts to a king-size berth. The galley and the electrical panel are to starboard of the companionway ladder and the double aft berth is behind it, near left. The galley, below, has a small sink, an alcohol cooktop with a cutting board cover, an icebox, drawers, and lockers outboard. The head, lower left, has a marine toilet and a telephone shower.

additional loose gear, as well as fixed equipment such as a water heater, air conditioner, and/or a generator.

Speed, depth, and wind gauges are located in the coaming on the port side above the cockpit seat hatches. A rudimentary engine panel is opposite to starboard.

Aft of the transom is a short sugar-scoop swim platform. Port and starboard stainless-steel rails and a pair of open-throat mooring cleats flank the transom, which is cut down in the center to ease access to the swim platform and also to function as a helmsman's seat. The swim platform is fitted with a swim ladder and an outboard motor bracket.

Belowdecks

A stainless-steel ladder fitted with four teak rungs leads down into the main cabin. The layout below is simple, bright, and open.

Forward, instead of a V-berth, there are opposing settees that form a U shape and easily provide seating for five. Between the settees, and built around the compression post under the mast, is a centerline teak table. This table can be lowered, covered with cushions, and converted into a king-size berth measuring 74 inches long and 72 inches wide.

Aft and to starboard of the U-shaped seating area is the galley, which consists of a stainless-steel sink with pressurized cold water, an Origo 4000 alcohol cooktop, and a 2.5-cubic-foot icebox. For stowage, there are four cabinets and three drawers. Immediately above the icebox is the electrical panel. Our review boat was fitted with the optional AC panel.

To port, directly opposite the galley, is a narrow hanging locker with a bureau top and the head compartment, which measures a generous 48 x 32 inches and has a forward-facing head, a stainless-steel sink with a hand pump, and a pressurized "telephone" shower. The marine toilet and sink were optional equipment.

Behind the companionway ladder and beneath the cockpit is the aft cabin that, in its entirety, is an athwartships, queen-size berth measuring 54 x 78 inches. It can be separated from the main cabin by a privacy curtain. A pair of portlights in the cockpit footwell as well as port and starboard portlights in the hull sides provide ventilation and light. A shelf surrounds the berth on three sides. This compartment adds two more berths and brings the total to four.

In addition to the galley stowage, there is a locker in the bow above the U-shaped settee and stowage behind the settee backs and beneath the aft end of each settee. Also beneath the settees is the U-shaped 60-gallon aluminum water tank.

The boat's interior is predominately off-white gelcoat trimmed in oiled teak. The drawers are solid teak, and the locker doors are teak with cane inserts that ventilate the lockers and add a touch of class. The sole is mostly off-white gelcoat with teak-and-holly inserts. Overhead, the insulated vinyl liner is fitted with zippers where access is needed to deck fittings. Headroom is 6 feet 2 inches.

A hatch immediately forward of the aft berth provides access to the bilge and bilge pump. The optional 20-gallon aluminum holding tank is in the keel cavity above the lead ballast.

The rig

The Lancer 27 PS is a sloop with a ⅞ fractional rig. The mast, which is stepped in a tabernacle that includes a stainless-steel block organizer, is supported by a forestay, a split backstay, a pair of cap shrouds running through a single airfoil spreader, and a pair of lower shrouds. The chainplates are inboard 18 inches and allow for a sheeting angle of approximately 12 degrees for the jib. Both halyards are sheaved internally and there are provisions for additional internal halyards.

The 36-inch headsail tracks are inboard and just aft of the chainplates. On the aft end of the cabin, one each side of the companionway, is a pair of Lewmar #16 self-tailing winches, used not only to hoist the halyards, but also to control the headsail sheets. Two cam cleats just forward of the winches are used to secure the halyards when sailing. There are no winches on the coamings. This basic equipment package makes singlehanding a bit awkward. An optional equipment package was available that would have made sail handling much easier. It included additional headsail tracks and winches installed on the coamings near the helm.

The mainsail is sheeted to a very basic traveler mounted on the bridge deck. A vang, topping lift, and slab reefing with two points make up the rest of the sail controls.

Under way

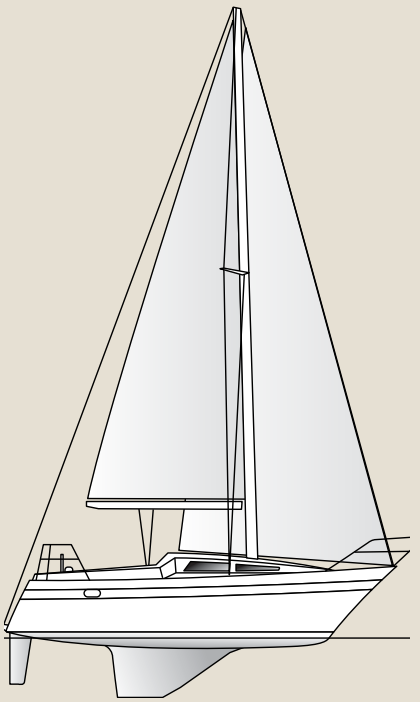
Our test boat, *California Dreamin'*, is owned by Todd Baker, who sails out of Sandusky Bay, Ohio. Though Todd was a sailor in the U.S. Navy, he'd never owned a sailboat before coming across this Lancer 27 PS with a "for sale" sign. He took the plunge, made friends with the seller, and learned to sail.

On the day of our scheduled sea trial on western Lake Erie, the winds were light and variable, which made assessing the Lancer 27 PS's capabilities something of a challenge. I did confirm that the boat is not a light-air performer and doesn't like to point all that high, maybe 45 degrees. Its best points of sail are on a run and broad reach.

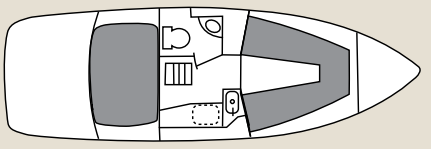
A displacement boat with a waterline of 22 feet has a theoretical maximum hull speed of 6 mph (5.2 knots). But the Lancer 27 PS is not normal. Fitted with a 200-horsepower outboard, the boat has achieved a recorded speed of 20 mph! *California Dreamin'* was equipped with a 40-horsepower outboard and, with the throttle fully opened, the speedometer read 10 mph. (This is a powerboat in many ways, remember, and powerboaters record speeds in mph.)

While under sail, the boat is quiet and smooth, as one would expect of a sailboat. Under power it's a different story. The outboard is noisier than an inboard and the ride is not all that smooth — a bit wobbly in fact. Turning under power, especially at speed, is quite uncomfortable. It's best to reduce power when maneuvering.

Lancer 27 PS



Designer:	Herb David
LOA:	26 feet 7 inches
LWL:	22 feet 0 inches
Beam:	8 feet 7 inches
Draft:	4 feet 3 inches
Displacement:	4,600 pounds
Ballast:	1,700 pounds
Sail area:	310 square feet
Sail area/disp. ratio:	18
Disp./LWL ratio:	193
Ballast/disp. ratio:	.37
Year built:	1983-1985



Things to check out

The majority of the sail-handling hardware is minimal, basic, and low-end. This includes the headsail furler, headsail tracks, and traveler. If they haven't been updated, they're prime candidates for replacement. The electrical panel is basic and may require the addition of a sub panel to accommodate modern instrumentation.

As is the case with most 30-year-old boats, there will be the typical issues related to age, including water incursion around stanchions and other deck hardware, craze cracking of the gelcoat, and head odors from saturated holding-tank hoses. There have been reports of internal corrosion of the water tank and subsequent leaks, external corrosion of the fuel tank, and internal failures of the optional aluminum holding tank.

Todd told me that the mounting screws around the deadlights on *California Dreamin'* work loose every season. This, and aging sealant, causes significant leaks. Renewing the sealant and through-bolting the deadlights should cure the problem.

Conclusion

The Lancer 27 PS has aged well and is an attractive-looking boat . . . except, perhaps when viewed from astern. The interior is laid out well, is user-friendly, and gains significant volume from the space that would have normally been filled by an inboard engine. It has one of the largest head compartments I've seen as well as a generous aft berth.

Compared to other manufacturers' powersailers, the Lancer 27 PS performs better under sail. Under power it can be both fast and a bit awkward. Overall, its performance is acceptable for what it is.

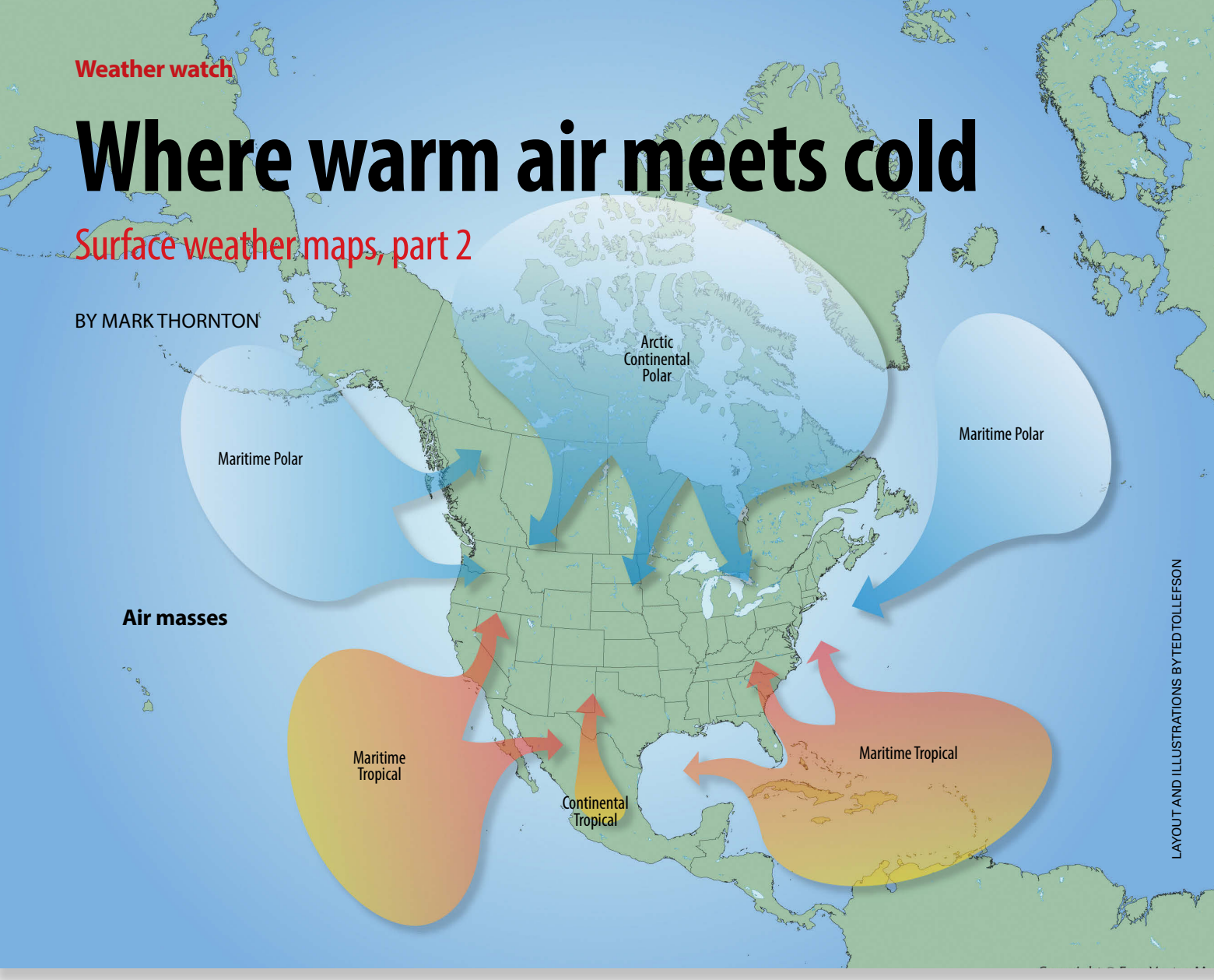
The demand for powersailers is not that strong. Expect to pay $6,000-$10,000 for a boat in good condition.

Gregg Nestor is a contributing editor with Good Old Boat. *He has authored three books on sailing, including* Twenty Affordable Sailboats to Take You Anywhere, The Trailer Sailer Owner's Manual, *and* All Hands on Deck. *He has been preparing his boat for a trip down the Intracoastal Waterway.*

Where warm air meets cold

Surface weather maps, part 2

BY MARK THORNTON



In the March 2016 issue I introduced surface weather maps, meteorological time-keeping systems, the difference between issued and valid date and time, and barometric pressure. Now we'll look at the symbols and meteorological shorthand used on surface weather maps.

Pressure patterns

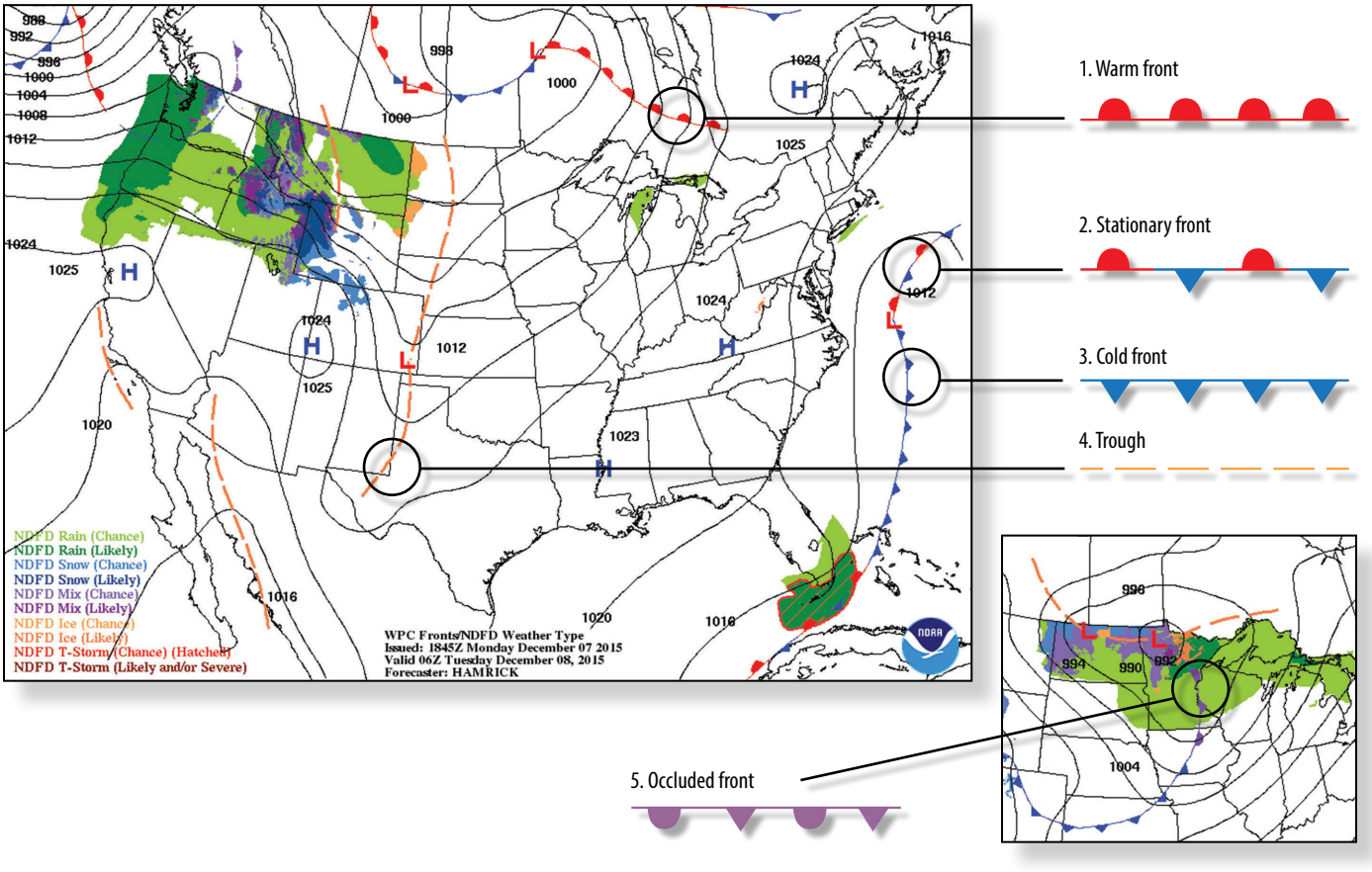
The solid black lines winding across a surface weather map are isobars — contours of constant sea-level barometric pressure in millibars (mb). Isobars are typically drawn at 4-millibar intervals and are labeled near the image border. One 1020-mb isobar in the illustration on the facing page starts in the Gulf of Mexico and crosses the Florida Panhandle before running north along the East Coast. At any point along this isobar, sea-level pressure is expected to be 1020 mb. Isobars allow forecasters to understand overall pressure patterns and identify areas of low and high pressure, along with other surface features.

Highs and lows

Areas of high and low pressure, each marked by a blue H or a red L, are easy to spot. Near each H and L is a label indicating its sea-level pressure. For example, the low off the coast of Virginia is 1012 mb, while the high centered over eastern Kentucky is 1024 mb. The average annual sea-level pressure across the U.S. is approximately 1013 mb. However, the threshold separating high and low pressure is not a fixed value but depends on the prevailing weather pattern. Sometimes, a pressure reading of 1010 mb, for example, is considered to be high pressure relative to the overall pattern. At other times it is low pressure.

Air masses

Many of the symbols on surface weather maps identify boundaries, or fronts, between air masses. An air mass is a body of air extending across a large area (hundreds of square miles or more) and is nearly uniform with respect to temperature and moisture. The nature of an air mass is influenced by the region in which it originates. For example, an air mass surging south from Canada is typically cooler and drier than an air mass moving north from the Gulf of Mexico. The boundaries where these air masses meet are important to weather forecasting because they're often associated with rapid changes in temperature, abrupt wind shifts, precipitation, and thunderstorms. In other words, weather "events" occur near frontal boundaries.



Fronts

Frontal boundaries (or fronts) are associated with lows. However, not all lows have fronts, particularly small-scale lows that form in response to local conditions. While lows may or may not have frontal boundaries, highs never have fronts.

The designation of a boundary as a stationary, cold, or warm front is determined by the movement of the colder air mass. Warmer air always yields to the flow of a denser cold air mass. A boundary between a cold and a warm air mass that's moving at 5 knots or less is called a stationary front (*2* on the key to the map above) and is drawn as alternating blue triangles and red half-circles on opposite sides of the line.

A cold front marks the boundary between colder and warmer air when the colder air is advancing toward the warmer air (*3* on the map key). Cold fronts typically extend from a low and are drawn as a blue line with blue triangles. The blue triangles are placed on the warm side of the boundary and indicate the direction the front is moving. On average, cold fronts move forward at about 20 knots.

When the cold air along a boundary is retreating instead of advancing, the boundary is identified as a warm front (*1* on the map key). Warm fronts are drawn as a red line with red half circles that appear on the cold side of the line and show the direction the front is moving. The nature of warm fronts results in an average forward speed of 10 knots — about half the speed of cold fronts.

As a low-pressure system matures, its faster-moving cold front often overtakes the warm front. This boundary is an occluded front (*5* on the map key) and appears as a series of alternating purple triangles and half circles along a purple line. An occluded front marks the boundary between the advancing cold air behind the cold front and retreating cold air ahead of the warm front. The triangles and half circles signal the direction the front is moving.

Although often included in descriptions of surface boundaries, troughs, shown as a yellow dashed line (*4* on the map key) are not boundaries between air masses. They are elongated areas of low pressure within an air mass. (A lengthy trough extends from Texas to North Dakota on the surface map illustration above.) Although troughs don't usually produce severe weather or dramatic temperature changes, their passage often results in significant wind shifts.

Blowing warm *and* cold

Since the type of the front is determined by whether the colder air mass is advancing or retreating, fronts can easily change from one type to another. For example, if an advancing cold air mass stalls and then retreats, the boundary transitions from a cold front to a stationary front and then to a warm front. It's part of what makes weather forecasting interesting.

Mark Thornton has been sailing on the Great Lakes for more than 20 years and currently owns Osprey, *a C&C 35. His company, LakeErieWX, provides marine weather education seminars, case studies, and forecasting resources to recreational boaters. Learn more at his website: www.LakeErieWX.com.*

FUNDAMENTALS OF

How sailboats stand up to the wind

ROB MAZZA

In a letter to Mail Buoy in the September 2015 issue of *Good Old Boat*, Rich Morrow of Herring Cove, Nova Scotia, called me to task for putting too much emphasis on ballast/displacement ratio, and not accounting enough for beam in stability comparisons between the Vineyard Vixen and the Southern Cross 35 (see the January 2015 issue). What I said in the design comparison was, ". . . as the wind builds, the Southern Cross could come into her own when, at higher heel angles, her heavier displacement should overcome a higher center of gravity, giving her the stability to carry more sail on a slighty longer waterline."

Rich suggested that the wider beam of the Southern Cross should also have been brought into the discussion, and furthermore that the 5,000-pound heavier displacement of the Southern Cross 35 over the Vineyard Vixen, with almost equal ballast weights and drafts, would indicate a "massive increase in structural strength and just plain physical robustness." He summed up his comments saying, "So we have boats for different purposes: the Vixen, a solid coastal cruiser with offshore capabilities, versus a vessel with the redundant strength to challenge Cape Horn." In my reply to Rich, I said that he raised some interesting points that deserved to be covered in an article on the subject of stability in a future issue. This is that article.

Before going any further, I should first reiterate what I have stated before about evaluating relative stability using only the information on a boatbuilder's product data sheet or brochure. It is not ideal, because one can only guess at a location for the center of gravity based on the ballast/displacement ratio and draft, and estimate relative form stability by comparing only maximum beam. What's more, as I have often mentioned, actual displacement numbers published in brochures are sometimes questionable.

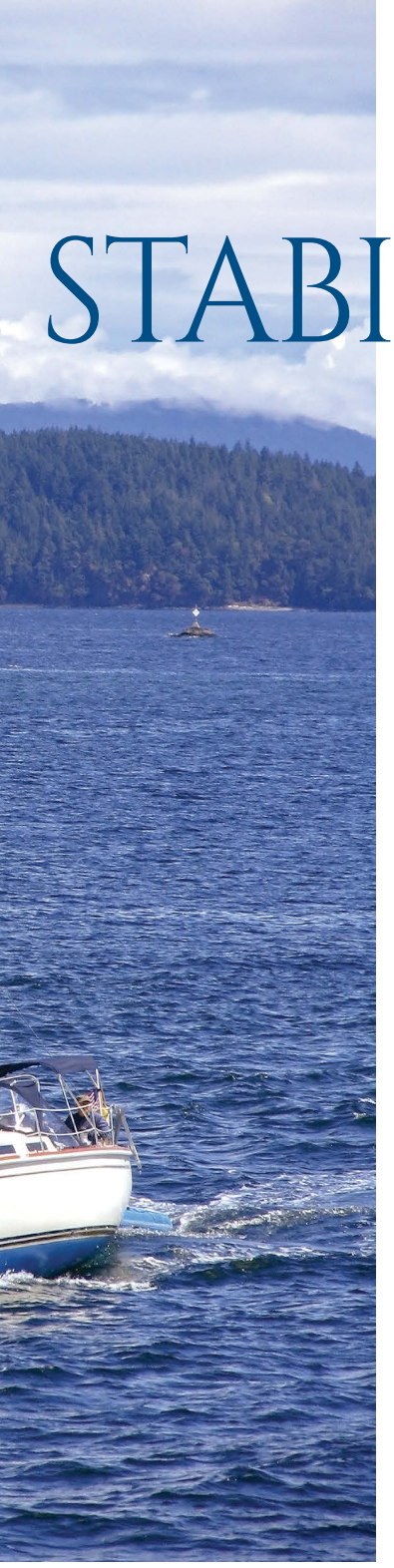
The language of stability

A force acting at a distance creates a moment, which is calculated as the force times the distance over which it acts (see the diagram on page 20). The simple lever provides a clear demonstration of moments: a small force applied to the end of the long arm of a lever can generate a much greater force acting at the end of the short arm. Archimedes is reputed to have said, "Give me a lever and a place to stand, and I will move the earth."

The forces induced by the wind acting on a boat's sails create a heeling moment. A sailboat's stability is a measure of its ability to counter this heeling moment, which it does by means of an equal and opposite righting moment generated by a shift in the transverse distance between the center of buoyancy and the center of gravity as the hull heels.

When the boat is at rest in the water, with sails stowed, there is no heeling moment. The centers of gravity and

STABILITY, PART I

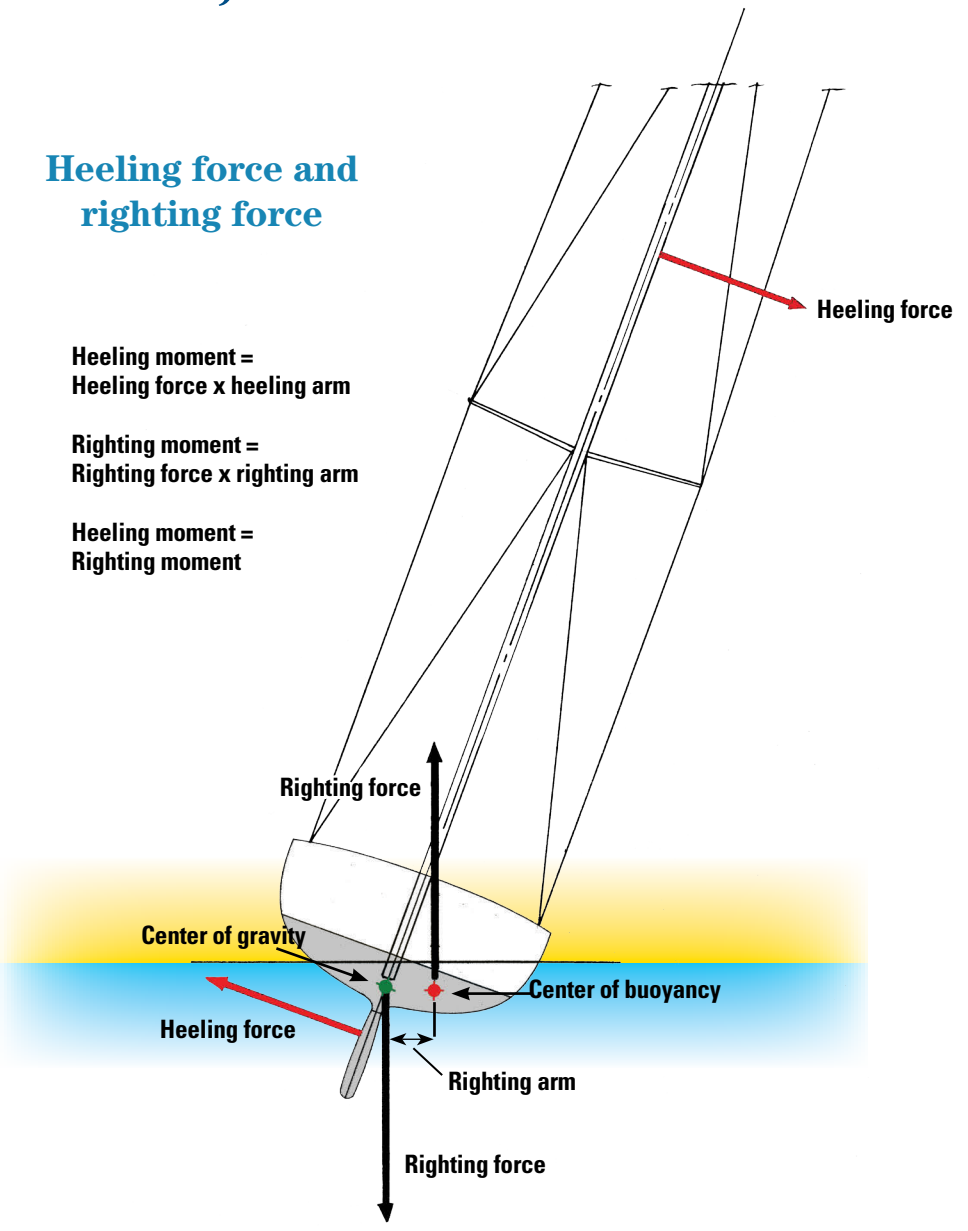


Heeling force and righting force

Heeling moment =
Heeling force x heeling arm

Righting moment =
Righting force x righting arm

Heeling moment =
Righting moment

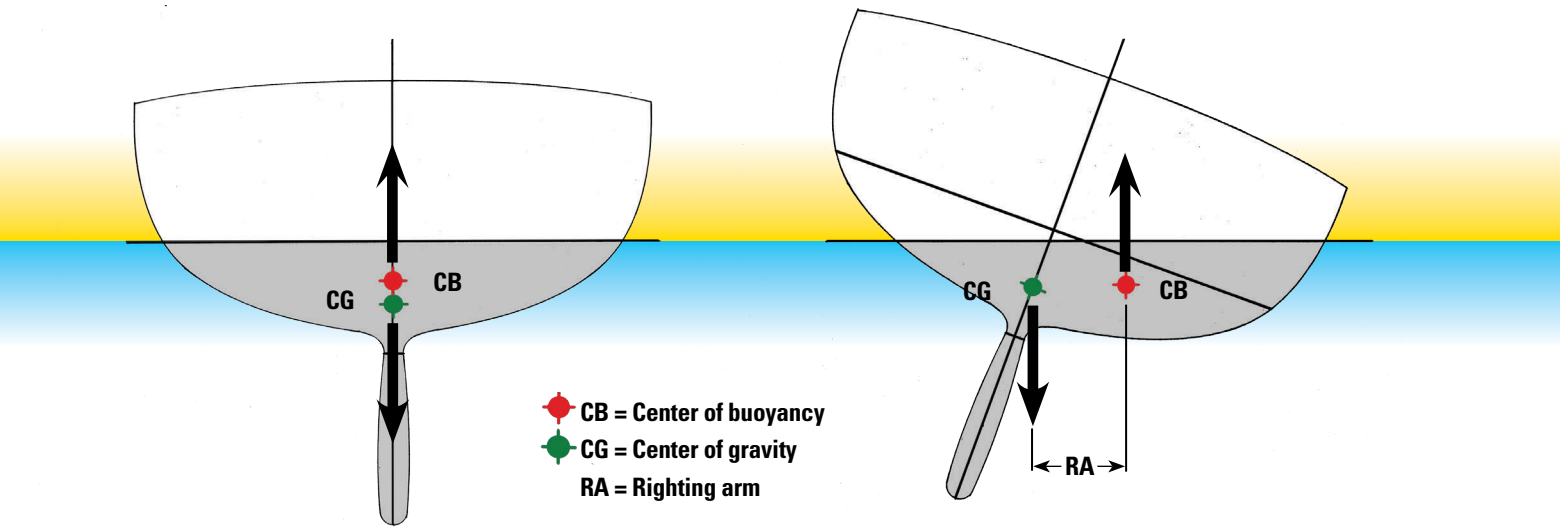


buoyancy are in line vertically and the boat sits at level trim. When subjected to sailing loads, the boat heels until the righting moment matches the heeling moment, at which point the boat and rig are in equilibrium and the boat sails at a fixed and stable heel angle (see the diagrams above and on page 18).

If the boat gets hit by a gust of stronger wind, increasing the heeling moment, it responds by heeling farther until the righting moment has increased by an equivalent amount to counter it.

The sail forces are assumed to act through the center of area of the sail plan, also called the center of effort, or CE, and the lever arm is usually considered to be the distance from the center of effort to the center of buoyancy of the hull and keel. However, I prefer to take the lever arm to the center of lateral resistance of the hull, since it is actually the lift on the keel that generates the equal and opposite side force to initiate the heel. (Without the resisting force of a keel, a boat will just drift sideways with little heel, which is why dinghy sailors often raise their centerboards in heavy air to reduce heeling moment.)

As wind speed increases, the force on the sails increases proportionately with the square of the apparent wind velocity and the heeling moment increases dramatically. If the boat is not to be overpowered, the mainsail must be reefed or the



size of the headsail reduced. A headsail change reduces sail area and thus the force acting on the lever, but taking a reef in the mainsail not only reduces sail area, but also lowers the center of effort of the sail plan. This reduces the length of the lever, further reducing the heeling moment.

Righting moment redux

Let's look in more detail at what generates the righting moment to counter the heeling moment. Since it's a moment, there has to be a force acting at a distance. The force is easy to define: it's the weight of the boat in pounds, which is listed as displacement in the boat's specifications. (Displacement, as Archimedes explained, is the weight of water "displaced" by the part of a boat that is immersed.)

The weight of the boat is assumed to act vertically downward through the center of gravity, and the equal and opposite buoyant force is assumed to act vertically upward through the center of buoyancy (see the diagram above).

The transverse distance between these two opposite forces is the righting arm (shown above and, abbreviated to a symbol, on the diagram on the facing page). The righting moment (RM) is the product of the weight of the boat multiplied by the righting arm.

For the purposes of this article, I have chosen the C&C 39 as our benchmark boat, and all the righting moment calculations for this analysis are based on the midships section only, not the complete hull. Modern hull-design programs can calculate full-hull stability quite easily, but traditionally, the midship section has been used as it provides a very good approximation. We will be looking at the righting moment through a full 180 degrees of heel, so I will ignore obtuse concepts such as the Metacenter and Metacentric Height, as they are really only applicable at small angles of heel.

I will also only be looking at "static" stability, with heeling forces being applied while the boat is stationary with a level waterplane, not under way. When a boat is sailing, a wave pattern develops with the formation of a bow wave and a stern wave and a trough between them. The calculation for the location of the true center of buoyancy with such an undulating water plane, which varies with boat speed, becomes extremely difficult without the use of very advanced flow-simulation programs. For the sake of simplicity and comparison, static stability is almost always used in the calculation of curves of stability.

The diagram on the left, above, shows the midships section of our benchmark boat in the upright position with no heeling forces from the sails. Since there is no heeling force and thus no heeling moment, there is no need for a righting moment and the boat remains upright. However, after a heeling moment is applied, the C&C 39 heels, in this case to 20 degrees of heel, in order to generate a righting moment equal and opposite to the heeling moment, as in the diagram at right, above.

This example shows a 20-degree heel angle. A smaller heeling moment would result in less heel angle, and a greater heeling moment will lead to a greater heel angle. Since the RM is equal to the weight of the boat times the RA, we can see from the drawing that the righting moment or stability of a hull is determined by three factors:

- *Displacement of the boat in pounds (D)* – Since RM is equal to D times RA, it goes without saying that, *for similar hull forms*, heavier boats are "almost" always more stable than lighter boats, since the righting moment is directly proportional to the weight of the boat. The "almost" enters the picture when you examine the shift in the CB, which we address below.
- *Location of the vertical center of gravity (VCG)* – The VCG is the center of mass of the hull in the vertical plane and is generally found either by a detailed weight study before the boat is launched or through an inclining experiment after launch. (The longitudinal location of the center of gravity affects trim but is not relevant to this study of stability.) The VCG, which we will refer to as the CG, is assumed to be fixed on the boat's upright centerline and does not vary.

- *Transverse location of the center of buoyancy* – The center of buoyancy (CB) is the center of mass of the immersed hull or, more accurately, the center of mass of the water the hull has displaced. The upward buoyant force is assumed to act through this center of displaced mass.

> "An understanding of righting moments leads to the concepts of maximum stability and range of stability."

As the boat heels, the leeward side depresses or "rolls in" and the weather side elevates or "rolls out." A triangle of hull becomes immersed to leeward and a triangle of equal area is removed to weather. This causes a dramatic shift in the CB to leeward, which rapidly increases the distance between the fixed CG and the now dynamic CB.

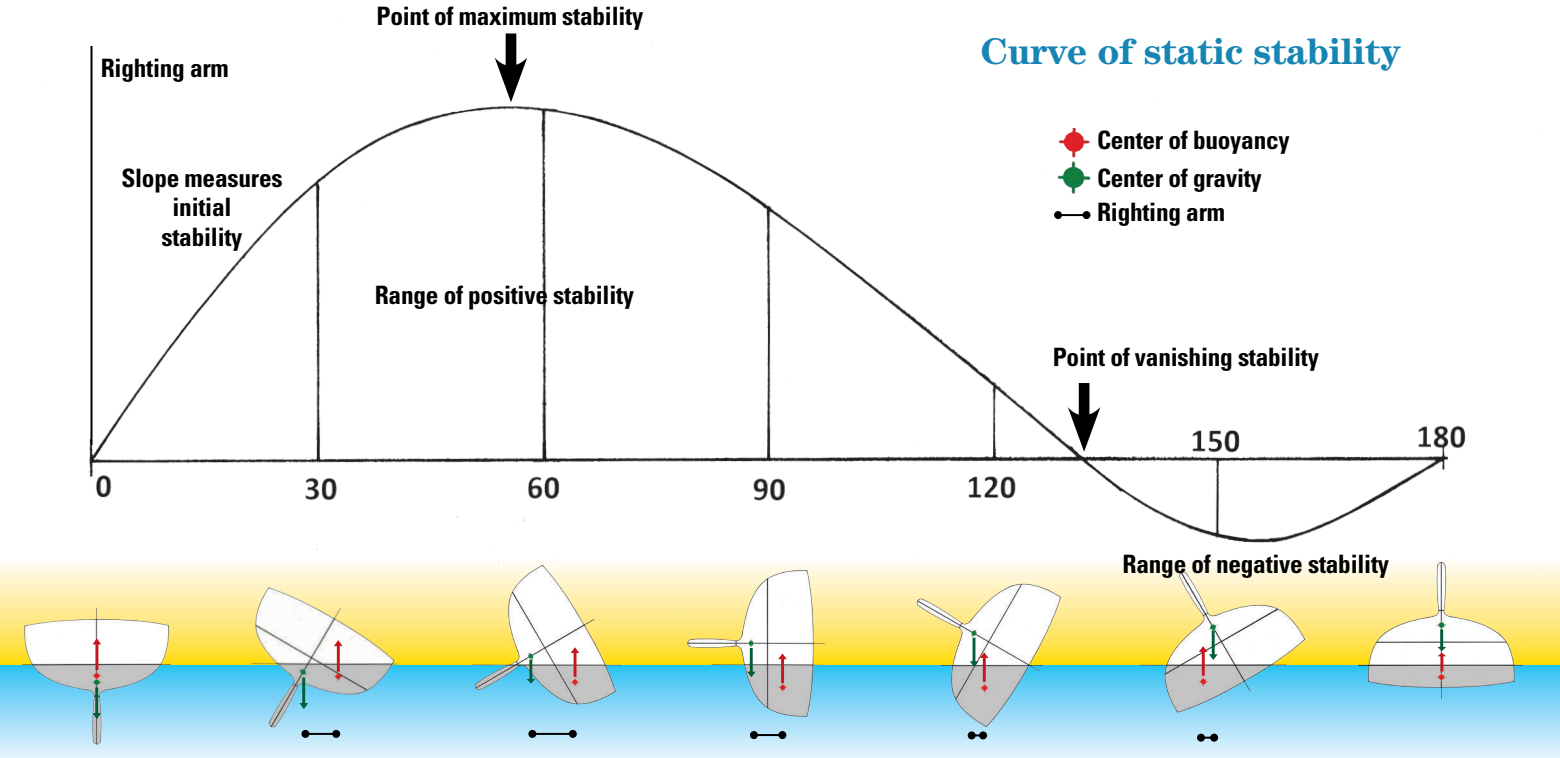
This lateral separation of the CG and CB creates the RA, which varies with heel angle. The wider the boat, the greater the transverse shift in the CB with heel angle. Stability resulting from beam is referred to as "form stability." To simplify the calculation, I have ignored the small effect of the volume of the fin keel shifting to windward.

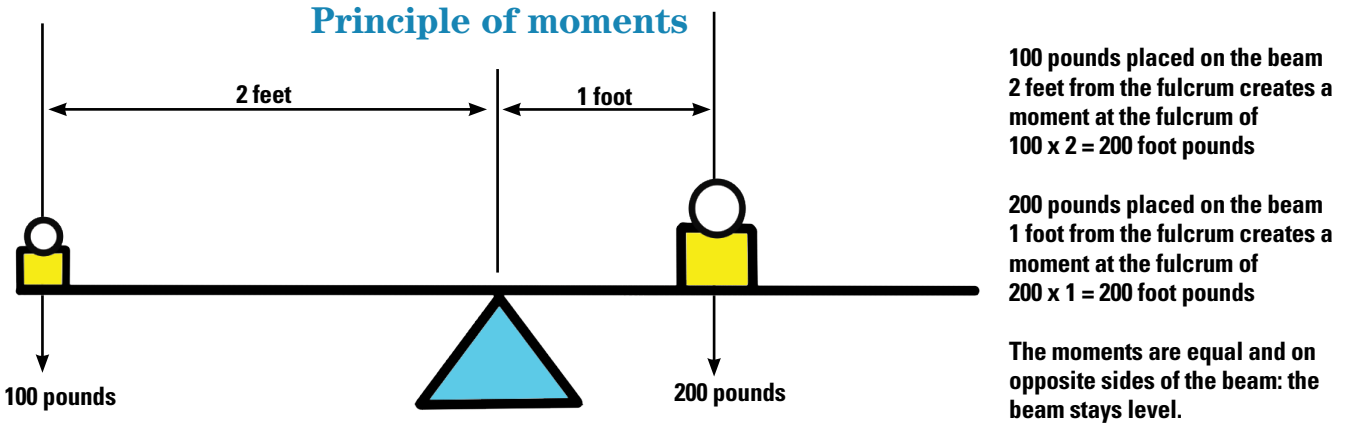
In real life, of course, the transverse location of the CG can be influenced greatly by shifting crew weight or using movable water ballast or canting bulb keels, but we are not going there! The CG of the boat can be substantially lowered by the use of lead ballast located as far down in the keel as possible, as well as by increasing the ballast/displacement (B/D) ratio, that is, adding increasing amounts of ballast for a given displacement. Therefore, it is assumed that boats with a 60 percent B/D ratio are, in general, going to be more stable than boats with a 35 percent B/D ratio due not only to the lower CG, but also to the increased displacement that is implied.

To recap, the weight of the boat is acting vertically downward through its CG, and the equal and opposite buoyant force is acting vertically upward through the CB. The horizontal distance between these two equal and opposite forces is the righting arm, and the righting moment is that distance times the displacement of the boat.

The righting moment equals the heeling moment for any given heel angle.

It follows that, to increase a boat's righting moment at any angle of heel, you can simply increase the weight of the boat or increase the length of the righting arm, or both. Increasing the length of the righting arm with heel angle can be achieved by lowering the center of gravity of the hull (by adding ballast, for example) or by shifting the center of buoyancy sideways (by making the hull wider).





So, the factors that influence the righting moment are:

- The total displacement of the boat in pounds
- The fixed location of the center of gravity of the boat, which includes the ballast
- The dynamic location of the center of buoyancy as the boat heels.

Curve of stability

An understanding of righting moments leads to the concepts of maximum stability and range of stability. This is best illustrated with a stability curve showing the righting moment at different heel angles, from 0 degrees to 180 degrees — from upright to turtled. (Naval architects often draw this as a plot of righting arms only, since righting moment is easily calculated by multiplying the righting arm by the displacement.)

In most sailboats the *curve of static stability* rises up to about 30 degrees of heel as almost a straight line, the slope of which is a measure of the initial stiffness of the boat — its ability to carry sail. The rate of increase then tapers off until the curve reaches a peak — the boat's point of maximum stability — and then starts to fall fairly rapidly.

Eventually, the curve will show a point where the heel angle is great enough that the CG is again vertically above the CB and the boat has zero righting moment. That is the point of vanishing stability. At this point the boat will continue to capsize without any additional input energy until it is resting upside down at 180 degrees of heel with the keel pointing skyward. In order to right itself, it will need a heeling force applied, usually by wave action, to rotate it enough to again reach and exceed the point of vanishing stability.

The curve of static stability provides important information. The part of the stability curve with positive righting moment is the range of positive stability, and the area under this part of the curve is the amount of energy required to capsize the boat. The part of the curve with negative righting moment is the range of negative stability, and the area under this part of the curve is the amount of energy required to right the boat again. What you are looking for in a good curve of static stability is a large area and range of positive stability and a small area and range of negative stability.

Rob Mazza began his yacht-designing career at C&C Yachts in the days before computers, CAD, and spreadsheets. Stability calculations were all done by hand and involved a lot of tracing of hull sections to calculate areas, volumes, and centers of buoyancy.

Please stay tuned. Part 2 of this article will appear in the July issue, where Rich and our fellow sailors will read about how the curve of static stability reveals the stability characteristics of two extremes in early yacht design.

The Law of Scales

In his letter, Rich Morrow stated that "stability increases with the square of the beam." Comparing stability based on beam or length requires some further explanation.

The Law of Scales would indicate that, as boat size increases, stability increases as the 4th power of size. That is, double the size of a boat and its stability increases by a factor of 16, because the displacement increases by the cube and the righting arm increases linearly.

However, if you were to keep the length the same and only increased the draft and beam, stability would rise by the cube of the increase. If you kept the length and draft the same and only increased beam, then stability would indeed increase by the square of the beam, because both the righting arm and the displacement would increase linearly. But if you increased beam and kept the displacement the same (the more realistic approach), then stability would increase only in relation to the increase in beam, because only the righting arm would change. This is true at small angles of heel only, because by keeping displacement the same and widening beam, the center of gravity (CG) would rise, and that would adversely effect stability at higher heel angles.

The out-of-date flare dilemma

Ways to dispose of expired pyrotechnics

BY DURKEE RICHARDS

Your flare caddy was overflowing with mostly expired flares. You bought a bigger one. Now it, too, is almost filled with expired flares. If you're thinking it's time to find a way to responsibly dispose of those old expired flares, you're in good company. Many boaters throughout the country are having to deal with perhaps several decades' worth of expired flares. Our expired flares accumulated twice as fast because we carry a life raft when cruising the coast of British Columbia and its flares also need to be replaced every three years.

Fortunately, there are several good options for disposing of old flares, aka pyrotechnic visual distress signals. These options vary by geographic region, but one or more of them may work for you in your area.

Option A: Supervised training

The first choice is to find a Coast Guard-sanctioned event where you and your crew can practice igniting or launching flares. The many kinds of flares on the market mean there is a lot of variation in how they operate. Attending a practice event may eliminate the need to stop to study the instructions when you're confronted with an emergency where you actually need to set off flares.

Participating in such events has other benefits. Several years back, our yacht club's safety officer coordinated an afternoon of test firing marine distress signals with supervision from our local Coast Guard station. It was very informative to watch the relative performance and reliability of the many types of flares used that day. Several samples of one particular type were "fired" (all well past their use-by dates) and the failure rate was discouragingly high. It was a sunny day, which made the lower intensity flares seem rather anemic. The light breeze helped the orange smoke flares stand out as good performers for guiding in a rescue party. Observations from that day influenced my decisions on what types of flares to carry in the future.

A rocket's red glare is comforting in an emergency, but a surfeit of expired pyrotechnic devices poses a storage and disposal problem.

Where should you look for Coast Guard-sanctioned marine flare training sessions? Two organizations come immediately to mind: the U.S. Power Squadron and the Coast Guard Auxiliary. On the Olympic Peninsula, where I live, the North Olympic Sail and Power Squadron (NOSPS) holds at least one, and often two, training sessions each year. The public is welcome and participants can set off as many flares as they wish. It is worthwhile checking to see if the Power Squadron unit near you also hosts training sessions with flares.

Our local Coast Guard Auxiliary flotilla has not sponsored a flare training session during the time we have lived on the Olympic Peninsula. However, the flotilla near you might be more active in this regard. It might also be worthwhile to contact yacht clubs near your home to see if any of them hold training events with flares.

Option B: Donation

Donate expired flares to organizations that use old flares for internal training exercises. This might be your local Coast Guard Auxiliary flotilla or the local Power Squadron. Other organizations, such as fire departments, conduct regular personnel training and might accept donations of expired

A light that flashes SOS meets nighttime carriage requirements in U.S. coastal waters, but Durkee also carries aerial flares for their "What's that?" factor.

marine flares. Near my home, the East Jefferson Fire Rescue station in Port Townsend, Washington, and the Clallam County Fire District #3 both use donated marine flares in the course of internal training.

My request for information from the Clallam County Fire District #3 found its way to Assistant Fire Chief Dan Orr. Having recently moved there from California, Dan used my request as an opportunity to do some investigation of his own. When he called back, he confirmed that his department does accept a "limited number" of flares that they use for internal training. He also said that he was surprised to discover that disposal options were very limited for boaters in our area. The fire district does have the required magazine for flare storage and they do accept some aerial flares. These are not used in training; they're fired in a bunker for safe disposal. However, Dan emphasized that the department is not in the business of flare disposal.

I learned that the East Jefferson Fire Rescue station also accepts some aerial flares that they give to other organizations for destruction. Also, as a courtesy to customers, the West Marine store in Port Townsend will accept old flares (in good visual condition). The store then drops them off at the nearby East Jefferson Fire Rescue station. It might be worth checking with a chandlery in your area to see if it offers a similar service.

Option C: Disposal facility

Take your expired flares to your local household hazardous-waste facility. Many moderate hazardous-waste facilities will accept old road flares and some will also accept marine flares. Some facilities choose not to accept marine flares because of the added costs of storing and shipping them. The U.S. Department of Transportation classifies marine flares as "Class 1.4 explosives" and imposes extensive regulations on commercial shippers. In addition, the Bureau of Alcohol, Firearms, Tobacco, and Explosives requires that marine flares be stored in a "type 4 magazine."

I made a quick check of some of the hazardous-waste collection facilities near me and learned that the Clallam County Moderate Hazardous Waste Facility will not accept marine flares, but three of the five hazardous-waste collection facilities in King County, Washington, (the Seattle area) do accept them. Their website lists the specific facilities that will accept them and the number of flares they will accept per visit.

Option D: Set them off

Ignite handheld flares in a safe location ashore. It is legal to burn road flares and marine handheld flares in a non-emergency situation away from navigable water. However, launching an aerial distress flare in a non-emergency situation is always a violation of U.S. Coast Guard regulations unless prior approval has been obtained.

Canadian options

Canadian boaters have another good option that is not available to U.S. boaters. I had read about an older program supported by CIL/Orion, based in Lachute, Quebec, in which boaters could purchase pre-paid mailers to ship their expired flares back to the company. Through a phone call to its headquarters, I learned that CIL/Orion now has a more convenient way for boaters to return old flares. CIL/Orion will take back old flares from the retail outlets that stock its flares. CIL/Orion's policy is that the number of returned flares can equal the number of new flares purchased

The USCG Auxiliary on expired pyrotechnic devices

This advice from the U.S. Coast Guard Auxiliary is available in a document that can be downloaded from its website in PDF format.

U.S. Coast Guard Auxiliary Advice for Disposal of Expired Pyrotechnic Signaling Devices (Flares)

Options for disposing of pyrotechnic signaling devices (including aerial flares and hand-held signals):

- Retain them for backup use to expand signaling time in the event of an emergency.
- Contact a local law enforcement or fire department for their advice on proper disposal.
- Ignite hand-held signal flares on land in a safe area away from any combustible material, much the same as highway flares would be ignited.
- NEVER jettison visual distress signals overboard.
- NEVER activate marine aerial flares in a non-emergency situation unless it is a Coast Guard-sanctioned demonstration.
- NEVER dispose of flares in household trash.

http://bdept.cgaux.org/pdf/WelcomeBoatersPDFs/dispo_of_vds.pdf

by that store. CIL/Orion is working with the Power Squadron in Canada to make boaters aware of this program.

A call to Orion's customer service department in the U.S. confirmed that this program for returning old flares is not available within the United States (www.orionsignals.com).

Now what?

Once you have dealt with your current accumulation of expired flares, is there any way to reduce the number you accumulate in the future? Yes, there is now at least one possible solution. No doubt there will be others.

Sirius Signal introduced an electric distress signal that meets U.S. Coast Guard requirements for nighttime use (see "Product Launchings," March 2016). It consists of a powerful LED light source inside a molded lens that resembles the Fresnel lenses used in lighthouses. The lens directs most of the light into a horizontal beam. A small portion is also directed vertically to aid final location by an overhead aircraft. The device is powered by three C cells and is said to continuously flash the Morse Code SOS signal for about 60 hours with a fresh set of batteries.

The Sirius Signal SOS Distress Light does not have an expiration date (but the batteries do have a shelf life and should be checked periodically). The U.S. Coast Guard accepts one device as fully complying with the requirement for nighttime distress signals carried aboard recreational vessels. ***Note:*** *The Sirius Signal light meets night-only requirements and needs to be elevated to be seen from any distance. A black and orange distress flag meets daytime requirements, but since it's not distinguishable from very far away, daytime flares are still a useful backup* ***–Eds.***

I purchased one of these devices. If we ever need to take to our life raft, I will be more comfortable using it than a pyrotechnic device that might drip hot slag. However, I have decided to continue to carry some SOLAS-grade aerial flares aboard our J/32. I anticipate that a very bright flare that lofts to 1,000 feet and burns for 30 seconds will be more likely to attract attention than any handheld signal.

Durkee Richards' sailing adventures began in high school with the Sea Scouts on the Columbia River. Later, he and his wife, Mary, chartered boats on Lake Superior until they bought their J/32, Sirius*, and retired to the Olympic Peninsula in Washington State. They have since sailed* Sirius *more than 20,000 nautical miles exploring the coast of British Columbia to Haida Gwaii and the west coast of Vancouver Island.*

Sail power

BY DAVID LYNN

Generating electricity via the prop shaft

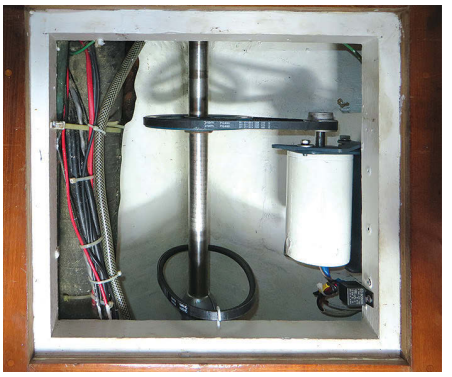
When we are anchored for any period of time, our solar panels and wind generator pretty much keep up with our power needs. On a passage, however, our requirements are higher. The additional electronics — autopilot, navigation instruments, AIS, radar, and so on — all require power. We usually have to run the engine an hour or two each day to keep the batteries charged. We dislike doing this for a number of reasons.

On a long passage, the amount of fuel required just to charge the batteries starts adding up. If we are on a significant heel, we have to alter course or reduce sail before and after running the engine. Using the engine at low rpm and with a light load is hard on the engine. In addition, it's annoying to disrupt that perfect broad reach on a warm, starry night by having to crank on the engine.

Several of our cruising friends have had success with propeller-shaft generators. In fact, our friend Eric on *Fiona* has sailed more than 300,000 nautical miles with his prop-shaft generator and has nothing but praise for it. If we could generate another 2 or 3 amps continuously while we were sailing, we probably wouldn't have to run the engine at all. Adding one to *Nine of Cups* had been on our to-do list for several years, and when we were in Durban, South Africa, a year ago, I decided to take on the project.

What does a prop-shaft generator do? We have a fixed-blade prop. When we're sailing, the water moving against the prop causes the prop shaft to rotate. (We actually have a shaft brake to prevent the prop shaft from rotating when the engine is off, but it can be disabled.) By adding a pulley to the shaft, mounting a generator or alternator next to it, and connecting the two with a belt, we should be able to use the rotation of the shaft to generate power as we sail.

That's the theory, anyway. The rest is just details.



***Nine of Cups*, top of page, has shaft-driven electric power. For his first attempt, David mounted a brush-type DC generator driven by a belt off the prop shaft, at left. After it overheated, he replaced it with a hybrid brushless DC generator, above.**

> “Ideally, I wanted the generator to produce at least a few amps at the low rpm of the shaft while sailing.”

Generator types

One of the more important details is which generator to use. Three types of generators or alternators can be used for this application and each has its own advantages and disadvantages.

Brush-type DC motor – The most basic DC motor, which has been around since the late 1800s, has a rotating coil mounted inside several permanent magnets attached to the outer housing. When connected to a battery, a 12-volt brush-type DC motor will spin. Conversely, spinning the rotor of a brush-type DC motor causes it to produce a DC voltage. If the motor is big enough and it spins fast enough, it can charge a battery.

The advantages are that it is inexpensive and simple to implement electrically. It has several disadvantages, however. Since it has brushes that conduct a large current, the maintenance requirements are higher; it generates electromagnetic interference (EMI), which may be a problem with an HF radio; the maximum allowable rpm for this type of motor varies widely, but is typically 1,500 to 6,000 rpm; and it is more difficult to keep cool.

Brushless DC motor – This type is the reverse of a brush-type DC motor: the permanent magnets are attached to the rotor and windings are attached to the housing. Since the windings don't rotate, the need for brushes is eliminated. The advantages of a brushless DC motor are that it requires less maintenance than a DC motor with brushes, generates little or no EMI, and is more efficient. The disadvantages are that it is more expensive, it generates a 3-phase AC output that requires a diode bridge to convert it to DC, and the maximum allowable rpm is usually 3,000 to 6,000 rpm.

Alternator – A typical automotive or marine alternator is also a candidate for a prop-shaft generator. It overcomes some of the issues of a DC motor. Since it's meant to be coupled directly to an engine pulley, the maximum allowable speed is typically greater than 10,000 rpm. The output is easily regulated by varying the field current, it is very efficient, and it is self-cooling. Also, it's made by the millions, so the cost is relatively low,

Alternators have a couple of disadvantages as well. Since they are meant to run at high rpm, unless the windings are rewound with finer wire, the output at low rpm is quite small. The biggest disadvantage, however, is that an alternator requires a typical field current of 3 to 5 amps. When an alternator is connected to an engine, it spins at thousands of rpm and the field current is negligible compared to the total output. When the boat is sailing, however, and the total output is only a few amps, the field current becomes significant. In fact, at lower boat speeds the field current will be higher than the amperage produced by the alternator.

To keep things simple, unless I'm referring specifically to one of these devices, I will use the generic term "generator" to refer to any of the three types of alternators/generators.

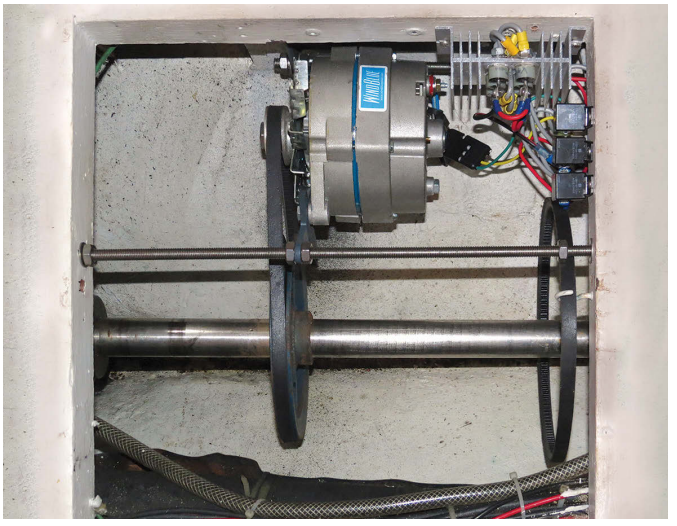
Prop-shaft speed

When *Nine of Cups* is sailing, the prop-shaft rpm ranges from zero at 3 knots to around 200 on those rare occasions when she is doing 8 knots through the water. When we're motoring, taking the reduction ratio of the transmission into account, the shaft rotates at between 400 and 1,400 rpm. The generator speed will be some multiple of the shaft speed, depending on the ratio of the two pulleys (one on the generator and one on the shaft). Ideally, I wanted the generator to produce at least a few amps at the low rpm of the shaft while sailing, yet be able to withstand the much higher rpm while motoring.

Pulley sizes

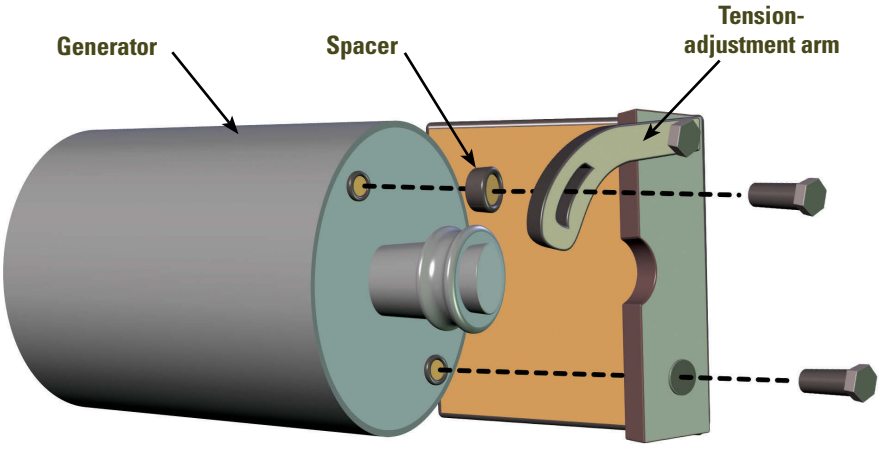
The faster the generator spins, the more current it will generate. The ratio of the two pulley sizes determines how fast the generator will spin, which in turn determines how much current will be generated. To generate the maximum current, we want a large pulley on the shaft and a small pulley on the generator. On the other hand, when the engine is cranked on and we are motoring, the shaft will turn much faster than when we are sailing, potentially destroying the generator if it spins too fast.

To determine the largest pulley ratio that could be used, I divided the maximum allowable speed of the generator by the maximum prop-shaft speed. *Nine of Cups* has a maximum shaft speed of 1,400 rpm. If I chose an alternator with a maximum speed of 10,000 rpm, the largest shaft pulley I could safely use would have a diameter of 10,000/1,400, or 7.1 times the diameter of the alternator pulley.



The brushless DC generator was David's second version. A spare drive belt hangs on a hook, just in case.

Mounting bracket for the generator



Electrical considerations

Each of the three different types of generator has different electrical requirements. The necessary electrical connections, how the generator's output is controlled and/or rectified, and how the output is handled when motoring differ between the three.

Brush-type DC motor – From an electrical point of view, the brush-type DC motor is the easiest of the three types. In the simplest implementation, the output is connected directly to a battery and when the generator shaft is turned, the battery gets charged. It's a little more complicated than this, but not much.

First, there must be a diode in the circuit between the battery and the generator. Otherwise, when the prop shaft is not turning, the generator would become a battery-powered motor, and the generator would try to turn the prop shaft rather than the other way around.

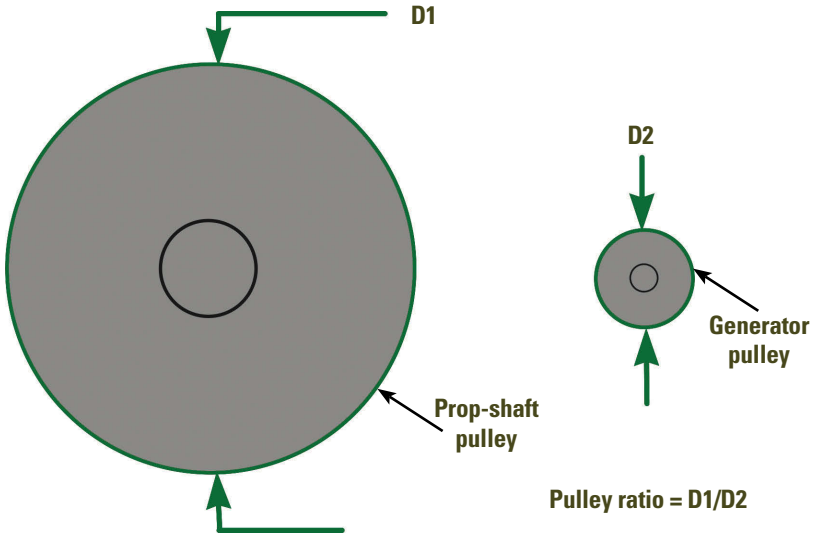
Also, if the batteries are charged, the generator output current must be disconnected from the batteries to prevent them from being overcharged. One way to do this is with a regulator that diverts the current into a dummy load when the batteries reach their charged state. Many companies that sell wind generators and solar panels also provide these charge controllers. On *Nine of Cups*, we use the water heater as the dummy load.

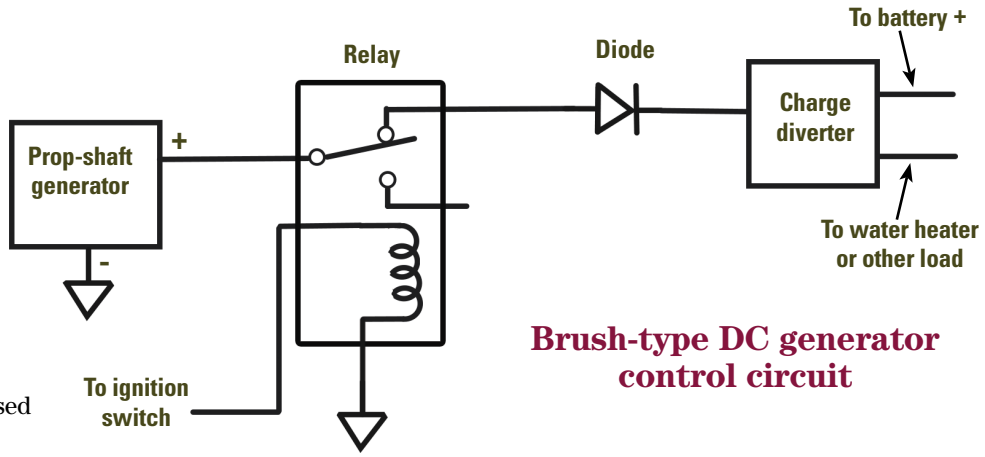
Finally, when motoring, the output should be disconnected, allowing the generator to spin freely with no load. The diagram at the top of the facing page shows a typical electrical circuit for this type of generator. The output first passes through the contacts of a relay that is controlled by the engine ignition switch. When the engine is switched on, the relay opens the circuit, disconnecting the output of the generator. (See "Resources" on page 28 for part numbers and sources for the components.)

Brushless DC generator – The output of the brushless DC generator is somewhat more complicated. Its output is a three-phase AC voltage, which must be converted to DC in order to charge the batteries. This requires six rectifier diodes connected as shown in the middle diagram on the facing page. An additional complication is that when this type of generator is open-circuited, the output voltage can reach 100 volts or more. To protect the diodes, three relays are needed, one for each phase of the output. As with the brush-type motor, these relays are controlled by the ignition switch.

Alternator – The output of an alternator depends on the rpm and field current. A standard automotive or marine voltage regulator would work fine except that the field current would exceed the output of the alternator at low speeds, and sailing at anything less than 3 to 4 knots would put a drain on the battery. A simple switch would do the trick as long as it's turned off whenever the boat's speed is below 4 knots and turned back on when the speed increases. A better solution would be a circuit that sensed the alternator speed and turned the regulator on

Calculating the pulley ratio





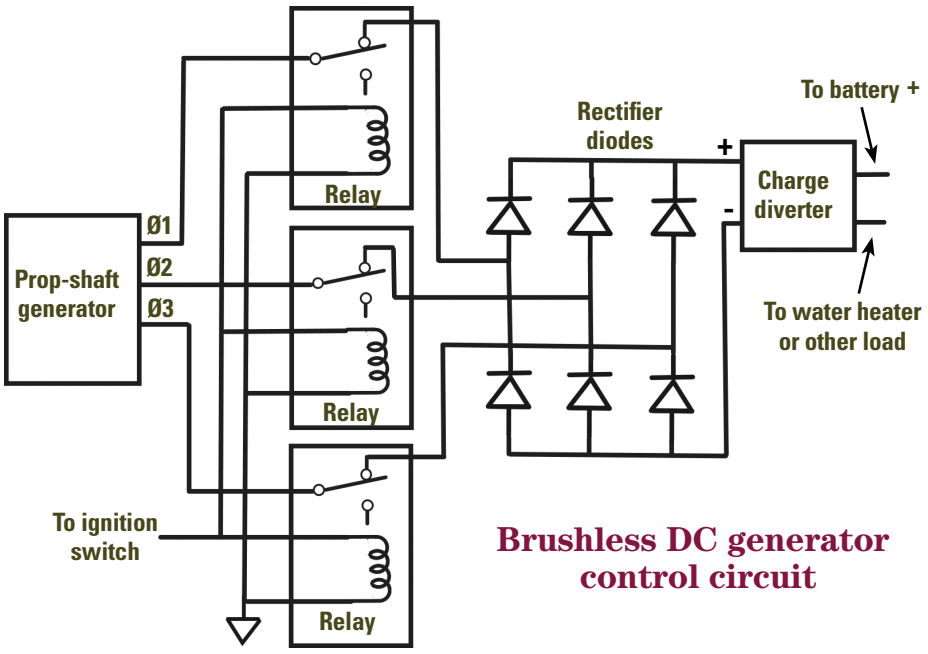
Brush-type DC generator control circuit

or off accordingly. The diagram at the bottom of this page illustrates a possible circuit for an alternator-based prop-shaft generator.

Installation mechanicals

Just like the alternator on an engine, the mounting bracket should allow the generator to be rotated — toward the shaft so the belt can be installed or removed and away from it for tensioning. I made some sketches and worked with a local machinist to fabricate the bracket.

The prop shaft must be disconnected from the transmission in order to slide the pulley and belt in place. I was able to accomplish this while *Nine of Cups* was in the water, but some boats might need to be out of the water. Since it is difficult to replace a worn or broken belt, I slid a spare belt over the shaft while it was disconnected. I suspended the spare over the shaft from a cup hook until it's needed. The spare belt is visible in the photos of the installed generators.

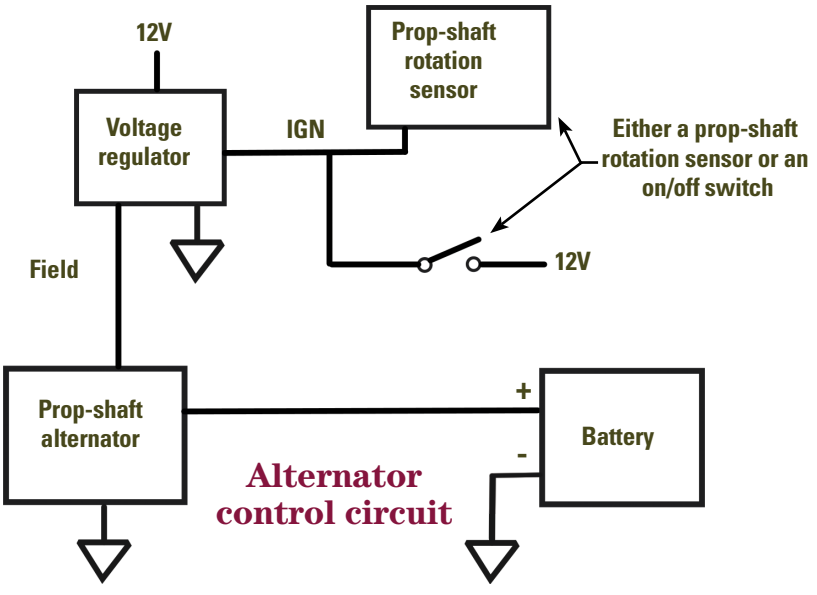


Brushless DC generator control circuit

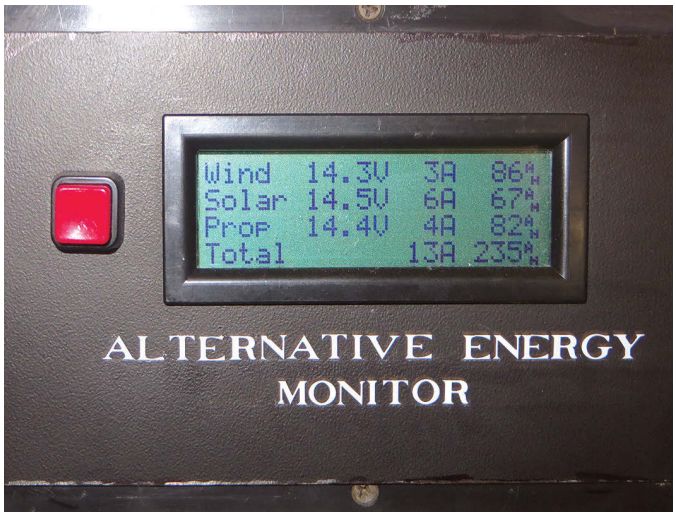
Decision and implementation

So which type of generator did I choose? On my first attempt, I used the brush-type DC generator that was a spare for our wind generator. It had a maximum speed of 5,200 rpm, and I selected a pulley ratio that ensured I would be operating within its range. On our passage along the South African coast from Durban to East London, it performed quite well, generating a consistent 2 to 4 amps throughout. As we motored the last few hours into the harbor, however, I smelled the odor of melting insulation. I discovered that the generator had overheated and I removed the drive belt. Based on our engine speed, we had been running it at around 3,000 rpm, well below the specified maximum speed. Apparently, it wasn't happy running at that speed continuously.

On my second attempt, I found a generator that was a hybrid of



Alternator control circuit



The alternative energy monitor aboard *Nine of Cups* shows the amps being generated and the total amp-hours generated over the past 24 hours on a typical day during her Atlantic crossing.

sorts. WindBlue Power, a company in the U.S. that makes components for wind turbines, buys standard automotive alternators and morphs them into brushless DC motors. They rewind the windings with finer wire so the output is higher at low rpm; they replace the field coil with a permanent magnet, eliminating the need for the 3 to 5 amps of field current; and they remove the internal rectifying diodes. The resulting generator overcomes most of the shortcomings of a standard brushless DC motor for this application. I modified the mounting bracket to fit the new generator and built a rectifier circuit (see the middle diagram on page 27). The new generator had a maximum speed of 10,000 rpm, much higher than the brush-type DC motor. Unfortunately, I wasn't able to find a larger diameter pulley to replace the existing one while in Cape Town.

Conclusions

I completed the project in Cape Town and it was in use during our Atlantic crossing. Our alternative energy monitor kept track of the amps being generated and the total amp-hours generated over the previous 24 hours. At 3.8 knots through the water, the generator had an output of 1 amp, which increased to 8 amps at 7 knots. On a typical day's run of 125 nautical miles, it produced about 80 amp-hours. Except on those calm days when we averaged less than 4 knots, we did not have to start the engine. The output would have been 50 to 75 percent greater had I been able to install a larger prop-shaft pulley.

A side effect is that both the spinning prop shaft and the generator produce noise when we are sailing. After a few hours, however, the hum of the prop shaft and the whine of the generator soon became part of all the other background sounds — creaks, groans, squeaks, chirps — as *Cups* sailed along, noticeable only when something changed. So far, that has been the only negative, and I regret not doing the project years ago.

Another option would be to disconnect the generator from the shaft when motoring. A much larger pulley ratio could then be used and a higher output could be achieved. One way to do this would be to remove the drive belt whenever we started motoring and replace it when we resumed sailing. This was not a reasonable option for me. I would likely forget to remove the belt as we started motoring into harbor or not have time to remove it if I needed to start the engine in an emergency.

Another method of disconnecting the generator would be to fit it with some sort of clutch. Several types of clutches — centrifugal, hydraulic, and electric — might work for this application and would be worth researching.

Is it for you?

Nine of Cups is a 45-foot, heavy-displacement boat with a 23-inch fixed-blade prop. Once she gets going, the prop shaft has a lot of torque, more than enough to drive a much bigger generator. A smaller boat, or a boat with a smaller prop, will produce less torque, and may not be able to drive a generator. If in doubt, get the advice of a marine engineer.

A note of caution

Some hydraulic transmissions may be damaged if allowed to turn for extended periods of time when the engine is not running. *Nine of Cups* has a BorgWarner Velvet Drive transmission, as does Eric Forsyth's *Fiona*. We now have more than 6,000 nautical miles on our shaft generator, which pales in comparison to Eric's 300,000-plus nautical miles on his. While neither of us has had any sign of problems with our hydraulic transmissions, I have not researched other types and models of hydraulic transmissions. If your boat has a hydraulic transmission, it would be prudent to investigate whether your particular transmission can be allowed to freewheel before making the decision to add a prop-shaft generator.

David Lynn and his wife, Marcie, have lived aboard Nine of Cups, *their Liberty 458 cutter, since 2000 when they sold up and sailed off. Since that time, they've put over 85,000 nautical miles under the keel and visited 36 countries on five continents. Their philosophy of "just a little further" has taken them from the Caribbean, twice across the Atlantic, around the five Great Southern Capes, and across the Pacific and Indian Oceans with lots of stops to explore along the way. They completed their first circumnavigation at Cape Town in 2015 and* Nine of Cups *is currently in the Caribbean en route from Africa back to the USA. David and Marcie blog daily at www.justalittlefurther.com and maintain an extensive website at www.nineofcups.com.*

Resources

WindBlue Power
Generator: model DC-540 permanent magnet alternator (order with fan)
www.windbluepower.com

Newark Electronics
Diodes: Vishay 95PF80;
Relays: Panasonic CB1-M-12
www.newark.com

Max(imizing) head room

A big makeover for a cramped water closet

BY ROGER HUGHES

When we bought our 1977 Down East 45 schooner, the forward head was a poky little place with a tiny "unstainless-steel" washbasin and a minimum-sized manual toilet that, for love nor money, I could not prevent from leaking. The toilet was not plumbed into the holding tank, as I had been led to believe by the seller. It had been disconnected, probably because the aluminum holding tank had more holes in it than a sieve.

There was no room to shower — unless you wanted to sit on the toilet and soak everything else as well. There was no shower drain, so runoff water went straight into the bilge . . . not a good idea when the toilet leaks.

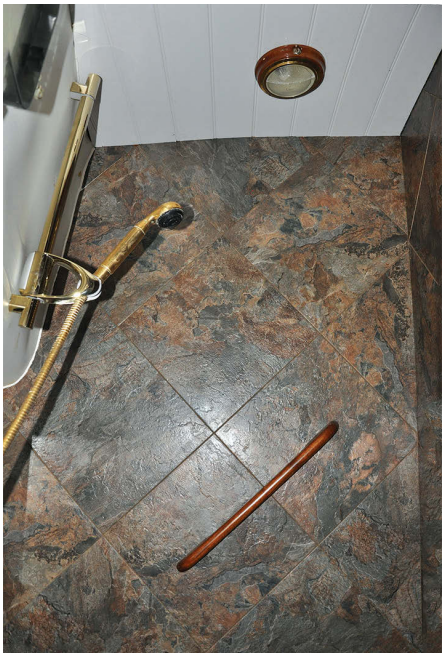
I closed all the seacocks and we used the place as a storage locker for fenders and lines. As it was a wasted space, I started to consider what else could be done with it.

The main problem was the small space: 4 feet long by 3 feet at its widest. However, there was an 18-inch wide, full-depth locker just forward of the head. It had a door that opened into the corridor but the locker was not accessible from either of the two forward cabins. Since each cabin had its own hanging locker anyway, after careful measurement, I decided to combine the volume of this locker with that of the head and then see what I had to work with.

I cut away the bulkhead between the head and locker, using a large reciprocating saw, a big hammer, and a chisel. Then I removed the locker door and its frame to reveal a surprisingly large space. I closed the opening where the locker door had been with plywood from the bulkhead I had just removed.

We had a functioning head for the aft cabin, so it didn't matter what I dismantled or discarded from the forward head. I discarded the washbasin and

After removing the bulkhead the towel rail was fixed to (before) and co-opting the locker behind it, Roger transformed a dark cramped space into a stylish head (after).



Vinyl tiles waterproof the shower-stall bulkheads, far left, and white Plas-Tex sheet brightens up the remaining vertical faces, near left. The *pièce de résistance* in the refurbished head is the tempered-glass washbasin, lower left, complemented by the polished-brass faucet set.

old toilet, along with all their plumbing and the smelly panels around them. On removing the liner from the cabin trunk, I discovered the caulking around the portlight had perished and leaked. I removed the portlight to be re-bedded with new sealing compound. The vinyl overhead material was old and discolored so I ripped that out as well. As boat owners know well, one thing leads to another . . . and another . . .

A pause for head scratching

Now that I had a bare shell, I could finally see what I had to work with, yet I had no clear picture of how it would all go back together again.

After a lot of measuring, thinking, and sketching, I decided the widest part of the area, where the old toilet had been, would make a good shower stall. A new toilet would fit nicely where the locker had been, and in between I could install a decent-sized washbasin.

After looking at all types of toilets, manually operated as well as electric, I finally decided to "go electric." These heads have come a long way since marine toilets were first "electrified." I chose the Marine Elegance model from Raritan Engineering, which has an internal macerator, a full-sized seat, and fully automatic controls. I bought the seawater-flush version, as opposed to freshwater-flush, because we will eventually be cruising and I don't want the toilet to deplete our supply of fresh water.

The toilet fitted flush against the old locker bulkhead, and I was able to route the inlet and discharge pipes down through the sole so no pipes are visible in the compartment. I don't like to see marine heads with exposed pipes and valves when, with a bit more effort, they can usually be enclosed.

Raritan also makes a U.S. Coast Guard-approved waste-treatment system, called the Purasan, that does not need a holding tank. It uses a chlorinator to percolate chlorine into the waste, neutralizing the bacteria and making it legal for overboard discharge.(***Note:*** *Discharging even treated sewage is not legal in federal no-discharge zones* ***–Eds.***)

I installed the percolator behind a mirror so it cannot be seen. The system employs twin macerators in a large plastic box that I mounted low in the forward bilge. I piped the discharge through the old toilet seacock.

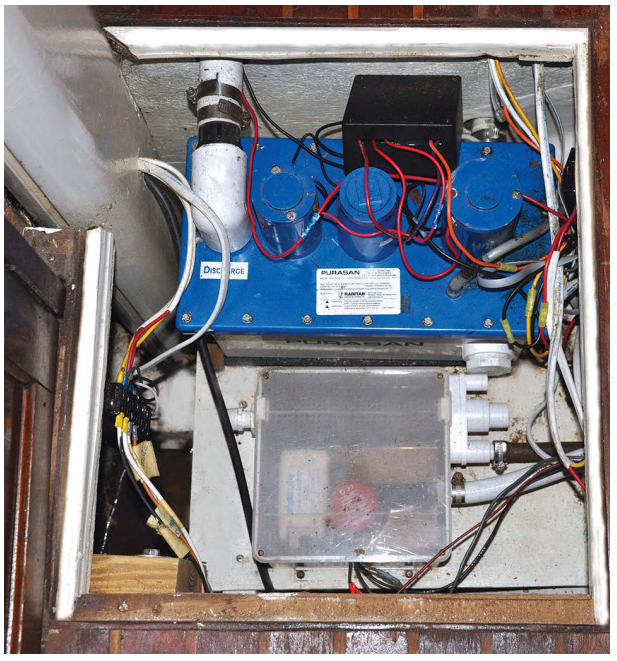
The electrical side was easy, as it was all pre-wired. The control panel gives options for different flushes and a fully automatic mode that allows you to just push a button and walk away. At least this saves the embarrassment of having to show landlubber guests how to work a marine toilet.

Fashionable basin and faucet

I found a beautiful tempered-glass vessel bowl and a polished-brass faucet set at Overstock.com. The bowl mounts securely on top of the counter, rather than being recessed in it like most washbasins. The faucet set came with a shower head on a flexible pullout cord and a polished wall-mounting bracket for it to hook onto. These were top-of-the-line German products, but were not expensive because the models had been discontinued.

It was not difficult to modify the existing wooden sink locker to mount the new bowl, but the single faucet needed to be mounted higher due to the height of the bowl. I therefore incorporated a raised section into the cabinet and covered both levels with imitation polished-granite tops.

Installing the toilet in the locker space left a nice area for a shower. The shower head pulls out of the washbasin countertop and can be attached to the adjustable bracket in the shower stall.



Roger installed the Purasan waste-treatment system low in the bilge where it's out of sight but accessible.

Fresh trim

The plywood bulkheads around the new shower space were scratched and coated with thick layers of varnish, so I decided to tile them with regular domestic ⅛-inch-thick waterproof vinyl tiles. I glued them to the bulkheads and caulked them thoroughly.

I finished the back panels outboard of the shower and around the toilet with Plas-Tex plastic sheet from Lowe's. This comes in 4-x 8-foot sheets and is very pliable, waterproof, and washable. I first made paper templates, then glued the plastic sheet to the cabin sides with contact cement. When everything was fitted and caulked, I built a seat from teak slats to allow sit-down showers when under way.

I installed a Rule shower-drain sump (item #500056 from Defender Industries) beneath the sole. The shower drains into the sump, which pumps out automatically through a vented loop into the washbasin overboard drain.

To make the head brighter and give it a much larger feel, I replaced the old wicker locker doors with mirrors. I clad the overhead, which now spanned the toilet and locker areas, with EverTrue PVC interior wainscot planking from Lowe's. These 7½-inch-wide and 8-foot-long tongue-and-groove panels form a very nice rot-proof overhead liner. They are ⅜ inch thick and offer a degree of insulation the old vinyl did not. I screwed and pinned the panels to the existing wooden crossbars and concealed all the wiring for the overhead lights behind them. I also installed three 120-volt wall sconces from Home Depot.

The forward head now looks more like one in an elegant yacht of a bygone era, yet it is modern and extremely functional.

Roger Hughes has been sailing for nearly half a century as a professional captain, charterer, restorer, and happy imbiber on a lot of boats. His present project, the restoration of Britannia, *a once run-down Down East 45, is nearing completion after five years. Roger and his wife look forward to cruising later this year and using all the innovations he has incorporated into the boat, many of which have been featured in* Good Old Boat. *Stay up-to-date with Roger's projects at his website: www.schooner-britannia.com.*

Resources

Raritan Engineering
Marine Elegance toilet and Purasan
www.raritaneng.com

Defender Industries
Rule shower drain sump item #500056
www.defender.com

Lowe's
Plas-Tex plastic sheet
EverTrue PVC interior wainscot
www.lowes.com

Overstock.com
Washbasin, faucet set
www.overstock.com

Time to chill

Installing air conditioning was a cool move

BY ROGER HUGHES

My Down East 45 schooner, *Britannia*, had neither air conditioning nor heating when I bought her one December in Fort Lauderdale. In Florida's winters, you can often manage without either. However, by April and throughout the summer, the oppressive heat and humidity can be unbearable inside a boat. I therefore set about researching the many makes and prices of reverse-cycle (heating or cooling) air conditioning units available.

I had never fitted AC in a boat, so I had no idea of what size unit or units might be needed or how to install them. I took detailed measurements and calculated the cubic capacity of all the areas I wanted to air condition. I then made a drawing and mailed it to different manufacturers to solicit their suggestions.

I received a variety of recommendations, from a single large unit in the middle of the boat to three separate smaller units. Most proposals seemed to agree the overall cooling capability needed to be about 30/35,000 BTU (British thermal units) per hour to be effective in the height of summer. Prices and specifications were similar between manufacturers so, rather than try to choose which make to buy, I decided to buy from the salesperson who had shown the most interest in my project.

Mike Patrick worked for Pompanette Air, a company in Tampa, not too far away from *Britannia*. I went to see him and we began a conversation that resulted in a very satisfactory and efficient installation of two 16,500 BTU-per-hour AC units.

AC units and accessories

A basic kit for an AC unit consists of the main air-conditioning unit, usually self-contained on some sort of base; an electrical box and digital controls; and a 120-volt pump that delivers seawater to the units. Other items must be purchased as needed according to the installation. These include water pipes, filters, ducting, and vents.

Ducting is especially important because, if the tubes are very long or twisty, considerable efficiency is lost. This was one reason I decided to buy two units instead of one large one, which would have been cheaper. I would have needed very long tubes to carry air to the front and rear of my 45-foot-long interior.

Another reason for installing two units was that, if one broke down, we'd still have cooling from the other. In fact, a breakdown did eventually occur. A blocked seawater pipe shut down one unit, yet the other continued to function while I removed the clog. This is a very practical consideration when it's 100°F outside and — without cooling — it would rapidly become 110°F inside.

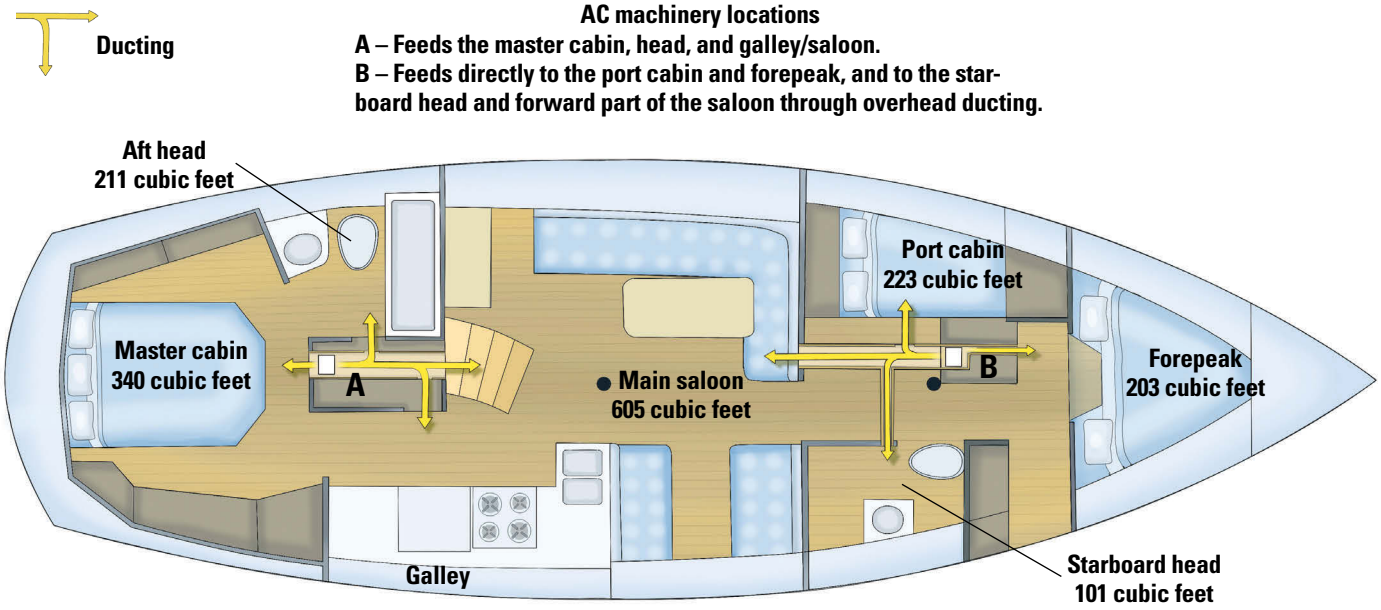
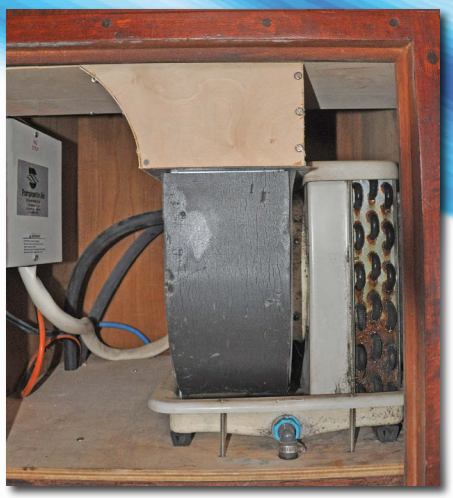
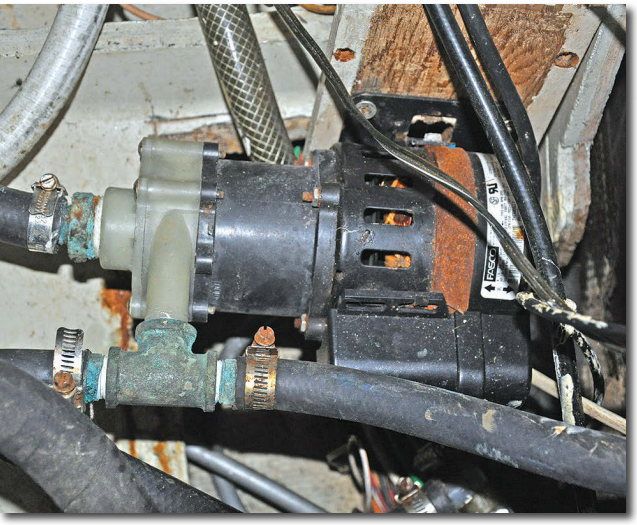


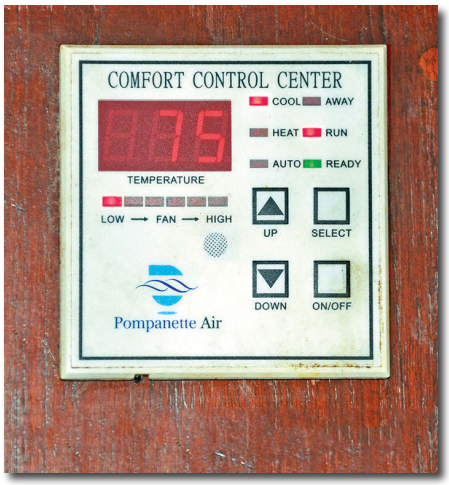
ILLUSTRATION BY FRITZ SEEGERS

Roger measured the cubic capacity of the areas he wanted to cool, then calculated how many BTU/hour would be needed to air condition the entire boat.



The forward AC unit fit very neatly into the top of an existing locker, at left, which enabled Roger to build the ducting up high, an advantage since cool air falls. The 120-volt seawater circulation pump, middle left, delivers water to both air conditioners. Because the control panels contain the thermostats, Roger installed them in the larger spaces, lower left. He uses the "away" button when he and his wife leave the boat for a period of time. It runs the AC for one hour every three, keeping the inside dry and mildew-free, even in the humid Florida summer.





Forward unit

The forward section of the boat consists of the port-side cabin, the starboard-side head, the forepeak cabin, and the forward area of the saloon. It's better to have the cool air discharge as high as possible because cold air descends. That's not so easy to do on a small sailboat. Luckily, the boat has a full-height locker forward that is 2 feet square and was once used for a washer and dryer. I built a strong shelf high in this locker and shoehorned one of the 80-pound AC units into the space. The heavy electrical cable, left over from the washing machine, still led there from the AC breaker panel, so I used it and saved about $200 in wire.

It took a bit of scrambling to mount the large 120-volt water pump and filter, plumb it to a spare seacock, then wire it to a breaker. The water is piped through the air conditioner and discharges through an above-water seacock. The condensate overflow, which is the condensed water from the air-conditioning process, discharges through another small seacock above water level.

The digital controls were easy to install since they were pre-wired to plug into the wall-mounted control panel.

Once the electronics and plumbing were complete, the installation became a woodworking project, since I had decided to build my own ducting out of ½-inch plywood. This offered a much smoother flow than convoluted tubing and enabled me to direct the air in straight runs exactly where it was needed. The main duct was 8 inches wide by 4 inches high with ducts branching off into the two cabins. I also channeled some air overhead across to the starboard-side head and forward passageway. A further advantage of plywood was it didn't need insulating like the thin flexible pipe normally used for ducting.

I bought the more expensive teak adjustable vents, since they offer better airflow distribution and can be closed off completely if required. They also look nicer than plastic vents. I was advised to use 3-inch-square vents for cooling the two forward cabins and the heads. This didn't seem large enough to me, but proved exactly right

Roger made the ducting out of ½-inch plywood to which he added teak veneer where it can be seen, above upper. Straight ducting provides the most efficient airflow and the plywood does not need insulating. The short branch duct, above, carries air from the main duct to the starboard head, with a deflector to cool the passageway.

Although only 3 inches square, the smaller vents cool the cabins and bathrooms perfectly, at left. The main vents into the large saloon are 7 x 3 inches, center, and have vanes that can be adjusted to deflect air in any direction. Roger made one vent from three separate vents, at right. It distributes cool air more evenly than a single vent and can be adjusted as needed.

in practice. I used a 7- x 3-inch vent in the aft cabin. In the saloon, I combined two 3-inch vents with a 7- x 3-inch vent to distribute air more evenly in different directions.

It was all quite straightforward and I completed installation of the forward unit in a week. It was marvelous to finally press the "on" button and feel the machine blow a blast of cool air into the cabins and saloon. Mike arrived with flow and pressure gauges and declared this was the most efficient system he had seen on a small sailboat. (In Mike's line of work, the 46-foot *Britannia* is small.)

Aft unit

I cleared a space for the aft unit by moving a couple of drawers in the aft cabin. Installing this unit was easier because I was now "experienced" and the seawater pump was already fitted.

I again built the ducting as a straight-through plywood box in the aft cabin, with branches supplying the aft head and aft area of the saloon. A key part of the system, a dedicated vent that blows into the galley, pleased my wife. I plumbed the condensate into one of the cockpit-drain pipes.

The electrical draw from both units is too high for a single shorepower cable, so I ran a second shore cable into a new AC breaker panel. I needed this anyway to handle our electric kettle, toaster, microwave, and washer/dryer. I also had to modify the wiring from the 6.5kW generator to feed both panels when running the air conditioners on generator power.

Beating the heat

In the summer, Florida gets to 95° to 105°F with oppressive humidity. These two machines now keep the inside of the entire boat at a nice dry 75°F. Cool dry air, (or heat when it's needed — the reverse-cycle units can also extract heat from seawater), spreads evenly throughout the interior and no area is warmer or cooler than any other.

Both units work independently, except for the common seawater pump that feeds one unit even if the other is switched off. This provides great flexibility. When just the two of us are on the boat, we sometimes switch off the forward unit or close the vents into the two forward cabins. This has the benefit of blowing more cool air into the other areas.

The aft unit's ducting passes just under the cockpit sole. As the cockpit has a full enclosure, I now have an idea that I could deflect some cool air into the cockpit, using a waterproof vent. This would make it very pleasant for sundowners on hot sticky evenings.

The total cost for both units was around $4,600, including pipes, wire, plywood, and vents. This, of course, did not include my labor, but on a boat that's supposed to be the fun part of a project! Even though we tend to take our air conditioning for granted now, it is still one of the best investments we have made in our boat.

Roger Hughes' *bio can be found on page 31.*

Roger removed two drawers to make a space to fit the second AC unit into the aft cabin. The plywood ducting feeds air to the aft cabin and head, the galley, and the saloon.

Resources

Pompanette Air
www.pompanette.com/pomp.nsf/Subsites/pompanetteair

Beating the heat

Ice-cooled air for a cool night's sleep

BY CLARENCE JONES

Some nights in mid-summer it's just too hot to sleep on the boat. Even with the companionway and all the ports and hatches open, very little air is moving. And, if you anchored in the wrong place, there are lots of mosquitoes.

I solved these problems with a way to cool the air for about $40, if all the parts are brand-new. A lot of the stuff you need for this project, however, may already be in your workshop. My air cooler is not elegant, the air is still humid, but it works. It can't be called an air conditioner because AC dehumidifies the air as part of the conditioning process. I call my alternative a cabin cooler.

The main component is an ice chest. The larger it is, the more ice it can hold and the longer it will cool the air. I chose a 25-quart Igloo cooler ($23 at Walmart). It's small enough to be easily portable and conveniently fits several spots in the cabin of my 28-foot Catalina from where it can blow cool air into the forward berth.

A key reason for choosing this ice chest was that its lid hinges can be easily removed. With the lid in place, there are no holes in the ice chest itself and containers of ice stay frozen solid until I'm ready to use the air cooler. At bedtime I replace the lid with a StarBoard panel that incorporates my modifications.

I took the chest to the store's housewares section to select containers to fill with water that will be frozen. Two square, 16-cup (1-gallon) food containers fit inside the chest very nicely while leaving room for air to flow all around them. They are an ideal size to place in a home freezer. I also bought smaller 3-inch-high containers that can be placed on top of the larger containers to increase the amount of ice and extend the cooling time.

You could use blocks of ice in the ice chest, but the melted water might slosh around and damage the fan. I use a water and alcohol solution in the plastic food containers. Because it melts at a

It's not exactly a box full of cold air, but Clarence's cabin cooler behaves very much like one, top of page. It contains "cold" in the form of containers filled with a frozen mixture of water and alcohol that melts at a lower temperature than plain water ice, at left. The containers fit inside a standard cooler with space for air to flow around them, at right. The hinges allow the cooler's lid to be easily removed, inset.

A small computer fan, far left, provides enough airflow to maintain the cabin at a comfortable temperature. The airflow direction depends on the choice of elbow, at left. The fan and elbow attach to a panel that replaces the icebox lid, lower left.

lower temperature, the melted solution is colder than it would be with plain water ice. This may be an illusion, but air blown over a cold container seems to be less humid than air blown over cold water.

Fan facts

To blow air across the ice, I used a 120mm computer-case fan. The frame of the fan is 120mm square (4.72 inches). The fan blades are 4.5 inches in diameter. Virtually all case fans run on 12 volts and there are thousands to choose from. Pick one that will best balance airflow and battery drain. For computer use, quietness is a prized and pricey feature. For this project, even the noisiest fan will be barely audible.

As a starting point, look for a fan that will move more than 50 cubic feet of air per minute (CFM) and draw about 4 watts. As CFM increases, so will the wattage and the price. Fans with built-in, colored LEDs are very popular with computer gamers. If you wind up with a lighted fan, you can always put black electrical tape over the LEDs to keep the cabin dark.

The fan I chose is made by Cooler Master. It cost $9 (free shipping, no sales tax) at Newegg.com. At the time, Amazon.com sold this same model, claiming it was its best seller. The fan is rated at 4.2 watts and will move 69 CFM. A 120mm Cooler Master fan rated at 4.8 watts that claimed to move 95 CFM cost twice as much.

You'll have to wire a plug to the fan's power cord. I used a 12-volt cigarette-lighter plug. I have a socket on the boat for each battery (one battery is for starting the engine, the other is the house battery).

Some case fans can run at variable speeds. That's because some computer motherboards vary the voltage supplied to the fan as the temperature inside the computer case changes. A few fans have a switch that will let you choose the running speed manually. For this project, you don't need variable speed. If you connect 12 volts to a variable-speed fan that doesn't have its own speed switch, it will run continuously at its top speed.

Battery drain

If the online listing shows power drain in amps, wattage can be calculated by multiplying amps by 12 (volts). A 12-volt fan listed at .4 amps will draw 4.8 watts. For perspective on what your boat's batteries can handle overnight, that's about half the drain caused by a typical incandescent masthead light with a 10-watt bulb. (Looked at another way, .4 amps for 8 hours is 3.2 amp-hours.) My masthead light has an LED bulb that draws 1 watt, so I'm not concerned about draining the battery if both the masthead light and air-cooler fan run all night.

The air outlet is a 2-inch PVC elbow with a short piece of pipe in one end. I have both a 90-degree and 45-degree elbow to give me a choice for directing the cold air. Use a sanitary-grade elbow. At $1, it's about half the price of Schedule 40 PVC and a little more compact. With another piece of pipe in the outer end, you can create a slight nozzle effect to shoot the air farther.

The magic of melting

The cooler will work fine if you fill your plastic food containers with water, freeze them, and put them in the ice chest. But when I tested my air cooler with plain water ice, it took 15 hours for it to completely melt. The cooler will work better if you fill the containers with a water and alcohol solution that has a lower melting point. I described my first experiments with this technique in "Ice Magic" in the May 2014 issue of *Good Old Boat*, where I showed how to improve the cooling efficiency of a boat's built-in icebox. The same principles apply in this project.

Heating and cooling are measured in BTUs (British thermal units). Before it reaches its melting point, a pound of ice removes only .5 BTU of heat for each degree Fahrenheit that its temperature

As a refinement, Clarence fitted a baffle across the cooler to deflect the air so it would flow around the ice containers.

Clarence's cabin cooler sits on the saloon settee where it doesn't impede nighttime excursions and blows chilled air toward sleepers in the V-berth cabin.

rises. But something magic happens at the moment ice melts. It takes a lot of heat to create that change from solid to liquid. A pound of ice absorbs 144 BTUs of heat in the process of becoming water.

The magic melting point for ice made with plain water is 32°F. Mixing rubbing alcohol with water lowers the freezing/melting point. The ice will melt sooner and the liquid it becomes will be cooler as the ice continues to melt. The air passing over the melting mixture will be cooled more than it would be with ordinary ice.

Optimum cooling for a good night's sleep will take place if it takes about eight hours for the ice in the cooler to completely melt. If there is still a chunk of ice there at dawn, you will have missed some of the magic-melt cooling power that could have occurred while you slept.

With three parts water and one part rubbing alcohol, the freezing/melting point is about 0°F, but most home freezers can't go that low. The magic melt and huge BTU removal will not happen unless the ice is frozen solid.

Using the 25-quart ice chest in the cabin of my boat, I found the best formula for 8 hours of melt is one part rubbing alcohol to 15 parts of water (1 cup of alcohol plus 15 cups of water make a gallon). Because rubbing alcohol is toxic, I add blue coloring to the mix to make sure nobody mistakes the solution for regular water.

Inside the chest freezer I use to make boat ice, the temperature is about 10 degrees below zero. At that temperature, it takes about 12 hours for the 1:15 formula ice to freeze solid. With the fan blowing air across the ice containers, it takes about eight hours for all the 1:15 ice to melt if the outside temperature is about 85 degrees. At the start of the melt, the air coming out of the air cooler outlet is 60 degrees.

Assembling the cooler

To mount the fan and air outlet, you can simply cut holes in the ice chest or its lid, but you'd have to devise a way to cover them so your ice will stay cold until you're ready to turn on the cooler. I mounted my fan and outlet on a panel that fits inside the top of the ice chest.

I used ½-inch StarBoard for my panel. The fan is mounted to draw air into the chest through a 4½-inch hole at one end of the panel. A 2¼-inch hole at the other end takes the 2-inch PVC elbow and directs the outgoing air. A saber saw will cut the holes, but to make them neater, I used a hole saw for the outlet port and a router circle-cutting attachment for the larger fan opening.

Using this panel, I didn't have to cut holes in the ice chest itself. I leave the lid in place and the containers of ice stay frozen solid until I'm ready to use the air cooler. I then swap out the lid for the panel.

To make the cooler more efficient, I made an air baffle by screwing two pieces of StarBoard together (it could also be made with Styrofoam). It sits on top of the containers, blocking the more direct route across the top of the containers from fan to outlet port. This forces the air to flow down around the sides of the ice containers.

If you use plywood for the panel, I'd recommend painting it to prevent it from absorbing moisture and getting moldy. StarBoard is expensive if you buy a sheet of it. I can usually find an inexpensive scrap at a local marine surplus store. StarBoard doesn't need paint and is easy to saw and drill.

For hot nights on the boat, I remove the lid from the ice chest, put the panel in its place, then plug the fan into a 12-volt outlet in the cabin. The air temperature quickly drops and I'm assured a better night's sleep.

Clarence Jones began sailing in a 12-foot dinghy 40 years ago, then sailed through a series of trailerable boats — two MacGregors followed by two Precisions. The big change occurred in 2007 with his 28-foot Catalina, which he moors behind his canal-front home on Anna Maria Island in the mouth of Tampa Bay. Part of the joy of sailing, Clarence says, is inventing modifications for his boats. He has published almost two dozen magazine articles about them, and two books: Sailboat Projects *(2012) and* More Sailboat Projects *(2015).*

Air cooler components

All it takes to make an air cooler:

- An ice chest
- A 120mm computer-case fan to move air through the chest
- A 12-volt plug to connect the fan to your electrical system
- A 2-inch PVC elbow to direct the flow of cooled air
- Plastic food storage containers to hold water that you freeze
- Rubbing alcohol to make ice that melts at a lower temperature
- A scrap of plywood or StarBoard the size of the ice chest lid
- Newegg.com is a good source for fans: www.newegg.com

Can Sailing Pay

A former tightwad reflects on shoestring budgets

BY SUSAN PETERSON GATELEY

Titania, a 1968 Chris-Craft Cherokee 32, contributes to her keep when Susan gives sailing lessons aboard her.

A central tenet of tightwaddery is fixing it yourself. At a wooden boat festival, I once saw a well-used pickup truck with a bumper sticker that read: "Oh no, another learning experience!" DIY repairs all too often become an adventure and challenge in problem-solving for those of us who measure twice and cut four times. But after 30-odd years of DIY, I've acquired a bit of equanimity as I contemplate the loss of yet another screwdriver (nut, bolt, ratchet handle, or whatever) after it has fallen into the black hole beneath the engine oil pan. As I fish for it with the old stereo speaker magnet on a string, the secret is to pretend it's all part of the great grand game of life.

The pastime of sailing has often been compared to standing in a cold shower while tearing up 20-dollar bills. Yacht ownership is not generally thought of as being an inexpensive hobby. These days a new Sunfish will run you $4,000 or $5,000. Yet some people living on the fringes of the middle class on hamburger budgets and driving fully depreciated cars nonetheless manage somehow to own and sail yachts. Many do so by owning odd old or small yachts they consider perhaps more accurately to be "boats" than yachts. Many are also practitioners of the DIY ethic, that pioneering spirit of self-reliance that made America great and that this publication espouses with such practicality and eloquence.

In my younger years, I considered myself a Master Tightwad of Sailing. I was sailing leaky, elderly, biodegradable boats. Now, I'm owned by a 48-year-old 32-foot plastic sloop, a 50-year-old 22-foot plastic trailer-sailer, and a composite-construction 60-year-old schooner. While my outlook has broadened since my solo sailing days, old habits die hard. Like my brother who straightens and saves rusty nails, I still can't bear to throw away odds and ends like a perfectly good sliver of hardwood scrap or a piece of line, even if it is only 2 feet long. Some of those old sails in the attic can be recycled as winter boat covers. If I wrap canvas around that worn out trailer tire, it will make a dandy dock fender. Someday I'll try to make a batch of baggywrinkle for our little gaffer out of that heap of old docklines. Throw something away? Never!

The beauty of small

I teach beginning sailing to help support my yachting addiction and students often ask about boating costs. A lot of my students, like their instructor, are on modest budgets, so I give the classic advice of "go simple and go small" as offered by the legendary circumnavigators Lin and Larry Pardey. Size does matter. Little boats can be stored in your yard, transported on trailers behind a friend's SUV or farm tractor, or perhaps moved with a rental truck. You don't need a $50,000 piece of equipment to step the mast. Smaller boats mean smaller outlays of cash for everything from bottom paint to a new mainsheet.

Sharing the overhead

If you simply *must* have standing headroom, one way to get around the yard fees and storage costs is to spread the load among several incomes. I've written previously in this publication (May 1999) about our first ill-fated "boat co-op." (See additional partnership articles in September 2003 and January 2011.)

Back in 1997, three of us purchased and then shared a 32-foot Chris-Craft Cherokee sloop for one summer before the trio broke up amiably. Ten years later, my eternally optimistic husband formed another co-op to support a Tancook schooner named *Sara B.* That experiment in boat sharing has lasted nine seasons. It has survived an extensive unconventional and very sticky two-year refit of the wooden 47-footer involving 2 barrels of resin, several rolls of glass fiber mat

Its Own Bills?

Sara B is photogenic enough for video production work but her owners don't always get paid for it.

The *Caledonian*, a scaled-down replica of a Revolutionary War-era vessel, is a reenactor ship. Her website listing says she made $20,000 taking part in celebrations in the Great Lakes that marked the bicentennial of the War of 1812.

and roving, 6,000 stainless-steel 1-inch staples, and at least 3 gallons of fairing compound and auto-body filler. We hope to carry on co-operatively with maintenance and sailing for at least one more season.

The Sara B LLC is a budget version of the fractional ownership setups that began gaining popularity a few years ago. Usually those deals involve new or nearly new boats with six-figure prices and cost each owner/LLC member considerably more each year than we originally spent to buy our little schooner. But there's no reason why such a deal couldn't be done with a good old fiberglass boat. A drawback with sharing is that you lose some flexibility in scheduling and control over the boat. Even as I enjoy sharing *Sara B* with others, I also enjoy having a smaller boat under my exclusive command to sail solo on short notice when that splendid weekday afternoon westerly wind ruffles the bay.

Cooperative arrangements are certainly not for everyone, but ours has worked well for a boat that's big enough to easily soak up a half dozen people for a Sunday sail. With her two masts, eight halyards, and abundance of other gear to keep track of, *Sara B* can be sailed solo in a pinch or with two people familiar with the boat, but having a third person along makes sailing (and docking) a whole lot easier.

The champion tightwad boat share that I've encountered to date was that of three women who went in on a $200 sailing dinghy they kept on a mooring in front of a friend's waterfront cottage. Now *that's* penny pinching of the highest order in my book.

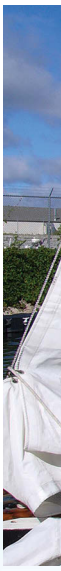
Studio, muse, or workshop

Some budget boaters find ways to generate income from their sailing hobby so the boat pays part of her expenses. I've crossed tacks with several sailors who transported compact art studios along on their cruises. Once they arrived at a scenic anchorage, they would haul their easels and paints ashore to create some *en plein air* artwork that they could sell for cash or barter. I know one sailor who does boat surveys. I've sailed with another who sometimes works as a delivery captain.

A time-honored way to help out with yachting expenses is to write about the boat and the adventures of her ship's company. Some scribes are a lot better at it than others. The sales of my sailing memoir about *Sara B* our eBay boat, *Living On The Edge With Sara B*, are never going to come close to the success of Canadian author Farley Mowat's book about his little schooner as portrayed in *The Boat Who Wouldn't Float*. Still, I did launch a modest self-publishing venture based on the first book I printed about traveling Lake Ontario aboard a 23-foot woodie, the good little ship *Ariel*. After that title sold out, I printed three more works based on my sailing experiences . . . all of which turned at least a small profit.

Other sailors, far more creative than I, have drawn inspiration from their hobby to write and sell many books, magazine articles, musical works, or photography. As readers of this magazine surely have inferred, combining photography and words often enhances the odds of getting into print.

If you have a lot more hustle and are a better sailor than I am, you may even be able to leverage your writing to get on the speaking circuit. Last year, I saw a boat-show workshop on how to sell stories to boating magazines. Another workshop I almost signed up for was about reducing the anxiety



Titania **and** ***Sara B,*** **at left, spend most of their time at moorings because their owners enjoy the privacy and quiet and the cost is about one-third the price of summer dockage.** ***Sara B*** **once stood in for a tall ship that was unavailable for a reenactment, at right. They were asked to land Bonnie Prince Charlie and his Jacobites on the shores of Lake Ontario. Fun? Yes. Unfortunately, they were not compensated for their assistance. The** ***Owl,*** **a formerly junked Cal 25, below, has become a liveaboard home and "pirate ship" for her owner, John Lewis . . . and perhaps also a piece of folk art.**

of boating. (One way to do that is not to get too deeply in debt!) Reducing anxiety would seem to be a rich source for stories about sailing. You might not get rich off the lecture circuit, though, unless you also have some sort of service or product (or book!) to sell.

Talk like a pirate

Last summer, I encountered two vessels with skippers who had ventured into the historic reenactment business. One, a Cal 25 the owner acquired for free, had been converted into a remarkably convincing tiny pirate ship. Her free-spirited skipper has traveled between the lower Great Lakes and Florida for several years attending pirate fests and other semi-theatrical gigs and being paid for his appearances.

Another such yacht stopped in my home port on Lake Ontario last summer en route to the coast of Maine. She was a 30-foot schooner, built of wood about 20 years ago, and was an exact half-scale replica of a Revolutionary War-era vessel. Her new owner, whose day job involved operating oil field service vessels in the Gulf of Mexico, planned to work the tall ship gatherings and pirate gigs of the New England and mid-Atlantic coast.

If your boat is really photogenic, you might even be able to make a bit of money by renting her out as a movie prop. A fellow schooner owner in the Toronto area managed to score a few hundred dollars from a production company for a day or two of filming with his little two-master.

An extreme example of making money with a boat was one that stopped in at a nearby port on Lake Ontario last summer. The *Amara Zee* is a steel-hulled knockoff of a Dutch sailing barge and currently owned by a theater company. The actors and gymnasts stage their shows on deck and aloft in her rigging. We watched a performance of "Hacked . . . The Treasure of the Empire" with a plot that has been aptly described by reviewers as "indescribable." Still, as sailors, we greatly admired the ingenuity and rigging skills of the thespians as they climbed, zipped, swung, hauled on tackles, and manned the capstan bars to present the show.

Charters and tours

One of the most common ways to make your boat pay her way is to put her to work in the sailing excursion trade as a UPV (uninspected passenger vessel). To do this you need to get your merchant mariner credential (MMC), more commonly known by six-pack operators as a Coast Guard captain's license. This involves a physical, a test of your seafaring knowledge and rules of the road, a hefty pack of paperwork, and some fees. Some people pay a four-figure tuition to attend a school that guarantees a passing grade on the test. Tightwads study at home and then drive to the nearest test site to take the exam.

I did this back in 1997, and subsequently offered day trips and sailing lessons on inland waters for a number of years. There are some legal requirements, including enrollment in an approved drug-test program and documentation of the vessel if she is over 5 net tons, but if you carry six or fewer

passengers, the trade is far less regulated than that involving so called COI (certificate of inspection) vessels like the windjammers and big cats that haul crowds around on harbor cruises and sunset sails.

Not all marinas allow commercial activity on their docks, however. We were fortunate to find a waterfront business that welcomed the idea of sailing charters as a complement to its own offerings. I've also encountered a sailing charter operator who teamed up with waterfront restaurants or taverns to offer sunset cruises.

If you operate a charter business for very long, you will almost certainly meet some very interesting passengers. Running a small passenger vessel is not a job for the faint-hearted. Perhaps you will be asked if the family can bring their dog. Or their very large macaw. You will almost certainly have to deal with infants and toddlers. It's difficult for someone like me, who has never had a child, to comprehend how quickly a 6-year-old can pull the free end of the halyard up to the top of the mast and through the halyard block. But some kids are an utter delight to have aboard. I remember a brother and sister team who spent most of the charter making the beds, swabbing the floor, wiping down the countertops, and otherwise putting things in order below-decks in their child-sized home.

You may well have to deal with frail people dreaming of taking the first (and last) sail of their lives. If that happens, I suspect you will never forget the light in their eyes and the smiles on their faces as they watched a fleet of racers crossing the starting line leaning to a sweet summer wind as they charged along.

Buy, sell, and trade

It goes without saying that if you are a true-blooded budget boater, you will buy low and sell high when it's time to change boats. Although this is something I have *not* yet managed to do, I have met a few wheeler-dealers who acquired cheap boats, kept them for a few years, and sold them at a profit. My marina neighbor fixed up a Catalina 30, then swapped it for a 41-foot Morgan Out Island with its comfy amidships cockpit and more room than the entire upstairs of our house. Another friend swapped a 22-footer with a freshly done paint job for a sweet-lined Irwin 27. When I last saw him, he was in the process of swapping that boat for a 40-footer he planned to take south as a liveaboard vessel.

I am ashamed to confess that I have the ability to buy cheap boats nobody else wants. This is, after all, why I could afford them. The problem is they are still unwanted when I try to sell them. On three occasions, I have sold these worthy vessels for the price of the trailer upon which they sat. But two of those boats had paid their way for years. They didn't owe me a thing. Quite the contrary. They enriched my life with an abundance of learning experiences that to this day make for great conversation on winter days when sailors gather to swap yarns. The third boat had been purchased as an act of charity from a non-profit organization, so I didn't feel too bad about letting her go for the cost of the car carrier she sat on.

I agree with everyone else that yachting is not a cheap hobby, but it's only money . . . and you can't take it with you. The older I get, the more I realize it is the memories, experiences, and friendships associated with sailing that are priceless.

Susan Peterson Gateley lives and writes among the poison ivy and multiflora thickets of a woodlot within earshot of Lake Ontario on a rough day. She learned to sail and cruise on biodegradable boats using the "discovery method" and — after several offshore bluewater trips on other people's boats and ships — decided she prefers "green water" coastal cruising. Her mission is to make the climb up the learning curve a little easier for wannabe sailors. Her books are available from her websites, www.silverwaters.com and www.susanpgateley.com. She still hopes to get one of her boats on this magazine's cover!

How green is my galley

When my partner, Robin, wants to get my attention, he'll come home with a big beautiful bouquet of freshly cut collard greens. If it's a special occasion, maybe a dozen stems of rainbow chard. I've always liked greens and, as anyone who's lived without refrigeration can attest, nothing says "I love you" like a fistful of organic arugula.

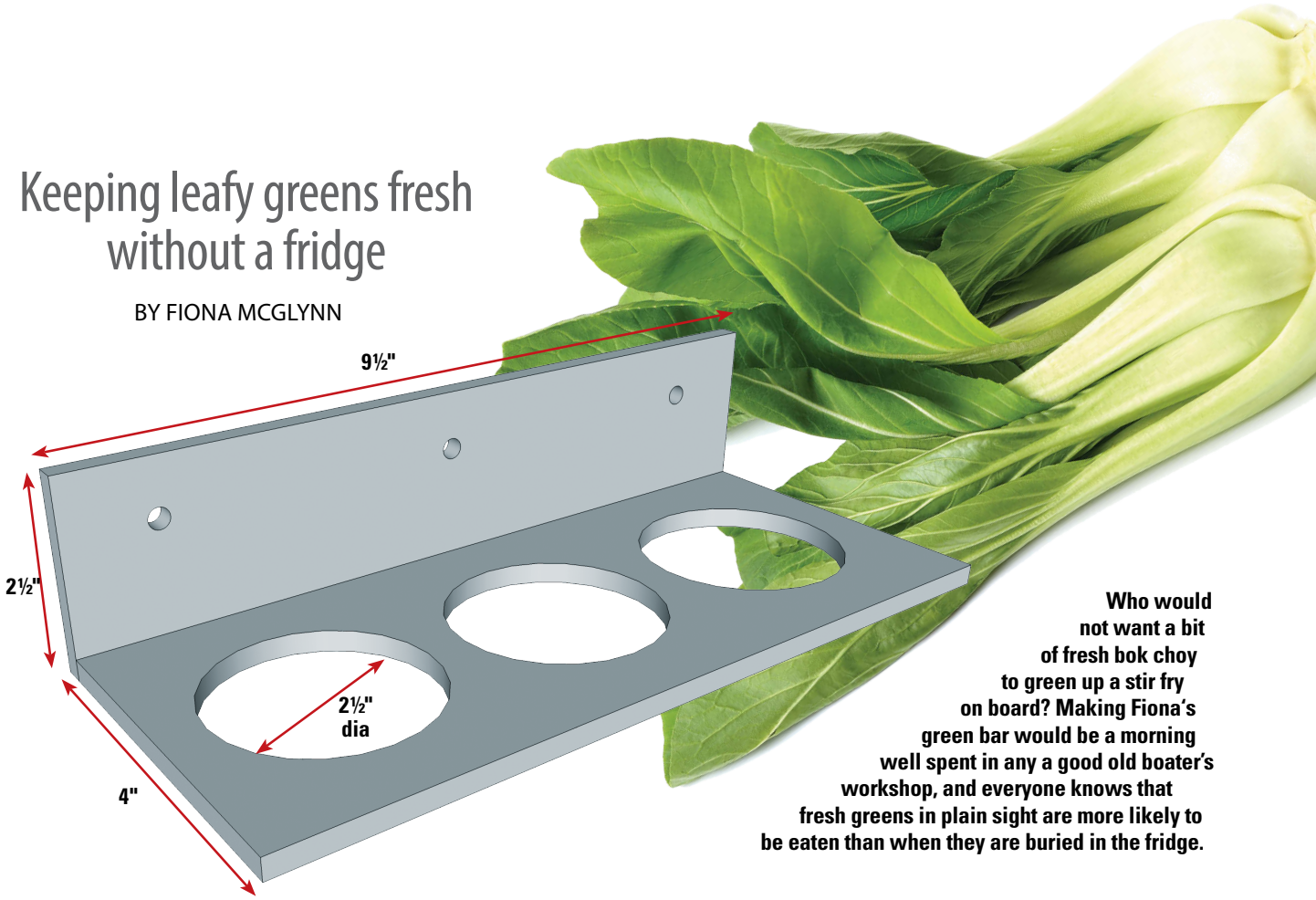
Robin and I have been together for three years and we've lived without a fridge for two, buying ice only when we have meat or dairy to keep. This is in large part due to our magical "green bar" (cue infomercial music) that allows us to keep our greens green for a week. If you're looking to free up space in your fridge, reduce power consumption, or just plain don't have refrigeration, read on.

Our green bar is a rack that holds cups of water. At the moment, the residents include kale, bok choy, rainbow chard, cilantro, romaine, and watercress. With the exception of the cilantro (a problematic tenant), all of these can last a week if we don't eat them first. It's very clean, easy to maintain, and is rated to hold everything securely up to (and possibly beyond) a small craft warning (a rating we had the pleasure of testing off the Oregon coast last fall).

Cut greens wilt due to water loss, but if you keep them in water, capillary action will draw the water up into the plant, keeping the cells alive just as capillary action keeps cut flowers looking fresh. You can help your greens last longer by cutting an inch off the bottoms of their stems before putting them in water. Use clean water and change it every two or three days, otherwise the water will begin to foul.

Keeping leafy greens fresh without a fridge

BY FIONA MCGLYNN



Who would not want a bit of fresh bok choy to green up a stir fry on board? Making Fiona's green bar would be a morning well spent in any a good old boater's workshop, and everyone knows that fresh greens in plain sight are more likely to be eaten than when they are buried in the fridge.

A simple rack

Designing and building a green bar is surprisingly easy. Ours consists of two ¼-inch-thick Plexiglas racks measuring 4 x 9½ inches for the base and 2½ x 9½ inches for the back mount. The rack has three 2½-inch-diameter holes cut at regular intervals to hold the cups. Alternatives to Plexiglas are wood or StarBoard. Use a hole saw appropriate to the size of cup you plan to use.

It can be tricky to find cups that fit. I like Bernardin's plastic freezer jars (with the purple lids) as they taper from 3 to 2 inches and can fit a range of cup racks. You can find them wherever canning supplies are sold. Once you have your bar set up, mount it in a cool place away from direct heat and sunlight.

If you'd like to discuss this or let us know how your green bar has worked for you, please reach us through our website. May your greens (and relationship) always be fresh!

Fiona McGlynn and her partner, Robin Urquhart, left Vancouver in 2015 to sail south on their 1979 Dufour 35, MonArk. *Follow their voyage and their reflections on where it is taking them, physically and metaphysically, at www.happymonarch.com.*

When winches wobble

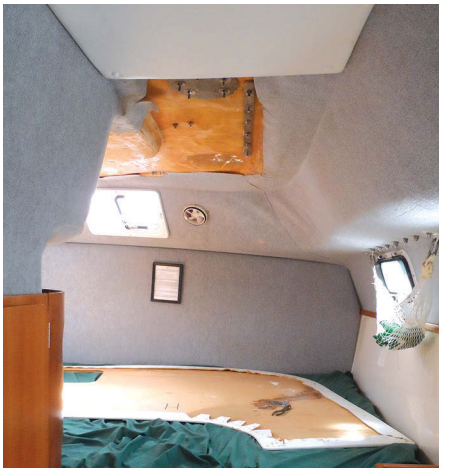
Better backing plates restore rigidity

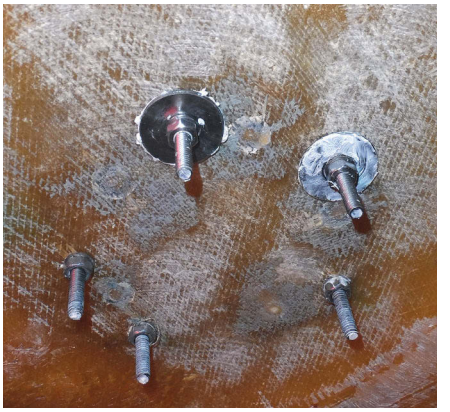
BY DREW FRYE

When a concentrated load is applied to a structure, that load must be distributed widely enough that the surrounding structure is not overloaded. Clew patches on a sail are a visible example. Sailmakers add extra layers of cloth to carry the point load at the clew, and reduce the number of layers as they move away from the corner so the load per layer will be relatively constant. Sailors likely assume that the builders of their boats took the same precautions when mounting hardware on their decks, but that is not always the case, as we learned on a recent cruise when seemingly well-mounted winches on a well-found boat began to wiggle after 18 years of use.

Years before, we'd experienced a failure with a winch mounted by the boat's previous owner (PO). While three of the cockpit winches were located on purpose-laid solid fiberglass pads, the fourth, as we discovered, was mounted on a cored section of the structure with only lock washers under the nuts and with no fender washers or even plain washers to spread the load. Knowing this, perhaps the PO had avoided using this winch for the genoa. I loaded up the sail on a breezy day and the winch nearly flew out of the deck.

After transferring the load to another winch, I removed the leaning winch to a safe location below. Repairs ultimately required dropping the overhead, replacing the core with solid material, and laying up a new inner skin. We added a backing plate (of the same





When a winch began to work loose while loaded up with a genoa sheet, Drew had to reinstall it, top of page, and learned something about backing plates in the process. Cracks in the gelcoat, at left, caused by the winch starting to lift, were mostly hidden under the winch skirt until the winch was removed. Fortunately, there was not yet any significant damage to the laminate. To gain access to the underside of the deck, Drew had to unscrew the overhead liner and drop it onto the bunk, center. Just visible is the fiberglass backing plate Drew installed 5 years earlier after a winch pulled out of the deck. When the previous owner swapped the winches around, he used only lock washers under the forward bolts, and simply flipped over the distorted washers and reused them on the aft bolts, at right.

material as described in this article) and it has since given no trouble.

Repeat performance

Our surprise, however, came years later, when one of the secondary winches, mounted in solid glass at the factory, began to wobble. Blasting to windward in a nice small craft advisory on the first day of a short cruise, we noticed the winch was lifting 1/16 inch clear of the deck and that spider cracks, originating at the bolts but previously hidden under the winch skirt, were suddenly growing. What had changed? It may have been the result of years of wear and tear, but it's more likely the increased load imposed by a new inside genoa track made the difference. In other words, an upgrade we made resulted in increased loads, and there were consequences.

I tacked to relieve the pressure and realized the other secondary had the same symptoms. I routed the sheet to the primary and limped to our destination under reduced sail.

That evening, I went straight to work, primarily to prevent water from leaking into the overhead. While the boat bobbed at anchor, I dropped the overhead under each winch, removed the bolts (which, under the failed winch, were not even finger tight), removed both winches from the deck, and covered the resulting holes with duct tape.

The bedding under the winch was silicone caulk (a bad choice by the PO) and gave no resistance. I also noticed

Backing materials under test

I performed a simple experiment to compare how backing plate materials hold up under load. Using ¾-inch pine as a simplistic surrogate for a soft deck and the same ¼-inch x 20 tpi (threads per inch) bolts that secure our Lewmar 40 winches, I tested several types of washer and backing plate materials. The results are in the table below.

For comparison, the maximum working load on the bolts securing a Lewmar 40 winch with a strong grinder is about 500 pounds. This requires a bolt strength of 2,500 pounds for a 5:1 safety factor.

Alternatively, with properly tightened bolts (about 60 inch-pounds), the clamping force is 1,300 pounds or slightly beyond the failure point of stainless-steel fender washers. Not surprisingly, our winch-mounting fender washers failed over time.

Simply put, ¼-inch bolts are sufficient only if the washer/backing plate design can transfer 100 percent of the load to the bolt without damaging the deck, which only ⅛-inch metal plates and ¼-inch fiberglass achieved. Specific test results depend on the bolt size and deck material, but the trend is clear: fender washers are not suitable for high loads.

The solution? Make your own washers out of ⅛-inch aluminum or ¼-inch fiberglass using a hole saw in a drill press.

Washer load testing

Washer Type	Initial surface failure torque (inch-pounds)	Tensile load pounds	Final torque (inch-pounds)	Tensile load pounds	Failure mode	Proof strength (pounds)	Min. breaking strength (pounds)
Plain washer (½" x 0.063")	16	320	19	380	pulled into wood	1,950	2,700
Fender washer (1¼" x 0.042")	40	800	80	1,600	distorted into cone	1,950	2,700
HDPE (like StarBoard) (½" x 1½")	15 *	980	49 **	980	slow distortion	1,950	2,700
Aluminum fender washer (1½" x 0.125")	100	2,000	125	2,500	minor distortion, bolt stripped	1,950	2,700
FRP plate (¼" x 1½")	no surface failure	no surface failure	120	2,400	bolt failed	1,950	2,700

* Maximum without distortion within 24 hours ** 24 hours, re-torquing 4 times

The ⅛-inch-thick aluminum washer began to distort just moments before the nut failed in the crush test, at left. This distortion did not begin to appear until the tension in the bolt was beyond its proof strength. At 523 pounds, the plain washer pulled well into the pine block, center. This is about the maximum safe working load for the ¼-inch stainless-steel bolt, and the same load at which the first winch pulled bolts into Drew's cored deck with similar washers. Within 24 hours, the HDPE washer was badly distorted, at right. Although it looked fine initially, it required repeated re-torquing to keep it tight. Damage to the wood began before the maximum working load was reached, and the HDPE continued to distort after the test was stopped.

there were extra holes. Further investigation revealed that all of the winches had been relocated by a PO, bringing into question what the factory mounting practice had been.

We finished our weeklong cruise using the other pair of winches, which are fortunately the same size, for sheeting the genoa.

Upon returning home, I started by breaking the winches down, cleaning and greasing them as should be done every few years. They were due. I then fabricated backing plates for each of them, about 2 inches larger in diameter than the winch base — as large as would fit in the recessed solid-glass area on the underside of the deck.

Fiberglass backing plates

The material I had at hand was a scrap solid-fiberglass panel (not cored) salvaged from an abandoned boat that had been cut up by a local marina. To my way of thinking, this is basic recycling, giving the bones of a not-so-good old boat another chance at life. It is well proven that fiberglass that has been kept out of the sun does not really age. My scrap was cut from a bulkhead.

Absent scrap, small sheets of precast structural-grade fiberglass are available from many sources. Higher-grade fiberglass panels, such as Garolite G10, are also available (for about twice the price). These are useful for highly loaded applications where threading may be required because there is no room for protruding nuts or separate backing plates.

Fiberglass is easy enough to shape once you learn a few simple techniques.

Backing plate materials

Many materials are used for backing plates. Some are suitable and others are not. I have seen and used a variety. Here are the results of my experiences.

Suitable

Solid hardwood – Easy to fabricate and cheap, hardwood can be very strong if close-grained and ¾-inch thick. Since rot is an issue if the bedding is not watertight, it's best to coat the wood with epoxy, which reduces the savings in cost and time. Hardwood tends to crack if the bolts are within 1½ inches of an edge, and space can be a problem when refitting under a close-fitting overhead. Longer bolts will be needed because of the thickness.

Plywood – Splitting is less of a concern, so ½-inch plywood is generally enough as long as it is of high quality and made with waterproof glue and coated with epoxy. Rot is still a concern in the long term.

Aluminum – Easy to fabricate with common tools, light, and compact (⅛ inch is a typical thickness), aluminum is generally very durable. It will bend rather than crack and is suitable for exposed locations if painted or polished . . . but see some caveats below.

Precast fiberglass – Corrosion-proof, easy to fabricate, compact, and cheap, fiberglass has the additional advantage of bonding well with epoxy, after which it becomes part of the deck. This is particularly beneficial when the deck is thin or the surface very irregular. A thickness of ¼ inch is adequate, and 3⁄16 inch is good if it's bonded.

Additional fiberglass lay-up – I later tested cored panels with 3 or 4 additional layers of 17-ounce biaxial-cloth reinforcement in the loaded area. Just as strong as ¼-inch precast, it is better for irregular deck surfaces because it is bonded to the skin.

The micrometer measured this fender washer, found under a failed winch on a different boat, as .026 inch thick, thinner than a car license plate, at left. A .042- x ¼-inch fender washer taken from the failed winch mounting on Drew's boat, center, had deformed nearly ⅛ inch, allowing the winch to lift and cause minor damage to the fiberglass deck. A threaded backing bar (this one is ¼- x 1-inch aluminum) can make a good backing plate for headsail tracks, at right. Drew used this one because he did not take down the overhead but rather fished the bar into place and inserted the bolts from above.

It can be cut with an ordinary carbide-tipped circular-saw blade, but leave a ¼-inch allowance for chipping. An abrasive cut-off wheel in a right-angle grinder works well without chipping.

Grind the cut plate to shape with an 80-grit sanding disk on a 5-inch right-angle grinder, smoothing the edges as needed. (Use respiratory protection and vacuum-equipped tools whenever cutting or grinding fiberglass.) Mark the holes by holding a Sharpie vertically and making circles in each hole, and drill 1/32-inch oversize to allow for alignment and angled drilling errors (both yours and those in the holes already in the deck).

Use plain washers with a backing plate or extra-heavy fender washers (0.063-inch minimum for ¼-inch bolts). I used a hole saw and drill press to make my own 1½-inch washers from ⅛-inch aluminum plate.

To bond or not to bond?

For most good old boats, a backing plate made of ¼-inch-thick pre-cast fiberglass and about 2 inches larger than the winch is adequate. However, bonding that fiberglass backing plate to the deck with thickened epoxy increases the strength considerably beyond that of the individual components. It also assures better load distribution and increases stiffness. On the other hand, it requires some additional work and is often overkill if the deck is sound and the backing plate is thick enough.

There are two circumstances that demand bonding: if the surface is not level and the backing plate will not

Stainless steel – It's the ultimate in durability, but stainless steel is expensive and fabrication is far more difficult. While usually overkill, it's a good choice for critical items. A thickness of ⅛ inch is typical, or ¼ inch for larger bolts.

Threaded insert plates (in the laminate) – Some builders incorporate threaded plates into the layup. An advantage is that hardware can be replaced later without access to the reverse side. There are downsides, which I have experienced several times. If the bolts seize, you are in a bad place, and if the plate corrodes, it can expand and crack the deck. Although I would like to ban these plates, I've installed them a few times because of severe access problems. I strongly recommend stainless steel.

Threaded backing plates (not in the laminate) – I have found these very handy in tight spots where getting nuts onto bolts was a real challenge. Fabrication is more complex and, because the bolts must be turned, in theory it is possible to break the bedding seal, although I have not experienced this.

Unsuitable

Fender washers – I see fender washers under deck hardware all the time. They were originally conceived to distribute light bolting loads over thin sheet-metal fenders, but boatbuilders often use them inappropriately. Used as backing plates to anchor high rigging loads to fiberglass structures, they frequently distort, which leads to deck damage. While they are acceptable for mounting blocks on racing dinghies, they have few valid uses on cruising boats.

Every failed mounting I have investigated had a cone-shaped, distorted fender washer at the root of it. As the load came on, the washer simply bent, the fiberglass cracked, or the core material crushed, resulting in loose hardware, leaks, and laminate damage. Often, the holes elongated as movement increased. Some of the washers were frighteningly thin — only 0.024 to 0.026 inch — but even standard 0.042-inch stainless-steel fender washers bend under heavy loads. ANSI (American National Standards Institute) requires 0.063 inch for ¼-inch bolting washers, but that is for bolting to rigid metal surfaces. (For larger sizes, the loads and required thicknesses all go up with the square of the fastener diameter.)

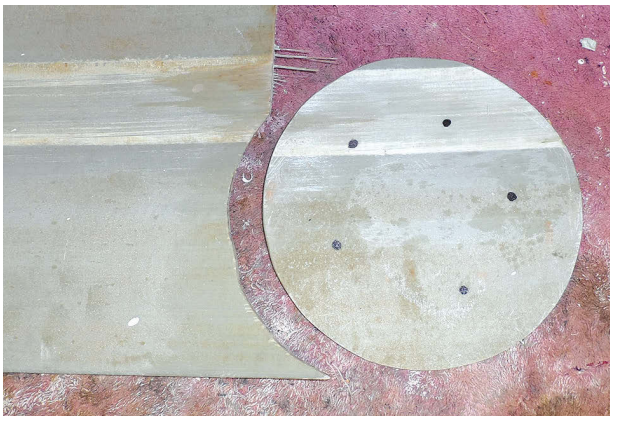
High-density plastics – HDPE, StarBoard, and synthetic lumbers deform slowly under high sustained loads and are also prone to splitting (see the table on page 45). In the crush test, we had to keep tightening the bolt for 72 hours, as it kept loosening as the plastic slowly deformed. Fine cracks appeared two months later. While these materials, although difficult to bond and seal, can make acceptable mounting blocks, they are not appropriate where high point loads are present.

Galvanized steel – Almost always, issues arise with galvanized steel because of mixing dissimilar metals. There are better choices.

Aluminum in damp locations – When exposed to salt and coupled with other metals, aluminum becomes sacrificial and corrosion can be severe. This can lead to failure in damp locations such as anchor lockers, and is a problem anywhere if the bedding leaks. Using anodized plate or treating aluminum with Alodine 1201 can be helpful.

My favorites

I like aluminum for its availability on the scrap pile, simplicity of fabrication, compact thickness, and unbreakablity. I use it for small plates in dry locations (under cam cleats and Bimini mounts) and for backing hardware subject to impact (mooring cleats, stanchions, and jackline anchors). Stainless-steel plate is nice if you are comfortable drilling and cutting it. For larger plates, I like fiberglass for permanence and the ability to bond it to the hull. For damp locations, only stainless steel and fiberglass are sure to last.



Drew cut the material for his backing plates out of a fiberglass bulkhead from a boat that was being sliced up for the dumpster, far left. Holding a Sharpie vertically, Drew made circles on the backing plate inside the holes in the winch base, near left. He drills 1/32 inch oversize to allow for alignment and measuring errors.

Resources and materials

***Good Old Boat* articles about backing plates**

- "Searching for Quality" by Ted Brewer, May 2003
- "Hardware on Soft Decks" by Charles Doane, March 2010
- "Better Backing Blocks" by Jerry Powlas, March 2010

Materials

Structural fiberglass sheet
McMaster Carr, part number 8357K24 (12- x 12- x ¼-inch for $16)

Garolite G10
McMaster Carr, part number 9910T31 (12- x 12- x ¼-inch for $37)
www.mcmaster.com

3M 4200 polyurethane sealant
About $20 for a 12-ounce tube at many marine retailers.

Locktite PL S40 polyurethane sealant
About $6 for a12-ounce tube at Home Depot.

Lifesafe Butyl Caulking Tape
Defender Marine, part number 755908, ¾- x ⅛-inch x 20-feet, $19
www.defender.com

Bed-It Butyl Tape
Hamilton Marine, part number 755207, ½-inch x 50-foot roll, $18
www.hamiltonmarine.com

Extra-thick stainless-steel fender washers Bolt Depot, 1¼-inch OD x ⅛ inch thick, $.47
www.boltdepot.com/Fender_washers.aspx

spread forces evenly, and if there is significant laminate damage that can be stabilized by bonding.

In that case, proceed as follows: Taper the plate edges 12:1 to avoid any hard spots. Drill ¼-inch holes in the center of the proposed winch location and the center of the backing plate. Prepare both mating surfaces by sanding, then coat both surfaces with thickened epoxy and clamp them together with a ¼-inch bolt in the center. After the epoxy has cured, drill mounting holes through the deck and plate and plug the center hole with thickened epoxy. Bed the winch in the usual manner.

Core sealing

When reinstalling the secondaries, I was working in solid glass. If you are drilling though cored laminate, remember that a portion of the core must be removed around the bolts and this area refilled with epoxy. The core cannot sustain the bolt loads, and water in the core can lead to rot in balsa and freeze/thaw damage in any core material. Inspect the existing holes for damage. Even if they were previously sealed, it can't hurt to smear a little epoxy inside the holes to fill any cracks.

Bedding preferences

Silicone has no place bedding deck hardware. It has poor bonding properties and complicates repairs — nothing else sticks to it, including more silicone. Medium-strength polyurethane sealants, such as 3M 4200 or Loctite PL S40, work well, although they can be messy to work with and removing the bedded hardware later may be a challenge.

I have learned that excess bedding compound under the pins holding the side gears on a winch will push them up as the bolts are tightened down. The pins and gears then have to be removed so the excess can be cleaned out. This is easily done.

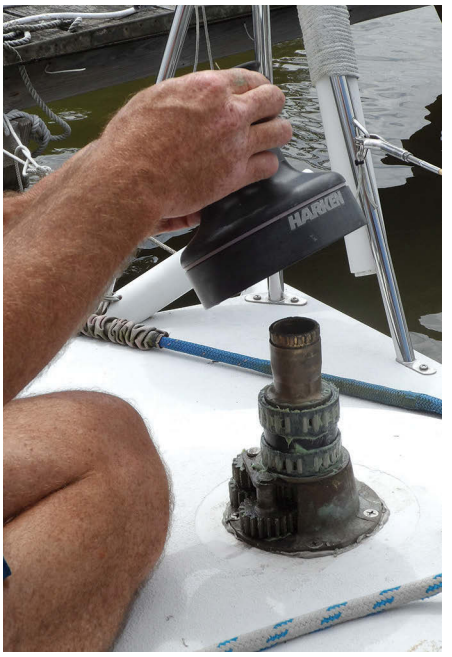
I like butyl sealant for hardware items that have a large bonding area, may be subject to movement, and are well secured by bolts. It never leaks, has a long shelf life in the toolbox, and is always easy to pry loose. Though some of the butyl will ooze out over time, it is easily trimmed with a plastic knife and, since it never hardens, smears or residue can be removed at any time with paint thinner.

Some butyl construction products contain fibers. They harden over time and do not have the same bonding characteristics. Butyl should be sticky with a consistency like Silly Putty and a nearly unlimited ability to slowly stretch without breaking. I purchased a roll at an RV center parts department 10 years ago, but the safe bets are Bed-It Butyl Tape or LifeSafe Butyl Caulking Tape.

When bedding hardware, do *not* apply sealant inside the boat. When the joint leaks — and someday it will — this will only force the water into the core and delay discovery of the leak. Trapped water will also accelerate corrosion of the bolts and metal backing plates. Apply sealant only on the outside.

Learning experience

Our winches are now more solid than ever and the gelcoat cracking has stopped, but I learned some lessons

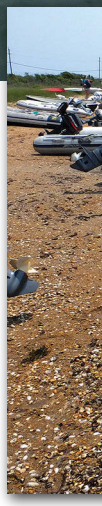


Drew used ⅛- x 1¼-inch aluminum washers he made himself because he was using relatively thin 3/16-inch FRP backing plate material, far left. After the repair was complete, the final task was to place the freshly greased drum back on the winch, near left. The gray butyl bedding tape is just visible squeezing out from under the base of the winch.

along the way: upgrades can introduce new stresses and we need to address these, boatbuilders don't always do what they should in hidden places, and previous owners can subvert a good design. Materials for projects can be free, if you like the idea of recycling old boats. And don't expect much from fender washers — you are much better off with a backing plate.

Drew Frye cruises Chesapeake Bay and the mid-Atlantic coast aboard his 34-foot catamaran, Shoal Survivor, *searching for out-of-the-way corners known only by locals. A chemical engineer by training, 40-year climber and 30-year sailor by inclination, he brings a mix of experiences to solving boating problems and writing about how he does it.*

Dinghy ramblings



Good fenders make good neighbors, at left. A good dinghy should be able to carry a load, and Cliff's Bolger Cartopper, above, does that with plenty of room for passengers. Every dink should be able to take the ground, whether it's sand, rock, or concrete, at right.

Conditions at Fire Island Inlet on the south shore of Long Island were "a bit sporty," as they say in New England, but not too bad. The wind was out of the southwest, 12 or 15 knots right up the inlet, but the waves had a fetch of thousands of miles . . . plenty of room to build up. They were only a few feet high offshore but, as they hit the shallows, they grew to big rollers of 8 feet or more.

My boat, a 26-foot Paceship, is steered with a tiller, and I had no trouble keeping the transom square to the waves through the inlet. But when we were halfway through the inlet I saw my dinghy, an 11-foot 6-inch Bolger Cartopper, surfing alongside on a wavetop at eye level. It seemed to be trying to pass. Clearly, it was in God's hands. At that moment it occurred to me that I'd better get serious about fenders on the dinghy. If it hit the transom, it has enough weight that it could do some damage.

My winter project that year was a bow fender from old rope, tugboat style. It already had synthetic gunwale guard, now $9 a foot. That helped, but I added one fender on each side for times when I would come alongside another boat. They were easy enough to install, but the lines securing them had to be covered with flexible hose. Otherwise, over time, the ¼-inch line cut like a knife into the heavy canvas cover of the gunwale guard.

Hard, soft, big, or small?

I won't get into the old bitter fight over what kind of dinghy is best: rigid or inflatable. Whatever you have is what you have to use. However, I have noticed that inflatables sometimes become airborne in high winds, twirling like whirligigs, merrily tossing the contents — and the motor — into the drink. That doesn't happen with hard dinks.

Bigger is often better, and generally not more trouble to tow than the usual short dink, especially the blunt-bowed sort. It's good to have a dink that can carry four adults safely in a chop under oars, that tows well in big seas, and doesn't need much of a motor to drive it.

I've towed my dink every summer on my cruise to New England, including through New York's Hell Gate, and further, at Plum Gut and the Race with no trouble at all. It has the happy quality that if water comes in over the bow, it ships out over the transom. But why push my luck? I always remove the engine before setting off into big seas.

Little ship outfit

Over the years, I've made a few other improvements to my dinghy. For one, the painter, ½-inch nylon triple-strand, is 60 feet long, but at times that's not long enough. I've had to bend on another 50 feet to keep the dinghy on the backs of the big following seas offshore a few times. Otherwise, when the painter's too short, it dances around.

The ring eye at the bow was too low, which forced the bow too high

Thoughts about the little boat that tends the big boat

BY CLIFF MOORE

at anything faster than 4 knots. And it rattled as the painter jerked at it. I hate noises at night when I'm trying to sleep. So I added an eyebolt a few inches higher that proved just right.

At 4 knots or more, the painter is entirely out of the water. At more than 5 knots, the bow rises high enough that the bottom chine clears the bow wave.

I also had the experience of wrapping the painter around the prop one time. Now there's a float rigged on the painter about 6 feet out from the bow to keep it safe at short scope.

There are two cleats on the inside of the transom, high up, one on each

side, and a wooden cleat at the forward thwart. Sometimes I run the painter to a cleat at the dock, then aft to one of the cleats on the transom.

Once, when I had engine troubles with the big boat, I tied the dink alongside at bow and stern and used the 2-horsepower outboard to push the big boat safely into port.

The aft thwart, where I sit when steering the dink under outboard power, has to be high enough for me to see over the bow as it rises. Sitting on a cushion adds another couple of inches of height.

Also, I added sacrificial rails on the bottom, a big one up the center like a keel and one on each side, pieces of 1- x 1½-inch oak. That way I don't worry about rubbing through the fiberglass along the bottom when I drag the dinghy up a beach or a ramp. It also lets the dinghy track pretty well. Once pointed in the right direction, it tends to hold its course without a hand on the tiller. Every couple of years, I replace the sacrificial strips.

Something else I learned the hard way is to never paint or varnish the thwarts. Otherwise, they're very slippery when wet. A piece of non-skid decking placed where I generally set my foot while stepping up onto the big boat helps, though, and I keep a piece of doormat in the bottom of the dinghy for getting the sand out of my boat shoes.

The big boat has a step dangling alongside, like a bosun's chair made of a piece of 2 x 8 pine and old three-strand nylon anchor line. It makes getting back aboard after a run ashore a lot easier.

A recycled plastic jar with a lid and big enough to hold a wallet, a camera, and my cell phone keeps these things dry. It floats and the price was right. But like most small boats, when heading into a chop, especially at an angle, my dinghy can be wet if there's any wind blowing. At times like that, I take a foul weather jacket with me.

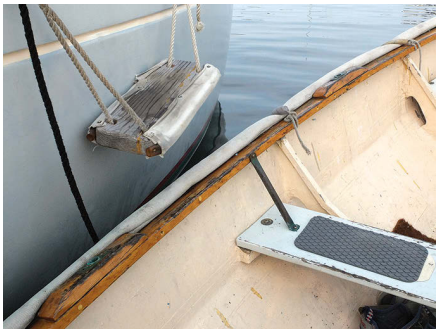
About oars

The oars, which have proper leathers and brass tips, are secured against theft with a bronze one-piece device. I had to drill holes in the center thwart on one side for the oarlocks and a hole in between for the locking device. The locks for the outboard and for the oars are keyed alike. My oars are 6½ feet but could easily be longer, say 7 feet, as the beam on my boat is a little over 4 feet.

Oars that are too short are a bane to boaters. Why settle for the short oars that come with inflatables? Long oars provide greater leverage. If possible, get oars that are at least 50 percent longer than the beam of the boat. Take a look at the oars used in whaleboats sometime — monsters at 10 or 12 feet. They look impossible to row with, but they aren't. Long oars may be the only thing you can use to get you to windward some stormy night while trying to row out a spare anchor. Even if the oars aren't locked on the thwart, the blades should be tucked under the after thwart in case the dinghy rolls and fills. That way, they're less likely to float off.

There are two sets of sockets for the oarlocks, so I can row from the center thwart or, if carrying passengers, from the forward thwart. I was reminded of that recently while I was anchored in

By the time he was 8, Cliff's son was as at home on or in the water as on the land, and could handle properly long oars with ease.



In a capsize, the anchor falls away and the PFDs stay put, far left. Non-skid on the thwart and an easy-to-make step allow safe transits between mother ship and dinghy, at left. A purpose-made 1-piece lock for the oars, lower left and below, secures them against loss or theft. A light is essential for trips after dark, bottom of page.

Cuttyhunk. I noticed a married couple rowing a small dink, round bowed, maybe 8 feet long. Both were seated on the center thwart and each had an oar gripped firmly in hand, little things about 5 feet long. The dink was headed from the beach, with a pooch seated on the rear thwart after a run ashore. Their dink made little headway in a slight breeze, mostly moving in a serpentine course as they windmilled more or less toward their boat. Seldom were both oars in the water at the same time. Each seemed to flail the water independently. Occasionally they stopped rowing in order to coordinate their actions. When they did, the dink drifted to leeward. The dog didn't care.

Outboards

I had been cursed with a Seagull outboard that I'd bought in a moment of weakness. Happily, it fell off the transom somewhere in Raritan Bay, disappeared without a trace . . . gone forever, I hope. I replaced it with a real outboard, a 2-horsepower Honda. But having learned the hard way, I put a stainless-steel wire keeper on it. It's a piece of recycled lifeline, properly clamped at one end, with a big eye in the other. I can lock the keeper to the transom, by a snap shackle generally, but with a padlock if I happen to be someplace where that matters.

That happened once. I had the dinghy at the dinghy dock in Edgartown, a posh sort of place. The next morning, no dinghy. I reported it to the harbormaster, who said, "We're just bringing it in now."

What happens, he explained, is that visiting boaters sometimes stay a little

Why a kill switch?

Most new outboards are now built so the operator can be attached to the engine with a strap, at the end of which is a key or clip of some sort. Often the key is just a flat piece of plastic, so if the operator falls overboard, the plastic is pulled from the engine, which then cuts electric power to the spark, "killing" the engine. Removing the kill-switch key reduces the chances of anyone stealing the engine.

When my son was about 5, we were anchored in Mattituck, a notoriously dirty hole-in-the-wall. It has a great draw at the end of it — a free hot shower and a nearby town with all the necessities: a bank, a good hardware store, two pizzerias, and two supermarkets. He pointed out something odd, a dinghy circling in the water under power with no one in it. I could see someone in the water struggling to get to a nearby anchored sailboat.

We rowed over and were able to snag his dinghy, which had no kill switch. It turned out that he had been stepping from the dinghy to the sailboat and his foot hit the gearshift on the outboard, which was still running. He fell in the water and the engine ran over his knee, cutting it badly through the kneecap into bone. We got him into my dinghy and rowed him and his dink back to the dock, where the rest of his crew had been waiting for him. They called the EMTs, who took him to the hospital. Later, I found out he had surgery and they kept him for a week, pumped full of IV antibiotics. That's why every outboard needs a kill switch and its operator must wear the key.

A wire strop ensures the outboard stays with the dinghy, at left. Cleats on each side serve many purposes, as does the rag. At 4 knots, the painter is entirely out of the water. At 5+ knots, at right, the dink follows as docile as a lamb with its bottom chine clear of the water.

too late at the fair and miss the last water taxi. So, they look around for a ride, seize on whatever is handy, in this instance my dinghy, and use it to get back to their own boat. Having gotten home, they abandon their ride, in this case, my boat. "Bye, little boat!" they blearily cry, as their temporary transport drifts off into the night. Oy!

After that, I got into the habit of taking the kill switch clip with me if I leave the dinghy overnight and locking up the oars. Always carry a spare kill switch clip in your wallet (see "Why a Kill Switch?" page 52).

Dinghy equipment

The Coast Guard has a few requirements for dinghies: there should always be a life jacket for every person on board, and proper lights at night, as well as some means of making an effective signaling noise.

I always carry two life jackets, stuffed under the forward thwart with the anchors. Each one has a light and a whistle. I stuck a light on the end of a length of PVC that fits on the transom for motoring at night, but I keep a high-power LED flashlight on board also, just in case.

Every dinghy should have an anchor with chain, just like the big boat. I carry a 2-pound Danforth and a folding grapnel-type. It's nice to have a choice. I used to carry 100 feet of nylon rode but got rid of it when I realized it was easier simply to tie the end of the painter to the anchor. I seldom need the whole length of it, so I secure the shortened rode to the cleat at the forward thwart.

Who hasn't read *The Riddle of the Sands*, especially the part where the protagonist has to follow a compass bearing through the channel? Something similar happens in big harbors such as the Great Salt Pond on Block Island during fog or at night. If I know that my boat bears 30 degrees from the dinghy dock for 10 minutes under power, it's easier to find it with a compass. So I learned to carry a hand-bearing camper's compass with a glow-in-the-dark face. There's also a compass app in my cell phone and a Navionics app with the anchorage waypoint on it. It's come in handy a few times.

When ashore, I keep the dink right-side-up on a wheeled trolley. This is a great aid for getting it up and down the boat ramp singlehanded. But right-side-up means it will collect water when it rains, so I have a drain plug that I sometimes don't remember to remove. No matter, there's a bailer, made from an old plastic bottle, with a sponge and a rag for cleaning up oil and gas spills and fish guts.

Just remember to put the plug back in before launching.

Cliff Moore is a Good Old Boat *contributing editor. His first boat was a Kool cigarettes foam dinghy with no rudder or sail. Many years and many boats later, he's sailing a 26-foot AMF Paceship 26 he acquired and rebuilt after Hurricane Bob trashed it in 1991. He is the editor of a community newspaper.*

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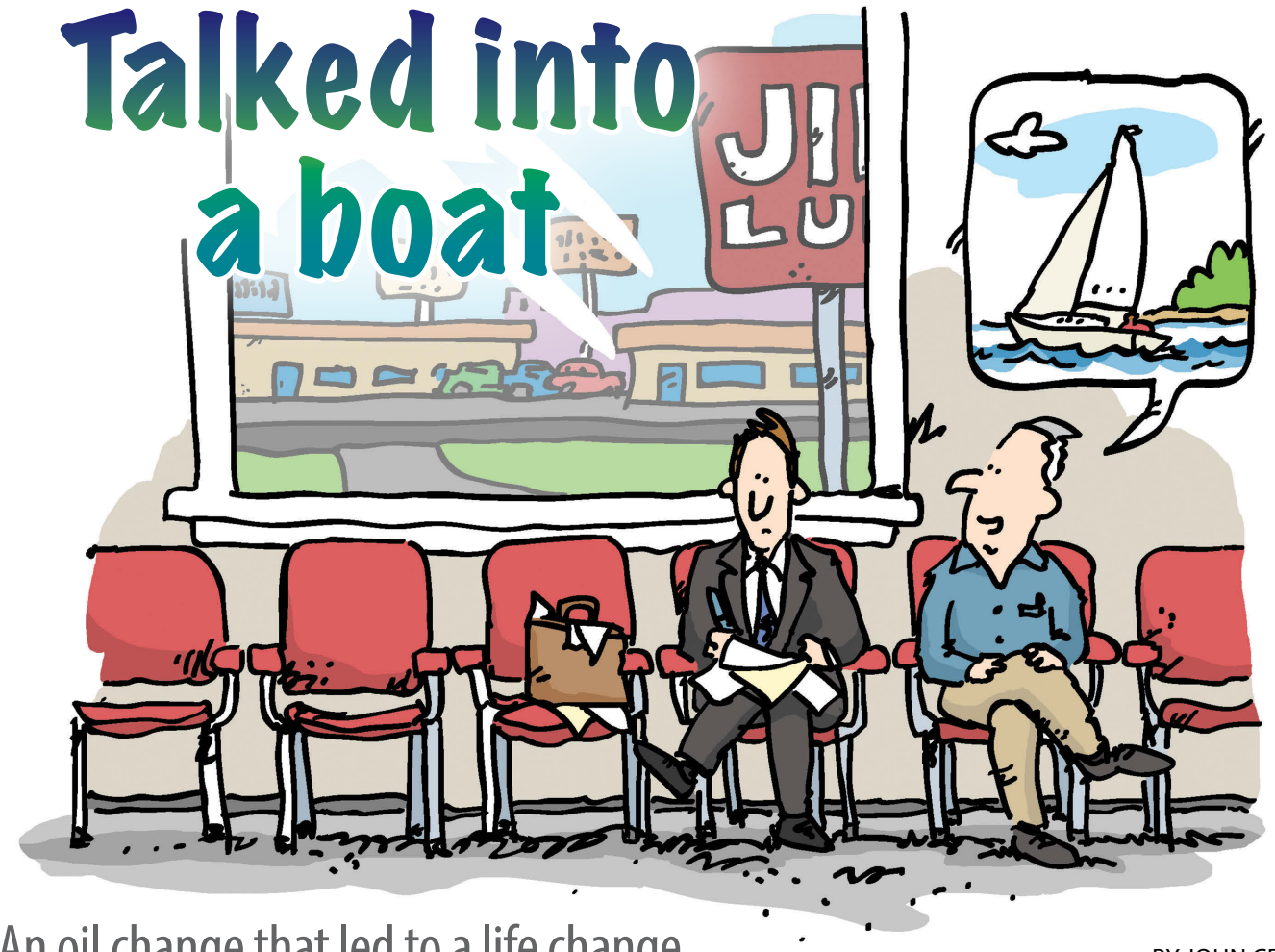


ILLUSTRATIONS BY TOM PAYNE

An oil change that led to a life change

BY JOHN CRUZ

The convergence of boat and boat owner is serendipitous. We expect the new owner to find the boat; sometimes the boat finds the new owner. My first boat found me far from any shore or tendril of sea while I was stranded in the scuffed linoleum lobby of a company famous for changing the oil in your car in a "Jiffy" fashion. In retrospect, the subtle portents of nefarious workings were auspiciously present, but when you fall off the cliff, you never stop in free fall to question the view.

Maintenance of my car was first on my list of errands, during which I planned to catch up on a pile of delinquent paperwork. The parking lot was empty as I arrived for my appointment. Signing the requisite waiver, retrieving my briefcase, and surrendering my car keys to the yawning attendant, I took refuge in the empty waiting room and planted myself into a seat of my choosing.

Ten minutes into my ascent on the mountain of papers before me, my sanctuary was shattered by the tinkling of the tiny bell that announced the opening of the waiting room door. From the periphery of my vision, I saw an elderly man enter the waiting room. I was instantly annoyed. Ignoring all the empty seats, he slowly shuffled the length of the room and sat adjacent to my fortress of papers. I made every effort to look busy. He was unfazed.

"Hello, my name is George." He offered his right hand.

"I'm John." My hands stayed with the pen and papers on my lap, eyes forward.

"Nice day isn't it?" His hand remained in midair. I sighed and shook his wizened hand. His grip was surprisingly strong.

"Yup." I went back to my stack of papers.

Then, studying my shoes, he asked, "Do you sail, John?"

"Well . . . a little. I mean, I used to . . . as a kid." I was caught off guard.

The cast

A long pause ensued, which I mistakenly took as my conquest of the encounter, then George launched into a monologue about life with a boat. He spoke eloquently of boat design and the logic of sheer, draft, and beam. He discussed the lessons of heavy weather and the value of keeping faith with your vessel. He boasted of raising two boys and bestowing his love of boats onto them while teaching them mastery of their skills. He joked of the power of "benevolent neglect" — allowing his sons to make their own mistakes within the safety of his presence without hovering over them — and fondly recalled circumnavigating with his young family while watching his boys grow stronger and wiser at sea.

I was drawn in. All thought of conquering my pile of papers evaporated.

George was impossible to dislike. Suddenly, setting my papers aside didn't seem like a tumultuous loss. I stuffed the entire stack into my briefcase and gave him my full attention. He stared at me for moment before speaking, then leaned in and lowered his voice as if asking a secret.

The bait

"Do you have a boat?" His gray eyes locked onto me.

I admitted that I had never owned a boat, but dreamed of someday buying one.

"You need to have a boat." George's gaze drifted out the window. "In fact, you need to have *my* boat."

I glanced to see if the mechanic had forgotten us.

"I have a pretty little boat." He paused to clear his throat. "But I'm not able to give her the attention she deserves." George gave me a sidewise glance and winked, "Mabel thinks I should give up the boat. She worries about me."

I didn't comment.

"I suppose it's time," George continued, "that my boat found a new fella to take care of her. I'd let her go to the right man for a good price."

I was rescued by the mechanic coming into the waiting room to inform me that my car was off the rack and ready to drive away. Standing, I began to say good-bye. George fumbled for a card.

"Don't decide right now, just think about it." He slipped the card in my shirt pocket. "Give me a call and I'll show you the boat."

George wouldn't let me leave without getting my number and for some reason I gave it.

"Give me a call," was the last thing I heard as the waiting room door closed behind me. Driving away, I congratulated myself for not letting a crazy old man dump his derelict boat onto me.

The play

A week went by and I had forgotten about the encounter. Then my phone rang. It was George.

"You haven't called," he admonished. I made up an excuse about being too busy.

"When do you want to come down to see the boat?" George was adamant if nothing else.

I protested. George persisted. Learning the boat was not far from my office, I gave in and accepted his invitation to meet him that afternoon. The sooner I got this over with, the better.

George and Mabel had a beautiful home overlooking the Severn River, not far from Chesapeake Bay. The walls were covered with photos and memories of a life well lived. Mabel offered me a frosty iced tea. The boat was docked behind their house. I walked in back expecting to find a derelict, but she turned out to be a beautifully maintained and shipshape

30-foot sloop. Her varnished brightwork and polished bronze reflected George's love and attention to detail.

"What about the cost?"

George tossed out a number that piqued my interest.

Reeled in

"Where would I keep her?"

George insisted she could stay at their dock for free.

I was out of arguments; the deal was too sweet to pass up. We shook hands and I wrote a check for less money than I would have paid for a two-week stay in the Bahamas. I had just purchased my first boat.

We spent that summer sailing around the Chesapeake as George introduced me to the nuances of my new boat. George was a patient teacher. He would finesse the tiller while I manhandled the sails. He never usurped my ownership or questioned my choice of destinations. We were a perfect team. Not only was I learning to sail, I was having fun. George even continued to maintain her brightwork and kept her bronze "spit polished" as an unexpected benefit of keeping the boat behind his house. I had fallen into the boat deal of a lifetime.

The good student

It was a cold October night when the phone rang. The tone in Mabel's voice was bothersome. I glanced at the clock; it was three in the morning.

"George is missing," she said, "and the boat is gone."

Surfacing slowly from my deep sleep, it dawned on me what she was suggesting. I tried to assuage her fear and told her I'd come right over. Throwing on a sweater and coat to fend off the fall chill, I drove to George and Mabel's home.

Mabel answered the doorbell on the first ring. She was visibly frightened. Taking her trembling hands, I assisted her to the couch and asked if she had called the authorities. She admitted that she had and they promised to start looking for George at first light. I reminded her that George was no fool or beginner.

"It's going to be all right," I heard myself say. She just stared at me.

I asked if I could borrow their little runabout to look for George. She nodded her head and smiled weakly.

Grabbing the keys from the boathouse, I checked the fuel and running lights as George had taught me and motored out onto dark waters. Following the shoreline, I peeked into the bays and inlets close to the house. Buttoning my coat tightly against the cold, I continued to putter, keeping the flashlight sweeping to and fro, afraid of returning without George. An hour later, I spotted the boat ensconced in the deeper recesses of a gunkhole where the surrounding trees offered protection from the wind.

Dousing the flashlight, I coasted to a crawl. I made out a shape huddled in the cockpit. Remembering George's tutelage, I killed the outboard and ghosted forward, approaching

the sailboat, in George's words, "no faster than I would want to ram her." Reaching out, I grabbed the caprail without bumping the two boats. I would make George proud.

"Ahoy, mate." I tried to sound as casual as I could. He turned and smiled, his comb-over standing straight up in the wind.

"Hello, John." And then with an impish grin, "What are you doing out this time of night?"

"Looking for you, George. Mabel's worried. Are you OK?"

"Poor Mabel!" he lamented, "I give her such grief." He pointed to the bow, "I couldn't raise the anchor, it's stuck. I wanted to be back in bed before she noticed I was gone."

We stared at each other for long time. Teacher and student.

"I just had to take the old girl out one last time," George admitted. "Just by myself. You understand." It was not a question.

I nodded.

Jumping aboard, I went to the foredeck to wrestle with the anchor and eventually succeeded in breaking it loose and bringing it aboard. Returning to the runabout, I started the outboard and shouted over the noise of the engine, "I'll tow you back home." George didn't argue.

Mabel was standing on the dock when we arrived. She never spoke a word. Gathering her composure, she slipped her arm tightly round George's waist. I slipped the lines around the dock cleats. Together they walked slowly back to the house.

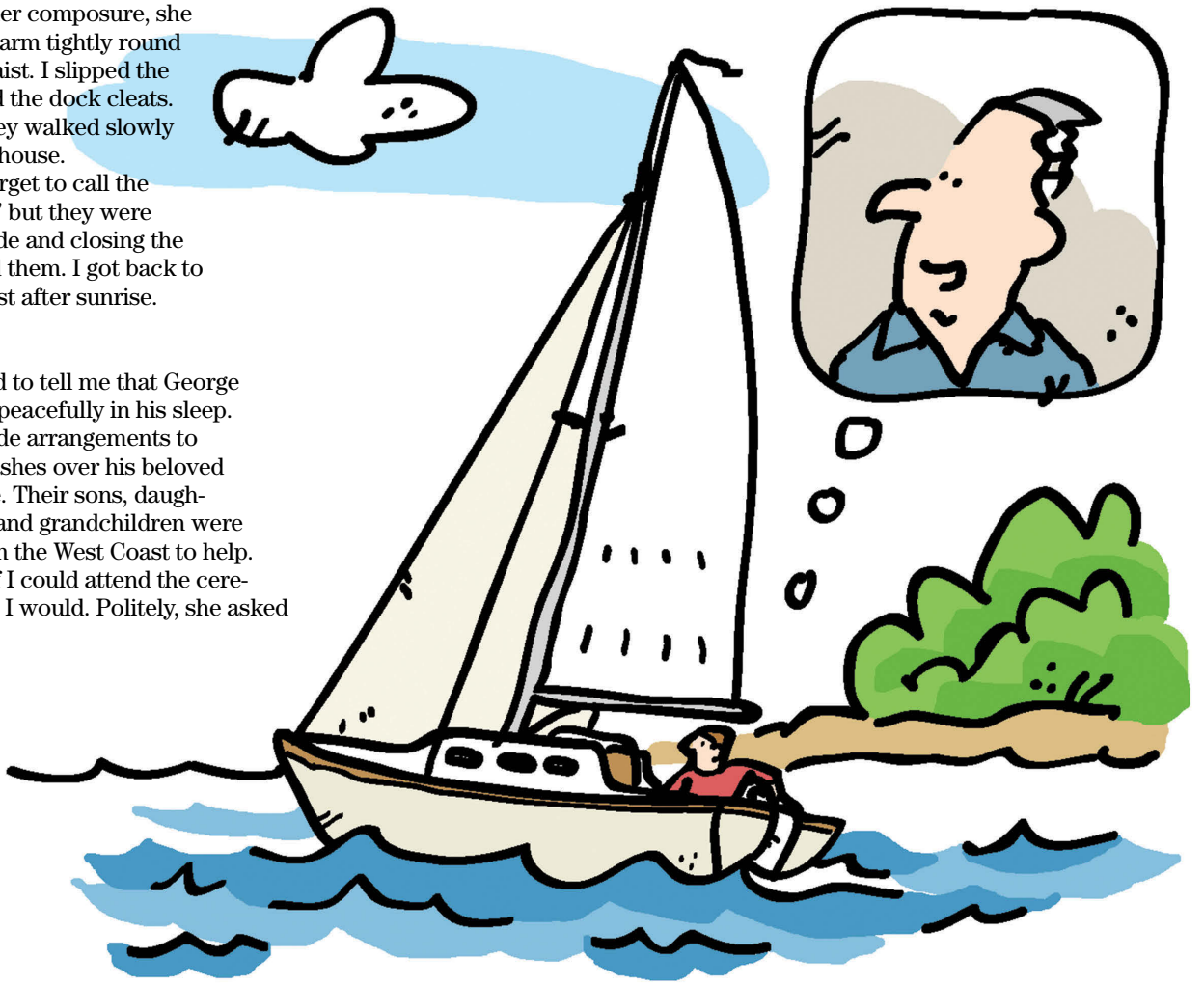
"Don't forget to call the authorities," but they were already inside and closing the door behind them. I got back to my home just after sunrise.

Epilogue

Mabel called to tell me that George had passed peacefully in his sleep. She had made arrangements to scatter his ashes over his beloved Chesapeake. Their sons, daughters-in-law, and grandchildren were coming from the West Coast to help. She asked if I could attend the ceremony. I said I would. Politely, she asked if I could remove the sailboat from their dock; it pained her to see it. Within a couple days, I arranged for other dockage. When I stopped by to take the boat away for the last time, Mabel hugged me and offered me an iced tea.

Going down to the dock, I checked the batteries, all the fluids, and the seacocks. I started the engine and studied the wind direction. Slowly, I motored away from Mabel's view. Alone on my boat for the first time, I was flooded with memories of my departed friend and mentor. Pointing into the wind, I killed the engine and raised the sail as George had taught me and sailed out to deeper waters . . . far away from shore where I knew no one could see my tears.

John Cruz and Ivy Kudo met, married, and sailed from Hawaii 20 years ago. Pausing periodically to repad the cruising kitty, they have cruised both coasts of North and Central America on their 47-foot Stevens Custom, Ruby Slippers. *They cruised Tahiti last year and have since returned to Hawaii where they are hatching plans for a Pacific circumnavigation. John swears this tale is at least half true. He just embellished it a bit.*



Westerly Pageant 23

A twin-keeler from across "the Pond"

BY ALLEN PENTICOFF

First we'll address the elephant in the room: the wild paint job is the result of work done by William Barnhart of Mesa, Arizona, for an Interlux paint promotion. The paint and the clear coat were done with a 2-inch roller and 1-inch tip brush. There is certainly no need for a sail number to distinguish this Westerly from the crowd on Kentucky Lake!

Now that's out of the way, this is the story of Rob and Gabi Hoffman taking a derelict small weekend cruiser and turning it into a *yacht*. To spend time aboard their 1971 Westerly Pageant 23, *Ladyship*, is to be amazed that there is so much boat in 23 feet and with so many innovations.

You may recall the story of Rob and Gabi of Nashville, Tennessee, buying a 28-foot Alubat aluminum sailboat in the south of France, shipping it to the United States, and then extensively modifying it to be a very large trailerable cruiser (see "Establishing a French Connection," March 2013). Since that boat, *Can Can*, is a tad unwieldy

PHOTOS BY RON FREHM

Rob and Gabi Hoffman base their Westerly Pageant 23, *Ladyship*, on Kentucky Lake, at top, and trailer her to other cruising grounds. The, er, unusual paint job was professionally done for an Interlux paint promotion. Rob has made a great many modifications to *Ladyship*, including the "hard Bimini" with solar panels, upholstered helm seats, swim ladder, and opening portlights, above.

Weighing roughly 7,500 pounds all up, *Ladyship* and her trailer can be towed nicely behind the Hoffmans' pickup truck. The twin keels that allow the Pageant to sit safely on a tidal flat also keep her stable on the trailer.

for quick "go-and-sail" trailering, and because they wanted to explore more, in similar comfort, in 2012 they bought *Ladyship* as essentially a bare hull and spent nearly three years modifying her to be their "other" boat.

Rob is retired from the U.S. Navy and from work as a commercial photographer. Over the many years he ran his business, he earned six U.S. patents in photography. This sort of creative vision comes into play in the way he modifies boats.

Rob learned to sail on Guantanamo Bay, Cuba, in a Rhodes 19 with a Cuban sailing instructor, and went on in later years to own a Venture 222 and other boats. During his naval career, he was a watch officer on the last of the wooden minesweepers, the USS *Valor*.

Design

Westerlys were brought to life by Denys Rayner's Westerly Marine Construction Ltd., founded in the United Kingdom in 1963. The Laurent Giles-designed Pageant 23, with twin or "bilge" keels, was one of its more popular models. A fin-keel version was called the Westerly Kendal 23. (See the May 2014 issue of *Good Old Boat* for a history of Denys Rayner and Westerly.) Much of what was said about the Westerly Centaur 26 in the July 2013 issue also applies to the Pageant. Constructed to Lloyd's standards, they are even a bit overbuilt for how most of them are sailed.

Rob found he could cut 6 inches off each of the cast-iron keels with a gas-powered saw, lightening *Ladyship* by around 600 pounds while retaining sufficient righting moment. Each of the keels was then reshaped to be asymmetrical for better lift. Because *Ladyship* has been so heavily modified, we won't be able to go into great detail as to what a stock boat is like.

Any review of a Westerly must include mention of the twin keels. Their real raison d'être is to allow the boat to sit level on the U.K.'s ubiquitous tidal flats. With their relatively shallow draft, these "bilge-keelers" are also good for gunkholing, in part because if they happen to run aground while heeled, they can immediately float free when they become upright — because they draw less water upright than heeled.

Bilge keels that have been properly designed, aligned, and shaped provide decent windward performance. Stock Westerlys, though, are known to be slower in light air than similar boats with fin keels, mainly due to the extra wetted surface area. In reducing the draft of *Ladyship* from the stock

Rob built a bow platform to handle two anchors with their rodes stowed belowdecks, at left. The inner headsail can be detached and secured aft at the mast to allow unrestricted tacking of the roller-furling genoa. The sidedecks are quite narrow, at right. On *Ladyship* they are obstructed by the shrouds, which Rob moved outboard, so anyone wishing to go forward must hop onto the cabintop.

The Pageant's cockpit seats are quite low, so Rob installed elevated padded helm seats port and starboard to allow a better view over the high cabin. Rob replaced the original rudder with a transom-hung rudder and steers with a vertical tiller that swings from side to side between the seats.

2 feet 10 inches, Rob gained some speed by raising the sail area/displacement ratio to 15.2 from 14.3.

Construction

The Pageant was built to Lloyd's standards and each boat received a certificate. The hull is solid fiberglass and the foredeck is cored with balsa for stiffness. The hull-to-deck joint is through-bolted and glassed over with mat. Bulkheads are tabbed to the hull. Hardware is through-bolted with backing plates to distribute loads.

On deck

The standard Pageant has the hull form of its big sister, the Westerly Centaur, with slab topsides running down to a firm turn of the bilge. The tall trunk cabin yields 6 feet 1 inch of standing headroom with only a slight reduction forward, and large cabin windows provide plenty of light. Here Rob has not only replaced the fixed glass but has installed opening ports that enhance ventilation while retaining great views. An overhead hatch in the forward cabin helps ventilate the whole boat.

Rob has added a large ipe Brazilian hardwood bowsprit that handles the anchor as well as two roller-furling headsails. The foredeck is wide with plenty of room to handle gear and tackle. The toerails are molded in while the rubrails are teak. *Ladyship* has aggressive non-skid walking surfaces and three long sturdy teak handholds on each side of the cabin trunk.

Toward the stern, *Ladyship* becomes even more custom. The inboard diesel has been removed and an outboard now occupies a fabricated engine well between two lockers where there was formerly a small lazarette and athwartships seats either side of the tiller head. Above the motor well there are two elevated forward-facing seats for the helmsman and crew.

The 20-horsepower Tohatsu is raised and lowered vertically in the well. When it's raised, "bomb bay" doors close off the bottom of the motor well to reduce drag. (Rob now feels a 9.9-horsepower Yamaha would be sufficient; he chose the Tohatsu for its alternator, but has found the solar panels do an adequate job of charging the batteries.) A shroud around the outboard's prop pushes the doors open and also eliminates prop walk. A small electric winch does the lifting work. The engine is operated via its tiller controls but does not rotate. Rob has installed an 18-gallon fuel tank from which he can also refuel the dinghy's outboard motor tank.

The original rudder was a spade with a tiller mounted low and aft in the cockpit footwell. Rob has installed a so-called fisherman's tiller that swings athwartships through a vertical arc. The balanced transom-mounted aluminum rudder salvaged from their Alubat is controlled with lines to the tiller and autopilot. Above the deep self-bailing cockpit there are three commercial-grade sealed access panels that replace the Westerly-made hatches.

A structure of stainless steel and 2-inch-diameter schedule 40 aluminum tubing supports a hardtop over the cockpit. The hardtop provides shade and some rain protection and also supports two 100-watt solar panels. It also bears the weight of the mast when it's lowered for transport. A roller on top of the arch aids in moving the lowered mast forward and a chock holds the boom that stays attached to the beefy tabernacle Rob fabricated.

Comments from an owner of the Westerly Pageant

My 1978/79 Pageant sails very well upwind and downwind. She's very stable downwind in a force 5 to 6 with a reefed main and jib. I sail a lot on my own and feel very safe. I like its size, what space you get, full standing headroom, comfortable bunks, good separate head, and plenty of stowage.

She is overbuilt with a strong fiberglass layup. Most of the fittings used were from the 26-foot Centaur.

The interior fittings again are over-engineered. The cupboard sliding door frames are secured with 10 5mm bolts; on a modern boat, they would either be laminated in place or four bolts would be used.

I am a large chap, and when I walk on the deck or hatches there is *no* flexing. My Pageant is white and the quality of the polished hull is excellent. I have been asked if it has been professionally painted because of the depth of shine.

What I least like: not a lot, apart from prop walk when going astern and a tendency to wander off course if you let go of the tiller under engine (no trouble under sail). The worst problem was leaking windows. I have also had a slight problem with headliner droop, but with the right spray this was soon put right.

–**Nigel Phillips**, Portsmouth, England

The dinette on the starboard side of the saloon converts to a berth, top left. The port side is a small galley. Rob fitted an Engel cooler/freezer aft of the galley. With the head on the starboard side, that side of the V-berth is shorter (5 feet 9 inches) than the port side (6 feet 6 inches), middle left.

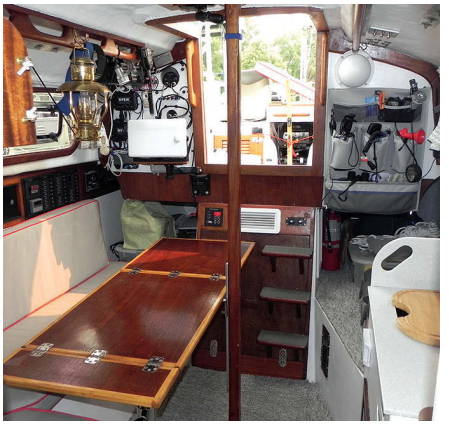
If this arch looks familiar, it is because it was built to a design by naval architect Cortland Steck, who did similar designs for Hunter Marine. The Hoffmans consulted Cortland on several of the modifications they made to *Ladyship* and to their Alubat.

On the stern, there's a very sturdy ladder and a swinging support for the dinghy motor. A canvas dodger shelters the companionway and forward end of the cockpit. When they're not using the three solid-oak dropboards, Rob and Gabi replace them with a weighted curtain that covers the companionway entrance. The footwell can accommodate a lot of water with little risk to the cabin due to the high bridge deck, and because the motor well cut is lower than the bridge deck. However, the footwell is below the waterline while under way, so Rob installed a ball valve on the scupper pipe to prevent water entry.

Accommodations

Sliding the companionway hatch forward and going down three small steps brings you into a very roomy cabin for a 23-foot boat. A Corian-topped galley counter is to port with an Origo two-burner alcohol stove and sink with pressure water (originally a foot pump). The stock stainless-steel 15-gallon freshwater tank has been retained, but a deck fill was added. One 12-volt pump supplies the sink faucet, flushes the head, and feeds a "dog" washdown in the cockpit.

There is no interior liner. The furniture is white-painted plywood with abundant teak trim. Originally there was a wood-grain plastic laminate on the bulkheads and table. The original foam/vinyl overhead liner was in bad shape, so Gabi removed it, stripped the adhesive off the overhead, and painted it white. Two long teak handrails on the overhead and a wooden post make for secure passage under way. The main cabin bulkhead, with its "shippy" oval opening, supports the mast step. On original Pageants, the forward berth can be closed off with the open head door.



Rob's excellent workmanship is evident in the three-piece table that folds up as needed and the varnished trim, above. He found space to mount more electronics than the minesweeper he served on ever saw.

Rob has rigged the dinette table to raise and lower with a seat pedestal and sail track on the standard wooden post. The table folds in three to aid access to the settees and can be lowered to convert the dinette to a berth for one adult or two children. In addition to a large V-berth forward, there are two quarter berths aft (originally there was a sail locker to starboard). A SeaLand toilet with a built-in tank is fitted in the head compartment to starboard. The holding tank can be dock pumped or pumped overboard where allowed.

How many 23-foot boats have a hanging locker? The Pageant does. What about refrigeration? Ditto. Rob has installed an auto-switching Engel 120-volt AC/12-volt DC cooler that can be a freezer as well. Perhaps my favorite addition to *Ladyship* is the Mermaid water-cooled air-conditioning system installed in the space formerly occupied by the diesel engine — perfect for dealing with sultry Tennessee summers at the dock. There is storage everywhere.

In addition to shorepower and an inverter/charger, Rob added a plethora of electronics including a chart plotter that swings into the companionway so it's visible from the cockpit. All the wiring is out in the open for easy service of the custom Blue Seas electrical panel. LED lighting is used exclusively. The house bank is two golf cart batteries.

Rig

Rob has modified the masthead rig to what he calls a "slutter rig" — a sloop/cutter with a removable inner soft-luff roller-furling headsail that replaces the stock baby stay, and a roller-furling genoa on the bowsprit. When not in use, the inner sail can be secured to a pad eye at the base of the mast to make

tacking the genoa easier. The inner jib sheets to tracks Rob mounted on the cabintop with full-length backing. The change to swept-back spreaders and mounting the chainplates outboard (formerly on the cabintop) stiffened the rig but interferes with passage forward. *Ladyship* is rigged for a rarely used spinnaker. Where an original Pageant has end-boom sheeting, *Ladyship*'s mainsheet and traveler are atop the arch. She has a new suit of sails, including a loose-footed mainsail.

Under way

The Pageant, like the Centaur, tracks very well due to the longish twin keels. Due to its stiffness it has an easy motion and can point as high as 30 degrees apparent, albeit pinching. In 8 knots of apparent wind on Kentucky Lake, we saw 3.5 to 4 knots to windward. It tacks quickly. *Ladyship*'s vertical tiller has a firm feel but it's a bit heavy with little feedback from the rudder. While I found using it a bit disorienting at times, and turned the wrong way in making corrections, I'm sure it would eventually become natural.

Ladyship's elevated seats give the helmsman a high perch with a good view forward and arch supports to hang onto while heeled. The mainsheet and traveler are nearby for easy adjustment and the headsail sheets are also handy at the forward end of the cockpit. As the shrouds obstruct the sidedecks, the best way to get to the mast or bow is to hop onto the cabintop. While heeled, I preferred sitting to leeward where I could see the jib telltales and lean against the arch. If Rob added an armrest with some padding it would be perfect! I was comfortable either with my feet propped on the coaming or sitting sidesaddle.

Bracing while heeled is easy in the cockpit with its good back support, but the seats get a low PNI (Penticoff Napability Index) of 2 for being short and narrow. A stock Pageant, with its deep cockpit and tall cabin trunk, has more limited visibility but much longer seats (6 feet 6 inches), although they are still narrow for napping, probably a 3 or 4 PNI.

Under power, with the outboard's thrust in front of the rudder, steering and handling is as easy as pie. The big motor will easily push *Ladyship* to her hull speed of about 6 knots. (I suspect the original 10-horsepower Volvo Penta MD1B diesel inboard would be adequate too.) The low forward location of the propeller ensures it won't cavitate in rough conditions. However, there may be a tendency for the lower unit and doors to collect weed, but they could probably be cleared without entering the water.

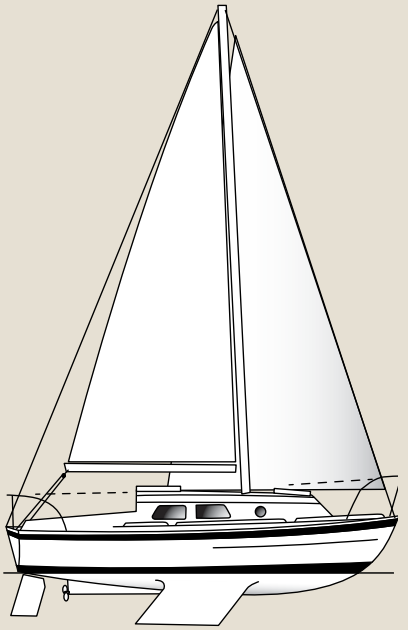
Although this comfy little cruiser was never really intended for competition of any sort, Rob reports that *Ladyship* has performed well in just-for-fun regattas against conventional keelboats. With a little work, one could take you safely offshore. Besides its previously mentioned gunkholing capability, an advantage that comes with owning this rather spacious and capable little boat is only paying the dockage of a 23-footer.

Conclusion

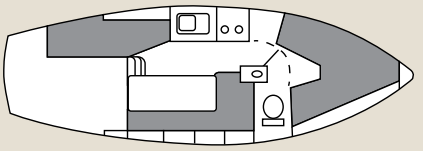
Westerly built 551 Pageant 23s from 1970 to 1979. Most were sold in the U.K., but they can be found in North America and elsewhere in Europe. They are very sturdy with few natural problems other than those associated with an aging fiberglass sailboat, but condition will have a big effect on value (the Hoffmans paid $1,000 for *Ladyship*). While there have been few listings in the U.S. over the last few years, offerings range from $2,500 to $10,000, with $5,000 the average.

Allen Penticoff, a Good Old Boat *contributing editor, is a freelance writer, sailor, and longtime aviator. He has trailer-sailed on every Great Lake and on many inland waters and has had keelboat adventures on fresh and salt water. He owns an American 14.5, a MacGregor 26D, and a 1955 Beister 42-foot steel cutter that he stores as a "someday project."*

Westerly Pageant 23



Designer	Laurent Giles
LOA:	23 feet 1 inch
LWL:	19 feet 0 inches
Beam:	8 feet 0 inches
Draft	2 feet 10 inches
Displacement:	4,300 pounds
Ballast:	2,100 pounds
Ballast/disp. ratio:	.49
Sail area:	236 square feet
Sail area/disp. ratio:	14.3
Disp./LWL ratio:	280



Resources

Westerly Owners Association
www.westerly-owners.co.uk

Details of the construction as well as photos of the interior, exterior, sailplan, and cabin layout:
westerly-owners.co.uk/westerlywiki/images/9/95/Fldr_Pageant_1.pdf.

American Westerly Owners Newsletter:
westerlyowners@gmail.com

Rob recommends following this link for a thorough analysis of twin-keel performance: www.brayyachtdesign.bc.ca/article_twinkeels.html.

More Online . . .

Read Rob Hoffman's own description of the changes they made to *Ladyship* during her refit at *Good Old Boat*'s website: www.goodoldboat.com/reader_services/more_online/Westerly_Pageant.php.

WiFi on the hook

A cell phone signal booster brings the world aboard

BY CLIFF MOORE

An iPhone sits snugly in the signal booster.

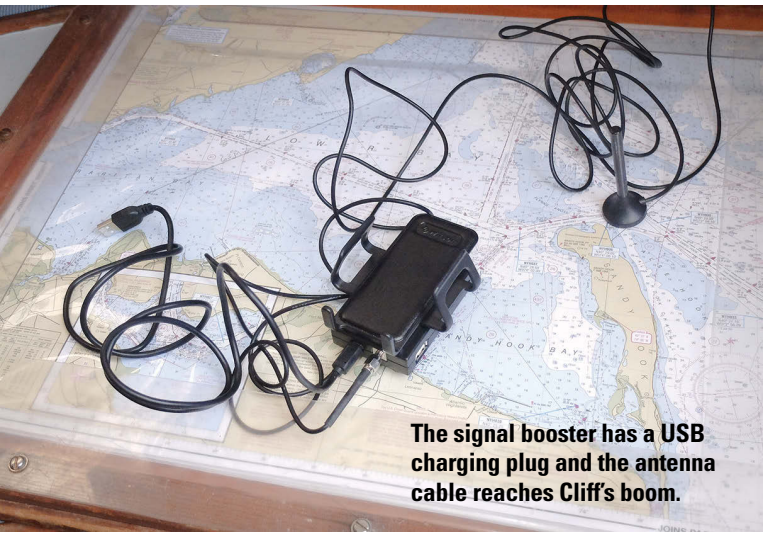
Like many sailors who still work, I like to keep abreast of things back at the office every few days, even when on vacation. The problem has been that when I anchor off, which is to say almost always, WiFi has been a problem. Usually, if I find a strong signal, it's some kind of pay-for-play network and often slow.

My attempted work-around was a WiFi amplifier with a semi-directional antenna. The result? In the Great Salt Pond on Block Island, I once snagged 27 signals, all of them locked. No joy. When I did find an unlocked signal, I often found my computer would lose it, as the computer wanted to switch over to the strongest signal, which was always locked.

The longest distance was at Cuttyhunk, where I got a signal at more than 7 miles. All of these were ultimately futile, as it happened, and I generally ended up at the local library using the free WiFi, which was slow, slow, slow. One time, the library was closed, but the WiFi was still available and a dozen or so of us — cruisers, islanders, and vacationers — all sat out in the hot sun struggling to read our monitors in the glare. That was no way to spend my vacation. There had to be a better way.

Cell phone multitool

How about just using my cell phone, an iPhone 6, as a modem? That worked well when I had five bars. At four bars, not so well, and out in the mooring field, I was lucky to get two or three bars. A web search turned up a number of cell phone antenna amplifiers, some of them quite sophisticated, for use in isolated locations such as cabins in hilly terrain. What caught my eye was one for autos from Wilson Electronics, a "Sleek 4G" cellular booster for about $115. I thought it might be worth a try. (***Note**: Wilson Electronics is now weBoost, the model is now called the Drive 4G-S, and it's now $200 –**Eds**.*)


The signal booster has a USB charging plug and the antenna cable reaches Cliff's boom.

Unlike something that would allow the user to hold the cell phone in the usual way and make calls, the phone must be in direct contact with the unit, which is about the same size as an iPhone. Otherwise, it feeds the signal back in a loop. The caller can use the phone in conference-call mode for voice calls, however. More to the point, it might, they claim, be able to give me a strong enough signal to allow my phone to support up to five devices.

How does it work? Like a charm. In Sag Harbor, where I had three bars, it gave me download speeds of 14.09 Mbps and upload speeds at 1.26 Mbps on my laptop. In Block Island, at a point where I did have five bars, I got 20.34 Mbps download speeds and 13.61 Mbps upload speeds, which is only a little slower than I get at home with cable. In Mattituck, on the North Fork of Long Island, with two bars, I got 4.24 Mbps download speeds and 2.42 Mbps upload speeds on my Android tablet, as measured by Speedtest.net. More to the point, I was able to upload large photos and work on web stuff with no problem where before I wasn't able to.

The device is small enough to not get in the way. It consists of a small antenna on one end with enough cable to get it above the boom. There's a magnet on the antenna, so I attach it to a clamp and put it where it's high enough to work, well away from the compass. The power supply is a USB cable that pulls 2 amps through a 12-volt adaptor, which is acceptable. It does get warm to the touch. The device itself has adjustable arms to make it fit a variety of phones, including Android cell phones as well as iPhones and the like.

The maker claims it works on all major North American cellular providers on the 850 and 1900 MHz frequencies, which are associated with voice and 3G, as well as the 700Mhz and 1700/2100Mhz 4G networks. More information on the booster and compatible phones can be found at www.weboost.com; www.wirelessadvisor.com lists the exact frequencies used by each cell phone provider.

Cliff Moore's bio is on page 53.

Terry the tiller tamer

A wet towel puts a damper on a loose helm

BY ALLEN PENTICOFF

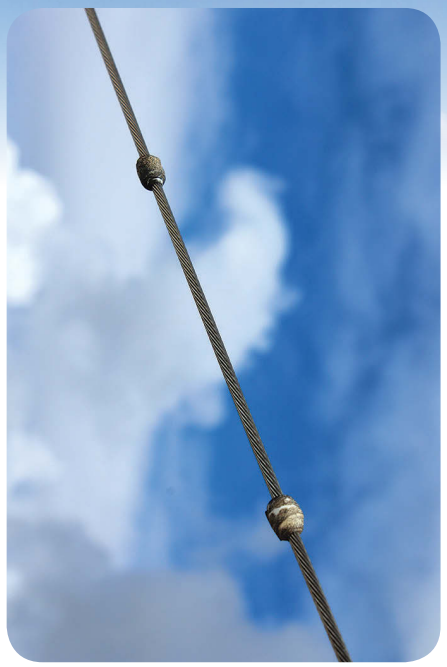
One morning, we were at anchor in a pretty cove when an empty water bottle blew overboard. We raised the anchor and chased down the errant bottle. Once the anchor was up, we decided to drift with the wind, under bare poles, out of the creek. We were in no hurry.

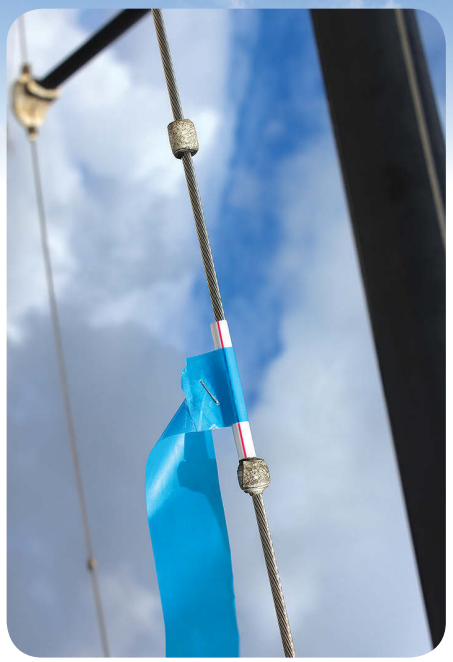
While the boat was moving along slowly like that, the tiller didn't need much attention, but I couldn't leave it on its own either. Since our laundry was still on the lifelines, I snagged a slightly damp towel, folded it, and set it under the tiller atop the lazarette. That immediately tamed the tyranny of the tiller. Now, I needed only to give it an occasional correcting poke. If I wanted to, I could stand up and straddle the tiller to steer with my knees.

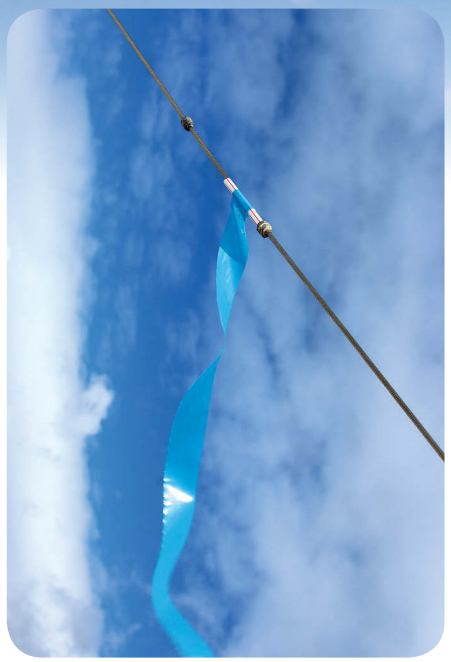
Dampness is essential to this quick trick, as it makes the towel a bit tacky. A dry towel slides on the fiberglass too easily to hold the tiller in place. Fortunately, a little water is not too hard to find.

Allen Penticoff's bio can be found on page 64.

Shroud telltales







Cheap and effective, they don't wrap or slide

BY PETE BEGICH

I sail my Boston Whaler Harpoon 5.2, *Quee Queg*, on lakes and reservoirs in Arizona, where accurately discerning wind direction can be especially tricky. I like to use shroud telltales and have used everything from yarn to ribbon to old cassette tape. The trouble with them all is that, as well as deteriorating quickly, they tend to get wrapped around the shrouds or slide down. They constantly have to be unwrapped or pushed up. In frustration, I developed an improvement.

After selecting a point on each shroud for its telltale, I cut rubber adhesive-backed tape (something like chafe tape or sail tape will do) into ¼-inch-wide strips. At the spots I selected, I wrapped the tape in two places about 5 inches apart. These built-up tape wraps limit the telltale's movement up and down the shroud.

I then cut two 1½-inch-long pieces from an ordinary drinking straw, slit them lengthwise, and slipped them onto the shroud cable between the tape wraps.

For the telltales, I cut the plastic drawstring out of a Hefty trash bag into two 18-inch lengths. I smeared Liquid Nails on the surface of one end of each telltale, then folded that end gently around the applied straw segment, being careful not to squeeze the straw. With an office stapler, I stapled this folded area to add strength and stability until the glue was dry. I like Liquid Nails glue, but any good glue will work.

This telltale is light enough to follow the wind and its ribbon shape helps it fly. With the tape delimiters, I never have to push a telltale back up the shroud; it stays in the same place all the time. The straw and telltale, being plastic, are rugged enough to last 3 to 4 months before they fully deteriorate in the mile-high Arizona sun.

These telltales are cheap and easy to make. Best of all, I never have to unwrap them.

Pete Begich has been sailing for about 45 years and, as an ASA-certified instructor, taught basic keelboat and basic coastal cruising at Marina Sailing in Newport Beach, California, to more than 500 students over five years. These days, he teaches in and sails his 1983 Boston Whaler Harpoon 5.2, Quee Queg, *on nearby reservoirs in northern Arizona.*

David Salter took this photo of his 1978 Mariner 28 last June from the bedroom balcony overlooking his dock in Bath Creek, Bath, Ontario, Canada. It was a perfectly still day and the reflections of the clouds make it look as though the boat is suspended in the air. Send your high-resolution sailboat photos to jstearns@goodoldboat.com and we'll post them on our website. If we publish yours here, we'll send you a Good Old Boat T-shirt or cap.

continued from page 9

Storm trysail question

The excellent article by Ed Zacko on trysails ("The Storm Trysail," January 2016) was very persuasive and got me to thinking about how I could fit one on my Baba 40 Pilothouse. I solicited the opinions of my fellow members of the Baba Owners' group on Yahoo and the consensus was that a trysail cannot be used on our boats due to the inability to sheet the sail without it chafing on the sides of the pilothouse. I reached out to Bob Perry (who designed the Baba/Panda/Tashiba 40 PH boats) for comment, but he has not responded as of yet. My question is, if a boat cannot carry a trysail, does that make it less appropriate for bluewater cruising?

–Frank Scalfano, Trinity, Ala.

Ed responds

I remember when we had the same issues. It is always a challenge to make things "work out." First, when a naval architect designs a boat, he also draws up a sail plan for that particular design. In my experience, this sail plan has always included storm sails in the drawing. So, my guess is that Bob Perry would have something to offer.

Having said that, and looking briefly at the Baba 40 Pilothouse, I see no reason why a competent sailmaker could not cut a trysail to fit that boat. It is easy to see in your mind's eye that a trysail would conflict with the pilothouse. That is perhaps because you're thinking of it as a closely sheeted genoa, which would indeed fight with the cabintop. The trysail is a different shape entirely, has a bit higher hoist and, if cut properly, should work out fine.

As stated in my article, our first trysail sheeted to the boom, and when we decided that was dangerous, we set out to design a new sail. It was the same fight you now have because we had to dodge dinghies, dodgers, and other things. It initially looked impossible. What we did for a start was to select a sheeting point and take a line from there to a point on the trysail track that would clear all obstructions. This became the foot of the sail. Next, we took the luff to a point "just" below the spreaders, then completed the triangle back to the sheeting point. We then had the sailmaker come to the boat, look at our basic triangle and work from there. From what I see of the Baba, there should be no real problem. But you must have a competent sailmaker involved for the final design. I should also say, "a sailmaker who knows and understands ocean cruising."

Our sailmaker, unfortunately now retired, did not rely only on sail plans and drawings and would never consider making any sail unless he personally visited the boat and measured it all out himself with the owner in attendance. I sincerely hope that those good old days are not a thing of the past.

–Ed Zacko, Sun City West, Ariz.

A trysail solution

Thanks to Ed Zacko for his helpful article, "The Storm Trysail." This is the perfect answer to our dilemma of adding a third reef to our Alberg 35, *Mystic*. With a little research, we found that a brand-new trysail is available at a reasonable cost online.

–Beth and Dave Rogers, Knife River and Stillwater, Minn.

Dinghy bladder

I compliment Linus Wilson on his "Weightless Water" article in the January 2016 issue.

We see boats all the time with rows of 5-gallon containers strapped to the rails, which I always thought was a bit of a dodgy idea, come the raging storm. The concept of a single rubber bag lying in the bottom of the dinghy is so simple and common sense, not to mention effortless and safe, I wonder why everyone doesn't have one. I sure intend to, whenever I can finally get out of this marina and actually do some cruising!

–Roger Hughes, Titusville, Fla.

PHOTO BY JEREMY MCGEARY

Typhoons swarm on the Rappahannock

Each spring for nearly 10 years, a ritual has occurred as dozens of Virginia Cape Dory Typhoon owners prepare their 19-foot sailboats for the coming racing season. The boat bottoms must be smooth and there's a certain pride in the way each boat looks. These Typhoon sailors are an interesting group. Many are "older" and retired from their professional lives but have vast racing experience in larger boats. There are very competent two-person racing teams that include father/son, father/daughter, brothers, and close friends male and female.

The Typhoon, designed by Carl Alberg, has never been considered a racing sailboat. However, when it comes to the fun of sailboat racing it doesn't matter how fast a boat is if all of the boats are alike. By most measures, the Typhoon is a slow and safe boat suitable for short cruises and sailing instruction. With 900 pounds of lead in the full keel and a well-balanced sail plan, the Typhoon is safe and fun to sail.

The Rappahannock River Yacht Club in Irvington, Virginia, sponsors the Typhoon fleet's racing program along with the Typhoon Nationals and the Hospice Turkey Shoot Regatta (the photo is from the 2014 Turkey Shoot). RRYC has been a "social hub" in Irvington for many years, offering exciting and fun sailing and social activities. In past years, sailboat ownership has been a requirement for full membership. However, that requirement has recently been dropped in an attempt to provide sailing and social opportunities to those who do not own a sailboat but are interested in sailing.

For more about RRYC and Typhoon racing, visit the RRYC website at rryc.org or contact Tom Watkins, Typhoon fleet commander, by email at tom@tmwatkins.com.

–Ned Crockett, Irvington, Va.

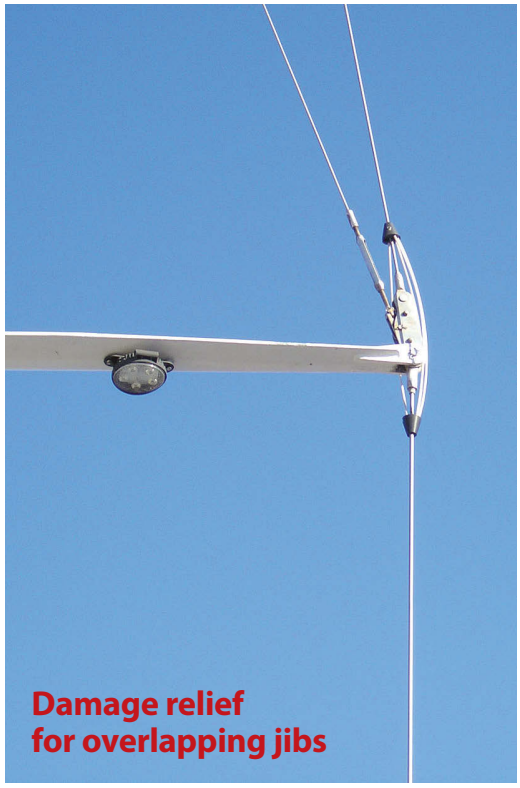
Product launchings

Fun with signal flags

In this day and age, when we expect to communicate with the push of a button wherever and whenever we want, it is wonderful consolation to know that a time-honored line-of-sight form of communication is still in use — the International Code of Signals.

If you've ever wondered why you continue to store those international signal flags on board, you now have a reason: 2K Yachting has created an app for both iOS and Android devices that makes using them very easy (if the irony of using your phone to read a signal flag isn't too much). The app's colorful interface clearly spells out the meanings of single-flag signals and helps you either read or compile a multiple-flag set. It also shows you how to "dress ship" using all of the flags. The app is available from iTunes or Google Play for $1.99, and you can learn about it at www.2k-yachting.de/en/apps/signalflags.html.

– by MF



Damage relief for overlapping jibs

If you have ever torn your headsail on a spreader end and thought there must be a better way, Wayne Barnett of EMC Innovations may have solved your problem with the Spreader Cage Jib Protector. This new device is lightweight and looks as though it should be very effective in helping your sail slide easily past the spreader tips without snagging or chafing on sharp points or edges. It is easy to install and, at $53 for two, less expensive than having the sailmaker repair the sail. For more information or to purchase, go to www.emcinnovations.com.

– by MF

First aid at your fingertips

Someday, whether you are in the middle of the lake, 10 miles offshore, or in the middle of the Atlantic, you will need some knowledge of first aid. Taking a course is a good thing to do, but remembering how to treat the specific problem might be another challenge. The Red Cross has introduced an answer in an app based on the "Everyday First Aid" program developed by the British Red Cross. It has an easy-to-use index of maladies along with instruction about how to recognize symptoms and administer appropriate first aid. There are even embedded video instructions. It's also available in Spanish. This free app is available for iOS and Android. To download, go to the App store or Google Plus and search for First Aid American Red Cross.

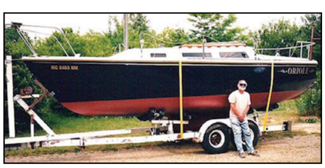
– by MF

To be featured on this page, items must be new products. If you would like your product featured here, please send an email to Michael Facius, michael@goodoldboat.com, or call him at 612-605-8319. By the way, readers, if you contact a marine supplier mentioned here or elsewhere in our magazine, please remember to tell them that *Good Old Boat* sent you.

Boats for Sale

Dufour 27
1974 fiberglass sloop. Volvo diesel. One owner since 1979. Excellent coastal cruiser, rigged for singlehanding plus many other upgrades. My health and other priorities have her feeling neglected; she needs TLC from a new owner. Well-equipped but needs foredeck lamination repairs and fresh bottom paint. Bodkin Creek, MD. $3,500 ($4,000 with complete fiberglass sailing dinghy).

Jim Caskey
301-770-0385
jimcaskey2@gmail.com



Catalina 25, Interlake 18
1985 Catalina 25, $6,900; $11,000 w/ V-10 tow truck. 1957 Interlake 18, $950. Both boats are fiberglass w/swing keels. Always in fresh water. Good trailers and tires. Southwest MI.

Michael Murphy
269-624-6583
modalservi@aol.com

Cheoy Lee Luders 36
1970. One owner. Spent most of her life cruising Chesapeake Bay. Teak decks replaced '92. New fuel tanks, 40-hp Yanmar '02, 3 coats Awlgrip, RF jib and genoa, rarely used spinnaker. On the hard and under cover outside Chestertown, MD. More info on YachtWorld.com. $42,500.

John Menocal
john@annapolisyachtsales.com

Vineyard Vixen 34
1980. Classic double-ender. Nimble, distinctive, handles well under all sailing cond. Featured in January 2015 issue. Vixens were built to high standards of structural integrity and quality finish with a semi-custom design. Teak deck, butterfly hatch, and elegant lines turn heads. Self-tending club sail enhances singlehanded sailing. Full inventory of sails. Light and airy cabin w/good headroom. Amenities. Well maintained. Rhode Island. Must sell! All reasonable offers considered.

David Lyon
401-461-8993
VineyardVixen@verizon.net
www.sailboatlistings.com/view/48559

Irwin 41
1983 center-cockpit staysail ketch. Original owner. 13'4" beam, 6'6" draft. Sleeps 6. Two heads w/showers. Exc cond. Many recent upgrades. Dealer-installed chairs in saloon. Owner's cabin aft w/queen berth and private head w/shower. 3 new sails '05. New upholstery '09, burgundy paint '10, canvas '13. 200 gal water, 100 gal fuel. Very comfortable cruiser easily handled by 2 people. On Lake Ontario, Rochester, NY. $70,000.

John North
585-621-6499
boreas84@aol.com

Pacific Seacraft Orion 27
1981. Classic cutter designed by Henry Mohrschladt and built for bluewater passagemaking. 4' draft for comfortable gunkholing. Long keel w/cutaway forefoot. Yanmar 30-hp diesel 680 hrs. 25 lb CQR w/150' chain and 250' nylon, electric windlass. Teak bowsprit and cockpit grate. WS. Custom interior, 4 berths. Extensive toolkit. Galley pans, dishes, utensils included. Solid cruiser in vg sailaway cond. Kenosha, WI. Owners relocated away from the water. $50,000.

Jeff Sandkam
630-677-4456
sandkam@sbcglobal.net

Frances 26
1977. All-wood interior, solid teak sole. 3 single berths w/2 berths port and starboard in saloon, 1 berth forward. Storage below and behind bunks plus lockers above. Toilet forward of mast. Volvo 7.5-hp under companionway ladder. Luke Heritage 2-burner ... /oven to port ... loading ... chest to starbo... Updated ... l. Lak...

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concre...ator.com

Most of our classified ads appear on the
GOOD OLD BOAT
website:
www.goodoldboat.com/resources_for_sailors/sailing_classifieds/

Irwin 37
1980 Mk III. Cutter-rigged, center-cockpit beauty. Totally rebuilt and outfitted into a floating work of art. Deck re-cored, hull re-epoxied, and equipment updated. Ideal sailer/cruiser w/shoal draft (4' to 7'). Large tankage, reliable 50-hp Perkins 4-108 diesel. 3 solar panels, windmill, stack-pack, and new sails. Lying Penetang, ON. Full inventory list and more photos available. $95,000.

Wayne Dowswell
705-326-1592
awdowswell@gmail.com

O'Day 25
1976 keel/CB. 30"/6' draft, 8' beam. EZ Loader trailer. '12 9.9-hp Mercury electric-start power-tilt. WS. F/B main. 130 RF. Bimini. Lake City, MN. $5,000.

Dale Place
651-387-8424
dhmeplace@aol.com

Irwin 34
1985. 11.4' beam, 4.4' draft. A great example of the last year this model was built. Recent main and genoa from Mack Sails with Harken furler and new headstay. Stack-pack for main. 26-hp Yanmar 3gm30F. Most systems recently updated or new. Windlass w/chain rode. AP. Chesapeake Bay, in Middle River, MD. $31,500.

Brian King
717-449-9496
3mrbee33@gmail.com

Boats for Sale, cont

Soverel 38
1968. Beautiful classic performance cruiser. Keel/CB. Many upgrades! Yanmar diesel '06, Quantum R/F genoa and F/B main '14, lazy-jacks, canvas cradle, and dodger, cruising spinnaker, SeaFrost fridge, Raymarine instruments '14, Garmin GPS, ICOM VHF, Simrad AP, Raritan electric head '15. Great ventilation. Much more! Priced to sell. Rock Hall, MD. Details/photos on YachtWorld.com. $29,000.

Al Blank
757-439-0019
alrblank@comcast.net
www.yachtworld.com/boats/1968/Soverel-38-2902309/Rock-Hall/MD/United-Stat

Columbia 10.7
1979, *Dahlfin II*. One owner. 35' Lake Superior sloop w/considerable Bahamas and Caribbean cruising. Exc cond w/extensive upgrades for long-term cruising: extra tanks (fuel & water), solar panels, great galley, fridge/freezer, forced-air heating, davits, inner forestay w/furler, double headstay w/2 furlers, and much more. Ready to cruise immediately almost anywhere: coastal waters and beyond. Bayfield, WI.

Ron & Bonnie Dahl
dahlfin2@gmail.com

Cape Dory 25D
1982. Documented. Custom Triad trailer. Set up for singlehanding. New North main, 150, Gennaker w/snuffer. Harken RF and traveler, new running rigging, bronze Lewmar self-tailing winches. Standard Horizon VHF and chart plotter, Raymarine ST 60 Tridata S/D, Autohelm, Promarine charger, New Prosafe galvanic isolator, new LED nav lights, and much more. Yanmar 1GM. Very clean and well loved. Stored inside, heated. Ready for spring! Holland, MI. $22,900.

Douglas Hill
616-698-0698
hill.douglasj@gmail.com
www.flickr.com/photos/136783275@N08

Cornish Crabber 24
2000 sloop. Classic British cruising boat in exc cond. Full keel, great stability, very seaworthy even offshore. Extra security w/2 RF headsails. Bimini, basic electronics. 18-hp Yanmar diesel. Enclosed head, 2-burner propane stove, sink. Sleeps 3. Only 2 owners. Many extras. Yard maintained. Ready to sail. Eastern Long Island, NY. $24,500.

William Winslow
631-325-1138
wcwinslow@aol.com

Ericson 32
1973. Fast comfortable cruiser/racer. Documented. New Raymarine electronics '15. GPS. Enhanced A-4 w/approx 670 hrs. New engine bed rails and motor mounts. Harken RF. Double-spreader aluminum mast. 4 Barient SS cockpit winches, 2 SS halyard winches, 2 Lewmar cabintop winches. Sails include main, 110, 150, drifter, gennaker, staysail. Martec folding prop. Boat stands, spare engine, tools, other misc. items. One owner for 30+ years. Kittery Point, ME. $12,500.

Larry Dow
207-752-6345
sailse32@aol.com

S2/Becker 30
1977 center cockpit. Originally an S2/8.0C. Boat was completely rebuilt by Becker Enterprises of St. Helens, OR, in '04-'08 w/new Beta diesel, lengthened hull providing queen-size berth aft, stern boarding access, new propane system, new roller-furling genoa, etc. A fantastic pocket cruiser with all the equipment a sailor could ever want. Portland, OR. $39,900.

Marge Welling, Broker
503-289-6306
marge@passion-yachts.com
www.yachtworld.com/passion-yachts

Cascade 42
1979. 45 lb Northern anchor (Bruce), 300' 5/16-inch hi-test lightweight rode. 120 gal fuel tanks, 6 gal hot water. Newer Hasse jib, original main. Pressurized water, 3-burner propane stove. Aft cabin, crouch-through engine room. Large raised dinette, separate head and V-berth. Mexico, Hawaii vet multiple times. Repowered '08 w/60-hp Vetus diesel and Hurth trans, rewired '09. Very nice boat. Poulsbo, WA. Owner motivated. $49,900.

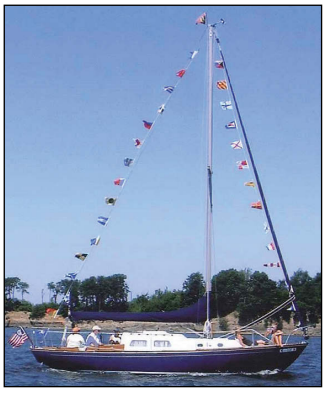
David Wells
360-981-8473
drslimited@accima.com

Cape George 36
1987. Must see! Finest example afloat of only approx 30 CG 36s completely built by the craftsmen at CG Marine Works. 2-owner boat. Extensive refits in '07 and '14. Meticulously maintained in Bristol cond. A true bluewater world cruiser. All custom-built magnificent teak interior. Too many extras to list. Vancouver, BC. $189,000 USD.

Wylie Elson
575-770-1872
wse541@gmail.com

Tartan 27
1967 keel/CB sloop. 3.2' B/U draft, Yanmar 2GM20(F) only 200 hours, dripless shaft seal. Sound hull and decks. Recent interior paint; cockpit, decks in progress. New house battery, LED cabin lighting, mainsail cover and sheet. Sturdy. Raced young, past 20 years daysailing on St. Johns River, Orange Park, FL. Inspect in neighbor's hoist, sail from our dock. Installed engine included! $9,500.

John Bartholomew
904-264-1543
jnilesbart@aol.com



Alberg 30
1966. Harken RF jib, Harken mainsheet traveler, Anderson #2 self-tailing cockpit winches, new toilet in head, new thru-hull fittings, all new deep blue cabin cushions, electric fuel pump and upgraded fuel filter on reliable Atomic 4. Main beam rebuilt. Full survey '12. All necessary docklines included. Danforth anchor w/chain and 200' rode, winch handles, and more sailing gear. Sailaway cond. Matching 9' Dyer Dink also available. Annapolis, MD. $14,500.

Scott Gardiner
410-544-8477, 410-647-7777
scott@gardinerappelgroup.com

Rival 32
1975. Solid fiberglass sloop (no core). Offshore cruising boat built to Lloyd's standards. In exc cond. Over the course of 18 yrs of ownership, all systems upgraded and/or replaced outright. Redesigned galley and nav station. Volvo '03 27-hp diesel, Alado RF. All sails in good to exc cond. Bombard AX2 dinghy.Take advantage of the low Canadian dollar and come to Newfoundland. $15,000 US.

Wayne Stokes
wstokes@nf.sympatico.ca
www.rivalowners.org.uk

Bill Boyd Catboat 23
1979. 23' x 10' x 27" draft (5' CB down), 6,000 lb. Wm. Garden design. Pretty, roomy, heavily built, stable, environmentally friendly with lots of character. Will go about anywhere. Folding mast, new sailcover, good sail. New cushions, Porta Potty, new canvas cockpit cover. Triple-axle King trailer. Electric Yacht IB. She's a joy to sail! Williamson, IA. $12,000.

Ford Brockman
fsbrockman@hotmail.com

C&C 26
1989 Wave 26. 26'8"x9'3"x2'11". Fin-keel shoal-draft auxiliary sloop, good cond. Solid survey from 8/14. Self-furling genoa and main middle-aged but completely serviceable. 11-hp FWC Kubota diesel, very low hrs, all fluids and filters changed last 10 engine hrs. Bottom paint fall '15. Cabin features well-built teak trim and holly sole, in exc cond. Ready to sail away. Simrad TP22 tiller pilot new in box. Relocation forces sale. Colonial Beach, VA. $6,500.

John Johnson
804-214-0711
jajohncb@gmail.com

Cape Dory 25D
1982 classic w/custom-fitted trailer. Wheel steering, too many upgrades to list. Leech Lake, MN. $24,000.

Frank Salomonsen
507-990-9598
salomonsenfb@gmail.com

Cal 29
1974. Great for extended coastal cruising in year-round Pacific Northwest conditions. Lovingly maintained and renovated for sailing performance and living comfort over the last decade with the attention to detail and enthusiasm of oceanographer and engineer first-time boat owners. Turnkey ready with lots of recent work and extras. Motivated to sell so we can focus on our growing family. Seattle, WA. $14,700.

Jedediah Smith
206-769-1465
or.house@gmail.com
http://oceantrekker.net/cal29

Tanzer 7.5
1978. Great coastal cruiser, many upgrades and comfort items added as we cruised her along the Maine coast the last 4 years. Comes equipped, ready for her next venture. 8, B, new wiring, 2 headsail, to finalize fall. Roc

SOLD

Keith Davi
150
sionnake gmail.com

Seafarer 31
1968 Bill Tripp design. *Trilogy* of Rockland, ME. Cruise-ready. A master cabinetmaker's boat. Classic inside and out. Solent-type rig: furler and headstay, inner cutter sail, RW&B spinnaker in sock. Red canvas dodger/awning. 200W solar, 400AH battery, inverter, hot showers, microwave, fridge, AP, cabin heater, Corian counters. 15-hp OB in lazarette. Rockland, ME. $23,000.

David Lewis
603-669-7937
dtlewistrilogy@gmail.com

Niagara 35
1981. Volvo 35-hp diesel. 6' draft. In great cond. Ready to go. Bluewater boat but has never seen salt. Full back enclosure, davits, new Harken furler, new fridge and electrical systems, gennaker, cradle and new custom winter cover. Beautiful teak and mahogany interior, furnace, hot water. Photos, full inventory and copy of recent survey available. Penetang (Georgian Bay), ON. $42,500 USD.

Stephen Bryan
603-938-2260
sbryan.steve@gmail.com

Allied Seawind 30
1967 ketch. Restored and located in New Hampshire on the hard. She needs to get back in the water, but I cannot sail her at this time. Equipment too numerous to list but includes rigid 7' dinghy, radar, 7 boat stands. $15,000.

Al Leonas
603-938-2260
a.leonas@yahoo.com

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Issue	Deadline
July/Aug	April 29
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Boats

Boat Deliveries

BY SUSAN PETERSON GATELEY

MIDGES EN MASSE

The inevitable, unpredictable, freshwater fertility frenzy

Each year, along the south shore of Lake Ontario in late April when it's time for painting and varnishing boats, the first midge hatch occurs. Uncountable numbers of tiny black gnats emerge from the lake's waters and fly inland. There they swarm.

As the morning sun floods lakeshore forests, boatyards, and lawns, everywhere golden motes of life float upward from grass and shrubbery to coalesce into clouds of dancing midges. The air fills with the tiny insects and bicycle riders are wise to breathe through their noses as they sweep through the living clouds.

These incredible aggregations, I have read, are a reproductive ritual. On a still sunlit spring morning as winter's dark days are a recent memory, the whine of a billion beating wings overhead fills the air with a siren song of life: "Come, mate, and we will make more midges."

The movement of the swarm is mesmerizing. It shape-shifts and swirls and rolls in a puff of wind and appears to act as a single entity. Even when the wind blows, the midges remain tenaciously coherent. Big swarms look like columns of smoke. Often, on a spring morning or a summer evening, they float stationary over a prominent tree or pond or roof for long periods.

Throughout the boating season, successive species of midges emerge from the lake's depths, swarm, and die. Though they look like mosquitoes and are a bug-phobic shore-dweller's nightmare, midges don't bite. Some don't even feed during their short aerial lives.

They do, however, raise havoc with a fresh paint job. On Midge Day, the gleam of a yacht's newly coated topsides promptly becomes a vast killing field. Thousands of hapless insects land on the tacky surface to be trapped in the paint. The boat takes on a distinctly speckled appearance.

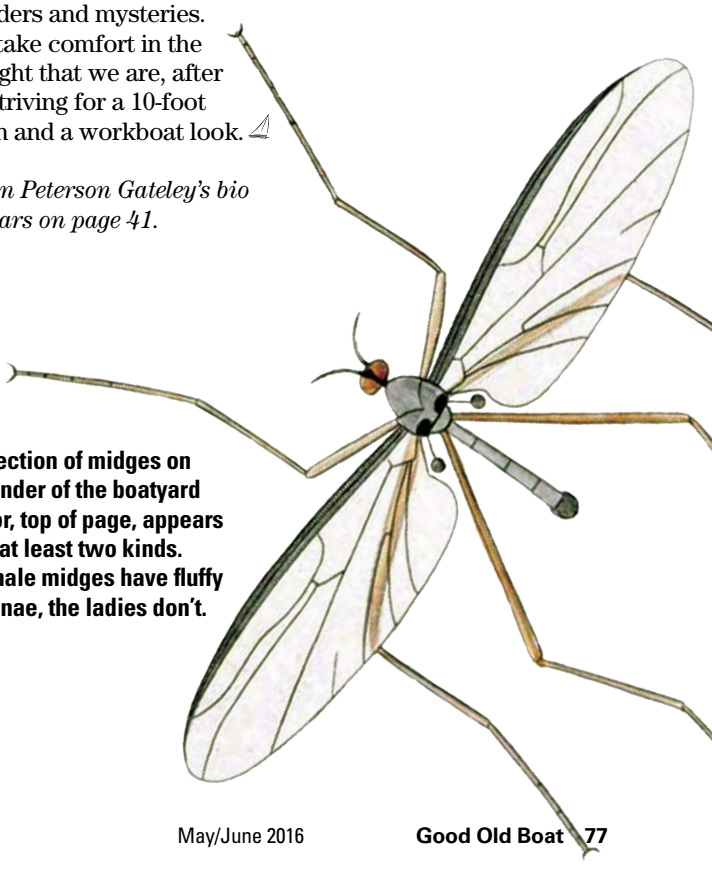
Overhead, the resident barn swallows who nest in the boat storage shed swoop and glean, stuffing themselves with midges. Spiderwebs in odd corners fill with gnats. Some webs are so packed that they sag with the weight of their clotted bounty. Out on the bay, small fish rise to the surface to pluck the midges.

As I gaze upward at the cloud of dancers whirling overhead, I ponder their mystery. How do they all decide today is Midge Day? How do they find the perfect mate in that swirling mass? And why does Midge Day always arrive just when I have applied something sticky to my boat?

A cheerful chatter from the barn swallows sweeping by reminds me that Nature has her own schedule. The wise freshwater boater adapts to it and is grateful for Creation's wonders and mysteries.

I take comfort in the thought that we are, after all, striving for a 10-foot finish and a workboat look.

Susan Peterson Gateley's bio appears on page 41.



A selection of midges on the fender of the boatyard tractor, top of page, appears to be at least two kinds. The male midges have fluffy antennae, the ladies don't.

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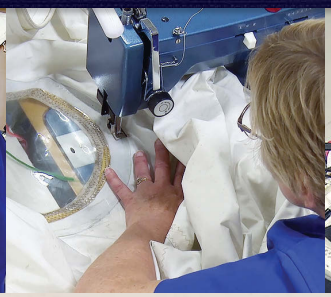

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