

GOOD OLD BOAT

The sailing magazine for the rest of us!



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About the cover...

Gail Scott sometimes writes articles for *Good Old Boat*. Other times she just thrills us with her photography. As a freelance photographer with a stock photography company called North Country Photos, she's well equipped to take our breath away, photographically speaking. She tells us, "I've always loved that photo." But she doesn't know what type boat it is. Let us know if you recognize it.



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Voices from everywhere

Whereabouts of good old sailors in this issue



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(and sometimes the back issues you're looking for)

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The view from here

Passing the *real* test

Seventy percent of the earth's surface is covered by water, and more than 99 percent of the earth's human population is on the remaining land. That makes the water a very special place and explains part of its attraction for some sailors. There may be almost as many reasons for taking up sailing as there are sailors, but for us, getting away from it all — the traffic, the noise, the mess of a small planet with six billion people crowded onto 30 percent of its surface — that is the main attraction. It has always seemed to me that the land was crowded and regulated and used hard, the water always less so. On the water there is freedom.


It is a transient freedom, however. We are not fish, or birds, or even marine mammals. We are truly creatures of the land and, as some of the world's navies have learned the hard way, we must have bases. Even a sailor needs the land. At best that is where he builds his boat. And in the modern interpretation, that is where he lives out most of his life paying for it. It is also where most recreational sailors serve the duties of faith, family, and citizenship. Very few sailors can completely avoid the land.

It is from the land that the pundits who would guide and regulate our lives operate. They think they know what is best for sailor and landsman alike, and they have given both a considerable volume of rules and regulations and laws — all offered with the best of intentions. Some of these are needed, but what concerns me

is that the volume is growing.

There is, for example, a plan afoot that would license the designers of our recreational boats, make them take tests to prove they know what they are doing, make them have degrees so we know they are educated. Just one more license for one more practitioner among the professionals who serve us. It is for our safety and the protection of our investment that they mean to draw a circle, leaving some in and some out.

Most of the really good designers of sailboats that I know of freely admit that they do not have these qualifications, and many say they could not pass the tests. They would not take them. That has always been a problem with tests and credentials and certifications. They may make us safer, but they will always make us less free, and if they ask the wrong questions who can say what they prove? I understand the test is about designing big ships, not small boats.

When we sail, we know the real test is administered by the water and wind, and I'm just as glad no man was consulted in the matter. I'm not sure my boat was designed by a person with all the currently recommended credentials, and I'm not sure it was built with all the currently recommended practices. She is, however, a masterpiece of designing and manufacturing with which I can find very little fault. When we go to take the real test, we will take it with her. 

by Jerry Powlas

Feeding cabin heaters

I missed the article on the Tiny Tot heater (March 2001). I guess that was before my subscription began. But I would like to comment on the Delezynskis' letter (Mail Buoy May 2001) about solid fuel heaters and the Dickinson heater in particular. We have had a Dickinson on our boat (1982 O'Day 37) for several years. We prefer the solid fuel to the oil- or gas-fired heaters because our heating needs are occasional (we are not live-aboards), and we really like the cheery look and dry heat of the solid fuel fire. But it is a chore to keep the thing fed.

We have experimented with many fuels — it will burn just about anything. The very least satisfactory in our opinion is charcoal briquettes. I don't know what they make those things out of, but they generate at least as much ash in volume as the original briquettes. And because of the huge percentage of inert materials, they generate much less heat than other fuels. The only advantage is they are cheap and easy to handle.

A far better fuel is real hardwood charcoal. It costs more and is messier to handle (use tongs) but it leaves virtually no ash, and the heat output is phenomenal. The best fuel by far is anthracite coal in the pea size (about ½ inch). Lots of heat, relatively little ash, and long burning — if you can *keep* it burning. We start the fire with the fatty wood mentioned in the letter and a mixture of hardwood charcoal and coal. Once the coal is burning, we just add more coal and shake down the ashes from time to time.

Here's the hard part: you have to get a lot more air into the heater to keep the coal burning than normal draft will provide, or the fire goes out. I cut a hole in the front of the ash drawer and mounted a three-inch 12-volt fan. Radio Shack sells them for about \$14. Mail order prices are far lower. The side of the fan that faces the heater has to be protected from radiant heat. I glued aluminum foil on the exposed surfaces. The fan must also run all the time to keep the flow of cooling air going through it. With this setup and a fan mounted high in the cabin to circulate the hot air that rises to the overhead, you get all the heat you could possibly need for as long as you want it. Keep a spare blower fan. Eventually the one in service will expire.

A word on the fatty wood: don't use too much of it. This stuff is loaded with oil. As the wood burns, the oil vaporizes into black smoke and rises unburned up the stack. You may find the fire is in

the stack a foot above the heater as the unburned gases catch fire. A glowing red heater is one thing. A glowing red stack is another.

Peter J. Brennan
New York, N.Y.

By the way, Peter sent a photo of his cabin and heater. Nearby is an embroidered cushion which states: "Living well is the best revenge."

Kudos to Torresen Marine

After more than two years, we are about ready to launch our CSY 44. It is currently on land at Torresen Marine in Muskegon, Mich. I would like to put in a plug for the folks at Torresen. After being there "on the hard" for so long, I'm starting to feel like family. That is not difficult since they are such nice people. If you are not familiar with them, the place is owned by Gordon Torresen and run by Gordon and his son, Brian, and daughter, Kathleen. (Torresen Marine: 231-759-8596, <<http://www.torresen.com>>).

They have been nice to me since the first day the boat showed up in February 1999. I can still remember the time when I was waiting in line to purchase about \$3 worth of stuff. As usual, I looked like crap with my paint-splattered blue jeans and ripped T-shirt. Kathleen was at the register. Some guy comes barging in. He was the typical "picture of success:" white curly executive hair, sunglasses with lanyards, orange iridescent jogging shorts, etc. He had just been informed that his mega yacht had sold. He tried to cut me off, but Kathleen informed him that he would have to wait in line as this customer (me) was here first.

My friends used to ask why I keep my boat all the way up in Muskegon when there are a lot of marinas on Lake Michigan much closer to Indianapolis. To me it was worth it. I was treated well. The summer storage fee was reasonable. They let me do my own work on the boat. The work I contracted them to do was not cheap but done well. One other thing about them: over the years, I have noticed that they have a really large selection of used sailboats in the 20- to 30-foot range. They have a few smaller ones and a few larger ones as well. I am always surprised more people aren't shopping for these. Only occasionally do I

see anyone on them. Some of them keep their winter tarps on all summer. What a pity.

Jim and Sandy Tenney
Relocated to Madison, Ala.

Kudos to Indigo Electronics

I'd like to pass the word along about Indigo Electronics and Tom Stevens, 800-428-8569, <<http://www.atomic4.com>>. Our Ranger 28 had an Atomic 4 that needed help. We could not count on having it start, among other problems. Indigo Electronics has been the answer, providing us with the parts to upgrade the distributor and engine into a reliable, modern system.

But that's only half the story. In our search for better performance under power we found that our original-equipment prop (2-blade, 12-inch diameter, 10-pitch) was a poor choice. We talked to other suppliers who all felt that theirs was what we needed, but we were not convinced.

We turned again to Indigo Electronics. Tom had a new prop under development for use with Atomic 4 engines. The prototype really looked promising. We ordered one, waited out some initial production problems, and the results were an unbelievable improvement: more engine rpm range, smoother under power, and better in reverse with less prop walk. (Backing down on the anchor is no longer a threat to cherished relationships.)

Everything we have bought from Indigo Electronics has been outstanding in quality and performance, and I am

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Mail
Buoy



Baba 40

An invasion of boats constructed in Asia began landing on the Pacific shores during the mid-70s, when the American sailboat market still included sailors with a soft spot in their hearts for traditionally designed boats. Many will fondly remember this spirited period in the history of the fiberglass boatbuilding industry. New brands seemed to appear monthly, bearing labels like Hans Christian, Tayana, Ta-Shing, Union, and Lord Nelson.

The invasion was fueled by several factors: a combination of cheap labor and raw materials; the builders' ability to fabricate metal components; and favorable currency-exchange rates.

At the time, American boatbuilders were operating at full capacity and dealers were rolling in clover. Boats were becoming more durable as builders seemingly had a handle on fiberglass construction techniques. Sporty designs produced by Cal Boats, Hunter, Ericson, and Catalina appealed to a market of sailors seeking combinations of good looks, comfortable accommodations, and a turn of speed.

However, the introduction of boats constructed in Taiwan launched a period during which traditionally designed double-enders enjoyed a renaissance. Following the aesthetic proclivities of Colin Archer and his ilk, the drafting tables of American designers began

spawning drawings for boats that looked right at home in a wooden boat festival. Not surprisingly, the blend of traditional designs and modern construction methods produced stylish boats constructed of fiberglass. Laminated hulls sported a deceptive, wood-straked appearance. Bulwarks, cabintops, decks, and cockpits were defined by prodigious amounts of glistening teak joinery. Belowdecks, combinations of gelcoat and teak produced warm interiors with the feel of a staid men's club. Standing headroom, large galleys and saloons, and oversized sleeping quarters were the norm.

by Ed Lawrence

Knockoffs were king

One idiosyncrasy of the Asian building system at the time was the introduction, usually at the expiration of a royalty agreement or some other financial arrangement, of a knock-off, a twin to an existing yacht given a different label. One dealer's boat left Taiwan as a Hans Christian 34 and arrived in Los Angeles six weeks later as a Union 34. These developments often occurred to the chagrin of designers who, in many cases, were not paid royalties.

The bad news is that many of the boats had the performance characteristics of a bathtub. Designed for bluewater passages, they were on the heavy end

of the displacement scale. Some were undercanvassed. Many underbodies sported a full keel that, while producing excellent tracking, inhibited performance and handling; a boat that tacked through 90 degrees was considered the exception. The ability to back up in a straight line under power, even when outfitted with a three-bladed propeller, was cause for celebration.

Their lack of performance often was exacerbated by owners overloading them, causing waterlines to disappear below the surface. One owner remembers designer Bob Perry telling him that one way to keep a boat on her lines was to paint a new line higher on the hull.

Some sail better than others

However, at least three of the boats were generally considered to have better sailing characteristics than their contemporaries. The Tayana 37, Baba 30, and Baba 40, all Perry designs, pointed higher and sailed faster. These boats still command high prices on the used-boat market, when you can find them.

One of these, the Baba 40, was introduced in 1978. This boat was conceived by Bob Berg, a Seattle yachtbroker who, with two business associates, formed Flying Dutchman International Ltd. Their plan was to import traditionally styled cruising boats from Taiwan.

The boats were built in the Ta Shing yard, which still enjoys an excellent reputation in the industry. Because the yardworkers were unable to pronounce Berg's name, he was nicknamed "Baba" and so was his boat.

"Our objective was to produce a boat that was faster and less expensive than the Westsail 32 and Valiant 32," he

The Baba 40 has nice lines whether viewed up close from the cockpit or at a distance. Yohelah under sail, at right. The name, Yohelah, is Salish (the language of the Puyallup Tribe) for eagle.



Courtesy Roger Eide Alibi Yachts

*A great cruiser by any name ...
including Panda and Tashiba*





A typical Baba 40 interior. Bob Berg, who conceived this boat, hired Bob Perry to design it, and founded the Flying Dutchman company to produce it, was the primary designer of the boat's interior.

recalls. Berg commissioned Bob Perry to design the Flying Dutchman 35 and the Babas. Berg's primary input was in the design of the interiors.

Perry says, "When Bob left his dealership, there was a legal fight over the name Baba, and Bob lost the right to his own nickname. He continued to market the Baba 40 under the Panda name. Then the yard took over the marketing, and the name was changed to Tashiba. The boats are essentially all the same. There was a deck-mold change, which reduced sidedeck width and increased headroom, that occurred fairly early in the project. I had nothing to do with that change, and I still consider it a stupid modification. There was also a steady progression in building details to help reduce the price of the boat. If you put an early Baba 40 next to a later Tashiba 40, you will find the newer boat has less teak trim, fewer hatches, and fewer portlights. There were also some interior changes to help reduce the price."

Production of the 40-footer began in 1978, and more than 150 were built. One of these, *Yohelah*, is owned by Rob and Teresa Sicade (Sigh-cayd), who live aboard and sail on Puget Sound while working through the middle months of a two-year plan to point the bow at the horizon. Viewed from abeam, *Yohelah's* profile reflects her intent to cross large patches of water. Her bowsprit adds an almost jaunty look while increasing her length by five feet and the sailplan by yards. Her sheerline is near level, accented by a teak caprail sitting atop high gunwales that keep water off the deck and passengers. Bronze portlights span the length of the cabin, as do teak handrails that, when properly maintained, reflect sunlight. Aside from the aesthetics, those handrails also provide a degree



Courtesy Roger Eide Alibi Yachts

of safety often appreciated while sailing offshore under dark, moonless skies.

The Baba 40s rolled off the production line with butterfly hatches under the boom that add to the appearance but have a tendency to leak. Bob and Teresa's boat, however, has a large, flush deck hatch that adds light and ventilation and prevents water from intruding below deck. This custom change was built in by the yard at the request of *Yohelah's* first owner, who made several trips to the Ta Shing operation while the boat was under construction. He also had the boat fitted with a forward-facing nav station.

Deck layout

Since the newest of these boats is at least 20 years old, it is unlikely that two boats will have the same deck hardware and configuration. Common denominators were aluminum masts supported by heavy wire standing rigging. Many of the competing brands at the time were equipped with wooden masts, booms, and spreaders that, though sturdy and attractive, required yearly varnishing. I've missed more than one day's sailing while aloft with varnish brush and bucket.

"My boat is still equipped with original wire," one owner told us, "and passed a recent survey. However, I'd re-rig the boat before heading offshore."

Another replaced running rigging with lighter lines and says that, combined with lighter sails, "it has reduced heeling significantly."

High on my list of modifications would be moving winches aft, where there is adequate space to mount them under a dodger, installing sheetstoppers and, if possible, internalizing halyards.

The bow and spaces below the boom provide space for the storage of an inflatable dinghy and life raft. The oval cockpit is large enough for four adults, but, like the Baba 30, smallish compared to the floating condominiums marketed by modern production builders. However, the cockpit is comfortable, and the boat won't be swamped by water coming over the stern in heavy seas.

Belowdecks

Spaces belowdecks are so spacious and well laid out that when the weather's too stinky for sailing, at least the crew can suffer in comfort. The configuration includes an enclosed stateroom with a double berth aft to starboard, galley to

port opposite the nav station, C-shaped settee to port, a second to starboard, and head and V-berth forward. The main saloon measures 10 feet 10 inches on the centerline.

Among the variations between boats was the layout of the C-shaped galley. Sinks may be located aft, at the foot of the companionway steps, or on a counter located athwartships. Either way, there's generous counter space; *Yohelah's* measures 54 inches long and 22 inches wide, large enough for the preparation of

a feast during a Fourth of July celebration or the Christmas goose. The chef will appreciate three shelves dividing the refrigerator that convert the space from a disorganized cavern to a well-organized storage area.

Considering that nav stations on many new boats are shrinking in size in direct proportion to the number of new electronic gadgets that can be mounted on bulkheads, I like the 32-inch by 21-inch chart table. There's room to spread a chart and plot a course without banging an elbow on a wood surface.

The C-shaped settee provides seating for 6 to 10 people, depending upon how well acquainted they are. Add the 64-inch-long settee to starboard, and there's additional seating for three. The settee doubles as a berth, extended by 12 inches of room in a footwell under the chart table. When underway on a port tack, that may be the most comfortable place to sleep.

The forward stateroom boasts an 80-inch-long berth, the equivalent of a queen-sized bed. The compartment also has a built-in hanging locker and shelves to port. The head is a spacious two-compartment affair. Are accommodations large

enough for extended cruising? You bet. "We have lived aboard for three years and been comfortable," the Sicades say.

Construction

Though many of the Taiwanese boats were cored with balsa, Baba hulls were constructed of alternating layers of hand-laid 1.5-ounce mat and 24-ounce roving. "Most boats had six layers in most places," Bob Berg recalls.

The interiors of the first boats in the production run were sprayed with gelcoat and covered with quilted vinyl; they later were produced with sound-deadening foam and teak battens in the main saloon and forepeak.

"The boats were substantially built and have held up well," a veteran surveyor who once marketed the boats noted. "The electrical systems are excellent. The company used high-quality wire that was tagged and bundled. The plumbing system is good."

The final product typically reflected a loose approximation of the designer's construction specifications. The good news is that they were, if anything, overbuilt.

However, if the boat has an Achilles heel, it is the fuel tank. Fuel is stored in a 110-gallon tank, located on the centerline, that runs the length of the main saloon. That's the perfect spot for that weight: low and amidships. However, the tanks were constructed of steel and are prone to leaks.

In the words of one owner, "Our tank looked good when we purchased the boat, even passed the survey. However, it ruptured three months later ... not a



The Baba 40 is a boat that looks seaworthy and performs as you'd expect. Yohelah sails with a standard sailplan of mainsail, 100-percent jib, and staysail.

Resources

Baba Web site

<<http://www.geocities.com/babaweb1/home.htm>>

Host of BABA-L e-mail discussions

Rick Emerson, baba-ad@pinefields.com
<<http://www.eta.k12.mn.us/~dennisv/baba/home.htm>>



Bob Perry recalls

I designed the Baba 40 about the same time I designed the Norseman 447. The year was 1977. I had been in business for 3½ years. Things were very busy. I had just completed the Flying Dutchman 35 design, and I was asked to do the Baba 40. The FD 35 was a development of my continuing line of heavy double-enders that began with the Hans Christian 34 and continued with the Tayana 37 and the Baba 30. I was very happy with the Baba 30, but I felt that the FD 35 could have been a better boat. Not that it was a bad boat in any way but I just thought that I did not see the progress in performance that I had been anticipating after the Baba 30. I felt I could do better.

When I began the Baba 40 I knew I needed a different approach, so I pulled out the lines plan for the Valiant 40. My question to myself was: "What did I do here that I had not done on the FD 35?" The basic answer lay in the sectional shapes of the two designs. While the Valiant 40 had a midsection that showed marked deadrise, the FD 35 was very arc-like in its midsection, approaching tangent at centerline. In fact it was too similar to the Tayana 37 and the Baba 30, and what I got was just another boat in that performance family. Also compared to the V 40, the FD 35 had a lot of fore-and-aft rocker with buttocks that were quite "soft" in the ends, particularly the bow. It was at that point that I severed that particular limb of the design tree and went back to a shape more similar to the Valiant 40.

This required a midsection that showed a harder turn to the bilge for more initial stability, less rocker for a higher prismatic coefficient and a longer sailing length, and a finer entry for better weatherliness, achieved through reducing the "spoon" profile of the stem. If you line up the entire crowd of Taiwan double-enders of the period — Hans Christians, Tayanas, Lord Nelsons, ad nauseam — the Baba 40 is an entirely different boat. While it shares a general cosmetic approach with the others, the hull form is very different.

I was knocked out by the performance of the Baba 40. The balance and feel was impeccable. Maybe the rig was a bit on the short side. I did one with a five-foot taller rig, and I really loved that boat. That one lives in Seattle and was raced extensively and compiled a very impressive record. On the wind, in a breeze, the Baba 40 is as able a boat as I have ever had the pleasure to sail. Before you condemn full-keel boats categorically, you had better sail a Baba 40. I consider the Baba/Panda/Tashiba 40 to be one of my very best designs.

weep or small leak — a rupture. If your boat has the original tank, replace it." Two other owners echoed his sentiment.

Performance

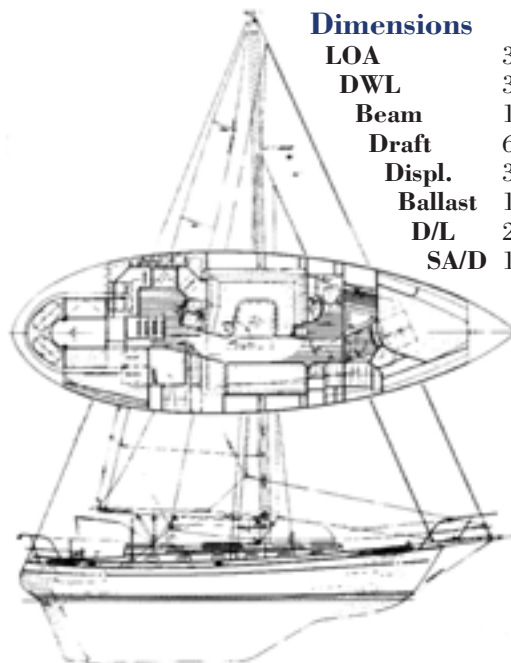
It's a sad reality in the liveaboard community that some boats become magnets for household items that inhibit performance or cause permanent attachments to a slip. Not so with Rob and Teresa.

"The basic rule is that she must be ready to head to sea in 10 minutes," Teresa says. I considered that to be a stiff challenge until the Sicades executed their pre-launch routine and cast off the docklines in as little time as baseball teams have between innings.

Yohelah was built in 1984, was fastidiously maintained by

Dimensions

LOA	39 feet 10 inches
DWL	36 feet 6 inches
Beam	12 feet 10 inches
Draft	6 feet 0 inches
Displ.	30,000 pounds
Ballast	12,000 pounds
D/L	275
SA/D	15



The Panda 40, above, is nearly identical with the Baba 40

her original owner, and sails with a standard sailplan of main-sail, 100-percent jib, and staysail. A light drifter or asymmetric spinnaker is on the Sicades' wish list.

Since most double-enders will sail to within 40 to 50 degrees of the apparent wind when windspeed exceeds 10 knots, the real test of sailability is in light air. As a consequence, I was not disappointed at having only 8 to 10 knots pushing us across Puget Sound. Initially flying only the main and staysail, we put her through her paces sailing in a 1- to 3-foot chop. Sailing closehaunched, she registered between 4.1 and 4.3 knots of boatspeed.

When Teresa hoisted the jib, *Yohelah* squirted forward, and boatspeed increased to 5.5 knots. Heeled comfortably at 12 to 15 degrees, she buried her shoulder and forged ahead. Considering that we were dragging a three-bladed prop, I think she performed well.

Then, since a gentleman never goes to weather, we footed off to 60 degrees and sailed in great comfort as boatspeed increased to between 6.1 and 6.3 knots. Continuing off the breeze, I saw little change in boatspeed until we attempted to sail below 120 degrees. Then the main, staysail, and jib began misbehaving like teenagers, and she slowed measurably.

The bottom line: the Baba 40 is a boat that looks seaworthy and performs as you'd expect. She is faster than most of her contemporaries, is stable, and tracks well. She's warm and comfortable belowdecks. If you only used her on weekends or short trips, you might enjoy spending warm summer evenings messing with the brightwork that makes her so appealing.

However, if you were heading to the South Pacific, you might want to consider covering the teak with a coat of white paint.



Ed writes about boats and off-beat subjects for several national magazines from his home base in Montana. Between boats right now, he's in the market for a trailerable 28-30 footer.



Metal corrosion

ALUMINUM ALLOYS FOR USE ON boats are generally limited to the 5000 and 6000 series. The former contain aluminum and magnesium and are used for plating on aluminum hulls, while the latter add silicon as well, and are used for extruded shapes (such as masts and other spars). Both types of alloys form a tough oxide film on the surface, which is light gray in color. Thanks to that film, they're sufficiently corrosion-resistant that they need not be painted, and aluminum boats with unpainted hulls and even decks are becoming increasingly common, while unpainted aluminum spars have been around for years. As with stainless steel, however, these aluminum alloys can suffer from several kinds of corrosion if the naturally occurring oxide film is broken or prevented from forming. They're also quite vulnerable to galvanic corrosion.

Pitting corrosion

Pitting corrosion is the most common type of corrosion seen with aluminum and shows up frequently on spars. It first forms at a weak point in the oxide film, after which chemical reactions within the pit will increase the chloride concentration and sustain the reaction. It shows itself as a dusty white or gray powdery deposit which blotches the surface. If you clean the deposit away, you'll see small pits or holes, as shown at left.

Pitting in aluminum exposed to salt water can be fast at first — with the pits reaching a depth as much as $\frac{3}{64}$ of an inch in the first two years, but it typically slows after that, taking 20 years to reach $\frac{3}{32}$ of an inch. Given that many masts are quite thin ($\frac{5}{32}$ to $\frac{3}{16}$ of an inch), pitting can be a very real and serious concern.

Stress corrosion

The corrosion rate varies depending on the situation, but it can increase if the aluminum parts are under stress. Corrosion fatigue can be

caused by a combination of stress and ongoing corrosion and can cause a metal part to fracture long before it otherwise would. The degree of visible external corrosion isn't a good indicator of relative corrosion fatigue, and the only defense is to choose the right materials for any parts subject to alternating stresses.

Galvanic corrosion

Aluminum sits very high on the galvanic series, meaning it will lose out to almost any other metal in contact with it. It must be electrically isolated from other metals if the two are in the presence of an electrolyte. Failure to do this will result in the aluminum corroding, often at a very rapid rate (example below).



Crevice corrosion

Crevice corrosion takes place in narrow areas where pieces of aluminum are joined or where aluminum joins another material. A variety of mechanisms can work to start crevice corrosion in aluminum, but it generally progresses due to galvanic action once two areas on the same surface have become passive and active.

Preventing corrosion

Because it will corrode whenever the oxide film is prevented from forming, aluminum should always be separated from other materials, even from other pieces of aluminum. This can be done in various ways: by using an adhesive waterproof paint such as epoxy, with spacers and gaskets made of plastic or a non-conductive material, through application of a waterproof bedding compound, or with a joint paste such as a barium chromate paste. (A barium chromate paste marketed as Duralac is widely available in New Zealand, Australia, and the United Kingdom; check with your marine supplier to see

by Mark Smaalders

if they can import this, or if a similar product is available in the United States.) The best protection will be achieved by using a combination of these techniques. Make sure that whatever you use doesn't create additional problems. For example, avoid using silicone caulk on aluminum unless it's neutral cure, as acidic-cure silicone (that smells like vinegar) will produce corrosion (photo at right).

Anodizing is a process whereby an especially tough oxide film is created on the surface of the metal. Anodized spars look good when new, and anodizing will slow pitting corrosion, but it won't prevent it, and it's no defense against either crevice or galvanic corrosion.



Copper alloys: Brasses and bronzes

Copper has been in use longer than any of the other metals typically used onboard — about 6,000 years. In its pure form, copper is quite soft but has excellent resistance to corrosion and conducts electricity very well. Pure copper doesn't see much use except in wiring and as wooden-boat sheathing, but copper alloys constitute some of the best metals available for the marine environment.

Brass

Brasses are copper alloys that include zinc, with the percentage of the latter varying from about 10 to about 40 percent. Brasses are the least useful of the copper alloys for marine applications because their zinc content makes them prone to general corrosion and "de-zincification" when immersed in sea water. De-zincification takes place when galvanic corrosion attacks a brass fitting so that the zinc (the less noble metal) is eaten away, leaving just the soft copper. Brass is suitable for interior fittings, but should not be used for any underwater fittings or fasteners.

Much confusion results from the fact



under stress. Corrosion fatigue can be

Second of two parts: *How aluminum and copper alloys behave and applying the theory to your boat*

that some brasses are incorrectly called “bronzes.” These include commercial, manganese, and Tobin bronze. If in doubt, check the composition and avoid using any “bronze” that contains zinc below the waterline.

Bronze

True bronzes are alloys that include varying amounts of silicon, aluminum, and tin; common types include silicon bronze, aluminum bronze, and phosphor bronze. Bronzes are protected by a very tough oxide film, which gives them their characteristic green color when exposed to sea water or marine air. Although they do corrode, they do so very slowly and uniformly and are not subject to problems such as pitting, crevice, weld, or stress corrosion. Silicon bronze can be easily welded with no loss in strength, meaning that it can be used to fabricate a wide range of fittings that are more commonly made of stainless. An increase in temperature (within the range found in the tropics, for example), causes the oxide film on bronze to form more quickly but doesn't otherwise enhance the corrosion rate.

Bronzes are the metals of choice for underwater use, except on aluminum boats where they can cause serious galvanic corrosion (see photo below). Otherwise, use bronze for through-hull fittings, hardware, fasteners, propellers, and shafts. Silicon bronze is a good all-around choice for most applications.



Applying the theory: corrosion and boat gear

Rigging

The vast majority of sailboats use 1 x 19 stainless-steel wire for standing rigging, and we'll restrict our comments to this type of rigging, but it is possible

to use other materials, including galvanized or stainless wire of 7 x 7, 7 x 19, or 1 x 7 (Dyform) construction.

Corrosion and wire fatigue are the primary sources of problems with rigging wire. Although inevitable, both can be delayed: corrosion can be slowed by using the best-quality stainless wire you can buy and by careful choice and installation of terminals. Keeping the rig properly tuned and ensuring that toggles are used on both ends of all shrouds and stays can reduce fatigue. Using good-quality wire is very important, as even small imperfections can lead to greatly accelerated corrosion. Quality control is uneven in wire manufacturing, and you should only purchase wire from reputable manufacturers. Finally, you can slow corrosion by buying a superior grade of stainless. The 1 x 19 wire is available in 304 and 316 grades. Type 316 is more corrosion-resistant, but is typically weaker for the same diameter. Make sure to check the breaking strength of any wire you use.

Rigging wire rarely fails in the middle of a shroud or stay, but instead at (or even in) an end fitting such as a swage or other terminal. Swaged fittings are especially prone to crevice and stress corrosion, and my advice is not to use them. Compression fittings have a number of advantages:

- They can be taken apart at any time to check on the condition of the fitting and the wire.
- They can be re-used even if the wire must be replaced.
- They're much less prone to crevice corrosion because they're filled with sealant when assembled.
- They're easy to assemble, so you can do the work yourself, saving money and ensuring that the job is done correctly.

Standing rigging should be replaced immediately if there are any signs of

pitting or broken strands. Specifying when to replace wire is difficult, as it depends in part on the quality of the wire, the type of end fittings,

and how the boat has been used. In general, though, rigging used in salt water in northern latitudes should be replaced about every 10 years, while wire should be renewed every 5 to 6 years in the tropics, even though it may look to be in fine condition. These times might be extended somewhat if the wire is 316.

Freshwater sailors are likely to do much better than these rough estimates suggest. No matter where you sail, inquire with a local rigger if you're in doubt about the integrity of your rigging.

If stainless

steel is used for running rigging, it should be 7 x 19 construction, which is more flexible than the 1-x 19 used for standing rigging. This wire is also suitable for lifelines. Lifelines should never be plastic-coated, as this will encourage (and hide) corrosion. If your boat has plastic-coated lifelines, replace them with bare wire, and increase the size so that the outer diameter of the bare wire equals the outer diameter of the plastic-coated wire. They'll be stronger and last longer. Ends should be fashioned with a thimble and Nicropress sleeve, and a lashing should be used to secure and tension the lifeline. Replace running rigging and lifelines whenever you replace standing rigging.

Aluminum spars

Aluminum alloy spars require much less in the way of regular maintenance than do wooden ones. Coatings are essentially optional. Although most masts are either anodized or painted, they can be left bare with no harmful effects. Problems with aluminum masts crop up where they're welded, where fittings and hardware made from other materials are attached, and at cutouts or openings.

Aluminum and plastic (or other electrically and chemically inert) fittings can be mounted directly on a mast or boom using aluminum rivets.

Galvanic action won't be a problem, but it is advisable to apply some joint paste before installation. Apply it to the fitting if it's aluminum, and on the rivets in all cases, to forestall any problems with pitting corrosion.

Stainless and bronze fittings — including sail tracks — must be electrically isolated from the spar, or pitting and galvanic corrosion will result. They should be mounted using stainless machine screws or Monel rivets, as galvanic action will cause aluminum alloy rivets to corrode rapidly. Isolate the fittings using a durable plastic spacer, and liberally apply joint paste to the fasteners. These should be removed and rebedded every year or two if you're in a warm climate.

Aluminum masts are susceptible to cracking in the vicinity of any welds, and these are most common near spreader sockets. Check welds frequently for signs of cracking or corrosion. Cracks may also develop around any openings, such as exit points for internal halyards. These should have rounded (rather than square) corners. If internal halyards are fitted, make sure that there's a hole at the base that will allow the mast to drain, as a surprising amount of water will find its way in, which can produce serious corrosion at the base of the mast.

Aluminum alloys used in making castings, such as spinnaker and whisker pole ends, are not as corrosion-resistant as the marine-grade alloys used for the poles themselves. Serious galvanic corrosion between the pole and the casting can result and may cause the pole to split (see photo below). The only solution is to disassemble the pole periodically and apply liberal amounts of joint paste or other anti-corrosion compound.



Rigging fittings and deck gear

Turnbuckles are frequently doused with salt water from waves and are susceptible to stress, crevice, and pitting corrosion if made from stainless steel. This is especially true of closed-body turnbuckles used in the tropics, as they're impossible to flush with fresh water and

therefore become perfect sites for corrosion. All-stainless turnbuckles are also prone to galling, which can cause thread damage and weaken the turnbuckle (see below). All of these problems can be avoided by using open-body silicon bronze turnbuckles; at the very least, ensure that the turnbuckle bodies are bronze. Turnbuckles should be checked for wear and greased annually.



Chainplates on steel and aluminum boats usually form an integral part of the boat's structure and rarely develop problems. On wood and fiberglass boats they're typically mounted on the outside of the hull, or somewhat inboard, piercing the deck or cabintop. In either case they'll be metal (usually stainless steel or bronze) and fastened with bolts. Bronze chainplates shouldn't suffer from corrosion, but chainplates made from stainless steel are prone to stress and crevice corrosion.

Outboard-mounted chainplates of stainless will develop problems where they're bedded against the hull and where they're pierced by bolts; the bolts that secure them to the hull are also very susceptible to crevice corrosion if made from stainless. Sealing inboard-mounted chainplates completely against leaks is very difficult, and these usually corrode where they come through the deck. With both types, problems are likely to be hidden from view, and will be found only by completely removing the chainplate and pulling all the bolts.


Even if they look to be in good condition, stainless-steel chainplates should be replaced every 10 years or so in the tropics. Use silicon bronze chainplates and bolts whenever possible if replacing these fittings, as the bronze ones will

last for the life of the boat.

Mast tangs are typically made of stainless and are subject to weld decay and to stress corrosion at any bends. Carefully inspect these fittings for cracks, and replace them immediately if any are found. Problems can be avoided if bronze is used to fashion replacements, but you should be very careful to isolate these completely from an aluminum mast.

Blocks are often made with a combination of aluminum and stainless steel parts, and these will corrode after a number of seasons in the tropics. There's little to be done, except rinse them frequently with fresh water, disassemble them if possible, and apply joint paste. Or replace them, preferably with blocks made from a single type of metal.

Winches, roller furling gears, and windlasses are all susceptible to corrosion, with the amount dependent on how and where you use your boat. Equipment that may last for years if used only on occasional weekends in a northern climate can corrode quickly and severely if you're cruising in the tropics. In any case, don't believe manufacturers' claims that a unit equipped with sealed bearings will deliver a "lifetime of service." I've experienced serious corrosion problems with all of these types of equipment, all of which were produced by major, reputable, manufacturers.

If you're thinking about purchasing equipment, keep the principles of metal corrosion in mind, and buy gear with the least potential for corrosion, especially for galvanic action. For example, "old-fashioned" anchor windlasses made of bronze (with perhaps some stainless gear shafts) are less likely to develop trouble than models combining aluminum and stainless. The same holds true for winches: although they're cheaper and lighter, if you're sailing on salt water don't buy winches with aluminum drums. Look for models with bronze or 316 stainless drums and gears. There's no magic formula for maintaining equipment, other than to strip it down frequently and to always use good-quality lubricants. 

Since 1993, Mark has been sailing Nomad, a 35-foot Cheoy Lee Lion, with Kim des Rochers. They're currently in New Zealand. Mark has a Web site at http://smaalders.net/yacht_design/. avoid using any "bronze" that contains zinc below the waterline.



Winter agitation

FOR THOSE OF US WHO LIVE IN THE higher latitudes, the approach of the fall season reminds us of an upcoming conflict between our boating agendas and the impending deep freeze. For a fortunate few, this means stowing those summer clothes on board and sailing toward warmer climates. But most of us will make arrangements at the local marina for a haulout and winter cover or possibly for wet (in-the-water) storage. Those who have their homes on the banks of navigable water and have their boats moored at their own docks or at the community dock of a

condominium have yet another option: wintering their boat in the water at her normal location near home. This option requires appropriate preparation and equipment, of course.

One of the problems with wet storage in latitudes where the surface of the water can freeze solid during the winter is the potential problem of ice damage, unless proper precautions are taken.

With wooden hulls, water getting between the planks can freeze, spreading them apart and allowing more water to enter and re-freeze until a major leak (and possible sinking) occurs.

The problems are usually less threatening with fiberglass boats. However, when thick ice forms around the hull of any boat, damage to the rudder and prop is possible. Also, when a boat is surrounded by ice, wind and current

will cause it to rock and pitch. The resultant grinding action of ice against the hull can cut away at the gelcoat along the waterline of a fiberglass boat. This can result in water incursion into the laminate and, at the very least, an additional gelcoat repair job in the spring. With wood boats, ice can wear through the paint and gouge the hull. Depending on the waterline hull shape, major structural damage is possible. For all of these reasons it's important to prevent ice from forming around a boat

that spends the winter in the water.

To make sure the boat is floating in

above-freezing water, a water de-icing system in the winter is the answer. These systems are just as practical for an individual boat at a private dock as they are for a large marina. For those who live where the waters freeze during the winter, the "bubbler" and underwater agitation-motors are a familiar sight, but how do they keep the water from freezing around our boats?

Properties of water

The designer of our world certainly gave us a great gift when the physical properties of water were promulgated. Water, one of the most commonplace and familiar of all natural substances, is one of the most remarkable. Compared with nearly every other substance, water behaves, physically, in a unique manner.

Nearly every other material expands



If needed, an agitation motor can be canted at an angle.

when heated and contracts when cooled, but water follows this pattern only in part. As it is cooled down to about 39°F it does indeed contract; but with further cooling it begins to expand again, and when it begins to freeze this expansion is dramatic.

Let's imagine what would happen if water did not follow this aberrant behavior. If water and ice continued to contract, as does nearly every other substance, ice would be denser and heavier than water. As ice formed at the cold interface of water and air, it would sink to the bottom. Other layers of ice would also sink as they formed, until the entire body of water would be frozen solid. Since sunlight and heat don't penetrate very deeply into a body of water or ice, none of our lakes, streams and bays in the northern latitudes would ever thaw out in the summertime, except to a slight depth at the surface. Fish and nearly all forms of aquatic and bottom-life could not survive, and our northern bays, lakes, and streams would be useless as a food source, for recreation, or navigation.

When a body of fresh water is cooled, it gradually contracts and becomes denser and heavier until it reaches 39°F. Then it begins to expand as it's cooled to the freezing point and is transformed into ice at 32°F or less. Although the temperatures given in

Mid-winter photo of the author's schooner, Delphinus, at the dock next to his home in New Jersey. His boat is protected from ice around the hull by a water-agitation motor.

by Don Launer



these explanations are for fresh water, salt water follows a similar pattern. In the case of salt water, the exact temperatures at which these events happen are determined by the water's salinity.

A solution of salt and water freezes at a lower temperature than fresh water. In fact, the freezing point of a saturated solution of salt water is about -6°C , whereas the freezing point of unsaturated ocean water (depending on salinity) is around 21°F .

Since surface water cooled to 39°F becomes denser, it sinks to the bottom. It is then replaced by warmer bottom water, which then follows the same scenario. Thus no ice can ever be formed on the surface of a body of fresh water until the whole body of water is cooled to 39°F .

This means that the water at the bottom of a deep-frozen lake is near 39°F whatever the temperature of the air above the ice. De-icing systems take advantage of this physical fact of nature, using this huge reservoir of "warm" water at the bottom for their supply of de-icing water.

Bringing water up

The two popular methods of raising this bottom layer of water to the surface are the air-bubbler system and the propeller-agitator.

With the air-bubbler, a weighted, perforated hose is laid along the bottom and connected to an air compressor (controlled by an air thermostat). The rising air bubbles coming out of the hose carry along with them the above-freezing water from the bottom, creating an area of unfrozen water above the bubbler hose.

The propeller-agitator accomplishes the same result by using a hermetically sealed electric motor with a propeller attached. These agitator units are also

Solving the problem of icing up in winter

controlled by air thermostats. Naturally, the deeper the water at the slip, the larger the reservoir of warmer water and the more practical the de-icing system.

A bubbler system can be used equally well for an individual boat or a huge marina with the physical size of the compressor and its horsepower dependent on the length of the bubbler hose and depth of the water. Originally these compressors were quite noisy and could be annoying in a residential



Agitator motor suspended at an angle at the author's dock.

environment. In recent years, however, internal as well as external sound-proofing and state-of-the-art compressor design has nearly eliminated this problem. During the winter, compressors usually live at dockside and must be in a location well above any possible flooding.

The underwater agitation motor is completely quiet, except for the rippling noise of the water. If depth is sufficient, the underwater motor can be hung directly beneath the boat. Alternately, it can be hung at an angle off the side of the boat where the water is deepest, or at the bow facing aft. These motors can be suspended by their own ropes, mounted to a rigid arm, or suspended from a flotation unit. Most manufacturers of agitator motors have optional dock or piling mounts and flotation-mounting kits. When the underwater motors are mounted in the vertical position, these units produce a circular pattern of unfrozen water. When suspended at an angle, the pattern is elongated.

Adjusting the angle of a rope-suspended motor is done by simply looping one of the suspension ropes back one or two ribs on the propeller cage or through

one of the off-center holes in the housing placed there for that purpose. These underwater motors have plastic propellers and replaceable zinc anodes for electrolysis

reduction and are available in $\frac{1}{2}$ -, $\frac{3}{4}$ -, and 1-hp sizes, depending on the size of the area to be de-iced and the severity of the winters. Originally, the motor cases were filled with oil, but recently synthetic dielectric lubricating fluids that are non-toxic, biodegradable, and non-bioaccumulating have been introduced.

Bags and debris

Although it would be nice if our waters were pristine, unfortunately underwater plastic bags and other debris are a fact of life. If a de-icing system is used in an area where large amounts of such things are present, the chance of their fouling the propeller of an underwater motor must be taken into account when selecting a de-icing system. Naturally, underwater debris presents no problem to a bubbler system.

If you're using a propeller-agitation system, the following practices are recommended:

- It is usually easier to de-ice a boat by installing the de-icer at the bow and pushing the water toward the stern, since boats are designed for easiest water-flow in that direction.
- If a boat is berthed in a river, de-icing from the upstream side will allow the current to help, rather than hinder.
- When a boat is wintering next to a bulkhead, the motor can be hung off the free side and canted toward the hull.

Obviously neither type of de-icing system can possibly prevent ice around a boat if the ice is being moved by wind or current.



Ice eater by The Power House.



Kasco's agitation unit.

Other considerations

De-icing systems are also very effective in preventing damage to pilings and docks in tidewater locations. In these locations, when ice freezes solid around a piling, the piling is frequently lifted inch by inch at each tide change. This results in expensive dock and piling repairs or replacements, come spring. Unfrozen water around the pilings can prevent this costly problem, and marinas often use bubbler systems in their slips whether or not any boats are present. This lifting or “jacking” damage is also common in the lakes, where weather, wind, and changes in lake levels can cause the same thing to happen.

Although we only think of water agitation systems for boating use, they are also used as aeration units in fish farms. A spectacular and bizarre use of a motor/agitator made world news when, in October 1988, whales trapped by ice at Barrow, Alaska, were kept in an ice-free area until Russian and U.S. icebreakers could open a path for them to open water.

Even though de-icing systems eliminate most of the problems associated with wintering in the water, some other things to consider are the possibility of freezing problems inside the hull. The relatively warm bottom water surrounding the hull typically will keep the bilge free of ice, but in harsh northern climates there's no guarantee. Where electricity is available, many boatowners use electric light bulbs or small heating elements inside the engine compartment to help keep the packing glands around the prop shaft and rudder shaft, as well as the cockpit drains, from freezing. Small, inexpensive, plug-in thermostats are also available so the heat is not on during warm spells.



BoatSafe: Bensaco's engine compartment heater.


Light-bulb problems

People who use a light bulb for heat can encounter several problems. A normal light bulb has a life expectancy of about 750 hours. This means that if left on continuously, it will last about a month — not nearly long enough to last through the winter. A long-life bulb, which puts out the same amount of heat, but less light, has a more rugged filament and less chance of burning out over the winter. It's also much less vulnerable to vibrations. An outdoor bulb should be used if there is any possibility of water dripping on it. The problem with light bulbs, in general, is that the very limited amount of heat generated is only effective within a very confined space and where winter temperatures are relatively mild.

There have also been cases where an exposed bulb has come in contact with flammable material or has shattered and caused a fire. Marine-grade engine-compartment heaters are a far better and safer way to go. These come in several styles and wattages. Some of these heaters have their own built-in thermostats and circulating fans and are in stainless-steel or aluminum cases.

Other items to check before in-the-water winter storage, are the condition of your automatic bilge pump and supply of power. Is the float-switch free of debris?

Can the pump be left in a standby mode without leaving the main 12-volt battery switch on for the rest of the boat? Is there a possibility of the bilge freezing, rendering the float-switch inoperable? Can the batteries remain in a charged — but not overcharged — state by use of a “smart” battery-charger or trickle-charger? Have you added non-toxic anti-freeze to the bilge and pumped it through the bilge-pump and discharge hoses? Other than the cockpit drains, are the through-hull seacocks closed? Ice can lift off a hose. While you're at it, now is a good time to see if those hoses are double-clamped and the clamps and hoses are in good condition.

Even though you have done all the winterization tasks properly, an occasional mid-winter visit inside the cabin is always a good idea to make sure everything is OK — if only to assure your boat and yourself that there are warm breezes and sunny days to come. After your checkout, a half hour curled up on the settee with your hands wrapped around a hot cup of coffee as you plan those summer cruises can be great therapy in relieving the depression of those cold gray days of winter as you wait for spring to creep north to reclaim the shoreline. 

Don lives on a waterway off Barnegat Bay, on the New Jersey coast. He keeps his schooner, Delphinus, at dockside next to his home.

Although Barnegat Bay and the adjacent waterways frequently freeze solid, his boat has wintered in unfrozen water for the past 21 years, protected by a water-agitation system and an electric engine-compartment heater.



Resources:

Manufacturers of propeller-agitation units:

Kasco Marine, Inc.

800 Deere Road
Prescott, WI 54021
800-621-7611
<http://www.de-icer.com>

Pyramid Technologies LLC

48 Elm St.
Meriden, CT 06450
888-479-7264
<http://www.pyramid-technologies.com>

Follansbee Dock Systems

State Street, P.O. Box 640
Follansbee, WV 26037
800-223-3444
<http://follansbeedocks.com/home.html>

The Power House, Inc.

20 Gwynns Mills Court
Owings Mills, MD 21117
800-243-4741

Manufacturer of bubbler de-icing systems:

World Wide Enterprises

19 Cedar St.
East Falmouth, MA 02536
508-540-0963
<http://www.worldwideent.net>

Manufacturer of engine compartment heaters:

Bensaco, Inc.

3301 Myrtle St.
Edisto Beach, SC 29438
800-969-3785

Resistance in yachts

*Universal forces act
to prevent or slow forward motion*

REGARDLESS OF SIZE, TYPE OR SPEED, the resistance of every vessel to forward motion comes from four major sources:

- Surface friction due to the area of the hull in contact with the water.
- Appendage resistance caused by the eddies generated by underwater fittings.
- Wind resistance on the topsides, deckhouses, spars, and rigging caused by direct wind pressure and wind eddies.
- Wave-making or residual resistance caused by the generation of surface waves due to the passage of the hull through the water.

by Ted Brewer

In addition to the four above, a yacht sailing to windward has the added resistance of induced drag caused by leeway and yaw angle.

Surface friction: A vessel moving through the water carries with it a body of water called the boundary layer. The water in the boundary layer travels in the same direction as the ship but at varying speeds. Next to the hull is a very thin layer, the laminar film, which clings to the hull and moves at the same speed as the boat. This laminar film is only a few thousandths of an inch thick, thinner than the roughness of normal paint. Outside the laminar film the speed of the boundary layer decreases the farther away the water is from the hull until, finally, all forward motion ceases at the outside of the boundary layer.

The thickness of the boundary layer increases from bow to stern. At the stem it will be nothing and will build up toward the stern to as much as 4 to 12 inches thick, depending on the size

of the yacht, and 24 inches thick on a 400-foot ship.

Outside the laminar film, the motion of the water will be one of two types: laminar or turbulent flow. Laminar flow is an extremely smooth flow and has very low resistance, but it occurs only at very low speeds on extremely polished surfaces, such as the centerboard

of a small racing dinghy in a drifting match. Indeed, it is unlikely to occur at anything above drifting speeds. It does occur on tank models though, due to their small size, so to obtain more realistic results, the models are given sand strips or studs on their leading edges in order to duplicate the turbulent flow of the full-size craft.

Frictional resistance is produced by the turbulent flow in the boundary layer and is the main source of resistance at low speeds. As speed increases, the vessel begins to make waves, and these become a larger and larger part of the total resistance until, finally, the vessel begins to plane. Then the wave generation is reduced and surface friction again becomes the primary source of resistance.

A smooth bottom is essential to reduce the penalty of frictional resistance and on many racing yachts, both sail and power, the hard epoxy bottom paint is polished to a mirror-like finish. Sailing yachts also have their surface areas reduced by using fin keels, and high-speed powerboats by stepped

hulls. Most lower-speed motor yachts can, generally, ignore frictional resistance as they have an excess of power, but a smooth bottom is still desirable. A further point: frictional resistance per ton of displacement is reduced as the displacement/length ratio decreases.

Appendage resistance: This actually results in wave making, but it is created by specific items of hardware that cause eddies and turbulence, such as shafts, struts, water scoops, echo sounders, speedometers, and so on. Propeller apertures in sailing yachts are a prime source of turbulence, as is the propeller when the yacht is under sail. Folding or feathering propellers can reduce this to a large extent. In motor craft, shaft struts should be, ideally, 1.5 inches per knot of speed ahead of the prop, but this is almost impossible to achieve except with custom-designed struts. Any deadwood should be well faired and cut away as much as possible, of course. Leading edges of fins should be free of fittings, as any bump

*“Propeller apertures
in sailing yachts
are a prime source of turbulence,
as is the propeller
when the yacht is under sail.”*

there acts like the ice on the leading edge of an airplane wing, creating serious turbulence.

Through-hull fit-

tings, such as water intakes, should be eliminated where possible by grouping or manifolding them and should be set flush with the hull. Toilet outlets can be faired with a neoprene flap that closes the hole when it is not in use. Rudders on sailing craft, if attached to a full keel or skeg, can be faired by having the gap closed off with a phosphor bronze fairing

plate, fastened to the hull and overlapping the rudder.

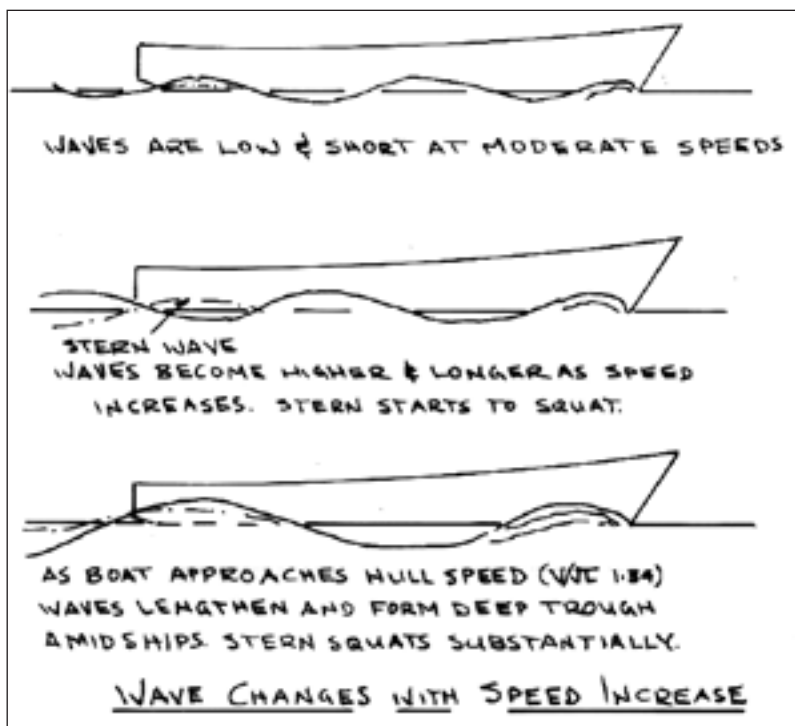
Wind resistance:

This is a negligible factor in motor yachts at speeds below 35 to 40 knots and always makes me wonder why so many of them are styled like ugly rocket ships. It can be a serious problem with sailing craft due to the great combined area of the mast, halyards, shrouds, stays, and so on, as well as the effect the wind eddies from these may have on the wind flow over the sails.

This is applicable only when the yacht is sailing to windward, of course. When sailing downwind, every square inch of this area contributes to thrust. With wind abeam the action of the wind on the rig does not add greatly to resistance to forward motion but does contribute to heeling and leeway.

To reduce wind resistance, internal halyards are common on yachts today, but they are an abomination on a bluewater yacht in my opinion. Internal halyards are difficult to inspect and even more difficult to replace at sea. High-tensile rod rigging is used to reduce the diameter of the shrouds and stays as well.

Wave-making (residual) resistance: A hull traveling through the water creates a pressure system below the surface that creates waves at the surface. The wave making, or residual, resistance of the hull is the energy lost



“To reduce wind resistance, internal halyards are common on yachts today, but they are an abomination on a bluewater yacht in my opinion.”

in forming these waves. The waves created by the hull are similar to those caused by the wind and are described as trochoidal waves.

As the energy that makes the waves is produced by the boat, it is obvious that the size and length of the waves determines the amount of energy that must be used; the larger and longer the wave, the more power that is taken from the vessel. The length is deter-

mined by the speed of the craft, and the size or depth is determined by the displacement; thus, residual resistance is basically determined by the speed and bulk of the hull.

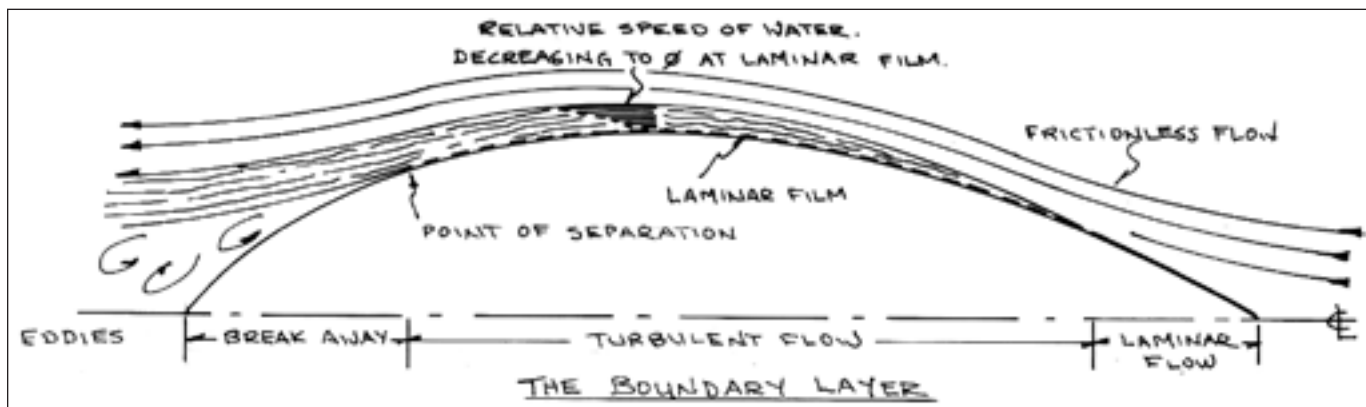
Speed: Residual resistance is small at speed/length ratios below 1.0, but above this it increases rapidly at more than a square ratio up to a velocity/length of 1.6. Then a properly designed planing hull will start to lift and the residual resistance will begin to drop, decreasing fairly quickly to velocity/length 4.5 and then leveling off. Obviously, one means of lowering resid-

ual resistance when designing a yacht is to reduce the speed/length ratio by spreading displacement over as long a hull as possible.

Displacement: Since displacement is also a prime factor in residual resistance, it is apparent that reducing the displacement/length ratio by spreading the displacement over a longer hull will benefit both the displacement and speed factors. Reducing dis-

placement will, of course, reduce the resistance of a displacement hull at any given speed.

Still, to be effective in reducing resistance, the displacement must be properly distributed as well, and that's where the prismatic coefficient (C_p) enters the picture. At a speed/length ratio of 1.1, the residual resistance of a typical planing hull with a C_p of 0.7 will be about 4 times that of a similar-



sized hull with a C_p of 0.5.

Eddy-making and separation:

Eddy-making is a part of residual resistance caused by a failure of the water flow to close in at the stern. If we put

a flat plate crosswise to a stream, most of its resistance will be from eddy-making due to the main stream of the water passing clear of the plate and leaving an area of low pressure behind it in which whirling eddies form and absorb energy.

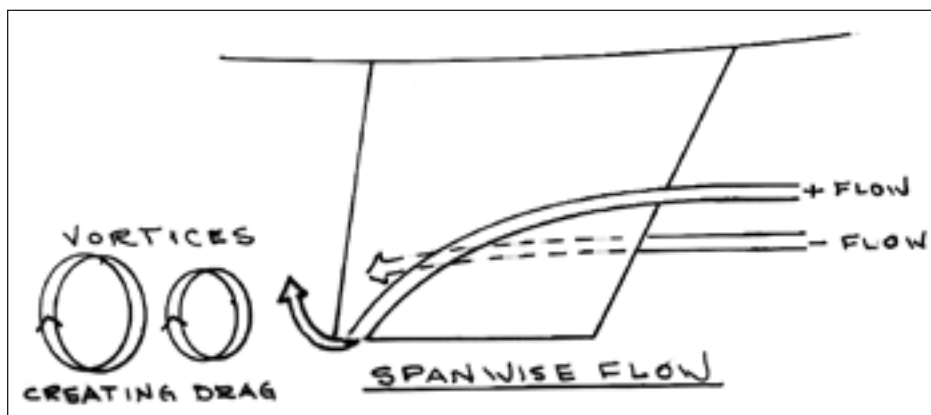
In vessels, eddies are formed by the distortion of the water flow by the boundary layer, separating the main stream of water from the hull and causing pressure variations which result in eddies at the stern. It is generally considered that the separation occurs at the point where the lines of the hull are at a 15-degree angle from the water flow.

Obviously, the transom of a planing hull, at 90 degrees to the water flow, creates huge eddies when the vessel is traveling at low speed, as does a submerged transom on a sailing yacht. However, eddy-making is primarily of importance to slow-speed craft, sailing yachts, and large ships operating in the lower velocity/length ratios. The shape of the stern determines the amount of eddy-making resistance, and designers have attempted to reduce separation by moving the 15-degree point aft, through the use of bustles and filled-out after-body sections.

Heel angle: A sailboat is also subject to increased residual resistance when she heels under sail. Once she heels, the underwater lines of the boat are no longer symmetrical, and this creates additional wave making. The increase can be substantial.

Heel Angle Degrees	Max. Resistance Increase
5	1%
10	2%
15	4%
20	7%
25	13%
30	24%

Induced drag: The sailing yacht also suffers from induced drag due to leeway and yaw angle. Leeway is the sideways slippage of the yacht due to



long a waterline and as light a displacement as possible.

- Residual resistance can be reduced by using the proper prismatic coefficient for the expected speeds.

- Vessels designed for velocity/ length

of 1.0 to 1.5 should have as small an angle of entrance as practical and this fine entrance should be carried above the LWL for some distance.

- At velocity/length above 1.34 the vessel has left the stern wave behind and is beginning to ride on the aft slope of the bow wave. A flat stern with generous width is desirable to prevent squatting and should become wider, flatter, and more immersed at rest as the speed increases until a full planing-type hull is evolved at velocity/length 2.2 and above.

- It must be noted that, at displacement hull speeds, a slightly high C_p creates less resistance at low speeds than a too-low C_p creates at high speeds. A sailboat with a high C_p , say 0.55 to 0.57, will still perform well in light winds if she has a low wetted surface. However, a sailing yacht with the same wetted surface and too-low a C_p , say 0.52 to 0.46, will be penalized by greatly added resistance in strong breezes and would gain only slightly in light air.

For further reading: *The Sailing Yacht* by Juan Baader.

Point to Ponder: If water were much thicker, we wouldn't be able to drive a boat through it economically. If it were much thinner, the normal ocean winds would create huge waves and travel by sea would be impossible. Those who created the world must have done their arithmetic!

Ted designed scores of good old boats ... the ones still sailing after all these years.

If the abbreviations used here seem confusing, refer to Brewer by the Numbers, July 1999, posted at <www.boatus.com/goodoldboat/brewerformulas.htm> or request a reprint for \$2.50 from Good Old Boat.

“Leading edges of fins should be free of fittings, as any bump there acts like the ice on the leading edge of an airplane wing, creating serious turbulence.”

the wind force on the sails. Yaw angle is the effect created by the yacht moving through the water at a slight angle to the flow and is caused by leeway. The induced-drag increase, as a percentage of pure wave-making resistance, is extremely high.

Leeway Angle Degrees	Resistance Increase
2	14%
4	34%
6	56%
8	80%

A point to note is that an angle of leeway as small as 4 degrees cannot usually be achieved by the average cruising yacht when beating to windward. In all probability, most typical cruising yachts are sailing at leeway angles of 5 or 6 degrees, and some of the cruder designs, like the famous Tahiti ketch, at angles of 8 degrees and more! There is also induced drag on the sails caused by leeway, and this will reduce the forward thrust.

Points to note

Hull design for minimum residual resistance:

- Hulls designed for velocity/length ratios below 1.0 derive most of their resistance from friction and can economically afford a higher displacement/length ratio than faster craft.
- As speed increases to velocity/length 1.0 to 1.5 it is desirable to have as

Stanchion repair

Bent stanchions and delaminated decks

WHEN WE WERE UNLOADING OUR boat following a recent week-long cruise, I noticed the midship stanchion on the port side was slightly bent toward the stern. It was about an inch out of plumb at the top. While docking in gusty conditions, the stanchion had taken the weight of the boat, and something had to give. When I examined it closely, I discovered that the stanchion was bent and the deck under the stanchion was flexing. Clearly there was also structural damage to the deck. Repairs were in order.

A bent stanchion requires replacement or straightening. In this case, it was possible to have it straightened. Removing the stanchion required access to the backing plate, nuts, and lockwashers holding it. I had to remove an overhead panel below the sidedeck. Another approach would have been to cut a hole in the panel slightly larger than the stanchion base and patch it after the repair was finished. The structural repair to the deck area under the stanchion was much more involved.

As a general rule, boats built before the days of modern composites and high-tech layup techniques are overbuilt. An exception to this rule, however, is in the area of deck reinforcement in high-stress areas. Where holes were drilled to mount hardware and stanchions in a balsa-cored deck, it's quite possible that moisture has invaded the core. Even if adequate bedding com-

pound was applied, the hardware will have worked under stress, and moisture may have invaded the core, resulting in delamination.

Dry below the stanchion?

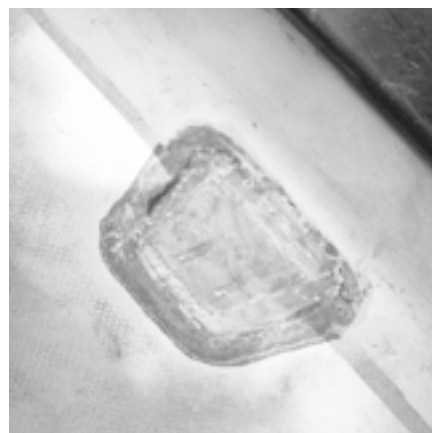
Once I had removed our bent stanchion, I examined the damage to the deck area. I was faced with two possible approaches to the repair, depending on the condition of the balsa core under the stanchion. If the core was dry and sound, the area around the mounting holes could be repaired. This involves putting a bent nail in an electric hand drill and enlarging the area in the balsa core around the holes. Do not enlarge the holes in the top or bottom laminates.

Once the debris is cleaned out, you can begin strengthening the area. Cover

can drill new holes and remount the stanchion. Don't forget to use bedding compound.

Wet under there?

However, if the impact caused the deck under the stanchion to delaminate

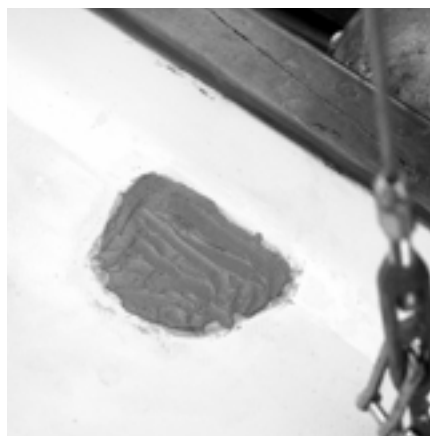


from the balsa core, or if the core has absorbed moisture, more extensive repairs are necessary. The most satisfactory way to repair the deck under a stanchion when the balsa core is wet is to replace the core under the stanchion.

Placing the stanchion over the existing holes, outline the stanchion base with a felt tip pen. Next, using a Dremel tool, remove the top laminate by cutting around the outline. When the laminate has been removed, dig out the wet balsa core material, digging back under the edge of the laminate around the hole. Try to dig back to dry balsa. Clean out the area of the debris and allow the area to dry thoroughly. There are several ways to hasten the drying:

- Use a hair dryer to blow in the cleaned-out area, being careful not to use too much heat.
- Cover the area with plastic, held in place with duct tape, and cover the holes under the area with duct tape. Cut a hole in the plastic and insert and tape the nozzle of a shop vacuum cleaner to the plastic. Now turn the vacuum on and allow it to draw out the moisture from the core material. Be careful not to overheat the vacu-

by Norman Ralph



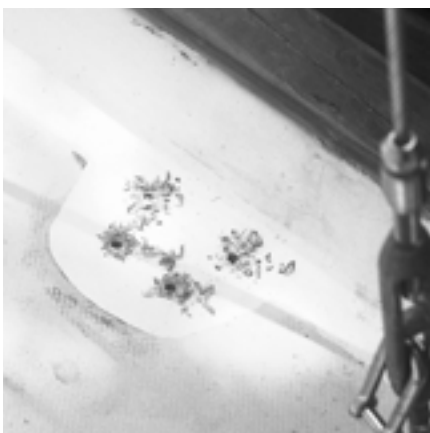
the holes below deck with duct tape. Mix up a small quantity of epoxy resin/hardener and add some high-density filler. Mix this to a mayonnaise consistency. Using a plastic syringe (available where epoxy materials are sold), inject this mixture into the holes from above, filling the voids completely. This mixture will bond to the surrounding core area and add structural strength while it seals the core from any moisture. When the mixture has hardened, the surface can be sanded smooth. Remove the tape from the bottom holes. Now you



um cleaner motor.

- Flood the area with denatured alcohol. The alcohol will absorb the moisture and when the alcohol evaporates, the moisture will evaporate with it.

You can use any or all of these, but be careful that the alcohol has thoroughly evaporated before using either the hair dryer or the vacuum cleaner to avoid any risk of the alcohol igniting from the heat of the dryer or



the sparks of the vacuum cleaner motor.

When the area is dry, cut a piece of marine-grade plywood the same size as the cut-out hole in the laminate. The plywood should be slightly thinner than the core material removed. You can use exterior grade plywood, but be sure there are no voids in it. Cover the holes in the bottom laminate from below with duct tape. Mix a small amount of epoxy/hardener. The amount to mix will depend on the air temperature and pot life of the mixture. Using an acid brush, thoroughly wet out the repair area, making sure the edges of the balsa core material are saturated with the mixture. Wet out the piece of plywood to seal it from moisture.

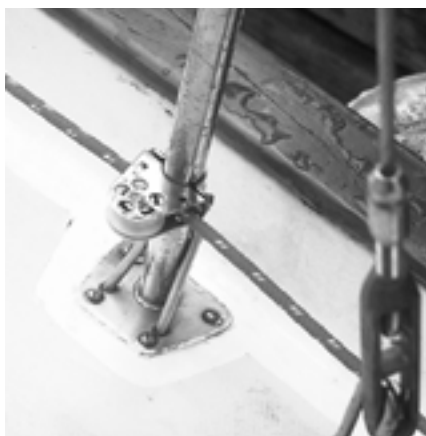
Pour it in

Mix some more epoxy and add some high-density filler to make a mayonnaise consistency. Pour some of this into the repair area and spread it evenly to about a quarter of the depth of the area. Force the piece of plywood into the area, displacing the epoxy putty into the area beyond the edge of the hole under the top laminate. The top of the plywood should be below the bot-

“If the impact caused the deck under the stanchion to delaminate from the balsa core, or if the core has absorbed moisture, more extensive repairs are necessary.”

tom level of the top laminate. Using a plastic syringe, inject the epoxy/putty mixture into the area around the edge of the plywood to fill any voids under the top laminate. Cover the top of the plywood with the mixture but only to the bottom level of the top laminate.

When the epoxy mixture has hardened, grind the edge of the hole with a pad sander and 80-grit sandpaper. Grind the edge on a bevel back about 1½ inches from the edge of the hole. This will give an approximate 1:12 ratio (⅛-inch thickness of the laminate to 1½-inch bevel). Now cut a piece of fiberglass cloth the size of the outside of the beveled area around the hole. Next, cut more pieces in decreasing sizes down to the size of the hole in the deck. The combined thickness should




total the thickness of the top laminate or slightly less. On a piece of plastic, such as a heavy garbage bag, wet out the pieces of fiberglass cloth with an epoxy/hardener mixture. Starting with the largest piece, first wet the cloth using an acid brush and a spreader. Place the next smaller piece on top of the previous one until all the pieces are stacked and saturated, with any excess squeezed out with the spreader. Now wet the bevel and hole area with the epoxy mixture and lay the saturated cloth over the hole, largest piece

down. This is important because if the cloth is damaged during the final finishing and sanding, the largest piece, which ties the whole patch together, will not be compromised. The layers of cloth should bring the surface of the patch slightly lower than the level of the surrounding deck. When

the epoxy has hardened, the area can be lightly sanded and leveled with a mixture of epoxy/hardener and a fairing filler such as micro-balloons. After that has cured, the area can be sanded smooth. I painted my repair with one-part polyurethane to match the color of the deck.

Replacing the stanchion

I was now ready to reattach the stanchion. I placed it in its proper location and marked the location of the four mounting holes on the deck. I then placed the stanchion aside and drilled the holes in the deck. The bolt size was ¼ inch, and I drilled the holes ⅜ inch in diameter. I then covered the below-deck holes with duct tape and, using the syringe, filled the holes from above with a mixture of epoxy/hardener and high-density filler. This added strength to the area and sealed the plywood core from any moisture should the bedding compound later fail. When the epoxy mixture had cured, I drilled the holes again to ¼-inch diameter and installed the stanchion with a bedding compound and the backing plate below. The resulting repair left the deck under the stanchion much stronger than when the boat was new.

A few closing notes and instructions: Use latex gloves when using epoxy. Over a period of time you can develop an allergy to it. Also, be careful not to breathe epoxy dust when sanding. Use a mask and goggles. The same techniques can be used to repair or strengthen the cored laminate under other deck hardware such as winches, halyard clutches, and cleats. It is not only possible to repair your boat, but to make it stronger than new. 

A Compac 16 hooked Norman in 1986. Now he and his wife, Jeanette, sail a Valiant-32 in Louisiana.





Electric *Rainbow*

Auxiliary motor borrowed from a fork-lift truck; batteries from golf carts

It was the kind of day that couldn't figure out if it wanted to rain, be foggy, or grow dark. *Rainbow's* skipper, Steve Cooper, assured us that in any case we would be comfortable on our trip across San Francisco Bay from Alameda to the Bay View Boat Club on the western shore. He was right.

Steve is not one to be stranded in shallows of convention. He seems the sort to go wholeheartedly where his technical musings may take him. After he skillfully backed his Rawson 30, *Rainbow*, out of her slip, he handed the helm to me and began to explain the rationale that led him to convert from gasoline to electric propulsion. I don't know that I believed a word of it.

He explained that the original gasoline engine had a faulty water pump and was inclined to leak oil into the bilge. He'd made some repairs and eventually converted the little four-cylinder Palmer Marine engine to run on compressed natural gas. He said the fuel tanks were heavy to haul around, the water pump could still fail again, and the oil leak remained. Thus he removed the engine and installed an electric drive.

I don't know Steve very well, but I was not taken in by his story. By the

time we'd crossed the bay, I was certain that Steve was the kind of guy who could have changed a water pump or two and fixed an oil leak without much fuss. We were talking about repowering *Rainbow* with an electric drive as if it were the logical solution to the problems the gas engine offered. What I sensed and saw, however, made me think that *Rainbow* had been repowered to all-electric for the sheer novelty of it all. It was where his technical musings pointed, and Steve was not afraid to go there. As near as I can tell, he pretty much got it right, too.

Heavy displacement

The Rawson 30 has a hefty 12,000-pound displacement, and carries a full keel with the two-bladed prop turning in an aperture cut in the front of the attached rudder. The original configuration had 5,000 pounds of ballast, but Steve removed 700 pounds of concrete and iron punchings from the keel and the 400-pound engine and marine gear before adding 1,300 pounds of batteries.

The innovative system uses 6-volt golf-cart batteries, 22 of them housed in three locations. Four of these — wired two in series, and the two pairs in parallel — make up the 12-volt house circuit. The house circuit powers a 1,500-watt inverter that supplies power to 115-volt AC loads. A 15-amp battery charger allows the system to be recharged from the marina AC shore power.

The propulsion system is three banks of six batteries wired in

Steve Cooper and his electric-powered Rawson 30.

series to give 36 volts, with all banks wired in parallel to each other. There are a total of seven solar panels in the system. One charges the house battery bank, and six charge the drive system bank. A DC-to-DC converter allows the six-panel array to assist in charging the house bank by converting the nominal 36-volt input to a nominal 12-volt output.

Initially Steve controlled the 8-hp, series-wound fork-lift truck motor with on/off and reversing contactors. He later added a pulse-width-modulated motor controller that allows him to vary the speed of drive. With just contactors, the motor was either off or at full power. In final form, a small device called a "pot-box" is held in the helmsperson's hand while maneuvering. With one hand on the tiller, Steve used the other hand to adjust motor speed and direction while maneuvering in his marina and at our destination across the bay. He made it look easy.

Same propeller

The fork-lift truck motor is mounted above and ahead of the prop shaft, which has its own inboard axial and thrust bearings. Power is delivered to the shaft with a 2.5:1 two-inch wide cog-belt drive. The boat uses the same two-bladed prop that the gas engine turned.

In our trips across the bay, we motorsailed with the mainsail up in

Continued on Page 77



Electric power: What you can expect

Should there be an electric drive in your boat? That depends entirely on your pattern of use and how much value you place on silence and novelty.

For most sailors, the most sensible and cost-effective engine you can have in your boat is the one that is in there already. If extensive repairs are needed, the corollary is that the easiest engine to put in as a replacement is one like the engine you are removing. You know it can be made to fit and function, and the lowest labor cost, (yours or the yard's) will be obtained. On the other hand, if the engine you are taking out is not available anymore, or the spares for it are absurdly expensive, alternatives are in order.

If you find yourself at that point (as we did a few years ago) there are many alternatives to consider, and an electric drive is certainly one of them. A very modest propulsion system will get you out of your marina in good weather. More power will be needed to deal with high winds and large waves. In heavy weather, inboards are better than outboards because the prop tends to stay in the water more of the time. More horsepower is also needed in heavy weather if you are powering into the seas.

In the areas of reserve power for heavy weather, cruising range, and speeds near hull speed, electric drives are not the best choice. Amid the hype that sometimes surrounds electric propulsion is the notion that you don't need as much horsepower if the drive is electric. Years ago there were pundits who said that diesel horses were larger than gasoline horses. Actually, horsepower is horsepower, and the prop and shaft do not know or care what kind of device is turning them.

Little loss of speed

Any boat can be repowered with a smaller engine, and in most cases the maximum flat-water speed will diminish by far less than the percentage of maximum rated power lost. This is because the power required is an exponential function of boat speed. Also, if the larger engine was sized to supply good speed in high winds and large waves, it will be oversized for flat-water work and will take a sailboat to hull speed at part throttle.

In addition to oversizing diesels for adverse weather, there were years when the most common engine in the recreational sailing fleet was the venerable Atomic 4. For reasons of convenience and availability, this 30-hp engine was installed in boats that could never hope to use half that much horsepower even in the most adverse conditions. Designers knew this and equipped these boats with direct-drive transmissions and small props. Diesels of half that rated horsepower were fitted in the same boats with no loss of performance, contributing to the myth that diesel horses were bigger.

Steve Cooper replaced a four-cylinder 20-hp gasoline engine with a fork-lift truck motor rated at 8 hp. The boat will probably no longer go at hull speed but can still make perhaps 85 percent of hull speed in flat water and calm

winds. There will be no reserve for adverse conditions. At the full 8 hp, the electric drive has a very short range. It does better with the input to the motor reduced, to make perhaps 65 percent of hull speed. Much greater efficiency is needed because it is simply not possible to store very much energy in lead acid batteries. In *Rainbow's* case, 1,300 pounds of batteries will drive the boat about 32 miles at 4 knots. In a very rough comparison, 14 pounds of gasoline would also drive that boat 32 miles at the same speed, and about two-thirds of that weight would be needed in diesel.

Good mileage

On our vacations, Karen and I don't plan on being able to refuel for as much as three weeks at a time. We carry 32 gallons of diesel, and because of a very fine engine turning a very specialized prop, we can hope to get 365 miles with no reserve from that fuel load. These are observed numbers from previous vacations.

An electric drive is cleaner if one considers only the atmosphere close to the boat. If the method of recharge is considered, however, electric drives are only significantly cleaner than alternatives if recharged with solar cells, wind generators, or regen-

eration. No method of recharge is particularly fast, but solar cells, wind generators, and regeneration are significantly slower than a high-capacity dockside charger. (These get their energy from a power plant, of course, which is the ultimate limiting factor on how clean the process is.)

We've seen some pretty strong claims associated with regeneration. The large three-bladed props recommended for regeneration will hurt boat speed, and several hours of this slow sailing will be needed to get one hour of electric motoring. In a hobby where a fast boat is slower than a slow bicycle, it is hard to give up any speed, and the guys I used to race with would have paid almost any price for half a knot.

The economics of fuel usage are probably not a consideration in most cases because most sailors don't buy very much fuel in a year even if they use their boats a lot. While Steve installed his electric drive for a little less than the cost of a suitable small diesel, other electric drives are extremely expensive compared to gas and diesel engines. These drive costs would, in most cases, make a payback on avoided fuel costs very slow indeed.

Without question, electric drives are the quietest and smoothest way to power a boat, short of raising sail. At the current level of technology, they have extremely short range compared to other drives and, in most cases, they will lack a bit of speed and will have very little reserve power for high winds and large seas. But they are the only drives available that are truly almost as quiet and vibration-free as the sailing experience itself.

You pays your money, and you takes your choice. 

Jerry Powlas is technical editor of Good Old Boat.

Silence and simplicity vs. short range and expense

The electric option

Boats often outlast some of their mechanical components, such as their auxiliary engines. If you own a 20- or 30-year-old boat, you may be considering a new motor for her. There are many options available, ranging from going without an engine to having a new diesel professionally installed. One of the more intriguing possibilities is the electric option.

A few years ago, electric propulsion was limited to small, low-speed launches and canoes

or represented by small electric trolling motors used on bass boats. Today, a dozen or more companies produce electric-powered boats, and at least three companies offer electric auxiliaries suitable for use in cruising sailboats up to 30 feet. A few people are installing electric motors in considerably larger cruisers, often in combination with a diesel generator to extend range. An ultimate example of such a hybrid is the 100-passenger electric catamaran ferry, *Solar Sailor*, that operated in Sydney, Australia, for the summer Olympics.

While larger electric auxiliaries for cruising sailboats and their associated battery banks are not as cheap as a do-it-yourself installation of a rebuilt inboard engine, they are approaching the cost of a new diesel installed by a paid mechanic. For a small daysailer, an electric trolling motor can be a cost-effective and quiet alternative to a new small outboard.

Electric-powered boats are hardly a new idea. Some of the earliest small low-speed launches of a century ago were electric. But as gasoline engines became more powerful, lighter in weight, and more reliable, the graceful electric fantail launch slipped away into technological obsolescence, its smooth slow way across the water losing out to speed, power, and noise.

Leisurely progress

But a certain segment of the boating population still enjoys the quiet, leisurely progress of a displacement hull, and that is the market that has led to a revival of interest in electric motors as a primary or auxiliary power plant. Compact Yachts, in cooperation with The Electric Launch Company, is even offering an optional electric auxiliary on new sailboats up to 27 feet. These are being sold as the Windborn line.

tion with my two-cylinder Universal Blue Jacket Twin. For those who tackle mechanical issues reluctantly, fewer components is a definite plus as is the smooth silent power delivered by an electric auxiliary at the push of a button.

But electric power for boats also has shortcomings. Primary among these is the limited storage capacity of today's lead-acid battery. One builder states that its minimum criterion for its 22-

foot low-speed launches is that they have an endurance of eight hours running time at 6 knots. A number of other installations give less than that: typical is five to six hours, or 40 to 50 miles of range at a speed of 4 to 5 knots. For those who mostly daysail, this is probably adequate, especially if they can supplement battery charging through solar or wind power. Several companies offer extra onboard charging through solar panels or by adding a generator to the installation to make the boat a diesel/electric hybrid.

Not fast and not far

When considering electric propulsion for larger cruising monohulls in the 25- to 30-foot range, it is important to be realistic about expectations. These auxiliary drives are smooth

and quiet, but they are not generally as fast as gasoline or diesel engine drives, and the technology is simply not available to enable them to have the range of a diesel drive.

A good way to evaluate alternative drives in terms of their range is to add up the weight of all the machinery and the weight of the fuel needed to move the vessel a given distance. The distance is the key to this evaluation. Among internal combustion engine options, for example, if the desired range is extremely short, the lightest drives (engine plus fuel load) are two-cycle outboards, followed by four-cycle outboards, then gasoline inboards, and

by *Susan Peterson Gateley*



Rainbow's bilge, the stern at the lefthand side of the photo. On the facing page, the electric Rawson 30 owned by Steve Cooper.

The biggest attractions of an electric auxiliary are probably its lack of vibration and noise, and its reliability. Once installed, the system is simple to operate. Solomon Technologies representatives claim to have only eight moving parts in their motor, and they tout the reliability because it was the power source for the Mars Rover. Other electric motors have only one moving part. Electric drives have no water pump, no transmission, no muffler, no starter Bendix, and no fuel pump to go wrong...all components that at one time or another have given me a lesson in on-the-spot troubleshooting and maintenance during a 17-year associa-



An electric auxiliary motor is smooth, quiet, and reliable, but . . .

finally diesel inboards. This order is established because the horsepower-per-weight of engine machinery is the significant factor.

As longer distances are considered, the order will exactly reverse, with the diesel drive being the lightest and the two-cycle outboard being the heaviest. In both evaluations the weight of machinery (engine, marine gear, shaft, prop, and bearings) is added to the weight of tanks and fuel. As the range is extended, the weight of the propulsion system will begin to be a significant part of the weight of the craft. This is well understood in the case of military and commercial aircraft operations, for example, where fuel load displaces payload to achieve maximum range.

To some degree it is possible to trade speed for range, and it is common for the designers of electric drives to do this to improve range. A displacement monohull traveling at hull speed requires much more than twice the horsepower needed to travel at half of hull speed. By sizing the motor in the drive for 70 to 80 percent of hull speed, the range of a boat can be extended.

Very short range

Also in favor of the electric drive is the efficiency of the motor and battery in converting stored electrical energy into mechanical energy at the prop shaft. The motor/battery combination is more than twice as efficient as a small marine diesel. In spite of these factors,

the range of an electric drive is extremely short when compared, pound for pound, with any of the other internal-combustion engine drives.

The problem lies in the storage battery. The energy density of batteries is extremely low. Calculations may vary depending on what factors are included, but in rough numbers — taking the usable storage capacity of an AGM battery as 30 percent of its rating — it takes

53 pounds of batteries to store the energy that a diesel engine can extract from one pound of diesel fuel. With factors of over 50:1, electric drives simply cannot be expected to achieve the range of any of the other engine options. While a four-ton monohull with a modern diesel and a 20-gallon tank can easily go 200 miles in average conditions, an electric drive in the same boat will be very hard-pressed to go 50 miles.

More batteries may be added to extend the range of an electric-drive vessel, but the weight added will quickly become significant enough to influence the characteristics of the vessel, including the amount of energy needed to move it a given distance.

Deep-cycle batteries can withstand an occasional draw down in excess of 50 percent, but recommended practice is to limit discharge to 50 percent of rated capacity and to consider the batteries recharged when they reach 80 percent of capacity. It will not hurt them to recharge to 100 percent of

capacity; in fact it is good for them. But the charging rate drops off as the batteries are brought up to full charge, so the recharge time is extended greatly when they are brought to 100-percent recharge.

Extending endurance

For this reason, electric boaters who need gasoline- or diesel-engine-class range should investigate the cost of a supplemental onboard generator, so they can operate as a diesel/electric to extend endurance. While a small generator won't deliver the power that a 10-hp diesel will, its engine is able to operate at its most efficient rpm while generating current. So, at least in calm water, it'll do fairly well. Extending range with a generator also gives you supplemental power for such amenities as onboard refrigeration, but it comes with a hefty price tag.

One of the most intriguing electric auxiliaries using supplemental onboard charging is the Electric Wheel, sold by Solomon Technologies. The Electric Wheel, originally designed for automotive use, takes advantage of regeneration technology. Originally installed as a drive motor on each car wheel, it acted as a generator during braking to feed power back into the battery bank. Solomon Technologies adapted this capability to use some of the wind energy collected by a boat under sail to regenerate. As you sail along, the prop drives the shaft that then runs the motor as a generator to produce current that goes back into the battery bank. Solomon Technologies' owner, David Tether, claims that the motor will start feeding power back into your batteries when the wind gets up to five knots. Sailing along near hull speed, he estimates you'll reap about an hour's-worth of running time under power from three hours of charging under sail.

Increased drag

There is, of course, no free lunch. A price must be paid in the form

Resources

Books:

Electric Boats, the Handbook of Clean Quiet Boating, by Douglas Little (International Marine).

On the Internet:

Electric Boat Association of the Americas: <<http://www.electricboat.com>>. Links to many builders and sites.

Electric Launch Company, 261 Upper North Road, Highlands, NY 12528; 845-691-3777; <<http://www.electriclaunch.com>>.

Solomon Technologies, P.O. Box 314, 7375 Benedict Avenue, Benedict, MD 20612; 301-274-4479; <<http://www.solomontechnologies.com>>.

of increased drag. John Finnerty, of Solomon Technologies, estimates that drag will reduce your speed under sail perhaps $\frac{3}{4}$ knot while your batteries are charging. But once they're topped up, you can eliminate the drag by letting the motor kick in to give you a boost. Since it runs quietly and smoothly, you probably won't even know it's on. A side benefit of an installation of this type for those sailing on long passages is that the ocean cruiser can enjoy a generous supply of juice to power the watermaker, stereo, beer cooler, and electronics without running an engine for charging.

Another option that works for smaller boats only is to use solar power from photovoltaic panels for supplemental charging. A small daysailer could get an hour or so of running time from a week's-worth of charge from a 20-watt panel. However, larger battery banks and more powerful systems will gain little more than a trickle charge from small solar panels.

Regardless of configuration, all electric power plants consist of a motor, a battery or bank of batteries, and a controller to regulate the current to the motor. Most large installations also include an e-meter that provides information on how much running time you have left in your batteries. Motors range in size from little trolling outboards operating off a single deep-cycle battery to units large enough to push a 48-footer.

The simplest and least expensive motor is the ubiquitous trolling motor seen on bass boats everywhere. They come in 12- and 24-volt sizes. A 24-volt motor will generate 65 to 70 pounds of thrust, enough to power a Catalina 22-sized boat at near hull speed in flat water. A marina neighbor of mine clamped a small 30-pound thrust outboard onto the transom of his 2,000-pound daysailer. The little motor, with a single deep-cycle battery, pushed his 19-footer in and out of the dock and got him back after he was becalmed a mile or two from home port. He didn't go very fast under power, but he said it was faster than he could paddle.

Self-sufficient

That size motor probably cost him about \$250. For another \$200 you could add a 20-watt solar panel to make your boat self-sufficient... at least for short runs. A couple of companies offer a refinement on the electric trolling motor in the form of a sterndrive system suit-

able for a catamaran or a 20- to 25-foot monohull. These use 24-volt motors and reduction gearing so they can swing a larger prop. A unit made by Sillette-Sonic, of Britain, claims to be powerful enough to replace a 10- to 15-hp internal-combustion engine. With four batteries, Sillette-Sonic will give about six hours of cruising time.

In addition to being very simple to install, one advantage of transom-mounted electric trolling motors is that they leave more room in the cockpit of a small boat. The motors are also considerably lighter than a comparable inboard electric installation of similar power. But boats bigger than 22 feet will probably require a more powerful auxiliary electric motor. And most small trolling motors are direct-drive and so turn a small prop at a fairly high speed, which is not optimal for pushing a larger heavy-displacement hull.

Most companies selling electric boats recommend absorbed glass mat (AGM) type batteries. These are sealed, maintenance-free batteries well suited to repeated deep discharge and recharge cycles. Sealed batteries eliminate any possibility of explosive hydrogen gas buildup, and they can be mounted on their sides, giving more flexibility in locating them in odd corners of the hull for optimum space and weight use. AGM-type batteries also lose charge more slowly than do conventional flooded batteries.

Replacing batteries

The big dollar drawback to electric installations, though, is battery life. Most manufacturers estimate well-maintained lead-acid batteries will last about five years. The cost of new deep-cycle batteries will buy quite a lot of maintenance, filters, diesel fuel, and other odds and ends for your internal-combustion system. Still, for some situations, electric auxiliaries may be worth the price. Andre Dionne, of the Electric Launch Company, claims that if you amortize the cost of the batteries over their lifetime, the cost per trip becomes competitive with many diesel or gasoline-powered auxiliary installations.

Most of Solomon Technology's installations employ two of their smaller model motors, one in each hull. The shared batteries can be placed where they do the least harm to trim.

As described in an article reprinted from *Multihulls* magazine posted on the company's Web site, Solomon recently replaced two 25-hp outboards on a

43-foot cruising cat weighing 16,000 pounds with two 6-hp motors and two 18-inch diameter, 14-inch pitch props. This boat generated 5 to 7 amps sailing in a 15-knot wind and after an hour replenished all the power used during her 20-minute passage under power to open water. The propeller change also improved low-speed maneuvering, her owner reported.

Other applications

Solomon has also installed electric auxiliaries in a number of 30- to 35-foot monohulls. One recent installation was a 10-hp motor (and supplemental generating set) aboard a 48-foot Cherubini as a replacement for a 65-hp Perkins. In early 2001 the boat was preparing to get underway from England to cross the Atlantic with her new plant. Solomon offers two models of its Electric Wheel, which the company claims will repower boats up to 12 tons displacement.

John Finnerty first got acquainted with the company when he was considering re-powering his Cal 29 after its diesel died. His typical sailing routine included a 30-minute trip under power out onto the open Chesapeake Bay for a daysail, and he liked the idea of a quiet reliable auxiliary that wouldn't object to frequent short runs. He put a 6-hp motor in his sloop and was so happy with it that he started selling Electric Wheels to other sailors.

The Electric Launch Company, of Highlands, New York, is another manufacturer that retrofits older sailboats with electric propulsion. A typical recent installation described on the company's Web site was that of a 4-hp, 48-volt motor with four 4D AGM batteries in series, for a 26-foot sloop. This was a replacement for a 7.5-hp diesel. The company claims it gave the boat a range of five hours at 7.4 knots. As with the Electric Wheel replacements, The Electric Launch Company's Andre Dionne says you may have to replace the prop and/or shaft as part of the installation. Most of the electric motors ELCO uses operate at around 1,700 rpm, less than some diesels, even with 2:1 reduction drives, and they will be more efficient with higher-pitch props.

Whether to repower with the electric option is a decision we're going to try to defer by keeping our Atomic 4 chugging along for a few more years. But the appeal of some new technology that is truly "green" is undeniable, and we

Continued on Page 77

The Viking yacht

Did Norse seafarers build a pleasure yacht 1,200 years ago?

MANY DOUBLE-ENDED BOATS are descended directly from the Viking longship. The best preserved of these ships are not the warships or the ocean-crossing freighters celebrated in movies and historical novels, but sheltered-water boats used for the same pleasant, but pedestrian, purposes as our own boats.

It's often said that western sailing vessels evolved from the dugout canoe. Others argue convincingly that the clinker-built (lapstrake) double-ended Norse longboat evolved from vessels made of skin stretched over a framework of wooden ribs and stringers. Whatever the origin, boats made with wooden strakes made their appearance in Northern Europe well before the Bronze Age. As the boats grew in size, paddles were replaced by oars, and steering oars at bow and stern were replaced by a single rudder controlled by a tiller.

Starting with a broad plank on the bottom of the boat, the development of the keel was the most troublesome aspect of the evolution, and the keel did not gain its modern form until just before the beginning of the Viking Age, usually dated from AD 793. The last stage in the evolution of the longship was the adoption of sails. Even as the Viking longship grew larger and was used to sail across the oceans, in design it remained basically a rowing vessel.

Ship burials

Seafaring Germanic people sometimes interred their kings and great men in ships. Many of these burials are known, and some have been excavated. The earliest significant burial of this type was excavated at Sutton Hoo, in East Anglia, England. The excava-

tion revealed a clinker-planked open ship constructed well before AD 650. Although its hull is very similar to the two longships discussed in this article, it was unlike them in that it had no provision for sails, all of its fastenings were of metal, and its keel had not yet reached the final form found in ships built two centuries later.

Near the turn of the 20th century, two longships in a remarkable state of preservation were discovered in burial mounds on the western shore of Oslo Fjord, in Norway. One, excavated at Oseberg farm, was constructed about AD 800. The other, excavated at Gokstad farm a few miles away, was constructed about the year 900. The honored dead in the Oseberg vessel was a woman of high rank, accompanied by her sacrificed maid.

Both vessels were in active service for some 50 years before being converted into sepulchers. They were built exclusively of oak, except for fastenings.

Construction details

The keel has a cross section like a parenthesis mark, extending 10 to 12 inches below the garboards. In the Gokstad boat, the keel is a single piece of straight-grained oak 67 feet 7-inches long; in the Oseberg boat, the keel is 64 feet 4 inches long, formed of two pieces of oak scarfed and riveted 13 feet from the after end. The sharply recurved stem and stern posts are strongly riveted and nailed to the keel. A decorative figure fashioned in wood is lightly fastened atop each post. Post heads have no technical function, but some are most elaborately carved and must have cost the owner dearly. The Oseberg figures are

by Robert Bringham



Photo from Universitetets Oldsaksamling Oslo

The 67-foot 4-inch Gokstad ship on display in Oslo.

quite detailed and represent the head and tail of a serpent; the Gokstad post heads are plain.

Each keel is almost imperceptibly rockered, with the mid-point about one foot lower than the ends. The garboard on each side is strongly riveted to the underside of the keel's arms. The strakes are laid on clinker fashion, with the upper strake overlapping the lower strake and fastened rigidly to it with iron rivets placed every few inches. The top of each strake is grooved for caulking yarn made of tarred animal fibers, usually wool. None of the strakes stretch in one piece from stem to stern, but instead are extended by scarfed, riveted, and caulked joints. No backing plates are used at these joints. The ends of the garboards and other strakes are fastened by rivets and nails into rabbets in the stem and stern posts.

The bottom consists of nine strakes, including the garboard. The 10th strake, at the waterline, is much heavier than both bottom and top strakes and does double duty as a stringer. Holes for oars are pierced in the 12th strake in both boats. The Oseberg boat has no more strakes, resulting in a freeboard of about two feet amidships. The Gokstad boat has two more strakes above the waterline, yielding a freeboard of 3 feet 7 inches at the mid-line.

Except at the very ends, where they sweep up steeply into rabbets in the stem and stern posts, the strakes lie parallel to the waterline. This is because Viking longboats of all types, even the latest, largest, and most developed are, first and foremost, rowing boats. The strakes are as thin as possible consistent with the necessary strength. The point cannot be overemphasized, since the seaworthiness of the open Norse longboat is due in large part to lightness.

open vessel, it was decked at the waterline by planks laid fore-and-aft over the entire vessel, resting upon shelves cut in the beams. In the Oseberg vessel these deck planks were permanently nailed to the beams, except for two or three left unfastened so that bailers could be inserted into the bilges. In the Gokstad boat all the deck planks were unfastened, so cargo could be stored below.

As in all earlier and smaller vessels, there are no provisions for the seating of the oarsmen, yet the placement of the oar holes is such as to force them to be seated. Although it is possible they were seated directly on the floorboards, a more reasonable suggestion is that the oarsmen seated themselves upon their own sea chests.

Ribs

The most unusual construction feature is that of the ribs. In the Oseberg boat, there are 15 ribs placed at 39-inch intervals, with rib number 8 at the mid-point and widest part of the hull. The interval between ribs is the same in all Norse longboats of whatever size, type, or age and represents the minimum distance needed to give the oarsmen sufficient working room. In the Gokstad vessel there is a 16th rib.

Each rib is a single natural-grown piece of oak of modest width and thickness extending thwartship from one waterline strake (the gunnel) to the other. It is firmly fastened to both by iron rivets and nails. An unarched beam stretching from rail to rail lies on the top of each rib, to which it is nailed and

Viking ships were built of oak framing strongly fastened by iron rivets and nails at all points — except only the fastening of the ribs below the waterline. Remarkably, the ribs were not fastened in any way at the keel, but merely laid over it. The ribs were riveted to garboard and gunnel, but to all other bottom strakes (numbers 2 to 9) the ribs were fastened only by ties of whale-

bone, spruce rootlets, or bast, a flexible fibrous bark.

One theory about this peculiar fastening practice is that

Norse ship-

wrights were conservative and were just building the hulls in the same way their remote ancestors fastened hides to ribs in the primitive coracles from which the longboat evolved. In view of the plenitude of the iron found all over the boat at every other point, including many at which the ribs are fastened to other parts of the structure, I don't think this theory stands up, and it deserves to be buried along with the boats. A more popular theory is that these fiber ties were used to permit the hull to flex in a seaway and thus preserve it. A rigid hull of such light construction would be broken by the stresses.

In 1893, an exact replica of the Gokstad ship was sailed from Norway to New York, under Captain Magnus Andersen. The entire trip was under sail, the oars not being used even when entering the North River in New York City. At times the ship attained speeds in excess of 10 knots. Captain Andersen reported that in heavy seas the ship twisted and wracked continuously with parts of the bottom distorting as much as 12 inches out of the normal line. This seems to support one of the traditional arguments for the rib tying, but in my view this flexing is the consequence of the very light construction of the hull, with its complete absence of strong fore and aft members other than the keel and the gunnel. If the ribs had been grappled to the strakes with iron bands, I believe the hull would have flexed just as much.

Had these very thin strakes been fastened to ribs by rivets, I think an inevitable consequence of constant flexing would have been an enlargement of the rivet holes, and the strakes would have been weakened more and more by this erosion and eventually would fail. But

*“...Viking longboats
of all types, even the latest,
largest, and most developed
are, first and foremost,
rowing boats.”*

Strake scantlings

	Bottom	Gunnel	Top	Extra strakes
Strake numbers	1-9	10	11, 12	13, 14
Oseberg Ship	¾"	2"	1½"	none
Gokstad Ship	1"	2"	1½"	⅝"

Although for other parts the Scandinavian shipwrights used both ordinary and rabbet planes, the strakes were shaped with a broad ax. A tree of suitable size and grain was felled and split, and one plank hewn from each half. A projecting pad or cleat had to be left every 39 inches on the inside of each plank. The workmanship is beyond admiration.

Although the Viking longship is an

riveted. An elbow riveted to both rib and beam extends the line of each rib end vertically, and the top strakes (10 to 14) are fastened to it with iron rivets. The ribs were placed in the hull after it was completely planked up to the gunnel. The ribs did not give form to the hull but rather followed and reinforced a form already perfect. The planking was almost certainly laid around temporary molds just as is the modern practice.

softer fibers holding hard oak strakes would themselves bear the burden of the constant friction and the strakes would be preserved — for 50 years in our examples. The strakes proper never actually touched the ribs at the points of fastening, as the ribs bore on the raised cleats or pads left on the strakes when they were cut. Each tie was made through a hole bored in this cleat and two holes bored in the rib. This made it feasible for the fiber ties to be renewed easily at sea, one at a time, as they wore out. My guess is that fiber ties were used because the ship was flexible, not to create the flexibility.

transverse tiller. On his transatlantic voyage in the Gokstad replica, Captain Andersen found the rudder to be easily controlled and as effective and efficient as any of modern design.

“Rooms”

Just as battleships in the days of cannon and sail were rated by the number of guns each carried, so the Viking vessels were rated by the number of “rooms” enclosed by the rib-and-beam structure. Thus the Oseberg ship is a 15-roomer and the Gokstad ship is a 16-roomer. For short excursions there were probably only two oarsmen in each room

the galleys of the Mediterranean Sea, ramming was an important tactic in sea battles. In the lightly built ships of the northern seas, ramming was not a choice; it might have been as destructive to the attacker as to the attacked. Instead, the battles were preceded by maneuvering under oars to bring two cooperating warships alongside a single enemy so it could be overwhelmed by boarding. To provide the greatest number of warriors for these hand-to-hand fights, the warships were crammed with six or more crew per half-room.

The invasions of Britain by the Saxons, Angles, Frisians, and other



The Oseberg find

The illustration below shows the profile and mid-section of the Oseberg boat. Each rail describes a perfect circular arc. The radius of the circle is equal to the extreme distance from the inside of the stern post to the inside of the stem post. The identical feature is found in the Gokstad boat and in the drawings of other longships. Although this circularity is not mentioned in references, surely it must have some intended and important functional purpose.



(one man for each oar) plus a small afterguard. A full crew for warships and overseas freighters included two to three oarsmen in each half-room (thus providing frequent relief at the oars), the commander, one or two steersmen, and specialists such as a cook, bosun, smith, or shipwright. Warships added as many additional warriors as could be crammed in. One of the 35-room monsters built during the dynastic wars that closed the Viking Era might have had a full combat complement of more than 300 men.

Uses and types

During the almost constant internecine warfare and in the rebellions against the Viking kings, longships were used to fight for control of coastal waters in Scandinavia. But these battles were fought exclusively in the sheltered waters of fjords and in the lee of the many islands along the coast. The romantic “Dragonships” specifically designed for these battles proved entirely useless for service in open water. For

North Germans in the 6th and 7th centuries, of Britain and Western Europe by Danes and Norwegians in the 9th, 10th, and 11th centuries, and the overseas voyages to the Orkneys, the Faroes, Iceland, Greenland, and Vinland, were not conducted by warships festooned with shields hung overboard to impress and cow the enemy. Sea battles preliminary to landing were neither anticipated nor fought.

The invasions and transatlantic voyages were conducted by freighters lacking such romantic aspects but having the capacity and seakeeping qualities that the stereotyped Viking ship lacked. They gained these qualities from heavier scantlings, greater depth, higher freeboard, a little more beam, and a commitment in design and gear to use as sailing vessels. Internal ballast was apparently never used, but it must be remembered that a freighter of 15 rooms would have more than two tons of human ballast to shift from rail to rail when the ship needed stiffening.

The Oseberg and Gokstad ships were neither fighters nor freighters. One authority writes that “The Oseberg ship also has the characteristics of a pleasure vessel for use in good weather on closed waters.” It is the Viking equivalent of a modern daysailer. The same writer notes that the Gokstad ship, of heavier build

The rudder


Before the opening of the Viking Age, the steering sweep or oar had been replaced by a rudder hung on the starboard rail as far aft as possible while still leaving footroom for the helmsman. The tiller extended into the boat at right angles to the rudder. The rudder was very narrow, with an aspect ratio as high as in any modern racing sailboat. It extended deep into the sea, several feet below the keel.

By means of a small block of wood and what can only be described as a ball joint ingeniously fashioned of rope, the rudder was held firmly in a vertical position, yet could be retracted for repair, swiveled up when the boat was beached, and easily turned by the small

and a little larger than the other boat and far better adapted to sailing, “bears the characteristics of a practical utility vessel” for coastal waters but not for the open ocean.

The Oseberg vessel is a millpond rowboat with sailing gear added as an afterthought. The mast was thin and unstayed, held in place by inadequate mast partners which had cracked in use and been repaired by iron bands. The Gokstad vessel is a working boat intended to sail, with a much heavier mast supported by massive partners. It was not stayed forward or thwartship, but the halyard was cleated at the stern and served as a backstay. There is almost no reliable information about mast heights or sail areas for Viking ships. In combat, warships maneuvered only by oars; and sailing gear and qualities were accordingly neglected. Freighters, with small crews and compromised in

“The Oseberg ship also has the characteristics of a pleasure vessel for use in good weather on closed waters.”

favor of carrying capacity, were sailed whenever possible and probably had more elaborate gear than the surviving artifacts demonstrate. 

Robert (Will) Brigham first sailed on the Ohio River in a Comet at age 12. He's been nuts about sailing ever since. He has sailed his O'Day Day Sailer on lakes from New York to Ohio

and Kentucky and crewed on other boats whenever he got the chance. He lives in the “Great Hoosier Desert” and dreams of circumnavigating the eastern half of North America.

An unrelated Gokstad replica (half-size) is being built and launched in British Columbia. Go to <<http://www.digitalnorseman.com>> for information.



Then and now

THE TABLE BELOW COMPARES DIMENSIONS OF THE OSEBERG and Gokstad boats with two modern yachts, the Bristol Channel Cutter and the Baltic 64. I have estimated the sail areas for Oseberg and Gokstad and could be badly in error.

	Oseberg	Gokstad	Bristol CC	Baltic 64
LOA	70' 2"	76' 6"	37' 9"	64' 0"
LOD	65'	71'	28' 1"	64' 0"
LWL	64' 3"	66' 8"	26' 3"	51' 6"
Beam	16' 7"	17' 6"	10' 1"	17' 4"
Draft	3' 0"	3' 0"	4' 10"	11' 0"
Freeboard	1' 11"	3' 7"	2' 10"	~ 6'
Displacement	20,000 lb.	44,500 lb.	14,000 lb.	56,218 lb.
Ballast	None	None	4,600 lb.	24,652 lb.
Sail Area	400 sq. ft.	750 sq. ft.	673 sq. ft.	n/a

The following tables translate these statistics into modern yacht parameters.

Displacement type: If the actual displacement is within 10 percent of a value calculated by the formula $0.8(LWL + 4)^3$, the vessel is said to be of medium displacement.

Oseberg	Gokstad	Bristol CC	Baltic 64
gossamer	feather	heavy	light

Beam to length ratio: The Beam/LOD ratio should be about 0.350. A greater value approaches the characteristics of a raft or barge. A lower value may lack initial stability and be tender.

Oseberg	Gokstad	Bristol CC	Baltic 64
0.254	0.246	0.359	0.270

Ballast to displacement ratio: Modern norms are from 30 to 40 percent. For a boat with high form stability, the ratio may decrease; with little form stability the ratio should increase.

Oseberg	Gokstad	Bristol CC	Baltic 64
0%	0%	33%	44%

Positive stability (capsize screen): A cruising yacht should have a capsize screen figure of 2 or less, calculated as follows: beam divided by the cube root of (displacement pounds/64).

Oseberg	Gokstad	Bristol CC	Baltic 64
2.43	1.98	1.67	1.82

Displacement to length ratio: The optimum value is between 250 and 350. Lower numbers are quick in light air; higher numbers are more seakindly. The formula is (Displacement pounds/2,240) divided by $(0.01 \times LWL)^3$.

Oseberg	Gokstad	Bristol CC	Baltic 64
34	67	347	183


Sail area to displacement ratio: Calculated as sail area in square feet divided by the $\frac{2}{3}$ power of (displacement pounds/64). The optimum ratio is said to be between 12 and 15.

Oseberg	Gokstad	Bristol CC	Baltic 64
8.7	10	18.53	not calculated

Displacement hull speed: This is a value calculated as the square root of the waterline length multiplied by a constant, taken as 1.34 in the absence of special factors.

Oseberg	Gokstad	Bristol CC	Baltic 64
10.8 knots	11 knots	6.9 knots	9.7 knots

These paradigms can be deceptive. For instance, the stated displacement of modern sailing yachts includes the weight of the auxiliary power; for a true parallel, the displacement of the Viking ship should include the weight of its auxiliary power, the minimum rowing crew. Thus the displacement of the Oseberg boat should more properly be fixed at 25,000 pounds; and this extra weight is self-activating movable ballast.

Nevertheless, these statistics and calculations make clear that the most striking difference in design principle between a Viking coasting vessel and a modern yacht is the extreme lightness of construction. The great virtues of the Viking ship are due to this lightness, and some of the defects of design are mitigated by it. Inadequately canvassed by modern standards, the Oseberg boat would have sailed easily in the light air of the narrow fjords or been as easily rowed when the wind was foul. 

Good old catboat

AT AN AGE WHEN MANY SAILORS retire, sell the house, move aboard, and go cruising, my wife, Dee, and I built a house, sold the boat, moved ashore for the first time in 25 years, and started a business.

But we didn't walk inland with an oar over our shoulder; we "retired" on the shores of the Chesapeake, just to keep our options open. And while we learned about hammers and saws, we were each privately thinking about all that Chesapeake water. When we started talking about it, we discovered we knew exactly what kind of "retirement" boat we wanted:

- Very shallow draft (2 feet or less) to give us access to little-used marshy headwaters and other unspoiled Chesapeake niches, let us moor in our local creek, and use the primitive launch ramp there.
- Courageous sail area for the bay's light summer air but on a divided rig for easy reduction in squalls and breezy weather.
- Accommodations for short cruises, with emphasis on staying out of the sun and bodily comfort generally, including good ventilation for summer and a wood stove for winter.
- Inboard power (for all those rivers).

Unfortunately, we knew of no such boat. But we had recollections of encounters with a couple of little catboats — Marshall 18 catboats, called Sanderlings — that impressed us with their abilities and possibilities. We saw one in the Gulf Stream, in reefing weather, making no more fuss than our deep-water ketch. We knew one in the Bahamas that could explore wherever we could take our sailing dinghy.

In magazines, we found photos of Sanderlings and defaced them with sketches and doodles. Encouraged by the ease with which a pencil transformed the little daysailer/overnighter into our idea of a comfortable, handy pocket cruiser, we decided we could work the same transmogrification on a real Sanderling, substituting a Sawsall, epoxy, and plywood for the pencil.

All we needed was a lonely, battered, decrepit (*cheap!*) edition of the design to

by Stuart Hopkins



Before the refit: Dabbling Mar as a Marshall Cat Sanderling.

operate on. Since Sanderlings have been in continuous production since the early 1960s, this would surely be possible.

Right off the bat, we found her. The voice on the other end of the phone in Florida said "Hull and deck sound ... otherwise not too good." No trailer. No equipment. No motor. Suspicious sponginess in plywood components like cockpit and bulkheads. Old sail. Built in 1966. Cheap. Just our meat.

A terrifying round trip on I-95 landed this econo-prize in our driveway.

Dee (a woman used to Brixham trawlers, Gloucester schooners, and deep-water yachts) stifled her reaction when she discovered we couldn't even sit upright below! Instead, she went to her studio and began some serious sketching and doodling. I (a sailmaker) rigged the boat where she lay on her trailer, and backed off a few yards to imagine how she would look as a yawl.



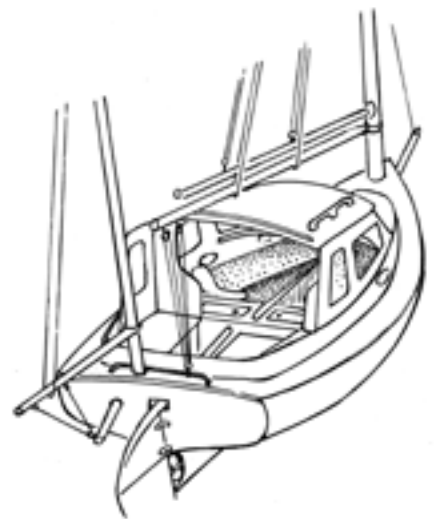
One of a kind: Dabbling Mar following the "transmogrification."



**Original Marshall 18
Sanderling.**



**"Transmogrified Marshall 18,"
also known as Dabbler.**



Sketch of revised interior.

While mulling over several schemes, we took a mattock and removed almost 200 pounds of bad plywood cockpit seats, sole, and waterlogged foam, right down to a naked hull from the companionway aft. This made it easy to plan for an engine installation, tankage, storage, and comfort. The finished job included a lucky bargain — a 10-horse Kermath that had lain for many years, mothballed, in a local boatbuilding shop. We had no interest in sharing an 18-footer with a diesel. This smooth, quiet antique went in without problems.

A cutout in the solid glass "deadwood" ahead of the rudder (Sawsall job) accommodated the stern bearing and prop. We measured for the beds by suspending the little engine in place from the boom. With an 11-gallon aluminum tank, blower, and electrics, we were beginning to look forward to poking up rivers and creeks in style.

We replaced the original benches with a U-shaped cockpit surrounding the engine box and introduced a bridge deck with big lockers and more lockers aft. We dropped the sole several inches for more leg room. Under the seats, outboard, was space for bins and sailbags held in place with removable fiddles.

Our more comfortable and useful cockpit (worked up out of CDX and epoxy) weighed about what we chopped out. A few pigs of lead ballast were removed to compensate for the motor.

We launched the *Dabbler* (named after the mallards that dabble in our local creek) for some cruising with a local club. The inboard and new cock-

pit were a great success, but otherwise the experience confirmed our opinion that we wanted to replace the single big sail with a divided rig. And after a few nights cramped below, we could hardly wait to haul her out, grab the Sawsall, and take the lid off the sardine can.

Doghouse cum main saloon

Some of our bold, even arrogant, sketches evolved from a doodle for a dodger. Why not make the dodger rigid

"We decided we could work the same transmogrification on a real Sanderling, substituting a Sawsall, epoxy, and plywood for the pencil."

and cut away the aft part of the cabin-top so the hardtop effectively encloses a greatly enlarged cabin? Why not provide standing headroom for the mate (5' 5"), with a little "galley" on the new bridge deck? Why not have full sitting headroom on comfortable chairs aft of the bunks? Why not fit removable windows and screens? Why not extend the roof far enough aft to provide shade and spray protection for the helmsman?

A mockup in cheap 1/8-inch luan ply (which later served as templates and as a building mold for the final construction), proved there was no reason why not.

A few minutes of surgery liberated about 90 pounds of cabintop and bulk-

head. Immediately, we could test with our bodies the thesis expressed on paper. Proof we could sit upright, surveying some lovely, lonely anchorage from the comfort within, spurred the work.

The house was designed to join the existing structure across the cabintop a few inches forward of the original hatch opening with an epoxy fillet; outside the cabinsides and cockpit coamings, with a 2-inch overlap, were epoxied and through-bolted.

We turned our backs on the local lumberyard for the deckhouse project and ordered expensive 3-mm okoume marine ply to be laminated in place over the mockup to lock in the heavily cambered top and curved front and create the eyebrows that trap the removable polycarbonate windows. All the construction was done in a corner of my small sail loft between sailmaking jobs.

We barely got it out the 8-ft wide doors! It dropped in place as neat as a cab on a pickup. Final weight was less than what had been removed with the Sawsall.

The new effective interior includes the bunks (as original), our "easy chairs" (cheap but comfortable plastic swivel-bottom fishermen's seats) port and starboard, the bridge deck, comprising "galley" with gimballed kero stove to starboard, solid-fuel cast iron Pet to port, and the forward half of the cockpit. At anchor, if desired, the fitted Sunbrella aft closure snaps in place, enlarging the "interior" to include practically the whole boat. In cold or wet (and on the mooring) the large screened opening in this closure is covered

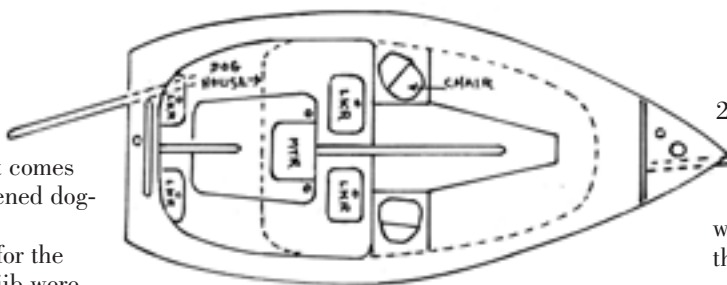
with a vinyl window. Otherwise, the screen liberates the breeze that comes in the forehatch and opened dog-house windows.

Eventually, controls for the main and roller-furling jib were brought into the house to jam cleats on the shelf formed by the little bit of cabintop inside. Raising, dousing, and reefing the main are all done from “below” *standing up!* Ditto deploying and furling the jib. What joy! Which brings us to:

The rig

There is no novelty in the cat yawl rig. The aim is to easily have more sail area when you want it and less when you want it in order to balance the boat under almost any condition. We have about 25 percent more sail area in the three working sails than the original cat rig. From the comfort of the cockpit, we can set a mizzen stays'l, and be flying 375 square feet. In races, we have been able to astonish the locals with five sails.

The new rig satisfied all our expectations. Sails can be adjusted to tame weather helm (a notorious fault of catboats) or dropped (instead of reefing, notoriously difficult in catboats) to suit the breeze. In gradually increasing wind, the mizzen might come down to lighten the helm. In a squall, we drop the main and stay in comfortable control under jib and jigger. Under this rig, she will go to windward in 15 or



Dabbler's modified interior.



Demolition: out come 200 pounds of rotten and waterlogged cockpit.



Dabbler's removable, waterproof, polycarbonate windows.

20 knots with just a little weather helm, broad reach with almost neutral helm, and selfsteer indefinitely downwind with the mizzen broad off and the jib flattened in.

An unexpected but welcome bonus is that when anchored by her long snout, the windage in the house and mizzenmast makes her lie to the wind like an arrow, whereas catboats are known to wander restlessly at anchor.

Engineering was fairly straightforward. The main boom was raised (to clear the housetop) and shortened (to clear the mizzen). Sawsall holes accommodate the mizzen mast, bowsprit, and bumpkin. The latter can be removed for trailering, and the 'sprit just clears the towing vehicle. But we would make it retractable, if we had it to do over.

The new spars are Schedule 10 aluminum pipe, fitted with tapered douglas fir inserts to complete the finished lengths and help fool the eye, while providing meat for sheaves, eyebolts, anchor rollers, and so on. The mizzen steps easily by hand. It can be temporarily relocated to a special hole in the foredeck (which doubles as the anchor rode deck pipe) where it serves as a gin-pole for stepping the main.

Finally, the sailmaker gets into the act. Since my business is making traditional sails, the suit for the new rig presented no unusual difficulties. We chose Egyptian



The new cabintop takes shape in the sail loft.



Dabbler's deckhouse is in place, the engine box removed, the bridge deck lockers installed.

Dacron for a good color scheme, and because it has a nice, moderately soft hand. The full battens may look modern, but Nat Herreshoff used them on a little cat yawl of his own way back when. They help flatten and control the very-low-aspect main and make it stack neatly in the lazy-jacks. This is also ideal for the mizzen, which must be kept very flat when sailing and when left standing at anchor. A half-wishbone sprit boom controls mizzen shape on all points of sail. The jib furls on its own braided Dacron luff rope, which acts as a forestay.

Would we do it again?

It was exciting work making dramatic changes, spiced with moments of delicious anticipation and delicious satisfaction when we got what we hoped for. The final product is a great, very small cruising machine, in which we have prowled both shores and many tributaries of the bay, sailing in comfort and safety, holding our own with bigger boats in fair weather and foul (we take shortcuts), yet coming to anchor in the marshes, while the bigger boats tough it out with the crowds.

In between all the fun, we had the grubwork of any restoration: things like removing 25 years of bottom paint;



Dabbler out cruising with first mate Dee Carstarphen. The transomogrification accomplished standing headroom with a great view through large windows.

repairing centerboards and rudders, coamings and rubrails; cleaning, sanding, and refinishing everything; rebedding everything.

We might have been spared much of this work if we started with a younger, well-maintained hull. But who would take a Sawsall to a Bristol-condition late-model boat, even if they could afford it? Much better to do surgery in good conscience when the patient is already teetering on the brink.

Would we do it again? Well, ah... actually, we *are* doing it again. It's the fault of a friend who had a Marshall 22 catboat (twice the displacement of the 18-footer, but only 6 inches more draft). He had an epiphany of some kind and all at once wanted to move to the mountains. His house sold out from under him before he had a chance to advertise

the boat. Would we... as a favor... at a distress price...?

"She's 30 years old," he said, "but basically sound, except for a few little things..." She's got that solid old pre-blister hull, but rot in the cockpit and splits in the rail. Corroded through-hulls and rusted-up steering system. Busted hatches. Tired sail. And, believe it or not, you can't sit upright below! Just our meat.

No reason why not to take a Sawsall to the poor old dear and transomogrify her a little. Dee has already

made a sketch of what we think she'll look like.

After a false start in life as a journalist, Stuart left Chicago aboard a 30-foot ketch, and stayed afloat for 25 years.

*His wife, Dee Carstarphen (a founding member of the Seven Seas Cruising Association) had an even longer career on the water. They now live near a Chesapeake Bay creek just deep enough for catboats. In his retirement, Stuart is a full-time sailmaker, specializing in traditional small craft sails. Dee is the author of four illustrated nautical books, including *Narrow Waters*, reviewed in the September 1999 Good Old Boat.*



Dabbler's favorite rendezvous, where Stuart and Dee like to "astonish the locals (with *Dabbler's* sailing ability)" is the Turkey Shoot Regatta, held each October on Virginia's Rappahannock River. This year's event is set for Oct. 12-14. Stuart says, "*Dabbler's* tiny cabin is adorned with three little brass plaques, each indicating her participation in a Turkey Shoot. We were always the smallest boat in the fleet. Every participant gets these plaques. The T-shirts you have to buy!"

Boats in this event must be of wood or of a classic design 25 years old or older. Last year's winning boat was a 1970 Irwin 38, sailed by Wayland Rennie. This year Hal Roth will serve as honorary chairman. And for the first time the event will include restored skipjacks (see *January 2001 Good Old Boat* for more about skipjacks) in the race. All proceeds go to the Northern Neck Hospice. Want to know more?

Yankee Point Sailboat Marina: 804-462-7018 or
<<http://www.yankeeptmarina.com>>.

Bristol is beautiful

by Karen Larson

Bristol Fashion. A Tartan 33. Gleaming navy topsides with red trim. She was on our list of dream boats before we bought *Mystic*.

But she wasn't for sale. *Bristol Fashion* was, and still is, owned and loved by Russ and Joanne Clepper, who sail Lake Superior from their home port of Washburn, Wisconsin. This 1980 Tartan wasn't Bristol when Russ and Joanne bought her in 1987. She'd spent seven hard years in the charter fleet and was showing the effects of the "learning experiences" that had trained many a vacationing sailor. But the Cleppers had been looking for an affordable freshwater sailboat in every marina between Duluth and Detroit. When they found this Tartan they'd already paid for a survey of another boat and backed away from that deal.

Then the Tartan went on

the market, ironically the very boat they'd chartered some years before. Still named *Deliverance*, she was trucked to their home in St. Cloud, Minnesota. She would be named *Bristol Fashion*, like the Cleppers' former pet schipperke. Russ and Joanne

weren't intimidated by this boat's survey, which noted some blistering on the hull and minor delamination of the rudder. They'd repaired boats before. This one would be redone from stem to stern and, when finished, she would live up to her new name.

As a couple, the Cleppers' sailing days began with a Christmas holiday in 1976. Russ remembered enjoying sails on small lakes as a child. He suggested that they attend Steve and Doris Colgate's Offshore Sailing School on Captiva Island, on Florida's west coast. They spent the mornings sailing Solings and the afternoons exploring the area as tourists.

A Santana for starters

The summer of 1979 they found a Santana 21 at a rock-bottom price when a broker was forced to sell his business.

"It was a repossession sale," Russ says. "You put in your bid and bought it 'as is, where is.' There was no survey."

They named the boat, appropriately, *Liquidation*. As it turns out, there were parts and pieces missing — rigging in particular — but they worked out the details and sailed *Liquidation* for three years. They could trailer this boat and attend a few regattas, although Joanne points



Bristol Fashion's crew on watch: Russ and Joanne Clepper and Mariah. The landing net is part of Mariah's MOB kit.

Beauty is in the details . . . Bristol Fashion's navy and red color theme makes for a striking combination. But these colors are further picked up and replayed in docklines and interior accents. Even the logotype for the transom was thoughtfully conceived.



out, "We went for the fun. We're not racers, but I like a good party." She notes with a laugh that the first boat was one that Russ (who is 6 feet tall) could kneel in. The second was one he had to bow his head in, and by the time they got to the Tartan, he had standing headroom.

Timely training

Each boat trains its owners for the next one, and the Cleppers were soon ready for another project. The boat with "bowing headroom" was a Columbia 7.6 (25 feet) named *Sparkle*. "But," Russ says dryly, "she didn't." *Sparkle* was already five years old in 1983 when she was brought home to the Cleppers' garage for remedial work. "We spent a lot of time on that one," Russ says.

Joanne adds, "We painted the deck, added cedar closets, built stowage spaces." *Sparkle* was reborn as *Prelude*. They sailed her on Minnesota's Mille Lacs Lake, a large shallow lake close enough to home to make it possible for Joanne, an elementary school teacher, to get there and spend time sailing alone when Russ, who owns a photo shop, had fewer summertime hours to spare.

Fast forward another six or seven years, and the Cleppers

were walking docks and getting familiar with marinas from Minnesota to Michigan in search of the boat with standing headroom. The Tartan 33 won the honors partly because of the interior layout and the warmth of the interior teak woodwork.

First they trucked her home to the garage, which they admit will not

allow for any further project boats — if the trend is to get larger, at any rate. (Even then, we marvel at the size of this garage. Could there be such a thing as a garage that holds a 33-foot sailboat?) They can't squeeze in a boat even one foot larger, they agree. But having her at home made the refit much more convenient.

"There is not a system, part, or piece of this boat (except the engine) that we have not overhauled, rebuilt, replaced, or modified to fit our needs."



Steve Stephan



Stripper award

"There is not a system, part, or piece of this boat (except the engine — a 24-hp Universal diesel was standard) that we have not overhauled, rebuilt, replaced, or modified to fit our needs," Russ says. "We stripped the topsides and prepared her for Awlgripping." Everything, Joanne notes, was stripped, earning her an honorary "stripper award" among her co-workers, who no doubt heard many tales of the project in the garage.

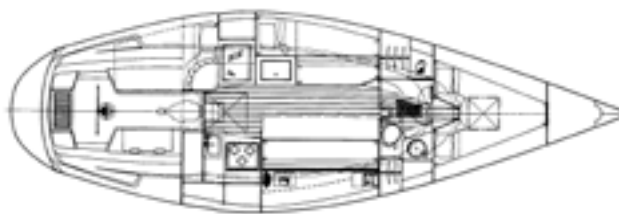
"We've stripped her from deck rail to the keel," Russ says. "The next big project will be the deck in preparation for Awlgripping." He notes that if you get



into a project, “you might as well spend the money and do it right.”

Blistering on the bottom? They did a full barrier-coat and bottom-paint job. They replaced a well-worn teak-and-holly sole. They had a new cabinet built for a microwave, installed new Lewmar ports, installed Alpenglow lights, replaced the alcohol stove with a propane version, added a Dutchman system, replaced the head and holding tank, replaced most of the wiring, added roller furling and a full-batten main, put in a bow anchor roller, added an inverter and smart battery charger, and so on.

They revised, restored, polished. When she truly was Bristol, *Bristol Fashion* was trucked back to Lake Superior where her former charterers



“...the first boat was one that Russ could kneel in. The second was one he had to bow his head in, and by the time they got to the Tartan, he had standing headroom.”

Bristol Fashion has a standard Tartan 33 galley, at left. Above, the nav station is to port. The Cleppers added the microwave and cabinet. They also added teak-colored curtains to hide extra storage located behind the cushions in what can be converted to a double berth.



would never recognize the gleaming red and blue version of the former bamboo-colored sailboat.

Well laid out

As a sailing twosome, the Cleppers particularly like the boat's interior layout. For starters, it has a V-berth big enough for two and a head that runs the width of the boat just aft of the V-berth, making a larger shower space. Aft the head in the main cabin there is a long settee to starboard and a short one to port with the icebox taking up the missing space to port. The starboard settee converts to a large double berth or a single with a padded leeboard. The remainder of the galley is in the usual place on the starboard side beside the companionway. A chart table and access to a quarter berth are squeezed into the corresponding space to port.

A fold-down table on the forward bulkhead makes the belowdecks area seem spacious. But once a folding table is down it often blocks access to the head, which is typically located forward. It's just about essential, therefore, for boats with a table of this sort to have a permanent navigation table, which the Tartan 33 does nicely. Otherwise, navigation and access to the head will be in competition on passages.

Unusual features

The Tartan 33 was designed by Sparkman & Stephens and introduced in 1979 for a run of approximately 220 boats that ended in 1984. Among its unusual features are a $\frac{3}{4}$ fractional rig and a Scheel keel. The Tartan 33 was introduced as a replacement for Tartan's earlier and very popular 34, which the company felt had become dated. The Tartan Ten, another 33-



The molded dodger breakwater is a 2- to 3-inch lip arranged in a semicircle around the companionway and hidden from view by the dodger, since it makes a marvelous attachment point. It is slotted so halyards and lines can be led aft.

footer, preceded the 33 by one year. But this was a flat-decked racer with practically no interior furnishings and lacking standing headroom.

Some of the racing qualities of the Tartan Ten were incorporated into the 33: the fractional rig, the slotted aluminum toerail, a flattish sheer, and a wide stern. The 33 was one of the first production boats to incorporate a Scheel keel. This keel, which widens noticeably at the bottom, reduces draft to 4 feet 5 inches. The fin keel which replaced it with the introduction of a newer Tartan 34 is 6 feet 3 inches deep. This newer 34 was nothing more than a modified 33 with a new keel, a masthead rig, and 9 inches added to the stern.

The Tartan 33 uses swept-back upper shrouds. It also has what *Practical Sailor* described as a “vestigial skeg” supporting a rudder that the *Practical Sailor* reviewer called “a high-aspect-ratio appendage practically parallel-sided in profile, rather than the more efficient elliptical shape” common at the time.

Practical Sailor also mentioned a noteworthy Sparkman & Stephens design element: a molded dodger breakwater, saying, “other builders should take note of the simple, functional

Dimensions

LOA	33 feet 8 inches
DWL	28 feet 10 inches
Beam	10 feet 11.5 inches
Draft	4 feet 5.5 inches (Scheel) 6 feet 3 inches (Deep fin)
Displ.	10,000 pounds
Ballast	4,400 pounds
SA	531



breakwater in the Tartan 33, which has openings molded in to allow halyards to be led aft.”

Bristol Fashion's namesake schipperke (a Belgian barge dog, by the way) has been replaced by Mariah, another schipperke who has her own bed in the V-shaped place in the footwell beneath the V-berth, and her own tiny life jacket for use when sailing. She's been “adopted” by other sailors at the Washburn Marina, who bring doggie treats and sometimes colored neck scarves from their travels. These scarves have become part of Mariah's dockside persona. She has to live up to a certain image as the boat dog on *Bristol Fashion*. Nothing less will do. 

Karen is editor of Good Old Boat.

T33 Resources

Tartan Email Discussion Group

<<http://members.sailnet.com/resources/links/list/index-new.cfm?id=tartan>>

There are other Tartan groups listed on the *Good Old Boat* association pages, but we know of none just for owners of Tartan 33s. If you have a Web site or group for these sailors, please let us know.

The Tartan 33 and the Scheel keel

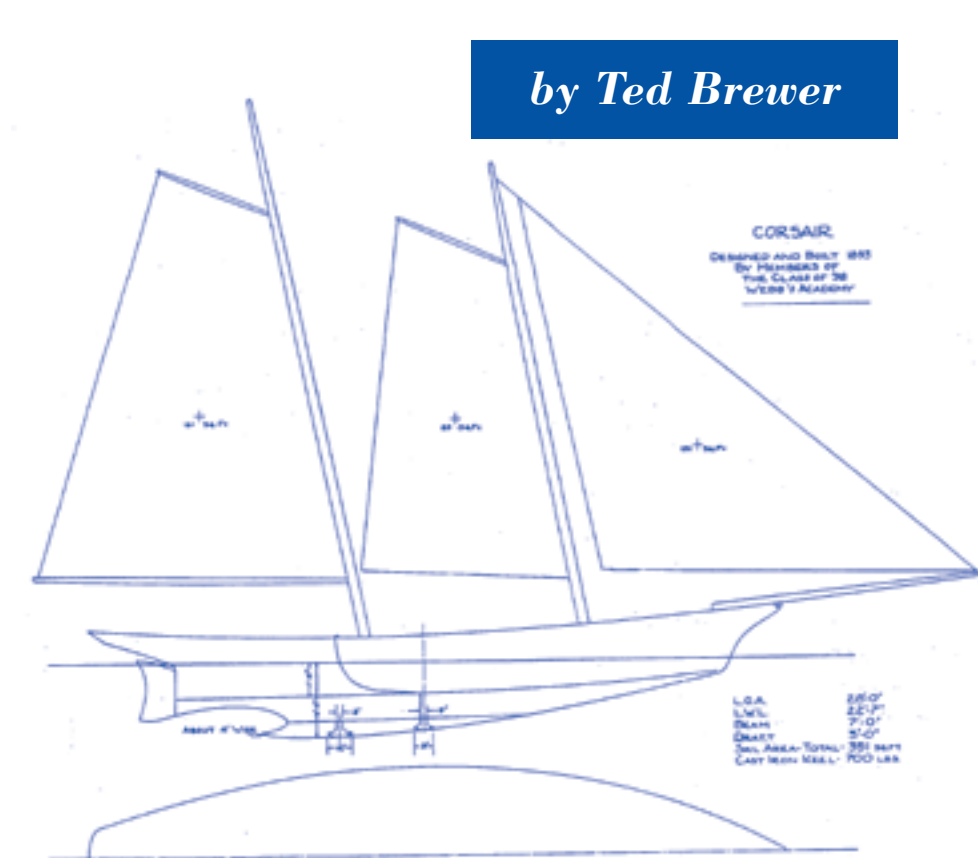
In my writing about the search for shoal draft (July 2001), I covered centerboards, leeboards, and bilge fins but neglected shoal fins — an oversight on my part. It was, perhaps, a deliberate omission though, since I've never been convinced that shoal fins actually work. Indeed, I have found that if a particular type of shoal-draft fin does provide the desired performance, its disadvantages often outweigh its advantages.

During my years with Bill Luders, we designed many 5.5-Meter yachts. This class of 32-foot sloops had a minimum keel width of 4 inches and a draft of 4 feet 5 inches. Naturally, such a narrow keel forced the ballast higher than it would have been if we fitted a wider keel, but every time we tried a wider keel, the tank test showed that performance suffered. Lowering the vertical center of gravity to increase stability simply did not offset the increased resistance of the fatter keel.

Then, in the last years of our association, a well-known Texan 5.5 sailor commissioned Bill to investigate bulb keels, and we tested a variety of shapes. Same result. Obviously, if we'd shallowed the draft to 3 feet 9 inches, and used a bulb keel, things would have been even worse. I suppose that's the reason I've never been a fan of bulb keels.

The Scheel keel, as used on the Tartan, is a form of bulb not unlike an inverted dumbbell. It's a patented shape so I'm unaware of its actual refinements, but it appears very similar to the keel used on *Corsair*, designed in 1893 by a class of the Webb Institute, the well-known school of naval architecture. Bill Luders' father was a member of that class, and I still have a print of the drawing of *Corsair* that Bill gave me. Indeed, when I pulled it out to look at it, I was surprised to see that *Corsair* also featured a "Brewer bite" between her rudder tip and the end of her keel. Perhaps that's where I got the idea for the cutout I've used on many of my designs. I don't know for certain, but it is definitely possible, as these things can stick in your mind long after you've forgotten seeing them.

The *Corsair* drawing was also printed in a yachting publication (I believe it was *Skipper* magazine) many years ago. It's quite possible that Henry



by Ted Brewer

Scheel saw it there, forgot about it, and mentally resurrected it when the need and opportunity occurred. I knew Henry for many years, well enough to know that he would not have pirated anyone else's work. So if he did get his keel idea from *Corsair*, it was unwittingly.

In any case, the only association I had with a Scheel keel was in the late 1970s when we were designing the Morgan 38. Morgan wanted to offer a relatively shoal-draft boat for Florida and the Bahamas and insisted on a maximum draft of 5 feet. We designed a NACA fin, fatter than I preferred in order to fit adequate ballast low inside it. Then Morgan hired Scheel to design one of his fins for the boat, and the result was a saving of a mere 2 inches in draft, 4 feet 10 inches. A tank model was built with interchangeable Scheel and NACA fins and tested at Stevens Institute under the watchful eye of Pete De Saix. The fat NACA fin was easily the winner, and hundreds of Morgan 38s appear to be doing well with it, some for more than 20 years now.

Winged fins are another story. They do appear to add to performance as,

when heeled, the wing increases the effective draft compared to a wingless fin. The wing also reduces cross flow from the leeward side of the fin and, in turn, this helps eliminate vortices and resultant drag. My concern about a winged fin, though, is that it could act as an anchor when the boat goes aground, making it difficult to tow the boat off into deeper water. I'm sure I'm not the only one who has heard tales of winged fins being badly damaged or even torn off in a minor grounding that would not have been a problem with a more conventional fin. In my opinion, a good winged fin is effective but fragile.

In any case, I'm convinced there is no perfect solution to shoal draft. Keel-centerboards, leeboards, bulbs, Scheel fins, shoal fins, winged fins — all seem to have their good and their bad points. At the moment I favor asymmetrical bilge fins for the cruising skipper who must have shoal draft, but only until something better comes along.

Ted is a Good Old Boat contributing editor.

Hail *to our* harbormasters

*All kinds of people
doing all kinds
of jobs for boaters*

IN MOST EVERY PORT OR HARBOR along the U.S. coastline, and on many inland lakes or river ports, there are harbormasters. A harbormaster may be a single soul with a badge and a Boston Whaler or the head of a team of men and women manning several craft and staffing a command center ashore of radiophones, landlines, and full office staff. The community might set aside a relatively modest \$20,000 to \$30,000 as a harbormaster's budget, while in the ports of large yachting centers it can run into hundreds of thousands of dollars.

The harbormasters, generally appointed by their town governments, are retired Navy chiefs, Coast Guard bosun's mates, ex-fishermen, retired airline pilots, and sometimes young salts right out of college or the military, searching for a way of life on the water. Almost always these keepers of our harbors are experienced boaters; they have "been there and done that," they know the nautical rules of the road, and they often have EMT training and knowledge of marine mechanics.

The harbormaster's office may be a modest four-by-six-foot shack with a desk, chair, and handheld VHF; or it may be like the glass-and-frame edifice housing the harbormaster and his staff at Scituate Harbor, Mass. Their vessels vary from a 16-foot Boston Whaler to a 25-footer with enclosed pilothouse, radar, depthsounder, and radiophones. Most have towing bitts or chocks and carry portable pumps and extra fuel. Most are capable of near-harbor search and rescue activities and, given the shrinking budget and resources of the




Sean Kelly, assistant harbormaster, and his furry assistant, named Bear, are at the ready in Scituate, Mass.

U.S. Coast Guard, are often the only source of near-at-hand help to the mariner in distress.

If the harbormasters are a varied group and divergent in their vessels, offices, and equipment, their duties are also a veritable smorgasbord. They assign moorings, collect fees, and maintain town moorings and slips at many town or municipal marinas. They police the waterways for speeders, those boating under the influence or transporting drugs, and they monitor discharge of sewage or holding tanks. Indeed, they offer town pumpout stations and boats, in many instances. They tow the stranded, fuel those with empty tanks, cite the offenders, check for chafing of mooring lines in gales, capture boats that have broken loose, save the sinking, answer the flood of VHF inquiries as to facilities available, and enforce the anchoring and no-anchoring areas. In other words, they keep their particular port or harbor as safe and orderly, yet pleasant and hospitable, as possible.

Harbormasters must combine the

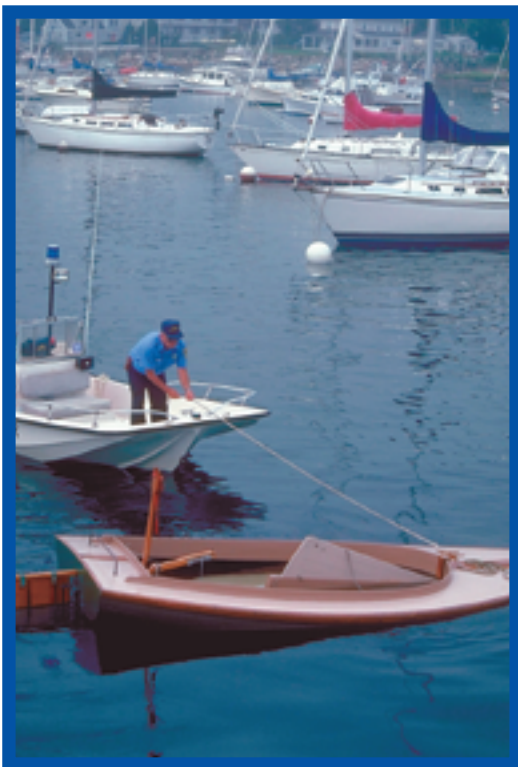
enthusiasm of a chamber of commerce with the strict enforcement of a nautical police department. They must at times be medics, mechanics, ambassadors, enforcers, communicators, police, or saviors. Most are now uniformed and badged, and many are armed with weapons and fully trained in their use. They are male, female, young, old, alone, or part of a staff. To a person, harbormasters are high up on the list of "People We Could Not Boat Without!" 



*Mary Jane and her husband, Warren, have been boating for more than 25 years. They sailed *Serena*, a *Sabre 28*, for seven years and now cruise the East Coast in a *Grand**

Banks 36, *Sea Story II*. A freelance writer and photographer, Mary Jane has been widely published in boating magazines. Her latest book, *Eye on the Sea*, was featured in *Good Old Boat*.

*Story and photos by
Mary Jane Hayes*



Assistant harbormaster Joe Noble, at left, tends a boat whose seams are being swelled following launch in Scituate, Mass.

Welcome to Scituate Harbor, at right, but make no wake. Harbormaster staffmembers set the speed sign.



An assistant harbormaster in Vineyard Haven, Mass., collects a fee from a visiting boater (above). Another in Vineyard Haven, Mass., stops to chat with sailors (below).



The harbormaster at Marblehead, Mass., can't help but enjoy working in a scenic setting (above). Block Island, Rhode Island, harbormasters collect mooring fees from visitors (below).



All this and cruising, too

An open call for all Sparkman & Stephens-designed boats led us to Mystic Seaport the weekend of June 15 to 17. This New England cruising destination was made even more spectacular in mid-June by the presence of more than 75 classic boats gathered for the Sparkman & Stephens Designer's



Recognition Rendezvous. From the second hull of Olin Stephen's first design (an Interclub Dinghy), to Lightning hull #1, to fine examples from Chris-Craft, Tartan, and Swan, to custom racers and hand-crafted cruisers, the fleet represented all that is S&S.

Thursday was a day of whirlwind activity, boats being "dressed" for the show set to begin the following morning. The most attention was given to boats that needed it least, which is not as strange as it sounds. Sailors scrubbed, polished, and varnished. Friday morning hoses were put away, flags went up, sun-covers came off, and bright-work glistened everywhere.

Olin Stephens was there... this tribute was as much to him as to his boats. He addressed a large and enthusiastic group of sailors, reflecting on more than 70 years of involvement with sailing, racing, and the firm he started with Drake Sparkman in 1931. "I fell for sailing quite hard. The way that those boats moved had much more of an effect on me than those driven by power," he said. This is true for him and for all of us, as much now as it was then. He stayed long after his talk to autograph copies of his 1999 autobiography, *All This and Sailing, Too*.

Owners and crew were gracious and humble, as were the many staff members on hand from Mystic Seaport and from Sparkman & Stephens. There was a sense of family and a sense of history and ample opportunity to share stories and ideas. An exhibit of half-hull models and historic photographs from Mystic Seaport's recently acquired Rosenfeld Collection underscored the firm's seminal role in the evolution of yacht design during the last century.

The weekend was one of the best we've spent while cruising. We made new friends, admired wonderful boats, and found a new destination we'll visit again.



Kai, an emergency physician professionally, grew up racing dinghies and Hobie Cats in New York. These days he and his family cruise Long

Neither artists nor sailors could resist the lovely Sparkman & Stephens designs in Mystic, Conn., in June. The author's Étoile Filante, A Tartan 34-C, above. Next column, from top: Whisper, a Tartan 27; a Chris-Craft Cherokee 32; and three New York 32s. In the far column, boats that made the firm famous: Courageous and Columbia with the cockpit of Bolero, below.



Story and ph





otos by Kai Sturmann



LOSING YOUR HEART TO AN OLD wooden boat is careless, but falling for her owner as well can only be described as rash. It was Sydney, Australia, in 1988. She was a 1950s racer called *Siandra*, one of Arthur Robb's Lion class, and he was a 20-year-old shipwright named Jamie Morrison, a sailor I'd met during a race series in Papua, New Guinea. We'd gazed at the stars together from the deck of an IOR racer and discovered a shared passion for old boats and a dream of long-distance cruising.

But that was New Guinea. Back in Sydney, reality was unavoidable. We were young and broke, and the future felt as far away as Mars. "When can we take your lovely boat out for a sail?" I asked eagerly. Jamie was evasive. There were many jobs still left to do on her. It would take ages to pack up the tools. "Don't worry old girl," I whispered as I waited for him to lock up at the end of that first visit. "Won't be long before we shake out those sails of yours."

A year later we embarked on our first cruise: a five-month scramble up the east coast of Australia. We'd made all the mistakes: underestimated how long it would take to recommission *Siandra*, spent most of our precious cruising kitty on gear before we'd even slipped the mooring, and finally

got away at the tail end of the season. Despite hundreds of hours of labor, *Siandra's* interior was still as Spartan as a prison cell, and to cap it all, the magazine I regularly wrote for was on the verge of bankruptcy and owed me for six months' work. Any of these factors might have spoiled the trip, but we thrived on fish and tropical fruit, avoided costly marinas, and had a whale of a time.

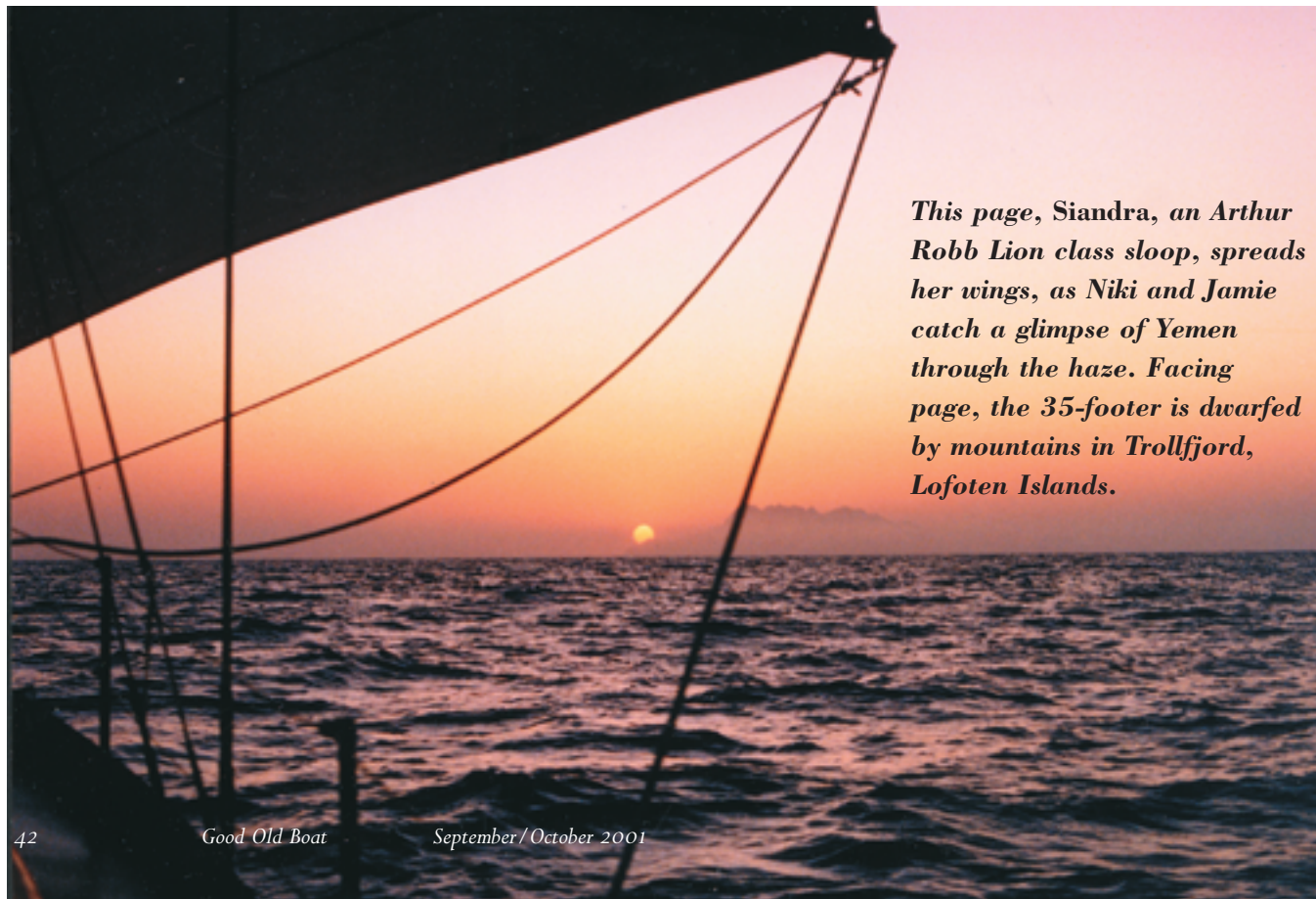
Immense impact

On the northeast coast we met two sailors destined to have an immense impact on our lives. Peter Schouten and Els Van Drunen. While both were in

their early 20s, they had set sail from Holland aboard a 47-footer they'd built themselves. Years of extended cruising later, they listened to our "one-day dreams" and asked: "Why wait until then? You have a good boat — keep it simple and cruise cheaply. All you need is a little money to get you started."

Before we parted company they presented us with an Ebbco sextant they'd always carried as a spare. On a slip of paper inside the box were the words "One less thing to buy." Their encouragement sparked an unquenchable flame: overnight, our fantasy of long-term voyaging turned into a serious campaign.

Lion on on on on a shoe



This page, Siandra, an Arthur Robb Lion class sloop, spreads her wings, as Niki and Jamie catch a glimpse of Yemen through the haze. Facing page, the 35-footer is dwarfed by mountains in Trollfjord, Lofoten Islands.

There was a lot to do. Five months on Australia's east coast had taught us just how cheaply you can cruise, but we didn't relish the thought of living solely on beans and rice for years at a time. We finally agreed on a budget of \$6,000 per year and resolved not to set off until we had two years' worth in the kitty. That way, even if Peter and Els' confidence in our ability to earn along the way proved unfounded, we could feasibly girdle the world in 24 months without starving. In addition to saving \$12,000, we had an old debt to clear and a million bits and pieces to buy for *Siandra*. Could we really raise so much cash in one year?

by Niki Perryman

string

Back in Sydney, we knuckled down to the task. Jamie found a dozen traditional boatowners around the harbor who needed the services of a shipwright, while I turned my back on a creative (but unprofitable) writing career to join the city rat race. Meat, wine, and smelly cheese no longer featured on our shopping lists; second-hand clothes slunk into the wardrobe; and friends shook their heads over our new determination *not* to have fun if "fun" involved spending money.

Restoration mode

Meanwhile, *Siandra* was back in "restoration-mode." To turn her into a comfortable cruising boat we needed to redesign and rebuild much of the interior. Long evenings and pads of paper disappeared in a flurry of ideas. Weekends converted the ideas into real bookshelves, a permanent dinette, new storage areas. Little by little, *Siandra's* Spartan saloon became a light, open, practical living space.



Exploring the world cheaply in an old wooden boat

As the months ticked away, we swung between dogged optimism and the grim knowledge that we wouldn't be leaving at the end of the first year. The kitty was swelling, but so was the job list, and we still hoped to acquire about \$22,000-worth of "essential" cruising gear. We pinned a world map to the wall for inspiration and continued working.

Year Two flew by. Our savings topped \$12,000, and we celebrated with pizza and a six-pack of beer — the first luxuries in a long while.

Siandra now sported a secondhand Aries windvane, a life raft, a shiny new anchor winch, a storm anchor, and a huge quantity of chain. We'd persuaded ourselves that the remaining items on the list were unnecessary. It was time to go. Neither our relationship nor our determination would stand another year of hard graft and miserliness.

Many cruising folk manage to sever their home ties in a calm and organized fashion (or so they claim). *Siandra's* departure was a complete shambles. Friends and family loaded gear on

board that we'd already decided not to take, while half the gear we really did need was nowhere to be seen. At the last minute I accidentally threw away a plastic bag containing our credit cards, and the 2-hp outboard escaped from Jamie's grasp and bounced down an entire flight of stone steps. But somehow *Siandra* wrenched us away and, as her bows lifted to the swell and carried us clear of Sydney Heads on May 19, 1992, our spirits soared. We were free. The whole world lay in front of us.

Parched wilderness

Our route took us north, and over the next eight weeks we covered 3,000 miles up the east coast of Australia, through the Great Barrier Reef, and



interior paintwork. But from time to time we stumble across the right materials or facilities to do one of the non-crucial numbers, and the restoration creeps toward completion.


It's been said a thousand times: "Simplicity is the key to inexpensive, hassle-free boating." Unfortunately, in this age of aggressive marketing, it's easier to say than

to do. Even though we live simply, so strong is the push for technology, we have to constantly remind ourselves we don't need it.

The bottom line is that gear equals money, equals labor, equals time ashore (and we'd prefer to be sailing). We don't feel deprived in any way. Sextant navigation is fun and keeps the brain cells pumping; a solar shower and bucket toilet are just as efficient (and much easier to clean) than their permanently-installed counterparts; and life without a fridge is no hardship if your tastebuds are adaptable. We try to restrict gizmos to things we can fix ourselves (anchor winch, windvane) or ones with little to go wrong (solar panel, diesel heater).

Six months' provisions

I suspect that when Arthur Robb penned the *Lion's* graceful curves, he was more interested in aesthetics than in load-carrying capacity. We like to travel with at least six months' worth of basic provisions, so weight is something we're always trying to whittle down. (Dried foods are the trick; we avoid tins, glass jars, and cartons whenever possible.) Finding space for everything is a monumental challenge, but as other liveaboards will testify, no matter how big your boat, the lockers will always be bursting.

Maybe *Siandra's* not the perfect cruising boat, whatever that might be, but no other would suit us as well. Since 1992, she's been our home and our ticket to freedom. She's given us hours of joy at sea, led us into a thousand adventures, and introduced us to friends we'll value for life. 

Niki and Jamie left Australia in 1992 to cruise in their 35-foot Lion class sloop, Siandra. After crossing the Indian Ocean, they spent several years exploring Europe, including an icy winter in Arctic Norway. They are spending this summer in Maine.

Above right, solitude in southern Norway. At left, Siandra under spinnaker while Jamie plays his guitar.



along the parched wilderness of Arnhem Land to Darwin. In spite of her burden of cruising gear and all our worldly belongings, *Siandra* showed a clean pair of heels to the modern cruisers we passed along the way. On those first passages we set two records that remain unbroken to this day: a top speed of nearly 15 knots and a daily run of 167 miles through the water. (That was before we learned that if you sail an old boat as though she's a go-fast racer, you have to be prepared to foot the repair bill.)

Her first major test was waiting for her in the Indian Ocean. Admiralty statistics show September as one of the safer months for crossing to Sri Lanka, but on September 27 we found

ourselves running under bare poles through mountainous seas. We were anxious and exhausted, and when our radio receiver spewed out the devastating news that tropical cyclone Aviona was heading our way, we began to have doubts about our 40-year-old boat. Was she strong enough to survive a cyclone?

As conditions worsened, we hove to and lay on the cabin sole waiting for something to break. "Would it be the mast?" we fretted. "The rudder?" But *Siandra* was more resilient than her crew believed, and when the storm finally abated, our search for damage revealed only one broken engine mount and one topside stripped of paint. We arrived in Sri Lanka with renewed confidence.

Turned into lifestyle

Since then, her sails have taken us to places we never imagined we'd visit. We've played football with Omani coast guard officers, dined on rotten goat's-milk cheese in Sudan, and picked olives with the Greeks. We've haggled in Turkey, crossed a canal-bridge over a French river, and spent a sub-zero winter north of the Arctic Circle in Norway. Somewhere along the route our "circumnavigation" has turned into a lifestyle. We work as we go, but the lure of the sea rarely lets us stop in one place for very long.

If by now you're picturing an idle existence of aimless wandering, you've overlooked maintenance. Cruising folk on old wooden boats are always busy. There's no wriggling out of it. *Siandra* would sink if we carried all the tools we'd like, but with a reasonable selection and a lot of improvisation we're almost self-sufficient. Doing our own work not only saves money, it ensures we end up with the result we want.

That's the theory, anyway. In practice our enthusiasm usually sputters out somewhere between the crucial jobs on the list and more cosmetic details like



by Don Launer

The completed Emigrance under full sail.

Chris Bauer and his boats

German-born sea adventurer settles in Florida

THE TERM RENAISSANCE MAN HAS been used with abandon in recent years, but for boatbuilder Chris Bauer the term is not misapplied. Chris is a scholar, world traveler, wine connoisseur, gourmet chef, opera buff, boat designer, boatbuilder, and sailor. He is, in addition, a linguist who speaks English, German, Spanish, Portuguese, Italian, and French. Chris builds his boats in St. Augustine, Florida, where he lives with his wife, Laurie, and daughter, Kirsten. How Chris and Laurie came to settle in Florida is a fascinating tale.

At age six, German-born Chris emigrated to South America with his family. They lived there for eight years. After he'd completed college, the open road beckoned to Chris, and he began a motorcycle trip through Europe, ending up in Portugal. On the coast of Portugal a Danish-built Baltic-trader, oak on oak, was being converted by a group of Americans into a square-rigger. The converted ship was designed to be a replica of the brig *Pilgrim*, immortalized by Richard Dana in his book, *Two Years Before the Mast*, the

book that exposed the brutal life of the common seaman to public view and influenced legislation to correct those harsh conditions. The replica brig, which would be used for charter work in the Caribbean, was also christened *Pilgrim*. Chris recalls that "it was 100 feet on deck and rigged in the traditional manner with wood blocks, dead-eyes, and belaying pins.

"Since there was a language problem between the new owners and the shipwrights, and since I was fluent in Portuguese and English, I signed on as interpreter and rigger, working for about eight months rigging the ship until it was ready to sail."

California girl

Just before *Pilgrim* was ready to leave for the U.S., a California girl and her younger brother came aboard. They served in dual roles as crew and paying passengers. Laurie had just graduated from college and, at the suggestion of their mother who thought crossing the ocean in a square-rigger would be a memorable and exciting adventure, Laurie and her brother, Dodd,

embarked on the square-rigger for the Atlantic crossing. By the time *Pilgrim* arrived in the Caribbean, Chris and Laurie were an "item."

Before leaving Portugal, Chris had met a German industrialist who became enamored of *Pilgrim* and wanted a ship just like it as his personal yacht. So after the Atlantic crossing Chris took on the job of finding a suitable hull that could be modified. In that pursuit he and Laurie flew to Scandinavia. There they found a three-masted schooner, but couldn't locate the owner. Eventually the project fell through and, as a German citizen, Chris decided that it would be an appropriate time to begin his obligatory 15-month tour of duty in the German Navy.

As a Morse code and teletype operator, he was stationed in Wilhelmshaven, on the North Sea. It was in northern Germany, in 1975, that Laurie and Chris were married. The service was performed by Chris' father, a Lutheran minister and Navy chaplain.

"While in Wilhelmshaven, Laurie and I ran across a boatyard where they built small lifeboats for Germany's

tall ships. Although they were constructed of heavy fiberglass, they were made along traditional lines. In the boatyard we found a 28-foot fiberglass lifeboat that the yard was experimenting with, and for a few hundred dollars the boat was ours. For the rest of my navy tour of duty, I used all my spare time designing how our boat could be converted into a safe, small, cruising sailboat, one we could ultimately use to cross the Atlantic Ocean.”

Construction of *Emigrance*

When his stint in the navy was completed, Chris and Laurie began work in earnest on the planned modifications that would make the little boat their new home. They rented space in an old barn and purchased a versatile power tool with attachments that could convert it into a lathe, table saw, router, joiner, grinder, and bandsaw. With this adaptable implement, they spent more than a year installing a long steel keel, ballasted with concrete and scrap iron. They framed out a deck, which was covered with plywood, and put on several coats of polyurethane paint that had ground cork mixed into it. This thick mixture provided a leak- and skid-proof deck.

They then constructed 16-inch wooden bulwarks, a teak caprail, and a teak cabintrunk that gave them 5 feet 9 inches of headroom below. Their boat was lightning-grounded and had a simple one-battery electrical system. They also constructed an outboard rudder with a tiller. The final stages of construction included a homemade anchor winch, heavy-duty bronze hardware and a long retractable bowsprit. Their completed boat had a 30-inch draft, a 9-foot beam, and was 28 feet on deck with a 27-foot waterline.

Mediterranean, here we come

With the mast, boom, gaff, and bowsprit stored on deck, and with their bicycles and belongings (including the



The fiberglass lifeboat purchased by Chris and Laurie in northern Germany. They would transform it into their sailboat, Emigrance, which would eventually carry them across the Atlantic.

large multiple-use power tool) stored below, but with no rigging, Chris and Laurie began a motoring trip toward the Mediterranean in their newly christened *Emigrance*. Their cruising home was powered by a one-cylinder, 8-hp inboard diesel that, in calm water, could move them at about 3 to 4 knots. The fuel tanks were two 5-gallon jerry-cans. Using Europe’s extensive network of inland waterways, they traveled from Bremerhaven into Holland and Belgium, then into France, spending a couple of weeks moored at a quay on the Seine River in the center of Paris. From Paris they traveled up the Seine, down the Saône and finally into the Rhône River, which flows south toward the Mediterranean Sea.

“Our trip through France was the quietest and most pleasant time I’ve ever spent on the water,” says Chris. “Since the locks on France’s inland waterways didn’t operate on weekends, we would moor our boat to a couple of stakes we would drive into the canal bank, take our bicycles off the boat, and go find the local boulangerie (bakery) and boucherie (butcher shop) along with a couple of bottles of wine. Then we enjoyed ourselves while waiting for Monday to come around.”

Near the mouth of the Rhône they found a small boatyard near the old walled town of Aigues-Mortes. It was on

the west side of the wide Rhône River delta, 60 miles west of Marseilles and just two or three miles from the Mediterranean. It was from this harbor, in 1248, that Louis IX, king of France,

assembled 1,500 ships and 35,000 men and embarked on the crusades.

By doing work for the yard two days a week, Chris and Laurie were able to spend the winter there while they rigged their sailboat. The rigging was done in the traditional style, just as the *Pilgrim* had been. The sailplan was that of a gaff-rigged Baltic cutter, with a long bowsprit and a square topsail.

Cruising the Med

Chris had become like a son to the boatyard owner. He wanted Chris and Laurie to stay and even offered Chris the boatyard, but they had a rendez-vous with a sailing adventure, so with heavy hearts they bade *au revoir* and sailed out into the Mediterranean Sea on their maiden voyage. This was the first sailing test of their small boat. On the morning of that first memorable day, they headed east along the coast of France.

Chris recalls thinking, “Well, it should work. I think I did everything right.” And later in the day he thought, “This boat is not bad at all!” Marseilles was their first stop. From there they hopped from port to port along the Mediterranean coast, discovering that all the planning and work had paid off: their little boat was an able cruiser. They daysailed up the French Cote-d’Azur, to Monaco, the Italian Riviera, Elba, and Corsica, finally returning again to the island of Elba just off the west coast of Italy.

“We spent two years cruising the Mediterranean without ever sailing an overnight passage,” says Chris. “During the summer we would day-sail the Mediterranean from port to port, and during the winter I would work at local boatyards. We stayed on Elba through the next summer, while

Chris’ homemade anchor capstan (at left), showing the remarkable construction and attention to detail that went into the building of Emigrance. Work begins on the lifeboat conversion (at right) in a barn in Wilhelmshaven, Germany.



I worked for a charter business, and then we spent our second winter on Elba again. If there were one place I would choose to spend the rest of my life, it would be Elba. It's a perfect universe in microcosm."

By then they had decided that their boat was a completely seaworthy vessel, and they began making plans to sail across the Atlantic to the United States. After two years of cruising the Med — on the first leg of their voyage, between the island of Sardinia and the Balearic Islands off the east coast of Spain — Chris and Laurie had their first overnight passage in *Emigrance*. Although it was a night filled with trepidation, they look back on it as one of the milestones of their sailing careers. Then, with all their belongings on board, they sailed from the Balearic Islands to Gibraltar and finally out into the Atlantic Ocean, traveling down the coast of Morocco and stopping at Casablanca and Safi for their final provisioning before starting the trip to the Canary Islands.

Across the Atlantic

"We stayed in Casablanca about 10 days, and just before leaving I got a weather report from the Casablanca airport," Chris explains, "They said we would have a good wind. I guess it might have been a good wind for planes but maybe *not* for small sailboats. As we started our ocean voyage from the African coast to the Canary Islands, the wind was 30 to 35 knots from directly astern. We rigged our twin headsails wing-and-wing and began four-hour-on and four-hour-off watches, surfing down the faces of huge waves for three days. It required constant attention to the tiller, since we had no autopilot or self-steering."

Fatigue probably contributed to a navigational error. Chris recalls: "I was using dead reckoning, and I added the deviation instead of subtracting it, so we were 14 degrees off course, heading for the coast of Africa instead of the Canary

Islands. On the fourth day out the wind subsided a little, and we were finally able to put up the mainsail. That day a little bird landed on deck, so I thought we were close to the Canaries, and I fired up the radio direction finder to get a bearing. It was then that I discovered we were closing on the African coast!"

Finally, the exhausted couple saw the huge cliffs and inhospitable coastline of the island of Lanzarote, the easternmost island in the Canary chain, appear dead ahead. They continued past the island of Fuerteventura to Gran Canaria island, where they entered harbor. Once safely ashore they evaluated their tiresome ordeal and decided they would be physically unable to continue to the United States. As they were making plans to ship their boat home and fly back to Europe, large sailboats and racing yachts began limping into the harbor with broken equipment and stories of the terrible storm they had just been



Laurie, in the hatchway of their nearly completed boat.

though — the same weather Chris and Laurie had experienced. As Chris surveyed the docks, where wet mattresses, bedding, and clothes were being laid out to dry and broken spars and blown-out sails were being repaired, he thought, "Well, we didn't think it was *that* bad. It was uncomfortable, but we never had any real trouble. I guess we have a pretty good boat, and we're able to handle things after all."

Two modifications

At the end of December 1981, after three weeks in the Canaries, and with renewed faith and self-confidence, they decided to undertake their 3,000-mile trip across the Atlantic. They made two important modifications: buying an electronic Tillermaster autopilot and changing their watch system from the four-on, four-off to the Swedish 6-4-2. "With only two people on board, these changes made all the difference," Chris recalls. "The two six-hour



Laurie furls sail aboard *Emigrance*.

watches were at night, so we each had a good night's sleep every night. We left the Canaries, and using celestial navigation, a cheap Casio watch I had bought there, and a shortwave radio to get GMT time signals and weather reports from French radio, we started our voyage. The first week out we were both seasick for the first time. I think it was the result of apprehension and the pressure of the commitment. But once the daily routine became normal, we felt much better.

"The second week out we began thinking, 'This is really nice.' By the third week it was, 'Will we ever get there?' By the fourth week we felt like we were in limbo and would be destined to sail on and on forever. Life on land became something out of our distant past that we could hardly identify with anymore. But soon we began receiving Caribbean AM radio stations, our first confirmation that we were actually where we thought we were.

"Finally, after 31 days, at around two or three in the morning, we saw a glow on the horizon, and our RDF showed Barbados just 10 miles away. We were just a few miles off course: my celestial sun sights worked!

"We had an enormous sense of accomplishment and euphoria. We had sailed across the Atlantic in a tiny little boat we built ourselves. We did it. This is it. *Nothing* is impossible!"

The first project on shore was finding a telephone and calling Laurie's parents. "My mom had no idea we were doing this," Chris says, "My dad never told her."



Chris and Laurie Bauer in their shop in St. Augustine.

Kirsten Bauer

Island hopping

They soon began island hopping up the Caribbean: English Harbor in Antigua, Puerto Rico, the Bahamas, and finally Fort Lauderdale, on the east coast of Florida. From Fort Lauderdale they began a trip north on the ICW and, while in St. Augustine, they discovered that Laurie was expecting. So in St. Augustine the Bauers swallowed the anchor and began a life ashore. Chris, relying on his boatbuilding skills, founded Bauteck Marine Corporation in 1983, with the intention of building the ideal dinghy. Chris and Laurie built a home in St. Augustine, near their shop, for the family that now included their new daughter, Kirsten. About this time they sold *Emigrance* for the amount it cost to build her and, sadly, never saw or heard about her again. (If any readers are aware of the boat's past or current whereabouts, we're sure the Bauers would love to hear from you. Contact information is at end of this article. -Ed.)



Kirsten Bauer

Chris, in his St. Augustine shop, working on a Bauer-10.

The first boat to be produced by Bauteck Marine was the Bauer-10. Chris conceived this dinghy as the perfect yacht tender. It was a dinghy that could be easily rowed, sailed, or motored. The Bauer-10 was followed in 1988 by the Bauer-8, and in 1996 the Bauer-12 made its debut. All three models were designed by Chris, with the help of a computer-lofting program. "I decided to build small boats because I like the idea of being able to put out a completed boat in a relatively short length of time," explains Chris. "In addition, the initial expense of starting out with a large hull would have been prohibitive for us."

The Bauers' factory is a 5,500-square-foot area that includes a



Chris, in the red shirt, talks to potential customers at the Annapolis Sailboat Show (October 2000).

separate building where the fiberglass layup is executed. The layup building houses modern equipment for keeping airborne pollutants to a minimum as well as an environmentally safe acetone recycling machine. About 55 percent of the 70 to 80 boats built yearly are the Bauer-10s and about 35 percent of the production are Bauer-12s, with the Bauer-8s coming in a distant third. It takes about 20 to 22 man-hours to do the fiberglass work on the 10-footer and, depending on how much wood is stipulated by the owner, the total man-hours for each of these boats is about 32. Seats and wood trim are teak, with some ash used in the tiller laminate for strength. Spruce is also used on the rare occasions when a customer specifies wooden spars. The staff at Bauteck Marine is usually about five. This includes Laurie, who takes care of all of the office work, with occasional help from Kirsten, who is now 17.

All custom-made


"We rarely build boats for inventory, since all our boats are custom made to each owner's specifications," explains Chris. "Usually we just have one boat of each size, which we use for boat shows and demos. About 60 to 70 percent of our boats are sold through boat shows and the rest through dealers or export. Currently we have only four dealers in the United States because most dealers find dinghy sales too time-consuming. Sailboat owners spend just as much time looking over a 10-foot dinghy as they do selecting their 32-footer."

The Bauer hulls are constructed of hand-laid fiberglass and have an interior liner that does triple duty as a hull reinforcement, watertight flotation, and a huge storage compartment. In the Bauer-10, four watertight ports give access to this storage/flotation area that can be home to tools, flashlights,

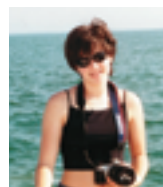
foul weather gear, mooring lines, anchor and rode, and a host of other paraphernalia that makes this little dinghy into a mini-cruiser. The double liner provides so much flotation that it can still be rowed, motored, or sailed when swamped. Whereas, in many so-called top-of-the-line dinghies, seating while sailing is awkward or non-existent, the Bauer liner provides a unique U-shaped stern seat that allows the sailor to sit athwartships for better balance and sail handling. High freeboard, wide beam, full-length keel, high loading capacity, and exceptional stability are designed into these hulls. And since it is a true displacement hull, it can be rowed for miles around a harbor with little effort.

The sailing models have kick-up rudders and kick-up centerboards, not daggerboards, and both the rudder and centerboard have an ingenious internal shockcord arrangement that pulls the rudder or centerboard back down again after it has kicked up. This avoids hanging over the stern trying to push the rudder down. Classic lines and exceptional performance are characteristics of the Bauer boats, which are not only aesthetically pleasing, but completely functional as well.

The rigging work that Chris did on the tall ship, *Pilgrim*, and the design and construction of their little *Emigrance* has all come together in a neat little line of dinghies that are built with personal care. It's nice to see a boat designer and builder who has "paid his dues" on the water, knows what is required of a small craft, and has firsthand knowledge of what old man Neptune can throw at us.

For more information on the Bauer boats visit their Web site, <<http://www.bauteck.com>>, or contact Bauteck Marine Corporation, Inc., 2060 Dobbs Road, St. Augustine, FL 32086; 904-824-8826; toll-free 888-228-8325; fax 904-824-8574; email bauer@aug.com. 

Don Launer's photo and bio appear on Page 17. Instead meet photographer Kirsten Bauer, 17, who took several of the recent photographs in this article and is the reason Chris and Laurie wound up settling down in St. Augustine 18 years ago. Kirsten is a senior in high school who hopes to become a journalist.



One-pot wonders *from the galley hatch*

The last thing most of us want to do when cruising is to spend much of the day standing over a hot stove. At first, my solution was a picnic cooler filled with bologna sandwiches and potato chips. But on longer cruises I began to notice a marked discontent among the rest of the crew. I suggested that each of us take turns with the cooking chores. Nice try, but in no time we were back to bologna. It was time to hit the books...cookbooks. And there it was, the one-pot answer to my prayers: good old-fashioned stew.

Stews are staple fare in every country around the globe, testimony to their great taste and convenience. These days, for shipboard cuisine I choose stews made with simple ingredients that



that take little preparation and cooking time. The final requirement is flexibility. These dishes can be made with fresh, frozen, or canned ingredients and still taste great. My galley pantry is lean. I have

dried spices

and herbs and canned vegetables. On longer trips canned meats, such as chicken, are staples. And I always have beef, chicken, and vegetable bouillon to make quick, flavorful stock. Whenever luck allows, I use fresh ingredients. The best finishing touch for these "tummy fillers" is good crusty bread if you have it, but regular sliced bread will do in a pinch.

Stews should be made in non-reactive stainless-steel cookware. Using iron or aluminum pots or skillets with acidic foods, such as tomatoes, vinegar, or wine, will cause discoloration and affect the flavor of the dish.

Sailor's Stew

No shipboard recipe collection would be complete without "Sailor's Stew." Serves 8.

Ingredients:

2 cups canned Italian plum tomatoes

Recipes for cruise stews, quick and easy tummy fillers

1 tablespoon flour
1½ cups sliced onion rings
1 teaspoon salt
½ teaspoon ground pepper
2 tablespoons chopped parsley
⅓ teaspoon oregano
½ teaspoon dry mustard
½ teaspoon ground allspice
1 slice fresh ginger or 1 teaspoon ground ginger
2 pounds cod or monkfish steak, diced*
2 tablespoons butter
2 eggs lightly beaten (optional)
2 tablespoons lime juice

*Fresh or canned chicken can be substituted for the fish.

To prepare:

In a large skillet, break up the tomatoes with a fork. Add the flour and stir until all the lumps disappear. Add the onion rings, salt, pepper, parsley, oregano, mustard, allspice, and ginger. Cook covered for 15 minutes.

Add the fish and cook for 5 to 10 more minutes, until flaky. Remove from heat. Stir in the beaten eggs, if you are using them, and the lime juice. Return to heat for 2 or 3 minutes. Serve hot.

Maine Chicken Stew

This is real Downeast comfort food, great for chilly days.

Serves 4.

Ingredients:

3½-pound package of chicken, cut up*
3 potatoes
2 onions
cold water
2 tablespoons butter or margarine
1 cup milk, half-and-half, or evaporated milk
salt and pepper
minced parsley
4 to 6 saltines

*Or canned chicken.

To prepare:

In a large pot, place alternate layers of chicken, slices of potato, and thinly sliced onion. Cover with cold water. Simmer until chicken is tender. Add butter in small bits and half of the half-and-half or milk. Season with salt, pepper, and parsley. Split crackers and moisten in the remaining half-and-half or milk. Add to stew and heat thoroughly.

Potato and Rice Soup

This is a traditional Italian recipe for a hearty dinner soup. Serves 4.

Ingredients:

½ tablespoon tomato paste diluted in 6 cups water
2 slices of bacon chopped (or prosciutto)
½ clove garlic, chopped
1 teaspoon minced parsley
4 medium potatoes, pared and diced
1 cup rice
½ teaspoon salt
½ teaspoon pepper

To prepare:

Place the bacon, garlic, and parsley in soup pan and brown well. Add tomato paste, diluted in water, and salt. Bring to a boil. When water is boiling rapidly, add potatoes and rice. Cook 20 minutes. Serve hot, sprinkled with Parmesan cheese.



Stew Roman Style

The original recipe calls for beef, but like all of these recipes, can be made with fresh or canned chicken. This meal takes slightly longer to cook, but it is worth every minute. Serves 4.

Ingredients:

1 tablespoon olive or vegetable oil
1 onion, chopped
2 slices of bacon or prosciutto, chopped
2 pounds of stew beef or chicken (if canned chicken, use two cans)
salt and pepper
⅓ teaspoon marjoram or oregano
1 cup red wine (white wine for chicken)
1 small can whole tomatoes or 3 large fresh tomatoes, peeled and sliced

To prepare:

Place the olive oil, chopped onion, bacon, and garlic in a stewpot and brown slightly; add meat, salt, pepper, and marjoram or oregano. Let the meat brown. When the meat is well browned, pour the wine over it and continue cooking until the wine is absorbed. Add the tomatoes and enough water to cover the meat. Cover the pan and cook until the meat is tender — no more than 2 hours. If the gravy is too thick, it can be thinned with water. The gravy will be dark and very tasty. This can be served with steamed rice or bread.

Vegetable Soup with Pistou

One day I hope to sail around the Mediterranean, but until then I will content myself by eating this wonderful soup as I sail along the coast of New England. The vegetables in this recipe can be replaced with canned or frozen vegetables, but I recommend leaving out the zucchini in that case. Serves 8.

Ingredients:

2 tablespoons olive oil
½ cup chopped onions
3 garlic cloves thinly sliced, or 2 tablespoons garlic powder
1½ cup chopped canned tomatoes
1 cup cooked cannellini beans (white kidney beans)

1 medium carrot
halved and thinly
sliced
2 teaspoons salt
10 cups water
1 cup cut green beans
1 medium zucchini
thinly sliced
½ cup uncooked macaroni

Pistou:

3 garlic cloves or 1
teaspoon garlic powder
½ teaspoon salt
½ cup fresh basil (or dried basil soaked in warm water for 15 minutes)
⅓ cup Parmesan cheese
3 tablespoons olive oil

To prepare:

Heat the oil in a soup pot. Add the onion and cook, stirring occasionally until the onion is soft. Add the garlic and cook for two minutes. Add the tomatoes, cannellini, carrots, salt, and water. Heat to boiling, reduce heat and simmer 30 minutes. Add the green beans, zucchini, and macaroni. Simmer 15 minutes. Meanwhile, prepare the Pistou by combining all the ingredients in a mortar or small bowl and mashing them together. To serve, remove the soup from the heat and stir in the Pistou.



Pasta and Cannellini Soup

This is based on the traditional Italian favorite, Pasta e Fagioli. Once again, those sunny Mediterranean flavors shine through. Serves 6.


Ingredients:

½ cup olive oil
4 large garlic cloves, minced, or 2 tablespoons garlic powder
2 teaspoons dried rosemary
1½ cups drained, canned, whole tomatoes, chopped
Salt and pepper
7 cups water and vegetable bouillon
6 ounces elbow macaroni

To prepare:

Heat the olive oil in a large soup pot. Add rosemary and garlic and heat over medium heat. Add tomatoes, salt, and pepper. Simmer three or four minutes. Add vegetable bouillon and water and simmer five minutes. Add the pasta and simmer seven minutes. Add the cooked beans and

simmer three minutes to heat and blend flavors. Adjust seasonings. Serve hot with crusty bread.

Happy sailing! 

Barbara grew up in Connecticut, where she learned to love ships and the ocean. She taught high school and worked as a professional singer and musician performing in some of the best jazz joints in the country. She now lives and sails in Colorado.





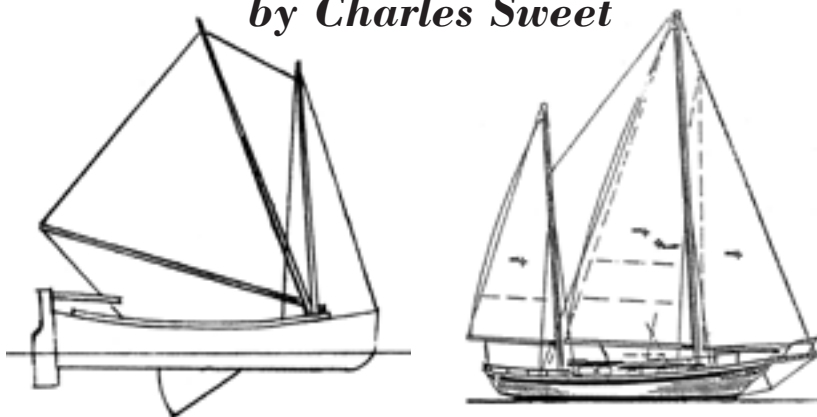
The Monterey boat connection

Reese Palley profiled the Cherubini 44, Hinckley 40, and Valiant 40 as classic American sailboats in the May 2000 issue of *Good Old Boat*. To this list might be added three groups of West Coast counterparts: the Pacific Seacraft Crealock 34, 37, 40, and 44; the Henry Morschladt DownEaster 32, 35, 38, 41, and 45; and the William Garden and Clair Oberly Mariner 32, 35, 40, 45, and 50. (The author notes that a group of Lockheed executives, inspired by his proposal for a fiberglass boat division similar to Grumman's Pearson subsidiary, supported the production of Mariners at Kawasaki in Japan; the other boats were built in Southern California. -Ed.)

These West Coast boats are related to the East Coast group by W.I.B. Crealock's and Robert Perry's canoe sterns and by John Cherubini's, Henry Morschladt's, and William Garden's clipper bows. Bob Perry has credited

Famous California boats spawned many derivatives

by Charles Sweet



The 1850s Sicilian felucca 19 (above left) became the 1860s Columbia River 22 to 28 and the 1870s 28- to 40-foot Monterey boat, with a clipper bow. The Mariner 40 (above right), one of many derivatives. At top, an excellent restoration of a Monterey boat.

the North Sea boats for his inspiration, and the Cherubinis aspired to L.-Francis Herreshoff's *Ticonderoga*.


The West Coast boats were derivatives of the clipper-bow, double-ender California Monterey fishing boat, which itself was developed from the lateen-rigged Sicilian beach boat, which Howard Chapelle says was "politely called the San Francisco felucca." Very few authentic Monterey fishing boats were built after 1941 due to the wartime relocation of their

Italian builders away from the coastline and the consequent loss of their boatyards, skilled workers, and material sources.

Both Crealock and Garden made several attempts to produce these boats in quantity before achieving success with their better-known sailing derivatives. It is fitting that an Italian, Sam Filippo, produced a mold over a plug made from an authentic wooden boat. This mold was used by several boatbuild-

ers to replace hundreds of aging commercial boats. Many of these replacements are still actively working the West Coast fisheries from Mexico to Alaska. Unfortunately, the appeal of the classic Monterey boat as a yacht was eclipsed by low-cost, glass-over-plywood, twin-screw boats that could reach Santa Catalina Island from Los Angeles in one hour instead of three.

Credit for the first Monterey boat derivative goes to Annapolis-based Thomas Gilmer for the Sea Horse 30 motorsailer, which he designed around 1950. In his own words, "I always admired those little boats when I was stationed with the Navy in San Diego."

Since 1942, hundreds of Monterey boat replicas and derivatives have been built. Primarily constructed from fiberglass over molds taken from original classic Monterey designs, many of these boats have retained the charm of those classics without the inevitable deterioration of wood. Only a few authentic wooden Monterey boats have survived and can still be found in fishing ports along the West Coast. The ingenuity of the Italian immigrant boatbuilders and the simple beauty of their design is still evident in many of today's modern yachts. Their boats served as inspiration for many of the sailboats that followed. 



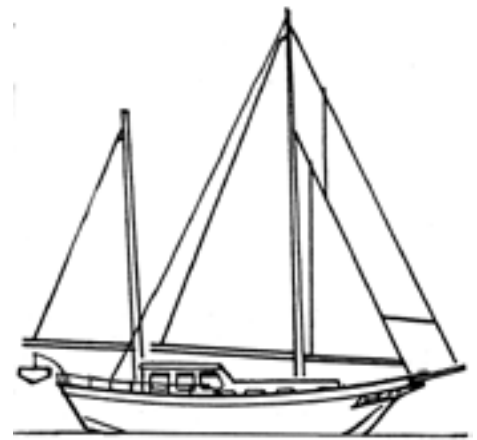
Monterey boat enthusiast Charles Sweet began his lifelong passion for boats as a teenager working in the Wilmington, California, boatyards during the 1930s and throughout his 50-year career at Lockheed. Charles recently sold his fully restored Monterey boat, Mary Ann, to Universal Studios for use in a theme park in Japan recreating Fisherman's Wharf in San Francisco.

He is writing a book about Monterey boats.



Visitors to Monterey, Calif., are greeted by the Francesca, on display in the heart of the shoreside community. A sign, commemorating the area's commercial fishing fleet and its Sicilian fishermen, says she's a 1937 Monterey-style salmon troller.





Thomas Gilmer's first Monterey derivative, the Sea Horse 30, designed in 1950, above left. At center, the author's 1956 design, developed with a proposal to produce replica boats from molds built over wooden

30- and 34-foot Monterey boats. At right, Monterey lover C. E. Ackerman's Newporter 40, the first runaway success as a Monterey boat derivative. At least 25 replicas were produced and more than 50 derivatives.

Monterey boat replicas

Year	Designer, Name, Length and Manufacturer	Qty	Mat	Bow	Stern	Notes
1942	George Meese, Morning Star 36 minesweeper for U.S. Navy	25	CDR	S	TR	San Francisco
1946	Harry Champlin, Monterey 30 & 39 at Fellows & Stewart	lea	MHG	C	DE	Wilmington
1956	Thomas C. Gilmer, Sea Horse 30 adaptation by Charles Sweet	0	FBG	C	DE	
1959	William Garden, Vega 36 & 40 at Willard, Costa Mesa, Calif.	low	FBG	S	DE	
1960	Robert Beebe, Monterey Clipper 35 at Monterey Boat Works	1	MHG	C	DE	
1960	William Garden, Monterey Clipper 30 on East Coast and Taiwan	2	FBG	C	DE	
1960	George Calkins, Bartender 19, 22, 26, 29 for Coast Guard	100s	F/W	S	DE	Semi-Vee
1961	Sam Filippo, Monterey Clipper 32 at B.F.P. on Cannery Row	100s	FBG	C	DE	Filippo mold
1962	Edwin Monk Jr., six double-ender 30s for Westlake, Seattle	low	AL	S	DE	Semi-Vee
1962	Ben Ostlund, Pee Wee 30 surfboat for Honolulu, Hawaii	1	F/W	S	DE	Semi-Vee
1962	Ben Ostlund, Troller 34 for Ed Douthit & Crane, Santa Rosa	low	F/W	S	DE	Semi-Vee
1962	Nils Lucander, Monterey Clipper 30 for Roland Reed/Cheoy Lee	low	FBG	C	DE	Semi-Vee
1963	A1 Mason, 30 foot Monterey-type cruiser for East Coast	1	FBG	C	DE	
1964	Edwin Monk Jr., Diesecraft 31 for Reinell in Salem, Ore.	low	F/W	S	DE	Semi-Vee
1964	Bill Tritt, Monterey 26 daysailer and cruiser for McDougall	low	FBG	S	DE	Santa Barbara
1965	W.I.B. Crealock, Carib 30 for Skipjack of Ft. Lauderdale, Fla.	med	FBG	S	DE	Filippo mold
1968	Edwin Monk Jr., Monterey Clipper 32 for Puget Sound, Seattle	100s	FBG	C	DE	Filippo mold
1970	W.I.B. Crealock, 5 models of Vega 30 for Willard, Costa Mesa	low	FBG	S	DE	Filippo mold
1972	Udo Vogel, Vega 36, 40, 45 trawlers at Vega, Long Beach, Calif.	Low	FBG	C	TR	Semi-Vee
1974	Edwin Monk Jr., Monterey Clipper 32 motorsailer, Puget Sound	100s	FBG	C	DE	Filippo mold
1975	John Schaefer, Monterey 22 at Dreadnought, Carpinteria, Calif.	low	FBG	C	DE	
1975	Westport Shipyard, Sportfisher 40 Laura J at Westport, Wash.	1	FBG	C	TR	Semi-Vee
1976	W.I.B. Crealock, Vega 8-Ton at Willard, Fountain Valley, Calif.	low	FBG	S	DE	Filippo mold
1981	Ray Jones, Monterey Clipper 34 at Monterey Marine	5	FBG	C	DE	Long Beach
2000	Thomas Gilmer, Monterey Marine 34 adaptation by Charles Sweet	0	FBG	C	DE	

Key: AL: Aluminum • CDR: Cedar • FBG: Fiberglass • MHG: Mahogany • F/W: Glass over plywood
C: Clipper • S: Straight • DE: Double-ender • TR: Transom stern

Expensive?

No . . . beyond price

Professionally restored Corinthian delights her owner

The founders of the Cruising Club of America bridged the gap between cruising and racing with a brilliant design rule. In the process, they created scores of aesthetically simple and comfortable family boats that were also successful competitors, dominating American yacht racing for decades.

As a youngster, I spent summers around traditional boats and learned to value everything about them. By the time I was ready for a boat of my own, designer Carl Alberg was interpreting the CCA rule for my generation. No surprise that my first serious boat was an Alberg. No surprise that my present boat is another Alberg. Those early lessons in aesthetics and simplicity set the focus and scope of a keel-up restoration.

I live on a lake, enjoy smaller boats, treasure simplicity, respect good design, value structural fiberglass, appreciate wood, and respond to the feel of a full keel, and I had already learned to appreciate Alberg's Corinthian two decades earlier. I knew firsthand what a joy this boat could be. So when faced with the prospect of rescuing a rather forlorn Corinthian, I did not hesitate for long.

In 1964 Carl Alberg completed his design #40, the 19-foot 6-inch by 14-foot 6-inch by 6-foot 6-inch by 2-foot 9-inch Corinthian, which appeared in the design section of *Yachting* the following year — no small feat for a small boat. Freed from the usual builder's demands for headroom, the graceful lines of the Corinthian are pure Alberg. His elegant compound curves convey far more than mere form; they convey feeling, spirit, and movement itself. And, in a very special way, they also constitute serious art. With her balanced overhangs, graceful sheer, sleek profile, and full-keeled wineglass hull, the Corinthian is an elegant little sloop. Although she might be considered narrow or heavy by some standards today, her yachtlike handling befits a gentle boat from a gentle era.

A professional job

Professionally restoring a famous old boat raises interest; professionally restor-

ing a small, 30-year-old production boat just raises eyebrows. Small seems to be counter-cultural. An American fixation with ever-larger homes, cars, and boats makes spending serious money on anything small appear suspect. Earlier I, too, had fallen into the trade-up trap, but experience gained during a few misspent years in powerboats taught me one major lesson: as complexity increases, enjoyment decreases.

I returned to sail and to that basic tenet: a simpler boat with good aesthetics is the favored tack to real enjoyment.

Sailing dinghies, canoes, and kayaks, which need neither crew nor bowthrustrer to leave the dock, share the lake with me. They are reminders that small is not just beautiful; small is simply enjoyable.

Sailstar of Bristol built my project boat in 1966. On a cold fall day 33 years later, I found her uncovered on a shaky wooden trailer in a Portland, Maine, back yard. The validity of my concept was more than challenged by the gruesome reality: years of neglect, poorly concealed by far too much high-gloss paint.

At first I just felt sympathy. Then I began to see that even her sad condition could not completely hide her good bones, her aristocratic bearing. She deserved restoration. As soon as transportation had been arranged, the tattered little sloop with a bilge full of ice was back in her native Rhode Island. There, the good folks at Bristol Marine would do

a serious evaluation. If everything went well, she would be reborn in spring as the *Daystar*.

Begin again

The evaluation was alarmingly simple: just start over. They say if you assemble a car using new parts, you do end up with a new car, but at 10 times the cost. Now I get it. That said, facing my three-score year and probably my last restoration opportunity, we did just that. The only unaltered piece of the original boat still aboard is her tiller. Everything else was completely reworked or crafted new to match the original.

We began with basics and then ran the gamut. Separating the hull and deck, we replaced the balsa deck coring and re-fiberglassed. We removed and patched the through-hull fittings of the old head and installed a new garboard drain. We built three bulkheads and added foam flotation before refastening the hull and deck with screws and sealant. Since she would carry only main and jib, we discarded winches and genoa track.

We gelcoated all visible interior



"With her balanced overhangs, graceful sheer, sleek profile, and full-keeled wineglass hull, the Corinthian is an elegant little sloop."



areas, including the bilge. We added a new teak cockpit grating and cabin sole, new mahogany seats, cockpit coaming, companionway

doors, all new wiring and fixtures, new portlights, new stainless-steel deck hardware, a new mast-support beam and chainplates, a new mast tabernacle, new rigging, new sails, and new boom tent.

Alberg designed an engine well deep in the cockpit where the motor would not mar the aesthetics. A quiet Nissan four-stroke, with exhaust through the prop, utilizes the well nicely. A rubber flap inside the well prevents backwash from wakes. At the aft end of the cockpit we added a bulkhead to close off an awkward looking open area around the well and installed a cockpit storage drawer. Below, in place of the head, we created a secure spot for an AGM battery, a small electric panel, and another storage drawer. We rebuilt the berths with mahogany trim and navy-blue cushions.

"Professionally restoring a famous old boat raises interest; professionally restoring a small, 30-year-old production boat just raises eyebrows."

On the deck we added a traditional mahogany eyebrow to the cabin trunk, replaced a

vinyl rubrail with mahogany, and used Awlgrip for all paintwork. We replaced the nonskid in the original pattern, coated the deck, cabintrunk, mast, and boom in white, and finished the mahogany in high gloss. We did her topsides in flag blue, lettered her name in gold and white, painted the bottom red, and added a white boot-top. Even in the relatively dim light of the workshop, the effect was awesome.

Cinderella

The center of attention in the bright sunshine of a late May afternoon, *Daystar* was the prettiest boat in the Bristol yard. People who remembered seeing her when she first arrived were amazed. She was a real-life Cinderella story. "What a shame Carl didn't live to see this," was the

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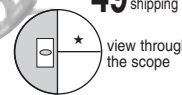


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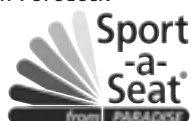
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heartfelt comment from someone who had known the designer. I recalled a moment years ago when I was walking past my first Corinthian, *Ragtime*. At least 10 years old by then, she could still provide that powerful rush of owner pride. *Ragtime* did then; *Daystar* does now. To achieve that rush of pride, the restoration must be as good as the initial design. Bristol president and naval architect, Andy Tyska knows that. His team worked as skillfully on little *Daystar* as on any of the million-dollar yachts only inches away.

Daystar exceeded expectations in her first Connecticut season. She mastered the fluky summer breezes on Candlewood Lake, tackling smartly in 2-knot zephyrs. She proved her mettle in the steep chop of approaching storms where, with spray flying well aft, she was as solid as a 40-footer.

In the generous winds of autumn, she became an absolute demon. Long rail-down tacks under hillsides of blazing color were spectacular. In the crisp




"The center of attention in the bright sunshine of a late May afternoon, Daystar was the prettiest boat in the Bristol yard."

fall air, her welcoming wooden cockpit became the center of a warm and wonderful world. Even stretched until Thanksgiving, the season seemed too short.

Daystar saw some minor changes in the off-season. We recut her traditional boom tent to create a more functional and attractive cockpit cover. We added a matching mainsail cover and a furler. Comfortably settled into her second Connecticut season at age 35, Alberg's

lovingly restored little gem is a quintessential CCA pocket yacht. The way I see it, the restoration saved an old boat from the chainsaw, while creating one of the finest small sloops in the country.

Inevitably at the end of a project of this magnitude, the final task is to answer those pointed questions. Was the restoration worth the considerable expense? Absolutely. Could I ever recover the cost? Probably not. Is that important? Not at all. Every time I see her at my dock, or charge down the lake on a reach, or motor quietly around a cove at dusk, I know deep inside

that little *Daystar* will always be quite simply ... beyond price. 

Frank has been sailing since his school days, competitively in college but just for pleasure now. After years on Long Island Sound, he now sails Candlewood Lake in Connecticut.



Send your boat "to camp" this fall and get it back "like new" in spring

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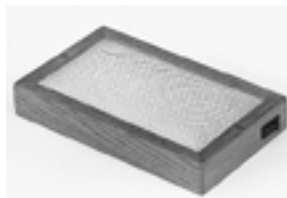
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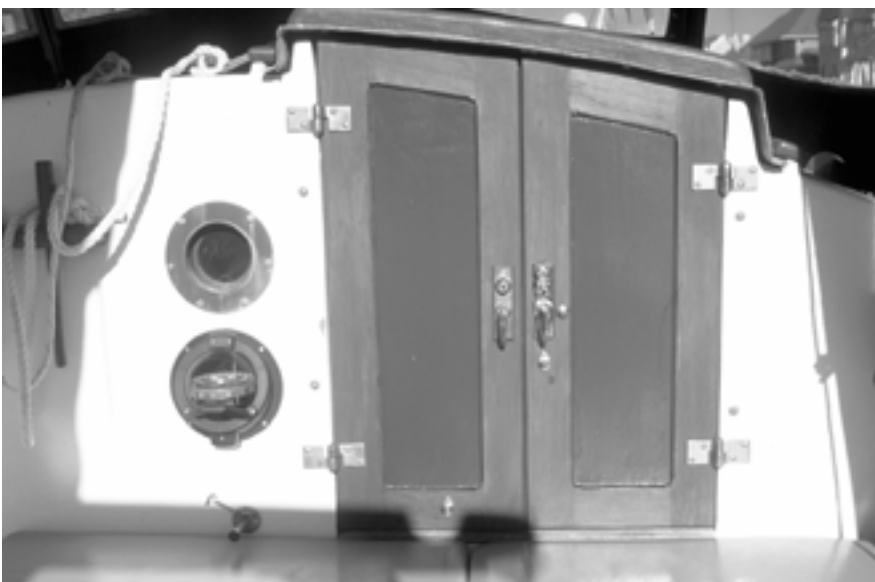
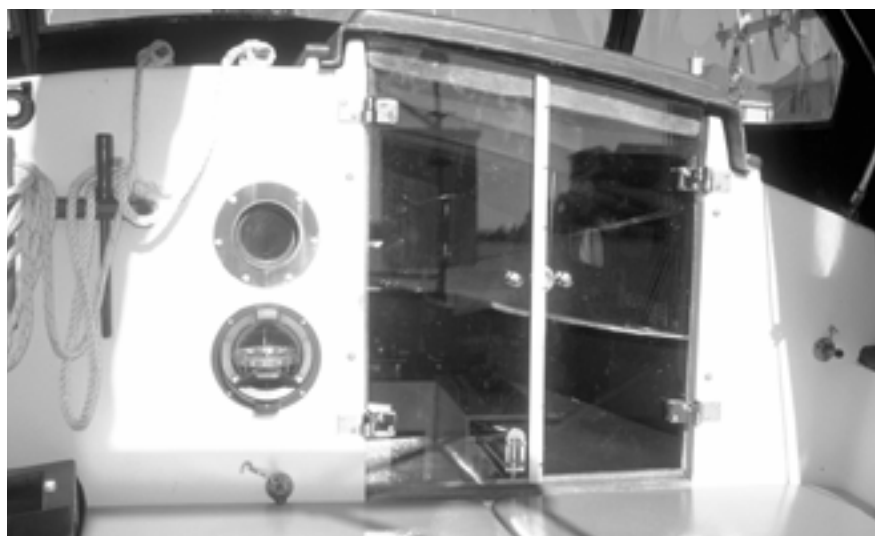
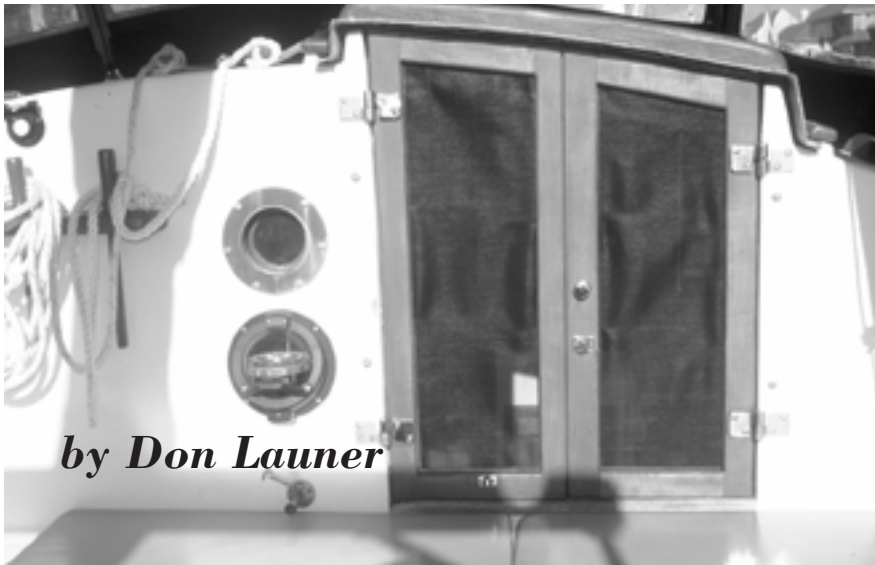
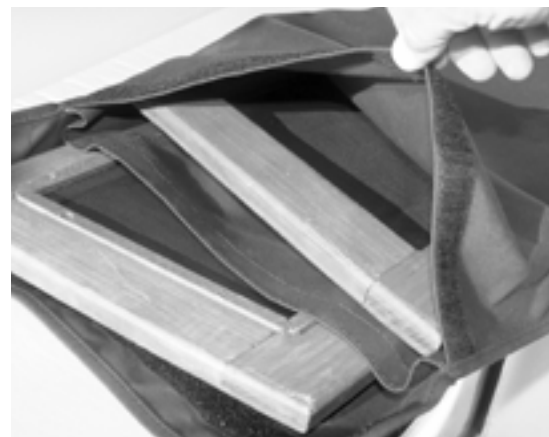
Elegant all-season solution

by Don Launer

One thing for sure about being aboard a boat is that the weather is never the same for very long. There are times when you don't need hatch doors at all, times when heavy-duty doors don't seem strong enough, times when it's warm and balmy but you need screens to keep the bugs out, and times when it's pouring rain or chilly outside and you want to close up without feeling like you're in a cave.

After many years of cruising, we have come up with a solution to the hatch-door problem that has proved practical for us. We have created three sets of interchangeable cabin doors to meet all weather conditions.

Our hatch doors are on lift-off hinges, and the hinges on all three pairs of doors are compatible, so that in a matter of seconds one pair of doors can be replaced by another. Since there are as many dimensions for drop-on hinges as there are manufacturers, to make the hinges interchangeable, sticking with the same manufacturer is a must.




The tight storage solution

Our main hatch doors are made of heavy 1½-inch teak, with a built-in lock and dead-bolt. These strong doors are the ones we use when we're out in rough seas and for security when leaving our boat unattended.

For hot summer days when bugs are annoying, we have a pair of screens with teak frames that we drop in place. Even though all 11 of our bronze ports open and have screens and our forward hatch can open in either direction and has a screen, the added airflow with screened hatch doors makes a big difference. These screens have the added advantages of letting in light and providing a view.

Once, while in a transient slip in Cape May, we had several days of cold, windy rain pelting our cabin from the stern. We used our third pair of hatch doors to keep us dry and cozy inside while allowing for light in the cabin. This third pair of hatch doors is made of ¼-inch clear acrylic. Although they have the drop-on hinges of the other doors, they have no frames. They're wonderful for keeping out the rain and cold while maintaining the feel of an open hatch. We find they're also handy on sunny days during the off-seasons when they create a nice greenhouse effect.

Our two sets of unused doors are stored in slip-covers made of Sunbrella. This rugged material protects the doors from scratches and keeps them together. Our two unused sets of doors are usually kept on a quarterberth unless our granddaughters are sailing with us. Then we keep them in the lazarette — the hatch doors, that is, not the granddaughters. 

Don Launer is an inveterate do-it-yourselfer. He built his own home from scratch. "I bought 28,000 bricks, a cement mixer, and a book on how to lay bricks," he says. In 1980 he also built his own Ted Brewer-designed schooner from a bare fiberglass hull, right out of the mold. (Look for a granddaughter photo in an upcoming issue. You'll understand why the hatch doors are occasionally relegated to the lazarette.)

Much has been published on how to add hatch screens to your boat, but the problem I have with the designs I've read about is that many are made with wooden frames and are very difficult to store aboard when not in use . . . which is most of the time. Others are made with zippers and/or Velcro and are easy to store but are not easy to pass through, and they leave the hatch lined with Velcro.


If these are problems for you, too, maybe this solution will help. If you have a sliding hatch cover and hatch boards that stack vertically in place, you can probably use this idea. All that is required is a couple of yards of mosquito netting and three ½-inch or ¾-inch wooden dowels. Measure the distance from the rearmost edge of the hatch cover when it is closed to that same point when it is fully open. To say it another way, measure the two sides of the hatch cover opening. They should be the same. Cut two of the dowels 1

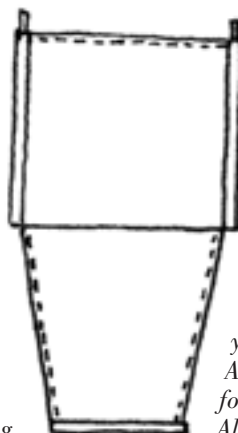
by Rolph Townshend

inch longer than that dimension, round the ends, and sand them smooth. Cut and sew the netting to fit over the entire open hatch area with a pocket on each of the top sides to hold these dowels, leaving the extra 1 inch exposed to fit under the rear edges of the open hatch cover.

Make the edge next to the open hatch cover long enough to sew a ¼-inch hem for stiffening. Cut the vertical part to fit the vertical opening with a pocket at the bottom to hold the third dowel as a weight to keep the screen in place. Cut the dowel to fit the bottom of the hatch opening,



round and sand the ends, and sew the ends of the lower pocket closed, capturing the dowel in place. Hem the two vertical edges for stiffening. This screen is cheap, easy to make, and requires no additions to the cabin or deck. It's easy to store and easy to pass through. And it keeps the bugs out! 




Rolph, better known as Towney to his friends, has been racing and cruising the Chesapeake for more than 60 years. He sails Skybird, an Alberg 30, and was one of the founders of the Chesapeake Bay Alberg 30 Association in 1964.

Jury-rigged cutter

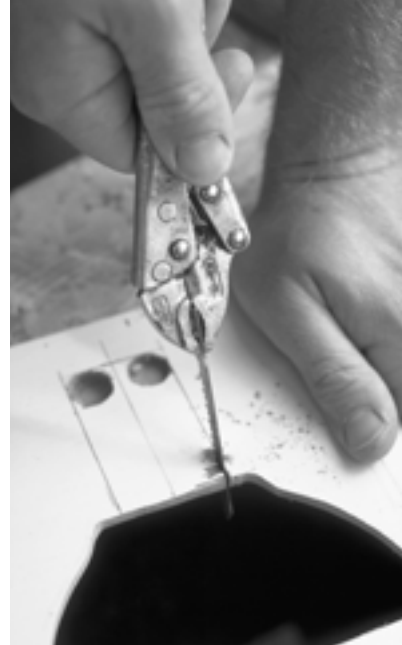
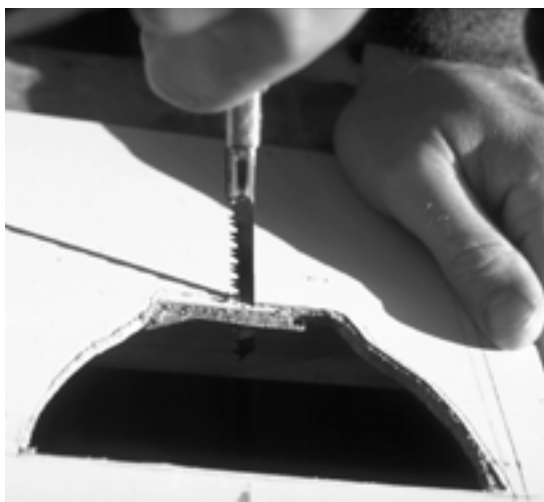
A keyhole saw is invaluable when you need to fit a barometer or speaker into a bulkhead, cut a dolphin-shaped vent in a locker-door, or for any holes you have to cut when — for one reason or another — you can't use a power jigsaw.

If you don't have a keyhole saw in your tool locker but find you need one, take a jigsaw blade and lock the butt end of it firmly between the jaws of a pair of Vise-Grips. If you use a sharp, fine-toothed blade, your makeshift keyhole saw will cut just as efficiently as the real thing.

Keyhole saws have one unfortunate habit: when sawing plywood, they tend to splinter the top veneer away from the edge of the cut, giving a messy result that is impossible to clean up with sandpaper. For

a neater cut, run around your outline with a utility knife before you start sawing. The knife slices through the top veneer, so as long as you saw just inside the knife cut, you'll end up with a much better finish. 

Niki is a frequent contributor to these pages. More about her sailing travels and her formal bio on Pages 42-44.



*by Niki
Perryman*



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Book reviews

Cruising the biggest baddest lake of all

Wake of the Green Storm, by Marlin Bree (Marlor Press, 2001; 223 pages; \$13.95)

Review by Steve Clark, Ottawa, Ontario

Big water doesn't have to be salty to be worthy of respect. The Great Lakes are pretty big, and Lake Superior is the biggest and definitely the baddest. Marlin Bree was cruising Superior in the summer of 1999 when he encountered the green storm, so called because of the unusual color of the sky and memorable because of its 72-knot winds. With a dose of luck, Bree survived the storm in good shape and proceeded with his cruise.

The green storm actually takes up a fairly small part of his newest book as this 66-year-old solo sailor and his 22-year-old homebuilt wooden sloop, *Persistence*, potter about the islands off the Canadian shore of Superior.

The author sprinkles his book with historical accounts of Lake Superior disasters. Most of these involve commercial shipping, but there are some stories like the *Gunilda*, a pre-World War I, 195-foot private yacht, that came to disaster because of incredibly bad judgment and too little fear. Along the way, he meets local characters, friendly ports, and favorite anchorages. These show the lake's less-forbidding side to encourage recreational sailors.

Marlin Bree has an interesting attitude toward boat outfitting. He carries not one but two matched 5-hp outboards, just in case one fails. He also likes to back up in threes with three compasses (in addition to his GPS) and three types of coffee.

In this book this sailor spends almost no time talking about rigging and trimming but spends a lot of time under a dodger, comfortably punching coordinates into his GPS and steering through the autopilot remote.

Nothing makes him happier than tying up and discovering

a sauna on an otherwise deserted island. He talks about the interesting fellow cruisers he encounters on the way and waxes poetic about their boats. One of these is the *Orenda*, a 40-foot wooden-hulled beauty originally built for Gordon Lightfoot. It was Lightfoot's song, *The Wreck of the Edmund Fitzgerald*, that, ironically, did much to create popular awareness of the potential for peril on Lake Superior.

The book contains 17 pages of notes to expand on the author's observations, along with several maps, pictures, and drawings. It is recommended for anyone planning a cruise in the area or just looking for a sailing-read when confined to the harbor.



An all-season must-have reference

Practical Seamanship: Essential Skills for the Modern Sailor, by Steve and Linda Dashew (Beowulf Publishing, 2001; 644 pages; \$69.95; an additional CD version \$19.95 when purchased simultaneously)

Review by Sally Perreten, Old Saybrook, Conn.

Now you can leave most of your other books on seamanship at home, perhaps even the dog-eared, lop-spined old Chapmans that takes most of your bulkhead bookshelf. Steve and Linda Dashew's *Practical Seamanship* is a must-have aboard, and it's an all-season must-read.

Anecdotal, chatty, continuously informative, with countless

illustrative tales and photos of nautical mishaps and disasters, this book tells us not just *how* to do it, but *why*, *when*, and often, *where*. Virtually every page is studded with clearly drawn diagrams, photos, and/or illuminating sidebars (a few of which have discontinuities.)

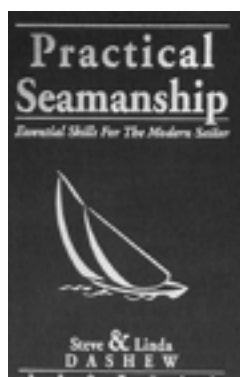
The section on anchoring may just be the most complete discussion in print: 82 pages with enough photos of beached and wrecked boats to get you out of your bunk to check wind direction and the chafing gear.

To keep you out of trouble while you're awake, every aspect of safe seamanship is thoroughly explored. A particularly useful section is devoted to fishing traffic, tugs, freighters and their navigation lights and behaviors. Those who don't know where to start with radar or electronic charting will find a careful and gentle guide to set them on the right path.

Throughout there are hints and tidbits that leave you wondering why you never thought of them. OK, so you take a small compass with you in the dinghy when you shore your dog in foggy areas or go for dinner ashore. But how 'bout that dinghy anchor languishing at the bottom of a cockpit locker? Or your handheld GPS — with the waypoint of the mother ship? These items can save you from being washed out to sea on the tide should you be blind, bewitched, or bewildered. Hate trying to turn on a dime in a jam-packed harbor? Page 476. Are you able to stop quickly under sail? Page 597. Easier docking skills? Pages 487 to 496.

Medical matters and first aid are covered in your other books, so keep 'em aboard. And only three pages are devoted to knots, so you'll still need your Cyrus Day. This small section, however, has a knot invented by Rod Stephens that is often preferable to a bowline. Another tip: using a lashing of Spectra line in lieu of a shackle.

Speaking of shackles brings to mind a small and presumptuous quibble. The Dashews suggest that in some cases it's a good idea to have a snapshackle on the end of the dock line being thrown ashore. They do recommend that you "take care when throwing this, to miss the folks on the dock." Most of us are just glad to get a line to the dock, period. Maybe it's best to forget about the shackle until you, too, have sailed 200,000 miles. Even then, you will still need this fine book.



Pardeys re-release a 25-year-old favorite

Cruising in Seraffyn, by Lin and Larry Pardey (L&L Pardey Books, 2001; 224 pages; \$21.95)

Review by Karen Larson, Minneapolis, Minn.


Lin and Larry Pardey did not set out deliberately to circumnavigate the world twice, nor to become a pair of well-known and authoritative authors of books and articles on sailing, nor to live aboard, earning their living for more than 30 years as sailing writers, delivery skippers, and maritime “tradesmen.” Knowing who the Pardeys have become today (and acknowledging the grace with which they handle this success), it is particularly enlightening to re-read *Cruising in Seraffyn*, their first book, now republished as a 25th anniversary edition.

Before they were halfway around the world, these two innocents had discovered their ability to market their written words, the joy of living simply, and a love of travel that would propel them from milestone to milestone even when no master plan laid it out in advance. While young, they were never foolish. More than two decades later, they realize the wisdom of choice in the boat they selected and built and the simple lifestyle they adopted. They have matured, honing skills and gaining experience,

but they have retained their positive outlook, love of sailing, and amazing energy, all of which shine through in their first book.

Can a book that has been in print for 25 years have anything worthwhile to offer today’s sailors, beyond an introduction to these 20-somethings who set off from California to see the world in a 24-foot boat they built themselves? Can it offer more than a reminder that even Lin and Larry Pardey were once beginners and that we all must start building skills by first raising the sails? Yes. This book is as worthwhile now as it was then. This new edition of a book first published in 1976 reminds us that cruising has not changed significantly in 25 years. All you need is an affordable seaworthy boat and an adventurous spirit. With this, and the other books and articles that followed, Lin and Larry are said to have inspired 50,000 sailing dreams.

A good book, even if there had been no changes whatsoever, this edition has been made better with the addition of the Pardeys’ contemporary perspective on the years they’ve spent sailing, their thoughts about their two Lyle Hess-designed boats, and musings about the changes that have taken place in the cruising scene since their first voyage in 1969. They’ve also included many photographs that haven’t been published previously (found, Lin says, in the bottom of a box of photos).

A rumination on the past 25 years, a bright ray of inspiration for would-be bluewater cruisers, a cheerful, delightful look at Lin and Larry Pardey at ages 24 and 29, still imbued with that marvelous passion they possess today ... all this is contained in a bright new package, one that is just as relevant today as it was a quarter century ago. 

Paradise Cay is distributing this and other Pardey books. You can get this book directly from Paradise Cay (800-736-4509; see the back cover for further details). Or order it from the Good Old Bookshelf; see Pages 64-65.

Encyclopedic work on bluewater cruising

Nigel Calder’s Cruising Handbook, by Nigel Calder (McGraw-Hill, 2001; 588 pages; \$49.95)


Review by Ron Chappell, Pasisade, Colo.

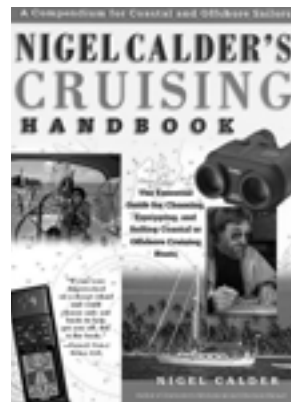
Ordinarily, I would not get too excited about another new cruising book, even one by as eminent an author as Nigel Calder, whose previous work, *Boatowner’s Mechanical and Electrical Manual*, has become an icon on both sides of the pond. While the cruising genre is a particular favorite of mine, recent offerings seem to have grown a bit redundant for those of us striving to keep abreast of the field. This book is a whole new ball game.

First of all, it’s a very big book, physically and in terms of its diverse subject matter. At just under 600 pages, in an 8½- by 11-inch format, it is not something I would refer to as a “handbook” unless speaking to a gorilla. The word “encyclopedic” springs to mind, as it is truly monumental in scope and execution; a good thing, too, when you consider it carries a suggested price of \$49.95.

McGraw-Hill did a commendable job of putting it all together. It looks like it might last, even in a marine environment, where it will most assuredly find a home. It features a water-resistant cover and flexible spine, designed to lie flat when opened, a wonderful feature on a pitching chart table, far at sea, where information is scarce and time of the essence. This book covers nearly everything, and it covers it in exquisite detail. It covers it in a manner anyone can understand. There are chapters relating to most any conceivable contingency a cruiser might run into, from boat selection, equipage, and maintenance, to the more esoteric areas of daily life on a cruising sailboat (and much more than I wanted to know about navigational history).

Nigel Calder remains the quintessential “systems man,” and his section on surveying a prospective purchase with its attendant checklist is, by itself, worth the price of the book. The section on weather and prediction should be required reading for every television forecaster in the country. There are up-to-date chapters on shipboard health and disease prevention criteria for every sector of the world. Nearly every page is clearly illustrated, and at the end of each technical chapter is a “worksheet” so you can evaluate your own vessel or system.

Here is a man not afraid to infuse his material with the very latest in technological know-how, even though it may at some point appear dated. For the mathematically inclined, there are charts, graphs, and formulas enough to satisfy the most gifted. And all this is just the tip of the iceberg. I have read this book cover to cover, word for word (it took a very long time). Is it the proverbial “one-book cruising library,” the definitive work on the subject? I think it may well be. 



Following in some famous footsteps

Kydd, by Julian Stockwin (Scribner, 2001; 256 pages; \$24)
Review by Dave Olson,
 Minneapolis, Minn.


I miss Patrick O'Brian. For years, I would find the latest book in his Aubrey/Maturin series neatly wrapped as only my wife, Jane, can do. I have now read them all because he is not here to write another. Maybe Julian Stockwin will help fill the void. With his first book, *Kydd*, he is off to a great start!

Nautical fiction fans have something to be happy about as Stockwin releases his first book in what promises to be a fine series detailing the naval career of Thomas Payne Kydd. Though written in the fashion of Patrick O'Brian and C. S. Forester, Stockwin takes readers along a new path by detailing the raw emotion of an intelligent man engaged ashore in the craft of wigmaking and then pressed into the King's service. Once aboard *Duke William*, a first-rate battleship, this "lubber landsman" learns the hard life, the bitter disappointment, and the despair and confusion of being pressed.

Stockwin makes us feel the emotions and trials endured by Thomas Payne Kydd.

Everyone loves a story that surrounds a man overcoming adversity, proving his mettle and demonstrating to himself and others that he is far more substantial than he was originally given credit for being. Stockwin comes through with the "good goods." To the internal applause of the reader, Thomas Kydd makes the transition from self-pitying "landsman" to able seaman. Stockwin has an excellent handle on his material and an outstanding story basis. Each new book

should prove to be a gem.

Julian Stockwin is cut of the genuine Royal Navy cloth. Joining at the tender age of 15, he has seen service all over the world. He recently retired from the Royal Navy Reserve as Lieutenant Commander. I'm certain Jane will be looking for the release of Volume II. 





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British storyteller Sam Llewellyn



Sam Llewellyn is one of Britain's great storytellers of the sea. He was born on Tresco, Isles of Scilly, 30 miles west of Land's End, Britain's southwesternmost point, where his family has lived for 170 years. He has been in boats since before he could walk. After completing the best education Britain could provide, he married the prize-winning Canadian children's author, Karen Wallace. They live in a medieval farmhouse in the Welsh border country with two sons, a vast garden, and a collection of boats in various states of disrepair. For three months most years, Sam goes sailing to research his novels. He has sailed from Turkey to the Baltic, in Maine, the West Indies, and the Pacific Northwest. In pursuit of fact and anecdote, he has hunted pirates in the Philippines, crossed the Pacific in a rustbucket freighter, and rowed from North Wales to London (the rowing trip being the worst of the lot). He makes an annual trip to the West Coast of Scotland, where he cruises a 21-foot open boat among the whales and mountains and tries to show children that there is more to sailing than learning how to race. He writes a novel most years. He also contributes to the *London Times*, *Daily Telegraph*, and several sailing magazines.



The Shadow in the Sands – Sam came to our attention when he wrote the sequel to *The Riddle of the Sands*. This is an updated “Chapter Two,” so to speak, which accompanies the well-known classic by Erskine Childers. – \$14.95.

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Blood Knot – Bill Tyrrell, sometime war correspondent and captain of the elderly cutter, *Vixen*, is heading to the tall ships celebration. In the darkness, *Vixen* collides with the wreck of a small dinghy and something snags the propeller... a body. It seems that Bill's past is about to catch up with him. – \$12.95.

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And more. Sam Llewellyn is one prolific writer! Other books with nautical settings include *The Iron Hotel*, *Blood Orange*, and *Riptide* (\$12.95 each) and a children's book called *Pegleg* (\$8). Ask BookMark (Mark@goodoldboat.com/ 763-420-8923) about these and other books Sam's written.

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(carry over to Page 65)

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Nigel Calder			
<i>Nigel Calder's Cruising Handbook</i> – See review on Page 62.	\$49.95	_____	_____
<i>Boatowner's Mechanical and Electrical Manual</i> – Maintenance and repair.	\$49.95	_____	_____
<i>And others</i>			
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Clipper Marine 32

1976 Crealock sloop. Trailer-launchable. LOA: 31'7" LWL: 26'0" Beam: 8' Draft: 3'11" Ballast: 2,200 lbs. lead Displ:

7,500 lbs. Fuel: 30 gals. Water: 42 gals. 2-axle trailer, tongue extender, spare tire. Yanmar Y5 B12 OEM inboard w/3-blade prop (new 1994). Lewmar winches. Sleeps 4-5. Head, holding tank with pumpout (new). New press. water & tank. Opening ports in head, hanging locker, and V-berth, 6 sails (all serviced by UK 1994). Mainsail cover, marine band radio, depth, compass. Hull stripped, sealed, painted 1995. \$12,000 OBO or possible trade.

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989-348-5907
zlc@freeway.net

1978 Rebel

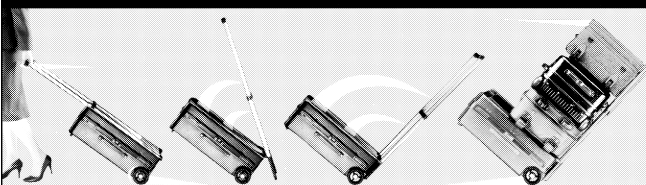
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2002 (after 6)
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Hunter 23

1986. Freshwater boat. Exc. cond.

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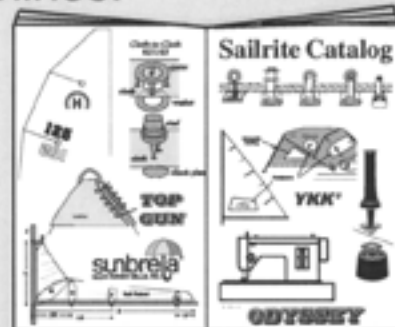
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1975. 4 sails. Diesel. Loran, VHF. Autopilot. Wheel steering. \$7,500.

Ron B.
231-369-218
128... Dr.
... MI
... 36-9218

Chrysler 26
1978 Herreshoff design. Bottom sanded/painted 2000, swing keel pivot pin and cable replaced 1990. Roller trailer (new tires and wheel bearing seals 2000), 15-hp ob (tuned up 2001). LOA: 26, LWL: 22, beam: 8, displ: 5,000

lb, ballast: 2,000 lb, draft: 2'3" (board up) 6'2" (board down). White hull and deck w/red trim. This freshwater sailboat will sleep 6 and is easy to sail and transport. In Wisconsin. Asking \$6,500.

David Lamp
920-533-5439
davidraiglamp@juno.com

Nor'sea 27
1991. Hull# 354. Fresh water. Aft cabin, ProFurler, full-batten main, 150 genoa, Heart 1800w inverter, battery charger, 3 new batteries, Adler refrig, pressure water, Navco autopilot, dodger, Bimini, 2GM Yanmar, CQR plow, spinnaker, 3-axle EZ Loader trailer with new tires. Excellent cond! New survey. In Minnesota. \$67,000.

Fred Armbruster
763-424-4354
fjarm@juno.com

Nor'sea 27
1978. Hull #116. Aft cockpit. Very good cond. Interior not completely finished. New bottom paint, no through-hulls below waterline,

6'1" standing headroom. 7 bronze opening ports. 6 sails in very good cond. 2000 Yamaha 9.9 Hi-Thrust long shaft 4-stroke with less than 6 hours. Whale Gusher manual bilge pump, CQR 25 and Bruce 16.5 with rode, autopilot, brand-new Garhauer mainsheet traveler system, running rigging, headstay and Schaefer 1110 furling unit. In Michigan. \$29,000 OBO. Relocating! Price reduced!

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Cal 30
1966. Hull Awlgrippd. Atomic 4. 11 sails. Tillermaster autopilot,

depth, wind, speed, Loran, VHF, chronometer. 4 winches (2 Barient self-tailing). Groco head, 30-gal. holding tank. Well-insulated icebox. 2-burner alcohol stove. Hauled every year for winter storage and bottom paint. Folding prop. Asking \$15,000.

Woodward Warrick
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San Juan 23
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Annapolis 25

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John Breyfogle
breyfogle@localaccess.net

Pearson 30

1973. Raytheon ST50 steering compass, depth, speed, log, wind instruments. Almost new main (Pentex), 4 jibs and spinnaker. Atomic 4 runs great. Surveyed 1995. In Chicago. Asking \$17,500.

Terry Miller
630-307-1997
sailboatariel@worldnet.att.net

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Nov. issue Sept. 1
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Kittywake 24

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billb@ulch.org

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860-961-8138
mpal@excelonline.com

Flicka 20

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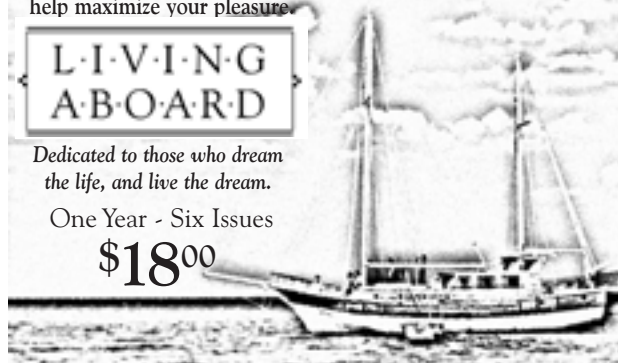
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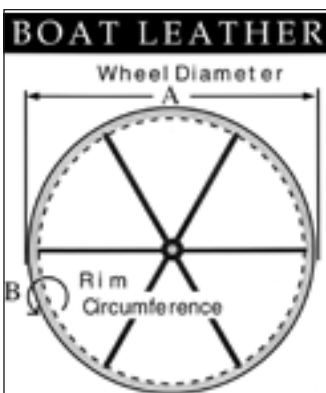
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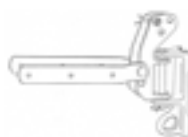
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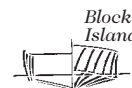
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Continued from Page 3

convinced it is because Tom will accept nothing less. He is a pleasure to work with and honest to a fault. The readers of *Good Old Boat* need to know about him and his company.

Walt Hodge
Stone Mountain, Ga.

Correction on Matella lifelines

In the July 2001 issue of *Good Old Boat* we noted that the lifelines marketed by Matella Manufacturing are made of stainless steel. They are, in fact, made of aluminum. For more information, contact Matella toll free at: 866-MATELLA (866-628-3552) or <<http://www.matella.com>>.

Brewer by the numbers

Best magazine for old boat sailors (sailors of old boats?) that I've ever seen... I read every word... congratulations... keep 'em coming! Ted Brewer's articles are very interesting, but could we please have an explanation of the numerical rating system that he uses in his summary of each type of boat? I'm sure longtime readers have a feeling for these numbers, but I have read all of your issues back to November 1999 and can't seem to find it.

Ken Goodings
Toronto, Ontario

Naturally, Ken, we ran Ted's article on yacht design formulas in our July 1999 issue. That one has been sold out for more than a year, but we do make reprints available for \$2.50 for anyone requesting a copy of an article from a sold-out issue. In this case, it sounds like it would be a good idea to keep a copy of that article nearby, like the dictionary of terms that's useful when reading the Patrick O'Brian series of books. In addition to our "reprint service," you can also look up some of our previously published articles on the BoatU.S. Web site at <<http://www.boatus.com/goodoldboat/archive.html>>. Ted's article is one that's posted there: <<http://www.boatus.com/goodoldboat/brewerformulas.htm>>.

How long is forever?

I have recently read with great interest the article "Mustang Forever" by Brian and Christine King. Several times it was mentioned that water must be kept out of the boat since the fiberglass was only on the outside. Several questions come to mind which have bugged me for ages. Given that all boats leak some — engine shaft, scuppers, rain, or spray... you name it:

- what happens if there is water, basically in the bilge, in a wooden boat that has been fiberglassed on the outside?
 - is the bilge glassed in so that water doesn't come in contact with the wooden hull?
 - as the wood expands due to the water will it cause fractures in the fiberglass on the outside?
 - is the effect so little that the consequences can be ignored?
- This whole subject has brought about some heated discussion among our sailing group. Please give us your opinion. I'm sure we'll argue about it, too.

Dick Gelfond
Towson, Md.

Brian King responds

The letter from Dick Gelfond indicates intelligent questioning of one of the potential problems of sheathing a wooden boat: how to deal with the water which will inevitably end up in the bilge. When we sought the advice of Gougeon Brothers

on this issue their response was to "strip the entire inside of the hull and seal this with epoxy." We respected their opinion but considered the solution to be impractical from both a time and cost standpoint. Therefore we compromised by thoroughly cleaning the bilge before sealing wherever we could reach with multiple coats of acetone-thinned epoxy. The dry wood absorbed the thinned epoxy mixture almost like a sponge. As many as four coats were needed in some areas before a glossy finish, indicating maximum absorption, was achieved.

Approximately one year after completing the sheathing project, *Mustang* almost sank while we were transiting the Inland Waterway. The bilge pump hose back-siphoned, which we only discovered when, going below, we stepped into 15 inches of water above the cabin sole. We solved the problem by ramming *Mustang* aground on the soft bank of the waterway, pumping her out, and subsequently fitting a non-return valve in the bilge pump exhaust hose. The point is that unsealed parts of the bilge were well saturated with water! Of course there is almost constantly a small amount of fresh water in the bilge resulting from rainwater draining down our hollow aluminum mast.

Eight years have now passed since we completed the sheathing of *Mustang's* hull. Five of these have been spent in the tropics where humidity is constantly high. Despite constant water in the bilge and high humidity, neither the bilge nor exterior sheathing is showing any sign of a problem. At all times we do strive for maximum ventilation of the entire boat and keep the bilge sweet by frequent pumping and occasional scrubbing. From our experience, we would say in Dick Gelfond's words, "the effect (of water in the bilge of a sheathed wooden boat) is so little that the consequences can (with reasonable precautions) be ignored."

Brian King
Somewhere in the Caribbean

Steel keel bolts

I find *Good Old Boat* most helpful as I continue restoring my 1961 Seafarer Ranger. Perhaps you can advise me about steel keel bolts. My boat has a cast-iron keel into which I have tapped six holes for "sister" bolts. Dan Spurr, among others, advised that this would be a smart idea, given the age of the boat. Once I got the drill press into the boat and had a machinist make me several drill extenders, drilling and tapping the holes wasn't very difficult. The difficulty is in determining the bolts to use. One source suggested that silicon bronze is too soft for keel bolts, although I question the statement since these have been used for years.

Jack Harkins
Downers Grove, Ill.

Dave Gerr replies

There are several questions:

- 1) The strength of the bolts
- 2) The bolts' resistance to corrosion
- 3) Whether tapping a cast-iron keel is a good idea
- 4) Where silicon bronze falls in this discussion

Answers, as far as I can tell:

- 1) The bolts can be strong enough made of any material. Select the correct diameter, after calculating the required tensile strength. Are 5/8-inch nominal bolts strong enough in mild steel, stainless, bronze? I don't know without having weights and dimension drawings to calculate from. You could use the method in my *Elements of Boat Strength* to calculate the required tensile strength.
- 2) I personally would never use mild steel for keel bolts. Mild

steel — regardless of how it's treated, protected, coated — is far too subject to corrosion in salt water. If those bolts go, the boat goes. Much too risky in my opinion. Stainless is a better answer, but only 316L stainless even comes close to the corrosion resistance required, and it can suffer from severe pitting corrosion also. Otherwise it's more noble than the iron keel, and the keel will corrode before the bolts. There's a whole heck of a lot more keel than bolt, so this is acceptable. My first choice for keel bolts for iron or steel keels is Nitronic 50 or Aquamet 22 rod (the same thing). These are highly corrosion-resistant chrome molly stainless steels. Aquamet 22 is standard high-quality boat shafting. Nitronic 50 is rod rigging stock. You would only need 3 or 4 feet, I'd guess. Pricy as it is, it shouldn't be too bad. The rod would have to be cut to length and then threaded on either end with a nut and lock nut for each "bolt." Use very large stainless (316) backing plates under the nuts. The size is given in *Elements of Boat Strength*.

3) Drilling and tapping lead keels (with about 2 percent antimony) for bronze bolts is **the** first-class way to fasten keels. I don't at all like the idea of drilling and tapping iron keels for bolts. The iron thread will corrode and seize the bolts. Regardless of the coating, I don't believe the bolts would ever come out again after five or six years. 316L stainless and Nitronic 50 would be better, but those threads will still corrode. (Lead and bronze will last 3,000 years in salt water and still not corrode worth mentioning.) I would have through-bolted this keel with Nitronic 50 (Aquamet 22) rod bolts. This way all the threads would be Nitronic 50 and the nuts 316L (if Nitronic isn't available, which it probably isn't at this budget). If you are going to use the tapped holes, go with the Nitronic.

4) There's more inexcusable ignorance about bronze these days than about nearly anything. I'm going to assume that there was a misunderstanding about the "silicon bronze being too soft," because it's the silliest thing I ever heard. Silicon bronze (after monel) is **the** king of all marine fastener materials and all marine hardware materials. Silicon bronze (or some of the other aluminum-, nickel-aluminum-, and phosphor-bronzes) are my first choice for everything metal that's on a boat. Silicon bronze bolts are **the** standard material for fastening lead keels, but . . . you can't ever, **not ever**, use silicon bronze as keel bolts for a steel or iron keel (or in contact with aluminum). You'd just be creating a battery, which would corrode itself away in no time. I hope this is of some help.

Dave Gerr
Gerr Marine, Inc.
838 West End Ave. - Suite BB
New York, NY 10025

Ted Brewer replies

Dave Gerr hit the nail on the head. It's an iron keel so use the best grade stainless steel in a tapped hole, the same material used for propeller shafts and rod rigging, PH-17 rod, Aquamet 22, etc. You can probably buy 5/8-inch diameter rod from a yacht rigger and have it cut to length and threaded. Beware of galling with this stuff, though. When we were rigging the

American Eagle, we had rod rigging gall when we tried to thread on a stainless steel end fitting, and then lock up so we couldn't get it off or thread it on further. That ruined an expensive shroud! Use of the Permatex "Antiseize" might be the answer. I would sure try it.

If the holes were not tapped, but drilled so you could use a nut on the end, then galvanized wrought-iron bolts and nuts would be fine, if you can find them. They were the standard for iron-ballast keels in the good old days and are far better than mild steel or the more common stainless steels such as 304 and 316. Galvanized wrought-iron bolts are slightly weaker than mild or stainless steel but more corrosion-resistant. In any case, a 5/8-inch G.I. bolt will have a stress area of .226 square inch and a tensile strength of 9,000 pounds or thereabouts. More than ample for this job, I'm sure.

Dave is also correct in saying you can't use bronze bolts with an iron-ballast keel. It would set up a mild battery, and you'd have no end of trouble. I also agree with Dave that silicon bronze or aluminum bronze bolts are the only answer in a lead keel. Indeed, why so many production boat builders use stainless-steel bolts in lead keels has eternally baffled me. The builders probably saved money, but the stainless bolts are trouble waiting to happen.

To say that silicon bronze is "too soft" for keel bolts is utter nonsense in my opinion, but then I'm known to be opinionated! Silicon bronze has been the standard for lead-ballast keels for many years now. Indeed, I have not heard that the *Eagle's* 44,000-pound ballast keel has fallen off, and it was fastened with silicon bronze bolts in 1964!

Ted Brewer
P.O. Box 48
Gabriola Island, BC V0R 1X0
Canada



Phil Nunn and the amazing floating good old ball cap.

And it floats!

Here's an undocumented feature of the *Good Old Boat* baseball cap. It floats for at least 10 minutes, allowing retrieval when it is inadvertently (read: sooner or later) blown overboard. Mine came off in the harbor at Muskegon while I was securing the mainsail to the boom. The floating feature gave me time to get into the dinghy, start the engine, and chase it. So I'm still wearing my original *Good Old Boat* cap.

Phil Nunn
Muskegon, Mich.

Tabasco sauce? Really?

I recently had occasion to help a friend repair a leak on the packing gland on his 46-foot boat. The locknut was frozen, and we couldn't tighten it to quell a steady drip into the bilge. As he was leaving the boat for a month, this was of some concern. None of the tools on the boat, nor the ones I had brought along, would budge the 2 1/4-inch nut, so we paid the local tool rental a visit to get some larger wrenches. We not only found the wrenches we needed, but also got some advice for freeing stuck fittings in the marine environment. Turns out the tool rental owner had spent 25 years in the navy, and when we asked what was the best penetrating fluid to use for the job, he

Mail Buoy continued on Page 76

Good Old Boat T-shirts:

- Work for boat parts
- Museum view

size/quantity					total quantity		extended price	
s	m	l	xl	xxl				
na	___	___	___	___	___	@ \$19 ⁰⁰ _{US}	=	___
na	___	___	___	___	___	@ \$18 ⁰⁰ _{US}	=	___

Summer-weight (6.5-oz) denim shirts:

- Long-sleeved
- Short-sleeved polo style

size/quantity					total quantity		extended price	
s	m	l	xl	xxl				
___	___	___	___	___	___	@ \$32 ⁵⁰ _{US}	=	___
na	___	___	___	___	___	@ \$36 ⁰⁰ _{US}	=	___

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___	@ \$53 ⁰⁰ _{US}	=	___

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Ken Kloeber models the denim long-sleeved shirt. (He's the one with the sunglasses.) Pup's wearing the denim ball cap. They sail a Catalina 30 named Positive Impact.

ships_store.html

If we're not showing it here,
you can probably see it
on our Web site, where we have
more pages and can run
all the color we want! Go to:
<http://www.goodoldboat.com/ships_store.html>

Ted Brewer, at right, has been spending a lot of time at the Silva Bay Shipyard School. Sometimes Ted wears our long-sleeved denim shirt when hanging out, appreciating boats like this 18-foot runabout he designed for the school.

E.J. Hurst



Scott Kennedy, below, penned the museum T-shirt and a popular Good Old Boat cover. Scott is shown making like a human whisker pole on a still day in California.



Dave Chase, above, designed the “work for boat parts” T-shirt, even if he did get his on backwards for the photo. Susan Chase shows how it really goes.



We're glad Charlie Perry got this Tilley hat, at left, because we like the way he poses in it. Ask Charlie, you can get your photo here, too. All you need is a good smile and something (from Good Old Boat) that you don't mind having others see you wearing.

Continued from Page 73

grinned and said, "Tabasco sauce."

Yeah, right! But Ken, the boat's owner, had faith, so our next stop was not the hardware store, but the supermarket. Back aboard, we poured liberal amounts of sauce on the nut and watched it actually start to "fizz" on the bronze fittings. The giant crescent wrench and giant pipe wrench were fitted, but the nut came free with almost no resistance! Thought I'd pass this along.

Peter Jacobs
Victoria, British Columbia

Seafarer owners site

Can't thank you folks enough for your great publication. It truly is "sailing for the rest of us." It is generally understood

that when *Good Old Boat* arrives, I will spend the evening with it! By the way, the Seafarer Owners Web site <<http://seafareryachts.home.att.net/>> is working well as we've had more than 3,500 visitors in the past 18 months. We have probably the largest single collection of Seafarer pictures, as well as some interesting stories from some owners! And yes, we have a link to *Good Old Boat*!

Steve Brechbiel
Raleigh, N.C.

Happy Birthday!

As a charter subscriber, I feel a sense of pride in knowing I was there at the beginning of such a great magazine. I have renewed for three years and will eagerly await every issue. Here is a recent picture of my Robb 35 yawl, *Kestrel*, my favorite good old boat. We both turned 40 this year!

Tim Searce
Seattle, Wash.



OK, you're on!

My subscription check has been accompanied with a firm challenge: get me to renew next year. I have been sailing in my 1978 Chrysler 26 since the 4th of July weekend in 1984. Without doubt, I have been on the water during more than 90 percent of the weekends since that time. Almost everything in my boat, with the exception of the fiberglass itself, has been altered, re-rigged, re-wired, and re-designed by me for single-handing and comfort.

In fact, I have only a single deep regret regarding my sailing years. I have never found a magazine that paralleled my interests. I tried the **big 2** and did not renew. I found **no**

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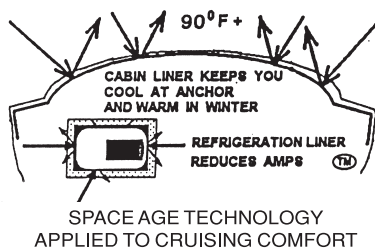
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similarity between their worlds and mine. I leave work on Friday afternoon and **must** be back on Monday morning. As a result, I have **no** interest whatever in "Chartering in the South Pacific" or "Sailing the Med" or even "How to get the last 1/8 knot out of your racer." As my new magazines came in, I spent seven or eight minutes leafing through them and then tossing them out, with only one or two short paragraphs having any interest for me.

The two sample magazines that you sent me have not only been re-read a couple of times, but have been carefully put on the shelf to be saved. It was that realization that prompted my subscribing. I do hope that next year I renew — I love everything about sailing except the stupid magazines I've found so far.

**Barry Marcus
Milford, Mass.**

Now you know what possessed us to start a magazine "for the rest of us." We hope to earn your respect. Please let us know in either case when the trial's over. We'll print your evaluation no matter which way the decision goes.

No slicing and dicing here

Your latest issue (July 2001) is the best yet! I read *Good Old Boat* cover to cover every issue. I do not slice up the mags as I do with other boat mags to add articles to my files. Not many maritime magazines are accorded that honor in the Triggs' household. I have discontinued several boating magazines in an effort to thin the pile. Some are nice but rehashes of the stuff they published two years ago.

I write to you today to put your mind at rest regarding the issue of plastering the outside front cover with copy. This sailor doesn't need it. Your target audience will pull *Good Old Boat* off the rack I'm sure, no matter what. It's what's inside that counts!

I believe you are trying to create articles for people who read a little deeper, think about what they read, and then go do something to their "good ol' boats." I remember a magazine publishing "expert" who told me many years ago that *WoodenBoat* would never make it. So much for experts. *WoodenBoat* and *Ocean Navigator* did it in their niches; now you are doing it in yours! Good luck and keep going.

**Bill Triggs
Rochester, N.Y.**

Send questions and comments to Good Old Boat, 7340 Niagara Lane North, Maple Grove, MN 55311-2655, or by email to jerry@goodoldboat.com. Please limit messages to 150 or fewer words. We reserve the right to edit.

Electric Rainbow continued from Page 20

winds that varied from nil to perhaps 15 knots. Steve controlled the motor thrust from the "potbox," blending in enough auxiliary thrust to hold our speed up as the wind came and went. We never hoisted the jib, so I'm not sure how *Rainbow* sails without electric boost.

As expected, the motor was pretty quiet and almost vibration-free. There was a vibration that I suspect was associated with the two-bladed prop aligning twice per shaft revolution with the deadwood in front of it and the rudder blade behind it. Some of that might be eliminated by using a three-bladed prop, but *Rainbow's* sailing properties would suffer for it.

The quietest engine drive in my (fairly limited) experience is a well-muffled Atomic 4 with a direct-drive transmission. Compared to that drive, *Rainbow's* drive was noticeably quieter, although not completely silent. Compared to diesel drives I've known, I might be willing to say that *Rainbow's* electric drive made practically no noise at all.

While the pulse-width-modulation motor-speed controller has been troublesome — it has been replaced twice — Steve is convinced that it is well worth having in the system. Without it, the motor drew 120 to 130 amps when it was powered, and it drove the boat at 5 to 5.5 knots in flat water. With the controller in the circuit, Steve can throttle back to 50 to 60 amps and get 3.5 to 4 knots. In so doing, he can obtain the 8-hour powered range he wants. The latest version of the controller installation includes a heat sink and a cooling fan, and Steve thinks this will end the failures. With the motor drawing 10 to 20 times the maximum energy that the solar panels can put out, they should not be considered a factor in the range calculation.


Ducted heat

Any electric motor has efficiency losses that show up in the form of heat. Steve has ducted cooling air from the motor to the cabin where it takes the chill off. He quantifies this recycling by saying that at full motor power, the duct discharges heated air that feels like a hair dryer set on low.

Steve has, at various times, lived aboard *Rainbow*. This shows in the collection of devices that are connected to the house system and the inverter. Along with a radio and television, he has a microwave oven, refrigerator, espresso maker, and computer. All the comforts of home.


All in all, this is a slick system well-suited to the way Steve uses his boat. He's quite satisfied with it and quietly proud of how well it works... well, almost satisfied. He's working with a fuel-cell company and intends to install one of these as soon as a suitable experimental fuel cell is available.

I was not taken in by his reasoning. Anybody who can jackhammer 700 pounds of ballast out of his boat and replace it with a well-designed and fairly low-cost electric drive could have changed a few water pumps and fixed an oil leak. The repowering of *Rainbow* was not about any of that. It was about novelty and experimentation. The muses called, and Steve went where they pointed.

Is this practical? Don't tell me about practical. Sailing is not practical. It is interesting, and it is fun. And with an electric drive like the one on *Rainbow*, motoring is almost as smooth and quiet as sailing. 

Jerry is technical editor of Good Old Boat.

The electric option continued from Page 24

may yet ultimately repower with electric. Perhaps the 21st century will see the old idea of an electric boat make a comeback. Thanks to scientists, engineers, and backyard tinkerers alike, it might be possible using non-nuclear, non-fossil-fuel energy. It's an intriguing aesthetic for the New Millennium auxiliary yacht. 

Susan sails Lake Ontario with her husband, Chris, on Titania, a 32-foot Chris-Craft circa 1968. Visit Susan's Web site at <<http://www.silverwaters.com>>.

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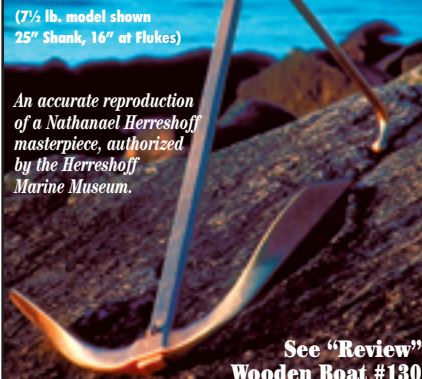
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There is a bitter end

We all have to start somewhere. Jerry and I started from the back of the fleet when it came to anchoring. A dinghy sailor most of his life, Jerry didn't get much opportunity to practice dropping and retrieving hooks. As a racer, in fact, he tried to have the smallest, lightest anchor aboard (and only if one was required, of course). Anchors of any kind were a scourge to a guy who didn't allow an extra can of pop on board for members of his racing crew.


However, we were of the belief that anyone who sails a small boat can certainly sail a large one. And so it was that — with more moxie than experience — we came to be sailing a friend's O'Day 27 all by ourselves for several days on Florida's Gulf Coast many years ago.

This is how all of us start, isn't it? One day you just sort of ...start. We were about to begin our anchoring career simply because we needed to drop the hook for the night. Unbeknownst to us, the friend with the O'Day didn't anchor often either.

In our twosome, Jerry was by far the more experienced sailor. Besides, he had read some articles describing the process. So he gave me the order to go to the bow and drop the anchor on his command. He would back down, and we'd be set. That's all there is to it, really. But it was dark and choppy, I was green as a sailor and green about the gills as well, and it had been a long day.

I dropped the anchor when told. But then I had the curious sensation I used to have when waterskiing ...just after yelling "Hit it!" We flew in reverse — at what speed I can only guess. The rode burned through my hands, and I realized I'd have lasting scars if I didn't drop the line. About then reality struck: the end of the rode wasn't connected to anything. Shouldn't it be? Was I responsible for hanging on to the bitter end against all odds? Ignoring all pain? Had I just failed at my part of the job? Oh horrors!

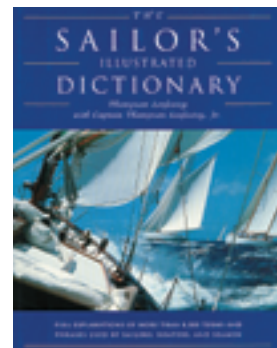
A few days later our friend got a brand-new anchor and rode from a couple of sadder-but-wiser cruising sailors.

We've anchored hundreds of times since then, preferring life on the hook to all other forms of overnighting aboard. In fact, we typically drop not one anchor but two, something that allows us to sleep through the night without anchor watches or alarms. On our first attempt we learned that yes, Virginia, there is a bitter end, and it's on the other end of the anchor rode. 

Just to prove that there's always more to learn about this sailing activity of ours, I recently looked up the term "bitter end" in a newly released sailing dictionary. It says, "n. (1) The end of a rope, cable, or anchor chain. (2) The end that might be bent on a bitt, thus the term." Then I had to know what a bitt was, of course, and there on the facing page was an illustration of various cleats used for tying ships and boats to docks and piers. The bitt is more likely to show up on a ship than on the docks where we sail. It is a coffee-can-shaped affair with two pegs sticking out from opposite ends near the top. You've seen them from time to time. Perhaps you even knew what to call them. Now I know also.

The dictionary, by the way, is a real gem. While it's difficult to "review" a dictionary, I will say that it has made it to an honored position on my bookshelf. It's The Sailor's Illustrated Dictionary, by Thompson Lenfestey. A beefy 541 pages with several pages of naval and nautical abbreviations worth looking up, this one's a real treasure. It's from Globe Pequot Press, released in June 2001, and selling for \$24.95. BookMark can get it for you if you want to get straight on any Navy, square rigger, or general sailing term and can't find the book on your bookstore shelves: Mark@goodoldboat.com, 763-420-8923.

by Karen Larson



Reflections

by Geoffrey Toye

*The start of a summer yacht race
from anchor, remembered*

*The first cool breaths of morning scratch the tide
whose pale sea-fret, a sounding board, makes heard
a footfall on the shingle beach, a word;
the oar-sound in its crutch is amplified.*

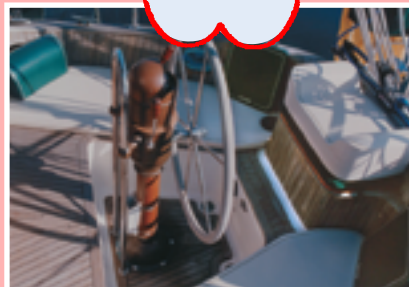
*The gun. And winches scream from every side,
as sails are set and anchors disinterred;
The night breeze has to greater strength deferred:
Sea-wind commits its daily fratricide.*

*Strong now, the new wind can be felt and seen,
each foresail flogs then, sheeted in aback,
all helms are up, each vessel bears away.*

*To leeward rail the tautened yachts careen,
“Let draw!” and beat the day’s first windward tack
and shoulder through the narrows to the bay.*

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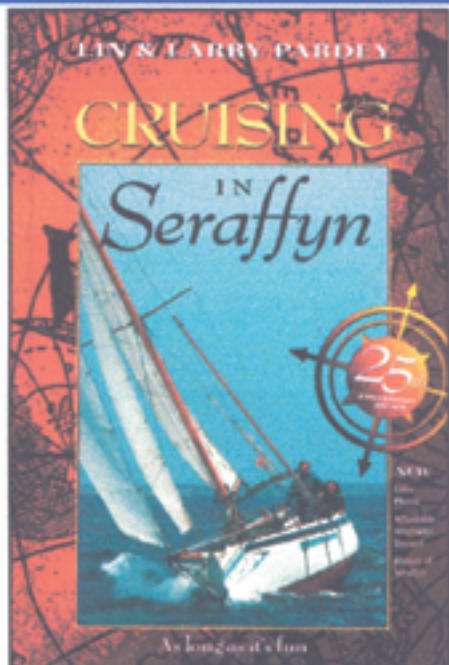
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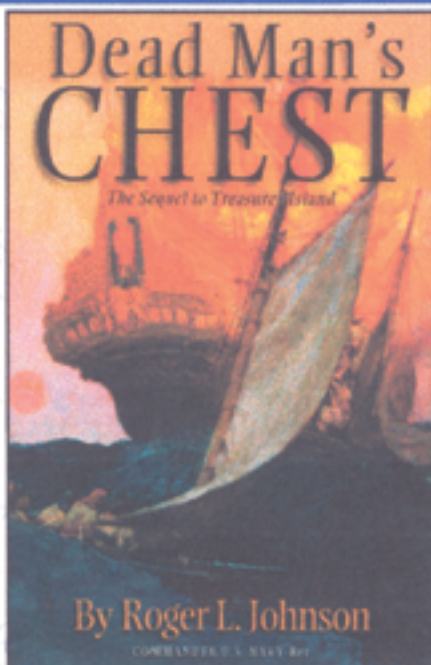
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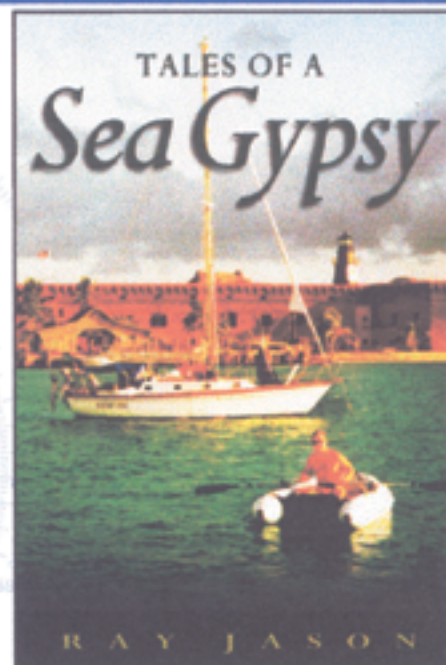


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