WoodenBoat

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MAY/JUNE 2011
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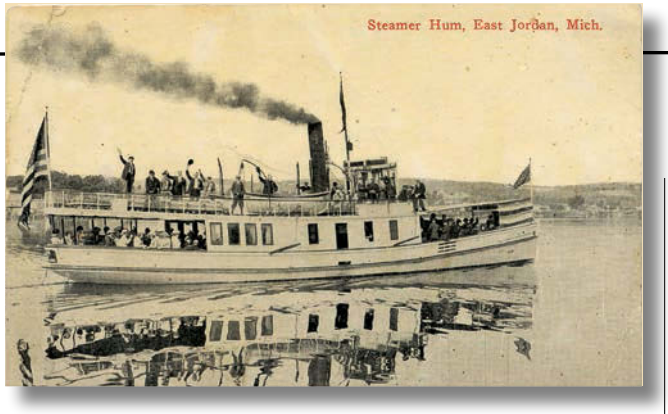
FEATURES



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DEPARTMENTS

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TEAR-OUT SUPPLEMENT Pages 16/17

Cover: KOHLENBERG, an 18-footer launched in fall 2010, is Jeremy Fisher-Smith's fifth variation on VIKING, a historic and much-admired San Francisco Bay boat with which the builder has had a three-decade relationship.

See Page 52

Photograph by Abner Kingman

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Their Best Days Are Now

In 1915, so the story goes, a pair of skilled San Francisco cable-car carpenters built a fast rowboat called VIKING, and 15 years later one of them donated it to the city's Dolphin Rowing Club. It's a pretty boat, bearing a passing resemblance to a Whitehall pulling boat, but it's lower, lighter, narrower, and thus faster than the Whitehall. It also proved to be faster than many of its contemporary peers nearly five decades after the boat came to the club when, in 1977, it outpaced its rivals in a race on the Bay. That race was organized by a boatbuilder named Gordie Nash who, awestruck at the boat's performance, began building copies of it in fiberglass. This gave rise to a request for a new wooden Viking, and the design's legend was made.

We learn these things in Abner Kingman's article beginning on page 52. We learn of how a young builder named Jeremy Fisher-Smith began his boatbuilding career with that first VIKING replica in 1978, and of how he built two more copies of the boat after that—and rebuilt the original VIKING. And we learn of how Fisher-Smith later met the demand for a single-rower version of the boat, an example of which appears on the cover of this magazine.

In the same year that the lithe and lean VIKING was donated to the Dolphin Rowing Club, a 28-ton oak-framed and -planked fishing trawler named ELLY slid down the ways at Jacobsen's Shipyard in Fredrikshaven, Denmark. Later called YUKON, this tired Danish fishing trawler had recently sunk in Dragør Harbor, near Copenhagen, when David Nash fell in love with her in 1997. David soon came to own her, near derelict that she was. "Once while I was working on deck," David recalls in his article beginning on page 44, "a young boy inquired as to how much such a vessel would cost. I proudly replied this one had cost me just one case of beer. He looked around at all the beautiful ships in the harbor, looked back at YUKON, and said, 'I think you paid too much!'" Undaunted, David spent the next seven years immersed in YUKON's rebuilding, and the result is a beautiful ship of his own. He's now on a global circumnavigation in the vessel with his young family, funding the venture by selling berths for various legs of the voyage.

What do a sleek rowboat in San Francisco and a burdensome trawler in Copenhagen have in common—aside from the fact that men named Nash were instrumental in each boat's survival? Their common bond is their relevance in today's world, for these boats are not conserved historical artifacts. Jeremy Fisher-Smith built a reputation, and thus a livelihood, as a boatbuilder; while he's worked on a variety of different boats, his work with VIKING and her descendants, which are still winning races today, helped to forge that reputation. And, as I write this, YUKON is carrying her crew on a defining voyage. These are two very different boats, hailing from ports a half a world apart. One is nearly 100 years old, the other just 15 years younger. But their stories are still unfolding. Indeed, their best days are now.

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2011 Schedule at a Glance

MAY		JUNE				JULY			
15 – 21 / 22 – 28		29 – 4	5 – 11	12 – 18	19 – 25	26 – 2	3 – 9	10 – 16	17 – 23
ALUMNI WORK WEEK	ALUMNI WORK WEEK	Fundamentals of Boatbuilding with Greg Rössel		Fundamentals of Boatbuilding with Wade Smith		An Introduction to Cold Molded Construction with Mike Moros	Fundamentals of Boatbuilding with Greg Rössel		Fundamentals of with
		Making Friends with Your Marine Diesel Engine with Jon Bardo	Build Your Own Chesapeake 17LT Sea Kayak with Geoff Kerr	Build Your Own Northeaster Dory with John Harris	Small Boat Repair with Greg Bauer		Glued-Lapstrake Plywood Construction with John Brooks	Build Your Own Greenland-Style Kayak with Mark Kaufman	Building a Dory with Walt Ansel
		An Introduction to Boatbuilding with Bill Thomas	Glued-Lapstrake Plywood Construction with John Brooks	Stitch-and-Glue Boatbuilding with Sam Devlin	Build Your Own Fox Canoe with Bill Thomas	Building the Asa Thomson Skiff with John Karbott	Build Your Own Plank Constructed Pond Yacht with Thom McLaughlin	Fine Strip-Planked Boat Construction with Nick Schade	Scratch Modelmaking with Steve Rogers
		Inspecting Wooden Boats with David Wyman	Inspecting Fiberglass Boats with Sue Canfield	Inspecting Wooden Boats with David Jackson	Coastwise Navigation with Jane Ahlfeld	Lofting with Greg Rössel	Bronze Casting for Boatbuilders with Sam Johnson	Vintage Pond Yachts Part II with Thom McLaughlin	Elements of Boat Design with Graham Byrnes
				WANDERBIRD with Rick & Karen Miles *(June 13-22)*		Elements of Seamanship with Jane Ahlfeld & Steve Stone	Elements of Seamanship with Martin Gardner & Steve Stone	Metalworking for the Boatbuilder & Woodworker with Erica Moody	Elements of Seamanship Martin Gardner & Sue LaVoie
					Blacksmithing and Modern Welding with Doug Wilson & Will Dupuis	Craft of Sail on ABIGAIL with Hans Vierthaler	The Skills of Coastal Seamanship with Andy Oldman	Island Landscape in Color with Tom Curry	Island Exploration & Seamanship with Andy Oldman
					Inspecting Wooden Boats with David Jackson	Blacksmithing and Modern Welding II with Doug Wilson & Will Dupuis		Elements of Seamanship *(women only)* with Jane Ahlfeld & Jenny Bennett	Elements of Coastal Kayaking with Bill Thomas
								Cruising through the Watches on ABIGAIL with Hans Vierthaler	

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AUGUST — SEPTEMBER

24 – 30	31 – 6	7 – 13	14 – 20	21 – 27	28 – 3	4 – 10	11 – 17	18 – 24
Boatbuilding Warren Barker	Build Your Own Bronze Salute Cannon with Jim McGuiggan	Building the Ness Yawl with Geoff Kerr		Sparbuilding with Eric Blake	Advanced Fundamentals of Boatbuilding with Greg Rössel		Fundamentals of Boatbuilding with Wade Smith	
Build Your Own Chuckanut 12 Kayak with David Gentry	Build Your Own Biadarka with Mark Kaufman	Strip Composite Construction with Clint Chase	Building the Seaclipper 20 Trimaran with Jim Brown & John Marples		Fitting a Ballast Keel with Eric Blake	Build Your Own Annapolis Wherry with Geoff Kerr	Build Your Own Skerry Daysailer with David Fawley	Build Your Own Willow Sea Kayak with Bill Thomas
Woodcarving with Reed Hayden	The Essentials of Fine Woodworking with Janet Collins	Traditional Wood-and-Canvas Canoe Construction with Jerry Stelmok	Traditional & Modern Oar Making with Clint Chase	Building a 16′ Outboard Skiff with Walter Baron	Building the 12½′ Semi-Dory Skiff with John Karbott	Building Half Models with Eric Dow	Traditional Lapstrake Construction with Geoff Burke	Finishing Out a Hull with Geoff Burke
The Art of Scrimshaw with Ron Newton	Rigging with Myles Thurlow	Boatbuilder's Hand Tools with Harry Bryan	Marine Electrics with Ray Frechette	Build Your Own Model Sailing Yacht with Alan Suydam	Elements of Sailing R/C Pond Yachts with Alan Suydam	Coastal Maine in Watercolor with Amy Hosa	Sea Sense Under Sail with Havilah Hawkins	Inspecting Fiberglass Boats with David Wyman
Elements of Seamanship II with Martin Gardner & Sue La Voie	Beach-Cruising & Coastal Camping with Ross Beane & Bill Thomas	Seascape/Landscape in Watercolor with Philip Steel	Elements of Seamanship *(women only)* with Jane Ahlfeld & Gretchen Snyder	Lofting with Greg Rössel	Small Boat Voyaging with Jane Ahlfeld & Bill Thomas	Elements of Coastal Kayaking *(over 40)* with Mike O'Brien	Marine Photography with Jon Strout & Jane Peterson	Sailmaking with Marti & Jed Siebert
Craft of Sail on BELFORD GRAY with David Bill	Craft of Sail II with David Bill	Elements of Seamanship with Martin Gardner	Elements of Coastal Kayaking with Stan Wass	Elements of Seamanship with Jane Ahlfeld & Gretchen Snyder	Craft of Sail on MISTY with Queene Foster	Coastal Cruising Seamanship on ABIGAIL with Hans Veirthaler		
Sailing the Schooner MARY DAY with Capt. Barry King & Jane Ahlfeld	Sailing Downeast with Andy Oldman	Elements of Coastal Kayaking with Bill Thomas	Sailing Traditional Daysailers & Beach Cruisers with Al Fletcher & Mike O'Brien	Craft of Sail on MISTY *(women only)* with Queene Foster	Elements of Coastal Kayaking II with Stan Wass	Sea Sense Under Sail with Havilah Hawkins		
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LETTERS

The Halvorsen Legacy

Dear *WoodenBoat,*
As the author of *Wooden Boats, Iron Men—The Halvorsen Story,* published by Halstead Press in association with the Australian National Maritime Museum in 2004, and as a member of the Halvorsen family, I read with great interest John Little's excellent article on HANUKA in the January/February 2011 issue of *WoodenBoat* (WB No. 219).

One point should be clarified, however. Mr. Little wrote that "Whatever the Halvorsens did, they did the best" after previously stating that the "hire fleet ... was given only what maintenance was necessary to keep them going." This is incorrect. In the 12 years that my uncle, Trygve Halvorsen, was in charge of maintenance—a period when I spent holidays on board the hire boats—I remember very clearly that they were immaculate and their engines didn't miss a beat. If a boat was returned with scratched topsides, it would be repainted with a special fast-drying paint and be ready for another hire the next day. Maintenance was carried out continuously, and major jobs, like servicing fuel tanks and lines, were planned two years in advance.

This is a minor point in what was an excellent article, but quality has been the hallmark of Halvorsen boats since Lars's father, Halvor Andersen, began building boats in Norway in 1887. I wouldn't like readers of *WoodenBoat* to think that it was ever anything less than a top priority.

Randi Svensen
Sydney, Australia

I'm sorry to say this, but Russell Tyler's Halvorsens haven't increased in value as much as he thinks. An Australian $25,000 boat would be worth $150,000 today (at least, according to the Reserve Bank of Australia), which means that his sales of $58,000 and $85,000 indicate that they've actually dropped in value. It's a common mistake to forget to "de-inflate" historical money values. Even so, the Halvorsen boats are beautiful, and it's great that people are still buying them!

Simon Woodside
Hamilton, Ontario, Canada

Anchoring Under Sail Revisited

Dear Editor,
I recently read Dave Bill's article on anchoring (WB No. 217). Although I've been boating for years, I find there's always something new to learn. But I do, however, feel that his explanation of the actual dropping of the anchor is incomplete. He feels that the proper technique calls for stopping the boat, dropping the anchor, and then reversing, setting the anchor. This might work well for a powerboat, but there are some sailboats that are beasts to run in reverse, and sometimes bottom conditions make this the less-than-optimal method of anchoring.

One summer day long ago my brother and I were hooked up on a communal mooring when a large ketch came into the anchorage. We were last in the line of boats, and as the ketch came by us they let their anchor loose and ran out the rode while still moving. When they let out the needed amount of rode they tied it off, the anchor dug in, and the boat swung in neatly behind us. It was one of the coolest bits of boatmanship I had seen in my early days of sailing. Needless to say, the next time I had to anchor, this was the method I tried and it worked great. It might not be best for all situations, but once you get the technique down, the old drop-and-back-up method will play second fiddle most every time.

Keep up the excellent work.

Clive Mutschler
Ocean Springs, Mississippi

More Powerboats!

Dear *WoodenBoat,*
While I usually at least scan your magazine at my local bookstore, I'd be inclined to buy it more often if you had more articles on powerboats and less on sailboats, which is almost exclusively the content of your magazine. I realize there may be more wooden sailboats being built, but there are also a lot of wooden powerboats being built. Also, in many of your articles about restoring old sailboats, so much is replaced that it's more of a new build than a restoration. Thanks.

James Lamont
via e-mail

Thanks for your comments, James. We're committed to wooden boats with all kinds of propulsion—paddle, oar, power, and sail. You'll notice that this issue features articles on the one-design runabouts of the Thousand Islands region, as well as a piece on the historic steamboats of the Great Lakes. In the next issue, builder Joe Norton will give us a lesson in the replacement of runabout bottoms. —Ed.

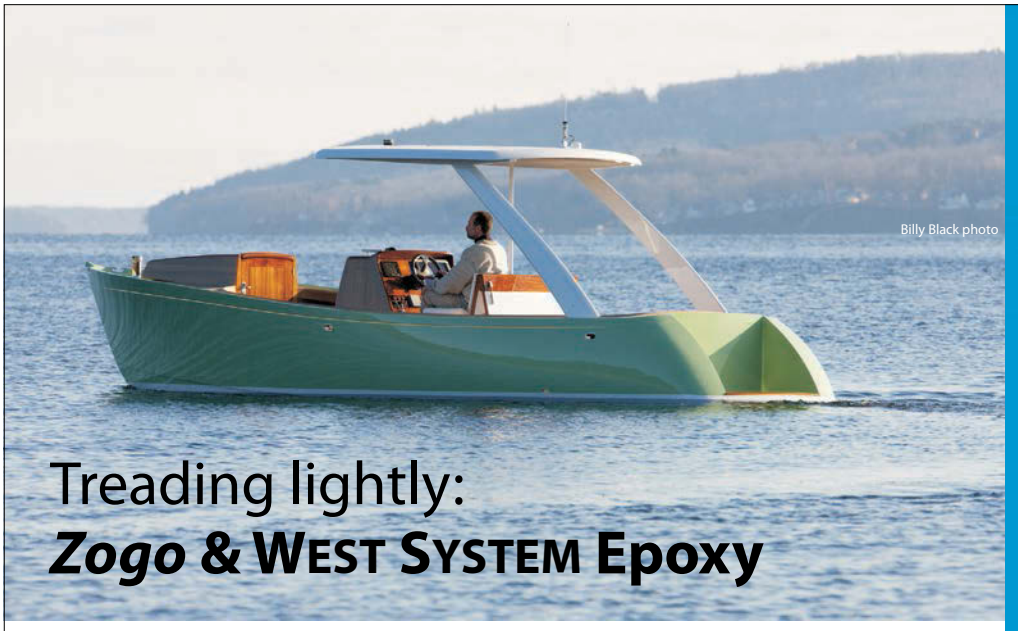
What Is This Boat?

Dear *WoodenBoat,*
I am working with the staff of the Mariner's Museum, Prince Edward County, Ontario, Canada, to identify an old boat that was literally dropped off one dark night. I believe it was built by a local doctor or doctors and sailed on Lake Ontario. Based on the fittings, it looks as if the boat was built in the late 1950s or '60s, possibly to a design published in a magazine. Unfortunately, the people who knew about the boat are no longer around.

The boat is about 17′ long and 5′ at the beam and probably draws less than a foot of water with the centerboard up. It has a canoe-profile bow and was likely cat-rigged. The boom may have extended out beyond the transom. The "whaleback" deck is most unusual, and the cedar-strip planks are individually fastened to closely spaced frames with copper rivets. I'd be grateful to hear from readers with information on this boat.

Peter Sly
22 Spencer Street
Picton, Ontario
K0K 2T0, Canada (psly@kos.net)

Peter Sly seeks information on this boat, donated mysteriously to an Ontario museum.



Billy Black photo

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Of Puritans and Puce

by David Kasanof

PETE GORSKI

Can you imagine Old Captain Stormalong losing sleep over whether to paint his deckbeams yellow or puce—whatever the hell that is? In the vast array of stuff that you can apply with a brush, I think the matter of tung oil versus linseed oil might engage him for a moment or two, but yellow or puce?

Such matters have long since been decided by tradition. Everyone agrees that boats should be white, green, black, or red. Interiors are almost certainly white and the brown of varnished wood. But where does this limited palette come from? Who has decided that lavender isn't a good color for a boat? Make no mistake: Nautical color prejudices can be very strong. I was once told that I was free to paint my boat any color I chose as long as it was white.

The color police sometimes cite the so-called special characteristics of this or that color. I don't buy it. If there were any truth to such claims, one wouldn't see such a carefree use of bright blues, purples, and yes, lavender in boats from the Mediterranean. I have seen color photographs of Italian marinas that would probably make Old Captain Stormalong turn red (workboat red, certainly not purple) with outrage. And what ever happened to the fine old Latin custom of painting an eye on each side of the bow so the boat will always find its way back to safe harbor? You may smile at this quaint superstition, but how many of you have ever been lost or disoriented at night or in fog? I have and I didn't have eyes on the bow of the boat and I bet none of you who shared my experience had eyes on your boats' bow, either, so let's not rush to judgment. If you haven't tried it, don't knock it.

Our aversion to a more freewheeling approach to boat decoration can probably be traced to our Puritan heritage. The ghost of old Cotton Mather stalks the paint sheds of New England. "Sinner repent! Cast away that can of magenta!" it cries.

We think we just don't like magenta as a boat color. We think we've made the independent judgment that "it ain't fittin'," but the truth is that it's old Mather wagging his finger at us all along.

The Puritan influence is hard to overcome. I know because I have tried. I decided not to paint my dinghy but to clean my brushes on it for the next few months regardless of the color I happened to be using. I thought that the resulting kaleidoscopic effect might be amusing once I had covered the entire dinghy. It didn't take long to see that my experiment would fail, though. By the time I had covered about half the dinghy it had become a veritable riot of whites, all the way from Pearl White to Oyster White.

However, we can't blame our narrow-mindedness entirely on the Puritans. The love of varnish is not part of a venerable tradition. Most wooden boats have workboat ancestors. The canny and practical skippers of such craft as the Grand Banks fishing schooners were not overly fond of wood preservatives that couldn't stand up to fish blood, seawater, or sunlight without having to be reconditioned every year.

Varnish looks great, is easy to apply (although difficult to apply properly), and even smells good. There's one tiny difficulty, though. It's completely unsuited to the marine environment. Also, when it deteriorates, a process which begins as soon as it is exposed to air, it looks really lousy. That's why some folks become addicted to the upkeep of their "brightwork."

Someday I shall read of a skipper whose marriage has failed because of his obsession with his brightwork. I will learn that instead of taking out the garbage he was spending all of his time sanding (600 grit) and applying 14 coats of varnish with intermittent rubbing with goosedown from purebred goslings raised under stress-free conditions.

Having eliminated brightwork you can still make your interior look shippy by choosing such yachty decorative items as a brass spyglass, barometer, and kerosene lanterns. Any marine gadget will serve as long as it has no practical utility. Spyglasses make the image jump around too much, kerosene lanterns never stay lit even when the wick is trimmed properly (straight across), and the barometer tells you what weather you are already having. On CONTENT, we had a marine forecast radio that not only served us well but was painted bright orange with yellow stripes. It was the color focal point of the main cabin. Any Italian fisherman would have approved.

So much for Cotton Mather.

Reconnecting with heritage long lost

by Tom Jackson

Maritime heritage runs deep in some places. A poignant reminder of that fact recently crossed my desk in the form of a square padded envelope with a return address in Pasaia, Spain. It contained a copy of a film, sent by Xabier Agote, whom I had met the summer before while he was in Maine collaborating on a multinational Atlantic Challenge crew. Agote gets around. His central project, however, has involved preserving the boatbuilding traditions of his people, the Basques.

The oldest European shipwrecks yet found in the Americas—at least so far—are not Spanish ships of discovery and conquest but Basque whalers, and they are not in the West Indies but in Labrador. In the 1970s, a particularly large one was excavated by Canadian divers at Red Bay. She is believed to be the SAN JUAN, a three-masted galleon 72′ long with three decks, and probably with a two-tiered sterncastle and a fo'c's'le. The ship is known from archives to have sailed from Pasaia, and she came to grief in Red Bay in 1565. One of her small boats, a rarity in nautical archaeology, was recovered with her, pinned down and flattened by the larger ship but therefore uncommonly complete. The 26′ LOA and 6′ beam double-ended whaleboat is preserved and on exhibit in Red Bay; the ship's timbers themselves were returned to the bottom after close analysis.

The recovered whaleboat is remarkable not only in its own right but also for being very similar to whaleboats of some 350 years later, which are well documented and can be seen in person at several New England museums—including replicas that will hang once more off the davits of the 1841 New Bedford whaleship CHARLES W. MORGAN once her restoration is completed at Mystic Seaport. Even the planking pattern—carvel bottoms giving way to lapstrake planking on the uppermost two strakes—is the same.

When Agote traveled to Canada to see the Red Bay boat, he was instantly captivated. The maritime center he directs, Albaola (see www.albaola.com), had already successfully completed a Basque *trainera*, an open boat used for net fishing. That boat was built at the Atlantic Challenge in Rockland, Maine. Albaola set to work to build a whaleboat replica faithful to the original, launching her in 2005. A second soon followed. In 2006, Albaola shipped the second boat to Québec for a 1,242-mile voyage from Québec City down the St. Lawrence estuary to the Gulf of St. Lawrence and on to Red Bay in the Strait of Belle Isle. Sailing with the two-masted lug rig and rowing when the wind failed, the crew of seven (with a chase boat for safety) made the trip in 41 days.

COURTESY ALBAOLA

The Québec-to-Labrador voyage of a replica 16th-century whaleboat—well-documented on film—honored the heritage of Basque seafarers.

They followed the trail of a fascinating history, well captured on film. The Basques—who already had a 500-year history of whaling by the time they reached Canada—set up on the order of 20 shore-based tryworks for rendering whale oil in various sites around Red Bay. The stone rings they erected to hold large copper cauldrons over a fire are still there. Their annual fleets may have reached 30 ships and 2,000 men for the lucrative trade in whale oil from that port. In addition to SAN JUAN, two other Red Bay galleon wrecks have been identified, along with smaller craft. Land archaeologists have excavated a graveyard, from which clothing samples allowed the Albaola team to re-create, for example, goatskin foulweather gear.

From here, a person's mind could wander in any number of different directions: to how small craft are often merely a footnote in maritime histories, to how much knowledge can be gained by well-executed replicas that are completely faithful to original constructions, to the way in which contemporary accounts and historians favor "official" expeditions and ignore the astonishing feats of common people. Each concept could be an essay of its own, but as one who has moved around a lot my thoughts run jealously to the rooted communities that gain deep appreciation for their own ancestors by such projects.

The Pasaia workshop and its replica projects have a close parallel—and perhaps found some inspiration—in challenges that Bernard Cadoret and his magazine *Le Chasse-Marée* laid down earlier in France. One of them called for coastal communities to re-create boats of their own heritage. I sailed in one of these, a *sardinier*, or sardine lugger, at the maritime festivals in Brest and Douarnenez in 2000 (see WB No. 158). What I didn't fully appreciate at the time, and didn't learn until returning on vacation two years later, was how important that boat was to its community. I was visiting new friends at Île Tudy when the boat arrived after the long daysail home, and dozens of people showed up at the stone ramp to welcome the crew, offload gear, and get the boat squared away. It was a warm reunion, and later there were lots of cheek-kissing introductions at a large outdoor café table. The boat was one of the heritage boats designed by François Vivier, who is better known to our readers for his small craft designs, usually in plywood, for amateur builders (see WB No. 212). At Île Tudy that day, I learned that the hundreds of moorings off the tiny peninsula's waterfront mostly served Parisian summer people. None of these local grandsons and granddaughters of sardine fishermen grew up as sailors, but the lugger had become the pride of their town. It also reconnected these people to the water, to their heritage, and to a broad network of maritime historical interests.

For Agote, the rediscovery of Basque outposts in Canada had to have added an even deeper connection. Imagine gazing at a boat that was built in your town nearly 450 years ago and was carried to lands only a few decades past their "official" discovery date. No wonder he felt compelled to replicate not only the boat but a long voyage in the waters his ancestors helped explore. A specific community making that kind of link strengthens its sense of its place in the world. The union of a hundred such

communities strengthens all of us. Anyone asking the "why" of historic boat replicas couldn't find a better answer than that.

Tom Jackson is WoodenBoat*'s senior editor.*

Albaola, Donibane 33, 20110 Pasaia, Spain; (0034) 943–34–44–78; www.albaola.com. The film is available through www.apaizacobeto.com/english.

Tasmania—on top of the world

by Ingrid Code

At the 2011 Australian Wooden Boat Festival held in Hobart, Tasmania, in mid-February, the enthusiasm for wooden boats and boatbuilding, for sea lore and the crafts of the sea, was simply astounding. It's the first year that admission has been free, and the results were remarkable. According to Festival Manager Rob McGuire, the change is due to newly obtained government funding and an increase in budget to $1.1 million (AUD), up from $800,000 in 2009. In unprecedented and overwhelming numbers, more than 100,000 visitors came to experience the exhibits, demonstrations, talks, tastes, scents, and sounds of the maritime world.

Two guest "villages" from Indonesia and Japan were incorporated within the festival. More than 600 boats filled every available space in the water, on the land and in sheds, including over 100 intricate models. I was thrilled to be able to return to the largest wooden boat festival in the Southern Hemisphere and one of the most significant such festivals worldwide.

Four days was hardly enough time to see everything, attend each talk of interest, or see all the wonderful boats that caught my attention. Of course there were the stand-outs, those of graceful line and fine hull, such as HURRICA V, the 1924 60′ Camper & Nicholson ketch exquisitely finished with a new lease on life after her $4 million restoration; or the rugged heritage of a commercial fishing smack expertly restored by Tim Phillips, the 54′ STORM BAY (see WB No. 203). But there were so many worthy vessels that it seems unfair to reserve praise for only the most notable of them. It's the combination and diversity of the boats that provide that "something for everyone" feeling and the equal importance—in terms of our collective maritime heritage—of the salty double-ender, the racing yacht, the fishing trawler, the sailing dinghies, or the steam launches massed together in stately array. There were a tremendous number of exhibits, wares for sale, demonstrations of log sawing or caulking a planked table, and the hiss from the steambox as frames were pulled out one by one and set up in a lovely dinghy by superb craftsman and boatbuilder Ned Trewartha in his "boatshop." There were the bustling throngs of people and the colorful signal flags whipping in the breeze from so many masts, the quiet side-displays of marine art, and the film theatre showing maritime historian Garry Kerr's masterful documentaries that capture the words and presence of the last true Cape Horners or couta boat fishermen. And there was the quirky "Australian bush hut" floating around the harbor with its band entertaining the crowds, their homemade helm concealed in an old tin drum.

With so much to look at, I found myself captivated by the simple perfection of the small double-enders and dinghies sheltered by a crane on Constitution Dock. Time and again I would return to study the sweeping sheer of the Arctic Tern ORNEN or the promise of adventure in the Caledonia yawl ERIN. Both of these boats were designed by Iain Oughtred, who was the featured speaker at this year's festival, and both represent something that all of Oughtred's designs seem to possess—an ancient timelessness and a distinct character. Robert Ayliffe, who introduced Oughtred's talks and is one of Australia's finest small-boat builders, captured something of this when he spoke of that something in us that is drawn to these boats—and similar types throughout the world—something that compels us to reach out and knock lightly on a wooden hull, to hear the soundness of the timbers and feel the solid grain beneath our hand. It's almost as if we have within us an ancestral memory of such boats that is somehow linked to our distant survival into the modern era. I would add that such boats also have an intrinsic beauty, a perfection of hull shape and line that has evolved for all its best seakeeping qualities, its flexibility, buoyancy, and litheness, and which is certainly evident in Oughtred's designs, many of which were on display throughout the festival. Oughtred spoke of his love for the faering type of double-enders that evolved along the forbidding coast of Norway and among the Shetland Islands, designs that were created by hand and eye and long-passed-down knowledge and for which plans have never existed. He has captured these ancient types in his own designs and in doing so has made them accessible not only to the expert boatbuilder but also to the dedicated amateur. In an interesting reversal, many of his clinker-plywood plans have been used as the basis for traditional plank-on-frame construction. When asked about his process of design, Oughtred replied very simply, "Well, I guess I've always been looking to have a beautiful-looking boat. That's the main criteria for me."

But what are boats without water? An invitation to sail aboard ERIN with Iain

INGRID CODE (BOTH)

The Hobart Wooden Boat Festival in Tasmania had a marked rise in visitation in 2011, with appeal of yachts like the 1924 Camper & Nicholson ketch HURRICA V (left) and a row of steam launches (right) interwoven with small craft, many of them designed by honoree Iain Oughtred.

Oughtred at the tiller, the indigo waters of the Derwent River rippling beneath the keel, brought home to me what it's really all about—the wood, the wind, and the sea. I couldn't help asking, "How did I get to be the luckiest person at the Festival?"

Ingrid Code is a freelance writer and classical violinist who sails as first mate aboard the Joel White–built scow schooner NINA.

COURTESY NORTHWEST SCHOOL OF WOODEN BOAT BUILDING

The Northwest School of Wooden Boatbuilding has a new building, and among the first projects to be built there is a Bob Perry–designed 62′ yacht.

Around the yards

■ **The Northwest School of Wooden Boatbuilding** in Port Hadlock, Washington, is expected to complete the construction of a **new building**—the school's fifth—in March. The 6,300-sq-ft, steel-framed building will be named the Jeff Hammond Boat Shop after the school's senior instructor. The building makes room for what will be a record number of students, 55, in the coming year for the school, which marks its 30th anniversary this year. One large project coming up is a commission to build a 62′ Bob Perry–designed sailing yacht, which the new building will accommodate. Fundraising for the final $70,000 needed for completion of the $500,000 building project continues. *Northwest School of Wooden Boatbuilding, 42 N. Water St., Port Hadlock, WA 98339; 360–385–4948; www.nwboatschool.org.*

■ **Herreshoff Designs, Inc.** has teamed up with **Bristol Boat Company** to build cold-molded boats to a **long-forgotten design by Nathanael G. Herreshoff.** An enlargement of the highly popular Herreshoff 12½, so named for its waterline length of 12′6″, the new boat is 17′4″ on the waterline, 19′10″ overall, and will be called the **H-20 class**. Lines for the hull were taken from a half model Herreshoff himself built in 1928. He called the prospective design "a pleasure sailing keel boat, to

COURTESY HERRESHOFF DESIGNS, INC.

The H-20 class is based on a half model made by Nathanael Greene Herreshoff in 1928 but never brought to production. Herreshoff Designs, Inc. and Bristol Boat Company are collaborating.

replace the Buzzard's Bay Boy's Boat," as the 12½ was first known. However, the Herreshoff Manufacturing Company never took the design into production. Other than cold-molding the hull and sheathing it in fiberglass cloth set in epoxy—a bow to modern technology for hull construction—the boats will match yacht standards that Herreshoff would have recognized and will be fitted with appropriate bronze hardware by J.M. Reineck & Son. Hull No. 1 was under construction during the past winter. *Herreshoff Designs, Inc., 18 Burnside St., P.O. Box 717, Bristol, RI 02809; 401–396–9971; www.herreshoffdesigns.com.*

COURTESY MARTIN GROSSI

WINDFALL, a 50′6″ yacht built in 1951 to a Philip Rhodes design, was shipped from the United States to Mallorca, Spain, to be restored for a Parisian restaurateur.

■ The **Philip Rhodes–designed** 50′6″ LOA **yacht WINDFALL**, launched in 1951 at Abeking & Rasmussen in Germany for an American client, is undergoing a restoration by **Sebastian Bennasar** in **Mallorca**, in Spain's Balearic Islands. In August 2010, Parisian restaurateur Martin Grossi purchased the 1951 yawl sight-unseen (but after a full survey), from an American owner after the yacht had been spotted by his friend Rick Farinholt of Chesapeake Marine Railway. Grossi had her sailed to Florida for shipment to Mallorca, where she will have a full refit and restoration, after which she will be renamed and homeported in Cowes, England. "She is in the good hands of Sebastian Bennasar, fourth generation of Mallorcan marine carpenters, or *mestres d'aixas* (axe masters)," Grossi wrote. *Construcciones navales Bennasar, www.bennasar-astilleros.com.*

COURTESY YACHTSNICKERIET

In Sweden, a new 30-square-meter yacht is taking shape at Yachtsnickeriet.

■ **Yachtsnickeriet** in the Stockholm Archipelago in **Sweden** is completing a **new 30-square-meter racing yacht** this spring. The company, which was founded by Thomas Larsson and Jonas Lorensson and until now has primarily been restoring classic yachts, is building the new cold-molded "skerry cruiser" for a German client. The yacht, 41′LOA, with a beam of 7′3″, is a double-ender designed to the century-old square-meter rule by Swedish yacht designer Bo Bethge. Her planking is an inside layer of Western red cedar strip planking followed by two layers of mahogany on opposing diagonals, finished with a longitudinal mahogany layer to give her

bright-finished topsides the appearance of a planked boat. Her deck is two layers of plywood topped with laid planking using Douglas-fir and a mahogany kingplank. Her only deck structure is a skylight. A March launching was contemplated. The company has recently moved into a handsome new waterfront building. *Yachtsnickeriet AB, Torpvägen 3, 132 48 Saltsjö-Boo, Sweden; +46–8–643–98–96; www.yachtsnickeriet.se.*

■ **John Hutchison** of **Saxonburg, Pennsylvania**, is restoring the **Sidney Herreshoff–designed Fishers Island 23 CRUSADER**, working by himself. "Although I've built a Haven 12½ and Coquina, this is a monumental project for me, and I can only hope that the final product will live up to the high standards set by Herreshoff," he writes. The 34′ LOA yacht was launched in 1932. As the only keel-centerboard version of the class, she has a beam of 7′9″, which is 9″ wider than her sisters, and draws 2′11″.

Hutchison missed purchasing the boat after seeing it in "Save a Classic" in WB No. 196 but later convinced her new owner that he could take the project to completion. "We brought her home to Saxonburg in the spring of 2008, built a temporary shelter, and began work. She had been out of the water since 1992 and was severely hogged. Nearly every frame was snapped, and the timber keel was badly split, but the hardware and rig, ballast, deadwood, stem, and transom were good. After producing section molds from the drawings available, I brought the boat back into shape and began a complete reconstruction. I steam-bent a new white oak keel from dried stock cut from my own trees. The boat is now completely reframed in oak and replanked in yellow cedar. The original mahogany sheerstrakes will be reinstalled soon, and interior work will follow."

Hutchison plans to install a 48-volt electric auxiliary, to be concealed under the cockpit sole. "I hope to complete the boat in a year (or so), as I am singlehanding the project," he writes. "Andy Giblin of MP&G in Mystic, Connecticut, has generously provided advice as needed, and Dennis Wolfe designed the electric drive. Classic sails will be made by Dave Beirig of Erie, Pennsylvania. CRUSADER will travel a bit on her new trailer when complete but will have a seasonal berth on northern Lake Champlain. I am enjoying every countless hour I spend on CRUSADER."

■ Gene Beley writes from Stockton, California, that **Adam Farrow**, who owns a **boat repair shop in Lodi**, has been restoring the **108′ DEANNA**, which he bought from the estate of the former owner. "The boat was taking on water in its slip in Richmond, but Farrow quickly found two small leaks in the hull below the fuel tanks. He made a wedge out of mahogany and packed it full of underwater epoxy and screwed it in with long screws and pressure-packed it into the void of the rotted area, a temporary repair which has ended up lasting four years. The next day, he and six friends cruised 85 miles to Stockton.

"DEANNA, originally commissioned by the U.S. Navy, was launched at Ventor Boat Works in New Jersey in 1943 as P272, LADY THERESA. Racecar driver and automotive designer Carroll Shelby bought her after World War II and converted her into a luxury yacht, which he named SEA SHELL. Farrow bought her from the estate of a subsequent owner and has begun restoring the boat at his Stockton home dock. So far he has upgraded electrical and plumbing systems, added solar and wind power, and replaced generators. He's replaced six planks, using Douglas-fir, and rebuilt portions of the upper structure using the medium-density overlay type of plywood commonly used for outdoor signs. Farrow expects to haul the boat soon, for the first time in 10 years."

COURTESY JOHN HUTCHISON

In Pennsylvania, John Hutchison, working solo, has taken on the reconstruction of the Sidney Herreshoff–designed Fishers Island 23 CRUSADER.

COURTESY GENE BELEY

The 108′ yacht DEANNA has been undergoing restoration by Adam Farrow in Stockton, California.

Offcuts

Word of John Hutchison's work on the Fishers Island 23 CRUSADER (see "Around the yards," above) called to mind that another Herreshoff Fishers Island design, the **Fishers Island 31 KESTREL**, built in 1929, was **donated to the Herreshoff Marine Museum in Bristol, Rhode Island**, in 2010. Said to be well maintained and recently restored, she races and cruises locally and sees service in the museum's youth seamanship program.

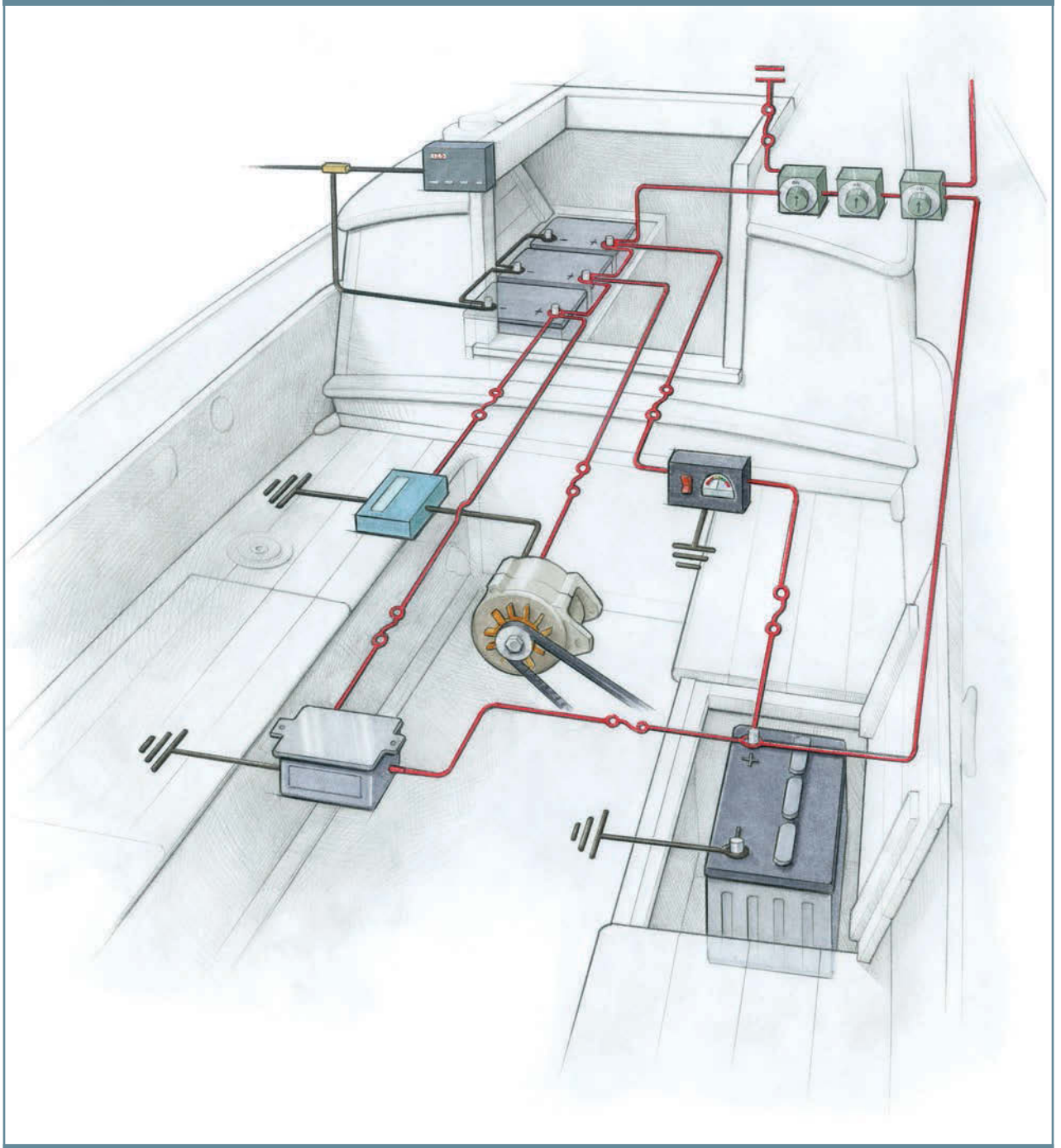
The Herreshoff Marine Museum also started an interesting program in September 2010, in which **professional boatbuilders** serve as **mentors for 14- to 18-year-old students**. The students take on the tasks of caring for, preserving, and restoring the Herreshoff 12½s the museum uses in summer programs, and along the way they learn skills ranging from wood identification to tool use to boat painting. Their after-school sessions are on Tuesdays and Wednesdays, with occasional Saturdays as well. *Herreshoff Marine Museum, 1 Burnside St., Bristol, RI 02809; 401–253–5000; www.herreshoff.org.*

Mystic Seaport Museum in Connecticut and the **Herreshoff Marine Museum** in Bristol, Rhode Island, jointly announced in February 2011 that the two institutions **have agreed to affiliate**. Both will remain independent institutions, but they will work collaboratively, according to a press statement. Mystic will aid the Herreshoff museum with expertise on things such as collections management, curatorial and custodial support, and exhibitions, while the Herreshoff museum will augment Mystic's existing connections with yachting history, especially in exhibits in conjunction with the Herreshoff museum's AMERICA's Cup Hall of Fame. *Mystic Seaport Museum, 75 Greenmanville Ave., P.O. Box 6000, Mystic, CT 06355–0990; 860–572–0711; www.mysticseaport.org. Herreshoff Marine Museum, 1 Burnside St., Bristol, RI 02809–0450; 401–253–5000; www.herreshoff.org.*

A group of **Chesapeake Bay** maritime history enthusiasts is trying to **bring a 1920 buy boat** typical of the region **back to the Bay** from Central America. **WINNIE ESTELLE**, a 66-footer built on Smiths Island by Noah T. Evans, is known to have been used as a movie

Getting Started in Boats

from the Editors of WoodenBoat *Magazine*

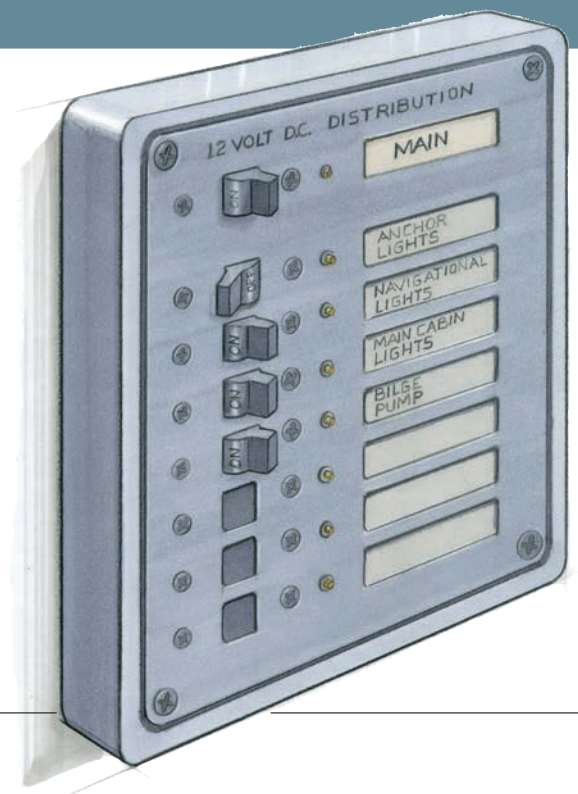


Volume 28

Fundamentals of Battery Management

Fundamentals of Battery — Management —

by Steve D'Antonio
Illustrations by Robert LaPointe



A proper onboard DC electrical system includes a distribution panel, which allows individual circuits to be switched off when not in use. The panel in this drawing includes three blank switch locations for the addition of circuits as needed.

The well-proven battery system design found on many recreational power- and sailboats has remained essentially unchanged for decades. As common as these arrangements are, however, their proper use can be a mystery to a beginning boater. And even for an experienced person, there are still many design and installation details that must be considered to make a battery bank and its systems reliable, seaworthy, and safe. There are also decisions to be made by the installer and user regarding redundancy, versatility, and compliance with commonly accepted guidelines such as those established by the American Boat and Yacht Council (ABYC). While typically considered voluntary, such guidelines may be mandated by federal agencies in certain circumstances. Gasoline-powered boats, for instance, are required to meet a series of standards under the Code of Federal Regulations (CFR), many of which relate directly to batteries and other electrical components. Insurance companies may also insist upon compliance.

Batteries and their management are anything but a black art. Choose them carefully; ensure they are installed properly, safely, and in compliance with the appropriate guidelines; then make sure they are charged in a manner that suits their design, and your engine will always turn over and the cabin lights stay on.

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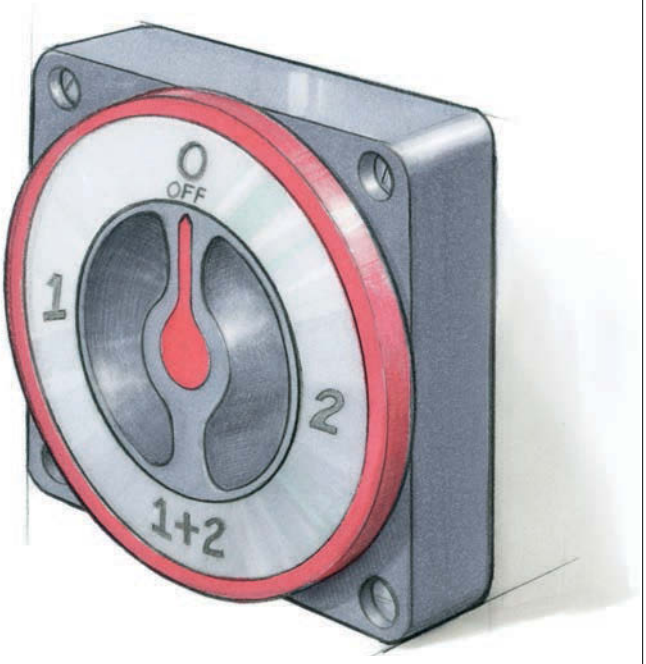
Traditionally, the builders and maintainers of boats using more than one battery connected them in such a way as to afford the user some degree of redundancy, and with good reason: It's vitally important to be able to start the engine when you want to.

The most common battery installation involved two equally sized battery "banks" that were connected to the engine via a battery selector switch offering [battery]1, [battery] 2, BOTH [batteries combined in parallel] and [all batteries] OFF. The switch enabled the user to "manage" both the current leaving the batteries (for starting and other vessel loads) and the current that is sent to the batteries from the engine-driven alternator.

Typically, for starting purposes, the skipper turns the multi-position switch to BOTH, which allows the engine's starter to receive the maximum amount of cranking amperage by drawing from both banks. Even if the engine will start on a single bank, there's some logic to this custom of supplying more current. If the starter labors because a single bank is weak or inadequate, or worse yet because the cabling is undersized or compromised, the drop in voltage may be excessive, which in turn causes an increase in current flow (cable size and current draw are inversely proportional for starter motor loads), and that in turn increases the heat that is generated within the starter. Over time this increased heat production and extended cranking can shorten the starter's life.

Once the engine starts, the alternator begins charging. If the selector switch remains in the BOTH position, current from the alternator will be directed to both banks, charging them simultaneously. That's straightforward enough, and it's a system that has served thousands of boat owners well for many years. It's the next step where events often go awry. Once the boat sets sail and the engine is switched off, or the boat reaches its destination, or drifts while fishing lines are put over the side, the boat's electrical demand, often referred to as "house" loads—lights, VHF radio, fans, bilge pumps—will draw on both battery banks equally, if the skipper forgets to turn the selector switch to 1 or 2. Switching to 1 or 2 will keep the isolated battery in ready reserve for engine starting when it's time to get underway. If the boat is idle for long—overnight, for instance—it's all too easy to draw down both banks, making it impossible to start the engine without outside assistance.



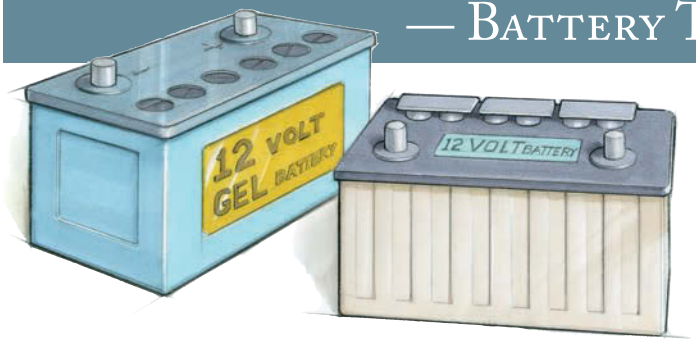
The conventional management of a two-battery-bank DC system involves the use of a four-position battery switch, which allows either or both banks to be used at a given time—or for the entire DC system to be switched off. Typically, one bank is designated as the "house" bank, and the other held in reserve for engine starting.

There are methods of ensuring that a fully charged starting battery remains available at all times, and they don't rely on the skipper's memory. We'll have a look at these on page 7, after we discuss battery types, basic charging protocols, and wiring.

Series or Parallel?

Two (or more) batteries that are connected in parallel will have double the capacity, or amperage, of a single battery, but the same voltage. A parallel bank is achieved when the positive posts are electrically connected, and the negative posts are electrically connected. A bank is said to be wired in series when the positive post of one battery is wired to the negative post of its neighbor. This yields no increase in capacity, but it doubles the voltage.

— Battery Types—



Most lead-acid batteries are immediately identifiable by their removable caps, which allow the addition of water when their electrolyte becomes depleted. Gel and AGM batteries have no such caps, and are similar to each other in appearance.

FLOODED BATTERIES are filled with a solution of sulfuric acid called free electrolyte. While some flooded batteries are "sealed," or "maintenance-free," the vast majority, and particularly those designed for marine applications, can be maintained by the addition of distilled water. These batteries can withstand repeated or chronic overcharging; when this occurs, they bubble or gas, sometimes vigorously, as they emit hydrogen. Gassing is normal, to an extent; it's part of the chemical process that occurs in flooded lead-acid batteries and is the reason why they periodically require water (hydrogen being one of the constituents of water). Under normal circumstances, even if you can't hear them doing it, flooded batteries emit hydrogen gas. While these batteries can endure overcharging, it should be avoided at all costs because it shortens battery life and makes frequent watering necessary, and the by-product, hydrogen gas, is explosive.

The primary weakness of flooded batteries, when compared to contemporary types that will be discussed in a moment, is that they are comparatively slow to charge and have a self-discharge rate of just under 1 percent per day at 80°F. Because their internal resistance (resistance is the opposition to the flow of current) is relatively high, there is a limit to how rapidly they can accept a charge, even if charging current is available in abundance.

GEL BATTERIES use the same chemistry (a sulfuric acid electrolyte) as a flooded battery but mix the electrolyte with a material called fumed silica—essentially, very pure sand dust—to create a gel. After the battery case has been filled with acid gel, it is sealed and slightly pressurized, usually to about 1.5 psi, which sometimes causes a case to bulge a bit—though anything more than a slight bulge is abnormal. The pressure aids the reconstituting of water from hydrogen gas and oxygen generated during charging—the so-called recombinant process. This and the following style of battery are referred to as the **sealed-valve-regulated lead-acid (SVRLA)** type. If the battery is overcharged, the sealed valve will vent the resulting gases, a process that markedly shortens the battery's life.

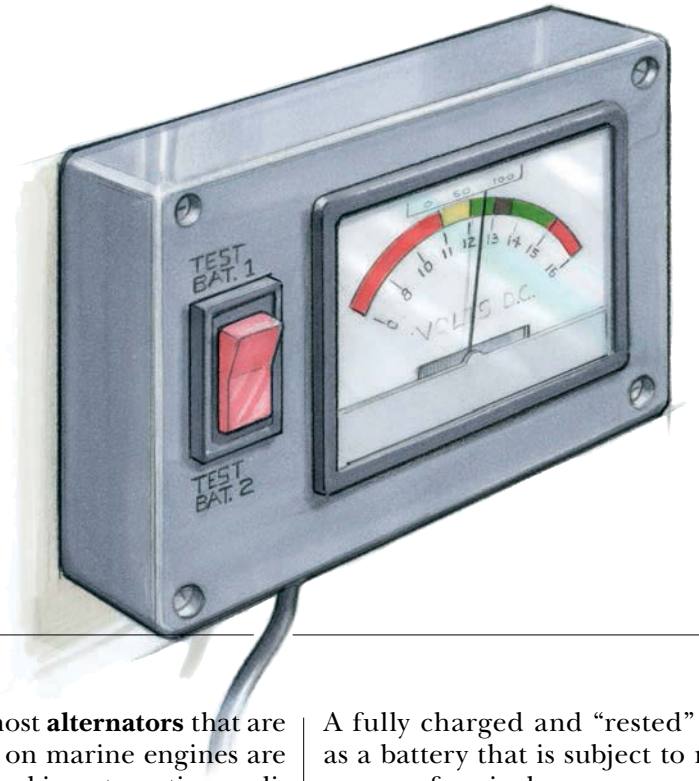
The primary strengths of a gel battery are that it requires no watering and recharges very quickly. This is because of the manner in which the electrolyte envelops the lead plates, and due to the pressure under which it operates. A gel battery can often be charged twice as quickly as a conventional flooded battery, provided it is connected to a properly regulated and sufficiently sized charge source. As one might expect, these batteries cost more than their conventional cousins, but if it's quick recharging and low maintenance you seek, they may be worth considering.

ABSORBED GLASS MAT The third battery type you are likely to encounter is an **absorbed glass mat** or **AGM**. Developed for and used by the telecommunications industry for decades, this battery is a relative newcomer to the recreational marine world. It embodies many of the attributes of the gel battery: it's an SVRLA maintenance-free design, and it has a quick recharge time. Its acid is held in suspension using tightly packed fine glass fabric. Both AGM and gel batteries have very low self-discharge rates. That is, if left with no load and no charge source, they tend to stay fully charged almost indefinitely. The AGM will accept a charge even more quickly than the gel, twice as fast in most cases, provided it's connected to a large enough and properly regulated charge source.

When it comes to battery-type selection, when comparing like quality, you often do get what you pay for. Flooded batteries tend to be less expensive than the gel and AGM types, with AGMs being the most expensive and now the most popular among SVRLAs.

A final thought on battery types: SVRLA batteries require a three-stage charging regimen, with the stages (typically called "bulk," "acceptance," and "float") having charge voltages that differ from the voltage typically supplied to conventional flooded batteries. This charge comes from a proprietary alternator-regulator package or shorepower charger. Failure to use these chargers will lead to premature battery failure.

— Charge Protocols—



A fully charged battery that has rested for six hours will measure between 12.6 and 12.8 volts. The meter should read above 13.8 volts when the battery is being charged.

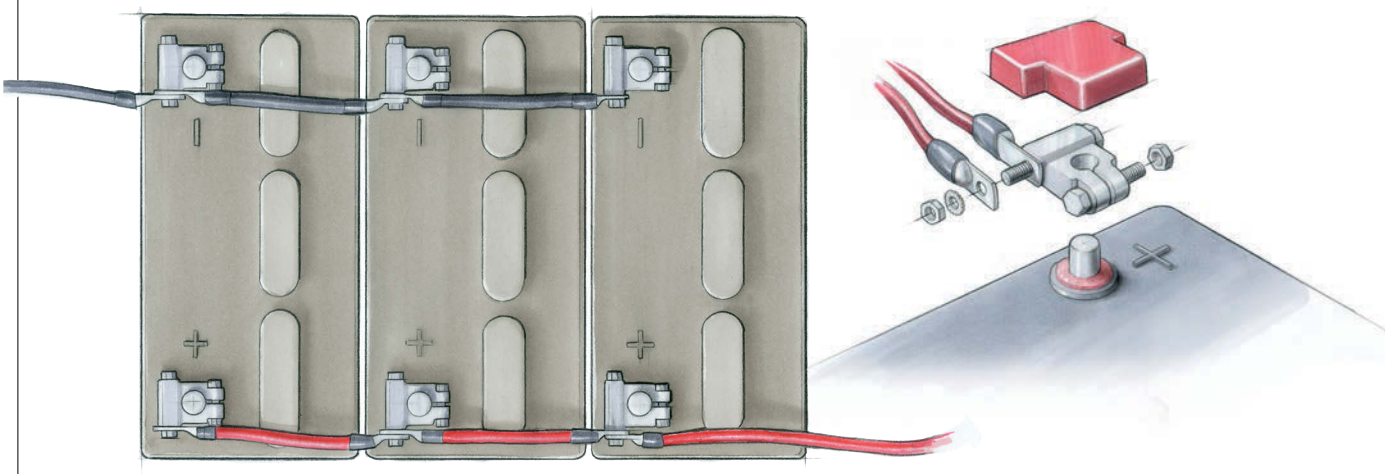
With few exceptions, most **alternators** that are standard equipment on marine engines are nearly identical to those used in automotive applications through the 1970s, with one important exception: Alternators, starters, ignition systems, and other electrical components used in the engine compartments of gasoline-powered boats must be ignition-proof. That is, they are designed to prevent the accidental ignition of flammable vapors that may inadvertently make their way into an engine compartment. For this reason, one should never substitute an automotive alternator or starter for the marine version; the higher price of the latter is justified. Such substitutions are dangerous and a violation of federal law. Diesel engine applications are exempt from this requirement.

The typical marine alternator is quite simple, and is designed primarily to replace the energy expended by the battery during the starting process. This energy is often much less than most users believe, and it's often replaced in just a few minutes of running time. After that point, the alternator is available to supply house loads. If the house loads exceed the often-modest output of stock alternators, the batteries will make up the difference—at least for a time, until they are depleted. A user must thus be mindful of the rate of power consumption and power production.

A **voltmeter** can monitor the basic condition of the batteries as well as the output of the alternator, but this ubiquitous device has its limitations. A fully charged and "rested" (rested is defined as a battery that is subject to no loads or charge sources for six hours or more) battery will be between 12.6 and 12.8 volts, while a 50-percent-discharged, rested battery will measure between 12.3 and 12.4 volts. As you can see, there is a scant difference between the two readings, and accurate measurement requires resting the battery, which typically isn't practical. Incidentally, none of the aforementioned battery types should be discharged beyond 50 percent of their capacity, because routinely doing so will diminish the amount of energy they will provide over their lifetime. The voltmeter is slightly more useful for measuring rate of charge: While it's an oversimplification, any reading over approximately 13.8 volts can be considered as "charging."

Stock alternators utilize a **regulator**, which monitors and controls the rate of output from the alternator. The regulator is nearly always built into or screwed onto the alternator itself, making it a complete charging package. To a certain extent, the batteries' state of charge controls the regulator's signals to the alternator. When the battery is depleted, or if house loads are high, the regulator will command the alternator to produce more current. It's important to remember that standard regulators have two primary missions: recharge the starting battery, and supply modest house loads. If called on to do more than this, their performance will nearly always be inadequate.

— Some Wiring Wisdom —



A bank of batteries should be wired in such a way that current is drawn across the bank—that is, the positive lead exits a battery at one end of the bank, while the negative lead exits at the opposite end.

Regardless of how large or small a battery bank may be or what it's called upon to do, two wiring rules must be followed. First, all wiring should be installed in accordance with ABYC or, where mandated, CFR guidelines to ensure safety. Among the most important of these is the overcurrent protection mandate, which calls for a fuse or circuit breaker in every wire, save one, that leaves any battery's positive post. This overcurrent protection, often abbreviated as OCP, must be installed within 7″ of the battery terminal. This distance may be increased to 72″ if the wire is "sheathed." Sheathing can include anything from proprietary wiring loom to conduit; a wiring loom should meet ABYC guidelines for the protection it affords the wire as well as for fire resistance. Therefore, if you can follow any wire from any battery positive terminal for more than 7″ (or 72″ with sheathing) without bumping into a fuse or circuit breaker, the installation does not meet this important guideline, and the oversight should be corrected without delay. Any wire between the OCP and the battery is essentially unprotected and is therefore a fire risk in the event of a short circuit.

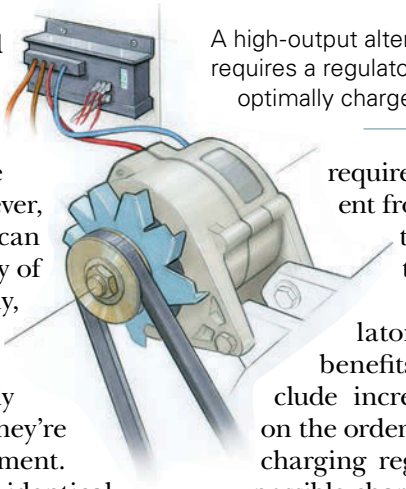
The one exception to the OCP rule is the cabling used for starting circuits. Any cable used, or that can be used via paralleling switches, to supply current to a starter is exempt from the OCP requirement. Because of that exemption, such cabling must be routed with extreme care to prevent chafe or short-circuiting. Other than the one that connects to the starter post, positive cables must not make contact with any part of an engine or its mounts.

Battery banks, depending on the number of individual batteries included in the bank, should be wired in such a way as to draw current across the bank. For example, the positive and negative cables connected to three group 31 batteries[1] wired together in parallel, should attach at opposite ends of the bank, to ensure all batteries are cycled evenly. If the cables are attached to a single battery at the electrical end of the bank, that battery often bears the brunt of the discharge and it is likely to become depleted before its brethren, making for an undesirable imbalance within the bank.

A final note on wiring: Bigger is nearly always better. That's an oversimplification, but where electrical current is concerned, large cables present lower resistance, which means more of the energy gets to where it's going rather than being lost as resistance-generated heat. Therefore, closely follow engine-manufacturer guidelines for starter cable size and length, and rely on standard voltage drop guidelines (available in a variety of books as well as from ABYC) when making charging and starting system connections. Voltage drop should never exceed 10 percent, while 3 percent is preferred, particularly for voltage-sensitive equipment such as bilge pumps, navigation lights, and communication gear.

[1] Battery case size is denoted by "group" number; group 31 is slightly larger than an automotive or light-truck-sized battery. Automotive-size batteries are typically group 24.

— Advanced Charging Protocols —



A high-output alternator charging a Gel or AGM battery requires a regulator that can be programmed to optimally charge a particular battery type.

Up to this point, we've considered a charging system using only the basic alternator supplied with most engines—a system that has worked well and continues to remain effective for many owners and operators. However, there are several improvements that can be implemented to increase efficiency of this system, make it more user-friendly, and still keep it reliable. All of the suggestions that follow are tried and proven designs that I've personally used aboard hundreds of boats, and they're illustrated on the cover of this supplement.

While the traditional use of two identical batteries or battery banks using a multi-position, 1, 2, BOTH, OFF power distribution switch may be familiar to many, there is room for improvement. Studies show that using a single battery bank for house loads and cycling it through approximately 50 percent discharge will yield the greatest amount of amp-hours[2] over the life of the battery. This bank also becomes the primary recipient of charge current from any source—alternator, shore-power charger, or solar panels.

In order to ensure the engine can be started under any circumstances, it should be given its own dedicated battery or battery bank. This bank, usually smaller than the house bank, remains electrically separate from the house bank under all but emergency starting needs, so there's no danger of waking up to a dead starting battery.

Instead of the 1, 2, BOTH, OFF switch, the improved arrangement uses three simpler ON-OFF switches, one for each battery bank and another between the two that is used to manually parallel the banks if the engine-starting battery fails. Proper wiring of this so-called "parallel" switch is important: It should be connected to allow either the starting or house battery switch to be turned off while still allowing paralleled voltage to flow to that switch's loads (in electrician-speak, the connections are made to the "load" side of the house or starting switch). With such an arrangement the user can essentially take a defective, damaged, or internally shorted battery off line entirely while allowing its loads to be supplied by the paralleled battery.

For those using SVRLA batteries or for those wishing to supply their flooded batteries with the quickest and "healthiest" possible charge, an aftermarket, high-output alternator and external regulator kit become a necessity. Because SVRLA batteries require a charge that's significantly different from conventional flooded batteries, this kit must be part of an upgrade to this battery style.

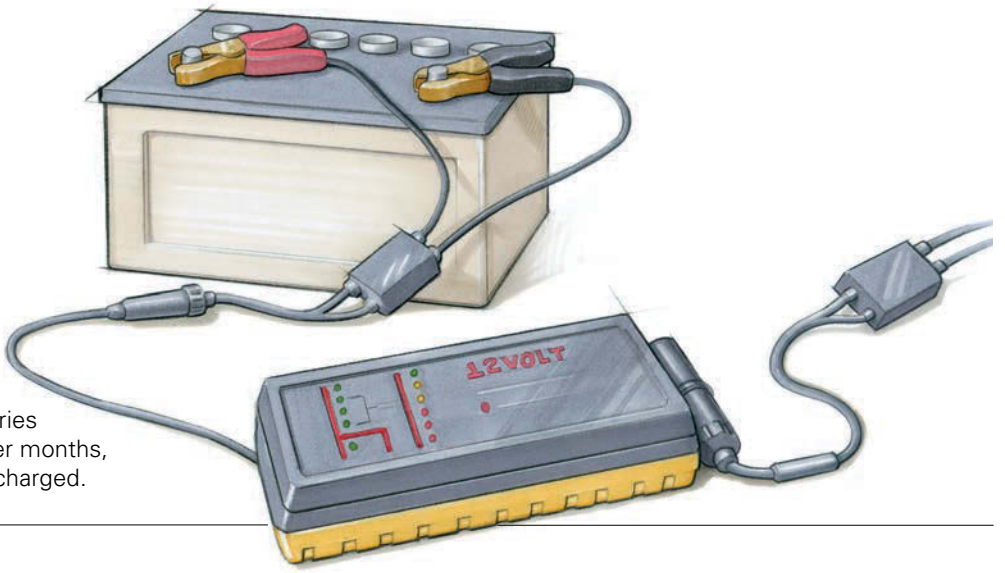
High-output alternator/regulator installations offer a variety of benefits for any battery type. These include increased sustained output, typically on the order of 100 or more amps; a three-step charging regimen that provides the quickest possible charge; and a temperature-compensated charge profile (warm batteries cannot be charged as quickly as cool batteries). Most aftermarket regulator kits can be programmed to charge a variety of different types and even brands of batteries. Consider this setup as granola and fresh vegetables for your batteries; it gives them the best charge possible.

If all the output from the alternator goes to the house bank, how, you might ask, does the starting battery get charged? One of two approaches may be used. The simplest involves the use of an isolator that essentially splits the output of the alternator, sending it to both the house and starting banks simultaneously. Because the starting bank is likely to be nearly fully charged and thus have a higher internal resistance, it will accept less of the output, allowing the bulk to go to the house bank. An alternative, and one I prefer, is to use one of the many proprietary starting battery charge devices that more intelligently shunt a small amount of charge to the starting battery. Some of these devices include temperature monitoring and compensation, which comes at a higher, but I believe worthwhile, price. Generally speaking, however, they will send a limited or regulated amount of charge current to the starting battery

Finally, the next-generation charge system requires next-generation monitoring, something a bit more sophisticated than a voltmeter. Amp-hour meters are significantly more useful than voltmeters in that they accurately measure the amount of energy used from, or remaining in, the house battery bank. Armed with that information, you can make an informed decision as to when it's time to recharge.

[2] This is a measure of battery capacity, one amp-hour being equal to a one-amp load operating for one hour; think of it as the equivalent to gallons of fuel in your tank.

— Off-Season Battery Storage —



Because a fully charged battery will not freeze, it's best to leave batteries aboard in the winter months, and to keep them charged.

One of the fall rituals observed in a boatyard I worked in many years ago involved the removal of batteries from most of the boats that were wintering over. The batteries were placed in a heated shed and charged periodically, the logic being that because batteries always seem to have less power when cold, keeping them warm during the winter must be better for them. In hindsight, this was a less-than-ideal approach. The potential for damage to the battery as well as the boat, not to mention the backs of the poor souls doing the lifting, was significant, and as it happens, flooded and SVRLA batteries endure extreme cold just fine. In fact, the reason a battery has less oomph when it's cold is because the falling thermometer is slowing down the battery's internal chemistry, sending it into a sort of hibernation, which is actually desirable when it's not being used, with one provision: The battery must remain charged. A fully charged battery won't freeze, while a dead or weak one will. If a battery is allowed to freeze, it will almost certainly suffer internal, and possibly external, damage that may result in a fire or even an explosion should a charge be applied—either while still frozen or after the battery thaws out. The axiom here is: Leave the battery aboard, make certain all its loads are disconnected, and charge it periodically—once a month is probably enough for flooded batteries, and every three months for SVRLAs.

A former full-service yard manager and longtime technical writer, the author now works with boat builders, owners, and others in the industry as Steve D'Antonio Marine Consulting, Inc.

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prop in Belize, but sometime after that she was abandoned. "In 1986," writes Don Appelbaum, "my friend Capt. Roberto Smith found WINNIE bent and broken on a sandbar off the coast of Belize. We knew the deceased owner, 'Bermuda Dave' they called him. Roberto, Russell Pollero, and I decided that we could salvage her and restore her. It seemed an easy thing to do, and we expected the restoration to take six months. It took six years, but WINNIE eventually returned to the waters of Belize, where she spent the next 17 or 18 years participating in the tourist industry, carrying passengers to the reef." In 2008, Nick Evans, a grandson of the builder, found the boat through an Internet search and went to Guatemala, where she now lies, to have a look. He and others forged a plan to bring her home, with the ultimate hope of having her reside in the collections of the Chesapeake Bay Maritime Museum.

COURTESY DON APPELBAUM

A group of supporters hopes to bring WINNIE ESTELLE, a 1920 Chesapeake Bay Buy Boat, back to Maryland from Belize.

Supporters are trying to raise money for the purpose; *contact Appelbaum in Florida, 386–462–1701 or don@farmtofamily.com; see also www.bringthewinnieestelle-home.com.*

The Wooden Boat Rescue Foundation, which Bruce Elfstrom of Connecticut (and Maine) founded some years ago, has started running **classes** for those who have taken on **wooden boat restoration** projects or are contemplating the idea.

The foundation, which is all-volunteer and nonprofit, provides a conduit linking the owners of endangered boats with those who are looking for worthy—and sometimes challenging—projects. The boats, which are free, are of widely various types, in various stages of need, and in various geographic areas. A database showing details is displayed on a newly refurbished web site.

The new workshops are held in East Haddam, Connecticut, and Beverly, Massachusetts. Both are led by graduates of Rhode Island's International Yacht Restoration School. **Greg Bradfield,** who teaches at IYRS, will lead the **Massachusetts workshops** on the first weekend of each month; contact Erica Moody or Paul Simonoff at Erica-paul@woodenboatrescue.org for particulars. **Jens Lange**, who operates Baltic Boat Works in Rhode Island, will teach the **Connecticut workshops** on the third

COURTESY JENS LANGE

The Wooden Boat Rescue Foundation, started as a way to connect needy boats with willing owners, is now conducting short courses in restoration work in Connecticut and Massachusetts.

weekend of each month; for information on those workshops, contact Elfstrom at Bruce@woodenboatrescue.org or Jim Hill at Jim@woodenboatrescue.org. The current project boats are, in Connecticut, a 17′, 1937 one-design by Furnans Yacht Company and, in Massachusetts, a 17′ prewar gaff-rigged daysailer.

With new volunteer leaders in the persons of Moody and Simonoff, a handsome new logo, the new courses, a nice web site, and tax-exempt status in the works, the WBRF seems poised for growth. They don't keep boats themselves, but they are always looking for help from builders or yards willing to store them while in transit and they, like all of us, are always hoping to hear about that great boat in a barn somewhere that's awaiting a savior.

A tip of the cap and a raise of a pint for them, if you please.

Wooden Boat Rescue Foundation, www.woodenboatrescue.org.

SCOTT AYERST

DAWN, by a circuitous route, ended up never straying far from home.

"A boat often lies at the heart of a whole network of human relationships," Helen Hopcroft writes from Australia. "In the case of an **old wooden yacht named DAWN**, a strange **series of coincidences** mark her 74-year history.

"Originally built in 1937 on Lake Macquarie, DAWN was raced hard, sailing up and down Australia's East Coast and into Sydney Harbour. In 1943, she popped up again on the records of Middle Harbour Yacht Club in Sydney, under Eric Merritt, who had bought DAWN for his son, Malcolm. Together they sailed the boat in a couple of informal events with one of his son's friends, Rodney Jones, crewing. Tragically, Malcolm was killed the next year while serving in the Royal Australian Air Force. Not surprisingly, his father didn't want to keep the boat; he made it easy for Rodney to buy her. By the early 1950s, DAWN was racing regularly in the MHYC fleet, sometimes cruising north to Lake Macquarie. Rodney assembled a crack crew, and even today, aged in his late 80s, he recalls in a husky voice that creaks like an oak tree in a hard wind, 'I reckon I had the best foredeck hand ever. He could get that [spinnaker] sail up within a boat length of the mark.'

"Years passed. Rodney and his wife retired and moved away. DAWN came into the care of Rodney's nephew, Keith, who did his best to maintain the yacht, but finally the family knew they had to let her go. There were few takers. Eventually a former shipwright named Marcel Vaarzon-Morel bought DAWN from Rodney and trucked her to his home on Lake Macquarie.

"A few weeks later, Marcel rang his brother to tell him about his purchase. Keith, an old family friend of Marcel's brother, happened to be visiting and answered the phone. Keith asked Marcel what year the boat was built, her name, and length. Marcel told him, there was a stunned silence on the other end of the line, finally Keith replied: 'Congratulations. You've just bought my family boat.' In a strange twist of fate, DAWN had been bought by an old friend

of the Jones family, a fact unknown to Marcel or Rodney at the time of the sale.

"DAWN is now almost completely restored, once again a much-loved family yacht, and regularly seen racing on Lake Macquarie."

Across the bar

■ **Dean Stephens**, 87, May 29, 2010, Ventura, California. Mr. Stephens (see WB No. 42) learned wood craftsmanship and self-sufficiency early by building a log cabin at age 13 in Blackfoot, Idaho. After serving in the Marines during World War II, he went home and apprenticed in furniture and cabinet making. He became enthralled with boats after moving his family to Alameda, California, in 1953 on the hope of better prospects. His first boat, FAIR DINKUM, was an 18′ Sam Rabl–designed sloop, quickly succeeded in 1962 by a William Atkin 34-footer, CHARITY, which he, his wife, and their four children lived aboard for a decade while he worked as an itinerant boatbuilder. Among his large boats was the pinky schooner RELIANCE, built to Howard I. Chapelle's Glad Tidings design and launched in 1971. In the early 1970s, divorced and soon with a second wife, he moved to Abalobadiah Ranch outside Fort Bragg, California, where he established a boatbuilding school that emphasized self-sufficiency. One of the school's boats was MATILDA D, a felucca now in the collections of the San Francisco Maritime National Historical Park. He moved to Wisconsin in 1978 after the school closed but returned to Fort Bragg in 1986 and fit in a few more boat projects until ill health forced him to cease.

■ **Daniel S. Gregory**, 81, January 6, 2011, Westwood, Massachusetts. Mr. Gregory, a 1957 MBA graduate of Harvard Business School and cofounder of a Boston venture capital partnership, was a U.S. Navy veteran of the Korean War and maintained a lifelong interest in boats and maritime history. He served on Mystic Seaport Museum's board of trustees starting in 1980, becoming an emeritus trustee in 1991. He was particularly generous in supporting the plans collections—the Daniel S. Gregory Ships Plans Library at the museum is named in his honor. He had an eye for small boats, including a Whitehall pulling boat he had built in the 1960s and an L. Francis Herreshoff Marco Polo dinghy built for him by Maynard Bray. Most notable among his boats was VITESSA, a Nathanael G. Herreshoff Buzzards Bay 25, which during his ownership underwent a full restoration at MP&G in Connecticut.

■ **Michael William Langan**, 55, December 31, 2010, Jamestown, Rhode Island. Bill Langan's career in yacht design started at Sparkman & Stephens, where he served an internship while a naval architecture student at the Webb Institute and where, in 1978, he started full-time as chief draftsman. In 1980, he succeeded Olin Stephens himself as Chief Designer, a position he held until striking out on his own in 1998 with Langan Design Associates in Newport, Rhode Island, specializing in large luxury yachts. Some of Langan's hulls were designed for cold-molded construction, a noteworthy one being the 110′ three-masted sail-training schooner SPIRIT OF BERMUDA, launched at Rockport (Maine) Marine in 2006. Mr. Langan, needless to say, was an avid racing sailor, and among his accomplishments was his participation, starting when he was 15 years old, in 20 consecutive runnings

of the Bermuda Race, for which he eventually became technical director.

■ **Don Donaldson**, 88, February 7, 2010, Newport Beach, California. Mr. Donaldson and his high school friend Richard Dittmar formed Dittmar-Donaldson Shipbuilding in Costa Mesa after World War II, during which Mr. Donaldson served in the Army in Europe and the Pacific. Their company specialized in large wooden-hulled power yachts—the 100′ MOJO, which today operates as a charter boat out of Newport Harbor, is one notable example. Many of the boats they built were of their own design.

■ **Don Glassie**, 76, February 4, 2011, Newport, Rhode Island. A native of the Washington, D.C., area, Mr. Glassie was an entrepreneur who had varied careers, including as a clothing importer and manufacturer, a hotelier, and a real estate developer with an eye for historic building conversions, which he accomplished not only in Newport but as far away as New York City and Florida. He learned to sail a Herreshoff 12½ while a youth summering on Cape Cod. After graduating from Amherst College in 1956, he served in the U.S. Air Force as a radar controller, then went on to Stanford University and George Washington University. In the 1960s, his clothing business led him to Uxbridge, Massachusetts, and he kept a Herreshoff S-boat, VIXEN, in Newport. In 1974, he and a friend acquired FORTUNE, a 50′ B.B. Crowninshield schooner of 1926, which they restored. In 1977 he moved to Newport full-time and became a waterfront fixture, starting boat shows specializing in used boats and running a harbor tour company based on the 58′, 1929 Elco RUM RUNNER II and the 72′ schooner MADELAINE, both of wood, and the 160′ aluminum schooner ARABELLA. Meanwhile, he continued to cruise FORTUNE and raced her far and wide—including at the AMERICA's Cup Jubilee at Cowes, England, in 2001—and continued racing as recently as the 2010 season.

■ **Rick Persson**, 55, February 20, 2011, Old Saybrook, Connecticut. Mr. Persson learned his boatbuilding alongside his father, Seth Persson. The elder Persson's small yard, established in Old Saybrook in 1931 after moving there from Brooklyn, New York, built some 60 yachts, most of them fine sailing yachts built one at a time. Among these was the Olin Stephens–designed FINISTERRE (see WB No. 218), launched in 1954, a year before Mr. Persson's birth. In 1973, Mr. Persson and his younger brother, Jon, joined the family business, which they carried on after their father died that same year at the age of 71. In most recent years, Mr. Persson served at Cove Landing Marine in Lyme, Connecticut, as the lead shipwright on repair and restorations of vintage wooden yachts, among them the Concordia yawl ABACO, which had been severely damaged by fire. Mr. Persson also enjoyed developing small-craft designs such as the Connecticut River Pulling Boat, and he was a licensed pilot with a keen interest in experimental aircraft. A memorial fund in Mr. Persson's name has been set for the Tabitha Foundation of Cambodia, www.forpeace.us/rick_persson.html, to assist those living in small villages to purchase small boats and fishing nets. Jon Persson carries on the legacy at Seth Persson Boat Builders, now located in Centerbrook, Connecticut.

A memorial web site in the "Across the bar" notice for Peter Phillipps in Currents, WB No. 219, was incorrect. See www.donation.rnkc.us.

MAYNARD BRAY

Boring Bars *and* Deadwood

ELLERY BROWN

Form long holes with accuracy

by Ellery Brown

Deadwood is the assembly of timbers between the sternpost and the keel that, in a small boat, would be called a skeg. Since the invention of marine engines, deadwood has often been bored through for propeller shafts, and, with the development of the split shaftlog (explained below), deadwood can be downright dynamic.

The 27′9″ catboat MOLLY B, our example, was designed by C.C. Hanley and built at Baker Yacht Basin. While she is atypical of a catboat (she has always carried a mizzen, making her a cat-yawl), she is quite typical in her deadwood construction. In the course of a thorough restoration, we replaced her entire keel structure, including the deadwood. With its inclined hole for the propeller shaft bounded by a split shaftlog, a mortised and tenoned sternpost, and some very long through-bolts, her deadwood assembly called for a wide variety of drilling and boring techniques.

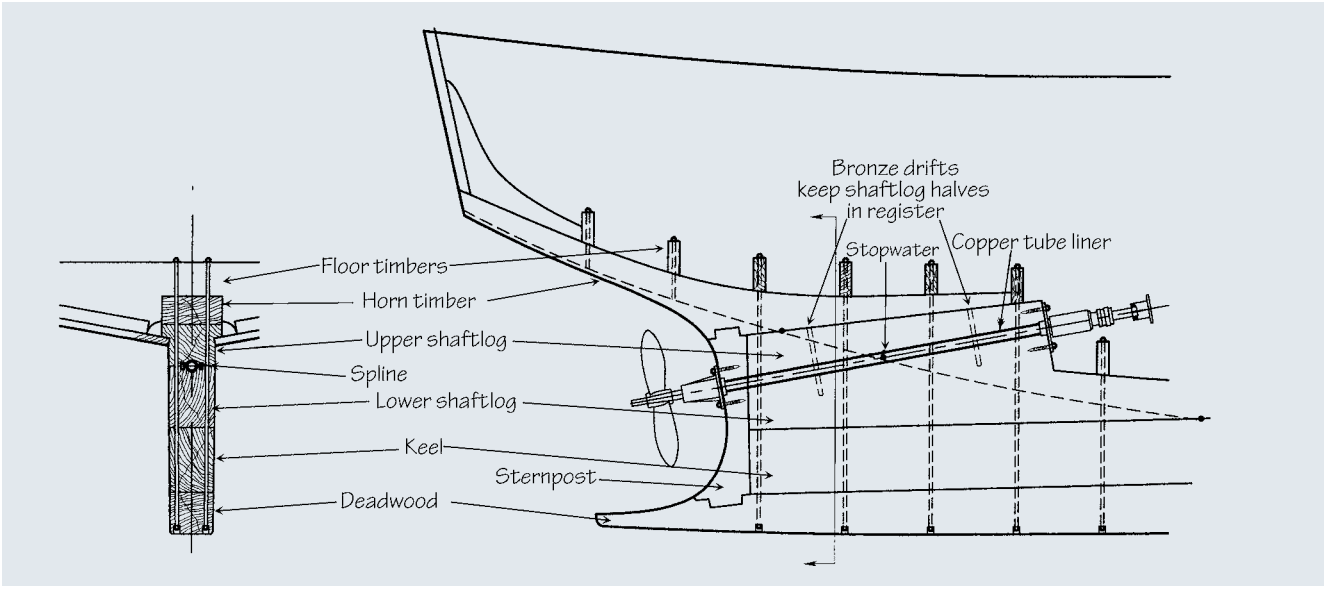
The boring bar is the star of the show. It is one of those tools that intimidates the uninitiated but is wonderfully simple and effective in practice. A boring bar is a piece of round metal stock, straight and true, that is a bit more than twice as long as the hole it is being asked to form. Somewhere along its mid-length, it carries a cutter that does the actual job of removing wood, and this cutter needs to be adjustable in the extent that it sticks out from the surface of the bar. At either end of the hole being bored sits a bearing. These two bearings need to be securely bolted to something fixed and stable, and then accurately aligned with the centerline of the desired hole, in which your perfectly straight and true propeller shaft will someday turn.

A boring bar does not actually drill the hole; it enlarges and trues up the hole that is already there, acting as a sort of rotary scraper, enlarging the pilot hole with each pass. To rotate your bar you will need some kind of drive motor attached to one end. We use a heavy-duty portable electric drill.

You can make your own boring bar from a length of cold rolled steel. Make sure it is straight before you plunk down your money, and treat it with care—you can easily bend your bar by dropping it. Unless you have a metal lathe, turning down the end to fit your drill chuck is probably the hardest part. Drilling the holes to hold the cutter, and the set-screw that secures it, is best done on a drill press. If you end up going to your local machinist, he can test your bar for straightness, and fix it if it is found wanting.

A boring bar is most commonly used for shaft holes, but you might also consider it for other challenging holes, such as hawsepipes or rudder tubes, where precision and proper alignment are critical.

***Above*—The catboat MOLLY B recently underwent a complete restoration at D.N. Hylan and Associates, in Brooklin, Maine. In this article, the author explains a dead-on approach to prepping and boring a shaft hole, a useful technique for many long-hole applications.**



DOUG HYLAN

MOLLY B's original shaftlog was one piece. Replacing such a timber can be problematic, as the piece often has a boxed heart (contains the pith), making it prone to checking and leakage. Her new shaftlog is "split," having two parts that meet at the centerline of the shaft, with one half above and one half below the split. Since the parts are smaller, their stock is easier to find and usually of better quality. Note the careful placement of bolts and splines. While bolts often graze or penetrate the splines, MOLLY B's do not, due to the generous siding to her deadwood and keel.

ELLERY BROWN

ELLERY BROWN

1 After the old deadwood has been removed, draw the engine outline on a plywood pattern and align it with the engine beds. Then screw a long straightedge to it on the shaft centerline to project the line across the deadwood patterns.

2 The parting line for the split is drawn on the shaftlog pattern along the top of the straightedge.

MAYNARD BRAY

ELLERY BROWN

3a This pattern, whose outline duplicates the original deadwood, needs to serve both parts of the shaftlog. The shaft line represents the mating surfaces of the upper and lower pieces. I can't cut it yet, because the saw kerf would throw everything off. Instead, I trace each half of the shaftlog onto its own piece of purpleheart stock. I define the mating surfaces on each piece by marking the ends of the shaft line, removing the pattern, and then drawing a line between the two marks with a straightedge.

3b I leave the upper shaftlog very rough and slightly oversize while I finish off the lower half and fit it to the keel. Then I cut the pattern along the shaft line, leaving the line on the upper half.

4 With the rest of the deadwood dry-fitted, all that is missing is the upper shaftlog. Conveniently, this is the smallest piece; its wedge shape will aid in making a nice, tight fit on both surfaces. The pattern should be a perfect fit, and if I had a bit more courage I would have already cut to my lines on the purpleheart stock. My caution pays off when the pattern reveals that a little fine-tuning is necessary, and I can simply adjust the plywood instead of the unforgiving purpleheart. Once the pattern fits just right I retrace it on the roughed-out upper shaftlog piece and cut to my lines with confidence.

MAYNARD BRAY

5 The mating surfaces of the upper and lower halves of the shaftlog will have three matching dadoes, the outer ones being for purpleheart splines. The center dado will act as a pilot hole for the boring bar. The square pilot should be slightly smaller than the diameter of the final shaft hole. Cutting it close allows you to use the largest-diameter boring bar possible. Since the stiffness of a steel rod is a function of its diameter cubed, even a ⅛″ increase in diameter means a much stiffer boring bar, which will wobble less between the bearings and cut a cleaner hole. Cutting it close also means less time running the boring bar, so be brave!

MAYNARD BRAY

ELLERY BROWN

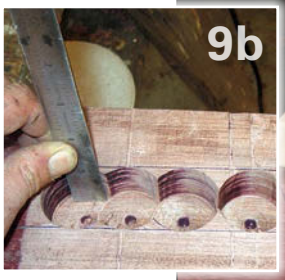
6 The two splines that flank the shaft hole prevent leakage and help with alignment. It is important to position the splines so that the bolts that go through the shaftlog will not intersect them, making them less effective. Also, try to place the splines inboard of the bolts. There must be two stopwaters where the rabbet crosses the parting line in the shaftlog. The stopwaters must butt against splines on each side to assure watertightness. You'll need two stopwaters, since, clearly, a single one cannot go all the way through. If you can remember to make a kerf on one face before the shaftlog goes together, you'll be able to use it as a pilot when you bore for the stopwaters, later on.

MAYNARD BRAY

7 Here the two halves of the shaftlog are assembled outside of the boat. You can see the square pilot hole on the end with splines protruding on either side of it. Next, two pairs of ½″ bronze drifts are hammered into the shaftlog, perpendicular to the parting line. These lock the halves together and keep them from sliding fore and aft.

NICK ROBINSON
MAYNARD BRAY

8a & 8b With the split shaftlog assembled, work begins on the sternpost. The sternpost gets a tenon on each end; these mate to mortises in the horn timber above and the skeg below. The sternpost locks the deadwood timbers together and, because its grain runs vertically, gives the propeller shaft bearing's lag screws a better bite.

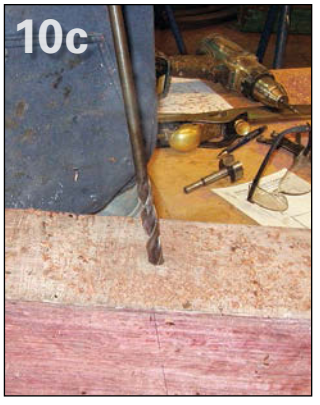


ELLERY BROWN (BOTH)

9a & 9b A mortise can be cut a variety of ways. A mortising machine or a router with a pattern works quite well. But for this job, I bored a series of holes with a Forstner bit and cleaned up with a chisel. (A drill press makes this easier, but given the irregular shape of the timbers, using one would have been problematic.) I began by boring a hole in a piece of scrap which, when clamped onto the timber, acted as a guide for boring out the mortise. The guide gave me better precision in locating each hole, allowing me to bore more holes closer together, making for less chisel work later on.

NICK ROBINSON

ELLERY BROWN



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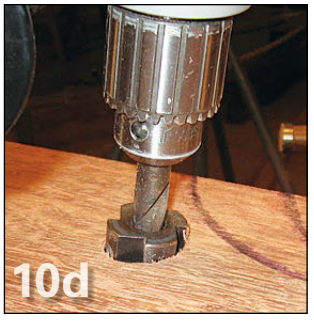

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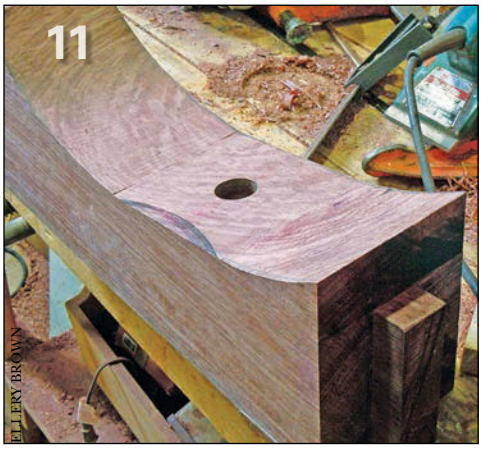


MAYNARD BRAY
ELLERY BROWN

ELLERY BROWN

MAYNARD BRAY

10a While the split shaftlog allowed for most of the shaft hole pilot to be cut with dadoes on the table-saw, this section through the solid wood of the sternpost must be bored through at the correct angle. With the sternpost in place, I'm marking the exact angle and location with a straightedge, held against the shaftlog parting line. (The tenon in the lower end of the sternpost has yet to be cut.)

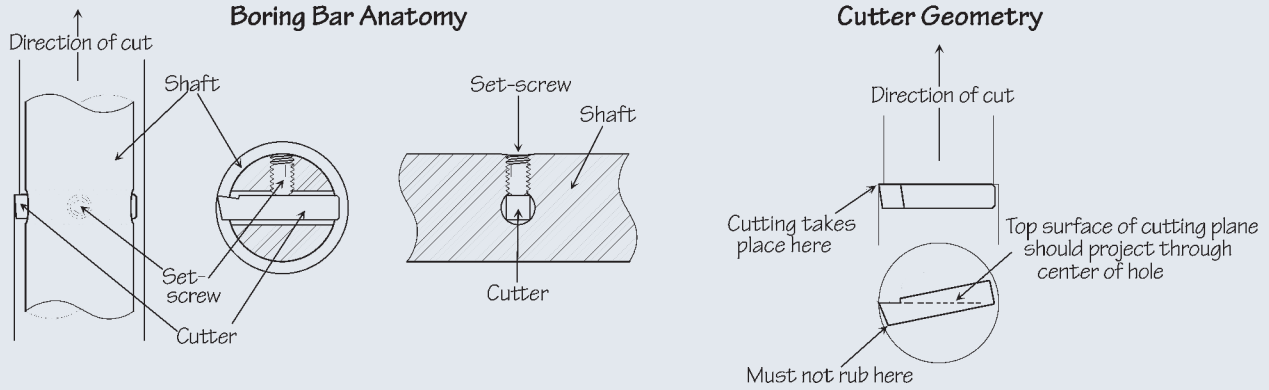
10b The final diameter of the shaft hole is 1⅛″, so the diameter of the pilot should be an inch or so. We didn't happen to have a 1″ spiral bit long enough to go all the way through the sternpost. We would lose a day and a good chunk of change if I ordered one and waited for it to show up. But we did have a 1″ counterbore that fits on a ½″ bit. So, as the first step, I adjusted the table on the drill press to the correct angle, and drilled a ½″ hole as deep as possible.

10c & 10d Next, I continued the ½″ hole all the way through with a longer bit. The 1″ counterbore was later attached to the ½″ bit and run through from both faces of the timber to meet in the middle.

11 At this point, with tenons cut on both ends of the sternpost and mortises in the horn timber and skeg, it's a good time to dry-fit the whole assembly. I use a flexible batten to lay out the propeller aperture and fair the shape into the horn timber and skeg. The area immediately around the pilot hole is made square to the shaft line. This must be done with precision so that the stern bearing will be properly aligned with the shaft when it is fastened to this surface.

12 The bolts that go through the shaftlog are more than 30″ long in places, and they must both miss the splines (however narrowly) and not come through the side of the deadwood. To ensure accurate placement, my partner Nick laid out the bolt locations and angles on the shaftlog while it was dry-fitted to the keel and other deadwood pieces. Here he starts the holes in the lower half of the shaftlog (where the location is most critical) on the drill press. The lower shaftlog is then used as a guide to chase the holes through the deadwood pieces above and below it.

13 With all its pieces fitted and pre-drilled, the entire deadwood structure is assembled with Interlux Primocon (an alternative to red lead paint) in the joints. The pre-drilled holes are used to guide the drill through floor timbers; to lengthen the ⅜″ drill, I welded it to a piece of ⅜″ steel rod long enough to clear the tallest part of the deadwood. Fastenings were bronze rod, previously cut to length and threaded, then driven through from inside the boat with double nuts to protect the threads. Two ½″ × 10″ bronze lags connect the mortise and tenon joints in their critical job of keeping the sternpost securely in place. The lags are drilled such that they don't go straight into end-grain and therefore have improved holding power.



The cutter for your boring bar will be most easily made of high-speed steel, which can be shaped and sharpened without losing its temper. Small pieces of this alloy, in either round or square sections, can be found at a machinist supply house. Almost all drill bits are made of high-speed steel, and in a pinch you could sacrifice one from which to make your cutter. Cutter-grinding geometry is important—if your bar is not cutting well, it is likely that its geometry, rather than a dull cutting edge, is at fault.

DOUG HYLAN

14 The work of boring a shaft hole is all in the setup. The actual action is, well, pretty boring. In a typical boring bar setup you have a drill motor chucked to the end of a long steel rod that is fitted with an adjustable cutter (see illustration above). The rod spins between two bearings, one on either end of the hole. Properly aligning and firmly securing these bearings is critical to achieving an accurate bore.

MAYNARD BRAY

MAYNARD BRAY

15 We use self-aligning pillow block bearings because they can be easily and securely fastened, they minimize friction, and they tolerate slight misalignments. A hardwood block with a hole in it can be a functional alternative. I fastened oak cleats to either side of the shaftlog, parallel to the parting line, positioning them below it enough to account for the height of the center of the bearing above this line. Doing this, I establish the height and angle of the bearing as well as create a sturdy foundation for it.

MAYNARD BRAY

16 The inner bearing is often not so easily set up. This one should be positioned quite close to the end of the shaftlog. The shorter the space between the bearings, the less the boring bar is likely to wobble as it cuts. Often, it makes sense to mount the bearing underneath a cleat that spans the engine beds. In this case, however, the best approach was to make a block that was sided and beveled to match the height and angle of the shaft line and to clamp it to the nearest floor timber.

17a The boring bar is now run through the shaft hole pilot and the two bearings. After making any small adjustments to the alignment, the cutter is slid into place between the aft bearing and the shaftlog, and locked there with its set-screw. It is important to think of the boring bar as a rotary scraper rather than a drill bit. The cutter will scrape the walls of the shaft hole and gradually increase its diameter with each pass. Therefore, the cutting edge of the cutter should be adjusted so that it extends less than 1/16″ beyond the opening of the pilot hole, with its cutting edge square to the surface. It might well be possible to remove more material than this, but it is best to start conservatively.

17b With the drill running at low speed and with fairly light pressure, run the cutter through, frequently pulling it out all the way to clear chips. The bar naturally tends to vibrate more as the cutter approaches the middle of the shaftlog when it is at its farthest point from the bearings. The vibration can feel a little alarming, and slowing the drill a little can lessen it, but you will be comforted as the cutter nears the inner bearing and things smooth out. With one pass complete, adjust the cutter to take another, larger, bite. Continue until you reach your final shaft hole diameter, or until you can't stand one minute more and need a drink, whichever comes first.

MAYNARD BRAY

MAYNARD BRAY

Shaftlog Considerations

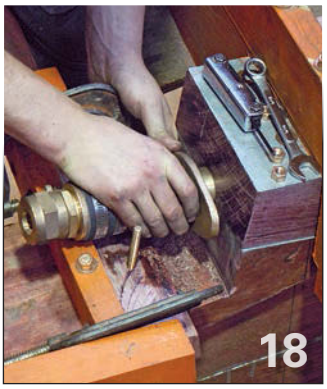
Once you know your shaft diameter, you might want to give a thought to shipworms. Remember that if you use the now ubiquitous water-lubricated stern bearing, the shaftlog is going to be full of water. Unless you are making your shaftlog out of some wood species that is impervious to teredoes, you might want to think about lining the inside of your shaft hole with something that is. Copper tubing is ideal for this, being naturally toxic and long lasting. It is also thin walled, which means that it has a minimal impact on the size of the hole you will need to bore. This tube need not be rigidly attached to the bronze casting on either end of your shaft hole, but it is best if a short recess can be machined in these castings, into which the ends of the tube can slide. If you are not worried about worms, and don't intend to fit a liner tube to your shaftlog, there is, in fact, no real reason to turn the square dado-cut hole into a round one. You will still want an accurate counterbore for the pilot bushings of the shaftlog castings, however, and the boring bar is by far the best way to do this.

In the case of making MOLLY B's new shaftlog, there were two possible approaches: a big, solid piece of wood with a hole bored longitudinally through, as C.C. Hanley originally drew it (and the way it was originally built), or two pieces with a seam that runs along the shaft centerline. If I were a braver man with a nice set of barefoot augers, I might proceed as the builders did. For this approach you would set up some kind of boring jig that would help keep the barefoot auger properly lined up, then bore half the hole from one end and repeat the procedure from the other end, hoping that the two holes would meet in the center, at least closely enough so that the boring bar could find its way through.

But being of faint heart (at least when it comes to boring long holes through expensive pieces of timber), I tend to lean toward the second option: a split shaftlog. The longer the log is, the harder I lean. First, the pieces of wood are smaller and much easier to find; that huge chunk that Hanley called for is almost certain to have a boxed heart (contains the pith of the tree) and is therefore doomed to check if it is ever allowed to dry out. Once there is a big crooked check running through your shaftlog, it will never be the same. The split shaftlog lets you decide where the wood will open up (on the nice straight seam between the two halves) and gives a greater chance for it to heal up nicely when the boat goes back overboard.

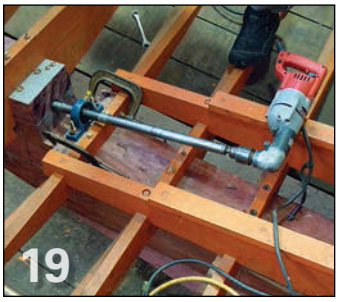
But the big reason I like the split shaftlog is that it turns the process of creating the pilot hole into child's play. With a little planning, both the pilot hole and the grooves for the splines can be cut in minutes with a dado cutter on the tablesaw. And it is almost as easy to bore the holes for the bolts that will hold the whole assembly together. These holes can be started right at the parting line, where there is the least margin for error, and then transferred to the adjoining pieces (those above and below the shaftlog) by clamping them together and boring through the holes just created.

—D.N. Hylan



MAYNARD BRAY

18 Both the stern bearing (outboard) and the stuffing box casting (inboard and shown here) have an accurately machined pilot bushing that must be let into the face of the shaftlog. The counterbores for the pilot bushings establish the orientations of the bearings, which must be perfectly aligned with the shaft, so it makes sense to continue using the boring bar to form them. With a longer cutter in the bar and a piece of tape wrapped around it to mark the appropriate depth, I gradually enlarge each end of the shaft hole to fit the pilot bushing.



MAYNARD BRAY

19 To counterbore the inboard or forward face of the shaftlog, end-for-end the drill and boring bar and operate it from inside the boat.

ELLERY BROWN

MOLLY B's new split shaftlog (its hole lined with copper tubing) makes her good to go for decades to come.

After the boring bar apparatus is removed and before the stern bearing is attached, we need to remember that unless some fairing is done, the propeller will be spinning in the shadow of this massive stack of timbers, possibly becoming so inefficient that it will keep you from getting home before dark. So I whittle down the aft end of the deadwood as best I can with a menagerie of macho tools, like a 4″ grinder with a wheel having chainsaw teeth called a Lancelot (see WB No. 117). The shape of the base of the stern bearing and the presence of the through-bolts limit the amount of wood that can be removed.

Once everything is faired and I've applied a generous coat of Primocon to keep the wood surfaces from drying out, the stuffing box and the stern bearing are fastened to the forward and aft faces of the shaftlog with hanger bolts (half lag screw, half bolt) after being bedded.

Ellery Brown is a boatbuilder who works with D.N. Hylan and Associates, Inc. in Brooklin, Maine, www.dhylanboats.com. *The author wishes to thank Doug Hylan for his particpation in this article.*

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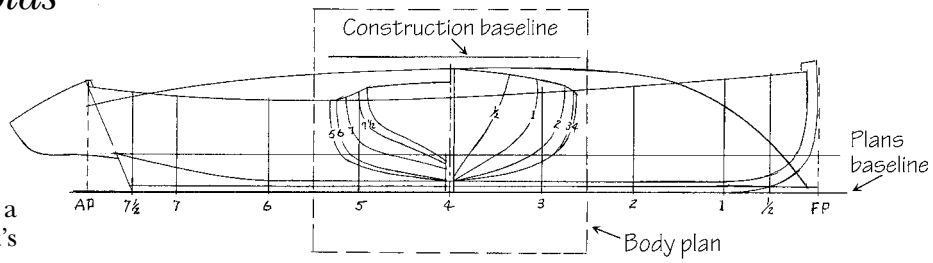
Molds and Setup

PART 1: Making Molds

by Greg Rössel

Illustrations
by Sam Manning



The lofting board body plan (or full-sized patterns) will provide the information needed to build accurate station molds.

Few operations offer as much of a guarantee for getting your boat's shape right (and symmetrical) as creating a properly set up construction jig made with accurately built and properly positioned station molds. A good construction jig will prevent the formation of unsightly sags or bulges, which detract from the desired curvature of the hull.

A construction jig can be enhanced and adjusted to reflect the complexity of the hull. A simple skiff might require just a few molds, as its shape is relatively simple and the planking is usually thick enough to fair itself between supports. On the other hand, a boat built with thin and floppy plywood planking, or with narrow strip planks, might need twice as many station molds to keep things fair. A sophisticated hull shape like the Haven 12½ might require a mold for every single steam-bent frame. In this article, we'll take a close look at molds: how to ascertain their shape by using information from the lofting board and how to build them. In part two, (in our next issue), we'll get into the finer points of setting up molds on the building jig.

Visualize and Create the Shapes

The stations are transverse planes that are analogous to the slice a knife makes in cutting through a loaf of bread. Station molds, because they have thickness, are like the individual bread slices. Only one face of the piece of bread, or mold, can be considered a station.

Before making molds, determine whether the lines on the lofting board (or the full-sized patterns, if your plans include them) have been drawn to the inside or outside of the hull planking. Older plans, especially those drawn to lines taken from historic round-bottomed hulls, are likely to be drawn to the outside of the planking, whereas hard-chined craft such as dories or sharpies are likely to be drawn to the inside. In most cases, there will be a notation on the table of offsets indicating whether dimensions are to the inside or outside. If the stations are drawn to the outside of the planking, you will need to subtract plank thickness in order to make an accurate mold. If the planking is thin (less than 9⁄16″ or so, as it is on most small boats), it is a simple matter to reduce the station outlines to achieve the correct shape of the molds (see **Figure 1**).

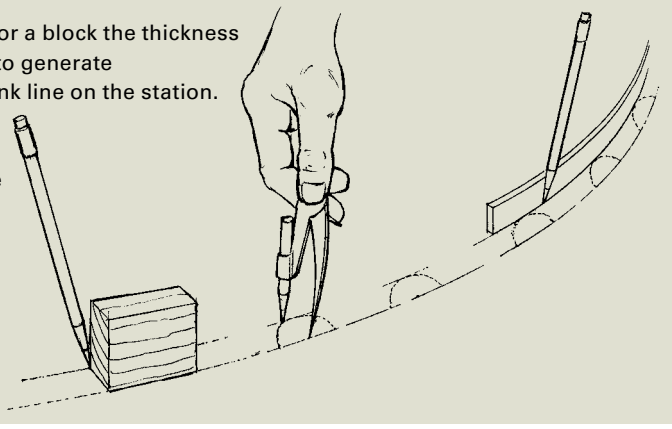
Take a small piece of wood that is the same thickness as your planking, and, on the body plan, run it along the inside of each station's curve (from sheer to rabbet) while making a series of pencil marks to graphically subtract the planking thickness. Alternatively, you can set a pencil compass to the plank thickness and run a series of arcs from the station line. Connect the points or crowns of the arcs with a flexible batten and draw in the line with a pencil. This gives you a trustworthy inside-of-plank station line from which to build the molds.

The easiest molds to make (and to modify) are those with square-cut edges rather than beveled ones. Most small boats have been built with squared-edged molds, so, for simplicity's sake, we will limit our discussion to boats built this way. We'll also set up the hull for upside-down construction to facilitate framing and planking, but refer to "top," "bottom," "upper," and "lower" as though the boat were right-side up.

Create Contact Points

With the desired shape of the station molds depicted, the next step is

Figure 1
Use a compass or a block the thickness of the planking to generate an inside-of-plank line on the station. This method is fine for hulls that do not have extreme shapes (such as a bluff bow).



to establish a construction baseline on the body plan that can be used as a reference to set the molds at their proper height relative to one another. This line will run parallel to the baseline that's shown on the lines plan. The idea here is that the upper end of each U-shaped mold will extend to (and be cut off at) this construction baseline. The port and starboard sides of each mold will then be connected with a narrow piece of wood (called a "cross spall") whose upper edge will be aligned with the drawn construction base. Now that each mold has a common line or base, when the molds are erected like a stack of inverted Us, they will all be at the correct height relative to one another—sort of like standing up a set of dominoes.

So where does this construction baseline come from? It may already be drawn on the full-sized patterns. But usually, you have to make the command decision of where to locate the line. Generally speaking, it will have to be higher than the top of the stem. So, if the top of the stem is 33″ above the original baseline, you could set your construction baseline at 34″, 35″, or perhaps 36″.

With that done, all that remains is to extend each station line vertically from sheer to the construction baseline. Once these steps are completed, we can begin to build the molds.

Making Molds

Molds can be made of either plywood or boards of solid wood. At first blush, plywood seems tempting—it's strong, and you can make each mold out of only one or two pieces of plywood. On the other hand, plywood does have its drawbacks. Inexpensive plywood (the most popular choice) warps easily so it will need to be reinforced, and it is hard to cut with edge tools as it is brittle and is riddled with voids. In most cases, building the molds from joined pieces of construction-grade softwood boards (like 1″×10″ pine, spruce, or cedar) is the better choice for mold building.

Now let's take a closer look at the body plan (or full-sized station patterns, if that's what you have). The first thing you'll notice is that the plan likely shows only one half of the stations. That's actually a good thing, as it's much easier to get symmetry by joining two identical halves made at the same time to create a whole, symmetrical mold. We'll build the station molds right on the body plan.

Cut a straight piece of 2×4, at least as long as the boat's beam width. Screw it down to the far side of the construction baseline with the near edge aligned with it. This will be your stop against which the tops of the molds will be pushed. Like the ledge on a drafting table, this stop will aid in keeping everything square, aligned, and generally right where it ought to be.

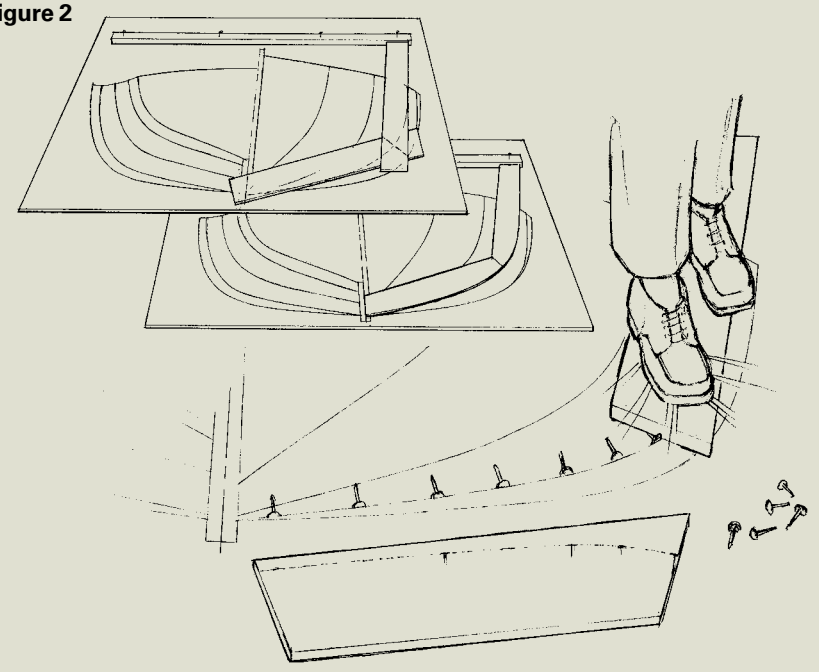
'Midship station molds will be made up of two boards per side (four in total) with a gusset securing the two halves and an elbow gusset at each side near the turn of

the bilge or at the chine. Often, the nearly straight, forward-most molds can be made from a single piece on each side without an elbow. You can easily determine the rough lengths of your mold boards by eye. Cut sets or pairs of rough stock for each station as needed. Now let's turn to making one side of a 'midship mold.

Lay the two pieces on top of the body plan. Cut the far end of the outer piece so that it will butt up to the 2×4 stop and the other piece so that it will overshoot the centerline. The opposite ends where the two pieces meet will overlap, and be located at the turn of the bilge, about halfway around the station.

Roughly bisect the angle formed by the overlapped pieces and draw that line onto the top piece. Cut it to the drawn line on the bandsaw. Lay it back on the body plan with the top pushed against the 2×4 stop as before and the end you just cut overlapping the uncut piece. Trace this angled end onto the uncut piece; take the uncut piece to the bandsaw

Figure 2



Use a straight piece of wood, fastened along the construction baseline, to establish mold ends. Once mold boards are roughed out, place nails along the station line and imprint points on the pieces. Connect the points to create the mold edge line.

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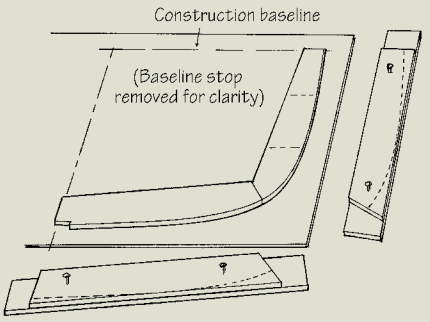
and cut on the drawn line. The two pieces should then come together in a tight butt joint and meet the construction line at the top. Next, transfer the vertical centerline onto the bottom piece and trim it on the bandsaw.

The next job is to accurately transfer the curved line from your body plan to the mold stock. While there are a number of ways to do this, (see WB No. 137), perhaps the easiest is the "bed of nails" technique (see **Figure 2**). Lift up the unfastened pieces and lay down a series of 3d box or ring nails with their heads laid right along the curved edge of the station line. (Some builders grind off one edge of the nail's head so they don't roll, while others tap them into place with a hammer.) Gently lower one of the pieces of mold stock back in place on top of the station, then press it onto the nail heads. Cautiously stomping on it is one good approach; another is kneeling and gradually bringing weight to bear.

Lift the piece, turn it over, and you'll see a whole series of impressions and/or nails stuck in the wood. Use a straightedge and a flexible batten to connect the points and then mark the shape with a pencil. Lay it atop the second piece you cut for the opposite side at this station and drywall-screw them together. Take the fastened pair to the bandsaw and cut to the curved line. Return the mold pieces to the body plan and see how closely your cut fits the drawn line. Touch them up with a plane, if necessary, and then anchor each assembly to the body plan with drywall screws to keep them from shifting. After fitting and anchoring, transfer waterlines onto the molds, squaring them up from the body plan and scribing them onto the edges and faces of the mold pieces.

Cut some gussets (just squares of plywood or scraps of mold stock) that will be used to join the pieces of the mold together. Attach the first gusset to the top (exposed) side while the pieces are still tacked to the body plan. Drywall screws work well for this job. (Many builders like to add a shot of glue under their gussets as well.) After one side has been gusseted, unscrew the joined pieces (a five-piece assembly) from the body plan, leaving the mold assembly fastened together. Then, glue and screw the second gusset to the other side of the pair.

Figure 3



With the upper and lower pieces cut to length, attach the pair to two identical boards; cut and shape the mold pieces in tandem.

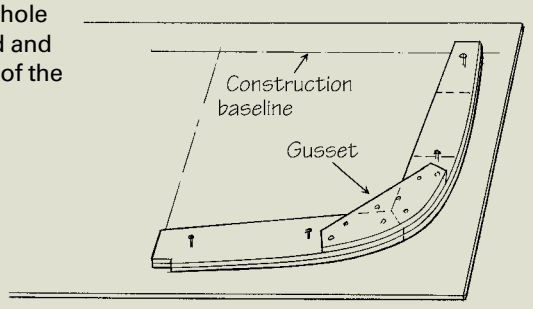
Now separate the two sides of the mold. One side is lined back up with the drawn station on the body plan and temporarily anchored into place. The other (mirror-image) side mates up to the first, butting up to the centerline at one end and against the construction line ledge on the other. Measure to ensure that the second piece is exactly equidistant from the centerline, matching the first. The drawn waterlines on the edge of the mold should line up with waterlines on the body plan. Gussets will be on the same side.

After giving the whole business one more check for accuracy, nail down the second section and attach the joining gusset at the bottom (on the same side as the other two gussets) with screws and glue. In the same manner, join the two half-pieces together with a cross spall (a 2×4 works well) at the construction base ledge location. Mark the centerline onto the cross spall and centerline gusset (see **Figure 4**). Lift it off, cut the notch for the keelson, and repeat the process for the next mold (and the next…).

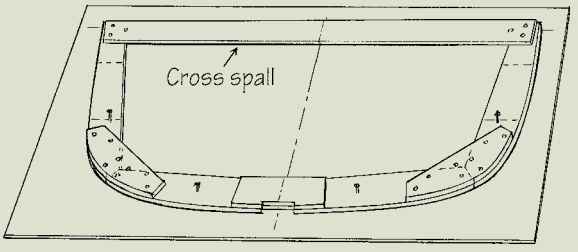
Greg Rössel is a contributing editor for WoodenBoat.

Figure 4

Right—Anchor the pairs (four pieces) to the lofting board. Transfer waterlines onto the mold pieces and then gusset the joint of the topmost pair as shown. Pull the whole assembly from the board and gusset the opposite side of the bottom mold pieces.



Below—Release the two sides; they will mirror each other. Secure the appropriate side on the station (gusset-side up), mate the other side to it, gusset the two halves at the centerline, and add a cross spall, placing its upper edge along the construction baseline.



Dust and Chemical Hazards

DARIN CARLUCCI

For large jobs such as epoxy-coating a hull, wearing a dual-cartridge half-face respirator with organic vapor cartridges prevents respiratory exposure, and wearing nitrile gloves and disposable impermeable coveralls prevents skin sensitization. For very large jobs, thicker chemical-resistant gloves are important and work well when dexterity isn't crucial—for example, when using a paint roller.

by Daniel Erwin

The hazards of wood dust, lead dust, paint spray mists, welding fumes, organic solvent vapors, uncured epoxy resins, and carbon monoxide from engine exhaust are well known to professional boatyards, which by practice and by law pay serious attention to workplace safety and health. Individuals working on their own on boatbuilding or restoration projects, however, are no less subject to the hazards of gases, vapors, and particulates—dusts, mists, fumes, and fibers—and can learn valuable lessons from the way professionals maintain a safe and healthful workplace.

Industrial hygienists analyze these hazards in commercial boatyards and identify ways to control risks of injury or illness among employees. Although do-it-yourself boatbuilders are unlikely to take on industrial-scale solutions, they can nevertheless directly benefit from boatyard experience and disciplines, which starts with knowing the nature of the hazards.

Exposures and Hazards

Gases, vapors, and liquid aerosol mists can be inhaled easily. Solids, too, can be inhaled in the form of dust, metal fumes, and fibers, but these pose the additional danger of being inadvertently swallowed. This section describes these hazards, and following sections address solutions involving workplace equipment and practices and personal protection.

Generally speaking, particles that you can't see are the most hazardous, because the smallest particles penetrate deepest into the lungs. Inhaled gases, vapors, and fine particulates can exert their toxic effects locally, or they can enter the bloodstream to produce systemic effects. The danger is worse for people who

smoke, because tobacco smoking suppresses the lungs' natural defenses and may act synergistically with airborne toxins to significantly increase the lifetime risk of developing occupational lung diseases, including lung cancer.

The harm done by a toxic airborne contaminant can be acute, meaning an immediate reaction to high concentrations of a substance for even a short time. Or, the harm can be chronic, meaning a long-term effect of exposure to lower concentrations. In the regulatory system overseen in the United States by the Occupational Safety and Health Administration (OSHA) and by similar organizations in other countries, exposure limits for specific substances are regulated based on both kinds of exposure. "Ceiling limits" and 15-minute short-term exposure limits, or "excursion limits," are often set to prevent acute effects such as irritation or the "narcotic" effects of solvents. Eight-hour time-weighted average limits are often set to prevent chronic effects. As a general rule, substances with higher toxicity typically have lower exposure limits.

Organic Solvent Vapors

Acute exposure to volatile organic solvent vapors can cause headaches, dizziness, nausea, and vomiting. Exposure to high concentrations can suppress respiration to the point of causing death. Chronic exposure is dangerous too, potentially causing liver and kidney toxicity and damage to the nervous system.

Hazardous vapors are generated to varying degrees by volatile organic solvents such as acetone, denatured alcohol, methanol, methyl ethyl ketone, varnish maker's and painter's naphtha, toluene, turpentine, xylene, bottom paints, stains, varnishes, paint strippers, paint thinners (also called mineral spirits, Stoddard solvent, or white spirits), lacquer thinners, chlorinated hydrocarbon solvent metal degreasers, gasoline, and diesel fuel. Avoid paint strippers and degreasers containing methylene chloride (dichloromethane), which is highly volatile, readily absorbed through the skin, and is regulated by OSHA as a suspected human carcinogen.

At low airborne concentrations, vapors behave essentially the same as gases (which are addressed below) at ambient temperatures and pressures. The higher the vapor pressure of the solvent, the greater its evaporation rate. The greater the evaporation rate, the greater the potential for inhalation.

Particulates

Wood dusts, metal dusts, uncured epoxy dusts, paint overspray mists, and metal fumes can be as common in the do-it-yourself boatyard as they are in the professional shop.

The toxicity of wood dust depends on the species. Aromatic, oily, and exotic woods such as cedar, teak, and mahogany tend to be the most problematic. Additional factors are the concentration of dust, the duration of the exposure, and the concentration of the hazardous agent in the wood. Additionally, how the wood is processed before delivery can play a role—for example, whether the lumber is flitch-sawn and retains some bark, which may contain bacterial toxins or allergenic fungi. Moreover, older wood may have been preserved with coal tar creosote or pentachlorophenol, and marine plywood can contain formaldehyde. The tools used to work the wood have an effect on the fineness of the particulate and its airborne concentration—chisels and hand planes, for example, produce less particulate than sanders and tablesaws.

According to one report by the Australian Workers Health Centre, "Skin irritation can be caused by contact with the wood itself, dust, bark, sap, or lichens growing on the bark. Symptoms subside once the irritant is removed." Terpenes are another hazard. Some people can become sensitized and experience allergic reactions such as contact or sensitization dermatitis, and subsequent exposure of the skin to even small amounts of the offending agent triggers an allergic response. Cross-sensitization to other woods or substances may also occur.

A typical upper-respiratory-tract reaction to wood dust includes nasal congestion and sneezing. Here, too, sensitization can occur, usually causing a runny nose. Certain woods (see Wood Technology, page 91) are associated with nasal cancer at occupational exposure levels. Lung problems include asthma caused by irritation or allergic sensitization, chronic bronchitis, and decreased lung function due to chronic obstructive pulmonary disease. "Unlike irritation," workplace safety authorities in the United Kingdom have stated, "where people can continue to work with the dust once it is controlled to below the level at which irritation occurs, people who become sensitized will not normally be able to continue working with the dust, no matter how low the exposure." To fully understand the exposure hazards, request a Material Safety Data Sheet (MSDS) with all initial wood shipments, and consider substituting less toxic woods for more toxic woods.

Grinding, drilling, or cutting metal components such as lead keels can also create harmful dust. Lead (see sidebar, page 40) can also be found in paint, primer, and metal coatings, especially in boat restoration projects. In older boats, it is often found in white lead paste, which was spread over decks before they were canvas-covered.

Repeatedly sanding or grinding epoxy resins that are not fully cured can cause skin sensitization or, if

MICHELE CORBEIL

Metalworking, such as casting or welding, can create hazards. Casting (as with the silicon bronze pour shown here) is best done outdoors or in an open-sided shed to allow fumes to dissipate quickly. Casting lead, for example in centerboard ballasts, holds special dangers since the particulate from fumes can go deep into the lungs, so lead should be cast at a temperature just high enough to melt the metal but low enough to minimize fume generation. Welding can generate fumes—which are particulates—but also gases. Respiratory protection is specific to the type of work and the alloys involved.

inhaled, lung sensitization. A person who has become sensitized may experience symptoms when exposed to even small amounts of amines in epoxy hardener or uncured epoxy, which can make working with epoxy all but impossible. Because there is no test that can predict who will develop sensitivity or when, always wear chemical-resistant gloves when working with uncured epoxy. When doing a large job, such as applying an epoxy undercoat to an entire hull, wear a chemical-protective suit and, if working indoors, an appropriate respirator.

Mists

In boatyards, the most common liquid particulate is overspray from a paint sprayer or an aerosol paint can, releasing both volatile organic solvent vapors and the overspray mist. The respirator used for spray-painting should be equipped with combination air-purifying elements that can remove both the organic solvent vapors and liquid particulate.

Fumes

The word "fumes" is often used incorrectly. For example, people say carbon monoxide "fumes" or gasoline "fumes" when they actually mean carbon monoxide gas or gasoline vapors. Technically, metal fumes are the oxides of metals that have been heated above their boiling point and then condense into fine particles upon cooling. This is an important distinction, because metal fumes are only removed by particulate filters, not by chemical vapor cartridges. Moreover, metal fumes consist of very fine toxic particles that can be transported deep into the lungs.

Welding is a common source of fumes. Significant variables influencing exposure include the type of welding process and rods used and the type of ventilation and respiratory protection used. Information about the identity and concentration of the base metals and other hazardous constituents in welding rods is available from the product MSDS. Welding can also produce the highly irritating gas ozone.

A classic welder's syndrome is "metal fume fever," characterized by flu-like symptoms, including fever, chills, headache, fatigue, nausea, and muscle aches. Metal fume fever develops after repeatedly welding on galvanized metal containing zinc, but it can also occur with other metals. Symptoms develop during the work week but subside over the weekend, when exposure ceases. However, symptoms recur at work the following Monday. This is typically caused by welding indoors without using local exhaust ventilation to capture the fumes at the source and not using particulate respirators.

One metal fume of particular concern is "hexavalent"

chromium, which is also called "chromium (VI)" or "chromium 6." Hexavalent chromium is typically encountered when welding, burning, and thermally cutting stainless-steel alloys, which are commonly used on boats. Occupational exposure to hexavalent chromium can cause lung cancer and other illnesses. In 2006, OSHA published a new standard for this substance. The maximum allowable airborne concentration is a full order of magnitude—or a factor of 10—lower than the comparable standard for lead. Cadmium, manganese and nickel are other toxic metals with low exposure limits. Work that generates these and other toxic metal dusts and fumes should be left to properly trained and equipped professionals.

Fibers

Asbestos insulation may be present on steam boiler components and steam distribution lines in old wooden boats powered or heated by steam. Moreover, asbestos cement wallboard was sometimes used behind galley stoves. Asbestos-containing materials become a hazard when they are disturbed, which releases asbestos fibers into the air, where they can be inhaled. Asbestos is associated with asbestosis, a fibrotic thickening of the lung producing an emphysema-like illness. It is also associated with lung cancer and mesothelioma. The cancer risk is even greater for smokers. Asbestos abatement is dangerous and highly regulated, and asbestos-containing products should be repaired or removed only by licensed professionals.

Gases

One common boatyard hazard is carbon monoxide, a colorless, tasteless, and odorless gas that interferes with the ability of red blood cells to carry oxygen to the organs and tissues. A dockworker in southern New England died in 2006 from the buildup of carbon monoxide inside a freshwater tank he was cleaning aboard a commercial fishing vessel because the exhaust from a gasoline-fueled power washer was not vented outside. The exhaust must not only be vented to the exterior but also downwind and well away from the work area. Because there are no warning signs that carbon monoxide may be present at toxic levels, boatyards use carbon monoxide alarms to signal the need to evacuate before the toxic effects impair a worker's ability to escape.

Another common gas in boatyards is phosgene, which is produced when chlorinated hydrocarbon solvent degreaser residues are not completely removed from a metal before welding. Commonly used degreasers include 1,1,1-trichloroethane, trichloroethylene, and perchloroethylene (tetrachloroethylene). In a number of documented cases, welders have died from delayed pulmonary edema, also known as "dry drowning," when fluid builds up in the lungs due to phosgene exposure. The solution is to use non-chlorinated organic solvents or preferably "bio-based" or "green" solvents.

Argon, carbon dioxide, helium, and nitrogen, which are used in certain welding processes and can leak from gas lines or tank regulators, are not inherently toxic but can build up in confined spaces and displace oxygen, causing asphyxiation. The atmosphere contains 20.9 percent oxygen by volume at normal temperature and pressure, and OSHA rules state that air containing less than 19.5 percent oxygen can be fatal. Testing the air with a properly calibrated oxygen meter is the only way to know if oxygen is deficient, and the solution is ample ventilation with fresh air.

Workplace Protection

Industrial hygienists who analyze workplace hazards use a specific terminology, and in this case "engineering controls" usually means the installation of fixed equipment, such as dust control and ventilation systems. On the "administrative control" side, workplace policies and practices help minimize hazards. Home boatbuilders aren't likely to involve such professionals—however, they can still benefit from analyzing their workshops in this way.

Engineering Controls

The most effective engineering control is to eliminate hazardous substances by using substitutes, such as "bio-based" or "green" alternative products whenever possible. This is also good for the environment. However, be aware that not all bio-based or "green" products are non-hazardous; be sure to check MSDS information. Next-best is to use less-hazardous products. One example is to substitute less-hazardous wood species for those that are known to create toxic dust. Another example is to seek out products that are low in volatile organic compounds (VOCs) and look for high-flash-point "safety solvents" and "low-odor" or "odorless" mineral spirits. When product substitution isn't feasible, working outdoors ensures the best ventilation available to disperse concentrations of dusts and chemical vapors. Remember, though, that particulates that are also harmful to the environment—lead dust, for example—must be contained, collected, and properly disposed.

For working in the enclosed spaces of a boat's interior—or in a workshop in winter, when the doors and windows are closed—use local exhaust ventilation to capture wood dusts and welding fumes as they are generated. When using volatile solvents on interiors, mechanical ventilation can be used to supply fresh air to reduce exposure and also prevent the buildup of vapors that can burn or explode. However, never try to evacuate such vapors from a hull using mechanical ventilation, because electric fans may ignite the vapors, perhaps explosively.

A typical well-equipped boatshop includes a permanently installed dust-collection system for stationary equipment and a variety of portable devices for local short-term dust collection. For example, portable tools such as an orbital sander or a circular saw may be connected to a shop vacuum to capture dusts when sanding low-hazard wood. (A HEPA filter is recommended when capturing toxic dusts, including those from wood species known to be toxic.) One step up from a shop vacuum is a portable dust extractor, which may have HEPA filtration.

The ultimate setup is a complete shop dust-collection system that has ductwork connected to every major

KAREN WALES

TOM JACKSON

***Above*—As a supplement to a dust-collection systems, an air filter system can help control common airborne dusts, but HEPA-filtering is necessary for dusts known to be toxic. *Left*—Metal ductwork dust-collection systems are common in well-equipped shops and go a long way toward reducing airborne particulate hazards, but personal protection in the form of a respirator is still important when working with toxic or sensitizing woods or chemicals.**

stationary power tool, often starting automatically when a tool is switched on. The ducts convey dust to a cyclonic separator that captures fine particles in filters while allowing large particles to fall to the bottom, where they can be removed periodically.

Administrative Controls

For do-it-yourself builders, whether the hazard is from sources as varied as wood dust or organic solvents, the parallel concept to "administrative" controls can be found in good work practices and housekeeping, combined with a big dose of common sense. For example, always keep lids on containers whenever organic solvents or solvent-based products are not in use. This is especially important when working inside an enclosed hull, because the vapors of most flammable and combustible liquids are heavier than air and can build up in low areas and explode if an ignition source such as a shop light or an electric fan is introduced.

Much of good housekeeping practice comes down to effective control of toxic or sensitizing dusts:

- Use the work method that produces the least dust; for example, use hand tools instead of power tools and wet-sanding instead of dry-sanding.
- Don't do dusty jobs in residential workshops, including basements.
- Purchase power tools that can be quickly connected to dust extractors.
- Use a local exhaust ventilation system to capture dusts generated by stationary power tools.
- Contain dusts to prevent spreading contamination.
- Wear disposable coveralls and an appropriate respirator.
- Clean up by wet-mopping, wet-wiping, or using a sealed HEPA vacuum cleaner.
- Never clean up by using dry-sweeping or a compressed air blower.
- Change out of contaminated coveralls or work clothing in a designated "dirty" area.
- Before removing contaminated coveralls, HEPA-vacuum them or lightly mist them with water to keep dust down, and never shake them or blow dust off them with compressed air.
- Take a shower and put on clean clothes in a designated "clean" area before eating, drinking, applying cosmetics, getting into a vehicle, or going home.
- Bag, seal, and properly dispose of contaminated clothing or send it to a professional laundry and tell them what the contaminants are.
- Never bring contaminated work clothes home for laundering, because this may expose household occupants.

Personal Protective Equipment

Aside from doing whatever possible in the way of engineering and administrative controls to minimize hazards, the third tier of protection in boatyards involves the proper use of personal protective equipment—coveralls, gloves, goggles, and respirators.

Gloves and Coveralls

Some chemicals that are respiratory hazards can also cause irritation or chemical burns in contact with bare skin. Organic solvents can also increase the skin absorption of toxic or sensitizing substances. Repeated skin contact with allergenic substances such as unreacted amines in epoxy hardeners may cause allergic contact dermatitis, which in some cases progresses to skin

sensitization. For all these reasons, always wear chemical-resistant gloves when working with organic solvents, irritants, corrosives, allergens, and sensitizers. Often, coveralls may be necessary as well.

Skin hazards are noted in the product MSDS, but these often make an overly generic recommendation for protective gloves, for example referring to "impermeable," "rubber," "chemical protective," or "chemical resistant" types without specifying the actual glove material. There is no "universal" glove material that will resist all chemicals. Many boatbuilders wear thin, disposable, exam-style nitrile gloves when working with hazardous chemical products, but these may not always provide adequate protection.

Chemical-resistant gloves work on the principle of "like dissolves like." If the solvent's molecules are similar to the glove material's molecules, the solvent can permeate the glove and be absorbed through the skin. Increasing glove thickness generally decreases the permeation rate. Thin exam-style nitrile gloves are only appropriate for incidental chemical contact. When the exposure is expected to last a long time or involve highly toxic chemicals, use thick, industrial-grade, chemical-resistant gloves.

Disposable dust-protection coveralls (as opposed to chemical-resistant suits) come in two types: one is made of a breathable fabric and is suitable for nontoxic or low-toxicity particulates, and the other is made of impermeable fabric and is worn when dealing with toxic particles such as asbestos and lead. Chemical protective suits are generally made of fabrics that are covered with a coating or film that confers the chemical resistant properties.

TOM JACKSON

For tasks in which a splash hazard accompanies a vapor hazard or where vapors are irritating or corrosive to the eyes, use a full-facepiece respirator. For anything more than short-term and incidental exposure (as shown here), use thick chemical-resistant gloves and coveralls.

The array of chemical-resistant gloves and chemical protective suits on the market can be bewildering, but manufacturers often provide information in hardcopy or online and typically also provide an information telephone hotline. It's best to use the manufacturer's information and not "generic" recommendations. For example, there are many different formulations of nitrile rubber gloves, and they may not all provide the same chemical resistance performance. I prefer exam-style gloves based on a specific standard, American Society for Testing and Materials (ASTM) F739, because it is the same rigorous standard used for testing thick industrial chemical-resistant gloves.

Glove selection for a single solvent is relatively straightforward. However, products such as lacquer thinners contain chemicals of several different classes, making it difficult for a single material to provide adequate protection. Laminated gloves that use two or more thin films of different composition may be required. However, laminated gloves are bulky, so they are best used for tasks such as holding a paint roller handle, where fine dexterity isn't required.

Goggles

Appropriate eye protection is also critical. In a dusty environment or where there is a chance of a liquid chemical splash, use safety goggles that meet the most current edition of the American National Standards Institute (ANSI) standard: approved protective eyewear will have Z88.1 date-stamped on the frame. Have an eye rinse available; I always keep a bottle of sterile, preservative-free contact lens solution handy. If you work with strong acids or caustic materials, you should have a 15-minute supply of water for emergency eye flushing, which is mandatory in the workplace. If you opt to purchase a portable emergency eyewash, it should meet the requirements of the most current edition of ANSI Z358.1.

Respirators

In my experience, respirators are probably the most misunderstood type of protective equipment used in boatyards. I frequently see boatbuilders using the wrong type of respirator or the wrong type of chemical cartridges and particulate filters. The most common error is using a disposable particulate respirator—otherwise known as a dust mask—to remove organic solvent vapors, which pass right through such filters. Similarly, chemical-vapor cartridges do nothing to remove particulates. I once saw someone who was preparing to apply bottom paint put on a respirator upside down, and then wondered why it was so uncomfortable.

With respirators, the burden is on the user to select the right respirator and wear it properly. For those

Dealing with Lead

Lead is a toxic heavy metal that affects nearly every organ in the body. It accumulates primarily in the long bones, where it substitutes for calcium. Lead poisoning is often insidious, because lead is a cumulative poison and clinical signs and symptoms may not become apparent until the lead levels are dangerously elevated. The damage that lead and lead compounds cause are both acute and chronic, affecting the central and peripheral nervous system, kidneys, blood-forming system, digestive system, and reproductive systems in men and women.

Lead poisoning is especially harmful to children under age six because at that age, the brain and the nervous system are developing rapidly. Lead poisoning in children causes developmental and behavioral effects that can last a lifetime. For children, lead exposure typically occurs from hand-to-mouth ingestion of lead-contaminated dust, often from deteriorated lead paint. Women of childbearing age are at particular risk because lead can be released from long bones when calcium stores are activated during pregnancy, potentially resulting in acute lead intoxication of the mother, which can endanger the pregnancy and cause harmful developmental effects to the unborn child.

The two most important routes of exposure to lead dusts are inhalation and ingestion. Disturbing lead paint—for example, by sanding it—can generate hazardous levels of lead dust and contaminate the work area or the environment. Sources of lead exposure in small-boat construction and restoration include drilling, grinding, sawing, or cutting lead ballast keels; "red lead" (lead tetroxide) primer in bilges; lead paints; and "white lead" (lead carbonate) paste, which was used as a bedding compound under canvas decking and as a putty for filling plank seams. I once saw an article that suggested reducing a boat's draft by using a chainsaw to cut off the lower portion of the fin keel, without any mention of respirators or dust control.

The Consumer Products Safety Commission banned lead paint in 1977, after which such paint could only be applied in controlled industrial settings. Even professionals are getting away from lead compounds: Clark Poston, program director at the International Yacht Restoration School in Newport, Rhode Island, said that the school eliminated lead paint ten years ago, and Mystic Seaport's Henry B. duPont Preservation Shipyard ceased using lead paints in the late 1980s. I recommend against using any lead-based products in do-it-yourself boat projects.

So how can you address lead paint in a boat working at home, respirators should supplement, and not replace, adequate ventilation and good work practices. A person who recognizes the need for a respirator should also ask himself whether the work might contaminate his clothing, the workshop, or the environment.

What many people commonly refer to as a "dust mask" can be a type of air-purifying respirator—but often is not. This is a source of great confusion. I don't like the term "dust mask," because not all dust masks are approved by the National Institute for Occupational Safety and Health (NIOSH), which OSHA requires in the workplace. To me, if it's certified by NIOSH, it's a respirator; if not, it's a dust mask. Always choose the NIOSH-approved type, and always recognize that even this type is intended only for protection against particulates.

Reusable "elastomeric" respirators—often called chemical-cartridge or "dual-cartridge" respirators—come in "half-face" and "full-facepiece" styles. These respirators are composed of a molded facepiece to which one or two replaceable chemical cartridges, particulate filters, or combination air-purifying elements are attached. They are not only more comfortable than the common disposable particulate respirators but also typically form a better seal with the face. There are also "limited use" dual-cartridge respirators that are good for tasks like spray painting. Look for the applicable NIOSH certification number on the package, as well as a detailed insert describing the approved uses for the respirator and associated cartridges and filters.

Use a full-facepiece respirator when the respiratory hazard is also hazardous to the eyes or when splash or impact hazards are also present—though not all full-face units meet the ANSI Z88.1 impact protection standard for protective eyewear, so choose carefully.

The most common chemical cartridge for reusable air-purifying respirators is the "organic vapor" cartridge. These are useful for removing many—but not all—organic solvent vapors, using activated charcoal as the sorbent material. Sometimes chemical cartridges contain specially treated sorbent materials to remove other hazardous air contaminants such as "acid gases" or formaldehyde gas. Don't rely on odor, taste, or irritation to determine when to change chemical vapor cartridges (which OSHA doesn't permit doing in the workplace). With the exception of specialized cartridges for such things as formaldehyde that have indicators that change color when saturated, chemical cartridges should be changed out on a schedule that is based on data typically available on the respirator manufacturer's web site.

OHSA and NIOSH recognize nine types of particulate filter, ranging from "N95" to "P100." The letter designates the resistance to degradation by oil, which can be an issue in machinists' shops; "N" means not oil resistant, "R" means oil resistant and good for only one work shift, and "P" means oil "proof." The number rates the filter's efficiency, which also has three possibilities: 95 percent, 99 percent, and 100 percent.

restoration project? The first step is to determine if lead is present. At most hardware stores you can get chemical spot test kits that use color-indicating test swabs. A better approach is to carefully collect a small representative paint sample, including all layers, and submit it to an Environmental Protection Agency–accredited lead paint testing lab for analysis. A third way that is useful for large projects is to hire a lead paint inspector to use an X-ray fluorescence meter to survey all painted surfaces, much like a residential or commercial lead-paint inspection.

If the sample comes back positive, you have two choices. If it's a small piece, it may be possible to remove it intact without disturbing the lead paint. However, if an entire deck or hull needs to be de-leaded, it's best to hire a lead-paint abatement professional. OSHA estimates that exposures from manual scraping, manual sanding, and heat-gun applications where lead paint or coatings are present can be presumed to be up to ten times the exposure limit, unless air sampling shows that exposures are lower. Lead exposures from using power tools to remove lead paint can be much higher unless the tools are connected to a HEPA-filtered dust collection system.

To safely remove a small component with lead paint intact, first coat it with a bio-based or "green" encapsulant product specially formulated to prevent the release of lead paint chips and dust, then wrap the piece in plastic so that only the ends are exposed. Place a plastic sheet under the piece to catch any small paint chips that may fall off during removal. Score the paint at the uncovered ends, wet the ends, then carefully cut out the piece manually. Never use a power saw, which would only spread lead dust everywhere. Carefully remove the piece intact, place it in a heavy-duty plastic bag along with the rolled-up plastic ground sheet, seal it tightly and take it to a household hazardous waste collection facility. Small metallic lead components can also be managed this way.

Teaching you the specifics of lead paint abatement is beyond the scope of this article. Anyone contemplating doing their own lead paint removal should take a course so that they will become aware of the hazards, learn safe removal techniques, and be able to make informed decisions. If you can't find a course on lead paint removal specific to boat restoration, I suggest taking the Environmental Protection Agency's "Renovation, Repair, and Painting Rule" course intended for residential contractors (call 1–800–424–5323 for information). Those working in commercial boatyards require training in the OSHA lead regulations and may also find an EPA professional de-leader course helpful.

Some shops melt small amounts of lead, for example, for casting centerboard ballast. OSHA recommends keeping molten lead temperature below 1,000°F to minimize lead fumes and particulate emissions. Lead melts at 621.5°F (327.5°C), so there is no need to heat it much beyond this. *—DE*

CALVIN MAGINEL

A disposable NIOSH-approved particulate respirator suffices for respiratory protection against nontoxic dusts. Toxic wood dust and the dust from sanding epoxy that hasn't thoroughly cured can be hazardous and sensitizing. Using gloves and coveralls when sanding would be a wise routine, as well.

The 100 percent filters are equivalent to HEPA filters. The N95 and P100 types are the two most commonly encountered particulate filter elements—and incidentally the most common types of disposable particulate respirators as well. The class 95 filter is used for low-toxicity particulates and the class 100 filter for toxic particulates such as asbestos and lead. Be sure to look for "NIOSH 42 CFR 84" or similar language on the product container as evidence that the particulate filters are NIOSH approved.

Combination chemical vapor and particulate filter air-purifying elements are used when it is necessary to remove both hazardous vapors and particulates at the same time, for example paint overspray.

Most respirators are designed to fit tightly, and a poor fit will allow contaminated air to bypass the filters and reach the lungs. Men who are not clean-shaven risk significant leakage of contaminated air.

In industry, OSHA requires employees to be medically cleared before using respirators, and home boatbuilders with serious medical issues should check with their doctors to be certain that the use of a respirator

CALVIN MAGINEL

For comparatively small epoxy projects, nitrile gloves suffice for incidental chemical contact. It is always wise to don a well-fitting respirator when using chemicals to minimize inhalation exposure.

will be safe for them. A medical questionnaire provided in Appendix C to the OSHA Respiratory Protection standard can be used for guidance; see www.OSHA.gov, and search "1910.134" under "Regulations." Respirators, especially those with 100 percent filters or combination cartridges, can significantly increase breathing resistance and susceptibility to heat stress in a hot environment, especially when worn with impermeable coveralls.

Selections are straightforward when dealing with a single respiratory hazard, but contaminant mixtures complicate things. An MSDS is the primary resource for obtaining the identity and concentration of each hazardous constituent in a mixture. However, an MSDS often does not make recommendations for specific air-purifying elements. OSHA provides a helpful "Small Entity Compliance Guide for Respiratory Protection Standard" and a "Respiratory Protection e-Tool" available at its web site, and NIOSH provides a "Respirator

Decision Logic" at www.cdc.gov/NIOSH. When in doubt, consult the respirator manufacturer or a professional industrial hygienist.

Under OSHA rules, boatyard employees must have the fit of their respirators tested, and they must check the seal and adjust straps as necessary each time they put on a respirator. For home boatbuilders, fit test kits can be obtained from safety supply stores. It's a good idea to check the seal by briefly covering each air intake and inhaling. You should not notice any hissing sounds or feel air leaking in around the edges. Next, briefly cover the exhalation valve and gently exhale. Again, you should not notice any hissing sounds or feel any air leaks. If you do, readjust the straps and repeat both checks. It can be more difficult to conduct these tests with a disposable particulate respirator, so follow the manufacturer's instructions carefully. Don't use a respirator that can't pass a fit test or these seal tests—try another brand or model.

Air-purifying respirators, whether of the simple disposable particulate type or the dual-cartridge type, have limitations. They should never be used in confined or poorly ventilated enclosed spaces where oxygen may be depleted. Also, an appropriately selected, adequately fitting, properly maintained, and correctly worn respirator will reduce but not eliminate exposure to respiratory hazards. This is because respirators don't always form a perfect seal at all times. OSHA has determined that, at best, disposable particulate respirators and reusable half-mask respirators can only reduce the contaminant concentration by a factor of 10, or one order of magnitude; full-facepiece respirators reduce concentrations by a factor of 25.

As in a boatyard, a respirator used in a home workshop should be inspected before each use. Look for deformed or missing inhalation or exhalation valves, which are the thin circular rubber discs on the inside of the respirator facepiece. Look at the respirator's general condition. If it is damaged or if the rubber has hardened, it may not fit properly and should be discarded. All of the straps should be present and fully functional. If a component needs replacement, use only the parts for that specific make and model, or the respirator may not function properly.

With a basic understanding of how to incorporate effective systems, safe work practices, and appropriate equipment, you can enjoy the rewards of working on your own boat construction or restoration—safely and in good health.

Daniel Erwin is a professional industrial hygienist who lives and sails in southern New England. He previously wrote "The New York 30s: A Century of One-Design Sailing" in WB No. 184.

YUKON

EA LASSEN

From salvage to salvation

by David Nash

The first time I saw the wooden fishing trawler YUKON she was lying just south of Copenhagen, Denmark. She was a beauty, with sweet lines that set my creative juices flowing. She was big enough to live aboard and, with the correct sail plan, would be manageable by a few people. With a length of 65′ on deck, a beam of 14′, and a draft of 6′, she seemed a perfect fit for a sailing shipwright like me; just the right size to sail around the globe. Unfortunately, she was not for sale. What's more, she lay at the bottom of Dragør Harbor.

At that time, I had been living in Denmark for only a few months, working as a stagehand. My profession (as a boatbuilder) had taken me all over the world, and now I was a long way from Adelaide, South Australia, where I'd been born and raised. There I had done my apprenticeship building sailing dinghies, then worked on the construction of the sail-training brigantine ONE AND ALL. Now I wanted my own boat.

YUKON's owners refloated her, and while they emptied the accommodation of waterlogged mattresses and sodden charts and publications, I was able to check her out. I could see that she was just what I had always dreamed of: a true little ship with proper stanchions and bulwarks, hatches and skylights. YUKON had started life as a fishing trawler in the North Sea off Jutland, Denmark, around 1930. By the time I found her, she had had several different owners and had been transformed from a fishing vessel to a pleasure craft. Her current custodians understandably had a passionate attachment to their vessel and had, over the past 15 years, seen their children grow from

***Above*—YUKON began life as a fishing trawler, was later transformed into a pleasure craft, and had become a derelict and sunken hull by the time David Nash found her. After a seven-year restoration, David and his wife, Ea, live aboard YUKON with their two young sons.**

DAVID NASH

After YUKON was lifted from the bottom of Denmark's Dragør Harbor, David had only 24 hours to decide whether he would buy her. The purchase price was one case of beer.

wearing diapers to make-up. They had cruised the coast and chugged around to the various events that make up the Danish wooden-boat calendar.

Six months later, while viewing another boat in Rudkoebing, in southern Denmark, my good Aussie mate Ross Grange rang me and said, "Check the paper." I got the local newspaper, and there she was: YUKON was for sale—for about double my meager savings. Undaunted, I contacted the sellers. Although they said they would consider my offer, I wasn't hopeful. But sometimes it's a case of "ship seeks owner" rather than the other way around. Two days later, the owners phoned me back and the voice at the other end of the line sounded desperate; YUKON had sunk again in Dragør Harbor. Having salvaged her once, they could not afford to do it a second time.

Taking the Plunge

I went back to have another look. YUKON was clearly tired, and clearly in need of a friend. Ross, with his broad Queensland accent, spoke optimistically of "mates with cranes" and "running a couple of slings 'round her guts." With his experience in industrial diving, Ross had a plan that seemed to be our only chance. My Danish was limited to the standard "I love you" and "two beers please," so an acquaintance proved most helpful in drafting up a salvage assessment in Danish and English. Under the circumstances, I felt that I really needed to see the boat out of the water to get a true appreciation of her lines.

Dragør's harbormaster was growing understandably impatient. "Salvage that vessel by the month's end or she'll be dragged out to the spoil ground," he told me. Negotiations between the owners and me continued. Eventually we reached an agreement that the salvagers—me, in other words—would cover the cost of raising the vessel and towing her to a slipway. I would then have 24 hours to inspect her, after which I would either take over the vessel or recover costs from the owners. If I chose to take over YUKON, the purchase price would be minimal: a single case of Carlsberg beer.

The salvage operation was fraught with hiccups. I had a full-time job and could spend only weekends and evenings at the project. The floating crane that was supposed to do the job looked like it couldn't lift a fly, and our pumps were totally inadequate. But after Ross's many hours of diving to patch suspect leaks and run slings, we secured the use of a bigger crane and an ever-increasing number of helpers. By the third weekend, we were on the brink of success; we just had to displace a little more water and get her main hatch above the surface. For this attempt we organized more people to help, including the local fire brigade, who graciously loaned pumps and volunteered their time. Clearly I was not the only one who was intrigued by the little old vessel.

In a final desperate push, we chucked both life rafts in the hold, shut the hatch, and inflated them. Yes! What a relief … she was floating! The fire brigade volunteers, owners, friends, and loved ones all gave cheers of delight as the old dame rose off the bottom and presented herself once again to the summer sunshine. It was June 19, 1997.

The clock was ticking: I now had 24 hours to decide whether to take her on. Towing her to the nearest slip meant going through the heart of Copenhagen, including passing through two drawbridges—and traffic

DAVID NASH

As if a live exhibit, YUKON was placed in the heart of Copenhagen. David wasted no time in replacing her stanchions, covering boards, and caprails, reinforcing her shape.

EA LASSEN

Astonished at his good fortune in the availability and quality of Danish oak, David used it throughout his restoration. Early on, he used it to build coamings for a new aft cabin, which in turn enabled him to live aboard while working.

would need to be held up at the second one. The following day, a chartered salvage tug took us gingerly on our way. Throughout the three hours' passage, we cleaned, scraped, and "inspected" the boat. During that trip I also enjoyed the sensation of actually sailing her.

Because it was a lovely day and we had worked so hard to raise YUKON, it felt as though we had nearly finished the job. We were exhausted after our hard work, and the 24-hour inspection period was up before we knew it. The old saying "Many a man has fallen in love with a dimple but made the mistake of marrying the whole girl" could have been scripted for this situation. Was I on the verge of making a costly mistake? The owners were getting twitchy: there would be a lot of work to get the boat back into the water, and they wanted to know if they needed to make a start or if they would be able to walk away. I knew that I was looking at a big project, but on the other hand, when would I get another chance to acquire a vessel of this caliber for only a case of beer? And I could see that YUKON was better shaped and better preserved below the waterline than even an optimist like me could have hoped. These Danes sure could build a beautiful boat. "Yes," I said to the owners. "I'll take her!"

Never before had I seen such relief on human faces.

I was a happy man, wandering the scaffold around my new vessel, poking her with a screwdriver and finding rot here and there, but generally nothing too extreme. After three or four days of caulking and painting, we refloated her. Now we had to look for a permanent berth. We were surprised to discover that the only place we were allowed to keep the vessel was in the very heart of Copenhagen, in Nyhavn. I couldn't believe that the authorities would allow a wreck like mine to sit slap-bang in the middle of one of Denmark's biggest tourist attractions for only $200 a year.

There is a large fraternity of wooden ship enthusiasts in Denmark. One of these organizations, called TS (Træskibs Sammenslutningen—Wooden Boat Association), has harbors around the whole country, with particular wharves and piers restricted (in theory at least) to member vessels. Luckily, Nyhavn was one of those

DAVID NASH

In autumn of 1999, the 7½-ton Alpha motor was hoisted in pieces, the flywheel shown here, from the depths of the bilge. The condition of YUKON's power plant and systems required David to start from scratch, as nothing proved salvageable.

places. So there I was, shoveling mud, grease, and rotten wood into plastic bags just meters from fine French cuisine and tourists at play. I could feel the eyes of the diners on me, no doubt thinking: what's this guy doing? The facility was not optimal, but it was sufficient for YUKON's first stages. Wharf space at Nyhavn was very limited, and rules were fairly strict with regard to storing materials. Luckily I had good deck space, so it was a case of building a bit of a tent onboard and storing everything out of sight.

Getting to Work

By now I had a full-time job building the interior of a yacht, a two-year project that provided me with a livelihood. Apart from this, the coast was essentially clear for me to get involved with YUKON's restoration. I didn't really have a plan; I had a dream for what I wanted YUKON to be. My dream was to restore the vessel and sail her back to Australia. Even though I came to the job with a lot of experience, I had no idea of how much work and time it would take to fulfill this dream.

Repairing stanchions, for example, was a case of completely destroying the old piece and making a new one. This could be done in a relatively stress-free way because the caprail and covering boards were also in need of replacement, so it gradually dawned on me that there would be very little of the original boat left above the waterline. YUKON's generous scantlings—2″ oak planking on 5″ frames—made perfect patterns. All her fastenings were galvanized, or at least they had been 70 years ago. I had to make a decent job of it; there was no other way. I would restore her following the skilled men who had built her originally, but this time I would coat all covered surfaces with red lead and plenty of fungicide.

Danish oak is a fantastic material. In Denmark, there are cultural links going straight back to the Vikings, and one of these is oak. My experience with this hardwood was limited, having trained in South Australia, where a European oak tree was something that stood outside a museum; it wasn't something you were allowed to cut down and fix old fishing trawlers with. So, in Denmark, the pleasures were plenty in visiting various sawmills and meeting interesting people—and buying lots of fine Danish oak.

My single-mindedness was not without serious bouts of self-doubt as the extent of the project became increasingly evident. The old main engine, a two-cylinder Alpha diesel (which amounted to 7½ tons of rust), took up 40 percent of the space below deck, and it would cost more to restore it than to replace it with a new six-cylinder 125-hp Ford diesel. All the electrics, all the plumbing, the entire interior—pretty much everything—would have to be changed or restored.

When I wasn't actually working onboard YUKON, I was planning, talking, drawing, and thinking YUKON. I made sure I always had a couple of things on the go at once so that I didn't become too bogged down or discouraged. If one aspect of the job wasn't going well or my energy levels weren't up to the task at hand, I could switch to something else for a while. Work on the vessel was proceeding apace when I was suddenly faced with finding another place to live, which is not always easy in Copenhagen. It was one of those crunch times, when I could just as easily have walked away from the project, headed back to my house in Australia, and put the whole thing down to experience. Instead, I packed my swag, bought a CD player, and moved on board YUKON—starting out with a small ship's woodstove and a bag of groceries. Fortunately it was summer, and the Danish summers are lovely, with long warm days and scarcely an hour of darkness. And Nyhavn, in the middle of Copenhagen, was not the worst place in the world for a sailor to find himself living, even if it was amidst the remnants of a boat.

I completed my two-year job fitting out the yacht, and signed on as second mate aboard an anchor-handler out of Aberdeen, just across the North Sea in Scotland. The money was good and I worked five weeks on, five weeks off—perfect for carrying on with YUKON's restoration. Things went well, and a good stretch of time living aboard YUKON gave me time to think about what I was doing. So long as you are doing the work yourself,

it's just time and raw materials that you need. Drawings and sketches developed, and I could sense that a plan was coming together.

Once while I was working on deck, a young boy inquired as to how much such a vessel would cost. I proudly replied this one had cost me just one case of beer. He looked around at all the beautiful ships in the harbor, looked back at YUKON, and said, "I think you paid too much!" I supposed she must have been a sorry sight, but I could only see the big picture—most of the time. An old friend of mine, Capt. John Søerensen, called me up one day and tried to lure me out of the grime of my engineroom. He spoke of schooners and ketches racing around Funen, one of the largest of the 300 or so islands that make up Denmark. It would take one week, and there would be about 40 vessels participating. He had just purchased the lovely schooner FREIA, built on the island of Bornholm in 1890. She was fast and John was a great sailor, but he needed extra hands to win. He talked me into joining his crew.

This race is an annual event, and one of the premier regattas in the Danish sailing calendar. Many of the charter boats in Denmark meet up and sail together, taking a week off from the hectic sailing season. Over the years it has developed into a major event that attracts large crowds of visitors, both sailing and observing, in all the harbors the fleet visits. It's something of a circus but great fun. We didn't win, but I met my life's love.

Ea was first mate and cook onboard John's schooner, and there were good vibes from the moment we laid eyes on each other. She had rough hands and soft green eyes, and I was swept away. After I accidentally spilled red wine on her dress, I invited her to Copenhagen so I could buy her a new one. Ea was fascinated not just by YUKON but also by the vessel's prospects. Luckily for me, our relationship was the real thing. After a surprisingly short time, Ea contacted me while I was at sea off Aberdeen and informed me that she was pregnant. I was in the middle of a fire drill on the ship and asked if I could call her back in a few minutes. But I didn't need time to think.

MARTIN RANDERS

To speed progress of the restoration, David and his new wife, Ea, had YUKON towed to the J. Ring-Andersen Yard, where David would be allowed to work side-by-side with some the world's finest shipwrights.

And so my 35 years of footloose freedom came to a delightful halt. Our first son, Kristopher, was born and Ea and I married soon after. I quit my job at sea to concentrate on being a father and husband. This also gave me the chance to continue construction of YUKON's two deckhouses. By now YUKON had been towed the

As sunlight streams through the bare hull, a lone worker brings home the scale and the enormity of each job within the project.

MARTIN RANDERS

MARTIN RANDERS

With YUKON substantially framed up, David uses what may be the longest fairing batten on earth to help establish the shape of the vessel's fantail stern.

140 miles to the town of Svendborg, one of Denmark's historic maritime towns and home to one of its famous shipyards, J. Ring-Andersen Skibsvaerft (see WB No. 150).

After removing all of YUKON's interior, I discovered that the inside of her 2″ planking, especially around the turn of her bilges, was badly rotted, the result of leaking stanchions. I estimated that I would have to change 650′ (about 200 meters) of planking and 160′ (about 50 meters) of framing. That was not a good day, but philosophically, I knew that the project was at a turning point. Such an undertaking was daunting. Dealing with 2″ oak planking is hard work, and I couldn't do it alone. It would require far too long out of water, especially with replacing the 5″ frames.

Ea said that she didn't want to spend the first 20 years of our marriage waiting to sail, and I had to agree. The restoration needed to go a bit quicker, and that needed money.

Three times we applied for funding from Denmark's Wooden Ship Preservation Trust but were turned down each time on the grounds that vessels like YUKON were common and the Trust had already invested large sums in similar ones. We needed to find another solution.

A New Tack

Ea came up a plan for starting a charter business. With her background as a social adviser, and the experience we both had in sail training, we might stand a chance of convincing the bank that we could be a going concern. With a roll of drawings and high hopes, we went to our banker. I don't know how we did it, but they said yes: They would lend us one million Danish kroner (about US$200,000). We went home joyously, enjoying the fact that for the first and probably only time in our lives, we were millionaires.

Now it was full steam ahead. We approached a couple of yards around the area and decided on J. Ring-Andersen, known the world over among the wooden ship fraternity. This fourth-generation family-run business attracts ships from all the over the Baltic region and with good reason, given its experience, thorough workmanship, and customer-oriented approach. It was one of those cherished moments, sitting in Peter Ring-Andersen's meeting room, adorned with half models,

After coating the frame faces with red lead primer, David fits in a strake of YUKON's interior structure.

MARTIN RANDERS

MARTIN RANDERS

YUKON strikes a handsome profile against the backdrop of the Red Warehouse in Rudkøbing, Denmark.

discussing our upcoming job. My Danish was still pretty rough, but we managed to agree on a plan. I was allowed to continue to work on our boat alongside the yard's shipwrights. This was a huge plus, as the deal included use of all machinery and access to all materials, which was much more convenient than going elsewhere to buy things. And, after working more or less alone for three years, I found it a huge morale boost to be working alongside fellow professionals.

While the yard's shipwrights replaced planks and frames, I managed to renew most of her deckbeams (while our two new deckhouses were more or less hanging in the air) and put in a new stem and counter including all knees except two. The keel and keelson and bottom planking were found to be sound, as were the floors and stringers. Three months on the slipway drew to a close in the summer of 2001. At her relaunching, YUKON revealed a vessel revitalized and floating a good foot higher. Such a beauty! Her clean lines and healthy aroma below decks inspired us to keep on going. After the successful restoration of YUKON's hull, it was time to turn our attention to her deck and interior. With help from friends and volunteers, we created a living space including a galley, saloon, and aft cabin. This enjoyable but time-consuming work was completed by August 2002.

At last it was possible to move our little family aboard. I'll never forget our first night, sitting in our lantern-lit saloon with the woodstove burning brightly and surrounded by the fruits of our labors. After two years at Ring-Andersen's shipyard, it was time to move on. Our good friend Ziggy Kruger, with his lovely ship ARKONA, offered us a tow to the nearby town of Rudkøebing and the Red Warehouse. The Red Warehouse is one of those institutions in Denmark that make it possible to undertake a project like ours. An old shipping warehouse, it stands proudly restored on the quay of this small medieval town. It has been host to scores of wooden ship restorers over the past 25 years. In all, 27 vessels have benefited from the use of the organization's workshop and living quarters. It's a real do-it-yourself place.

And do it ourselves we did. By now we were building the last of the deck furniture and skylights, and planning the rig and engine installation. More and more we were under pressure to get finished and get sailing. During this period of intense work, our second son, Aron, came into the world. Fortunately, he could sleep the days away in his hanging crib on deck without a care, despite the hive of activity around him. We fitted out our old van as a "peace haven," with an armchair and books in the back. That way Ea could get away from YUKON and find a secluded stretch of beach to give the children a bit of breathing space. After a while

CIRCUMNAVIGATION OF THE WORLD

YUKON's world tour commenced in June 2010 and is scheduled to take two-and-a-half years. Starting in Rudkøebing, Denmark, the outbound trip will take in Ireland, Spain, Portugal, the Caribbean, Panama, the Galápagos Islands, the South Pacific, and Australia. We had hoped to cross the Indian Ocean, head up to Egypt and the Gulf of Aden, then Italy, Portugal, and France, and finally back to Denmark. However, because of the situation in the Indian Ocean and the Gulf of Aden, we are reworking our sailplan.

Preparations for such a big trip were extensive and involved making further modifications to YUKON. For example, we rigged a yard on the mainmast so that we could take advantage of the tradewinds, and made various minor changes below decks to make sailing longer distances more comfortable. Four or five berths are available for customers on each monthly leg. Guests are not expected to be sailors, just to have a desire to experience life onboard a sailing vessel. It's a hands-on holiday; guests become part of the crew and learn about steering, sail handling, navigation, and seamanship, take turns as lookouts, and are given galley duties and asked to help with light maintenance. The captain is English speaking and also fluent in Danish; the rest of the crew all speak fluent English as well as Danish and several other European languages. *—DN*

For more information, go to www.YUKON-tours.dk.

DIETER BETZ

DAVID NASH

While David began YUKON's restoration on his own, meeting and marrying Ea, who grew up in Copenhagen (inset), set in motion a dynamic new way of life for both of them. Together, they have created a charter business (see sidebar) that allows them to enjoy the fruits of their labors while traveling the world with their children.

we rented a small apartment nearby. It was getting frantic onboard, what with the electrics and engine to install, not to mention the eight or ten people working there each day in a last-ditch push to get us sailing. My brother Patrick came from Australia to help with sanding and painting for the final six months. The sense of purpose onboard was amazing. One way or another it seemed to bring out the best in people. Everyone had different strengths, but we all shared the same clear goal.

Finally, on July 18, 2004, after seven years of hard work, we took our maiden voyage. YUKON was sailing again. This first trip was to Svendborg to take part in YUKON's first regatta, the round-Funen race. Tired but exuberant, we (and all our volunteers) enjoyed a good week's sailing and had a great time.

Wooden vessels abound with human energy; this is their true beauty. Their pieces are sawn, bent, and carefully laid together. Every turn of a clamp, every bang of a spike, every grunt, every groan … it all remains in them. The reward for all our hard work is the feeling that we have brought YUKON back to life. Since that desperate salvage exercise in 1997, a great many hours have been spent thinking, working, and dreaming. We have now sailed over 14,000 miles in the Baltic Sea, giving almost 1,500 guests the opportunity to learn about sailing traditional craft.

Now it's time for the next dream. In June 2010 we embarked on our first circumnavigation of the globe, a two-and-a-half-year enterprise. This trip has always been out there waiting to happen, and Ea and I decided to do it before our boys became teenagers. Our route takes us from the island of Strynøe near Rudkøbing in Denmark, westward through the Panama Canal, to my hometown of Adelaide, South Australia, then back to Denmark in the autumn of 2012, with paying guests for both short and long periods (see sidebar). If our guests can experience something of the charm of the wooden vessel at sea, and of the thrill of sailing the wide ocean, then another of my ambitions will have been fulfilled.

David Nash, a native of Adelaide, South Australia, is a professional shipwright with over two decades' experience. David and his wife, Ea, and their two sons live and work aboard YUKON.

VIKING and Her Descendants

Carrying forward a San Francisco rowing tradition

Text and photographs by Abner Kingman

In 1977, boatbuilder Gordie Nash decided that with a resurgence in recreational rowing going on around San Francisco Bay, the time was ripe for a new open-water rowing race. Competitive rowing had deep roots here, but at the time the closest modern heir to the tradition was the Funky Boat Race in Sausalito, which was a great party but not much of a race, with participants rowing all kinds of contraptions—even mattresses lashed to shipping pallets. For the 5.5-mile course that Nash laid out for the first Open Ocean Regatta, on April 16 of that year, 24 boats competed. "The fleet bunched up and had a great race," Nash says. "But one boat left them all behind. It was a wonderful thing to watch. It was like a Porsche racing against Volkswagens. It was one of a kind."

That boat was VIKING. She defied easy description, but at 22′ long and 43″ wide, with two rowing stations, she was reminiscent of West Coast Whitehalls but

***Above*— KOHLENBERG, launched in late 2010, is the latest construction inspired by a much-admired San Francisco Bay boat that has been in more or less continuous use for more than a century.**

***Above*—VIKING, a lean and fast four-oared pulling boat built sometime around 1900, was donated to the Dolphin Club in the 1930s. Jeremy Fisher-Smith has not only replicated the boat three times but thoroughly restored the original in 1984. *Right*—THOR, which Fisher-Smith designed as a two-oared version of the Viking class, took its place in the lineup of classic rowing craft at the Dolphin Club after being commissioned in 1986.**

longer and narrower. She shared some construction characteristics with Cornish gigs but didn't match their form. "VIKING had racing-shell geometry," Nash says. "The sliding seat, the foot blocks, the outriggers, the width between the oarlocks, the length of the oars—all that's been worked out for a long time in racing shells, and they carried it over into VIKING."

VIKING was—and still is—owned by the Dolphin Club (see WB Nos. 155 and 40) in Aquatic Park on San Francisco's northern waterfront. The story they like to tell in the club is that the boat was built sometime around 1900 by two cable-car carpenters as a "gentleman's pulling boat" for their own use on the Russian River. When one of them died in the 1930s, the survivor, or a family member, donated the boat to the Dolphin Club.

Until the 1977 race, the boat had gone largely unnoticed outside the Dolphin Club, even by its next-door competitor, the South End Club. But then Bill Paine, a South End Whitehall rower who didn't relish being bested that day, began lobbying the club's leaders to commission a VIKING replica. "He was a strong character," says one of his rowing partners, Jim Flack. "He was very competitive. He had to have that boat." At last, in the fall of 1978, the club agreed to commission a construction and approached Davenport boatbuilder Bill Grunwald, who had been making a name for himself building plywood rowboats and dinghies.

Davenport is a collection of some six dozen buildings on a surprisingly desolate stretch of the California coast south of San Francisco between Half Moon Bay and Santa Cruz, where the two-lane Pacific Coast Highway skirts beaches and bluffs without passing a single harbor. The 50-mile stretch of foggy, surf-battered shoreline even today feels completely

***Above*—By shaping patterns for each strake, Fisher-Smith made efficient use of his planking stock. *Top right*—For Fisher-Smith, lapstrake hull construction is all about carefully fitted planks; "they are key," he says. *Right*—KOHLENBERG was built over the same molds used 23 years earlier for the construction of THOR.**

isolated from the hordes clogging the freeways in Silicon Valley and San Jose, which lie just over the mountains to the east.

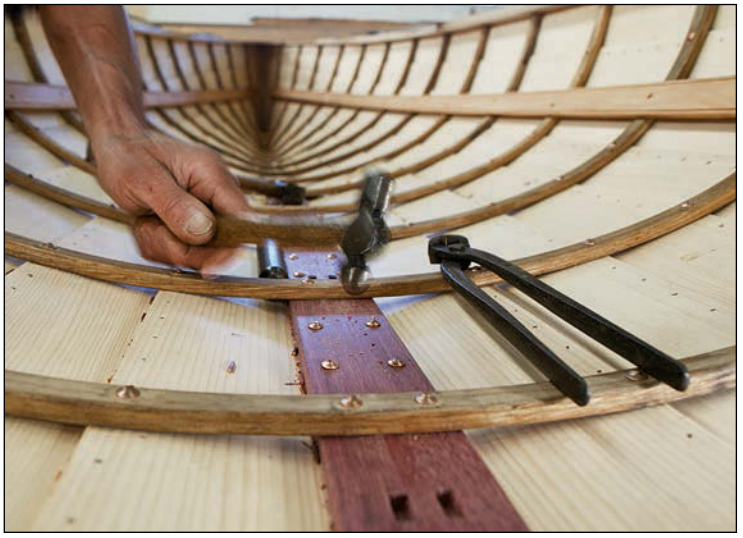
At the south end of the town, which is separated from the shore by the highway and railroad tracks, a 50′ × 100′ shed built on a framework of redwood poles housed Aeolus Boats, the company Grunwald founded in the early 1960s (see WB No. 37). As the rowing renaissance took hold, he was turning out a steady stream of plywood rowboats built to a variety of designs. However, Grunwald declined the club's invitation to build this traditional boat, suggesting instead that his young employee, Jeremy Fisher-Smith, take on the project.

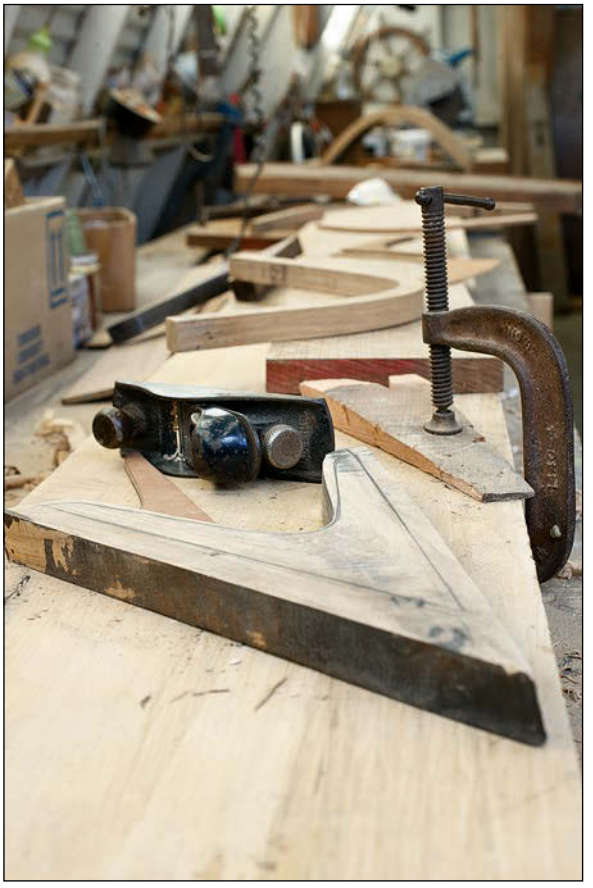
Fisher-Smith, then 22, agreed even though he didn't fully understand what the boat's design and construction would entail. The project would be far more complicated than anything he had worked on before. Yet the replica he completed in 1979 had a profound effect on his career as a boatbuilder. During the next 30 years, he had several more opportunities to revisit the design, and his most recent construction based on the type was launched in the fall of 2010.

In 1976, when he was 19 years old, Fisher-Smith had dropped by Grunwald's shop to have a look around. Grunwald happened to be looking for help and offered him a job on the spot.

Fisher-Smith had dropped out after a year at UC–Santa Barbara, foreseeing that he would never conform to a life "in a white shirt with a tie behind a desk." Relying on his high school woodshop skills, he was scraping by as a carpenter in Mill Valley just north of San Francisco, but he was also hanging around the docks in nearby Sausalito. "I was being drawn there. There were so many characters and so much excitement for me. There were all these young hippies building boats. They were cutting up these big chunks of Port Orford cedar and spiking them together with big galvanized spikes. It was like the 19th century."

Grunwald's job offer came with free housing in an old carriage house behind the shop. "It was built out of vertical slats of tongue-and-groove fir that sat on the ground and got shorter and shorter as the bottom rotted off," Fisher-Smith says. "There was no water and no electricity. The toilet was over on the old back porch





***Top left*—Fisher-Smith used Port Orford cedar planking, Oregon white oak frames, and a purpleheart inner keel in constructing KOHLENBERG's hull. *Left*—Careful attention to proportion, fit, and detailing pay homage to the aesthetics of the original VIKING. *Above*—A doorskin pattern has been used to mark the breasthook's shape on a just-right grown crook of Oregon white oak.**

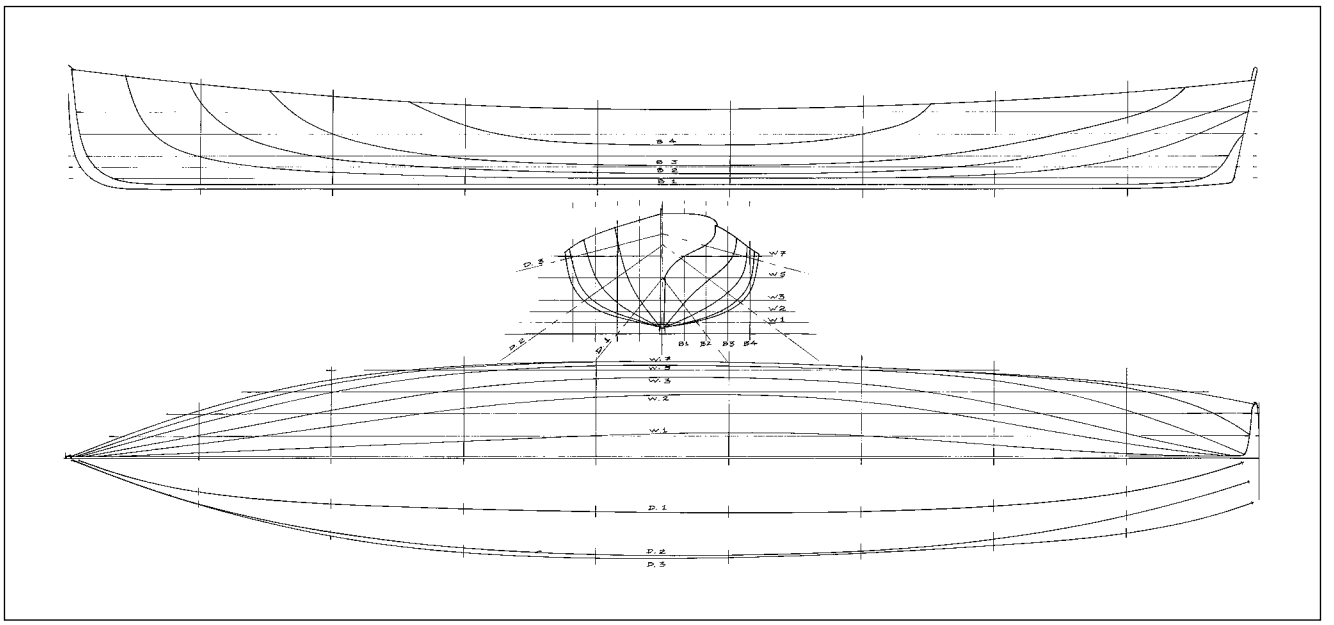
of a hotel that had burned down. To bathe, we had a 15-gallon aluminum army cook pot that we heated on a fire in the yard. Because I was lean, I could sit down in it and take a hot tub with my arms and legs hanging out. I've never taken hot showers for granted since."

They worked six days a week. Most of the time it was Grunwald and Fisher-Smith working away, each on his own project, building one of Grunwald's designs. On Saturdays, however, they took a long lunch and welcomed wooden-boat aficionados. "Grunwald's wife would send a little loaf cake in. We'd all sit around, have a nice lunch, and eat cake, and drink instant coffee, and talk to people who came to see us. There was this little group of enthusiasts, but we weren't all of the same ilk. There were people into canoes, kayaks, whatever."

Alone in the evenings, Fisher-Smith devoured books about wooden boat building. "I'd go home in my shack and read. That's what I did. I didn't know anybody there for a long time. The books I was reading were about these old designs that were made by guys on the beach. They would go out into the forest, cut a tree down, mill it down into planks, season the planks, hand-plane them to thickness—taking materials out of the forest and coming up with this beautiful thing, elegant, shapely, so fine. I was yearning to know that feeling."

At the time, all of Fisher-Smith's boats had been built of plywood, but within a year of starting work with Grunwald, he had his first opportunity to branch out into traditional construction. A woman brought in a dilapidated lapstrake yacht tender that had belonged to her father to ask if it could be rebuilt. It was beyond repair, but Fisher-Smith offered to build a replica. "It gave me a sense of how valuable that process could be as an education, because you have to thoroughly digest the boat in order to reproduce it," he says.

At the time of the South End Club's overture, Fisher-Smith had only recently cut his teeth on the lapstrake tender. But he jumped at the chance for another replica project. "I would say yes to anything at that point," Fisher-Smith says. "I took it on without the skills to do it. I had never done anything like it. I was totally excited. I was 22 years old. I was ready to take the 'next class'—I was going to school on



In 1986, Fisher-Smith designed a variation on the original VIKING, only this time for a single oarsman instead of a pair. The first of these long and lean boats was THOR, commissioned by the South End Rowing Club. In 2009, the Dolphin Club commissioned a matching single. The singles are 18′ LOA with a beam of 3′1″, compared to VIKING's 22′ x 3′7″.

this boat. The price I came up with was a total joke. I think I charged $2,800."

Fisher-Smith spent an entire night in the Dolphin Club poring over VIKING, taking measurements and studying her construction. Even though the boat wasn't in good condition, it was love at first sight. "It was tired. The bottom was all out of shape. They had added frames as the old ones failed. A lot of the rivets had worn through. It was a tired old boat, but even so…. That boat has so much grace." Both clubs had fleets of a dozen or so boats, but at the time, Fisher-Smith says, "All the boats were worn out. I think racing had pretty much died out. At that point the boats were used for exercise rowing," and to accompany the club's many recreational open-water swimmers.

Still yearning after the romantic ideal of taking a project from timber harvest to launching, Fisher-Smith set off on a wood safari. He went to a Langlois, Oregon, mill that had supplied Port Orford cedar to the Sausalito hippies. "My 18-year-old brother and I drove up there in my '47 Ford pickup. I selected as many vertical-grain flitches as I could load on the truck. Coming home it was so foggy my brother was running the spotlight up on the roof."

Back in Davenport, Fisher-Smith lofted the replica on sheets of painted hardboard and set out to build a boat that would be far more complicated than anything he had yet worked on. "At that time," he says, "the shop had no power tools except one tiny little bandsaw from the 1920s, and a tablesaw, lousy little 10″, with a blade angle that would constantly change while you were cutting." He had the 1¼″-thick planks resawn at a nearby lumberyard and bought and rebuilt an antique 13″ thickness planer. He had his books, Saturday lunch conversations, and Grunwald's experience to learn from, but he was otherwise operating in a vacuum. He learned by trial and error.

He had trouble fitting several planks, which even after steaming would crack as he hung them. "It takes a while to perceive something accurately," Fisher-Smith says. "I hadn't fully digested all the information that was available in VIKING. So, I went back and looked some more, and I saw things a little better." He discovered that several of the planks had been carved, not bent, to shape. "It takes a lot more work to do the planks this way," he says, "but it makes the boat more curvaceous, instead of faceted. This boat only has seven planks per side, because it's narrow, but it helps so much to have the curved planks, they make the boat look so sculptural."

After months of long hours, he completed the boat, named VALHALLA, in 1979, and Paine himself came to pick her up. "He was excited about it; he was inspired. He was competitive, and he was a brute of a guy. He looked like Bluto from Popeye. He was about 280 lbs. He was a rugby player. His legs were like tree trunks. They called him 'The Animal.'"

That year and the next, Paine, rowing with Eddie Blum, dominated open-water races all over the state. Competitive West Coast rowers took note, including those at the South End Club, where more members started reserving the boat. As the demand increased, the club concluded it needed a second replica, which it commissioned Fisher-Smith to build in 1982.

At that time, Fisher-Smith was still living in the carriage house, which remained much the same although it now boasted electricity and a rudimentary floor over the dirt. His boatbuilding skills, however, had evolved

***Top left*—Fisher-Smith matched the construction details and scantlings of the original VIKING's hull but gave the new boat its own identity in such things as seat details. *Left*—Following the Bay Area rowing club tradition, the new boat's name is carved into her seat back. *Above*—KOHLENBERG's quarter knees are through-riveted into place.**

considerably since VALHALLA, and he approached the second replica with a more sophisticated eye. "It's a hundred percent better in the finish. It's a much finer-built boat. I did a lot of things wrong on the first boat. If you look at it, you can see it's a lot cruder in form and finish."

When Fisher-Smith delivered the second boat in 1983, South End rowers Jim Flack and Scott Ellsworth had teamed up and were training five days a week. "We just drove each other," Flack says. "You had to show up come hell or high water. We went out on mornings that we wouldn't go out on today, just because we were determined—what we called 'victories at sea,' the slamming-destroyer-in-the-North-Atlantic kind of scene." Flack and Ellsworth began winning all the major open-water races. With two new boats in addition to the original, what was becoming known as the "Viking class" had become the undisputed leader in open-water racing.

The original VIKING, however, was at the brink. Nash himself recognized that fact when he used the hull to make a fiberglass version. "I took a mold off the original boat, which meant I got its good qualities and its not-so-good qualities," he says. The boat was showing its age. "It looked great, it had a beautiful sheer, it was real seaworthy, it had a good turn of speed. It also had a little pull to port, and the ends were sagging. The keel wasn't straight." At last, in 1984, Bill Walden, the Dolphin Club member who won the first Open Ocean Regatta in 1977, asked Fisher-Smith to restore her.

Fisher-Smith calls the project an important step in his development as a boatbuilder. "I didn't really get to know it well until I took it apart. You can feel the guy putting it together. You can see his tool marks. It was great taking it apart—scary and excellent. I was really proud of that, because restoration is a whole different game than building new. It's a great challenge to figure out how to come out with something that is still the original boat. I tried to save as much as I could."

VIKING continued to inspire admirers. Fisher-Smith built a third replica in 1985, this time for a South End Club member who wanted a boat of his own because he was having trouble getting access to the two popular VIKING class boats at the club. And in 1986, the same club took the concept one step further, commissioning Fisher-Smith to adapt the hull for a single rower, something Paine had envisioned as a natural extension of the class. Fisher-Smith was then 10 years into his career, and he knew the boat as intimately as anyone. By then, he had also designed a few boats of his own. "I think that's naturally one of the avenues of expression that present themselves," he says. "If you were playing guitar, you might want to try writing a song."

The challenge in adapting the design for a single oarsman was to match not only the look but also the performance qualities of the two-person VIKING. He drew an 18′ single with a 37″ beam, and he spent a lot of time making sure that the rowing ergonomics matched the ideal exhibited in the original boat. Fisher-Smith

***Top left*—Varnish shows the beauty of contrasting woods and fine joinery as the pieces converge at the bow. *Left*—D.S.B.C. marks KOHLENBERG as a fleet boat of the Dolphin Swimming and Boating Club, which was established in San Francisco in 1877. *Above*—With attentive care, the new boat will join its predecessors in having a long life; the original VIKING was launched about 1900 and is still going strong after a 1984 restoration by Fisher-Smith.**

delivered what Flack calls "obviously just the sweetest little boat ever. Anybody who likes rowing on San Francisco Bay recognizes that THOR is just the cat's meow. It just practically rows itself. It's just perfectly set up. It just glides. It's very heavy in actual fact, but it's an easy boat to row. It's immensely easier than any other single we have, any of the other Whitehall singles."

Before long, however, open-water racing underwent a sea change as builders adopted lightweight fiberglass construction. The Viking class's racing heyday was over.

Fisher-Smith struck out on his own, living in Santa Cruz while working in Davenport for two more years in shop space he rented from Grunwald while generating all his own custom boat work. In 1988, Fisher-Smith decided it was time to leave. "I dropped out of college and then dropped right into this situation, and stayed 12 years. And it was total immersion, six days a week, nothing but small wooden boats for 12 years. My life was so sheltered down there, I didn't feel well rounded. I was excited about stepping out and working on some big boats." Since then, Fisher-Smith has worked on many boats, large and small. He married, had kids, moved to rural western Marin County, and took over a boatyard in the tiny town of Marshall on the shore of Tomales Bay.

The Viking-class boats no longer win open-class races, but they have remained the pinnacle of the wooden boat fleets at the Dolphin and South End clubs. Members spend months training in other boats to earn the privilege of taking out one of the prized Vikings. Lyrinda Snyderman, who rows the original VIKING with her husband, Neal, says, "We just love to think of the history and feel a connection with it. Also, the beauty of the wood and its seaworthiness. There's something special about going out in the Vikings. It's not so much a racing boat now. But the Viking is nice and seaworthy. You've got good freeboard, and it tracks well. And it's rigged perfectly."

Todd Oppenheimer and a group of like-minded Viking class devotees at the Dolphin Club bought the one privately owned Viking replica and donated it to the club. Then, after a much-loved member of the club died in 2006, Oppenheimer started a campaign to build a one-person Viking class boat as a memorial, to be named KOHLENBERG. This would round out the fleet so that each club would have two doubles and a single. The club went once again to Fisher-Smith.

Fisher-Smith says that when the order came for the new boat in 2009, he had to remember how he built the first one-person Viking 23 years earlier. "I had to

***Above*—KOHLENBERG's launching brought the Viking class to six boats, four doubles (two of which are seen here) and two singles. The Dolphin Club and the South End Rowing Club each have two doubles and a single. *Left*—With her rowing outriggers and sliding seat, the Viking single closely matches the rowing ergonomics of the original boat.**

go back and take some patterns off the original, so in a way I was replicating my own work. I felt like I couldn't do this in my sleep. I had to be conscious."

Electing to build the boat upside-down, Fisher-Smith constructed a ladder frame out of 2×12s. "I mounted my molds, feeling glib that I still had them—blew the dust off." He had built the first boat the same way. "You get to fit the planks looking down on them, and when you lay a plank it naturally drapes on the boat instead of sagging off. On a lapstrake boat planking fits are almost everything. They are key."

He fashioned a white oak keel and inner stem, a purpleheart hog piece, and a mahogany transom. Although he still favors local woods, he finds it harder and harder to find suitable stock, while lumber dealers have ready, although ultimately unsustainable, supplies of high-quality tropical woods. Fisher-Smith says that finding stock will only become more challenging over time, and—ironically—engineered wood products might ultimately provide an answer.

For planking, he made patterns out of 3⁄16″ doorskin. "They were easy to make and they are a very accurate way to lay out on your stock," which in his case consisted of 1¼″ × 12″ × 19′ cedar boards, which were resawn to produce 5⁄16″-thick planks. "They have all kinds of inconsistencies. They've got knots, bark inclusions, swirls, bad spots, you name it. And you've got to thread through those with your plank, so that when you're done it looks like it's pristine." He used quarter-sawn Port Orford cedar, which yielded planking stock of nearly vertical grain.

Since the original VIKING proved herself for many decades and her restoration took her into a new century, he aspired to match her construction standards. "It's a lot to live up to, adding boats to those collections at the clubs," he says. And given that he has invested more than 1,000 hours building KOHLENBERG and she is "worth as much as an SUV," both he and the club hope the boat will last a long time.

The days of neglect at both clubs are long over, and the chances of a boat surviving for 100 years or more are now much improved. The Dolphin Club has an in-house boatbuilder, and both clubs have a weekly "boat night" where members contribute to the maintenance of the boats (see Currents, WB No. 217). Reuben Hechanova, president of the Dolphin Club, says that even though members join for many reasons and quite a few are more interested in swimming than in rowing, the boats remain the core of the club's identity and their care is a source of pride. When you walk into either of the clubs, the wooden boats hold the stage, and the Vikings steal the show.

Abner Kingman is a journalist who lives in the San Francisco Bay Area with his wife and two young sons.

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Getting a Grip

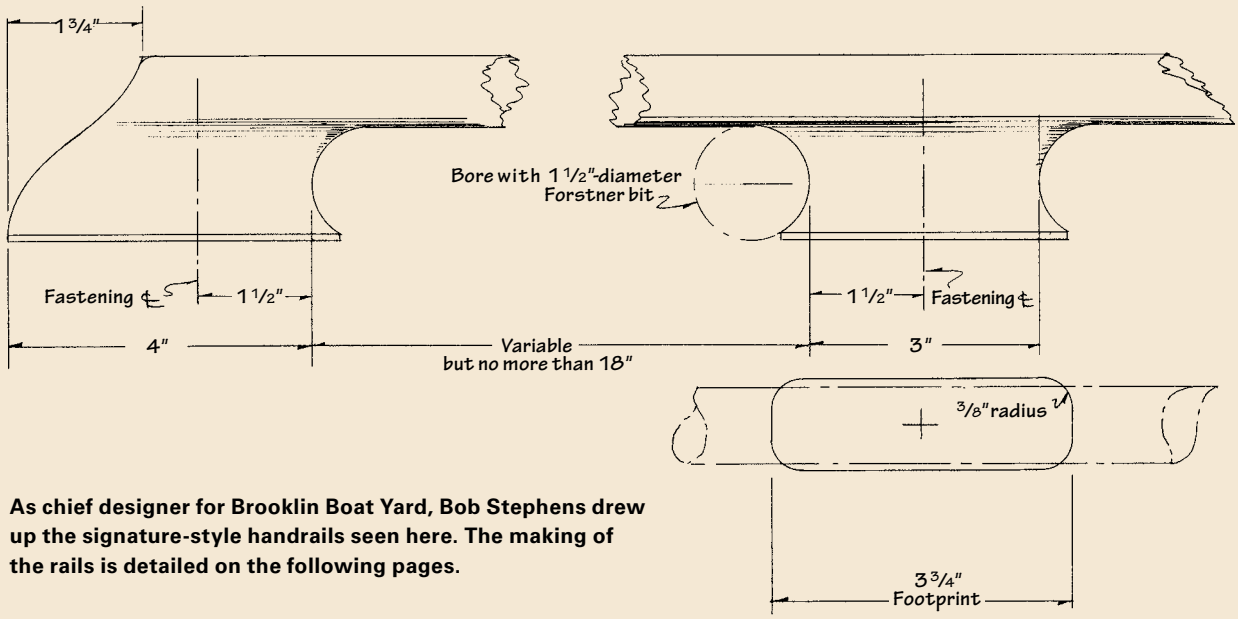
How to make elegant, profiled handrails for on-deck and below

by Eric Blake
Photographs by Matthew P. Murphy

Shortly after I was asked to write an article detailing how to make handrails, I found myself swinging from one handrail to the another on a rough offshore passage late in November 2010, crossing the Gulf Stream in conditions that gave me a renewed appreciation of how vitally important these items can be. These humble pieces of joinery may very well be among the most important pieces on any yacht: They may save your life.

It was the very handrail design shown on the following pages that graced the deck of SONNY, the 70′ sloop I was delivering. Not only are these handrails used above deck, they are found throughout the yacht's interior as well, and in a subtle way they visually join the exterior to the interior. The handrails described here are not your run-of-the-mill, CNC-routed, off-the-shelf version. They are complex as handrails go, but they are also functional, beautiful, and easy to maintain. They are fastened from below, allowing them to be completely prefinished before installation, and they'll be easy to remove without having to pop out bungs and ruin brightwork. The light plays off the concave sectional shape and shouldered base, creating a striking bit of detail. These particular handrails will give you a way to dress up what is often a typically ordinary piece of joinery. Alternatively, you may omit the hollowed, tumblehome sections and detailed end profiles if you'd like a more common design.

Making the handrails as described below may take a little more time than the common version, and there will be more hand shaping and sanding involved. But I promise you that they'll be handsome, and that if they're well fastened you'll be able to depend on them just as I did aboard SONNY. So find yourself a nice piece of hardwood, then get after it. When finished you'll have something to hang on to, and something to look at when they're not being used.

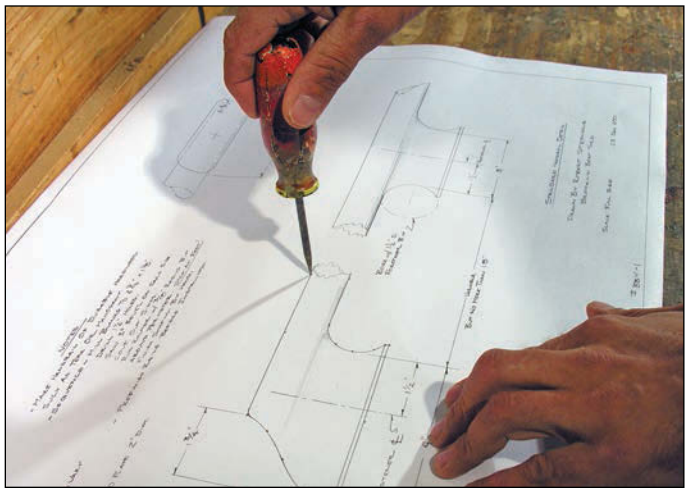


As chief designer for Brooklin Boat Yard, Bob Stephens drew up the signature-style handrails seen here. The making of the rails is detailed on the following pages.

Begin by milling blanks from clear, straight-grained, and durable hardwood such as teak, black locust, or mahogany. Saw them out straight with square corners, 2 7/16″ high × 1⅛″ wide, and a bit longer than the desired length. At the same time, mill out any shorter rails you may want for the interior, as well. A few short pieces of stock of the same dimensions as your workpieces are nice to have for testing, so as to not ruin real pieces when determining saw settings.

1

Instead of making separate layouts for the end profiles of each individual rail, make a single layout on a template; this will ensure that the ends are all the same throughout the boat. Here I am using the full-sized drawing to prick through onto a piece of pattern stock to get the proper shape. Connect the resulting dots, cut out the template, and set it aside for the next step.



2

Now determine the rail's finished length and mark its ends with lines squared across the face of your blank. Using the template described in the previous step, trace the end profiles onto each end of each blank. Then lay out the distances between the feet and, referring to the drawing, use a combination square to line out the openings, to locate the centers of the circles whose arcs form the ends of the openings, and to establish the ⅛″-high shoulder line at the bottoms of the feet. Being accurate during this stage of layout is important so your handrails and their openings will be symmetrical. The span between feet shouldn't exceed 18″.

3

The first milling operation is to bore the 1½″ holes that form the ends of the handrail openings. Do this while the rails are still square, and use a drill press for this, if possible, to maintain nice, square cuts. A Forstner bit works well because it makes a controlled, clean cut. Go slowly, keep clearing away the shavings, and bore into a good backing pad, as these precautions will help prevent tearing out the back side of the cut.

4

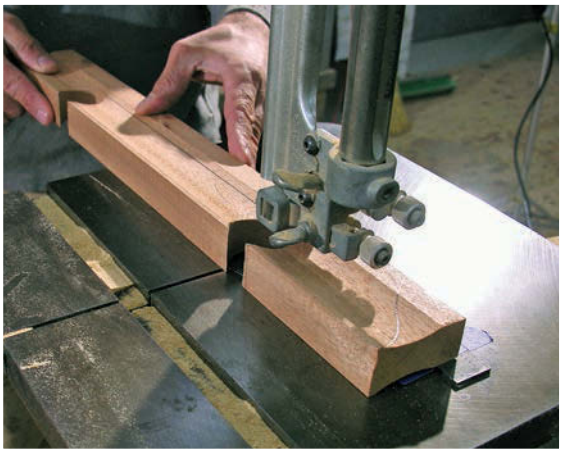
Now it's time to begin cutting the rail's sectional shape. Set the tablesaw to rip each face to a 3-degree bevel. When working with the blade tilted towards the fence, be sure to stand out of the path of possible kickback. Hold the rail firmly against the table on the second pass; the already-beveled face must not bear against the fence, though the small unbeveled shoulder at the base should be tight to it. The resulting subtle taper (or "tumblehome") gives the rail a refined look and is the first step toward producing a real hand-made piece.

5

The broad shallow cove, or hollow, that gives the handrail its elegant sectional shape is made by passing each face diagonally across a tablesaw blade that's set very shallow. Getting the fence (a wooden straightedge clamped to the table) at the correct angle will take a few tries, so use a test piece of the same cross section as your blank to get the correct setup. I could give you the exact angle I used here, but you'll find that the proper setup is best achieved by studying the photograph and making a few test passes. With the blade not tilted at all and set only ⅛″ above the table, set your angled fence at a distance from the blade that will have the bottom of the cove terminate just where the drawing shows, leaving a ⅛″ uncut shoulder at the bases of the feet. "Sneak up on it," I like to say. The proper setting here saves a lot of handwork later.

6

The previous steps eliminated some important layout lines, and these must be redrawn. So dig out the template you made in step one, carefully align it with the remnants of the end profile layout, and rescribe this curve.



7

Once the cove is cut on each face of each handrail, the next step is to cut out the openings and end profiles. I lay out the cut lines for the openings on both faces, using a combination square to connect the tops of each pair of 1½″ holes that we bored in step 3. Whether you use a jigsaw or a bandsaw to cut these out, you will be off-square by 3 degrees unless you compensate for the bevel you cut in step No. 4. As you can see, I taped the rule of a combination square to the table to create a shim, as this handily compensated for the bevel. You could also tilt the table 3 degrees.

8

A ⅜″ round-over bit with a guide bearing is set up on a router table to run around each opening. (Holding the router freehand is impossible on such a delicate piece with tight radii; you really need to use a router table.) The fence shown here is kept far enough from the piece to not interfere with shaping, but close enough for its built-in vacuum hose to remove dust and chips. The router won't completely cut a radius across the hollow sections at each foot; those areas will require hand-shaping.

9

To complete the rounding-over by hand, I draw layout lines in each hollow by simply using my finger to guide the pencil and connecting the resulting arc to the already-profiled area. Quick layout lines such as these are key to keeping a constant round-over, giving you fair, sweet lines to rasp and shape to.

10

Rough-shaping starts with a round rasp. Clamping the piece in a padded vise is helpful; you can also clamp the rail across the corner of a bench. I usually start by completing the radius in the hollowed areas. Again, it is important here to take your time and to "sneak up on it." One or two passes with too much pressure can drastically change the shape of the cove at these tight radii.

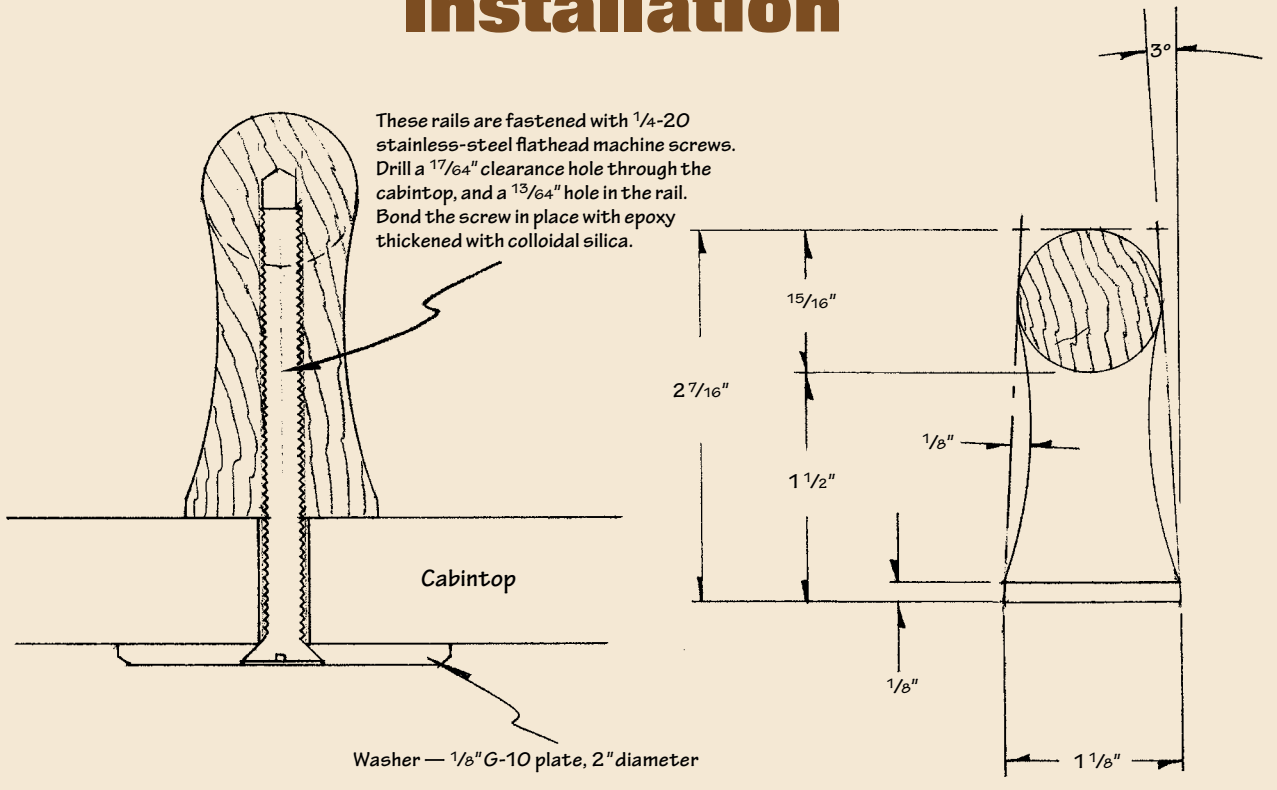
11

After using a block plane to take off any hard edges left by the router and to trim the grip as close to round as I can, I finish shaping the rails with sandpaper wrapped in a custom foam sanding block. These blocks are easy to create and are key to keeping the shape of long, radi-used pieces of joinery consistently fair as you sand them. Once a short section of the grip feels fair after trimming with the plane, I use it to shape a foam sanding block. Wrap a piece of sticky-backed sandpaper around this section and rub a foam block back and forth across it. This gives a perfect foam-block negative of the desired radius to which I can then stick sandpaper. With 60-grit sandpaper, I use this foam block to shape the rest of this rail as well as the remaining ones.

12

Once the overall shaping is complete, you can begin working through the finer grits, finishing with 120 before sealing. The shadows from bright lights played across the rails will help you to see unfair spots or cross-grain scratches. When you feel you are ready, get out the varnish brush and seal them completely, feet and all. When that coat dries, inspect the rails and sand out any flaws before building up your varnish coats. Chances are, if you've taken your time, the rails are going to look incredible and you'll be eager to get them finished and mounted.

Installation



These handrails can be fastened in one of two different ways. The "feet" of a yacht's handrails traditionally have been fastened from above, through the cabintop and into the underlying deck beams with large wood screws. Many modern boats have a cabintop that is laminated of solid plywood or constructed of a cored panel with no beams, and solid blocking where the handrails are located. In these cases, handrails can be fastened from below with machine screws set in epoxy. This is a very common way that not only allows the builder to prefinish the rails before installing them, but also to remove them without picking out a bung from the varnished rails and ruining their finish.

Eric Blake is a boatbuilder at Brooklin Boat Yard and an instructor at WoodenBoat School. On the following pages, he presents a gallery of handrail options for various types of service.

A Gallery of Handrails

Photographs by Steve Stone

Handrails come in all shapes, sizes, and locations. Last winter, the storage sheds at Brooklin Boat Yard housed a variety of boats that gave Eric Blake an opportunity to study the details and placement of numerous rails on both sail- and powerboats, above decks and below. Here, Eric describes the thinking behind some of these rails. —*Ed.*

***Above*—On the C. Raymond Hunt-designed motoryacht STING RAY, handrails mounted on the pilothouse sides provide secure passage along narrow side decks.**

***Above*—CIRRUS, a Fishers Island 31 sloop built in 1931 by the Herreshoff Mfg. Co., carries a simple style of cabintop handrail first seen on Herreshoff yachts in 1912.**

***Right*—End profiles should play off other joinery details found throughout a boat. Soft half-rounds are a typical detail on QUEST, a 42′ yawl designed by John Alden and built by Paul Luke in 1959.**

***Left*—It's best to simply stop and start a rail if it is interrupted by a piece of hardware, as is the case with this smoke head on the 46′ Sparkman & Stephens yawl MADRIGAL. Don't be forced to move the rail inboard, where it will be less functional.**

***Above*—When a boat is on-soundings, the bases of handrails are a convenient place to tie a boat hook or a set of oars, putting them close at hand when you need them. At sea, these items should be stored securely below and the handrail left uncluttered for good gripping.**

***Below*—This short athwartship rail on NORTH WIND (ex-CACHALOT), a 35′ sloop designed by Joel White, is handy for getting in and out of the boat's deep cockpit.**

***Below*—The 74′ commuter yacht APHRODITE has varnished rails running through bolted-on chromed bases. This configuration allows for easy removal for varnishing.**

***Above*—The 48′ sloop LUCAYO carries bare teak rails, which blend nicely with a similarly weathered deck. They also eliminate a lot of varnishing.**

***Above*—The W-76 sloop WILD HORSES has very simple rails running the length of the overhead. They're round in section, and thus easy on the hands, and they have flats left where they land on each deckbeam.**

***Above*—If properly made, a set of handrails makes an ordinary housetop sing. Here we see the handrail design shown on the previous pages aboard SWEET OLIVE, a 43′ cutter designed by Joel White.**

ANTIQUE BOAT MUSEUM, CLAYTON, NY

Number Boats

Treasures of the Thousand Islands

by Emmett Smith

It's always a thrill to learn something new about a familiar boat. On a windy, sunny day last summer in the Thousand Islands region of the St. Lawrence River, I learned that to race a Number Boat, goggles are required. They're not needed for the wind—these semi-displacement launches are not fast by contemporary standards—but for the spray.

Glancing left toward Hart Island off the village of Alexandria Bay, I saw a century-old boat, identical to the fiberglass-hulled reproduction I was driving, running smoothly along the placid inshore water, making for the island well in advance of me. Its two occupants seemed to be engrossed in conversation. I had stood off from the shore, hoping to pass delicately between a pair of tour boats and take the lead. As I rounded the island, the volume of water coming over the rail was such that I could barely catch a glimpse of the river in front of me once every few seconds. Even if I could make it through the cross-sea of wakes, the poor visibility would slow me down. Experience and local knowledge (and a windshield) were allowing Teddy McNally and the wooden-hulled NIGHT RIDER to get the better of me for the second race of our series.

NIGHT RIDER is No. 18 of 20 identical boats built over the winter of 1909–10 for racing in the Thousand Islands. She is part of the first one-design class for

***Above*—Charles D. Mower designed a one-design class of motorboats in the early 1900s for racing in the Thousand Islands Region of the St. Lawrence River. Twenty identical boats—colloquially called Number Boats—were built over the winter of 1909–10. NIGHT RIDER (above, foreground), is one of those boats; No. 22 is a fiberglass-hulled reproduction from the Everett Boat Works in Canton, New York.**

ANTIQUE BOAT MUSEUM, CLAYTON, NY

On an outing in NIGHT RIDER, Andrew McNally and his family pass by their houseboat LA DUCHESSE on Wellesley Island, about 1980. The houseboat was built for George Boldt in 1903 and is now on display at the Antique Boat Museum.

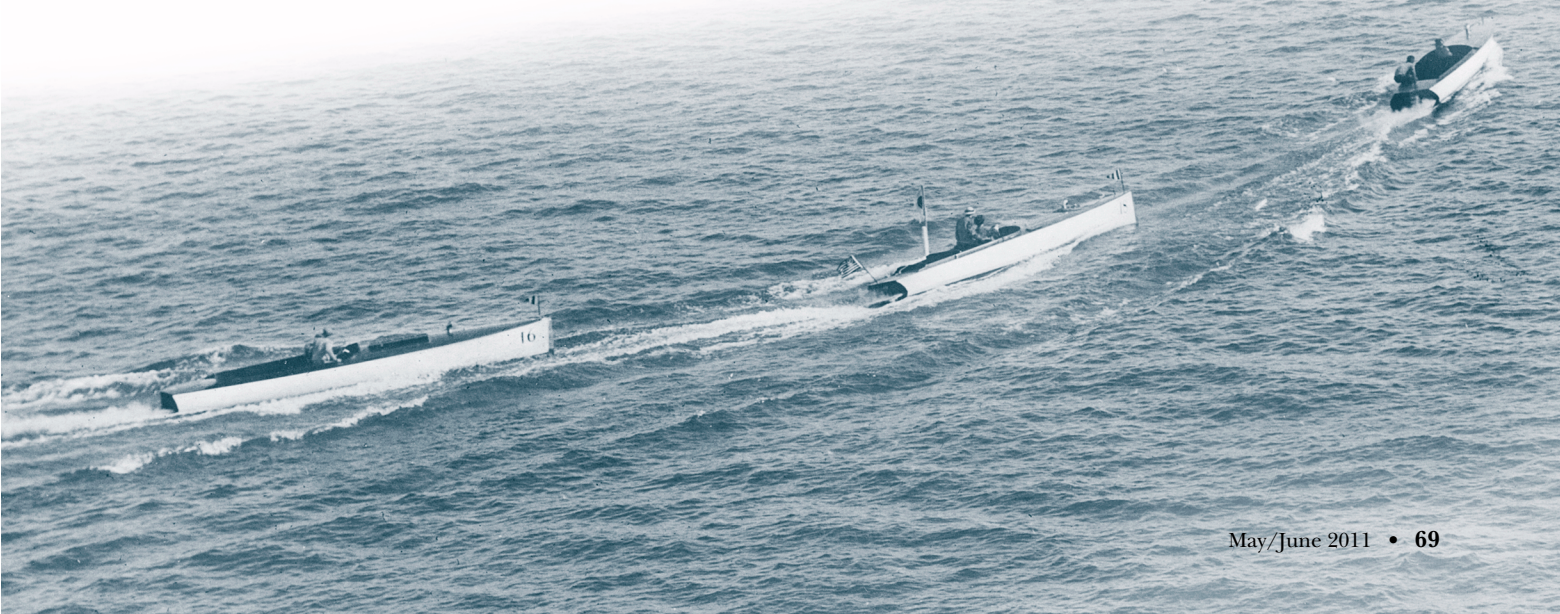
motorboats. Since the boats had no sails, their numbers were painted on their bows, which led to the colloquial class name "Number Boats." The racing last summer was part of a two-day event celebrating the 100th anniversary of the fleet's first season. In those races, I piloted Bob Cox's No. 21, which I helped to build along with No. 22 at my father's shop, The Everett Boat Works in Canton, New York. Later, I worked at the Antique Boat Museum (ABM) in Clayton, New York, which maintains two original Number Boats for display.

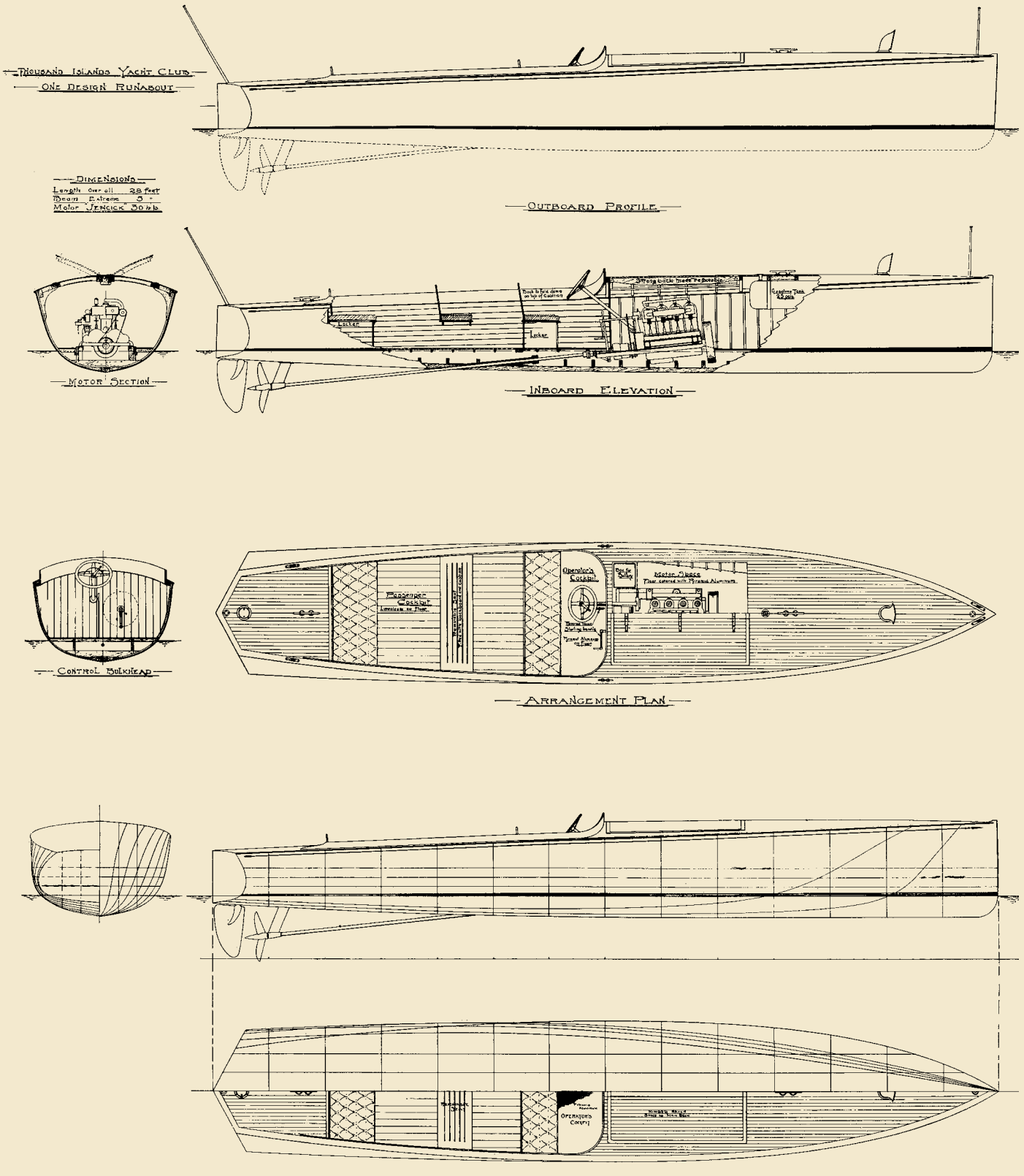
The Thousand Islands is water like no other. The great St. Lawrence River, 8 miles wide at Clayton and flowing out of Lake Ontario at close to 15 million cubic feet per minute, hosts this community of nearly 1,800 islands stretching about 50 miles between the lake and Morristown, New York (see map). The U.S.–Canada border picks its way judiciously through the middle, though regional identity often seems more relevant than national identity to residents. There is an unspoken sense of abiding community here.

Like many scenic locales in the East, the Thousand Islands experienced a boom of summer tourism between 1880 and 1910. Many prominent yachtsmen from New York City, Long Island, Toronto, Montréal, and the Midwest built palatial island residences

ANTIQUE BOAT MUSEUM/McNALLY COLLECTION

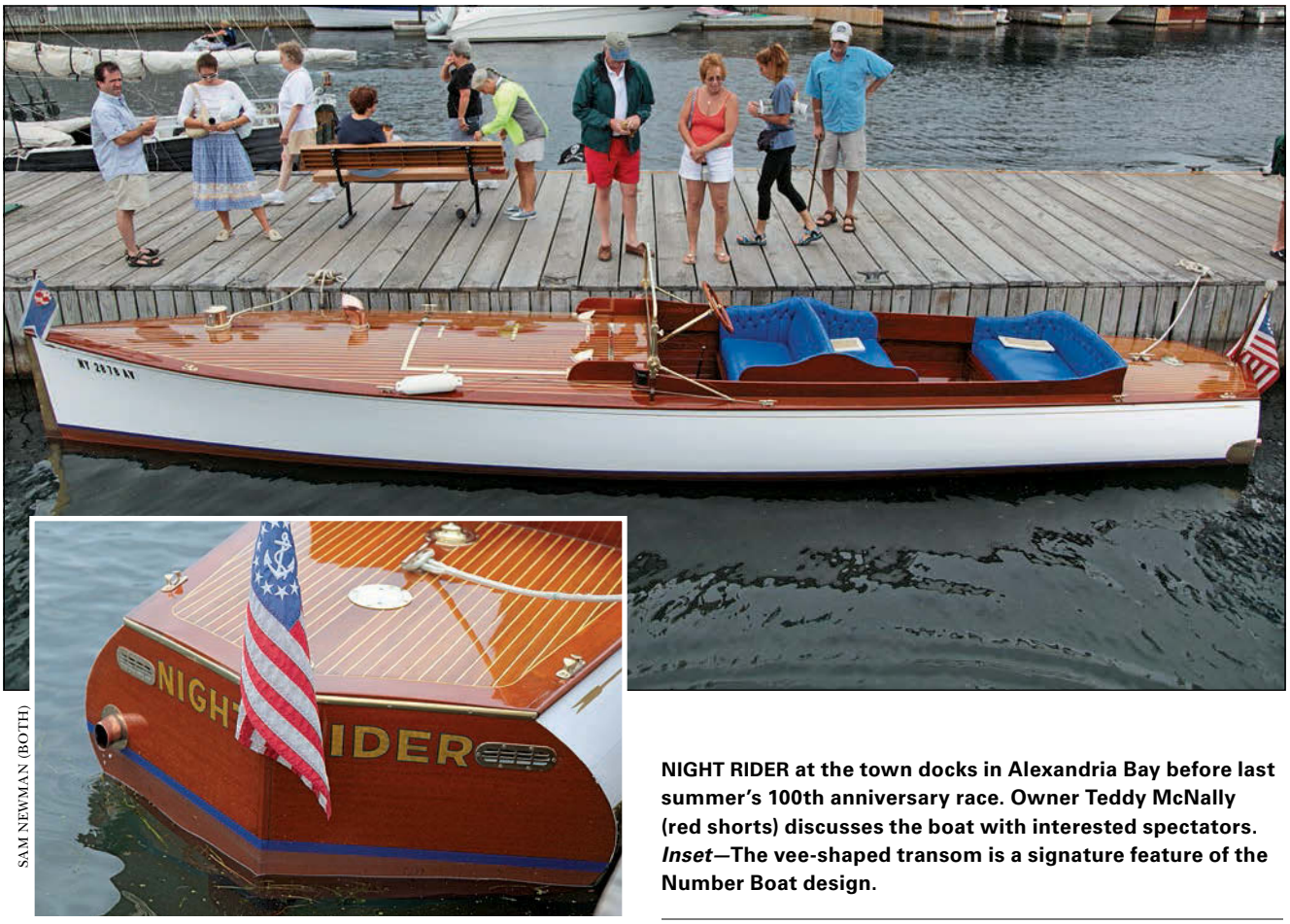
This image of a Number Boat race was found on board the houseboat LA DUCHESSE (above) when the houseboat came to the Antique Boat Museum. Note the crew of the lead boat hiking out to bank the boat in a turn.





THE RUDDER, JULY 1910

Identical drawings for the Number Boats were published in *The Rudder* magazine in July 1910, and in *Motorboat* in April 1910. *The Rudder*'s review stated that "The intention was to produce a boat that would be serviceable for general runabout work; one that would be dry and a good sea boat and at the same time have speed enough to make interesting class racing Wednesday and Saturday afternoons throughout the season." "Dry," of course, is a relative term.



SAM NEWMAN (BOTH)

NIGHT RIDER at the town docks in Alexandria Bay before last summer's 100th anniversary race. Owner Teddy McNally (red shorts) discusses the boat with interested spectators. *Inset*—The vee-shaped transom is a signature feature of the Number Boat design.

here. They knew boats, they had money, and they were near wonderful water. It is shallow water, however—treacherous for deep-draft sailboats, but ideal for modest-sized powerboats.

This was a competitive crowd, in golf, tennis, and squash. But the region's primary sport in those days was motorboating. The American Power Boat Association Gold Challenge Cup resided in the Thousand Islands from 1905 to 1913, despite challenges from around the country. Local builders were on the leading edge of hull and engine technology, and were also adept at gaming the rating systems. From 1905 to 1907, the Gold Cup was won for the Chippewa Yacht Club by the modestly powered CHIP I (1905) and CHIP II (1906–7) which rated better than far faster and more impressive craft due to small size and cleverly arranged engines. In 1908, the old rating system was abandoned, to be replaced by a new rule requiring only that a boat not be longer than 40′.

By this time, the fastest boats were well over 30′ in length, with big, heavy engines topping 200 hp. The fees of naval architects were significant, the engines were phenomenally expensive, and staying competitive required a new boat each year. The boats themselves were often cranky, wet, and dangerous; aside from being expensive, they were of no use off the racecourse. After a year of the new rule, the members of the Thousand Islands Yacht Club decided it was time for a more egalitarian class of racing powerboats. Taking note, no doubt, of the growth of one-design competition among sailors, they elected to create a one-design class for motorboats—the first of its kind. The boats were to be fast by the standards of the day, but also sensible and comfortable for family use. The broad vision was for a semi-displacement launch of no more than 30′, with moderate power. A committee was formed, and a design competition held in the fall of 1909. We do not know how many applications were received, or from whom, but we do know the winning entry: a narrow 28-footer with a plumb stem, a sharp entry, and a shallow V in the after sections. The boat was capable of making 18 mph with a 30-hp Jencick engine. It was of the "Auto-Boat" type, with the engine forward under a long sweep of deck, and ample seating aft. The designer was Charles D. Mower.

Motorboaters from all over the islands signed up for a total of 20 boats to be built during the winter of 1909–10 by the yard of Joseph Leyare in Ogdensburg—a man *The Rudder* magazine called "The Great St. Lawrence Boatbuilder." In the years after the original 20 were constructed, Leyare built at least four more of these Number Boats for customers. Leyare also designed and built stock boats, and in some of its round-bottomed, semi-displacement models from the mid-teens, there's a shallow V in the stern sections, a trait borrowed from the Number Boats. Good design elements always

inspire future designs, and the best boats seem to last through generations. The first owners of the Number Boats, however, might have been surprised at just how long their new boats would endure, or how much a part of the local culture they would become.

From about 1906 until 1910, the fastest boats were making up to 35 mph on skinny hulls that were a delicate marriage of a very sharp entry, a narrow, round-bottomed midsection, and a long, flat run aft. These semi-displacement launches at first want to slice through the water straight and level. A great deal of water shears up the sides as the boat starts to exceed its theoretical hull-speed, and at this point it can start to become cranky. If it is trimmed properly, however, the cutwater will slowly lift clear of the surface, the stern will drop, and suddenly the dynamics will change entirely for the better. The tendency to track off in one direction goes away, and the flat sections near the stern keep the boat stable. The spray, or at least some of it, moves aft. With a rounded bilge instead of the sharp-cornered chine of a V-bottomed hull, Number Boats run through choppy water with a steady glide instead of a bounce.

Whether this can be called planing or not is a matter of semantics, but in a Number Boat at speed, as much as 5′ of the bow clears the water. There is no "up-and-over" as there is in a runabout or a deep-V boat, however; they just gradually lift. The speed/rpm curve is virtually straight up to 25 mph. They are quite stable at speed, a trait I attribute to the shallow-V after sections. It is a remarkably prescient shape for 1910, suggestive of the runabout bottoms of a few years later, and where Mower's inspiration came from I do not know. The bilges remain pretty narrow until about 8′ back from the stem, so when you hit waves at speed the boat parts them, only lifting when the peaks reach amidships. This means there is little tendency to pitch, except in a very long sea.

This same lack of lift in the forward sections means that if you do get into a long sea of good size a very little bit of carelessness can cause you to bury the nose, which is quite exciting. More than once I have nosed down into a trough and seen the top of the stem disappear into the face of the next wave, before being flung up into the air as a sheet of water comes hurtling down the deck and into my lap. The sharp bow also means that if you try to run through a steep chop at high speed you will get wet, despite the flare in the bow. It is easy enough to avoid this by moderating your speed, which I had always done until actually racing these boats last summer. Which is why it was only then that I appreciated the need for goggles.

All of the Number Boats now floating, both originals and replicas, have much more horsepower than the originals, so it is hard to tell just how they performed in 1910. No. 21, the fiberglass reproduction I raced last summer, has a 180-hp motor that weighs 350 lbs. The original Jencick four-cylinder T-head put out only 30 hp but weighed 900 lbs. There was some controversy about

The 57′ express cruiser KENSINGTON, committee boat for the anniversary races, cruises in company with NIGHT RIDER. On board NIGHT RIDER are owner Teddy McNally and Holly Pastula, granddaughter of Number Boat designer C.D. Mower.

EMMETT SMITH

SAM NEWMAN

The wooden-hulled NIGHT RIDER is flanked by the fiberglass reproductions Nos. 22 and 21 (mostly obscured) during a flying start.

the original power plants, which were phenomenally expensive and performed very poorly. At some point early on, all the Jencick motors were scrapped and replaced with four-cylinder engines from Red Wing. The Jencick engines came with a steering column mounted right on the engine, complete with throttle and spark advance levers, and they were started with a crank handle that came through the dash. This meant that when they were taken out, the original bulkheads and bent coamings were also removed. The long bent coamings were not replaced; instead, a new dash with a cowling was put in. None of the originals still have the as-drawn configuration. The three boats that raced last summer all had different engines: NIGHT RIDER has a mid-century Chrysler Crown straight six, the fiberglass No. 22 has a modern four-cylinder Chevy, and No. 21 has a futuristic dual-rotor Mazda.

Competition ran very high in the Number Boat class for at least the few years after its inception. Race results were printed in the *Thousand Islands Sun* and the *Watertown Daily Times* through 1912. From the variety of the results we can infer that the class was a success; there were no predictable, consistent winners, and this level field fostered spirited competition. Why the Number Boats stopped racing is uncertain, but the class was likely eclipsed by advances in design. In those few years of the Number Boats' heyday, there was an explosion of creativity and experimentation with different hull shapes which resulted in much faster boats. At the end of summer 1913 the Lake George–based boat ANKLE DEEP leapt from the water on her hard chines, swept past the village of Alexandria Bay at close to 50 mph, and took the Gold Cup out of the Islands forever. The era of semi-displacement raceboats was over.

Over the next 100 years, Number Boats continued to be used and valued despite their age, and despite being eclipsed by later design trends. They served as family launches, workboats, and commuters. Gradually the fleet dwindled. Seven original boats are left now, another half-dozen accounted for as burned, sunk, or scrapped. Two fiberglass reproductions were built recently, and a third is underway. NIGHT RIDER has the distinction of being the only original boat to remain in continuous service since construction, and has been owned by only two families over that period. It was commissioned by L.M. Rumsey of Manhattan Island, and remained there until the island was sold by Rumsey's son-in-law, who kept the boat for a few years afterward. One summer he called Andy McNally, a good friend and a friend to wooden boats, and told him he wanted to give him the boat. "If you don't take it," he said, "I'm going to chop it up for firewood." McNally took it, and it moved over to Wellesley Island where it has been ever since.

At about the same time, Bob Cox was waging a decade-long campaign to purchase a Number Boat from E.J. Noble Smith, whose grandfather Edward John Noble had bought the Boldt Castle summer estate and everything that went with it. In the boathouse were boat Nos. 3 and 13. By the time Bob tracked them down in the 1960s, one had been converted into a double-cockpit runabout, probably by E.J., who was a great customer of Gar Wood's and a fan of the runabout style. Bob bought the more original of the two, and not long afterwards, his friend Jim Lewis bought the double-cockpit boat. The new owners couldn't figure out which boat was which, so in the end they decided between themselves which was No. 3 and No. 13. These two boats, donated by Bob and Jim, are now owned by the Antique Boat Museum (ABM) in Clayton.

Bob got a lot of use out of No. 13 before donating it, using it for everything from "shoal-finding" to grocery runs to and from Grindstone Island. It was he who commissioned the new fiberglass-hulled boats. The Everett Boat Works built the wooden decks and cockpits, and turned up a lot of new information and interest from the community while researching the construction of the originals. The excitement of the project raised the profile of the boats, sending collectors and craftsmen off searching for other originals and leading to last summer's race.

At least one other Number Boat was on the water in the Thousand Islands until its carburetor overflowed and it blew up in the mid-1980s and another, from Michigan, showed up at the ABM Boat Show in the late 1970s. Two more unrestored boats surfaced in the 1980s, and they both ended up at the ABM Boat Show auction in 1992. One of these had been converted to a workboat, with spray rails nailed on full-length. Both boats have changed hands since then and are now being restored, one by Tom Frauenheim of Buffalo, New York, and the other by Doug Morin in Grand Rapids, Michigan, for the late Tom Mittler, who died last spring.

When it comes to preserving raceboats, it is private collectors such as Mittler who have done the heavy lifting. They have sought out, and in most cases meticulously restored, boats that were once the focus of national attention. Morin is continuing with the restoration of No. 19 at the direction of Tom's family.

Last summer's anniversary racing event was over two days, the first being August 10, exactly 100 years from the first official Number Boat race. The second was on the following Thursday, August 12, the day before the semi-annual Race Boat Regatta at the ABM. In the morning we picked up our guests of honor, Holly Pastula and her son Jamie, granddaughter and great-grandson of Charles Mower. Hailing from from Long Island Sound, the Pastulas are boat enthusiasts and were delighted to be involved; they had a keen appreciation of the event. After a brief stop at the town docks in Alexandria Bay to show off before the race, we loaded into the boats and moved across the channel for the race. Holly rode in NIGHT RIDER, noting it was the first time she had ever ridden in one of her grandfather's boats. Jamie rode with Everett in No. 22, and my copilot in No. 21 was David Sommerstein, a journalist from the local NPR affiliate.

We set up a starting line between the bow of the committee boat, ABM's 57′, 1924 express cruiser KENSINGTON, and a buoy in front of the Boldt Castle Yacht House, in a calm little area on the far side of Hart Island from the village of Alexandria Bay. Near our starting line runs the shipping channel and the entrance to Alexandria Bay, one of the busiest stretches of water in the Thousand Islands. Because of the wakes of the constant traffic, it's rough water in any weather.

The race was not sanctioned by anyone but ourselves: no flags, no APBA stickers, no crash helmets. We were just a handful of enthusiasts competing against each other in long, narrow boats. We ran three heats, two from a dead stop and one on the fly. Teddy and Holly in NIGHT RIDER won the first two, each time leading us on a victory lap around Pullman Island and past the TIYC. In the last race Everett and I both made

EMMETT SMITH

NIGHT RIDER in her element.

an uncharacteristically aggressive dash at the end, coming from Hart Island toward the boathouse. I passed pretty close to a tour boat coming out of Hart Island, and I am not sure if the horn blast they gave me was one of appreciation or reproach. In any case, I was too far inside of my competitors to take the lead safely, and Everett crossed first.

A short cruise in company, with a fleet comprising the racers, ABM boats, and some spectators, followed the races. It was not a large event, and there were not many spectators or participants. Though our purpose was to honor the past, it felt a bit decadent, even self-indulgent. But perhaps that is not inappropriate. We are fortunate to be surrounded by the castles of years past as reminders of the opulence of 100 years ago. It is a different culture here now. Just being on the river is wealth enough, without there being a yacht and an island to every man. Familiar territory has new context if you're in the right boat, and all the connections—from the Gilded Age to the present—become clearer. I find it difficult to think of the Number Boats as racers. The men who developed them knew what sort of territory they had available to explore—with innumerable coves and bays—and came up with just the right craft to do it in. They knew what pleasures, and what boats, were fleeting. Perhaps all that stonework and woodcraft was just so much foundation for days like this.

Emmett Smith is a freelance curator and boatwright in Seattle. Currently, he's at work on several curatorial projects for The Center for Wooden Boats and for Northwest Seaport. Visit his web site at www.evsboats.com.

AUTHOR'S COLLECTION

Great Lakes Wooden Passenger Steamers

The way west

by George D. Jepson

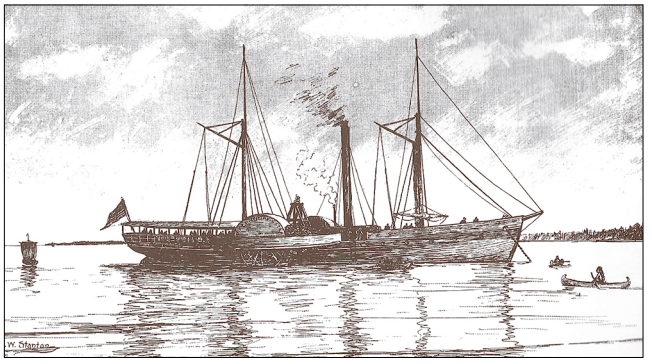
A whistle pierced the mid-afternoon air, smoke belched from tall twin funnels, and great paddles churned the water, sending a shudder through the single-deck wooden passenger steamer CONSTITUTION at Sandusky, Ohio. Bound for Buffalo, New York, in late April 1842, the side-wheel steamer—149′ length on deck (LOD), with a 28′1″ beam and 11′10″ depth of hold (depth)—was a spectacle as she departed the sleepy hamlet along the southern shore of Lake Erie.

Among the voyagers were English novelist Charles Dickens and his wife, Kate, who had arrived in Sandusky by rail the previous evening (see sidebar, on page 85). The Dickenses were on a grand tour of the United States and Canada, reaching as far west as St. Louis, which the author documented in his book *American Notes for General Circulation*.

By the early 1840s, passage aboard steamers through the Great Lakes (Ontario, Erie, Huron, Michigan, and Superior) was favored by New Englanders and immigrants seeking a fresh start as America expanded westward. Overland travel was a test of a person's sufferance. Stagecoaches, slung on leather strapping between axles and jerked along over crude highways or pikes, were primitive at best. It's little wonder that Dickens booked steamer berths for himself and Kate. CONSTITUTION, launched in 1837 at Conneaut, Ohio, steamed over the horizon, portending the future of travel on the Great Lakes.

Side-wheel and propeller steamers were fundamental to westward expansion. They reached their zenith on the Great Lakes before railroad lines connected far-flung waterfront settlements in the states of New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, the Wisconsin Territory that eventually became the states of Wisconsin and Minnesota, and Ontario, Canada. By the early 1850s, railroads were beginning to augment overland service with their own steamboat lines to carry passengers and freight between railheads,

***Above*—SHEBOYGAN, a side-wheel paddle steamer (208′ LOA, with a 32′ beam and 12′ depth) operated between Chicago and ports along the western shore of Lake Michigan until 1914. American artist Samuel Ward Stanton created a portfolio of more than 800 illustrations of American steamboats, including several shown in these pages.**



AUTHOR'S COLLECTION

Said to be inspired by the Native American interpretation of the word *steamboat,* WALK-IN-THE-WATER (also illustrated by Stanton) ran primarily between Buffalo and Detroit on Lake Erie.

which broadened their reach well into middle America and Canada. This combination service gave steamers a new purpose, extending the useful lives of many into the early 1900s. Other steamers, designed primarily for the excursion trade, were in use on smaller inland lakes and rivers during this period. Steamboats of the western rivers (see WB No. 64), another breed entirely, were running at this same time. But the Great Lakes steamers—related to those operating along the Eastern coastline—had deeper, heavier displacement hulls with higher freeboard for negotiating rough waters. This design difference set them apart from other steamer types and proved crucial to the development of the Midwest.

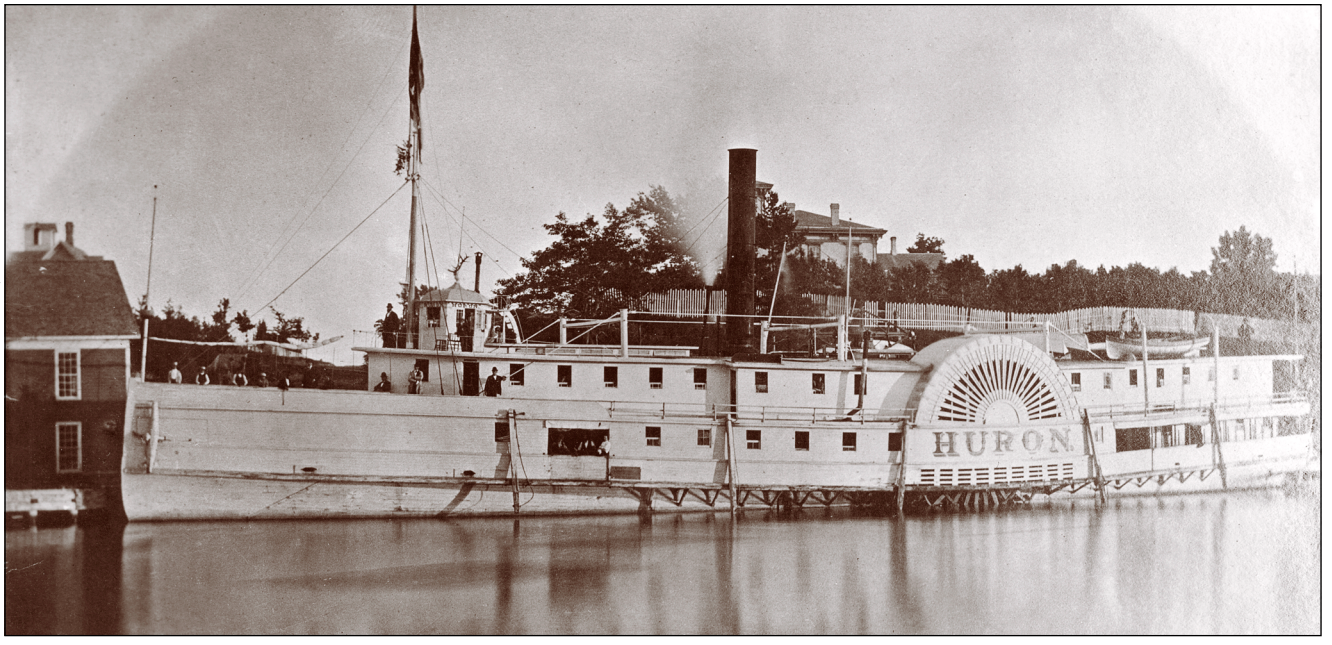
Early Side-wheel Steamers

The first Great Lakes steamers, which went into operation after the War of 1812, were schooner-rigged (for emergency and auxiliary power) and shaped like sailing vessels, with paddle wheels located amidships and a single smokestack between them. FRONTENAC, 170′ LOD, with a 32′ beam and 11′ depth, was built near Kingston, Ontario, and went into service in 1817. ONTARIO—112′ LOD, with a 28′ beam and 8′3″ depth—was built at Sackets Harbor, New York, and began operating a few days before FRONTENAC. These two ships led the way for steam navigation on the Great Lakes.

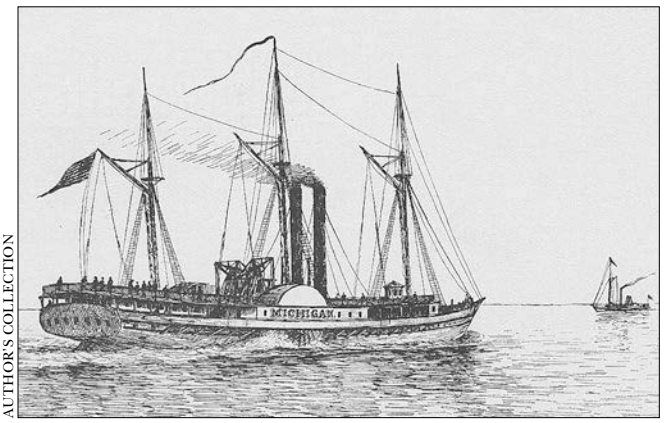
WALK-IN-THE-WATER, similar in design to FRONTENAC and ONTARIO, was the first steamboat constructed for use above Niagara Falls. Built by New York shipwright Noah Brown, this steamer measured 135′ LOD, with a 32′ beam and an 8′6″ depth, and was launched at Black Rock (Buffalo) on August 23, 1818. She was powered by a "square" (or A-frame) 60-hp, condensing, low-pressure, vertical crosshead engine, and carried two masts with a stack between her 15′-diameter paddlewheels. She was steered from the stern (later steamers had their wheelhouses located forward, near the bow). Her maiden voyage was from Buffalo to Detroit, a passage of 36 to 40 hours in clear weather that consumed 36 to 40 cords of wood.

Almost three years after running exclusively on Lake Erie, WALK-IN-THE-WATER inaugurated interlake navigation. On July 31, 1821, she left Detroit bound for Green Bay, Wisconsin, carrying 200 passengers, including members of an expedition formed by Michigan Territorial Governor Lewis Cass to explore the southern shore of Lake Superior and the upper Mississippi region. Passing from Lake Huron through the Straits of Mackinac, she became the first steamboat to operate on Lake Michigan, just as she had been on Lake

HURON (165′ LOA, 23′ 7″ beam, and 9′ 5″ depth) was built in 1852 by Samuel and Eber Ward at Newport (Marine City), Michigan, at a cost of $30,000. Her size was typical of the early Lake Michigan side-wheel paddle steamers. The Wards ran HURON between Detroit and Saginaw and Bay City, Michigan, until 1855, when she was sold to another operator.



THUNDER BAY NATIONAL MARINE SANCTUARY, C. PATRICK LABADIE COLLECTION



AUTHOR'S COLLECTION

At 145′ LOD, MICHIGAN was the largest steamer on the Great Lakes when she was launched in 1833. She was powered by twin vertical beam engines, whose walking beams are visible between the paddle boxes in Stanton's illustration. MICHIGAN was abandoned and broken up near Buffalo, New York, in 1841.

Erie and Lake Huron. Four years would elapse before another steamer would return to Lake Michigan.

On October 31, 1821, WALK-IN-THE-WATER ran into gale-force winds and driving rain after leaving Buffalo en route to Detroit. Early the following morning, having struggled through the night, she was driven ashore by the wind and broken up near Buffalo. Fortunately, there was no loss of life. Her engine and other machinery were salvaged and in 1822 transferred to the steamer SUPERIOR.

Steam navigation on the Lakes during those early years was perilous. Weather forecasts didn't exist, requiring captains to rely on their instincts. Storms blew up with little warning and natural harbors were few. Shifting sandbars often blocked channel entrances, while rain, snow, fog, and the smoke from forest fires often impeded visibility. Unmarked boulders and shoals lurked beneath the inaccurately charted surface.

Until lighthouses and navigation buoys were introduced, Great Lakes mariners sailed with great uncertainty. The region's first beacon was lit in 1818 on Lake Erie near Erie, Pennsylvania. Fort Gratiot Light, erected in 1825 at the entrance to the St. Clair River in Michigan, was the first light on Lake Huron. The first Canadian lighthouse went into service in 1847 at Goderich, Ontario. As traffic on the Lakes increased, so too did the number of aids to navigation.

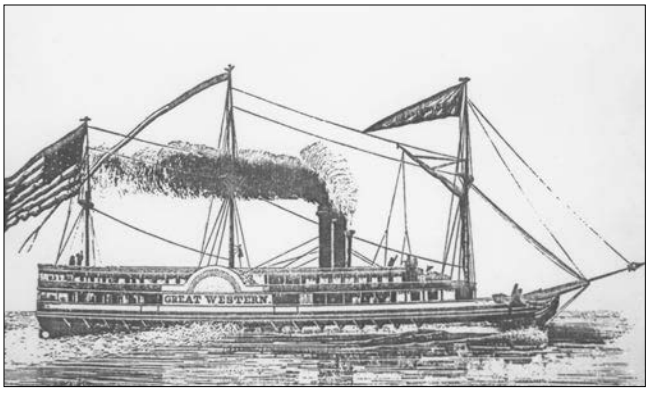
During the 1830s and 1840s steamboats rapidly shifted from hulls that resembled sailing ships to new and different hull shapes. In 1833, MICHIGAN—145′ LOD, with a 29′ beam and 11′2″ depth—was launched in Detroit by shipbuilder Oliver Newberry. The hull featured a main deck that extended out over the paddle boxes but curved inward forward and aft to eventually meet the bow and stern. The additional width amidships allowed a cabin to be built on the main deck; this feature became a hallmark of Lakes side-wheelers. Before this breakthrough, most cabins were located below the main deck in the fashion of oceangoing steamers.

Not every new development was successful. With an eye toward improving stability, Newberry unwittingly introduced a new wrinkle in MICHIGAN, installing two 80-hp vertical beam engines, which were independently connected to 28′-diameter paddle wheels. Speeds up to 15 mph were possible in calm waters, but in heavier seas the independent power of each wheel accentuated the boat's propensity to roll from side to side, one wheel rising awkwardly out of the water and spinning, while the other labored underwater, making steering difficult.

Another significant innovation was introduced in 1838, with the launch of the clipper-bowed GREAT WESTERN—183′ LOD, 34′5″ beam, and 13′ depth—at Huron, Ohio. She was fitted with the first full-length upper-deck cabin, a concept that was replicated on most steamers that followed her. Below the main deck and for a good part of the space between the two decks, the boilers, engine, firewood, and freight were housed. The ladies' cabin and staterooms were aft on the main deck, while the saloon, dining room, and bar were on the hurricane (top) deck. As one of the Great Lakes' finest steamers, GREAT WESTERN was a regular on the Buffalo-to-Chicago run.

Palace Steamers

By the 1840s, economic pressures had created keen competition among steamer owners for an ever greater share of the passenger trade. This motivated designers and shipbuilders to create even larger vessels. The result was the so-called "palace steamers," which were larger, faster, and more lavishly appointed than their predecessors. EMPIRE—253′6″ LOD, with a 32′8½″ beam and 14′2″ depth—was the first of these enormous boats. Built in Cleveland by shipwright George W. Jones, she was launched on June 1, 1844. The palace steamer era would be short-lived, however, lasting only until the Panic of 1857. But by then, at least 25 of these magnificent vessels had been built. Among the exquisite accoutrements, passengers enjoyed grand cabins with arched ceilings that were lit by skylights and stained glass domes by day, and by dazzling chandeliers



THUNDER BAY NATIONAL MARINE SANCTUARY, C. PATRICK LABADIE COLLECTION

The GREAT WESTERN was a regular on the Buffalo-to-Chicago route between 1838 and the early 1850s. Despite two fires in 1839 and collisions in 1843, 1844, and 1852, the double-decked vessel survived the rugged elements of the Great Lakes until 1855, when she was dismantled.

MICHIGAN MARITIME MUSEUM

The propeller-driven HUM steamed between East Jordan and Charlevoix, Michigan, on Pine Lake, making twice-daily trips with passengers and freight between 1900 and 1915. Renamed the T.B. BANNER in 1918, she operated as an excursion boat out of Chicago, until 1935, when she was abandoned in the Chicago River and later scuttled in Lake Michigan.

"Mosquito" Steamers

A vintage postcard, circa early 1900s, depicts the propeller steamer HUM (ex-PILGRIM and ex-TRUANT) under way on a calm summer's day, mirrored in the placid waters on Michigan's Pine Lake (later called Lake Charlevoix), with a full complement of passengers. The image is an iconic snapshot of maritime life common across the Great Lakes over a century ago.

Small steamers like HUM, primarily propellers under 120′ in length, carried passengers and freight throughout the Great Lakes region. These short-haul waterborne buses and trucks of their time were known collectively as the "mosquito fleet," though the boats varied greatly in size and design.

By the 1860s, long-distance steamer routes from Buffalo to Chicago and Milwaukee were giving way to year-round travel by railroad, which was faster and not as dependent on weather conditions to maintain regular timetables. But at small ports not yet linked by rail, unpretentious mosquito craft remained popular alternatives to uncomfortable horse-drawn vehicles to the end of the century.

Lake Charlevoix, which runs inland from the northeast shore of Upper Lake Michigan, had a fleet of small propeller vessels that were representative of the type throughout the Great Lakes. Several of these steam packets ran on the lake from the late 1860s into the 20th century.

HUM—76′ LOA, with a 16′ beam and 5′ depth—was one of the last wooden mosquito steamers, running between East Jordan and Charlevoix on the South Arm of Lake Charlevoix from 1904 to just before America's entry into World War I in 1917. Driven by an 85-hp non-condensing engine, she had a single deck forward and a double deck aft of a pilothouse and a stack amidships. HUM had been built as the sail and steam yacht TRUANT in 1876 in Brooklyn, New York, for Michigan businessman and Congressman John S. Newberry, who once entertained President Ulysses S. Grant aboard. In 1900, she was rebuilt as a passenger steamer at Grand Haven, Michigan, and in 1905 was renamed HUM.

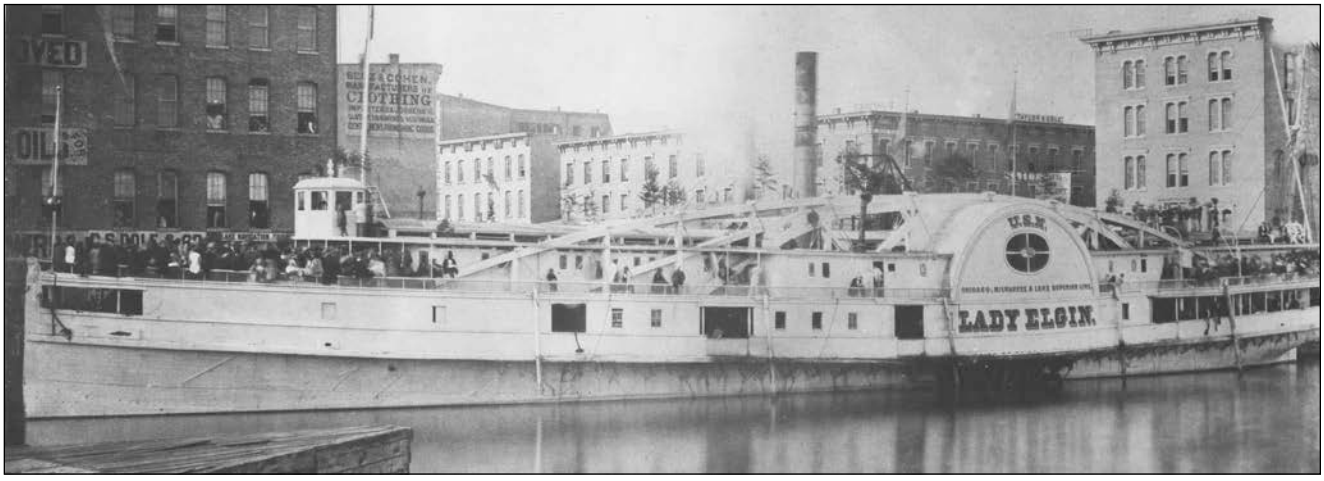
Running opposite HUM on the East Jordan and Charlevoix route was the little steamer JOSEPH GORDON—43′ LOA, with a 9′2″ beam and 4′3″ depth—powered by a 120-hp non-condensing engine.

The GORDON, built in West Bay City, Michigan, in 1881, was abandoned in 1907 after her engine and machinery were removed. Although HUM and the GORDON were separately owned, they were "more complementary than competitive boats," according to Great Lakes maritime historian Dr. William Lafferty.

Mosquito steamers were generally built for coastal and inland waters, rather than the open Great Lakes. Shipbuilders in port towns and villages along the Lakes built mosquitoes along with the larger vessels used for cross-lake service, until the demand for wooden craft diminished in favor of steel in the waning years of the 19th century.

Although propellers dominated the mosquito fleets, a few small paddle steamers still operated within the fleet. The MAY GRAHAM—95′7″ LOD, with a 16′ beam and 3′6″ depth—was built in 1879 at St. Joseph, Michigan, along the southwestern shore of Lake Michigan. This two-deck side-wheeler was once a fixture on the St. Joseph River, steaming between Berrien Springs and Benton Harbor.

Other paddle-wheel mosquitoes operated on Green Bay in Wisconsin and on Lake Macatawa, which flows into Lake Michigan at Holland, Michigan. *—GDJ*



THUNDER BAY NATIONAL MARINE SANCTUARY, C. PATRICK LABADIE COLLECTION

When LADY ELGIN slid down the ways in 1851, she took her place among a fleet of over 400 side-wheel paddle steamers navigating on the Great Lakes between 1818 and 1924. This rare photograph by Samuel Alschule captures the palace steamer moored to a pier in the Chicago River near LaSalle Street in 1860. The vessel's massive hogging trusses are made of wood.

in the evenings. Paneled passenger spaces were painted white and trimmed with gilded moldings that set off the fine upholstered furniture and plush carpets. The last of the breed was CITY OF BUFFALO—331′ LOD, 40′ beam, and 15′7″ depth—launched in 1857 in Buffalo. She had only operated a month on Lake Erie before the financial panic forced her out of service for nearly two years.

The great size of these vessels was made possible by iron fastenings and diagonal strapping, and the development of large, arch-shaped hogging trusses that resembled today's suspension bridges and longitudinally stiffened the long and limber hulls. To support the heavy engines and boilers, holds were fitted with athwartships timbers. Tall A-frames were fastened to the timbers to support and stabilize the exposed walking beam that sat above the hurricane decks and drove the monstrous paddle wheels.

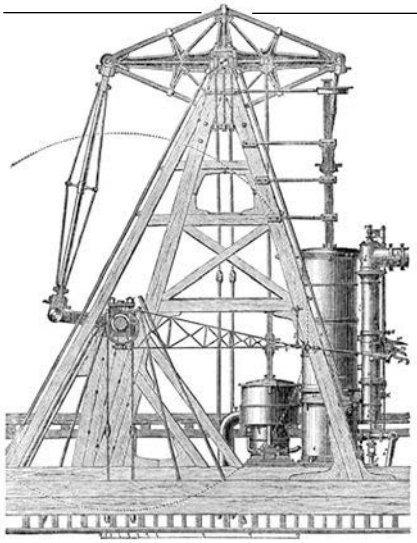
Interest in Gothic architectural style was back in vogue during the palace steamer era, and shipwrights adapted and incorporated fine architectural details into wheelhouse designs. Gilded spheres or eagles graced the crowns of fancy domes, and pilothouse windows came in various shapes to provide an eye-pleasing flourish as well as a clear view for the helmsman.

Collisions, groundings, boiler explosions, fires, and other mishaps were common, even among the immense palace steamers. On September 1, 1854, the *Cleveland Morning Leader* reported: "The Steamer ALABAMA which left Buffalo Aug. 30, at 4 o'clock in the morning, bound up, sprung a leak when about two miles out, and immediately sunk. Fortunately she grounded on a bar where the water was not more than 20 feet deep, and sank only to her upper deck." At 234′6″ LOD, with a 29′2″ beam and 12′ depth, ALABAMA would have been a serious threat to navigation in those waters until the wreckage was cleared away two months later.

LADY ELGIN—252′ LOD, 32′8″ beam, and 13′ depth—was launched in 1851 at the Bidwell & Banta shipyard in Buffalo. The vessel was powered by a 350-hp single-cylinder, vertical walking beam engine that drove her twin 32′-diameter wheels. She ran between Buffalo and Lake Michigan ports early on, but during the Panic of 1857, while many palace steamers were laid up, LADY ELGIN continued on the Lake Superior and Lake Michigan route.

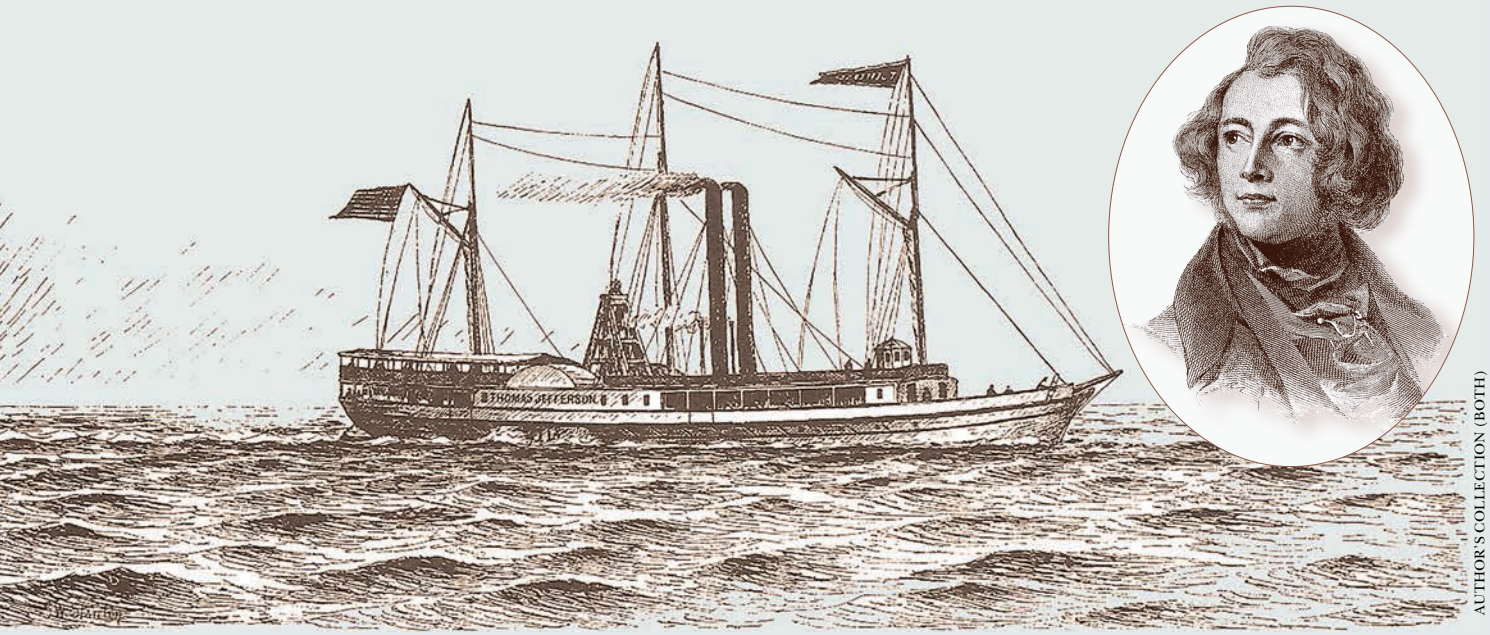
She had a hard life, having survived groundings, as well as fire and collision, over her nine years afloat. In the early-morning hours of September 7, 1860, on the run from Chicago to Milwaukee in darkness with an excursion party aboard, she was struck by the unlit schooner AUGUSTA off Winnetka, Illinois. She went to the bottom of Lake Michigan, taking 300 souls with her; it was one of the worst disasters ever recorded on the Great lakes.

Thankfully, most palace steamers did not end in tragic circumstances. MISSISSIPPI, among the largest of her class at 335′ LOD, 40′ beam, and 14′ depth, was launched in 1853 at the Francis N. Jones shipyard in Buffalo. She was built for the Buffalo and Sandusky line to run opposite her sister steamer ST. LAWRENCE—326′ LOD, with a 40′11″ beam and 14′2″ depth. In her second year, MISSISSIPPI was purchased by the Michigan



AUTHOR'S COLLECTION

Walking beam engines—also called vertical beam engines—drove many paddle steamers on the Great Lakes during the 19th century. The large arc in the illustration phantoms a paddle wheel, which was turned by the wheels' crankshaft.



AUTHOR'S COLLECTION (BOTH)

***Above*—There are no known illustrations of the early paddle steamer CONSTITUTION, which carried English novelist Charles Dickens (inset) on Lake Erie in 1842; the THOMAS JEFFERSON was a near twin.**

Charles Dickens and the Steamer CONSTITUTION

Author's Note—*During Charles Dickens's grand tour of the United States and Canada in 1842, he chronicled his journey in letters to his friend John Forster in England, and later in his book* American Notes for General Circulation. *In the following, I share some of Mr. Dickens's observations about his voyage aboard the steamer CONSTITUTION.*

Clamorous clanking and the hiss of steam in the early-evening light signaled the arrival of a railroad locomotive in the quiet Lake Erie port of Sandusky, Ohio, on Saturday, April 23, 1842. Stepping down from a carriage behind the engine, English novelist Charles Dickens—then 30—and his wife, Kate, hoped to connect with a passenger steamer bound for Buffalo, New York.

After securing overnight accommodations in a small hotel within sight of the lake, Dickens wrote to John Forster that Sandusky is "...twenty-four hours journey by steamboat from Buffalo. We found no boat here, nor has there been one, since. We are waiting, with every thing [sic] packed up, ready to start on the shortest notice; and are anxiously looking out for smoke in the distance."

Arising on Sunday, April 24, the author wondered whether a boat would appear. "We were taking an early dinner...when a steamboat came in sight, and presently touched at the wharf," he wrote in *American Notes*. "As she proved to be on her way to Buffalo, we hurried on board with all speed, and soon left Sandusky far behind us. [CONSTITUTION] was a large vessel of [four] hundred tons, and handsomely fitted up, though with high-pressure engines; which always conveyed that kind of feeling to me, which I should be likely to experience, I think, if I had lodgings on the first floor of a powder-mill. She was laden with flour, some casks of which commodity were stored upon the deck."

Leaving Sandusky, the side-wheeler steamed along Erie's southern shore. Dickens wrote, "After calling at one or two flat places, with low dams stretching out into the lake, whereon were stumpy lighthouses, like windmills without sails, the whole looking like a Dutch vignette, we came at midnight to Cleveland, where we lay all night, and until nine o'clock next morning."

Dickens's celebrity—even in the backwaters of America—proved to be a distraction. "The people poured on board, in crowds, by six on Monday morning, to see me," he bemoaned in the letter to Forster. "...a party of 'gentlemen' actually planted themselves before our little cabin, and stared in at the door and windows while I was washing, and Kate lay in bed. I was so incensed at this..."

After departing Cleveland, CONSTITUTION steamed to Erie, Pennsylvania, laying over for an hour, and then set a course for Buffalo, arriving the following morning at six o'clock. The Dickenses "went ashore to breakfast; sent to the post-office forthwith; and received—oh! who or what can say with how much pleasure and what unspeakable delight!—our English letters!"

Writing to Forster, Dickens compared the journey with ocean voyages. "It's all very fine talking about Lake Erie," he said, "but it won't do for persons who are liable to sea-sickness. We were all sick. It's almost as bad in that respect as the Atlantic. The waves are very short, and horribly constant." *—GDJ*

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Dickens, Charles. *American Notes for General Circulation*. Penguin Classics, 2001.

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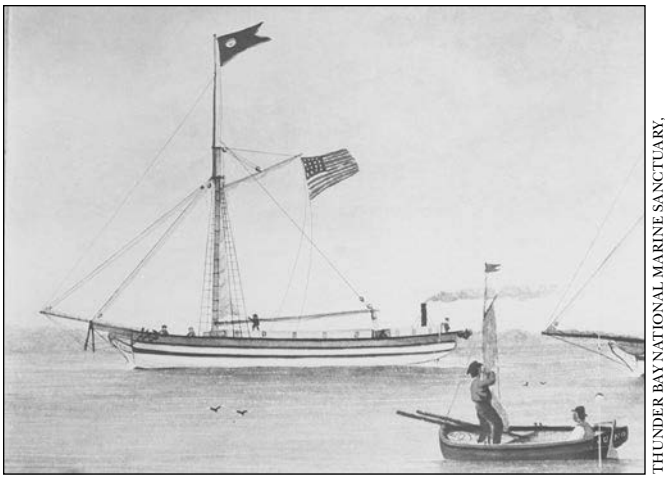


THUNDER BAY NATIONAL MARINE SANCTUARY, C. PATRICK LABADIE COLLECTION

Launched in 1841, VANDALIA (91' LOD), the first propeller steamer on the Great Lakes, was the largest vessel of her time that could transit the 39 locks in Canada's Welland Canal, which connected Lakes Ontario and Erie.

Central Railroad Company (MCR) to operate between Buffalo and Detroit, where westbound passengers connected with MCR rail service across southern Michigan to St. Joseph and ultimately, again by steamer, to Chicago. At the end of the decade, it was the economy, not the Lakes, that doomed MISSISSIPPI.

Although the palace steamer era peaked before the Civil War, many of these surviving behemoths, all built of wood as side-wheelers, continued on the Lakes in the excursion and cross-lake trade, but slowly faded away as screw propellers and steel hulls became more dominant.

Propeller Steamers

The screw-propeller-driven steamer—known colloquially as the "propeller"—was first employed in the early 1840s on Lake Ontario. Shipbuilding in the 1800s developed primarily through trial and error. Lessons learned in the construction of Great Lakes schooners (see WB No. 208) were applied both to side-wheelers and to propeller-driven steamers. In 1841, a screw-driven steamer commissioned by Capt. James Van Cleve was launched at Oswego, New York. Christened VANDALIA, she was 91′ LOD, with a 20′2″ beam and 8′3″ depth. She looked like a traditional sailing vessel, with a sloop rig and with cabins on her main deck and an open-air promenade for passengers.

Two years later, the first double-deck propeller was launched at Buffalo. HERCULES—136′3″ LOD, 24′10″ beam, and 8′1″ depth—became the prototype hull shape for future propellers. Unencumbered by paddle boxes, the cargo ports of their slab-sided hulls gave direct access to the docks, which greatly sped up the loading and unloading operation. The absence of paddle boxes reduced the beam and made it much easier to transit the Welland Canal between Lake Ontario and Lake Erie. Beginning with HERCULES, the typical early Great Lakes propeller vessel carried a single mast and sail for supplemental or emergency propulsion when needed. While propeller steamers were about equal in speed to side-wheelers, averaging 7–8 mph, they burned less wood and thus required fewer stops for cordwood refueling. Their engines and machinery were also more compact.

In June 1872 a large propeller was built of a conventional design by shipwright Ira Lafrinier and launched at Cleveland. PEERLESS—210′4″ LOD, with a 31′2″ beam and 13′ depth—was destined for the Lake Superior trade. She had spacious staterooms and a lengthy upper-deck saloon. Freight was stowed below on the main deck and in the holds. Nearly as large as the side-wheel palace steamers, PEERLESS carried twin stacks just aft of amidships over her 400-hp engine. A pair of arched hog trusses stiffened the hull, keeping the bow and stern from drooping.

Smaller and more efficient steam engines came to pass during the propeller era. Two-cylinder compound engines, in which steam was expanded twice, made their debut on the Lakes in 1869. Triple-expansion engines appeared in 1887, followed by quadruple-expansion engines in 1894. Each succeeding generation provided incremental improvements in speed, efficiency, and power.

The discovery in 1972 of INDIANA, which sank in Lake Superior in 1858, has led to a greater understanding of early propeller designs. Built in 1848 by Joseph M. Keating at Vermillion, Ohio, she was 144′ LOD, with a 23′ beam and 10′10″ depth. On June 6, 1858 she cleared Lighthouse Point at Marquette, Michigan, and set a northeasterly course for Whitefish Bay. Aboard were a crew of seventeen, three passengers, and 280 tons of iron ore stowed in piles on the main deck. Off Point Crisp Lighthouse, just west of Whitefish Point, she foundered and sank, but without loss of life.

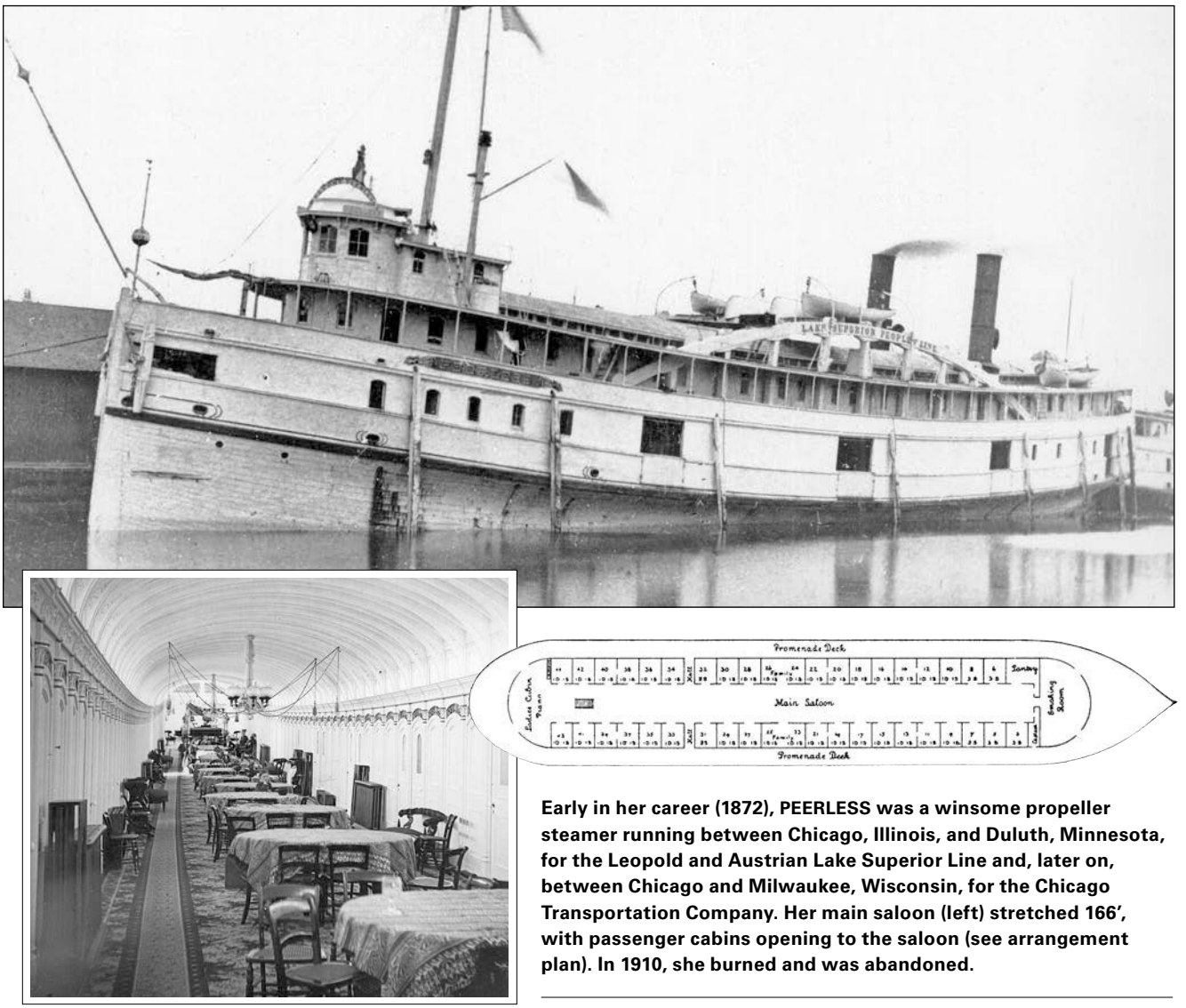
Over a century later, marine archaeologists dived on the wreck, which they found sitting upright on the lake bed, and recorded her characteristics: straight stem, rounded stern, two decks (one large and unobstructed for freight), cargo hold, nearly vertical sides amidships, and minimal sweep to her sheer. Typical of the early propellers, INDIANA was powered by an aft-mounted, single-cylinder engine. Investigating the boat up close in Lake Superior's frigid waters led to an understanding of the propeller era that could not have been achieved in any other way.

Over the Horizon

As the Buffalo-to-Chicago and -Milwaukee routes gave way to rail travel in the decades following the Civil War, cross-lake excursion traffic was also on the rise, particularly on Lake Michigan. Maritime communities were strung around the lake like so many pearls on a necklace. Steamer routes connected Chicago with western Michigan ports like St. Joseph, South Haven, Muskegon, and Manistee. Milwaukee and Manitowoc in Wisconsin were also cross-lake destinations.

Wooden side-wheelers and propellers, including craft of the "mosquito fleet" (see sidebar, page 83), were built in many of these ports. The propeller H.W. WILLIAMS—140′ LOD, with a 28′ beam and 10′4″ depth—rose from

THUNDER BAY NATIONAL MARINE SANCTUARY, C. PATRICK LABADIE COLLECTION (THIS PAGE)



Early in her career (1872), PEERLESS was a winsome propeller steamer running between Chicago, Illinois, and Duluth, Minnesota, for the Leopold and Austrian Lake Superior Line and, later on, between Chicago and Milwaukee, Wisconsin, for the Chicago Transportation Company. Her main saloon (left) stretched 166', with passenger cabins opening to the saloon (see arrangement plan). In 1910, she burned and was abandoned.

the stocks in the South Haven shipyard of John B. Martel in 1888. She initially ran between South Haven and Chicago. The Martel-built propeller CITY OF KALAMAZOO—161′8″ LOD, with a 31′10″ beam and 12′6″ depth—splashed into the Black River in 1893, in time to carry crowds of revelers to the Chicago World's Fair (World's Columbian Exposition). These vessels, representative of similar craft throughout the Lakes, continued steaming into the 1920s, well after the wooden ship-building yards that built them had closed and were replaced by steel ship-building concerns.

Wooden steamers trailing clouds of smoke operated on the Lakes for over a century but vanished long ago. Their legacy lives on in the villages and towns that swelled with new generations of enterprising Americans and immigrants delivered to the shores of the Great Lakes during the 19th century.

George Jepson is a frequent contributor to WoodenBoat. *The author would like to thank Great Lakes Maritime Historian Patrick Labadie (Thunder Bay National Marine Sanctuary, Alpena, Michigan) and Judy Schlaack (Michigan Maritime Museum, South Haven, Michigan) for their assistance.*

For more information, visit the Great Lakes Maritime Collection online at www.alpenalibrary.org. The site contains an extensive collection of photographs and details on Great Lakes passenger steamers.

Further Reading

Barry, James P. *Ships of the Great Lakes.* Thunder Bay Press, 1996.

Cameron, Scott L. *The Francis Smith—Palace Steamer of the Upper Great Lakes 1867–1896.* Natural Heritage Books, 2005.

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Nute, Grace Lee. *Lake Superior.* Minneapolis: University of Minnesota Press, 2000.

St. Mane, Ted. *Lost Passenger Steamers of Lake Michigan.* History Press, 2010.

Van Heest, Valerie. *Lost on the LADY ELGIN.* In-Depth Editions, 2010.

Edited by Karen Wales

These pages are dedicated to sharing news of recently launched new boats and "relaunched" (that is, restored or substantially rebuilt) craft. Please send color photographs of your projects to: Launchings, WoodenBoat, P.O. Box 78, Brooklin, ME 04616, or e-mail us at launchings@woodenboat.com.

Include the following information: (1) length on deck; (2) beam; (3) type, class, or rig; (4) boat's name; (5) names and contact information (include e-mail or phone) of designer, builder, photographer, and owner; (6) port or place of intended use; (7) date of launching (should be within the past year); (8) brief description of construction or restoration.

KEN UNFRIED

Above—Katie Unfried built her own Night Heron kayak (a Nick Schade design) from a Chesapeake Light Craft kit. ALKYONE has an LOA of 18′ and a 20″ beam and weighs about 40 lbs. Katie strip-built the hull and sheathed it inside and out with epoxy and 'glass. She uses her kayak to explore the waters near her home in Redding, Connecticut. For plans and kits, go to www.clcboats.com.

Right—Tim Marchetti wanted a freighter canoe but couldn't find a plan for one, so he designed his own. The result is this hearty craft with an LOA of 18′ and a beam of 53″. He built the hull using 7⁄16″ cedar strips, then sheathed it in 10-oz 'glass and epoxy. Tim enjoys his canoe on waters near his home in Camden, Maine. You can reach him at www.cncroutinganddesign.com.

TIM MARCHETTI

BILL EDDY

Above—The schooner MRS. HARRIS (46′ LOD, 11′6″ beam) was designed and framed by John Swain and then finished by her owner, Bill Eddy. She carries over 800 sq ft of sail and displases nearly 20,000 lbs. Her sturdy hull has three layers of ½″ marine plywood over Douglas-fir frames and is sealed in epoxy and 'glass. Bill sails her out of Waquoit, Massachusetts. Contact Bill at wmweddy@gmail.com.

Below—Under the guidance of Forrester Valle, John Silverio made this delightful little boat for his granddaughter, Ellie (rowing with her dad.) Built to David Stimson's Teeny Tiny Skiff design, LI'L BOO has an LOA of 7′6″ and a 3′8″ beam. She has a white oak stem, a mahogany transom, white pine planking and thwarts, and a cross-planked bottom in white cedar. For plans, contact David Stimson, www.by-the-sea.com/stimsonmarine.

JOHN SILVERIO

Right—Mark Ritter built this Chester Yawl using a kit from Chesapeake Light Craft. She has an LOA of 15′ and a 42″ beam and weighs 100 lbs. Mark and his wife, Lynda, named the boat PAIGE after their daughter. Lynda applied the name in gold leaf. Mark and his family use their boat on Lake Lanier, in Georgia. For more information, go to www.clcboats.com.

MARK RITTER

NAOMI GRUNDTISCH

Above—Bob Hicks and Greg Grundtisch built this Oyster Pirate skipjack over the course of 25 years (part-time). The half-scale boat, based on MESSENGER, found in Howard I. Chapelle's book *American Small Sailing Craft*, has an LOA of 18′ and a 5′ beam and weighs approximately 650 lbs with ballast and rigging. Home port is Lancaster, New York.

Below—BONZO is a pedal-powered Escargot-class canal boat (19′6″ LOA, 6′ beam), designed by Philip Thiel and built by Nate Cunningham and Bobby Calnan. Modifications to the design include a catwalk on the roof to serve as a runway for jumping into the water. The hull is Douglas-fir marine plywood sheathed in 6-oz 'glass and epoxy. For plans, see www.mission-base.com/pedal-power/pp_main.html.

CHRIS CUNNINGHAM

RAFAEL NEUMANN

Above—Against the magnificent backdrop of the Tyrolean Alps, the lovely PATEPLUMA awaits a mid-morning sail. She is a Stickleback dory (15′ 8½″ LOA, 5′ 5½″ beam), designed by Iain Oughtred and built by Christian Neumann. She has a glued-lapstrake plywood hull and is trimmed in ash, elm, and other local woods. Her sprit rig carries 57 sq ft of sail. You'll find plans at The WoodenBoat Store, www.woodenboatstore.com.

Below—David Shively built this handsome runabout to Ken Bassett's Rascal plans. She has an LOA of 14′10″ and a 5′4″ beam. The cold-molded hull is African mahogany over okoume plywood. Power is a 50-hp Honda four-stroke outboard; top speed is 45 mph (so far). David runs his boat on Lake Allatoona, Georgia. Plans are available at The WoodenBoat Store, www.woodenboatstore.com.

DIANE VANDEPUTTE

Below—Boatbuilder Jim Crocket did a superb job in building this Walt Simmons–designed Lincolnville Salmon Wherry. KOKANEE (a salmon species) has a 15′ LOA and a 4′5″ beam, and weighs 250 lbs. Her hull is ¼″ okoume planking over sawn oak frames, with mahogany thwarts. Jim recently launched her in Bass Lake, near Yosemite National Park, in California. Plans are available from Walt Simmons, www.duck-trap.com.

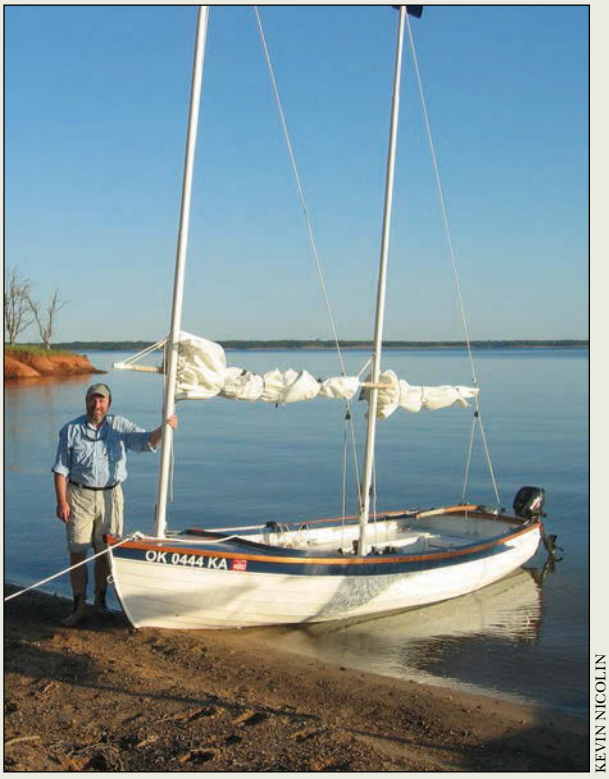
ROY COYLE

Below—Georgia's Lake Lanier remains undisturbed when Ed Duggan cruises along in the non-polluting and virtually silent electric skiff that he designed and built. The 16′ boat has a 52″ beam. Her hull is sapele plywood with solid sapele trim. She is powered by a 36-volt system with a built-in battery bank charger. You can reach Ed at edoak@mindspring.com.

ED DUGGAN

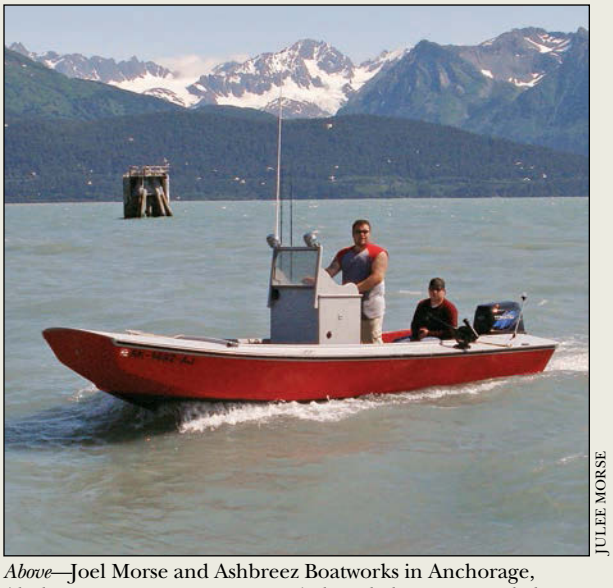
Below—BLUEBERRY is a strip-built Adirondack guideboat that Lou Jacobs interpreted from a 1905 boat built by Lewis and Floyd Grant. The boat has a 16′ LOA and a 38″ beam. Lou's father carved the thumbnail ends of the seat risers and enjoyed the boat's launching a few days before passing away. Lou carries fond memories as he rows BLUEBERRY on Thirteenth Lake, in New York. Contact Lou at jacobs2424@verizon.net.

LOU JACOBS



KEVIN NICOLIN

Above—BLUE PETER is a Lapwing 16 (15′8″ LOA, 5′6½″ beam) designed by Graham Byrnes and built by John Turpin. The sprit-rig cat-ketch carries a total of 104 sq ft of sail. John built her using marine plywood and woods that are local to his Edmond, Oklahoma, home. He sails BLUE PETER all over the Southwest. For plans, contact Graham Byrnes at www.bandbyachtdesigns.com.



JULEE MORSE

Above—Joel Morse and Ashbreez Boatworks in Anchorage, Alaska, present FAST TIMES, a stitch-and-glue garvey-style boat built to Sam Devlin's Honker 20 design. She has an LOA of 20′ and a 7′4″ beam. Her hull is mahogany marine plywood and Dynel sheathing over solid African mahogany. Power is a Tohatsu TLDI 70-hp two-stroke outboard. For more information, go to ashbreezboatworks.com.

Right—With help from Milton Edelman, Chuck Pritchard brought this WWII–era sportfishing boat, ANNA M (47′ LOA, 14′8″ beam), back to her former glory. The six-year project included replacing keelbolts, extensive repairs to the stem and transom, an overhaul of her twin 6-71 GM diesels, and a lot of attention to systems and cosmetics. Home port is Cape May, New Jersey. Contact Chuck at copritch@comcast.net.

KEN RUSSELL

Below—LA PALOMA, a Javelin skiff (designed by John Spenser in 1961 and built in the 1980s), is again race-ready, thanks to Ian Larsen and his friend Ken Spring. Her LOA is 14′; beam is 6′. She carries 175 sq ft of sail and she weighs about 150 lbs. Restoration included wood repairs, stripping and replacing all 'glass sheathing, and new paint and brightwork. For more on the Javelin skiff class, go to www.javelins.org.

IAN LARSEN

ONNE VAN DER WAL

Above—The stem-to-stern reconstruction of this 1939 Herreshoff 12½ (15′10″ LOA, 5′10″ beam) took Mike de Angeli seven years of part-time work. The sheer clamps and lead keel are all that remain of the original boat. Traditional carvel construction is cedar over oak—as in the original—with bronze fastenings and fittings throughout. You can reach Mike at www.ripatentlaw.com.

EV CASSAGNERES

Above—Ev Cassagneres faithfully restored this old beauty of an Old Town canoe, built around 1945. She has an LOA of 17′, a 34″ beam, and weighs 80 lbs. Ev used ash to refurbish the stems and keel. He recanvased and repainted the hull, then added a lateen rig. He enjoys sailing and paddling his canoe near his Cheshire, Connecticut, home.

Hints for taking good photos of your boat:

1. Please shoot to the highest resolution and largest size possible. Send no more than five unretouched images on a CD, and include rough prints of all images. We also accept transparencies and high-quality prints.
2. Clean the boat. Stow fenders and extraneous gear below. Properly ship or stow oars, and give the sails a good harbor furl if you're at anchor.
3. Schedule the photo session for early, or late, in the day to take advantage of low-angle sunlight. Avoid shooting at high noon and on overcast days.
4. Be certain that the horizon appears level in your viewfinder.
5. Keep the background simple and/or scenic. On a flat page, objects in the middle distance can appear to become part of your boat. Take care that it doesn't sprout trees, flagpoles, smokestacks, or additional masts and crew members.
6. Take many photos, and send us several. Include some action shots and some of the boat at rest. For a few of the pictures, turn the camera on its side to create a vertical format.

We enjoy learning of your work—it affirms the vitality of the wooden boat community. Unfortunately, a lack of space prevents our publishing all the material submitted. If you wish to have your photos returned, please include appropriate postage.

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£1,400,000 VAT unpaid
Lying UK

It would be hard to find any yacht of this period to complement her 1920s opulence with the facilities more suited to present day expectations. An extensive refit at T. Nielsen & Co in 2006 has left HALCYON and her teak on oak structure in near perfect condition. The systems and conveniences of a modern yacht are seamlessly incorporated without detriment to her character and enable her to cruise waters warm or cold, in real comfort. It is also rare to find a yacht of this size that can be sailed quite so easily. In 1929 Yachting Monthly commented that – 'Snugly rigged with Bermudan main and mizzen, having a sail area of 2,275 sq ft, she could be handled by a small crew' - and this is still true today.

Rebecca of Vineyard Haven

60 ft Gannon & Benjamin Schooner
2001

$1,200,000 USD
Lying Antigua

Designed by Nat Benjamin, REBECCA was built by Gannon & Benjamin of Martha's Vineyard whose yachts are famous for their speed, seaworthiness, simplicity and practicality. With accommodation for 12 in four cabins, she displays superb craftsmanship both above and below deck. Her designer conceived REBECCA as his own 'dream yacht' to combine blue water cruising with classic racing.
For very good reason a book has been written about her build and traditional carvel construction - REBECCA must surely define what the term 'spirit of tradition' should really mean.

33 High Street, Poole BH15 1AB, England. Tel: + 44 1202 330077
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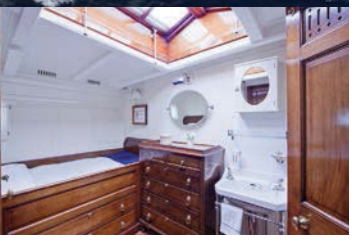
Altair

SANDEMAN
YACHT COMPANY
Classic Yacht Brokers



William Fife III Gaff Rigged
108 ft Topsail Schooner
1931

Lloyds 100A1
EUR 6,000,000
Central Agents

ALTAIR's near mythical status in the classic yacht world is for good reason – she has become the standard bearer for the cause of authenticity since her landmark restoration in 1987. William Fife III may have saved his best until last; commissioned as an ocean going cruising boat for the southern seas and her designer's last big boat, Fife could not help but create a blend of breathtaking beauty; fast, safe and totally capable.

Always the darling of the classic regatta fleet and often winning her class; ALTAIR is the ultimate vintage yacht. While important as the yacht to have started what has become the classic yacht revival, that role is as nothing to her own status at the top of this hierarchy.

Her dimensions have allowed for the modern comforts that a smaller classic will not; all discreetly concealed and allowing her to cruise anywhere. Above all she is blessed with the spirit engendered by her original designer the incomparable William Fife III.

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Health Hazards of Boatbuilding Woods

by Richard Jagels

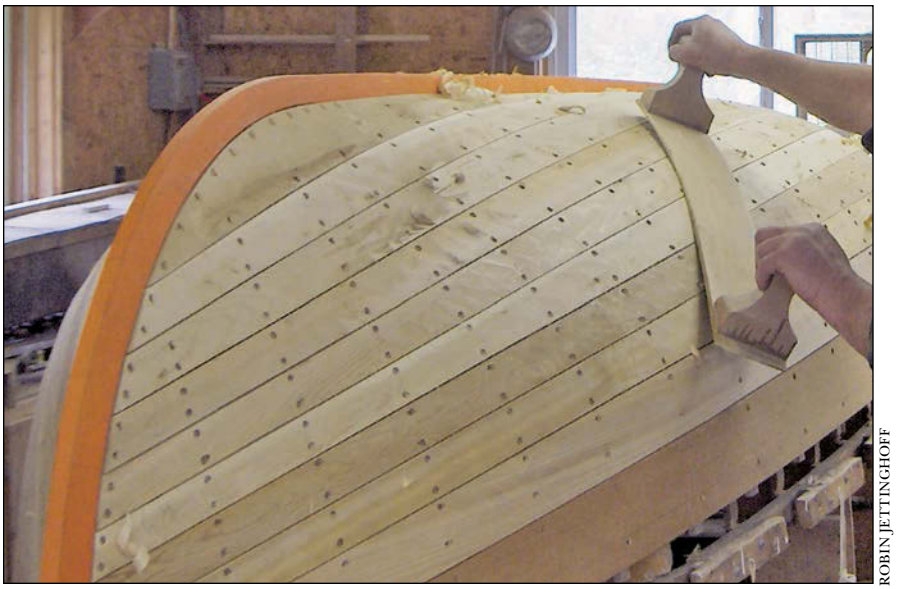
In this issue of *WoodenBoat* (page 34), Daniel Erwin discusses some of the hazards that vapors, fumes, and dust particles present to boatbuilders working in their shops. He covers a wide swath, including wood dust, and provides various kinds of solutions for boatbuilders working with "toxic" woods.

As an adjunct to Mr. Erwin's article, I will provide additional information about which woods are the culprits that pose the greatest potential risk to boatbuilders. Much of this information can be found in a 1985 article I wrote for the *American Journal of Industrial Medicine* ("Health Hazards of Natural and Introduced Chemical Components of Boatbuilding Woods," No. 8, 241–251). I can provide photocopies of the article for anyone interested. Also, your local library may have the definitive book on the subject, *Toxic Woods*, by Brian Woods and C.D. Calnan, first published in 1976 in the *British Journal of Dermatology* (vol. 95, pp. 1–97).

The major chemical components of wood—cellulose, hemicellulose, and lignin—pose few human health threats. Basswood and other "white" woods are often used for containers that have direct contact with food items. But some woods contain accessory substances, generally labeled as "extractives," that have toxic properties. Those classified as alkaloids, glycosides, saponins, phenolics, and quinones pose the greatest health risks—ranging from skin contact dermatitis to lung and respiratory-tract dysfunctions resulting from inhaled wood dust.

Extractives are more concentrated in the heartwood, and their toxic properties provide protection against decay fungi, wood-boring insects, and marine borers—attributes we appreciate as boatbuilders. Unfortunately, naturally decay-resistant woods often pose the greatest health risks to boatbuilders.

It should be noted here that preservatives added to wood can also pose health risks—particularly those that contain arsenic. As a consequence, CCA and ACA pressure-treated wood has been replaced by more benign pressure-treatment compounds. Pentachlorophenol (PCP), once widely used as a wood preservative, is now greatly restricted.



ROBIN JETTINGHOFF

While the major components of wood are not harmful to human health, many species contain additional substances, so-called "extractives," that are quite dangerous to inhale. Others, such as the cedar seen here, may cause skin reactions.

The Chemical Compounds

Alkaloids and glycosides can be found in woods like greenheart (*Ocotea rodiaei*), Ceylon satinwood (*Chloroxylon swietenia*), and yew (*Taxus bacata*). (As an aside, the toxic properties in taxol, extracted from yew, is a widely used cancer-fighting chemical.) Saponins are present in some tropical wood species, and have been used as arrow-tip poisons. Phenolic substances are widespread and constitute a large, heterogeneous group of compounds—including the skin sensitizer in the poison ivy family. Quinones, found in woods such as teak (*Tectona grandis*), roble (*Tabebuia spp.*), walnut (*Juglans spp.*), and angelim (*Andira inermis*), act as general allergic reaction skin sensitizers. Terpenes (found in pines) and furocoumarins are reported skin sensitizers.

Human reactions to skin and respiratory sensitizers in wood are very variable. The following descriptions of hazardous woods commonly used by boatbuilders are based primarily on case studies reported in peer-reviewed medical or occupational health journals. Internet sources generally expand the list by being based on a variety of sources.

Short-term Risks

Among native softwoods, contact dermatitis has been reported for Sitka spruce (*Picea sitchensis*), some firs (*Abies spp.*), Northern white cedar (*Thuja occidentalis*), Eastern red cedar (*Juniperus virginiana*), incense cedar (*Calocedrus decurrens*), and Douglas-fir (*Pseudotsuga menziesii*). Irritating blisters or eczema are the usual symptoms. Septic splinter wounds that are slow to heal have been reported for some of these woods, but wood-inhabiting fungi or bacteria could have been causal agents.

Of greater concern are respiratory ailments caused by wood dust of softwoods. Inhalation of redwood sawdust has been linked to a kind of pneumonia (termed sequoiosis), but a wood-associated fungus or bacteria was not ruled out. Western red cedar has been cited as a cause of bronchitis. Exposure to the sawdust of this wood is the cause of the most prevalent occupational asthma in British Columbia and the U.S. Pacific Northwest. Plicatic acid has been identified as the sensitizer.

Few native hardwoods have been implicated with skin reactions or asthma sensitizers. Cases reported usually involve fresh sapwood or bark ("woodworker's eczema," "maple bark stripper's disease," etc.). Some have suggested that the causal agent may be fungi isolated from the cambium.

Wood shavings of black walnut have been blamed for laminitis in horses that

stand on this bedding material, but skin or mucosal irritation for humans has not been reported. Oak sawdust has been cited as a cause of asthma in Europe, but American cases have not been reported.

Imported tropical hardwoods growing in hot humid areas where wood-infesting fungi and bugs are rampant have, as might be expected, evolved to produce a myriad of toxic chemical wood extractives. Desoxylaphacol in teak is implicated as a cause of contact dermatitis in European woodworkers. Iroko or African teak (*Chlorophora excelsa*), afromosia (*Afromosia elata*), and fustic (*Chlorophora tinctora*), sometimes used as teak substitutes, can cause skin and respiratory irritation. Belgium officially recognizes the first two of these woods as a cause of industrial asthma. Splinter wounds from these woods are slow to heal.

The sawdust of greenheart irritates workers' throats, and splinters of this wood can cause troublesome wounds. Lignum vitae (*Guiacum officinale*) sawdust causes sneezing and contact dermatitis. Burma cedar (*Cedrela tooni*) produces a skin irritation, while Spanish cedar (*Cedrela spp.*) sawdust has produced respiratory complaints from boatbuilders in Louisiana. African mahogany (*Khaya spp.*) causes dermatitis in workmen sanding furniture parts, and mucosal irritation has also been reported. The active ingredient is anthothecal. Meranti (*Shorea spp.*) is reported to cause skin or mucosal irritation among Belgian woodworkers.

Long-term Health Risks

In addition to asthma, already discussed, two other major diseases are linked to long-term exposure of wood dust—nasal and paranasal cancer and Hodgkin's disease. Death certificate analyses have revealed an increased risk for nasal and paranasal cancer among woodworkers in several countries and for a wide range of wood species and wood-related occupations. The risk seems to be highest where machine-sanding of hardwoods is involved. Latency for development is in the order of 40 to 45 years, but exposure periods may be considerably shorter. No specific carcinogens have yet been identified, but one possibility is pentachlorophenol, which is often used as a dip at sawmills. Later machining of this wood could release PCP in the dust. PCP was banned from over-the-counter sales in the 1980s, but the water-soluble form has continued to be used as an anti-sapstain dip on freshly cut lumber. Because this chemical, which contains the highly carcinogenic contaminant dioxin, can leach from sawmills into water supplies it is being phased out in many parts of the United States.

As native woods are replaced by exotics in boatshops, the potential for developing new skin sensitivities increases. And because we use more and higher-speed power tools that produce very fine dust particles that can reach deep into lung tissue, diligence in applying respiratory protection becomes increasingly important in protecting yourself.

Dr. Richard Jagels is an emeritus professor of forest biology at the University of Maine, Orono. Please send correspondence to Dr. Jagels by mail to the care of WoodenBoat, or via e-mail to Editorial Assistant Robin Jettinghoff, robin@woodenboat.com.

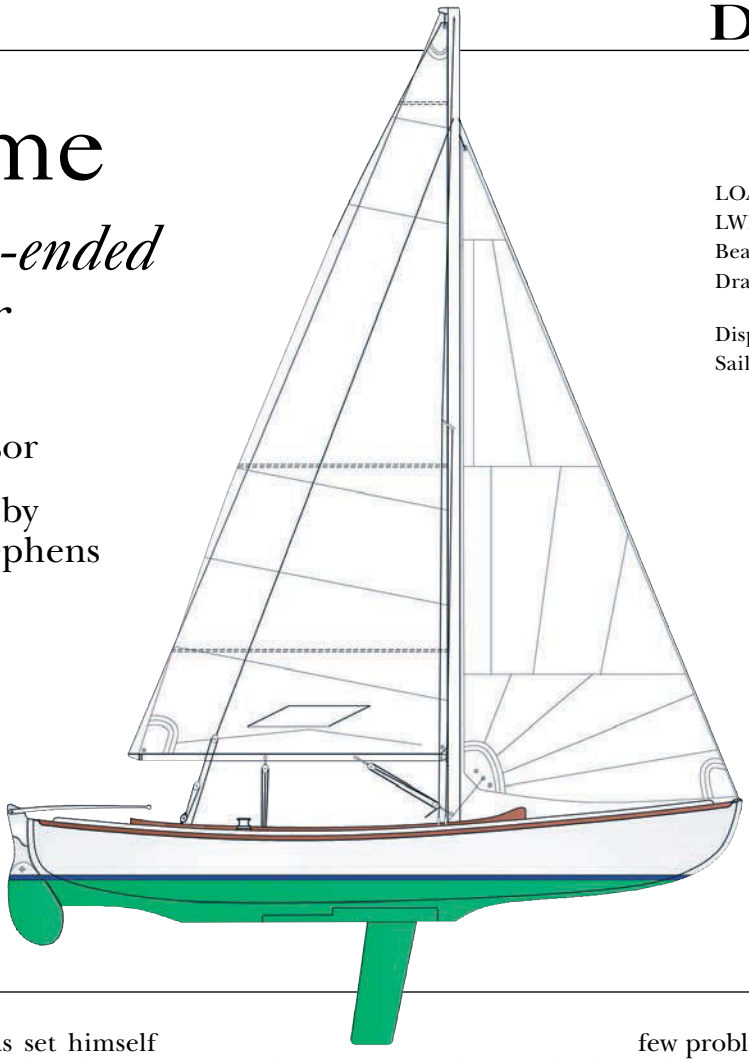
Note: An Internet link mentioned in Wood Technology, WB No. 219, for an Oregon State University publication, Hardwoods of the Pacific Northwest, *was out of date. The publication can be downloaded here: fcg.cof.orst.edu/rc/RC%208.pdf.*

Thyme

A double-ended daysailer

Design by
Crayke Windsor

Commentary by
Robert W. Stephens



Particulars

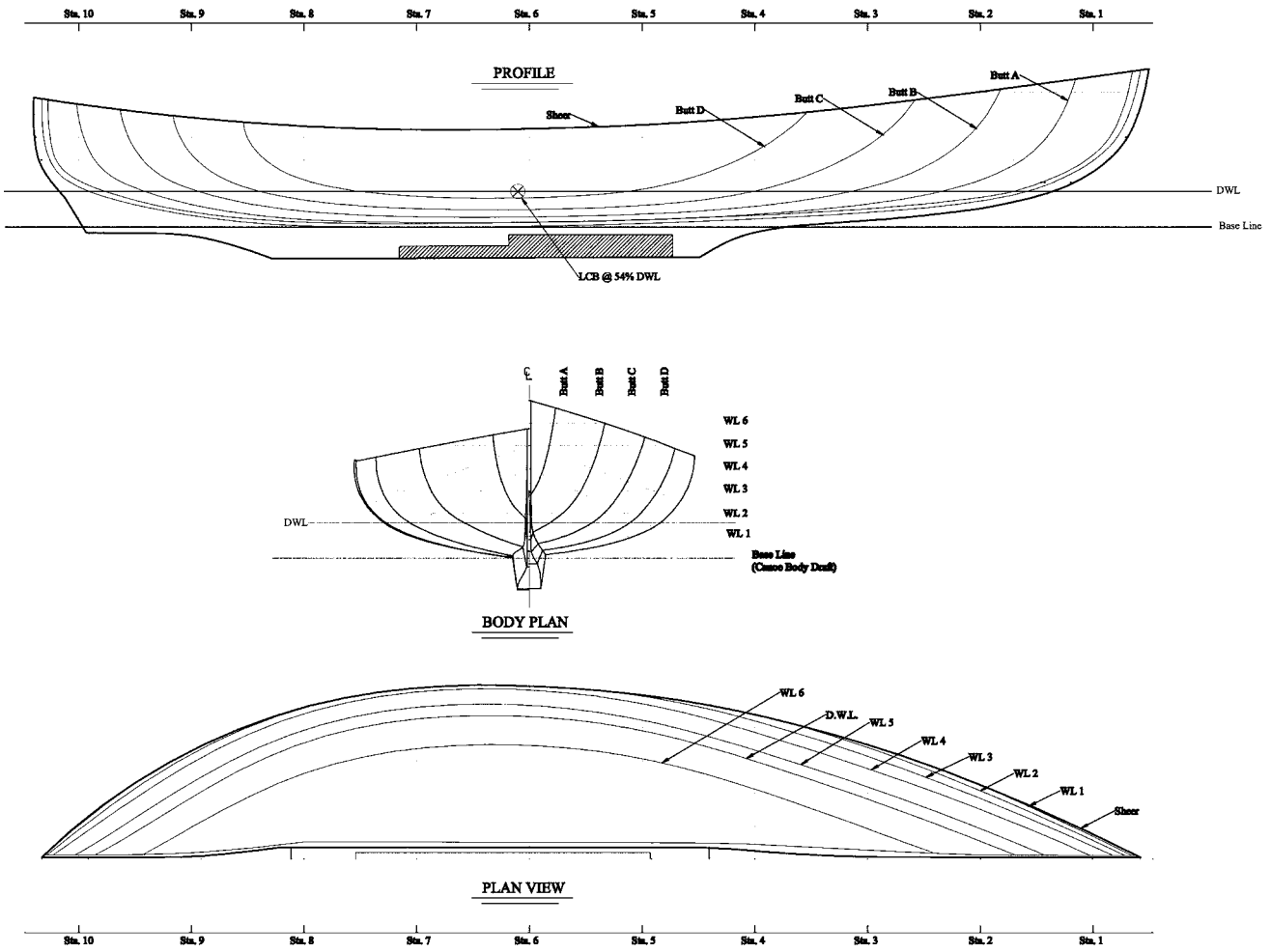
LOA	24′ 11″
LWL	22′ 4″
Beam	7′ 10″
Draft (cb up)	1′ 2″
(cb down)	5′ 11″
Displacement	2,400 lbs
Sail area	260 sq ft

Crayke Windsor has set himself quite a task: with his elegant double-ender Thyme he has invited comparison with the 20th century's master of double-ender design, K. Aage Nielsen. During the course of his half-century-plus career, Nielsen drew upon the historical types of his native Denmark to create a series of double-ended sailing yachts including some of our most graceful and instantly recognizable ones, from salty cruisers like the Bermuda Race-winning HOLGER DANSKE and the powerful NORTHERN CROWN (owned for years by my mentor, Joel White) to tidy daysailers even smaller than Thyme. The great unifying feature of this series was Nielsen's refinement of classic Norse lines, including his unique adaptation of the pointed stern into a shapely, buxom, yet still somehow fine canoe stern.

Windsor unabashedly confesses to paying homage to Nielsen's work with Thyme, and the results would be rewarding to the "silent mentor," as Windsor refers to Nielsen. Indeed, Windsor's effort is the more impressive for being the work of a budding designer still in school for yacht engineering at Southampton University in England. While drawing his inspiration from the same primary source, the working craft of Scandinavia, Windsor has the advantage of a century's worth of yacht evolution to draw from as well; this has eased his task, but the most striking aspect of his well-crafted double-ender is how clearly the working roots shine through. At the same time, Windsor has been able to take advantage of the more pleasure-oriented mission of this daysailer to draw a lighter, finer, cleaner hull than either the coastal fishing boats of Norway and Denmark or most of the yacht work of Nielsen.

A key difference is Windsor's decision to stick with the more traditional outboard rudder rather than Nielsen's favored canoe stern and inboard rudder; this solves a few problems as well as introducing others. On the plus side, the outboard rudder can be built to kick up, allowing good control when the blade is lowered and, when raised, the ability to take advantage of the shallow draft conferred by the keel/centerboard arrangement. This will make loading the boat on a trailer a simple task—a big advantage for many of today's sailors, who lack access to pricey deepwater moorings or slips. Also, the construction complexity of rudder shaft, bearings, tube, and stuffing box are avoided.

On the minus side, the deck-sweeping tiller makes rigging a standing backstay a challenging proposition (more about this later), and the geometrical issues of fitting an effective rudder to a curving sternpost are not insignificant. In traditional boats, the rudder hangers (pintles and gudgeons) were fitted far apart, near the top and bottom of the curved sternpost, and the blade remained stable as it rotated along this axis. With Thyme's kick-up

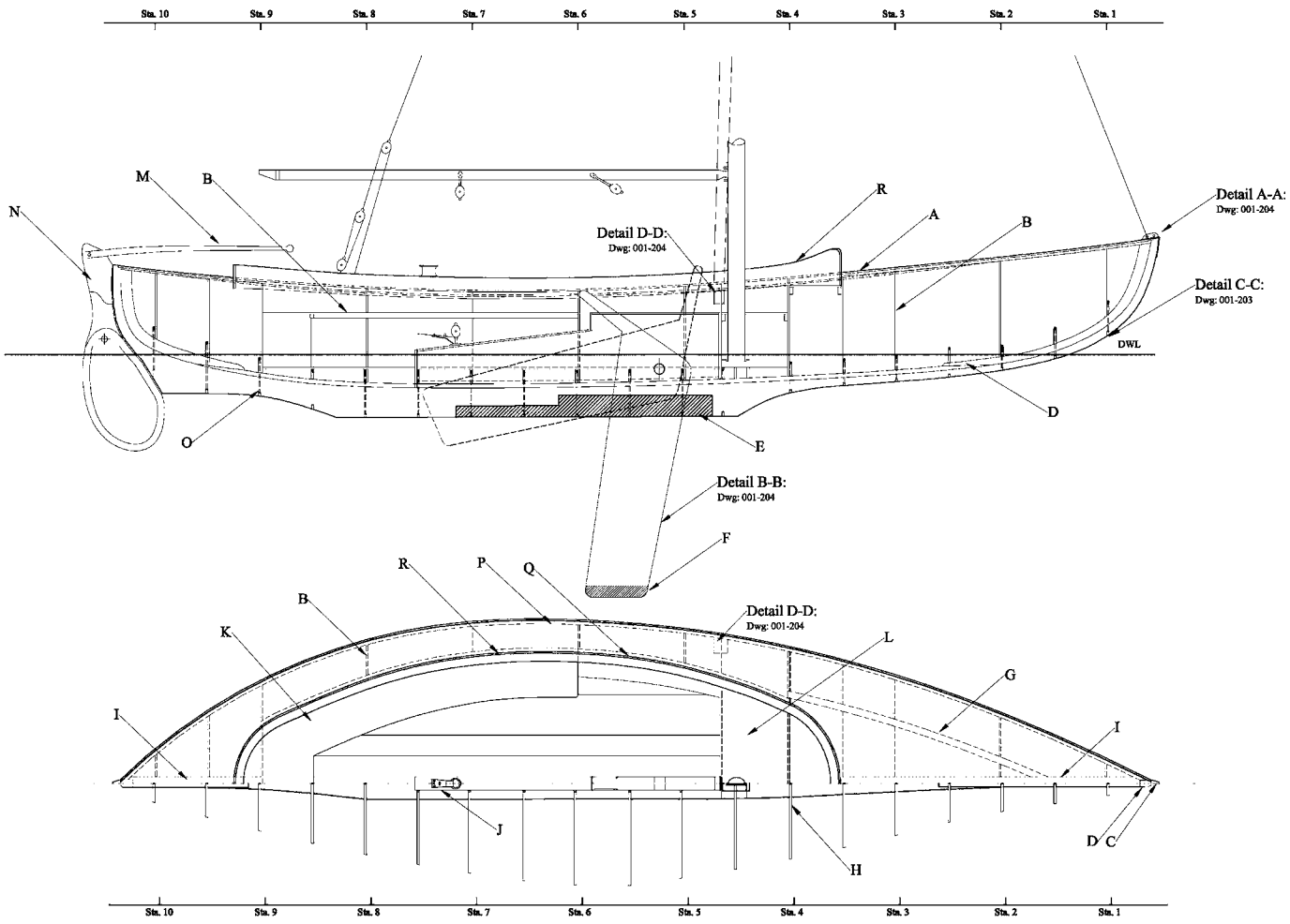


Influenced by the work of K. Aage Nielsen, designer Crayke Windsor drew a striking double-ended hull. The shallow buttock lines describe a clean run, which suggests the potential for good speed.

blade, however, both sets of hangers must be located close together and high up on the rudder, well above the pivoting blade. As drawn, this would place the axis of rotation well aft on the rudder blade, creating a rudder that would be overbalanced—the center of pressure would be forward of the axis and force the rudder hard over when the tiller is released. Windsor will likely need to allow the blade to hang down more vertically, with some distance between it and the skeg.

Thyme's hull is light and fine, with a total displacement of 2,400 lbs, placing her displacement/length ratio at a svelte 113. Her lines show the advantages—clean, shallow buttocks promise great speed potential and avoid the curse of heavier double-enders, the dreaded speed-robbing, stern-wave-creating upward hook as they struggle to reach a pinched-in sheerline. An important factor in Thyme's clean run and smooth lines is the substantial flare in her sections. (Technically, "flam" is the time-honored term, meaning outward slope of the section lines without concavity in the topsides.) This keeps the waterline beam relatively narrow, for low resistance in lighter air, while promising plenty of reserve stability when the breeze comes up. A nice side benefit is dryness—particularly welcome in a boat with Thyme's elegantly low freeboard. Despite her fine-boned nature, however, she clearly displays the powerful genes of her ancestors in the strong curvature of stem and stern profiles and the springy sweep of her sheer.

Thyme's sail plan shows an interesting juxtaposition of details from the last century of rig design, and perhaps reveals a bit of her designer's limited experience as well. At first glance, the straightforward marconi sail plan seems a bit small, but Thyme's light displacement easily explains this—her sail area/displacement ratio of 23.2 promises more than ample power and sparkling light-air performance. The sizable working jib is sheeted inside the cockpit coaming for a tight sheeting angle and great upwind performance when working with the deep, well-shaped centerboard. The mast is a stock aluminum section, shown without taper, and will be easily



Thyme's amateur-friendly construction: ½-thick bead-and-cove strips sheathed inside and out with fiberglass cloth set in epoxy. This hull should go together easily and will prove strong, light, and perpetually leak free.

and affordably obtained by a home-builder—although a tapered top would dress the boat up considerably. The standing rigging arrangement is rather unconventional: very slightly swept spreaders support the shrouds, and running backstays provide the only support from aft, since no fixed backstay is fitted. In a boat whose primary mission is daysailing rather than grand prix racing, the dependence on runners to keep the mast upright seems unfortunate. While the outboard rudder would interfere with a backstay mounted on the sternpost, a bridle could be rigged from each side to carry a fixed backstay. With more strongly swept shrouds or a set of jumper stays, this would allow the elimination of the runners and vastly simplify the sailing experience.

Thyme's construction is very well suited to her mission: light, strong, simple, and durable. Windsor has called for a hull of strip-composite construction: think cedar-strip canoe written large. Bead-and-cove strips, 12mm (½″) thick, are fitted over marine-plywood ring frames, then sheathed inside and out with fiberglass cloth in epoxy. This method is very accessible to the home-builder, as all the pieces are small, easily milled out and handled, and go on in discrete chunks of time, making it easy to come home from a day at the office and hang a plank or two before dinner. The sheathed skin is also impervious to the stresses of swelling and drying out, making Thyme ideal for sailing off a trailer. Windsor's well-detailed plans spell out most aspects of the construction process in simple, easily understood drawings, displaying his experience as a boatbuilder before he went back to school to study design.

Early effort or not, Thyme is a credit to Crayke Windsor's talent in blending traditional and modern, performance and comfort, durability and ease of construction. She'll do her builder proud, and reward her owner with a timeless experience.

Bob Stephens is a principal of Stephens, Waring & White Yacht Design in Brooklin, Maine.

You can reach designer Crayke Windsor at 2204 Eton Ridge, Madison, WI 53726. As he is currently in England, email will be more efficient: crayke@stormhawkboats.com.

The Ditty Bag Book

The Ditty Bag Book, by Frank Rosenow. Skyhorse Publishing, 307 West 36th St., 11th Floor, New York, NY 10018. 128 pp., illus. $14.95. *Available from the WoodenBoat Store, www.woodenboatstore.com.*

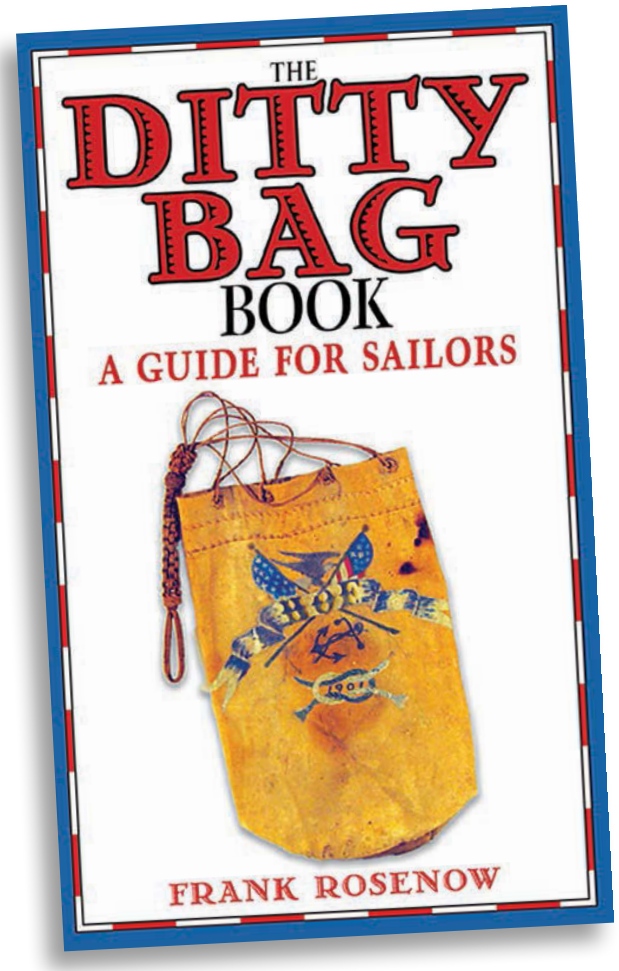
Reviewed by Ben Fuller

Some years ago in Camden, Maine, the Windjammer Weekend festival featured ditty-bag contests. Sailors displayed the small bags they used to hold sailmaking and rigging gear, and the bags, which showed the skill of their owners in palm-and-needle work and in creating functional and fancy ropework, were judged for their decoration and functionality. Some had features a lot like those Frank Rosenow wrote about and illustrated in *The Ditty Bag Book* 35 years ago.

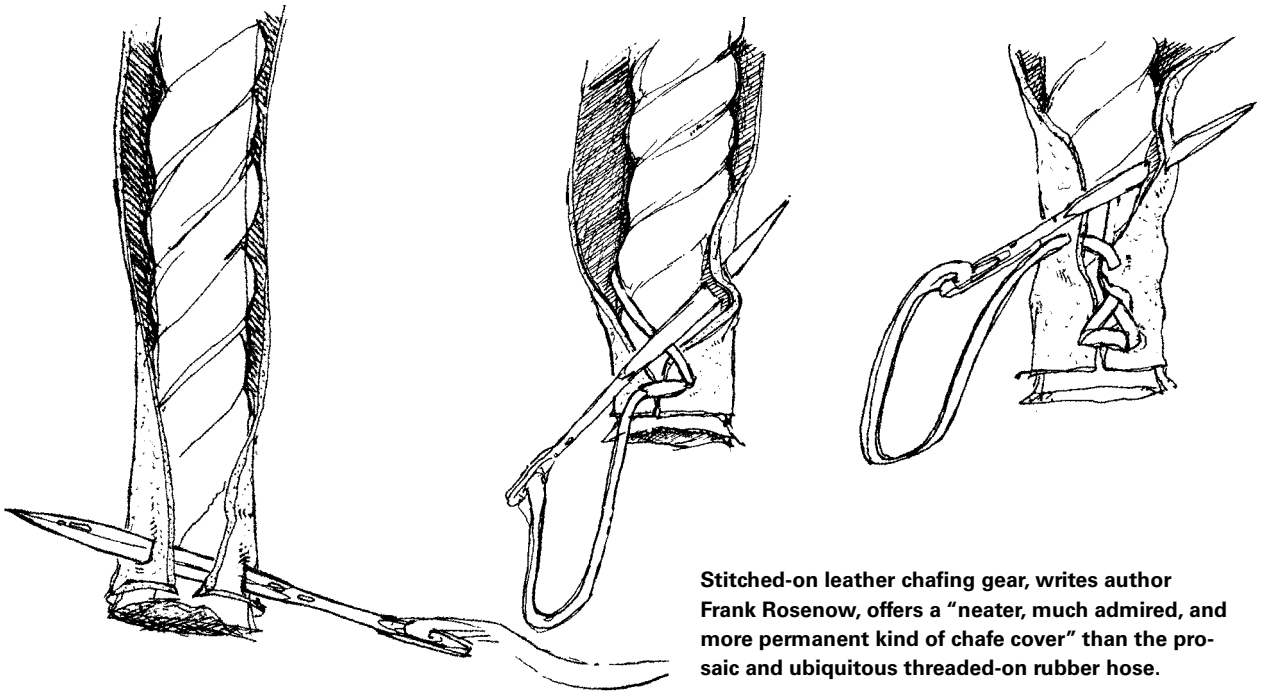
First published in 1976, with a second edition in 1982, Rosenow's book is now back on the market in this reprint edition. It deserves to be. Reading this little volume and practicing the skills therein is like being an apprentice to a master sailmaker showing you everything from tool selection to the details of how to hold a needle.

Frank Rosenow (1944–1993) straddled two worlds. Growing up in Marstrand, Sweden, he sailed racing dinghies and modern cruiser-racers. After wandering the ocean, he returned to apprentice with a master traditional sailmaker, Gunnar Andersson, who in turn had apprenticed in the day when you bought your master a dram for every skill shown. There were many ways to work thread and canvas, but from Andersson you learned The Right Way. In the 1970s Rosenow became a columnist for *Sail* magazine while continuing to cruise.

The author divides the subject into two parts: Tools and Processes. Conversation is his style; it is as if he is sitting next to you. Somewhere in his rovings, he learned to draw magnificently well. He shows you each step as if he were demonstrating it, detailing the proper placement of hands and fingers. The book itself is a tool: Unlike most marlinespike seamanship books, it is small enough to travel in a ditty bag.



A drawing of a sailmaker's bench introduces the tools. The knife is the first one, a simple folding knife kept sharp using a readily obtainable hardware-store stone, with instructions for use. Next are needles, and the author presents the various styles and the rationale for their shapes and sizes. For palms, he recommends investing in a roping palm, which has a thumb guard to protect your hand when heaving seizings and stitches taut. I don't have such a guard, and I suffer when I am into a project. Rosenow tells you exactly how to hold the



Stitched-on leather chafing gear, writes author Frank Rosenow, offers a "neater, much admired, and more permanent kind of chafe cover" than the prosaic and ubiquitous threaded-on rubber hose.

needle, how to use beeswax to prepare the twine, and how to whip wire rope ends preparatory to splicing. For the sailmaker's bench hook he shows you how to file the hook to easily penetrate but not rip canvas. In the spike-and-fid section, he recommends the "Swedish" hollow fid for its versatility both in soft and wire-rope work, and shows you how to insert it to make the largest hole needed.

Rosenow shows exactly how to use each tool. With wire, he shows you how to choose and use swaging tools and specialized cutters, to choose thimbles, and to use a serving mallet. He argues that traditional service is still useful in modern rigs as a cover for wire splices. For heaving he shows you how to use a spike to heave a seizing taut, and how to sew-in rings and grommets. He finishes by discussing traditional and double-braid rope and wire, canvas and cloth, and the need for heat when working with synthetic materials.

To teach the processes, he uses the ditty bag. Rosenow learned flat-seaming from his master who was paid by the yard to hand-sew tarpaulins during World War II, seven to nine stitches to the needle length or three stitches to the inch. Round-seaming was tighter, nine to fifteen stitches to the needle. This level of detail sets this book apart from other volumes on sailors work.

Each step in creating the ditty bag is shown. These include laying it out on canvas and cutting it, laying out and cutting the bottom, selecting the needle for stitching, and using the hook to hold your work. Unlike tailors, sailmakers don't knot thread to hold the end in place; rather, they use a locking stitch, and Rosenow shows you how to do this. For the bottom you have two choices: a round-stitched bottom, and a stitched-on grommet employing running and roping seams. The top rim can be finished plain or with added canvas to make tassels. Rosenow favors a plain handle with a simple seized eye in the top to hang the bag, and a Turk's-head slider. Working ditty bags do not need long ornamental handles, which get in the way. All of this is shown with clear drawings. More practice can be had with bucket and hammock making.

Putting the ditty bag and its tools to work, Rosenow shows you how to patch sails of various weights, make stitching repairs, and seize on hanks.

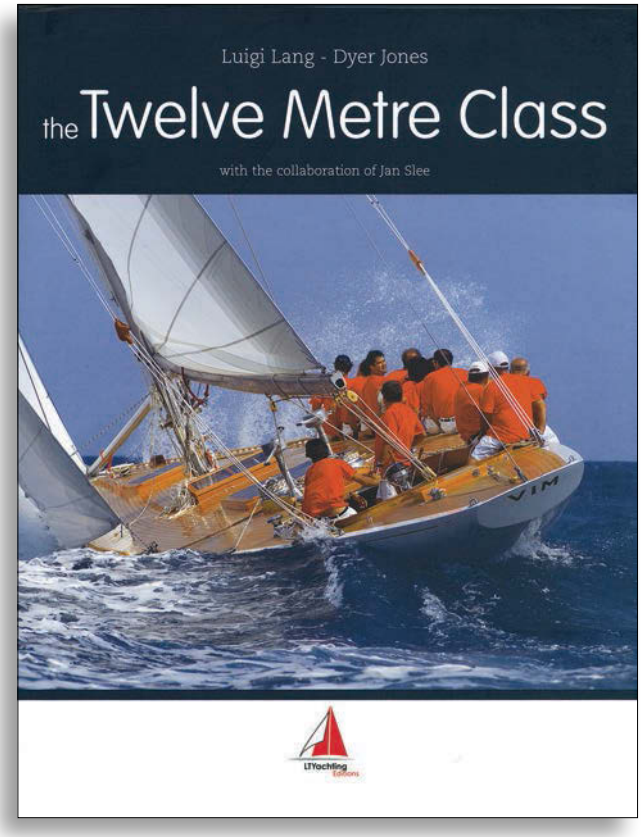
Palm-and-needle whippings with an extra set of hitching make a more attractive and durable whipping than the standard variety, and this technique works for both three-strand and braided rope. End whippings connecting two ropes can be used to reeve a new halyard.

To fight chafe, we learn how to put on leather (which will also work for oars), make French whipping and baggywrinkle, and to make rope fenders.

Rosenow finishes the book with splices. Clear drawings show the three-strand eyesplice, the double braid splice, a simple wire eye, the rope-to-wire splice, and a short splice (with a bosun's chair as a practical project).

Sometimes it's hard to think about books that I've grown up with as classics, and to realize that a good chunk of my library is out of print. This book deservedly is back. It's the place to start learning rope and canvas work, and there are tricks for the advanced practitioner, as well. Today, to complement it, you might need a book on braided splicing, and an encyclopedic book if fancy work strikes you. Rosenow wrote several others. His knot book, *Seagoing Knots*, is still in print, and his *Canvas and Rope Craft*, which has numerous projects and introduces a sewing machine, is readily available. "Doing it Right" provides tremendous satisfaction. Frank Rosenow shows you how.

Regular contributor Ben Fuller is curator of the Penobscot Marine Museum in Searsport, Maine.



The Twelve Metre Class

The Twelve Metre Class, by Luigi Lang and Dyer Jones, with the collaboration of Jan Slee, preface by Olin J. Stephens II. LTYachting Editions, c/o GMT Edizioni, Via B. Chigizola 34B R – 16147 Genova (Italia). Standard edition of two cloth-bound volumes in a slipcase, 572 pp, numbered and signed by the authors. $275. U.S. and Canadian orders through Columbia Trading Company, 1022 Main St. (Route 6A), West Barnstable, MA 02668, USA; and from Howland and Co., 100 Rockwood St., Jamaica Plain, MA 02130; 617–522–5281.

Reviewed by John Summers

Perhaps you saw one of them on TV or in a magazine between 1958 and 1987 when they contested the AMERICA's Cup. You might have sailed on one yourself for a day charter out of St. Maarten. You may have seen an exceptionally beautiful example, or perhaps a pair of them, one white, the other dark blue, sailing through the harbor in Newport, Rhode Island. Or finally, maybe you sat on the edge of your theater seat in 1992 seeing them match each other tack for tack in the seas off Fremantle, Australia, while you enjoyed some of the best sailing (and cringed at some of the worst romance) ever filmed as you watched the movie *Wind*. In any case, it's a sure bet that if you're the least bit interested in sailing, you've seen at least one 12-Meter, and probably more. You may not know, however, that the Twelves we are familiar with

from their AMERICA's Cup years were only the most recent iteration of a class that began early in the 20th century, and had its roots in the end of the 19th.

The problem of how yachts of varying sizes, displacements and rigs can compete fairly against one another is almost as old as yachting itself. The authors explore the history of the 12-Meter class through rating rules, beginning with the tonnage-based volume measurements of the early 19th century and continuing through Thames Measurement, the Length and Sail Area Rules, the Linear Rating Rule, and the Universal Rule. It was this latter that produced the well-known letter classes such as M, R, P, Q and S, as well as the J-boats, the Twelves' predecessors in the AMERICA's Cup. Succeeding chapters explore the International Rule, which followed the Universal Rule and gave yachting the metric classes. Lang, Jones, and Slee have done a great service by providing a condensed and useful tour through the often-arcane world of yacht ratings. The focus on the 12-Meter class allows them to demonstrate the effect of the rules on succeeding designs, and in some cases of succeeding rules on the same design, as yachts were modified to stay competitive.

Later chapters explore the epic story of the 12-Meter years in the AMERICA's Cup, and summarize the considerable influence the class has had on the history of yachting. As the authors point out, the International Rule has held up well, and almost all existing Twelves are either sailing or under restoration, while the

The 1925 Fife 12-Meter LADY EDITH.

Six- and Eight-Meter classes are also very active. The first volume is rounded out with a Twelve-Meter Hall of Fame with biographies of key designers and the text of the AMERICA's Cup Deed of Gift. The second volume in this set, *The Twelve Metre Register*, is a virtual encyclopedia of the class. Detailed information is presented about every Twelve ever launched, organized according to the version of the rule in force when they were built. This is followed by indices arranged by yacht name; designer and country; International Rule version; year of build; and sail number and country. These are complemented by a cross-reference for name changes and racing records relating to the class.

This large and impressive two-volume set is a greatly expanded new edition of the same authors' 2001 single-volume work. They are to be commended for the sheer amount of research they have amassed, and for a sincere effort to create the definitive work on this important class. Unfortunately for all concerned, however, if this were a race, they'd be towing a bucket. *The Twelve Metre Class* is thoroughly, and at times absurdly, compromised by lack of attention to the most basic details. In some cases, this calls into question the accuracy of the historical information. In others, it just disinclines you to pay at least $275 for a book whose proofreaders couldn't even catch the typos in large, bold-faced chapter titles.

The book is filled with un-idiomatic and ungrammatical copy, of which only one example need be quoted here: "We must remember that the smaller yachts almost always sailed on protected estuaries, so designers felt free to exasperate a boat's lines and sacrifice some seaworthiness to gain in overall speed" (p. 27). And if the designers were exasperated, imagine how the reader feels after more than 500 pages of this, rounded out with absurd hyphenation, improper use of the apostrophe, incessant typos, and questionable editorial decisions. If the drawings of C.Y. BRITANNIA on pp. 32 and 33 are titled "Sectional Elevation," "Deck Plan," and "Cabin Plan" right on the drawing itself, why would you caption them "Construction Plan" and "Interior Plan?" Similarly, you don't have to be a professional proofreader to notice that the transom of the Twelve identified as NYALA actually reads VIM (pp. 110–111). If there were only a few of these errors they would be unfortunate though unworthy of mention, but *The Twelve Metre Class* is riddled with them.

The book has some elegant design elements, and there is a handsome dust jacket on the first volume, but there are some other aspects of the graphic presentation that make you shake your head. Why, for example, in a book on this topic, would you pick a typeface that (a) looks like an anemic version of Courier; and (b) produces a very awkward near-ligature between an upper-case "T" and a lower-case "w" which you will see hundreds of times as you read the word "Twelve?"

The book was printed digitally on a Xerox Docucolor press. While this technology can offer short print runs and make possible projects that would otherwise be prohibitively expensive, it also has a number of potential pitfalls that are unfortunately realized here.

Many of the color photos in particular are harsh and contrasty, and a number are blighted by thin horizontal red lines that should have been caught in production. The lines drawings are blurred and hard to read, a situation not improved by the choice of a mottled, parchment-like background for most of those pages. Finally, a number of the head shots of those participating in the early-20th-century measurement rule conferences in London were obviously scanned from offset-printed sources and not de-screened, for they show in the book with a telltale moiré pattern.

By all means buy this book for the useful reference work it is, and enjoy a detailed exploration of this significant class, but take a moment when you read it to reflect on how much better it could have been had it been produced with more care and attention. It is to be hoped that the publishers will make use of the capabilities of the short-run digital format to address some of these deficiencies in future editions.

John Summers had ample opportunity to admire 12-Meter yachts during the three years he worked at the International Yacht Restoration School in Newport, Rhode Island, where GLEAM and NORTHERN LIGHT are based. A curator and maritime historian with a long-standing interest in yachting, he is currently general manager of the Canadian Canoe Museum in Peterborough, Ontario.

KAREN WALES

UNIWRAP MPI Anti-corrosion Paper

by Karen Wales

My home shop is seaside. Lucky though that is, my tools are constantly exposed to salt air. Recently, while going through my hand tools, I came

upon two identical handsaws that I had purchased a few years ago, before a season of teaching woodworking classes. Little did I know that my shop had become an accidental laboratory, an optimum location for testing the effectiveness of UNIWRAP MPI anti-corrosion paper. This chemically treated paper, made by the Daubert Cromwell Company, is available in small parcels from Lie-Nielsen Toolworks, Inc., who also use the paper to wrap their fine hand tools.

At purchase, each of my two handsaws had been neatly bundled in the manufacturer's packaging boxes. Inside the respective boxes, each saw blade was wrapped in UNIWRAP MPI paper. I had used one of the handsaws and then put it away in its box, but failed to rewrap it in the protective paper. I left the other one wrapped and undisturbed in its box. As mentioned, a significant period of time had lapsed before I examined these saws again (my having landed an office job), only to find that the saw blade that had been left in its UNIWRAP MPI wrapping remained in new condition while the one left bare in its box became pocked with corrosion blooms.

This paper works best in enclosed, protected spaces, such as a toolbox, indoors, guarded from windy conditions. Wind is a prime threat to the paper's effectiveness, since the chemical treatment can be blown off its surface. When used properly (wrapped around the metal parts of the tool), the volatile corrosion inhibitor (VCI) compounds vaporize from the surface of the paper. VCI molecules arrange themselves on the surface of the metal (either ferrous or non-ferrous) and create a barrier that stops corrosion in its tracks. The manufacturer recommends changing out the paper at least once per year, even though my results indicate that its effects can last well beyond that.

I wondered whether it might be a good idea to take a few sheets aboard my sailboat since it has an enclosed cabin. I learned that it would be fine to use in the tool drawer but to keep it away from the silver and cutlery drawer. Daubert Cromwell has other products that can protect silver, but UNIWRAP MPI should not be used to wrap any mouth-bound utensils.

It's hardly any effort at all to roll a block plane in a sheet of the paper or to fold a piece in order to sheathe a saw blade. I find UNIWRAP MPI paper to be a reasonable alternative to coating hand tools in oil, having never been a great oiler myself. I'm not arguing that it offers better protection than oiling—nor am I discouraging the use of toolbox desiccants and other products and practices known to extend the life and usefulness of metal tools. But add UNIWRAP MPI to your short list. It works.

UNIWRAP MPI anti-corrosion paper is available in packs of 10, 12" × 24" sheets for $10 from Lie-Nielsen Toolworks, www.lie-nielsen.com. For more information on Daubert Cromwell products, visit www.daubertcromwell.com.

Karen Wales is WoodenBoat's *associate editor.*

BOOKS RECEIVED

Boater's Log, by Capt. John Wooldridge. Published by Hearst Books, a division of Sterling Publishing Co., Inc., 387 Park Ave. S., New York, NY 10016. 192 pp., hardcover, $19.95. ISBN: 978–1–58816–752–1. *This logbook includes space for just about every detail pertinent to your boat or your voyages—pre-departure checklists, GPS waypoints lists, vessel specifications and numbers, and much more.*

Signalman Jones, by Tim Parker. Published by Sheridan House, Inc., 145 Palisade St., Dobbs Ferry, NY 10522. 140 pp., paperback, $17.50. ISBN: 978–1–57409–309–4. *The true story of the sea adventures of a British naval signalman during World War II.*

Understanding Boat DC Electrical Equipment, by John C. Payne. Published by Sheridan House, Inc., 145 Palisade St., Dobbs Ferry, NY 10522. 96 pp., paperback, $16.95. ISBN: 978–1–57409–301–8. *Windlasses, furlers, bow thrusters, and more.*

Understanding Boat Refrigeration and Air Conditioning Systems, by John C. Payne. Published by Sheridan House, Inc., 145 Palisade St., Dobbs Ferry, NY 10522. 96 pp., paperback, $16.95. ISBN: 978–1–57409–300–1. *Keeping things cold aboard your boat; companion volume to the preceeding book.*

The Invasion Year: An Alan Lewrie Naval Adventure, by Dewey Lambdin. Published by Thomas Dunne Books, Smithsonian Institution, 600 Maryland Ave. S.W., Suite 6001, Washington, DC 20024. 368 pp, hardcover, $25.99. ISBN: 0–312–55185–1. *In this, the 17th book of the series, Alan Lewrie protects French Haitians and then crosses the ocean to fight Napoleon.*

An Island Cabin, by Arthur Henry. Published by Flat Hammock Press, 5 Church St., Mystic, CT 06355. 368 pp, paperback, $19.95. ISBN 978–0–9818960–1–4. *In a reprint of a story originally printed in 1902, the author retreats, à la Thoreau, to an isolated cabin on an island off Connecticut—and invites three friends to join him.*

Small Boat to Freedom: A Journey of Conscience to a New Life in America, by John Vigor. Published by Sheridan House, Inc., 145 Palisade St., Dobbs Ferry, NY 10522. 272 pp., paperback, $17.95. ISBN: 978–1–57409–303–2. *A South African journalist and his family sail to America to escape the apartheid regime.*

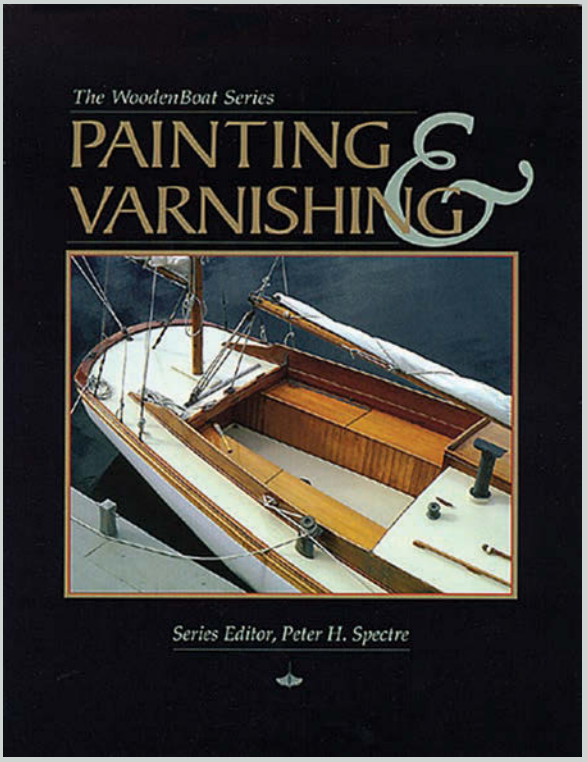
The EGERIA: An Example of Mid-Nineteenth Century New Brunswick Ship Construction, by Eric Lawson. Published by Ship Research Services, RR 1 G-3, Bowen Island, BC, V0N 1G0, Canada. 142 pp., softbound, CAN$49.95. ISBN: 978–0–9780998–0–0. *Detailed drawings and photographs document the construction of a Canadian bark whose remains now lie in the Falkland Islands.*

Nantucket Sleigh-Ride: A Notebook of Nautical Expressions, by Edward Lodi. Published by Rock Village Publishing, 41 Walnut St., Middleborough, MA 02346. 108 pp., paperback, $14.95. ISBN: 978–0–9721389–9–4. *With a bit more humor and breadth than the usual nautical dictionary, this book explains hundreds of nautical phrases that are now part of our common use.*

2011 Shipwright: The International Annual of Maritime History & Ship Modelmaking, edited by John Bowen and Martin Robson. Published by Conway, an imprint of Anova Books Ltd, 10 Southcombe St., London, W14 0RA, England. 208 pp., hardcover, £30.00. ISBN: 978–1–84486–123–1. *This annual publication has incorporated and succeeds* Model Shipwright, *a quarterly journal for modelmakers.*

**Available from The WoodenBoat Store, www.woodenboatstore.com.*

New From WoodenBoat Books



Painting and Varnishing, by various WoodenBoat contributors. Published by WoodenBoat Books, P.O Box 78, Brooklin, ME 04616; www.woodenboatstore.com. 146 pp., softcover, $24.95. ISBN: 0–937822–33–7. *Painting and varnishing are part art and part science. The keys to success are a well-conceived plan of action, the correct choice of tools and materials, a careful preparation of the surface, proper application of the coating, and a "feel" for what you are doing. This book is a compilation of* WoodenBoat *magazine articles that address all of these areas.*

MICHELE CORBEIL

***WoodenBoat* Magazine sales representative Ray Clark, President of Mystic Seaport Steve White, and Cocktail Class founder Kim Granbery are neck and neck (and neck) in the Cocktail Class (see *WoodenBoat* 213) Championships held at the Woodenboat Show at Mystic Seaport last year. You will see lots more than little boats chasing each other at this year's show June 24–26, 2011 at Mystic Seaport.**

EAST

Continuing through July 17
Northeast Wooden Canoe Heritage Association Activities
Various locations, Maine and New Hampshire
Planned events are a **Meeting at Kimball Pond Boat Barn**, Vienna, Maine, May 21; the **Maine Canoe Symposium**, June 10–12, in Bridgton, Maine; and a **Father's Day Paddle** on June 19 in Chocorua, New Hampshire. *Event information, Bob Bassett, Chapter Head, Northeast Chapter, Wooden Canoe Heritage Association, P.O. Box 111, 21 Day Rd., Vienna, ME 04360; 207–578–0876; kpboatbarn@yahoo.com.*

Continuing through October 9
WoodenBoat Classic Regatta Series
Various locations, Connecticut and New York
Greenwich, Connecticut, hosts the **Indian Harbor Classic Yacht Regatta** the weekend of September 17–18, while the following weekend the yachts move to New York. On September 24, they are in Greenport at the **Greenport Classic Yacht Regatta**, while Hempstead Harbor hosts the **Heritage Cup** on October 1. This precedes the **Manhattan Classics Week** which runs October 3–9. *Event information, Bill Doyle, WoodenBoat Classic Regatta Series, c/o Bill Doyle, Performance Research, 25 Mill St., Newport, RI 02840; 401–848–0111; bill@performanceresearch.com.*

May

21–22 Nautical Festival
West Sayville, New York
A gathering of classic boats with music, food, and fun. *Event information, Long Island Maritime Museum, P.O. Box 184, 86 West Ave., West Sayville, NY 11796; 631–447–8679; www.limaritime.org.*

28 Opening Day
Wolfeboro, New Hampshire
The New Hampshire Boat Museum opens for the season. Among its summer activities are **Youth Boat Building** programs for skiff building June 20–July 1 and again August 8–19. A **Family Boat Building** event runs July 5–10. An **Adult Boat Building Class** will be held July 23–30. *New Hampshire Boat Museum, P.O. Box 1195, 397 Center St., Wolfeboro Falls, NH 03896; 603–569–4554; www.nhbm.org.*

June

4 IYRS Launch Day
Newport, Rhode Island
More than a dozen boats to be launched, along with a display of Moth hydrofoils. *International Yacht Restoration School, 449 Thames St., Newport, RI 02840; 401–848–5777; www.iyrs.org.*

4 Grand 40 Gala
Bristol, Rhode Island
Celebrate the museum's 40th anniversary with dining, dancing, and an auction. *Event information, events@herreshoff.org. Herreshoff Marine Museum, 1 Burnside St., Bristol, RI 02809–0450; 401–253–5000; www.herreshoff.org.*

4–5 Wooden BoatFest
Fair Haven, New Jersey
Build a six-hour canoe and launch it Sunday afternoon. *Event information, Navesink Maritime Heritage Association, P.O. Box 6498, Fair Haven, NJ 07704; www.navesinkmaritime.org.*

10–12 Maine Canoe Symposium
Bridgton, Maine
Hands-on workshops, demonstrations, films, and slide shows, at Camp Winona on Moose Pond. *Winona Camps, 35 Winona Rd., Bridgton, ME 04009; 207–647–3721; www.mainecanoesymposium.org.*

11 Radio Vintage M Full Cup Invitational Regatta
Marblehead, Massachusetts
From noon to 3 p.m. at Redd's Pond. Hosted by the Marblehead Model Yacht Club. *U.S. Vintage Model Yacht Group, 78 East Orchard St., Marblehead, MA 01945; 781–631–4203; www.swcp.com/usvmyg.*

11–12 Cape Cod Maritime Festival
Hyannis, Massachusetts
On the Hyannis Waterfront, with boats on display, demonstrations, maritime arts and crafts, and more. *Cape Cod Maritime Museum, 135 South St., Hyannis, MA 02601; 508–775–1723; www.capecodmaritimemuseum.org.*

17–19 Antique and Classic Boat Festival
St. Michaels, Maryland
Over 100 boats at the Chesapeake Bay Maritime Museum, and much more. *Event information, Maryann Fiaschetti, fianagle@verizon.net, 410–437–8108, or Chris Brown, brcwb@aol.com, 518–281–0045. Sponsored by Chesapeake Bay Chapter, Antique & Classic Boat Society, St. Michaels, MD 21663, 410–571–8370.*

17–18 1871 Schooner Showdown
Camden to Rockland, Maine
Maine windjammers STEPHEN TABER and LEWIS R. FRENCH will race from Camden to the Rockland Breakwater lighthouse. Daysails and an open house on both boats on Saturday. *Event information, www.windjammerbirthdays.com. Maine Windjammer Association, P.O. Box 317P, Augusta, ME 04332; 800–807–9463; www.sailmainecoast.com.*

18–19 Great Hudson River Revival
Croton-on-Hudson, New York
Bringing people together to honor the river through songs, education, and action. *Clearwater Festival, 112 Little Market St., Poughkeepsie, NY 12601; 845–454–7673; www.clearwater.org.*

24–26 The WoodenBoat Show
Mystic, Connecticut
Sponsored by WoodenBoat, the show returns to Mystic Seaport. The annual show is a gathering of boats and people, boats afloat and on shore, demonstrations, vendors, and entertainment. *WoodenBoat Publications, P.O. Box 78, Brooklin, ME 04616; 207–359–4651; www.thewoodenboatshow.com.*

24–26 John Gardner Small Craft Weekend
Mystic, Connecticut
Nearly 100 small craft meet to mess about at Mystic Seaport. View boats available for participants to use. Those bringing a boat should be prepared to have it used. *Event information, Mystic Seaport, 75 Greenmanville Ave., P.O. Box 6000, Mystic, CT 06355–0990; 860–572–0711; www.mysticseaport.org.*

24–26 Lake Hopatcong Boat Show
Mount Arlington, New Jersey
This is a judged show now in its 37th year. Dinner Friday, show and awards on Saturday, and boat parade on Sunday. *Event information, Bob Larson, 908–638–4081 or boatshow@lhacbs.org. Sponsored by Lake Hopatong Chapter, ACBS, 55 Point Pleasant Rd., Hopatong, NJ 07843; www.lhacbs.org.*

July

8–9 14th Annual Chautauqua Lake Antique & Classic Boat Show
Bemus Point, New York
At the Bemus Point Village Park. Judging, seminars, and awards Saturday; lake cruise on Sunday. *Event information, William Locke, 716–386–2107, wrlenzo@aol.com. Hosted by the Chautauqua Lake Twin Tier Chapter, Antique & Classic Boat Society, www.cltt-acbs.org.*

8–9 21st Annual Fulton Chain Rendezvous
Old Forge, New York
Non-judged show held on the public docks in Old Forge. *Event information, Old Forge Visitor Center, 315–369–6983 or www.oldforgeny.com. Adirondack Chapter, Antique & Classic Boat Society, P.O. Box 1377, Clifton Park, NY 12065.*

8–10 Boatbuilding Festival
Portland, Maine
No experience is necessary to build 12′ Bevins Skiffs in Monument Square. Registration fees cover all tools, materials, and instruction. After the launch, take your skiff home. *Contact the Compass Project, 170 Anderson St., Portland, ME 04101; 207–774–0682; www.compassproject.org.*

9 IYRS Gala
Newport, Rhode Island
An annual fundraising event. *Event information, Deirdre Opp, 401–848–5777, ext. 217, dopp@iyrs.org. International Yacht Restoration School, 449 Thames St., Newport, RI 02840; 401–848–5777; www.iyrs.org.*

9 27th Annual Mahogany Memories Show
Essex, Connecticut
View antique and classic boats at the Connecticut River Museum. *Event information, Dave or Lynn McFarlin at 860–643–7900, dmcfarlin@snet.net, or Lee Heinzman, 203–264–5823, bdbw3@sbcglobal.net. Sponsored by the Southern New England ACBS Chapter; www.southernnewengland.org.*

9 Vintage Model Invitational Regatta
Laconia, New Hampshire
Held at Lily Pond. Hosted by the Laconia Model Yacht Club. *U.S. Vintage Model Yacht Group, 78 East Orchard St., Marblehead, MA 01945; 781–631–4203; www.swcp.com/usvmyg.*

13–17 Wooden Canoe Assembly
Paul Smiths, New York
Seminars, lectures, and canoeing events; this year's theme is "Rushton: Return to the Adirondacks." On the Green at Paul Smith's College of the Adirondacks. *Event information, Wooden Canoe Heritage Association, P.O. Box 117, Tamworth, NH 03886; www.wcha.org.*

16 New England Vintage Boat Auction
Wolfeboro, New Hampshire
The auction supports the New Hampshire Boat Museum. Preview noon to 5 p.m. on Friday and Saturday morning 8a.m.–10 a.m.; auction starts at 10 a.m. *For information on consignments and donations, contact 603–569–4554, auction@nhbm.org. New Hampshire Boat Museum, P.O. Box 1195, 397 Center St., Wolfeboro Falls, NH 03896; www.nhbm.org.*

CENTRAL

June

3–5 Lake Pepin Messabout
Lake City, Minnesota
Open to all amateur-built watercraft, meeting at Hok-Si-La campground on Lake Pepin. Admission is free. *Event information, lakepepinmessabout.com. Bill Paxton, Paxton Consulting, 6657 133rd St. W., Apple Valley, MN 55124; 612–237–8689; bill@lakepepinmessabout.com.*

9–12 Classics Cruisin' Weekend
Branson, Missouri
On Table Rock Lake, Missouri. Fun, food, and cruising all weekend. *Event information, Don Parker, 402–770–5400 or donaldwparker@hotmail.com. Sponsored by Heartland Classics Chapter, Antique & Classic Boat Society, P.O. Box 339, Langley, OK 74350; www.heartland-classics.org.*

10–12 Door County Lighthouse Walk
Sturgeon Bay, Wisconsin
Lighthouses that are ordinarily closed to the public will be open. *Door County Maritime Museum, 120 N. Madison Ave., Sturgeon Bay, WI 54235; 920–743–5958; www.dcmm.org.*

19 30th Annual Classic Boat Show
South Haven, Michigan
Held in conjunction with South Haven's HarborFest. Boats, demonstrations, speakers, and kids activities. *Event information, Michigan Maritime Museum, 260 Dyckman Ave., South Haven, MI 49090; 269–637–8078; 800–747–3810; www.michiganmaritimemuseum.org.*

17–18 Presque Isle Harbor Wooden Boat Show
Presque Isle, Michigan
Over 50 boats will gather at the state marina on Lake Huron. Friday noon cookout, boat tour, and dinner. Public viewing Saturday. *Event information, Dave, 989–595–9926, or www.presqueisleharborwoodenboatshow.com. Sponsored by Presque Isle Harbor Wooden Boat Show, P.O. Box 178, Presque Isle, MI 49777.*

17–19 Wooden Boat Show and Solstice Festival
Grand Marais, Minnesota
Boats on display, speakers, handcrafts, brunch, games, and more. *North House Folk School, P.O. Box 759, Grand Marais, MN 55604; 888–387–9762; www.northhouse.org.*

18 Eagle River Antique and Classic Boat Show
Eagle River, Wisconsin
At Wild Eagle Lodge. *Event information, Jo Daniel, 715–479–5778, or events@wildeaglelodge.com. Sponsored by Glacier Lakes Chapter, Antique & Classic Boat Association, 533 W. Grand Ave., Port Washington, WI 53074–2102; 262–284–3650.*

24–26 Thompson Antique and Classic Boat Rally
Marinette, Wisconsin
Held at Nest Egg Marine, near Peshtigo, the Thompson's original home base. Open to all boats, with a special focus on those by Thompson family companies. *Event information, Andreas Jordahl Rhude, 4054 Wentworth Ave. S., Minneapolis, MN 55409–1522; 612–823–3990; thompsonboat@msn.com.*

24–26 "Where It All Began" Boat Show
Algonac, Michigan
Celebrating the former Chris-Craft factory, now the Algonac Harbour Club, and held in conjunction with the Michigan Outboard Motor Club. *Event information, Greg Lewandowski, 248–391–1826, or greglewand@aol.com or Roy Schoehnerr, 810–794–3007, roynjudi@comcast.net. Sponsored by the Michigan Chapter, Antique & Classic Boat Society; www.michacbs.com.*

25 Portage Lakes Antique and Classic Boat Show
Akron, Ohio
A judged show with cruises and evening boat rides on the Portage Lakes. *Event information, David Bud, 216–409–6863. Sponsored by Les Demaline, North Coast Ohio Chapter, ACBS, P.O. Box 299, Avon, OH 44011–2399; www.northcoastohio.org.*

July

9 Chain of Lakes Classic Boat Show
Alexandria, Minnesota
At the Arrowwood Resort on Lake Darling. All classic boats are welcome. *Event information, www.mnlakesmaritime.org. Minnesota Lakes Maritime Museum, P.O. Box 1216, Alexandria, MN 56308; 320–759–1114.*

SOUTH

May

12–15 Charleston Harbor Fest
Charleston, South Carolina
Tall ships, family boat building, exhibits, children's activities, air shows, fireworks, and more. *Event information, www.charlestonmaritimefestival.com. Sponsored by South Carolina Maritime Foundation, 303 Concord St., Charleston, SC 29403; 843–722–1030, ext. 12.*

28–29 Billy Creel Memorial Gulf Coast Wooden Boat Show
Biloxi, Mississippi
The Gulf Coast's largest gathering of wooden boats, to tour or sail aboard. Food, crafts, music, and more. *Sponsored by The Maritime & Seafood Industry Museum, P.O. Box 1907, Biloxi, MS 39533; 228–435–6320; www.maritimemuseum.org.*

June

10–11 Lake Chatuge Antique and Classic Boat Rendezvous
Hiawassee, Georgia
To be held at the Ridges Resort. Friday cookout; cardboard boat building contest, public show, and banquet Saturday. *Event information, Randy Cunningham, mountain_design@hotmail.com. Sponsored by Blue Ridge Chapter, Antique & Classic Boat Society, 123 Mr. Johns Choice Rd., Hartwell, GA 30643–2365; www.blueridgechapter.com.*

18–25 James River Batteau Festival
Lynchburg to Richmond, Virginia
A re-enactment of tobacco transport by river. *Event information, www.vacanals.org. Lynch's Landing, 210 Eighth St., Lynchburg, VA 24504; 434–528–3950; www.batteaufestival.com.*

WEST

Continuing through June 19
Master Mariners' Events
San Francisco Bay, California
The annual **Sponsors Lunch** at the St. Francis Yacht Club will be May 20. Watch the **Master Mariners Annual Regatta** at the Encinal Yacht Club in Alameda on May 28. The **MMBA Annual Wooden Boat Show** at the Corinthian Yacht Club in Tiburon will be Sunday, June 19, the day after the annual meeting and party for members. *Master Mariners Benevolent Association, San Francisco, CA 94109; 415–364–1656; www.mastermariners.org.*

Continuing through June 26
Ancient Mariners Sailing Society Events
San Diego, California
The **Yesteryear Regatta** for wooden boats will be May 7, the **Kettenburg Regatta** is June 24–26, and the third **20 Guinea Cup Race** is on June 11. *Ancient Mariners Sailing Society, P.O. Box 6484, San Diego, CA 92166; 619–688–6961; www.amss.us.*

Continuing through May 20–September 5
Fundraising Charters
Port Townsend, Washington
The schooner ALCYONE has two charters to benefit sailing teams at Port Townsend High School and the University of Washington, held May 20–23 and August 31–September 5. *Event information, Alcyone Sail Training, P.O. Box 1511, Port Townsend, WA 98368; 360–385–7646; www.schooneralcyone.com.*

May

21–22 Maple Bay Marina Wooden Boat Festival
Maple Bay, British Columbia
Registration and dinner Friday. Boats on exhibit Saturday. "Two and a bucket" dinghy race at 5 p.m. Monk-owners marine swap meet on Sunday, and many boats will be open for tours. *Maple Bay Marina Wooden Boat Festival, 6145 Genoa Bay Rd., Maple Bay (Duncan), BC, V9L 5T7, Canada; 250–746–8482; www.maplebaymarina.com.*

29 Vancouver Meet at the Beach
Burnaby, British Columbia
At Barnet Marine Park to discuss designs and plans, learn new techniques and tips, and share a common interest in small wooden boats. *Event information, Rod Tait, Orca Canoes & Kayaks, Ltd., No. 7, 3005 Murray St., Port Moody, BC, V3H 1X3, Canada; 604–312–4784; info@orcaboats.ca.*

June

3–5 Lake Arrowhead Boat Show
Lake Arrowhead, California
A judged show with an awards dinner on Saturday night. *Event information, Dave Anderson, asapdave@aol.com, or 760–245–3363. Sponsored by Southern California Chapter, Antique & Classic Boat Society, www.cityintheclouds.com/acbs/antique_classic_boat_society.html.*

10–12 South Sound Traditional Inuit Kayaking Symposium
Twanoh State Park, Washington
Presenting kayak skills classes and kayak-building demonstrations. *Event information, 253–761–8105. Qajaq PNW, 1507 N. Cedar St., Tacoma, WA 98407; www.qajaqpnw.org.*

17–19 Bell Street Pier Classic Rendezvous
Seattle, Washington
Rendezvous of classic power yachts, on the waterfront in downtown Seattle. Vessels open for boarding. *Event information, www.classicyacht.org. Pacific Northwest Fleet, Classic Yacht Association, 5052 38th Ave. SW, Seattle, WA 98126; 206–937–6211.*

18–19 2011 San Diego Wooden Boat Festival
San Diego, California
Held at the Koehler Kraft Boat Yard on Shelter Island; more than 70 boats on display, food, music, demonstrations, children's activities, and more. *Event information, www.koehlerkraft.com. Koehler Kraft Company, Inc., 2302 Shelter Island Dr., San Diego, CA 92106; 619–222–9051.*

July

8–10 Sandpoint Wooden Boat Festival
Sandpoint, Idaho
Held at the marina on Sand Creek. *Event information, John Keener at keener@my180.net, or Michael Boge, mountainfever1@frontier.com. Inland Empire Chapter, Antique & Classic Boat Society; www.inlandempireacbs.com.*

9 Grand Lake Boat Show
Grand Lake, Colorado
At 8,600′ above sea level, it's "the boat show above the rest." Located at Grand Lake Marina. *Event information, Chris Braaf, cbraaf@msn.com, 970–887–2210 or Bob Braaf, bbraaf@msn.com. Sponsored by Rocky Mountain Chapter, Antique & Classic Boat Society.*

16 Eric Erickson Oil Island Race
Long Beach, California
An easy-going race in Los Alamitos Bay. *Sponsored by the Wooden Hull Yacht Club. Wooden Hull Yacht Club, 4219 Maury Ave., Long Beach, CA 90807; 562–495–4235; www.whyc.org.*

EUROPE & BEYOND

Continuing through July 12
Antique and Classic Boat Gatherings
Various Cities, Italy
The **Marineria Fair** in Spezia, northern Italy, June 25–26 welcomes all types of classic boats, while the motoring crowd can gather at the **Meeting for Antique Runabouts** in Peschiera del Garda, Lake Garda, June 26–28. This year's meeting will include the **14th annual Riva Boat Meet**. *Associazione Scafi d'Epoca e Classici, Registro Storico Nautico, Via Melegari 1, Milano, 20122, Italy; +39–02–76–01–39–88; www.asdec.it.*

Continuing through July 9
Baltic Classic Circuit
Various cities, Scandinavia
The **Evli Hanko Regatta** is in Finland on July 1–3. Sandhamn, Sweden, hosts the **Eurocard Classic Baltic Race** on July 6–9. This is a 24-hour offshore race. *Event information, www.sailtrust.org. Olle Appelberg, Executive Director, Scandinavian Classic Yacht Trust, Hållsnäs Skräddarudden, Trosa, S 619 92, Sweden; 0046–8–559–21–830; United States 1–440–499–5495; www.sailtrust.org.*

May

28–June 4 Sail Caledonia
Fort William to Inverness, Scotland
An annual crossing of Scotland via Loch Ness and the Caledonia Canal for traditional small craft, most of them of wood construction, with races and shoreside activities. *Sail Caledonia, c/o Caledonia Discovery, The Slipway, Corpach, PH33 7NN, Scotland; +44 (0) 1397–772–167; www.sailcaledonia.org.*

30–June 5 Morbihan Week
Various ports in the Gulf of Morbihan, France
This biennial gathering draws hundreds of boats from all over the world. Flotillas sail around the Gulf of Morbihan during the week before gathering for the Grand Parade. *Morbihan Week, BP 2009-PIBS Allee Nicolas Leblanc, Vannes Cedex, 56009, France; 33–0–297–62–2009; www.semainedugolfe.com.*

June

10–12 Beale Park Thames Boat Show
Pangbourne-on-Thames, England
A celebration of boatbuilding in a countryside park setting on the Thames River. The emphasis is on traditional small craft. *Beale Park Thames Boat Show, Beale Park, Lower Basildon, Reading, Berkshire RG8 9NH, England; +44 (0)118–976–7498; www.bealepark.co.uk.*

25–July 6 Bailiff of Suffren Trophy
Saint-Tropez, France
An annual cruising race for classic yachts from Saint-Tropez to Malta. *Trophée Bailli de Suffren, BP 72, Parking du Nouveau Port, Saint-Tropez, 83992, France; +33 (0) 4–94–97–87–00; www.tropheebaillidesuffren.com.*

28–July 3 Flensburg Classic Week
Flensburg, Germany
Six days of Baltic Sea classic yacht races between Flensburg and Kiel, Germany. *German Classic Yacht Club, c/o Wilfried Horns, Kanalstraße 30, Kiel, D–24159, Germany; 0431–76277; www.fky.org.*

28–July 3 Rolex Baltic Week
Inner Flensberg Fjord, Glücksberg, Germany
Races for the 12-Meter and 8-Meter World Championships, and for the Robbe & Berking 6mR Sterling Cup. *Flensberger egel-Club, Quellental, 24960 Glucksburg,, Germany; 49–46–31–32–33; www.fsc.de.*

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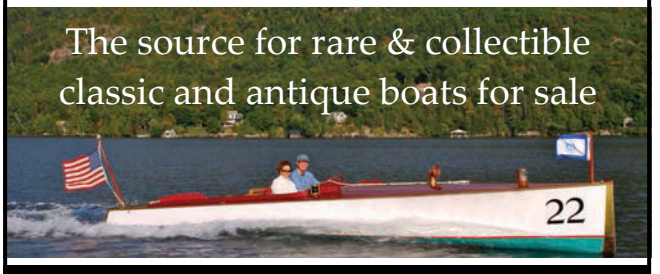

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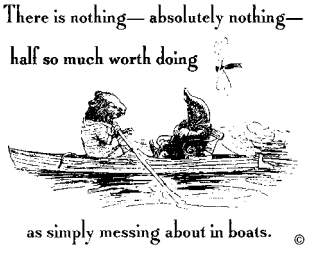

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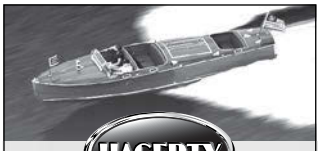

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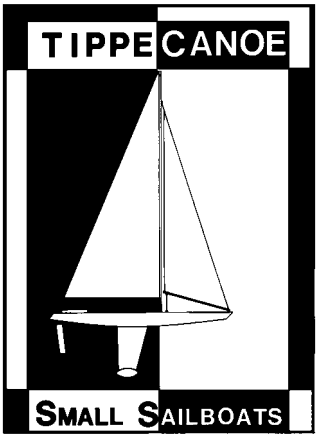

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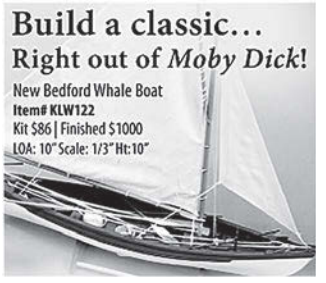

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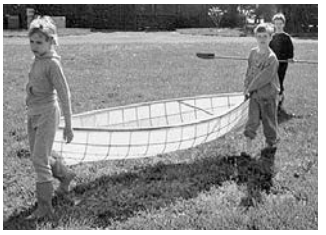

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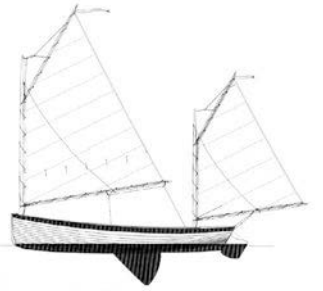

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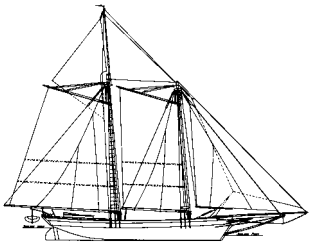

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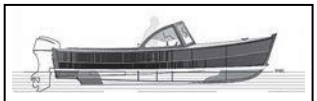

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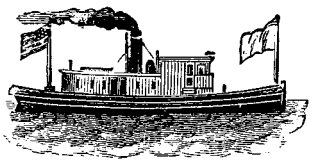

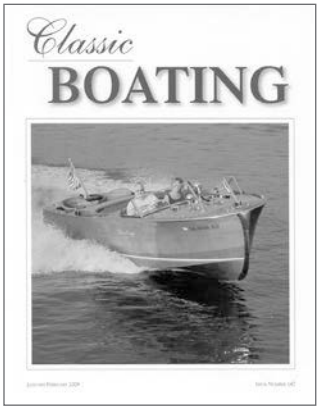

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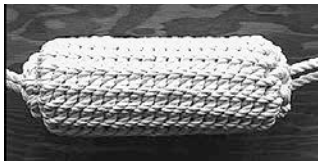

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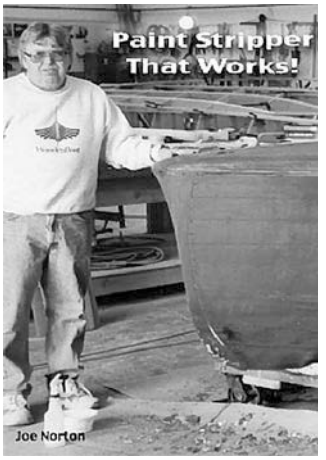

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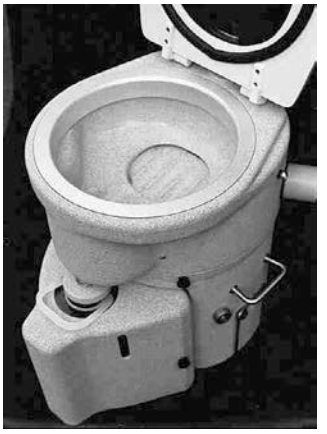

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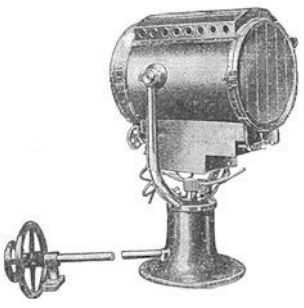

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CLASSIC MOTORYACHT—1926, 62′ ELCO. Shown in *WoodenBoat* No.171, March/April 2003, sketch pg. 42. Survey one year ago June. Twin diesels. $500,000+ invested. Northern CA, Asking $149,000, 415–887–9932.

1937, 35.9′ LOD "SEA WITCH," Angelman ketch, hull #1. Documented. Circumnavigated twice, won Transpac, second 1949, first 1951, corrected time. Gaff-rigged, new electrical wiring, navigation, paint and mahogany on oak, full lead keel, Dynel-sheathed, 6′ dinghy. Well maintained. *WoodenBoat*, March/April 1999, web Sea Witch. angelmanketch@gmail.com. Titusville, FL.

1938, 25′ WINTHROP WARNER wooden sailboat—"Typhoon," sloop hull #1, restored. $30,000, or best offer. http://signal1.com/typhoon/.

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55′ ALDEN KETCH MOTORSAILER. Hodgdon Brothers, 1961. Twin screws cruise at 9 knots. Inside/outside helms. Gourmet galley, fully equipped, excellent condition. Ideal for cruising/liveaboard. $189,000. 207–475–8208, 954–769–0222. lizfalvey@ymail.com.

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1987 WAARSCHIP 1010, 34′ performance sloop, Dutch-built lapstrake plywood hull, inboard Volvo diesel, custom Southern spar, Meissner winches, Antal stoppers and mast track, rigged for singlehanding, all sails good to very good condition, Brooklin Boat Yard custom elliptical rudder. $19,000. transit49@gmail.com.

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Boats For Sale
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50′ NAVY-BUILT, HISTORIC University (Washington) Research Vessel, 1937. Fully equipped/operational/proven. Extended charter/kayak mothership/liveaboard. Sleeps 10. Extremely economical/reliable/seaworthy. 30-year owner retiring. Price reduced to $110,000. Juneau, Alaska, 907–789–0539, email frontierqueen@hotmail.com.

1961 KROGEN MOTORSAILER—American Marine, solid teak on ipol. 140-hp Deutz, Onan, Marineair. Recent tankage, rigging, wiring, cosmetics. Solid passagemaker. Formerly owned by "Daddy Warbucks." $110,000. 941–232–6066.

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17′9″ STRIP KAYAK—Professionally built by seller. Designed by redfishkayaks.com, and called the "Spring Run." Asking $3,500. Never used! For more details or pictures, 401–487–2887 or everettj60@yahoo.com.

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KETTENBURG 38, 1954, HULL #23. Hull and deck in excellent condition. New rigging in 2007. Engine runs well. Needs minor electrical work. Price CAD$33,000. BC, 250–629–3056, alex.vasiljevic@shaw.ca.

37′ ALDEN COASTWISE CRUISER, 1939 (#675). Beautiful restoration! Ready to sail! Trailer included. Asking $59,000. Must sell. Owners relocated, will consider any reasonable offer. See www.yachtworld.com/boats/1939/Alden-Coastwise-Cruiser-2240489.

1962 TOR 40′ MERRYMAN—double-planked, keel-centerboard sloop with new standing rigging, Yanmar 40 diesel, GPS autopilot, traditional interior. Asking $69,000. Contact Frank Gary, 410–703–4017, frank@walczakyacht.com.

20′ THOMPSON LAPSTRAKE OFFshore, 1961. First year with Volvo Penta Aqua-matic drive, 80-hp, 4-cyl, tandem trailer. Full canvas, new seats. All excellent. Steering; portside. Best offer. ME, 207–796–5576

1978 RKL BOATWORKS SAILING pram—Like-new condition. Cold-molded. Cedar, oak, mahogany, teak and bronze. All rigging and oars. $4,000/offers. 410–544–2403.

2008, 22′ SPENCER SERENE custom-built Ski/Day Cruiser—Brand-new condition, professionally maintained. Book-matched Honduras mahogany w/stainless-steel fastening and custom hardware; tucked-and-rolled dark green marine upholstery; seats six. 300-hp MerCruiser Marine FIHO V-8 I/O. $69,500, call 610–324–0789 or smsmith811@gmail.com. *Also see www.woodenboat.com/business.*

1933 OLD TOWN CANOE, 20′ double-ender, Guide model #110460 with sponsons. Being restored, ready spring. New decks, gunwales, paint. Caned seats new. Best offer. ME, 207–796–5576.

1961 CHRIS-CRAFT SEA SKIFF hardtop. All very good condition. Original twin 283 Chevy. $4,700. RI, 401–596–2553.

2009 REDWING 23—Fiberglass over okoume. Honda, Wallas stove, pressure water, GPS, depth, trailer, in Missouri. $24,900, foxcook3@gmail.com.

19′6″ ITCHEN FERRY CUTTER, 1999—This is a one of a kind sailboat! Built by Nokomis Boat Works, cedar on oak. Draft: 3′6″ LOA: 30′9″, beam 8′3″, LWL: 18′9″. Yanmar Model SB12, one-cylinder with a new water-lift muffler, some new hoses. Cruising speed 4.5. Her handsome gaff rig pushes her along well. Displacement 6500, ballast 1200, fuel 10. Nat Wilson sails, manual and electric bilge pump, galley, compass and VHF. Two berths with 4′2″ headroom. Marine plywood with a laid deck. Great space for a small boat. $24,000 USD. Ask for Todd, 207–359–4651.

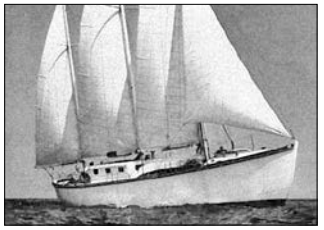
24′ MAHOGANY STRIP-PLANKED hull, professionally built, photos/plans available, build gaff-rigged cutter, 906–478–3332.

12′×6″ GAFF-RIGGED CATBOAT—Wm. Gardner design. With trailer, built 2006. White oak ribs, old-growth cedar planks, 16– mast. Sails beautifully. Inside storage, $16,000. 360–387–1450 or rmsigns1@gmail.com.

18′ CHRIS-CRAFT COBRA. HULL #47. Very good condition. Best offer. Call Bob Ingram, 757–650–4610.

1956, 42′ MATTHEWS MARTINIQUE Express Cruiser—Very original, one of two remaining of this model. Twin 331 Chrysler Hemis, rebuilt. Newer canvas upholstery and instruments. All new chrome. Hull sanded to bare wood and repainted in 2010 to show quality. $45,000. 330–482–1607, randallhart.nyl@comcast.net.

BEAUTIFUL TWO-MASTED Schooner—40′ on deck. Designed 1973 by RD Culler of Concordia Co. Waterline length 33′7″, beam 12′, draft 5′7″. Hull completed, galvanized-fastened tamarack on white oak frames, needs caulking and completion of interior. Deck planked, deckhouses constructed. Engine and 9,000 lbs iron ballast installed. Taffrail turnings, lines drawing, offsets, construction and sail plans included. Illness requires selling. You haul away. Make offer. 207–633–2383.



H-55 HERRESHOFF MARCO POLO. Mahogany, oak, Sitka, teak, bronze. 14 knots, 6,000-mile diesel range. $215,000 or best offer. CT, 860–434–9414.

1972, 49′ GRAND BANKS ALASKAN—120-hp Lehman, 1,600-mile range, three new A/C's, new 8-kW Kohler generator. Hull is ¾″ mahogany planking. Boat is a 10. A must-see! Asking $159,000. TN, Pete Ewing, 727–742–9499, oldtinman1@msn.com. Let's negotiate.

1957, 29′9″ INTERNATIONAL Dragon Class, #153. Trailer, mast, sails, rigging. Needs restoration. Make offer. 231–767–2633.

1988 FENWICK WILLIAM–Designed 33′ cutter—Mahogany on oak frames, bronze-fastened, aluminum spars, Daimler-Benz 34-hp diesel with new Paragon 33 transmission. Garmin plotter/sounder, VHF, isolation transformer, 2,000-watt inverter, Simrad autopilot, 10-oz Dacron sails, sleeps four, headroom for tall crew. Asking $29,500, includes Whitehull dinghy with 2-hp long-shaft Honda four-stroke. Call Don, 207–570–5255.

STEWARD THE YACHT OF A Lifetime! Historically significant 76′ Alden, design #357. Regretfully for sale, 206–601–3867.

"PLUMBELLY," 26′ Proven oceangoing vessel. Plenty of info and pics online. $18,500, www.davidjones classics.com, 207–236–7048.

17′ WITTHOLZ CATBOAT with trailer and outboard engine. In excellent condition. $9,000. Located Brooklin, ME. NJ, 201–569–3787 or 201–568–1441.

SURFRUNNER 25′, 2004 by Sam Devlin. Immaculate, 500 hours +/- diesel I/O runabout. Featured *WoodenBoat* No.188, pages 54–61, and on www.devlinboat.com as "Gooselodge III." Includes new tandem-axle galvanized trailer. $125,000. Contact Sam Devlin, 360–866–0164.

BUZZARDS BAY 19 GAFF SLOOP—Pete Culler design, Landing School 1997, excellent condition. Hull epoxy sealed, teak deck, fresh-water sailed, Triad trailer. Located Seattle, $21,000. Refer *WoodenBoat* No.122, DMBergey@msn.com, 425–646–9037.

12′ STRIP-BUILT KAYAK called the "Parr," designed by redfishkayaks.com. Used once, professionally built by seller. $3,000. Contact for more details and pictures: 401–487–2887, everettj60@yahoo.com.

51′, 1940 CONSOLIDATED CRUISER. C-Flex fiberglass wrapped hull. Twin 165-hp diesels, one rebuilt '07. Completely rewired and full electronics '07. Sleeps 6–8, full head, galley, much more. $49,000 or best offer. Call 504–450–2157.

FULL RESTORATION OF CUSTOM-built 1962 International 500, 32′ mahogany sloop. Over $140,000 invested, completion in 2011. May consider selling when complete; WILL sell now to someone to complete restoration and get exactly what they want. Visit www.WhiteHawkForSale.com for info.

1965, 42′ TRAWLER. 6-cyl diesel, 4K generator. Undergoing restoration, needs paint and cosmetic work. TX, $32,000. Call for more details. Joe, 713–851–1702.

52′ JOHN ALDEN MALABAR VI Schooner "Liberty," 1924. Classic, historically significant, manageable maintenance, numerous sail combinations. Powerful and fast; beautiful. Requesting $99,000 USD, serious offers considered. Contact: Robin Clair Pitts, St. John, VI. Web site: www.coralbaystjohn.com/Liberty.htm. Telephone: 340–779–4994, fax: 340–776–6136, e-mail: randfpitts@yahoo.com. *Also see at www.woodenboat.com/business.*

17′ GENUINE WHITEHALL—Closed gunwale, frames stand athwartships, copper, Port Orford cedar/oak. Masthead rig, centerboard, four English-pattern open-water spoons, custom fitted trailer, new sails. Boat is in new condition. San Francisco area. $19,000. More photos, ferrariboatwright@gmail.com, 415–453–5051.

HAVEN 12½—Built 1991 by present owner. Carvel-planked, white cedar over oak frames, mahogany trim and transom, bronze fittings. Trailer and two boat covers, spars up or down. Good condition. Stored in Port Townsend, WA. Asking $15,000. Contact C. Hall at 801–277–1555, or emily.hall@comcast.net.

19′ BARTENDER—Launched 2007, hull built by Bartender Boats, completed by owner. 2005 Honda 50, approximately 200 hours. Uses just over 2 gph at 20 mph. $12,500. 509–671–7823, NE WA, guyathomas@povn.com.

1959, 26′ GHERLEIN. MAHOGANY lapstrake. Meticulously rebuilt in 2000. New keel, stem, cold-molded. Repowered Yanmar diesel. $65,000. Surveyed. CT. 201–410–3480, slanzner@gmail.com.

54′ ALDEN CENTERBOARD YAWL—Built 1970, full cover, Ford Lehman engine, low hours, restored, newer sails. Amazing interior. Great liveaboard, berthed Honolulu. $70,000. 510–332–4900.

1963, 16′ CHRIS-CRAFT CAVALIER—283 V8 inboard motor, trailer included. Asking $7,000 or best offer. Call 608–930–2626.

Boats For Sale
continued

NEW SHELLBACK DINGHY—Professionally built to designer's detailed plans. Custom trailer included. Asking $6,500. CA, captainkipp4811@att.net or contact 559–429–4082.

COMET SAILBOAT—NEW DECK frames, decks, spars, rigging, sails. Bronze centerboard. $4,850, ronsue42c@verizon.net, 410–820–9203.

POCKET TRAWLER—2006 DEVLIN Surf Scoter 27, plywood/epoxy composite, Volvo D3-160, beautiful, fast, and efficient. Details at http://keenesignworx.typepad.com/alsek/ or 603–358–1003.

1964, 17′ CHRIS-CRAFT SUPER Sport—Excellent condition. 430 hours on original 327. Numerous upgrades. Original manuals and documentation. Trailer and cover included. $12,900 or best offer. 207–380–9173.

CULLER-DESIGNED 18′5″ SPRITsail Skiff. Cedar on oak, Shaw & Tenney oars, sculling sweep, ground tackle, boat cover, trailer. Custom built, Rock Hall Boat Shop, Burgess, VA. pedaleri@aol.com, VA. 804–526–5264.

1962 THOMPSON SEA LANCER—1961 25-hp Sea King outboard. Trailer included. $8,950. ronsue42c@verizon.net, 410–820–9203.

28′ ROZINANTE, 1982. RALPH Stanley built, cedar over oak construction, recent Yanmar 1GM10, bunks, two-burner stove, like-new condition. $125,000. Motivated seller! (ME) 207–244–5509. jallen@morrisyachts.com.

NATHANAEL HERRESHOFF NY 30, 44′ LOA, classic built in 1905, one of original 18. Completely rebuilt, ready to race or cruise. $45,000. Greenport, NY, 631–682–2068, marekminx@yahoo.com.

1917 HERRESHOFF 12½—Professionally maintained, excellent condition, successfully raced. 2001 Triad trailer. Located MA. $22,500. 508–560–0023.

1935, 25′ CHRIS-CRAFT CUSTOM Runabout—This is a rare boat (one of 76) that has been fully, professionally restored using the WEST system. Boat is powered by the original Scripps 202 engine with approximately 100 hours. Many additional pictures available, as it is in our showroom. Asking price, including tandem-axle trailer, and waterline cover, is $135,000. Antique Boat Center, 513–242–0808 or sales@antiqueboat.com, www.antiqueboat.com.

THE BOAT OF A LIFETIME: "DEVA"—L. Francis Herreshoff design #65. The only one ever built. See the feature article in *WoodenBoat* No. 157. A dream to sail and a beautiful sight to behold. This is your chance to become "Deva"'s next steward. A pedigreed ketch which has cruised the Caribbean; second in class, Eggemoggin Reach Regatta 1997. See her in Herreshoff's *The Common Sense of Yacht Design*, p. 269. Dan Brayton and Brad Story combined to faithfully interpret details of her design and construction. LOA 36′6″; beam 8′6″; draft 4′9″; displacement 16,500 lbs. Fully equipped. $65,000 firm. Tel. 207–359–2529, carl@woodenboat.com.

45′ CHESAPEAKE DRAKETAIL cruiser, 1991—FRP with West System, Cummins 210 turbo diesel with 1,000 hrs, twin disc, two stations, full electronics, electric freshwater with head, galley, v-berth, settee berth, economical. Turn-key, $70,000. Tom Kramer, 410–667–0348.

47′ COLUMBIA RIVER PILOT vessel, 1937. North Sea double-ended trawler-type hull. 2″ cedar over oak frames, new planks, refastened, deck covering, new wheelhouse. Three-year total restoration by Walt Schulz/Shannon Boat Co. to new condition. Award winner at Mystic 2010. Sleeps 4–6, stall shower, new galley. Factory rebuilt Detroit 6-71 diesel, new electric, plumbing, fuel and water tanks, cushions, windows, etc. Bow thrusters, Espar heater, inverter, windlass, stove, pumps, steering. New radar, GPS, depth, autopilot. Fascinating history, a rugged sea boat. Full specs and photos available at www.pacific-pilot-polaris.com. $175,000, R.I., 401–253–2441.

NEW HERRESHOFF 12½, Joel White. Gaff-rigged, yellow cedar planking. Call for photo and details. OH, 937–407–7415.

21′ CROSBY SLOOP—Aage Nielsen–designed keel/centerboard daysailer. Restored, mahogany on oak. Beautiful, simple, elegant. $6,500. Cape Cod. 508–428–8238, jacksween@comcast.net for photos, www.sailcloudnine.net.

1962, NEEDS ENGINE. OUT OF water three years. $5,000 or best offer. 508–645–2883, menemshamass@yahoo.com.

1938 HUCKINS 38′ FAIRFORM FLYER—Rare find, one of two made of this model, built before WWII. Plank-on-frame construction, custom-built trailer. 952–470–5005, brokerage@indoorboatstorageinc.com.

COLIN ARCHER PILOT CUTTER—"Marion D" 38′, Norwegian-built 1950, cutter-rigged, pitch pine carvel-planked on double-sawn flitch frames, white oak backbone, trunnel-fastened. $58,000. 970–626–5901, mariond.squarespace.com.

MASTER BOATBUILDER'S partially finished boat began as 18′. Grew, modified and extended to 22′. Extended lapstrake wooden hull, finished solid mahogany transom, West System epoxy resin, and fiberglass cloth on completed hull. New Cobra 4.3 litre inboard/outboard installed. Outdrive still in shipping crate. Inside flooring and seating mocked up. Gas tank installed. Most plumbing and electrical complete. $7,000/offers. 905–617–1778, howards2nd@bellnet.ca.

Boats For Free

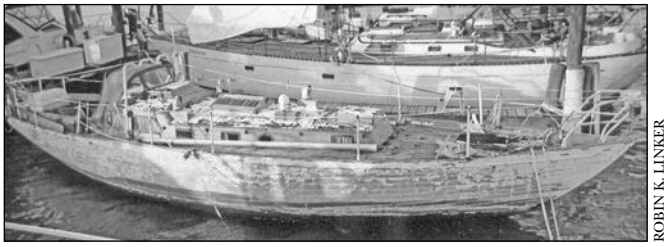
22′ HUTCHINSON BROS. lake boat. Year? Chrysler Crown flathead 6, hardware and cushions. Needs complete rebuild. In Rhode Island. 401–348–0284.

INDEX TO ADVERTISERS

THREE CLASSICS
A Cutter, a Sloop, and a Troller

FRED DOWALO

CARTER CASSEL



ROBIN K. LINKER

Three classics in need, on three coasts: *Left*—GAVIOTA, a converted troller, lies in Berkeley, California. *Top*—BANTRY BAY, a 43'7" cutter, lies in York Harbor, Maine. *Above*—DANDELION, a Robb-designed Lion-class sloop, lies in Clearwater, Florida.

East Coast, South Coast, West Coast: you can take your choice this issue. We have a boat in each location, and all three are in floating condition.

The first is a 43′7″ × 11′9″ × 6′3″ double-ended cutter now named BANTRY BAY, which lies in York Harbor, Maine. She was well built in 1934 by Pries, Baum & Mitchell of Wilmington, California, to an Edson Schock design, and since then, besides cruising the California coast, has voyaged to Africa, Europe, and South America. She's had some fairly recent frame and plank replacement, the result of a collision. There are more photos online (www.triton680.com/BantryBay.html) that show an exterior that's beginning to weather, but a fine-looking interior.

Another good cruising design lies in Clearwater, Florida. She's a 35′ Cheoy Lee Lion-class sloop (hull No. 713), appropriately named DANDELION, planked with teak copper-riveted to steam-bent oak frames. She was built in 1959 and, like BANTRY BAY, has also cruised extensively. Passages took her along the Central American coast and to the Pacific islands including Hawaii, Panama, the Florida Keys, the Bahamas, and Chesapeake Bay. She's now in the water at Clearwater, Florida. Because she hasn't been hauled for a number of years, worm damage is a distinct possibility. She's due for a total restoration according to her owner, and the photos back him up. To guide the process, designer Arthur Robb's plans are at Mystic Seaport, and DANDELION's should be among them. Her owner for the past 40 years often voyaged singlehanded, so lots of sea stories no doubt come with the boat.

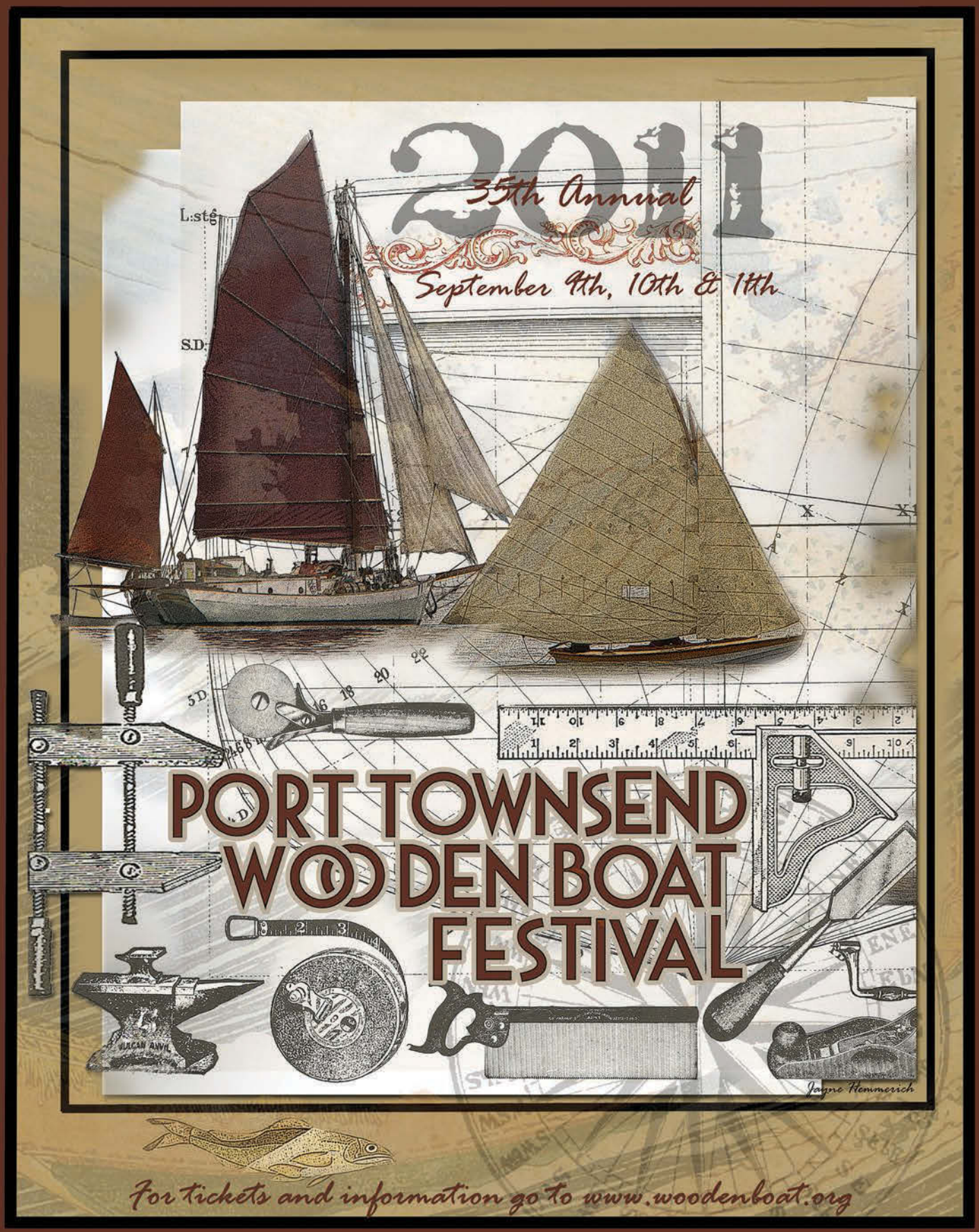
Our West Coast classic this issue is a 40′ × 12′ × 4′6″ converted troller presently named GAVIOTA. She's lying in Berkeley, California, where her owners began a refit but have decided that carrying the project to completion is beyond their means. Having been built around 1945 by San Pedro Boat Works, she was used for commercial fishing for the first part of her life and therefore not listed in any yacht register. There are conflicting stories of her history, but it is agreed that she was converted for pleasure during the 1960s with an enlarged deckhouse, expanded accommodations, and a raised sheer forward. A GM 4–71 diesel powers her now and has been recently overhauled. I understand that her hull is okay, but that there's some rot in the deck structures.

Maynard Bray is WoodenBoat*'s technical editor.*

For more information or to inspect any of these three boats, contact their owners:

- *For BANTRY BAY, Fred Dowalo at freddowalo@gmail.com.*
- *For DANDELION, Robin K. Linker, Island Yacht Club, 200 Windward Passage, Clearwater, FL 33767, or phone at 727–442–9845.*
- *For GAVIOTA, Carter Cassel at cartermoore@hotmail.com, 949–293–9358.*

Send suggestions for "Save a Classic" to Maynard Bray, WoodenBoat *Publications, P.O. Box 78, Brooklin, ME 04616.*



Boaters. They see the world differently. They talk differently. And out on the water, they even walk a little differently. How do we know? We're boaters too and have been around our share of yachts and boat yards for nearly 130 years. But boating isn't just our love, it's also our livelihood. And developing the most sophisticated coating products on the market is our passion. Which ultimately means, nobody's better equipped at helping you enjoy your passion.

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