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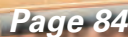
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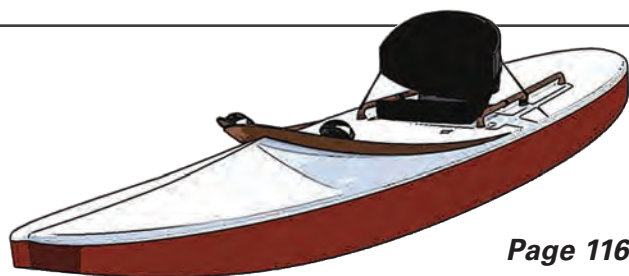


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Getting Started in Boats:

Bailers and Pumps

Jan Adkins

Cover: COMPAÑERA lies at anchor in northern Labrador. Jill Fredston and Doug Fesler have cruised this ketch-rigged motorsailer to some of the most remote places between Alaska and Atlantic Canada.

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Photograph by Jill Fredston



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A Fine COMPAÑERA

Our coverage of COMPAÑERA, the sturdy motorsailer depicted on the cover of this issue, began from a distance at the Port Townsend (Washington) Wooden Boat Festival last September. I was sharing a meal with Bruce Halabisky and Tiffany Loney, recently returned circumnavigators (see WB No. 246), at Sirens, a pub-style restaurant with an incomparable view of Port Townsend Bay. Among the numerous moored boats and vessels glowing in the twilight that evening was a distinctive-looking dragger-style yacht. Bruce and Tiffany had visited aboard her earlier in the day and met the owners, Jill Fredston and Doug Fesler.

Jill and Doug had an amazing story and a beautifully adapted boat, Bruce and Tiffany told me. That's high praise from a couple who spent 11 years circling the globe—much of that time with two daughters born along the way. Jill and Doug, they said, had acquired their boat, COMPAÑERA, in order to indulge their penchant for wilderness rowing—a passion that had carried them, over the course of nearly 20 summers, 25,000 miles through remote northern places. In her article beginning on page 58, Jill writes that in a larger cruising boat they sought passage “through scary or boring stretches of coast by big boat” but also the freedom to explore “the interesting intricacies by oar.”

Jill and Doug and I never met at the festival. They were anchored out for the weekend and I was absorbed with the show. But I made a note after my conversation with Bruce and Tiffany: “Get in touch with owners of dragger-style yacht. Wilderness rowers.” Later, Ethan Cook, an old friend from Maine now transplanted to the Pacific Northwest, seconded the motion. A friend of Jill and Doug's, he put us in touch after the show. I asked Jill if she'd be interested in telling their story—which I knew only peripherally at that point. Her response, describing their trip, was nothing short of breathtaking: It included Alaska, Mexico, Patagonia, The Falkland Islands, Brazil, Mystic, and Labrador—and many “interesting intricacies” in between. Fascinated with this ambitious cruise track, we editors did not hesitate in our pursuit of the story.

So as to not risk spoiling the narrative, I'll limit the introduction to that and leave it to Jill, in her incomparable style, to tell the full tale of her amazing six-year journey with Doug in COMPAÑERA.



Speaking of journeys: *WoodenBoat* is on one of its own, and the magazine you hold in your hands marks a noteworthy waypoint: This is our 250th issue.

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Gerhard Rønne's RUNAs

Dear *WoodenBoat*,

This is an interesting complement to the Gerhard Rønne story in *WoodenBoat* No. 248. When searching for a photo album on my bookshelf, I accidentally found an old yearbook from Svenska Kryssarklubben (the Swedish Cruising Club) from 1925, which I inherited from my father. With curiosity I began looking through the book and found a long article (32 pages) that was in fact a logbook from a long cruise made by Gerhard Rønne from Denmark via Sweden into the Norwegian fjord archipelago as far as the famous Sognefjord, and then back again to Denmark. The boat he sailed was RUNA V. According to the text, RUNA V was a bigger boat than what is described under the sketch in the *WoodenBoat* article; she is more like RUNA II.

This is the description of RUNA V in Gerhard Rønne's own words, translated from Danish:

RUNA V is a 5½-ton cruiser, 9.95m LOA, 2.32m beam, 1.45m draft, and sail area, without the topsail, 55.6m². She was built 1920 by Nielsen Brothers in Skogshoved after my design.

My idea is to have a seaworthy, solid, and spacious boat well suited for long sailing tours. The self-bailing cockpit is quite small and so is the cabin. This allows the 2.6m dinghy to be stowed upside down on deck. The cockpit has a small bridge deck where the compass is placed. The stove is on the port side near the door so that you can move it outside in fair weather....

Inside there are two settees separated from the stove aft with a bulkhead. In the forward bulkhead there is a door to the WC and forward locker. The three lower sails have enough area in most cases, but when sailing long distances in moderate winds the topsail is very useful. Considering the Norwegian fjords, we have acquired a 2½-hp outboard motor. However, we did not have enough time before our departure to learn how to use such a capricious object, so therefore we did not use it very much. On the other hand, we had good use of a pair of 12' oars. Considering the long cruising, the boat was adequately equipped.

RUNA's cruising began June 16, 1920, from Skogshoved, Denmark, and ended in Copenhagen July 27, 1920. The total distance was 1,326 nautical miles (20 with the small outboard motor, which was not very powerful for a boat with a displacement of 5½ tons).

Björn Magnusson
Boge, Gotland, Sweden

In WoodenBoat's longstanding usage, LOA refers to hull length overall. RUNA V's LOA was 27'9" (8.45m). Her "sparred length," from the end of the boom aft to the tip of the bowsprit forward, was 32'8" (9.95m), which matches the quoted 1925 description. The draft and beam also match. Jacques Taglang's book recorded sail areas from Lloyd's Yacht Registry (61.1 square meters) and the magazine Sejlsport (55.6 square meters, matching Rønne's account). The difference, 4.5 square meters (48 sq ft) is accounted for by the topsail, which Rønne specifically omits in his report.

It's hard for us to know which boat Mr. Magnusson's



In a Swedish Cruising Club yearbook of 1925, reader Björn Magnusson found yacht designer Gerhard Rønne's account of a voyage in RUNA V.

noted comparison refers to, but we assume it is RAN II, sister to RUNA, both 31'9" (9.73m) LOA. (The designer felt that RAN II occupied the second design position, so named the second yacht built for himself RUNA III; there was no RUNA II.)

—TJ

PIPE DREAM

Good Morning Matt,
Congratulations to *WoodenBoat* and Rob Mazza. His story of PIPE DREAM and Metro Marine was of great interest for Canadian readers. In 2007, I spent a lot of time researching and privately published a small 20-page booklet on the history of Northern Shipbuilding & Repair Company Limited (NSB&M) of Bronte, Ontario. NSB&M was the former occupant (circa 1946–1954) of the building that Rob writes about as being Metro Marine. The booklet is on file with the Bronte/Oakville Historical Society.

Joe Fossey, Sr.
Barrie, Ontario

Beautiful Book Design

Dear Editor,
I enjoyed John Summers's review of *L. Francis Herreshoff, Yacht Designer* (WB No. 249), published by Mystic Seaport. Along with his interesting review of the subject, I liked seeing the photo reproductions of the book's page layouts that accompanied the article. It often seems that the craft and art of boat design and the craft and art of book design share quite a few attributes, with both



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endeavors resulting in objects that range from the serviceable and workaday to the artful and gorgeous to the memorable folly. Mr. Summers shows a real appreciation of the book itself—its design and its production values—and how it reflects the artistry of L. Francis Herreshoff.

I also like that Mr. Summers notes the care that Mystic Seaport took with overseeing the publication. Well-designed boats deserve well-crafted publications. However, real credit should go to the book's designer, whose name was ironically missing. It takes a team effort to make a successful yacht or a successful book. But as with yachts, it is the designer who *creates* the look and feel we long admire. The book's designer deserves to be mentioned.

Thanks again to *WoodenBoat* and Mr. Summers for the review.

Mason Singer
Montpelier, Vermont

As Mr. Singer notes, it takes a team effort to create a work as beautiful as L. Francis Herreshoff: Yacht Designer, and author Roger Taylor acknowledges a number of people at the beginning of the book. Trish Sinsigalli Lapointe was responsible for the book's design.

—Eds.

Ray Hunt's Shoalers?

To whom it may concern:

After reading the review of *A Genius at His Trade* in WB No. 248, I purchased the book and am finding it very interesting. I had thought I knew a lot about Ray Hunt but was sadly mistaken.

The most interesting design, to me, is the "Shoaler" series. There is some sparse information in the book and on the Internet, but just enough to further spark my interest. Is it possible that there is more detailed and descriptive information somewhere? If there is, I'd appreciate your letting me know about it. Would you know if there are any surviving boats? Any information would be welcome.

Thanking you in advance.

Neil Barney
via email

The historical archives of C. Raymond Hunt reside in the Ships Plans Collection at Mystic Seaport (www.mysticseaport.org). Our cursory inspection of their online list shows that the collection includes drawings from the Shoaler series.

—Eds.

Another Solution

Dear *WoodenBoat*,

Dr. Richard Jagels's Wood Technology column (WB No. 248) on compressive set was highly informative and well-written. The section on solutions, however, omitted a simple and perhaps the most effective method to swell a large plank-on-frame boat before caulking or launching. Use of drip hoses and sprinklers to apply water to

the outside of a hull may help maintain moisture content but will not swell dry planks effectively. It's easier and more efficient to "tent in" the hull and use a portable industrial ultrasonic humidifier to swell the planks.

Over the past 14 years we conducted a very extensive restoration of our 43' Alden schooner BLACKBIRD (design No. 309Q). We have used this method to swell the boat and help maintain moisture content of the planks for about eight years. With the exception of new angelique garboards, BLACKBIRD retains virtually all her original 85-year-old longleaf pine carvel planking. Based on plank-gap measurements, we estimate that old-growth longleaf shrinkage ranges from 3 to 6 percent. Several years before relaunching, when the planking was at its driest, we reefed out the underwater seams. Before caulking in 2015, several planks had shown a tendency to shrink back to the point where a pencil could be passed between them. This did not cause us concern, since we knew we could easily swell even those planks tight before caulking. To do so, we tented in BLACKBIRD's bottom from above the waterline with shrink-wrap, with the bottom edge of the plastic held down with gravel ballast. Perforated drainage pipe was laid under the hull, one run per side, and attached to the humidifier, which was located on the outside of the "tent." Access under the boat is maintained through zipper doors. A garden hose provides water to the humidifier, which converts about 30 gallons of water per day (1,750 lbs/week) into cold mist.

Since migration of water moisture back into the planks is limited by capillary forces and diffusion, the swelling requires time; in our case about four to six weeks (7,000 to 10,000 lbs of mist exposure). Within about 15 minutes of starting the operation, the area encapsulated by the tent is at 100 percent humidity—Maine fog, so to speak. The surfaces of the planks will remain fairly dry for two to three weeks as water migrates back into the planks. The surfaces of the planks will start becoming wet as moisture content increases, after which the planks will begin to swell noticeably and the planking seams close. After four to six weeks, the hull is ready to be caulked with cotton. Even the seams that a pencil could be passed through closed tight. Moisture content is then easily maintained by turning the system on when needed until the seams can all be caulked and finished with seam compound.

Caulking an old boat is a challenge for many reasons, but dry planks do not need to be one of them. When caulking BLACKBIRD, we used only a fine caulking iron to roll the cotton into the seams, tighten it, and set it, rather than using larger irons. But that would be another discussion all in itself.

We hope this information is helpful to other owners. If a boat is dry, there is no need to panic, and certainly no need to cause damage by overcaulking.

The Thompsons
Schooner BLACKBIRD
Freeport, Maine



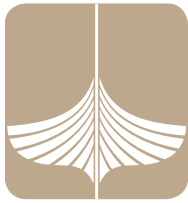


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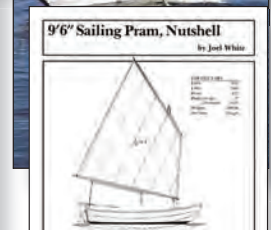
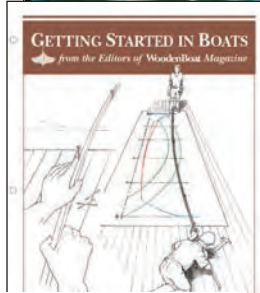
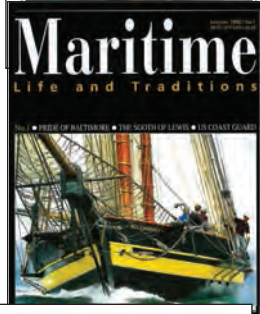
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This 10'2" dinghy includes 26 pages of instructions, and two sheets of plans. #152-001 **\$30.00**

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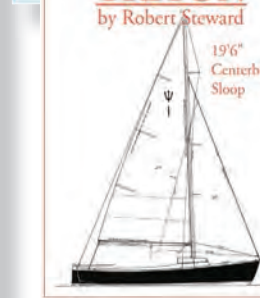
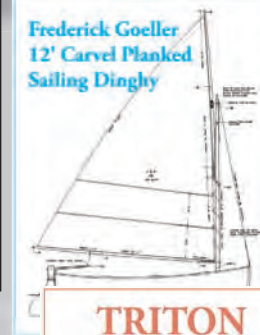
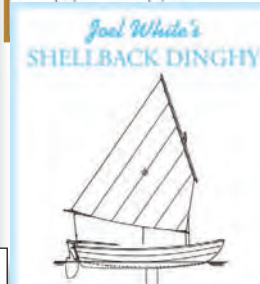
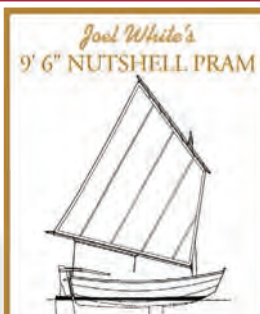
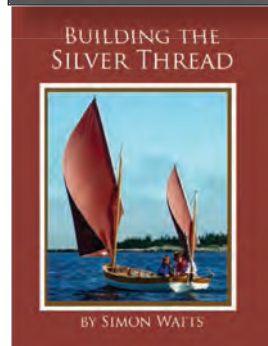
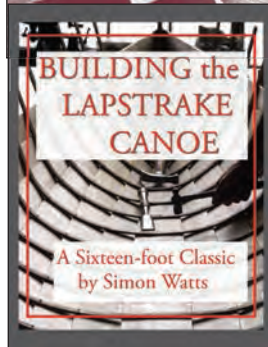
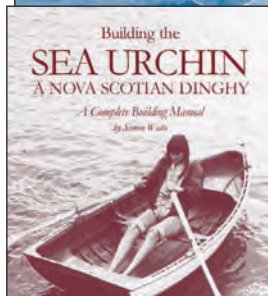
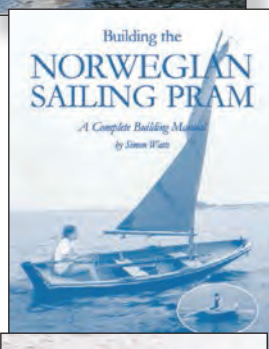
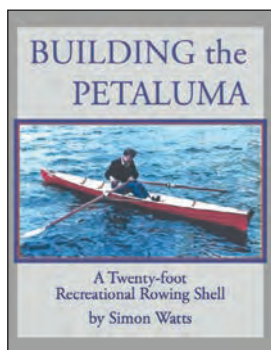
This canoe is 16' long with a 34" beam. Digital file includes two pages of plans, plus 32 pages of instructions. #152-003 **\$30.00**

Building the Petaluma

A 20' recreational rowing shell; the digital file includes two pages of plans and 38 pages of instructions. #152-004 **\$30.00**

Building the Silver Thread

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Barbara Anne

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COURTESY OF POLYNESIAN VOYAGING SOCIETY

Some old advice, brought up to date

by Tom Jackson

*"To young men contemplating a voyage
I would say go."*

This sentence, **Joshua Slocum's** advice from the appendix to *Sailing Alone Around the World* of 1900, **needs editing** these days. Foremost, it should be directed equally at young women, not just young men. Come to think of it, "young" needs work: Modern oceanic voyagers are both much younger and much older than the good captain could ever have imagined. Solitude still works, but of course on social media you can be alone with everyone. The old merchant mariner might have been amazed, too, that these days teams of people go to sea as volunteers, each person making a better person of the others and the boat making better people of them all.

These changes in seafaring would come as no surprise to the crew of two long oceanic voyages that are converging on the U.S. eastern seaboard this year from opposite ends of the Earth. One is a double-hulled voyaging canoe from Hawaii, the other is from Norway, the largest-yet representation of a ship from the Viking age. Both celebrate ancient cultures famous for their total dependence on boats, long voyaging, and large crews sharing confined space.

Look to the Pacific to ponder any concept of voyaging. Untold generations of seafarers populated islands by crossing thousands of miles of open ocean in simple but elegant boats that came as a shock to early European explorers. In the 1970s, scholar-sailors set out to reconstruct canoes and restore cultural pride by demonstrating how Pacific populations migrated—and especially how they navigated. One of the first of these was **HOKULE'A**, which as of this writing

HOKULE'A, a reconstruction of a Pacific voyaging canoe, was built in Hawaii in 1975 and is currently on a world tour. She is expected to be at Mystic Seaport in Connecticut in time for The WoodenBoat Show, June 24–26.

was nearing Cuba midway through a **world tour** (see www.hokulea.com). Her visit to Mystic Seaport in Connecticut is expected to coincide with The WoodenBoat Show, to be held there June 24–26. **HOKULE'A**, a 62' LOA double-hulled sailing canoe, was originally built in 1975 of layers of light plywood sheathed in fiberglass and epoxy, enormous koa logs being unobtainable. She was rebuilt in the mid-1990s. (A second Polynesian Voyaging Society canoe, **HIKIANALIA**, a 72' fiberglass-hulled boat with solar-electric auxiliary power, will sail the U.S. West Coast this year, then to Panama, where she will rendezvous with **HOKULE'A** for a joint voyage back to Hawaii.) **HOKULE'A's** purpose was always tied to voyaging culture more than original construction, and during her first passage from Hawaii to Tahiti, Mau Piailug served as her navigator, teaching a universally admired art that was very nearly lost to the world.

Cultural pride is also at the heart of **DRAGON HARALD FAIRHAIR's transatlantic voyage** this year from Norway to numerous destinations in the Great Lakes, then down the canal and river system to New York City in September and Mystic Seaport in October. (See www.drakenexpeditionamerica.com and also Matt Murphy's review of a book about the ship on page 102.) She'll stop along the ancient Viking track in Iceland, Greenland, and Newfoundland on the way. At 114' LOA, she is the largest of many modern ships representing the Nordic boatbuilding expertise of a thousand years ago, and there is no question about the authenticity of her construction. An extraordinary piece of work, she's huge...bigger than any replica the Danes have built so far.

Having sailed one such voyage, in a 98-footer, from Dublin to Denmark (see WB No. 206), I can say with certainty that

the shared intensity of these voyages will forge lasting friendships for the men and women aboard. Such camaraderie is powerful, formed even during a few fleeting weeks out of a long and varied lifetime.

Another kind of voyager, however, hews closer to Slocum's style, going it alone, often in smaller and smaller boats with greater and greater ambitions. This year, for example, adventurer **Howard Rice** will sail a 12' **John Welsford**-designed **Scamp** extensively in the islands of **Tierra del Fuego**, Chile, where almost 30 years earlier he doubled Cape Horn in a 15' folding canoe. (Updates on the preparations can be found at www.forum.woodenboat.com; a film is planned.) Of course, kayak voyaging can lead to other things, as shown in the article on **COMPAÑERA**, starting on page 58. And to counter Slocum's reference to "young men contemplating a voyage," I offer the example of **retired scientist Dr. Deb Walters**, who in February 2016 completed a **2,500-mile voyage** from Troy, Maine, to Guatemala in a modified **18' plywood kayak** from Chesapeake Light Craft. Like many a modern solo voyager, she had more than a trip in mind—she raised some \$425,000 in aid for children and families living in a garbage dump in Guatemala City. (She wrote about her experiences in blog form; see www.kayakforsafepassagekids.blogspot.com.)

The world is more complicated than in Slocum's times, and many people simply can't take months or years to indulge a voyaging habit. If we have families and work we love, we take shorter voyages. If money is limited, we make smaller boats. If opportunity arises, we volunteer for a few weeks. Slocum set the pattern from the first, for all successors—to do it as best you can, then tell the tale, and tell it well. It was said of one writer—I can't recall which: E.B. White? James Thurber?—that in the right hands the story of a row across a Central Park pond could compare with any voyaging epic. True, even if the tale is merely told over dinner.

Something deep in human instinct sees a river, bay, or ocean, and feels the need to cross it. The instinct is as ancient as all of us, as new as a fresh breeze. One word of Slocum's sentence needs no editing: "**Go.**"

Tom Jackson is WoodenBoat's senior editor.

Around the yards

■ **BARLOVENTO**, a 1932 Maine-built schooner, is undergoing an extensive refit at **Jespersen Boatbuilders** in **Sidney, British Columbia**. "The project to replace a number of deckbeams and redecking has grown, in the inevitable manner," proprietor Eric Jespersen writes, "to include replacement of sheer planks, transom, all deckbeams, the top 3' of the stem, and of course the deck. Beams are laminated Douglas-fir, and decking will be two layers of 12mm plywood, with a laid deck over the top," using either teak or a suitable substitute. The schooner, 64'5" LOA, was designed by Cox & Stevens and built for Pierre duPont at the F.F. Pendleton yard in Wiscasset, Maine. Her new owners, who hail from Germany, intend significant world cruising, Jespersen reported. The work so far has been done while the schooner remains afloat in a covered boathouse. "Spring will see **BARLOVENTO** hauled out," Jespersen said, "with our focus shifting to planking repair and repainting the topsides and bottom. The rig will get some attention at the same time."

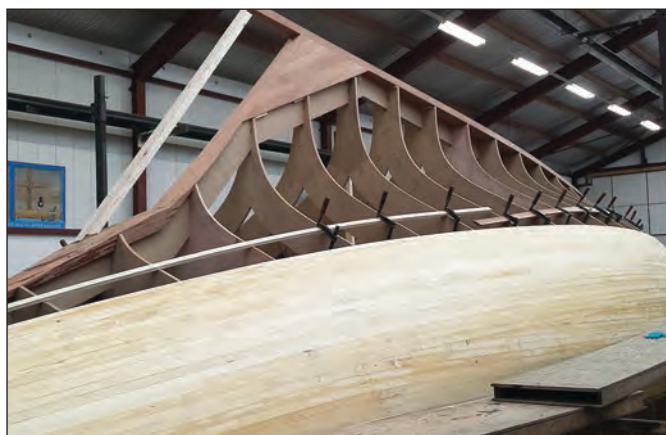
The 1932 schooner **BARLOVENTO** is currently undergoing an extensive refit at **Jespersen Boatbuilders** in **North Saanich, British Columbia**.



COURTESY OF JESPERSEN BOATBUILDERS

(See more from Jespersen in the SAGA article on page 40.) *Jespersen Boatbuilders*, No. 39, 2300 Canoe Cove Rd., North Saanich, BC, V8L 3X9, Canada; 250-656-2581; www.jespersenboats.com.

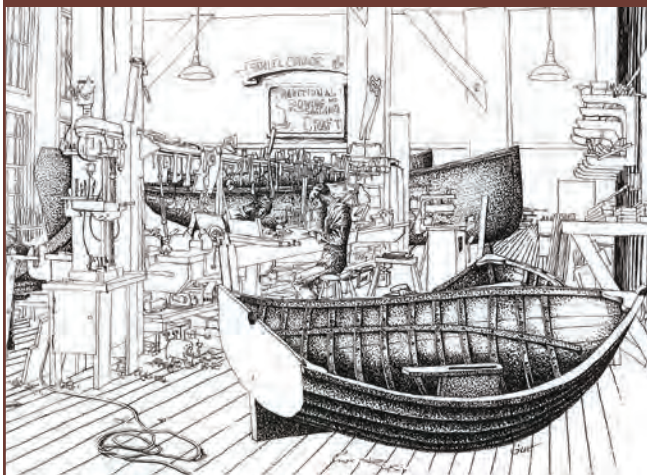
■ A new yacht built to a 1954 design by **Sparkman & Stephens** is under construction in **Enkhuizen, Holland**. "We received the order to build a 56' yawl to the design of **IMPALA**, originally commissioned by James Farrell and built at Abeking & Rasmussen in Germany," Hans-Peter Baars writes from the **Ventis Shipyard**. "IMPALA comes from the line of amazingly pretty, fast, and seaworthy yawls by Olin Stephens. The original IMPALA is still going strong and cruises the coasts of Europe; however, a friend of the owner was so enchanted with the yacht that he discussed building a sistership. The plans were ordered from S&S, and Ventis was selected as the builder." The hull will be cold-molded using quarter-sawn Alaska yellow cedar but otherwise matching the original specifications, with a 2017 launching anticipated. "It is smiles all over at the yard, something that comes naturally with



COURTESY OF VENTIS SHIPYARD

A modern cold-molded rendition of **IMPALA**, a 1954 yawl designed by Olin Stephens, is under construction at **Ventis Shipyard** in **Enkhuizen, The Netherlands**.

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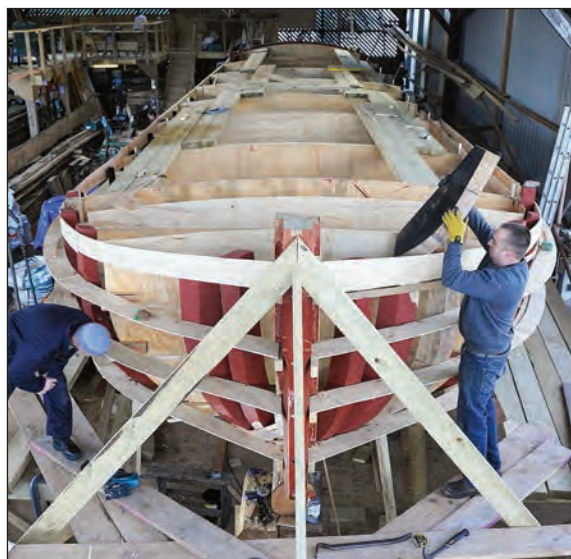
CURRENTS

the excitement and opportunity to build a thing of true beauty,” Baars wrote. Wooden masts and spars will be built by Brasker Masten in Enkuizen. *Ventis Shipyard BV, Vlakwater 7, 1601 EV Enkuizen, The Netherlands; +31 (0) 228-312-542; www.ventis.nl. Brasker Masten, www.braskermasten.nl.*

■ “There was disbelief when the crumbling remains of the 1910 wooden barge **GEORGE** arrived at **Baltic Wharf** in **Totnes** in June 2015,” Nic Compton writes from **England**. “Local boatbuilder **Bobby Cann** had been tasked with the job of restoring her ‘to her former glory,’ but few believed she would ever float again. Six months and several lorry-loads of timber later, the futtocks were being cut for the last few frames, and the first 2”-thick oak planks were being hung. The great piles of timber surrounding the yard were gradually being whittled away, as a magnificent bluff-bowed barge reemerged from the clouds of sawdust.

“**GEORGE** is the last surviving transom-sterned ‘short boat’ from the Leeds & Liverpool Canal in northern England. Built in 1910 for the Wigan Coal and Iron Co., she carried coal, iron ore, and stone on the canal until the 1970s. Her method of propulsion was 1-hp—literally, one horse, which towed her by means of a long rope. At one time, around 64 such barges were in operation, of which only four survive today: three double-ended versions and **GEORGE**. After being decommissioned in 1972, **GEORGE** was acquired by the Boat Museum at Ellesmere Port and underwent extensive restoration in 1984–85. The museum was unable to keep up with her maintenance, however, and in 2013 a Heritage Lottery fund of £147,300 (about \$210,000) was awarded for the restoration of two boats: **GEORGE** and **MOSSDALE**, an 1860 ‘Mersey flat’ (i.e., wooden barge) also owned by the museum (by now renamed the National Waterways Museum).

“Cue Bobby Cann. Bobby has been based in South Devon since the 1970s, when he pulled into Brixham for a few repairs to his own fishing boat and, in his own words, ‘never left.’ He built several wooden fishing boats in Brix-

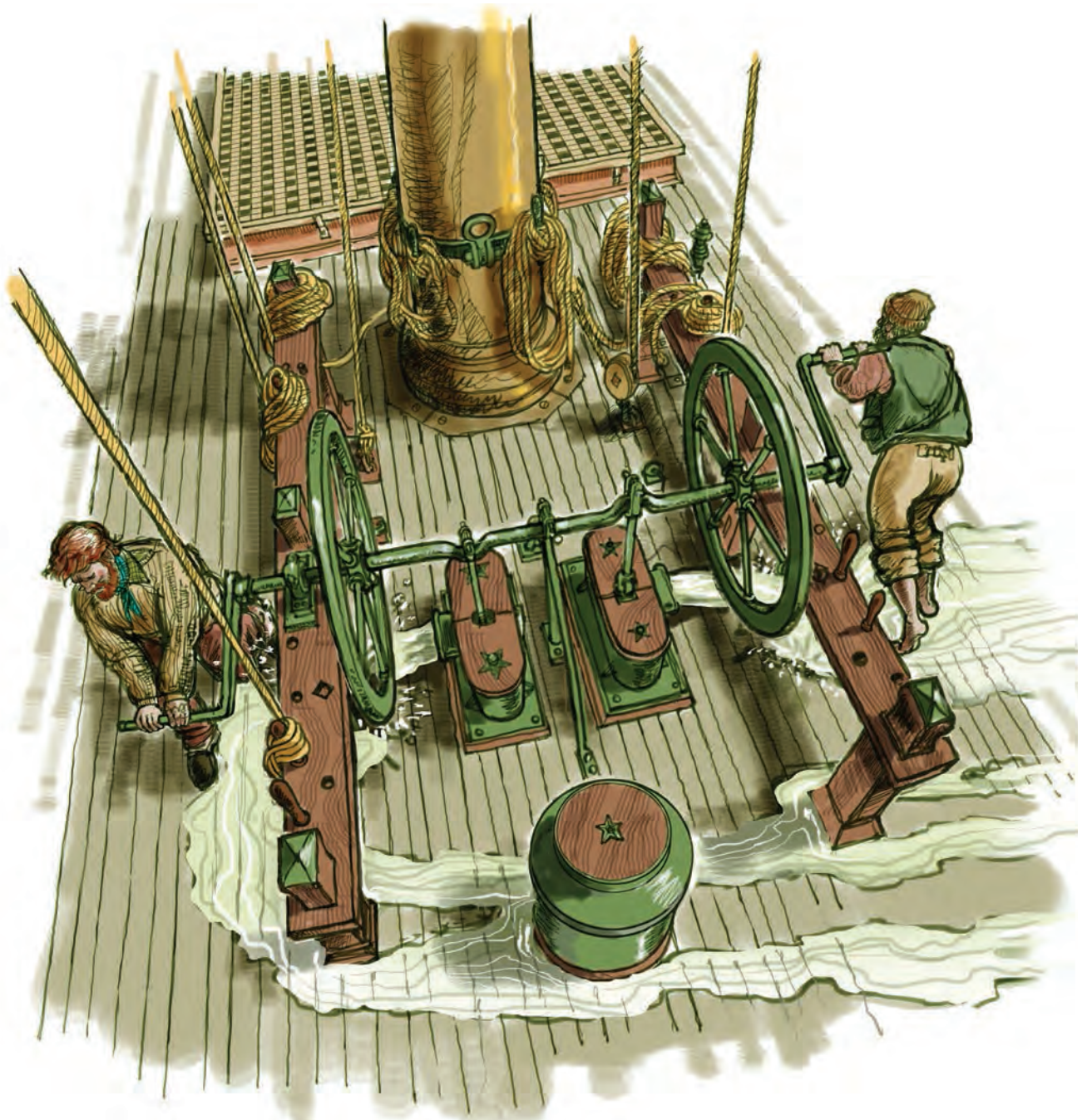


Boatbuilders in Totnes, England, have been rebuilding **GEORGE**, the last canal barge of her type. Built in 1910, she was used for hauling coal, iron ore, and stone on the Leeds & Liverpool Canal into the 1970s.

GETTING STARTED IN BOATS



from the Editors of WoodenBoat Magazine

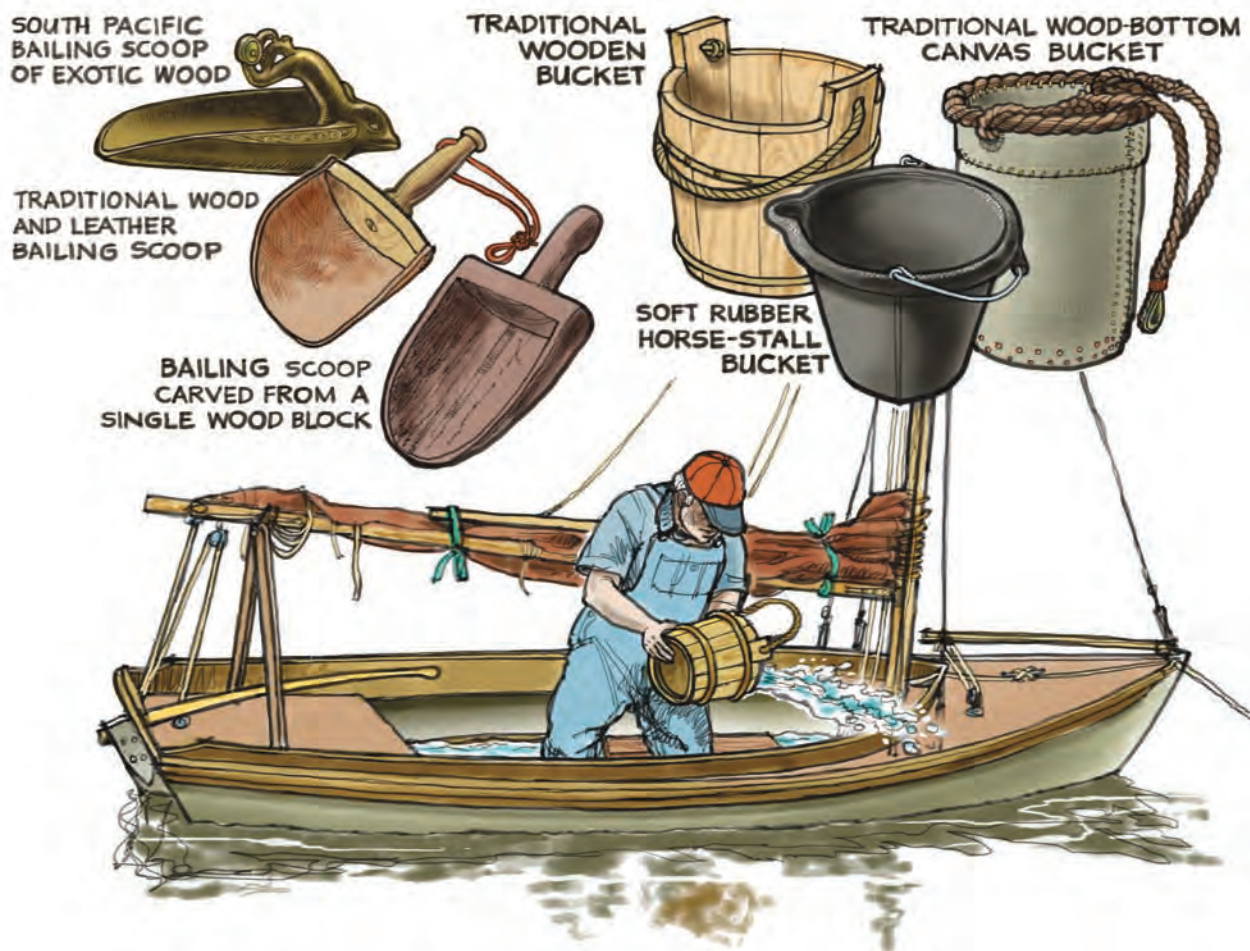


Volume 57

Bailers and Pumps

BAILERS AND PUMPS

Text and Illustrations by Jan Adkins



Everything orderly devolves into chaos. That's the principle of entropy. Mountains tumble, ravines fill up, walls collapse. And a sailor's feet will eventually get wet. The hull, deck, and coachhouse of your boat—although conceived intelligently, built thoughtfully, and maintained lovingly—will admit water at some time, be it a drip directly

over your bunk or a torrent into the bilge. Boaters accept this predestination and prepare cleverly for it: The prudent mariner is ready at any time to pump ship.

Since the Pharaohs floated upon the Nile and before, sailors have spoken this truism in many languages: "The best bilge pump is a scared man and a bucket." A stout bucket,

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worked desperately, can shift a mighty amount of water.

Our best advice features no high technology: seize a large-volume container and pitch water out—through a hatch, into a self-draining cockpit, or over the side. Know where that bucket is and how you plan to use it. It's the cheapest and most efficient water expeller you can have, and you can use it to wash dishes and decks, too. Two buckets and two crew members, sufficiently motivated by water coming, say, through a collision rift in the hull, are even better.

An oak or cedar bucket with a rope bail is a traditional tool aboard wooden boats, and much-praised by L. Francis Herreshoff. It floats, it works, it's handsome. The palm-and-needle stitched canvas bucket, with or

without a wooden base, is even more traditional, a part of Hervey Garrett Smith's marlinespike craft. Boaters may not be familiar with the black rubber horse-stall bucket but can appreciate its easy price and its refusal to scratch woodwork.

The bailers shown here are traditional for small boats and modest sailing craft. The exotic example from the South Pacific is an illustration of art transforming a working essential to a beautiful object, perhaps to soften a disagreeable chore. The leather-and-wood bailer, and its even simpler carved brother, were familiar tools in the ships *VASA* and *MARY ROSE* five hundred years ago. Any of the three examples would be welcome in bailing an open boat today.

Some leaks are catastrophic, some are nuisances. Getting started in boats most often involves small, open daysailers where only a few gallons of water will wet your bottom. Simple mechanical pumps, probably like those used by the Pharaoh's bargemaster, are appropriate and even satisfying: Sending rot-inducing rainwater overboard with a hand pump feels like progress. *WoodenBoat* has detailed a few basic wooden pumps you might make in your shop (WB Nos. 178 and 243). They utilize leather one-way flap valves at the bottom, and push-rod "lifters."

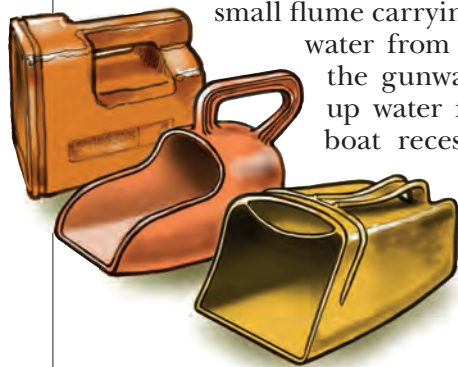
BAILERS AND PUMPS (CONTINUED)

Water is lifted up through an opening flap-valve, then out the spout on the up-stroke, but the flexing downstroke against the one-way flap doesn't affect the column of water. That's all there is to it, and the same principle applies to the familiar water pump in young America's kitchens, and to the galvanized steel and the brass lift pumps used in boats throughout the past century. The logistics of a small flume carrying the lifted bilge-water from the lift pump to the gunwales is plain: pick up water from the deepest boat recesses and carry it overboard.

Even without a mechanical pump you can bail your boat. What's wanted is a flexible lip

that will conform to the curves of your boat and a capacious gatherer of water. Plenty of commercial bailers are sold, like the ones on the left, but many boaters prefer to fall back on recycling detergent, milk, or bleach bottles. True, we may refer to fiberglass boats as "Clorox bottles," but we respect the watertight integrity of a Clorox bottle.

All "craft" bailers are works in progress. You're not spending money or much time on them, so you're at leisure to experiment. Mark a likely scoop contour that will leave good bilgewater volume in the bailer, and cut away with a utility knife with a new blade. Friction-tape the top closed. Does it work perfectly? If not, then try another.



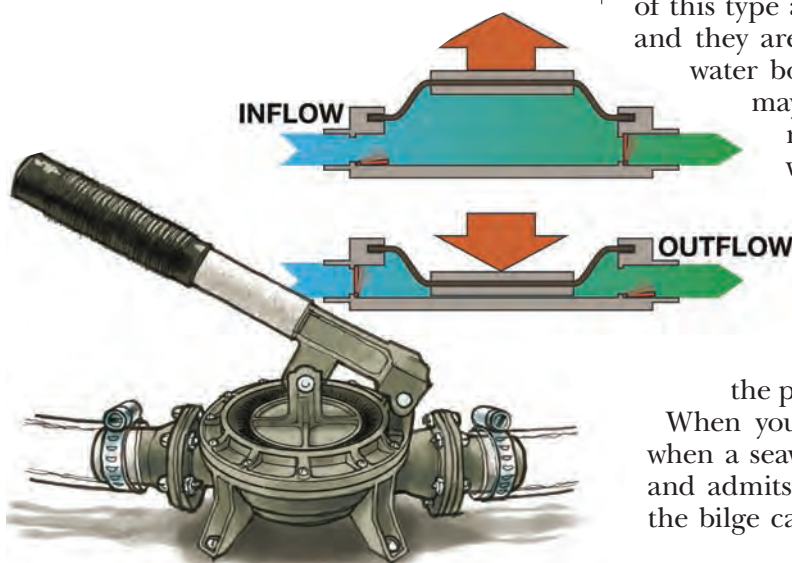
PERMANENTLY INSTALLED PUMP TYPES

Getting started in boats may involve a small cruising vessel sleeping on a mooring, vulnerable to leaks. Such

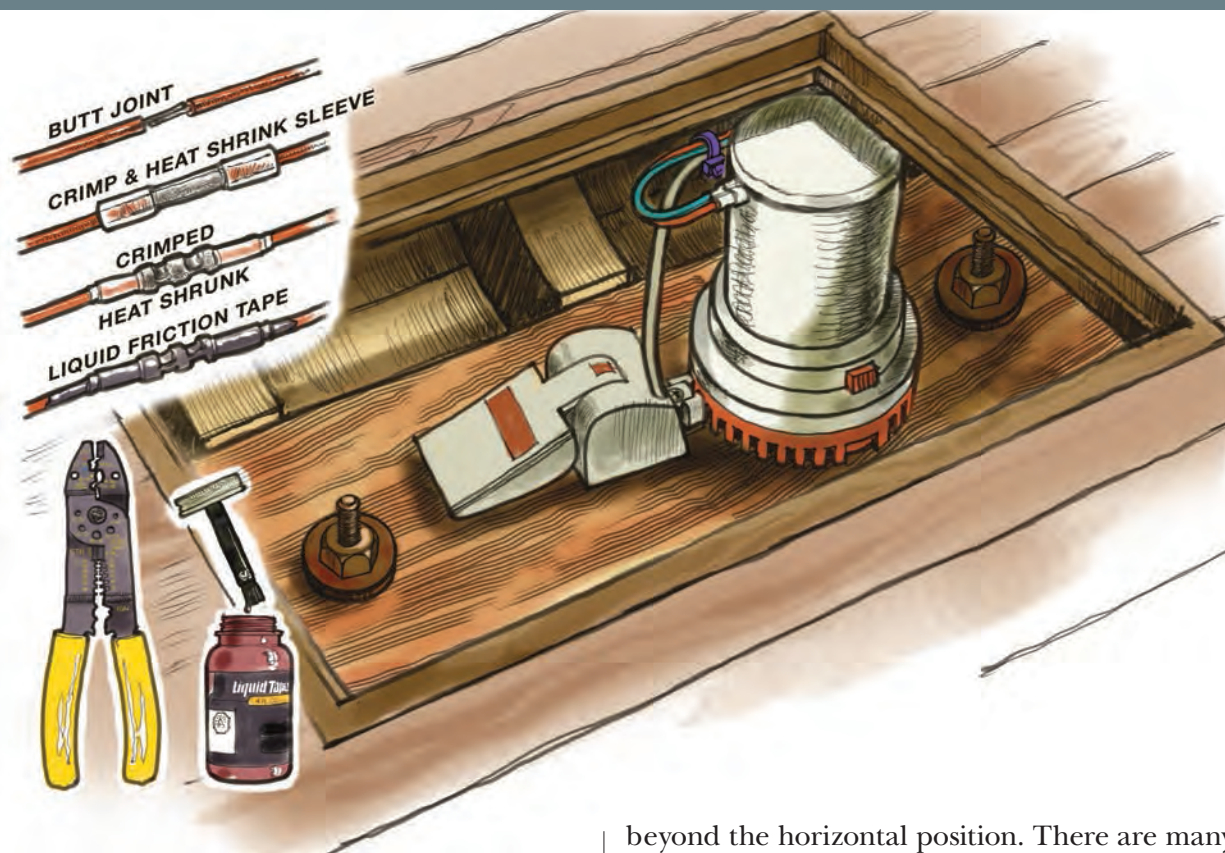
a boat might need to be pumped out each time you arrive aboard, and a hand-stroked diaphragm pump might be the tool of choice for this. Pumps of this type are rugged and move a lot of water, and they are also standard equipment in blue-water boats: Keeping up with a leak at sea may well depend upon such a permanently installed diaphragm pump with a handle convenient to the helm.

This pump is not much more involved than the lift-pumps. It consists of two one-way valves and a rubber diaphragm that expands and compresses to squeeze a volume of water through the pump.

When your boat is alone for many days, or when a seaway promotes "working" of the hull and admits a bit more water, accumulation in the bilge can be addressed by an electric bilge



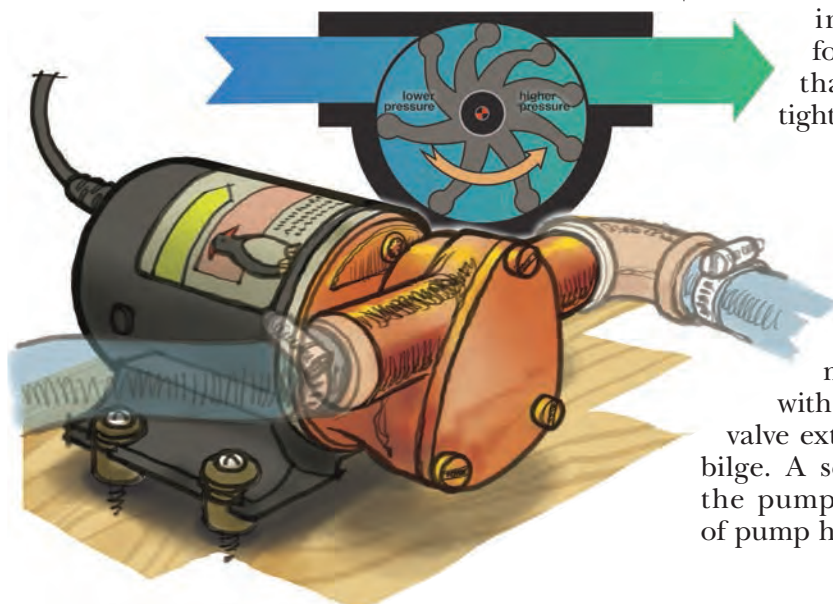
PERMANENTLY INSTALLED PUMP TYPES (CONTINUED)



pump. This is well-established technology. The typical arrangement consists of a plastic-bodied pump with a hard-plastic impeller in its base, an electric switch, and a discharge hose leading to a through-hull fitting. The electric switch is activated when it floats in rising bilgewater to

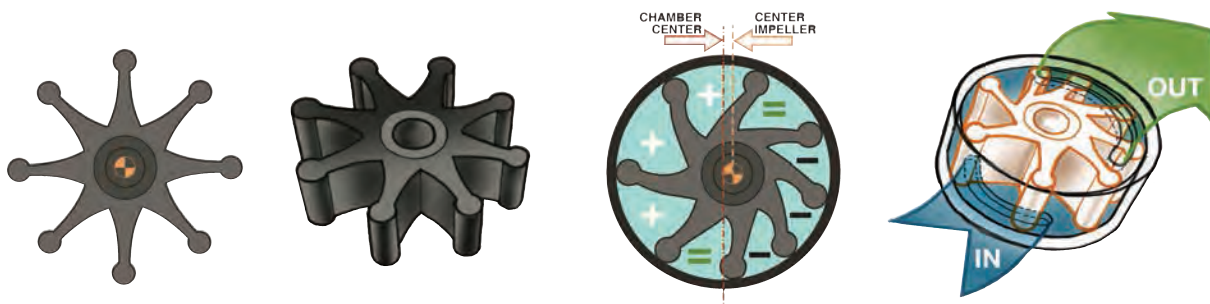
beyond the horizontal position. There are many contemporary variations on the basic, time-honored unit shown here. Some of them have switches built right into the pumps. Others dispense with the float switch altogether, and instead “sample” the situation at specified intervals; if water resistance is felt, then the pump will keep on running. The most recent

variation on the switch-and-pump theme includes a low-profile pump body and foot (the portion that picks up water) that can be configured for a variety of tight situations.



A multipurpose “impeller” pump can also be used as a bilge pump. The advantage of this type of setup is that the pump itself can be mounted anywhere, thus keeping the electric motor out of the harsh bilgewater. The pump body may be mounted on a convenient bulkhead, with a pickup hose equipped with a foot valve extending from it into the depths of the bilge. A separate discharge hose leads from the pump to a through-hull fitting. This style of pump has a many-armed rubber impeller set

PERMANENTLY INSTALLED PUMP TYPES (CONTINUED)



into a housing slightly smaller than its unconfined diameter. Its spin-axis is offset from the housing's center. Each time the impeller revolves, the inter-arm spaces on one side are being reduced, and the spaces opposite are expanding. Water is drawn into the pump by the expanding spaces, then pushed out by the

compressed spaces. There are alternative geometries for impellers, but they all depend upon the longevity of the impeller, flexing many times per second.

The prudent mariner replaces his impeller each season, and always keeps a spare one aboard, along with the tools to replace it.

BILGE PUMP INSTALLATION

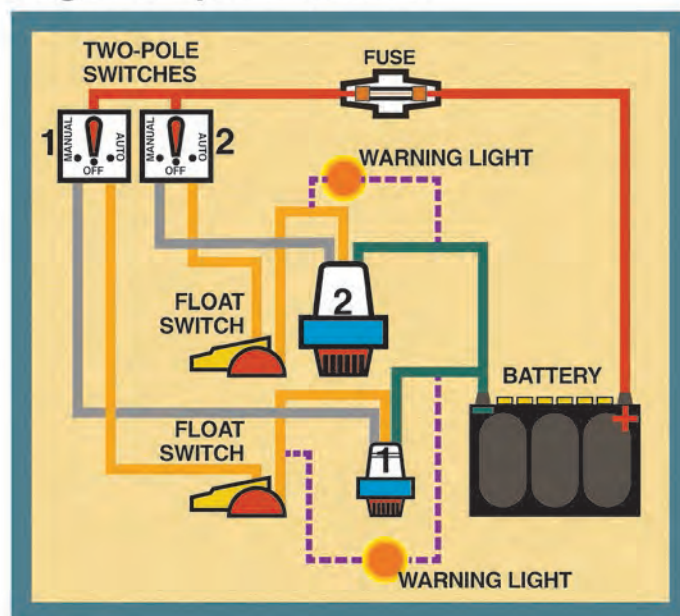
The “plumbing” of pumps is straightforward, but be wary of fluid dynamics. An improperly plumbed pump can actually siphon water back *into* the boat, potentially sinking it.

Pumps are connected to smooth hoses sized to fit the output and corresponding through-hull fitting. Corrugated hoses, though sometimes used, create a friction that reduces the efficiency of your pumps. The connections are force-fit and then secured by stainless-steel hose clamps—two of them for each connection. All this good advice means little if you don't get into the bilge and inspect those hoses and their clamps several times a season.

We're showing a dual-pump configuration (see page 8). The American Boat and Yacht Council (ABYC; www.abycinc.org) recommends that the discharge in a powerboat be above the waterline when the boat is heeled 7 degrees. In a sailboat, the ABYC recommends that the discharge be lo-

cated *at or above* the maximum heeled waterline—unless there's a seacock installed on the discharge through-hull fitting, and there's a vented riser loop, as shown here, extending

Bilge Pump Electronics



BILGE PUMP INSTALLATION (CONTINUED)

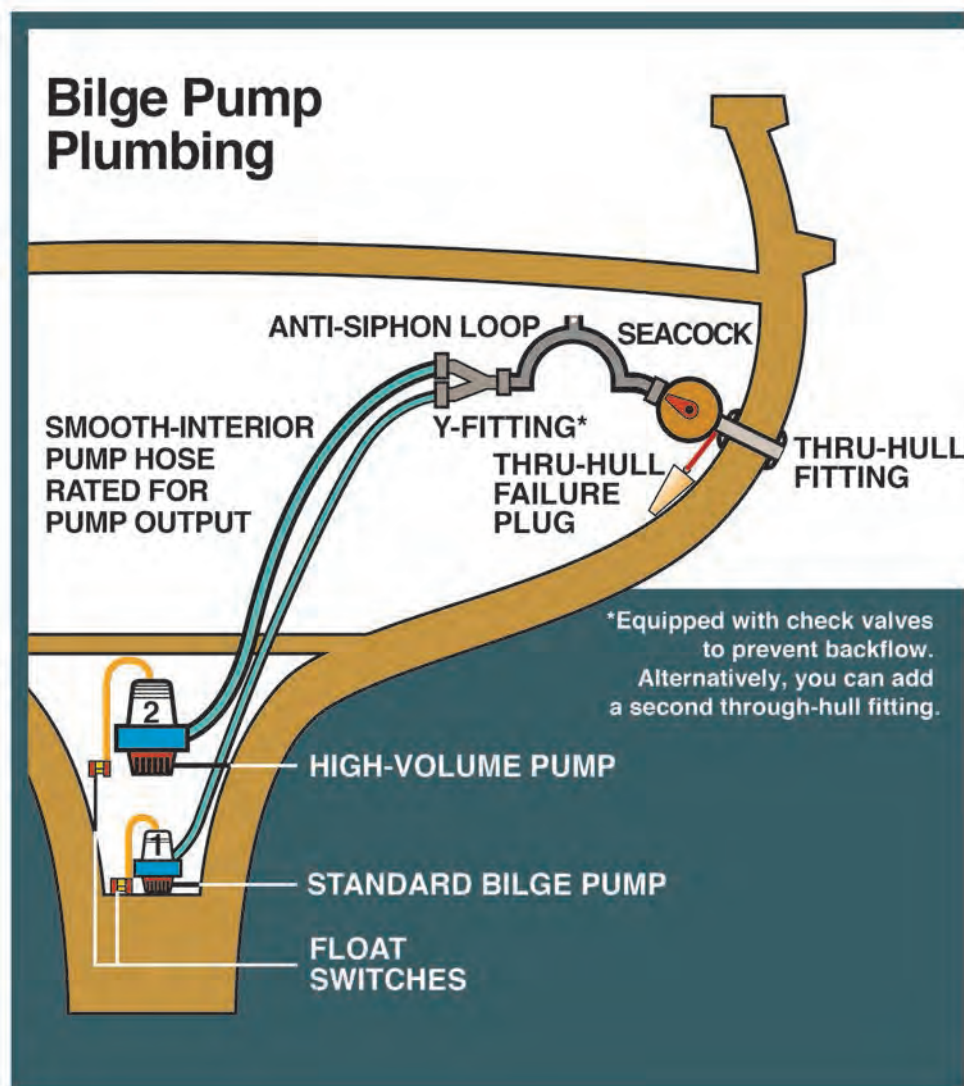
well above the waterline as a guard against the aforementioned back-siphoning. The seacock-and-vented loop option is best.

For aesthetic reasons, many people locate their discharge at or near the waterline—with corresponding riser loops to prevent siphoning. Plumbing configurations will vary from boat to boat, due to the constraints of shape, layout, and structure. The ABYC has a thick book of carefully considered standards for all manner of boat systems. If you are altering or installing a bilge pump, we highly recommend a review of these standards before designing your system; there's more to it than we can detail in this short article. Do not neglect to attach a conical wooden emergency plug to the through-hull fitting; it might save the boat in the event of a hose failure.

Electricity at sea is always suspect. The bilge environment is not ideal for electronic integrity. Do what you can to forestall failure by using good tinned-copper marine wire, and

marine-grade electrical connectors coated with heat-shrinkable plastic. Run the wire out of likely bilgewater or splash. Use a non-conducting clamp to secure every wire at intervals of, at most, 18". Connections should be robust, positive, and water-resistant. (Again: consult the ABYC standards before getting too deep into your design.)

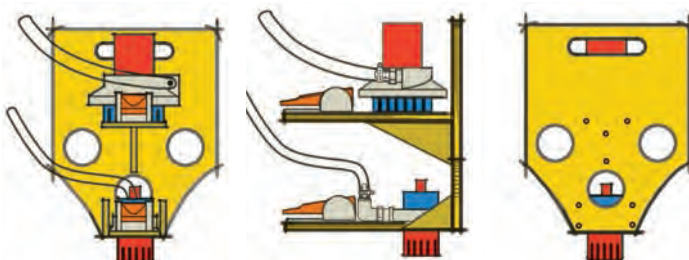
We're showing a two-pole switch. The "manual" pole feeds current into the pump, bypassing the float switches, so you can turn the pump on at any time. The "auto" pole passes current through the float switches to the pumps, so it will be activated by rising water. We're also showing a possible circuit for a warning light that could alert you if your pump is running.



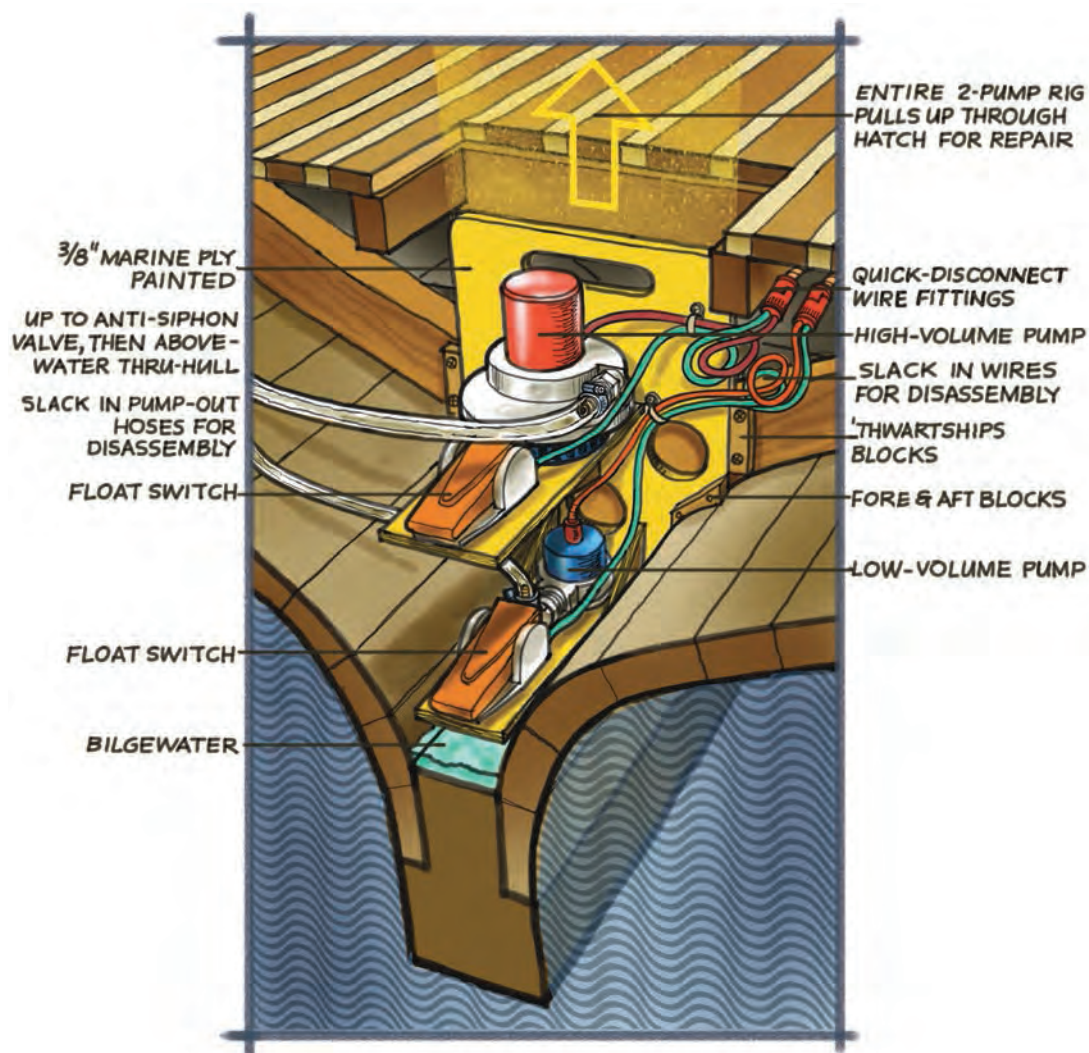
DUAL BILGE PUMPS

It's difficult to judge the scale of a leak immediately. A small bilge pump, set to work by a float switch, will deal with nuisance water. But if the water level in your cruising boat rises above this maintenance pump, you may be in trouble. Many cruisers address this eventuality with a larger, higher-volume pump and a second float switch, and some install both a warning light *and* a very loud alarm to alert the whole harbor if the boat begins taking water seriously.

Because every pump should be inspected several times per season, a two-pump array with its two-stage float switches can be mounted on a single marine plywood plate that slips into guides on the boat's structure—say, a floor



timber. The plate, pumps, and switches are “plumbed in” and electrically connected with enough slack to pull and inspect or repair the entire system as a unit. The board, when in use, must be securely fixed in place, and this can be done in a variety of ways: turn-buttons, screws, bolts, or even Velcro. The solutions will vary from boat to boat.



ham before moving upriver to Totnes in 2000. Since then, he has undertaken several lottery-funded restorations on boats such as the St. Ives lugger BARNABAS and the Brixham trawlers LEADER and PROVIDENT. For the work on GEORGE, he took on three young apprentices to work alongside his existing longstanding team of David Houcke (who has been with him since 1980) and Andy Savage (since 1986). He told me the lads were ‘shaping up well.’

“GEORGE was scheduled to be relaunched in May 2016, though when I visited her in February it looked as if Bobby Cann and his boys might overrun that deadline by a few weeks.”

National Waterways Museum, South Pier Rd., Ellesmere Port, Cheshire, CH65 4FW, England; www.canalrivertrust.org.uk. Bobby Cann, bobbycann1@gmail.com or +44 (0) 7886-710406.



DOUG COLE

Dave Hartford works on topside replanking aboard the 1977 schooner SPIKE AFRICA at Seaview North Shipyard in Bellingham, Washington.

■ “At Seaview North Boatyard, the schooner SPIKE AFRICA, 65’ LOD, is undergoing the final phase of a **near-total hull rebuild**,” Doug Cole writes from **Bellingham, Washington**. “On previous haulouts over the past seven winters, the forward part of the keel, the horn timber, and 21 planks below the waterline were replaced, followed by refastening and recaulking. A new mainmast was also made. Now, a crew headed by shipwright Al Meyers is well along in replanking the port topsides, using old-growth Douglas-fir milled in Forks on the Olympic Peninsula. The project has involved new purpleheart upper frame futtocks in the forward half of the hull, new covering boards forward, the transom framework and planking, new rails and railcaps, and new topside planking. A new foremast is also being built this year. Designed and built by Robert Sloan in Costa Mesa, California, in 1977 based on a design by Murray Peterson, SPIKE AFRICA in recent years has been in the charter business for **Schooners North**, based in **Friday Harbor**. Owner Gary Gero, who is also working full-time on the project, said the schooner would be ready in time for the 2016 sailing season.” *Seaview North Boatyard, 2652 Harbor Loop Dr., Bellingham, WA 98225; 360-676-8282; www.seaviewboatyard.com. See also **Schooners North**, 685 Spring St., Friday Harbor, WA 98250; 360-378-2224; www.sanjuansailcharter.com.*

■ The **Ilen School and Network for Wooden Boat Building** in **Limerick, Ireland**—whose gandelow project is the subject of an article beginning on page 24—is currently **reconstructing** its namesake vessel, **A.K. ILEN**, a 56-footer built in 1925. As Patrick Beautement, author of the gandelow article, writes, “ILEN (pronounced ‘eye-len’) was designed

by Limerick man **Conor O’Brien**, who in 1923–24 became the first yachtsman to sail south of the three Great Capes—Good Hope, Horn, and Leeuwin—in his 42’ yacht SAOIRSE. ILEN was framed in sawn oak, with an elm keel and planking of yellow pine, sheathed below the waterline in copper. She carried a ketch rig with a square foresail. In 1926, O’Brien and two crew sailed her to Port Stanley in the Falkland Islands, where for many years she plied an inter-island trade among the farming communities. She is the last surviving O’Brien boat.

“School Director Gary MacMahon, long interested in the enigmatic O’Brien, put together a project to repatriate her in 1997. She arrived in Dublin that year, and came to the Ilen River the next. The hull reconstruction is nearing completion at Hegarty’s Boatyard, in Old Court, Skibbereen, in West Cork, 5 miles upriver from where she was originally built. Deckhouses, spars, and interior fittings are being made at the school’s workshop in Limerick.

“Once situated in Hegarty’s yard in the ‘top shed,’ an ancient stone barn that formerly served as a grain store, the hull was assessed and her lines documented for the Traditional Boats of Ireland project [see www.tradboats.ie/projects/south/ak-ilen and WB No. 206]. Work really got going in 2009, through an educational program, and she has been reframed with oak and replanked with Bavarian larch fastened with 5” custom-cast bronze spikes, which would surely have pleased O’Brien. A new worm shoe of greenheart will soon be bolted to the original elm keel. The deckhouses, of reclaimed pitch-pine, are built and are being fitted to the deck on hardwood sills. The deck planking is of Douglas-fir, as are the mainmast and bowsprit. The school hopes to sail her to Limerick for her final fitting out. She’ll retain her original ketch sail plan, with some contemporary adjustments specified by traditional rigger Trevor Ross and naval architect Theo Rye. Many original metal fittings are being restored, and new fittings made as needed.

“ILEN is back on the Irish register of shipping and has regained her original 1926 official number, 146843, now beautifully carved on an oak deckbeam by Cork sculptor James McLoughlin. By 2017, the Ilen School hopes to see the good ship plying a new trade in teaching the immemorial ways of the sea.”

A.K. Ilen Company, 94 Henry St., Limerick, V94 XN6V, Ireland; +353 (0) 86-264-0479; www.ilen.ie.

A.K. ILEN, namesake of a boatbuilding school in Limerick, Ireland, has had her hull rebuilt at Hegarty’s Boatyard in West Cork. Students at the Ilen School and Network for Wooden Boat Building have contributed to the work, and she’ll have a role in sail-training upon completion.



PATRICK BEAUMENT

Offcuts

The report above from the Ilen School reminds me that the Currents report in WB No. 248 about school and youth programs had more entries than would fit. Rather than making the good people wait, here are four more:

■ In **Portsmouth, New Hampshire**, boatbuilder **Nate Piper** of nearby Rye is joining forces with the **Strawbery Banke Museum** to make **boatbuilding** once again part of the museum's programming. The museum envisions not only **exhibits and demonstrations** but also **boatbuilding workshops** for a **new boatshop** to be installed in an expanded existing building.

Strawbery Banke, a historic quarter of Portsmouth, has had boatbuilding as part of its emphasis—most notably by hosting a nonprofit organization's construction of a gundalow launched in 2011 (see WB No. 233), building on the legacy of an earlier gundalow project completed in 1982. (The gundalow, not to be confused with the Irish gandelow described starting on page 24 of this issue, is a large, lateen-rigged, barge-like craft of the Piscataqua River area.) Among the envisioned boatbuilding demonstrations will be the operation of a nail-making machine, said to be one of the last three of its type in the United States fabricating copper clench nails often used by small-craft builders.

Piper, a New Hampshire native, attended The Landing School of Boatbuilding and Design in Kennebunkport, Maine. He worked on numerous ship and historic vessel projects before moving to Rye in 1997 to open his own boatshop, which will continue. Among his projects have been the refit of the 1982 gundalow, CAPTAIN EDWARD H. ADAMS, and he served as project manager for the 2011 gundalow, PISCATAQUA. (As noted in the 2016 edition of our annual *Small Boats* magazine and in the February 2015 *Small Boats Monthly* (our web-only magazine), his boatyard is also the approved builder of the 13'6" sailing dinghy MerryMac, designed by fellow New Hampshire resident Ned McIntosh.)

Fundraising for the building continues, and volunteers are sought for demonstrations.

Nate Piper, Piper Boatworks, P.O. Box 879, Rye, NH 03870; 603-686-2232; www.piperboatworks.com. Strawbery Banke Museum, P.O. Box 300, Portsmouth, NH 03802; www.strawberysanke.org.



Volunteers working with Nate Piper (second from right) at the Strawbery Banke Museum in Portsmouth, New Hampshire, helped construct a shed addition to accommodate boatbuilding demonstrations and programs.



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CRAIG MILNER

In its new home on Fan Pier in Boston, Community Boat Building has been building Periwinkle and Periwinkle Junior skiffs designed by Nat Benjamin of Gannon & Benjamin Marine Railway.

■ “Community Boat Building, an eight-year-old program for Boston public school students, has a new permanent location just a stone’s throw from Boston Harbor at 21 Liberty Drive in the rapidly developing Fan Pier area of the city,” Craig Milner writes. “A new teacher, Sarah Besse, has been working with girls and boys from the Haley Pilot School in Roslindale who have completed the first two hulls of the Periwinkle design, a 13’ rowing-and-sailing skiff by Nat Benjamin of Gannon & Benjamin Marine Railway on Martha’s Vineyard. Next, the seventh graders, working in their geometry class, will lay out and build the daggerboards, rudders, and sails. Meanwhile, International Yacht Restoration School graduate Margery Bradshaw has been working with students from the Harvard Kent Elementary School in Charlestown to build 12 Periwinkle Juniors, a 10’ flat-bottom design also by Benjamin. Bradshaw also coordinates CBB’s summer programs and the work of volunteers, who play a key role by preparing components ahead of time and by finishing and painting the bare-wood hulls the students have built. The organization has a new project director, Stockton Reece, to handle administrative and fundraising duties, which enables CBB’s founder, John Rowse, to work with fifth-graders from the Young Achievers Science and Math Pilot School in Mattapan, who are putting their classroom skills to work building nine Periwinkle Juniors.

“CBB’s mission, Rowse says, is to close the ‘opportunity gap’ for youths from underserved parts of Boston by generating excitement for learning through hands-on boatshop experiences that put their classroom skills to work in practical ways. Some 200 fourth- and fifth-graders are taking part. All fifth-graders at these Boston schools can take part for free. ‘Every one of those kids gets to build a boat,’ Rowse said. ‘These kids don’t necessarily know yet what they want to do in life. What we offer is the chance for every girl and boy to open their minds to opportunities by getting their hands dirty.’ CBB students demonstrated their skills by building a boat at the New England Boat Show in February. In June, CBB boats will launch at Jamaica Pond Boathouse, where they become part of the rental fleet for the summer, and at the Boston Rowing Center at Fort Point Channel. Students and their families can use the boats at no cost. At the end of the season, the boats are sold to make way for more.”



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CURRENTS



COURTESY OF OLIVER CHOI

Oliver Choi's school of wooden boat building is housed in three handsome buildings in Wonju, South Korea. Trained at the Northwest School of Wooden Boat Building in Port Townsend, Washington, Choi incorporates such influences as diverse as the stitch-and-glue methods of designer-builder Sam Devlin and the cedar-strip kayak techniques of Joe Greenley at Redfish Kayaks.

■ In South Korea, Oliver Choi has started a school of wooden boat building. Earlier, he studied in the United States and worked as a designer in London, England, before returning home in the late 1990s to work in education and design. "Until 2004, my boatbuilding was no more than having fun at my backyard—thinking of being a professional boatbuilder was just a vanity in my heart. In 2005, chance smiled upon me when the government offered me financial support to go anywhere and do anything for a year or two to acquire extra knowledge and experiences. Without any hesitation, I went to the Northwest School of Wooden Boat Building, in Port Townsend, Washington, where I spent a year and half and met many inspiring teachers and friends. I came home at the end of 2006, facing the reality of urban life again. In spring 2007, I hung a small sign in front of my own boatshop in the busy district of Seoul. Almost a year later, my first customer dropped in by mistake, assuming it was a coffeehouse named 'Boat Shop.' Business was slow, however, and wooden boats just weren't part of the culture. I was left with the other option: teaching people to work together—that's how the boatbuilding school began. In 2009, I decided to get away from limited space and amazingly expensive urban settings to somewhere where there are mountains and waters. The city of Wonju is where we are now, about an hour-and-a-half drive southeast of Seoul. On about an acre of land, I built three small buildings, housing a lecture room, indoor shop, outdoor shop, carpentry shop, wood stock, and milling room, CNC-machining shop, students' lounge, visitors' lounge, teachers' office, and so on. Besides the full-time boatbuilding course, we also offer weekend boatbuilding classes for amateur builders and we build a couple of custom boats (usually about 25' outboard motorboats) a year. We have two full-time instructors (including myself) and a few visiting lecturers instructing 16 students divided into two groups—so, we invite eight new students each year. Some study for one year, after which they go back home to open a small business or just to enjoy their life building boats. Students who are approved for a second year would normally want to be hired by industry, so they work on larger project commissions, usually stitch-and-glue or cold-molded hulls. We are also studying Korea's traditional methods of building wooden boats, and we gather information, take lines, and make records before these boats are permanently gone."

Across the bar

■ **Maurice John “Morrie” Rhude**, 91, January 26, 2016, Marinette, Wisconsin. Mr. Rhude was the president and owner of Sentinel Structures, Inc., of Peshtigo, a manufacturer of structural laminated timber with a project list that included many restorations and constructions of large wooden ships. He grew up on a family farm in Elk Mound and started his education in a one-room schoolhouse. After a year at Eau Claire State Teacher’s College, he enlisted in the U.S. Navy in 1943 and served aboard USS DENVER during World War II. After the war, he earned bachelor’s and master’s degrees in engineering at University of Wisconsin, Madison. He worked as an engineering teacher there and as a researcher at the USDA Forest Products Laboratory until 1951, when he joined Unit Structures, Inc. (later part of Koppers Inc.) in Peshtigo. He was named chief engineer in 1954 and vice president in 1961. In the early 1950s, the company made laminated white oak and Douglas-fir timbers for U.S. Navy minesweepers, but its output also involved yacht timbers, notably for the Sparkman & Stephens–designed NINA of 1955. In 1972, Mr. Rhude established Sentinel Structures in the same facility that had been occupied by Unit Structures and continued laminating timbers for Navy minesweepers but also for the restoration of such historic ships as USS CONSTITUTION, USS CONSTELLATION, and C.A. THAYER and for reconstructions of the brig NIAGARA, SPIRIT OF SOUTH CAROLINA, Great Lakes schooner DENIS SULLIVAN, ENDEAVOUR, LYNX, and VIRGINIA.

■ **Michael Lawler**, 70, January 7, 2016, Santa Barbara, California. Mr. Lawler, who was born in Callicoon, New York, lived in various places, including Hawaii and Japan, before settling with his family in Santa Barbara in 1961. Educated as an architect and geographer, he maintained a lifetime passion for woodworking that extended to boats, among them rowing shells, wherries, skiffs, a steamboat, many kayaks, and more than 500 models. His interest in restoring classic rowing craft led him to a friendship with Darryl Strickler, author of *Rowable Classics*, who died a few months earlier; see WB No. 248. Mr. Lawler helped produce the book and wrote its foreword.

■ **Kay Ellis**, 65, March 2, 2016, Gloucester, Massachusetts. In 1997, Mrs. Ellis and her husband, Tom, had the 65’ schooner THOMAS E. LANNON (see WB No. 143) built by Harold Burnham at Essex Shipbuilding Museum for daysailing charters out of Gloucester. Mrs. Ellis grew up in Beverly, Massachusetts, but lived most of her life in Gloucester, working in various careers such as teaching and real estate before becoming manager of Essex River Basin Adventures, a sea kayaking company co-founded by her husband. Charters with the LANNON, a traditionally crafted, double-sawn frame schooner, became their next family business, with her sons Heath and Brian both taking active roles dating back to the construction (see www.schooner.org). For many years, their summer voyaging alternated with extended ski trips to Wyoming.

■ **Michael Scarborough**, 59, December 27, 2015, Rockport, Maine. Mr. Scarborough’s career mostly involved newspaper production, but he had wide-ranging, sometimes eccentric, interests, one of which was coastal kayaking. At WoodenBoat School in Brooklin, he built two wooden sea kayaks. In 1999, he moved to Friendship, continued kayaking, and also took up tobogganing. 🛶

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ALUMNI WORK WEEK	ALUMNI WORK WEEK	Fundamentals of Boatbuilding with Greg Rössel				Fundamentals of Boatbuilding with Wade Smith				Fundamentals of Boatbuilding with Greg Rössel				Fundamentals of Boatbuilding with Warren Barker			
		Making Friends with Your Marine Diesel Engine with Jon Bardo		Build Your Own Annapolis Wherry with Geoff Kerr		Build Your Own Greenland Skin-on-Frame Kayak with Mark Kaufman		Introduction to Cold- Molded Construction with Mike Moros		Build Your Own Stitch-and-Glue Kayak with Eric Schade		Traditional Wood-and- Canvas Canoe Construction with Rollin Thurlow		Wooden Boat Restoration Methods with Walt Ansel			
		Introduction to Boatbuilding with John Karbott		Fine Strip-Planked Boat Construction with Nick Schade		Boatbuilder's Hand Tools with Harry Bryan		Introduction to Woodworking with Bill Thomas		Build Your Own Friendship Sloop Model with Mark Wilkins		Building the McKenzie River Dory with Brad Dimock		Woodcarving with Reed Hayden		Building a Nordic Pram with F. Jay Smith	
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								Elements of Sailing for Women with Jane Ahlfeld and Robin Lincoln		Craft of Sail on MISTY with Queene Foster		Elements of Sailing with Sue LaVoie & Rich Naple		Elements of Sailing with Martin Gardner and Sue LaVoie		Vintage Pond Yachts Part II with Thom McLaughlin	
								Skills of Coastal Seamanship with Andy Oldman				Craft of Sail on TAMMY NORIE with Joel Roland		Craft of Sail on BUFFLEHEAD with Daniel Bennett		Painting the Downeast Coast in Oils with Jerry Rose	
												East, West & Island Exploration with Andy Oldman and Madeline Otani Oldman		Cruising through the Watches with Hans Vierthaler		Elements of Sailing II with Martin Gardner & Rich Naple	
												Seascape/Landscape in Watercolor with Paul Trowbridge		Tallship Sailing and Sea- manship with Capt. Barry King & Jane Ahlfeld		Cruising in Tandem with Hans Vierthaler & Queene Foster	



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Build Your Own Echo Bay Dory Skiff with Clint Chase	The Arts of the Sailor with Eric Stockinger	Elements of Boat Design with John Brooks	The Art of Woodcuts with Gene Shaw	Lofting with Greg Rössel	Maine Coast: Watercolor Travel Sketchbook with Amy Hosa	Introduction to Canvas Work with Ann Brayton		
Learn to Sail with Jane Ahlfeld & Gretchen Snyder	Bronze Casting for Boatbuilders with Michael Saari	Rebuilding a Herreshoff 12½ with Eric Dow		Metalworking for the Boatbuilder & Woodworker with Erica Moody	Marine Photography with Jon Strout & Jane Peterson	Marine Photography II with Jon Strout & Jane Peterson		
Sailing Downeast with Andy Oldman	Elements of Sailing for Women with Jane Ahlfeld & Annie Nixon	Elements of Sailing with Annie Nixon & Rich Naple	Elements of Sailing II with Martin Gardner & Robin Lincoln	Open Boat Cruising with Geoff Kerr	Sea Sense Under Sail with Havilah Hawkins	Sea Sense Under Sail with Havilah Hawkins		
	The Catboat with Martin Gardner	Craft of Sail on MISTY with Queenie Foster	Craft of Sail on BUFFLEHEAD with Daniel Bennett	Craft of Sail on MISTY for Women with Queenie Foster	Coastal Cruising Seamanship with Hans Vierthaler	Elements of Coastal Kayaking with Mike O'Brien		
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SEAN CURTIN

To Build a Gandelow

Resurrecting a working rowboat from
Ireland's Shannon River Estuary, Part 2

Text and photographs by Patrick Beautelement

Our construction of four gandelows by the A.K. Ilen Wooden Boat Building School paid homage to the workboats of previous generations. However, gandelows also have long been associated not only with fishing but also with racing and pleasure boating, both more likely uses for these fine craft in modern times.

A recently discovered photograph (visible at the Limerick Life website, www.limerickslife.com) shows what appear to be gandelows painted up and fitted out as pleasure boats by the Limerick Rowing Club as early as 1864. Though the boats seem to be painted white inside and have fancy seats, the distinctive stern still suggests a gandelow. Since our project, the Ilen School team has been approached by boatbuilders in Cork in the south of Ireland, and we know of one gandelow built as far away as the Northwest School of Wooden Boat Building in Port Townsend, Washington, in 2012, with some interesting variations in design.

With ordinary precautions for a small, open boat—meaning the judicious use of inflatable buoyancy bags and proper use of life jackets—gandelows make good craft for family days out. They are maneuverable and seaworthy. They were never built as sailing craft, but

in the past, fishermen on the long passage homeward bound up the Shannon would set a single sail on a small mast to take advantage of the prevailing wind from the west, so a small downwind sailing rig would be possible. These days, the transom, with only a little modification, could carry a small outboard motor, no doubt for a fast and lively ride. To add flotation, with an eye to modern safety requirements, a built-in locker could easily be added forward, following the style of the net locker aft, to hold inflatable buoyancy bags, which could also be placed inside the net locker. Gandelows built specifically with racing in mind could be built with thinner or lighter woods to minimize weight.

Gandelows are relatively easy to build using readily available materials, tools, and familiar techniques. They are suitable for lakes, rivers, and even coastal waterways. A boat could be built by two people in about a month. We of the Ilen School team have no doubt that the gandelow, as a type, still has much life in it.

At the end of Part 1, we described the completion of the butterfly planks, and we resume the narrative with the installation of the sheerstrakes, which also have some characteristics unique to gandelows. Then, fitting out the interior will be described in detail.

Above—A new gandelow takes to the River Shannon at Limerick, where boats of this broad-transom type were once commonplace.

19.



The sheerstrakes. Forward, the sheerstrakes were shaped much like the two previous planks, with the same $1\frac{1}{8}$ " lap. Again, however, the aft area has a complication: a chine-like angle between the last butterfly plank and the sheerstrake, visible in Photo 19. This time, it was the corner of the second butterfly plank that had to be planed to a rolling bevel while in place on the boat.

First, we established the sheerline on one side by tacking a batten along the top-of-plank marks on the molds and then adjusting it by eye to fair the line. It is a local tradition to avoid too much spring in the sheer forward; in fact, many builders reduce its height at the stem by about $\frac{3}{4}$ " while fairing the line. When finalized, the sheer was then marked on each mold and at the stem and transom, after which the marks were transferred to the opposite side.

While the sheer batten was still in place, we used it to help establish the rolling bevel needed at the top outside corner of the butterfly plank between about Station 5 and the transom. This creates a landing for the sheerstrake's inside face along its lower edge. For this task, we used a guide tool—a "preacher," as we call them, as mentioned in Part 1. This preacher, shown in Photo 20, was made from a simple, straight length of wood to help mark the bevels. Near one end, a deep notch $1\frac{1}{8}$ " long was made, corresponding to the lap width. At the opposite end, a long cutout was made, this one to a depth matching the thickness of the sheer batten, as visible in the photo, so that the tool's inside edge would correspond to the inside face of the yet-to-be-installed sheerstrake. With the cutaway upper end held against the batten, as shown, the preacher was adjusted vertically until the lower notch's corners touched both the plank's face and its top edge. Marks made at these points at various locations along the plank, and faired with a batten afterward, showed the depth and angle at

which to plane the rolling bevel fair. The batten was moved to the opposite side and the process repeated.

After the bevels were completed and the sheer batten removed, the first sheerstrake could be clamped in place for marking. To define its top edge, the marks were transferred to it from each mold, the stem, and the transom. Its lower edge could be traced directly onto the sheerstrake's inside face, following the top edge of the butterfly plank for its whole length. Later, after removing the sheerstrake, we added

$1\frac{1}{8}$ " to the traced lower edge to account for the width of the plank's overlap. The hood ends at the stem and transom were also marked, but we left the aft end long to be cut off after installation. The sheerstrake had only one gain to cut, in the inside lower corner at the forward end, and after it was finished the plank was ready. The forward part needed to be steamed, and the plank followed the same bedding and nailing methods used in the previous ones.

Typically, the bottom edge of the sheerstrake hangs down just below the overlap aft in the area of the rolling bevel, and local tradition leaves it just like this—it is not planed off. The clench nails in this part of the lap angle downward through the second butterfly plank's edge, so we were especially careful to drill accurate pilot holes.

The sheerstrake on the opposite side has to be fit in the same way, without assuming that its shape will be identical to the first one. After both sheerstrakes were completed, all the aft plank ends were cut off flush with the transom, and our work turned to the interior.

20.



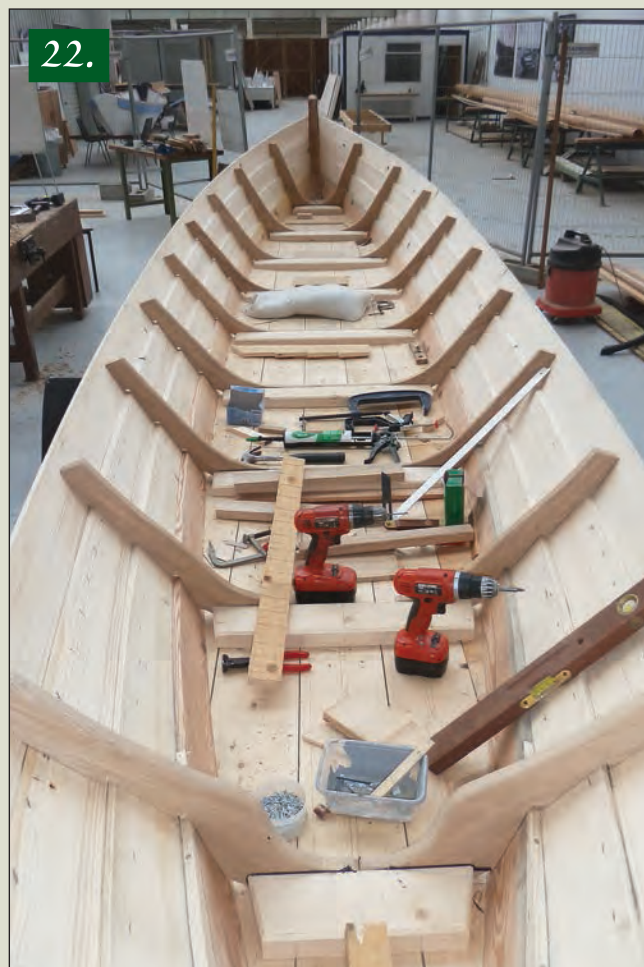


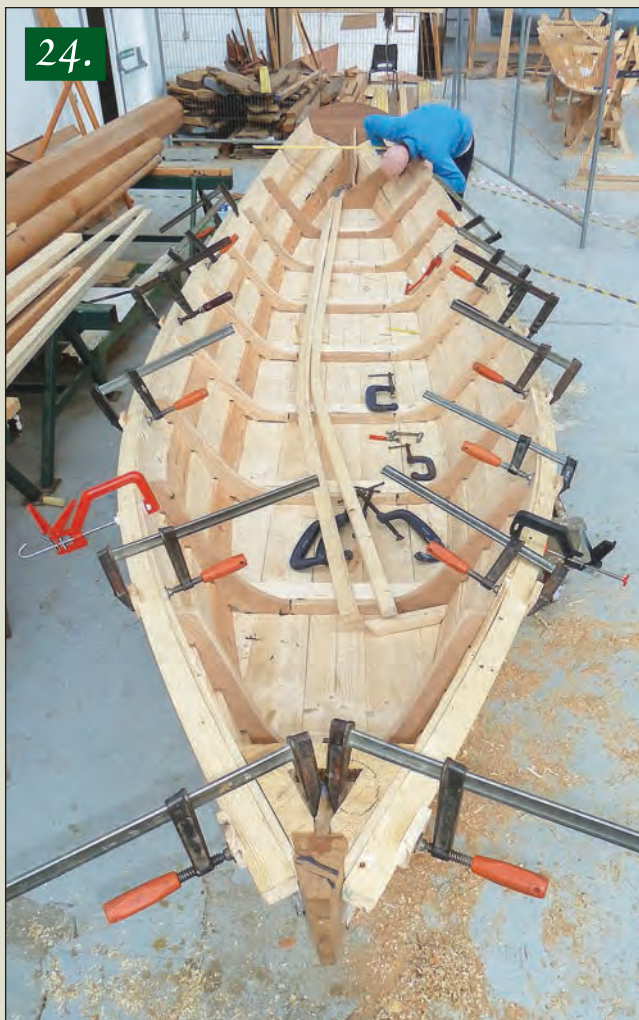
The knees. There are two styles in common use in Ireland for gandelow knees, or frames as others may call them. In one, the knees are a hockey-stick shape with the heels ending about 6" inboard from the side planks, all the better if its grain follows the curve. In the other, a filler piece is added between the heel of each knee—and this was the style we followed. The knees and filler pieces are nailed to the forward faces of the saddles. Given the mighty strength of the Irish rowers—believe me, I've seen it firsthand—these pieces must fit tightly to the floor and to the sides, because they add an important element to the boat's strength. We made knees from oak blanks $\frac{7}{8}$ " thick, and the pieces were carefully selected to ensure the best possible grain direction to minimize cracking.

Traditionally, most boatbuilders jealously guarded their knee patterns, since they, together with other measurements and patterns, could be used instead of molds when building boats by eye. We made light plywood templates, as shown in Photo 21, from our plans, but each knee at each station is unique and has to be final-fitted individually. In our boat, the outer faces of the knees from Stations 1 through 7, are stepped to fit the inside faces of the lapped planks but are parallel to one another, making them quite straight. At Stations 8 and 9 they were distinctly concave. At Stations 1 and 9 we omitted the filler pieces in the middle.

Note that at the chine, as shown in Photo 23, gaps

called limbers allow water to move easily; all knees must have these. Limbers were also built into the knees at each plank lap. The knees tapered toward their tops, and there they were cut short at an angle picked up from the lofting to accommodate the gunwales, which fit on top of them and are nailed stoutly down into each one. The faying surfaces of the knees were traditionally bedded in tar, and fastened by driving galvanized nails driven through the planking from the outside. Nowadays, we use bedding compound and stainless-steel screws.





The gunwales. The gunwales were cut from 14'-long pieces of white deal (Norway pine) planed to 2" wide and 1 1/4" thick, scarfed together to make them full-length. The gunwales fit tight against the inboard face of the sheerstrakes and to the tops of the knees. For the proper fit, 10-degree bevels were planed along their outboard faces, so their upward slant isn't as pronounced as it would be otherwise. The top of each knee has already been angled to match. The forward end of each gunwale had to fit snugly to the stem and the aft end to the transom.

We steamed the forward 8' or so of the gunwales and essentially used the boat as a bending form, clamping them to the outside of the sheerstrakes, as shown in Photo 24. To protect the planks at the stem while steam-bending the gunwales, we fitted a triangular stem support just behind the stemhead. Shaped like a breasthook and made of oak offcuts, this brace was temporarily fastened with screws just behind the stemhead. Left overnight to cool, the gunwales were ready the next day to be final-fitted to the inside of the sheerstrakes and fastened in place.



The breasthook and quarter knees. Traditionally, builders used bog oak, which is very tough but difficult to find today. Our breasthook (Photo 25) was cut from a 9" x 9" piece of 7/8"-thick oak and, once shaped, was bedded and firmly fastened in place with two 4", 3/16"-diameter stainless-steel screws from the outside and two 2", 1/8"-diameter screws from the inside. Each of the quarter knees, also 7/8" thick (Photo 26), was shaped from a piece 14" x 6" and fit against the transom and its respective gunwale. They canted upwards at the transom, to match the angles at the tops of the gunwales. They were carefully beveled for a tight fit, and in place of the traditional tar and galvanized nails we used bedding compound and fastened each of them with stainless-steel screws, using two of 2", 1/8" diameter driven from the inside and one of 4", 3/16"-diameter driven from outside through the sheerstrakes and gunwale.





The net locker. Traditionally, the hatch over the net locker functions like a deck, and it is the place where someone would stand while paying out or hauling in the nets over the stern. The hatch is removable and covers a space where nets were stored. The wide stern of a butterfly-planked boat is buoyant and commodious, making it ideal for these tasks. In past times, so the stories go, this space might also store other items—such as goods being hidden from the (often English) customs officers on a boat's journeys up and down the Shannon. The hatch sits on cleats shaped out of $\frac{7}{8}$ "-thick offcuts, usually of oak. For our boats, a filler piece atop the Station 9 knees supported a cleat on its aft face, and another cleat was fastened to the transom. Both are visible in Photo 27. The hatch planks land on these cleats, as shown in Photo 28. The hatch's five stout, tapered softwood planks, about $\frac{3}{4}$ " thick, $6\frac{1}{2}$ " wide at their forward ends, and 3' long, as shown, were shaped and fastened to $3" \times 1"$ athwartships battens underneath. The ends and sides of the hatch planks were beveled

to follow the shape of the transom and sheerstrakes, spaced to shed water and allow ventilation. The hatch should fit as tightly as possible but must clear the knees and quarter knees when being lifted out.



Stringers, thwarts, and thwart knees. The stringers, or seat risers as some call them, are made from two pieces of red deal (Scotch pine) 13'6" long, $2\frac{1}{2}$ " wide, and about 1" thick, and tapered at both ends. The top inside corner of each stringer was then beveled off to be $\frac{3}{4}$ " wide and provide a flat landing for the thwarts. The top of the stringer typically is 8" below the top of the gunwale. The position of thwarts can be adjusted on the stringers to suit the size of the boat and the size and weight of the rowers, which can be tested on the water first before final fitting. Usually, a 33" spacing between thwarts, measured edge to edge, works well. The stringers were fitted and fastened to the knees from Stations 2 through 8, as shown in Photo 29. The thwarts were cut out of three pieces of red deal, 9" wide by about 1" thick and starting off at 48" long. The forward and after edges are rounded. The ends are cut to follow the curve of the inside face of the topside planking, leaving a $\frac{1}{2}$ " space for ventilation. We made thwart knees from oak about 1" thick cut from blanks 16" long and 6" wide, with the grain

running parallel to the thwarts' surface. They were set square to the planking face, not aligned with the centerlines of the thwarts. They were screw-fastened down through the thwarts into the stringers, in through the side planks, down through the gunwale, and up from below, all in carefully drilled pilot holes.





30.

The paddles, tholepins, and tholepads. The tholepins are usually 9" long, turned out of green oak to a pronounced taper. The paddles—as oars are called here—traditionally were homemade, but commercially made ones are quite adequate. They should be 9'6" long for the center and bow positions and 9' long for the stern. The poles, as we call the looms, are 2½" in diameter, the hand grips 1½" in diameter. The blades are 1" thick, 18" long, and 4" at the widest. Traditionally, the paddles were painted matte gray, except for the hand grips, which were not painted. Leathers 8" long were stitched on (see WB No. 127) to protect the poles from chafe against the thole pins and pads.

The hardwood thole pads were 14" long, 2¼" wide, and 1" thick. Two tapered holes were drilled 5" apart and reamed to the taper, as shown in Photo 30, to fit the tholepins. The spacing varies depending on the type of rowing to be done and the diameter of the poles. For fishermen, the spacing was usually not less than 4½", but for racing the spacing increased up to 5½" to allow for a longer sweep. The thole pads had to be positioned along the gunwale with care, so the holes through the gunwales would not damage the top of any of the knees or the sheerstrakes. Strength is important. The untimely breaking of paddles and tholepins has featured in many a story about famous races of the past—and, indeed, in the races in September 2014 breakages led to a nail-biting and exciting final battle to the finish line.



31.

Caulking. Cotton caulking follows usual practice in the stem rabbets, the sternpost rabbets both of the garboards and the gorings, and in the floor planking, as shown in Photo 31, all of which is best done with the boat turned upside-down. Traditionally, tar would be poured in after caulking, but we used primer paint followed by seam compound.

32.



The stem and sternpost caps and gars.

Before these trim pieces could be fitted, the part of the garboard protruding below the floor had to be planed flush. The stem and sternpost capping pieces strengthen the bird's-mouth joints at the bases of the stem and sternpost, as shown in Photo 32. These caps were made from pieces of $\frac{3}{4}$ "-thick oak, 7" long and 5" at the widest, bedded and screwed onto the bottom. These caps were made to be replaceable, since they will get a lot of wear in grounding. Gars, as we call them, are hardwood rubbing strips fixed to the bottom to cover the seam between the garboard and the floor, also visible in the photo. The ends of the gars butt against the capping pieces. The gars were made 1" wide and $\frac{3}{4}$ " thick, running the full length of the boat. A bevel planed on the inside edge, experience has shown, helps the flow of water. The gars were bedded and fastened to the garboards with galvanized nails, as shown in the photo.

Shaping the stemhead and rubbing rails.

The stemhead was cut to shape to reflect regional preferences, and a hole was drilled through it to receive a light mooring line, or painter. Following tradition, we fitted a strong eyebolt 10" up from the heel of the stem. A line made off to the eyebolt helps when dragging a boat across mud or sand up onto the riverbanks. Also, many boats were traditionally moored on the river, so a mooring line from a stone anchor left on the bottom could be made off to the eyebolt. Given the Shannon's fast flow and its tidal range, the builder made sure to install a strong eyebolt, and the fisherman used a good rope—otherwise the boat could go missing.



33.

The rubbing rail, or rubrail as some call it, is made of hardwood 1" square in section; we used mahogany. The outer face is rounded off, as shown in Photo 33, and the rail shaped to fit snugly to the stem. For a bright finish, the nail or screw heads are recessed and bunged.



Finishing. Gandelows were typically painted gray, with a red inner floor, as in Photo 34. One theory is that gray paint was easily available from the dockyards, but another is that it made the boats hard to see on a misty day on the river when its occupants wished to escape notice. Some say gray was simply traditional and set the boats off at their best. The red floor was to mask fish blood, I'm told. Final finishing is, of course, up to the owner. After painting, the boat is ready for launching—and for use.

The gandelows built in 2014 at the A.K. Ilen School of Wooden Boat Building have been racing regularly on the River Shannon off Limerick, where rowing races have a long history.



SEAN CURTIN

Patrick Beutement has recently retired from leading technical research programs. He trained at the Lyme Regis Boat Building Academy in England in 2012 and is now a journeyman boatbuilder who is gaining more experience in the “rolling stone” style. In 2015, he published a full guide to building the Limerick gandelow, including tables of offsets and patterns for all parts, including the molds, stem, sternpost, knees, breasthook, transom, quarter knees. As noted in Part 1, these drawings are available as PDF downloads at the WoodenBoat website, www.woodenboat.com, providing full information needed for construction. For information on ordering the author's book, see www.beutement.com/boats.htm.

The author wishes to gratefully acknowledge the permission of Jim McNerney for use of historical material and photographs, and also extends his thanks to all the other members of the Ilen School community for their encouragement and assistance, especially Director Gary MacMahon, Chief Instructor James Madigan, master shipwright Matt Dirr, the gandelow building team, and the “Gandelow Gang” rowers.

For further reading, see *The Gandelow: A Shannon Estuary Fishing Boat*, by Jim McNerney, published by A.K. Ilen Company, 2005.

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Building SILVER THREAD

A traditional Cornish lug-and-mizzen

by Simon Watts

SILVER THREAD is a close copy of a boat type once widely used in Cornish harbors and estuaries in the 19th century and well into the 20th. The boats, known as *lug-and-mizzens* on account of their rigs, were used as waterborne taxis for ferrying fish, gear, crew, and supplies in and around harbors. The masts are stepped at the ends of the boat to leave a clear working space in the middle. There are three rowing stations, so rowing from the forward station leaves plenty of room for passengers, nets, and other gear. The small mizzen serves as a riding or steadying sail.

Top—SILVER THREAD is a copy of SUMMER HAZE, a “lug-and-mizzen”-rigged boat purchased in the 1920s by the author’s father. Here, the author’s son and granddaughter, Richard and Rose, sail SILVER THREAD in the Lahave Islands, Nova Scotia. **Middle**—One of Arthur Watts’s last drawings (1935) for the British humor magazine *Punch* is based on SUMMER HAZE. **Right**—Alice Sloan and her father, David, were among the many eager and talented people who helped build SILVER THREAD.



Padstow in the early 1900s. The harbor, which now has locks, was tidal then, so all boats grounded out at low tide. Several lug-and-mizzen-rigged craft appear here along the seawall.

These were working craft that evolved according to the necessities of the time and the building techniques and materials then available. As the Cornish gig builder Ralph Bird once said to me, “They never came off no drawing board.” All were locally built using native woods—narrow-leaf Cornish elm for the planking and white-oak frames fastened with copper rivets.

In 1926, my parents bought an old mill house in Sea Mills, Cornwall, not far from Padstow, a prosperous fishing community on the north coast. My father, Arthur Watts, was an artist and keen sailor who soon acquired one of the remaining lug-and-mizzens, a 16' boat built in 1906 by one Steven Braybin. She was called SUMMER HAZE, and has been around longer than I have. One of my earliest memories, from age five or so, is getting my fingers caught under a roller while “helping” my father launch the boat. She had tanbark cotton sails and an iron centerboard that was liable to crush the fingers of the unwary—not an ideal boat for us children. My sister and I were seldom taken out sailing but amused ourselves by puddling around in the mud catching shrimp, prawns, and the occasional flounder.

Arthur kept the boat on an outhaul mooring, but the estuary had been partly blocked off from the main channel by a low railway bridge. This made getting in and out under sail tricky, and my father would tip the boat at an extreme angle to clear the bridge. Many years later, while reading through Steven Braybin's day books, I came across a number of entries that told their own story: “*Commander Watts: Repair Mast*”; or “*Commander Watts: Make New Gaff*.”



In 1935, just before my sixth birthday, Arthur Watts was killed in a flying accident the same year he did one of his best drawings for the humorous magazine *Punch* (now defunct). It features a grizzled old skipper sailing a lug-and-mizzen in stormy weather with two terrified tourists onboard. The boat is clearly SUMMER HAZE, two reefs down, minus the mizzen.

With the death of Arthur, my mother had to sell the house at Sea Mills. SUMMER HAZE was laid up in a field and her sails and spars put in storage. Shortly afterward, we moved to London, where we spent the war years. In 1946 we retrieved SUMMER HAZE from the field—I remember grass growing up through her planking—and had her repaired at Braybin's boatyard in Padstow, where she'd been built. After a few new frames, a couple of coats of paint, and beating the rust off the centerboard, the boat was, if not like new, at least serviceable.

My sister and I were now quite old enough to handle the boat, and we made good use of her. There was still a hangover from the war years—especially in Cornwall. Beaches had not yet been cleared of mines, and there were tank traps, barbed wire, and gun emplacements, so no one (including our mother) paid any attention to

The Drascombes

By the 1950s, the lug-and-mizzen tradition was fading. The story may have ended there, but in 1965 an enterprising boatbuilder, John Watkinson, began building 16-footers that he trademarked as Drascombe Luggers. (“Drascombe” is a made-up, trademarked word like “HagenDazs.”) These open boats were intended as daysailers, with boomless mainsails and wells for small outboard motors that could be raised or lowered as needed. They carried the traditional lug and mizzen rig with the addition of a short bowsprit and jib. The construction at first was

glued-lapstrake plywood, with four planks per side, but fiberglass construction took over as production increased.

The original Lugger was followed by several variations—the Dabber, the Drifter, and the Coaster—all with the same basic gaff rig, centerboard, and outboard-motor well. For trailering, the oars, spars, and motor fit inside the boat. It's not surprising that the Drascombe line became immensely popular, and remains so. For details, visit www.drascombe.co.uk.

—SW

The author hanging a plank on SILVER THREAD in his island workshop in Nova Scotia. The deep-reach, clothespin-type clamps are an essential tool in lapstrake construction.

a couple of teenagers taking a rather leaky 16' sailboat out of the harbor and into the open sea.

We carried little gear—not even life jackets—just a pair of oars, a grapnel, a bailer, and a tattered chart. We went hand-lining for mackerel, explored the narrow, rocky coves of the north Cornish coast, and salvaged what we could from floating wreckage. We did race SUMMER HAZE in local regattas but were woefully ignorant of racing rules and the attendant etiquette. More than once, we had a competitor pinned between us and the beach with every intention of putting them ashore despite frenzied cries of, “water, water.” I was unwise enough to take one of my first dates out for a sail in SUMMER HAZE. It was a gray, blustery day, and as we were tying up at the end of the sail, I remember her saying, “Well, thank you very much. That was cold, wet, and frightening.”

One of Braybin's last jobs was replacing the keel of a 28' pilot gig named NEWQUAY. This was a major operation and had not been attempted around there before. Local opinion was unanimous: “Can't be done, Steven.” But Braybin closed the yard to all but his most trusted workmen until the job was completed. After NEWQUAY, he made repairs to several of the other surviving gigs before retiring in 1956.

These pilot gigs were fast, six-oared craft, 28' to 32' long, based on the boats of the Scilly Isles, which straddle the Bristol and English channels. With no radios, the gigs had to wait around until an approaching vessel, flying the flag to request a pilot, was sighted. Then there was a mad race to board the ship, since the first gig to reach her got the job, and the losers gained nothing but a long row home. Not only was speed essential, but the gigs had to be light enough to be picked up and carried by their crew of seven and able to go out regardless of weather, winter or summer.

William Peters began building gigs around 1790 in St. Mawes on the Falmouth estuary. The Peters family



AUTHOR COLLECTION (THIS PAGE)

soon found themselves in the enviable position of being their own competitors. A new gig was a major investment, so a group of pilots would get together and order a new boat—on condition that it was faster than a rival's that had also been built by the Peters. As a result of these stringent requirements, the design and building techniques evolved rapidly. With the completion of the 32' TREFFRY in 1835, considered the finest boat that William Peters ever built, even the Peters family could make no further significant improvements. TREFFRY would be critical to my understanding of SUMMER HAZE's construction when, many years after my youthful adventures, I built a replica of her.

In 1953, I left England for Canada to take up a career in civil engineering. We gave SUMMER HAZE to friends at Sea Mills, who sailed her occasionally but then retired her to a sheltered garden spot. She remained there for the next 20 or so years, blocked up off the ground but exposed to wind and weather.

In 2002, after I'd acquired some skill as a boatbuilder, my sister and I decided that SUMMER HAZE was too important historically and too much a part of our own family's history to be let go, so we decided to build a copy of her. By this time, there had been a renewal of interest in pilot gigs and a small group of dedicated individuals had been finding and restoring the few remaining boats. TREFFRY had been measured and her plans published. This inspired a whole generation of new boats and boatbuilders pioneered by Ralph Bird on the Helston estuary in south Cornwall. When I met him in 1991, Ralph had a half-built gig in his workshop, the 18th boat he had built to TREFFRY's lines.



The author and his sister, Marjorie-Ann, with SUMMER HAZE in the garden at Sea Mills, 2001. Since the old boat was by then beyond repair, the only option to preserve her was to build an exact replica. The double guardrails are a typical detail of these harbor craft.

Kathryn Mason and her sons, Galen and Isaac, try out the newly launched SILVER THREAD before the masts were trimmed to their proper lengths.

TREFFRY's construction was virtually identical to SUMMER HAZE's except that TREFFRY's planking was thinner—a bare ¼", with every part fined down to its essentials. Ralph showed how the frames were "joggled" to better support the thin planking—each frame carefully fitted to the plank laps before being fastened. This may seem a fussy, time-consuming detail, but it makes obvious sense when one considers such frail craft coming alongside a vessel to be boarded, with a sea running. Another precaution was to fasten the seat knees with clenched copper nails, not rivets, so they would yield, not break, when struck a heavy blow that might punch a seat right through the planking.

There are 28 seat knees in each gig, plus the same number of lodging knees. Grown knees being scarce, Ralph had devised a technique for laminating them in quantity, gluing them up five or six at a time. Unlike the older generation of boatbuilders, Ralph was most generous with his time and expertise. He died of lung cancer in 2009, having completed 29 gigs and restored many more.

I went back to Sea Mills to take the measurements of SUMMER HAZE preparatory to building a new boat. Because I had had little experience in drawing lines, I made templates of the inside of the hull, both sides, every foot or so. I used sheets of stiff cardboard, faired the curves, and cut out patterns. I then traced the body sections onto heavy brown paper that I could roll up and take with me to Nova Scotia, Canada, where I have an island workshop.

To record the sheerline and keel, I stretched piano wire from stem to stern, tensioned by suspending a concrete block at each end, and used a plumb bob to record vertical measurements at each station. SUMMER HAZE's current owner, John Watt, very kindly gave me the original rudder, tiller, and anything else from the old boat that I could use in the new one.

One thing that baffled me about the gigs was their extraordinary longevity. Ralph suggested I pay a visit to Frank Peters, then 86, the last of the gig-building Peters family, who was living at St. Mawes, just across from Falmouth. Frank's recollections seemed to span several centuries and he began every story with "It was during one of them continental wars." I was never quite sure if we were talking Napoleon, post-Napoleon, or even earlier. I asked Frank how



it was that the oldest surviving gig, NEWQUAY, built in 1812 (now over 200 years old), far from being a museum case, was actually still in (limited) use. This had puzzled me since the Cornish elm used for planking is not considered durable—especially around the water.

Frank described the careful selection of trees: "They never took one that was more than half grown" and then chained the logs together and left them in the creek mud, "where the tides do come and go." After five or six years, the wood was pickled with salt, and worms had eaten off most of the sapwood. The logs were then hauled out, sawn to whatever thickness was required, and finished with scrapers.

Other factors that helped preserve the gigs were the cold salt water off the Cornish coast and the fact that the boats were kept in stone boathouses down by the shore—not left out in the rain and sun. Since they were too lightly built to be dragged over the rocky shores, they had to be picked up and carried by their seven-man crews. In stormy weather, they could only be launched in the lee of the island—a considerable carry for an 800-lb boat. Painting the bilges with pine tar—a mild antiseptic—also helped preserve the wood. Our own SUMMER HAZE was certainly planked in elm, but whether it was salted or not I cannot tell.

Smuggling was a major occupation on the Scilly Isles, and Frank had many stories of gigs evading the revenue cutters. In a light breeze they were known to row straight upwind while the cutter, having to tack, was soon left far behind. "So what happened when they were caught?" I asked.

"Oh, they just cut the gig in half with a handsaw—that put them out of business."

That's not so bad for the boat *building* business, I thought. I did remember seeing a chicken house on St. Mary's roofed with half a gig—one of the unlucky ones, I assumed.

Back in Nova Scotia, I duplicated the construction of the original SUMMER HAZE in building her replacement, SILVER THREAD, because historical reconstructions lose authenticity when details are fudged. Since the original boat was four time zones to the east of my workshop, I had to rely on what I'd brought with me—field notes, patterns, and photographs. I was also up against unfamiliar details—a rabbeted keel, reverse curves in the garboard, and a centerboard trunk set directly on the keel. I had a local mill supply 18' lengths of clear, white pine barely air-dry, which I had planed to $\frac{3}{8}$ ". Having full-length planking stock saved considerable time because I could simply wrap the new plank around the boat and mark it directly from the one already in place. This is one of the beauties of lapstrake construction: Spiling to determine the plank shapes is virtually eliminated.

I prefer to build boats right-side up so I can use battens to see how the run of the planks will look. That's an impossible job with the boat upside down. With the boat set up this way, however, I found fitting garboards to a long, straight keel rabbet, bedding, and then nailing them in place to be an awkward job. The bronze nails have to be driven at exactly the right angle so they don't split the plank or break out through the keel timber. I soon found it was a job for a younger man, so I enlisted the help of a local boatbuilder, Kevin Wambach. Kevin also came back a few weeks later with his steamer and his wife, and the three of us framed the whole boat in only half a day.

SUMMER HAZE's planking is fastened with rivets—square-sectioned copper nails, with diamond-shaped roves cut out of sheet copper. Driven into hardwood, these same nails will cripple unless you drill pilot holes—which reduces their holding power. To remedy this, nails were “ragged,” or barbed like a fishhook. I've tried this and it's very effective—but time-consuming, so I opted for the modern equivalent: bronze ring-shank nails.



JIMMY KARAN

The narrow channel between Bells Island and Wolfs, known as “The Gut,” provides secure mooring for the local fishing fleet. SILVER THREAD is easy to row through such narrow entrances, and has three rowing stations to accommodate a variety of loads.

For edge-joining the boards that make up a rudder or a wooden centerboard, bronze drift pins were typically driven into undersized holes and the joint pulled together with clamps; any remaining gaps were filled with seam compound. SUMMER HAZE's original rudder was put together in this fashion and has lasted well over a hundred years.

I used pine tar (imported from Norway at considerable expense) on the interior below the risers. This is easily renewed from time to time with no sanding or surface preparation. It has a pleasant “shippy” smell and is still used by farriers.

As soon as the hull was planked I sent copies of the patterns, notes, and photos to a colleague, Bill Nielsen, in Oregon. Bill lofted the boat, faired the lines, and produced four sheets of 30" × 40" plans. These are very detailed and show full-sized mold and rudder patterns, plank widths, fastenings, and such. It would have been more logical to loft the boat before building it, but that would have delayed the project by at least a year.

It's been well over 60 years since I sailed SUMMER HAZE, so I had a lot to learn—and relearn after launching SILVER THREAD. I had forgotten how comfortably this boat sails herself on a broad reach—a great convenience when hand-lining for her- ring or mackerel in the open sea. Thanks to the mizzen, there is never any hesitation in coming about, and jibing with a boomless mainsail is not life-threatening. Picking up a mooring or coming into a dock under sail is more manageable with only the mizzen set.

The only changes I made in the rigging were to put a double block on the mainsheet and run it through a traveler attached to the stern quarter knees. This additional purchase made it easier for young people (and the elderly) to handle the large mainsail and made both sails self-trimming which is a boon to the single-handed sailor. I also put a downhaul on the tack for tensioning the luff of the mainsail.

I've just turned 86, so it's clear that my early encounter with SUMMER HAZE marked the beginning of an 80-year involvement with wooden boats. Building a replica of her is a rewarding project available to anyone with the interest, woodworking skills, and a modest workshop. Along with the pleasure of owning a boat you've built yourself, you'll find a great satisfaction in building something with a pedigree—a history—going back long before living memory. Keeping these traditions alive is a compelling reason to continue building small boats—and building them in wood. 

Simon Watts's first attempt at building a lapstrake boat was such a fiasco that he named it GOOD GRIEF and fed it into the workshop stove. That was many years ago. He eventually mastered the craft, and then took to the road pioneering the concept of itinerant instruction, teaching six-day classes in lapstrake boatbuilding around the United States and Canada.

Plans and building instructions for SILVER THREAD are available from The WoodenBoat Store (www.woodenboatstore.com) or on disc from simonwattswoodworking.com. Several boats are under construction in the United States and Canada, and at least one, planked in $\frac{1}{4}$ " plywood, is already sailing in Australia.



Compression Failure

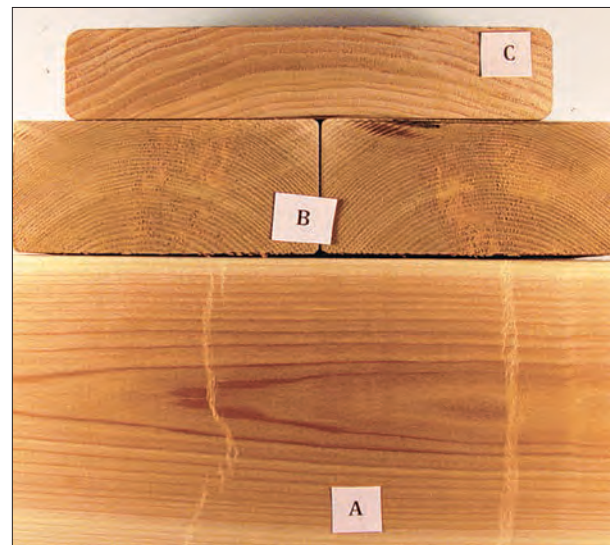
by Richard Jagels

I recently needed a new pair of 8'6" oars. A nearby marine supply store only had 6- and 7-footers, and a single 8' oar—ideal for rowing in circles. Except for very expensive custom-made oars, it appeared my only solution was to make my own. I have a copy of R.D. "Pete" Culler's book, *Boats, Oars and Rowing* (International Marine, Camden, Maine, 1978), and have read it often; but until now I had not attempted making my own oars.

So I headed off to the local big-box store to hunt up some relatively clear spruce. In the past they have had some pieces that were nearly knot-free and would have met my requirements—but not this time. After pawing through the pile for about ten minutes, I happened to turn around and spotted, on the rack behind me, a small load of western red cedar. A short search yielded some very nice clear stock. Since the oars would only be needed for occasional use in a motor-powered boat, I liked the idea of using cedar to reduce weight.

As I pulled out boards for assessment, I noticed one 2×4 that had irregular white streaks running perpendicular to the grain (labeled A in the photo). Within a few seconds, I realized I was seeing something that I had learned about as a student many years ago and had seen in textbook photos but had never encountered "in person."

Longtime readers may recall that I discussed compression failure in a column titled, "Spruce for Spars" in 1994 (WB No. 118). That writeup was in response to a letter from a spar builder who was finding that some of the Sitka spruce he was getting was quite brash. As he described it: "I could take a long scrap, say 1" × 1", and break it



Compression failure in western red cedar is seen as ragged white lines across the board at "A" and crushed fibers at "B." The board at "C," from the outer portion of the stem, is free of compression failure.

between my thumbs with a 'snap,' breaking it cleanly across the grain, almost as if it had been cut with a chop saw."

This is an apt description of brash wood, a defect much feared by those who make spars. As I noted in that column, brashness in conifers can be caused by incipient decay or by compression wood, a reaction wood that forms on the underside of leaning conifers. But in tall western conifers, another defect known as compression failure can occur in living trees—especially in trees stressed by snow and wind loads. Both of these stresses are greater in trees growing at relatively high altitudes. As coastal populations of Sitka spruce and western cedars are harvested out, lumber companies seek trees farther inland, in mountainous areas—hence compression failure becomes a more common defect.

The end tag on the western red cedar 2×4 and the 1×6 boards I purchased read "Idaho Forest Group." Idaho seemed to be much farther east than western red cedar is normally found, but a check of my tree books revealed that a band of this cedar grows along the western side of the Rocky Mountains, which is relatively wet, from central British

Columbia south into the northern tip of Idaho.

In 1805, the Lewis and Clark Expedition, after crossing the continental divide in what we now call northern Idaho, needed a tree from which to build boats in order to float downstream to the Pacific. "With fire, mallet, and crude chisel, they fashioned four large pirogues and a smaller one. And on the morning of October 7, the fateful and illustrious band set out upon the last stage of the outward journey, downstream to the Pacific, borne on the great boles of the Giant Canoe Cedar, which lumbermen today call Western Red Cedar" (D.C. Peattie, 1953, *A Natural History of Western Trees*, Houghton Mifflin, Boston).

Fortunately for American history, Lewis and Clark's cedar boats survived the journey to the Pacific Ocean. We might be tempted to surmise that they were lucky in choosing trees that were free of compression failure—but we would be wrong in this conjecture. Compression failure occurs mostly in wood near the center of the tree. Lewis and Clark removed this central wood as they hollowed out their dugout canoes.

Why is compression failure mostly confined to the central portion of

the bole? To answer this we need to understand how trees develop internal stresses as they grow. As a sapling, the main stem develops mostly compression stress as the crown enlarges. Eventually, equilibrium is reached and subsequent wood laid down develops tensile stress. Under heavy snow loading, the compression stresses in the central part of the stem can be converted to strain, often as localized deformation seen as compression failure.

In the accompanying photo, a tangential surface of a western red cedar 2x4 is shown with the label "A." The two ragged lines that cross the grain indicate the locations of compression failure. According to a 1961 USDA Forest Service Bulletin (No. 1588: Detection of Compression Failures in Wood), compression failure on side grain (radial or tangential) is best seen if light strikes the surface at an angle of about 20 degrees—the method I used for this photo. Fortunately, the natural reddish-brown color of western red cedar makes it easier to detect the white compression failure lines than is the case with a wood such as Sitka spruce—which is probably why I spotted them easily at the big-box store.

The two cross-sections, shown with the label "B" in the photo, were cut through a zone of compression failure. Here we can see areas of crushed fibers. Note that the curve of the growth rings indicates this piece came from part of the tree close to the pith. Using a compass, I determined the distance from the pith was about 2". The 1x6 board, labeled "C" in the photo, is free of compression failure. The arc of the growth rings tells us that this board was more than a foot from the center of the tree.

According to *The Wood Handbook*, wood with visible compression failure has low strength and shock resistance. In particular, "the tensile strength of wood containing compression failure may be as low as one-third the strength of matched clear wood."

Because compression failure is often difficult to detect, the best

preventive measure boatbuilders can take is to use wood from the outer portion of a tree, which has more flattened growth rings, for situations in which bending strength is most critical—but avoiding sapwood when decay resistance is desired. 🛠️

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 Senior Editor Tom Jackson, tom@woodenboat.com.

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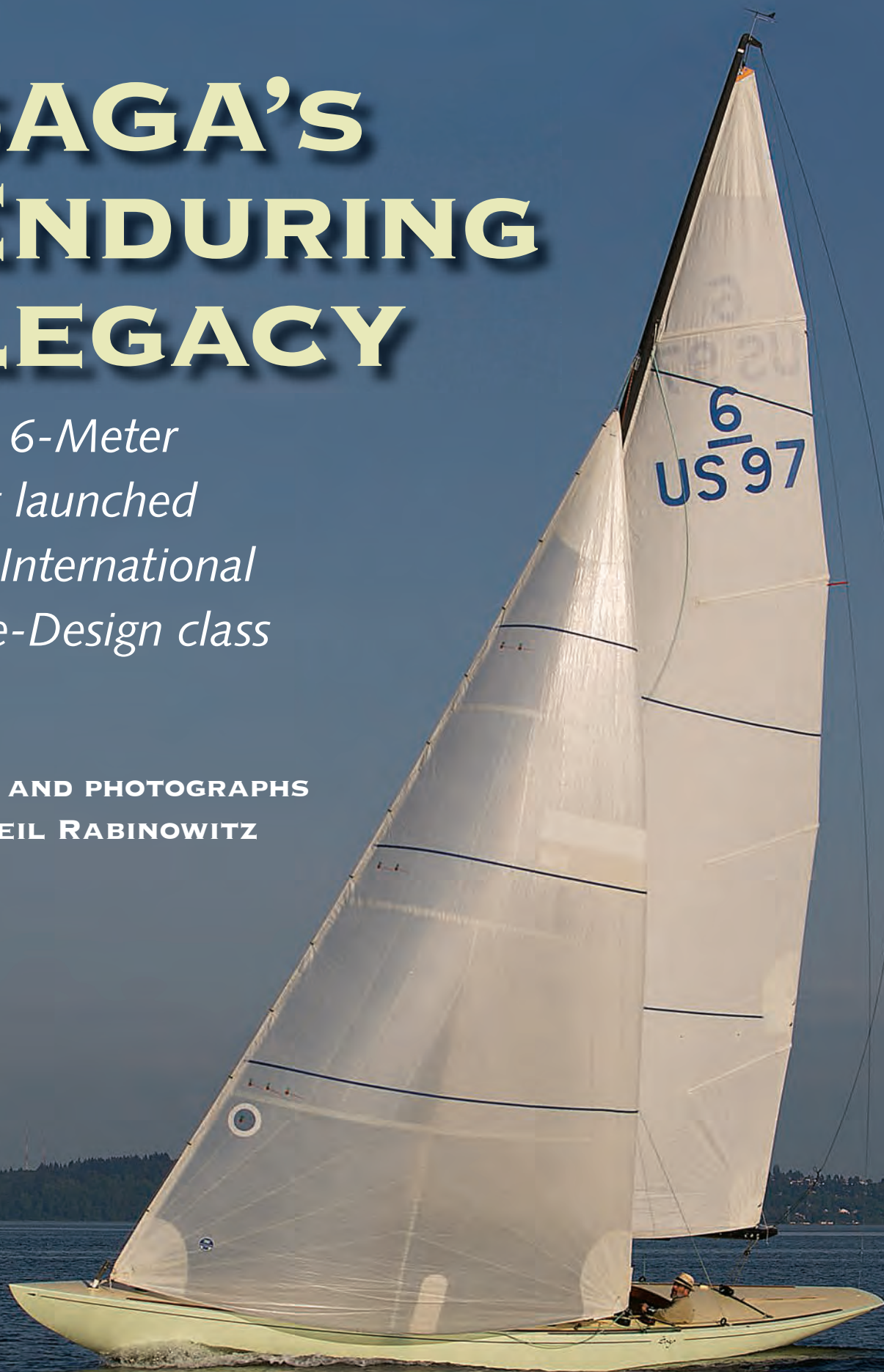
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SAGA'S ENDURING LEGACY

*The 6-Meter
that launched
the International
One-Design class*

**TEXT AND PHOTOGRAPHS
BY NEIL RABINOWITZ**



In 1935, the legendary yachtsman Cornelius Shields of Larchmont, New York, traveled to Bermuda to race in the AMORITA Cup—a team-racing event between Bermudian and Long Island Sound sailors. For about a decade, that trophy was contested in two nearly identical one-designs sharing the same course: The C.D. Mower-designed Sound Interclubs (see WB No. 242) and the W. Starling Burgess-designed Bermuda One-Designs. Shields, who had been instrumental in the development of the Sound Interclubs and owned one of them, was often heard to say that if he were going to be beaten on the water, he wanted it to be by a better sailor, not by a designer. He was a true believer in the concept of identical boats on the race course—or “one-designs.”

The Sound Interclubs had been launched in a single batch of boats by Henry B. Nevins in 1926, and they attracted some of Long Island Sound’s best sailors. By 1935, Shields was seeking a replacement design that would hold together the competitive group that had coalesced around this design. Inspiration came to him on that trip to Bermuda, when he saw a stunning new

6-Meter-class sloop called SAGA, designed and built for Keith and Eldon Trimingham, undergoing sea trials. That first glimpse of this boat set him on an inexorable path:

The minute I saw SAGA, I fell in love with her. I thought she was the most beautiful boat I’d ever seen. I loved her shape, her sheer, her dainty transom, and her long, straight, counter.... All I could think of on the way back to the States were the lines of that darned boat. She literally haunted me.

That shape inspired Shields to commission the Norwegian designer-builder Bjarne Aas, who had created SAGA, to draw up the International One-Design (IOD)—a lighter, wider, shorter (33’), more lightly canvased version of SAGA. Aas had, in fact, been mulling a smaller version of SAGA himself, and Shields’s enthusiasm motivated him to complete the design. Shields and his brother, Paul, formed a six-person syndicate of Long Island sailors, which purchased 25 boats to be sold locally. The new design required only three crew instead of a 6-Meter’s five, and cost less than half as



Facing page—The 37’6” International 6-Meter-class sloop SAGA, designed by Bjarne Aas and launched in 1935, inspired the creation of the International One Design (IOD) the following year. **Above**—SAGA went on to a storied career, and has been owned since 1991 by Kimo Mackey (inset)—first in partnership, and later on his own. Mackey sails the boat from Bainbridge Island, Washington.



Kenneth and Eldon Trimmingham commissioned SAGA for the burgeoning 6-Meter fleet in Bermuda. They sold the boat only two years later, when British-American team racing required that they sail a British-built boat. Eldon later regretted selling SAGA, considering her the best boat he ever owned.

SAGA was to be no ordinary 6-Meter. For starters, she'd be dry-sailed—hailed between outings on a local marine railway—and this required some special considerations for her backbone timbers if they weren't to dry out and shrink when the boat was out of the water. Most 6-Meters of the day were timbered in white oak—a durable choice, but a wood prone to shrink and swell with wet-dry cycles. SAGA, on the other hand, has a keel, stem, and sternpost of teak, which is much more stable.

By dry-sailing, the Trimminghams would maintain a clean, hard-enamel bottom. Some observers said that even the lead ballast was a work of art; it was so sleekly shaped that pundit-designer Uffa Fox said, "The casting might have been molded from the body of a tuna...."

The boat's deck was of laid Sitka spruce, and she was framed in elm. The full-length hull planking, edge-glued without butt joints, is of old-growth Douglas-fir. The plank-

ing produced a hull so smooth-sided it shone, according to Shields, "like the side of a porcelain bathtub." The rudder was also teak, as were the floor timbers, and while most of the 6-Meters of the day had iron bolts and drifts joining the backbone timbers, SAGA's were of silicon-bronze. No expense was spared: She was built to last.

much as a 6-Meter. Aas turned out two IODs a month for the next 12 months, and classes soon formed in New York, Massachusetts, Maine, San Francisco, and Norway—not to mention Bermuda, where the IOD became the new boat for the AMORITA Cup.

The IOD remains popular to this day, and its story has been well documented (see WB No. 231 for a review of a book detailing the history of the class). But what ever happened to SAGA, the alluring 6-Meter that inspired it?

The 6-Meter was big in Norway in 1934. King Olav himself raced nine of them over the years, and in 1924 a Norwegian, Eugen Lunde, won Olympic gold in the class. Bjarne Aas's designs had had a string of successes in Europe, and the Trimminghams purchased an existing boat of his design, VIKING, in 1930, which prompted Bermuda sailors to soon order two more 6-Meters from him. But new American designs by Olin Stephens and others were threatening, so the Trimminghams returned to Aas for something special.

SAGA scored three firsts and a third in her first races in 1936, the Prince of Wales Cup and the first King Edward VII Gold Cup, and in team racing she scored two more firsts and a third. Known for her heavy-weather performance, she competed in Bermuda for only two years, and then the Trimminghams sold her in 1938 to Johnston deForest, a Long Island sailor, just before the hurricane of the century raked Long Island and New England claiming hundreds of lives, flooding cities, and destroying thousands of small boats. SAGA survived, but as interest grew in the more affordable IODs, deForest sold her to Myron Spaulding of San Francisco, where she sailed for two years before Ray Elliott, a 6-Meter enthusiast in Seattle, bought her. Elliott's personal fleet would eventually grow to five



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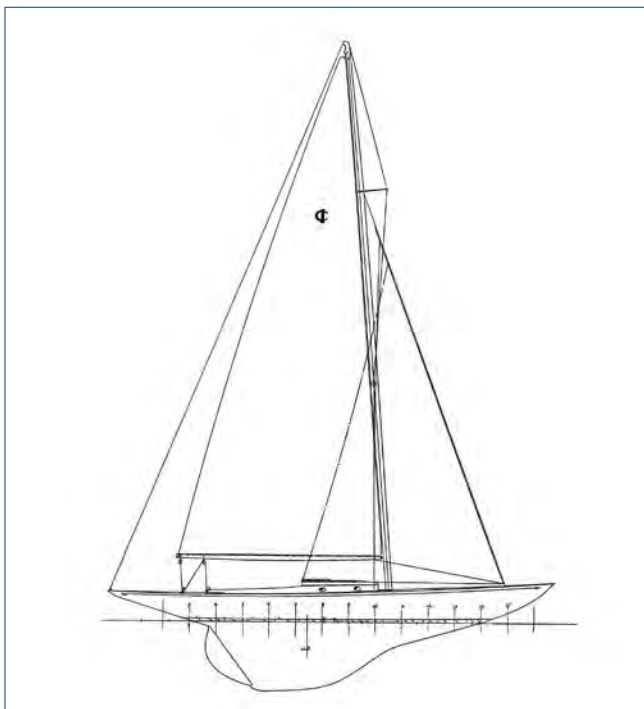
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The 33' IOD class, while not among the largest one-design fleets in the world, is certainly among the most influential. In appearance, the design is a diminutive version of SAGA's—a few feet shorter, but proportionally beamier.

6-Meters, encouraging Seattle sailors to build their local fleet to twelve boats. SAGA passed through two more owners but stayed in the region; by 1966, however, she lay neglected, ignobly chained to a wharf and sold at a sheriff's auction for unpaid bills.

In 1968, Seattle sailor Bill Buursma restored her to racing condition, and she again rose to the top of the veteran fleet, finishing seventh out of twenty in Seattle's 1973 6-Meter Worlds, in which five boats were modern designs. In 1976, Buursma built another 6-Meter, FRENZY, designed by Britton Chance, and sold SAGA to Canadian sailor Paul Longridge, who raced her out of the Royal Victoria (British Columbia) Yacht Club—which along with Vancouver and Seattle combined to form the largest and most competitive 6-Meter fleets in North America. SAGA kept winning races, and in 1978 finished first against a fleet of pre-1960 6-Meters. In 1979, she placed 16th out of 25 boats in the World

STRENGTHENING SAGA'S FRAMES

BY ERIC JESPERSEN

Every pound that can be saved in a boat's structure is a pound that can be integrated into the lead ballast, which in turn means better stability and windward performance. The downside of reducing a structure's weight is that the safety margins in the most highly loaded areas of the hull are also reduced. Though strong enough when new, these areas can be dangerously weakened over time by water absorption and the deterioration of wood and metal. The mast-step and the bilge near the ballast keel are two areas where loading and age can conspire to render a boat too weak to sail.

SAGA was well built, with elm frames and teak floors and backbone. But these floors had to be bolted to both the tiny frames and the keelson. This was the core of SAGA's problem: The elm frames are small, to allow them to bend to the

tight curves of the wineglass-shaped sections common to 6-Meters. But these small-sectioned frames weren't big enough to accommodate the bolts: The bolt holes took away too much material from the frames. The holes were also so close to the edges of the floors that the resulting connections were poor. Small, angled, metal brackets helped hold the floors to the few planks they touched, but with 6,000 lbs of ballast pulling down, the connection was tenuous. As a result, SAGA had broken frame heels.

In 2002, we repaired these frames by cutting away their bottom portions and scarf-joining new frame heels made of laminated white oak to the remaining frames. We chose to not replace them entirely, since the breaks were all in the lower 30 percent of the length of each frame, and the rest of each frame was in good condition. We increased the sided and molded dimensions of the new heels, but tapered them to match the existing frames at the scarf joint. We chiseled out the frame pockets in the keelson to fit the new dimensions of the heels; this had the added benefit of cleaning up the pockets by cutting them back to fresh wood.

We glued the scarfs with epoxy, and bedded the heels in the pockets with polysulfide. Bronze bolts of increased size now hold the frames and floors—and we reused the metal brackets. The frames were bedded to the planking with Sikaflex.

It's been 14 years since we made these repairs, and they've proven their longevity: SAGA is substantially stronger than when launched, with the cross sections of the frames at their sharpest turns double their original dimensions.

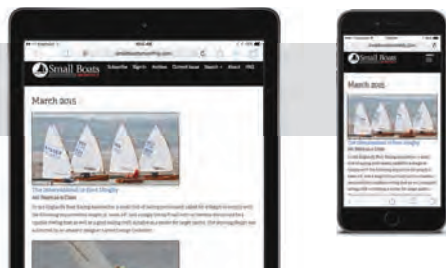


SAGA's frames were small in section in order to accommodate a tight reverse curve at their heels. Eric Jespersen repaired this age-weakened area by scarfing on new heels of greater dimension, and tapering them to meet the original frames.



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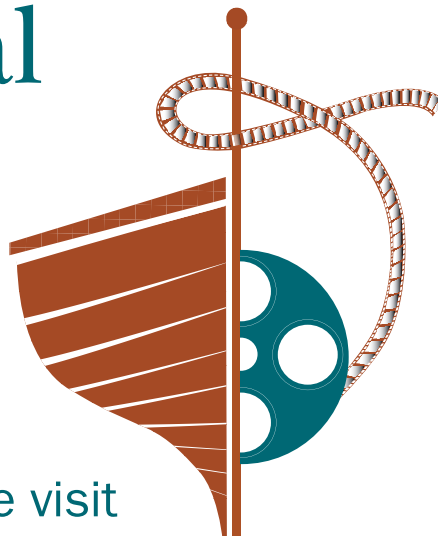
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SAGA's simple layout includes separate cockpits for the helmsman and headsail trimmers, and a "trench" in the sole between them for easy passage. Inset—Custom bronze fabrications spread the chainplate load over two oversized frames, and bronze hanging knees help support the deck.

Championship, and was runner-up to the highest-placing "Senior Six," YLLIAM VIII, a Sparkman & Stephens design. In the 1983 World Cup in Newport Harbor, California, she held her own in rough conditions against the latest designs.

It was at that 1983 World Cup event that Kimo Mackey, in true Cornelius Shields fashion, emerged from the clubhouse and encountered SAGA in gleaming condition. He was thunderstruck. "My jaw went slack," he recalls. "She was gorgeous. I had been searching for ten years [for a 6-Meter] and knew it right then I had to have that boat."

Mackey was no stranger to 6-Meters. In 1974, he and a group of college buddies had had a grand adventure in Athens, Greece, aboard an old 6-Meter named CRESTA. Five months earlier, they had taken a semester off from college to sail the Mediterranean. The group had pooled \$6,000 from their combined savings to cobble together a cruising yacht and spend a term gunkholing the Côte d'Azur, frequenting harbor cafés and dreaming of Gina Lollobrigida.

Mackey, then a 21-year-old from the San Francisco Bay Area, had sailed Sunfish and once hopped on a

Transpac delivery, but that was it for his sailing experience. However, he'd devoured every book he could find on yacht design, and was the most knowledgeable of his adventurer friends. So he was sent ahead to scour the docks of Europe for a boat.

"Six-Meters were never part of the plan," Mackey said. "I was sent to find a boat because I read the most, but I was thinking a Lapworth or 40' Cheoy Lee we could sleep on and sell before we went back to school." He hummed about the docks with his Euro-Pass, beginning in the Netherlands, and soon realized he lacked purchasing power. Anxious to begin voyaging, his friends clamored to know the plan when Mackey spotted a 1932 Camper & Nicholson 6-Meter in Palma, Majorca. It had been converted into a short-hop cruiser, with a tiny cabin, and it needed work, but it was within their budget. He jumped at the chance and called the boys. The next thing he knew they were setting sail from Palma to a cluster of Greek islands.

"That passage from Palma to the islands nudging the Turkish border was one of the longest ever on a 6-Meter," Mackey said. "But we were full of ourselves, having studied our Greek classics. We were oblivious to the history of the class. Still, cramped as we were, we fell in love with that 6."

For five months, they sailed throughout the Mediterranean, slipping in and out of harbors, enjoying the good life, sleeping on deck and below. Then, with the money all but gone and school about to begin, it was time to go home. They stuck a sign in the rigging and put the boat up for sale. Then Turkey invaded Cyprus. A coup d'état ensued, and a junta sparked fears of war. The Greek sailing odyssey became a war epic.

"It *was* war. People got hurt," Mackey recalls. "No one was buying sailboats. We ran out of cash and needed our money out of the boat. The government wouldn't let us sail out of the country or even off the dock. The junta shut down all marine traffic, and the harbor-master threatened to shoot us out of the water if we dared leave the slip."

Their situation was grim: They were broke and stuck in a war zone when a wealthy Greek shipping magnate nearby offered to purchase CRESTA, but he insisted on seeing her under sail. "Despite our pleas that we might get shot," Mackey said, "without seeing the boat sail he said it was no deal."

Desperate, they crouched low on deck at 1 a.m., hoping the Greek sentries they saw drunk nightly would be



Kimo Mackey, seen here at SAGA's helm, had a youthful adventure in a 6-Meter, and that experience cemented his love of the class. He tracked SAGA for years before finally buying her.

sleeping it off. They slipped the boat free, and the heavy, skinny hull glided halfway across the harbor. They hoisted a blade jib—just enough to ghost along—and threaded through a half-dozen patrol boats anchored in the roadstead. Suddenly, a spotlight flooded CRESTA in blinding white.

They hit the deck, expecting to get shot, when a sailor shouted to them in Greek. Scared, Mackey shouted back in his best local accent. The group could then hear a quiet conversation, a faint response, and then nothing. They passed through, their hearts racing. As they left the harbor, Mackey said, “The wind picked up off the quarter, building following seas until we pegged 12 knots under headsail alone.”

Passing Cape Sounion and the Temple of Poseidon, being good students of the classics, they poured red wine libations to the gods in celebration of freedom and life—and, with their escape, the upcoming sale of CRESTA. “We flew through the moonlight,” recalled Mackey. “It was pure 6-Meter magic. It intoxicated me.”

Mackey finished college and, having been seduced by the rich history of yacht design, he plunged into formal naval architecture studies and eventually became an engineer specializing in sophisticated propeller design and underwater repair on everything from top-secret Navy vessels to commercial ships and

cruise liners. He went on to sail a succession of unsatisfying yacht designs, but the memory of his 6-Meter adventure lingered.

Recalling his encounter with SAGA in 1983, he said she “was a knockout.” He offered Longridge nearly twice what the boat was worth, and while impressed with Mackey’s devotion, Longridge was not ready to sell. Mackey wouldn’t let it go, but with family health issues and business dealings demanding his attention, he figured it just wasn’t the right time and dolefully made an alternative offer on another 6-Meter, MAYBE VII—a Sparkman & Stephens design. While this purchase was still under survey, Longridge suddenly changed his mind and offered to sell SAGA to Mackey. “As badly as I wanted her,” Mackey said, “I felt obligated to honor my deal in progress. It wouldn’t have been right.”

Subsequently, he mentioned SAGA to a sailing friend, Bjorn Sundt, and suggested Sundt take a look. At that moment, Longridge was craving a more modern design, and Sundt ended up buying the boat. Sundt later sold SAGA to Paul Stohlman. Mackey tracked each of SAGA’s sales since Newport Harbor, but upon close investigation discovered she’d been neglected by 1990.

With two partners, Mackey finally purchased SAGA



A deck replacement in 2010 provided the opportunity to rethink SAGA's layout. Long bench seats in the aft cockpit fold down when sail handling is the priority, but are quickly deployed when comfort is desired. A removable skylight shelters the forward cockpit for cruising.

SAGA: A TRUE RACER-CRUISER

SAGA's fir-over-plywood deck grew soft over time as water found its way in and rotted the subdeck. For years, Kimo Mackey retarded the deterioration by keeping the boat under cover, but as the deck grew softer, the day arrived in 2010 for a complete replacement. This allowed the opportunity to customize the boat's deck layout.

Mackey's earlier 6-Meter, MAYBE VII, had the signature Sparkman & Stephens cockpit arrangement: a small two-person "cloverleaf" cockpit aft for the helmsman and tactician, and a three-person forward cockpit for the sail trimmers. While it worked for racing, Mackey was intrigued by the 6-Meters of the Baltic Sea, whose larger aft cockpits also accommodated cruising. These Scandinavian boats had small two-person cockpits forward, which were covered with a skylight when cruising. The remaining three crew occupied the aft cockpit; that third person in the aft cockpit allowed for efficient tacking of the No. 1 genoa. Mackey combined the two concepts, creating a hybrid—a large cloverleaf cockpit aft and a small cockpit forward for the headsail trimmers. There's a removable skylight for the forward cockpit, which creates a sheltered cruising cabin.

The ideal racing arrangement prioritizes sail handling. One of the most difficult maneuvers in a 6-Meter is tacking the No. 1 genoa in a strong breeze. In the Baltic layout, the crewmen stand and brace themselves against the coaming while sheeting. Mackey's configuration allows the forward crew, between maneuvers, to step into a fore-and-aft trench joining the two cockpits, and even to sit at times to lower their weight. This arrangement also allows the boom to clear their heads.

The well-rounded forward cockpit allows the jib tailer to lean hard against the coaming while pulling on the sheet. The jib trimmer in the aft cockpit grinds the winch out of the way of the tailer, while facing forward.

For racing, the running backstays are led aft and are tensioned using the No. 2 winches. For cruising, the runners are led forward and tensioned with the No. 3 winches; in this configuration the runners essentially become part of the standing rigging because they don't interfere with the mainsail while sailing upwind.

The mainsheet is double-ended to create a continuous loop which eliminates running out of sheet during a sudden bear-away. There are openings in the sole for the tail ends of the headsail sheets as well as the runners; the mainsheet tail leads underneath the sole into a mesh "hamper" to prevent it from falling into the bilge.

SAGA's cockpits convert to cruising mode by first flipping down the aft cockpit's long bench seats to allow seating for four people. The skylight, stored in the forepeak when racing, is secured over the forward cockpit and the forepeak cushions are placed on an elevated sole on either side of the forward cockpit. The deep "trench" sole allows passage between the two cockpits, but is narrow enough to not constrict the port and starboard berths.

A Tiny Tot woodstove next to the mast keeps things cozy below. A quick-release collapsible dodger over the aft cockpit provides additional shelter; lowering it allows an unobstructed view for the helmsman.

—NR



When racing, Mackey's curatorial connection gets the best of him, and he must call in a skipper who will "race by the numbers."

in 1991. They raced her for a decade, winning the King Olav Cup in 2001 and the Lipton Cup in 2002, and finishing third in the 2006 North Americans. Mackey eventually bought out his partners and began SAGA's restoration.

"She was in fine shape due to the quality materials throughout her backbone," Mackey said, "and because racing inspired her owners to keep a constant level of maintenance." To this day, her teak backbone timbers remain in pristine shape. Her Sitka spruce deck lasted for nearly 50 years until the 1980s, when it was replaced with a plywood subdeck overlaid with Douglas-fir planking. Her hull planking remains in near-original condition. Later, following a survey, Mackey began thinking that the frames were too light for such a heavy keel in the tight garboard tuck, so he hired Eric Jespersen of Sidney, British Columbia, to address this issue (see sidebar, page 44).

SAGA now lives in Port Madison, Bainbridge Island, Washington, surrounded by generations of 6-Meters in various states of repair. And Mackey and his crew, thanks to a reconfiguring of the yacht's deck, enjoy a

wonderfully ergonomic layout (see sidebar, page 48).

At times, when racing, Mackey has to surrender the helm because he gets so wrapped up emotionally in the state of the boat and shifts from SAGA's helmsman to her curator. Sometimes his crew just needs a skipper. "That's when I bring some emotionally cut-off skipper to race her by the numbers, without the connection I bring to the task," Mackey said.

But once in a while, alone on the helm and with one quiet and distant crewmember enjoying the peaceful sunset off Bainbridge Island, Mackey drifts off to that heart-stopping moonlit reach in Greece and realizes that, with SAGA, the magic is never far below the surface of his daily life. 🏠

Neil Rabinowitz is a Bainbridge Island, Washington-based photographer and writer specializing in marine, adventure, sports, travel, and lifestyle. He has covered such diverse subjects as the AMERICA's Cup, the Olympics, the Indianapolis 500, river rafting in Chile, superyachts in Tahiti, fly-fishing in New Zealand, and grizzlies in the Alaska wilderness. View his work at neilrabinowitz.com.

Electric Auxiliary for a Sailboat

With solar recharge, off-the-grid cruising is in range

by Jonathan Taggart

What we enjoy most about recreational sailing is just that—sailing. We are thrilled if we can sail all day in NEREID, our 1962 Bermuda 30 ketch, without ever needing to use the engine. We like to leave our mooring under sail and return to it the same way. For my own part, I am a traditionalist but a pragmatic one: For example, I appreciate the sweet, clean sheerline of an older wooden boat like ours, but I did not hesitate to reinstall stanchions and lifelines for the sake of safety. In the same way, I would rather sail if I can, but I will motor if I have to.

For our boat, motoring meant starting up the gasoline-powered engine. I believe the Atomic Four engine was original to the construction of the boat, a type often called a modified Herreshoff H-28, at the Cheoy Lee boatyard in Hong Kong more than 50 years ago. Like any old gas engine, the Atomic Four required constant attention, service, and maintenance. That was work I did myself, and maintaining the engine often made me feel more like an on-the-water motor mechanic than a sailor. I know I'm not alone in this. In the mooring basin, I often commiserated with one of our neighbors—John Teller, who owns the lovely Murray Peterson-designed ketch WILD DUCK—about



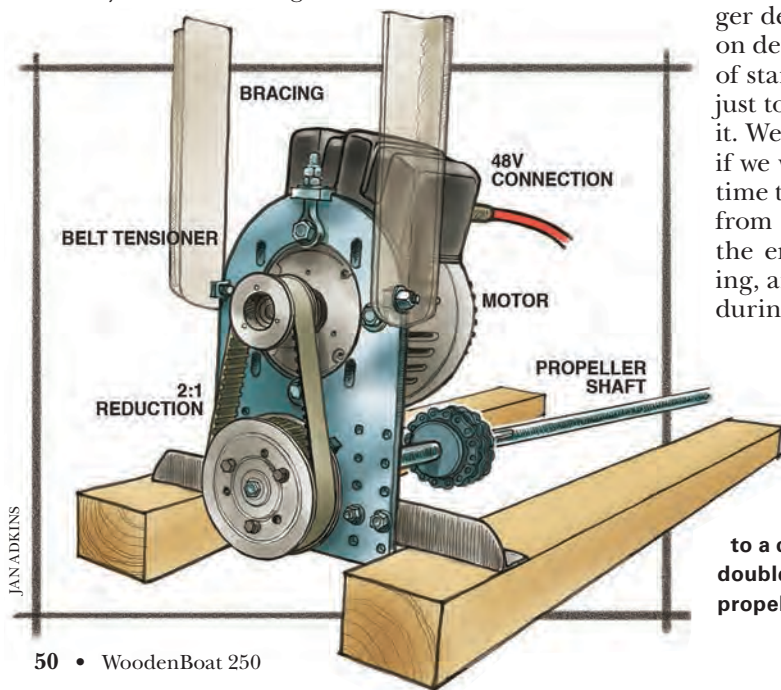
JONATHAN TAGGART

Solar panels have improved a lot during the years the author has sailed his Bermuda 30. The thin, flexible panel on the companionway sliding hatch can be walked on and is rated at 50W, while an earlier panel, visible on the coach roof and predating the author's electric motor installation, is stiff, thick and fragile and is rated at 33W.

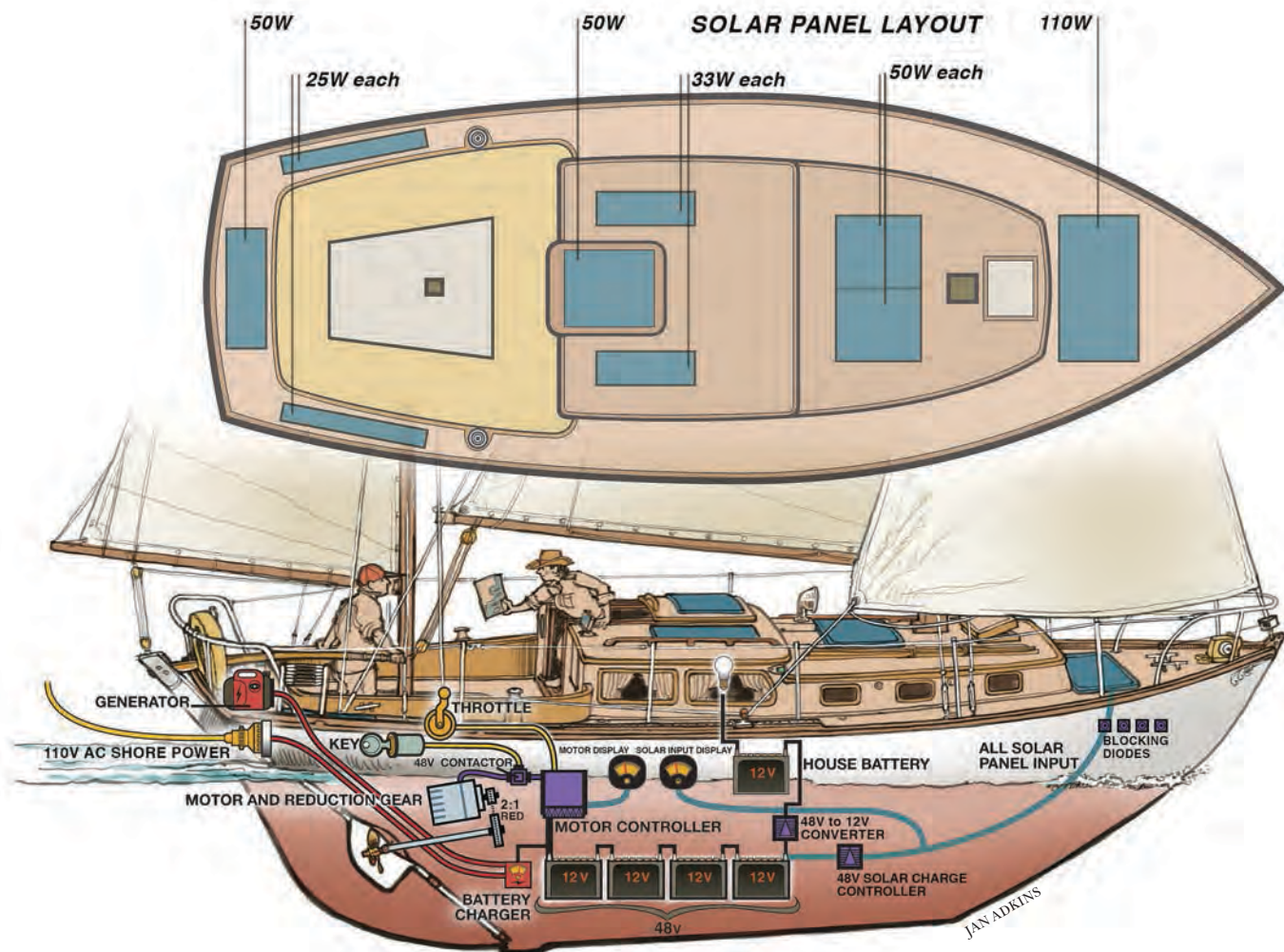
spending way too much time with our heads down in the bilge, uncomfortable, our hands in impossible positions, covered with grease, as we worked on carburetors, fuel pumps, impellers, distributors, oil filters, or spark plugs, not to mention changing the oil regularly and going through the annual winterization and spring recommissioning. "I bought a sailboat so I could sail, but I have become an engine mechanic," he once told me. I knew exactly what he meant.

Despite all the maintenance, our engine was no longer dependable. We were never sure that it would start on demand, especially in a pinch. We got into the habit of starting it when sailing into a harbor or a tight spot just to be sure it would be running if we really needed it. We always had to keep in mind, of course, that even if we wanted power quickly we'd have to allow enough time to run the bilge blower to clear any gasoline fumes from the engine compartment. We would always start the engine and warm it up before leaving the mooring, and sometimes that was the only time it would run during the day. The engine was noisy, and the exhaust

The electric motor and reduction gear are mounted on a stainless-steel plate, which attaches to the existing engine bedlogs by a simple athwartships metal angle. Additional metal angles extend above to a cockpit sole deckbeam. The drivetrain is fitted with a double-roller, chain-sprocket coupler for connection to the propeller shaft.



JAN ADKINS



System Components

Propulsion

- Electric motor: Motenergy ME 1115 12kW AC brushless motor
- Reduction gear: Thunderstruck Motors 2:1 reduction gear for 1" drive shaft
- Motor controller: Sevcon Gen4, 450-amp with heat sink
- Motor display: Sevcon Clearview, 3.5" color screen (Above included in Thunderstruck Motors kit, which also included key switch, throttle, wiring harness, and Tyco Contactor solenoid.)
- Propeller: three-bladed bronze, 13" diameter x 11" pitch

Electrical

- Batteries: Main battery bank 48V with four in-series 12V batteries to power the motor. (Connection to 48V bus has a 250-amp fuse.) One 12V house battery supplied through a 48V-to-12V converter isolated by two 250-amp fuses, one on the 48V side and one on the 12V side. All batteries are Firefly Oasis Group 31 carbon-foam absorbed glass matt (AGM) batteries, 13.4" x 9.4" x 6.8", 74 lbs each. The main bank and house battery connect to a two-bank monitor.
- Charging control: The charging bus, with output to a 48V bus, receives two input lines, each of which is monitored by a Skyrac WM-010 watt-meter. One input comes from the solar bus, the other from a Delta-Q

Technologies QuiQ 1kW industrial battery charger that receives input from a portable generator or from shore power.

- Generator: Portable Honda EU2000i, 2,000W, 46 lbs, 8.1 hours per gallon of gasoline

Solar Generation

Panels—all of flexible, anti-skid, walk-on variety, with the exception of two previously installed 33W panels—are set up in four zones:

- Zone 1, aft deck and side decks: one Aurinco Compact 50W, 2.7 amp, 33½" x 16¼" and two Aurinco Bluewater 25W, 1.35 amp, 47½" x 6" connect directly to one of four solar Genasun GV-Boost 48V charge controllers with 8-amp input limits, then to solar bus
- Zone 2, doghouse roof port and starboard: two pre-existing Northwest Industries 33W, 1.6-amp panels, connect directly to a charge controller, then to solar bus
- Zone 3, companionway slider and coach roof: three Solara Premium M-Series 50W, 2.36 amp panels, isolated by blocking diodes, connect to charge controller, then to solar bus
- Zone 4, foredeck: Aurinco Compact 110 ST, 5.4 amp, 40½" x 26½" x ⅛", 110W, connects through blocking diode to charge controller, then to solar bus



The electric motor and reduction gear, visible at the top of the photo, are smaller and lighter than the Atomic Four gasoline engine that they replaced. Two of the three 12-volt batteries visible here are part of the four-battery bank that supplies the motor; the third is a house battery. Red cables lead to the gray contactor, or solenoid, and at the extreme upper right is the motor controller.

fumes were annoying when running downwind. We also disliked carrying 20 gallons of gasoline aboard the boat.

The engine had had almost every upgrade available from Moyer Marine Inc. (www.moyermarine.com), which specializes in Atomic Four parts and service. During the engine's last year of operation, 2013, I had to pull the spark plugs and pour Marvel Mystery Oil into the cylinders to prevent the valves from sticking, both before starting the engine and again right after shutting down. I had done everything short of replacing the sticking valves, which were a continual problem. The next step would have been to remove the engine for an overhaul that would have included replacing the valves with Moyer's new, more powerful valve springs.

If we'd had the engine rebuilt, we could have just continued business as usual. But for years I had been exploring alternatives. I learned that I could gain efficiency and enable the use of a larger propeller by installing a reduction gear, which the original engine did not have. But such a unit would have had to connect aft of and lower than the engine block, and it wouldn't fit—which was probably the reason the boat didn't have a reduction gear in the first place. A small, new diesel engine would fit on the existing engine bedlogs, but NEREID's engine compartment didn't have enough height under the cockpit sole to accommodate one. Also, replacing the copper gasoline tank would have meant tearing out, and then rebuilding, the entire galley. Meanwhile, I had been hearing about electric auxiliary power, and I began to think seriously about its viability for this boat.

In talking with David Wyman, a naval architect from Castine, Maine, who has professional experience with electric auxiliaries and uses one for a sailboat of his own, I learned that these motors not only can be extremely powerful for short periods of time but also can keep going for many hours if they are run at low speeds. They are not suited to mariners who tend to use their motors a lot—which seems to be quite a few

of them these days. But electric power can provide exceptional backup propulsion for those who prefer to sail most of the time and rely on auxiliary power only when docking or mooring, in emergencies, or when becalmed. Another friend, Honda engine and system mechanic Michael Start, recommended that I ask Eugene Story, an engineer with Maine Electric Boats (www.maineelectricboats.com), about the possibilities. Gene convinced me that a 12-kW electric motor would be perfectly suited to our boat and the way we sail.

The prospect of electric power raised an important secondary consideration for us: We keep our boat at a mooring, not at a marina, so we have no regular, convenient access to shore power. Plus, when we cruise, we prefer to steer clear of the "civilization" of marinas and docks. If electric power was going to work for us, we would want to power the battery bank with solar panels mounted on the boat. For advice on solar regeneration, Gene directed me to Bruce Schwab of Ocean Energy Planet (www.bruceschwab.com), who helped me to develop an array of panels, supplementing two I already had on the doghouse roof. The types he recommended are flexible, so they can conform to the camber of the deck and coach roof. At the same time, they have slip-resistant surfaces and can be walked on, so they don't interfere with sail-handling and ordinary life aboard. All together, the panels would be rated to produce 416 watts.

They would be connected to the battery bank via a charging bus, which would also have a

The original electrical panel was repurposed to include a battery monitor (upper right), solar panel monitor (middle right), charger monitor (lower right), and updated circuits.

Below the main battery switches is one of the solar charge controllers. The motor display is mounted near the companionway.



The 9" propeller was replaced with one having a 13" diameter and 11" pitch better suited to the electric auxiliary.

second input line to allow connection to shore power when available or to a Honda 2000i gasoline-powered portable generator when necessary. Meters for both incoming power sources would track watts, amps, amp-hours, and much more.

I concluded that installing an electric auxiliary with solar regeneration would be practical for us. So I jumped in. The first project was to remove the Atomic Four, and as I did so I quickly realized that I'd be getting rid of more than just the engine. Out came all of the systems that supported it, including through-hull fittings, the freshwater cooling system, gas and oil filters, the water-cooled exhaust, the bilge blower, wiring, and a large assortment of fuses. I hadn't considered all of the stuff I wasn't going to need to carry, including oil, antifreeze, Marvel Mystery Oil, spark plugs, a spare fuel pump, belts, and service manuals.

We weren't completely freed from gasoline—we keep a small amount of fuel in the generator, which stows in the lazarette and operates in the cockpit when needed. I left the boat's old fuel tank in place rather than tear apart the galley to remove it, but after removing the Atomic Four I took advantage of the access in the empty engine compartment to sister a few frames.

Based on recommendations from Gene Story, I ordered a 48-volt motor kit from Thunderstruck Motors, which included the 12-kW motor with a 2:1 reduction gear, controller, controller heat sink, display, throttle, wiring harness, switch key, contactor, and battery charger, all of which I installed myself.

I also installed nine solar panels divided into four zones, each regulated by a charge controller with a maximum input of 8 amps at the solar panels' output of 20 volts. The panels produce an average of 20 amp-hours per day at 48 volts, but on a really good day might produce as much as 50 amp-hours, or almost half the capacity of the batteries. A potential problem with multiple solar panels, especially when portions of them



JONATHAN TAGGART

can be shaded by rigging, is "hot-spotting." This occurs when one panel in a group is in sunlight and the others in shade. To prevent this, blocking diodes are installed at each panel to prevent power generated by one panel from flowing into another instead of to the batteries. Panels of over 75 watts require blocking diodes, and some of my panels came with them. The diodes cause a loss of about 0.5 volt per panel. Individual panels connected directly to a solar charge controller don't need diodes because the charge controller serves that function. Ideally, the panels supplying a single charge controller should all be about the same wattage and efficiency, and the wires connecting them should all be of equal length and wire size. To reduce line loss, the wire gauge needs to be increased with the length of the wire runs.

I chose to use five 12-volt batteries. Four of these are connected in series to create a 48-volt bank to run the electric motor. The fifth one is the 12-volt house battery, which is connected to the existing house electrical panel and is recharged from the 48-volt bank through a 12-volt converter. This arrangement ensures that the house battery always carries a full charge and is the last battery to die if power is being drained. All

Regeneration while sailing

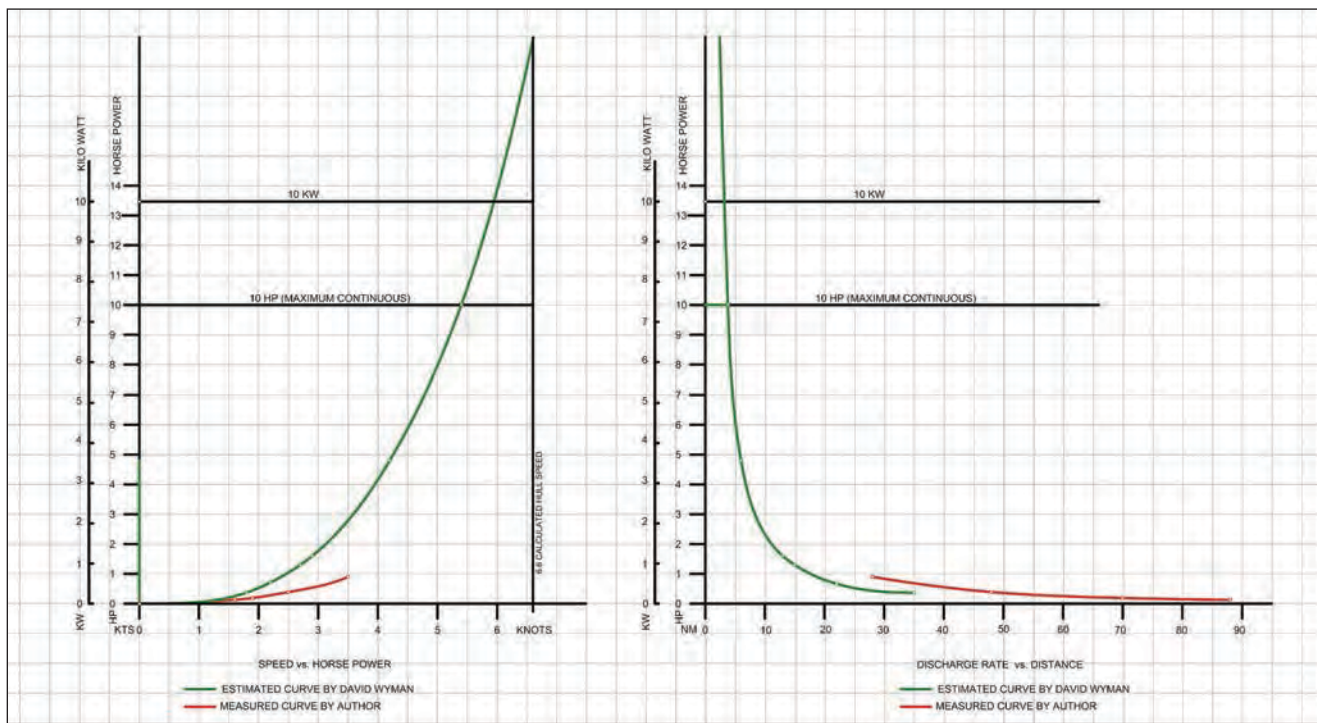
Regeneration of electricity while sailing—via the propeller's natural rotation in the flow of water—is one of the power generation possibilities with a system such as ours. Unfortunately, as I learned from Eugene Story at Maine Electric Boats, this type of regeneration would not be very likely with my boat. He pointed out two limiting factors: Hull speed and propeller size. Increasing the hull speed of a displacement boat is nearly impossible, and I wasn't willing to start hacking away at the teak sternpost and rudder to permit a propeller of the size required for that purpose.

You can imagine our surprise, however, when we were sailing near hull speed of 6.5 knots for the first time after installing the electric auxiliary and

we started to hear the gentle mechanical sound of the propeller turning the motor. I would have dived down into the bilge right then with a voltmeter to confirm that I was creating some electricity, but I was too busy sailing. Later, I did find such an opportunity—but then I realized I didn't have a certain way to separate out the amperage contributed by the solar panels from that possibly contributed by the propeller.

We're not going to count on sailing as a source of regeneration, but we may occasionally get a free amp or two out of it. A boat that sails a couple of knots faster than mine, or one that could handle a larger propeller, could start considering regeneration as a viable contributing power source.

—JT



DAVID WYMAN/JONATHAN TAGGART

Naval architect David Wyman of Castine, Maine, estimated the performance of the conversion from gasoline to electric power. On each of these graphs, the green line represents Wyman's calculations, and the red line shows data recorded by the author in real-world use. The left-hand graph charts boat speed versus horsepower and generally shows that the more energy used, the greater the speed available. The right-hand graph shows the distance attainable compared to the discharge rate of the batteries. As in all battery-powered electric motor installations, the lower the speed, the greater the boat's range.

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five are Firefly Oasis carbon-foam absorbent glass mat (AGM) batteries. I considered lithium-ion batteries, but decided against them based not only on their cost but also on the complicated and expensive battery management system needed to prevent overheating and its associated fire hazard. These AGM batteries promise a long life, deep discharge without loss of performance, resistance to sulfur buildup, and fast bulk charging. If they live up to the claims, they'll prove to be worth their cost.

I chose Firefly's "Group 31" batteries because at 74 lbs each they are the largest that can be reasonably handled manually by one person. Larger batteries would also have been difficult to fit into the existing engine compartment, where I was able to fit two of the four batteries in the bank for the motor and also the single house battery. These three batteries were placed so that they would not block access to the through-hull shut-off valves for the cockpit scuppers. The other two batteries fit on their sides at a 45-degree angle under the lazarette, one on each side.

I installed the various systems myself. The costs of the components came to a total of about \$13,000. Of that, \$5,064 was for the motor kit; \$1,681 for the batteries; \$4,225 for the seven solar panels; \$1,075 for the four charge controllers; \$291 for a battery monitor and two watt meters; \$168 for a 48-volt to 12-volt converter; and about \$500 for miscellaneous wire, connectors,

fuses, battery boxes, and so on. My deck was originally built of plywood sheathed with fiberglass set in epoxy; it was solid but showing its age, so before installing the solar panels I coated it with Tuff Coat (\$726), a flexible marine nonskid deck coating, before installing the solar panels. I also replaced the 9", three-bladed propeller with a new 13" one best suited for the new motor (\$571). The generator, which I already had, now costs \$999.

From the very first moment I worked the throttle after NEREID was relaunched for the 2015 season with her new auxiliary, I realized that her new motor delivered way more power than we had ever had before. Electric motors have the ability to deliver full torque at low speeds, and they can generate three times their rated output for short bursts. As we put the boat through sea trials, it became clear that the electric motor was going to be an excellent fit for the way we like to sail. We found during our first season that the solar panels were able to keep the batteries at full charge most of the time. When the motor is running, I can hear the shaft turning on its bearings and feel it vibrating through the hull. I can hear the chuckle of water along the hull and a vigorous prop wash at high RPMs, and I can also hear conversations. I am beginning to get a feeling for how the mechanical sounds relate to the RPM, boat speed, and amp usage. The motor is not silent—but it is very quiet.

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Photo by Steve Stone

In ideal conditions, the solar panels would supply 420 watts of electricity, with all of the panels in full sunlight at exactly the right angle. At that rate, they would charge our batteries to their 110-amp-hour capacity in 14 hours. Allowing for line loss, blocking diodes, and less-than-ideal efficiency, maybe 60 percent of that charge could actually be attained in the same amount of time. But in reality, the panels are mounted on deck at less-than-ideal angles and are partially shaded by rigging, sails, and the mast, and people sometimes inadvertently set food, drinks, life jackets, or clothing on them. So, what recharge rate do we actually achieve? On an average sunny midday, I recorded readings of 1.5 to 1.8 amps charging per hour. When all the stars are aligned, we get 3.2 amps. I estimate the average at 1.65 amps for 12 hours in Maine, although we might get more time during the longest days of summer. In these real-world conditions, the solar contribution averaged a gain of about 20 amp-hours per day. This means that going from a dead battery to a fully charged battery would take five days of average solar gain. For weekend sailing, this means that even if the batteries were flat on Sunday, we could almost guarantee that they would be fully charged by the following Friday.

With electric power, the life of the charge depends entirely on how the motor is used. We ran some tests going with and against the current and averaging the

results to see what the motor would give us for boat speed at various amps. Here are our findings:

Amps	Knots
2	1.6
3	1.9
6	2.5
14	3.5
45	4.8

Stated another way, this means that with fully charged batteries we could motor at 5 knots for about two hours, covering about 10 nautical miles. Or, we could hold our speed down to 1.6 knots and use the motor for 55 hours, covering 88 nautical miles. Clearly, low and slow is the best approach to getting the most distance out of one battery charge (see graph on page 54). At low speed, we can run much longer and farther. Plus, this assumes that there is no wind at all—but if there were wind, we'd be sailing. In light winds, we've found that motorsailing at 1.6 knots increases the apparent wind, allowing the boat to point higher to weather and increasing the sailing speed with only minimal power consumption.

Power management may become more of an issue when cruising for weeks at a time. The generator, charging at 22 amps, takes about four-and-a-half hours to pack in a full charge. With its one tank of gas, it can do that at least twice—but better yet, it might be time to go into a marina and plug into shore power while

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Pure sailing is important for the author, who finds picking up the mooring under sail to be a point of pride. For this kind of sailing, electric propulsion with solar regeneration is a quiet, reliable, and practical solution—with shore-power connection and a portable generator as backup.

using the showers and having a dinner in town. If we rely predominantly on sails for propulsion, and if we are conscientious about working the currents, set realistic goals about how far we can go in a day, and don't use the motor except for necessity, then we have all the power we need and then some. Such planning, as part of our cruising routine, will make us even better sailors. For daysailing, it's not an issue: the motor is there when needed.

I could increase power capacity in a number of ways, for example by putting in a second battery bank. The additional weight would be no problem: We actually had to shift trim ballast aft after the new motor's installation, which in total weight is several hundred pounds lighter than the Atomic Four and its associated systems. We could add more solar panels; we already have the layout. Or, we could go to the nearest marina and plug in every night. But considering the first season's experience, I think I'm going to keep it the way it is. It quite nicely satisfied our needs and the way we sail.



COURTESY OF DAVID TELLER

I am very pleased to say that in the first year of operation, after the spring commissioning, I never had to open the motor hatches to do anything except to show the installation to interested guests. I do not miss my days as an on-the-water engine mechanic—not one bit!

Jonathan Taggart, who loves to explore the rocky coastlines of Maine, is a sculpture conservator and has also worked with numerous maritime museums. In addition to NEREID, he maintains and uses a lapstrake Whitehall he built, a Lyman runabout he restored, and a lapstrake pram tender.



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COMPAÑERA

A wilderness cruiser

by Jill Fredston

Photographs by
Jill Fredston and Doug Fesler



“North Carolina. Who do we know in North Carolina?” asked my husband, Doug Fesler, one dim morning in January 2004 as I cantilevered over his shoulder for a closer look at the photos on the computer screen.

We live in Alaska and would likely have better luck finding a friend in Antarctica. But then Marj Martin Burgard flashed to mind. She had grown up on the water in New England, pioneered recreational rowing, and been game enough in her mid-60s to row several hundred miles of the Yukon River with us though she’d never before camped a single night. Most relevant, she knew us and she knew boats. Now in her seventh decade, she had just migrated south and cheerily answered my call on the second ring. “Marj, do you live anywhere near New Bern?” I asked without preamble though we hadn’t spoken for months. “Sure,” she answered, “I’m 45 minutes away.”

Three hours later, she called after having tea with Capt. Alick Mackenzie Slater. The 67-year-old master mariner had modified a 1954 Eldredge-McInnis design and spent four years (1998–2002) building the one-off, 47′, ketch-rigged motorsailer we’d been eyeing on the Internet. He had launched the boat in a nook near

Halifax, Nova Scotia, named her COMPAÑERA (meaning special female friend in Spanish), and appropriately enough, sailed off to Cuba. “Better buy a plane ticket,” urged Marj. “This boat has your name on it.”

We were rowing a second summer in the Northwest Passage in 2003 when the idea of having a boat powered by something other than dark chocolate and our fraying joints kept muscling itself into our conversations. We’d spent nearly 20 summers rowing two small boats more than 25,000 miles along northern shores, including much of Alaska and northern Canada, western Greenland, a circumnavigation of Spitsbergen, and the coast of Norway from Sweden to Russia. Actually, despite my proselytizing, Doug had kayaked rather than rowed the first 13,000 miles before finally nodding to the greater leverage afforded by long oars and a sliding seat. Our boats could hold food for up to 100 days, and we reveled in traveling for months in wild country without seeing many people.

Thirteen years older than me and weary of combating headwinds, dragging our boats and hundreds of pounds of gear around blocks of ice the size of dump trucks, and lying stormbound in our tent for days at a

Above—COMPAÑERA, a long-distance cruising vessel built to a modified Eldredge-McInnis design, has carried author Jill Fredston and her husband, Doug Fesler, from Alaska to Tierra del Fuego, to Labrador, and beyond. “If asked why we cruise such long distances,” says Jill, “this photograph from Northern Labrador—a place that feeds our spirits—would be a good part of the answer.”



A rough rule of thumb for measuring the minimum safe distance for traveling along the terminus of a glacier is a length five times the vertical height of the glacier face. When blocks of ice larger than a twenty-story building calve, they can create a fast-moving 25'-30' wave. This image is foreshortened.

time, Doug was quicker to anticipate that it might be time for a change. In the 1970s, when as a park ranger Doug was charged with recovering the bodies of avalanche victims from places he wouldn't have hesitated to go himself, he learned about avalanches through total immersion and in the process became one of the world's authorities. A few decades later, he used the same approach to learn about boats. Nearly every available surface in our house had long been heaped with meticulously read trade magazines.

Doug's highest priorities were seaworthiness and safety. He wanted a craft that could "take some punishment" and was only interested in gear that could enhance our margin of safety or make life aboard more body-friendly. He concentrated on hull designs, construction materials, engine types, fuel efficiency, and myriad mind-numbing but potentially life-saving details. I thought his focus noble and wise, but couldn't stop myself from fantasizing about a couch on which I could recline and nibble chocolate while the boat moved without any help from me. Still, I knew that for us to be content on any big boat, we had to be able to escape into our smaller boats, which at 19½' long were

going to require some deck space. One of the limitations of our long rowing trips in the Arctic was having to bite off as much mileage as possible on the nice days. The ability to move steadily through scary or boring stretches of coast by big boat and then spend time wiggling along the interesting intricacies by oar enticed both of us.

Given our proclivity for remote, ice-strewn regions and penchant for exploring rather than working, we thought a steel or aluminum hull would suit us better than wood. Sailing held more appeal than motoring, but sailing at the far latitudes is typically limited by ice and variable wind conditions. We were also cautioned by sailing friends to decide whether we wanted to go somewhere or spend our time getting there. We knew we needed horsepower, but agreed that we didn't want a noisy engine. We'd spent so many years staving off hypothermia that we did not need to discuss the imperative of an enclosed steering station.

COMPANERA, with her sturdy build, no-nonsense flared bow looming 8' above the water, shallow 4'6" draft, traditional lines, and aft pilothouse, immediately sang to both of us. We knew, however, that two deal-breakers were going to preclude us from heeding Marj's advice. First, COMPANERA is a wooden boat. Her 1½"-thick hull is cold-molded of four layers of ¾" spruce laid on alternating diagonals, with a sheathing of fiberglass cloth set in epoxy on the exterior. Second, she was powered by a Detroit Diesel 4-71, which is known, not always affectionately, as a "Screaming Jimmy."

Still, COMPANERA lingered in our imaginations. Before the evening was over, we bought Doug a plane ticket. Our rationale was that seeing COMPANERA could teach us more about what we really wanted, and while on the East Coast, Doug could pay an overdue visit to his mother. In mid-winter 2004, he left Alaska with three pairs of underwear and no clue that he wouldn't return home until fall.

Shortly after he first saw COMPANERA at the dock, Doug urged me east to make what had to be a joint decision. Cocooned in Marj's guest bed, we whispered pros and cons through several marathon



Doug steers from the comfort of the pilothouse. On one particularly raw, windy day in southern Patagonia, COMPANERA's crew received an email message from friends on a conventional sailboat: "We were thinking about you today warm and dry in your pilothouse while we shivered in the cockpit, and we decided that we hate you."



Jill and Doug are grateful for their 88-lb Rocna anchor, which holds exceptionally well even in the strong winds and currents of this Labrador anchorage.

nights. The strength and relative simplicity of the boat appealed to us, as did her capacity for self-sufficiency. She has large water tanks, a rainwater-collection system on the pilothouse roof, and 840 gallons of diesel tankage. With what a naval architect has described as a “slippery hull,” she leaves almost no wake and nibbles fuel, using an average of 0.7 gallon per hour at 6 knots. This gives her a theoretical maximum range of more than 5,200 nautical miles even without factoring in the three sails, which though mainly useful for steadying, do increase efficiency and add range. She has a full-length, straight keel that ranges in depth from 15” at the bow to 33” at the stern. The keel is made of laminated oak planks covered with fiberglass cloth and epoxy, and is fitted with a ¾”-thick steel shoe along its length. A separate rudder shoe extends from the after end of the keel to capture the heel of the rudderstock, acting as a skid plate, protecting the propeller in case of grounding, and reducing the chances of catching nets. It is a robust system, with easy access to the upper rudderstock and hydraulic steering through the lazarette. COMPANERA has dry bilges and a comfortable interior, with open cabins taking advantage of the 14’2” beam, lots of headroom, and the capacity to stow food for a year as well as an arsenal of tools and spare parts.”

One of our concerns about buying a boat 8,000 nautical miles from home was that I was on a book deadline and not available to travel. We made Alick an offer contingent on his helping Doug sail COMPANERA to Port Townsend, Washington, via the Panama Canal.

The journey, even in delivery mode, would take about eight weeks. Alick didn’t hesitate, and before long and despite ourselves, we’d made the leap from rowers to skippers of a small wooden ship.

By the time Doug reached the Pacific, he had mined Alick’s intimate knowledge of every wire, hose, and system stem to stern and had absorbed the example of Alick’s slow, masterful handling of the boat in tight situations. They arrived in Port Townsend in late May. Though Alick died only seven months later, he remains a presence aboard; we think of him when we use the old-fashioned key engraved with his name to wind the main cabin clock, or when COMPANERA withstands a particularly nasty pummeling and brings us safely to anchor. We have also cursed him on occasion because everything is so solidly built that taking anything apart can be a challenge.

From Port Townsend, Doug and I and our intrepid 34-lb mutt, Bodie, brought COMPANERA to our new homeport of Cordova, Alaska. For the next five years, we spent five to eight months aboard annually, exploring some of our favorite haunts in the world. Bodie, part terrier, part perpetual mystery, was born in the Athabaskan Indian village of Nikolai in roadless western Alaska. He bounced around for a rough three years before being summarily given to us (his fourth set of people) in 1999 by an overwhelmed single-mother friend. An independent thinker, he was a full member of the crew.



Sometimes in Patagonia a good anchorage could be found in a little pocket cove along the edge of an otherwise windy and unprotected channel. Here, COMPAÑERA's crew anchored in 70' of water on a steep incline and ran a line astern to the base of the cliff to maintain a constant position and good holding.

Typically, late winter to mid-spring would find us tucked into one of the myriad quiet anchorages in Prince William Sound, chipping steps into the 8'-high snow berms at the high-tide line so Doug and I could climb to the ridges on skis (with Bodie usually breaking trail), watching pinnacles of ice calve off the tide-water glaciers, spying on sea otters, greeting incoming waves of migratory birds, and cheering the escorts of Dall's porpoise cavorting in front of our bow. Rainy rows would often be followed by fresh bread and music in the warm saloon, the spruce interior gleaming from the flame inside the Dickenson stove. When the winter storms began to lose their punch, we'd venture into the Gulf of Alaska toward Kenai Fjords, eager to beachcomb for Japanese glass floats or other fresh treasures from

afar. Our path often intersected by orca or humpback whales, we'd cross to Kodiak Island where we'd take rambling walks in spongy rainforest and watch brown bears fling themselves at spawning salmon. Sometimes we'd traverse Cook Inlet, which has 42'-high tides at its head, and hunt for fossils of ammonites and giant mussels before heading out along the Alaska Peninsula,

One of Jill and Doug's primary requirements in a cruising vessel was the deck space to carry rowing boats—and the ability to launch them. A power cruiser would allow them to move efficiently through monotonous stretches of coast, and then, writes Jill, "spend time wiggling along the interesting intricacies by oar."



TIM GRAMS

Top—The treasures collected en-route not only brighten COMPAÑERA's saloon but also help hold the memories of distant people and places close. **Bottom**—COMPAÑERA's galley is used routinely to crank out waffle breakfasts for as many as 16 people, or to feed friends from around the world.

a nearly 1,000-mile-long majestic sweep of sand beaches, basalt cliffs, bears, berries, archaeological sites, big storms, and steaming volcanoes. When the fall storms began to ramp up and the days began noticeably shortening, we'd retreat to Prince William Sound, now free of summer bustle, and watch the termination dust (otherwise known as snow), creep down the mountains, indicating that it was time to get back to work.

Just as rowing has long been a way that we "are" rather than a sport we "do," COMPAÑERA quickly became an extension of ourselves, a very natural way of being. Even Bodie, who had accompanied us on rowing trips around Kodiak and into the Northwest Passage (either lounging on the stern deck of my shell or loping for miles alongshore), eased into big-boat life. Several times every day, he'd jump fearlessly over the gunwale onto a carpeted plank ramp angling steeply downward from the scupper. Barring the rare mishap, he would land in the dinghy or rowing shell waiting to transport him to shore where he'd take us on extended hikes. Nothing really surprised us about life on the hook except for the enormous delight we took in being able to bring family and friends into places they might otherwise never have experienced. Although some might find it inconvenient that the engineroom bulkhead blocks inside passage between the forward and aft cabins, we love the privacy afforded to all when we have guests aboard. We sleep aft, which gives us access to the engineroom, a head with toilet and sink, and the pilothouse. The guest berth is forward, along with the saloon, galley, and head complete with shower. So if a grandchild is cranky at the end of a long day, all we have to do is say goodnight, cross the mid-deck, and retreat to our quiet kingdom.

COMPAÑERA weighs into most decisions we make. She accommodates our needs if we do the same for her. One of the first modifications we made, during a meticulously planned, intense three hours while grounded out on a tidal grid, was to drill two 1"-diameter holes through the hull. Then we installed forward-scanning sonar transducers that give us a 180-degree view of the ocean bottom ahead. The sonar gives us the security to hug the shoreline and to explore uncharted areas. We use COMPAÑERA's cold-molded rowing dinghy as readily as most people reach for their smartphones, so we



set up a quick-launching system using davits that hook into mounts on the transom. Interesting rocks or whale bones on the beach? No problem; one person can have the dinghy ready for action in less than thirty seconds. Because we wanted the ability to remain at anchor for days or weeks, we secured a 400-watt array of solar panels along with a wind generator on the pilothouse roof to keep the 800-amp-hour house battery bank charged. Only in exceptionally cloudy or calm weather (or if the "light police" have not been vigilant) do we have to enlist the backup services of either the portable Honda generator or main engine with twin 120- and 130-amp alternators.

In May 2009, we decided to point COMPAÑERA's bow south. Neither of us had ever experienced a winter without snow—it has fascinated me since I was six, which led me to earn a master's degree in snow and ice, and ultimately to several decades of working alongside Doug as an avalanche specialist. And as is typical of longtime Alaskans, we were beginning to feel a need to see and feel the sun in winter. Our vague plan was to head toward Mexico's Sea of Cortez and then perhaps



COMPANERA in translucent Sea of Cortez water that Jill says “often made us wonder whether we were awake or dreaming.”

layers together—except for the base-to-hull joint, where we omitted the screws in order to encourage the rolling chocks to break away if need be without ripping a hole in the hull. The fins significantly reduced both the roll period and magnitude; **COMPANERA** now rarely heels more than 15 degrees. Listening to us complain that it was nearly impossible to turn the boat in a tight radius, the architect calculated that the steel-plate rudder was undersized. He suggested that we nearly double its surface area

by building a rudder with a hydrodynamic foil shape, which resulted in a marked increase in maneuverability.

We didn't escape the boatyard until the end of October. This, of course, was not an optimal window for sailing down the exposed Pacific Northwest coast. Carefully, we nipped and tucked our way between storms. The forecasted approach of an immense low deeper than 950 mb, with sustained 55-knot winds at its center, sent us scurrying into Coos Bay, Oregon, to hide. Two days later, 25' waves in the entrance channel caused the Coast Guard to take the nearly unprecedented step of closing the port even to its own rescue vessels. In boisterous winds, one advantage of **COMPANERA**'s short mainmast, which is keel-stepped and has an air draft of 39', is that we rarely have to reef. Though the boat was designed to have a free-standing mainmast and gaff sails, Alick had set her up with a marconi rig, and we stayed the mainmast in anticipation of legendary Patagonian gusts.

We stopped almost everywhere we could, partly to satisfy our curiosity and also for Bodie's sake as he declined to do his business aboard, even when passages stretched into multiple days. By the start of 2010, we had sailed into a parallel universe in Baja's Sea of Cortez;

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These 15'-long rolling chocks, built in Port Townsend, Washington, considerably reduce **COMPANERA**'s roll in beam seas—especially when used in combination with sails.

**Jill returns to the mother ship after
an evening hike in Nova Scotia.**

shell-shocked Alaskans blinking in the abundant sunshine, delighting in desert ridges, strolling barefoot along shockingly white sand beaches, and swimming with the fish in crazily translucent green water.

Continuing southward in the spring, we didn't adjust to the tropics as effortlessly. Costa Rica in May is hot enough to melt a rubber exercise band into an unrecognizable gooey blob. We'd sweat while brushing our teeth, and even indomitable Bodie could barely lift his head off his paws. One sticky morning too many, when debating whether to continue torturing ourselves, we decided that we'd each write down our preference and, if in agreement, would act on our resolution. On our respective paper scraps, Doug and I scribbled "turn" and "go home." So Doug swung the wheel hard over and we began our escape. Our relief lasted only a half-mile before I started second-guessing our decision—quitting seemed harder than continuing. Doug, who was having similar misgivings, spun the wheel yet again and we more stoically resumed our original course.

With heat comes lightning, and in Panama, boat-sinking daggers repeatedly sizzled into the water in frightening proximity. *COMPañERA* was never hit directly, but there was enough electrical magnetic interference one night while I was on watch to cause almost every one of our electronic instruments to behave erratically, as if possessed. Most recovered, but a few of them, including the battery monitor, could never be resuscitated.

In El Salvador, *COMPañERA*'s formidable bow proved itself, bobbing easily up and over 8'-high breakers powerful enough to overwhelm less well-found boats and tall enough to completely obscure our view of the jet ski-mounted pilot who were supposed to be following over the bar at the entrance to Bahia del Sol. Elsewhere along the Pacific coast, when it was too harrowing to land the dinghy through dumping surf, Doug would drop Bodie and me outside the breaker zone to swim in. Snorting a little, his chin almost on my shoulder, Bodie would plug steadily to shore, ducking at all the appropriate times. But when I tried to lead him to sea, he would backpaddle with the strength of a mother bear defending her cub. Enveloping him in a one-armed life-guard hold, I would drag him unceremoniously back through the surf.

Ecuador, with more clouds and cooler ocean temperatures, brought relief from the heat, and we made



steady progress into the southern hemisphere despite running counter to the prevailing current and wind. In Peru, while we traveled overland to Machu Picchu and other magic places, Bodie did a home stay with a young couple who didn't speak any English. Eminently adaptable, he learned Spanish. His vocabulary was formidable, ranging far beyond the obligatory *sientate* (sit down), *venga* (come), and *carne* (meat).

We reached Puerto Montt in northern Patagonia in late November 2010. Roughly 1,000 miles separate this area from Puerto Williams near Cape Horn in southern Chile, but we roamed 6,000 nautical miles in a year and a half. Relying on the sonar, as the charts often gave no depth information, we ranged deep into the convoluted maze of fjords. We were alone and without resupply for so many months at a time that we began to regard pickles as vegetables and applesauce as fruit.

Patagonia is smooth granite ridges ruled by sharp-eyed Andean condors with 10' wingspans, lavish waterfalls, fairyland spires, biblical rain punctuated by blazing rainbows, and complete calm followed in a blink by 60-knot shrieks. Though we have enormous faith in the 88-lb Rocna we use as our main anchor, taking anything for granted in Patagonia usually exacts a toll, so we routinely ran at least two lines to shore.

Patagonia made us soaringly grateful to be alive, and nearly crushed us. On a high-spirited day south of the Straits of Magellan in October 2011, Bodie and I went hiking in a magnificent amphitheater of domed mountains, wind-wizened trees, tundra terraces, and squishy meadows. Too excited to remember that he was elderly (probably around 14½), he took off like his younger "rocket dog" self and charged across an entire valley. I last saw him along the bank of a major cataract where braided torrents of water dropped over a series of slippery, polished ledges. Then he vanished.

Helped by compassionate friends from another boat, we searched for a blur of days in wretched weather, with penetrating sleet and 70-knot winds forceful enough to blow waterfalls uphill and knock us to our knees. Yelling ourselves hoarse, none of us ever found a single sign of Bodie. We don't know that the waterfall is where he met his end, but it is as good a bet as any. Within minutes of his disappearance, an especially brilliant rainbow erupted across the sky, stretching in full arc directly from the river to my feet.

Without Bodie around to quiver with excitement whenever we lowered the dinghy, it seemed pointless for a good long while to go for a walk. We limped along, a hollow ship. Ever so slowly, we regained momentum and in March 2012 the wind helped push us from the tip of South America nearly 400 miles across to the Falkland Islands. Stunning for their vibrancy, they are host to five addicting and endlessly entertaining types of penguins, acrobatic porpoises, inquisitive sea lions, log-like elephant seals, and nesting albatross.

Crossing back to the red-rock desert country of southeastern Argentina, we hopped our way north along the Atlantic coast, lingering for five months in Brazil. There we reconnoitered a few rivers and became aficionados of *capoeira*, the crazily athletic, drum-driven martial art imported by slaves and disguised as dance. Before swimming with turtles or indulging in other Caribbean delights, we hired help and checked into hard labor camp in Trinidad. For 86 hot, dust-encrusted, respirator-wearing days, we rejuvenated COMPAÑERA, while having the opposite effect on ourselves. The most brutal of the projects involved sanding all deck and house surfaces to bare plywood and covering them with Nexus Veil (polyester cloth) and epoxy before applying nonskid paint. The Nexus Veil project may not look like much in a sentence, but it involved a staggering amount of work that ultimately made all surfaces more impervious to weather and the wood less prone to checking. We also commissioned new upholstery and varnished or painted (in a multitude of colors) nearly all of the interior surfaces. By the time we painted the hull, we had developed a bit of an attitude; hence the bright yellow stripe along the bulwarks.



Bodie, a worthy shipmate and kindred soul, exploring Tierra del Fuego.



Jill was so enthralled when photographing king penguins in the Falklands that she didn't notice this other group marching up behind her.

Dazed but euphoric, we splashed again in late February 2013. Three months later, we picked up a mooring in my ancestral harbor of Larchmont, New York, in time to celebrate my mother's 85th birthday and then continued north, intending to spend the summer circumnavigating Newfoundland. We did make our way around the rock, but not before succumbing to the lure of northern Labrador. It was my fourth trip (Doug's third) to this country we especially cherish, but the first time when, instead of polar bears stumbling at random hours into our camp, we had the luxury of watching them from the high-sided security of COMPAÑERA's decks. When heading south, we stopped in tiny Purcell's Cove, the Nova Scotian birthplace of our steadfast ship. Though it was a drizzly afternoon, locals who remembered helping to turn the hull or raise the mast emerged from their houses to hail us in gentle brogue and welcome COMPAÑERA home.

During our voyage, Doug became famous for his sourdough waffles, which we sometimes heard being discussed on the single-sideband radio. It was not uncommon to suddenly find a boat or two anchored in hopeful proximity on a Sunday morning, even if we'd never met the crew. His sourdough starter has made its way into the hands of an ever-expanding network of friends from around the planet. COMPAÑERA is overflowing with art and natural treasures collected en route, and though we have again transited the Panama Canal and 2016 will likely find us back in Alaska, our journey feels far from over. We are still curious about what lies around the next corner, and are often asked about our intentions for future cruising in COMPAÑERA. Doug usually answers, only half in jest, "We don't have a plan and we're sticking to it." 🐾

Jill Fredston is the author of several books including Rowing to Latitude: Journeys Along the Arctic's Edge, which won the National Outdoor Book Award for Literature, and Snowstruck: In the Grip of Avalanches.

Two Gambles



ROSENFELD COLLECTION, MYSTIC SEAPORT

The birth and survival of the Atlantic class

by John Rousmaniere

The 1920s were a boom time for all Americans, but especially sailors. In the thriving economy, old waterfronts were converted from commercial ports to yacht clubs, many of them devoted to the new idea of junior sailing with equal opportunity for girls and boys. One of the best-known young sailors of the time was Lorna Whittelsey Hibberd. A graduate of the junior program founded in 1924 by the Indian Harbor Yacht Club in Greenwich, Connecticut, in her teens and twenties she won five national women's championships

for the Adams Cup and many other prizes as well against sailors of all ages. "All summer we mostly sailed," she recalled many years later in an interview with Mystic Seaport's oral historian, Fred Calabretta. "We used to go down the Sound. We would sail down and sail back, which horrifies people now because they either get towed, or always start off American or Larchmont [yacht clubs]. It was good fun because we learned a whole lot that we never would have learned [otherwise]." There weren't many days off, she added.

Above—"A good fun boat," very popular with younger sailors, the Starling Burgess-designed, Abeking & Rasmussen-built Atlantic Class received an added boost when parachute spinnakers were introduced in the mid-1930s.

Crewed by her designer (in the broad-brimmed hat), the prototype Atlantic sails on Long Island Sound. By 1930, 99 Atlantics were racing in 13 fleets from Long Island to Maine.

“You had to go to church. The sailors didn’t all go to church.”

Sailors like that were, and still are, drawn to challenging boats, and if anyone was eager to create such a boat, he was Starling Burgess. When Burgess turned 50 in 1928, his career as a yacht designer was reaching a new peak of activity and success. As Llewellyn Howland III writes in his recent biography of Burgess, *No Ordinary Being*, the radical staysail rig that pushed NINA, the schooner of his design, to victory in that year’s Transatlantic and Fastnet races, “offered the yachting world dramatic evidence that Starling Burgess was ready to move from the regional onto the national and indeed the international stage.” The Burgess-designed M-class sloop PRESTIGE, meanwhile, was winning armfuls of trophies on the New England racing circuit for her owner-skipper Harold Vanderbilt, who in his careful way was developing the relationship with Burgess that led to three AMERICA’s Cup victories in the 1930s.

Heading the New York naval architecture firm of Burgess, Rigg & Morgan, Burgess brought four strengths to the drafting table. One was his lifelong experience with boats; the more original they were, the better. Another was his brief but intense engagement with the new field of aerodynamics as a pioneering airplane pilot, designer, and builder—experience that gave him a head start with lightweight construction and the newly popular marconi rig. His third strength was his willingness to take chances, which he did with aircraft and many boats.

Burgess’s fourth strength in 1928 was more pedestrian than the other three: his business relationship with a capable, ambitious boatbuilder. At a time when most sailboats were small or built either one-off or in limited numbers, Henry “Jimmy” Rasmussen was thinking big. The Danish-born head of Abeking &



EDWIN LEVICK COLLECTION, THE MARINERS' MUSEUM

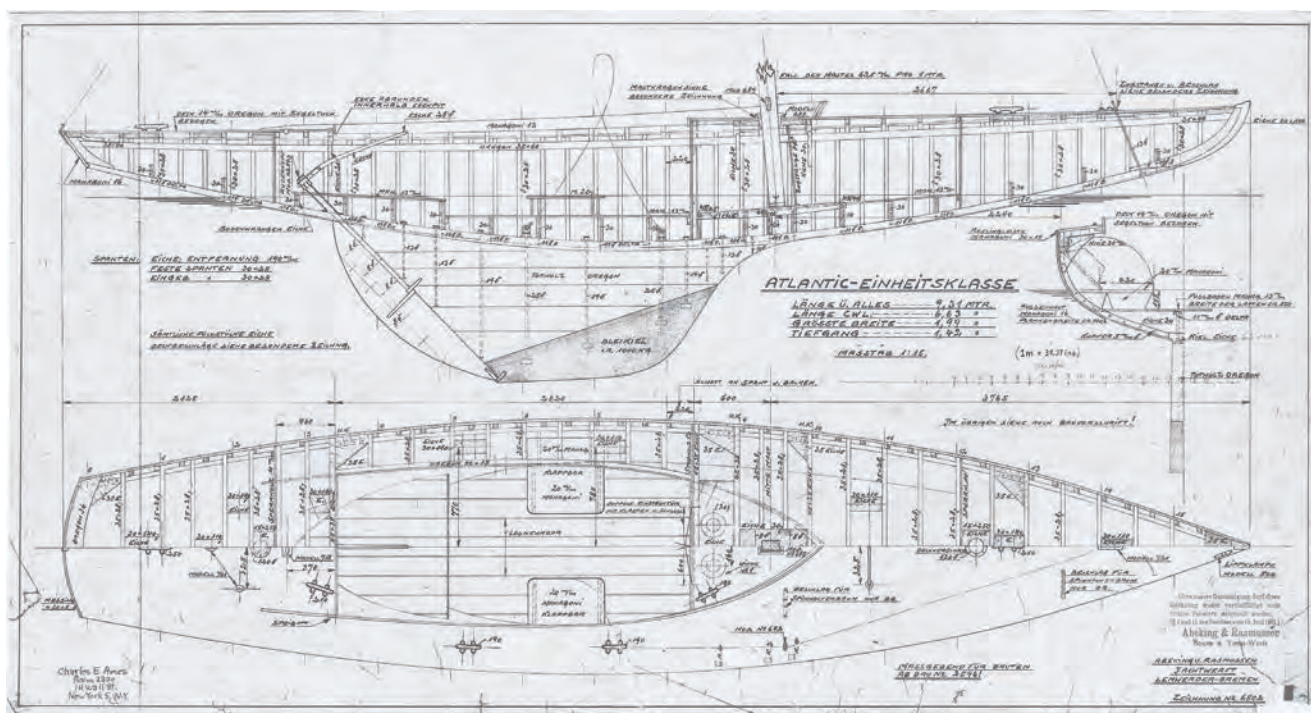
Rasmussen, in Bremen, Germany, he had been in the Western Hemisphere yachting market for several years. At first his plans were modest—for example, when in 1924 he sent over some dinghies for junior sailing programs that were beginning to spring up at yacht clubs on the U.S. East Coast. Two years later, Rasmussen and Burgess collaborated on a somewhat larger project when they developed a class of keel one-designs for the Royal Bermuda Yacht Club. And then Burgess and Rasmussen raised their sights: From 1927 through 1930, they together designed and built a total of 150 boats for American sailors.

They started in a dramatic fashion with fleets of one-design International 8-, 10-, and 12-Meters—a total of 31 boats, with overall lengths from 50’ to 70’. Owned by Clifford D. Mallory and other leaders of the rapidly developing sport of amateur yacht racing, the big meter-boat fleets attracted wide attention, and not only for their tight racing. Shipped to Halifax, Nova Scotia, in order to avoid U.S. duties, they were then sailed across open water to the American East Coast. These voyages both proved the seaworthiness of the controversial new marconi rig and provided offshore

Five-time winner of the Adams Cup for the national women’s championship, Lorna Whittelsey Hibberd (right, stopping a spinnaker) was an early Atlantic Class star along with Bus Mosbacher and Bob Bavier.



ROSENFELD COLLECTION, MYSTIC SEAPORT



With her moderate displacement, U-shaped sections, large sail plan, and light construction, the “Atlantic-Boote” (shown here in the Abeking & Rasmussen construction plan) was not another deep-hulled heavyweight inspired by the meter-boat classes. The seats for the crew were optional.

experience for several young sailors. One of those youthful initiates was 19-year-old Olin Stephens, who a decade later teamed up with Burgess to design Vanderbilt’s J-boat RANGER. (Stephens later revealed that the towing tank model on which the design was based was Burgess’s work.)

With the complicated meter-boat projects behind him in early in 1928, Burgess drew up the plans for a new one-design class, which he and Rasmussen called the Atlantic Coast One-Design. The boat measured 30’ overall and 21’ on the waterline, and was intended as a daysailer-racer. Despite competition from several existing classes of that size, its popularity was explosive: There were so many Atlantics on western Long Island Sound in 1929 that the race committee for the area’s big regatta, Larchmont Race Week, divided them into two fleets of 30 boats apiece. To put this into perspective, another popular class, the Sound Interclub (see WB No. 242), had been considered a success with 27 hulls. Within two years, Atlantics would account for 99 of the 150 boats Burgess and Rasmussen designed and built together.

Freed of the International Rule that shaped the heavy meter-boats, Burgess called on his nearly lifelong experience with fast, extreme craft in the design of the Atlantic. One of these influences was the Sonder Boat, a radical, restricted class of long-overhang, lightish-displacement keelboats that had been popular before

World War I. The prototype of what Rasmussen called the *Atlantic-Boote* arrived in New York in the summer of 1928 was not as extreme as the Sonder Boat, yet its 4,559-lb displacement was two-thirds the weight of other 30-footers of her day. Here was a boat that promised to perform well. Her sail area/displacement ratio (SA/D) of 23.3 was well above the Sound Interclub’s 20.6, the Herreshoff S-boat’s 19.6, and the 18.4 of the soon-to-arrive International One-Design (popularly known as the IOD and a close cousin to a 6-Meter; see page 40 for an account of its development). The more modern Shields class is in the heavy meter-boat tradition, with its 20.8 SA/D ratio.



ROSENFELD COLLECTION, MYSTIC SEAPORT

The original boat featured a straight-leech, high-boom mainsail, self-tacking jib, single-luff “balloon” spinnaker, and simple rigging (except aloft to support the big rig).



Atlantics in the large Western Long Island Sound fleet approach a mark near Execution Rock, around 1950. By then the boat's devotees were worrying enough about structural problems to bar Dacron sails, limit boom vang, and think about replacement hulls.

As Burgess spent a good part of the 1928 summer taking the prototype from yacht club to yacht club, the sailors' response was very strong. Rasmussen stepped up the specifications for the production boat, replacing the iron ballast with lead and the cedar planking with mahogany. Planks were fitted tight, without caulking, over oak frames on 8" centers; they were fastened with silicon-bronze screws. Thanks to the depressed German mark and A&R's assembly-line techniques, the price was low at \$1,800 (about \$25,000 today). That was about half the price of a similar-sized Herreshoff-built S-boat.

Everybody lauded the Atlantic's performance. "Those who take pleasure in sailing a boat which is light and delicate on the helm, and lively to handle, should appreciate this craft," wrote a *Yachting* magazine correspondent who sailed the prototype. Lorna Whitelsey Hibberd, in her oral history, described racing an Atlantic in an inter-class team race against the top Sound Interclubs: "A lot of the Interclubs got upwind first, including Arthur Knapp. But then when we got on the reach, we just went down the waves and surfed. The Atlantic was much faster. They were a good fun boat." Fun to sail and fast, the "good fun boat" had a striking appearance, too, with a snub bow, a low profile unobstructed by a cabin, and a long afterdeck leading

back to a graceful counter stern. When a class champion of the 1960s, Joe Olson of Cedar Point Yacht Club in Westport, Connecticut, called Atlantics "our gallant beauties," he expressed the devotion of many sailors. A more recent Atlantic owner, Dick Morris, who sails at Niantic Bay Yacht Club, in Niantic, Connecticut, has described his decision to buy into the class in these words: "I joined the cult and bought an Atlantic."

As much as the cultists have loved the Atlantic's looks, what won their hearts for keeps was its performance—and not just downwind. Karl Kirkman, a naval architect who has raced an Atlantic successfully against other keel boats, has explained the boat's all-round ability: "To a naval architect, the most amazing thing I found was the way Burgess used powerful, almost scow-like ends to the hull to gain sailing length. The boat sort of goes the same speed upwind and down in moderate conditions because of the ability to increase the sailing length when heeled. Since my Atlantic races amongst a Shields fleet, it is easy and instructive to watch them together near the start, and see the wizardry of Burgess before the Atlantic inexorably pulls away."

Jimmy Rasmussen was so pleased by the boat's immediate success that he became eager to place boats on the Pacific coast. When he changed the name



The gamble on the Burgess design in the 1920s paid off, and so did the later bets in the 1950s on new construction. Here, the mostly fiberglass Atlantic fleet contests the national championship on Blue Hill Bay, Maine, in 2008.

from Atlantic Coast One-Design to Atlantic Class, some wags, inspired by the country's largest national grocery chain, nicknamed the boat the Atlantic & Pacific class. "How those A&P boats could run and reach!" *Yachting* editor Sam Wetherill exclaimed. The Atlantic's West Coast initiatives were unsuccessful until the Kutscher family moved from Connecticut to Vashon Island, Washington, bringing with them Atlantic No. 62 for daysailing on Puget Sound.

Two years of deliveries during 1929 and 1930 created 13 Atlantic fleets that ranged from the south shore of Long Island, at Cedarhurst, New York, to Long Island Sound (10 fleets), on to Warwick, Rhode Island, in upper Narragansett Bay, and, finally, as far east as Portland, Maine. A very few boats had small cuddies, but most had wide-open cockpits that became quite damp in even a short chop. The Cedarhurst sailors eventually tired of the long tow out through shallow Great South Bay to the racecourse on the ocean, the Warwick fleet was wiped out by the hurricane of 1938, and the Portland boats migrated to Kollegewidgwok Yacht Club in Blue Hill, Maine. Today there are five fleets. In order of seniority, they are Cold Spring Harbor, New York; Niantic Bay (Connecticut) Yacht Club; Cedar Point Yacht Club, Westport, Connecticut; Madison (Connecticut) Beach Club; and Kollegewidgwok Yacht Club.

Fleet No. 1, the founder of the class association and the author of the class rules, was the Pequot Yacht Club at Southport, Connecticut. The effort was led by Fred T. Bedford, a small-boat enthusiast who had started out in extreme one-off catboats in the 1890s but quickly tired of the yachting arms race. "Nobody minds being beaten in competition where conditions are equal for the competitors," he observed in Edwin J. Schoettle's book about American yachting in the early 20th century, *Sailing Craft*, "but who will voluntarily enter a race

in which he is licked before he spreads a sail?" Bedford leapt into the first one-design classes. When the prototype Atlantic turned up at Southport and beat his Star boat, he made the switch and 19 of his friends quickly followed.

The first rule book seems innocent in its simplicity, with 11 plainly worded regulations taking up just three pages. Rigging was tightly controlled, in-season haulouts were restricted, and purchase of new sails was limited. Those original sails look odd to us today: the straight-leeched mainsail, the high-clewed self-tacking jib, and the tiny "balloon" spinnaker with its sheet running upwind of the headstay. When more modern sails were allowed, as with all class rules they had to be approved by the owners. The Atlantic's well-organized class association, tight rules, and large numbers led to its frequent selection in the 1930s as the boat for national and regional women's, junior, intercollegiate, and interscholastic championships. The interscholastic Clifford D. Mallory Trophy features a tiny model of an Atlantic.

In 1929, the class held its first championship regatta, at Pequot, in a three-race series won by James Tillingham, from Warwick. Soon the owners included J-class AMERICA's Cup figures such as George Nichols and Clinton Crane. The celebrated "gray fox of Long Island Sound," Cornelius Shields, sailed Atlantics for a while. In his autobiography, he said that one of the two most important sailing prizes he ever won was the 1931 Atlantic Class Championship. (Yet he preferred heavy displacement and founded two classes from the meter-boat school, the International One-Design and the Shields.) Other Atlantic sailors were the three winning skippers of the first four AMERICA's Cup contests of the 12-Meter era, from 1958 through 1967: Briggs



BENJAMIN MENDLOWITZ

Cunningham, Emil “Bus” Mosbacher, Jr., and Robert N. Bavier, Jr. Mosbacher’s first mate, Victor Romagna, and AMERICA’s Cup tactician Tom Whidden were also weaned in Atlantics. All five of these sailors have been elected to the AMERICA’s Cup Hall of Fame. Amid all that young, famous talent, the first two-time class champion (in 1937 and 1938) was a disabled sailor named Mills Husted. With his left arm withered by a birth defect, he steered his well-maintained RUMOUR (Atlantic No. 27) from the port side regardless of which tack he was on.

There is continuity in Atlantic fleets. Families are interwoven with the boat’s history. I know this from my own experience at the Cold Spring Harbor Beach Club, on Long Island. Founded in a former vacation hotel as a family summer center in 1921, the club acquired an Atlantic fleet in 1930. Competition was serious. “It was always intense around the house on Saturdays,” Louise Earle Loomis, the daughter of one of the pioneer Beach Club skippers, has told me. But competition had personal connections. In the 1930s, Atlantic No. 94, LYNX, was sailed by the young man who would become my father, with a regular crew that included his own very game father, whose chief sporting interest was golf. Among his competitors were Dad’s schoolmates, named Page, Lindsay, and Noyes. Decades later, my father was back racing Atlantics at Cold Spring Harbor against (and sometimes with) those former classmates. At the Atlantic Class Championship at Cold Spring Harbor last September, I trimmed the mainsheet for George Lindsay, the son of one of my father’s opponents of 50 to 80 years ago.

Women were always sailing Atlantics. One Cold Spring Harbor boat for decades was the bright-red ZEST (Atlantic No. 95), sailed by Anna Matheson Wood, known to all as “Aunt Nan.” She was a leader in the national movement to establish women’s sailing as a sport. At Blue Hill, a popular summer haven for New Yorkers, many of the Atlantics in the Kollegewidgwok

Yacht Club fleet were sailed by women in July when the men were back at work in the city. Some boats were also sailed by the same women in August, after their husbands came Down East. One of the sailing seasons of the longtime fleet leader, Alida Milliken Camp, was described as follows by Kollegewidgwok historian Berto Nevin: “They won every race, nearly sinking in one when a squall knocked them down, but Alida was a determined skipper and no squall was going to deny her, so she sailed on, her crew bailed as they raced to another victory, finishing with the perfect score.”

At Pequot Yacht Club, “Miss Charlotte Perry” (as the newspaper reporters called her)—better known as Sharlie Perry Barringer—sailed in Atlantic No. 6, CAROLINA, from age 14 on. Her victories were not always fully celebrated. After she won a race by six minutes, a reporter felt called upon to comment, “A girl from the Pequot Yacht Club gave proof to the old adage about the lethal qualities of the female of the species, if

proof were needed, by walloping her male rivals in the biggest group of the day, that for Atlantic Class boats.” In 1944 she won the Class



ROSENFELD COLLECTION, MYSTIC SEAPORT

Briggs Cunningham, shown here in his still-wooden A12, SPINDRIFT, in 1954, played a major role in the process that introduced fiberglass construction to the Atlantics.

Championship with a 1-1-10-5-2 record. Later, with her husband, Rufus Barringer, Sharlie raced CAROLINA at Cold Spring Harbor. "I would love to sail in an Atlantic again," she said recently. "I still think the Atlantic is one of the most beautiful boats ever. We used to go cruising in the Atlantics.... We had so much fun in those boats. When I look at them today, I think, 'How in the world did they put us in these boats at such a young age?'"

Marking the class's 20th birthday in 1949, the knowledgeable yachting writer Everett B. Morris identified three reasons for the Atlantic's success: (1) "the vigor with which its converts sing its praises," (2) "the solid all-round performance of the boat modernized with loose-footed jib and parachute spinnaker," and (3) "the impossibility of getting anything anywhere near as good for the same price." That bargain price was not necessarily a good thing. The Atlantic was inexpensive because it was lightly built, fragile, and aging quickly. The boom vang (then called the "boom guy") was permitted by the rules to have only two parts because anything stronger might break the boom, and maybe weaken the lightly built hull. Most sailors preferred the expedient of the "human boom vang"—a sailor seated on the boom as far aft as he or she dared. After the first synthetic sail fabric, nylon, was allowed in the 1940s, the sails proved so stretchy that sailors demanded that they be free to experiment with low-stretch synthetics, such as Orlon and the rumored "miracle fabric" (which eventually appeared as Dacron). But class chairman Charles Ames, a Cold Spring Harbor sailor, feared that Dacron might over-stress the hulls, so the Rules Committee barred it.

The fact is, Atlantics had been leakers right from the start. After the first shipments from Germany in 1929, the Burgess and Abeking & Rasmussen offices, recognizing that the frames were too small and flexible, scrambled to design bigger ones for the 1930 boats. This improvement, however, did not cure the inherent flexibility in these lightly built, flattish-bottomed, hard-driven boats. "Theoretically, the Atlantics are planked with mahogany on oak ribs," Everett Morris observed in the 1940s, "but the more active these boats become, the stronger grows the belief that they are constructed of rubber." Norman B. Peck, Jr. of Niantic Bay, the class's 16-time national champion, has used another analogy: an Atlantic he sailed in the 1940s, he told me, was "a wicker basket."

If the boats were inexpensive to buy, they were extremely expensive to maintain. Charles Ames estimated his total maintenance expense over a few years in the late 1940s and early 1950s at \$3,903 (\$38,000 in 2015 dollars)—this for a boat that he had purchased for \$2,000. Boatyards on Long Island Sound had a set of special molds for replacing or sistering broken Atlantic frames—and they did a lot of business. Ames and the other sailors loved their Atlantics very much and were prepared to do anything to keep them sailing. Discussions with boatyards about building new planked hulls (Abeking & Rasmussen, then enjoying a second boom producing Concordia yawls and sloops for the

U.S. market) or hot-molded hulls (Luders Marine Construction Co.) went nowhere.

Then a third option surfaced: a new building method (soon to be called fiberglass) using layers of synthetic fabric and polyester resin. A letter to four of the very few boatbuilders who worked with the material turned up just one show of interest, Lester Goodwin of Cape Cod Shipbuilding in Wareham, Massachusetts. "We are sure that we can equal or reduce the weight on the Atlantic and have a boat much stronger than your present wood boat," Goodwin wrote the Rules Committee. After a long career as a salesman for the famous powerboat racer and boatbuilder Gar Wood and other yards, Goodwin had bought Cape Cod Shipbuilding and acquired the rights to build boats to several Herreshoff designs. "To visit the yard was a flashback to the past," Cedar Point Atlantic sailor Jim Bradley has told me. "Mr. Goodwin often had a fire going in his office fireplace that he fed with teak and mahogany scrap from the yard. He was an avid hunter, so when he sat down he had to kick his hunting dogs off the chair. When he took you to lunch, it was to a local diner where, no matter what you wanted, you got a cheeseburger because that's what he ate."

Goodwin's proposal to convert wooden hulls to fiberglass put the Atlantic Class on the spot. A quarter century after Burgess took a gamble when he made the Atlantic so different from other boats its size, the class in the early 1950s was challenged to make another big bet: To save their Atlantics from sinking, they would need to use a radical new building material that might produce boats much faster than the old woodies. Desperate to save the boat they loved, the class went ahead with the conversion plan.

Goodwin took the next step in what he dramatically referred to as the "reincarnation" of the Atlantic by selecting RUMOUR, Mills Husted's old boat, as the plug from which to produce the mold for the first fiberglass hull. Briggs Cunningham financed the process with a loan. An heir to a Midwestern fortune and Fred Bedford's son-in-law, Cunningham was an automobile racer, had won three Atlantic championships, and would win the AMERICA's Cup in 1958 as helmsman of the 12-meter COLUMBIA. None of this went to the head of this modest man who, among his many contributions, donated the schooner BRILLIANT to Mystic Seaport.

When RUMOUR's fiberglass hull was found to be 300 lbs lighter than the old one, compensating lead ingots were placed in the bilge before the boat was towed to Southport for the 1954 Class Championship, where her skipper would be Cunningham. A member of that delivery crew, Goodwin's son Gordon, has told me, "As we pulled into the dock, Briggs stepped on board, inspected the rig, and said, 'This rigging is too tight for an Atlantic.'" Once under sail, he quickly discovered that the fiberglass hull could carry a tauter rig than a soft wooden boat. To the relief of all, the first 'glass boat finished fourth of 28 boats: She was competitive but not dominant.

The Cape Cod yard sold RUMOUR to John Hersey, the Pulitzer Prize-winning author of *Hiroshima* and



One of the few wooden Atlantics still sailing after the 1960s, **TRIPLE THREAT** shows off the Burgess lines and original rig after her 1994 restoration by Frank Day, Jr. This was her final sail before going to Mystic Seaport to join its permanent collection of historic watercraft.

compensation was that the new boats looked quite good. “Unlike other fiberglass conversions, it didn’t change the boat’s character,” says Atlantic sailor and photographer Guy Gurney. “It looks like a wooden boat that happens to have a fiberglass skin.”

Today, Atlantic sail numbers are at 149, and two-thirds of the 87 existing Atlantics are sailing and racing under powerful modern rigs and aluminum spars. A recent National Championship at Blue Hill had 41 entries, a majority of them trailered hundreds of miles from their home clubs. The quality of competition at the top of the fleet is very high. I can’t recall sailing in a boat pushed so aggressively, and so intelligently, as Norm Peck’s **MISS APRIL** (Atlantic No. 130) was in a Sunday afternoon race at Niantic Bay in 2013.

About 14 wooden Atlantics are believed by the class to have survived. One of the best known of them is No. 23, **TRIPLE THREAT**, which after a long, active life, is in storage at Mystic Seaport. Two other woodies are known to be sailing still. The Barringers’ **CAROLINA**, somewhat modified from the Burgess-Abeking specifications and now called **SILVER-FISH**, is owned and sailed by boatbuilder Steve White in Maine. The other is **PISCES** (No. 69), owned by Harry Fish, Jr. of Jonesport, Maine.

Fish’s father acquired **PISCES** for \$1,000 from a Blue Hill owner in 1972, and she was first to finish in that year’s big race, the Bucks Harbor Regatta. A retired high school math and science teacher, Harry Jr. continues to sail the boat under the burgee of the Port & Starboard Yacht Club. “She’s all original,” he told me in 2013, with her old wooden mast, high-cut jib, and the original bronze fittings. The big event is an annual race at Jonesport with a three-mile windward leg. **PISCES** is up to it, and so is Fish, another member of the cult. “It’s such a spectacular boat! It looks like it’s going about 100 mph just lying at the mooring. Then when you sail her she’s a black line in the water with sails sticking out of her. Everybody who sees the boat loves it. I’ve sailed a lot of other boats, but I’ve been fascinated with this one since the day I first sailed her.

“The Atlantic is such a dream to sail. It’s almost like it knows where to go on its own. We finish first *always*. My racing strategy is go fast all the time, and faster when we can.”

*John Rousmaniere, a regular contributor, is author of the book **The Great Atlantic: The First 85 Years** (Smith-Kerr, 2014).*

other books. After a summer of racing at Pequot, Hersey was asked by Charles Ames if he felt 100 percent favorable about the boat. Hersey replied, “My answer has to be that I feel 1,000 percent.... We never bail. The crew is happy. In heavy weather, where once the dried-out topsides took in water in a way familiar to all Atlantic sailors, we now can sit and chat and look at the view—we can concentrate on racing, too.” He added, “I’ll say that I feel sure that while the ’glass boats will not outclass the others, they will sail with the best of the wooden boats, other things being equal.” Twenty hulls were converted in 1956–58, and many more later made the switch at Cape Cod Shipbuilding or, for a few years, at the Seafarer yard on Long Island. Meanwhile, new boats with sail numbers over 99 were also built. In time, the ’glass boats, with their compensating lead in the bilge, did prove faster in most conditions, as well as more dry and less costly to maintain. Sharlie and Rufus Barringer, owners of **CAROLINA**, held out for wood. “That was a decision that was both philosophical and economical,” she said. “We just didn’t go that route. Most of the time, we were competitive. But when it blew hard or if there was a sea, the fiberglass boats seemed to sail through the waves better.” Some owners were distressed as they gave up their dear old woodies. “Cutting up A30 was *very* sad,” Jim Bradley said of the conversion of his **INGÈNUË**. “The boat was unbelievably sound. The Germans built an extremely good boat.” A



The Herreshoff Mast Hoop

A lesson in humility

Text by Wade Smith • Photographs by Heather Holloway

A mast hoop is the easiest part of a traditional boat to explain: It's like a big shower curtain ring that allows the sail to slide up and down the mast. Like many ancient devices, it often works as well or better than modern equivalents. Sail track, for example, can bend or pull out, or track cars can jam, leaving your sail stuck wherever it is—an inconvenience at best. Of course, to use mast hoops, the mast along the luff must be free of obstructions such as shrouds and spreaders. That's why mast hoops are associated with gaff or sprit rigs, and unstayed or lightly stayed masts.

Excellent laminated mast hoops are available at reasonable prices, but at Snediker Yacht Restoration, in Pawcatuck, Connecticut, where I work, we use period-authentic replacements in our restorations. Currently, we're finishing the rebuild of a B.B. Crowninshield Raceabout-class sloop from 1902, named THE KID,

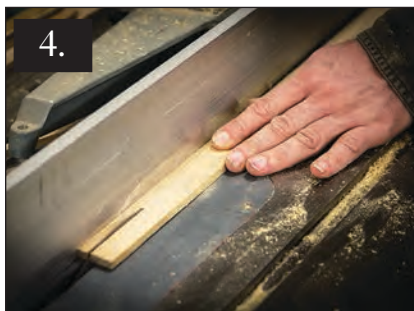
which needed new hoops. The Crowninshield sail plans didn't include any details about hoops. This was commonly the case; builders didn't need the information, since mast hoops were so readily available. We searched thousands of plans in several major collections—and found nothing, not even with the help of Kurt Hasselbalch, curator of the Hart Nautical Collections at Massachusetts Institute of Technology. But my colleague Ed McClave in Mystic knew of a mast hoop detail on the spar plan for BIRD, a racing catboat built by the Herreshoff Manufacturing Company in 1890.

The most striking thing about the Herreshoff mast hoop compared to one of today is that it is incredibly delicate. Nathanael G. Herreshoff shaved off weight any way he could, especially aloft. These deceptively simple-looking Herreshoff mast hoops can be made in sizes that fit any boat—but be warned: A small project isn't always easy.

Above—Three finished Herreshoff hoops built by the author are on the left—fine and light, with just one thickness of wood scarfed at the ends. Some of the other hoops are also traditionally made, and some are heavier with two-and-a-half wraps.



1. Planning the first cut. Although red oak or white ash would bend more readily, white oak is specified in the plan, so that's what we used. I looked for the greenest, straightest, clearest pieces I could find. Most mast hoop blanks are small, so it's possible to find good bending stock in fresh slabs at the sawmill. It is imperative that the strips be cut perfectly with the grain—splitting out the stock is the surest way to do that, but the next-best approach is to draw a line down the center of the stock parallel to the medullary rays. If you don't know what those are or can't see them, start a little split in both ends with a hatchet, study which way the splits run, and draw your line parallel to that.



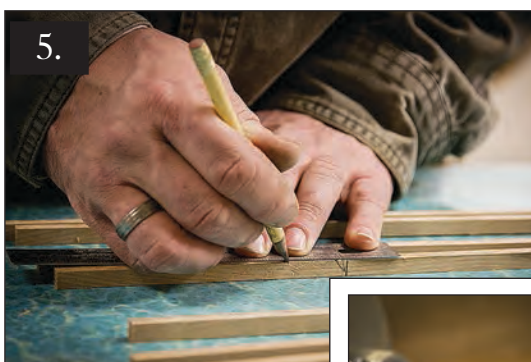
4. Ripping the staves. Now you can rip the staves to width. Again, if you are worried about saw marks, cut the pieces oversized and plane them to the finished dimension. I started with $\frac{3}{4}$ " stock, so I got four blanks from each slice.



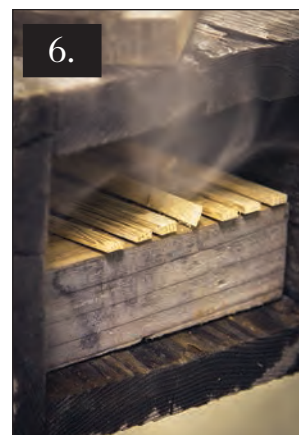
2. The first cut. Free-handing on a tablesaw to the marked cut line gives the straightest, smoothest cut. The next-best method is to use a handheld circular saw. But any method is fine, as long as you can cut and finish smoothly and squarely to the line.



3. Ripping the strips. Rip out strips to their finished molded dimension—or thickness—if you don't mind saw marks, or about $\frac{1}{16}$ " thicker if you want to plane the staves to their final thickness. (The other measurement is the sided dimension, or width viewed from the side. My finished dimensions were $\frac{1}{4}$ " $\times$ $\frac{5}{16}$ ".) Mark the sapwood before cutting near it to avoid any chance of including it.



5. Tapering the ends. When making many large mast hoops, I build a jig for cutting the tapered ends. For a handful of small hoops, it's faster and easier just to mark and cut the ends one at a time by hand. I used a bandsaw and a stationary sander, but it would be as fast to use a block plane. (See the chart on page 77 for taper dimensions.)

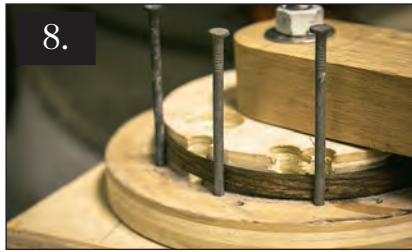


6. The steambox. Stock this small can be steamed in a small box with steam provided by something as simple as a teakettle. The rule of thumb is that wood "cooks" for one hour per inch of thickness—so only about 15 minutes for these $\frac{1}{4}$ "-thick sticks. This formula is just a guide. Over-steaming can lead to failure as surely as under-steaming.



7. The bending jig. This little birthday cake is my bending jig. It consists of a 5"-diameter plywood disc on top, fastened to a larger plywood disc below it and then to an underlying plywood base that can be clamped to a workbench. To hold the stave as you're bending, either drill large holes like the one on the left for clamping or drill small holes around the perimeter, as shown, so nails can be stuck in like cribbage pegs to hold the stave in place.

The rotating lever on top is something we developed at Mystic Seaport when I worked there, and I have found it helpful but not always necessary. Bending a stave by capturing one end in the jig and then grasping the far end to start the bend can concentrate forces at the stave's weakest point, where it is most likely to break. The lever with the rubber caster bolted to it holds the stave tight to the mold, puts less stress on the wood, and allows smoother, easier bending.



8. Starting the bend. Here, the bending has begun, with the feather-edge of the inside taper on the stave held by the nails stuck into predrilled holes.



9. Bending slowly around the jig. As my right hand holds the stave tight to the lower disc of the jig, my left hand provides the bending power through the lever. There is pressure to do this quickly, because the wood cools off rapidly; however, I have found that slower bending yields less breakage. People more often go too fast than too slow.



10. Finishing the bend. When the bend reaches its starting place, you have to remove nails or clamps one at a time so that the outer part of the scarf can bend around the inner part.

11. Riveting. The diameter of the copper rivets should be less than one-third of the sided dimension of the stave, in this case No. 14 rivets driven in holes predrilled with a No. 45 bit. (They are peened over No. 15 flat copper burrs in a later step.) The holes in the edge of the jig allow nail clearance.



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Researching Mast Hoops

The Herreshoff mast hoop (see chart, below) had an inside diameter 11 percent greater than the mast diameter. Its height-to-thickness ratio was 5:4. These numbers varied significantly from ratios I found when researching mast hoops in 1999 while working at Mystic Seaport. Before making mast hoops for the schooner AMISTAD, I studied numerous examples in the museum collections and came up with the following ratios:

- The hoop's inside diameter is about 20 percent greater than the mast's diameter.
- The thickness is $\frac{1}{4}$ th of the inside diameter.
- The height is 50 percent greater than the thickness.
- The length of the scarfs equals the inside diameter.

AMISTAD's hoops had an inside diameter of 24", were 1" thick, $1\frac{1}{2}$ " high, and made from 99"-long staves with a 24" scarf.

Pert Lowell began making mast hoops of similar proportions in the 1940s but thought of a way to reduce breakage: instead of one layer scarfed at the ends, he made mast hoops of thinner stock that wrapped around several times. For that 24" mast hoop, he used two staves 188" long, both $\frac{5}{16}$ " thick, wrapped $2\frac{1}{2}$ times, including the scarfs. This gives a luxurious bend ratio of over 1:38 and results in a finished mast hoop $1\frac{1}{4}$ " thick and $1\frac{3}{4}$ "

high. (See more about Pert Lowell in WB No. 65 and at www.pertlowell.com. Another source of mast hoops is R&W Rope Co., www.rwrope.com, which carries laminated ash mast hoops made by Davey & Company.)

Though commercially available laminated hoops are thicker overall, they are made up of thinner layers which, unless glued together, flex more, and seem to fail more often from fatigue than single-layer hoops. In our experience, the traditional mast hoop is more likely to break during the initial bending; the non-glued laminated hoop is more likely to break in service. —WS

Herreshoff Mast Hoop	Drawing Specification	Formula
Maximum diameter of mast (MD)	$4\frac{1}{2}"$	MD
Inside diameter of hoop (ID)	5"	ID = 1.11 MD
Molded dimension of hoop (M)	$\frac{1}{4}"$	M = 0.05 ID
Sided dimension of hoop (S)	$\frac{5}{16}"$	S = 1.25 M
Inside taper to feather-edge (IT)	$5\frac{1}{2}"$	IT = 1.1 ID
Length of outside taper (OT)	$6\frac{3}{4}"$	OT = 1.35 ID
Thickness at end of outside taper (TOT)	$\frac{1}{4}"$	greater of $\frac{1}{3}$ M or $\frac{1}{4}"$
Total length (TL)	$22\frac{1}{2}"$	TL = 4.5 ID
Bend ratio (BR)	$\frac{1}{4}"$ M:2.5"R	BR = 1:10

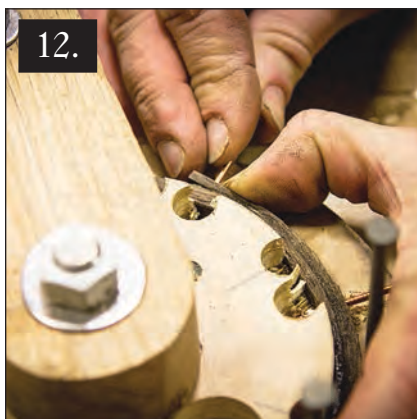
This chart shows the dimensions and a derived formula from Herreshoff Manufacturing Company plan No. 80-12 that can be used to scale mast hoops up or down to suit any mast.



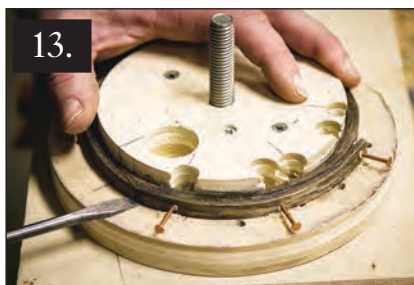
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12. Riveting near the end of the taper. The Herreshoff drawing specifies the locations of three rivets. Because the end of the outer taper runs past the last rivet, that end of the scarf is left heavy— $\frac{1}{8}$ " in this case, which is half the stave thickness—so that a rivet can be driven very close to the end of the scarf.



13. Removing the hoop. After the wood has cooled, remove the lever and then pry the hoop from the jig as shown, with the rivets still in place. Before riveting, reverse the nails so that their heads are inside the hoop, so the end to be peened sticks outward.



14. The finished hoop. The finished hoop doesn't have to be perfect; misaligned scarfs and small "feathers" as seen here can be tended to later. This wood is discolored from having orange shellac applied before steaming to slow its cooling. Scrubbing with alcohol and sanding will clean it up.

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15.



I made three batches of a dozen staves each and tried to bend them into Herreshoff mast hoops, and with each batch I was more careful and tried more tricks than the time before. In the first batch, I did things quick-and-dirty, and broke half of them. In the second batch, I broke every single stick, due to a bad kink in the grain of that piece of stock, invisible until too late. In the third batch, I did everything as perfectly as I knew how, and broke half—the same as my first attempt. This yielded 12 hoops in 36 attempts; a failure rate of 67 percent.

I am not sure what to conclude from this, except for increased humility and respect for hoop-makers of old. When I told Ed McClave about my poor success

15. When hoops go bad. In steam-bending, occasional failure is expected. In this broken hoop, the dark flecks you see in the oak are the medullary rays, and this stave has split along the places where the rays run off the edge of the stock. If this stave had been riven or sawn so that it was perfectly parallel to the medullary rays—with not a single ray running out—this break wouldn't have happened.

record, he replied, “The bend ratio of almost all mast hoops of normal proportion is terrible. Of all the thousands of frames I've bent, the breakage rate is probably a fraction of 1 percent, because we've always been careful to select the wood and keep the bend ratio reasonable [see WB No. 187]. But for mast hoops, different story—I always seem to break quite a few no matter what.”

The “bend ratio” he mentions is the relationship of the thickness of a stave to the radius of the bend. A 1:12 ratio is about the tightest bend you can expect from simple steam-bent wood—that is, a 1"-thick stave bent to a 12" radius. The Herreshoff mast hoop, though delicate, has a bend ratio of 1:10, the equivalent of bending a 1" stave to a 10" radius, which is right at the limit of what wood can do. There's no margin for imperfect stock.

Mast hoops are great, simple devices.

Trust them and use them, if they suit your boat. Buying them is a sensible option (see sidebar for sources), but if you choose to make your own dainty yacht hoops like those of a century ago, just realize that it's not a case of a lot of careful work or accepting that a large percentage will break—it's probably both. The 36 staves I milled to make 12 finished hoops came from a piece of oak 2" × 3" × 23", or less than one board-foot—so I broke about \$1 worth of wood. Splurge on \$10 of oak, and you can practice hoop-bending all day. In every task, even making silly little mast hoops, the difficulty is proportional to the feeling of accomplishment and pride when you win—in this case when your hoops are gleaming in the sun beneath their spar varnish. 

Wade Smith is a boatbuilder at Snediker Yacht Restoration in Pawcatuck, Connecticut, and teaches at the WoodenBoat School in Brooklin, Maine.

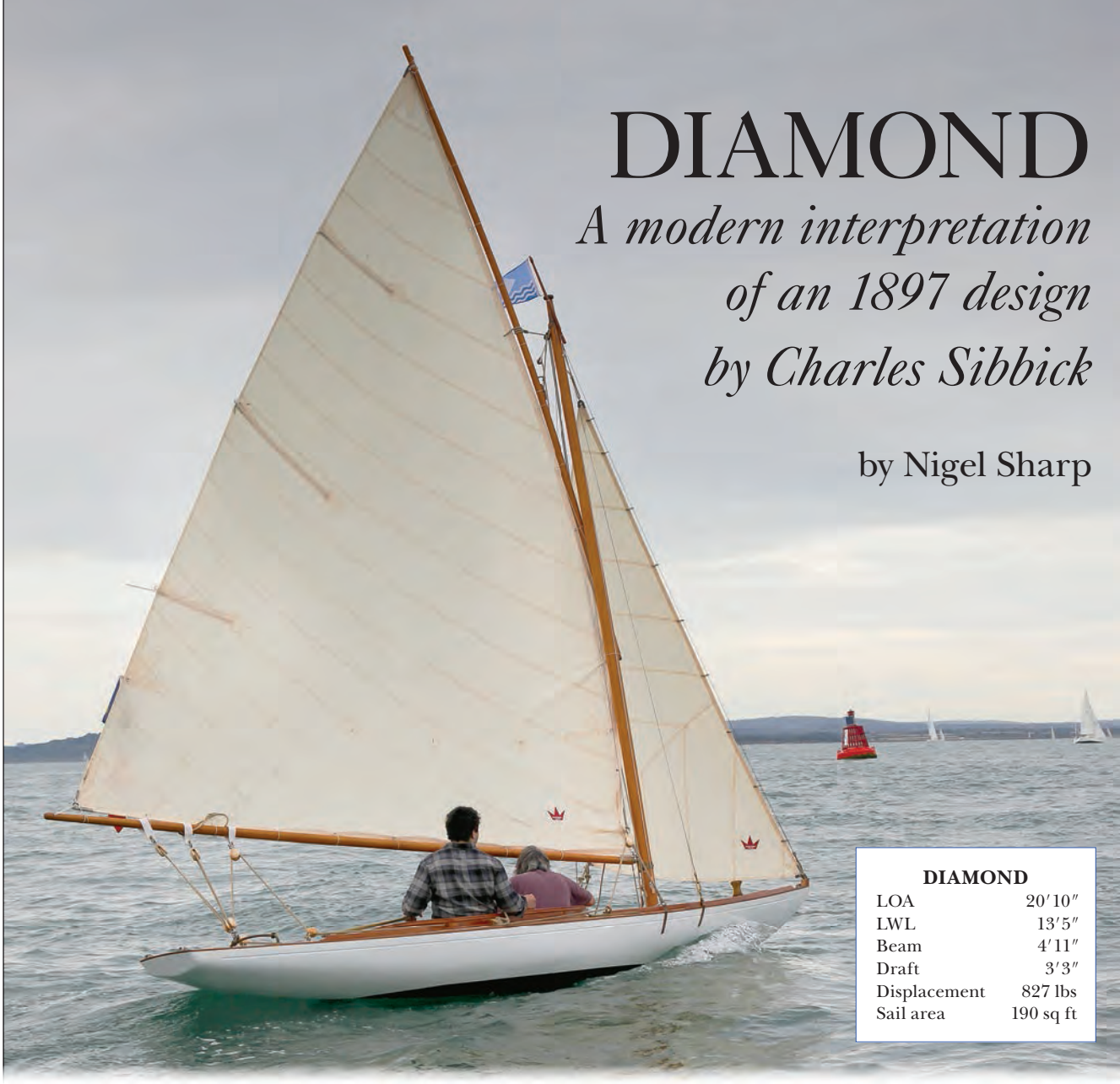
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DIAMOND

*A modern interpretation
of an 1897 design
by Charles Sibbick*

by Nigel Sharp

DIAMOND

LOA	20'10"
LWL	13'5"
Beam	4'11"
Draft	3'3"
Displacement	827 lbs
Sail area	190 sq ft

JAKE SUGDEN

Martin Nott became an aficionado of the work of English yacht designer Charles Sibbick at first by accident but soon with a will, and his passion for this designer's legacy has only intensified over the years. It all began for him in 2006, when he sold a 33' motorboat and bought the 36' gaff cutter WITCH, designed and built by Sibbick in 1902 and in need of restoration. As the years went by, his dedication to the project, and to classic yachts in general, deepened, and eventually he enrolled at the Lyme Regis Boat Building Academy. He had become a self-confessed "Sibbick nut," and in 2011 he undertook a school project to build a 21' version of the designer's 1897 DIAMOND, reconstructing her lines based on surviving records.

"I accidentally bought WITCH," he said, "because she looked quite interesting and I liked the name, which had a link with my old university college." She

was in poor condition, so Martin moved her to a shed in Cowes, about 100 yards from where she was built. After nearly nine years of work, his restoration came to a tragic end when WITCH became one of the nearly 70 yachts destroyed in a January 2016 boatyard fire. DIAMOND, however, survived, and Martin's dedication to Sibbick's legacy was undiminished.

As Martin's work was progressing on WITCH, he began to look into the history of the yacht and, in particular, the man who had produced her. At age 40, Sibbick (1849–1912) transitioned from residential construction to designing and building yachts, and during 24 years of operation his boatyard in Cowes built 300 racing and cruising yachts, many of them of his own design. Until the Cowes fire, WITCH was among some 20 of his yachts to survive. One racing yacht that Martin encountered during his work on WITCH was

Above— The research into the original configuration of the slender, fin-keeled DIAMOND of 1897 extended to its "Solent rig," a kind of hybrid between lug and gunter in which the high-peaked spar is hoisted by its halyard but its lower end is not attached to the mast.

the 43' cutter BONA FIDE of 1899 (see WB No. 180), a very early example of a fin-keeled boat, which had been restored in Italy in 2003 for her owner, yacht designer Doug Peterson. In his research, Martin found a number of books with more references to Sibbick and one of them—*Sailing Boats from Around the World, The Classic 1906 Treatise* by Henry Coleman Folkard (Dover Maritime, 2012)—published a profile drawing of the 1897 DIAMOND, an 18' "Linear Rater."

In Sibbick's times, racing yachts were classified by a simple rating formula: Waterline length multiplied by sail area, divided by 6,000. Previously, yacht racing ratings were based on tonnage measurements, but changes were advocated soon after the 1875 formation of the Yacht Racing Association (YRA, now the Royal Yachting Association). It was the YRA's first secretary, the influential Dixon Kemp, who formulated the new so-called "length and sail area" rating that replaced the tonnage rating system. Kemp's rule wasn't adopted in Britain until 1886, although a modified version of it, the Seawanhaka Rule, was put into effect in America four years earlier. Its simple formula gave its name to the various classes that ranged in size from Half Raters (typically about 23' overall) to the 20 Raters (around 65'). Most of the boats Sibbick designed were "Raters."

Large numbers of these Raters were built and keenly raced in Britain over the following decade, but they were so extreme that they were unsuitable for anything else. Typically, they had lightweight skimming-dish hulls with generous sail plans and—way ahead of their time—fin keels and ballast bulbs, an innovation that Sibbick used not only on DIAMOND of 1897 but also on BONA FIDE, two years later. In 1896, in an attempt to halt the development of such extreme boats, the YRA introduced the Linear Rating Rule, which included a girth measurement intended to put an end to skimming-dish hulls. However, the Linear Rating failed to achieve its declared aim—as shown by the original DIAMOND, which was built to this rule. After ratings based on length and sail area were replaced throughout Europe by the 1907 International Rule, Sibbick's prominence waned.

Sibbick built the original DIAMOND on speculation and exhibited her at the International Yachting Exhibition at the Imperial Institute in Kensington. The event celebrated Queen Victoria's



NIGEL SHARP

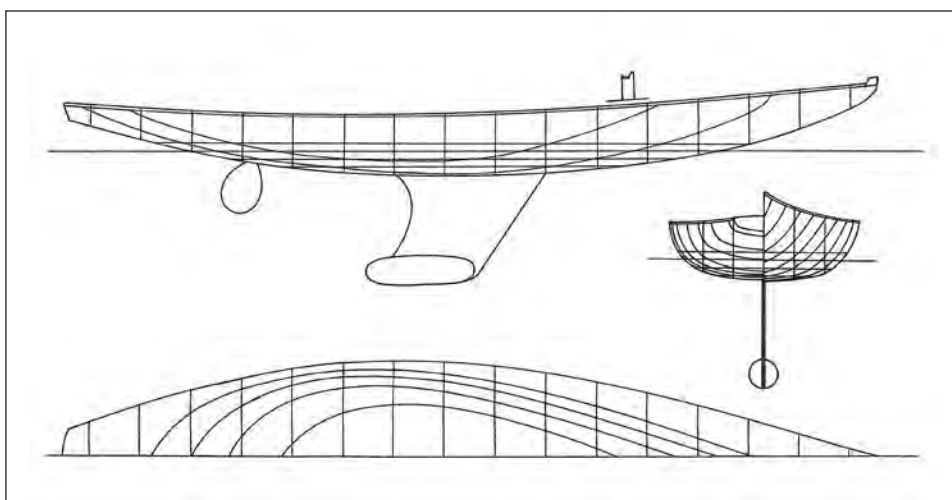
Martin Nott, working with fellow student Alastair Munro, reconstructed DIAMOND in 2011 while enrolled at the Lyme Regis Boat Building Academy in Lowestoft, England.

Diamond Jubilee, hence the boat's name. A Russian, Count Garassimoff, bought her and took her to Nice, France, to enjoy some Mediterranean racing, after which he took her to Russia. She has never been heard of since.

Although Folkard's drawing inspired Martin to build a new DIAMOND, he didn't have nearly enough information to do so. However, while researching in the Cruising Association's library just before he enrolled at the Boat Building Academy, he found a lines plan for a Half Rater, along with a table of offsets and various other details, in an 1895 issue of *Yachting World*. Although he decided to base his new boat on this information, when he lofted it full-size he made some changes. One was forced on him by restrictions in workshop space, which determined that the boat's length would have to be reduced from 23' to 21'. His other modifications were to make her "a bit more Sibbick-like," for instance by increasing the curve of her stem and changing the shapes of underwater appendages. There were things he had noticed in various drawings and photographs and on boats such as BONA FIDE. Even though Martin's new boat technically would be an undersized Half Rater as opposed to a Linear Rater, he felt that in spirit, at least, she would be a near-replica of the 1897 DIAMOND.

Drawing on historical research and studies of surviving boats designed by Charles Sibbick, Nott reconstructed the lines of DIAMOND. He was faithful to the spirit of the original, which was launched in 1897, but some interpretation was necessary.

One required change was to reduce the overall length from 23' to 20'10"—the maximum length that would fit into the available construction space.



MARTIN NOTT



NIGEL SHARP (BOTH)

Above left— The elegant scrollwork at DIAMOND's bow, typical of Sibbick's style for racing yachts, was rescaled from the 36' yacht HEARTSESE, one of some 20 yachts designed by Sibbick that still survive today. **Above right—** The new DIAMOND's cockpit is sparsely appointed, with only port and starboard seats for the helmsman.

At that time, Martin had never actually seen a Half Rater, but Academy Director Tim Gedge mentioned that he had a friend who had built one—a strip-planked reconstruction of the 1892 N.G. Herreshoff-designed WEE WINN—and that she was just half an hour's drive away. Martin jumped at the chance to see her. "The way he had built her was pretty much exactly what I was planning to do," Martin told me, "but it was very reassuring to see her and know that she had been sailing for 10 years and that everything worked." Martin has since taken the opportunity to visit the original WEE WINN at the Herreshoff Marine Museum in Bristol, Rhode Island.

Having settled on a design, Martin and fellow student Alistair Munro began the construction by lofting the hull and setting up 14 temporary molds, upside-down. Over these they set up the sapele backbone, which consisted of 4"-wide solid pieces for the relatively straight part of the keel from the maststep aft, while the long, gently curved inner stem was laminated from eight 1/8"-thick layers. The hull was then planked—starting at the sheer and working toward the centerline—with 3/8"-thick edge-glued western red cedar strips with bead-and-cove edges.

After the planking, the hull was faired and the exterior sheathed with fiberglass cloth set in epoxy—one layer of 350 gsm (10 oz) on the topsides and two layers below the waterline—and then faired again with epoxy filler. With the sheathing completed, the exterior was painted and the hull turned right-side up.

The temporary molds were removed and the inside was then sheathed to the same specification as the outside—this time by vacuum-bagging, not only for strength but also to minimize the chances of an opaque appearance, since Martin wanted the interior to look as much like a wooden boat as possible. The

vacuum-bagging also provided a good experience for all the students in the course. The interior structure was then fitted: six floor timbers; seven steam-bent oak frames (more for cosmetic than structural reasons, since they hid temporary screw holes); and three plywood bulkheads, two of which are watertight.

The deck structure consists of a 2 3/8" x 3/4" sapele beam shelf, deckbeams laminated from western red cedar, a 1/4" plywood subdeck overlaid with 1/4"-thick Alaska yellow cedar planks and varnished khaya covering boards. The cedar planks are slightly swept, tapered, and fitted into the covering boards, which was labor-intensive but best represents the Sibbick appearance, according to the evidence Martin observed on WITCH and in various old photographs. Martin chose khaya for the cockpit coamings, which have decorative moldings inside and out, and also for the toerails, two cockpit seats for the helmsman, a thwart for the crew, and cockpit floorboards.

The ballast keel was made of a 3/8"-thick stainless-steel fin welded to 1/4" L-shaped plates forming a pair of flanges that were bolted through the hull planking and floors with six 3/8" stainless-steel bolts each side.



Designer Sibbick was an early advocate of fin keels with ballast bulbs, which were radical innovations in the late-19th century. The new DIAMOND has a stainless-steel fin and a 187-lb lead bulb, cast in halves and bolted to it.



Although her low ballast keel bulb helps her stand up to a breeze, DIAMOND's low freeboard and ample sail area make her best suited to light winds.

The plate assembly, without the bulb, weighed 110 lbs. To create the lead bulb, two halves were cast and then encapsulated in fiberglass and epoxy, after which they were bolted onto the bottom of the fin. Their total weight was 187 lbs, about 20 lbs of which came from melted-down cockpit drains and seacocks removed during WITCH's restoration. Martin was determined that some small part of the toil of Sibbick's men should directly contribute to his new boat.

All of DIAMOND's deck and rigging fittings look traditional but some had to be custom-made. The tiller, for example, was cast from a modified stanchion pattern. The mainsheet traveler, too, was purpose-made. The Sitka spruce spars were made at the Academy. Martin himself built the hollow mast, and other students made the solid boom and gaff during a weeklong spar-and oar-making course. Martin considered making the blocks also, but decided to buy them instead—wooden ones at deck level for show and Tufnol at the masthead to save weight aloft. "Because I always planned to sell the boat when I finished her, I didn't want to cut corners," he told me. A coin collection he inherited from his grandfather included an 1897 penny, which Martin epoxied into the maststep before stepping the mast.

I met Martin on the Academy's Launch Day in June 2011, but almost four years went by before I had a chance to join him to sail DIAMOND in Yarmouth on the Isle of Wight. Although the day began wet and windy, the forecast was for an improvement and, sure enough, by midday the sun was shining and the wind seemed to be moderating. So we rigged the boat and decided we would sail within the confines of the relatively sheltered harbor, although both of us, I think, had silent misgivings about setting sail at all that day, as there was still plenty of wind. We moved DIAMOND

to a pontoon, where she was head-to-wind, and hoisted the sails while Martin explained the correct name for her rig: Although some people may think it is gunter or lug, it is neither, because the yard is not attached to the mast and essentially stays aft of it when it's set up correctly. Its proper name is the Solent rig which, according to Folkard, "first came into general use amongst the small racing yachts on the Solent in the year 1889."

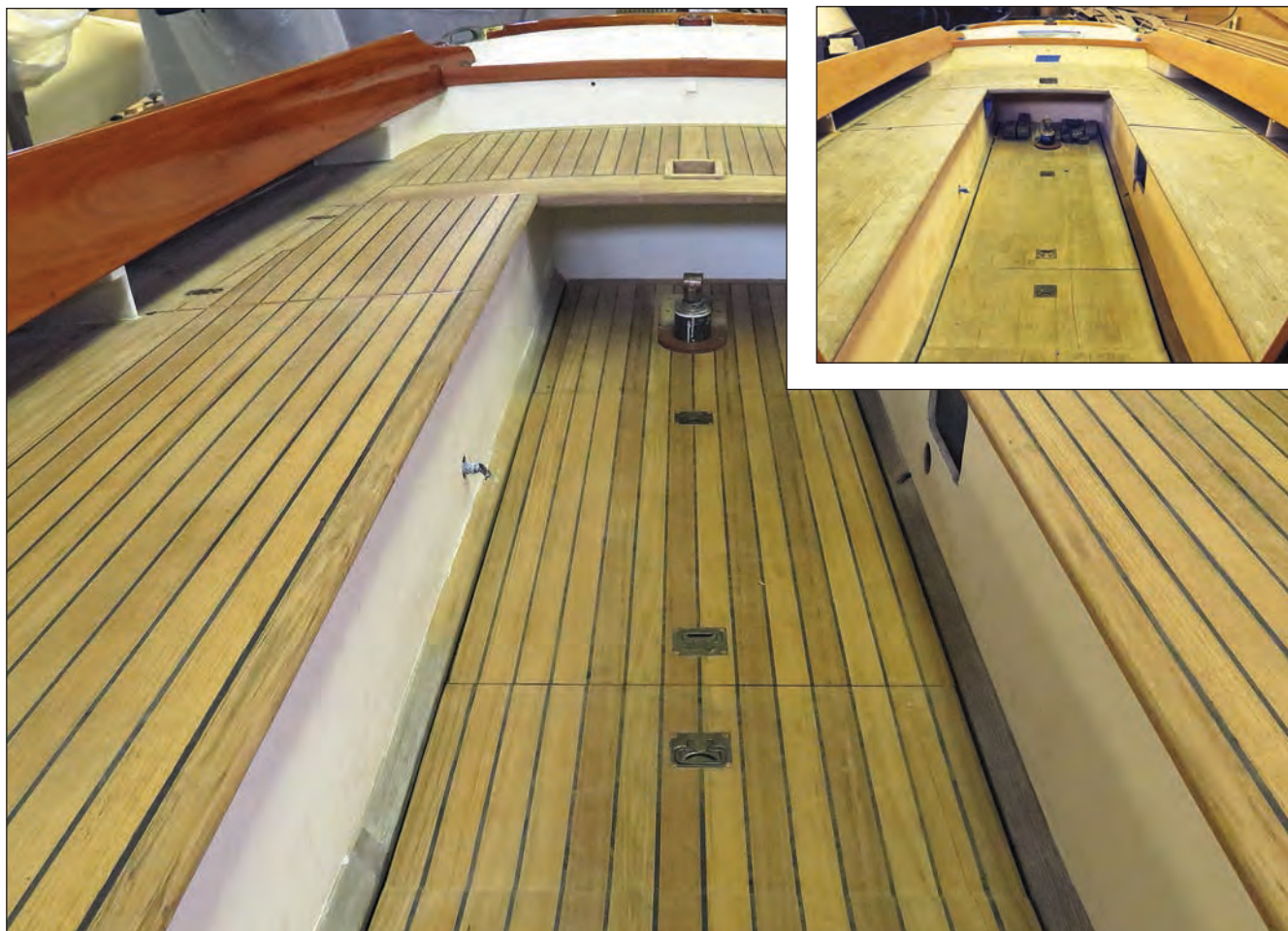
By feathering the mainsail, we were able to beat out of the narrow gap between two pontoons with relative ease, but as soon as I bore away toward more open water and the mainsail filled, a gust hit us—a good Force 6, I should think—and things became tricky. A slight mainsheet tangle momentarily confused things, but by this time I realized that this was simply not the right day to sail this boat. Seeing an empty pontoon space just upwind of us, I steered DIAMOND alongside it and we dropped the sails. It was frustrating for both of us, especially as the forecast for the next few days was not much better. However, soon afterward I caught up with Alistair Munro, who has sailed DIAMOND considerably more often than Martin has, and he told me about his experiences.

Although Alistair has singlehanded DIAMOND, with the sail reefed, in 20 knots, he agreed that she is best suited for light winds. He described her as light on the tiller, well balanced, and "very steerable," but at the same time, her short fin keel contributed to a lack of directional stability. So the biggest problem when singlehanded, he reported, was not being able to let go of the tiller, even for a split second, to do anything else. He found it a stretch, but possible, for a solo helmsman to reach the jibsheet. The running backstay lines were easily within grasp—and the stays themselves are far enough forward so that the leeward one doesn't have to be eased when working to windward.

When I stepped aboard, I could sense the inherent stability provided by the heavy lead bulb, so it was no surprise when Alistair told me that he hasn't known her to heel beyond putting her covering board in the water. On one occasion he sailed DIAMOND with his father, a very accomplished sailor who was initially critical of the way the rig had been set up, but enjoyed the sail enormously after making a few adjustments.

Listening to Alistair describe DIAMOND's performance made me hope that I might one day sail her in the kind of breeze that would suit her best. 🦋

A lifelong sailor, Nigel Sharp is a freelance marine writer and photographer who also spent 35 years in managerial roles in the boat-building and repair industry. He has logged thousands of miles in a great variety of boats, including his own Nordic Folkboat.



When Caulking Comes Before Planking

Vacuum-bagging pre-made sections of decking makes for a clean job

Text by Brion Rieff • Photographs by Tom Jackson

ARROW, which I designed based on L. Francis Herreshoff's ARAMINTA and built in 1998, has been in continuous use since then. Now in the hands of a new owner, she came back to my shop last fall for what you might call cosmetic or aesthetic work. Most of this was straightforward—repainting the deck and renewing its nonskid surface, stripping old varnish off the cabinsides and cockpit coamings to renew its luster with six new coats of varnish, and repainting the topsides.

But it was also clear that the time had come to replace the teak cockpit seats and cockpit sole. These were originally made of ¼"-thick teak planks 4" wide,

edge-glued to each other and then glued down to a plywood substrate. Seventeen years of continuous use had worn the teak paper-thin in places, and the edges of the teak had chipped around the hatches. In other spots, the teak was wearing down close to the glue-line. Sanding would have rejuvenated the appearance, and the owner could have gotten maybe another season out of it, but sanding would have taken off even more thickness. Sooner or later, there would be a risk of wearing through to the plywood below. Replacement was the best course.

Originally, the teak veneers in ARROW's cockpit didn't have caulking seams. The veneers were simply

Above—For a cosmetic refit of the 32' yawl ARROW's cockpit, new ¾"-thick teak strips were laid out and edge-glued with tenacious caulking to make panels that could easily be vacuum-bagged into position to emulate a traditional laid deck.
Inset—Original teak veneers had nearly worn through since the author built the boat in 1998.

epoxied together to appear as a single, wide piece. They were laid up over a meranti plywood substrate made up of two $\frac{3}{8}$ " layers for the seats and one $\frac{1}{2}$ " layer for the cockpit sole. These substrates, coated as they were with epoxy, were still in very good shape, so the new owner and I saw a chance to not only make repairs but to improve the aesthetics by using $\frac{3}{8}$ "-thick and $1\frac{1}{4}$ "-wide teak strips with $\frac{1}{4}$ "-wide caulking seams filled with black caulking compound. The new look would be first-rate, much like a traditional laid deck, and would complement all the effort put into renewing the brightwork.

This resheathing was the most challenging part of the project. But we greatly simplified the work by making up sections of decking ahead of time, off the boat. We made accurate patterns of the areas to be sheathed, then made up slightly oversized deck sections

of individual planks separated by a uniform $\frac{1}{4}$ ", then filled these seams with adhesive caulk made by Teak Deck Systems. After a couple of days of curing, the individual deck sections could be handled very much like plywood panels, which allowed us to focus on accurate planning and cutting.

Vacuum-bagging is a great way to install this kind of sheathing, and making up caulked panels ahead of time simplifies the work. If we were vacuum-bagging individual planks to be caulked later, the epoxy would partly fill the seams, and then somebody would have to come back with a tool to clean out the cured glue before caulking. By making the whole panel up on the bench, all we have to do after vacuum-bagging is to clean up the perimeter. For me, that's the main reason for using this method.



Photo 1—Mike Moros (who manages WoodenBoat School's shop during summers) started off by carefully fitting three $\frac{1}{4}$ " plywood

patterns. One spanned the width of the cockpit aft and butted against the aft bulkhead, and the other two followed the curve of the port and starboard seats and butted against the forward bulkhead as well as the previous pattern. *Inset*—Notations on the patterns showed the exact locations of things such as hinges, hatches, and the mizzenmast. The two diagonal lines are used to line up the pieces on the workbench later. The original teak veneers under the side decks were not worn, so we retained them.



Photo 2—Using the patterns, we determined the layout of the panels and laid out the strips following the pattern—in this case, for a panel that runs the length of the cockpit and the curvature and width of the side seat, minus trim. Spacers of $\frac{1}{4}$ " plywood guaranteed a uniform seam width. The planks were wedged together from the sides to keep the setup tight. Lead bricks held everything down. When ready, Mike hot-glued crossbars down to hold the spacing.



Photo 3—Using a power caulking gun, Mike filled the seams with caulk, taking out spacers as he went along and making sure to fill the space under the crossbars. The best way to fill a seam is to push the caulking gun, rather than drag it. In my experience, one advantage of caulking the seams before gluing down the strips is that the caulk adheres to the

seam for its full depth. After each seam was filled, Mike used a putty knife to force the caulking deeply into place (as has been done on the first two seams shown here) to make sure there would be no voids. A sheet of plastic under the panel keeps it from being glued to the workbench.



Photo 4—It takes two days for the caulking to cure fully. During that time, Mike worked on fairing mating surfaces on the boat, then came back to work on the panels again. He used a heat gun to loosen the hot glue on the crossbars and a putty knife to pry them off. An 8" sander-grinder with 60-grit discs made short work of the excess caulking, taking care to sand as little of the wood as possible.

Photo 5—On the workbench, Mike lined up the new panels on the patterns. In the middle part of the aft seat, we planned one broad panel with an even number of planks, which would then be cut down the middle. Each side piece was glued to its corresponding side panel, leaving a centerline gap that would be filled by a kingplank. Careful work both in planning how pieces fit together and how margin boards, bullnose pieces, and trim would fit with the run of the strips paid off later. The curved piece visible at the lower left is a margin board laminated up of four



half-width teak planking pieces, with the grain matched as well as possible to look like a full-width plank. Later, pieces were added to the margin boards to widen them because we came up with a change in the layout and decided that slightly wider margin boards would look better.



Photo 6—We planned to nib the planks into the margin boards to avoid feather edges and to give the planking a traditional look. It's the right thing to do. Here, Mike laid out the nibs to blend in well with neighboring pieces, for example the seat hatches and a wide athwartships strip that fits under the mainsheet traveler. Especially at the hatches, we didn't want to leave a small piece of a nib extending past the hatch seam where it would look out of place. The nibs also matched side-to-side, in mirror image.



Photo 7—After cutting and finishing the outboard side of the first panel, including its nibs, Mike cut to the line and finished off the edges with a block plane, chisel plane, and sandpaper. Then he transferred the shapes to the opposite side and made the same cuts there. Next, he traced the outboard profile of the seat panels directly onto the margin board, as shown here.



Photo 10—Once all the cutting and finishing were done, the margin board (port side in this case) was aligned with the planking panel using spacers. Lead bricks hold things in place, ready for crossbars to be hot-glued to hold the spacing while the seam was filled with caulking, making it part of the panel.

Photo 8—After tracing the profile of the panel, Mike marked another line on the margin board exactly $\frac{1}{4}$ " outboard of the traced line to allow for the caulking seam. Then he used a sabersaw to cut to the outer line and cleaned up the edges.



Photo 11—During test-fitting, more decisions had to be made, almost all of them based on aesthetics. Here, Mike and I were puzzling out the fit of the plank located under the mainsheet traveler. We also talked about the type of trim to use in way of the mizzenmast, and exactly where to cut the hatches. I knew I wanted margin boards at the forward and aft ends, but I hadn't decided on their widths. It's easier to visualize these details when the panels are in place. I wanted the forward and aft margin boards to butt tight to the side margins. By this stage, the two small panels that form part of the aft seat had been edge-glued with caulking to the long side panels, making the kingplank's layout clear, and we decided the width of the aft margin board and the mizzen trim. There are several ways you could treat it. You could border the hatches out, but I'm not a big fan of bordering everything. I like a more traditional look, based on what would have been done if it were a real laid deck. It's all aesthetics, and therein lie some decisions and changes.



Photo 9—We used the completed port-side panel to make a mirror-image for the starboard side. Fortunately, things on the boat were pretty close to symmetrical, and any minor errors could be taken up during the margin board's final fitting. The point of doing all this fitting so carefully on the workbench, with lead bricks holding everything in position, was to fit the margin boards so that we could glue them to the panels using the adhesive caulking. That way, we would be final-fitting only one full-length panel per side, from the cabin bulkhead to the aft bulkhead, with everything lined up, nice even caulking seams, and matching grain.

Photo 12—While caulking seams were curing, Mike turned to surface preparation and fairing. He used a router to cut a uniform depth in a checkerboard pattern, then followed up with a broad chisel to break out the pieces. Even though there was a little variation in the thickness of the old veneer, we could mill off an even amount. After that came sanding. That's boatbuilding—90 percent of it is sanding. And if I'm wrong about 90 percent, then it might be 95.



Photo 13—After fairing the old surface as much as possible, Mike applied thickened epoxy to fill low spots. He made a plywood tool to screed the epoxy to reestablish the camber of the seats, which had relaxed over time. After two applications and a final sanding, shown here, the surface was fair, the camber was right, and we were ready to install the new panels.



Photo 14—Having made up his beautiful, long deck panels, Mike then had to cut them up. The clean cut he's making here is along one of the seams of a lift hatch in the seat. We planned to protect these edges with thin



bronze trim pieces set flush on each side. Cutting out the hatch openings left us with four separate pieces of panel to vacuum-bag aboard the boat in a single operation. The hatches themselves were easier to vacuum-bag on the workbench.

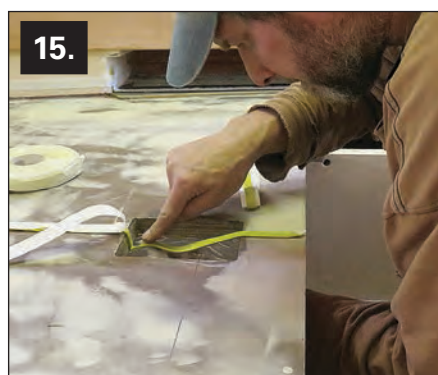


Photo 15—Preparation for vacuum-bagging begins with cleaning up the whole area, then putting down paper-backed sealant tape around each area to be bagged. The idea is to have a continuous air seal, with no breaks. Bagging an awkward area can be tricky, and

no place was trickier than the hole where the mizzenmast passes through the aft seat. Mike put sealant tape around the hole on the underside of the seat, then put a small plastic patch over the hole itself. Next, as shown here, he applied tape to the top of the plastic sheet. The tape also went up onto the bulkheads, then down to the side decks. Sealant tape, when being removed, can tear the surface off bare wood, so we first coated the wood under the side decks with epoxy, to be sanded off later.

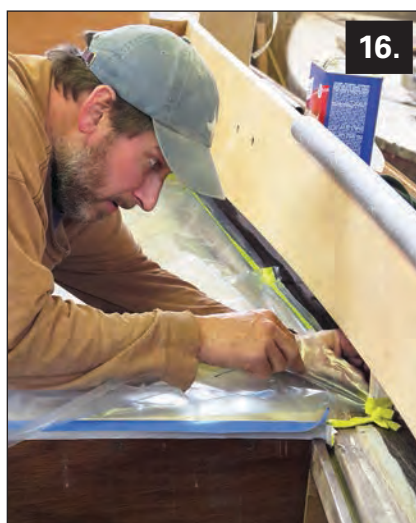


Photo 16—Mike started applying the plastic “bag,” which is big enough to cover this particular panel, to the sealant tape. The outboard side, which is hardest to get at, came first. The visible yellow of the sealant tape shows the extent of this first attachment. Then we flipped

the plastic up over the coaming to be out of the way while epoxy was troweled on and the panel laid down over it. The blue tape visible here made double-sure that no epoxy would get on the sealant tape. If that happens, the bag won't seal, even if you wipe it off. It's like grease.

Photo 17—Using a $\frac{1}{16}$ ”-notched trowel, Mike spread thickened epoxy on the surfaces, making a very even layer, not too thick. Meanwhile, Richard Will had rolled unthickened epoxy on the underside of the four panel sections we were going to vacuum-bag.

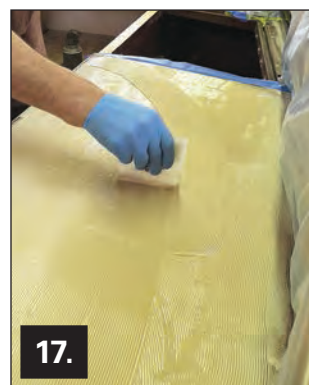


Photo 18—Next, one of the glued-up panels was set in place, with the margin board butting against the remaining planking under the side deck and its forward end butting against the cabin bulkhead. The forward end of the planking on this panel has been cut back to allow room for the forward margin board and a $\frac{1}{4}$ ” caulking seam.

Photo 19—After this first panel was in place—in this case, the port aft corner—a cut-to-size layer of peel-ply was laid down, followed by a cut-to-size breather cloth. The peel-ply prevents the cloth from bonding to the panel, and the sole purpose of the breather cloth is to allow air to pass through, for a uniform pressure all around the vacuum bag. I like to put a little extra breather cloth under the vacuum port, the bottom part of which is visible here. Then, the vacuum bag was flipped back into place, spread over the port fitting, and its edges sealed by pressing them into against the tape.



19.



20.

Photo 20—While peeling the backing off the sealant tape and simultaneously removing the blue masking tape a few inches at a time, the plastic vacuum-bag's edges were pressed into the sealant tape, taking care to get a continuous seal. Good preparation and careful attention prevents leaks.

Photo 21—After the bag was sealed to our satisfaction, we poked a hole in the plastic and joined the bottom part of the vacuum port with the top part, sandwiching the bag in between. This section was now ready for the vacuum pump to be turned on.



21.



22.

Photo 22—We planned four separate vacuum bags to be done simultaneously, two forward and two aft. The aft bags ended at sealant tape that was placed in the void where the kingplank was going to go in later. We worked as fast as we could to get the plastic taped in place and everything ready to go, checking at the same time to see that the panels were lined up just right.



23.

Photo 23—Once the vacuum pump was turned on, we could see right away if we had any leaks even without looking at the gauge. If you grab a wrinkle and you can't pick it up, you've got a good seal. If you can pick it up, you have a leak. On the port side aft, we had a few leaks, and chased them down. Richard, working from the aft deck, found out that the sealant tape had taken the paint off the bulkhead, which caused one of the main leaks. I worked under the seat to check the mizzen patch. If you have air leakage, the trick is to not give up, but to be tenacious about it and find the leaks. Then, all a sudden, whump, you've got it.

Variations on the theme

We use pre-made panels in a variety of ways. At the same time that ARROW's cockpit seats and sole were being redone, we also vacuum-bagged western red cedar bulkhead panels and edge-glued deck panels for a new boat of my design that we're building for a San Francisco client.

In the background, the vacuum-bag I've set up was for an interior bulkhead of western red cedar. The lamination consists of two fore-and-aft outer layers of $\frac{1}{4}$ " and two inner layers of $\frac{1}{8}$ " on opposing diagonals. This gives me a $\frac{3}{4}$ " bulkhead that is stiffer and stronger than plywood. It is also lighter, at 1.44 lbs per square foot compared to plywood at 2.28 lbs for $\frac{3}{4}$ ", 1.85 lbs for $\frac{5}{8}$ ", and even 1.5 for $\frac{1}{2}$ ".

In the foreground, $\frac{1}{4}$ " western red cedar tongue-and-groove planks have been edge-glued to make panels for the first layer of decking for the same boat. Because of the compound curvature due to the deck's camber and sheer, this layer is made up in two halves so the deck will lie down firmly. The 5"-wide planks are V-grooved at the seams and, for appearance, have an identical V-notched false seam along the centerline of each



plank. The V-notched side will be varnished while the panel is on the bench, which is much easier than the tedious work of varnishing after installation. Then, the panels will be installed varnish-side down, epoxied and screwed to the deckbeams and sheer clamp. From below, it will look like a laid deck, and it will need only one more coat of varnish. After the first layer is done, two $\frac{1}{8}$ " diagonal layers and a final $\frac{1}{8}$ " fore-and-aft layer will be vacuum-bagged in a single operation, for a total of $\frac{5}{8}$ " of thickness. The deck will then be sheathed in fiberglass cloth set in epoxy and painted with a nonskid texture (see WB No. 222).

One advantage of making up this kind of deck panel is that we're working with lumber that's 12' to 16' long, as opposed to 8' plywood that would have to be scarfed, which presents problems of its own. The V-notching is easier to do on these panels than on plywood, and it gives a better result. And it's also amazing how stiff a deck built this way is. With $\frac{1}{2}$ " plywood, I would have to have deckbeams every 12"—and that would be stretching it. With this $\frac{5}{8}$ " panel, the deckbeams can have twice that spacing. —BR

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Photo 24—After all the vacuum bags were checked and rechecked for leaks, we left the vacuum pump on overnight, pressing down with 14.7 lbs per square inch on the panels while the epoxy cured. The seat hatches and cockpit sole pieces were also vacuum-bagged, but they were done on the workbench, since they were much simpler.



Photo 25—After the epoxy cured, only minor cleanup was needed, after which the remaining pieces were fitted and glued in place individually. Here, the kingplank between the aft seat panels takes shape, soon to be followed by fitted pieces fitting around the box-sectioned mizzenmast, rails on the sides, a piece under the mainsheet traveler, and bullnose pieces along the edge of the cockpit seats. Caulking these final seams finished the job.

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The Two-pointers of Dead Creek

A traditional trapping skiff from Vermont

by Douglas Brooks

Earl Bessette owns an old, leather-bound ledger book, which he retrieved during one of our conversations about life on his Vermont family farm and the boats he built and used for trapping fur-bearing animals. "I want to show you something," he said, rising from his chair. He returned with the ledger, which begins in 1942 when he was only 12 years old. For nearly 40 years, he recorded every single bird or animal he trapped or shot in the marshes, woods, and fields surrounding his dairy farm in New Haven, often while poling his small skiff along the waterways. Over 120 deer antler racks are fastened to the wall of his machine shop, and dozens of rusting beaver and muskrat traps hang in clusters from nails throughout the barns.

Reading Earl's ledger, it becomes clear how families like his literally scoured the surrounding landscape, often using boats they built themselves, for additional income and food as the Great Depression years wore on. Skunks, beaver, muskrat, bobcat, and foxes were skinned for their pelts, their carcasses thrown away, and everything else was taken for the table. "The only thing I could never trap were foxes," Earl remembers. "My father said I wasn't 'slick' enough, meaning I couldn't keep the traps clean of my scent. You have to boil your fox traps, otherwise they won't come near them." The money from a few weeks of trapping in the fall and spring was absolutely necessary to the farm's survival. Earl's father almost lost the farm in the late '40s after a barn fire in midwinter forced him to sell his herd of dairy cows.

Jason Hatch poles a replica of his grandfather's trapping boat on Dead Creek in Addison County, Vermont. The boat was built by Middlebury College students based on one of six trapping boats Gerald Hatch built between 1950 and 1972.



Earl Bessette stores a trapping boat he built in 1960 in his barn. He used the boat to trap several miles of creek near his dairy farm. On the wall behind the boat are his snowshoes and muskrat traps.

Raymond “Bud” Bodette, now in his 80s, recalls that back in his father’s day a single “winter prime” muskrat pelt, which has its thick spring coat, brought more money than a day’s work at average wages. His uncle Archie built trapping boats and carved decoys. Bodette and Pat Hatch both grew up on dairy farms in the broad Champlain Valley of Addison County. All these farms had humble beginnings. Bodette’s grandfather tried raising Belgian workhorses in addition to milking. He had 17 horses and 12 cows, but the advent of the tractor nearly bankrupted him. Bodette can see Lake Champlain and the Adirondacks beyond from his farmhouse, and Hospital Creek to the east. The Hatch farm sits alongside Dead Creek, a long inland waterway running for miles parallel to the lakeshore, connecting numerous marshes before it empties into Otter Creek, and it was on these waterways that the trapping skiffs served a crucial role. Muskrat trapping was so important to the Hatches that Pat’s father Gerald used to hire workers to milk his cows during the spring trapping season so he and his sons could trap the creek.

I met Pat Hatch when a friend of mine told me he had seen six boats on a local dairy farm, which turned out to be the Hatch place. I learned that the boats were all built by Pat’s father, Gerald Hatch, who started building boats in the 1950s and built his last in 1972, just before he died. As Pat showed me the boats, he explained that his father built mostly “two-pointers” but also built a couple of more stable “flat-sterned” models for his youngest children. Gerald Hatch’s boats were used only for trapping, and they share elements with other trapping boats I have found. They have no oarlocks, because one could only pole through the cattails that filled Dead Creek. Their hulls are also sheathed below the waterline with sheet metal, of the type commonly used for roofing, to protect the planking during spring trapping, which coincided with the breakup of the winter ice. The poles, referred to as duck-billed poles by some trappers, are shaped like a narrow paddle and fitted with a pair of metal spikes at their tips for pushing off the ice. Many boats have a wire hook on the inside for a rifle, because trappers would shoot muskrat as well as trap them. Hatch’s flat-sterned boats rise up

abruptly in the stern—like sharpies—to aid them in backing out of the cattails.

Pat recalls his father building boats by bending a pair of 14"-wide pine side planks around a single center mold, attaching the planks to stems fore and aft, adding hardwood chines, rubrails, and a single thwart, and then cross-planking the bottoms. Hatch admitted the carpentry was basic and well within his father’s talents; as a dairy farmer he did plenty of carpentry maintaining the farm. The biggest obstacles were the stems and stem rabbets. Gerald hired a local carpenter who had a tablesaw to make his stems, cut out of 12’ stock so enough would be left over for more stems when he needed them.

Pat Hatch also has a ledger book, a record of his work as a fur broker bidding on muskrat pelts from trappers throughout the region, then selling them to the wholesale fur buyers. In one season in the late 1960s, over 20,000 muskrat pelts passed through the Hatch farm. When I marveled at the amount of effort devoted to trapping—building boats, setting traps, brokering furs—Pat summed it up in a single sentence: “Trapping was our sugaring.” Most traditional Vermont dairy farms are hill farms, and it’s an old saying here that maple syrup sales were enough to pay the taxes. In the lowlands of the Champlain Valley, there were few sugar maples but plenty of muskrats.



Steve Brooks (no relation to the author) and his father trapped the opposite side of Dead Creek from the Hatch farm, paying \$600 a season to the landowner for the privilege. His father borrowed Gerald Hatch's center mold and built a pair of plywood trapping boats in the 1960s. Their best year was 1969, when A-grade pelts were fetching \$5 apiece and they trapped over 1,800 muskrats with 400 to 600 traps. Like all trappers, the Brookses would shoot muskrats if they could. He said in his best day of shooting he got 68 and his father got 88, all head shots to preserve the pelts. They also would remove the musk glands from the male muskrats, which were used in the perfume-making industry and brought \$40 to \$50 a quart.

After giving a lecture at Middlebury College in 2007, I was approached by three students who said they wanted to build a boat. I had just discovered trapping boats, so I suggested they create an independent study project in which they would interview trappers and help me take the lines off their boats. I would help them build a replica. Our first boat was one of Gerald Hatch's two-pointers. A year later, I led another Middlebury class in taking the lines of two more boats and building replicas of them, including one of Hatch's flat-sterned boats.

Our first interview was with Bud Smith, whose family has lived in the Champlain Valley since the 1700s. Bud's

father was a dairy farmer and part-time carpenter. During trapping season all the males of the Smith family would decamp about a mile from their farm to a muskrat camp they had built on shores of Hospital Creek, also known as Tremble Creek. For three weeks every spring the Smith men would set their traps and check them through the mornings, then spend all afternoon skinning muskrats and stretching pelts. Unlike the home-built boats used by other trappers, the Smith family used a dugout canoe of unknown age. It now hangs in rafters of Bud's kitchen in Middlebury, sheathed in roofing tin like any other trapping boat. Bud talked about how the trapping season would wind up as the weather warmed. "With the ice finally out, the water would be at its highest, which means the fish shooters would come down shooting pike swimming in the shallows. Other men would walk the banks—we called them boot trappers—shooting muskrats. Serious trappers like us would be exhausted, and the drinking would get a little heavy. You'd be checking traps with rifle fire all around you. It's a miracle no one ever got hurt."

In 2014, I established a Lake Champlain-wide small-boat research project in partnership with the Henry Sheldon Museum of Vermont History (www.henrysheldonmuseum.org). Titled *In Champlain's Wake: The Small Boat Traditions of Lake Champlain*, our first significant research project was a collaboration with the Patricia Hannaford Career Center, Addison County's technical



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high school. Working in partnership with Jake Burnham's advanced science, technology, engineering, and math students, we interviewed trappers and brought historic boats into the school's wood shop for measuring and lofting. After drawing the boats using computer-assisted design programs, the students built the replicas.

In 2014, the class collected two trapping boats from Ferrisburgh, Vermont, both classic two-pointers, along with a trapping boat from Putnam Station, New York. The latter looks like a more conventional skiff, because trappers in that region were often operating right on Lake Champlain itself. In 2015, we studied Earl Bessette's trapping boat, which he built in 1960, along with a very old and very large boat built by Orville Mulliss of Bridport at least 75 years ago. Meeting with Bessette at his farm, Earl told us he copied a neighbor's trapping boat, but he was so concerned about leaking that he used a 10' sheet of $\frac{3}{8}$ " marine plywood for the bottom. Like the Hatches, Bessette hired a carpenter to make

Like the original builder, Gerald Hatch, students at Middlebury College bent the side planks around just a single center mold to develop the shape of the two-pointer. Hatch's sides were parallel-edged $\frac{3}{4}$ "-thick, 14"-wide pine boards from the lumberyard. The rocker—or "spring" as the Vermont builders call it—is governed by the amount of flare in the sides.



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Students gained practical experience in the use of tools by such tasks as planing the bottom edges of garboards flat to receive the bottom planking. On this replica, the bottom was planked with plywood, matching the technique Earl Bessette used on his boat of 1960.

his stem. At that point, Earl interrupted our conversation to go rooting around in his barn, emerging with a long, narrow piece of darkened oak rabbeted on both sides. "I told him to make the stem extra long in case I built another boat. You can have it."

The bottoms of trapping boats, like the stems, were another challenge to their farmer builders. Some were caulked with cotton, and if done right these boats could stay in the water all season. But others were built without caulking, and the first job before the season began was to soak them so they would swell tight. John Campbell remembers how his father would space the bottom boards with a 10-penny nail. "You had to know whether or not your planks would buckle if you left the boat in the water. Once my father's boat swelled tight, we always pulled it out of the water each day." Ray Bodette tells the story of one of his uncle's boats that swelled so tight that the planks buckled. "You couldn't tear enough off your shirttail to plug the leaks in the bottom."

Trapping boats make excellent projects for students. Though they may appear simple, it would be a mistake to describe these boats as crude. Some show niceties

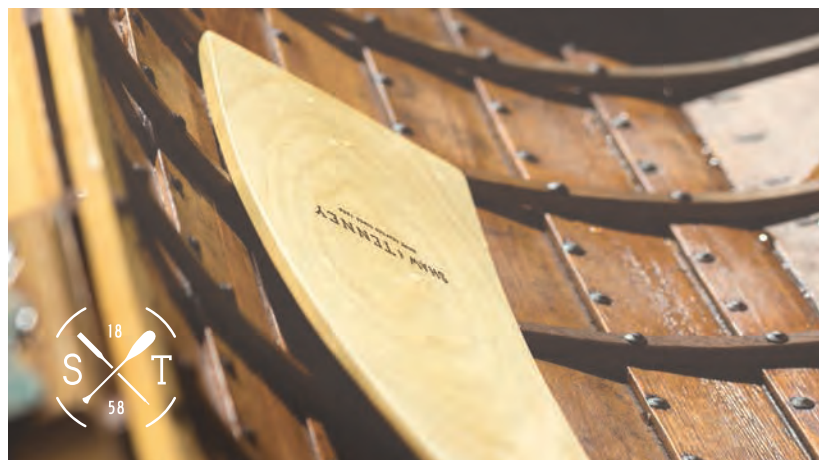


DOUGLAS BROOKS

such as decks and camouflage paint schemes, and they were refined to perform in a harsh environment.

I recently asked Jason Hatch if he would come and pole our replica of his grandfather's two-pointer. Jason was in his early teens when he helped his grandfather build his last boat, and he still tries to take it out on the water every summer.

It was a cold, windy, and uncomfortable day on Dead Creek when we met up. The creek had ice at its margins where Jason put in. He stepped aboard, standing with one foot wedged in the stern, leaving the forward half of the bottom clear of the water. Jason shot away from the bank, pushing his duck-bill pole with all his might,



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In 2014–15, high-school students documented boats built by Orville Mulliss and Earl Bessette, shown in the foreground, and then built new boats to the plans they developed. The project will look at two more historic boats starting in fall 2016.

the stern of the boat almost buried in the waves. Bud Bodette told me you always pole a trapping boat from one side; carefully heeled, it would track straight as an arrow. Jason demonstrated this, and when he turned he let the wind carry him home, using the blade of his pole to steer his way in. It was an impressive performance. Another trapper told me a good boat had to have just the right amount of “spring” to the bottom, which was essential to stability and performance. I had to ask what “spring” was but finally realized he was describing longitudinal bottom curvature, or what most boatbuilders know as rocker.

The two-pointers of Dead Creek were functional tools for their former owners. With Yankee self-sufficiency and pluck, they developed a type of boat that matched their skills and their needs. They were creative, and their inspiration came from their immediate surroundings. Plenty of finely built boats were produced for Lake Champlain, but they would have been a world apart and unaffordable to local trappers. Until nearly the end of the trapping era in the 1980s, trappers persisted in building their own boats. They drew inspiration from their habitat and spoke their own vernacular. At the end of my conversation with Pat Hatch, I interrupted him as he was telling me about his father’s two-pointers to ask whether he had ever heard the phrase “double-ender.”

“No,” he replied, “what’s that?”



Douglas Brooks is a boatbuilder, writer, and researcher specializing in traditional American and Japanese watercraft. His latest book, Japanese Wooden Boatbuilding, is available through his website, www.douglasbrooksboatbuilding.com. He lives with his wife, Catherine, in Vergennes, Vermont.



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LAUNCHINGS

Edited by Robin Jettinghoff

These pages, along with the Boat Launchings section of www.woodenboat.com, are dedicated to sharing recently launched wooden boats built or restored by our readers. If you've launched a boat within the past year, please email us at launchings@woodenboat.com, or write us at Launchings, WoodenBoat, P.O. Box 78, Brooklin, ME 04616.

Please include the following information: (1) the boat's length and beam; (2) the name of its design class or type; (3) the names of the designer, builder, owner, and photographer; (4) your mailing address along with an email address or phone number; (5) the port or place of intended use; (6) date of launching; and (7) a few sentences describing the construction or restoration. (8) Send no more than five photographs (jpg images at 300 dpi) and enclose a SASE if you want anything returned.



HEATHER KAUFMAN

Last summer, at WoodenBoat School in Brooklin, Maine (www.thewoodenboatschool.com), Mark Kaufman led seven students in the construction of their own Aleutian baidarkas. The class spent a week building the boats and, as you can see here, had them nearly finished by the end of class. A time-lapse video of the class is at www.woodenboat.com/videos.



HOLLY BIRD

Rex and Kathie Payne have built 16 boats at their home in Spring Hill, Florida, and their latest is the Caledonia yawl KATHLEEN. They launched her for the first time last May at the Cedar Key Small Boat Meet in Cedar Key. Plans of the Iain Oughtred design are available from www.woodenboatstore.com. Kits are sold by www.hewesco.com and www.jordanboats.co.uk.

Donn Constanzo and Bruce Wahl of Wooden Boatworks (www.woodenboatworks.com) in Greenport, New York, led their team of boatbuilders in the two-year construction of INVADER, a replica of the William Fife 8-Meter of the same name designed in 1930. She was launched to great fanfare in July 2015. The owner is having a second one built, to be christened DEFENDER. He will race the boats in Oyster Bay, New York.



PETER BRAUNÉ



KEVIN STRATHY

Kevin Strathy of Sebring, Florida, built this Mia 15 design from plans by Andrew Walters (www.andrewwaltersdesign.com). Kevin spent 10 months on the construction of the 15'2" okoume-plywood-and-epoxy double-cockpit runabout. She is powered by a 30-hp Honda outboard. Kevin launched her last September, and enjoys cruising on Florida's inland lakes.

MIKE JOHNSON



Last May, at the Mashantucket Pequot Museum farmstead in Mashantucket, Connecticut, members of six First Nation tribes began building a 36' x 30" dugout mishoon ("canoe" in Wampanoag) under the guidance of Wampanoag canoe builders Jonathan Perry and Darius Coombs. On August 8, they launched NOOKUMUHS, meaning "my grandmother," at Mystic Seaport, after which 12 tribal members paddled 6 miles to Noank and back. Videos and pictures are available at www.pequotmuseum.org.

Alex Low recently launched a Beach Pea, designed by Doug Hylan (www.dhylanboats.com), which he chose because he wanted a stable, attractive boat he could use to teach his daughter to row and sail. Alex, a graduate of Silva Bay Shipyard School in British Columbia, trimmed out the plywood hull with ash rails, elm breasthooks, and spruce spars. Alex and his family row on Georgian Bay, Ontario.



BARBARA LOW

SARAH HARRISON (BOTH)



This elegant 16' Gentleman's Runabout, designed by John Hacker and Nelson Zimmer, was built by Dave Harrison of Orangeville, Ontario. In 2010, Dave bought the plans from The WoodenBoat Store (www.woodenboatstore.com) and started building FINALLY. The name is a tribute to the five years Dave spent building the boat before *finally* launching her last September at his family cottage on Buck Lake, Ontario.

Mark Bayne's boatbuilding students at Cape Fear Community College in Wilmington, North Carolina, built and launched six boats last spring. Among them was this lovely Melonseed skiff, which was strip-planked with cypress, then sheathed in Dynel set in epoxy. Her deck is Atlantic white cedar, trim is mahogany and red grandis, and the spars fir. Get Marc Barto's plans for the Melonseed at www.woodenboatstore.com.



DAVID HARDIN

COURTESY OF BRUCE HOLADAY



Bruce Holaday of Oakland, California, spent every weekend for nine months building this 11'2" Shellback dinghy designed by Joel White. Bruce bought his Shellback kit, built of sapele plywood and epoxy, from The WoodenBoat Store (www.woodenboatstore.com). He and his family row and sail PETIT BATEAU on the lakes and bays of northern California.

LAUNCHINGS

GREG PARKS



Greg Parks designed and built this 15'6" flat-bottomed skiff. He bought wood from his local lumberyard and sealed the boat with Dynel cloth set in polyester resin. She carries two deep-cycle batteries to power her 55-lb Minn Kota trolling motor. Greg and his grandchildren use GREEN LIZARD to fish and explore the creeks of Virginia's Eastern Shore. Contact Greg at 757-665-6966.

In 2012, Bill West of Eureka, Montana, ordered plans for a Rambler 20 from Harry Bryan, www.harrybryan.com. He built his boat from western red cedar planking on oak frames with mahogany trim. Harry called for an inboard motor in his plans, but Bill beefed up his transom to take an outboard. Besides exploring his home waters, Bill and his family hope to cruise in Arizona, Montana, Maine, and parts of Canada.



DONNA WEST

JOHN TUCKER



Diane Tucker and her daughter, Julia, enjoy gunkholing in their new 14' Ladybug sailing dinghy, NANCY BLACKETT, in the waters near their Farmington, Connecticut, home. Diane asked Greg Hopkins of Nextwave Boat Shop (www.nextwaveboat.com) in Portsmouth, New Hampshire, to build the plywood-and-epoxy hull. Plans by Jim Michalak are available from www.jimsboats.com.

Joe and Laura Koessler, a father and daughter from Buffalo, New York, had lots of help from the staff of Buffalo Maritime Center in building this Core Sound 17 cat-ketch. They started with a kit from B&B Yacht designs of Vandemere, North Carolina, www.bandbyacht designs.com. Joe is teaching Laura to sail LAURA in the waters near their home.



KYOKO KOESSLER

CRAIG M. BOUSQUET



SHILOH, meaning "place of peace," is the name Craig Bousquet of Albany, New York, chose for his new Argie 15, a skiff designed by Dudley Dix (www.dixdesign.com). Craig spent a year building the 15'6" x 5'6" fiberglass-covered plywood boat and launched her last June. He plans to sail, row, and motor her on the Mohawk River, Hudson River, and Cape Cod.

LARRY GASPAR



In 1954, Richard Berg of Beverly, Massachusetts, built this plywood Junior dinghy to a design by William D. Jackson. Richard borrowed the molds from a friend who had stretched the 8'6" boat out to 9'7". Eventually, the dinghy found its way to Richard's nephew, Larry Gaspar, who recently restored it. He and his family row the Junior on North Pond in Rome, Maine. See plans at www.svenson.com.

After working for three years restoring this 1958, 13'4" Thompson Sea Skiff, Rich Rothaupt proudly launched her last summer in Menomonie, Wisconsin. Rich bought the derelict boat when her previous owner threatened to burn it, then replaced the keel, bottom, frames, splashboards, gunwales, and decks. He also restored the 1959 Mercury Mark 58A outboard that powers her.



JAN SPINDLER

BRIDGET BONTRAGER



WHISPER is a 1958 Knarr-class sloop designed by Erling Kristofersen and built in 1958 by A.S. Westermoen of Mandal, Norway. John Bontrager bought WHISPER in 1992 and raced her until 1998, at which point restoration was required. He replaced her maststep, keelbolts, and most of her frames, then redesigned her cockpit with new seats and lockers. John relaunched WHISPER last year in Muskegon, Michigan.

Paul Cooper of Keene, New Hampshire, writes that this 1960, 16' Thompson Sea Coaster was tired when he bought her. He revived her by replacing her keel and splashrails, refastening her planking below the waterline, sistering or replacing 18 frames, and giving her a new finish. Paul and his family now cruise in SUZY G on the Connecticut River and Maine's southern coast.



PAUL COOPER

Hints for taking good photos of your boat

1. Set your camera for high-resolution images. We prefer jpg format, at 300 dpi minimum.
2. Stow fenders and extraneous gear out of the camera's view. Ensure the deck is clean and uncluttered.
3. Take your photographs in low-angle sunlight for best results. Early morning or late afternoon usually work well.
4. Keep the horizon level and the background simple and scenic so your boat stands out from its surroundings.
5. Take some pictures of the boat underway and some at rest. Often a vertical format works well for sailboats. Shoot a lot of images, then send us your five favorites.

We enjoy learning of your work—it affirms the vitality of the wooden boat community. We receive so many submissions that there is not room in the magazine for all of them to be published. Launchings not printed in the magazine can be seen at www.woodenboat.com/boat-launchings.



WoodenBoat REVIEW

PRODUCTS • BOOKS • VIDEOS • STUFF

DRAGON HARALD FAIRHAIR

Reviewed by
Matthew P. Murphy

DRAGON HARALD FAIRHAIR, by Arne Terje Saether. Arne Terje Saether, Straumsveien 85, N-9105 Kvaløya, Norway; terje@kasavi.no. 305 pp., illus. \$65. ISBN 978-82-997328-1-9. Available from the Wooden Boat Store, 800-273-7447; www.woodenboatstore.com.

DRAGON HARALD FAIRHAIR, by Arne Terje Saether, details the construction and sea trials of the largest Viking ship in the world, which was launched in 2012. It's an artful account, told through a stunning and comprehensive album of photographs accompanied by short, focused bits of text. Reading it, in fact, is like enjoying a slide show—but without the relentless and unforgiving pace of a live presentation. With this book, we're able to linger on photographs and study details of a most fascinating boat as it comes together, piece by piece, in a formerly vacant industrial building in the southwestern Norwegian city of Haugesund.

The book opens with a chapter called "The First Meeting," with these words: "Our introduction to this incredible project is a telephone call in 2008." The caller "represents someone who wants a Viking ship.

Not just any Viking ship, but the biggest Viking ship in the world." Was it a joke? A hoax? A scam? After a first meeting, it seemed clearly none of those things. Sigurd Aase, the prospective owner, was quite serious, and eager to get started. He gave the builders only two mandates: size and seaworthiness. The ship was to be the largest in existence, and it was to be safe at sea. The latter was the more challenging order, because no ships the size of this one existed, and so the design required copious research into all available information. This would be distilled into detailed construction

drawings for an entirely new vessel, but the builders were free to depart from these drawings as they saw fit.

From that first meeting, the book moves to pithy discussions of design, test boats, drawings, and materials, before embarking upon a colorful and informative account of the construction of a "25-room" ship. A "room" is the space between frames, varying from 30 to 34 Norwegian inches—which measure slightly longer than English inches. The new ship was to be 35 meters (115', more or less) overall, and 7.5 meters (about 25') on the beam. When not sailing, she would be driven by 25





pairs of oars, with two people per oar, for a whopping total of 100 rowers. The archaeological record suggests that ships of this size did exist—though no actual remains of one have been unearthed.

Although this is a sophisticated discussion of the building of the ship, the text and photographs are suffused with a certain playfulness, making it accessible to the untrained. At one point, we're treated to photographs of two builders draped in shavings—one making a long moustache of the fine spruce curls, the other a full head of hair. "Sorry, in-house humor, impossible to translate," reads the caption. On the opposite page, we see a photograph of the remainder of the crew, deftly positioned in the layout so as to look as if they're observing the proceedings with wide smiles. This is skilled bookmaking, so much of which depends upon such careful photograph selection and placement.

The book's very first words are self-deprecating: The frontispiece shows the heads of the builders (their bodies were obscured by the boat-in-progress) aligned along the sheerstrake, smiling restrained-goofy smiles. "We knew everything when we started," reads the text, "the rest we learned along the way."

In fact, they learned quite a bit along the way. The project leaders came to the job with some definite opinions: There's an undercurrent of criticism running throughout of scholarly Viking ship reconstructions that have labored to be pure copies of archaeological finds. The archaeological finds, writes Saether, are often missing much material—or the material that is found is

deformed. Both scenarios require conjecture in interpretation for reconstructions. FAIRHAIR, he writes, is not a reconstruction. She is a construction: a new Viking ship meant to optimize hull form and rig, and not to copy a predecessor. He acknowledges the FAIRHAIR building crew being criticized by scholars for their approach to the project—for disregarding the archaeological record and favoring optimal hull shape. "This is to be expected," he says, "since we have criticized their methods for many years."

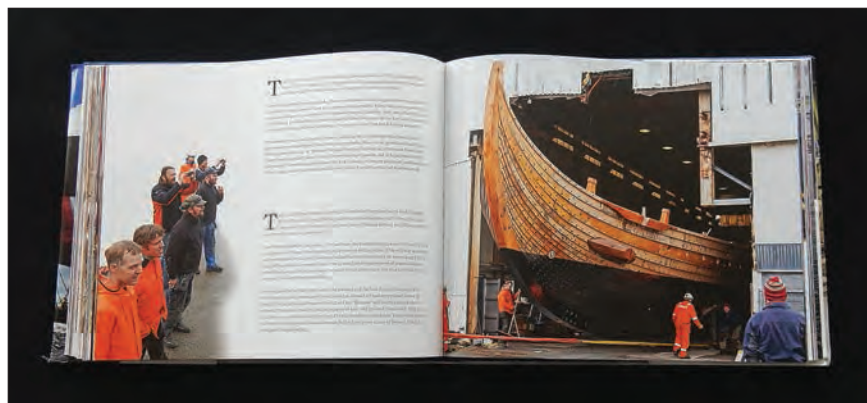
The "they" in that statement refers largely to the scholars at the Viking Ship Museum in Roskilde, Denmark, who have brought rigorous interpretation to bear on the archaeology of Viking ships—going so far as to build replicas using nothing but the tools and materials available in the Viking era. The differences between the two groups are friendly: FAIRHAIR's builders made a study trip to the cargo ship OTTAR in Roskilde to test the power of its windlass to determine the forces required to raise the new ship's sail. In addition, three of FAIRHAIR's

builders visited Roskilde to study the vexing intricacies of Viking ship rudders. They also measured the rudders of the two most famous excavated Viking craft in the world: the Gokstad and Oseberg ships, which lie in state in a churchlike museum on Oslo's Bygdøy peninsula.

Freed from the Viking method of splitting planks from logs, the builders used portable sawmills to get out beautiful quarter-sawn planks from massive, perfect oaks harvested in Germany. Power planes appear often in the photographs. Toward the end of the project, two 150-hp engines are fitted transversely and discreetly into the hull, and connected to hydraulic transmissions—a harbinger of the owner's ambitions. FAIRHAIR is not to be a dockside attraction.

Despite the anachronisms, there was plenty of scholarship in this construction. The crew was led by Gunnar Eldjarn, himself a researcher of Norwegian boats. He wrote the definitive treatise on the country's fabled Nordlands boats—*Nordlandsbåten og Affjordsbåten*, with co-author Jon Godal—one of the legendary keepers of Norway's traditional-boat knowledge, who also helped out at the beginning and end of the FAIRHAIR project. Another major study in the FAIRHAIR project was to test the feasibility of silk as a Viking-era sail material, with the ship driven by a 290-square-meter sail of silk. It worked beautifully initially, but wore out in a few years and was replaced by a smaller synthetic one.

The text is in both Norwegian and English, carefully blended together so neither dominates. Saether is a



skilled photographer as well as wordsmith, and his photographs convey a technical mastery of the boatbuilder's art—as they should, for in addition to creating this comprehensive set of photographs, which lead from the very first meeting all the way to sea trials, he served as the project's lead rigger.

The ship emerged from her building shed two years and one month after the first plane stroke, and was launched by a floating crane on June 5, 2012. She didn't leak—save for a single jet of water captured in a photograph. And so she complied with the “Gulating Law,” which dates to before the year 900: If a man can keep a ship that has soaked for five days afloat in a seaway, then the ship is seaworthy. She was subsequently

ballasted with 25 tons of stone that also appear in one of the book's images. Sea trials, which included a crew of elite Norwegian square-rig sailors, included much experimentation with trim, which is discussed at length here.

An original 25-room ship may not have been built this way, writes Saether, but FAIRHAIR reveals a lot about the forces at work on such a ship, and about the sailing characteristics and sail handling. This has been amply tested over the past several summers, with trips along the Norwegian coast and to Ireland. This summer comes the big test: DRAGON HARALD FAIRHAIR will depart Haugesund for North America in May. She'll make stops in Iceland, Greenland,

and Newfoundland before heading into the St. Lawrence Seaway for visits to Toronto, Ohio, Michigan, Wisconsin, and Minnesota before transiting the New York Canal system. She'll end the season at Mystic Seaport, and overwinter there on display.

This ship “is the product of one way a large Viking ship could have been built,” Saether writes. It was a “once in a lifetime project.” And her visit to North America will be a once-in-a-lifetime event. I'd strongly encourage anyone planning a visit to get their hands on a copy of this book first. The encounter will be all the richer for having read it.

Matthew P. Murphy is editor of WoodenBoat.

Kayaks of Alaska

Reviewed by John Summers

Kayaks of Alaska, by Harvey Golden. White House Grocery Press, 2000 S.E. 47th Ave., Portland, OR 97215. Softcover, plans, photographs, drawings, footnotes, appendices, bibliography, index. 560 pp., \$59. ISBN 978-0-9787221-2-8. Available from the Wooden Boat Store, 800-273-7447; www.woodenboatstore.com.

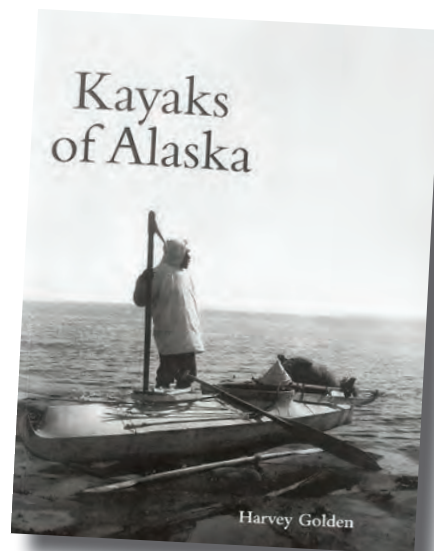
Both Harvey Golden's new book, *Kayaks of Alaska*, and his earlier *Kayaks of Greenland: The History and Development of the Greenlandic Hunting Kayak, 1600–2000* (2006), are steeped in tradition. The paddled watercraft he researches and writes about are, as George Dyson says in the introduction to *Kayaks of Alaska*, a “record of a way of life, and a system of belief” and they are part of a continuum reaching back thousands of years. As the author notes, “Kayakers have been navigating the waters of Alaska for several millennia. When the great pyramids of Giza were being built, hunters in the Bering Straits were feeding their families with sea

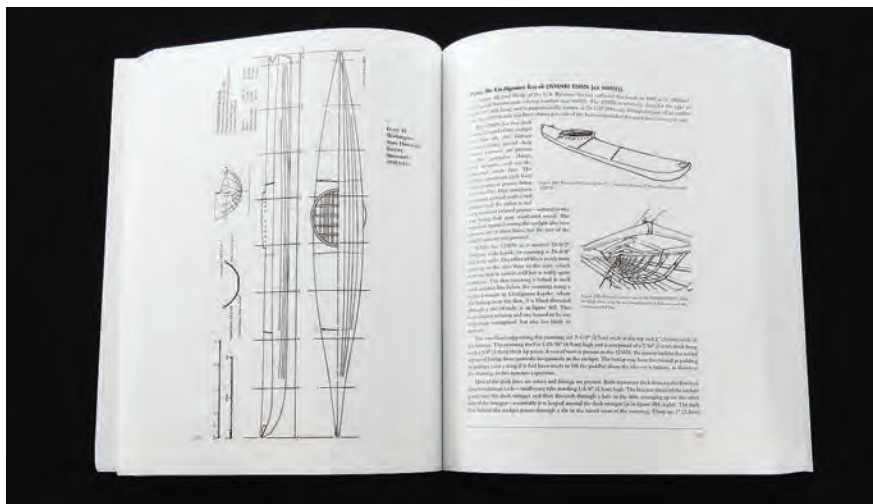
mammals hunted from kayaks.” In stark contrast to these preceding millennia, a mere two centuries elapsed from the kayak cultures' first contact with Europeans to the end of the kayak's use for subsistence hunting. Drawing on preserved kayaks in museum collections, journals, diaries, notes, interviews, and historic photos, Golden documents the shapes, forms, and structures of kayaks and the northern cultures that built and used them.

Golden's work is also part of a more modern tradition of researchers who seek out and document traditional watercraft both in the field and in museum collections. Like Edwin Tappan Adney, Howard Chapelle, John Gardner, and John Heath, among others, his plans, drawings, photographs, and writing are a vital link between museum collections and their countless thousands of preserved artifacts and the peoples, traditions and practices that made them. As with Chapelle, who took over Adney's life's work of

notes, sketches, and research after his death, merged it with his own studies, and published both as *The Bark Canoes and Skin Boats of North America* (see sidebar), Golden has incorporated John Heath's unpublished fieldwork and research into *Kayaks of Alaska*.

This is a monumental work, so packed with details and information that even the author admits that it is “a daunting prospect for the casual reader.” The breadth, range, and detail of Golden's scholarship are simply overwhelming. However, that very density of





content also makes for an almost-inexhaustible reference that can be dipped into and enjoyed again and again over many years. The first chapter introduces the Alaskan kayak and the three main groups of its builders and users: the Aleutian Islanders, known as the Unangan; and two distinct cultural groups of Alaskan Eskimos, the Yup'ik and the Iñupiaq. In this chapter Golden also discusses the decline in kayak use that began after the arrival of traders in the mid-18th century, caused largely by the integration of northerners into trading-company economies that tied them to items of European manufacture and diminished their reliance on subsistence hunting carried out in kayaks. There are different orthographic and transliteration conventions for what these peoples and their boats are called. "Kayak," which Golden uses throughout the book, is an English spelling of an indigenous spoken word from several different dialects, which is also now sometimes rendered as "qajaq."

The next chapter classifies Alaskan kayaks into a typology based on characteristics of form and construction that also takes account of the background of the builders and users. This is followed by a chapter called "Presentation & Terminology" describing the conventions used in documenting and illustrating the kayaks and provides a glossary of terms. As with every other aspect of this book, Golden's drawings are thorough and meticulous and

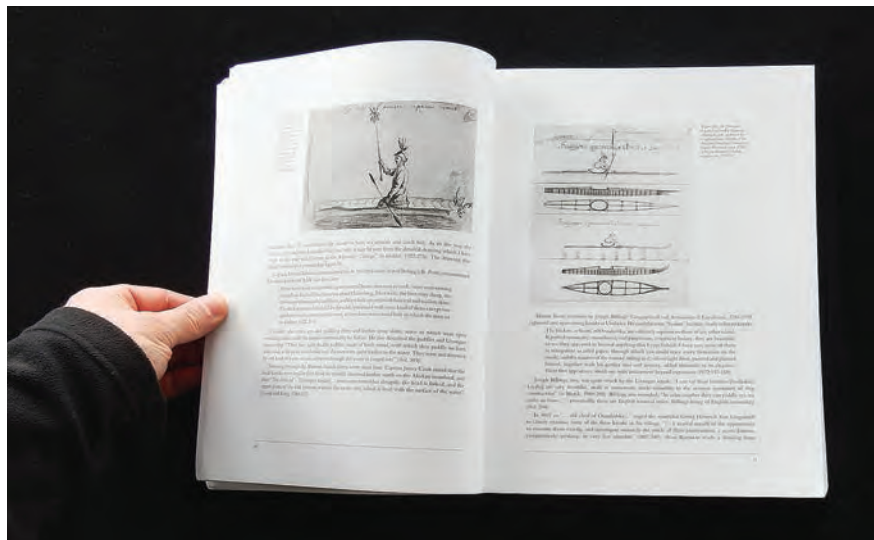
demonstrate the depth of his research. In addition to the conventional views of naval architecture—plan, profile, body plan, and section—Golden has added his own unique touch in the form of perspective sketches of the interiors and exteriors of selected kayaks.

Using a lightbox, he has traced photographs of these details in pen and ink, capturing repairs, scarfs, and the irregularities resulting from construction with driftwood and other found materials. Freed of the visual clutter of photographs, the drawings offer additional insight into the structures of the kayaks. Golden is scrupulously honest about identifying where his drawings show conjectural or reconstructed elements, or where he has refaired distorted lines. In some cases, he also presents the

as-found lines for comparison. This truth in representation is important for the scholarly integrity of his work, and will forestall some of the criticisms that have in the past been leveled at Chapelle, among others, for "tidying up" irregularities in recorded lines.

The following chapters cover six regional varieties of kayaks, one type per chapter. Each chapter begins with a history and a discussion of the construction and use of that particular type, together with notes about its shape and unique features. This is followed by plates of scale drawings and a very detailed discussion of that kayak, together with more sketches, photographs, and illustrations. For each kayak design featured in the book, he offers a detailed account of its provenance, history of ownership, and how it came to be in a museum collection. A section of 24 color plates offers measured drawings of ornamental stitching and fabric tufts, decoration on hulls and structural members, and painted patterns on paddles.

Chapter 10 addresses kayak construction, Chapter 11 covers kayak equipment, and Chapter 12 deals with paddles. Readers used to thinking of kayaks as being propelled only with double blades may be surprised by the widespread use of single-bladed paddles by Alaskan kayakers. The five appendices that follow this chapter provide information on the remains of kayaks from burial caves, an undecked



canoe-form kayak, two kayaks from the Russian Far East, a comparison of the ratios and proportions of various examples, and finally the author's suggestions for lifting and lofting kayak lines. The book concludes with a substantial bibliography and an index.

It is impossible to read this book and not be in awe of the seamanship

and boat-handling skills of the Alaskan kayakers that Golden portrays. Beginning as young boys, hunters learned to use kayaks in sheltered waters in lakes or alongshore. Maturing early in the harsh northern environment, they were soon expected to master the use of the tools of their trade, for both their own personal safety and the survival of their

families depending on their prowess. From their slim, strong, flexible kayaks they routinely ventured miles from shore to hunt walrus, sea otter, and even, in the case of the Unangan of the Aleutian Islands, whales.

John Summers is a boatbuilder, small craft historian, watercraft blogger, and museum curator who lives in Burlington, Ontario.

Further Reading: A Library of Canoe and Kayak Research

A rich and interesting literature has grown up around indigenous watercraft. True scholarship of any kind, and particularly watercraft scholarship, can be a stern calling. Years of patient, careful study in libraries, archives, and museums must be combined with meticulous fieldwork, often under difficult conditions, and anthropological knowledge of other cultures,

customs, and languages. The reward for all of this hard work may sometimes be fame, but very seldom fortune.

The Bark Canoes and Skin Boats of North America, by Edwin Tappan Adney and Howard I. Chapelle (Smithsonian Institution, 1964)

The challenges and rewards of watercraft history are nowhere

better illustrated than in the career of Edwin Tappan Adney (1868–1950). After three years of art school, he developed an interest in outdoor life and native culture and in 1889 worked alongside a Malecite Indian in New Brunswick, Canada, as each built a bark canoe. Over the next several decades, he ranged far and wide across North America working as a writer for *Harper's* and *Colliers*



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and also serving as a Canadian Army engineer.

All the while, he was drawing and recording aboriginal watercraft, interviewing their builders and constructing a series of exact scale models based on his field notes and photographs. In the later years of his life he began turning over a portion of his notes and models to The Mariners' Museum in Newport News, Virginia. Following his death in 1950, his son donated the remainder of his papers, and Frederick Hill, the director of the museum, sought naval architect and historian Howard Chapelle's help in organizing and publishing Adney's work. The resulting publication, *The Bark Canoes and Skin Boats of North America*, is a fundamental text for anyone interested in watercraft history and a model for other scholars in the field.

Harvey Golden frequently acknowledges his debt to Adney and Chapelle's

work, and his studies of kayaks often pick up where their work left off. Watercraft historian John Heath, whose research Golden published in the same way as Chapelle did Adney's, also features in *The Bark Canoes and Skin Boats of North America*, having contributed an appendix on kayak rolling techniques.

In 1923 naval architect Norman L. Skene redrew for amateur construction a southwest Greenland kayak he had documented in 1921 and whose lines Chapelle later included in *The Bark Canoes and Skin Boats of North America*. These plans and specifications were published in the June 1923 issue of *The Rudder*. Skene had been introduced to kayaking by designer Starling Burgess. He frequently paddled this and other kayaks around Marblehead Harbor, but in June 1932 he failed to return from such a trip, marking a great loss for American naval architecture. Through his classic

work *Skene's Elements of Yacht Design* and this kayak, among other boats, his work has lived on. In redesigning the kayak for amateur construction he had substituted dimensional lumber and canvas for the original's driftwood and animal skin.

Wood and Canvas Kayak Building, by George Putz. (International Marine Publishing, 1990)

In 1990, George Putz, a self-described "author, curmudgeon, and sometimes walrus," revived Skene's design with the help of kayaker and naval architect Spencer Lincoln in his book *Wood and Canvas Kayak Building*. Putz further updated Skene's design for modern materials and included the option of scaling the original 17' hull up or down. With Putz's book and the investment of a little time and a modest amount of materials, you can bring to life and enjoy a boat in the spirit of the original Greenland kayaks.

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As the author notes, "Many people make a hobby of studying and collecting boat plans." For those so afflicted, and I certainly include myself among their number, Putz's book is worth your time even if you never even dream of building yourself a kayak. His detailed, step-by-step instructions, pragmatic advice, and self-deprecating humor make for an enjoyable read. A self-portrait of him holding a pattern piece is captioned, "...here modeled by a vagrant working off a debt," and a few pages later a friend helping with canvassing is described as "a visiting tractor dealer." A section titled "General Watercraft History" begins with, "Neither in the first chapter or here will I indulge a thesis about skin boats being Man's First Watercraft or any similar paleo-maritime nonsense... even some respectable maritime historians have published illustrations of a cave man on a log with a caption reading something like 'Man's First Boat.' The authors and editors of such books have never tried a log."

Qajaq: A Journal Dedicated to the Study of Northern Native Watercraft, published by Qajaq USA. www.qajaqusa.org

Qajaq USA is a nonprofit organization that supports the Greenland Kayaking Association and "their efforts to preserve, study, and promote the traditions and techniques of Greenland kayaking while seeking to further the appreciation and development of Greenland-style kayaking in the U.S." Harvey Golden is an emeritus board member. Their website provides a wealth of information about equipment, techniques, kayak building, events, and discussion forums. Each year they publish an issue of *Qajaq: A Journal Dedicated to the Study of Northern Watercraft*. Back issues can be purchased online, but only members receive the current year. The journal is well-researched and scholarly in tone. Issue No. 1, for example, which was published in 2003, includes an article about

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PHOTO: © Benjamin Mandlowitz

the walrus-pull. Once a necessary skill for hunters, it has become a competitive event mimicking what could happen after a walrus had been harpooned. Five paddlers on shore pull the kayak sideways in the water, simulating the wounded animal, while the paddler fights to keep the boat upright. Other articles include a piece about how to spot fake kayak models and kayak-related antiques, two articles by Golden about West Greenland kayaks, and an article by noted Canadian kayak researcher Eugene Arima about two ivory skin-boat models in a private collection.

Birchbark Canoes of the Fur Trade, Vols. I and II, by Timothy J. Kent (Silver Fox Enterprises, 1997)

Timothy Kent is to fur trade canoes what Golden is to Greenland and Alaskan kayaks. The two volumes of his *Birchbark Canoes of the Fur Trade* are the product of countless hours and miles spent photographing and documenting birchbark canoes in North American museum collections and conducting interviews and archival research. In the acknowledgments, Kent recognizes Edwin Tappan Adney's pioneering research, calling him the "scholar upon whose shoulders all canoe historians stand." According to Kent, "The present study is an extension of his work, based on a number of surviving canoes and a wide array of references which were either unavailable or difficult to access in Adney's era."

The first volume contains substantial chapters on the manufacture, hull design, decoration, equipment and provisions, cargoes and loading, propulsion, portaging, use as shelters, and longevity, storage, and repairs. The second volume presents a detailed study of eight surviving 19th-century birchbark voyaging canoes, four full-size and four models. As with Golden's book, Kent provides photographs, drawings, sketches, and detailed notes about the canoe's scantlings and construction.

—JS

BOOKS RECEIVED

Anchoring: A Ground Tackler's Apprentice, by Rudy and Jill Sechez. Waterway Guide Media, LLC, P.O. Box 1125, Deltaville, VA 23043; www.waterwayguide.com. 218 pp., \$25. ISBN: 978-0-9903955-9-1. *Ready answers for your anchoring questions, including setting tandem anchors, factors for calculating scope, and the proper sizing of anchors for different conditions.*

Celebrating the EMMA C. BERRY, by Lawrence R. Jacobsen. Noank Historical Society, Inc., P.O. Box 9454, Noank, CT 06340; www.noankhistoricalsociety.org. 114 pp., softcover, \$15. ISBN: 978-1515300809. *The story of an 1866 Noank fishing sloop, restored and now afloat at Mystic Seaport.*

Bounty, by Mark Evans. Published by Kentish Boats, 21 Milroy Ave., Northfleet, Kent DA11 7AZ, U.K.; www.kentishboats.co.uk. *A construction manual for building an 8'2" plywood rowing dinghy designed by the author.*

DVD RECEIVED

CROI AN CLADAIG: From the Woods to the Water, by Tony Walsh. Produced and directed by Tony Walsh, Tocar Productions, tocar.media@gmail.com. 90 minutes. *An in-depth documentary about CROI AN CLADAIG, the first Galway hooker built in Galway City since the 1920s. Interviews with the builders and others involved in the project accompany shots of the construction, launching, and sailing.*



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In addition, most users of center-consoles are focused heavily on the utility of the boat—will it fish well; can it easily carry the family on an island excursion; can it serve as a floating pickup truck to support an offshore camp? Most custom boats are commissioned because the client falls in love with the beauty of the boat and the promise of gorgeous craftsmanship—and, frankly, for most buyers of center-consoles,

these subjective delights are way down the list of what's important to them. A good solid boat with great running lines and a useful cockpit trumps the desire for glossy varnish and elegant tumblehome. Among the offerings from the dozens of high-volume builders, there are many, many high-quality boats that look good and deliver solid serviceability, so why go to the trouble of a custom design and build?

If you are someone who's used to getting the very best and is accustomed to the enjoyment of a custom project, you know why. Rockport Marine has been fortunate to work with a number of people who recognize top quality and see the value in it, and REMBRANDT's owner is such a client. Among his stable of yachts REMBRANDT is small potatoes, but there's not a detail on her

that wouldn't hold up on one of his larger yachts. He built a relationship with the building crew and design staff at Rockport during the build of a custom 50' sailboat, and when he needed a small utility boat, Rockport was the obvious choice.

The design staff at Rockport Marine has been involved primarily in supporting its crew of highly experienced craftspeople in new builds and restorations of classic yachts by other designers, rather than in working from a blank slate. REMBRANDT's build was a great opportunity to apply their deep knowledge of hands-on skill to a new design. Their expertise in modern laminated-wood construction methods and their understanding of just what the crew would need from them to build this boat shows in the concise drawing list and the

Above—REMBRANDT is a most uncommon rendition of a very common type: The ubiquitous center-console boat.

wealth of detail that's found on the drawings.

REMBRANDT is the result of a collaboration between the two designers at Rockport during her design and build—Brendan Riordan and Sam Chamberlin. Before moving on to another career, Brendan completed the 3D hull modeling and the bulk of the design—he had been Rockport's primary contact on design matters with the client during the build of the sailboat, so was a natural choice to roll into this project. After Riordan's departure, Chamberlin stepped in to shepherd the boat through the build and round out any remaining details. The dovetailing of the two designers and the seamless integration with the build crew under job boss Sam Temple shows in the clean and deceptively simple detail of the finished boat: They make it look easy.

Now, to the boat. As Riordan says, "There's nothing magic about designing a good planing powerboat." Well, yes; the basic science is not very complicated, and since

pioneers such as Lindsay Lord and Ray Hunt showed us the way about six or seven decades ago, there's really no excuse for a boat that performs really badly. But that's not to say there's no nuance to it. The nuances REMBRANDT shows are all on the positive side of the ledger.

The design brief called for a moderate top speed, so Riordan specified a 200-hp diesel inboard for fuel efficiency and reliability—and the safety of a non-explosive fuel. The small engine, coupled with a Volvo Duoprop stern-drive, delivers a top speed of 28 knots and a solid cruise of 20 knots, which is pretty remarkable given the substantial displacement of over 6,000 lbs. The stern-drive features twin propellers, rotating in opposite directions on the same shaft for high efficiency and elimination of prop-walk; the low drag of this system (compared to a conventional shaft, strut, and propeller) is largely responsible for the high efficiency of the boat, motor, and drive package. Other benefits are the ability to use the tilt-trim

feature of the drive to adjust running trim, and the shoal-water capability and easy trailerability of tilting up the drive.

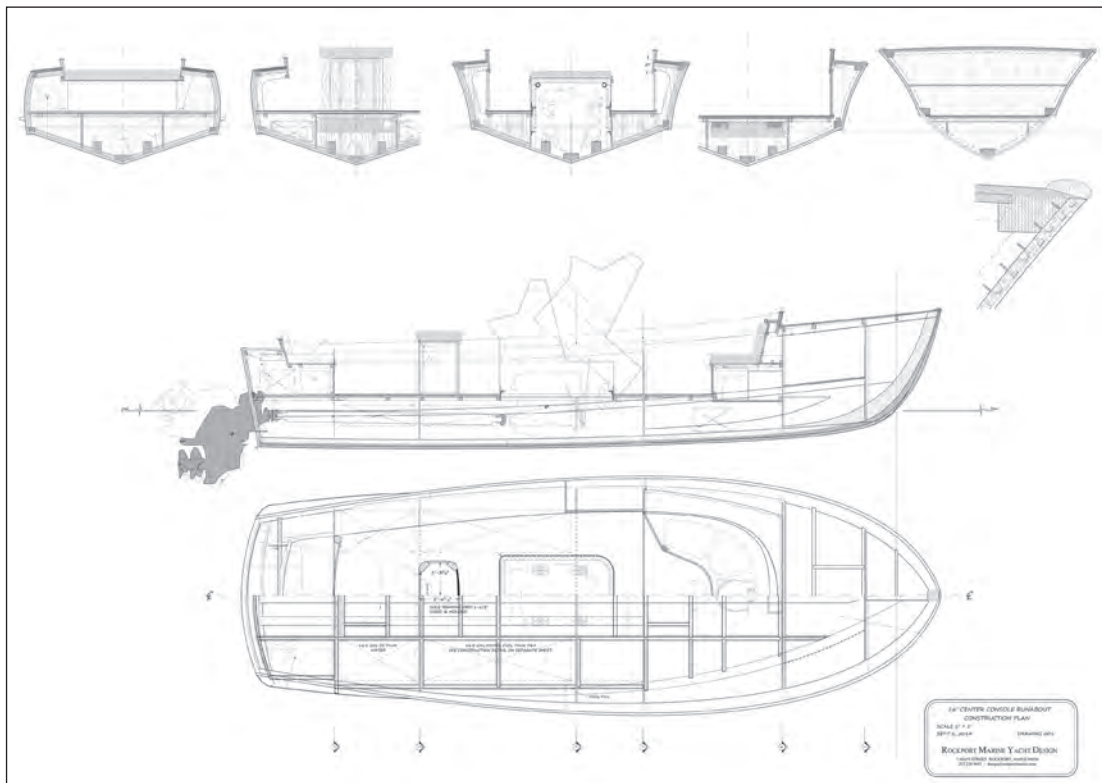
Not that trailering is a snap: A sizable rig will be needed to move the hefty boat over the road. A deep-V boat relies on steep dead-rise and a deep hull centerline for a solid, smooth ride in chop; this means lots of boat in the water and thus lots of weight to press the boat down in the water. A light boat of deep-V shape is either an oxymoron or a bad-running boat. Taking weight out of a deep-V boat will let her float so high that her chines are no longer immersed, and she'll become tippy at rest and squirrely at speed. These vices are notable in their complete absence aboard REMBRANDT; Chamberlin and Temple report that she has a sense of solidity and predictability that's totally reassuring. "You can spin the helm hard-over at full throttle without any concern," says Temple proudly. "She's just a good-running boat." He credits the



BILLY BLACK

The boat is driven by a 200-hp diesel inboard motor coupled to a Volvo stern-drive.

Modern wood-composite construction is a specialty at Rockport Marine, where REMBRANDT was designed and built. Having designer and builder under the same roof allowed for easy flow of information, which is critical to building a boat as detailed as REMBRANDT.



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The large, open cockpit includes bench seating forward and aft, and the elevated helm seat affords good all-around visibility—and room for a passenger.

weight distribution resulting from the forward placement of the engine as being responsible for the pinpoint handling.

The hull shows the hallmarks of a classic deep-V shape, familiar for half a century since Ray Hunt introduced us to MOPPIE, but a few differences catch the eye. Most striking is the way Riordan introduced rocker to the underwater profile of the hull

and the planing surfaces: Instead of the keel and buttock lines running straight aft from the 'midship section, there's a noticeable curvature of several inches over that distance. You can see it also in the lines plan: The waterlines at the stern are narrower than amidships, indicating a rising surface in the bottom panel. We would expect this to cause the boat to trim up in the bow when

running fast; maybe the extra lift allows the helmsman more flexibility in running angle by using the tilt-trim feature of the stern-drive to push the bow down—if the bow runs too low, there's really no way to lift it.

The layout is standard center-console, with details carried out to the highest level of craftsmanship. Another plus of having the engine under the console is excellent access for service. The console can be heavily soundproofed and the jackshaft between engine and stern-drive allows the engine to be mounted on very soft bushings, as the thrust is taken by the stern-drive, limiting structure-borne noise and assuring



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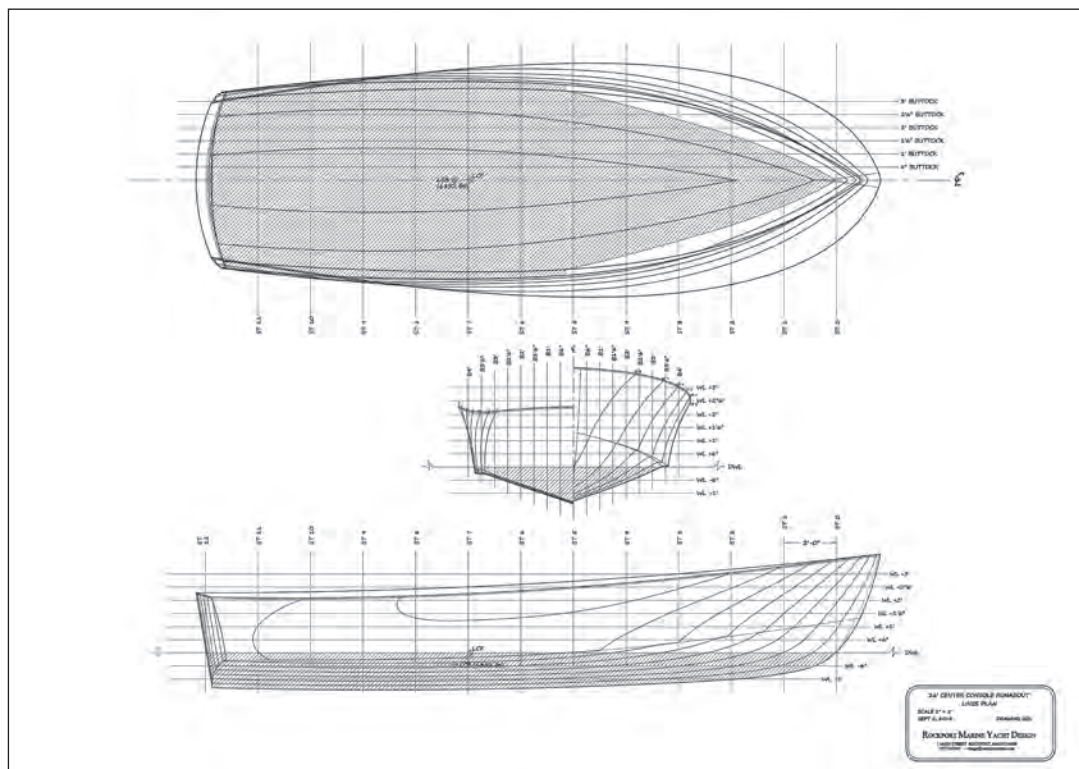
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The lines plan shows a symphony of shapes, including a distinctive tumble-home in the aft top-sides and a flaring bow. The classic deep-V bottom shape has a few noticeable differences, including a subtly curving keel from amidships aft.



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MANTA

A sit-on-top kayak

by Laurie McGowan

Dear Designer,

My name is Cameron Major and I live in Canberra, Australia's capital, a two-and-a-half-hour drive from the coast. We have a small place at Kioloa Beach in New South Wales, and I love to go fishing. My wife and son aren't keen fishermen, so I can't justify the cost of buying a fishing boat. Therefore, I have been looking for an alternative but cannot find it anywhere.

My search has been for a kayak I could build—a wooden kayak, not a plastic one. Why can't I have a really nice wooden fishing kayak? The thing is, though, that I would like the kayak to be of the sit-on-top variety, as I'll launch it through surf and don't want it to fill with water. There is a small island about 500m (about a third of a mile) offshore, and I would like to be able to get out there and fish around the headlands. I could also use the boat as a spearfishing platform if it was sit-on-top.

It should be sturdy enough to be launched from the sand (a plywood hull, perhaps?), easy to get out of storage and

just go, and wide and stable. Fast isn't necessary, but there should be room for some gear and a rod or two.

In WB No. 247, Christian Smith describes Manny Palomo's Plank Form Surfboards, which are composed of vertical staves. This gave me an interesting idea: Could my kayak be built this way? But I love the lines of the Bootlegger kayak and the beauty of strip planking, so can there be some strip planking on the deck?

I have an original Couta boat that I am restoring, and a folding kayak. I have also built a couple of hollow surfboards and teach woodworking and metalworking at a high school, so I am pretty capable with tools. Therefore, construction shouldn't be a problem for me.

I weigh 100 kg (220 lbs) and stand about 185cm (6').

I can't wait to see if this concept fits your criteria. I will go out to the shed right now and clear some space!

—Cameron Major

Dear Cameron,

Thanks very much for your letter. Your request is a fun one, and I can easily imagine you arriving at the beach with this boat, hopping on, and heading out. While sketching the boat, a few requirements came to mind:

- light weight
- reasonable length
- easy construction
- good performance upwind, and ability to surf on waves on the way home
- deck clean enough to flop on to while recovering from a spill, and
- a strap-on space for gear that also is the strap-down for the seat

I'm calling this boat MANTA for the incredible family of rays that populate the oceans of the world, and are really well represented in the waters of Australia. Though I've only seen skates while diving in our northern waters, I've always admired the graceful way they move. Rays live in the oceans and up brackish rivers; they can park on the ocean bottom (often in the shallows off beaches); and they sometimes fly completely clear of the water like a beach kayak launched through waves.

Hull Shapes: Flat, V, or Box Keel?

My initial reaction was to think of a surfboard with a seat on it, but then I thought about improving the upwind and up-wave performance, which led to the

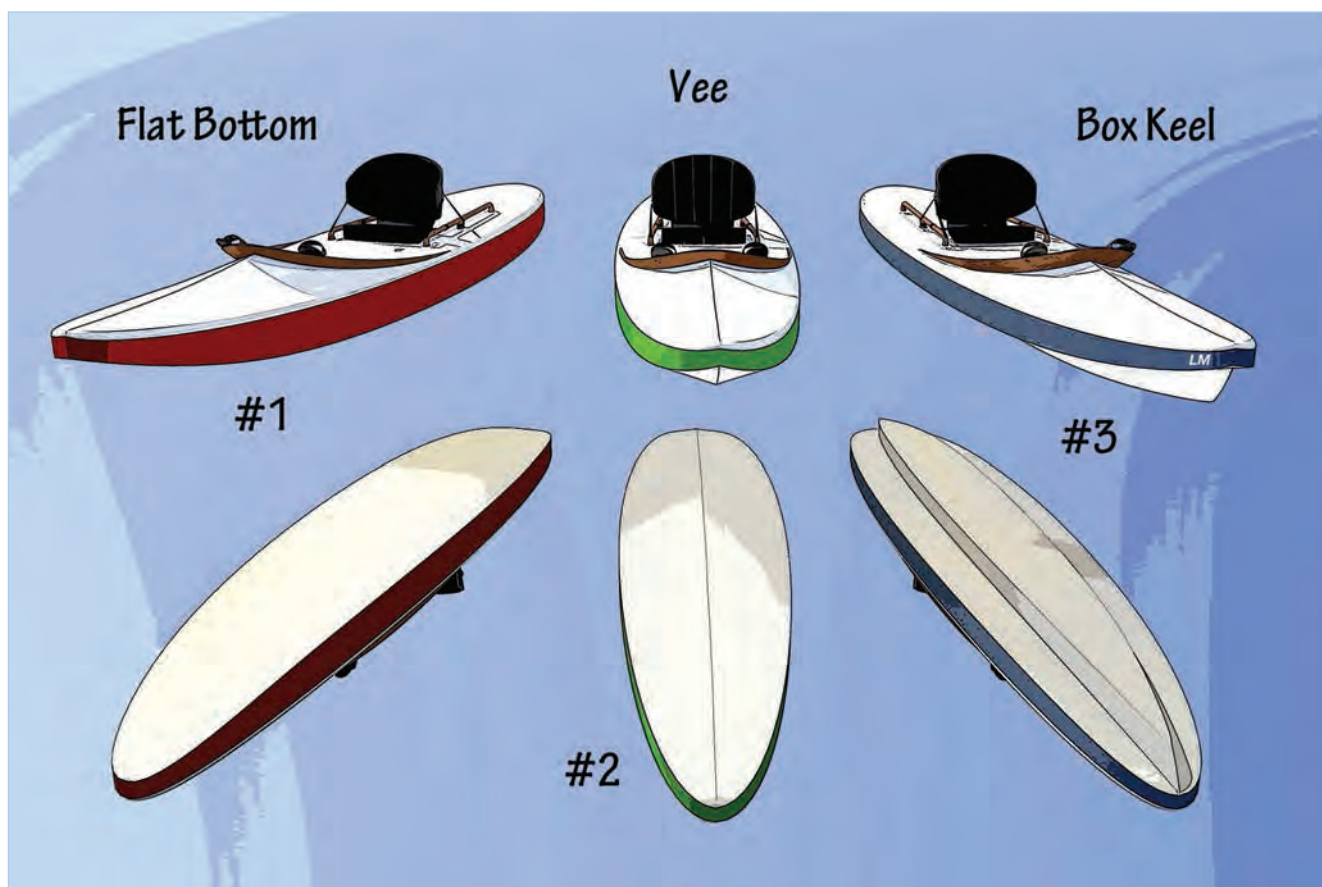
following comparison of three hull shapes. For the three hulls, I'll keep everything the same above the sheerline but alter the bottoms for the comparisons. To accommodate a big person like you, the working displacement is set at 245 lbs (111 k) and the length at 11' (3.66m). All would require fewer than three sheets of 4mm plywood to complete.

Flat Bottom

Boat No. 1 is a simple flat-bottomed shape, with good rocker and an upturned bow to clear small waves. This would behave exactly as one would imagine, with lots of lift forward, and be great for surfing. But it would be abrupt when paddling against those same waves. The flat scow bottom means part of your energy would be used to push through a pressure wave that would build up in front of the boat. Stability would be excellent, but with a stiff feel—that is, it would not roll with you much on each stroke, meaning a less natural motion and maybe banged fingers on the sides of the hull if you don't reach out far enough. This would be the lightest and easiest boat of the three to build.

V Bottom

Boat No. 2 is a simple, shallow V-bottomed shape. Like No. 1, it has a lot of initial stability, but with a more refined waterline forward that will divert the high-pressure bow wave to the sides as the boat moves forward. For some reason, my Computational Fluid



The designer considered three different hull shapes when developing the concept for a home-buildable sit-on-top fishing kayak. He chose No. 2—a V-bottomed hull—for its relative ease of construction and good performance. The name of the new boat is MANTA.

Dynamics (CFD) software gives a conflicting prediction that at around 3.5 knots this hull would start to have more resistance than the flat-bottomed hull but would require less power to go the same speed. Experience and common sense say this is a better shape, so I'll go with requiring less power!

The V will allow for a little more flexibility in the panel layout, but will require one more joint, the center one, to complete the bottom.

Box Keel

This is a shape that designer Phil Bolger popularized, and I really like it a lot. It provides the benefits of a much more complicated round-bottomed hull, while being much easier to build. If you look at the curves of areas, you can see that this one (Boat No. 3) has the longest waterline and its volume is spread out better than the other two shapes. This hull will slice through the water much better. The long keel provides a natural skeg as well, so directional stability will be much improved over Nos. 1 and 2. There is enough rocker, or longitudinal curve, in the underside of the forefoot to keep that area from taking over, or "bow steering"—especially while surfing down a wave. This happens

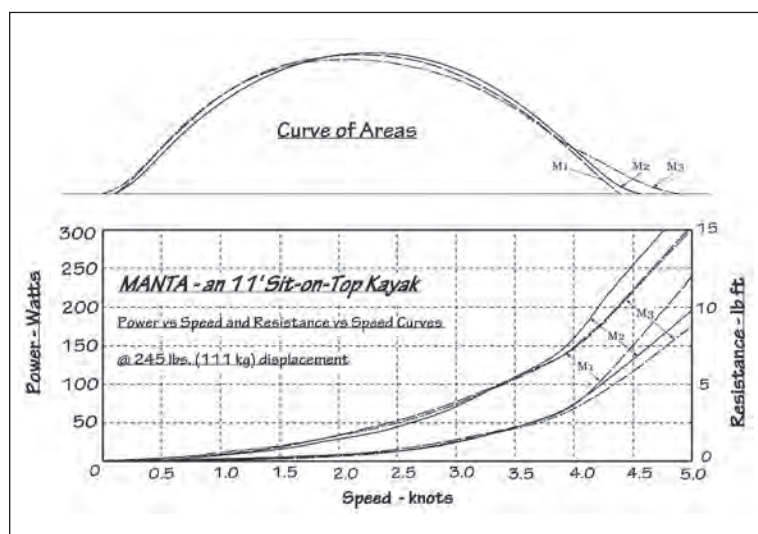
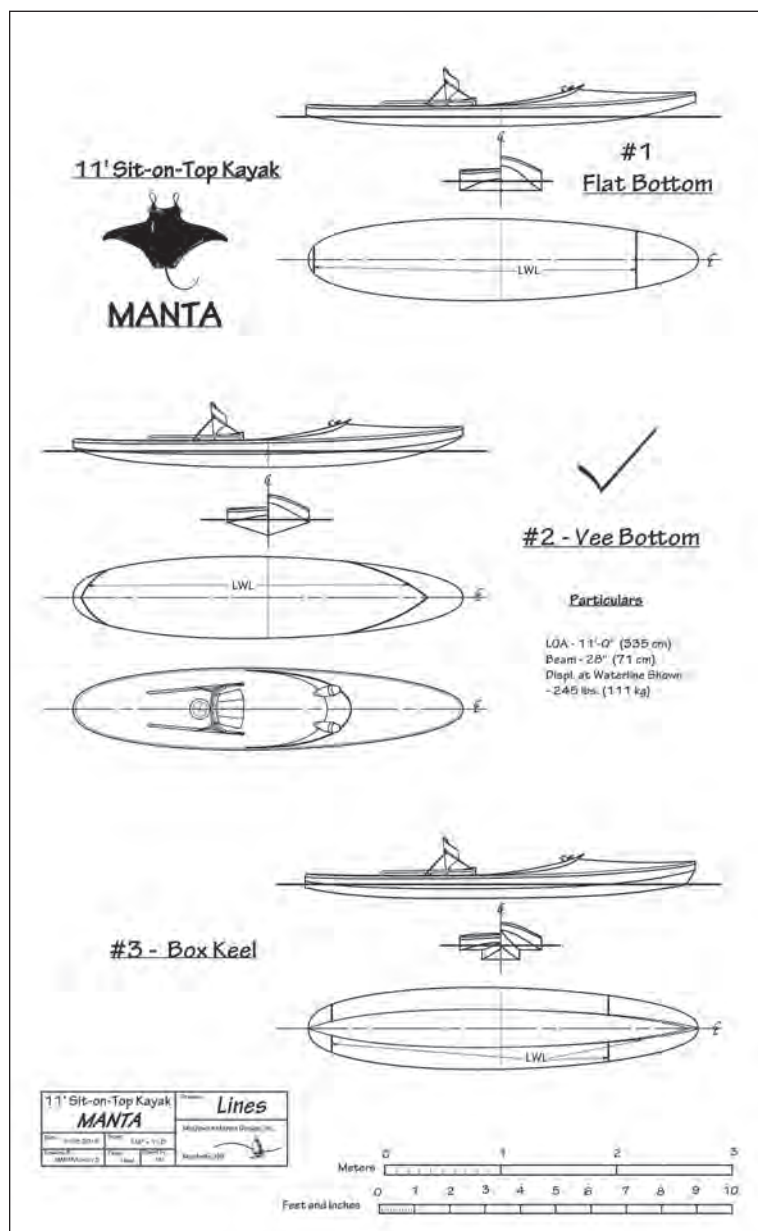
most often when a deep and fine bow digs in while the aft end of the boat rises and pivots around the bow. Having this happen at the wrong time can result in a nasty wipeout.

The panels of this type of construction are very long, straight, and thin, and you can lay them out really well on plywood. However, the construction is more complicated than the first two and the number of longitudinal joints, from chine to chine, jumps to six, meaning extra building time and greater weight of materials.

So, I'm going with hull No. 2 as the compromise. It has a good combination of performance and moderate construction cost.

Topsides and Decks

I originally included some flare in the sides in the forward sections, but flare often requires curved pieces cut from plywood, and this is wasteful of materials, so I altered it. The sides are now perfectly vertical all the way around the boat, but because they're not very high the boat doesn't look boxy. The ideal side construction would be three layers of 12' × 8" × 1/16" (3,658 × 203 × 3mm) softwood (not plywood) bent around simple L-shaped gluing guides screwed to a bench or a sheet of



MANTA is a simple and versatile boat—quick to build, and quick to get underway.

plywood. If you can't easily get that material, then two layers of 4mm okoume cut cross-grained (the outer layers having their grain running vertically) will do it. This grain orientation means the plywood will bend better in the tightly curved ends. You'll need to stagger the joints, but once it's all glued up you'll have two 8mm-thick sides to be joined together against small butt-blocks on the centerline at bow and stern. The final sheer and chine lines in the sides can be cut with a jigsaw once the gluing is complete. The chine log and sheer clamp will be laminated from three layers of $1\frac{1}{4}'' \times \frac{1}{4}''$ (32×6 mm) spruce, using the top-sides as the gluing jig. When installed, their edges should protrude above and below the sides by $\frac{3}{8}''$ (10mm). When the deck and bottom panels are eventually glued to the chine logs and sheer clamps, they too will be set back from the edges by $\frac{3}{8}''$. This setback will allow for a good radius of the corners and make covering the hull with 6-oz fiberglass cloth tape that much easier.

Assembly will start right-side-up, with the ring frames and bulkheads tabbed into their correct locations between the sides with thickened-epoxy fillets. The boat will then be flipped over, the chines planed to the correct bevel, and the bottom panels glued to them. Once the glue has dried, the chines can be radiused with a block plane and sandpaper (the plywood sides and bottom will taper to feather edges) and taped. The centerline joint will be stitched together with zip ties or copper wire, then taped over with 6-oz fiberglass cloth and epoxy.

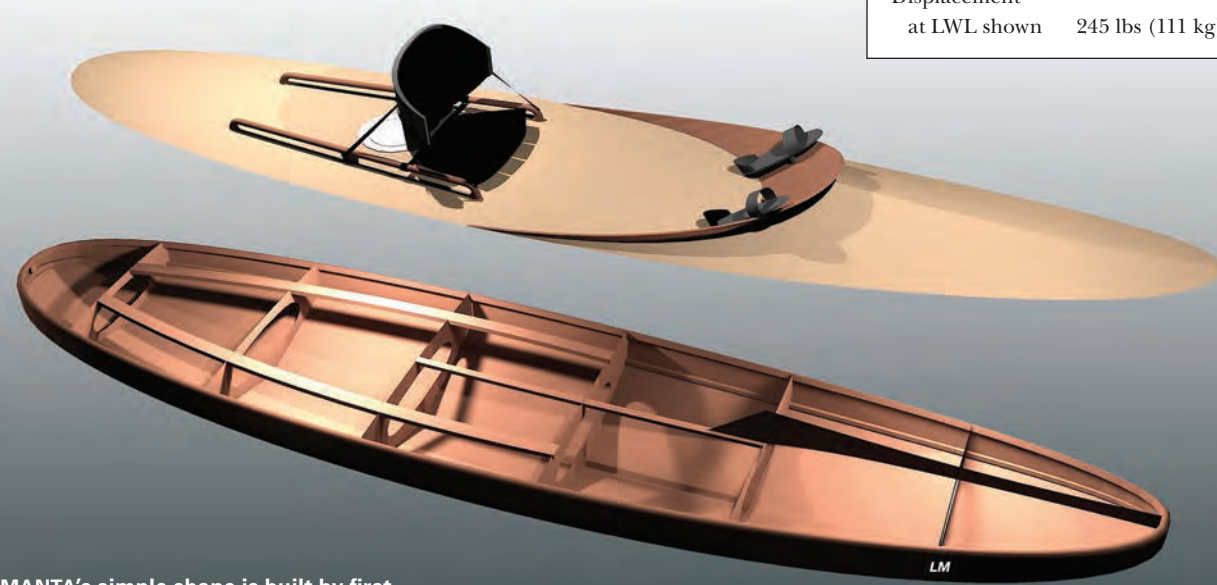
The boat is then flipped right-side up, and the remaining interior components tabbed in place—including the three deck stringers let into the frames. The two aft stringers are the backing for the rails, and the deck is glued to these and the beveled sheer clamps. The edges are then radiused and taped in the same manner as the chines. All wood gets three coats of epoxy for protection.

I won't try to keep you completely dry, as the weight and complexity would go up a lot in

The speed (right) and resistance curves show conflicting predictions that the chosen hull—"M2"—would develop more resistance around 3.5 knots, but require less power to go that speed. The designer, however, relying on "common sense and experience," chose this hull.

Particulars

LOA	11' (335 cm)
Beam	2'4" (71 cm)
Weight	32 lbs. (14.5 kg)
Displacement at LWL shown	245 lbs (111 kg)



MANTA's simple shape is built by first forming the sides, and then installing the interior framework. The bottom, deck, and details follow.

attempting to do that. Although you live in a warm place, it still would be good to divert small waves when you're heading out, so I've designed a combination footrest/coaming of sorts. The peaked foredeck forward of this is small, but like a motorcycle cowling it will, I hope, keep most of the spray off you and provide buoyancy in waves.

Since you're an experienced woodworker and aren't afraid of a little strip-planking or laminating, I've made the curved footrest/coaming a key design feature of the boat. It is laminated of three layers of 4mm okoume plywood, cross-cut for ease of bending, and will have to be laid up over a simple jig. The coaming is tabbed to the aft deck, then the foredeck is tabbed to both the coaming, sheer clamp, and foredeck stringer. The coaming will need to be fiberglass-sheathed as it has a lot of exposed end-grain, and it's part footrest and part handhold so needs to be strong. It will get hit by pretty much everything—a lot—but I hope not by your hands while paddling, so it might need paring-down near its edges to ensure this never happens.

Only the major wear points will need fiberglass tape, and everywhere else will be coated in epoxy, then painted (if desired). A 6" (150mm) plastic screw-in hatch is installed in the deck aft of the seat, the rails and footrests are then installed, and the semi-rigid, store-bought seat strapped in place.

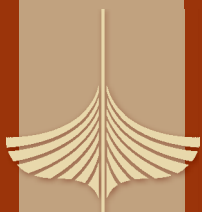
Goin' Fishing!

I estimate MANTA to finish out at around 32 lbs, or 14.5 kg, so I can see you carrying it to the beach in one trip. You'll have the boat in one arm, maybe with a strap around your waist that goes under the side of the boat and up to your hand. You'll be wearing your life vest and will have a waterproof gear pack on your back, with the fishing rod and paddle in your other hand.

When you reach the water's edge, you'll put your flip-flops in the pack, strap it and the rod between the rails behind you, hop aboard, say your "see you later," and head out. I'm getting excited just imagining that great feeling of heading off on an adventure. You'll be held in place by foot straps, plus the diagonal seat straps and backrest. If your son is young enough, maybe he can stand behind you with a foot under each rail while you go yahooing in the waves. "Faster, dad, faster!" Those kinds of fun activities make the best memories!

Laurie McGowan is a boat designer in Nova Scotia with a diverse on- and below-water work history; he specializes in energy-efficient commercial and pleasure boats. More of his work may be found at www.mcgowanmarinedesign.com.

Do you have a boat concept you'd like to see Laurie McGowan develop on these pages? If so, send it to Sketchbook, WoodenBoat Publications, P.O. Box 78, Brooklin, ME 04616, or email it to sketchbook@woodenboat.com. Your letter should be no longer than 500 words.



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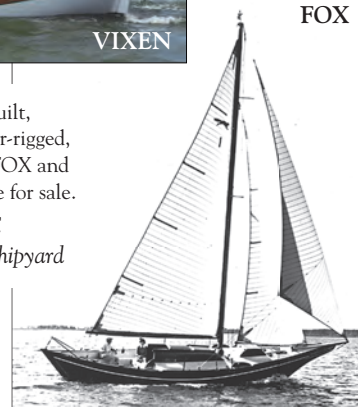


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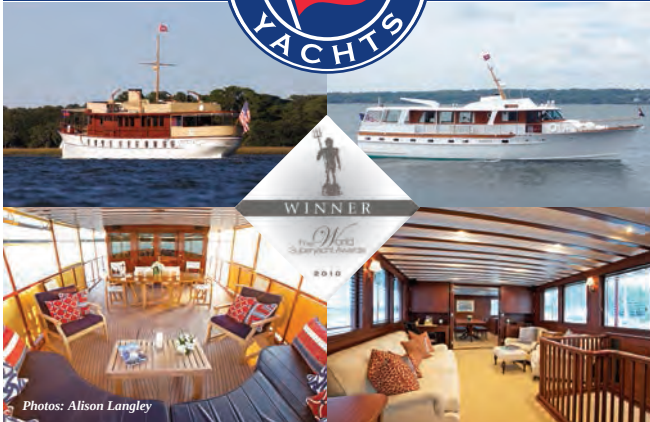
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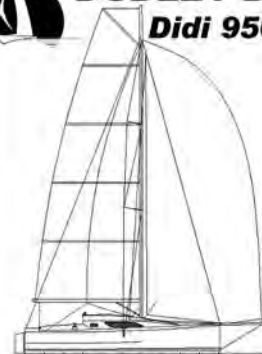
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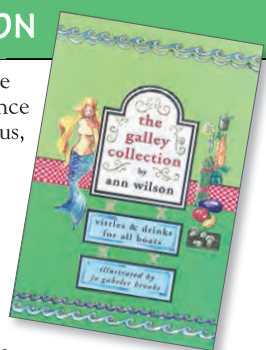
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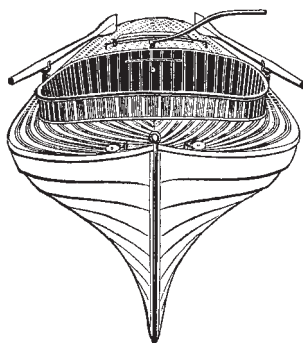
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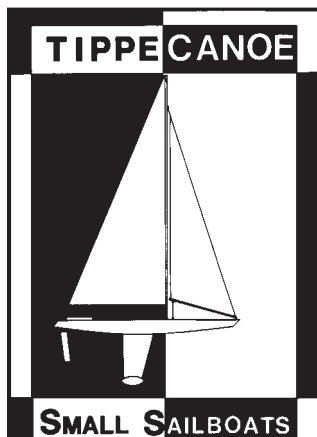
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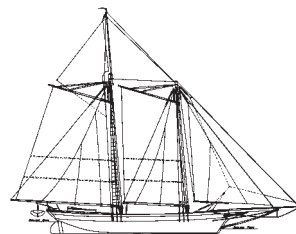
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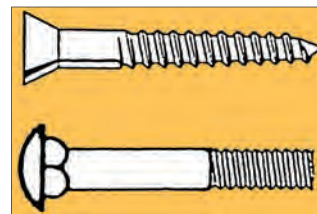


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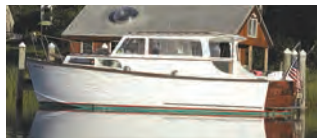
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26' NORWALK ISLAND SHARPIE. Bruce Kirby design. Beam 7'11", Draft 12" board up. Fast, fun boat. Easily single-handed. Built by professional yacht rigger. Launched 1992. Bruyn-zeel plywood, epoxy and glass. Fiberglass masts, aluminum booms. Fresh paint and ready to go. \$25,000 or best offer. dajames@optonline.net.



39' CONCORDIA YAWL, #48 LARA, 1957. Fully restored and upgraded by Traditional Boat LLC, 2014/2015. Clean survey. \$195,000. 207-322-0157, john@mainetraditionalboat.com.



CATSPA W DINGHY FOR SAIL AND oar. Joel White design built by owner in 2008. Traditional carvel-planked cedar on oak frames. Sprit sail rig. Trailer included. \$7,500. Bel Air, MD. mpj513@hotmail.com, 443-910-4410.



"ZEPHYR" WAS BUILT AT GANNON & Benjamin in 2005. She is a custom-designed centerboard sharpie set up for comfortable sailing with small groups of kids. Perfect boat for family sailing in protected waters. A classic, one of a kind! \$17,500. Contact John Rowse, 617-595-8557. john@communityboatbuilding.org.



A TRUE CLASSIC, NOT A reproduction, lapstrake rowing/sailing dinghy. 11' long, 4' beam, lateen sailing rig, pivoting centerboard housed in a trunk with two stations for rowing. Asking \$2,900. Located in Woodstock, VT. Contact Laurie Lombard, 802-457-5121, sugarhillvt@gmail.com.



JERICHO BAY LOBSTER SKIFF (*WoodenBoat* Nos. 210, 211). Built 2011 by owner. Motor and trailer included. \$23,000 or offer. Seattle. dhlester@gmail.com.

ALDEN PRISCILLA FOR SALE—30' sloop "Odyssey," c.1972 by Irwin Jones. Mahogany over oak, with varnished teak trim. Ready to sail condition. 1997 Perkins 30 diesel, Raytheon radar/GPS, VHF, all onboard equipment and yard bills since 1989. Includes Stimson Shed and Nutshell Pram. Asking \$14,000. Email andybangs@comcast.net for full description and pics. Located seacoast NH.



1924 HERRESHOFF 12 1/2. Major rebuild in 2012 including new sails and mooring cover. \$25,000. Contact Frank Duncan, 339-225-0839.



17' SHEARWATER, JOEL WHITE design with additional freeboard and built-in buoyancy. Beautiful boat, exciting sailer. Okoume plywood hull, Fowler sail, Shaw & Tenney oars, Trailex trailer. All in like-new condition. Located Central NY. \$4,000/best offer. 315-725-9592. jonathankirk@roadrunner.com.



33'6" AAGE NIELSEN YAWL, LUKE built 1954. Varnished spars, new rigging, new Beta engine, Raytheon radar, GPS, new wiring, Dynel deck and house; large sail inventory includes roller-furling genoa. Located Penobscot Bay, ME. Asking \$45,000. Offers considered. 603-569-2024, leighro@myfairpoint.net.

Boats For Sale

continued



1933 GAFF CUTTER, TEAK ON OAK, by Capt. O.M. Watts. Massive, well sorted, owned 25 years. Picture gallery on sandemanyachtcompany.co.uk, page 10, "Makora." 011-44-1202-330-007 and 001-818-853-7101. \$148,000.



15' CHESAPEAKE LIGHT CRAFT sailing and rowing wooden boat built from one of the best-known boat-building kits in the world. Includes spars, sail, oars, rudder and daggerboard, galvanized trailer. Lightly used and in excellent condition. Asking \$5,800. 603-772-3498. j24sail@aol.com.



HULL #C-25-194. SECOND OWNER since 1978. Dinette, galley, head. Inboard 350 repowered 2012. New canvas, seats, cushions 2013. Very good condition. Located in Mystic, CT. Call Brian 860-490-8508.



1931 ALDEN YAWL, 57' LOD—Very fast classic yawl, diesel, radar, water heater, watermaker, gas stove, refrigerator/freezer, 10' dinghy, roller-furling jib, large sail inventory, new paint/bright, sound hull. Owner will consider all reasonable offers. Located in Alameda, CA. 907-488-8937, roachagucci@outlook.com.

1968 32' CUTTER—MAHOGANY/oak, lead keel, bronze screws/hardware and Monel tanks. Teak deck, Dynel roof, oceanus sails, electronics/GPS/chart plotter and engine all new in recent years. Boat is in good/great condition and sailed in 2015 until November. Valued at \$45,000 before new engine. Asking \$37,000. Call/text 709-746-3644.



1969, 26' SAKONNET/MACKENZIE Design. True bass boat, shallow waterline, clinker topsides. Keel cutaway, forward and aft controls. Reverse laps on the bottom, 6-cylinder Isuzu diesel. Full electronics, custom-built trailer. Ready for the water, must see! \$19,900 or best offer. Amaxxinc@office@gmail.com.

21' GARTSIDE PLANK-ON-FRAME sloop. Inboard diesel, Dynel decks, bronze fastened. Located Brooklin, ME. Launched 2011. \$19,500. Call 207-664-9266.

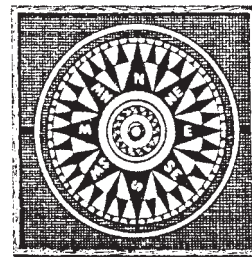
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Tips on writing a 'Boats for Sale' ad, and how to prepare for questions from potential buyers. For a copy, call us at 207-359-4651 or email classified@woodenboat.com.

Boats For Free

MASON 30, 1955 MAHOGANY/OVER oak, bronze, in-water San Francisco Bay. Needs some topside planks. Newer engine, sails. Contact bill@aaaboat@gmail.com.

21' CROSBY MALLARD SLOOP. Built in 1951 by Nobel Prize winning scientist, Ray Davis. Restored in 1985. Needs some work. 8-hp Palmer; last run in 2005. Includes trailer, mast, sails, etc. 631-878-8847, edavismaple@gmail.com.



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7 _____	8 _____	9 _____
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16 _____	17 _____	18 _____
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HEL-PORT II

A Fellows & Stewart Sportfisherman Cruiser

What a lovely boat this is! She is narrow, with a raking stem and transom, a pointed trunk cabin topped with a skylight, and a low, sweeping sheer. You can see that designer Nick Potter had sailboats on his mind when he drew the plans for HEL-PORT II. He'd just designed the 46' LOA Cal-32s for the same builder, and soon went on to create the lovely double-ended sloops YUCCA and TANTALUS and the 62-footer SERENADE for violinist Jascha Heifetz.

HEL-PORT II's name, apparently coming from "Helen" and "Porter," has stayed with her through a succession of Southern California owners. The first was Shell Oil executive William P. Durkee, who specified that seakindliness and comfort be prioritized over speed. He used her for deep-sea fishing, and in at least one contemporary write-up she was called a sportfisherman instead of a power cruiser.

She's as unusual below deck as she is above. The layout is open and symmetrical like a sailboat. Four could sleep in her forward cabin in paired uppers and lowers before the two swing-up berths were removed. Unusual for boats of this type, her galley is forward, and the enclosed head is located up in the bow under the "point" of the trunk cabin. She has two more berths in the deckhouse, along with the steering station. She had two steering

As you can see from these photos, HEL-PORT II has been carefully looked after by her current owner.



Particulars

LOA	40'
LWL	37'
Beam	9'6"
Draft	2'6"
Power	Two 85-hp Kermath Sea-Flyer gas engines
Doc. No.	280751
Designed by	Nicholas S. Potter
Built by	Fellows & Stewart, Inc., Wilmington, California, 1937

stations when built, one in the deckhouse and another in the cockpit, but the latter was removed by the current owner to make more space.

HEL-PORT II's current owner since 1989, during a four-and-a-half-year refit ashore, replaced nearly half of her underbody and completely refastened it with bronze. She also received a new transom, her steam-bent frames were sistered as needed, the deck was refastened, and both cabintops were resheathed with fiberglass and epoxy. Fuel and water tanks are new and so is the wiring. Some of her laid-teak foredeck needs to be replaced—all of the deck could stand it for a first-class job—and the toerails call for attention. Then there's the paint and varnish, which is a cosmetic upgrade.

Amazingly, and important for the purist, her original gasoline engines are still with her, overhauled at the time of acquisition.

If you're a sailor or ex-sailor, or just appreciate powerboats with sailboat roots, HEL-PORT II might attract you to the other side. She's afloat at Marina Del Rey; to inspect her or learn more, contact owner Gerard Buck, 17471 Raymer St., Northridge, CA 91325; 818-701-0782; gbinmdr@msn.com.

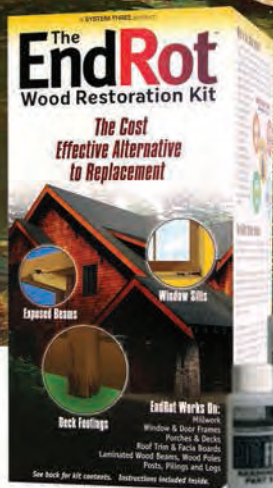
Maynard Bray is WoodenBoat's technical editor.

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