Electric Propulsion Issue *starting on pg16* | **Catalina Island** *pg38* | **Pearson 39** *pg8*

Good Old Boat

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Issue 143: March/April 2022

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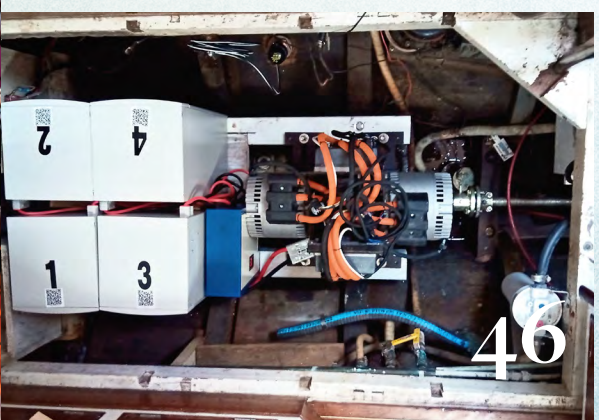

Good Old Boat

Issue 143: March/April 2022

ELECTRIC PROPULSION

DEPARTMENTS

On the Cover
Adam Cove snapped this image of his fiancée, Alison Rogers, sailing *Ben-Varrey*, a 1969 Luders 33, across Buzzards Bay in Massachusetts, en route to Cuttyhunk on an August evening. "It was one of those sails that you just wanted to last forever," Adam recalls. "The boat was perfectly balanced and as happy as could be!"

GOOD OLD BOAT

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The sailing magazine for the rest of us.

Contributing Boats

A few boats behind the stories in this issue.

***Ben-Varrey*, 1969 Allied Luders 33**

"*Ben-Varrey* is an amazing R&D platform. We have experimented on nearly every front and will continue to play with new ideas to satisfy our curiosity. Her modified full keel also makes her a perfect match for sailing effortlessly through the Maine lobster pot fields."
Read about the boat's propulsion evolution on page 32.

ILLUSTRATIONS BY FRITZ SEEGERS

Designer: Bill Luders
Owner: Adam Cove
Home Port: New Bedford, Massachusetts
Fun Fact: She's named after what Isle of Man legend says is a friendly variety of mermaids.

***Hwyl*, 1999 Beneteau 411**

"After 20 years of dreaming, five years of research, and 23 showings, we knew this boat was the one for us. On our maiden voyage, we sailed the entire course on a broad reach in 25- to 30-knot winds hitting 10 knots when the boat was surfing. It was exhilarating!"
Reflect on Rudyard Kipling, Vikings, and women who love sailing on page 61.

Designer: Group Finot
Owners: David and Lisa Livezey
Home Port: Chesapeake City, Maryland
Fun Fact: Hwyl, pronounced "hoil," is a Welsh word with two meanings: passion and sail.

***Yahtzee*, 1984 Grand Soleil 39**

"We love *Yahtzee*'s combination of performance, seakindliness, and functional space down below. We've won races with her, endured heavy winds and seas, and had many magical days of sailing."
Yup, this good old boat belongs to Good Old Boat*'s new editor, Andy Cross!*

Designer: Alain Jezequel
Owners: Andy and Jill Cross
Home Port: Seward, Alaska
Fun Fact: Yes, she's named after the game.

***Delilah*, 1972 Cape Dory 25**

"I love the modest minimalism, the subtle overhangs, that swooped little stern, and the stability that comes from a full keel with attached rudder. I love the clean look of no lifelines, a green hull, and all that teak! And I appreciate that the boat's powered by a small (but unseen) outboard. And. . ."
Take a vicarious newbie ocean cruise to Catalina Island on page 38.

Designer: George Stadel
Owners: David and Emily Blake Fischer
Home Port: Marina del Ray, California
Fun Fact: A 3,600-mile road trip from California to Washington and back brought her home.

The Gift that Keeps on Giving

BY WENDY MITMAN CLARKE

OK, so this is a test.

I am kneeling—no, really, I'm in what amounts to a contorted version of yoga's "child's pose"—facing aft in the rather narrow passage between the main and forward cabins. On my left, a vertical series of small lockers and the open hanging locker. On my right, the closed head door. In front of me, the newly painted mast step, the gleaming base of the newly painted mast, a strewage of wires, and the open bilge. And the source of my frustration.

I'm trying to run the mast wiring, and it is doing its best to vex me. Four wires, that's it. One skinny black one (new Garmin wind instruments), one skinny white one (VHF coaxial cable), two fat, flat white ones (anchor tricolor and deck steaming light). How hard can it be?

I've successfully run the skinny white one through the pair of small access holes that lead in, through, and out one of the boat's thick horizontal stringers. And with my success, the inevitable boat catch-22. It's taking up too much of the hole. No way I can even get the business end of my long screwdriver through there again to use as a messenger to pull one of the fat, flat wires through—the trick that worked to get the skinny wire run.

I'm a regular practitioner of yoga, but damn, my knees are killing me. I don't want to interrupt my husband, Johnny, with the same old question: Is there a technique for this? He's engaged in his own battle back by the engine, which is fully exposed and fighting his efforts to give it an upgraded alternator.

So it goes.

We are nearly a year into the restoration of our 1978 Peterson 34, *Luna*. It's a gorgeous early fall day, and we thought we'd be sailing by now. You would think, with a lifetime's experience sailing, fixing, loving, and cursing good old boats, we'd have known better than to figure this wouldn't take twice as long and cost three times as much as we'd estimated.

But, like most of us, we're doing this work on the weekends and evenings after the day jobs. You could say it's our hobby. Some empty-nesters spend beautiful autumn weekends riding a motorcycle along the Blue Ridge Parkway, say, or enjoying an afternoon of wine tasting with friends at a mountain vineyard, or, I don't know, actually *sailing*!

We get up, drink coffee, talk about the day's hopeful goals, make lunch, pack the dogs into the truck, drive to the boatyard, and genuflect to the god of fiberglass till we're too tired to do it anymore, pack it up, and go home. Rinse, repeat.

Perhaps, if I use the wire that's already through the hole as a messenger, it might work? I dig around for a short piece of messenger line and tape it to the wire, then ease the wire back out the hole, grimacing at the going-backwards-to-go-forward-again.

That's been happening a lot this time around with this dear old boat. More than once, I have grumbled, "Maybe she doesn't *want* to be fixed up." But this morning something occurred to me: She's been more or less neglected for over 15 years (long story, see "Lost and Found," July/August 2021). How would my knees and joints and psyche feel if I'd been left for so long, feeling forgotten? Wouldn't I be a little jaded? Wouldn't I want to make someone suffer, just a little, for all that waiting? After all the joy and memories I'd gifted?

I've taped the fat wire to the thin one, carefully tapering the tape to ease the passage, and hey, nearly through and then—zip—out comes the messenger wire, tape dangling. The two have pulled apart. This time Johnny hears me grouching and comes to help. We retape, work together, him nudging the thick wire forward, me tugging gently on the thin one, and, eureka, we get it. And in no time, we've finagled the final two wires through the second set of access holes.

Of course, the tricolor will refuse to work initially, until Johnny susses out the bad connection near the panel. But, it's another step forward, another job crossed off the never-ending list, a reason to celebrate a little victory.

Along with being a sailor and senior editor of this magazine, I'm a poet, so I think in metaphors all the time. And when you see the world through metaphorically-colored glasses, you realize that even a 43-year-old ex-IOR racing boat has something to teach you about the inexorable passage of time, the pain of transition, the gratitude of love, the grace in compassion.

By the time you read this, we'll still be working on the list. But spring will be here. And with it, hope.

Design Comparison Debate, Sporty Sailing, and Yay for Dads!

Gimme Shelter

Thoroughly enjoyed Kelley Gudahl's article on sailing Long Island Sound ("Waypoints and Wine," March/April 2021). It included a report that Mattituck dockmates refer to the inlet as a "Port of Last Resort." In fact, the federal government designated Mattituck as a Port of Refuge because of its location on a long, inhospitable shoreline (reference: *A Cruising Guide to the New England Coast*, Duncan & Ware).

—**Ken Thorn**, Carrboro, North Carolina

Doubts About Designs

I enjoyed Rob Mazza's piece "Denouement in Design" (*The Dogwatch*, December 2021; July/August 2020). As an old guy, I know all the names and revere them for their contributions. I own and sail a Tripp and a Lapworth design. But then I came to this:

"Today, a fleet of 30 or so one-design boats on a course does not represent the efforts of a dozen or so designers, but only one. No longer are there 'design duels' in racing, contests between different boats that are actually proxy contests between their designers. In fact, the majority of yacht racing today happens without regard to any competitive designer influence. And perhaps that's a really good thing. The focus has moved from having the good fortune to pick a design that's better than the others (better, within the constraints of a given rule) to being a better sailor."

There is one lament that Rob missed: the intrusion by the marketing department into design decisions. New cruising boats all seem to have vast interior spaces and complex systems. The big interiors must be difficult for humans to navigate when in messy conditions at sea (where are the handholds, at least?). And those complex electronic and mechanical systems that allow people to sail larger and larger boats with small crews—what happens when they start failing? One of the great attractions of smaller boats is that they are more likely to be human-powered and less helpless when the electronics or hydraulics fail.

—**Chris Campbell**, Traverse City, Michigan

Dare to Compare

I found the *Good Old Boat* comparison of the Sabre 38 to the C&C 40 and Pearson 40 a bit curious, because there are better comparisons to be made of like-minded cruising keel/centerboard boats ("Sabre 38...And Two More Centerboard Cruisers," November/December, 2021). The C&C 40 and Pearson 40 are larger boats with more emphasis on racing performance than the Sabre 38, with hull forms and sail plans heavily influenced by the IOR. The Sabre 38, with its relatively short I and J dimensions, has a much smaller headsail than the C&C 40 and Pearson 40, which translates to easier shorthanded or even singlehanded sailing. The C&C 40 has terrible fuel and water capacities that limit cruising range, while the Pearson 40 is significantly heavier, which complicates boathandling. In my opinion, the obvious keel/centerboard choices for this comparison are the Tartan 37 and the Pearson 36-2, which offer more traditional and

Good Old Boat **reader Hank Garfield was returning his Cape Dory 25,** ***Planet Waves*****, in October to its upriver winter home on Maine's Penobscot River when he caught this image of can #3 at the river's mouth serving as a cormorant rest area. The Penobscot Narrows Bridge is in the background.**

Good Old Boat **readers start small. . . really small! Jonathan Adams of Annapolis, Maryland, unearthed this image of himself at a tender age aboard the 51-foot Alden cutter *Lady Eastwind*, with his dad, William Adams, keeping a firm, if amused, grip on things. These days, Jonathan and his wife, Lynne, sail the Chesapeake Bay aboard *Tranquility*, a 1978 Bristol 40.**

more modern designs, respectively, within a similar size envelope while maintaining vital cruising characteristics. Additionally, relatively few C&C 40 keel/centerboard and Pearson 40s were built, compared with the Tartan 37, of which many fine examples exist in the market today, having been lovingly maintained or restored.

—**Jesse Falsone**, Edgewater, Maryland

Rob Mazza responds:

Jesse, thank you for your feedback on the Sabre 38 design comparison. I'm gratified that you felt strongly enough to reach out. You raise some interesting points with regard to other boats that would qualify as alternative comparisons to the Sabre 38, and I certainly do not dispute your suggestions. Let me explain some of the criteria and rationale that I consider in choosing the boats for these design comparisons to the review boat. Undoubtedly, we should be comparing boats that are similar to each other, so let's discuss what we mean by "similar."

Type—It makes sense to compare boats that are all the same type, that is all either full keel, fin keel, centerboard, freestanding rig, trailable, or even multihull. It would not make a lot of sense to compare a Westsail to a Beneteau, for example.

Usage—That is, predominately cruising, racing, or dual-purpose. Though related to type, this is what, to a large extent, influences the type.

The Sabre 38 under sail.

Size—There is not much sense in comparing boats that are substantially larger or smaller than the review boat. However, as I've often discussed, defining the actual size of a boat is sometimes a challenge. There are basically three ways to measure a boat's size: length over all (LOA), length on waterline (LWL), or displacement. Each is problematic for a number of reasons that I won't go into in any detail now, but for this particular comparison I choose LWL as the common factor.

Age—Unless we are discussing the evolution of a design concept, it is preferable to compare boats from the same design period—late 1960s, early 1970s, etc.

Available drawings and data—I have sometimes honed in on a suitable candidate and then could not find a suitable drawing of

continued on page 56

We Want to Hear from You

We love hearing from you, our readers! To be part of Mail Buoy, share your letters and images with andy@goodoldboat.com. Also, are you getting *The Dogwatch* in your email inbox? It's free and the content is original. If you're missing it, visit goodoldboat.com to sign up.

Pearson 39

A Solid CCA-Style Centerboard Racer/Cruiser

BY JOE CLOIDT

John Geraci may not have known Pearson Yachts' history when he learned how to sail in 1969 on a Pearson Commander, but he did know that he loved sailing the turquoise waters of Biscayne Bay south of Miami. John spent the next few years renting boats and crewing in the local racing scene until it was time to be his own skipper.

Perhaps influenced by his experience on the Commander, John purchased a 1975 Pearson 39, which he renamed *Aventura*, Italian for adventure. John explored south Florida and the Keys for several years before meeting his future wife, Lynda, and persuading her to sail with him. Lynda's previous sailing experience had not gone well, but John showed her that sailing can be fun, and the pair sailed locally as well as venturing to the Bahamas.

The Geracis eventually moved to Satellite Beach, Florida, where they bought a waterfront home to dock *Aventura* in the backyard. They also joined a local sailing club, East Coast Sailing Association (ECSA), and much of their sailing these days is with ECSA on weekend cruises along the Indian River Lagoon.

History

Pearson Yachts, founded by cousins Clinton and Everett Pearson in the early 1950s, was instrumental in popularizing fiberglass as a more durable alternative to wood. Clinton and Everett left the company in the mid-60s, but the Pearson brand continued with Bill Shaw as chief designer and general manager.

The company enjoyed several decades of growth, and while Pearson had a reputation for building good-quality boats, it could not escape the economic downturn of the

Because boat speed is partly a function of waterline length, the now-defunct CCA rule, to which the Pearson 39 was designed, encouraged long overhangs; when heeled, however, waterline length increases as does boat speed.


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1980s. After changing owners several times, the company filed for bankruptcy in 1991.

The Pearson portfolio ranged from the 8-foot Plebe to the Pearson 530, with more than 50 models in between. Early models were designed by some of America's luminaries including Phil Rhodes, Carl Alberg, and John Alden. Later models, all designed by Shaw, followed the trends of the day, from full keels to fin keels.

While time and attrition, along with limited production runs on some models, reduced the number of actively sailing Pearsons, they remain desirable sailboats. Mention that you own a Pearson, and you'll often get a knowing nod from an old salt.

Design and Construction

The Pearson 39 was built from 1970 to 1978 in Portsmouth, Rhode Island, with an updated version produced from 1986 to 1991. It's estimated that around 150 were produced, of which a dozen were yawls.

Shaw designed the Pearson 39 to be a performance boat. He wrote, "She's the boat for the racing skipper who will occasionally cruise." This is certainly shown in the boat's 9-foot draft with centerboard fully lowered, a deck plan rigged for action around the buoys, and a practical interior for cruising.

Of course, much has changed since 1970; the transition from the CCA (Cruising Club of America) rule to the IOR (International Offshore Rule), explained in Rob Mazza's accompanying comparison (see p. 14), resulted in the trend toward fin keels, spade rudders, and lighter displacement.

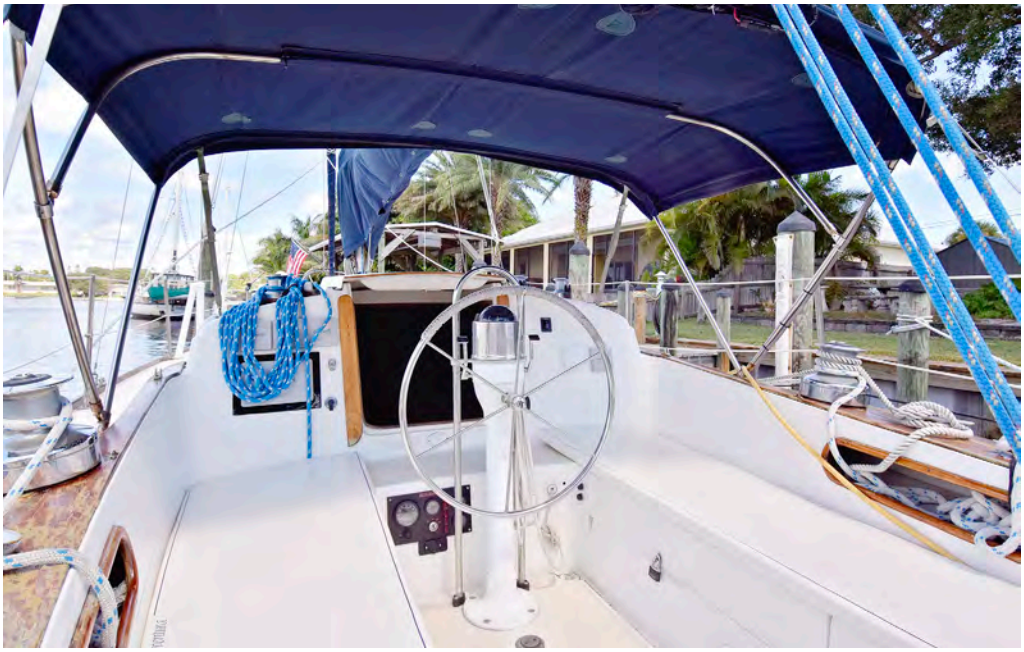
The Pearson 39 hull is a solid hand-laid fiberglass laminate and is reported to be ½-inch thick near the keel. The centerboard trunk is molded into the 4-foot 8-inch-deep keel, which keeps the trunk below the cabin sole and provides room for a shallow bilge. Constructed from fiberglass laminate, the board is raised and lowered via a dual winch/drum assembly located in a housing aft of the galley sink, with the control line in the cockpit. One owner providing feedback felt this setup was not user friendly.

The centerboard pivots on a bronze pin embedded in the keel stub. Lead ballast is encapsulated in the forward part of the keel and extends halfway aft on both sides of the centerboard trunk. The Pearson 39 also has a substantial rudder skeg molded as part of the hull and a bronze shoe bearing that supports the rudder.

The deck is cored with end-grain balsa wood. The hull-to-deck joint is an inward facing flange, through-bolted and glassed over, resulting in a smooth exterior deck joint. A teak toerail bolts into the flange. The Pearson 39 also has

Notable deck features include a sea hood, two Dorade vents, and shrouds located outboard for a wide staying base but not-so-tight sheeting angles.

***Avventura* powers off the wind in Florida's Indian River Lagoon. Bill Shaw designed the 39 with the racing skipper first in mind.**



an ash wood rubrail just below the toerail to help protect the hull during docking.

Below, the cabin is finished with a textured overhead fiberglass liner bonded to the cabintop and a lower pan liner that forms the base for berths and stick-built cabinetry. The forward bulkheads fit into slots in the headliner and are glassed in place. Several owners said they had to rebed the stanchions and repair wet core underneath.

Rig

The Pearson 39 sports a masthead rig typical of the era—an aluminum keel-stepped mast with single spreaders, and fore/aft lower shrouds attached at the spreader hounds. The lateral rigging leads to chainplates at the toerail that are bolted to fiberglass ribs molded into the interior side of the hull. The wide rigging stance makes for a strong rig but limits the headsail sheeting angle.

The Pearson 39 came from the factory with a hanked-on headsail, but the Geracis converted to a North Sails 135-percent jib on a Harken Mark II roller furling system. *Avventura* had been set up for racing by the previous owner, and much of the hardware is still in place—a mast-mounted spinnaker pole, spare blocks and winches, and an adjustable backstay.

Designed before the era of all lines leading aft to the cockpit, this boat's main and jib are raised with dedicated winches on the mast. And, the old-fashioned boom-end mainsheet runs through a four-part tackle to the traveler mounted at the aft end of the cockpit; it's led forward along the boom to a cabintop winch.

The full-batten mainsail has three reef points tensioned by a boom-mounted winch. Jib and spinnaker sheets lead through cars that run on toerail-mounted tracks back to the cockpit where trimmers use the three-speed primary and two-speed secondary winches mounted on the teak-capped cockpit coaming. *Avventura* still carries all its original Lewmar winches.

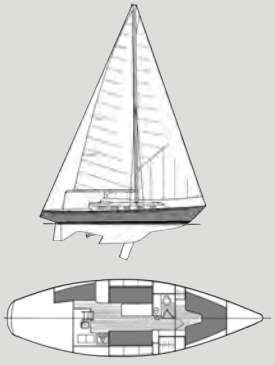
On Deck

One of the Pearson 39's most unique features is the location of the helm near the forward end of the cockpit. Although this layout is unconventional, the open area behind the helmsperson provides good working space for sail trimmers without blocking the skipper's view forward. The tall cockpit coamings provide good back support and keep the cockpit dry when sailing hard on the wind.

Double lifelines and teak handrails on the cabintop add a sense of security. The large, uncluttered foredeck is probably the only location to store a dinghy, as the narrow stern does not lend itself to dinghy davits, which would also spoil the boat's lines. Access to the deck from the water is by a removable midship ladder that fits on either side.

Belowdecks

The factory offered two main cabin layouts; the racing version replaced the starboard side shelves and cabinets with a pilot berth and featured a dinette to port. Several cabinetry finishes were offered.



LINE DRAWINGS BY ROB MAZZA

Pearson 39

Designer	Bill Shaw
LOA	39'3"
LWL	30'
Beam	11'8"
Draft (C/B up/down)	4'8"/8'10"
Displacement	17,000 lb
Ballast	7,300 lb
Sail Area	673 sq ft
Displ./LWL	281
Sail Area/Displ.	16.3
Ballast/Displ.	43%

The standard layout has settees on both sides of the cabin that are long and wide enough to make comfortable berths and seat plenty of guests. Storage is good with bookshelves and cabinets above and below the settees. There is also a hanging locker that the Geracis repurposed for an AC-powered, Mermaid 16,000-Btu air-conditioning unit—necessary when tied to the dock during Florida's hot, humid summers.

Surfaces in the head are a white laminate with some wood trim. Storage here is also good. John revamped the entire plumbing system, which included installing a Jabsco marine toilet, diverter valve, macerator pump, and 15-gallon holding tank.

Further forward, a small step leads to the forward cabin that has plenty of headroom for John's 6-foot-plus frame; the V-berth also allows him to stretch out comfortably.

The Pearson 39 didn't offer a finished sole, just the non-skid pan liner, and while that may be more practical for a boat set up for racing, John and Lynda put down a non-skid rug which is easier on the feet and eyes.

Avventure **was repowered with a Beta diesel, again facing aft with a V-drive forward. Access from several sides is decent.**

Mechanicals

The Pearson 39 came standard with a Universal 30-hp gas engine, but the previous owner opted for the Westerbeke 4-107 diesel upgrade. The "Westerbeast" was showing its age, so after some research, John replaced it with a Beta 35-hp model, also replacing the V-drive and installing a dripless seal on the prop shaft. *Avventura* has had several different props through the years and now has a Flexofold two-blade folding prop.

Several removable panels on the engine box provide access to the engine, and additional front access is through a cockpit locker. Part of the galley cabinetry must be removed to fully expose the engine. The V-drive and propeller shaft stern tube have good access by lifting a panel on the cabin sole. A 30-gallon fuel tank under the cockpit suffices for local and coastal cruising.

The Pearson 39 came with a basic 12-volt DC system. On *Avventura*, the distribution panel is located just inside the companionway; it's convenient to reach from the cockpit but is more exposed to the weather. John replaced the DC cartridge fuses with resettable circuit breakers and added panel meters to monitor the AC and DC voltages.

He also added a Xantrex battery charger with a built-in 2-kW inverter. In addition to the AC battery charger, twin

Comments from Owners

My *Netop* is a 1974 hull, #60. I purchased her in 2012 and performed a major refit. I've always admired the lines of these boats from the outside. From the inside however, not so much. The factory interior was disappointing compared to the exterior. Hull #60, however, had been built with a custom Herreshoff-style interior that was beautifully constructed by skilled craftsmen.

—Gary Langley,
Mattapoisett, Massachusetts

Zig Zag feels like a very solid boat. If we had to share one attribute that we like about her, it's her good looks. In fact, she has become something of a tourist destination during the warmer months when she is on her mooring. We did have some soft spots on the deck, and we need to rebed the lifeline stanchions. She handles well on all points of sail but prefers a reach. With just the "jib and jigger" my wife and I can sail her easily. With the headsail and mizzen trimmed properly, you can take your hands off the wheel. A boat of this vintage will have been through at least one repower, and the standing rigging should have been replaced.

—Rick and Elise Torpey,
Island Heights, New Jersey

I owned a 1971 Pearson 39 sloop with tall rig. Upgrades: replaced a tired gas Atomic 4 with Yanmar 3YM30 diesel. This required new engine beds, a new V-drive, a new shaft (increased diameter), and modifications to the fuel system, fuel tank, and exhaust system (increased exhaust diameter and exit through the transom). Renewed/replaced wiring, switches, outlets, lighting, fans, and both AC and DC electrical panels (from fuses to breakers). Installed new propane stove/oven, replacing smelly alcohol stove. Installed vented propane storage on aft deck. I enjoyed every day I spent with her. She sailed very well on all points. Her keel/centerboard design was great for the skinny water around Florida. Bill Shaw told our son that the 39 was the boat his family owned.

—Frank Giambatt,
Mount Dora, Florida

Outboard of the sink is the top-loading icebox, which John updated with a Frigoboat 12-volt water-cooled refrigeration unit. He also replaced the alcohol stove with a Force 10 propane three-burner stovetop/oven with a flip-up cover over the stovetop to provide more counter space.

The forward cabin has a standard V-berth with an insert available to make it a double. Note the drawers port and starboard. On each side of the berth, long shelves can hold odds and ends that don't fit into the portside bureau.

100-watt solar panels and the 400-watt wind generator can also charge the boat's three AGM Group 31 batteries when the Geracis are out on a cruise.

To help conserve energy, all the interior and navigation lights have been updated with LED bulbs. The instrument package has also been updated with Garmin depth, wind, and GPS units, and although Florida doesn't normally have to contend with fog, *Avventura* also has mast-mounted radar.

Underway

The day of our test sail, a dry, cool northeasterly breeze was bringing the first hint of fall after a long, muggy, Florida summer. I met the Geracis at Dragon Point on the southern tip of Merritt Island in my dinghy so I could take underway pictures and then join them for a sail. The breeze was starting to pick up as they rounded the point and raised the sails. John trimmed in, cracked off the wind a few degrees, and *Avventura* took off faster than I expected for a heavier-displacement boat with a fair amount of wetted surface.

I couldn't help but think how the graceful lines of the Pearson seemed to blend in with the bow wave as it formed its own curving line down the length of the boat. Compared to the straight lines of most modern designs, this Pearson seemed more in harmony with its element.

Then it was time for me to transfer to *Avventura* for a trick at the wheel. The wind was 10 to 12 knots when I took the helm. My first impression was how steady and solid it felt, almost as if riding on a smooth track while also being responsive to the helm. With the wind just aft of the beam, we were averaging around 6-plus knots with just a little heel. The boat heeled a bit more in gusts but settled right back in the groove.

The Indian River Lagoon is relatively shallow for the Pearson 39's almost 9-foot centerboard, so we sailed with it up. When John used to race *Avventura*, he sailed close-hauled to within 38 degrees of the wind and says the boat likes it when the wind pipes up to 15-plus knots. Other owners agree the Pearson 39 sails well on all points of sail, even with the board up, but it can start to crab when the wind picks up on a close reach.

Conclusion

If you ask owners what they like the most about their older Pearsons, they'll often say they fell in love with their boat's lines and its sailing performance. The Geracis are no exception.

Pearson built above-average boats that sail well, but like any sailboat approaching 50 years, expect some level of refitting and updating. An Internet search showed a handful of Pearson 39s for sale along the East Coast with prices ranging from $25,000 for one needing a refit, to close to $40,000 for an updated model. Finding documentation on older Pearsons can be a challenge, but there are several Internet groups that can be a helpful source of information. Start with pearsonyachts.org.

Joe Cloidt is a retired electrical engineer who lives and sails on Florida's east central coast. When he isn't out cruising on his Pearson 31 or racing on a J/30 at the local yacht club, he can often be found in his shop tinkering on his latest project or simply messing about in boats.

Pearson 39

. . . and Two More Transitional Centerboard Racer/Cruisers

STORY AND ILLUSTRATIONS BY ROB MAZZA

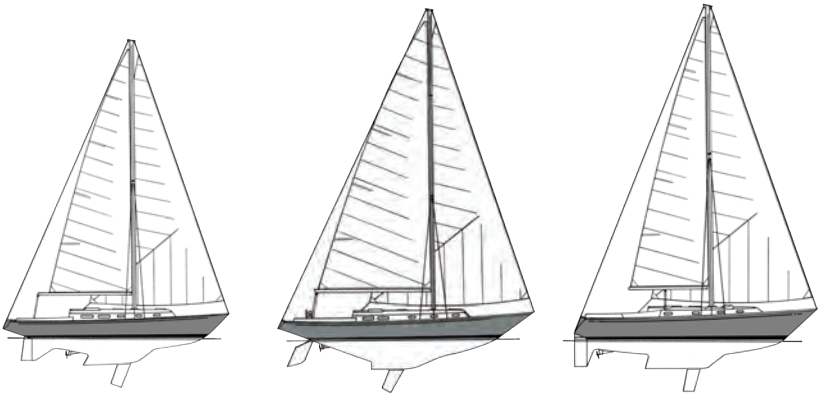
You may remember that in *Good Old Boat*'s November/December 2021 issue, we reviewed three centerboarders from the late 1970s and early '80s in relation to the Sabre 38. However, while two of the boats—the Sabre and the C&C 40—offered the centerboard as an option, only the innovative Pearson 40 made it the standard configuration. For this review comparing the Pearson 39, C&C 40 Crusader, and Tartan 37, all three boats from the late '60s and early '70s came standard with a centerboard.

One can't help but notice this interesting transition from centerboards as the standard configuration in the 1960s, shifting to an option in the 1970s and '80s, and today being virtually nonexistent in new, larger production fiberglass cruising sailboats.

One reason for this transition is that the late '60s and early '70s were the last years of the CCA rule, under which centerboarders such as the S&S-designed *Finisterre*, the Rhodes-designed *Carina*, and the Cuthbertson-designed *Inishfree* dominated offshore racing, prompting the centerboard to become a common feature in racer/cruisers. With the introduction of the IOR in the early '70s, their popularity quickly waned, with the exception of a brief burst of interest in lift keels and daggerboards in the late '70s—a trend quickly stamped out by further rule modifications.

Today, the centerboard in larger production fiberglass sailboats has been mostly replaced by shoal-draft options that incorporate low-aspect-ratio wing or bulb keels. The rationale is that fixed shoal-draft keels achieve thin-water cruising potential without the complication of a more expensive, movable appendage underwater that is often difficult to repair or access. The wing or the bulb keel also achieves a lower center of gravity that, when married with the wider beams of modern production sailboats, achieves quite acceptable upwind stability, if not good capsize numbers.

The boats chosen for this comparison span the CCA/IOR transition, with the 1968 Cuthbertson & Cassian-designed 40-foot Crusader firmly planted in the



	Pearson 39	C&C 40 Crusader	Tartan 37
LWL	30'0"	28'8"	28'6"
Beam	11'8"	11'2"	11'9"
Draft	4'8"/8'10"	4'6"/9'1"	4'2"/7'9"
Displ.	17,000	18,225	15,500
Ballast	7,300	7,900	7,500
LOA/LWL	1.31	1.38	1.31
Beam/LWL	.39	.39	.41
Displ./LWL	281	345	299
Bal./Displ.	43%	43%	48%
Sail Area (100%)	673	735	625
SA/Displ.	16.26	16.95	16.06
Capsize No.	1.82	1.70	1.89
Comfort Ratio	30.4	35.5	28.9
Year Introduced	1970	1968	1976
Designer	Bill Shaw	Cuthbertson & Cassian	Sparkman & Stephens
Builder	Pearson Yachts	Belleville Marine	Tartan Marine

CCA era, the 1970 Bill Shaw-designed Peason 39 right at the transition point, and the 1976 S&S-designed Tartan 37 firmly fixed in IOR. Belleville Marine built the Crusader in 1968 before the official creation of C&C Yachts in 1969, but even then, the decision had already been made that Belleville Marine would build center-board models designed by Cuthbertson & Cassian, while Hinterhoeller Yachts would build fixed-keel configurations by the same design office.

What makes the Crusader unique in the Belleville offering is that she is the only center-board configuration that had a separate keel and rudder, not a full-keel centerboarder like my own 31-foot Corvette. Coming out the same year as *Red Jacket*'s monumental Southern Ocean Racing Conference (SORC) win ("Anatomy of a Legend," September/October 2021) that firmly established the performance advantage of a separate keel and rudder, this should not be surprising.

Most would say that the Crusader is the largest of the three at almost 40 feet length overall and a respectable 18,225 pounds of displacement. However, her 28-foot 8-inch waterline length is 1 foot 4 inches shorter than the 17,000-pound Pearson's waterline length of 30 feet, and only 2 inches longer than the 15,500-pound Tartan at 28 feet 6 inches. This shorter waterline on that much displacement is typical of CCA designs and is reflected in the Crusader's displacement/waterline length ratio of 345, compared to the Pearson at 281 and the Tartan at 299.

This transition from CCA to IOR is also reflected in the maximum beam of each boat, with the "larger" 1968 Crusader being the narrowest at 11 feet 2 inches, the 1970 Pearson the next widest at 11 feet 8 inches, and the "smallest" boat—the 1976 Tartan—having the largest maximum beam of 11 feet 9 inches. This beam difference is reflected in the capsize numbers that follow the same pattern, with the Crusader coming in at a very safe 1.70, the Pearson at 1.82, and the Tartan at 1.89. However, all are well under the capsize threshold of 2, above which boats are considered more vulnerable to capsize.

Sail area/displacement numbers are in the low 16s for the Pearson and the Tartan, and almost 17 for the Crusader, reflective of her larger sail area compensating for her heavier displacement. The CCA-to-IOR transition is also noticeable in the aspect ratio of the mainsails for these boats, as the main becomes chronologically narrower for each, with the Tartan finally sporting something resembling a "ribbon" main.

It is no secret that I am fond of centerboarders and have been involved in the design of a few while I was with C&C and Mark Ellis Design. However, centerboards were never an option offered in the larger boats by Hunter Marine during my tenure, or even before or after, to my knowledge. Most builders now prefer simplicity, and it seems that most buyers of new boats would agree with that philosophy. However, as each of these boats illustrates, there are some very good centerboarders still available on the used boat market that are certainly worth a closer look.

Good Old Boat *Technical Editor Rob Mazza is a mechanical engineer and naval architect. He began his career in the 1960s as a yacht designer with C&C Yachts and Mark Ellis Design in Canada and later Hunter Marine in the U.S. He also worked in sales and marketing of structural cores and bonding compounds with ATC Chemicals in Ontario and Baltek in New Jersey.*

The Life Electric

How one sailor's electric propulsion system went from dubious to undoubtable.

BY FABIO BRUNAZZI

It is a beautiful, sunny day, and after more than 3,500 miles singlehanding across the North Atlantic in *Tranquility*, my 1965 Columbia 29, I am approaching the most difficult part of the journey—landfall in an unknown port, Puertito de Güímar in Tenerife.

It's challenging in multiple ways. In this area of the Canary Islands archipelago, wind speeds climb to 30 knots and gust to 40 due to the interaction between trade winds and the islands' peculiar orography. Three miles out, the winds finally force me to douse everything but the staysail, and I keep a constant eye on the windvane autopilot that wants to round us up during violent gusts. As I approach the marina breakwater, I will have to drop my last sail and make my way upwind into the basin created by a narrow cut between two seawalls of sharp rocks and artificial boulders. To leeward is a rocky and shallow beach.

I'm depending on my electric inboard propulsion—a system I inherited when I purchased *Tranquility* seven years ago. And while I was dubious at first and had always thought I could repower with a diesel if need be, thousands of U.S. East Coast and sea miles later, I am completely confident in this system. It has never failed me.

The main switch is on, and I read 52.3 volts on the display. The batteries are more charged than when I left the U.S.; the wind generator and regeneration from the propeller have charged them for the entire 42 days it has taken me to cross the Atlantic.

With electric propulsion there is no ignition to worry about. You have voltage, you are good to go. The only questions crossing my mind are of a different kind: Will it be powerful enough? Will there be current coming out of the marina?

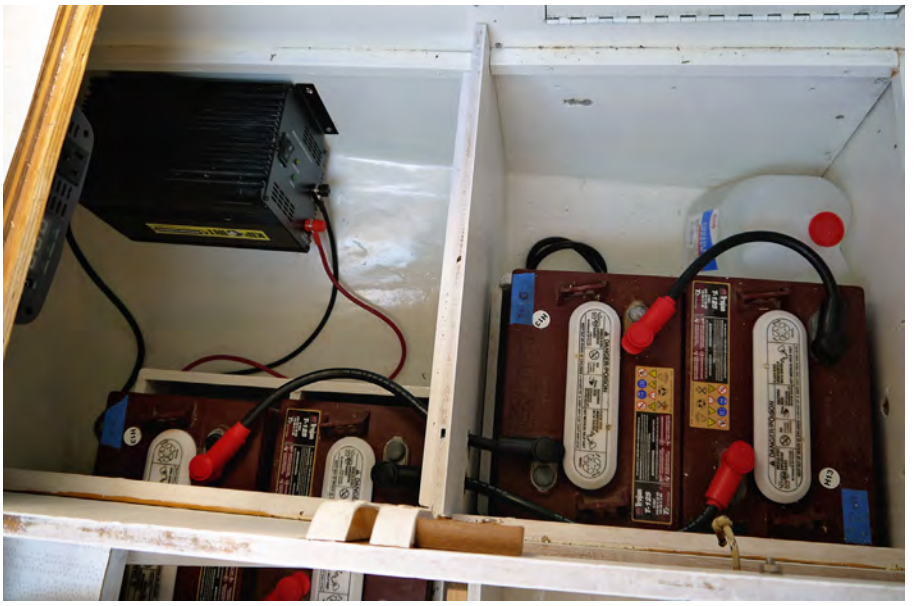
I remember struggling to keep the bow dead upwind in a strong blow while trying to conserve batteries in the Intracoastal Waterway (ICW). Then, I had to save battery capacity as much as possible to motor upwind through the shoals of the ICW around Cumberland Island in Georgia or to cross Pamlico Sound on a windless day.

Here, I have 500 yards or so to reach the place where my girlfriend and a member of the local yacht club are waiting for me to dock.

It's easy to turn toward the opening in the breakwater with residual speed from the just-dropped staysail. I put the lever forward and the display shows a draw of 25 amperes. The motor's familiar low humming starts, and I can feel the boat pushing forward.

The system aboard *Tranquility* had been installed by a previous owner and included a 5-kW, 48-volt, DC Eltek brushed motor mounted on a 2-to-1 gear. Fabio immediately upgraded it with new batteries placed in reconfigured storage areas.

A top-down view of the upgraded installation, with the battery charger at the bottom right, the electric motor at top right, and the batteries installed in multiple compartments close aboard.



Fabio reconfigured the area beneath the starboard chart table to accommodate four of the batteries. At the top left is the AC battery charger, at left.

Regular maintenance is minimal but does include replacing the shaft belt on the electric motor. It's easy enough that Fabio can do it on the saloon table and the cat can hang out, at bottom left.

When it comes to motoring, I am rather conservative, and my strategy is to keep the boat moving while using the least current possible; speed doesn't really matter. But as the wind shoves at us and I gauge progress by watching the boulders abeam, I can see we're not moving, and the bow threatens to fall off.

I ask the batteries for more amperes, from 25 to 35. This steadies the bow, but progress dead upwind is still negligible. I increase to 40 amperes, then 45. I rarely go that high because I am afraid of overheating the batteries and motor, even though by specs I should be able to venture up to 100 amperes.

With this extra push, the boat gains momentum, and I slowly see the horizon progress behind the breakwater. As soon as the boat gains speed, I adjust the throttle to 35 amperes. Despite the strong wind finding its way inside the basin, I turn on a dime and proceed toward the welcome party in the far corner. I use hardly any current in the five minutes it takes to reach the dock where friendly hands grab my lines. I have safely landed, and my electric motor once again has helped me finish my long voyage.

Getting to Know Electric

It has been seven years since I've begun using electric propulsion, and my boat and I have traveled more than 10,000 nautical miles between the U.S. East Coast, the Caribbean, South America, and now the Eastern North Atlantic. I've maneuvered in and out of marinas on the East Coast and covered considerable distance in the ICW. I've been caught in calms and in adverse current in the last 30 miles before a Panama landfall. All of these situations were resolved despite the limitations of electric propulsion, which gives me barely 3 knots of motoring speed and a range of 10-15 nautical miles.

> Sailing is the first choice, not the backup.

It's true that my little, good old Columbia 29 sails well and is very maneuverable, so few of those miles were under electric propulsion. On my Atlantic crossing, I knew I'd need auxiliary propulsion even less than before; in fact, I even sold my aging gas generator before taking off, freeing up some space onboard. By now I know what I can expect from my low-cost setup and what is asking too much.

I had never put too much thought into having electric inboard propulsion before owning a boat with that technology. I was ignorant and skeptical about it, and my previous experiences were all with internal combustion engines, mainly diesel inboards and gasoline outboards.

But when the time came to purchase *Tranquility*, the simple 5-kW, 48-volt, DC Eltek brushed motor mounted on a 2-to-1 gear was part of the deal (see "Tranquility, A Columbia 29," May/June 2017). A previous owner had made the conversion a few years earlier. I was more interested in the hull and the boat design than its propulsion; I also knew I could easily install a diesel inboard or an outboard on a bracket. That was my rationale, even though in our minds we always tend to see things as simpler than they really are.

However, when it was time to complete the boat's refit and go sailing, I did not have time to think about an alternative or to put particular thought into how to improve the system I already had. The easiest option was to simply drop a thousand bucks for eight new Trojan T-125 6-volt lead acid batteries and try out my motor. It was a test, after all.

Connected in series to provide the motor's required 48 volts, the batteries would provide a total capacity of 240 amp-hours. I did build new battery compartments, one in the engine room and one under the settee in the saloon. This helped with the boat's trim and provided better access to the previously inaccessible propeller shaft.

The first voyage was from Fairhaven, Massachusetts, where I bought and fixed *Tranquility*, to Brunswick, Georgia. I had new rigging, brand new sails, and I was

The boat's fixed, three-blade prop helps provide regeneration capability while under sail, at right.

The shaft coupling on the aft side of the electric motor, at bottom right.

prepared to do 99 percent of the miles under sail. I made the trip in jumps that included sailing through parts of the ICW from Norfolk, Virginia, to Beaufort, North Carolina, mostly because it was nearly winter, and I could not count on long enough weather windows to get around Cape Hatteras safely.

I went through long stretches of the ICW sailing and motor sailing. For some of it, I used a portable gas generator strapped on the lazarette hatch to power a 20-amp battery charger. It was noisy, uncomfortable, and precarious, and I never liked the idea of using it. So I sailed as much as possible; it's safe to say that *Tranquility* was probably the only boat in the ICW with at least the mainsail up all the time.

Over time, I refined my recharging methods. The boat's system came with propeller regeneration capability, which charges the batteries while sailing. I picked a fixed, three-blade, 12-inch propeller to enhance this function. Though the propeller creates drag, I'm willing to accept it in exchange for good power regeneration. When sailing at 5 knots, it produces around 2 amps at 48 volts. On long ocean passages with good weather windows, this is a lot of power that I redirect to my house bank through a DC-to-DC converter.

From the outset, I had discarded the idea of recharging using only solar. The Columbia 29 has very limited space on deck; placing several solar panels there and still having a balanced and pretty boat was nearly impossible. Instead, I kept a separate house battery bank of 200 amp-hours at 12 volts, powered by a 60-watt panel on a solar tracker. Later, I added an additional 110 watts of solar by placing two semiflexible solar panels on a self-built hard dodger.

Finally, a 48-volt wind generator installed on an aluminum pole on the stern also recharges the batteries. It works extremely well in windy Caribbean anchorages and helps prevent self-discharge.

The experiment has been successful, as I sailed more than 5,000 nautical miles in seven years before dropping another grand to buy a new battery bank, just before my longest trip ever, crossing the North Atlantic. Budget constraints didn't make it feasible for me to go with a different technology like LiFePO4 (lithium ion phosphate).

Maintenance has been minimal; I routinely check the motor's brushes, and I had to change the transmission belt once (motor and shaft are on a 2-to-1 pulley system), 10 years after installation. I check the battery water level often, more to have something to do than out of necessity. Depending on use, I need to add distilled water to the batteries every three months or so.

Among the system's many perks is an engine room that is always clean, even dusty at times. There's no smell, no heat, and very little sound. There's no need for sound insulation or for an exhaust hose that has to run somewhere out of the boat. The motor itself weighs a little more than 50 pounds and each battery about 65 pounds. All the components can be moved by one person.

It's a *Sail*boat

Some people I have met in my travels have argued that with such limited range and power, I might as well be an engineless sailor. I disagree. Even if I consider engineless sailing a noble and desirable achievement in seamanship and sailing

skills, I am still very happy to count on auxiliary propulsion, even a cheaper and limited system like mine.

In terms of safety and convenience, electric propulsion is still a huge resource compared to nothing at all. For example, if killing my battery bank by discharging it all the way would keep me from a dangerous situation, I still have this option. I know I'm just a thousand dollars from another battery bank.

In my style of sailing, auxiliary propulsion is only required to avoid the most difficult parts of landfalls, to correct our position when winds fail to provide adequate power, to get out of the way of incoming traffic, and of course to maneuver in marinas and anchorages. Sailing is the first choice, not the backup.

When leaving an anchorage, I typically hoist the mainsail, loosely sheeted, while I weigh anchor. I usually sail off the anchor unless I need the motor to pop out of a tight spot. The switch is on, and even if you hear no sound, it is ready to go—it only takes a moment to put in forward or reverse in case unforeseen trouble arises.

The opposite is true with dropping the hook. When it is necessary to find your spot in a busy anchorage, electric propulsion works flawlessly, as the boat ghosts around other vessels. When the wind and the location cooperate, I can do this under sail alone, although I always dig the anchor deeper using my motor in reverse.

If I had to summarize what electric propulsion has taught me so far it would be this: Sail ever more efficiently with what you have available.

I have learned that I can sail more than expected when sailing becomes the best option in terms of speed. If I could make 4 to 5 knots under power, I'd be tempted to motor more than I do now. Depending mostly on wind and wind-powered self-steering, I am constantly trying to keep the boat moving with a balanced sail plan.

Having less range and power also requires more problem-solving. Planning ahead and knowing my limitations have so far allowed me to avoid landing in dangerous situations. We are natural problem-solvers, and as in many other situations if we don't practice this skill, we tend to get accustomed to limited solutions, and our creative thinking shrinks. I am glad electric propulsion is giving me a reason to keep these skills sharp.

Horses for Courses

I admit that I kept a diesel in the back of my mind when I first bought *Tranquility*, but all things considered, I wouldn't repower with one. If I had to sail through an area notorious for its calms like the Northwest Passage, or if I wanted to transit the Panama or Suez canals, I'd likely have to find an alternative to electric, but for now, I don't think it is necessary.

Also, during my career as a yacht captain, I became quite familiar with crawling through engine rooms. On my 28.5-foot sailboat, I know I wouldn't enjoy the extreme yoga required for regular maintenance of a small diesel unit. I'd also regret the loss of the already meager storage space I gained thanks to electric propulsion. (Conversion from diesel to electric is equivalent in surface and weight, but electric has the advantage of a more flexible installation.)

I'm not ideologically against internal combustion, and I know that if I owned a bigger and heavier boat, I would rather have a diesel than an electric motor. But a small yacht like *Tranquility* is often more maneuverable and moves well in light air, so electric propulsion makes sense. It's a matter of horses for courses.

One could argue that electric propulsion is boring. So many of us have stories about fixing diesel engines, sometimes with barely adequate tools and little more than sheer ingenuity and determination. These stories are part of the common lore we share in the sailing life.

I have no such stories to share about my experience with *Tranquility*'s electric auxiliary. Maybe I have been lucky, but the lack of maintenance, fuel issues, and breakdowns are the top perks of electric propulsion.

And, while I consider myself a good diesel mechanic and problem-solver, learning to sail *Tranquility* with electric as the auxiliary has had the intangible but no less real benefit of honing my sailing skills. In that way, my boat's electric propulsion system has made me a better sailor, and I'm proud of the sailing achievements I've accomplished.

Fabio Brunazzi trained and worked as a psychologist but has made sailing and yachting his professional career for over a decade. He believes that sailing and fixing good old boats is a good coping mechanism to life's troubles and can contribute to good mental health. He's the author of two blogs: lapossibilitadiunisola.com and psychologyofsailing.com.

While transiting the Intracoastal Waterway during his first trip south with his new boat, Fabio used a portable generator perched on the lazarette to recharge his batteries, a solution he later ditched for renewable recharging methods.

Repower with E-Power?

As electric propulsion technology leaps forward, that's a question worth constantly revisiting.

BY DAVID LYNN

When we repowered our Liberty 458, *Nine of Cups,* a decade ago, we took a close look at our options. Should we stick with diesel, or was switching to electric propulsion a reasonable alternative? What we found was that repowering with an electric motor was certainly possible, but the technology for a sailboat of our size was new and untested, the cost would have been triple that of a new diesel replacement, and the necessary modifications would have been extensive. It was no surprise that we opted to stay with diesel.

The technology has, however, changed immensely in those 10 years since we last considered it. If we were repowering now, would we make the same decision, or has the technology evolved enough to make e-propulsion a serious option?

The Basics

In its simplest form, repowering a boat for e-propulsion involves removing the old diesel engine and fuel tanks and replacing them with an electric motor running from a large battery bank. How far the boat can travel on a charge depends on a number of factors, primarily motor size, boat displacement, and battery bank capacity (assuming flat seas and no wind).

Electric motors are rated in kilowatts (kW) rather than horsepower, and in my research, I came across a couple of guidelines that are helpful in determining the size of the motor and the battery banks needed for a given boat. One guideline, from Bell Marine in the Netherlands, is that a motor big enough to power the boat into a strong headwind and/or adverse seas should have a kW rating of at least 2.5 times the displacement of the boat in tons. Another guideline, suggested by Hybrid Marine Ltd., a UK company that specializes in converting boats to e-propulsion, is that it requires about 0.8 kW for every ton of displacement to power a boat at cruising speed in calm conditions.

Using these guidelines for our 20-ton, 45-foot cutter, we'll need a 50-kW electric motor to handle the worst-case conditions, and it will require about 16 kilowatt-hours (kWh) of battery capacity for every hour of motoring. If we are day sailors and our usual routine is to motor out of the marina, spend the day sailing, then motor back into the marina for sundowners at the dock, we'll probably need about an hour's worth of range, or 16 kWh of battery capacity. A 200-amp-hour (Ah), 12-volt battery has a capacity of 2.4 kWh, so we'll need a minimum of seven batteries. Since many of the electric motors require 48 VDC, we'll need to put four batteries in series, increasing our batteries to eight.

Unfortunately, this example assumes we are using ideal batteries. Almost every battery chemistry currently available, including lithium ion batteries, exhibits a significantly shorter lifetime if the batteries are frequently subjected to high charge and discharge rates or are fully discharged routinely (See "Taking Charge," March/April 2020). Typically, to get 8 to 10 years of useful life from a battery bank, only 50 to 60 percent of the available capacity should be

E-propulsion technology has seen major advances over the past few years.

A clean install of an Electric Yacht QuietTorque 180ibl on the 1975 Cal 2-34 *Footloose*. Photo by Kirk Grier.

used, meaning that the battery bank in our Liberty will need to be increased to 12, or even 16, 200-Ah, 12-volt batteries. That's a lot of batteries to provide a paltry hour's worth of motoring, especially when you consider that it takes only about 1.5 gallons of diesel to accomplish the same thing.

If, instead of daysailing, we want to spend a couple weeks gunkholing around the Chesapeake Bay, a summer in the Bahamas, or a few years sailing around the world, we may need even more batteries, and we'll certainly need a method of recharging them.

Extending the Range

"Range anxiety" is a term that has been used since the mid-'90s and refers to electric vehicle owners' worry that they won't have enough range to make it to their destination, thus becoming stranded along the road somewhere. Many believe range anxiety is the primary obstacle to more universal acceptance of electric vehicles.

If that's true of electric cars, range anxiety is also a major fear for those contemplating repowering their boats with an electric motor. It's one thing to run out of power along a highway, quite another to have the engine quit while motoring up a tight channel with an adverse wind and current, or getting caught in an untenable anchorage without enough battery reserve to raise anchor and motor to safety. Fortunately, there are several ways to recharge those huge battery banks and extend the range.

As boat speed increases, the drag on the hull also increases. The relationship between speed and energy efficiency is somewhat linear at lower speeds but becomes less linear as the boat approaches hull speed, making the boat significantly less energy efficient at higher speeds. Boats have a sweet spot, usually around two-thirds of hull speed. Below the sweet spot, there's not that much savings to be had in energy efficiency by reducing speed. Every fraction of a knot above the sweet spot, however, decreases energy efficiency disproportionately. Finding the sweet spot and motoring at or below that speed can significantly

Pros and Cons—DL

As with everything in boats, e-propulsion is a compromise, and there are pros and cons to each choice. Note that in the cost comparisons below, the assumption is that an old, stinky diesel engine is being totally replaced with something new, whether it be a shiny new, state-of-the-art diesel or an e-propulsion option.

All Electric

Pros:

- Least expensive e-propulsion option.
- Far fewer components than a fossil-fuel engine, reducing maintenance and increasing reliability.
- Almost totally quiet.
- Relatively easy to implement.
- No fuel tanks or fossil fuels; environmentally better in terms of emissions.
- Solar, wind, and prop regeneration can provide some or all recharging.

Cons:

- Requires a large battery bank.
- Even with a large battery bank, limited to one to three hours of motoring per day.
- Range anxiety.

Cost:

- Typically, 0.8-1.5 times the cost of comparable diesel engine. Much depends on battery bank size, quantity and size of solar panels and wind generators, prop regeneration system, and controllers.

Serial Hybrid

Pros:

- Only the motor has a mechanical connection to the shaft or saildrive; the generator and batteries are interconnected to the motor electrically and can be located anywhere in the boat, providing more installation flexibility.
- For the same reason, installation is often easier.
- Plenty of power for other onboard electrical needs.

Cons:

- Requires a larger electric motor to handle the worst-case conditions.
- Energy must be converted from mechanical energy to electrical, transmitted along wires, then converted back to mechanical energy to spin the prop. This results in more losses (usually seen as heat) and less energy efficiency than a simple diesel engine connected to the shaft.
- Losses must be offset by sizing the motor 10 to 15 percent larger than an equivalent traditional diesel engine connected to the shaft.

Cost:

- Typically, two to three times the cost of a comparable diesel engine. Cost includes a large generator, batteries, large controller, and large electric motor.

Parallel Hybrid

Pros:

- Since the engine is directly coupled to the shaft, efficiency while motoring with the engine is the same as a traditional diesel-powered boat and better than a serial hybrid.
- Since the engine is adequately sized to power the boat, the electric motor and controller can be smaller.
- Better redundancy. Since the boat can be driven with either the diesel engine or the electric motor, a failure of either won't disable the boat.
- Plenty of power for other onboard electrical needs.

Cons:

- The engine and motor must be mechanically coupled to the shaft. Installation may be more difficult, especially in a small engine room.
- For the same reason, maintenance and repairs may be more difficult in smaller engine rooms.

Cost:

- Typically, 1.5 to 2.5 times the cost of a comparable diesel engine. Cost includes an adequately sized engine, batteries, controller, and electric motor.

increase the range that can be provided by the battery bank.

Adding solar panels and a wind generator are two ways to help recharge the battery bank, thereby extending range, but the amount of power that can be generated from these is limited. Let's look at the output of a state-of-the-art, 320-watt solar panel. On a good, sunny, summer day, we can probably expect to have direct sunlight and full output for about five hours, indirect output at about 50 percent another four hours, and maybe 25 percent output an additional four hours.

This means that one of these panels could generate a total of five times 320 watts, plus four times 160 watts, plus four times 80 watts, reaching a total of 2.5 kW per day.

The 320-watt solar panels are rather large— 5.5 feet by 3.5 feet. On our 45-foot Liberty, we could probably find room for five panels, three on the stern arch and two on the coach roof, which means that on a good day we could generate five times 2.5 kW, or 12.5 kW of recharge—about enough to motor for 45 minutes. That's an optimistic number; some days are going to be cloudy, and it doesn't take into account our other electrical needs like powering the refrigerator, nav instruments, laptops, phones, autopilot, windlass, etc.

Adding a wind generator or two will help. The latest wind generators have a maximum output of 400 to 600 watts, which is typically achieved when the wind speed is 28 to 30 knots. The power generated drops off quickly at speeds below the optimal, however. For example, most wind generators will produce only about 50 percent of their maximum output at 20 knots of wind, and around 10 percent of rated output in 12 knots of wind. If we mounted two wind generators on the transom of *Nine of Cups* and had a reasonably good day with an average of 20 knots of apparent wind, we could expect to produce 500 watts times 24 hours, or

What's Available?—DL

This is a growing market with more entries every day. A little time spent searching the Internet will locate everything from the components that can be pieced together to build your own DIY system to total turnkey systems designed for megayachts. For those in the market for a new boat, several boatbuilders now offer the option of including e-propulsion in their new production boats. Here are a few suppliers; these brief lists are not exhaustive:

DIY

- California-based Electroprop sells preconfigured packages that can be installed by a DIYer or prepackaged and installed in your engine room enclosure. www.electroprop.com/
- Minnesota-based Electric Yacht sells all the components for boats from 22 to 66 feet. electricyacht.com/
- Mastervolt is a Dutch company that provides all the components for a complete e-propulsion conversion. www.mastervolt.com/leisure-marine/

Serial Hybrid

- Elco Marine is the true pioneer in electric propulsion, having built their first electric boat in 1893—and that's not a typo!—when they won a contract to supply 55 electric launches to the 1893 Chicago World's Exposition. They now supply electric outboards as well as electric replacements for inboards ranging from 6 to 100 horsepower. elcomotoryachts.com/
- Torqeedo, started in Germany in 2004, is also considered one of the pioneers in the e-propulsion field. They began with outboards but have expanded their offerings to include hybrid systems for boats in the 10- to 120-foot range. They recently began working with BMW and now offer products that utilize marinized versions of the BMW i3 and i8 series auto batteries. torqeedo.com/us/en-us/products/hybrid-drives/
- Oceanvolt is a Finnish company that provides drives for boats from 30 to 60 feet. oceanvolt.com/standard-systems/

Parallel Hybrid

- Hybrid Marine Ltd. in the UK has been providing parallel hybrid systems since 2008. They sell a complete engine/motor system using either a Beta Marine or Volvo Penta engine as the base platform with the electric motor and controller attached. hybrid-marine.co.uk/
- Bell Marine in the Netherlands is a historical leader in electric marine propulsion and has long been known as a high-quality provider of hybrid systems for boats of all sizes. bellmarine.tech/

Production Boats

- Alerion Yachts, a Rhode Island company, now offers the option of a Mastervolt electric propulsion drive on a few of their new production boats. alerionyachts.com/about/
- Greenline Yachts in Slovenia, working with Torqeedo, offers the option of an electric or a hybrid propulsion system in their production motor yachts. greenlinehybrid.com/
- Candela Speed Boat in Sweden recently introduced an electrically powered, foiling powerboat. https://candela.com/
- Spirit Yachts is a UK company that has been building classic sailing yachts since 1993. It now offers a 44-foot racer/cruiser with an Oceanvolt ServoProp15 saildrive. spirityachts.com/
- Salona Yachts, a company in Croatia, builds a modern 46-foot sailing yacht with electric propulsion, the Salona 46. salonayachts.com/
- Arcona Yachts is a Swedish company that now offers electric versions of all of their sailboats, ranging from 38 feet to 46 feet. The new 415 comes with electric propulsion as standard. arconayachts.se/
- In addition, at least 30 boatbuilders have teamed up with Oceanvolt to provide electric propulsion in their production boats. A complete list can be found on the Oceanvolt website. oceanvolt.com/e-boat-models/

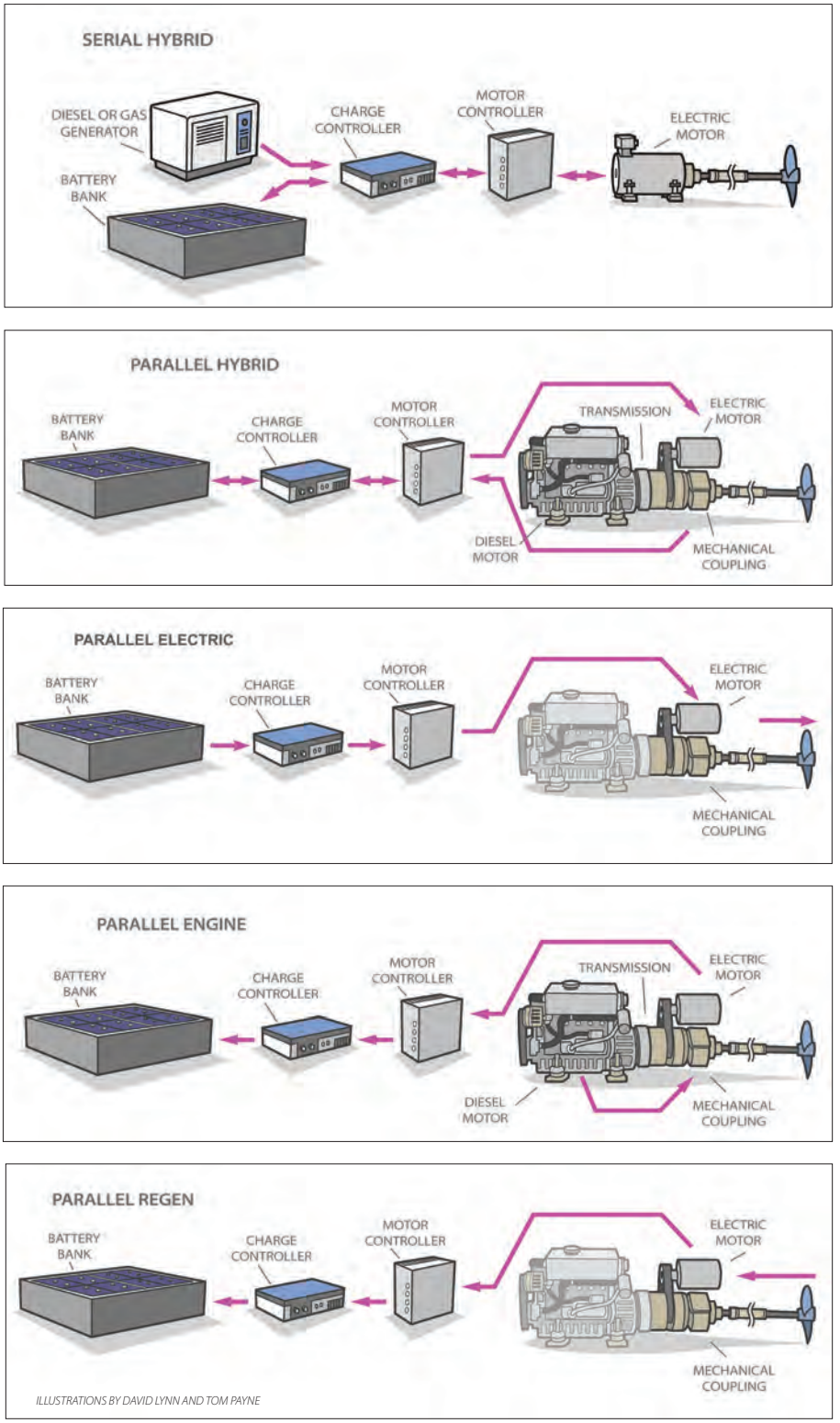
12 kW of recharge per day—equivalent to another 45 minutes of motoring.

Another method is prop regeneration. When a sailboat is sailing, its freewheeling prop can be configured to rotate the motor, turning it into a generator, which in turn charges the batteries. Hybrid Marine, a UK company that specializes in converting boats to e-propulsion, states that their system will regenerate about 350 watts when sailing at 7 knots. This translates to about 8.4 kW per day—more than the output of three of those 320-watt solar panels.

Combining solar panels, wind generators, and a regenerative prop, we might be able to generate as much as 30 to 35 kW per day, enough to motor our Liberty for an hour and a half or so. If we also keep the speed at the most energy-efficient point, perhaps we can increase the motoring time to two to three hours; more than adequate for most days. On the other hand, a couple of cloudy, calm days may find us producing little more power than our normal electrical needs, with very little going towards recharging the motor battery bank.

Having a small, 2- to 6-kW gas or diesel generator aboard can be a good backup plan and help reduce range anxiety. If the boat's displacement is much bigger than the kilowatt output of the generator, however, the generator probably won't be big enough to drive the motor directly. But, it can help recharge the battery bank. The negative, of course, is that with our Liberty, we'd have to run the generator for somewhere between three and 12 hours to replenish an hour's worth of motoring time.

Even with all these options, it's probably prudent to keep the boat towing insurance paid up—or consider another option, an automotive type of combination of a fossil-fuel engine and electric propulsion, aka, a hybrid.



ILLUSTRATIONS BY DAVID LYNN AND TOM PAYNE

Hybrids

Hybrid technology combines a fossil-fuel engine and an electric motor to propel a boat through the water. There's no range anxiety, because the engine is always available as a backup to get you home if you become becalmed, the weather changes suddenly, or the batteries run low. And just like today's hybrid cars, there are two approaches, a serial hybrid drive and a parallel hybrid drive.

A serial hybrid drive consists of a large generator that provides the electrical power to drive the propulsion motor and charge the batteries. (see Serial Hybrid at left). The controller monitors the battery charge and motor load and automatically starts the generator as needed. Ideally, the generator output should be at least large enough to drive the motor at maximum load. Any excess energy produced by the generator charges the batteries.

The generator can be either the boat's original engine coupled to a generator or a standalone AC or DC genset.

In its simplest form, a parallel hybrid drive has both an electric motor and the boat's combustion engine attached to the propeller shaft (see Parallel Hybrid on page 23). When the batteries are charged and the boat is motoring, the engine is shut down and put in neutral, and the electric motor drives the shaft (see Parallel Electric on page 23). When the batteries get low, the engine is started, driving the propeller as well as the electric motor and recharging the batteries (see Parallel Engine on page 23). When sailing, the engine is turned off, put in neutral, and the freewheeling prop drives the motor, recharging the batteries (see Parallel Regen on page 23).

Is it For You?

E-propulsion technology has seen major advances over the past few years. There have been significant improvements in battery technology especially, much of it spurred by the automotive industry. Even with these advances, however, batteries remain the weak link of e-propulsion for boats. Pound for pound, diesel has 10 times the energy density of the best available battery technology. Some of this is offset by the higher efficiency exhibited by electric motors, but even taking this into account, fossil fuels have a major advantage in energy density.

So, if we were repowering *Nine of Cups* today, would we go with one of the electric options or make the same decision we did a decade ago and replace that old diesel with a newer version? From a purely economic point of view, diesel is the clear winner. It's doubtful that the installation costs of electric would ever be recouped by the savings in maintenance, oil changes, and fuel.

However, there is much to be said for electric propulsion other than the cost, including quiet, smooth, emission-free operation, low maintenance, and increased maneuverability, not to mention the environmental benefits in terms of emissions and fossil fuel consumption. For me, it would be a tough call.

Good Old Boat *Electronics Editor David Lynn and his wife, Marcie Connelly-Lynn, lived aboard* Nine of Cups, *their Liberty 458 cutter, for 18 years, putting nearly 90,000 nautical miles under her keel and visiting more than 36 countries on five continents. They are currently exploring North America in a tricked-out Ford Transit van named* Blue. *They blog regularly and maintain an extensive website at justalittlefurther.com.*

The shortened prop shaft and 16-inch Perfect Pitch Extendo prop installed on *Footloose* raised eyebrows from old salts in the boatyard, but it's efficient and easy to change on an electric motor. Photo by Kirk Grier.

Hip Hugger

Storing the dinghy on the hip while moored is an easy, useful practice.

BY CHRISTOPHER BIRCH

A mother often finds it convenient to rest a toddler on her hip. A mother ship can benefit from the same approach when it comes to short-term storage for her tender.

Large sailing yachts frequently avail themselves of this option. The tender is pulled alongside, forward of the beam, with the painter secured to the bow of the mother ship. A three-point lifting bridle is rigged, and the small boat is plucked from the water with a spinnaker halyard. She'll rest nicely against topsides or stanchions when raised 4 or 5 feet.

Smaller yachts, like our 36-foot 1991 Morris Justine, *Sundance*, also benefit from this short-term storage technique; I find it a great solution for our wooden rowboat, *Heidi,* when I'm away from the boat for a few days.

Just like toddlers, unattended dinghies are prone to mischief, while a dinghy on the hip won't wander around or clunk into the boat like one on a tether. It will suffer a lot less abuse than a dinghy on a dinghy dock. The bottom will stay clean, and with the drain plug pulled, the boat won't collect rainwater as she would if left on the towline behind the boat or at a dock.

Hip storage requires a lot less work than hauling and lifting a boat onto a dinghy rack. It's superior to foredeck storage because it keeps the foredeck clear (and clean). Also, I can haul the dinghy into place on the hip by myself, whereas getting her over the lifelines and onto the foredeck requires the help of a crew member. For boats with dinghy davits, hip storage clears the transom, which can be convenient in some docking situations.

If theft is a concern, popping the toddler up onto the hip is a smart nightly routine that can stave off a nautical AMBER Alert. Thieves look for the easy targets, and dinghies floating on a painter behind a boat can be stolen without drawing attention. Dinghies suspended out of the water are harder to abscond with quietly and quickly. For additional security, dinghies and dinghy motors can easily be locked to the mother ship with a cable or chain when in hip storage.

Once you've built a lifting bridle and established lift points, hauling a dinghy a few feet out of the water is a quick and simple task. I used bowlines when building my bridle so I could easily tinker with the leg lengths until I had them optimally adjusted. I suppose purists would prefer to see splices in place of my bowlines. If so moved, go for it.

To keep dinghy weight to a minimum, I opted for soft lifting rings for the three corners of the boat. Ronstan 4mm x 80mm Dyneema links work well. I luggage-tagged them to a soft dogbone built from a wee bit of 3⁄16-inch New England Ropes Sta-Set line.

On most boats, a halyard winch will provide all the mechanical advantage needed for lifting. On my boat, the dinghy was catching on the rubrail of the mother ship on the way up. To solve this, I support a 4-to-1 purchase tackle with a spinnaker halyard. This allows me to strike the pose of an archer and hold the dinghy away from the hull with one hand while pulling it up with the other.

After hoisting, I lash the tail end of the lift line to the tackle above to ensure the line won't slip out of the 4-to-1 lower block cam cleat.

To maintain manageable loads for the tender and lifting rig, a transom or garboard drain plug must be left open to allow rainwater to escape. The lifting bridle should be tilted to assure drainage toward that unplugged opening.

It probably goes without saying, but storing on the hip is a moored strategy; doing it underway is a bad idea. Even when motoring in calm conditions, rolling in a wake could dip the tender in the water, adding unanticipated loads to the lifting and lashing gear. When sailing, the lifting rig will interfere with the sailing rig. In either case, increasing wind and waves would make launching and reverting the dinghy to the towline challenging.

Like most things having to do with boats, dinghies demand compromise. Larger tenders have greater load-carrying capabilities, but they are harder to stow. Dinghy sailing rigs and/or motors can be fun, but the added weight can be a burden. Storage on the hip helps ease the tension. The lifting systems already aboard the mother ship are strong, and there is plenty of room out there off the rail forward of the mast.

Keep that toddler out of trouble. Keep her on the hip.

Christopher Birch is the proprietor of Birch Marine Inc. on Long Wharf, in Boston, where he has been restoring and maintaining boats since 1985. He sails Sundance, *a 1991 Morris Justine.*

The tender *Heidi* is stored safely on the hip of the mother ship.

Anchor Alarm

An unpredicted nighttime wind shift created a dangerous situation that demanded quick action.

BY MARISSA NEELY

After months of boat work, my partner, Chris, and I sat back to enjoy the fruits of our labor while anchored in Emerald Bay at California's Catalina Island, tucked behind Indian Rock. Our 1979 Cheoy Lee 41, *Avocet*, had been home for three years, but we seemed to spend a lot more of that time working on projects than sailing, so feeling the movement beneath the keel was welcomed with every breath the ocean took, rocking us gently in the October sun.

It was the perfect belated-summer day spent snorkeling with friends, hiking along the shoreline, and enjoying the 80-degree weather. It wouldn't last.

A large weather system out of the north formed above us, bringing the most magnificent colors at sunset but also a strange, rather foreboding combination of hot, salty, damp air sliced by sharp, cold wind off the water. After reviewing the weather reports and consulting local sources, we decided to let out more scope, anticipating the accurately predicted 28-knot winds of northwest wind that was expected to die down at around 2:00 a.m.

As the wind built outside to a harrowing howl, we enjoyed the warmth and comfort inside our cabin thanks to our diesel heater. The storm was balefully beautiful, with thunderclaps that rattled our bones, sheets of rain that washed our decks, and stringy fingers of lightning that touched down all around us, illuminating the sky for brief moments before everything faded to black once more.

We were safe and sound, capturing the event with our camera and tucking our electronics into the oven-turned-Faraday-cage for safekeeping. The wind was blowing us safely away from the land mass, and we were at the end of our scope, about 20 yards from Indian Rock. Before turning in for the night, Chris completed his final deck check while I secured the portlights and hatches below.

Hours later, the sound of water crashing violently into rocks was our alarm—quite literally—springing us into action. Chris ran on deck, shirtless, while I scrambled to put my contact lenses in—I'm uselessly blind without them. To our horror, we saw that we were fewer than two boat lengths away from Indian Rock. The weather system we had gone to bed with had passed as predicted, only to be replaced by an unpredicted gale-force wind from the opposite direction, putting us on a perilous lee shore.

I threw my foulie jacket on and took the helm while Chris charged to the foredeck in hopes of bringing in the additional scope that had kept us secure during the first storm. I glanced behind me at the rock we had spent the afternoon swimming around and felt my stomach flip. It was so close I could nearly touch it.

Lightning cracked over the island while *Avocet*'s bow lurched up and down in the 5- to 6-foot chop that slapped us every five seconds or so. It was like riding an enraged bull as white water splashed up the sides of the hull like shattered glass.

With the engine on and me at the helm, Chris used the windlass to retrieve 100 feet of the original 175 feet of chain, leaving a 2-to-1 scope. Although we were much further away from the rock, it was still way too close for comfort, and the scope was terribly insufficient for the 35 knots of southeasterly wind. We needed to move.

Our windlass tore the 55-pound Vulcan from the seabed like a champ, and after struggling for a few minutes, Chris managed to lash the anchor on the bow in the heavy seas without taking any paint off the boat or skin off his limbs. I watched nervously from the helm as he stood there securing the anchor, shirtless, soaked repeatedly in showering spray, and not a life vest or tether to be seen.

With the anchor up, I revved the engine to gain distance from shore as Chris secured two reefs in the main and hoisted

Chris sits at *Avocet*'s bow at sunset as the evening's tumultuous weather approaches.

the sail within the span of five minutes. I threw his PFD at him, his adrenaline keeping him warm without a shirt. With a small amount of genoa unfurled, we broke off the wind and chop at about 35 degrees, making for deeper water.

A mile or so from the anchorage in 100-plus feet of water, I turned off the engine and let the sails keep us moving at 6.5 to 7 knots. After another 3 miles or so, we hove to, bringing the boat to a near stop, reducing the aggressive rolling and returning a small sense of comfort.

At this point, we were able to reconvene, layer up with some clothing, and figure out a plan. Simultaneously shaken and awed, Chris and I watched as lightning continued to split the sky and dark clouds rolled over the island, seeming to bleed into the ink-black sea. We decided to wait out the storm hove to in the safety of the deep water, then make a break for Avalon—a well-known harbor on the island about 20 miles away—when the winds lightened up.

I was fading from the excitement, my fingertips cold in the chilled early morning air. From below deck I grabbed two blankets and a pillow, making myself comfortable in the cockpit. I wasn't going anywhere in case Chris needed me.

Eventually I dozed off, and we remained hove to for another two hours before the wind resumed its normal direction from the northwest. Chris shook out the reefs, raised the main, and unfurled the genoa, still wet from the rain. At dawn, the clouds dissipated, and the sun brought bluebird skies, a complete 180-degree change from the few hours before. That day, we lounged beachside in 80-degree weather, our fellow beachgoers having no idea what we had endured to get safely to that very spot.

Chris and Marissa Neely have been living aboard and upgrading their 1979 Cheoy Lee 41, Avocet, *since 2018. Primarily they sail in and around Southern California's Channel Islands. Follow them at www.svavocet.com, on other social platforms at @svavocet, and on their YouTube channel called Sailing* Avocet.

The Takeaway—MN

This was the first time we had woken up in a bad lee-shore situation with *Avocet*. That night, we were reminded how things can change quickly and that we are at the mercy of the sea, humbling us to our core. The seaworthiness of our vessel and confidence in ourselves and our ever-growing knowledge and experience are the only things that stood between us and disaster. That we were able to stay (relatively) calm, start the engine immediately, pull the anchor, and be safely under sail in about 10 minutes was a true test of our skills.

There were things we had done right from the outset that helped accomplish this outcome. The dinghy was stored on deck for the night—this is our typical practice for quick action as needed—so we didn't have to worry about accidentally maneuvering over it or somehow tangling its line in our prop.

The engine through hull was already open, the navigation equipment was ready, and the sailhandling gear was ready to rock, needing no fiddling about. The reefing system for the main is quick and efficient, and the genoa furler worked flawlessly.

We did mess up a few things though, first and foremost, Chris not putting on his life jacket before doing anything else. Though I was relatively protected in the cockpit and was able to grab mine, Chris was fully exposed on the bow. Had a wave knocked him off balance and overboard, I am not sure how I would have been able to retrieve him. From the moment we woke up, it was a tight situation, and while it clearly warranted immediate PFDs, Chris was acting quickly and didn't have a second to put his on without compromising the boat and our safety. Still, things happen, and we will take it as a learning experience and remain thankful it was nothing more than that.

Another mistake was leaving our roll reducer poorly stowed. We use a flopper-stopper that we deploy and retrieve with our spinnaker pole, which slides up and down on a track on the mast and when stowed lies vertically along the mast. As the weather got sporty during the late afternoon, we should have retrieved and stowed the whole system, but instead (out of laziness) we pulled in the flopper-stopper but left the spinnaker pole deployed over our beam, where it remained securely tied 15 feet off the water.

There was no time to deal with the pole as we were working to get the anchor up and get safely away from the the rocks. And once we started sailing, Chris didn't feel comfortable going forward to bring the pole in and stow it because of the risk of a line being caught in the prop, skying a halyard, or the pole getting out of hand and damaging the boat or hurting us in what was an already tricky situation. Although not ideal (and clearly preventing us from tacking), we felt it was safer secured where it was.

This is one of the biggest reasons we have decided to swap our rigid boom vang for the traditional block-and-tackle with a topping lift, so we can easily use the boom to deploy and retrieve the flopper-stopper, rather than the pole.

Despite these errors, we did more right than wrong in this incident, and we're proud of our reaction time and doing what was needed when necessary to avoid catastrophic failure. Using what we've learned from those who've sailed before us (thank you, Pardeys!) and applying well-known storm tactics, we were able to seek shelter in deep water and safely wait until the system passed.

An Electrifying Refit

Restoring a nearly 50-year-old Pearson included repowering with electric.

BY JESS HALL

I purchased my 1972 Pearson 30, hull #220, in March 2015 sight unseen by way of eBay. I was the only bidder and won the "prize" for the minimum bid.

When I finally first set eyes on her in Annapolis, Maryland, I was sad to see this beautiful sailboat suffering such neglect. The bottom was spalling in several areas, the interior was a disaster, and all the running rigging was tattered and worn. The standing rigging seemed OK, but the haphazardly stored sails were moldy, and the mainsail looked as if it had been dragged along the bottom of the Chesapeake Bay.

Was I regretting my decision? Not for a minute. I saw the beauty beneath the overwhelming neglect. I shipped the poor girl back to my home in Barnegat, New Jersey, so I could spend time breathing life back into this sleeping beauty. And I certainly did spend time, starting with trashing everything not secured to the boat. I stripped out the holding tanks, freshwater tanks, electrical system, and every bit of running rigging. The Atomic 4 was beyond repair, so that went to the dumpster too.

Three months after I purchased her, I renamed her *Kenzie Too* in memory of our loving 17-year-old yellow Lab, Kenzie, who had left us the year before. And with a clean slate, I commenced a full restoration plan fit for a queen.

First Steps

I started with the obvious and the more-or-less easy part: the hull. Although I knew it would be quite some time before splashing, I repaired the bottom with epoxy, faired and smoothed it, and then coated it with bottom paint.

I cleaned and waxed the topsides to a shiny finish. Having taken down the mast for transport, I re-stepped it and replaced all the running rigging. Now my Pearson 30 no longer looked like an abandoned scow.

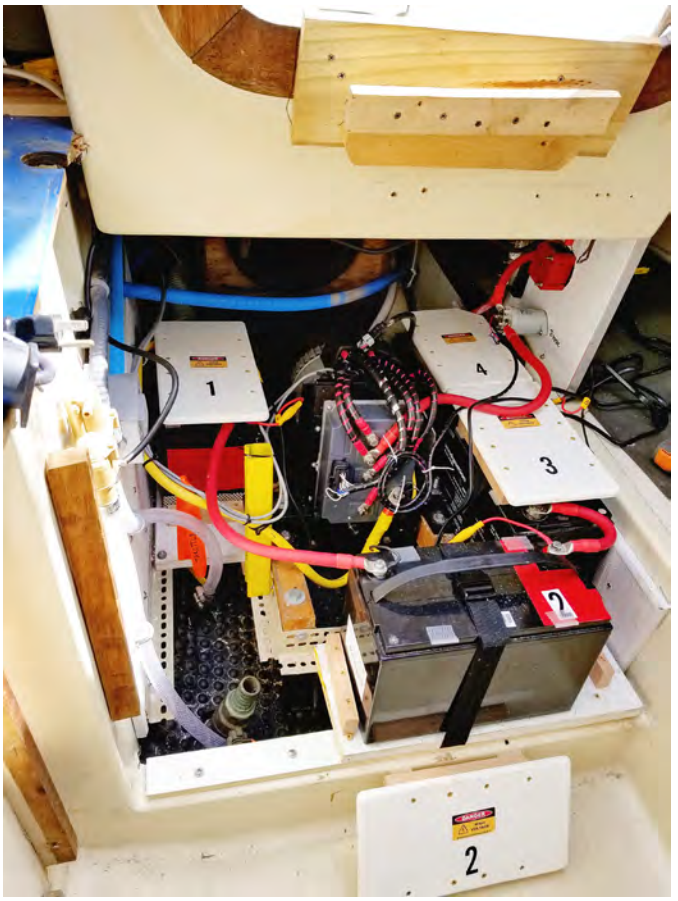
I replaced the old piped-in toilet and holding tank system with a Dometic 975 MSD, opting for the 5-gallon self-contained holding tank and pump-out fitting. I also relocated the freshwater tank behind the portside, outboard bulkhead inside the head compartment.

This afforded new storage below the V-berth and eliminated the stench of a saltwater overboard discharge and holding tank system. For the short-range sailing I would undertake in these refined years of my life, the modified freshwater system and sanitary system would be functional and efficient.

A good deal of master planning and multitasking now had to happen to accomplish the remaining elements for the restoration and refit. Fortunately, my engineering background, experience in boat restoration, my own woodworking and canvas

The first time Jess actually laid eyes on his new-to-him Pearson, she was on the hard in the snow, below.

The interior before the renovation, below right.



The new Electric Yacht motor and battery bank fit neatly into the space beneath the cockpit that once contained an Atomic 4, at left.

Jess repurposed the quarter berth to house the rest of the batteries he'd need as part of the conversion to electric propulsion, at bottom left.

As part of the propulsion conversion, Jess installed a new electrical panel between the saloon and the head; beneath it, he built a sliding, locking tray to hold the house batteries, below.

workshops, and the will to see things through enabled me to work this in while still running my personal life and business.

Going Electric

Along with the Atomic 4, I jettisoned the associated exhaust, controls, and fuel tank. I considered repowering with diesel, but being a "non-techno wizard" who is willing to try new, cleaner, and greener options, I researched electric propulsion.

Electric Yacht was the answer, and I decided to go with the 10-kW QuietTorque (QT10) electric motor system. Electric Yacht's team was extremely helpful when it came to planning, and we worked out answers to questions, among them, would the electric motor and needed batteries fit in the original engine compartment?

I set up the motor and battery configuration as a full-scale template drawing. This confirmed that the motor and four 100 amp-hour 12-volt AGM batteries would fit. However, I was 100 amp-hours short of what I needed to sustain a four-hour run. I sacrificed the port quarter berth to store a second battery bank identical to the first, and that did the trick—48 volts DC and 200 amps of clean, quiet propulsion.

I fabricated a new electrical panel and located it on the bulkhead between the saloon and the head. This minimized wire run lengths and offered a place to store two deep-cycle house batteries below the electric panel. To do this, I built a sliding, locking battery tray within the forward cubbie area of the starboard berth in the saloon. The remainder of the berth works very nicely for seating and is quite comfortable. This battery tray is behind a louver that provides ventilation.

I installed all new wiring and switching for the DC system and new wiring for AC shore power. I charge the motor's batteries with shore power, which is enough for my limited needs. However, just in case, I keep an 1800-watt, low-decibel generator on board that can charge the propulsion batteries. If I need AC power for small appliances like a coffee pot or phone charger, I use a self-contained Goal Zero Yeti 1500x Portable Power

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The new steering system under construction. It includes a new raised platform to accommodate the Edson pedestal; the cable-drive quadrant is beneath the platform, at right.

Jess at the helm of *Kenzie Too* after three years of renovation, upgrades, and refit, at far right.

Station that provides safe, clean 120-volt power.

For the running gear, I wanted to swap the existing feathering propeller for a more reliable fixed-blade prop. On eBay, I scored a "vintage" three-blade, 12-inch, 10-degree-pitch propeller and had it reconditioned. eBay provided a new shaft seal as well. I bought a new shaft bearing from Defender and attached everything to the boat's ⅞-inch shaft.

Changes on Deck

My Pearson came with a tiller, and I wanted to convert it to wheel steering. Like the propulsion, this conversion required detailed planning. I designed several actual-size templates and painstakingly fabricated a raised platform from plywood and fiberglass to house the cable-drive quadrant. I mounted a "vintage" Edson pedestal (eBay again!) to this platform. The cable-drive quadrant beneath the pedestal attaches directly to the tiller fitting on top of the rudder post. I cut down the tiller and stored it in the lazarette to be used as an emergency tiller.

Another big cockpit modification was moving the mainsheet traveler from the cockpit to a location over the companionway, as far forward as possible without stressing the boom. (I had done my research and knew how to make this conversion safely.) I mounted the traveler track with raised supports that I built of AZEK, through-bolting them with stainless steel bolts and backing plates. For aesthetics, I covered the backing plates with compact wooden boxes that contain lights, but I can still easily access the fasteners for inspection and any needed tightening.

The interior after the renovation.

Now, I can control the mainsheet via a fairlead back to the port winch by the helm.

When it came to the sails themselves, I replaced the old main with a new fully battened mainsail. It's a little shorter than the original to accommodate the slightly higher boom, which I raised to gain headroom in the cockpit and clear a newly installed sectional bimini. (I fabricated the bimini in my workshop and added light-diffusing, see-through center panels that let me see the mainsail while maintaining shade in the cockpit.)

Lazy-jacks make the mainsail easy to lower and stow, and other than going to the gooseneck to reef, there's really no need to leave the cockpit to tend it. Likewise, the headsail; I'm a fan of hank-on headsails, and most of the time I use a 125-percent working jib. I installed a downhaul that's attached to the headsail halyard and leads aft so I can easily lower the headsail from the cockpit. Lifeline netting prevents it from falling overboard.

Comforts Below

When it was time to turn my attention belowdecks, I gutted the interior and refinished it with laminate PVC board and PVC beadboard to provide a bright, cheery environment instead of the customary dark, wood-rich panels. I dressed up the cabin sole with removable carpet runners stabilized with nonslip backing. And, I reupholstered everything with Sunbrella. Finally, I replaced all the lighting with dry-cell-powered LED that's not dependent upon the house battery for power (only navigation, communication, and safety devices use the house batteries).

In August 2018, three years and about $12,000 later, *Kenzie Too* splashed for the first time. Since then, she's been a joy to sail. Of course, she's an ongoing work in progress, but I know of very few boats that aren't. It's all part of owning a very good old boat—all it takes is time, attention to detail, and patience.

Jess Hall knew at a young age that he wanted to go to sea; he ended up on a Merchant Marine training ship at age 16 and then joined the Navy. In 2010, he founded a boat repair and restoration business, mainly working with wooden boats, and since has spent much of his time involved with boating in one form or another.

Evolving into E-Power

Sailing with a diesel auxiliary, as well as engineless, led one couple to make a third choice: fully renewable electric propulsion.

BY ADAM COVE

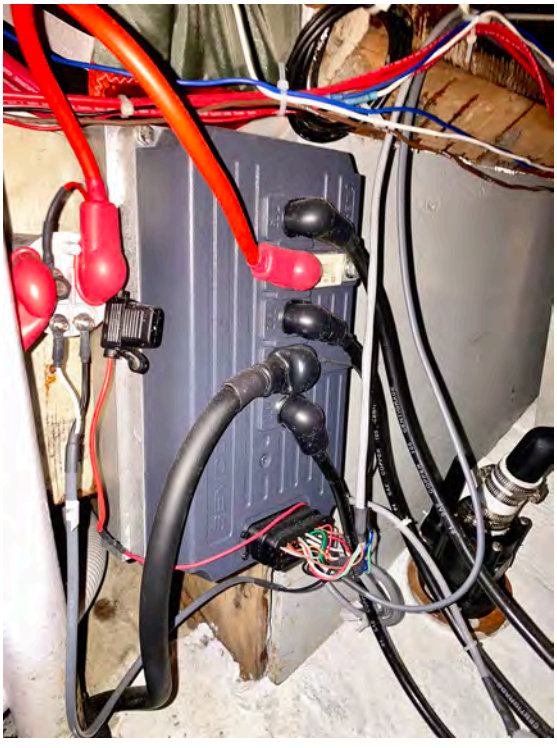
As far as I can tell, my fiancée, Alison, and I aren't typical sailors. On our 1969 Luders 33, *Ben-Varrey*, it's not unusual for us to sail when others would fire up the engine. Instead of racing to the next anchorage, we pull out a book, splice a line, clean the decks, or make a nice meal while underway. True, there are times when we are entirely becalmed while some slow sea creature, like a sunfish, does laps around us. But we spend more time on the water and let the journey create an incredible experience.

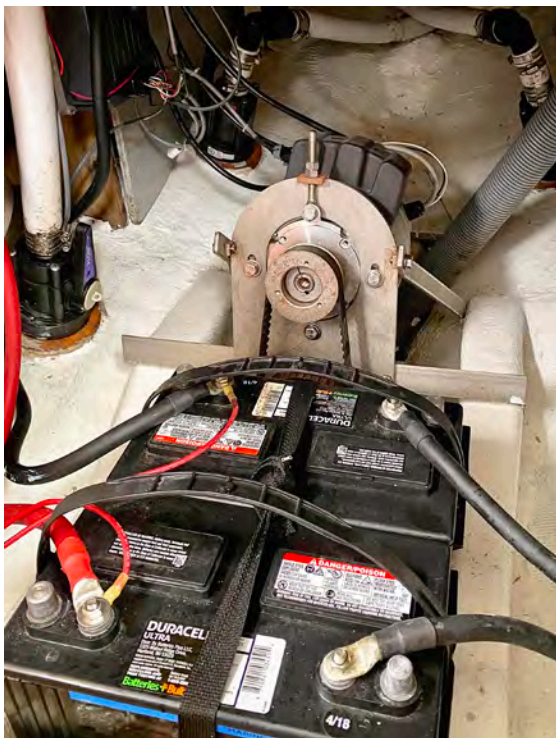
This philosophy has driven the changes over time in our relationship with *Ben-Varrey*'s auxiliary propulsion, from diesel, to no engine, to an electric propulsion system. When we bought her, she had a 28-hp diesel that possessed its own personality and demanded regular attention to keep running smoothly. That game lasted for two years before the desire for simplicity and the need for a new challenge took over. We went engineless. Yes, I hauled a perfectly good engine out of the boat, sealed up the shaft log, and bought a sculling oar.

Sailing on and off anchor was standard practice already, but this change did force me to refocus on light-air sailing. There was no option other than to sail or scull up to docks for water or pump-outs. It was a quick way to get to know intimately how the boat handles and to develop new skills in the warping department. *Ben-Varrey* was noticeably lighter and faster, thanks to that 550-pound diet. And a spacious new storage area for folding bikes was a bonus!

Granted, it takes a special mix of patience, experience, and craziness to enjoy it, but I would rather work hard to keep the boat sailing than spend time buried in the engine compartment. And the change came with unexpected benefits. Every trip required better planning; wind was always helpful, and current could be an ally or enemy. This level of forethought led to quick local sails and a great head start on anything with distance. It was also safer navigationally. We didn't tempt a lee shore with an engine not starting, and any oncoming traffic earned high attention.

But, after sailing for three years with only a sculling oar for auxiliary power, Alison challenged me to come up with a solution to expand our cruising options. There are some channels that are just too tight to short tack and days when the breeze is just out of reach. It was a matter of convenience. There was always the option to wait for conditions to change, but perhaps there was a better balance—a level of modest convenience? The solution would also need to be as environmentally ethical and thoughtful as possible.





The controller is mounted close to the motor to keep wire runs to a minimum, which helps prevent voltage drops caused by high current flows, at far left.

The new motor and four batteries fit neatly into the space the diesel engine had occupied, at left.

Adam performs some annual maintenance on the propeller, replacing the zinc and applying a new coating of Propspeed.

The Calculus

Regardless of what we would install, we would not fall into the trap of relying on it to get us out of trouble. All navigational decisions would still need to be sound, and we would preserve redundancy through our main propulsion system: sails and rigging.

We needed to maintain simplicity and keep maintenance and operational effort to a minimum. All avenues led to an electric propulsion system that was self-sustaining while on a mooring, anchor, or underway. It needed to be charged by renewable power. This represented complete independence.

An electric motor doesn't have a crankshaft, pistons, injectors, a fuel pump, fuel valves, a camshaft, rocker arms, or a crosshead bearing, among many other common moving diesel engine components. The only moving parts to wear out on an electric motor are a set of bearings and potentially a belt if a gear reducer is used. As for electrical components, modern diesel engines are just as dependent on them as a full electric propulsion system. Combine these two factors, and an electric motor is fundamentally more reliable and requires less maintenance. It also eliminates issues like contaminated fuel that will stop a diesel engine.

Another bonus is the cleaner boat environment. Nothing makes me seasick faster than being trapped in a hot, small compartment that reeks of diesel while rocking back and forth and getting covered in oil or grease. Likewise, no exhaust in the cockpit. We'd experienced the clean boat smell after we extracted the diesel engine and were not willing to go back.

Finally, there was the money factor. Since we were looking at a partially self-built electric system, the cost was well under half of the cost of a new diesel.

With our commitment to wind propulsion firm, this new system was to be a true auxiliary. Range would be limited by our battery capacity. We wouldn't get anywhere close to the power density of diesel with a similar volume of batteries, but given our goals, this concern could be left ashore. With our intentions clearly defined, the system began to take shape.

The Motor

The heart of any propulsion system is the power plant. This is where I began the project's design: the electric motor. When sourcing a diesel, the language is horsepower; when selecting an electric motor, it is kilowatts (kW). Some translation was needed to determine the size of the motor I would need, and it's not as simple as multiplying by a conversion factor.

There are two approaches to this. One is what most sailors probably will use, a table that electric propulsion manufacturers provide to help determine the conversion's parameters. The second requires more work but is more accurate. However, it also requires a four-year degree in naval architecture, or at least the ability to follow a set of formulas from a book on yacht design. I took the second route, as I'm a bit of a boat nerd; that degree was expensive, and I need to make it count anywhere I can!

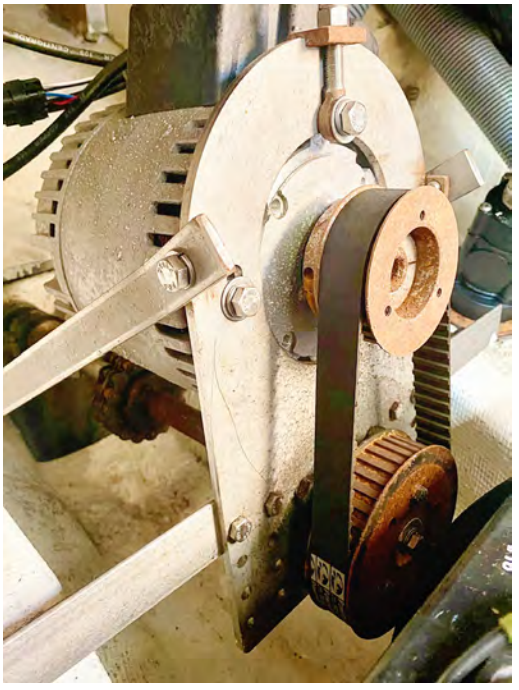
The process also provided me with a propeller and shaft specification, which made it simple to order a new Campbell propeller. After crunching the numbers, I knew that the 28-hp diesel that I once had could be replaced with an 11-kW electric motor, with the added benefit of instant torque.

With the power determined, I narrowed the search by choosing between a brushed or brushless motor and the voltage. Brushed motors were less expensive, but a brushless motor carried significant advantages, among them higher efficiency, higher torque-to-weight ratio, increased reliability, a longer lifespan, and no ozone production. Why worry about ozone? In addition to higher concentrations being harmful to humans, it posed

a risk to a fair amount of equipment on board. Ozone can quickly break down certain rubbers like nitrile, which was the material of the diaphragm for my primary bilge pump (close to where this engine would be installed). I'd look for a brushless motor.

In the brushless family of motors, I could opt for a brushless DC motor or an AC motor with a DC controller. The voltage would need to be much higher than the existing 12-volt power in the boat, as the current draws would be too large for any reasonably sized wires to handle without suffering major voltage drops. Existing electric vehicles and boats had a range of voltages, but 48 volts seemed to be emerging as the leader on the marine front.

As I dug deeper into options, I came across Thunderstruck Motors (thunderstruck-ev.com), a California-based operation specializing in DIY electric drive systems for vehicles and boats. They offered kits for boats that included a 48-volt brushless motor, controller, and throttle, all bench-tested before delivery. They also had gear reduction kits, which I would need to reduce the rpms on the propeller shaft per my earlier calculations. I purchased the 10-kW kit, as the next size up, 12 kW, required water cooling for the motor, an added complication not in line with my propulsion needs of occasional and light use.



A carbon-reinforced rubber belt connects the motor's two gears.

The gear reducer acts as the primary frame of the installation. The motor is bolted to the upper smaller gear, and a coupling secures the propeller shaft to the lower gear. The two gears are connected by a carbon-reinforced rubber belt. Installing the gear reducer frame required custom brackets that my brother, Ryan, fabricated (he's a marine mechanic, machinist, and boatbuilder). He also assisted with some custom tools for the propeller shaft installation. The alignment of the gear reducer to the propeller shaft frame is critical and made slightly easier by the flexible shaft coupling provided. A few dry installations went a long way in making sure that all the components would line up correctly.

We built a custom box to house the throttle, accessible through a latched waterproof door in the cockpit. This also housed the main power switch for the engine, which activated a solenoid to allow power to flow to the controller. I installed a second, manual, switch in line with the solenoid to ensure the power was off when I was doing any maintenance.

I mounted the motor controller safely to the side of the motor but close enough to minimize the distance of the wiring runs. Such high current flows can result in large voltage drops if wires are not large enough and if wiring distances are too long. By keeping the components in proximity, I could maximize efficiency with heavy-gauge wire. And, since the new electric motor configuration was so much smaller than a diesel, I could install the batteries right next to the motor, allowing for another short wiring run to the controller.

The Batteries

Aside from emissions considerations, we also wanted the life cycle of the entire system to be as environmentally responsible as possible; each component should be as low impact as possible to manufacture and be readily recyclable. If the batteries were just going to end up in a landfill, require a tedious recycling effort, or run the risk of poisoning the environment, we missed our goal. That immediately removed any form of lithium batteries from the list, despite their capacity and efficiency. This technology is still young, and I bet there will be appropriate and widely available recycling, especially for the LiFePO4 versions, in the near future. It's just not available today. And although the mining performed to create any battery is far from ideal, that is universal.

Adam fabricated a small, weatherproof compartment in the cockpit to house the throttle and main power switch for the motor.

At the top of the list were flooded and AGM lead acid batteries. They are almost entirely recyclable (and previous emissions from the process have been greatly reduced by regulation). We settled on flooded lead acid batteries for the cost per amp-hour and relative cost of the efficiency when compared to AGM. A Duracell group 27 flooded deep-cycle 90-Ah marine battery cost slightly over $100. There is undoubtedly a performance difference when compared to other battery types, but as with any outfitting choice, we compromised based on our priorities.

The motor required 48 volts to operate. Shy of power loss through a DC-to-DC converter, that means that the boat needed a power bank comprised of intervals of four batteries. So, would we have four, eight, twelve batteries? At 50 pounds each, this needed to be carefully considered. This was altogether separate from the existing solar-charged house battery bank that already included three of these batteries. It was effectively replacing the long-forgotten full diesel tank and the single engine starting battery (330 pounds).

Ben-Varrey **at anchor in Cutler Harbor, Maine. In this photo, the solar panels on either side of the pushpit are raised to capture maximum sunshine.**

Battery bank capacity needed to be equated to range. Also, since resistance is not linear but rather exponential for this and other displacement boats, I needed to determine the range at different speeds. The motor could deliver a maximum of 10 kW. Using the vessel's particulars and a velocity prediction program (later verified by sea trials), I estimated this to equate to 6.4 knots in flat water.

In a 48-volt battery bank, 10 kW requires approximately 208 amps. Given that flooded batteries should not drop below 50 percent capacity, a bank of four 90-Ah batteries (using only 45 Ah) wired in series would provide just under 13 minutes of motoring at 6.4 knots, or a range of 1.4 nautical miles. Pulling that many amps out of a deep-cycle flooded battery will cause sulfation on the plates and reduce battery life considerably, even with occasional equalization, but since I had no interest in motoring that fast, I wasn't too worried about this.

The table at right breaks down the calculated range at other speeds following the same logic.

With eight batteries, multiply the ranges by two. With 12 batteries, multiply by three. Most importantly, this is based on calm water (if it were not calm, we would be sailing), and slow and steady winning this distance race.

Based on our minimal engine use and the desire to be able to charge this battery bank entirely on renewables in a reasonable period of time, we opted to install just four batteries. In existing space within the engine compartment, I fabricated secure foundations for the batteries using wood, fiberglass, aluminum flat stock, and nylon webbing. Fitting additional batteries would have been possible but challenging. And remember the weight factor. Lighter means faster, so why add more weight to slow us down? The future of energy storage is promising, and we will be keeping a close eye on what is coming next.

Renewable Charging

Any battery storage bank still needs to be charged, and we wanted our installation to be fully off the grid. That meant solar, wind, or hydro generation specified such that the batteries could be recharged within a short passage.

Expanding our existing solar array would be the most cost-effective first step. We opted for twin Renogy 175-watt solar panels, the largest we could fit on board. These replaced our existing twin Renogy 100-watt panels that charged just the house bank and moved us from a combined 200 watts to 350 watts. The panels are attached to the pushpit, port and starboard, with customized adjustable rail brackets. The panels tilt to help optimize power generation and fold all the way down for docking.

The panels are connected in parallel and linked to a two-way switch. One mode charges the house bank with a 12-volt charge controller (Victron 100/30) and the other charges the engine bank with a 48-volt boost charger (Renogy Rover Boost). The generation varies considerably with the time of year, cloud cover, and point of sail. For example, sailing south in the fall wing-and-wing with a northerly breeze is tough on generation. Alternatively, a completely clear summer day at anchor will provide the maximum amount of energy. The panels can add anything from a few watts into either bank to our current best of 1.75 kW in a day. Just like any exchange, you must budget use based on generation. A series of cloudy days equates to less motoring unless there's another charging source.

A wind generator was next. This took a fair amount of research and would be a completely new form of power generation for *Ben-Varrey*. The wind generator would be dedicated to the engine battery bank, and a 48-volt unit would offer the best charging efficiency. The market is flooded

Engine Power	Speed	Range (Time)	Range (Distance)
10kW	6.4 kts	13 min	1.4 nm
8kW	6.1 kts	16 min	1.6 nm
6kW	5.5 kts	22 min	2.0 nm
4kW	4.7 kts	32 min	2.5 nm
2kW	3.5 kts	65 min	3.8 nm
1kW	2.3 kts	130 min	5.0 nm
.5kW	1.4 kts	259 min	6.0 nm

with options but shrinks considerably when looking for 48-volt models. (On a side note, I installed a crossover switch that can charge the house bank from the engine bank via a Victron 75/15 charger, allowing the wind generator to effectively charge the house.)

After focusing on efficiency and noise level, we installed a Silentwind 400-watt model that included a charge controller specific to the unit. It consistently scored well in professional reviews and in various forums, with an emphasis on decent generation at lower wind speeds and quiet operation. Shortly after installing it, we were in the Vineyard Haven anchorage among a few other boats with wind generators, one at least a thousand feet away. From our cockpit, we easily heard the others above ours. Along with Silentwind's great customer service, this performance reinforced the choice.

I mounted the wind generator on a 9-foot-tall, 3.5-inch-diameter aluminum Edson pole secured to the deck and the reinforced pushpit using Edson Marine's stock fittings. The height places the spinning blades out of the way of any person or sail, yet I can just reach it when standing on the pushpit. This maximizes wind velocity while also ensuring that I can physically secure the blades in heavy weather or during maintenance.

A wind generator's power generation is exponential relative to wind speed, and it does not start generating any power until a certain wind speed. In most sailing environments, it's the lower wind speeds that count. A wind generator's ability to produce an impressive number of watts in 40 knots isn't all that helpful (although on a recent heavy-air passage, I had the entire boat running off of the wind generator, but that's a rare exception). In most cases, we were concerned with how much power could be generated in 5 to 22 knots of breeze—at least 90 percent of the sailing conditions we experience. The Silentwind 400W estimated production as follows, and has proven very accurate based on our four years of use:

Wind Speed	Power Generated
6 kts	6 W
8 kts	15 W
10 kts	25 W
13 kts	50 W
16.5 kts	100 W
21 kts	170 W
23 kts	220 W
24 kts	250 W
25 kts	300 W
26 kts	350 W
27 kts	400 W
28 kts	420 W

We didn't expect the wind generator to hit the same power generation peaks as the solar panels, but because it can generate power anytime, it becomes competitive in total generation. On a cloudy and windy day, it will be doing almost all the work. On average, we generate 1.1 kW per day with the wind generator.

A third possibility would have been a hydro generator, which uses a propeller to generate power while under sail. Unfortunately for us, the math didn't work out. It was too costly for our budget to go with a separate unit, and using the new propeller and motor was equally problematic. The ideal propeller design for driving a boat forward is very different from the optimal design for power generation under sail. With the fixed-blade propeller that was in our budget, and consideration of the aperture in which it would sit, regeneration by the motor wasn't worth the effort to develop.

Time with this renewable package has taught us that we still need to be conscious of our energy use, but we have sufficient generating ability to fill our needs. The solar is directed approximately 90 percent at the house bank, as the wind generator charges the engine bank well on its own. We have increased our house electrical usage with time and find that we have topped up batteries earlier in the day. Combined, we generate a typical 2.2 kW per day, split evenly between the generation sources over a long enough period. This number will be lower when cruising in Maine (1.8 kW) and higher when wandering in the Caribbean (2.6 kW)—a perfect fit for the additional refrigeration draw in warmer waters.

With our occasional usage of the electric propulsion system (typically five to ten minutes at low speed), it can easily be charged up within the same day, typically in a matter of hours. If we were to run the engine batteries to our imposed minimum level of 50 percent, it would take a couple of days for them to recharge, on average. Under certain weather conditions, that could be shortened to only a day or lengthened to a week. Therefore, we remain conservative with usage, which fits well with our sailing style.

We are still sailing with this system four years later and we love it. Maintenance has been nearly nonexistent, we sustain adequate power levels on a mooring and at anchor, and there seem to be no limits on our sailing destinations.

This has been our experience, and we hope it inspires others to think about breaking through resistance to change and innovating when it comes to repowering.

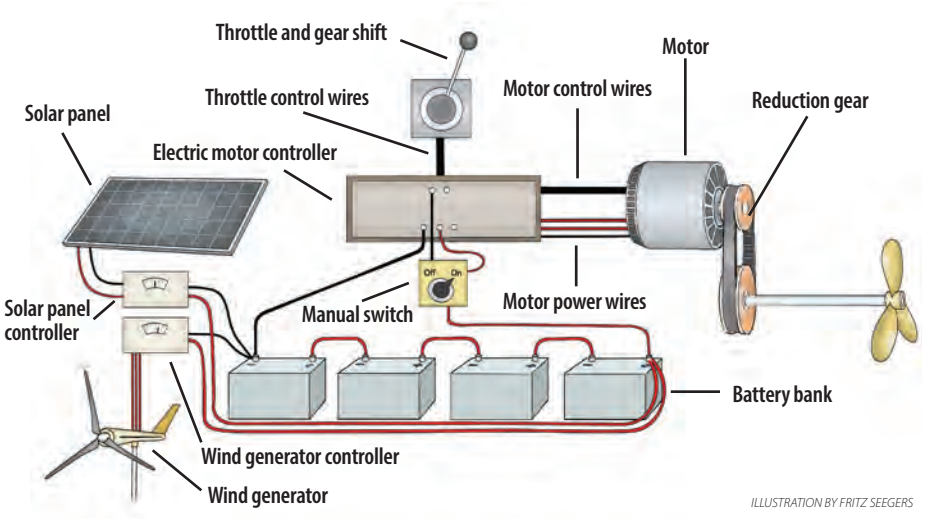


ILLUSTRATION BY FRITZ SEEGERS

Adam Cove is a naval architect and former CEO of Edson Marine. Now a marine consultant, he lives aboard and travels with his fiancée, Alison, on their Luders 33 Ben-Varrey. *Check out their latest travels at www.adamalison.com.*

Rethinking the Thimble

Do you really need to splice a thimble into that line? Maybe not so much.

BY DREW FRYE

Traditional wire or metal thimbles are common gear on boats, usually spliced into a line where a rope bears on a shackle—for example, a rope anchor rode attached to a chain, or a halyard end. But when it comes to truly high loads—tow lines, drogues, and sea anchors—there is a growing understanding that traditional wire thimbles (the most common type) can do more mischief than good.

The problem with traditional thimbles is that nylon stretches under load. No matter how tight you form the eye and seize the throat, it becomes loose under high load. If subjected to pulling loads and being jerked from side to side, the metal thimble can shift from its proper position and abrade the rope, and its sharp edges can easily cut nylon that is wet and under load.

In other instances, the thimble damage is more annoying than life threatening. For instance, over-hoisting a halyard can cause the thimble to gouge the halyard sheave, which then begins chafing the halyard itself.

In most cases you just don't need a thimble; I haven't used one in 20 years. Instead, I attach smooth hardware directly to the eye or connect drogue bridles and rode sections with a luggage tag/girth hitch (which is simply a way to attach a loop to another loop or object—like a shackle—by passing it through itself). Note that rope is best connected to chain by splicing the rope directly to the chain, eliminating both the shackle and the thimble. This is mandatory for rodes that pass over a windlass, but I like it better for hand-hauled rodes as well.

To best calculate the types of attachments to make, it's useful to understand the D/d ratio—the ratio of the diameter around which a line is bent, divided by the body diameter of the line. This ratio helps determine how a line is weakened due to sharp changes in direction; a higher number means the rope is weakened less by the turn. Single braids, like Amsteel, are still 100 percent strength at a D/d of 1 when used as an eye, but double-braid and three-strand are slightly weakened.

In fact, very few lines break because they are overloaded, because most are sized for stretch, not strength. They fail because of chafe, and most often that is not the apex of the eye. All bends weaken the line, but because there are two legs in an eye, as long as the line is not weakened more than 50 percent, the eye remains 100 percent strength.

While polished hardware, such as a halyard shackle, does not really abrade line, if it seems like there's potential for chafe, if the D/d ratio is less than 1 for single-braid, or if the line is double-braid or three-strand, I slide a length of tubular webbing over the rope before splicing. This will increase the D/d ratio and provide considerable wear protection.

Specialized coatings, such as Yale Maxijacket, can also extend wear four to ten times (I tested this on a chafe test rig and in the field). They stiffen the rope some, so they're excellent in jammers, but limit the coverage to areas that are not handled or on winches.

Movement between two lines can be prevented by luggage-tagging one around the other. But doesn't a knot weaken the line? Not in this case. The luggage tag or girth hitch is unique in that both legs carry half of the load. The bend around the other line weakens the line about 50 percent, but each leg carries only half the load, so it works out. However, when a rope runs around a pulley, the D/d ratio rules are different. Because both legs carry the full load and because there is friction between moving fibers, an 8-to-1 D/d ratio is recommended.

And of course, that rusty mooring shackle is a different case. The pendant should be well oversized to provide long wear and fatigue resistance. This conservative sizing will also keep the eye from stretching. Without a thimble, the shackle would eat the rope and even chafe gear for lunch.

Even so, I recommend using a tube shackle for better stability, or at the very least, carefully polishing all sharp edges. Yes, this is impossible on galvanized thimbles, but they seem less prone to shifting than stainless, most likely due to greater friction.

Good Old Boat *Technical Editor Drew Frye draws on his training as a chemical engineer and pastimes of climbing and sailing to solve boat problems. He cruises Chesapeake Bay and the mid-Atlantic coast in his Corsair F-24 trimaran*, Fast and Furry-ous, *using its shoal draft to venture into less-explored waters. He is most recently author of* Rigging Modern Anchors *(2018, Seaworthy Publications).*

This boom end plate could chafe this Dyneema topping lift. A short bit of webbing stops that with less weight and bulk than a thimble.

The Noob Cruise

A first-time passage to Catalina Island serves up wildlife, outboard hijinks, starry nights, and happiness.

BY DAVID BLAKE FISCHER

I was getting pretty good at the marina thing.

Nine months after getting *Delilah* (see "Hey There *Delilah*, May/June 2021), I was settling into that unsettling period just after one realizes their midlife crisis dream. To onlookers, I was a real-life sailor with a zinc-slathered nose and a capable little 1972 Cape Dory 25. But I had no real chops at ocean sailing.

Twice a week, I went to the boat. I'd bring along a VHF radio, a life vest, and a few magazines. So my wife would think I was a serious sailor, I'd also pack a small cooler with drinks, chips, dip, and some moist towelettes. At the dock, I'd pull out the cockpit cushions, warm the outboard, and chat with neighbors. Then, when they were out of sight, I'd turn off the motor, apply sunscreen, and nibble on snacks.

Also, my slip was located between a Trader Joe's and a nautical-themed restaurant with old photos of John Wayne, Ben Stiller, and Goldie Hawn laughing, drinking, and eating fried food. So, no, I wasn't on the open ocean, per se, but the smell of fish sticks, the photos of the cast of "Overboard," and the fact that I could see my boat from the restaurant's patio meant I was almost sailing.

"What are you gonna do?" a dockmate hollered at me one morning. The guy was maybe 70. He held a paint brush and a coffee cup filled with epoxy. It looked to me like he was transforming his Catalina 25 into a Hawaiian-themed houseboat. "You gonna cruise that new boat of yours? Anchor at Malibu? Take it to Catalina? What are your plans?"

I poked my head up from the cockpit. "Well, I've got a lot to learn before an adventure like that," I said.

"You know more than you think you do," he shot back.

When I first got here, the thing that struck me was the size of things. Marina del Rey is a city and a marina and a condo development. On weekends, 20-somethings charter megayachts to take TikTok videos of themselves twerking on the bow of a boat.

The other thing that struck me was the size of the Pacific Ocean. Each time I sailed *Delilah* beyond the breakwall, I got the sinking feeling that I was entering into danger. Over some months, that fear faded, though by summertime it still hadn't disappeared, and I still hadn't sailed beyond the Santa Monica Bay.

Then one evening, I met a guy on a Catalina Capri 18. *That's a small boat for an ocean*, I thought. The boat isn't really that small; my 25-footer is just 18 feet at the waterline. Anyway, we talked on the dock and exchanged info. A couple of weeks later he texted.

"Hey, it's Jordan on the Capri 18," he wrote. "I'm sailing with my buddy Dan to Catalina Island in August. Would you like to come along on your boat?"

Santa Catalina, aka Catalina Island, is one of the Channel Islands, a 21-mile-long volcanic remnant off the coast of Southern California renowned for its rugged beauty, rare

David and *Delilah* head into the morning light leaving Marina del Ray.

Delilah **rests on a mooring at Catalina Island, at left.**

DK and David (L to R) enjoy a nice reach on *Delilah,* at bottom left.

species, and OK restaurants. Two Harbors is a village on its skinny northern end, 18 miles from the island's only city, Avalon, and 31 miles from Marina del Rey. To get there, sailors cross one of the world's busiest shipping lanes and areas of ocean where water depths reach 3,000 feet.

I bit my thumbnail and considered Jordan's text. Then, I wrote back: *I'm in.*

The summer heat was searing. A couple of weeks before the trip, I took my son to the pool. I was floating on my back, lost in thought, when the lifeguard stopped me. He was just a teenager, but he was in that little tower and he had that whistle. Pool rules: He said I'd have to pass a swim test to be in the deep end. I was 39; the pool's depth maxed out at 5 feet 5 inches, but I respected it.

And, so, here's the thing I want to mention about sailing: Unlike at the 5-foot-deep pool, anyone with a boat can simply float out onto the ocean, totally unsupervised, and go.

When I'm nervous, I bite my fingernails. Sometimes I eat chips or make lists. As the Catalina adventure neared, I made an inventory of everything one might want on a weekend cruise. Typing with a single, Dorito-stained finger, I searched for chart plotters, biminis, and outboards. As my list grew, it migrated from scrap paper, to cell phone, to laptop.

A few days before departure, I was resting on my kids' bunkbed, using a magic marker and writing *cool dinghy with drink holders* on my hand when I had an epiphany. Maybe I didn't need this stuff. Maybe the boat was ready. Maybe I was just...nervous.

That night, I went down to the water, tidied up *Delilah*, and rehearsed some things. *Here's hot dogs on top of beer in the cooler; and here's hot dogs beside beer with lunch meat on top.* "What do you think?" I asked my wife.

"You're going to have fun, David." Emily said. "Do you have gas for the outboard? Have you downloaded Navionics?"

"You read my mind," I said. "It's literally next on my list."

An experienced sailor might wait until there's wind to sail to Catalina Island. I lacked that particular insight. So, we left at 8 a.m. and motored through soupy seas and light fog—Jordan and Dan on their Catalina 18 and my buddy, DK, and me bobbing along on *Delilah.*

"Point the boat about 2 inches to the right," I told DK, squinting at my iPhone like an Angelino in traffic. This exchange repeated every few minutes. Between intervals, I'd spill a coffee, sit on my sunglasses, or drop my phone, then glance down at Navionics and announce, as if for the first time, "OK, let's head about 3 inches left. Yes, DK. Hold it right there!"

This story might be titled "Amateur Man Goes Motoring" were it not for the fact that, with each passing mile, a sense of flow took over, and my anticipation of the trip was replaced by the real-time experience of it.

"Oh my god!" DK said. We were about 7 miles out. A pod of bottlenose dolphins, numbering perhaps in the hundreds, was stampeding at the surface. DK went to the bow. I held the tiller between my legs and shot some video. Most of my life, I've seen protected or institutionalized expressions of nature: zoos, stocked fishing ponds, cats playing keyboards. To encounter this many dolphins, from a small sailboat, with the cliffs of the Palos Verdes Peninsula behind us, was wild.

"Did you get a good video?" DK asked afterward.

"No," I said. "But not to worry. It's a thing now."

"What's a thing now?" he asked.

"Unfocused video," I said. I told DK how kids who've grown up with cell phones consider sharp, focused photos boring. "They post blurry stuff as a sort of middle finger to the tyranny of perfect pics," I explained. I looked down at my phone. "*Damn.* I forgot to hit record."

"So, no video?" DK asked.

"Right," I said.

"Well, that's probably cool now, too."

We started sailing about midway through the shipping lane. The fog was gone. The island was in view. On the horizon, a smattering of container ships was faintly discernible. *Delilah* has no radar or AIS, but Jordan had a free mobile app called Ships Near Me that reveals the real-time position of the big ships.

"Is that the far end of the island?" I asked Jordan over VHF.

"No, that's a container ship," he said.

"Is that a distant rock formation?" I asked.

"No, that's a container ship," he said.

The final ship we passed was stacked implausibly high and had the letters COSCO splashed in big red letters across the side. DK got excited and grabbed the VHF to radio Jordan and Dan. "Capri 18, when you get close, we'll take two 20-ounce Pepsis and a couple of Kirkland Signature all-beef hot dogs. Thanks!"

Before heading back to the mainland, the guys took a side trip to Big Fisherman's Cove for some snorkeling, at top.

Seeing a pod of dolphins in the wild and so close to *Delilah* was a highlight of the outbound trip, above.

For years, I'd dreamt of this sort of experience, and now I was doing it.

The wind was rushing through the island's isthmus as we approached the outer anchorage at Two Harbors. I dropped the mainsail and steered. I hailed the harbormaster on channel 9 but got no response. Were we too far out? Was our radio garbled? I tried hailing them again, only this time in a deeper, more masculine-sounding voice. Nope. I tried a British accent. Still nope.

"Well, we've done everything they tell you to do in the sailing books," I told DK. Then I had a horrifying thought: *Was this God's punishment for enrolling in AAA insurance instead of BoatU.S.?*

If leaving the dock was the hardest part of cruising, coming into harbor was second. Moving closer, DK and I explored the various downsides of motoring through a busy mooring field in a strong headwind with a 3-hp outboard. When the motor began acting flakey, I readied the sails and sent DK forward to prepare the anchor.

"Just in case," I told him. Outwardly I was a man in control; inwardly, I was teetering on the edge of an emotional break.

"Sailing vessel *Delilah*, this is the harbormaster," a voice suddenly cracked over the radio. "We're sending a boat." Minutes later, a calm young woman in a patrol boat appeared. This is just like

David's 25-foot Cape Dory floats happily among the catamarans and big cruising boats visiting Catalina Island.

that episode of "Baywatch," I thought as she led us to our spot on the string line.

"You'll want to go ahead and grab the pickup pole," she said after our bow had floated over the hawser.

DK looked at me.

"How do we do that?" I asked her.

"You pick it up," she said.

That night, we enjoyed cold beer and OK burgers on the patio at the village restaurant. But something felt different. Was it endorphins? Was it the fact that four first-timers just sailed two small boats 31 miles to an island? Or was it the super-spreader event that was now unfolding on the restaurant's crowded dance floor: *Conga line in the time of COVID?*

I slept like a baby that night to the sound of gentle moving water and the Macarena. At sunrise, I woke to the snorted rattle of DK snoring. I snuck out to the cockpit, brushed my teeth with no paste, splashed a little lemon-flavored La Croix under my pits, then—after landing a few contact lenses on my cheeks—put on glasses.

Nearby, Jordan was in the cockpit of the Capri 18, waking too. I used an ancient maritime method of boat-to-boat communication called whisper-yelling where one airs one's grievances without using vocal cords. I told him about DK's snoring.

"You're kidding me," he said, using only his breath. "That's why I'm in the cockpit. Dan snores, too!"

Jordan swam over and together we shared instant coffee under the shade of a wet towel hung from *Delilah*'s boom. Nearby, families cruised the cove in fancy dinghies with sunshades and steering wheels. When DK was up, he and I floated around on a pair of five-dollar inflatables from the kids' toys section at Target. We met a few cruisers; we also made some friends. Two of them, buddies on a Catalina 30, joined us aboard *Delilah* on a short shlep over to nearby Emerald Bay where we saw the famed Indian Rock and some remarkably translucent green and blue water.

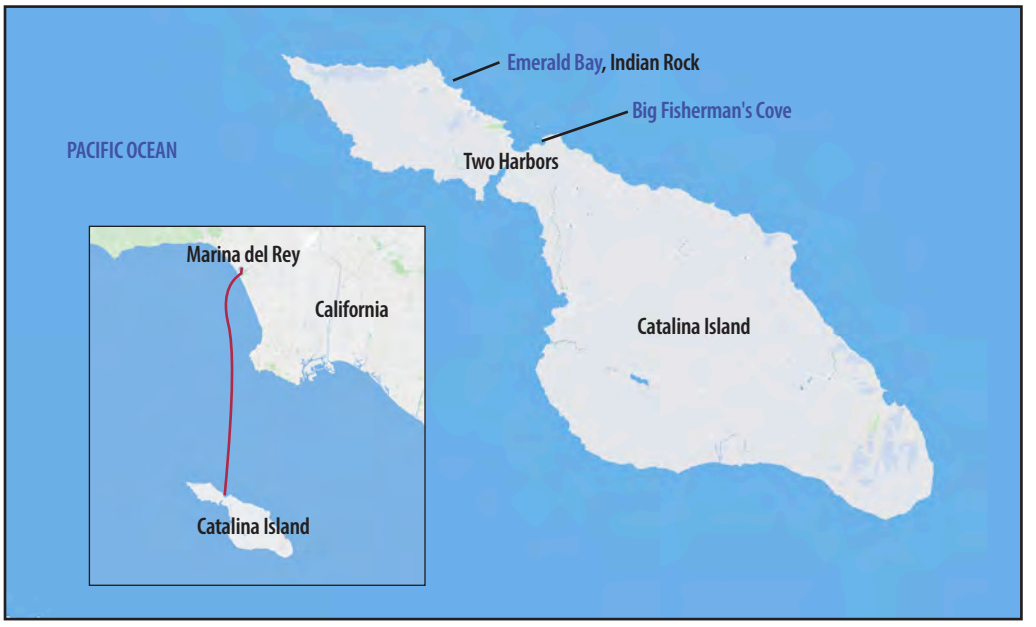
That evening, Dan, Jordan, DK, and I climbed an isolated trail, high above Two Harbors. We saw Catalina Island fox—found on Catalina Island and nowhere else in the world—stood awed at the moonlit California coast, and witnessed the kind of jaw-dropping shooting star one can typically see only with the aid of psychedelics.

I slept in *Delilah*'s open cockpit under a huge sky. For years, I'd dreamt of this sort of experience, and now I was doing it. Does it get any better than this? I wondered.

On Sunday, I rose at sunup and discovered that our Tohatsu outboard had gone kaput. Was it a clogged carb? Bad gas? Gluten? I said these questions aloud to impress DK with my motor maintenance knowledge, which is about as deep as an *Us Weekly*. The best you can do in these situations is to pull yourself together and look helpless, I told myself.

And, it worked. A nosy neighbor on a dinghy—who

A vaguely rumpled Jordan awakens in the Capri 18 after a night under the stars (and escaping his friend's snores below).



I should mention had been snoopy from the start—instantly appeared and taxied me and my injured outboard to shore. But the shop was slammed and couldn't help. Add the fact that the coffee shop wasn't open yet, and now we had a full-blown crisis.

I was lugging the outboard back to the dock, sweating, and bearing my burden for the world to see when the guys from the Catalina 30 appeared. "Do you want to borrow our dinghy motor?" Hudson offered. What a dream! We dropped their propane-fueled outboard into *Delilah*'s motor well and, just like that, we were jamming again—but, not so fast.

Before leaving the island, Jordan suggested one last adventure. We sailed over to nearby Big Fisherman's Cove and anchored the boats, then snorkeled in the warm August water, surrounded by cavernous rock and volcanic caves. Dan pointed out kelp, crab, garibaldi, and sea bass, along with a variety of marine macro algae, plants, and invertebrates. Then, after he spotted a large bat ray, Jordan surfaced from the water.

"Can you believe it?" he said. "Most guys are on the couch, eating chips, and watching football. And we're doing this! And afterward, we're gonna go sailing!"

"Yeah, but what kind of chips?" I asked.

We left the island at 1 p.m. in the Pacific sun and a 10- to 12-knot breeze. And, boy, was it magic. We sailed seven hours on a single tack back to Marina del Rey, all the while smiling, snacking, and jabbering like Chatty Cathys.

Of course, this was a high point; it hadn't been a perfect trip and we weren't perfect sailors. In fact, one of these days, I'll probably scribble down a long list of lessons learned and potential upgrades. Maybe next time, we'll sail more than we motor. Maybe I'll have a cool dinghy with drink holders, a cockpit table, or a heated towel rack. A guy can dream. Until then, though, I'll probably just wing it, grab a few friends, a couple of small sailboats, and go cruising.

David Blake Fischer lives in Pasadena, California. His writing has appeared in McSweeney's, The Moth, *and* Buzzfeed, *among others. Follow his sailing adventures on Instagram at @sailingdelilah.*

On day two of the Catalina voyage, *Delilah* sails into Emerald Bay, below.

Sailing Schooled

The most memorable physical education class in college had nothing to do with the gym.

BY MEREDITH ROHN

"I'm sorry!" I shouted as a massive wave hurled itself across the bow, soaking my crewmates. Again.

Nervous that I was doing something wrong—and downright terrified of those waves—I eased the tiller to fall off the wind.

"No!" the instructor, Brian, stopped me. "Don't apologize for good sailing."

This was perhaps the best sailing advice—or advice in general—I'd ever received. I tightened my grip on the tiller, but I wasn't nervous anymore. Keeping my eyes on the mainsail, making sure it wasn't luffing, I steered us close-hauled. The boat was still leaning like it was about to capsize, and the waves were still horrifyingly tall. But it felt like we were flying.

This was my first time sailing, my first time cooking and sleeping on a boat, and my first time peeing in a bucket. And it was exhilarating.

In the spring of 2019, I signed up for what sounded like Penn State University's most interesting physical education course: sailing. In March, 15 other college seniors and I traveled to Florida, to Hurricane Island Outward Bound School's base on the island of Big Pine Key. We would spend the next week learning to sail and living on two 32-foot sailboats incongruously named *Llama* and *Boat Fifteen*.

When you sign up for a college class, you usually know what to expect. There's typically a syllabus. There was no syllabus for what we would learn out at sea, in the backcountry of the Florida Keys. Nothing could have prepared us for the lack of privacy, the practice and finesse sailing as a team required, or the backbreaking work of rowing for miles upon miles under the hot sun when wind inevitably failed us.

We slept on deck, on top of oars that we rolled into a platform over the thwarts. When the skies were clear, we sprawled in our sleeping bags under the stars. When it stormed, we squished together under the tarp like a row of piglets.

By day, our two instructors, Brian and Whitney, taught us the essentials: knots, navigation, sailing theory, points of sail, rowing, tacking

> **There was no syllabus for what we would learn out at sea.**

Forrest Hunter and Walter Bain learn the rules of navigation under the careful watch of their instructor, Whitney. Photo by Meredith Rohn.

and jibing, anchoring, and even backcountry cooking. We were not hardened sailors, and we were not easy to teach.

The first lesson we learned came out of necessity. By the first afternoon at sea, everyone was dying to use the bathroom. The only caveat: There is no bathroom aboard a 32-foot pulling sailboat. There was a bucket at the bow, just in front of the main mast, or you could go over the side while the boat was underway. There was no privacy.

The first time I tried to go over the side, to avoid the hideous thing that was the bucket, I couldn't relax enough to do it. The bow was swinging wildly in the waves—we were sailing out into the Gulf of Mexico, and the water was rough. Up, down. Up, down, I swung. And I couldn't do it. Of course, it didn't help that the other boat kept gaining on us, threatening to reveal my struggle to an additional 10 people.

The bathroom situation aside, however, it turned out that we weren't good sailors.

"You know," Brian said at one point, "sailing is actually a sport to some people."

Lying around the deck, soaking up the sunshine, we all thought he was pretty funny.

We did focus seriously most of the time, however. Most of us, never having sailed or received any education about wind-powered transportation, had a hard time grasping the different points of sail and the perfect execution of tacking. We learned by doing—and failing—repeatedly.

We readied the tarp at night in case we encountered unexpected bad weather. A few days in, an engineering student named Thomas thought he could handle the setup. He couldn't quite master the knots though, and when we came to help, he shook us off.

"Whatever," one of us said, raising our hands in defeat. "You're the expert."

We called Thomas "The Boy Scout" after that.

Tensions ran high when we weren't getting along with each other or with the boat, but things could also be unexpectedly—even hysterically—great when we sailed. We took turns being the day's captain. When one of the boys, Forrest, was captain, he taught us all the words to "The Wreck of the Edmund Fitzgerald" by Gordon Lightfoot.

I tried for a rousing chorus of "Baby Shark," but it was shut down immediately.

One of my favorite parts about exploring the backcountry keys and wild maze of mangrove-covered islands was the night sky. Each night, the eight students aboard our boat would take turns on anchor watch, staying up for a little more than an hour at a time before waking the next person. It was the most peaceful experience, sitting at the bow on the still waters, looking up at the Milky Way shining magnificently above.

One night I dragged my hand through the water and came away with little green sparks shooting outward from my fingertips: bioluminescence. I'd only ever read about that in books and wasn't even sure it was real until that moment. I wanted to dive overboard and swim in the dancing green lights.

Often, while we were sailing or rowing in shallow waters, we would see baby sharks or stingrays.

"Manta ray!" The Boy Scout shouted one morning, and I had to explain that stingrays and manta rays are not the same. I don't think he liked me much after that.

Every time we saw a baby shark I was quickly silenced before I could start my favorite song. But I didn't mind.

On the day I learned to sail—the first morning I got my hand on the tiller, at least—dolphins swam to us and played in the waves off our bow. Half my crew rushed to the front and sides to watch, abandoning their posts trimming the main and mizzen sheets, but it didn't matter. I wasn't going to change our course anytime soon—not with dolphins as our company.

That day when I was captain, I believed I learned more than I've ever learned on a single day of my life. I learned

The crew goes over the day's sailing plan in the morning on *Boat Fifteen*, below. Photo by Meredith Rohn.

The crews of *Llama* and *Boat Fifteen* enjoy the sunrise after spending the night camping and swatting bugs on a deserted key, at bottom. Photo by Meredith Rohn.

how to judge the wind and sail and how to steer us as close to the wind as possible. I learned how to tack and when to shout to my crew to perfectly execute the maneuver. I learned if I fell off the wind just a hair, my crewmates hauling in the sheets and cleating them would have an easier time getting them taut. I learned how to raise anchor, and what "coming about" meant.

Over the next few days, I would get many more chances to practice sailing at the helm. I improved a lot—possibly more than anyone else on board. I knew at least a few people thought that, when Thomas was acting helmsman one afternoon and we seemed to be wavering between being caught in irons and being too far off the wind to make good headway.

"Can we get Meredith back on the tiller, please?" Forrest asked loudly. That was the best compliment I'd ever received.

One evening, the instructors dropped us off at an uninhabited key.

"Shipwreck!" they shouted, tossing a tent overboard and leaving us with a few meager supplies. We thought it would be fun, camping on a deserted island like in the movies. We were wrong.

The bugs on the island were awful. We couldn't do anything before coating our skin and hair with at least two layers of DEET. An argument broke out over whether the tents were far enough from the waterline. The boys burned our dinner in the campfire. But it was an experience we wouldn't forget.

A few of the students—now my fast friends—and I wandered through the mangroves and discovered an open, sandy beach on the other side. The water lapped at our toes, made purple and pink by the reflection of dusky clouds. We watched the sun set and herons fly home to roost for the night. We swapped stories and shared secrets around the fire.

In the morning, Walter declared, "It was the worst night of my life."

In some ways, he was right. In others, it was the best night of our lives.

Most of us were ready to leave the boats—to go home, shower, pee in privacy, sleep in a bed. But I wasn't. I could have stayed out on that boat, out at sea, for another week. Or month. Or year.

We sailed back to Big Pine Key, practicing our tacking one last time before rowing in. I let my hand fall regretfully from the tiller. Whitney, directing us through the tight canal to the dock, told Walter to steer left.

"What's left?" he said. "I only know port and starboard!"

When we were back on dry land, the Outward Bound instructors presented us with course certificates. We said goodbye.

"Thanks for secretly knowing how to sail," Forrest told me. He waved away my protests that I never knew how to sail, and, once again, I was proud of us.

Walter Bain on the tiller and Meredith on the mizzen sail aboard *Llama*. Photo by Sarah Maslakowski.

The crew of *Llama* tries to catch up to *Boat Fifteen* before the evening anchorage as the sun sets behind them. Photo by Meredith Rohn.

We learned by doing—and failing—repeatedly.

We weren't sailors. Heck, we weren't even boaters. We were just eight college kids stuck on a 32-foot boat for a week. But we became a team. We learned how to survive—to thrive—together, and that's something you can't replicate on dry land. We went out of our comfort zones. We learned something new. We stood in awe before the sunrise while cormorants squawked on wild mangrove keys.

Brian kept trying to teach us the word "alacrity." It means "with joyful readiness." We laughed, but some of his teachings must have sunk in.

When the next adventure arises, I know we'll approach it with alacrity.

Meredith Rohn first learned how to sail in 2019 as part of a college course set in the backcountry Florida Keys. She has since sailed in places as diverse as Maryland and Thailand, but her love for the water traces back to becoming a SCUBA diver in 2012. She currently lives in inland Pennsylvania, where she's picked up yet another water sport—whitewater kayaking.

Balance of Power

A DIY diesel-to-electric repower required a lot of education but only a little engineering.

BY LARRY ORDOINS

While motoring my 1968 Mason 40, *NorthWind*, out of the marina on a beautiful spring morning on Puget Sound, smoke began billowing up through the companionway, and I quickly glanced at the engine temperature gauge to see it climbing fast. My first thought was, "Not again!"

I shut down the engine, ducked below, and pulled up the floorboards to the engine compartment. Our old Perkins 4-108 had blown a hose—the same one we'd replaced a few weeks earlier. Instantly, I knew we were going to need a tow back to the marina, and by now, the BoatU.S. towing crew were not strangers to us.

All of which gave me plenty of food for thought later as *NorthWind* rested in the boatyard undergoing some restoration work. I began wondering if I should finally repower. I'd already spent a lot of money on the boat during this refit, but my overall lack of trust in the old Perkins convinced me that now was the time.

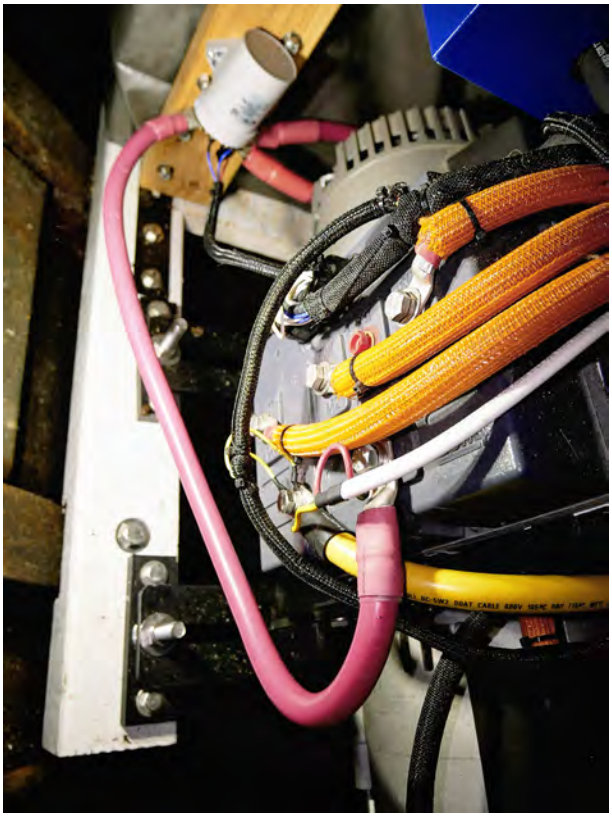
First, I contacted the local Beta dealer and discussed a Beta 38 or 43. Beta motors have a good reputation for reliability and ease of maintenance and repair, so they were a logical choice. I thought it would be the simplest option since I was pulling out a diesel, and dropping one in its place should be easy. Right? Not exactly. The Beta dealer said everything except the fuel tanks should be replaced, including fuel lines, exhaust components, hoses, shaft, propeller, and shaft bearing. This quickly added to the total cost before we even discussed the installation, which prompted me to expand my search to electric motors.

Learning the E-Options

To educate myself about electric, I commenced conversations with representatives from Oceanvolt, Elco, and Electric Yacht. All were easy to reach, quick to respond to questions, and helpful in planning my potential repower.

Truth be told, I had long pined for an Elco motor—they have a long and excellent reputation—so they were the first company I contacted. Their motors run at a higher voltage than the others I considered, which meant battery planning

Larry installed the 48-volt motor battery bank switch above the existing main 12-volt cabin battery bank switch, below.



The port side of the motor showing one of two relays, in the background, bridging the main 48-volt battery bank switch, and the port side motor controller with a few of the red (positive) wires Larry had to make to fit the install. The black motor mounts extend to a standard set (such as a Perkins 4-108) of motor mount beams, at right.

Some of the components of the motor, before installation, include the display, throttle lever with key switch, and two sizes of wire used for the custom lengths that Larry had to make for his installation.

would be a challenge. I thought the EB-40 (40-hp comparable) would be the best Elco model for *NorthWind*. This motor required 108 volts, which made sourcing batteries difficult and way over my budget. That being the case, I went back to the Internet in search of a 48-volt system.

Oceanvolt, also a reputable manufacturer of electric and hybrid systems, offered several 48-volt motors. However, I soon learned that these would be quite underpowered for my 40-foot, 12-ton, full-keel sloop. They recommended their 20-kW shaft motor. Oceanvolt bundles a battery into a complete system with all their motors over 10 kilowatts, and they provided a professional, extremely detailed quote for a very smart system.

But even though I knew any repower is more than simply the cost of the motor, my back pocket, where my wallet usually resides, was starting to cause some pain.

Accepting once again that repowering was not going to be cheap, I contacted one more 48-volt marine propulsion company that I found in a magazine article, Electric Yacht. I liked that I could search the company's website, pick out a motor, add it to the cart, check out, and pay with a credit card, as if I were buying a book online. And because I'm an engineer, I appreciated the spec sheets and drawings they provided so that I could plan accordingly. Electric Yacht's other big selling point is the assurance that their motor is easy enough to install that somewhat handy do-it-yourselfers can do it, potentially saving me thousands of dollars in installation costs.

Choosing the Batteries

I spoke with one of Electric Yacht's representatives, who helped me determine that the QT20 (20-kW) motor would be a good match for *NorthWind*, and if I wanted to use LiFePO4 for my battery bank, I would need a maximum continuous discharge of over 416 amps. Meeting or exceeding that in my battery bank should prevent the battery management system (BMS) from shutting the batteries down or limiting the full available power from the QT20. (Incidentally, using the motor settings in the display, you can limit the power of the QT20 for battery banks with fewer maximum continuous amps, allowing people to start with a smaller battery bank and build onto it over time. This flexibility can help keep initial costs down.)

There are so many battery options out there, and most of the chemistries on the market—AGM, Gel, or LiFePO4—will work with the Electric Yacht motor. LiFePO4 lithium batteries have grown enough in popularity that the prices have gotten competitive. They're only a little more expensive than similarly sized AGM batteries, and they have many more charge cycles, so I wouldn't need to replace them as often. In for a penny, in for a pound; if I was going to the trouble and expense to repower *NorthWind* with an electric motor, I should have a LiFePO4 battery bank.

I found Big Battery out of Southern California, which offers LiFePO4 batteries in many configurations and stocks several that are 48 volts. They provide a 10-year warranty, and their customer service and tech support are easily reachable. Since this was my first installation of this magnitude, I knew I might need last-minute questions answered and problem-solving assistance throughout the process. I purchased four of their Husky 48-volt 103-Ah batteries. At 6,700 maximum continuous watts or 139 discharge amps, I could get by with a minimum of three; however, a fourth came with a deep discount, so I went with that.

The batteries arrived first—four of them filled a pallet! The motor came

(left to right) **The empty engine bed after removing the Perkins.**

Larry built new frames to hold the the new motor.

Finally, he added a platform to the new frames that would house the batteries. At this point, he was ready to install the new system.

next and included everything, along with a display to replace the diesel engine's gauges and a single throttle control lever for both forward and reverse—a welcome change for *NorthWind*. Only some wiring components not attached to the motor—such as those for the main battery switch—weren't included; my Electric Yacht rep explained that this is because each installation is different, and the wiring for each is customized. While some boat owners need longer wiring runs to accommodate batteries and associated components in various places, I was able to fit the entire QT20 system and the 48-volt battery bank in the same deep bilge space that once housed the Perkins 4-108 and transmission.

NorthWind **prepares to return to the water, below.**

For the complete Electric Yachts QT20 motor package and the Big Battery 48-volt bank, I was into this project for just less than $18,000—about 25 percent more than the cost of a new diesel (but no fuel). Although I did not need to replace my drive shaft, propeller, fuel lines, hoses, and exhaust system, I did need a 48-volt battery charger. I added a 340-watt 4-volt solar panel, solar charge controller, and a small 2,000-watt gas generator as emergency backup. Those add-ons came to an additional $1,500, putting me slightly under $20,000 for the complete system.

The Install

Once the old diesel engine was pulled, I prepped the space by running 4-x-4 frames to mount the new motor and routed in a 1-inch-thick plywood bridge to hold the battery bank. I coated all the new wood with a good boat paint, since there wouldn't be stray oil spray or drips to protect it from moisture.

The mounts that came with the QT20 package allow for wide adjustments, so it was easy to mount the motor into the same cradle as that of the diesel. The QT20 only weighs 135 pounds, so a friend and I easily lifted it down into place and bolted it in. We mounted the batteries on the new platform right behind the motor.

In between, I built a bracket/mount for the parallel box for the battery bank and mounted the detached relays for the motor. The wire installation took nearly all day (it's not easy to cut or bend into position 4/0-gauge wire). Finally, I installed the display and control lever in the cockpit and ran those wires back to the motor.

By now it was fall, and not wanting to spend winter in the boatyard, I splashed *NorthWind* and returned to my marina some 25 miles away with parts of the refit incomplete. Since some key equipment still wasn't installed (including my windlass and running rigging), I opted for a tow to my homeport, rather than do a full sea trial on my new engine.

Still, while under tow I tested the system's regeneration capabilities—recharging the batteries while the propeller spins. Being towed at a steady 5 to 6 knots, I was pleased to see the motor returning 160 to 200 watts of charge back to the batteries. This was great news, since it doesn't take a lot of wind to get *NorthWind* to 5 to 6 knots under sail.

A few weeks later, I headed out for a short sea trial. I easily got the boat to 5 knots, about cruising speed, for two hours as I crossed Puget Sound and back. Back in the marina, I plugged in the 48-volt charger, and its display showed that I had used about half the battery bank.

I'm planning more tests after *NorthWind*'s restoration is further along and I can factor in the solar panel's effect on the battery bank's charge level. Over time, if I decide I want more range, I can add more batteries, since I have all that space that once held two 50-gallon fuel tanks.

Overall, this project has been an education and actually a pleasure. I am looking forward to exploring my home waters from a brand new, e-powered perspective.

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Larry Ordoins has been living aboard, sailing the Salish Sea and down the Pacific Coast for over a decade now. His 1968 Mason 40, NorthWind, *is a wood hull, offshore sloop he has been restoring for the last few years in preparation for more Pacific Coast travels and beyond.*

The new system, including batteries, fits neatly into the space that once held the Perkins 4-108.

To (B)e-Outboard, or Not to (B)e-Outboard?

Outboards are an easy way into electric propulsion, but are they for you?

BY DREW FRYE

For the last 15 years I've been telling myself my next outboard might be electric. If I had a small dinghy I lifted on deck every night, perhaps I would buy one. But for a dinghy on davits or a small sailboat, I'm not yet seeing it. I compare the specs, look at the track record, and ask myself, "Why I would pay more for less?"

My next car will likely be electric. But the problem with boats is energy density. My car (a Mazda3) gets 43 miles per gallon (mpg) at 60 mph. My F-24 weighs three times less and gets about 12 mpg at 6 knots. The difference is that cars practically coast once they get up to speed, particularly streamlined models, but boats are constantly pushing up a hill of water unless far below hull speed, and waves only make this worse.

So, while I'd love the quiet on protected waters that an electric outboard affords, I'd miss the power and range a good four-stroke gas outboard provides on more open waters.

In other words, I'm still waiting, but that said, let's look at how electric outboards stack up.

Because of differences in prop design and rpm, electric outboards typically have more low-speed thrust, but they're slower than equivalent gas outboards at the top end. Boat tests and user reports agree that electric motors with the same rated equivalent horsepower are slower than gas outboards; often the rationalization accompanying these results is, "But they're so quiet."

In general, manufacturers overstate effective horsepower; the horsepower calculated from motor watts (a simple conversion factor) and typical electric motor efficiency (85 percent) is, give or take, about half of which the manufacturers claim. The propellers appear to be more efficient, so two-thirds of the claim seems to match both the math and product reviews. Given this information, I suggest de-rating effective horsepower claims by about a third; in other words, a 6-hp electric motor would be equivalent to a 4-hp gas outboard.

Electric outboard propellers tend to be a bit larger in diameter, higher aspect ratio, and run at lower rpm. This increases efficiency at low boat speeds, but at higher speeds, where cavitation and ventilation are factors, conventional prop designs still rule.

Direct-drive electric outboards are quieter because the motor is underwater and there are no gears. The tradeoff is increased vulnerability to corrosion and a general reduction in total life expectancy versus conventional gas outboards.

Charging

Unless they plug them in ashore, sailors need the ability to recharge their electric outboard motor batteries from the main bank. ePropulsion motors have a separate input for solar charging, but unless you're powering a small boat on a mooring, most likely the panels will be connected to the mother ship.

As a practical matter, all will be charged using a dedicated 120-volt charger run off an inverter. Unavoidably, recharging adds strain to both battery capacity and charging energy sources. You'll probably need more solar or wind if you plan to charge from the mother ship, rather than plugging in ashore.

When cruising, we typically use about ⅓ tank (one pint) of gasoline per day in my Mercury 3.5 dinghy motor. Some days it might be as much as ½ gallon, sometimes only a few ounces, but in general, I top it off every other day. I estimate this is equivalent to about ½ charge on a self-contained electric outboard, about 500 Wh (watt-hour), or about 50 Ah on your 12-volt battery bank, after inverter efficiency and charging hysteresis are factored in. For my needs, this would mean I'll require an extra 100 to 120 watts of solar and one to two more house batteries to power my dinghy with an electric outboard equivalent to my 3.5-hp Mercury.

My F-24 has a 4-hp Honda and a 3-gallon external tank. Though I use the motor only to exit the harbor and manage sails, I seem to go through about ½ gallon each daysail. This is twice the requirement of the dinghy we just discussed, or about 100 Ah on a 12-volt bank. Assuming five hours at 100 percent rated output (an accepted industry estimation of solar output), it will require 200 watts of solar panels just to keep the motor charged, and six to eight hours to accomplish the charging.

For this little bit of maneuvering usage, I'd need to add two to three batteries, and running multiple days without recharging is a risk. If the wind dies on day two, we'll just have to wait until it returns, and we'd better earmark a reserve for harbor maneuvering. Running a generator to charge is possible, but ironic.

ePropulsion offers hydrodynamic charging—putting amps back into the battery at the cost of drag and slower sailing. I question an outboard prop's ability to stay solidly in the water in the sea conditions required to provide excess sail power for charging. I can see it with a pod drive, but for outboards, I'm skeptical, judging from the way they bounce up and down in waves. I'd rather squeeze in one

more solar panel. Still, this option could help smaller boats that are limited by hull speed and lack sufficient space for solar.

As for batteries, a few of the manufacturers—Elco, Hangkai, and Minn Kota—recommend lead acid batteries, because they still offer the best ratio of dollars per unit capacity. They remain the standard for industrial forklifts and solar installations. But they are heavier, cannot be cycled below about 40 percent state of charge without serious lifespan reduction, don't last as long, and charge more slowly. Installed low in the bilge of a displacement cruiser, a few lead acid batteries won't hurt a bit. But for a light dinghy or sport boat, lithium is the better answer.

An Outboard Sampling

Below is a sampling of electric outboards on the market. I've only used the Torqueedo and EP versions, but I've talked to people who have used or have tested the rest.

EP Carry: Dubbed the electric paddle, it is light, less powerful, competitively priced, and earns good reviews. I've only used it once, and though it was not powerful, it moved a small hard dinghy well in the harbor and was light as a feather. Compared to a trolling motor, it is far more user friendly. It's the best choice if you value easy handling and don't need power.

Torqeedo: This is the best-known manufacturer, with the longest track record for self-contained electric

	Electric Outboards. Blank spaces indicate no information provided.						Value Electric Outboards	
	Torqeedo	Torqeedo	ePropulsion	ePropulsion	EP Carry	Elco	Hangkai	Minn Kota
Model	Travel 1103C	Cruise 3.0R	Spirit 1.0 Plus	Navy 3.0		5	4 Electric Outboard	Riptide Transom
HP	3	6	3	6		5	3.6	1.5
HP calculated from input watts	1.3	3.4	1.1	3.4		3.4	1.1	.6
Propulsion watts	520	1530	about 370	about 1500		1060		210
Static thrust (pounds)	70	142	about 50	about 140		98		45
Draw watts	1100	3000	1000	3000		3000	1000	525
Prop RPM	1450	1100	1200	2300		2250-2500		1540
Blades	2	3	2	3	2	3	3	2
Prop diameter (inches)	10.2	11.8	10	10	14	7.8	7.5	10
Battery (Wh)	915	3500 (external)	1276	4100 (external)		1920	3840	1920
Run time WOT (hours)	.8	1.2	1.3	1.4	1	.4	varies	varies
Integrated battery	yes	no	yes	no	yes	no	no	no
Charging	120V charger	120V charger	120V charger, solar, or regeneration	120V charger, solar, or regeneration	120V charger	120V charger	120V charger	120V charger
Motor weight (pounds)	38	41	44.2	54	21	65	24	20
External battery weight (pounds)	N/A	56	N/A	106	N/A	136	272	136
Cost	$ 2,699.00	$ 4,298.00	$ 2,199.00	$ 2,599.00	$ 1,600.00	$ 2,610.00	$ 359.00	$ 350.00
External battery cost	N/A	$ 2,999.00	N/A	$ 1,999.00	$ 1,600.00	$ 350.00	$ 700.00	$ 350.00

outboards, though a less-than-enviable reliability record. The original Travel was plagued with a variety of mechanical and electrical problems. The redesigned Travel 1103 C switched to a direct drive, like a trolling motor, and seems to have solved many of the original's problems, but I am still hearing some complaints and doubt they will match the 10- to 20-year life expectancy of a well-cared-for gasoline outboard. Corrosion will get to something, the plastic parts will crack, and certainly the battery will need to be replaced. In their favor, however, is quiet and simple operation.

The Travel models use integral batteries, and the Cruise line uses external batteries. All use direct drive. The Cruise line requires the installation of a remote throttle. Torqeedo also makes saildrive and shaft-drive inboards.

ePropulsion: At first glance, this is a Torqeedo look-alike, but it's not a clone, and the engineering is different. Though only on the market for six years, we've heard few reports of trouble. For example, the Spirit has sturdier electrical connectors, more range, and faster charging. The 6-hp Navy 3.0 is available with a tiller, eliminating the need for a remote throttle and allowing direct steering for tight maneuvering. Like Torqeedo, ePropulsion also makes pod drives up to 6 kW. Pricing is 20 to 35 percent less than Torqueedo.

Elco: Long established, Elco has been building electric drives for 130 years, well

before electric was cool. Mostly, I've seen shaft-drive inboard units in launches and taxis. The 5-hp is based on a proven Yamaha gas outboard frame, and Elco knows how to make durable electric drives. It's not light, and the recommended lead acid batteries drive the total weight even higher, but you can expect reliability and solid performance. This is perhaps the best choice if easy portability is not important.

Below are what I call "value" electric outboards.

Minn Kota: This company has been making trolling motors since before I was born, and for the most part, they last. The Riptide is a transom-mount saltwater version, so it should stand up to corrosion, but don't expect a lot of oomph on open water. Like the EP Carry, it is a good harbor motor and cheap as chips, but not as user friendly because of the external batteries.

Hangkai: They make a 4-hp electric for a bargain price. A fellow down the dock from me got one last spring, paired it with some batteries he got for free when a yacht repowered with lithium, and for under $400, he's scooting around the harbor in good style. In a few years, we'll know more about durability.

In the end, it boils down to personal needs and wants. For me and my needs, it's hard to top a gasoline four-stroke outboard. Honda and Tohatsu (which makes small outboards for Mercury, Evinrude, Yamaha, and Nissan) are the standard for comparison; I've had all of them. Feed them clean gas (keep the vent closed when not in use, turn over the gas by sailing often, and use a quality anticorrosion additive), and they run and run.

They are louder than electrics and vibrate more, they are slightly heavier than the self-contained electric outboards, but they are lighter in larger sizes when the external battery weight is included and have far greater range if an external tank is attached. Even a 1-liter aluminum fuel can under the seat adds considerable range and backup safety. In my opinion, these remain a better solution for larger boats and dinghies that will take longer trips or cross open water.

Good Old Boat *Technical Editor Drew Frye's bio can be found on page 37.*

Quiet by Nature—James Borton

I am fortunate to sail my 1962, Carl Alberg-designed Pearson Electra, *Sea Gypsy*, out of Bluffton, in the heart of South Carolina's low country. As a self-acknowledged nature lover, I can't get enough of the May River and the extraordinary estuarine system that it's a part of, miles of tidal creeks and rivers where it's not uncommon to share the water with dolphins and all manner of sea and marsh birds.

Though tranquil on the surface, this is fast-moving water, with tidal falls as much as 8 feet. When the wind isn't helpful, dependable auxiliary power is a must, even for my 23-foot boat that weighs only a little over 3,000 pounds.

My Pearson came with no engine. In July 2021, I decided I wanted to go with an all-electric outboard system. My motivation was simple: I didn't want to disturb the natural habitats of the sounds and rivers so abundant with tidal marshes, spartina grass, and an alluring array of flora and fauna including nesting pelicans and egrets.

After some extensive online research and speaking with owners of electric motors, I opted for a 3-hp Torqeedo Travel 1103 CL electric motor. The system is one unit that integrates a lightweight, high-performance lithium battery, an onboard computer that provides GPS-based range calculation, mounting clamps, and shaft and prop. It's light enough that even my 72-year-old self can bend with modest agility over the stern and hang the engine securely on the bronze bracket. When I leave the boat, I carry it in a case that weighs only 34 pounds; it's about the size of a golf bag, allowing the shaft to fit perfectly inside.

There has been, admittedly, a learning curve. On my first trip aboard *Sea Gypsy* with the new motor, I was fighting the tide and realized belatedly that the engine had not been fully charged. There I was, nearly 300 long yards from my arrival at the dock, when the engine died. Without any breeze to help me along, I broke out a single paddle, and working up a South Carolina sweat, got safely to my friend's dock.

I realized later that I'd run out of juice because I was operating the new engine at maximum speed (about 4.7 knots), running it against the fast-moving tide. I'd splashed *Sea Gypsy* at the nearby public launch, approximately 2 nautical miles upriver. Foolishly, I never checked the battery's charge or range indicator until it was too late, and the engine had cut off.

Knowing that I never wanted to repeat that incident, I quickly ordered a solar panel, designed by Sun Powered Yachts in Hawaii, but belatedly realized it wasn't compatible with the Torqeedo's battery. So, it's now my practice after sailing to remove my Torqeedo from the boat and always plug it in at home; I've also bought a second battery that I can keep charged as a backup.

And, to further combat "range anxiety," I've purchased a Jackery Explorer 1500 portable power station that lets me plug in the battery when under sail. It can supply 1000 watts of power using multiple output ports and features a lithium battery.

True, it cost me $2,700 to make this clean wake, about $1,500 more than a standard 6-hp outboard would have cost. But there's no fuel, no exhaust, and best of all, barely any sound when I am slipping along among the grasses and birds. The winds of change, propelled by this blue electric revolution, will certainly be powering me without a carbon footprint into the next stage of my sailing life.

The electric motor, which incorporates the battery, is light enough that James can easily lift it on and off the boat's motor mount, at top.

***Sea Gypsy* under sail on the May River in South Carolina, above.**

James Borton is a former foreign correspondent in Hong Kong for The Washington Times, *a national fellow in the Explorers Club, and an avid sailor out of the May River in Bluffton, South Carolina.*

Waste? Not.

An externally mounted sensor takes the guesswork out of the holding tank status.

BY HOMER SHANNON

In 2014, I rebuilt the holding tank in our 1978 Bristol 29.9 using ⅜-inch polypropylene welded into a custom shape for the boat. This tank has worked well, but one shortcoming has persisted: the lack of a good way to gauge its fullness.

When I built the tank, I expected that I would be able to detect its level by looking into an open area under the V-berth, or by pulling back the V-berth mattress and looking through the clear access port on the tank. Neither method is convenient, and after a few weeks, the plastic became too opaque to detect the contents' level.

Our solution has been to know that we have about three days of capacity and to make sure that we get pumped or discharge at sea at least every three days. This has worked reasonably well, but it does create some worry when we are anchored for several days in a harbor with no pump-out boat, especially if we have a guest or two on board.

Recently, though, I came upon a simple, low-cost means of creating a full-tank alarm. While researching another issue in a yachting forum, I saw a reference to a "non-contact liquid water level sensor induction switch." A search of this phrase brings up dozens of eBay sellers offering these devices for about $6. As the name implies, it can detect the presence of liquid behind a non-metallic tank wall up to 20 millimeters (mm) thick (⅜ inch is about 10 mm). When liquid is present, a red LED comes on. When the liquid drops below the level of the device, the LED turns off.

I thought this could be useful as a warning that the holding tank was getting full. As a bonus, no parts would actually be in the tank, which means no worries about leaking, corrosion, or working inside the tank.

But wouldn't it be even better if I could make the LED remote and put it somewhere easy to see and monitor? A little more searching brought up an item called "XKC-Y25-PNP liquid level detector sensor," which was essentially the same item but with a switched lead that can be taken to a remote LED. I found it on Amazon for $15, plus free shipping and return.

The specifications for the detection switch stated that the output signal for the remote LED alarm needed to be below 100 milliamps (mA). Most single LED lights are under 100 mA, so this was not much of an issue. I found a light that could be mounted in a ¼-inch (6 mm) hole and purchased a package of six for $10.99. Both parts arrived in a day. The sensor only draws 5 mA, so it wouldn't put any significant load on the battery.

Before the boat came home for the winter, I set up the switch and LED and powered them with a small 12-volt battery. I used a quart plastic milk jug, half-filled with water, as my test bed. The thing worked! A sensitivity switch on the side of the device needed tweaking, but other than that, when water was present, the LED on the sensor and the remote LED illuminated. When water was not present, the LED stayed off.

Once the boat was home, I installed the sensor and the alarm LED. This was simple 12-volt DC wiring and did not present any challenges. Initially, the sensor had trouble detecting liquid through the tank's ⅜-inch polypropylene plastic. I increased the sensitivity adjustment screw several full rotations before the device could detect liquid. After adjusting it, I checked its function by sliding the sensor up and down the side of the half-filled tank.

The last issue was where and how to attach the sensor to the tank. The tank holds 14 gallons, so I decided to set the alarm at the 10-gallon level. This would give me about one day of warning before the tank topped out.

The device has a mounting pad about ½ x 1½ inches, which seemed like a sufficient area to securely attach it. I glued it on using Loctite's two-part plastic bonding glue. Available in most home centers and hardware stores, this glue is specifically for use with polypropylene plastic. I ran tests, filling and draining the tank with water to confirm the sensor's operation.

Though not a perfect solution, it works reliably, and it sufficiently warns of an impending full tank, providing a little more peace of mind for the onboard waste management engineers.

Homer Shannon and his wife, Denise, sail a 1978 Bristol 29.9 out of American Yacht Club in Newburyport, Massachusetts, where they enjoy sailing to Portsmouth, Gloucester, and Rockport as well as taking more extended cruises to Maine and Cape Cod Bay.

Product Profile

Git 'er Done

What to do with rotted wood on a boat? Whether it's a supporting internal structure or a wood-cored fiberglass sandwich exposed to the elements, either may be remedied with "Git"-Rot, a solution that doesn't require a total rebuild.

A good example of this product's usefulness is the hard dodger from a Taswell 45 that I helped repair after it was removed in preparation for an engine repower. The inside bottom edge on the port side was very soft, and the laminate surface was cracking away from the wet plywood core. The thicker fiberglass exterior laminate was undamaged but flexed dangerously when the dodger was lifted from the cabin top. Examination found a completely rotted plywood core for about 20 inches along the bottom edge, extending 6 to 7 inches into the core.

Having used "Git"-Rot before, I believed it would be the ideal solution. The manufacturer's instructions indicated that "Git"-Rot would perform on wet wood, but that the epoxy would not displace water saturated into the wood fibers. The dryer the rotted wood, the more strength in the results. So, I scraped out as much of the rotted plywood core as I could reach without further delamination, particularly from the exterior skin. Then I placed everything under an improvised tarp with a small heater; after a few days, the core was damp but not dripping wet.

"Git"-Rot comes as a two-part epoxy—a 3:1 mix of Part A resin and Part B curing agent—all clearly labeled. The product box, available in three sizes, includes a mixing and application bottle with measuring lines for accuracy. The most commonly available package (16 fluid ounces) contained enough epoxy for two applications for my project. Mixing smaller batches requires separate mixing containers or the purchase of the 4-ounce package.

For this repair, the inside skin of the dodger had pretty well disintegrated when the dodger was removed from the deck. I needed to create a dam to hold the epoxy in place while it cured. Clamping a shaped board against the inside of the core, I left a thin space to allow the epoxy to form a replacement surface. Before clamping, I waxed the board and the remaining inside skin to ensure that I could remove the board after the epoxy cured.

After properly mixing the parts, I poured the "Git"-Rot into the cavity created when I had removed the rotted plywood core. The next day, the epoxy was hard and dry, saturating all the wood fiber. Some of it had leaked out of my dam before curing, running down the inside skin. Thanks to the pre-application of wax, it scraped off easily.

The exterior laminate had reattached to the plywood core, as had the remaining interior laminate. Tapping indicated no voids. Success! It didn't look pretty, but that wasn't the goal; the intent was to ensure that the epoxy saturated the disintegrating plywood core and reattached the two laminate skins. To complete the repair, I used standard epoxies or fiberglass resins with filler to fair the surface, then coated everything with a matching paint.

Without "Git"-Rot's ability to stick to damp wood to create a hard structure, I would have had to remove the inner skin to gain access to all the rotted plywood, fabricate a replacement core, and then glass in a new inner skin—far more work, time, and expense than letting "Git"-Rot create a solid core out of damp plywood.

For more info: boatlife.com/product/git-rot-kit/

—**Bert Vermeer**, *Good Old Boat* contributor

The exposed rotten wood on the dodger's base (top) and the repaired area after "Git"-Rot application and fairing (below).

We present these profiles as a service, as firsthand accounts from fellow boaters. Neither *Good Old Boat* magazine nor the folks who profiled the products on this page were paid for these profiles. Most products were sent to *Good Old Boat* for review consideration by the manufacturers. We profile only a small percentage of the products that marketers contact us about, choosing only those we're interested in, in the hope you're interested too. A few products we pick up on our own, because we want to share.

the sail plan or the underwater profile, or was missing a vital design dimension. Time to move on!

Personal bias and background—Having designed for C&C Yachts, Mark Ellis Design, and Hunter Marine, I make no secret of the fact that I am often drawn to those boats, not only because of my personal bias, but also because I might have some additional insight into the design.

What to emphasize, similarities or differences?—If the boats are too similar, there isn't much to talk about, forcing an undue emphasis on small variations in the numbers, which, as I have discussed in previous comparisons, can be problematic. So, it is sometimes of interest (to me at least!) to include a boat that fits a number of the categories above but might be a bit of an outlier. It is far more interesting to discuss differences than similarities, especially when it illustrates one designer's approach to the same design challenge.

Limited focus—We should also note, of course, that these design comparisons are primarily based on the performance aspects evident in the published design numbers, the sail plan, and underwater profile. We do not compare interior layouts, tankage, deck layouts, etc., since we don't have room in two pages and 800 words to include that data.

So, in the design comparison of the C&C 40 and Pearson 40 to the Sabre 38, all of these factors influenced my choices. With this particular review, I zeroed in on LWL as the defining factor for size with all three boats being within 4 inches of one other, and all being from the late '70s and early '80s. I agree the Pearson 40 was definitely an outlier in its configuration, but for that very reason I felt it deserved to be discussed in comparison to the two more conventional configurations.

However, your choice of the Tartan 37 and Pearson 36-2 are equally compelling, so I appreciate that input. In anticipation of every new boat review, Good Old Boat *Boat Review Editor Dan Spurr asks for readers' input about their experiences with that boat. To gain similar reader input for the design comparison going forward, Dan will ask for suggestions about which boats might best be compared to the review boat.*

You may also appreciate my inclusion of the Tartan 37 and another outlier, the C&C 40 Crusader, in this issue's design comparison to the Pearson 39 review boat. Here, the emphasis was on the evolution of the type through two design rules.

Speaking of Rob Mazza…

In case you ever wondered at the depth of *Good Old Boat* Technical Editor Rob Mazza's experience in boat design and construction, here's a hint: He just earned official recognition from the Society of Naval Architects and Marine Engineers that he's been a member of the august institution for 50 years! That's a perspective on yacht design, sailing, and the sailing industry that few can beat. Congratulations, Rob!

—**Editors**

Not Feeling Too Sporty

Are you sure that the Hunter 260 handles like a sport boat ("Hunter 260," January/February 2022)? I laughed when I read your reviewer's conclusion.

—**John Dyson**, Brooklyn, New York

Andy Cross responds:
A laugh is always a good thing, John, and we're happy to provide one. That said, our reviewer, Allen Penticoff, said that he felt the boat handled "sportily," as it were, compared to other boats he has reviewed. Also, he adds, sportiness is relative. Unlike so-called sport boats such as the Melges 24 or J/70, the Hunter 260 does not have an extendable sprit to fly asymmetrical headsails, but it does accelerate quickly, turn nimbly, and feel light on the helm. Note that "handles" is the operative word in the review's conclusion. And for what it's worth, the Hunter is trailerable, another feature of many sport boats.

Thankful

After sorting out a gift subscription with longtime reader Mike Slepian, whose Hunter 356 is named *Thankful*, our peerless publisher, Karla Sandness, received this email: "It was delightful speaking with you. We are "Thankful" for your magazine and nice people like you!" Mike and his wife, Nanere, sail out of Marlton, New Jersey, where Mike helps out with the Coast Guard. They've been *Good Old Boat* readers for 12 years. So, Mike and Nanere, back at ya; we are thankful for you!

—**Editors**

Sailing Dads

I just read "Let's Go Sailing" (The View from Here, January/February 2022). I enjoyed this issue and I appreciate any attention to diversity. My kids are 9, 7, and 4. My wife and I enjoyed a Mengher 23 for a season or two—picked it up at Arey's Pond in Chatham, Massachusetts, and sailed it down to Long Island. That's when my son was 1. I was made an offer I couldn't refuse and traded her for Whitby 42 hull #4. We sailed to Maine last summer and left her on the hard there. Plans are afoot to set sail for Canada this summer. Covid, children, and full-time jobs—life could be worse. My dream is to get this boat in shape to cast off more permanently sometime. I'm glad to know there is another dad at the helm.

—**Ralph Wolf**, *CaLeRu II*, New York City

Boats for Sale

Ontario 32
1978. Modified C&C design sloop. '10 Yanmar 3YM30 diesel, overhauled '16. 11.5′ beam provides space and headroom of 36- to 38-footer. Bluewater boat that has crossed the Atlantic, sailed the Mediterranean, Black Sea, Caribbean, and West Coast from Alaska to Costa Rica. On the hard in Puerto Penasco, Sea of Cortez, Mexico. Full inventory avail. $17,500.

Aubrey Millard
705-849-3836
svveledaiv@hotmail.com

Downeast 38
1975. Cutter-rigged. Recently completed $10,000 interior upgrade. Rebuilt inside/out '08. New bottom, rigging replaced. Interior exc cond. Marine survey '09/'19, new zincs, 3.5KW genset. AC blows cold, VHF, AP, full instrumentation, GPS. Many pics avail. Ft. Walton Beach, FL. $89,700.

James DeSimone
850-939-7241
jdesim2015@gmail.com

Atkin Schooner 33
1957. Gaff-rigged. 32′9″x9′8″x4′4″ restored 2012-17, new African mahogany plywood/glass deck. Bald cypress deck beams, white oak frames, 3″ floor timbers, 7x6″ stem, white cedar hood ends, 1⅜″ carvel planking, both garboards and 3 planks above. Set of 5 sails including gollywobbler. Bulletproof Sabb-2H, 18hp, new rings and cylinder sleeves. 12′6″ standing headroom, sleeps 3+, July '18 survey. Westerly, RI. $60,000, all reasonable offers will be considered.

Jim De Reynier
860-305-1582
Jimder40@gmail.com

Tanzer 10.5
1983. Great cruising boat. Anchor windlass, Hood mainsail, stowaway mast & boom, Profurl headsail system w/self-tacking jib. Vetus bow thruster. Retractable ballasted lead keel with elec hydr lifting system. Mast tabernacle with lowering equipment. Pilothouse accessed from the cockpit down short ladder. Center cockpit with aft cabin connected to the galley through small passageway, with 3 maple cabinets for storage. Dinette w/comfortable seating for 6. Port Clinton, OH. $59,900.

Carl Gottwald
419-320-3154
cgot@inbox.com

Island Packet 29
1992. IP-29 cutter, CB, Yanmar 2GM20F w/1600 hrs, new genoa, newer main, Dutchman system. Many upgrades, '13 electronics, Raymarine e95 w/radar. Comfortable family cruising w/2 large berths fore and aft. Easily singlehanded. Needs some cosmetics. Owner downsizing. Georgetown, ME. $49,000.

Bruce ZuWalick
203-430-9822/203-988-4950
Bzuwalick49@gmail.com
brux1949@sbcglobal.net

Sabre 28
1976. Professional maint. Freshwater radiator, auto bilge pump, folding prop, Garmin GPS, Harken RF jib, windspeed indicator, boom vang, boom kicker. Standard features of Sabre 28 (e.g. Raytheon depth/temp, boat speed/distance, ICOM VHF, oil pressure, water temp, voltage gauges). Friendship, ME. $16,500.

Ken Dunipace
317-654-2929
krd9@att.net

Tartan 37
1979. *White Hawk* is a self-sufficient cruiser. 4′6″ CB. Strong Track slide, Harken lazy jack systems, both '20, for Quantum main. Sails incl. 140 genoa, 100 jib, staysail, gennaker. Westerbeke 40hp. Garmin radar and chart plotter, Raymarine instr. Two solar panels w/Blue Sky Solar Boost charge controller run Frigaboat fridge and most elec needs. Immaculate interior w/upgraded galley, new Bomar SS ports. Pasadena, MD, $65,000. View details at sailboatsforsale.com; search Tartan 37.

John Clarke
410-570-1500
johnclarkejr45@gmail.com

Tartan 34
1968. Classic S&S by original builder, Douglas and McCleod, hull #18. Solid hull and deck, no problems. Solent rig w/double RF jibs. New mast '12, masthead and deck-level LED running lights. New dodger, new ultrasuede upholstery, optional deluxe interior w/recent refinish. SS LP stove/oven. Upgraded Atomic 4 engine. GPS, VHF, depth sounder, double anchor roller, 3 anchors. West Coast of FL. $25,000.

David Santos
252-617-2808
santosjd10.5@gmail.com

Irwin 30
1974. Shoal-draft sloop. Owned by a rigger for 20 years. Many rigging upgrades. RF genoa, reefable mainsail w/Dutchman traveler, halyards led aft, self-tailers, new boom, wheel steering. Harken blocks, spinnaker gear. Split backstay. Newer head, folding prop. VC-17 bottom annually. Atomic 4 gas engine has fresh ignition parts. Very complete boat ready to sail. On cradle in Eastern Lake Erie, NY. $9,500 OBO.

James Berry
716-867-7388

Pearson 26 Weekender
1976. Great daysailer, exc PHRF racer, heavy-duty gear, spinnaker-rigged. Lots of accessories. Incl LS OB, car trailer, steel cradle. Plymouth, MN. $6,000.
Michael Barnes
763-557-2962
granite55446@gmail.com

Caliber 35
1994. Cutter-rigged, impeccably maintained. 100hrs on rebuilt 3GM30F Yanmar. AC, radar, AP, GPS, VHF, SSB. full instrumentation. Set of 5 sails, including brand new main. Water maker. Fresh water boat until recently. Bluewater ready. St. Petersburg, FL. $85,000.
Gregg Nestor
440-632-1463
rotsen@nls.net

S2 9.2 C
1986. 30' Center Cockpit Masthead Sloop. Beam 10.25', Yanmar 2GM20F Diesel. Mainsail 2014, Mack Pack. Genoa roller furling. Sails professionally stored, cleaned, inspected yearly. Comfortable cruising for 4, private aft cabin, V berth. 6'2" headroom galley area. nav station. Cabin table relocates to cockpit. Origo 2 burner stove, AC/DC refrigerator, pressurized H/C. GP32 GPS, CPN700i Chart Plotter, VHF radio, CD/Radio. Ritchie binnacle compass, depth & knot meters. 2 Danforth anchors. Spring launch Maine. $22,000.
Walter Reynolds
207-240-1407
wereynoldsllc@gmail.com

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Harp Song of the Sane Women

A sailor is grateful for her fellow bold sailing women.

BY LISA LIVEZEY

It was mid-March in Rock Hall, Maryland, and boaters were emerging from hibernation to prep for the upcoming season. Our newly acquired Beneteau 411 was sitting on jackstands near the docks, having recently completed its sea trial. My husband was painting the hull while I spruced up the interior. Our teenage son was oiling the teak trim.

Needing a break, I descended the ladder and met a woman passing by named Teri. She and her husband, Craig, had sold their sizable horse farm in Canada and had bought a gorgeous 2011 Hunter 50 CC. They had purchased it virtually, via the Internet and a FaceTime tour, and now were busily outfitting the boat. Teri invited us to their renaming ceremony planned for later that afternoon.

"So nice to see another woman here," Teri said. "It's mostly been guys working on their boats. They tell me their wives aren't into sailing; one guy said his wife divorced him because of it."

This wasn't a new refrain, and while I've wondered if there weren't other untold factors at play in these stories, it brought to mind a recent conversation I'd had with a woman who fit this description. She had harped about her husband's boat, calling it his mistress because of the amount of time he devoted to it.

Then there was the sleek black racing yacht that my husband had pointed out last fall, its glossy hull inscribed with the name *Widow Maker*. We had laughed, assuming that the owner's sailing passion might leave his partner feeling like a widow. It called to mind Rudyard Kipling's poem "Harp Song of the Dane Women" that begins:

What is a woman that you forsake her,
And the hearth-fire and the home-acre,
To go with the old grey Widow-maker?

Told from the perspective of the women whose Viking mates each spring would "steal away to the lapping waters," the poem's speaker laments the loss of the men who would rather go to sea than enjoy home with its creature comforts and domestic pursuits.

Admittedly, recreational sailing bears little comparison to the wild and woolly lives of Viking men. But I couldn't help thinking that women like Teri and me are more like the men of the poem than the bereft women left at home; unlike some, we understand the draw of the water and the desire to escape from everyday routines.

Even as I was mulling these thoughts standing in the marina, our two-story brick colonial was 94 miles away on a wooded acre, the demands of its annual spring cleanup unmet as we drove happily to Rock Hall to prep our boat for the season instead. The maintenance requirements of a 42-foot sailboat—all to get her out on the blissful water—were deeply appealing compared with the "home-acre" and its endless chores.

ILLUSTRATION BY FRITZ SEEGERS

Later that afternoon, we gathered to rename Teri and Craig's boat, and we all toasted as *Sanctuary* was laid to rest and *Cala II* was initiated. The champagne flowed freely.

As we hung out afterwards talking and sipping, I met another kindred spirit, Liliia, who was there with her husband, José, and their two daughters. They were preparing to sail south on their Hunter 34. Liliia was describing how they had hiked to Mt. Everest base camp with a baby and toddler.

Here I sat, in the cockpit of a gorgeous yacht, meeting fascinating, ambitious people, while a crimson sunset graced the Chesapeake sky. Surely we aren't the Dane women, I mused. You know what? We are the *sane* women! A counter to Kipling's first stanza came to mind:

What is the lure, you Home-maker
O laundress, maid and baker
When you could go with the Spinnaker?

The next afternoon, Teri stopped by to chat. We glanced across the boatyard and saw someone in a bosun's chair high up the Hunter 34's mast.

"Is that José up there?" Teri wondered. But a couple of hours later, when I bumped into Liliia, she set me straight.

"That was me," she said. "I wasn't strong enough to hoist him, so I went up instead." And in true "sane" woman fashion, she added, "At first I was scared, but then I looked around...and wow, what a view!"

Lisa Livezey is a freelance writer and spiritual blogger who lives in the Philadelphia suburbs, but escapes whenever possible to sail the Chesapeake Bay or to kayak in Maine. Her spiritual musings can be found at: likeagreenolivetree.blogspot.com, or read her devotionals in Strength and Grace *magazine, published by Guideposts.*

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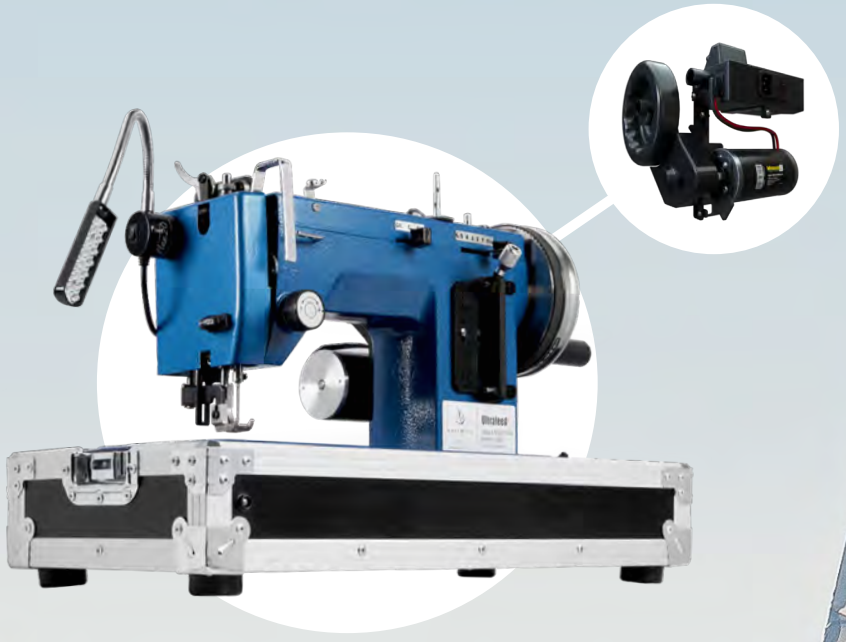

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