PERSPECTIVE

It's always difficult when you do a book like this, or you're involved in yacht building and design as we've been, to keep in mind that one doesn't need a whole lot of boat or fancy gadgets to enjoy the cruising lifestyle. Sure, it's nice to have a bigger boat, and SSB or weatherfax reduces anxiety, but the objective really ought to be cruising, and not waiting around until you have enough bucks to buy some ultimate cruising machine. In the early sixties, when I had my first boatyard and was struggling to get established (or maybe just make the next payroll), I would occasionally see young folks going cruising in very small boats with even smaller budgets. I'd get a postcard now and then, perhaps from Papeete, or Sri Lanka, and think, "Some day, I'll do that too."

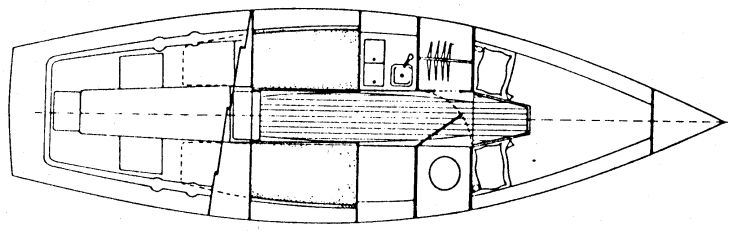
Well, it took a lot of years for me to accumulated the money I thought I needed, and the good sense to kiss off our "normal" lifestyle. With a modest budget we bought our 50-footer (15.4m), as you know by now, and sailed into the sunset.

I have only one major regret: That we waited so long. While it's always hard to look back and say one should have done this or that, I firmly believe that selling my car and few possessions and buying a Folkboat, or some such machine, and heading off to the South Pacific, would have been more rewarding in the long run, than banging my head against the walls of our economic system in order to accumulate the wealth I thought was necessary to go cruising in the "proper" style.

Much of what you have read now, I hope, will enable you to make informed decisions on what you really need, and what can be passed over. It really is possible to cruise in a proper *little* ship, with a minimum of fancy toys, and do it safely, with some degree of comfort, with the entire world to play in — to learn about — while you expand your personal level of awareness. The sooner you go and the simpler you do it, the better off you will be.

Toward that end, we thought it fitting to end this book with some comments on several small yachts, aboard which we would have been happy to head off to paradise two decades ago.

The main cabin of the Contessa 26 is tight, but still offers the comforts of home. There's a nice little sink and galley area to port and a small chart table to starboard. Forward you'll find V-berths and an enclosed head.



Remember, these are just examples. There are a number of such designs afloat throughout the world today. All you have to do is be clear about your objectives, sell the car, get rid of the furniture at a garage sale, take a modest amount of savings, and you're off!

CONTESSA 26

Linda and I first got to know the Contessa 26 when we met Tanya Aebi at a lecture she gave near our home in Ojai, California. She'd sailed a somewhat modified version of this design around the world alone, and it was obvious from her comments and the photos that it was a proper little ship.

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Then, one day I received a phone call from a friend and yacht designer, Richard Black. Richard had found a Contessa 26 sadly in need of loving care, but otherwise quite sound. He'd bought the boat for $10,000.

The boat was a wreck inside and out, but only cosmetically. Within a couple of months, with a few hundred dollars in paint, Richard had her looking like a proper yacht. When he added gold leaf to the cove stripe I knew the job was done.

There aren't any electronics, the engine is noisy, and he couldn't carry that much cruising gear, but there's an enclosed head, a place to sleep at anchor, and room for enough clothes and supplies to keep you happy in the South Pacific.

Richard's priorities in buying this boat are interesting. He had owned and cruised on a series of large boats and could have afforded more. However, with this small an investment he could pick the boat up without going to the bank. They had a few bucks left over in the bank to boot. There were no cash-flow hassles, no emotional problems associated with being overburdened financially.

If you keep your eyes open you may find a similar situation. They are always around, you just need to find them. The worse the boat looks, if it is in structurally sound condition, the better the deal is likely to be, as long as you are prepared to put a little elbow grease into the project.

The Vanguard 32 has a moderately sized cockpit, ideal for a couple on a liveaboard yacht. You can sleep (albeit in somewhat cramped style) in the cockpit, and the dodger offers excellent protection. Having the mainsheet behind your head would make you cautious during jibes, but this is the only drawback on an otherwise lovely living area.

PEARSON VANGUARD

For Rick Marvin, patience and being in the right place at the right time (which comes from being prepared and hard work) led him to *Wind's Way*, a Pearson-built and Phil Rhodes–designed Vanguard. This salty 32-footer can be seen in many anchorages around the world.

Wind's Way, had been to Tahiti and back in 1979 (taking 25 days from and to Hawaii in each direction) before Rick picked her up.

With just a 23-foot waterline and 9-foot beam you would expect things to be a little tight below compared to a modern yacht of the same size, and they are; but if the issue is going to sea, sometimes it is necessary to trade a little space for timing and budget.

The Pearson Vanguard, with its 10,000-pound displacement, allows for a reasonable amount of stores and cruising gear. The rig has 470 square feet of sail balanced by 4,250 pounds of ballast, so she is stiff. She carries 40 gallons of water and 21 gallons of fuel (about a 350-mile range with her little Westerbeke diesel).

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Rick has taken *Wind's Way* down the Line islands from his home base in Hawaii, visiting Palmyra, Fanning, and Christmas en route. He averaged 125 miles per day reaching in the trades with a best 24-hour run of 155 miles, so you know this little yacht will move right along in a breeze.

One of the interesting things about *Wind's Way* is how Rick picked her up. She was dirty and worn inside, needed a dose of TLC abovedecks, and the owner was tired of the cost and responsibilities of maintaining her. Rick was on a tight budget and offered what he could afford at the time — $10,000 paid out at a rate of $200 per month.

"A steal," you say. Yes, certainly if the boat were in better shape, and sitting on the mainland she'd be worth a lot more. But at the time, when Rick picked her up, he offered what he was comfortable with and the owner felt it was in his best interests to make the deal. This winter Rick will spend five or six months of part-time work redoing her interior, plumbing, and electrical systems, after which she will not only look good, but be worth substantially more than he paid for her.

Is there a lesson in Rick's and Richard's experiences? If you really want to pursue a cruising dream, you bet there is. What are *you* waiting for?

The main saloon on the Cal 29 is very efficiently laid out. The working area is located to starboard, with plenty of counter space on top and storage volume under the counter. The L-shaped saloon seating and table allows space for guests to visit.

A diesel heater on the forward bulkhead is located well outboard, so it is out of the traffic pattern going forward.

As you move forward there's a head compartment that is actually quite roomy for a boat of this size. Then you get to the "master suite" — a V-berth/double combination located under a forward hatch. I doubt if you'd sleep here at sea, but at anchor it would be lovely, especially with a wind scoop funneling cool night air onto your head and chest.

CAL 29

I've always been a fan of the boats designed by Bill Lapworth and built by Jack Jensen at Cal Yachts. I can't think of a single boat they collaborated on that wouldn't be a good choice for cruising.

The Cal 29 is an interesting design because it represents an early break with the CCA tradition, a precursor of what was to come a little later from this duo in the Cal 40 and Cal 48 projects.

We've seen a number of these yachts out cruising. The one in the following photos was in

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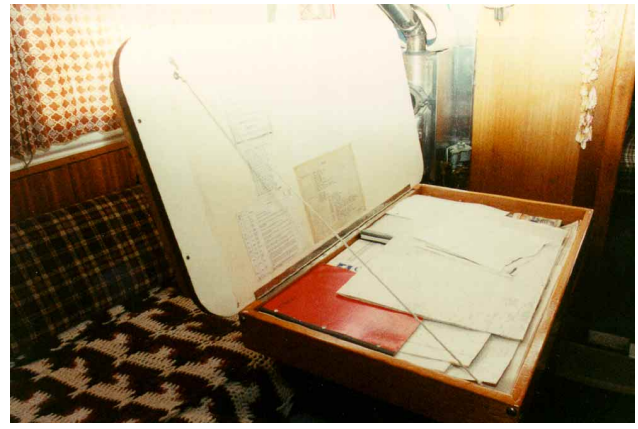
Hawaii at the time we met the owner. She'd spent some time in the South Pacific, and had a number of uneventful Pacific crossings to her credit.

You can pick up Cal 29s, in need of care, for under $15,000 — sometimes less.

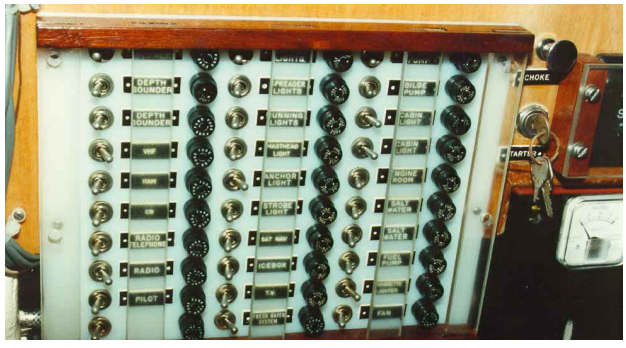
The forward cabin has traditional V-berths. At sea the main saloon becomes the bunk room.

Note the miscellaneous stores on the starboard side. They are all bagged in plastic in case of a leak — a good idea for many boats when heading to sea.



There's a small nav desk located at the end of the saloon with room beneath the top for a bit of storage.

Outboard of this area is a shelf where basic electronics are installed (in this case a Magnavox Sat Nav and Ham radio rig.)



The electrical panel has been redone along with the wiring loom. This is a project that is probably going to be required on any vessel of this vintage. If you take your time, plan ahead, and think things through in advance, it can be done in three or four weekends.

When you take on this project, be sure to use tinned wire, and protect each circuit at the source (whether batteries or main panel).

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Mistral, winging her way home toward Auckland, New Zealand

MISTRAL

It's probably safe to say that *Mistral* has more boatbuilding experience worked into her trim form than almost any other yacht afloat. She's the product of Kelly Archer, by far the best yacht builder I've ever known. By the time *Mistral* was launched, Kelly figured he had built more than 20 yachts over 50 feet in length and countless smaller ones. His credits include *Wakaroa* and *Deerfoot*. Kelly has built complex motorsailers, race boats, motor launches, and even the dinghy we took with us from New Zealand years ago. He has seen just about every type of system available, had a chance to evaluate them all, and plenty of time to decide what was right for his own ultimate cruising yacht.

We think enough of Kelly's work to have recruited him to help us with getting the Sundeer production program working at TPI. And when he returned to New Zealand, intent on going cruising again, we talked him into doing just a couple of more boats for us (as this is being written he is overseeing the completion of *Beowulf*'s interior and the construction of an 80-foot/24.6m yacht to our design).

When *Mistral* isn't cruising she sits on a mooring in the Greenhithe Creek, just a couple of blocks from the Archers' home.

What I find so interesting about *Mistral* is how she had stood the test of time. When Linda and I were looking for an interior design approach, Kelly suggested we take a look at one of our older boats then moored in New Zealand and *Mistral* (which was moored near his house). While we hadn't been aboard his boat for ten years, the minute we went below is almost felt like coming home. The lovely timber finish, exquisite joinerwork, and careful integration of bulkhead materials had an elegant, timeless feel. It had a big impact on our thinking, and in the end, Kelly convinced us to go with a much more traditional interior on *Beowulf* than we'd been planning on.

Kelly started work on *Mistral* in 1976. He built the hull, a Bob Salthouse design, in just 90 days. Like so many strong Kiwi boats she's constructed of triple (diagonal) skin kauri wood over longitudinal stringers set on structural frames.

With such a fast start he thought he'd be finished in no time. Then he met Jos. Marriage, and then a house got in the way of *Mistral*. There were lots of other people's boats to build anyway.

Eleven years and 12,000 painstaking man hours later *Mistral* was launched. There were some folks in Greenhithe, New Zealand, who had figured he would never get the job done. But what a creation Kelly and Jos had been building. From her perfect joinerwork, with its 15 coats of varnish, to the carefully thought-out systems, this boat was the ultimate expression of a perfectionist's dream.

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Kelly popped a mold of our dinghy when we first met in 1978. When the time came to make one for *Mistral* he made it as a two-piece unit, which easily stows in halves on the foredeck.

Kelly wanted to be able to cruise in many of the shallow rivers that abound in New Zealand, so *Mistral* draws just 4 feet with her centerboard raised (8 feet with it down). Her mast is deck-stepped with a hinged bottom. By using their boom to control angle they can easily drop the mast forward to fit under low bridges. Kelly feels that the higher mast weight necessitated by the deck-stepped spar is more than made up in the extra cruising grounds.

The hull shape is of modest proportions: 39 feet (12m)on deck, 32 feet (9.8m) on the waterline, with an extreme beam of 11 feet, 2 inches (3.4m). The hull maintains its balance when heeled with only modest weather helm at a 25-degree sailing angle. They displace 25,000 pounds (11,337 kg), with 6,000 pounds (2,720 kg) of lead and 6,000 pounds (2,720 kg) of personal gear, stores, and sports equipment. Water capacity is an ample 160 gallons (650 liters), with directly piped catchment capabilities from the trunk cabin top.

Mistral's layout is typical of a yacht of her size and vintage: large galley adjacent to the cockpit, nice large saloon with the starboard settee making into a double bunk for Kelly and Jos in port, a good-sized head and shower forward, with a separate cabin for their daughter, Katy, made up forward. The dual V-berths will also do for occasional guests if Katy moves to the saloon.

The saloon table is usable full-sized for dining or when Katy is exercising her considerable artistic skills, and can easily be folded back on itself to reduce bulk and work as a coffee table. It swivels and can be raised and lowered to find the optimum configuration for whatever activities are taking place.

They have a modest-sized cockpit — comfortable, but not too large for offshore work.

The rig is stout. The main halyard, tack and clew reef lines, and mainsheet traveler controls all come back to the cockpit. Kelly has two roller furlers in the forward triangle, one for a no. 2 genoa, and the other for a large, light reacher. Both are hank-on roller-furling systems so he can change headsails offshore. The spinnaker pole is stowed on the mast in port and when sailing downwind. Upwind the pole is stowed on deck, and the unused headsail is dropped and secured so windage and weight aloft is reduced.

The deck is adorned with interesting, functional bits of cast hardware, all custom-designed and in most cases built by Kelly himself.

But it's in the systems end of the boat that Kelly has really done some interesting things. He and Jos wanted to have a comfortable life-style afloat. As a minimum this meant (for their purposes) hot showers, refrigeration, and some of the conveniences that come with electricity. But they also wanted efficiency and total reliability. For them that meant being able to do without electricity if they had to.

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Looking aft (top photo) toward the galley area. The fridge/freezer bow on the starboard side also works as a chart table. The galley layout (lower photo) features a stainless sink and counter, with integral stainless fiddle rails. Easy to clean and you never have to worry about leaks in the caulking

So they started with an 18-horsepower SAAB diesel that can be hand-cranked if necessary. When coupled with a variable-pitch, fully featherable prop, this little two-cylinder engine pushes them at a comfortable six knots into 25 knots of headwind, and in smooth water gives them a 1,200-mile range under power from just 72 gallons (290 liters) of diesel fuel.

Kelly uses an exhaust-gas temperature gauge (pyrometer) to tell him when the prop is pitched so the engine is fully loaded. He can crank up the pitch in smooth water or when motorsailing and flatten it out when plugging into a head sea.

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The main saloon has a table that folds in halves when not in use for dining. This allows you to see more of the sole, which makes the center of the boat appear larger. The use of light-colored bulkheads, covered with a textured vinyl, also opens the interior visually. It also sets of the exquisite teak joinerwork and varnish nicely.

Like so many of our other cruising friends, the Archers use a York automotive air-conditioning compressor to pull down the fridge and freezer. The fridge/freezer box is lined in stainless steel, with 1 1/2-inch-thick holding plate all the way around. This, in turn, is surrounded by a full 6 inches of insulating foam. Talk about holdover power! Cruising in the summer in New Zealand they can easily go for three days before they need to run the engine, and the box can sit for a week if the boat is unattended.

Now it doesn't do much good to have a fantastically efficient fridge system if you have to run the engine every day for electricity. So they've gone the limit here, too. Kelly started with a 700-amp-hour deep-cycle bank of "traction" batteries. These are industrial-type units, each cell being two volts, sealed into a watertight locker to protect the batteries in case of flooding. Kelly has gone one step further to provide electricity in the event of a flooding. He has kept the bilge pump and radio on a separate circuit. If the electrical system shorts during a saltwater flooding, they can turn off all the circuits except the one which services the radio and pump.

Of course, it takes a pretty healthy alternator to charge this bank. The unit they use has a seven-to-one drive ratio from the engine. At normal charge speed, which for them is 800 rpm, the alternator pumps out between 90 and 100 amps. They have both a conventional regulator and a manual unit with which they can adjust the output.

One of the nice features of this big alternator and highly loaded compressor is that it puts a decent

The reefer box is divided into fridge (forward) and freezer (aft). It has a strainless liner with integral hold over tanks. The fridge is top- and front-loading, while the freezer only loads from the top. Note the clever use of baskets in both units.

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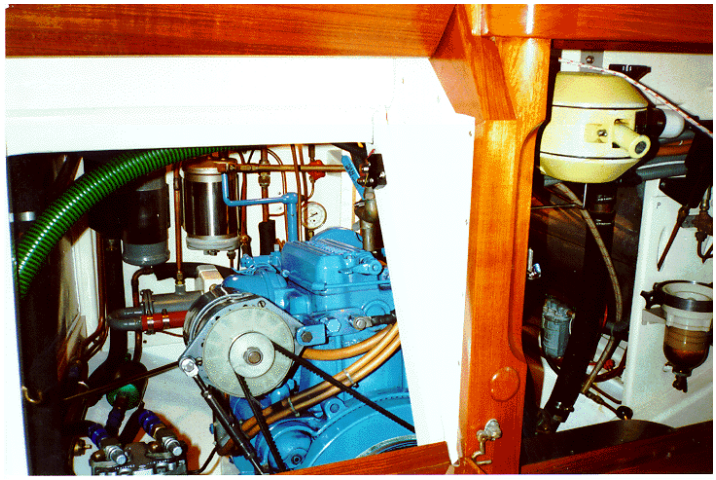

The engine "room" stretches across the aft end of the boat, under the cockpit. For a boat of this size there is wonderful acess.Things are neatly laid out on bulkheads, and it's easy to keep an eye on what is happening.This is a key factor in staying *ahead* of problems.

Mistral's cockpit coamings are high and generously angled for maximum comfort. Note the seat built into the pushpit, with backrests on the corners (these work at sea with the boat heeled, and in port).

load on the engine when it's being used as a generator. If they're motoring and a breeze comes up, they just turn off the acessories so they have full engine output for propulsion. It's the best of both worlds as far as power is concerned.

Another clever feature aboard *Mistral* is Kelly's pumping arrangement on the engine. A single 1-inch Jabsco impeller pump, with a hand clutch, serves the fridge's heat exchanger, provides deck wash, and can be used as an emergency bilge pump. To keep the plumbing simple the water is directed first to the fridge condensor, and then forward to the deck wash point on the bow. Throw a Y-valve and you're drawing from the bilges.

The head shows the same type of thinking. Kelly stripped down a little Hoover washing machine and built the innards into the counter, so Jos has a lovely washing machine to help on laundry day. The toilet is a "Lavac" style head, which uses the toilet seat as a seal and pulls water and effluent through the system with a single vacuum pump. Kelly reports this is much more reliable than the more complex check valve–laden marine heads most of us are used to dealing with.

For hot-water showers they have a heater that uses waste heat from the engine. Because the little SAAB runs so cool, Kelly had to make a jacketed exhaust line to get enough heat. For the days the engine isn't run they use a small propane heater in the hot-water circuit.

Ground tackle consists of 300 feet (93m) of 3/8-inch (19.6mm) chain coupled to a 70-pound (32kg) CQR anchor; pretty heavy gear for a moderate-displacement 39-foot yacht, but it lets them sleep soundly under less-than-ideal anchoring conditions. In keeping with Kelly's electricity-independent philosophy, the anchor windlass is a manual unit, with an electric motor added. They normally use the windlass electrically, but should the motor fail, they still have a conventional hand windlass.

With a boat this lovely you think that Kelly and Jos would be forever happy. But that next-boat syndrome has been hard at work. In their back yard in Greenhithe, New Zealand is the hull for a 68-foot (21m) motorsailer. In the next year or two the Archers are going to part with *Mistral*, and some very lucky person is going to get one the most beautiful timber yachts afloat.

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BEACH PARTY

John and Pat Sprouse in *Beach Party*'s comfortable saloon.

One of the things we enjoy about cruising is the interesting boats we meet along the way and the crews that go with them. Linda and I had been anchored at Espiritu Santo, in Mexico's Sea of Cortez for a few days when *Beach Party* sailed smartly into the anchorage and dropped her hook.

She was one of the first fractionally rigged boats we'd seen out cruising, and I was interested in finding out more about how she handled.

We hopped into *Sundeer*'s dink and were soon alongside.

Come aboard, drawled John Sprouse. It wasn't long before Linda and I had met John and his wife Pat and were exchanging sea stories.

The Sprouses had been cruising for a year at this point, having escaped from the cold weather in their native Oregon.

What had attracted me initially to *Beach Party* was her fractional rig with aft-swept spreaders. This is a rig that Bruce Farr had pioneered in the late 1970s down in New Zealand and had proven quite popular with many of the smaller Kiwi boats.

However, this design was 46 feet (14.1) long with a large main. John reported that the big main handled easily, with a bonus in a very small forward triangle.

The aft-swept spreaders eliminated the need for running back stays except in heavy going. And the fractional spinnaker, while small in size, was easily manageable for cruising. The one drawback was a lack of cutter stay on which to fly storm canvas.

Like many boats in New Zealand, this one was built in timber, double-diagonal-planked Kauri, strong, light, and, as wood goes, relatively maintenance free. A bonus, at least in some parts of the world, is that timber boats tend to sell at a discount to fiberglass. If you get one built this well by Kiwis, it is hard to go wrong.

The boat was originally built as a centerboarder, but the Sprouses changed the centerboard trunk into a fuel tank added a fixed keel.

The Farr 46 is a center-cockpit design, with a large engine room under the cockpit and owner's suite aft. The galley is forward of the engine space, with saloon ahead of that, and then a double V-berth guest cabin in the bow.

While I am not usually a fan of center-cockpit boats, this design pulled it off nicely, and with guests aboard you certainly have privacy when you're in the aft cabin.

After five years of owning the boat, during which time they got the boat and themselves ready and their sons graduated from college, they'd headed off for parts unknown.

As you would expect with a design of this type, she moved right along. Days of 150 to 175 miles were the norm. Watching the boat sail you could see that Farr knew what he was doing. A very small bow wave and hardly any wake would show, even at seven knots.

If you see a well executed design in timber, especially if it's cold-molded, don't immediately turn up your nose. Some of these boats can make wonderful cruisers.

Beach Party is quite handsome for a center-cockpit design. The bulk amidships has been dealt with nicely.

The interior is functional, with a lot of wood to make it warm. Much of the storage is open or behind cane-fronted doors for good ventilation.

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Intermezzo II was a classic cutter rig. Small main, with a large forward triangle broken into Yankee jib and staysail. When everything was trimmed exactly right, it was a very fast rig. However, we found the double-head rig difficult to keep in trim as apparent-wind angle and strength varied. If we were building her today, we'd go with a full-batten main of a much larger size and smaller forward triangle. Note the top full batten and reef points in the staysail.

She was flush deck, which made her very strong, gave her a huge amount of visual space below, and was efficient to build.

INTERMEZZO II

Even before we'd left the U.S. for our cruise on *Intermezzo*, I was thinking about a proper cruising yacht, one which was free of the racing rules that determined so much of what cruising yachts looked like in the 1970s. Two things forestalled my going forward. The first was the cruising lifestyle. We wanted to give it a try for a while to see if we really liked it.

The second was our own lack of experience. While both Linda and I had raced on a variety of boats for many years, we'd done little cruising. Neither one of us felt we had the experience base to define, let alone build, an ultimate cruising yacht.

As we sailed across the Pacific we looked at all sorts of boats. Many of them had interesting rig, systems and hull designs. We looked, picked the brains of our fellow cruisers, took copious notes and photographs.

By the time we'd reached New Zealand we knew a lot more about what we were after and had decided that we did indeed love the cruising life.

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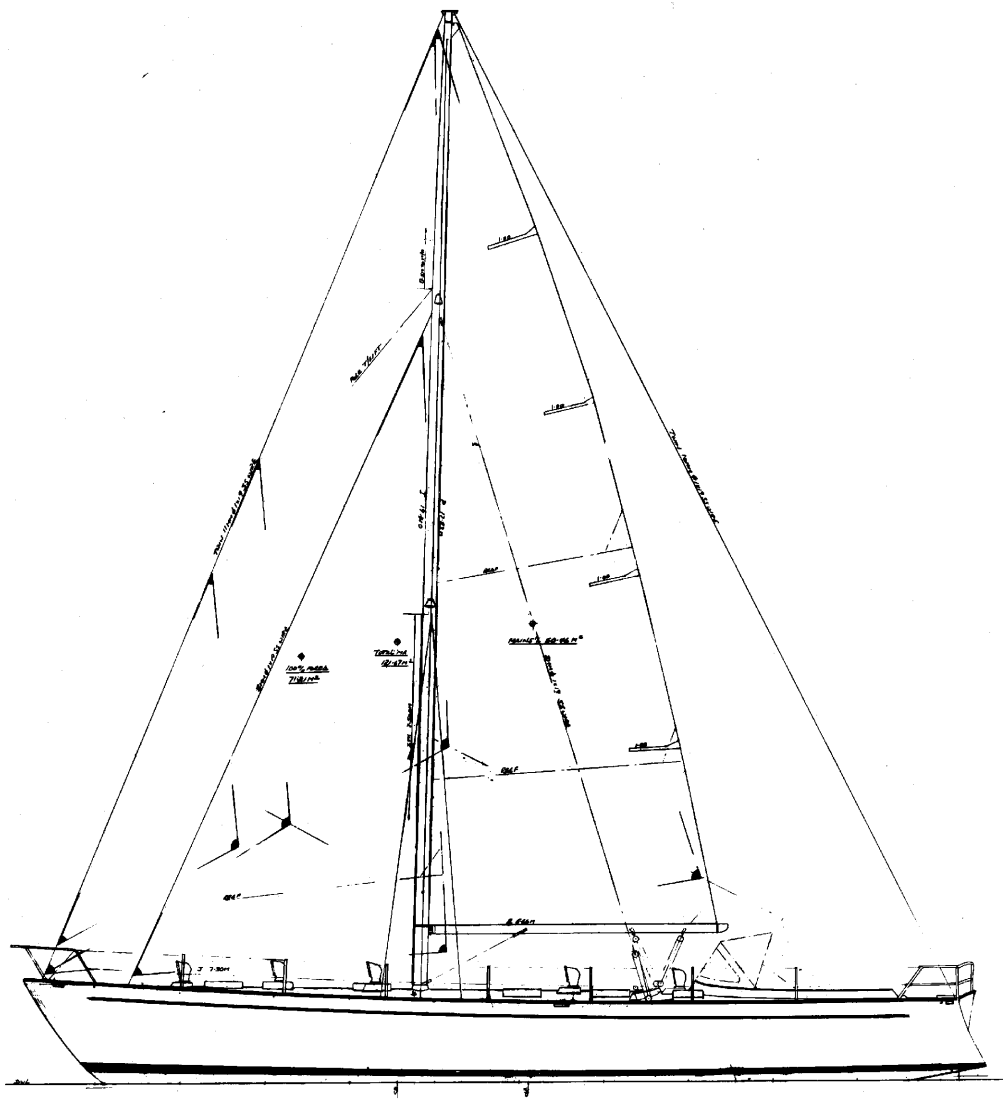

The first time I looked at the rig at the dock after stepping the mast, it seemed huge even though in reality, as you can see here, it is quite short. We found that at sea this boat was much easier to handle than had been the case with the smaller *Intermezzo*.

Then, as we've already mentioned in the design section, we went for a sail on the Kiwi-designed-and-built *Innismara*. A little later my Dad came to visit, he was between boats, we found a local yard, and the rest, as they say, is history.

While we had planned to do a boat out of the same mold we'd built for my dad's *Deerfoot*, a series of events combined to delay us until we'd sailed across the Indian Ocean and reached South Africa.

Here we found a situation too good to pass up in terms of cost to build. Not only that, but it looked possibly that we could build our new boat in aluminum, the ultimate material as far as we were concerned.

In Cape Town I was introduced to a designer, Angelo Lavranos, who had designed most of the local boats. He had an open mind and was receptive to our design concept.

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On our way from the hull builders to where she would be fitted out. As I sat on the roof taking this photo, I started to think about a bare aluminum hull. But in the early 1980s, the idea was too radical for me.

I gave Angelo our basic parameters: a maximum boat for the two of us, one that we would be able to sail *without* having to rely on roller-furling aids in the high latitudes. We wanted a maximum draft of 6 feet (1.85 m) fully loaded, and a displacement not over 50,000 pounds (22,670 kg). I threw Angelo the rough work I had done, and he replied with an enigmatic, "We'll see."

Two weeks later I had a set of preliminary drawings in front of me. The numbers he came up with indicated that within our weight limit we should be able to carry the cruising payload I needed to keep both Linda and myself happy.

We set up a company to build a new boat, and shortly thereafter set sail from Cape Town on a nonstop 6,000-mile journey to the West Indies. We were anxious to get back to the States, sell *Intermezzo*, purchase the materials for the new boat, and see about getting an order or two for additional vessels.

After we cleared customs in Ft. Lauderdale, our old friend Chuck Adams was next on the list; he was holding our mail, including the newly arrived drawings!

We stretched out the lines on *Intermezzo*'s saloon table and absorbed what Angelo had created.

She was 62 feet (19.1m) long on deck, 55 feet (16.9m) on the water, and 14 1/2 feet (4.5m) wide. He had caught exactly the flavor of what we wanted, and was able to work in not only the draft requirements but our aft engine room as well. Both factors came together in the hull to form a moderately wide stern that helped stability without compromising hull balance and steering ability too much.

All the tankage would be in the keel and just under the floorboards. Within our weight budget we were able to work in 340 gallons (1,300 liters) of fuel, enough for a 2,000-mile range at 7 knots or 1,200 miles at 8 knots, and 540 gallons (2,100 liters) of fresh water.

I had specified fore-and-aft watertight bulkheads, and Angelo had added a partial collision bulkhead 6 feet (1.85 m) back from the bow. A collision at sea might ruin our day, but it wouldn't sink us.

Interior

The forward 14 feet (4.3m) of the vessel would be used for stowage. Pipe-framed sailbins were welded in on both sides to make handling and stowage of our headsails easier. To starboard we

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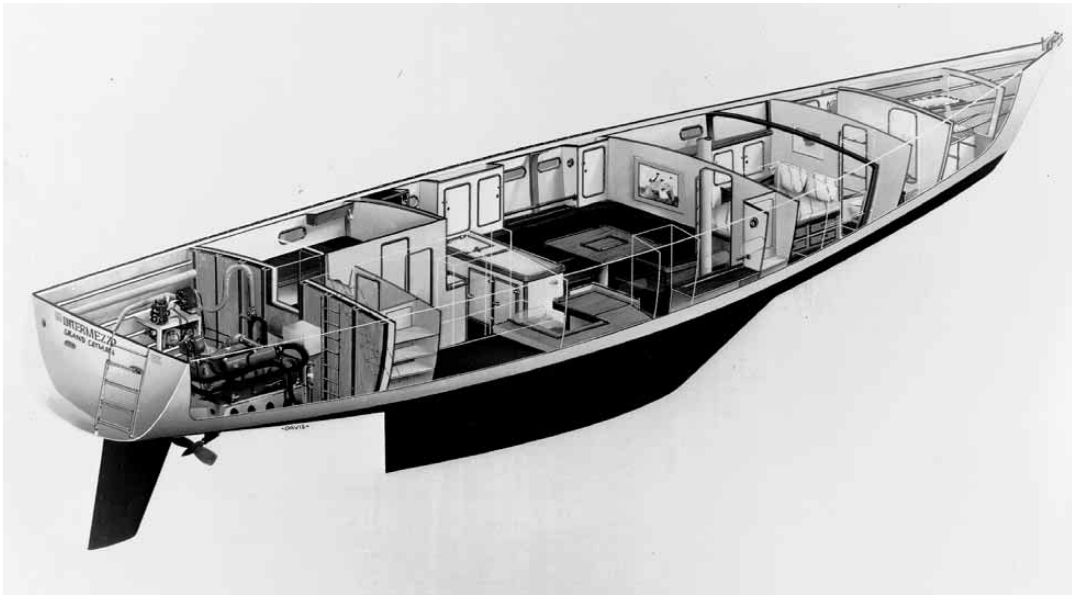

We've found that this layout — engine room and guest cabins aft, owner's suite forward — is by far the most efficient use of space for a cruising boat. Since it was first used on *Wakaroa* and *Intermezzo II* it's been the basis for most of our subsequent designs. We frequently try other approaches but have yet to find anything that works anywhere near as well.

made up two pipe berths which were used as stowage shelves for awnings, fenders, and diving gear.

We were concerned throughout the project with safety at sea, and the interior had to be usable, with minimal risks in severe weather. We solved this problem by putting two aft cabins, each with its own head, on either side of the companionway leading down directly from the cockpit. This provides four good sea berths (two to each cabin) and a secure walkway forward between the cabin bulkheads. In severe weather we could live in the after section of the boat. The open forward sections served us in port and in reasonable conditions at sea.

We put the owner's cabin forward where it most efficiently uses the space available. There were large lockers on either side, and the double bunk is somewhat free standing, thus easier to make up. Forward of this cabin was our head with a tub/shower combination to port.

The galley was C-shaped, with the sink placed outboard and the propane stove placed athwartships on the aft bulkhead. We decided to try a non-gimballed stove in this location, as we felt that the boat would be stable enough to get away without the gimbals. I've always been leery of a stove outboard of, and therefore directly in line with, the cook in heavy going. The athwartships stove worked out well; we bolted fiddles in place around the burners, which did an excellent job of holding the pots and pans in place at sea. The inconvenience of an off-center sink is not that hard to live with.

The navigation area is simpler than on many large yachts, but also larger. We were primarily interested in a ship's office first and a navigation station second. We wanted enough desk space and storage to spread out paperwork, typing, or navigation. The saloon doubles for meals when we eat below. We opted for an L-shaped settee to port, with access under the seats for storage, and another settee to starboard. Port and starboard settees are 27 inches wide, comfortable in heavy going if we chose to sleep in the saloon.

For refrigeration we went to a mechanical compressor-driven holding plate system. We found a Cape Town firm to custom-make finned evaporators for the holding plates to our specs, so we had a very efficient fridge/freezer with 6 inches (150 mm) of insulation, a 4-cubic-foot refrigera-

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tor, and an 8-cubic-foot vegetable box, each with 4 inches (100 mm) of insulation. The reason for the double refrigerator system was so that we could use the smaller box for normal refrigerator storage, thus leaving the larger box free for storing fruits and vegetables when we were on long passages, or for stores when we were going to be away for a long time.

One of the aspects that excited me most about the new-boat project was the possibility of getting into the mechanical, electrical, and plumbing systems at the beginning. I'd spent so much time dealing with poorly built gear (both on our own and on our friends' boats) that I was anxious for the opportunity of doing things really right. I had learned that a slight increase in the overall cost of materials, and a little attention to detail in the building stage, could yield tremendous maintenance benefits later on.

Finally, on March 22, 1981, a glorious, clear day, 10 months to the day from when lofting was started, *Intermezzo II* splashed into Cape Town Harbor.

What a joy to be afloat again, to hear the southeaster whistle in the rigging and the lap of the inner harbor wavelets on our transom. Tomorrow would see our first sail, and we would know what we had wrought. From the experiences of many acquaintances who had custom-built, we realized how lucky we had been both to enjoy the process and to complete it on time, within budget.

Saturday morning dawned bright and clear. Table Mountain was beginning to develop its famous tablecloth, a sure sign of a strong southeaster.

In the protection of the inner harbor we set the main, staysail, and yankee. We were sailing in light trim, with no personal gear aboard yet, tanks empty, and no supplies. The area to leeward of Table Mountain is marked by a series of wind zones, and as we headed toward the beach after leaving the harbor, we could see the whitecaps whipping. As the 30-knot southeaster hit us on the quarter, *Intermezzo* leaped forward, leaving a clean, flat wake behind. She was doing a steady 11 knots, about what we had expected, but with much more poise and less excitement than projected.

The mast was reasonably well tuned and, with a full crew of willing hands to do the work, I decided to take advantage of the conditions. Out came the cruising spinnaker. We were doing 13, then 14 knots and more.

We were rapidly eating up ground toward the lee shore, so we jibed and headed back up the coast. As we beat toward the harbor, the wind increased to the high 30s and low 40s, and we shortened down progressively to two reefs in the main and the no. 2 yankee. She went upwind much better than we'd thought she would and, considering her light condition, was very powerful. In the smooth water we were plugging along at 9 knots, at about 45 degrees off the wind.

In the next two-and-a-half weeks we had several additional shakedown sails and a chance to try out our ground tackle. Our dodger was fitted and a set of deck awnings made. The twin backstays, used to eliminate twist in the masthead from our offset twin headstays, helped tremendously with rigging a large sailing awning. Some minor recutting of sails was needed, and we were ready to go.

Never ones for big send-offs, we slipped quietly away from the yacht club at 2000 on a Sunday evening. A light southwesterly greeted us as we headed west to put some distance between ourselves and the lee shore that the coast of Africa formed. We were back in our element.

We set the mainsail first. Its 540 square feet (51 square meters) of 9-ounce cloth was much easier to raise than I had anticipated. I found that by going to the mast to heave down the halyard, with Linda or one of the children tailing from the cockpit, I could get it all the way to the masthead without the winch. The no. 27 self-tailing Barient in the cockpit was used only for luff tension. Next up went the 600-square-foot (57 square meter) yankee (7 1/2-ounce) and then our 400-square-foot (38 square meter) staysail (9-ounce). We'd installed the double headsail cutter rig to keep our working sails small. While not as efficient as having all the foretriangle devoted to a series of genoas, the double-head rig meant that none of the headsails were so bulky that I couldn't unhank and stow it in the bins forward with relative ease. If bad weather was expected, we could hank on a second, smaller headsail on the other headstay. All sails, from the no. 2 yankee

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Launch day! Notice how large the keel is compared to what we do today. This was in part due to the need to store large quantities of fuel and water in the keel. Today we'd use a slightly deeper canoe body and put all of the liquid into hull bottom tanks. The keel could then be shorter and far more efficient.

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down to the storm jibs, could also be set on the forestay in extreme going.

As the wind and sea built up toward Force 5 and 6, *Intermezzo II*'s motion was very ladylike.

The breeze was influenced by the land, and as the lights of Cape Columbine disappeared behind us the wind went with them. Under power shortly thereafter, we found that at 7 knots it was very quiet aboard and we used 40 percent less fuel, extending our range to more than 2,000 miles.

With the first light of morning I switched up to our 3 1/2-ounce, 125-percent genoa. The sail had been ordered at the last minute for just such occasions, and while its 1,000 square feet (95 square meters) seemed daunting, it really was quite easy to handle. The lightweight cloth actually made stowing it easier than the heavier but smaller yankee jib.

Working on Deck

We found that the combination of stable foredeck, 32-inch-high (0.8m) lifelines, and short overlap on the headsails made them very easy to douse. With the sheets in tight, they would end up on deck, with perhaps a little tug on the leech, when the halyard was released. Compared to our 50-footer's (15.4m) bouncy foredeck, lower lifelines, and longer overlaps, it was easier to change headsails on the larger boat.

With the light genoa up we ghosted along at 7 to 8 knots, close-reaching in 8 to 10 knots of wind. By the end of our second day at sea, with a little help from the current, we had covered 386 miles for an average speed of just over 8 knots.

Linda was performing her usual wonders in the galley. We'd settled into our seagoing routine much more quickly than usual. There were no signs of *mal de mer* among the crew. The bigger boat and smoother motion really helped. We found the forward cabin very comfortable to sleep in, even going uphill. Sarah and Elyse began rehearsals for the big Easter show that was to be held in the port after cabin. Posters began appearing announcing the extravaganza, and they spent

This deck layout proved to be very easy to work with for the two of us. We had the main and spinnaker halyards led aft along with the reef and vang control lines. There was a single primary winch at the aft end of the cockpit, behind the helmsman. This also worked, but was a bit of a bother when jibing the spinnaker.

hours in seclusion writing the script and rehearsing the characters.

The navigation area worked out well as a belowdeck watch station. We had put in some simple wind-speed and direction gear with readouts below, as well as a speedometer/log combination. With the generating prop kicking out lots of DC power, we ran our 36-mile Furuno radar every evening. We had splurged on a radar alarm and found this amazing little device worth its weight in gold (and peace of mind). In the cool air of the approaching fall we would snug ourselves in at the navigation table, keeping an eye on the elements and any shipping that might be close by on the radar. Every 15 to 20 minutes we'd go on deck, scan the horizon, and check our sail trim.

On the third day at sea the wind began to freshen from the south southwest and the yankee/staysail combination pushed us along beam reaching in 15 to 20 knots of wind. *Intermezzo II* was really rolling the miles under her keel now. With occasional bursts as high as 13 knots, she was averaging over 9 knots without current. Down below it was quiet, and if we hadn't seen the sea whipping by through the hull windows it would have been impossible to imagine the speeds we were making from the motion or sound. The 2-inch (50mm) foam insulation on the hull and the interior, plus the watertight bulkheads, had made her very quiet. Not quite familiar with our Wagner hydraulic autopilot and its several controls, I didn't push as hard as I could have, and we ended up with a respectable 228-mile run between sights.

The fourth day gave us an indication of the boat's potential. The wind freshened to 25 to 30 knots and backed toward the south. I was just barely able to carry the yankee on the spinnaker pole to windward. I had thought our 25-foot (7.7m) pole would be a handful, but with a track on the mast allowing for vertical stowage, it was actually quite simple to work with. Once I learned a few tricks, the combination of stable platform and mast stowage made the actual work of setting or dousing the pole easier than on the old boat.

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A quartering sea running 5 to 8 feet began to lift our stern as we bore off slightly to make the yankee more efficient. As we accelerated smoothly down the face, I heard a yell from Elyse, who was reading at the navigation table: "Sixteen knots," she shrilled. *Intermezzo II* didn't seem to be hard-pressed at all, and there was certainly room for higher numbers.

Over the next eight hours we would see speeds in the low teens so often that they no longer caused much comment: 16, 17, 18 knots would be casually announced by whomever happened to glance at the steam gauge as we whooshed down a sea. As the day wore on into early evening the wind continued to back until the main was well out. Still not having the pilot controls sorted out to my satisfaction, I pulled down a reef in the main for the evening.

That night, in honor of our first day of real sailing, Linda really went to work in the galley. We had a huge, crisp, green salad, oven-fried chicken with fresh corn and broccoli, and for dessert, lemon meringue pie.

While I was washing up there was a larger whoosh than usual, and Linda screamed "22, 23.2, 24.3 knots!" We were sailing with the main well out and vanged to the rail with the wind on the quarter. As we surfed down the sea *Intermezzo II* seemed to linger on the face, enjoying her own motion. If this kept up, what a day's run we would have!

Alas, the wind began to lighten after midnight and back around farther, and soon we were running almost square; though we still clocked some exciting speeds on the waves, our average speed slipped back toward mediocrity. At noon the next day, after working out my sights, I was disappointed to announce only a 226-mile run. At that rate we would never get anywhere. (How quickly one's expectations change.)

With the wind now behind us, I decided to drop the staysail and hoist the light genoa on the leeward headstay.

The genoa added enough speed to smooth our ride out considerably, and it eased steering as well. It was warm and sunny for the first time since leaving Table Bay, so all hands were on deck enjoying the approaching tropics. With the wind now down to 15 knots, I contemplated setting the cruising spinnaker but decided to wait. We made 201 miles between sights and had now averaged over 195 miles per day since leaving Cape Town.

Easter dawned, and the children discovered that the Easter Bunny had visited during the night, leaving beautiful African baskets stuffed with hand-painted eggs, jelly beans, and a plethora of other Easter delicacies. Elyse and Sarah had colored their own eggs to add to the collection. We had a delicious leg of lamb for dinner, and all hands enjoyed the Easter show performed by Elyse and Sarah, accompanied by Brownie and Bobbie Bunny, the monkeys, and all the other dolls.

The wind continued to lighten and back until it was just off the stern at an angle of about 160 degrees. We dropped the yankee and switched the genoa to the weather stay, then hoisted our cruising spinnaker in the lee of the main. The spinnaker hoisted, the mainsail was dropped. With the spinnaker sheet led through the end of the main boom, we had 2,900 square feet (275 square meters) of sail aloft, enough power to keep us moving on the faces of most of the waves. Our apparent wind was down to 4 or 5 knots at about 140 degrees. Boat speed averaged 7 to 8 knots, and we settled down to a routine of 175 to 185 miles per day. The cockpit awning was rigged, a real milestone, and we thought about St. Helena Island.

St. Helena

It wasn't long before the main anchorage hove into view and we saw several familiar-looking rigs, cruising neighbors from the docks of the Royal Cape. With their help we secured bow and stern to the local moorings and awaited customs.

The combination boat watchman/water taxi rowed us ashore after we cleared customs, so we wouldn't have to launch the dinghy. It was a short walk down the wharf along the beach to the entrance of George Town through massive wooden gates and across a moat. The town is built in the valley with soaring canyon walls on either side. Many homes and businesses sport antique hand-carved doors; it's illegal to export the indigenous furniture on this island.

We met a pleasant old gentleman on a street corner who asked if he could help us. When we told

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The swim step on *Intermezzo II* was originally conceived as a way to aid a man-overboard recovery. It was just 20 inches (508mm) deep. We quickly learned how valuable they were for swimming, getting into and out of dinks, and just dragging your feet at sea. Today we typically make these about 50 percent wider.

him we were looking for a car to tour the island, he volunteered to take us; arrangements were made to meet him after lunch.

One highlight of the tour was a stop at the governor's mansion, where we were introduced to the island's oldest living inhabitant, an ancient land tortoise who had been alive since Napolean's day. A stop at Napoleon's house was the second feature of the day. We were interested to learn that this historical monument had been unobtrusively maintained by the guide, who also worked as the gardener. His father was guide and caretaker before him, as was his grandfather. The present guide unlocked the door and took us on a tour through history. What an intimate, exciting lesson it was. Napoleon will be much more than a name in history for our children.

The next morning we were underway early, having spent less than 24 hours on beautiful St. Helena. The hurricane season was advancing, and there were things to do in the States. We set the spinnaker to leeward and the genoa on the pole again and ran off in the light 10-knot tradewinds. The next couple of days saw runs of 180,190, and 188 miles. In the vicinity of Ascension Island the wind lightened further, dropping at times to 4 or 5 knots. Apparent wind was so light that our wind-speed meter refused to budge. Still, we were able to average 169 miles between sights.

Ascension Island appeared off the starboard bow as a light smudge, and the radar put us 40 miles off. As the island drew abeam I decided to jibe to port and more or less follow what we felt would be the circulation of the high. It would put us on a more westerly course, and if we picked up an anticipated shift to the east farther on we'd be able to jibe back and pick up a good wind angle. We decided to try the spinnaker to windward. The pole was shifted to the weather side and the genoa sheeted to the rail. I then put the main back up; the spinnaker would feed the genoa, and the main could add some horsepower. The new sail arrangement worked well, and our daily runs picked up to better than 190 a day for the next week. The wind was still at 165 degrees true, in the 10-to-12-knot range. Our log of the previous passage in the first *Intermezzo* showed that condi-

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tions this trip were lighter, if anything, and yet we were averaging 15 to 20 miles a day better than the old *Intermezzo*. Our sail area/wetted surface ratios indicated this wouldn't happen. A combination of better stability and taller rig must have made the difference. Whatever it was, we weren't complaining. But we would have liked more wind.

Linda took advantage of the calm weather to use the compact Maytag washing machine. I strung clotheslines from the mast back to the cockpit, and we were able to go to bed with fresh sheets.

Sarah discovered a new use for the swim platform on the stern. She and Elyse hooked their lifelines to a line in the cockpit, then went down the ladder to the platform where they sat and dragged their feet in the water, a good way to keep cool.

We started to get occasional squalls as we neared the Equator. They almost always came at night and rarely brought any more than a brief increase in wind, which we welcomed. The radar alarm would announce their coming with its loud beeping, then we'd dog the hatches and stand by the autopilot control for any necessary course changes. Occasionally we'd get 20 knots of breeze.

On our 15th day at sea, with 2,800 miles on the log, it was time for our halfway party. We celebrated with a menu that was a favorite of Linda's mother: roast beef, mashed potatoes and gravy, Jell-O salad, fresh vegetables, and cookies the girls had baked for dessert. Our fresh food was holding out well. Elyse and Sarah opened their halfway presents of books, games, and crafts.

As if the halfway party had put us into a new weather system, our next day dawned overcast, with an ominous-looking cloud buildup behind us. By afternoon we could see the evening's entertainment developing in the form of large, black clouds.

That night it was one squall after another. We were up and down constantly trying to keep the boat headed in the right direction without a lot of sail changing. Between squalls the wind dropped away, but in spite of the off-again, on-again weather, *Intermezzo II* had another 190-mile day between sights.

The 17th day at sea was enlivened by two substantial squalls. We saw them coming on the radar, 12 to 15 miles across. For the first one I decided to be cautious and dropped the spinnaker. When all we had was 30 knots I was disappointed at not being able to let *Intermezzo II* stretch her legs. The next time I wasn't so cautious.

As the clouds bore down on us I watched the water turn white, and before I could react we were slammed by a 50-knot-plus gust. With the spinnaker, genoa, and main set, we were slightly overcanvassed. *Intermezzo II* leaped forward, and then in a substantial shift found the wind almost on her beam. Over she went, with the genoa in the water and the main boom buried almost to the vang bail. We were knocked down to 65 degrees, with the decks barely awash. We sat like that for several minutes, the spinnaker protesting madly, until a brief lull allowed *Intermezzo II* to right herself and bear off downwind. By this time I had relieved the pilot and was standing at the wheel, having the time of my life conning our flyer at speeds to 20 knots. But then the spinnaker tack let go and we settled down to a comfortable 11 to 12 knots under genoa and main.

That last squall helped the average, and a popcorn and pizza party was declared as we had our first day over 200 miles in some time.

I had hoped that a day or two of this weather would put us into the northeast trades.

It wasn't to be. Day after day the wind stayed fluky and mainly in the southeast. Had we been reaching in the light air we would have been moving well, but since we were running, not much could be expected. Finally on our 24th day at sea the breeze picked up, still from the southeast. In 12 to 18 knots of wind and carrying everything we could set, we logged another 195-mile day. Not bad, but nothing compared to what we would be doing if the northeast winds came.

Our easy living ended abruptly on the 26th day at sea. The autopilot refused to steer to starboard, and for the first time in all our cruising we faced the prospect of hand-steering. We had close to 1,000 miles to go, and I didn't relish the idea of standing watch on watch at the helm, but there was no choice.

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The wind backed and filled, teasing us with a taste of east northeast, and then veered back to east southeast. Not what we had hoped for, but with the true wind on the quarter and the apparent wind forward of the beam, we reeled off runs of 213, 215, 219, and 225 miles while carrying working sails only.

Desirade and Guadeloupe were in our wake, and Antigua was rising fast on the horizon. Below, Linda and the children cleaned and polished in our usual prearrival flurry of activity. With main, yankee, and staysail set and the wind finally in the northeast, we were finally scooting along at just under 10 knots.

We hardened up as the Pillars of Hercules in front of English Harbour hove into view. The tradewind cut off on cue, and we ghosted into the outer anchorage. Staysail down, then yankee; our momentum carried us past half a dozen beautiful yachts. Linda headed us up, Elyse let go the main halyard, and I watched the anchor splash down. As we settled back on our chain, an inflatable powered over to have a look at the new arrival.

"Where from?" they hailed.

"Cape Town."

"How was it?"

"A little light, but pleasant."

"Take long?"

"No, 30 days for 5,860 miles."

Over the next two years *Intermezzo II* served as our floating home, office, demonstrator, and transportation.

She gave us a nice start in the boat business, and while our partnership that was supposed to produce boats in Cape Town didn't work out as we had hoped, other sources opened up for us. The phone continued to ring with people asking if we could do a boat for them, and our boatbuilding business, started informally while cruising, flourished.

Intermezzo II took us past Cape Hatteras four times, three of which were during severe gales, through the Panama Canal, and finally back to California. We learned several lessons along the way. First was the value of a sailboat that powers well. With all of the coastal cruising we'd been doing, we found that the quiet, efficient powering capabilities that came with the boat had us motoring 60 percent of the time. Second, there was less maintenance than with our smaller boat. Good access and well-situated gear were the keys.

We also learned a couple of negative lessons. The autopilot system we employed wasn't up to steering in heavy going, if I was really pressing the boat. Henceforth more powerful systems would be used. The twin side-by-side headstays couldn't be tightened enough to really reduce headstay sag. And carrying a jib on the windward stay when sailing free led to chafe. I came to the conclusion that if twins were to be used, fore-and-aft positioning was a better bet.

Sitting at the dock in Newport Beach, California, we were torn between the desire for a period ashore and continuing our life-style afloat. But with two budding teenagers to look after we decided to sell *Intermezzo II* and move ashore to concentrate (for a while) on their needs and those of a growing business.

Linda and the girls took right away to our lovely home in Ojai. Their adjustment period took all of two weeks. Our furniture was retrieved from relatives and storage, bicycles were purchased, paintings were hung.

For me, however, the adjustment was more difficult. Gone were my days of freedom. The seven years until Sarah was ready for college stretched out interminably in front of me. The concept of looking at the same views, same neighbors, and doing the same things over and over had me down in the dumps.

My one consolation was in our growing boat business. I was able to assist in the creation of other people's dreams. And if our cruising was limited to sea trials in Europe or New Zealand, at least we were learning more and more about design and systems with each new project. My next-boat notebook grew steadily thicker.

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SUNDEER

While many of our sailing friends considered our previous efforts at creating ultimate cruising boats somewhat of a breakthrough design-wise, in reality each of the projects we had worked on was an extension of basic *accepted* marine practice. Perhaps our interpretation was somewhat different, and the way we assembled the pieces of the cruising puzzle more oriented toward offshore work, but in the final analysis the boats were very conservative.

Sundeer, however, was to be a different kettle of fish. Let's start *Sundeer*'s story where she belongs — offshore.

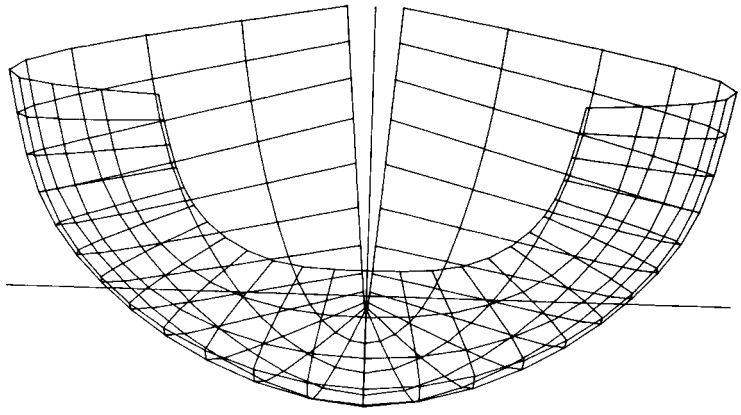
A gust of wind whips spray off the tops of the seas behind us. I watch the white overtake our foaming wake, wondering what *Sundeer*'s reaction will be. With a full mizzen, main, and working jib we're definitely pushing a brand new boat too hard. We heel moderately as the 40-knot gust rumbles aboard our stern quarter and we begin to accelerate. The speedometer climbs steadily until it hovers in the 16-knot range. There's little fuss as the speed hangs there. Noise level is subdued. *Sundeer*'s deck is rock-solid under the pressure of the gust. The red and green lights of our autopilot wink back at the following waves as they adjust the helm. "No sweat," they seem to be saying.

With the east coast of New Zealand acting as a giant breakwater to windward, these seas are short and somewhat steep. Another day out and we'll start to see some proper open-ocean action. But for now, having just received our departure clearance for Tahiti from Auckland customs, the horizon beckons. Our goal is to work this high-pressure weather system to the north for all it's worth. The longer we stay with it, the longer we'll have fair winds.

The wind drops to a steady 30 knots, and our speed is back down in the 12- to 13-knot range. Sitting in the warm, dry environs of our cozy pilothouse it's hard to believe we've finally left New Zealand. I think back over the thousands of hours of design work; the endless, numbing overseas airplane rides; and the countless frustrations, big and small, that have led to the launching of this 67-foot ketch.

It would have been so much simpler to stay with a design that we knew from experience was successful. The Deerfoot formula, refined over 10 years and hundreds of thousands of sea miles, has yielded many comfortable, fast cruising boats. We could have pushed a few buttons, spent a couple of weeks on the drawing boards, and known the new boat would be on target.

But for the last few years this voice in the back of my mind had been asking questions. Why have our keels always been just so? Can't the canoe body be narrower and still powerful? Who says we must have a 37-degree bow angle? Why not load up the rudder like we used to do on the catamarans? The answer, I'd told myself, was easy. In the business of designing seagoing yachts, you break with tradition ever so carefully — one small step at a time. See how an idea works, then go on from there. A major mistake can ruin the owner's investment and a lot of designers' and builders' reputations in the process.



Sundeer had a very narrow waterline beam. This gave her an extremely soft motion, more comfortable in fact than some of the much larger and heavier cruisers we'd done. To maintain stability she had a lot of lead in her keel, a little over 40 percent of her daysailing displacement.

After 27,000 miles of cruising we came to feel that we could improve the hull design a bit by adding a hair more form stability (in the form of waterline beam), reducing ballast in the process. This lead to the Sundeer 64 design, which, while marginally less comfortable at sea, has a much higher speed potential.

Our motion feels a little sharp. Gerry Eaton, an old catamaran sailing buddy, and his friend, Frank Johnson, my crew for this 7,000-mile delivery back to California, are looking a bit green about the gills. If truth be known, I've felt better myself. It's been five years since I've put

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Sundeer was the first of our "destroyer" bow designs. It was considered radical ten years ago, but now it is quite common. The efficiency gained from the extra waterline length, in terms of boat speed, comfort, and wave penetration is gradually overcoming many "experts" who don't like the look.

Note how small the actual bow wave is here. The burble of spray is what we refer to as a pressure release. The total volume of water is minuscule when you consider that this is a 30-ton vessel traveling at a speed-length ratio of 1.15.

to sea, and it will take a while to get sea legs again. With Sarah and Elyse occupied in school and Linda's efforts needed on the home front, they're letting me make this passage on my own.

Comfort is what we've been chasing in the design process. If you're not relaxed at sea you tend to put off going places, and we want *Sundeer* to do lots of traveling when we're free to go cruising a year hence. We also like quick passages. The shorter the passage time at sea, the farther afield we can journey. And besides, fast is fun, *as long as it's comfortable*.

We'll start our watch system, three hours on and six off, after dinner. Jerry decides to whip up some spaghetti. Maybe a little starch will settle our stomachs.

I'm left alone with my thoughts, or should I say fears. Coastal sea trials have gone well. In protected waters we're hitting our projected performance under sail and power. But this is a very inconclusive test. It's in the real world, offshore, where we'll find out how well this new design does.

Gerry appears in the companionway, a steaming plate of spaghetti and hot fresh bread in his hands, and a smile on his face. "Nothing like a little solace for the stomach to ease the mind," he says with a grin. The freezer has produced sauce, the fridge fresh vegetables, and the microwave the hot bread. "All I had to do was heat some water," Gerry says.

Gerry has the first watch, so I decide to turn in. I write up sailing instructions for the next two watches in the log and then try the shower. It works fine on starboard tack, but on port we'll have to rig some form of a restraining strap. What a luxury to have a watermaker and substantial tankage. I decide to rig my leecloth in case of a windshift, and turn in between fresh, clean sheets.

I feel as much as hear our progress. There's a hint of whoosh and slight vibration as *Sundeer* surfs off the waves. But otherwise our heavy aluminum plating and 3 inches (75mm) of foam insulation keep things very quiet.

The cockpit worked extremely well for short-handed sailing. All of the winches were located so they could be reached from the helm or from inside the pilothouse. Either Linda or I could singlehandedly tack, jibe, or reef the boat. The mizzen mast provided good support for my back when I was steering. The aft deck had enough space to accommodate our 13-foot (4m) hard dinghy. Note the boomkin to which the mizzen backstay was attached. This was eliminated once we moved the mizzen chainplates aft and changed to swept spreaders. We still had a masthead backstay with this change, but it was only required when the mizzen spinnaker was being flown.

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I'm back on watch at 0300. The wind has lightened and is swinging to the west. The seas are beginning to lengthen and move faster. *Sundeer* likes that just fine, and is surfing almost continuously, interrupted only by the occasional southerly swell slamming into the bow.

As we've already discussed, the most important factor in offshore comfort, to say nothing of safety, is how well your boat steers. The better job the pilot or vane can make of things, the faster you can go, with less rolling around. And as anyone who has ever sailed offshore knows, a quartering sea is the most difficult to cope with.

A balanced hull form is the easiest to steer, and *Sundeer* is virtually a double-ender when heeled. Her bluff, almost vertical bow has allowed us to get more buoyancy into the forward sections to balance that in the transom stern as she heels, so the natural tendency in an unbalanced hull to round up when heeled has been almost eliminated. At the same time, with 3 feet (0.9 m) more waterline to work with from the reduced bow overhang, we've been able to sharpen her underwater entry, making wave penetration smoother for upwind sailing and powering.

Compared to *Intermezzo II* we steer better in heavy going, hang with the waves longer when surfing, yet have a substantially easier motion when going to windward.

Our primary cockpit was under the pilothouse roof. We installed two helm chairs aft of the wheel for watch keeping and general lounging in nice weather.

The chairs made a comfortable place from which to keep watch. Linda is holding our WH Pilot remote control, which controlled both pilots and all winches aboard.

The sun is beginning to push back the night, its first rays illuminating the cloud banks to windward. *Sundeer*'s bow is covered with spray in the early morning twilight. The water off her bow wave streams across the deck and off to leeward, just forward of the cutter stay. "This is going to be a very dry boat," I think to myself. We've averaged better than 11 knots since leaving, and have yet to see solid water aft of the mast.

The day rolls on and the miles pass beneath the keel. Our first 24-hour run turns up 273 miles. The breeze backs to the northwest, and we jibe to port tack. We'll keep the wind on the quarter instead of running. It's faster and more comfortable for us to jibe downwind rather than run square with the wind. We set the big reacher to leeward and the jib on the pole to weather. With the wind in the mid-20-knot range and seas lengthening now to open ocean status, we're flying: 14 knots on the small waves, 16 to 18 on the 8-to-10-footers (2.4 to 3.1m).

We're averaging very high yet comfortable speeds for open-ocean shorthanded cruising, even by our previous standards. *Sundeer*'s 14,000 pounds of payload are carried very low, adding to her ability to harness the wind. And our 64,000 pounds of displacement are obviously not hurting the daily runs.

The offshore routine begins to assert itself. The days melt together. *Sundeer* does 230 to 250 miles per day with ease. Nothing is being taken out of either her or her crew's hide at this speed.

Our fourth day out, with the wind once again behind us, we try the spinnaker. Even with the true-wind speed down in the low teens we average 10 knots with ease. Late in the afternoon the NNW breeze begins to build to 18 knots. We ease the spinnaker pole against the headstay and set the reaching strut to keep the guy clear of the cap shrouds. *Sundeer* is now feeling the full power of the gusts as the apparent wind moves forward of the beam. Between puffs of wind and quartering seas our steering system is getting a workout.

We've shortened *Sundeer*'s keel to the minimum we feel is necessary for good tacking in tight quarters. Just 6 feet, 2 inches (1.9m) of draft makes a pretty small keel, and less than half of the area on a scale basis that we used on *Intermezzo II* or *Wakaroa*. The rudder, on the other hand, has been enlarged. That is, after all, what steers the boat. Because the rudder is fully balanced, very

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little effort is required of the autopilot or the person on the helm. Our wake shows barely a hint of the conflict of sea, wind, and hydrostatics taking place around and beneath us.

The rudder has a much higher aspect ratio than the keel, and is therefore very much more efficient at providing lift. So we've decided to let it provide some of the force required to offset the rig. The fact that we haven't had to reef our mizzen to balance out the rig indicates this is working well.

With the increased speed the spinnaker brings, our motion steadies. Except for an extra bit of heel now and then occasioned by a gust, *Sundeer* is providing us with a very soft motion. That's a side benefit of her round bilges and modest waterline beam. Coupled with the high polar moments of her stout ketch rig, our ride is smooth indeed. There are no hard spots to her motion. The anxiety of the new design, the frustrations of the building process, are fading into the mist like a bad dream. I begin to enjoy watching *Sundeer* put her 66-foot (20.3m) waterline to work.

Daytime brings the southeast trades, gently at first, and then with a bit of vigor, until we're pressing along to windward at 9 knots with main, mizzen and working jib. As the breeze builds we find that reefing the main gives us more speed with less heel than messing with the mizzen. Our very fine bow is now slicing cleanly through the seas, no pitching to speak of. Occasionally there's a good thump as we drop into a trough and the sea finds the reserve buoyancy tucked high into the forward hull sections. The trades are now in the mid-20s, and we try dropping the main altogether. With the big mizzen and working jib, *Sundeer* is extremely happy. She's maintaining a comfortable 9.5 knots at less than 22 degrees of heel. We might see another quarter of a knot if we really pushed, but then we'd be sailing on our ear, and cruising is supposed to be comfortable.

Dinner this evening consists of roast chicken, green salad, and baked potatoes, followed by a delicious fresh fruit plate. We linger over the meal, enjoying both the food and the ambience. Through the hull windows we see the South Pacific rapidly flowing aft. The occasional wandering albatross comes by for a look. Every few minutes Frank goes up to the pilothouse to check the horizon. As the last rays of sun give way to the black tropical night, a slight tension builds. Even though we have watertight bulkheads there's something about going this fast in the dark that always gets a bit of adrenaline flowing. *Sundeer*'s crew will be alert on watch, but the overall mood is definitely mellow.

Even the appearance of cyclone Cilla on the weatherfax doesn't change the temper. We'll play her conservatively, and if necessary use some our 10-knot powering speed to put distance between us and the cyclone. We discuss storm-avoidance tactics and watch her track carefully over the next days. As Cilla heads southeast, across our course we adjust our direction more to the north. A day later we're in a position to run for the safety of the Equator if this mature Pacific cyclone should change course and double back.

But the wind gods must be happy with us. Cilla makes an uncharacteristic straight dash for high latitudes as she continues on her way, and allows us to ride her back across the trade-wind belt. We change course back towards Tahiti. Southeast winds veer to south, then southwest, and finally northwest as Tahiti heaves into view under our starboard bow.

Eleven days after departing Auckland, having averaged 230 miles per day through the water, *Sundeer* lies stern to the quay in Papeete Harbor.

Rig

The primary objective in *Sundeer*'s design was to maximize comfort while minimizing the effort required of Linda and me to sail *and* maintain her. While we would have opted for a single-sticker in a somewhat smaller vessel, we felt a ketch rig with a large efficient mizzen gave us the most flexibility in a 67-footer (20.6m). Her 1,600 square feet (151 square meters) of sail is broken up into a 600-foot (56.8 square meter) forward triangle, 430-foot mizzen (40.7 square meter) and 670-foot (63.4 square meter) mainsail.

Eventually we'll change this rig to one with much more aggressive roaches on main and mizzen. The mainsail roach will overlap the backstay two feet (0.6 m) while the mizzen mast shrouds will be swept aft 19-degrees so that no backstay interferes. The increase in sail area will significantly add to boat speed while heel and weather helm are reduced (because of the more efficient tip shapes on the main and mizzen).

Both main and mizzen masts are designed for conservative bending to allow us to flatten the sails. This is critical to an efficient use of the mizzen in any sort of breeze, and is made possible by an oversized Navtec hydraulic system.

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The working jib is hanked onto the headstay, which drops into a self-draining foredeck well where the sail stows. To set the jib we open the two deck doors, attach halyard, and hoist away. Stowing the jib involves dropping it on deck and rolling it into the well. A cutter stay is rigged to aid in mast bend, and as a place to set storm canvas.

Off the wind we use a large reacher sewn on a wire luff with a roller-furling drum at the bottom. This is hoisted on a spinnaker halyard and, once rolled, is easily stowed in its sail bin in the fore-peak. A full-sized flat-cut 1.5-ounce nylon spinnaker will prove to be one of our better cruising sails. But the ultimate cruising sail is the mizzen spinnaker. It can be flown in squally conditions with the crew secure in the knowledge that it can be gotten down in almost any conditions.

Sundeer's spinnaker was substantial in size, almost 2,450 square feet (232 square meters). We'd carry it in light airs reaching, and in medium airs on a run. One of the keys to handling this large sail was the ATN Snuffer. If the breeze was up, we'd run off square, trim the leech tight against the main to collapse the spinnaker, then ease the pole and guy. With the sail lying docilely against the leeward side of the main, we could snuff the sail without a problem.

Both main and mizzen are fully battened (eight and seven battens, respectively). With lazyjacks the sails are much easier to handle than smaller mains we've used in the past.

Sundeer is primarily a passagemaker, so we don't mind the extra effort required to get her underway compared to a smaller boat. The payoff in comfort and speed more than makes up for this inconvenience. But there's a substantial amount of physical effort associated with hoisting her sails. To help out we have a single electric Lewmar No. 55 self-tailing winch mounted behind the mainmast. All lines on the mast lead through jammers and can go to this winch or to one of two manual winches mounted right on the mast.

Against my better judgement we also put in electric-powered primary winches. While these aren't necessary for trimming, having their control buttons and that of the mast winch mounted on our pilot remote means that one person can raise sail and trim with one hand and guide the canvas with the other. And the electric primaries are handy for kedging when the skipper makes a mistake (as I found out to my chagrin in Moorea on this trip home).

As a result of these sailhandling aids we're doing a lot more daysailing than we had in the past with *Intermezzo II*.

Maintenance is a major concern of ours, since we do all of our own work. Here *Sundeer*'s size is an advantage. Lots of space has been devoted to the engine room and to electrical gear. A simple repair project stays easy, since we don't have hours of disassembly work to get to the problem.

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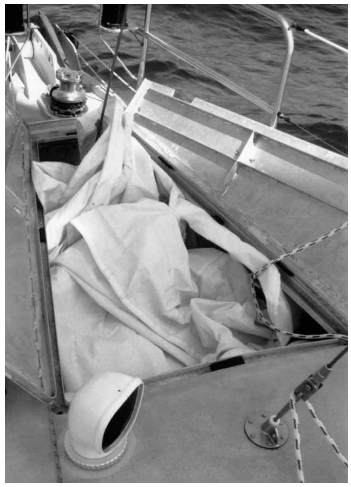
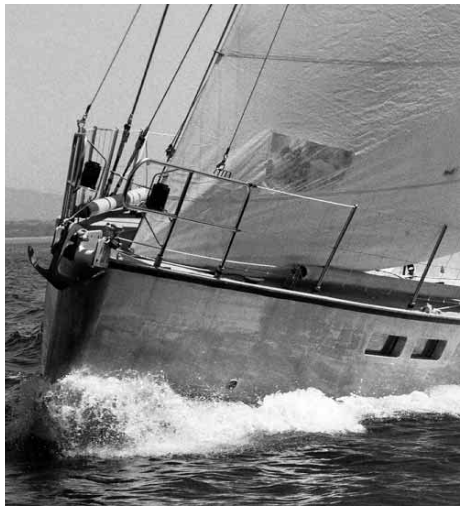


Here are some additional photos of the "horizontal" roller-furling system we used (there are additional shots under roller furling in the rig section). One of the keys is having the headstay set well back from the bow, in this case 3 feet (0.9 m). The sail is flaked against the headstay, and then rolled from the clew forward and dropped into the self-draining well.

Hoisting involves opening the doors, attaching the halyard, and winching the sail aloft. It unrolls by itself as it is hoisted.

With a powerful bow and the tack set well aft we felt comfortable in having the jib sweep the deck. This provides an endplate effect and really helps upwind and reaching performance.



We were initially concerned about seas sweeping into the foot of the jib, but this did not prove to be a problem over many miles at sea. The bottom photo shows you that the forward 40 percent of the sail is nicely sealed. Before our last cruise Linda insisted we raise the clew so we had better visibility. It was raised 3 feet (0.9 m), which cost us a little less than half our seal. This small change reduced boat speed upwind by half a knot in 10-knots of breeze!

Maintenance Issues

Big boats with more surface area take a lot more paint work, especially if you happen to have aluminum construction as we do. We solved this problem by leaving the hull and decks bare above the waterline. It does look a little different, but we don't have to worry about people banging into us, and an occasional hose down to get rid of dirt is all the maintenance required.

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Of course *Sundeer* has fore-and-aft watertight bulkheads. She's heavily plated and framed to resist collision impact. In fact, she's somewhat heavier in scale than had been our (conservative) practice before. In addition, special structural provisions have been made in the forward sections of the hull. Between the fore and aft bulkheads below the cabin soles she's completely tanked. Not only does this give us enough fuel for 2,000 miles of powering at 9.5 knots, but 400 gallons (1,550 liters) of water as well. The double bottom provided by the tanks is an added safety feature.

While the beam at deck is 15 feet, 6 inches (4.8m), she is, as already mentioned, very narrow on the waterline. In order to keep the center of gravity low to compensate for lack of form stability, every effort has been made to lighten the interior. It's built up from 1/8-inch (3mm)-thick plywood with 1/2-inch (12.6mm) PVC foam core. The result is stiff, light, and strong. The entire interior, including headliner, cushions, and wall coverings, weighs under 3,500 pounds (1587kg).

Today there are so many ways of providing the power required for cruising systems that playing the various factors involved leaves Linda and me feeling like we're engaged in a hot game of three-dimensional chess. When we sat down to decide the approach for *Sundeer*, we wanted to examine all the old ways of doing things, to look at what we had been doing on other boats recently, and to see if there were any new technologies that might be of help.

Systems

It was easy enough to define our requirements: first, we wanted maximum efficiency to minimize machinery running time. We knew from experience that we hated to hear a generator or engine running in quiet anchorages, and that fewer hours meant less maintenance. Second, we wanted to keep things simple. Yet we desired the basic conveniences we'd become used to on our other cruising boats. Last, systems needed to have a certain amount of redundancy so that no matter what went wrong, it wouldn't materially affect our cruising plans.

A major determining factor was our style of cruising. We've found that for every day spent at sea on long passages, 10 to 12 days are spent in port. And, we tend to move the boat, usually under power, every fourth or fifth day between local anchorages.

The first question that had to be answered was the type of electricity to be used. If the basic systems were all to run on AC, the motors would be lighter and we could use conventional 110-volt appliances. This, of course, meant having a large generator, that tends to run frequently. The DC approach was a little heavier from a motor standpoint but opened up alternative power options, such as wind and water generators and solar power.

Several technological breakthroughs strongly influenced our final approach. First was the availability of extremely powerful DC alternators in compact, lightweight packages. Weighing only 40 (18 kg) pounds, these electrodyne alternators would produce better than 3 kilowatts of power at just 3,000 alternator rpm. Second was our success using Heart Interface MOSFET-style inverters to make AC power from the batteries. With better than 90 percent conversion efficiency we felt that we could use this as a source of AC power for galley appliances, hair dryers, and tools.

If these two systems were connected to a very large battery bank, say 1,000 amp-hours or 600 reserve minutes at 24 volts, we would have the ability to go for long periods without hearing machinery noise. (Our 1,200 pounds/544 kg of traction batteries were located just above the keel, well below the center of gravity. They are in effect part of *Sundeer*'s ballast system.)

Failure in the alternator would seriously cramp our cruising style, so we opted for two running in parallel. This gave us 7 kilowatts of DC generating power, a threefold increase over anything we'd thought about before. With this approach it began to look feasible to again use our main engine for a generator as well as propulsion.

Since we would also be belting to the engine a 200-gallon-per-minute (775 liter) self-priming centrifugal damage-control pump and a 25-gallon-per-hour (97 liter) Sea Recovery watermaker, we opted for a lay shaft connected to the engine to drive all this gear. Pulley ratios were engineered so that at 1,000 engine rpm we would have full alternator output and use of the watermaker. At this speed the accessories would take half of the engine's available power, enough of a load to keep the engine running warm and clean.

The next decision involved refrigeration. We knew this would be the largest consumer of power. DC was more efficient than AC here, so we utilized two 1/2-horsepower Grunert systems, each completely isolated from the other. One or both of these compressors easily handle *Sundeer*'s 7-cubic-foot freezer and 15-cubic-foot fridges. In practice, in the tropics, with both compressors on, an hour and 15 minutes per day of running time does the job. And if one system goes down for

any reason, we can rely upon the second. The two compressors, coupled with our large double-walled holding plates (built right into the stainless liners) mean fast pull-down when we're freezing new food in the freezer.

An advantage of the DC approach and large battery bank is our ability to leave the boat unattended without having to worry about fridge power. When set to run automatically, the fridge/freezer can cycle for 10 days or more before the batteries need a recharge.

For backup and to reduce charging time, we decided to give solar cells a try. Eight Siemens M-55 cells, set around our pushpit, provide about 60 percent of our normal daily requirements when anchored, or about 1,300 watts per day. These are easy to fold down in heavy weather or at the dock, and while the aft pulpit location does subject the cells to some shading from the mizzen rigging, it's a simple, light installation.

Having this enormous amount of capacity has enabled us to be more laid back about power use. The fridge is opened and closed at will, and we use a substantial amount of indirect ambient electric lighting at night. We installed very accurate amp-hour meters to measure power consumption, and the results have been somewhat surprising.

We're able to make two slices of toast for 50 watts. Using the microwave oven for six minutes of cooking fresh vegetables takes just 30 watts. With the inverter at idle, charging the various portable tools, DustBusters, and video cameras, the meter doesn't even register. The fridge system consumes a little over 1,000 watts per day in the tropics, and 35 percent less in Southern California. Considering the fact that we can replace this power at a rate of almost 100 watts per minute when running the engine, you can see that power conservation is not a major issue.

When Linda and I are on the boat together our total power usage is under 1,800 watts per day.

Since the main engine is also the generator, we want to be sure everything possible is done to keep it happy. Toward this end we employed two very large Refineco fuel filters (with a selector valve) which filter dirt down to 5 microns in size. (At press time filters work down to 1 micron, with 30 microns being the norm.)

Keeping oil clean and free from contaminating acids is always difficult on a sailboat on which the engine may not run as hot as desired. To help out we plumbed in both a Refineco heating element to boil off acids and moisture, and a Spinner ll centrifugal oil cleaner which takes dirt out down to a tenth of a micron in size. As a result, our 150-horsepower 6-cylinder Isuzu diesel runs clean as a whistle, with no appreciable carbon buildup in the exhaust.

In the past we've used waste heat from the engine or generator to make hot water for the heads and galley. Without the engine running on a daily basis we had to come up with another solution. We considered an on-demand propane heater, but in the end opted to tap into our interior heating system. With an oversize heat exchanger in the hot-water cylinder, two or three minutes a day on the Webasto diesel heater takes care of all our requirements for hot water. At the same time the Everhot heat exchangers are efficient enough to let the diesel engine's waste heat warm the interior, if the Webasto's circulating pump is turned on.

While at anchor our need to run the engine is nominal, at sea power consumption zooms. With performance instruments, satellite navigator, radar, and autopilot on around the clock, plus navigation lights and extra reading lights in the evening, usage more than doubles to more than 4,500 watts per day. However, we've found that we can get away with under an hour-and-a-half per day of engine time for charging. This has eliminated the need for the separate charging prop used on *Intermezzo II*.

We were interested to find out if it was possible to exist, albeit at a somewhat diminished level of ambience, with just solar cells providing electricity. Our biggest concern was with long ocean passages, where a needed spare part might not be readily available for engine repair. We found that the solar cells will cover the autopilot requirements and either the fridge or freezer (but not both), while maintaining an even battery level. Of course, this means digging out the taffrail log and sextant, but they need the cobwebs brushed off now and then anyway.

When *Sundeer* is anchored it's a bit easier to cope. The solar cells will handle both fridge and freezer, with something left over for reading lights, listening to a tape or two, and maybe even two slices of toast in the morning. But hairdryers are definitely on the prohibited list!

This new approach to supplying power works better than we'd hoped. When passaging, the large battery bank allows us to go two to three days without the engine if required, and even in the trades the wind goes light more often than that, necessitating some help from the prop. On the

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hook the solar cells keep battery drain at a low enough level that we can wait for our move from one anchorage to another to recharge the batteries. We've eliminated the annoying noise and vibration of running a genset daily, and saved the space and weight associated with this gear. And best of all, when those solar cells are cooking away we feel like we're getting something for nothing.

After a couple of years of cruising with these systems it became apparent that we had a serious logic flaw in our approach to things. The watermaker was very sensitive to engine rpm. Once it was set, if you changed rpm, even a small amount, the watermaker would kick out. Also, the lay-shaft arrangement, while nicely executed, took a lot of floor space in the engine room and was a bit noisy.

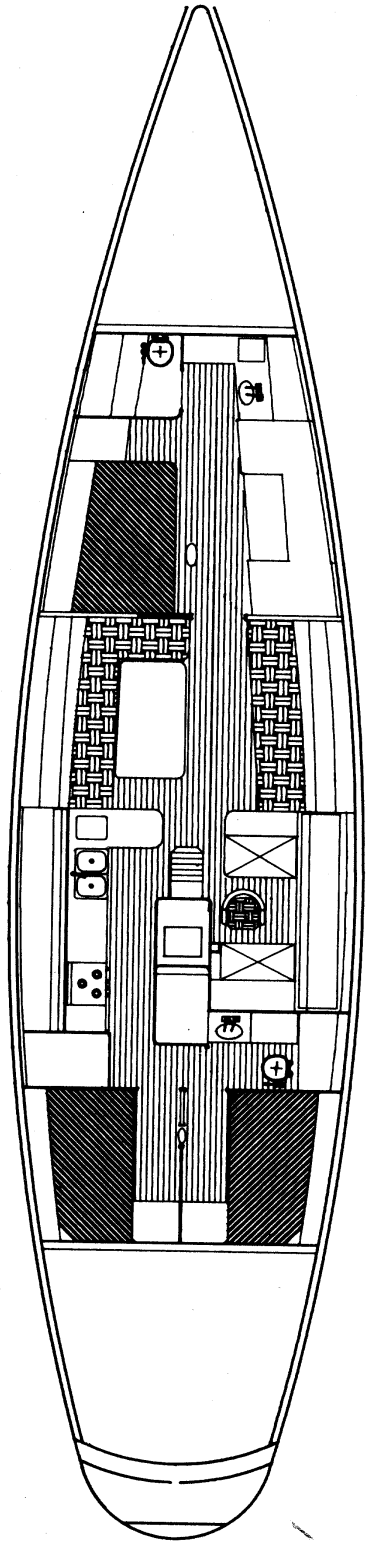
To improve the situation we removed the lay-shaft setup entirely. The damage-control pump stayed on the port side of the engine. The dual alternators were replaced with a single, double-sized unit (two complete alternators on a single shaft) mounted on the starboard side. We acquired a 2-horsepower DC motor to drive the watermaker. This motor was only run when the engine was on and the big Electrodyne unit was pumping out the amps. By separating it from the main engine we could run the engine at any rpm, and/or vary the speed at will, without affecting the watermaker. This turned out to be a much more viable solution for our needs.

To increase ventilation capacity we went to 12 dorade vents, each with larger cowls than we had used previously. This almost doubled the natural airflow compared to *Intermezzo II* when the hatches were closed. Since we didn't intend to be living aboard dockside in the tropics, air-conditioning was eliminated, and even coming through Polynesia in the summer we didn't miss it.

Interior Layout

The interior layout is developed around the theme of maximum boat for Linda and me, with occasional visits from the children or friends. Our cabin and head are still forward, and there are twin aft cabins. In between is a very large saloon, galley, and office area. The office is even larger than in the past and has room for all the computer equipment we now find necessary to assist us in the business of earning a living. The galley runs alongside the hull on the port side. Linda wedges herself in between fridge/freezer box on the centerline and her outboard galley counters. While this leaves the stove outboard, she's able to use it at sea standing to either side, so the danger of getting hit with a flying pot is minimized.

Is *Sundeer* the ultimate boat? She's close to it, and she certainly performs better than we had dared to hope. But one is never sure; and besides, we have this new idea...



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While *Sundeer*'s interior was very open in a visual sense, all of the floor spaces, including the saloon, were tight enough so that moving around in heavy weather was possible with a reasonable degree of security.

Both the office and galley area were abeam of the pilothouse/cockpit area where motion was minimized and communication with the pilot house was easy.

The elongated L-shape in the galley allowed one to work in this area either forward or aft of the stove. The sink, being outboard, was emptied via a macerator pump. This eliminated the problem of flooding on starboard tack.

There were two guest cabins aft. They shared a head and, while not overly large, were certainly comfortable enough for moderate-length stays aboard (if you make guests too comfortable they'll stay too long!).

Our suite was forward, the same as in *Intermezzo II*. Ventilation is better up there, you are further away from machinery noise when motorsailing, and it is easy to hear the anchor chain if one starts to drag.

The main saloon table had a removable handrail built into the inboard edge. It turned out that we used this handrail a lot more than the one built into the headliner. If we were doing this design over, we'd probably eliminate the overhead handrail altogether.

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HIO AVAE

When Sarah and her buddy Kristin Sandvik left *Beowulf* after helping us sail her through the South Pacific, their intent was to explore New Zealand for a month or so, then return to the States to start careers.

After a couple of weeks in the Auckland area they quickly found that they could support themselves by working on other people's boats, working on farms, and singing on street corners with the occasional paying gig at a restaurant or bar thrown in for good measure.

By watching their budgets carefully, they were able to save a bit here and there. The stay lengthened, and the idea of cruising started to take hold.

If they could find a boat at the right price, their "rent" would be covered. All they'd need to save for would be food and a bit of boat maintenance, and that ought to be easy.

Hio Avae anchored in San Diego just prior to heading off for Mexico. The masthead is red for better visibility. Note the riding sail on the back stay.

As the southern hemisphere summer sun started its northward trek, Sarah and Kristin took time off to explore the South Island, and then caught an inexpensive charter flight back to California. The plan was to find a boat — cheap — get her ready to go cruising within a couple of months, and head back south.

The Search

As anyone knows, the latter part of the 20th century has been a buyer's market for used boats. And no geographic area offers a better choice of "deals" than Southern California. The problem the girls ran into was sifting through the garbage to find that one really nice boat, one that needed a bit of care, was seaworthy, and was available at a price that would fit their budget.

My own guess was they'd find a nice 30-foot (9.2 m) design from the 1960s. This, would be, of course, somewhat smaller than the vessel in which they'd just crossed the South Pacific. However, when you are in your 20s the issue isn't so much how big and comfy your boat is, as the ability to go now with the budget in hand.

Sarah and Kristin figured that by selling their cars, pooling their savings, and doing a bit of work on the side they could probably scrounge up about US$35,000 to buy, outfit, and provision for a year.

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I won't burden you with the details of the search. Suffice it to say it involved hundreds of trips up and down the coast, even more phone calls to owners and brokers, and numerous consultations with us. There were times when Sarah was close to tears in frustration over their inability to find the right boat at the right price.

And then one day they were having lunch with my dad and a friend of his, Bob Metzner. Bob asked Sarah how the search was going and what she was looking for. She told him that they'd like to find a Cal 36 or a Santana 37 that needed some work....in their price range.

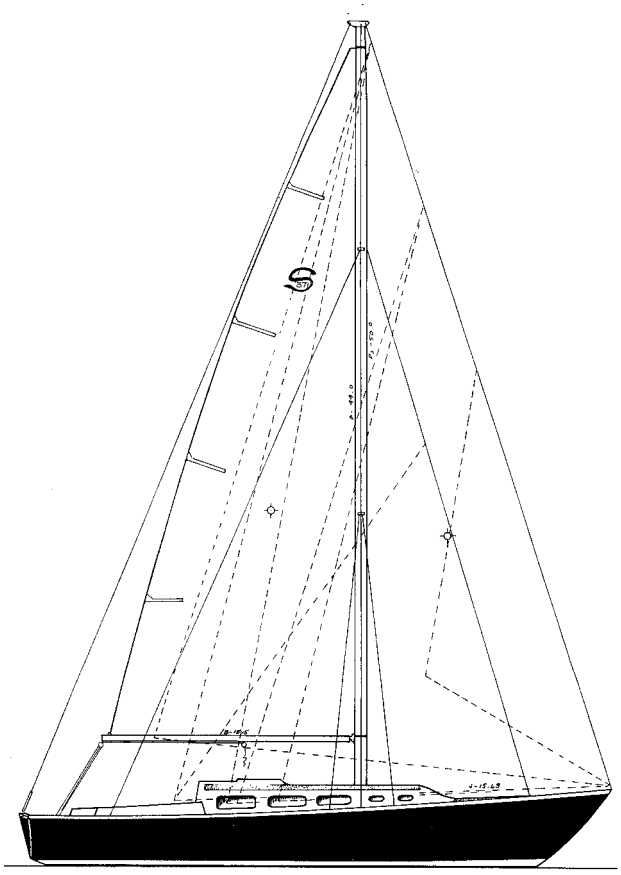
Bob mentioned an acquaintance with whom he'd just had a meeting. This chap had owned a Santana 37 for the past 25 years and had not sailed it in eight. And he was talking about selling the boat!

That afternoon Sarah called the owner and asked him if he was indeed going to sell. He said that he'd been thinking about it and they made a date to meet at the boat.

After looking at all sorts of unsuitable boats, when Sarah and Kristin first saw *Novia Del Mar*, it was love at first sight. The deck layout, cockpit, and interior were perfect for their needs. It didn't hurt that the boat had a reputation for quickness and sound construction.

She was a bit on the rough side on the interior — "cosmetically challenged" is one way of putting it. But that was easily corrected with lots of work.

The real issue now was price. Sarah and Kristin made a list of what they would need to add to the boat's gear to be self-sufficient and safe in an oceangoing context. They allowed for some overages and for a year's provisions. What they had left in their cruising kitty was less than half the asking price for a Santana 37, but they were a cash buyer, there were no brokers involved, and it was money right now in the owner's hands (as opposed to waiting a couple of years to sell the boat and paying all of the costs associated therewith).



While this rig looks modest by racing standards, for a medium-displacement cruiser, it is substantial. The Santana 37 has a reputation for speed, and you can see why.

To Sarah and Kristin's delight, their offer was accepted subject to survey. We received an excited phone call that afternoon from the girls and made plans to come across to L.A. for the survey.

Santana 37

The Santana 37 was designed in the late 1960s by Gary Mull. This was in the heyday of the Cal 40, which was winning everything in sight. The design brief was simple: create a boat to compete under the CCA handicap rule with the Cal 40, and give the bigger boat a race on elapsed time as well.

Mull came up with a design that was quite radical in its time. It had a relatively high prismatic coefficient (lots of volume in the ends) with a long straight run aft for good

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reaching and running performance. There was almost no overhang aft and modest overhang forward. The waterline of the boat loaded for cruising is a hair over 31 feet (9.53 m).

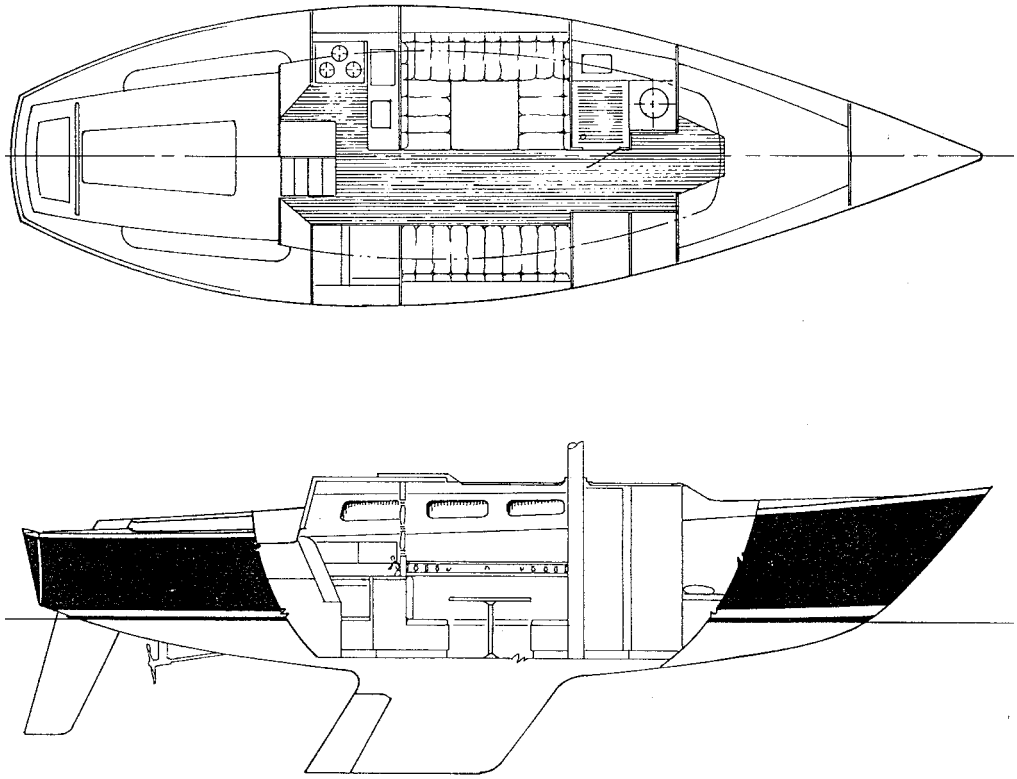
Beam was 11.66 feet (3.6 m) for a length-to-beam ratio of 3.11. I'd like to see a narrower length-to-beam ratio, but in a vessel of this size it is tough to work an acceptable interior into a narrower hull. There's a fin keel and spade rudder. Most interesting from a cruising standpoint is the trim tab on the aft end of the keel. While this is a potential maintenance headache, it does allow you to reduce leeway angle and weather helm with trim tab adjustment, a major issue in self steering. The original draft was 5.8 feet (1.8 m) but was more like 6 feet and a hair (1.9 m) when loaded for cruising.

The rig was enormous for a boat of this era. The hoist on the jib (I) was 50 feet (15.4 m). The forward triangle base (J) was 15.5 feet (4.8 m), while the main had dimensions of 44 feet (13.5 m) by 15.5 feet (4.8 m).

The mast was a heavy Sparcraft section, rigged with double spreaders and fore-and-aft lowers. There was no cutter stay, but there were running backstays. By today's standards the mast was bulletproof.

The original displacement was a svelte (for the time) 16,000 pounds (7,256 kg), of which almost 45 percent was lead.

Construction was mat and woven roving over balsa core for hull and deck. The hull and deck



This is a very traditional cruiser/racer layout. They have lots of bunks, and could sleep eight people if you used the aft quarter berths as doubles, the saloon settee as a double, and then packed another two bodies into the V-berths forward and two more on the starboard side of the saloon.

However, Sarah and Kristin have started out using the quarter berths as "private space" keeping the V-berth area free for lounging and storage. This may change in the tropics.

Note the large spade rudder and trim tab on the keel.

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Putting your college education to work! Sarah and Kristin singing in a nightclub in Auckland, New Zealand (above).

Below, Kristin picking zucchini on a farm outside of Auckland. Both Sarah and Kristin decided after this experience that working on boats wasn't so bad after all (especially if your employer is someone other than your parents).

appeared to be in very good shape, and we could find no loose sections of core anywhere in the structure. The laminate, while light for the era in which it was built, was bulletproof by current standards — just what you want for cruising.

The keel was an external casting with plenty of large keel bolts, well spaced. While the bilge was relatively flat, there was a nice deep sump in the way of the keel, into which bilge water could accumulate.

The boat surveyed very well, with only a few minor write-ups. We removed the sea cocks to check for dry rot and the condition of the laminate, and surprisingly found everything in perfect order. There were just a few blisters on the bottom, nothing worth worrying about at this point.

When you consider that this boat had been launched in 1971, and was even older than one of its owners, you'd have to admit the boat looked pretty good.

Sarah and Kristin went to the bank, picked up a cashier's check for the purchase price, paid the previous owner, and had themselves a new home.

The first thing they did was rename the boat *Hio Avae*, "look at the moon" in Puamotian.

It wasn't long before Sarah and Kristin knew they had a very, very quick cruising boat on their hands. It was obvious from the design that the boat would be fast off the wind, especially in a breeze, and they found out that she was also fast in light going.

Cruising Conversion

After a few days of sailing and living aboard, the girls started to make lists. It quickly became apparent that the first thing they wanted to do was brighten up the interior, to make the boat more livable.

Like many yachts, the Santana 37 had lots of dark wood trim-varnished bulkheads, as well as a covering of old, dirty, brown vinyl wallpaper on the hullside.

They painted the bulkheads and much of the trim, stripped the wallpaper, and painted out the hullsides an off-white, making the boat look twice as big inside.

Kristin contacted Sonny Singh for a quote on new bunk and saloon cushions, a dodger, and a cockpit awning. The price was within

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their budget (Sonny does great work for very reasonable rates — we've used him on a number of our big boat projects) so they had him start right away.

While Sarah began to work on plumbing, wiring, and rigging projects, Kristin cleaned decades of accumulation from lockers and bilges.

The to-do list continued to grow and was still growing by the time they were ready to go cruising. For propulsion they had a Westerbeke 4.107. The engine had just 700 hours on it, and appeared to be in good condition. However. it needed a good cleaning, and only had a very small alternator for power.

When they took possession the boat was fitted with a fixed-blade prop. However, there was a Martec folding prop in the spares box. Putting this on made a huge difference in performance (although maneuvering the boat under power became somewhat problematic). There was 90 US gallons (348 liters) of diesel fuel capacity in two black iron tanks. While the tanks appeared clean, the fuel itself was old and probably contaminated. They arranged to have the fuel removed and the tanks cleaned by a mobile, waterborne cleaning service.

Ninety gallons of fuel is a lot of capacity for a boat of this size. In smooth water it ought to give them a range of almost 700 miles.

From a systems standpoint the first decision they had to make was refrigeration. The boat had a small box, with galvanized holding plates made by Dole (good units). However, the plumbing was shot and the compressor was missing. Given the state of their finances, and the fact that running the engine every day did not seem like such a neat idea (it was located under the companionway), they decided to forgo cold drinks. This simplified the rest of the equation.

When the time to get serious about these projects arrived, they moved the boat to Ventura Harbor, where they could work behind Dave and Diane Wyman's

A Polaroid shot of the boat during survey. Look at the difference some paint and elbow grease makes (below).

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The galley sink is close to the centerline where it drains on both tacks. The stove is outboard (a safety negative at sea — but you can't have everything).

The engine box (left foreground) has fiddle rails on both edges so it works well as counter space.

The forward cabin has a moderate amount of easily accessed storage plus some bulk area under the bunk. However, most of the bulk space is taken up by a large stainless-steel freshwater tank of 50 gallons (194 liters).There's another 30-gallon (116 liter) plastic freshwater tank in the saloon.

house. This gave them a much quieter environment, and they could call on Dave for advice and help when required. (As it turns out, they relied upon his expertise a great deal!)

From Bob Williams at SALT they picked up a couple of M-55 Siemens solar panels. They figured that without a fridge, on the hook, these ought to provide more than enough power. For backup, and when they were passaging, the purchased a used 160-amp Balmar alternator. Bill Daffron made a sturdy bracket for this oversized alternator. They installed two Trojan L-16 deep cycle batteries with 320 amps of total capacity. These would give them a huge reserve for cloudy days and provide a large load for the alternator to work against when they were drawn down.

From my dad's garage they dug out an old Ham Ferris towing generator for use at sea.

One of the things I was interested in as a father was their security in event of a breach of the hull. It was obvious that the boat was light in the bilge-pump department. To improve this situation they replaced their hand pump with a Whale 20-gpm unit,

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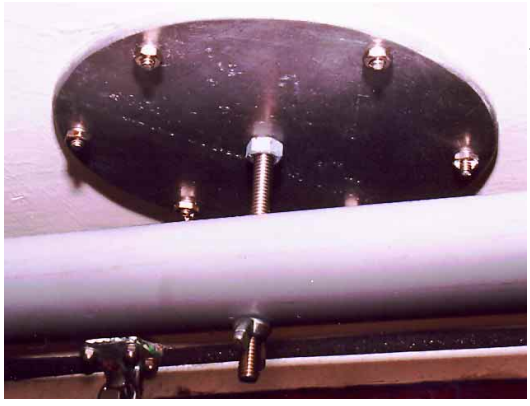
Quarter berths can be a bit warm and claustrophobic. To improve the situation large ports were cut into the cockpit footwell. They are installed under the dodger, so that they can be left open in rain and spray without worrying about turning the quarter berth into a quarter bath.

Eight-inch (200mm) diameter ports were cut into the lazaret bulkhead for additional ventilation. When the lazaret hatch is left open, it funnels air into the lazaret and thence through these open ports. In 8 or 10 knots of breeze, on the hook, it is like having your own private air conditioner. Note the mesh clothes storage bins on the hullside. They provide an inexpensive way of adding to storage capacity while providing good ventilation for the stored items.

A large foredeck hatch is ideal for ventilation in the tropics (and for bringing sails on deck). The problem was that there was no really good way to seat it on its gasket. If a wave ever caught an edge of the hatch, it would be easily ripped off, leaving the boat totally vulnerable.

To get around this problem Sarah and Kristin fitted a large PVC pipe brace snugged down with a wing nut before heading to sea. They used 1 1/2-inch (37 mm) schedule-80 PVC pipe. The bolt is a 14-20, through-bolted onto the aluminum plate which is 6 inches (150mm) in diameter. This plate in turn is bolted and glued with 3M 5200 to the fiberglass hatch.

When you snug up the wing nut, the gasket is compressed all around the hatch edge. This also helps the normal latches take any load that a wave might impart to the hatch edges.



and a much larger submersible electric pump. They added a T on the engine intake so that the engine raw water pump could be used for emergencies as well.

The boat came with an antique VHF, depth sounder, and sailing instruments. The VHF and depthsounder looked funky but worked, so they stayed. The wind instruments and speedometer did not work, and were replaced by some wool in the rigging and a masthead fly. After carefully

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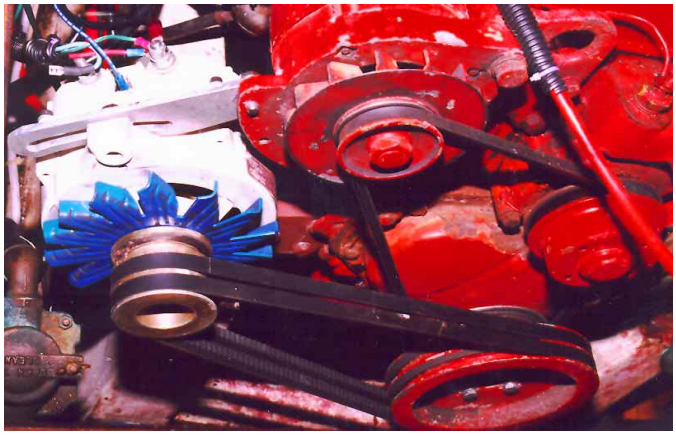
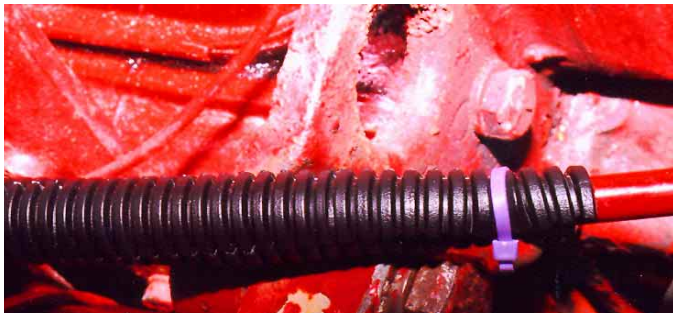
The main electrical panel (above) was extremely simple, yet with the addition of a couple of breakers and fuses it gets the job done. Note the $17 Radio Shack digital voltmeter permanently wired to check voltage.



A Balmar 160-amp alternator was mounted under the standard alternator. Both use external regulators. They are wired to each feed a separate battery bank. The smaller alternator feeds a single starting battery. The bigger unit feeds two Trojan L-16s (the house bank).

The battery selector switch allows you to use either bank, but not both.

Chafe is always a problem with hoses and wires where they run over the engine (bottom photo). This cable is protected with a bit of wire wrap.



checking the budget they decided on a used Furuno LCD radar. Its small antenna and light power output made it marginal for target definition, but for seeing big ships at sea and working into open harbors in less-than-ideal conditions it seemed to be okay. They installed a small Garmin GPS, and then found a used Kenwood ham radio for long-range communication.

For ground tackle they added a bow roller, a 1/4-inch (6.3mm) schedule-4 ACCO chain rode, and a used Maxwell electric windlass. Sarah found a used 66-pound (30kg) Bruce anchor. Aside from my own comments on it being just about right, the girls could tell from the comments around the marina that they had the right hook. When people start kidding you about the size of your ground tackle, you know you are going in the correct direction.

Hio Avae had come with two 25-pound (11kg) Danforth anchors and two 200-foot (61m) 1/2-inch (12.6mm) nylon rodes. To this they added a couple of short lengths of chain for the Danforths. They also bought a 600-foot (185m) roll of 1/2-inch (12.6mm) Yale nylon braid, a very stretchy construction. This was emergency stock, to be used when the chips were down.

Other projects included pulling the mast and checking it over, replacing standing rigging (although what they had looked pretty good) and turnbuckles (the old turnbuckles were single-toggle and subject to stress failure as a result). The main halyard and reefing

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gear for the mainsail was lead aft to the cockpit. The reel winch on the main halyard was consigned to the used-gear bin.

While the mast was out of the boat they painted the top of it rescue orange for better visibility, and added a storm trysail track.

A cutter stay was rigged down to the centerline track on the foredeck (which was reinforced to a bulkhead under the deck). This would provide a place to fly a storm staysail.

The one weak point in the rig was the boom and topping lift. To get around this, they acquired a Forespar mechanical vang (which is used primarily to support the boom). Forespar also made them an adaptation of one of their vang fittings which could be used to replace the older cast-bronze gooseneck that was much too light for offshore work.

For self-steering, Sarah scored a Sayes windvane from a used marine gear place for $300 and their old turnbuckles. She found a used WH autopilot from Will Hamm in Seattle.

The Santana had originally been built with tiller steering. Somewhere along the way their boat had been converted to wheel steering. Dad was in favor of converting back, but it seemed like a big project to the girls, and they already had two forms of self-steering that were not wheel dependent.

Sail Inventory

Hio Avae had spent much of her early life racing, so she had a large, albeit old, sail inventory. There were two extra mains, one of which was quite heavy and looked brand new. This was sent back to Dan Neri at North Sails Rhode Island to be converted to a trysail for $225. The other main looked to

The shower sump pump needed replacement. Rather than put another pump in, Kristin came up with the idea of using a bucket. This allows the waste shower water to be used again for washing clothes, the boat, or even recycled in the shower itself.

Propane was originally stored in the lazaret, in a not-very-well-sealed box. Sarah mounted a new 20-pound (9kg) tank on top of the trunk cabin, and led the hose through a deck gland — a much safer option. There's a second tank tied down aft at the pushpit.

To improve water taste, a PUR water filter was mounted on the galley faucet. It really works well. The two Whale hand pumps are for salt- and freshwater.

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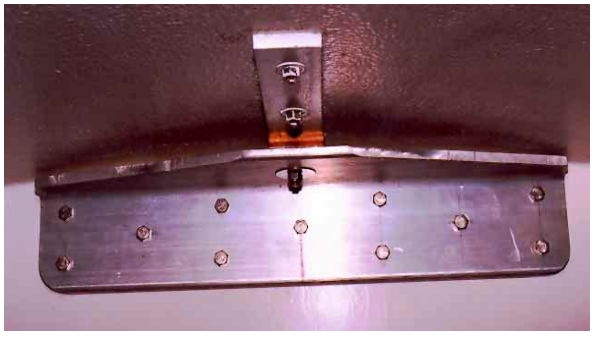
A 25-year-old leaking toilet was rebuilt with two inexpensive hand bilge pumps — one for pumping in salt water and a second for evacuating the bowl.The built-in pump (on the right in the photo) was disconnected.

This type of system is far more efficient and longer lasting than the normal built-in toilet pump — and required far less maintenance over time.



The cutter stay attaches to a track which is bolted to the deck. However, the track, by itself, was a bit on the light side to carry the load of a storm jib in heavy seas. Dave Wyman made up this brace for Sarah to install. It is a chunk of aluminum angle (3 x 3 x 5/16-inch / 75 x 75 x 8 mm) that is used to connect the track to the anchor locker bulkhead.

There are, of course, doors into the anchor locker, weakening the bulkhead effect of the plywood.This aluminum angle actually spans the entire opening so the load of the cutter stay can be carried by the bulkhead into the hull sides.

be in better condition than that which was on the boat. After checking the shape (somewhat flatter), Kristin took it to Morelli Sails in Ventura and worked with Tony Morelli to restitch, add spreader chafe patches, and make the battens longer (the top batten was made full length, the second 50 percent longer than normal, and the bottom two a third longer than normal). The ends of the batten pockets (at the leech) were sewn shut to prevent accidental launching of the battens during reefing operations.

They had a relatively new no. 4 jib with a sun cover. This sail was about 75 percent of the forward triangle and while fine for a breeze, would leave them underpowered in anything light. The larger genoas were all shot and not worth taking along.

They arranged with Dan Neri to make them a 125-percent working jib from some medium firm 7-ounce Dacron. The sail was set up to roller furl on the ancient but very effective Mariner hank-on roller-furling headstay. They also had Dan make them a storm staysail to be flown from the cutter stay or the headstay.

The staysail could be used with reefed main or trysail if conditions were strong, or as a double head rig with the smaller jib.

From the rest of their inventory they kept a light genoa staysail to be used when running wing and wing (sheeted to the end of the main boom), and a full-sized 3/4-ounce crosscut spinnaker. To make spinnaker handling easier, they picked up an ATN spinnaker snuffer.

After several short cruises they found that the boat sailed on her anchor in any sort of breeze. We discussed this problem and then they had Dan Neri make them a riding sail (also known as a “back staysail”) that could be set off the backstay on the hook (hoisted with the main halyard).

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Getting Ready to Go

The hardest part in cruising preparation is knowing when to go. There are always new items on the to-do list. But when your budget is severely limited, and every month at the dock is costing three or more out cruising, there is more incentive to get a move on.

Sarah and Kristin went sailing every chance they got. But with the pressure to get the list whittle down it wasn't nearly as much time as they (or their parents) wished. When the time came to finally leave they decided to hang out in Southern California for awhile, using the boat, seeing what worked and what didn't, and working on their boathandling skills. A cruise through the local offshore islands finally brought them, like so many others, to San Diego, where they made last-minute preparations.

Linda and I flew over to help with provisioning (it is amazing how many shopping-cart loads a boat of that size will hold). After a few days we headed back to Arizona to work on this book and the girls did their final chores before departure.

Then the day finally arrived...in fact, a few paragraphs ago I was interrupted by Sarah calling to say goodbye. They are off for Mexico and then who knows where. They have a small but seaworthy home fully paid for. They can support themselves by singing and working on yachts and by writing the odd magazine article. We expect they'll be gone as long as it's fun.

The running rig, 125-percent jib poled out to weather, and the lightweight (3-ounce) genoa staysail sheeted through the end of the main boom. In 10 knots of true wind, the genoa staysail will add 10 to 12 miles to the day's run.

Heaving-to with storm staysail and trysail requires that the trysail be sheeted amidships (bridled between weather and lee rails). With the helm lashed, the boat will lie between 40 and 65 degrees off the wind, depending on sea and wind state.

In 14 knots true they can reach at 4 knots with this rig.

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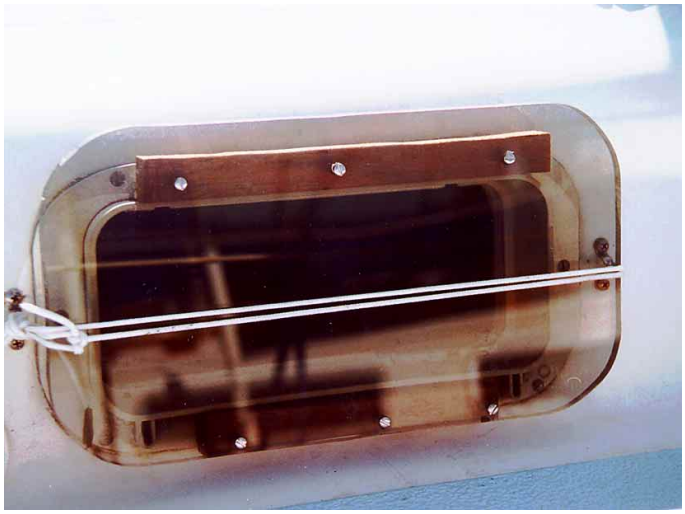
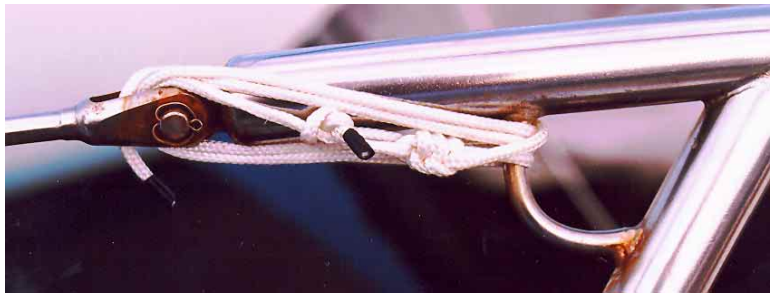


Protecting hatches from a knockdown is always a concern. The ancient aluminum frames that held in the cabin windows could not be removed without destroying them in the process. And they had a tendency to leak in rain and spray. To mitigate the problem a bead of sealant was run around the edges of the window plastic and frame. Then some 1/2-inch (12.6mm) Lexan was bolted over the outside (upper right). The Lexan acts to take the structural load off the older aluminum framed window, transferring stress directly to the trunk cabinet laminate.

For the forward-opening ports the issues were a little different. These ports had large spigots (eyebrows) that protruded past the skin of the house structure. Also, it was important to have a system that was easy to install and remove so the hatches could be opened in nice weather.

They took a bit more of the Lexan and added a couple of timber strips, top and bottom, to hold the Lexan off of the port spigot. This allows the Lexan to transmit any load it sees directly onto the finishing ring and thence to the house without loading the port itself. The timber also serves to hold the storm shutter in place.



Lightweight welded lifeline bails like those in the photos on the left are always suspect, especially on a 25-plus-year-old boat. Rather than remove all of the stanchions and have these rewelded or replaced with flat plate bales (a huge job) both ends of each top lifeline wire was seized around the stanchion itself. This way, if or when the bales fail, there will be something holding the lifeline in place.

The aft top lifelines were replaced with light stainless steel tubing to lend a bit more security when walking around the cockpit area.

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There aren't many doors aboard *Hio Avae* but the few that are there are held open or closed with door hooks (left).This is especially helpful for ventilation.

Drawers are kept in place with a simple plastic "earthquake" lock sold in Southern California hardware stores. Much more secure than finger locks, these are easy to install and cost less than a dollar each.

Here's another view of the hullside storage bags that Kristin designed. These are a neat way to store lots of small items that need to be separated. They're made from a breathable Textilene fabric, which will help to minimize problems with mildew when cruising in damp environments.

Galley storage was somewhat lacking, especially for dishes. Hinged wire-frame baskets were installed under the side deck (behind and above the stove) for everyday utensil storage.

There are two of these baskets (costing about five dollars each).

Rather than carry a life raft, Sarah and Kristin opted for a Yachtsaver buoyancy bag system (right). There are a total of six bags and two CO_2 cylinders. The total cost was about the same as a quality life raft.

It took Sarah about a week's work to install the entire system.

The bag shown here is under the saloon table. The fabric used to hold the bag matches the saloon cushions.

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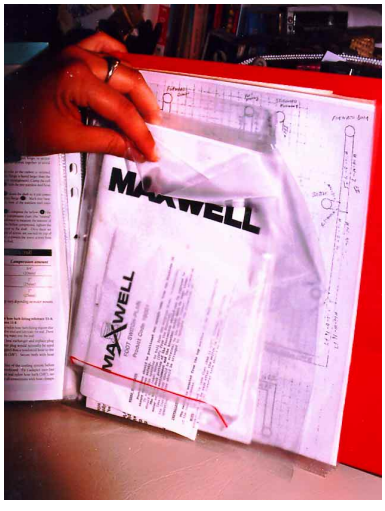
Sarah (left) and Kristin (right) smiling because they know it is almost time to go!

This is the first of several van loads. At this point, just before the loading process was started, it was hard to imagine where these stores would fit.



All paper and cardboard wrapping was removed (upper left).This reduces the chances of getting a roach infestation, and reduces the possibility of clogged bilge bumps should the packaging material get wet.The food was then double-packed in ZipLok bags for extra protection.

The shallow bilge was used to store items in plastic that would not be affected by the odd bit of salt water (upper right). Labels were either removed or varnished over.

Canned goods were stored beneath seats and bunks where they were a bit higher and more protected from moisture (right). Many of the items purchased in bulk had the cans shrink wrapped.This added protection for long-term storage.

To keep track of the many manuals, diagrams, and notes, a loose-leaf binder with plastic insert holders was assembled (middle left).

At Target, Kristin found these light weight, rectangular-shaped sealable jars (lower two photos), ideal for keeping things fresh.

Sonny Singh made this good-looking dodger. It has removable side and aft curtains., and covers 52 inches (1.32 m) of cockpit area, just enough for two people to sit together on one side. Handholds are sewn into the top.

The cockpit awning is attached in front to a couple of stainless-steel pipe supports which are mounted on the aft dodger bow.These are held forward by straps to the cabin-top handrails.The awning is then stretched aft to the backstay. Both front and back are held in place by aluminum pipe battens. A small halyard seized to the backstay keeps the center of the awning topped up so it doesn't pool water. Alternatively, when they want to catch rainwater, the halyard is eased and the center of the awning is pulled down. (There's a hose bib for attaching a hose to fill the water tanks.)

The riding sail is essential to keep them head to wind for ventilation, and to keep anchor loads down in breezy conditions. Without this riding sail they shear back and forth on the anchor rode in any sort of breeze.

The photo below is a good view of the compact cockpit. There's sufficient room to stretch out, yet the volume of the cockpit is not so large as to endanger the boat when a wave breaks aboard.

The small wheel is nice for maneuvering in port but for sailing is not nearly as pleasant or efficient as would be a tiller.

Note the openings in the dodger where it wraps around the aft bow. These provide a nice handhold (where you can get your hand all the way around the pipe).

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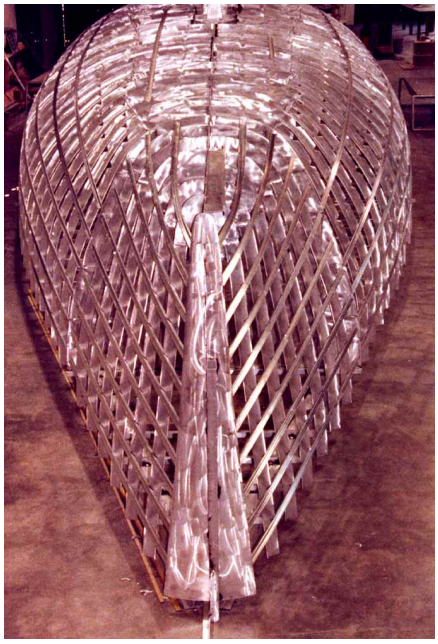

There are all sorts of framing systems you can use with metal boats. *Beowulf* had frames at roughly 16 inches (400 mm) on center from the bow to the beginning of the main saloon, and then 24 inches (610 mm) on center from there aft.

BEOWULF

As our work on the Sundeer production series started to wind down, Linda and I discussed what to do for our own next cruiser. The easiest thing to do was to have TPI build us a boat. Send them a fax, and five months later we'd be sailing. We liked the 64 and loved the 56, but two things held us back.

First, we had recently learned that Linda was allergic to mold and dust. With either of the production boats it was going to be tough to deal with this unless we made major modifications to the way they were built.

Second, for many years I had been thinking about a somewhat different hull-and-rig combination that while similar in appearance to what we'd been doing was in many ways radically different.

While this concept excited me, I had been leery of committing time and resources to it as there were several major areas of risk that we'd only prove (or disprove) once we were at sea.

However, our experience with the way the Sundeer 64 and 56 behaved, along with the information we had on the original 67, gave us some excellent data on which to base a new design. We'd also learned how to push rig efficiency to higher levels of performance, while advances in sail design and materials gave us confidence that we could generate increased rig power in a form that Linda and I could handle.

The creation of a cruising yacht is very much about making the right compromises in hull shape, rig, fins, powering capability, systems, and interior layout.

One of the frustrations I always face is the trade-off necessary between performance and seamanship. Realistically, there's only so much rig you can deal with as a couple. Because of prudence, respect for the sea, and the fact that our yachts (regardless of size) have always been designed for couples they have had to be efficient and easy to handle. This in turn naturally led them to be very fast in a *cruising* context (although this has never been the primary design objective).

But, at the same time, I recognized we were leaving a lot of boat speed on the table, because our rigs have been smaller than our designs have been capable of utilizing.

Design Objective

Once Linda and I decided to take a look at a new design, we had many discussions as to what we wanted in the next boat. From Linda's standpoint there were several key issues. First, she needed full protection from the sun under all conditions. Second, the boat must to be well ventilated so there would never be any mold or mildew. And if any did start to grow, it had to be easily cleaned (i.e., no hidden or inaccessible places). Finally, Linda wanted a comfortable cockpit with a large table at which we could entertain guests and take our own meals.

There were several things I wanted to pursue. One was the engine room. I enjoy playing in the engine room but hate the frustration of working on gear that is difficult to get to. The engine room had to be large enough so that *everything was out in the open*. Next, I wanted space to stow our hard dink and an inflatable on deck.

On the performance front I had felt for some years that we were tantalizingly close to a critical mass of design parameters that would allow us to jump to a new level of cruising-boat speed in a configuration that Linda and I could handle by ourselves

For me, this was the driving force — I wanted to see if we could come up with a cruising yacht which allowed us to sail at 300 miles per day in *average* trade-wind conditions.

This sort of speed would allow us to move the boat around more, visiting more and different destinations than had been our practice in the past.

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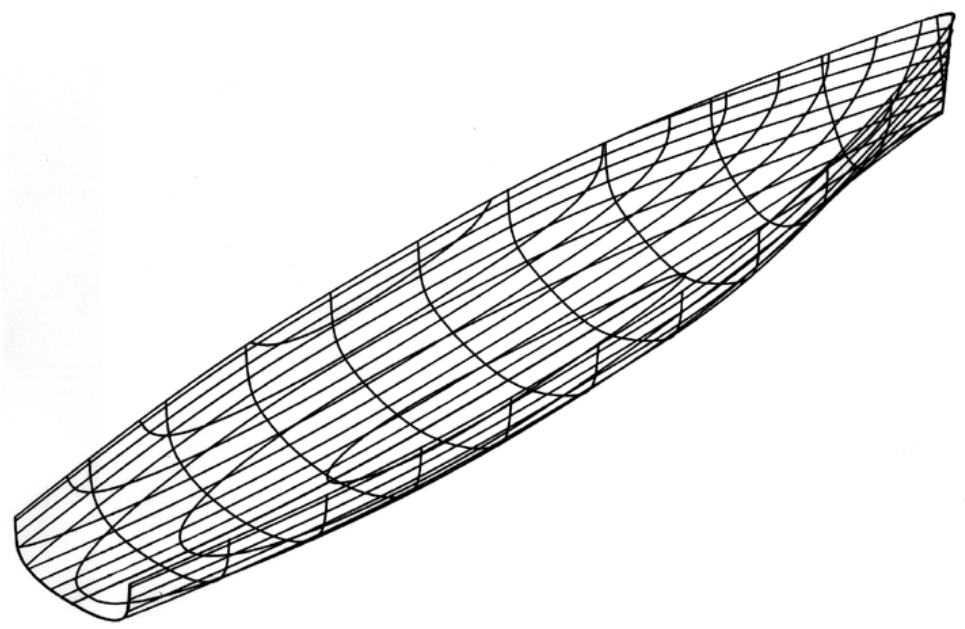
With this broad-brush outline we started on a two-year design odyssey. As time went on we tried one thing, then tossed it aside and went in another direction. Everything, except for the basic concept of the boat was on the table. We challenged every assumption we held about large cruising yachts.

The process was exhaustive, at times frustrating, but always invigorating. We were, after all, on a quest for the holy grail of cruising — the perfect yacht.

Initial Hull Shapes

We began by allocating basic space throughout the hull. The engine room was roughed in at the aft end of the boat, which gave me plenty of space on deck above for our two dinghies. We added a couple of aft cabins, length for a galley/saloon area, and an owner's suite forward. At this point we were in the 70-foot (21.5 m) range, with a basic interior layout similar to our original *Sundeer,* but with a somewhat larger engine room.



This isometric drawing is of *Beowulf*'s hull shape. The hull is totally balanced with heel. Between upright sailing angles and a 20-degree heel, the fore-and-aft trim remains almost constant. Even power reaching in heavy airs the steering loads are very low because of this balance and the modest length-to-beam ratio.

The initial displacement was based on *Sundeer*, with the assumption that we'd probably carry a little less payload.

As we worked through the first series of hull designs, we used shapes based on the production boats, but with finer bows for better wave penetration and smoother ride. These shapes were more powerful than the original *Sundeer* (i.e., more beamy at the waterline), but with comparable entry angles forward.

Experimenting with various hulls on the computer and then comparing the results to our historical database quickly made it clear that adding length to the boat was beneficial in almost all sailing scenarios.

Water Ballast

Early in the design process we started to look at ways of working in salt-water ballast to augment performance and comfort. Since we would be using aluminum construction, we would put fuel and fresh water into hull-bottom tanks, leaving the sides of the hull available for salt-water ballast tanks.

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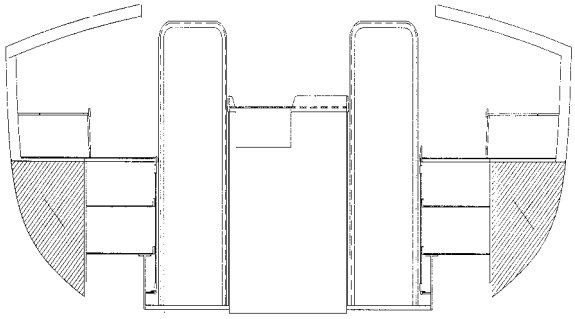


Ballast tanks are hidden under furniture in such a way that they have no visual impact on the interior. They run from the main-saloon bulkhead back into the engine room.

The trick was to do this in a manner so that it did not compromise the aesthetics of the interior or the storage volume we felt we would need for long-term cruising.

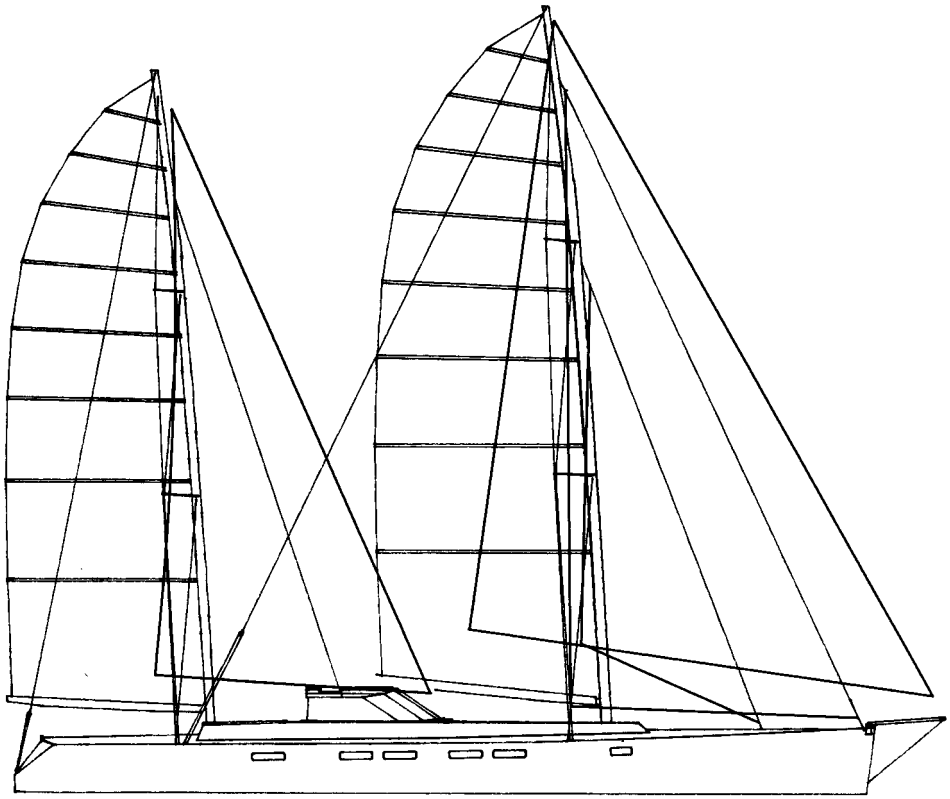
After dozens of different configurations we found that tanks that ran from the main saloon bulkhead below the counter-top level, aft to the engine room, could be fitted into the boat so that you wouldn't notice they were there.

These tanks would reduce heel by anywhere from six to ten degrees, depending on how much of their capacity was used.

Rig Design

We started the rig-design process at the same time we began to look at hull shapes with several goals. First, the rig had to be easy to handle for the two of us in a wide variety of conditions. Second, we wanted to be able to sail in tight quarters *without using a headsail*. Third, I wanted to be able to push the boat hard in moderate-to-strong winds, without having to worry about gusts and squalls knocking us down.

After looking at a variety of sloop and cutter sailplans we came back to the ketch rig, with which we'd been working for the past decade. With 25-degree-aft-swept spreaders, no permanent backstay is required, allowing highly efficient, big-roached sails. Lots of separation between main and mizzen makes the headsails flown from the mizzen mast much more efficient. We knew from past



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experience that mizzen headsails are easy to use offshore, and that they add horsepower rapidly, with little effort on the part of the crew.

As the design process went on Linda and I debated back and forth the merits of short and tall rigs. I looked with favor at sailplans that would be very fast in light airs, but more difficult to handle in a breeze, while Linda's preference was for something more docile. We initially settled on a very aggressive rig, but then after thinking about the handling issues in the trades with lots of squalls, we shortened it down.

We did not make a final rig decision until the day before we released the drawings to Forespar to begin construction. In the end, we opted for a rig of modest height, with a main mast just shy of 70 feet (21.5 m) off the water, with a mizzen a hair shorter. *Seventy-five percent* of total area was in the main and mizzen, leaving a very small forward triangle. Even though the rig was short, it carried 2,300 square feet (218 square meters) of working canvas (an increase of over 30 percent compared to our original *Sundeer* — and this on a rig of the same height).

Obviously the main and mizzen were going to be a lot bigger than we were used to handling. To make these easy to handle we kept the booms very low. The mizzen was designed at just 3 feet (0.9 m) off the deck, with the main 6 inches (150 mm) higher. These low booms, lazyjacks, and the use of Spectra sailcloth made for a rig that was in most respects as easy to handle as what we'd been used to before. The sails ended up the same total weight (the main came in at 194 pounds/88 kg, while the mizzen weighed 178 pounds/81 kg — both weights are with all hardware and battens), even though this was a far more powerful design with substantially more sailcloth in both sails.

Beowulf's rig has a lot more roach in main and mizzen than what we have used before. The above photo and the drawing to the left will give you a good idea of how much separation there is between the spars. This spacing is a key factor in the aerodynamic efficiency of this ketch rig. The working jib is more like a staysail, so it is very easy to tack and has efficient sheet leads when reaching as well as beating. The large roaches on both main and mizzen allow us to pack in lots of highly effective sail area onto a rather short sail plan. If we used conventional, triangular sails, the rig would need to be 16 feet (5m) higher to have the same horsepower. Of course then there would be more weight aloft and more drag, so the boat would be much more tender.

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Articulating Bowsprit

With the very high speed potential we'd have with this design, we knew that using asymmetrical spinnakers would make sense for long downwind passages. However, a centerline bowsprit is not particularly efficient when broad-reaching and running, so we decided to look at a sprit that could be rotated from side to side, thus moving the luff of the spinnaker or reacher to weather.

We tried a number of possibilities on paper and then during construction mocked up four different approaches. The final design was moderate in weight (less than two spinnaker poles) and very easy to use.

It is basically an aluminum heavy-walled pipe, with a solid aluminum bobstay. Control lines lead over spreaders to a point back by the main shrouds. For more data on this system see the section under modern bowsprits.

Deck Layout

It quickly became evident that the best layout would have the cockpit contiguous with the pilothouse. This kept the after deck clear for dink stowage and made it easy to step out from the pilothouse to do any sail handling.

The mizzen mast would mark the aft boundary of the cockpit, with a large table in the center of the area to break up the space at sea (with convenient handrails all the way around). The table was designed with folding leaves so that Linda could serve meals on deck.

This layout had the added advantage of allowing us to rig a permanent awning over the entire cockpit area between the mizzen cap shrouds and headstays.

We spent many hours on the design of the running rigging systems to simplify sailing the boat as much as possible. Harking back to our catamaran days we adopted two large semicircular travelers for the main and mizzen control.

Full-width travelers mean gunwale-to-gunwale control of the booms. Thus we'd not need a vang unless we were running. When we wanted to adjust the sail angle of attack we could do so with the traveler control rather than sheet. The sheet would be used just for controlling the twist in the upper portion of the sail. Traveler loads are about one-third of those on the sheet, and with a 2-to -1 tackle, very fast to trim or ease compared to a much more highly loaded sheet with a 4-to-1 tackle.

Sheet and traveler controls, via jammers for main and mizzen, lead to electric winches, each of which are set either side of the door into the pilothouse — one for the mizzen to port and one for the main to starboard. Sail adjustments are possible from *inside* the pilothouse (just reach out and ease the sheet or push a button to trim).

The combination of powered winches and traveler-based sail control makes jibing in strong wind very fast (remember, there are two large sails to control here!).

Primary winches and sundry adjustment controls (jib-lead position, vangs, preventers, running backstays, and bowsprit angle) all lead to winches at the forward edge of the seats.

The deck coamings were designed similarly to what we'd done before. They were to provide seats in the cockpit, a base for the pilothouse to sit on, and then run forward to the mainmast.

They were both an enormously strong box beam to support the deck and a giant "plenum" chamber into which all cowls funneled fresh air from on deck and from which you could draw fresh air from a variety of vents in the interior.

Pilothouse

There are many ways to look at on-deck shelter. In reality, a well-designed dodger will provide almost all of what you need under most conditions when you are at sea. However, an enclosed pilothouse adds a hard-to-define level of ambiance to the cruising experience.

But this comes with some costs. One is weight. Unless very carefully engineered, a pilothouse can add a ton or more of weight very high above the center of gravity. Another negative is windage and finally, the biggest hurdle for me, aesthetics.

But with a hull as long as we were contemplating, it seemed possible that we could design a

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pilothouse that would meet Linda's environmental and ambiance requirements without ruining the appearance of the boat in the process.

There are many ways to design a pilothouse, with lots of ergonomic and aesthetic issues to be worked through. There can be substantial conflicts between what works well at sea and what looks good in port.

From the beginning we determined that our primary objective would be to have a pilothouse that was at its best on long watches at sea. This meant that we would need to be able to brace ourselves as we moved about, and that the seats had to be comfortable for me to sleep on when I was off-watch (as I like to be close at hand if we are carrying a spinnaker at night or in tricky navigational areas).

Next, we wanted to have all the navigation and communication functions centralized in the pilothouse so that one could keep close watch outside of the boat while navigating or communicating (without having to leave the conning area).

Finally, we wanted the pilothouse to be an inviting space to use when we were at anchor.

One of the trade-offs with mid-cockpits and pilothouses is that the footwell, the area where you stand, intrudes into the interior living space. Regardless of what you do design-wise to mitigate the impact, this significantly reduces the visual space in the saloon. We'd wrestled with this problem for years and were determined to try something new.

Rather than surround the footwell with vertical walls as is the norm (thereby cutting off the pilothouse from the rest of the interior), we left it open all around the area where you stand.

The navigation-desk furniture and seats "float." The effect when you are below is that the entire galley/saloon area is open without obstruction. And from the pilothouse looking down you see an expanse of open space below and in front of you. The effect from both viewing angles is dramatic.

This approach enhanced air flow throughout the entire interior and made it easier for those in the pilothouse to communicate with the folks below.

Interior Layout

We looked at all sorts of alternatives for the interior, but in the end came back to the same basic layout we've been using for the last two decades. Owner's suite forward, large open saloon/galley/office area centrally located, with guests cabins aft. Because of the larger size of this new design, each guest cabin would have its own head area, with a shared, enclosed shower.

In the early stages of the design development we decided to leave an area forward of the owner's cabin as "free" space. This would be for later use, perhaps an area for exercise equipment, a crew cabin, or a space for (someday) grandchildren.

The galley area was to be somewhat larger than we'd used before, with a fridge/freezer of 30 cubic feet (0.85 cubic meter). The ship's office was much larger than we'd done before, giving us plenty of room to stretch out drawings or video-editing equipment.

In general, however, what we were after was not so much more storage area to carry "stuff" (although there was plenty of that!) as more *visual* space.

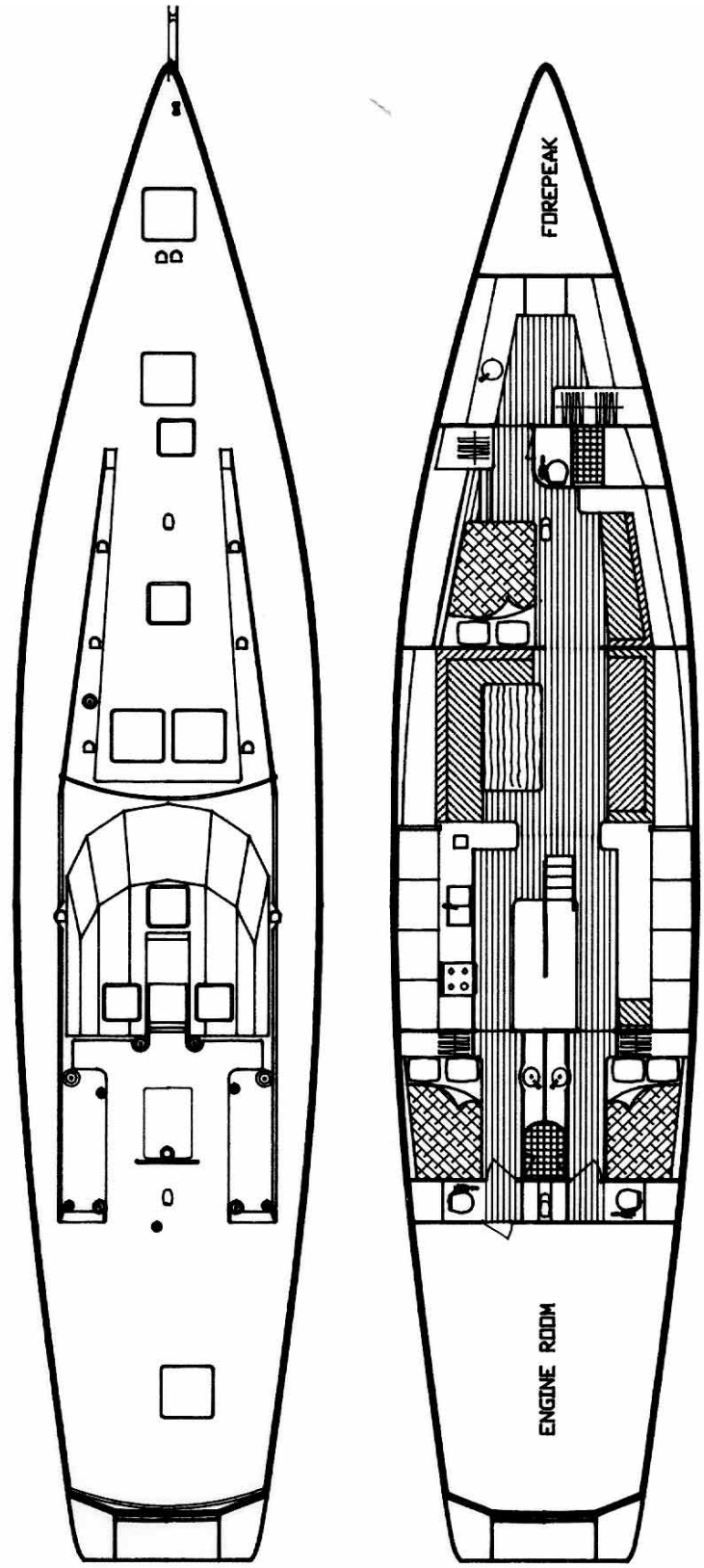
Keel and Rudder Design

On a large cruising yacht, along with rig proportions, draft and fin design are amongst the most difficult compromises to make. In terms of pure performance, deep draft is a huge advantage. But when it comes to many lovely anchorages, not to mention hurricane holes, deep draft is a definite negative.

One also has to be concerned with running aground at speed. A deep keel puts much more load on the hull and keel-reinforcing structure when it suddenly hits the bottom.

We designed keels ranging from 5 feet (1.54 m) in draft to 8 1/2 feet (2.6 m). We evaluated them all in terms of performance, structure, and the impact on our cruising. As we went back and forth on the fin proportions, we were also juggling the rig numbers (the two are closely interrelated).

We finally opted for a 7 1/2-foot (2.4m) draft as an all-around compromise. This would give us reasonable performance upwind, yet as we knew from the experience during our circumnavigation aboard *Intermezzo*, we'd still be able to visit most of the good anchorages around the world.



With a powerful engine system and narrow keel tip we could push the bottom couple of feet (0.6 m) through mud if necessary. This would allow us to work into hurricane holes where we had to cross a shallow river bar to gain entrance.

And in case we wished to do some thin-water cruising in the future, we designed the keel so that we could change the bottom of the fin to reduce draft to an even 6 feet (1.85 m).

If you have balanced hull lines and a modest length-to-beam ratio, the boat will basically steer itself. The actual steering loads, under sail, are very light indeed. As boat size increases and stability goes up, steering loads tend to drop in scale relative to smaller yachts that are bounced around more by the waves. These two factors would indicate that a small rudder (in scale compared to our other designs) could be used at sea.

However, when you want entry into a tight anchorage or marina, the size of the rudder becomes the most critical ingredient in close-quarters maneuvering. But big rudders add significant amounts of drag under sail and power when they are not being used.

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In the past we had always designed rudders for the close-quarters work. Very closely related to this is the amount of power the engine can deliver to the water in front of the rudder (as the rudder, if designed correctly, acts as a very effective thruster).

With the combination of the Hundestadt prop and the 170 Yanmar, we had far more power available, in scale, than we'd had at our command before. This allowed us to downsize the rudder a bit, orienting it toward heavy-weather sailing needs.

Final Hull Shape

The use of computers is a two-edged sword. We can now produce a set of lines, generate hydrostatic data, and test the hull against others in less time than it takes to drink a cup of coffee. But rather than save time, this actually exacerbates the design cycle. With so much computation power in our hands, it is hard to stop trying "just one more idea."

On the *Beowulf* project we drew seven distinct families of hull shapes, with over a thousand variations on these different themes. More than 2,500 VPP projections were done during the design cycle (over 20,000 pages of paper were consumed!).

By the middle of the design process we knew that the waterline was going to be stretched out. From 70 feet (21.5 m) we gradually lengthened toward 77 feet (23.7 m). This lengthening was primarily to help the bow cut smoothly through the water upwind when motorsailing and downwind when overrunning seas at high speed.

Toward the end, as we solidified the concept of rig, fins, and water ballast, we spent most of our hull-design time playing with the bow shape.

The problem we faced was one of motion and comfort. We knew that the hull was going to be flat (the final canoe body only draws 20 inches/508 mm of water) in cruising trim. This is fine amidships and aft, but if one is not careful there can be slamming problems forward.

The only way around this is to create an extremely narrow entry angle and pull some volume into the forward sections just aft of the cutwater.

If you want to add volume forward you can do it in two ways: make the hull wider, which of course slams, or make it deeper, which penetrates nicely. However, deeply immersed forward sections have a reputation for digging in and taking over at speed thus being difficult to steer.

We knew from our experience at sea over the last decade that we could use a deeper forefoot than commonly thought possible. However, what I wanted to try with *Beowulf* was even more immersion that we'd used in the past.

We thought we could handle this from a steering standpoint for several reasons. One, with correct shaping of the bow section, running downwind at high speeds should provide a degree of *lift* so that the bow would begin to rise up rather than depress at higher speeds, thereby making the bow easier to steer than the other way around.

Second, when power reaching or beating, as the boat began to heel we felt that by keeping her heeled sections almost identical to the upright ones, and by arranging buoyancy so the heeled sections were more or less parallel with upright shape, additional lift would be provided reducing forefoot immersion even more.

This all sounds good in theory. But the only way to find out is to spend a pile of money and test it in the real world!

We finally ended up with a very deep forefoot, almost *half* of the midship section immersion at rest in cruising trim (compare this to a lot of designs that have no immersion at the cutwater, and you will see how radical this might appear).

The half-entry angle was just 10.9 degrees, finer than any vessel we'd yet drawn. We worked in large hollows in the forward sections below the waterline to help wave penetration even more.

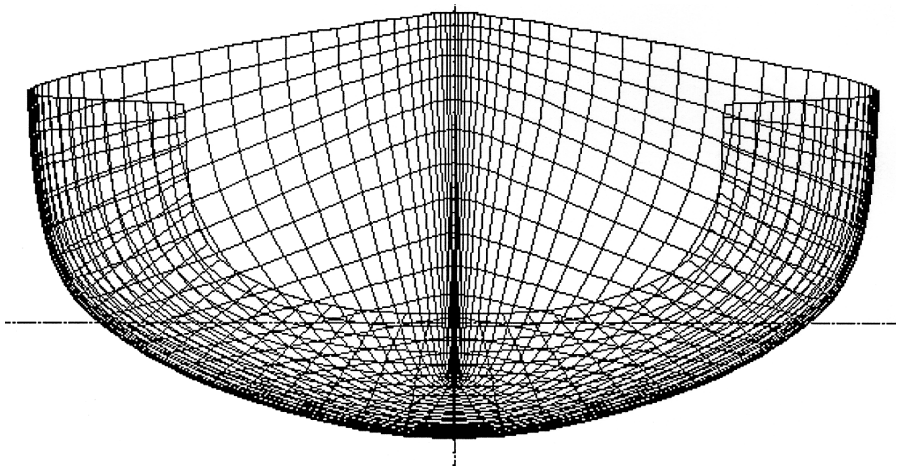
Final beam ended up at 16.25 feet (5 m) which gave us a length-to-beam ratio of almost 5-to-1 on deck and almost 6-to-1 at the waterline. The displacement-length ratio in daysailing trim was a just under 50 and in cruising trim right at 60. Sail area–to-displacement ratios in cruising trim are in the range of 22, while in daysailing conditions SA/D ratios are more like 26 (and all of this on a structure built like a tank, with the usual big-boat cruising conveniences and systems!).

Hull Construction

We took our usual approach to an aluminum hull. Fore-and-aft watertight bulkheads, a double bottom between those bulkheads for lots of tankage, and the protection of integral tanks in case the outer hull is breached.

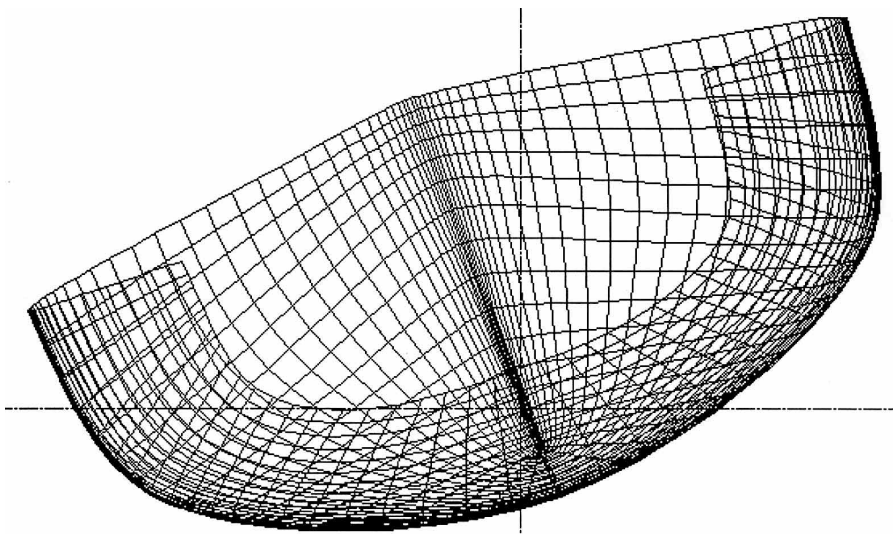
When you couple this with the ballast tanks, you find that from the main-saloon bulkhead aft there is very little of the below the water hull shape that is not protected by tanks of one sort of another. Add to this the watertight bulkheads, and you start to get a very secure feeling.

A hybrid transverse/longitudinal framing system was used with moderate frame spacing — 16 inches (400 mm) on center forward and 24 inches (610 mm) aft, with heavy longitudinals used between the frames. All interior bulkheads, except for the forward watertight were composite construction. Twenty-ounce triaxial unidirectional S-glass on either side of Divinylcell core, held in place with epoxy resin was used as the basic laminate throughout.



Here are two parametric views of *Beowulf*'s hull in daysailing trim, with the transom just clear of the water. In full cruising trim the transom is immersed about 2 inches (50 mm). The lower view shows the hull heeled at 20 degrees. Notice how the hull is in almost the same fore-and-aft trim, except the stern has been forced down just a hair. At this heel angle the leading edge of the rudder is still covered with water, which maintains the endplate effect of the hull.

While the heeled hull has a slightly different shape than that of the upright hull, the distribution of volume is virtually identical. This is one of the keys to good steering control.



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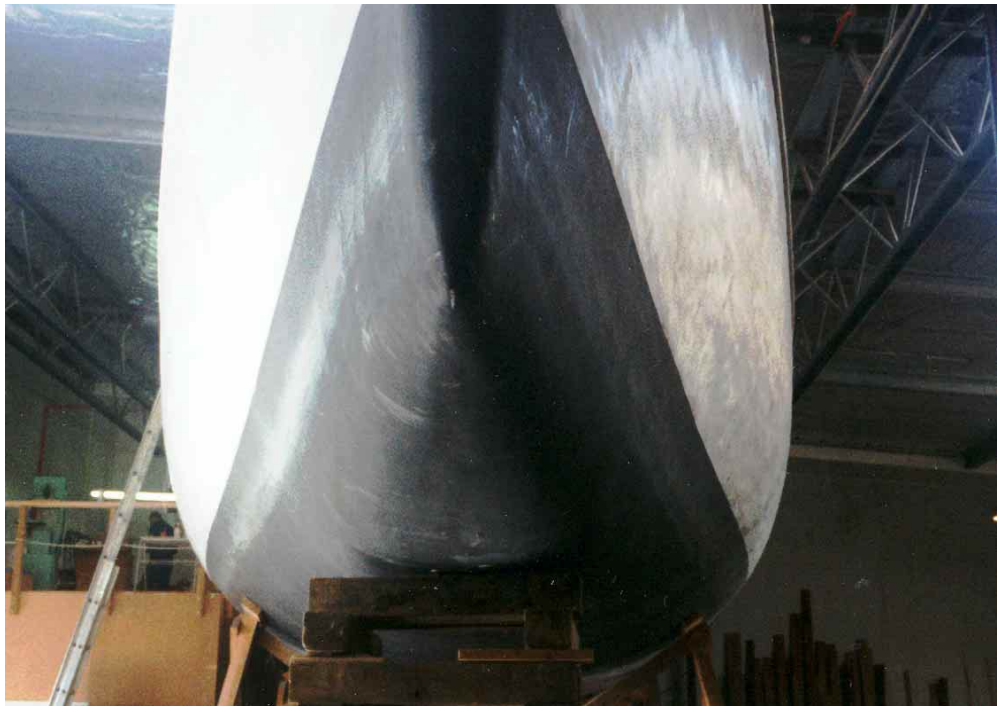

Beowulf's bow is the finest we've ever drawn, just under 11 degrees entry angle. In addition, she has large hollows in the forward sections from just above her load waterline down. At the same time, the bottom is relatively flat, a function of her long waterline and very light displacement.

Two things help to soften her motion. One is the narrow bow/hollow waterline combination. The second is the deeply immersed forefoot. In cruising trim, at rest, she has 8 inches (200 mm) of bow immersed. This gives her a good start into the wave as well as a bit of a bite to keep from being blown or pushed off to leeward in heavy weather.

The trade-off in this type of bow is typically more difficult steering control. However, *Beowulf*'s lines are so well balanced that when you couple this fact with a length-to-beam ratio of 4.9-to-1 at the deck and 6-to-1 at the waterline, steering is not a problem. In fact, she is by far the most docile of all our designs when being pushed hard downwind. Even surfing at speeds in the high 20s, the autopilot can steer her with ease.

Fuel and water tanks (lower photo) come up to the underside of the soles. Outboard on the hull sides are the seawater ballast tanks. Note the small amount of area between the two where a breach of the hull would lead to a leak. The ballast tanks run from the saloon bulkhead (in the back ground) through to the engine room.

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We used large longitudinal girders in the hull to reinforce it for grounding loads. Note the very deep web frame running across the boat that ties into the girders. This is designed to take the impact load at the aft end of the keel when we hit the bottom (not that we'd ever run aground, mind you!).

These three shots of *Beowulf* in the yard will give you some additional idea of the relationship of her fins to the hull, and a feel for the hull shape.

The hull sections are rounded as much as possible in keeping with good form stability. The rounded shape reduces wetted surface and softens the transverse motion.

Because *Beowulf* has such a powerful hull form and water ballast we had expected her motion to be quicker and therefore somewhat less comfortable at sea than we'd been used to with *Sundeer*. However, she turned out to be even more comfortable — a welcome surprise!

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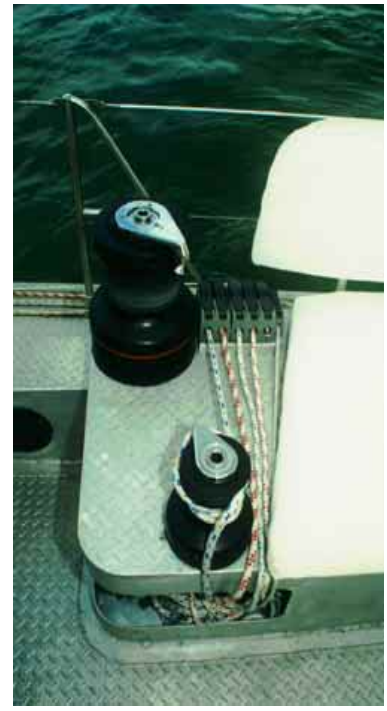
Above: One of the bonuses of this deck layout is proper dinghy storage. We've got space for our hard dink and the inflatable, both of which are launched with the mizzen spinnaker halyards.

Above: The cockpit area is contiguous with the pilothouse. Sail controls are clustered around the aft end of the pilothouse, where they can be easily adjusted. The large winches at the aft end of the cockpit are for the staysail and main runners. The smaller aft winches handle the mizzen vang.



Above: The smaller inboard winch handles a variety of tasks. Inboard and outboard jib sheet adjustment, main sail vang, bowsprit angle, and main runner retriever all end up in this area. Note the rope tail storage under the coamings.

Left: The two winches beside the companionway entrance control the main and mizzen sheets. Both can be trimmed or eased from inside the pilothouse. The larger outboard winches are the primaries, for headsail sheeting and warping when coming into difficult docking situations.

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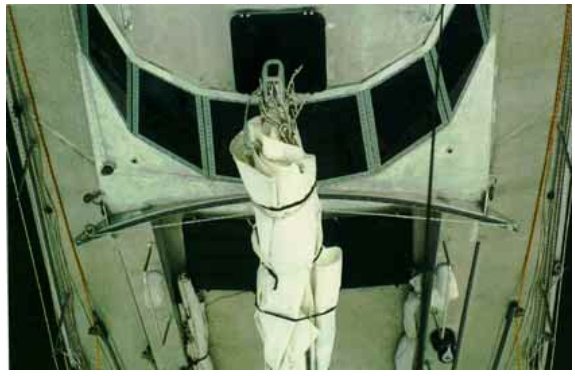
Left: The table in the middle of the cocpkit area serves several functions. Along with serving as a place to set your food when eating outside, it also breaks up the space and provides handholds at sea. The aft shower hatch, which is under the table, protected from rain and spray in most conditions, provides valuable ventilation at sea when other sources are unusable.

Two right photos: A critical factor in handling this big rig are the multihull–style travelers for the main and mizzen booms. Because they perform vang as well as sheet functions, they allow us much easier control than would otherwise be the case. They also permit the booms to be lower than would be necessary if we were to use hydraulic vangs where you have to be concerned with vang to boom angle.



Left: The main sheet has a four-to-one purchase, rigged so that it is dead-ended on one side of the traveler. It then leads to the boom and finally to the other end of the traveler, after which it goes to the cockpit. The traveler is controlled by a simple two-to-one system that dead-ends forward then runs through the traveler and via a double block system to the side of the pilothouse and aft. Both sheet and traveler go to the same winch in the cockpit.

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Living With A Mock-up!

Linda and I knew we were taking some chances with certain elements of the design of *Beowulf*. It was obvious that we wouldn't know if we'd made the right decision until we'd done some voyaging with the boat.

Not only did we have questions about the hull and rig trade-offs, but there were lots of issues not fully resolved with the use of interior space, and even our approach to some of the systems. Since we'd never cruised with aggressive water ballast before, we figured it would be tough to make the right decisions out of the box.

If you want to build a custom yacht efficiently (i.e., keep the cost down) you need to proceed in a straight line. Major changes lead to cost catastrophes.

With all of this in mind, along with some other factors, we decided to take an unorthodox step and do the absolute *minimum* required to get the boat into the water and sailing.

Our approach was to use a quickly (and inexpensively) built interior, basically to define how we thought the space should be used. There would be no hull or headliners, not even a cabin sole (except for the insulation on top of the fuel and water tanks). In effect we were going to live with a mocked-up interior and see how it worked before deciding what to do with the final layout of furniture.

Storage in the forward and aft sleeping areas was provided by sewn bags, hung from the deck.

Even handrails were done on a temporary basis, with just a few at the start. This would enable us to install or move them as experience dictated was necessary.

Sarah, fresh from her college graduation, and our good friend Dave Wyman joined Linda and me for the last five months of the building process. Together we did the plumbing and wiring and installed the engine room and all the various accessories.

Launching

Beowulf was delivered to Marina del Rey in the middle of the third week in May. To get her ready to sail we had to weld the keel onto the hull, install the rudder, assemble and rig the spars, and do a myriad of other details on the interior.

With a strong desire to get the boat sailing we had only finished wiring the most important gear (leaving many items like lights, fans, etc. to be done after we'd launched the boat).

The yard in Marina del Rey figured we'd need a minimum of three weeks to get our work done, but after a little more than a week, we were ready for launching.

Friday afternoon came, the Travelift finished with its other business and picked us up. Soon *Beowulf* was hovering over the waters of the Pacific. Linda did the honors with champagne and then *Beowulf* was slowly lowered into her element.

The stern on *Beowulf* is designed to be just barely clear of the water in *daysailing* trim. This means that if kept light, as you would expect if competition or just fun sailing is intended, we do not pay the light-air immersed-stern penalty.

When the hull is loaded for cruising, where the light-air penalties are not as important as good powering and heavy-weather considerations, the transom is immersed a couple of inches (50 mm).

As a designer of a yacht with a minimal overhang aft, the first thing you look at is transom clearance as the boat hits the water.

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In this photo *Beowulf* is powering at 10.5 knots, a speed-length ratio of 1.2. Note how clean the wake is and how small (almost nonexistent) the magnitude of the bow wave is.

That provides the key to most of the displacement and center-of-gravity variables that are so important to performance and comfort.

When the Travelift eased off the slings I was relieved to find *Beowulf* sitting *exactly* on her lines. Test one passed.

We spent Saturday setting up the rig, tuning the stays, and bending on the sails.

Initial Trials

We should digress here a moment and tell you something about the name *Beowulf*. We'd used it for a series of catamarans Linda and I had raced together during the 1960s and 70s. These were, at the time, probably the fastest sailboats in the world with our last two boats, *Beowulf V* and

Our initial interior was done on a quick basis, as a mock-up to test the use of space. We quickly became comfortable with the exposed aluminum structure, and found that by adding some art to the bulkheads and a few colored pillows the interior took on a very nice feel. Most of the furniture was built from 1/4-inch (6.3mm) plywood, and given a quick coat of paint.

We decided to experiment with stainless fiddle rails that would act as handrails as well. However, when the time came to do the yacht-like interior, we went with conventional fiddles.

This rough approach to the interior taught us a valuable lesson. It had no impact on our enjoyment of cruising, the boat was lighter, and the costs were far lower.

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Beowulf VI holding just about every elapsed-time record there was to be had in Southern California, not to mention an outright speed record of over 35 miles per hour.

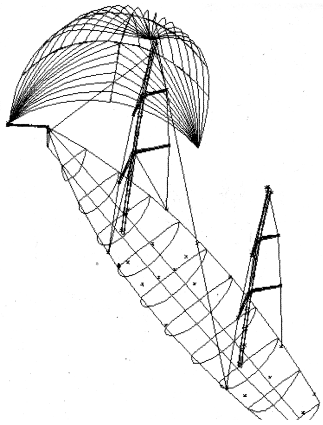
Because we occasionally took Elyse and Sarah sailing as babies, these last two *Beowulf*'s were referred to as "family cruisers."

We had discontinued the use of the *Beowulf* name on our monohulls. It just didn't seem to fit the type. However, when the time came to choose a name for the stern of this new monohull, between the performance potential, the multihull looking rig and full-width catamaran-style travelers, we felt that this indeed was a family cruiser worthy of the *Beowulf* name.

The dock to which we were tied was in the middle of a long, narrow channel, about 120 feet (37 m) wide. From our dock to the open ocean was a dead beat out this narrow channel, a reach down the harbor, and then another beat out between the two breakwaters of Marina del Rey.

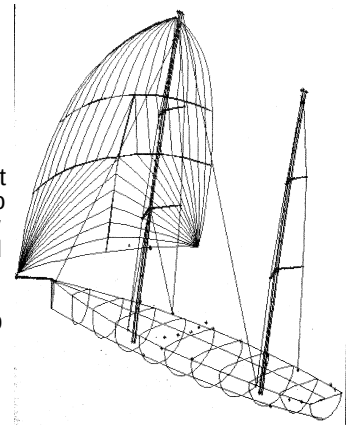
The obvious thing to do was to light off the engine and power out to where we could test the rig. But no vessel of ours with the name *Beowulf* has ever been subject to such an indignity on her first outing, and this new *Beowulf* would be no exception.

After a brief discussion we decided to sail off the dock and out the channel. The fact that we were 86 feet (26.4m) long with our bowsprit installed did not deter us from giving *Beowulf* a proper start in life.



Beowulf is rolling along here on her way to Fiji from Tonga. The two asymmetrical spinnakers are easy to handle and very fast in a cruising context.

We worked with Dan Neri at North Sails Rhode Island to come up with a user friendly shape for both sails. The forward chute could be flown as close as 50 degrees apparent, yet was quite stable when sailing at deep angles. (North Sails RI drawings)



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Our three working sails were hoisted, the jib backed to weather, and the bow shoved out into the channel. *Beowulf* accelerated quickly into the 8-knot breeze with little evidence of keel stall. Score one for our medium-draft keel.

As we tacked back and forth up the narrow channel I started to get excited (as did the folks sitting in the cockpits of the boats lining the channel!). *Beowulf* handled like a big dinghy, or perhaps I should say like a high-performance catamaran. She accelerated out of her tacks, even when she barely had time to get moving before it was necessary to tack again.

We worked our way outside the harbor and while we found we could consistently sail above wind speed on almost all points of sail, the airs were really too light to give us a good feel for the boat.

Two photos of *Beowulf*'s asymmetrical spinnaker. She is beam-reaching here, with the apparent wind at about 55 degrees. Even though these sails are quite flat, they are not difficult to fly downwind, as long as the bowsprit is angled to windward.

When dousing the chute we use the tried-and-true method of sheeting the leech tight behind the main, which has been let all the way out. After running off, the sail collapses and is then socked.

While dousing has not been a problem yet, we've recently added a "takedown" patch in the luff which enables us to pull the luff back toward the mast to get a better blanketing effect from the mainsail.

Over the next couple of weeks we worked full-time getting the boat ready to head for the South Pacific. Whenever we saw a chance for some breeze we went sailing, but conditions were typically light.

We did get a chance to test out our powering abilities and found that *Beowulf* would do 10 knots with the engine barely turning over. She cruised at 11.5 to 12 knots with ease and would motor-sail, with extra pitch cranked into the prop, at a very comfortable 12 to 14 knots. The few small waves we encountered gave us encouragement about our bow shape. *Beowulf* seemed to slice through without a pause.

Then came the weekend where Skip Schroeder and Melinda Bessko visited us. Skip and Melinda were friends who had purchased our old *Sundeer,* and they'd come out to see the new boat (we'd been picking their brains and bouncing ideas off of them for the past two years). And they brought with them the best gift anyone had yet given *Beowulf* — some wind.

Heading up the coast under working canvas we were beating into a 14-knot seabreeze, tacking through 95 to 100 degrees with leeway and doing a steady 9.5 knots. With no water ballast in the tanks heel averaged a moderate 18 degrees. With water ballast it was just 11 degrees.

Upon reaching Malibu we headed out to sea for awhile on a beam reach. In 14 knots of true wind we sailed at a steady 13 knots, still with just working canvas set. Heading downwind for

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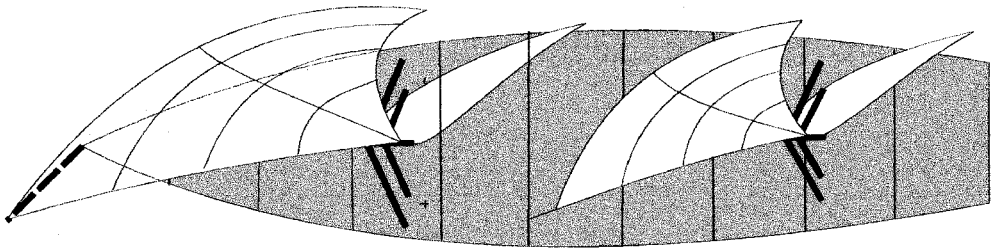

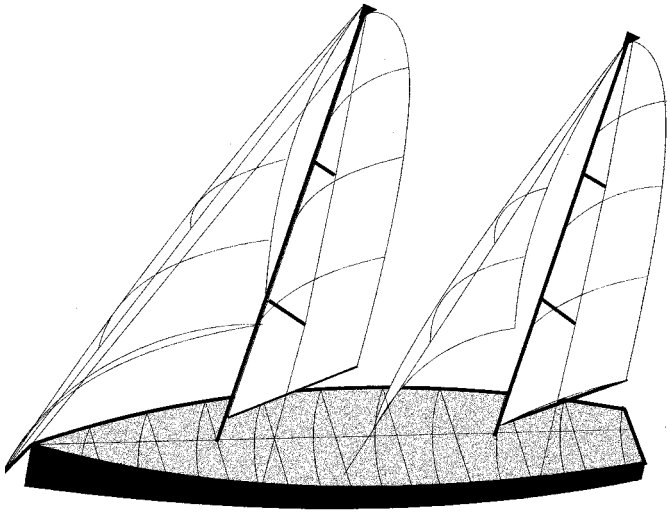

The free-flying reacher, set on the end of the bowsprit, turned out to be a much more powerful sail downwind than we had expected. When the breeze got into the 20-knot (true) range we'd drop the main spinnaker and set this instead. Speed would drop, but we were quite comfortable in the squalls while averaging better than 300 miles per day. Being able to project the luff of the sail to weather had a hugely positive impact on its downwind efficiency.

The mizzen jib was likewise more powerful than we'd expected. Because there was no main backstay to interfere with the luff the tack could be brought all the way to windward giving it a much better slot effect over the mizzen. (North Sails RI drawings.)

the harbor with the true wind on the quarter, we hoisted both spinnakers. The speed climbed a hair, and everybody waited for the first wave to lift the stern. Now mind you, these were not trade-wind seas, but when the speed climbed quickly to 17 knots on a 3-foot (0.9 m) wave, Linda and I knew that we indeed had a boat worthy of the name *Beowulf*.

Skip and Melinda returned to *Sundeer,* and we continued our preparations for getting *Beowulf* ready to go to sea.

Cruising Test

Somehow we managed to put a thousand miles on *Beowulf* during that couple of months of continued boatbuilding. Unfortunately, we were skunked in the strong-wind category with the most breeze to be found a meager 25 to 28 knots.

We had enough time on the systems to know that the engine was reliable, although our Balmar genset continued to give us problems. The dual Glacier Bay fridge system was working well, and with a full complement of tools and boatbuilding parts stowed away, by early August we were ready to head for the Marquesas Islands, 2,900 miles to the southwest.

As it was summertime in the Northern Hemisphere, we'd been keeping a close eye on the tropical-storm development off the Central American coast. So far things had been quiet, but toward the end of July depressions started to form and drift west, toward the track we'd need to take.

Linda had planned on four or five days of shopping to buy supplies for the four-month trip to New Zealand. However, with weather brewing and the need to move on we compressed this into a single day.

The folks at the local supermarket were in shock as we wheeled cart after cart through the check-out stands. We had so much to buy that we devised system: Linda and I would load our respective carts as fast as we could, while Sarah and her friend Kristin, who was joining us for the trip, took the carts through the check-out stands and loaded them into our truck. When the truck was filled they'd rush back to the boat, toss things aboard, and rush back for more. In the space of less than *two* hours we bought all our supplies. No lists, no advance planning, just instinct.

We had no idea how well this would work but figured we could always supplement locally as

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we cruised (as it turned out, this was the closest to the correct quantities as we'd ever come!).

I was in daily contact with Bob Rice at Weather Window about the tropical disturbances. Bob urged us to hurry as Pacific storms mature and move rapidly, and we had no stomach for such a test with a brand-new, essentially untried boat.

With Balmar alternators still giving us problems we were delayed a few days until a couple of replacements were sent, upon receipt of which we immediately departed (before even installing them).

You cannot imagine the relief we all felt in getting away from the dock, the coast, civilization. It had been four years since Linda and I had been to sea, and we were ready for a break.

By the time we'd cleared the back side of Catalina Island, *Beowulf* was in her element. With 16 to 20 knots of wind on the starboard quarter, and our asymmetrical chute set on the bowsprit, we were absolutely flying. Our second 24 hours saw 300 miles roll under the stern.

Beowulf's motion in the trade-wind seas was much softer than we'd thought possible. She was very stable, sailing almost upright while we broad-reached along under one or both spinnakers. As she'd overrun the waves the very fine bow would penetrate so smoothly that you'd not even know she was driving through 6 or 8 feet (1.85 to 2.46 m) of water.

The record for the passage from Southern California to the Marquesas was 14.5 days, set some years previously by a Whitbread veteran, *American Eagle*. Even though we had a new boat, and one that we'd have to slowly bring up to speed as we'd never really tested her in a breeze, we thought this was a worthwhile goal at which to shoot.

But after the first three days of sailing, with almost 900 miles under our keel, we were beginning to think a lot faster trip was possible.

Meanwhile, up ahead of us excitement was brewing. A tropical depression was rapidly turning into a tropical storm. Its course and ours would coincide within a couple of days.

The normal track for these storms is northwest. This meant we had two choices. One was to veer to the west, keeping the storm center to the east of us. This would keep us in the trade-wind flow, which would eventually be enhanced by the counter-clockwise circulation of this low-pressure storm system. If this approach were successful, we had a good chance of breaking ten days for the trip. Now that would be something to write home about!

On the other hand, if the storm accelerated and matured into a hurricane, we could end up with the eye of the hurricane rolling right over us. With a brand new, untested boat, it was not a prudent risk to take.

We could alter course to the southeast, allowing the storm center to pass to the west of our track. This would put us in the weak circulation on the back side of the storm. The only problem is that we'd end up beating, something none of us relished.

We adopted this tactic and within a day we were hard on the wind, *beating* our way toward the Equator.

The objective in an out-of-season crossing of the hurricane belt is to do it as fast as possible. We wanted to get to 5 degrees N latitude with all dispatch, as from this point south the hurricanes could no longer maintain their closed circulation.

As the wind came on the nose we dropped our jib and mizzen, hiked the main to weather on the traveler, and motorsailed as fast as the seas would allow.

We maintained a 10-knot average during this time, charging through the steep headseas on the back side of the tropical storm. Winds were moderate, rarely more than 35-knots.

Beowulf seemed to be quite content, but her crew was definitely not. After two days hard on the wind we'd passed the magical 5 degree N latitude point, but the winds continued on the nose. By the time we'd reached the Equator we *still* had head winds.

Even south of the equator the head winds continued. After five days of beating, with only a short distance to go to Nuka Hiva, the breeze finally backed and the southeast trades came in so that we were once again sailing free. It felt so good to set a spinnaker and watch the speed climb. *Beowulf* flew along and before we knew it early on the morning of our twelfth day at sea Nuka Hiva was on the horizon.

We'd sailed a little over 3,100 nautical miles including our detour in a reasonably quick time, and while we were a little put out by all the beating, just a few hours of trade-wind sailing had set everything to right.

The boat had performed well in adverse conditions. And we knew faster passages were in the offing.

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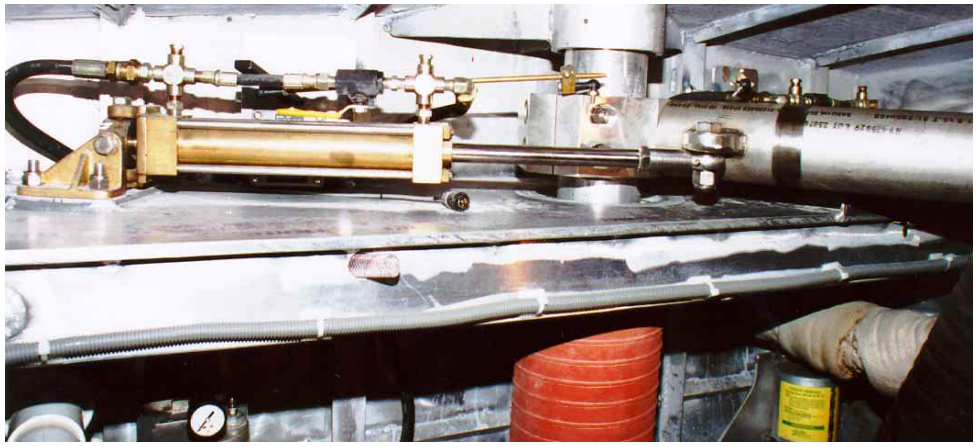
Engine Room

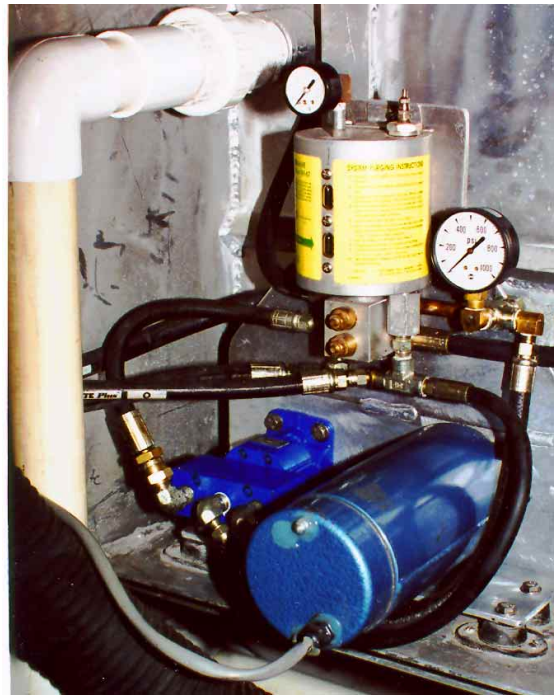
One of the advances Linda and I were looking for in this new boat was better powering capabilities. Granted, we could cruise at 10 knots with our other boats, but we could not maintain this speed into big headseas, and besides, 12 knots was our target as we felt this was a magic number to take maximum advantage of weather windows.



We used hydraulic steering for the main helm on *Beowulf* since the wheel was located some distance forward and cables would have had an inordinate amount of friction. Dual Hynautics K-3 cylinders were used, each plumbed independently so there were separate hydraulic systems (top photo). The tiller arm, to which all of this attaches is machined from a solid chunk of aluminum so we don't have to worry about welds failing.

Each cylinder has a WH Autopilot 1/2-horsepower pump set to drive it when the pilot is on (lower right). These pump sets are attached to bases that are soft mounted to the hull to minimize noise transfer to the hull. The 2-inch (50mm) pipe to the left of the pump set is the exhaust for the central vacuum system. The outboard end is threaded so that we can use this to pump up the inflatable dinghy. The suction side is used to deflate the dink into a very compact size.

The top of the rudder bearing carrier (which is welded to the hull) is above the loaded waterline. Rather than use a packing gland requiring maintenance and risking leaks, we simply attach a piece of hose (lower left) that comes up to the underside of the steering gear. This makes it impossible for any pressure leaks at high speed to work their way into our engine room.



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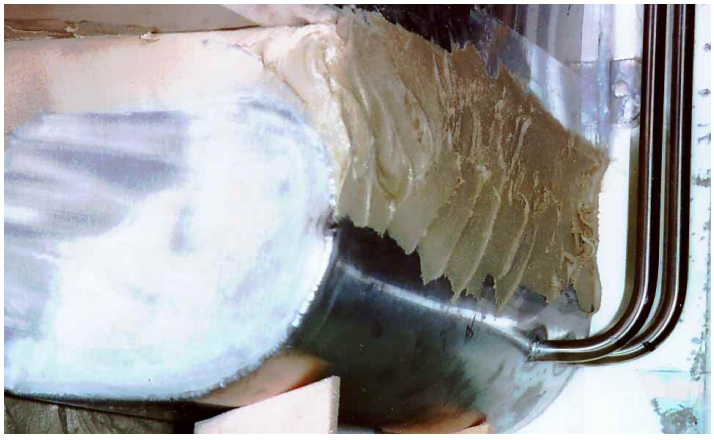
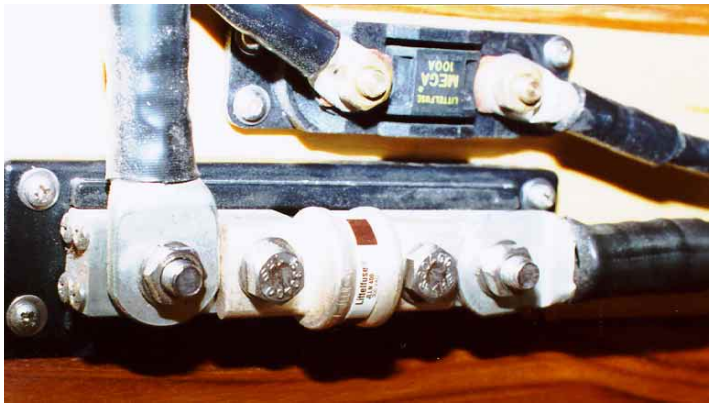
This Village Marine "Little Wonder" watermaker worked really well. We average 6 gallons (23 liters) per hour of output, consuming about 175 watts of power per hour. It worked without a single problem, and based on what other cruisers have told us, appears to be more reliable than other DC models available.



We used a stainless steel inner liner for the fridge. This makes a sanitary easy-to-clean lining (although fiberglass is somewhat more efficient in terms of heat loss). The liner was made with a step, and inside the step we installed a 2-gallon (8-liter) stainless water tank. This feeds a faucet outside of the fridge and allows us to get cool water without opening the fridge doors. The putty you see in the upper middle of the photo is installed to give the tank maximum contact with the fridge liner, so the water in the tank cools as quickly as possible.



All high-powered circuits are fused, starting with the leads off the batteries. We also fuse the output of the alternators.

Of course, a key factor when powering would be the hull shape, specifically the forward sections, if we were to be able to maintain fast speeds upwind.

We quickly settled on a Yanmar 170-horsepower diesel for auxiliary power. This is a light, very smooth running engine, and we'd used the 140 version with good success on the Sundeer 64s. The big question was the drive train and propeller. While we'd used Max props for years we knew they were not as efficient as we'd like, yet they were very streamlined when feathered and thus good for sailing. From lots of real-world data we knew that the best we could hope for in prop efficiency from a Max was around 40 percent.

A fixed prop, which would have higher efficiency, would have way too much sailing drag. Eventually we decided to use a Hundested controllable-pitch propeller that has an efficiency around 60 percent half-again better than the Max prop. This system would allow us to adjust the prop while under way to optimize it for existing conditions, and then feather the prop when sailing.

The rub was in feathered drag. With a very large hub, bigger prop shaft, and twisted blades (as opposed to straight blades with a Max prop), we figured drag would be *twice* what we were used to. In addition, the Hundested gearbox, shaft, and prop added over 250 pounds (120 kg) to our engine-room weight. However, these

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were penalties we were prepared, with some reservations on my part, to pay, providing we got our steady 12-knot cruising speed with a range of around 2,000 miles.

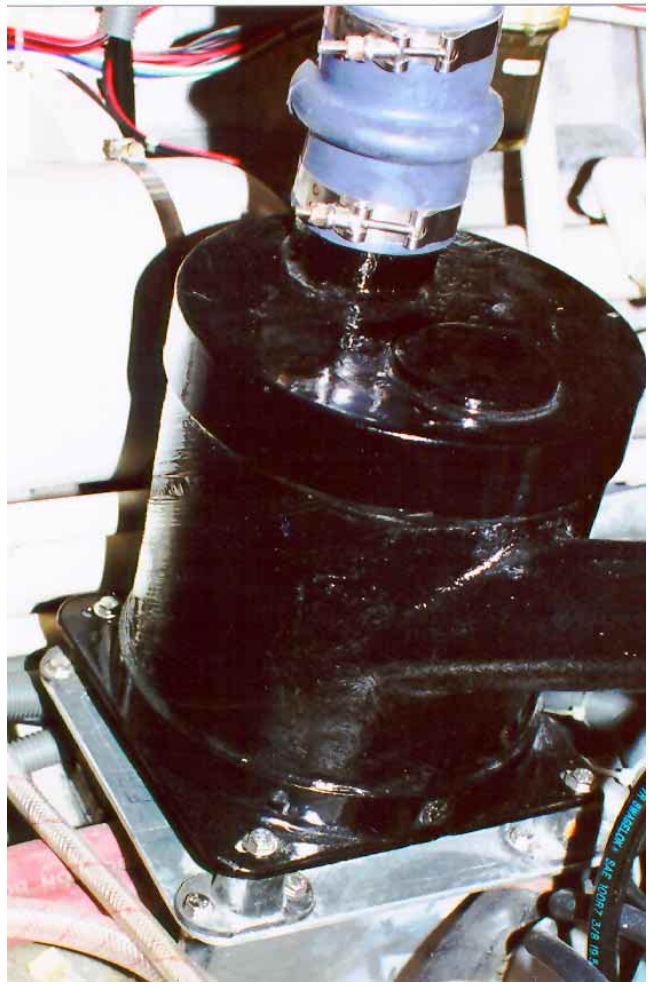
On the systems front we started out with our usual DC-based approach. With 800 amp-hours of *usable* capacity in a "traction" battery bank (at 24 volts), we had battery power to last us a week or so without running a genset.

We put two large Lestec alternators on the main engine and installed a small Balmar DC genset. Even though we carried over 400 gallons (1,550 liters) of fresh water we installed a DC-operated Village Marine Little Wonder watermaker (6 gallons/23 liters per hour).

Hot water for showers, the galley, and boat heat would be provided by a Teledyne 30,000-Btu diesel heater, a new unit about which we'd heard good things.

Most of this gear worked well, but the Balmar equipment was a big disappointment. We'd agreed to test a new prototype unit, but when this failed repeatedly Balmar replaced it with a small diesel driving two standard alternators. When we received this unit I should have known we were in for trouble as the wiring harness was made with cheap, stiff, untinned wire, and the alternator mounts were out of alignment with no system for tensioning.

Within a week we'd burned up three alternators. Replacements came as we were ready to leave the dock for the Marquesas Islands. These lasted for ten hours, and then burned up.



An engine room as large as that on *Beowulf* requires a huge amount of insulation. This is heavy, and over the years tends to get quite messy. We decided to do everything possible to keep systems quiet and see if we could get away without insulation.

Isolating the exhaust system from contact with the hull helped enormously. In the photo above you can see one of the Aqualifts. It is mounted on four soft rubber feet, so that no vibration or noise is transmitted directly to the hull. The same approach is taken with the exhaust-hose hangers.

The combination of Yanmar diesels and Hundested propeller also proved to be very quiet. In the end, we found that, overall, the machinery noise levels on *Beowulf* were no higher than on our other yachts where we used significant amounts of engine-room insulation.

What was most disturbing about this entire affair is that we'd warned Balmar in the beginning about the problems of charging a large battery bank, and were assured they understood what was involved and that the equipment being sent would do the job. As we traveled across the Pacific we encountered a number of other boats which had not had positive experiences with their Balmar gear. I'm sure some of their equipment is good, or they'd not have stayed in business this long. However, our experience was far from positive.

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Above: Engine rooms are difficult to photograph, and this one is no exception. This shot is taken from the engine room door, at the back end of the aft port head. The main engine is to the left of the photo. The genset (not seen) sits aft and to the left.

Shelves run along both sides of the hull, on which we stow everything from dive gear to covers. The Teledyne diesel boiler is shown to the left (aft), along with the Village Marine Little Wonder watermaker on the top shelf. A larger 50 GPH (238 liter) unit is mounted below the shelves.

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We fitted a Teledyne 30,000-Btu diesel boiler for domestic hot water and interior heat. At every high point in the plumbing system we installed an air vent (photo above). These make it easy to bleed air out of the heater system, wherever it is trapped.

We have two Glacier Bay fridge compressors (DC driven with a 1/2-HP motor), each of which can handle the fridge and freezer. They are cooled by a hull tank (in the foreground) which contains fresh water. The fresh water circulates through the fridge condenser and transfers its heat to the surrounding sea water via the hull. This eliminates all sorts of maintenance headaches and means the sea cock can be closed when we leave the boat.

It also works when the boat is hauled out!

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Nightmares

Building a custom yacht is anything but easy. If anyone should know this, we should. We've built custom yachts all over the world, working with all levels of skills and craftsmanship. In each case we've been able to bring out boats within our internal budgets; we have never had a yard go out of business on one of our projects (a commendable feat in the custom–yacht-building process!); and we have always gone on to do a series of additional boats after going through a learning curve together with the yard.

Because we have our own way of doing things — which is frequently not what a yard is used to — there are often some difficult periods during the first boat as we and the yard learn each other's needs and requirements.

We hash out the various issues as we go, usually in a spirit of cooperation. We've found that experienced yard management, once they understand what we are after, and why, is usually eager to learn new ways of doing things.

When we decided to build *Beowulf* I was tired of traveling. Rather than go to one of our established sources outside the United States, we decided to use a new builder, Jim Betts, located in the Sierra Nevada Mountains of California.

While Jim had no cruising experience, he had built a series of racing boats. We had chatted several times throughout the years about projects, but had never come to an agreement.

When Linda and I finally decided to proceed with the *Beowulf* project I called Jim, and he was very interested. I sent him a set of preliminary plans; he came back with a budget price. After going through the usual back-and-forth, we eventually sent him a set of detailed contract specifications and plans.

A fixed, final price was agreed upon, we paid a deposit, and work was started in late winter. What ensued was a nightmare beyond anything we could have been able to imagine. At first things went smoothly (they usually do in the beginning). But before the halfway mark on the metal work, the situation had deteriorated badly.

We'll spare you the details of what ensued. Suffice it to say that it was a most difficult period for us and sadly, we could not recommend this builder to anyone else.

Beowulf heated up on a broad reach. She's doing a steady fourteen to sixteen knots in eighteen to twenty knots of wind.

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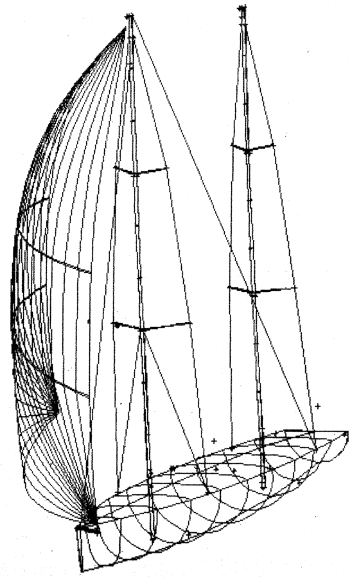
Beowulf is sailing here, en route between the Yasawa Islands and Nandi in the Fiji group, at 10.5 knots with the wind on the quarter. Note the sailing awning covering the cockpit area, and the Novarania inflatable, with 30-horsepower outboard on the aft deck. Our hard dink is to starboard.

After 8,000 Miles

Over the next three months we made a quick trip through Polynesia, visiting many old friends and anchorages to which we'd been on previous cruises to this part of the world. We found that with any sort of a trade-wind breeze *Beowulf* would easily do 300 miles a day. While our average down from California had been a relatively slow 267 miles per day, to the Tuamotus we averaged 297, and then 303 a day to Raiatea in the Societies from Takaroa. Both passages were in moderate conditions, without pushing the boat.

Between Bora Bora and Tonga (with an intermediate stop in Nieue) we had a variety of conditions. During one day of strong trades with average breezes in the mid 20-knot range and puffs to the low 30s we had a best day's run of 347 miles. For the passage we averaged 302 miles per day. Between Tonga and Fiji we had lighter winds and did the trip at an average of 282 miles per day.

Our biggest disappointment came between Fiji and New Zealand. We wanted to depart with a big high coming up from the Australian bight and see if we could crack the four-day mark for the 1,150-mile passage, as we understood the record to be four-and-a-half days. However, an uncharacteristically stable high settled over the entire area for several weeks and in the end



One of the most pleasant surprises regarding the articulating bowsprit was how efficiently it worked with our free-flying reaching jib. This sail has a Vectran luff line and its own roller-furling drum at the bottom and head swivel at the top. In moderate breezes, like the 11 knots shown above, the sail can be flown a very deep angles and still generate lots of power.

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Beowulf's awnings are designed to work in port and at sea. The large cockpit awning can be flown in 30 knots of apparent wind. There is an "eyebrow" awning over the forward windows to reduce heat load in the pilothouse.

The balance of the awnings span the deck between the coamings and protect all of the opening hatches from sun, rain, and spray. All three of these coaming awnings are carried on passages. They are quite effective at keeping spray out of the hatches, since the coamings act as giant breakwaters.

In addition, the awnings can be angled up. This way, when we are anchored, they act as giant wind scoops, forcing a nice breeze into the open hatches.

we were forced to depart into what we knew would be light conditions. Still, with a combination of motoring in glassy seas and sailing when we could, we made the passage in an uneventful 4.25 days for an average of 271 miles per day.

For the entire passage from California to New Zealand *Beowulf* averaged 286 miles per day — not bad for a shakedown cruise on a boat loaded with gear to be used in her completion upon arrival in New Zealand!

Weather Lessons

One of the most interesting things we began to notice about our new-found speed was the ability it gave us to make better use of weather patterns. The 30 percent or so increase in daily average runs made it much easier to position ourselves to take advantage or avoid weather systems.

While it may have been luck, we found that during the 7,000-mile trip we were able to work every weather system to our advantage (or at least in the way that was most prudent, as in the case of the tropical storm). Aside from the pure joy of sailing fast, this weather-friendly aspect of *Beowulf*'s

We were pleased to find that *Beowulf* was quite dry in power-reaching conditions. As we would overrun waves (in these two shots we're moving at a steady 16 to 19 knots, with the wind just aft of the beam) the crest of the wave into which we were descending would be sheared off and fly across the deck well forward of the mainmast. Rarely did we get spray as far back as the cockpit area.

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speed was turning out to be a wonderful cruising advantage.

Handling Under Sail

Most people would say that sailing a vessel the size of *Beowulf* short-handed was anything but prudent. Yet we found her easier to handle under all conditions than any vessel on which we'd previously put to sea.

In the entire 8,000 miles of trials we had only reefed once due to wind force (and several other times to slow down due to arrival at our destination before dawn).

The sails were easy to raise, reef, lower, and cover. The low booms made sure of this, and the Spectra sailcloth, once it had been furled a few times, became reasonably docile.

Off the wind the pivoting bowsprit proved to be a wonderful cruising tool. Not only was it highly efficient with both reacher and spinnaker tacked to it, but it made jibing a piece of cake.

It got to the point when we were sailing with *both* main and mizzen chutes that I could jibe *Beowulf* by myself in a little over four minutes!

The full-width travelers worked better than we'd hoped, making sail trim and jibing these big sails an absolute dream.

And we were pleasantly surprised at how well *Beowulf* sailed bare headed. Whenever we had to slow down due to an early arrival we'd strip off the headsail first, leaving main and mizzen flying.

We even found that we could sail her off the anchor without a headsail, and that by pushing the mizzen boom to weather we could get the bow to pay off to where she'd come quickly out of irons, and within a couple of boat lengths be ready to tack.

We started sailing *Beowulf* with a hanked-on jib. I did not want to give up my full-length top batten and did not want to admit that I was old enough to need a roller furler. The sail was not that much hassle to raise and lower. We'd flake it against the headstay and then zip it into a sailbag.

However, it made a large obstruction in front of the boat and severely impacted our visibility from inside the pilothouse. So we tended to remove it from the headstay, brick it carefully, and drop it (all 105 pounds/48 kg) into the forepeak. This got to be tiring after awhile. *Beowulf* now has a ProFurl roller furler.

The tack of the mizzen spinnaker is controlled by two 5-to-1 tackles with built-in cam cleats. We can move it from the weather rail to the centerline as conditions warrant. Note the tack of the main chute rotated to windward on the bowsprit.

Using Salt-Water Ballast

Beowulf has her salt-water ballast tanks divided into a forward and aft section. The aft section holds 4,500 pounds (2,041 kg) of water, while the forward section holds 3,000 pounds (1,360 kg).

With the boat sailing in light trim, where fuel and water tanks have only a small payload, we have full factors of safety in the rig with full-ballast tanks. However, as cruising payload increases, we then restrict ourselves to using just the after tanks (which run from the middle of the galley into the engine room).

During the passage to New Zealand, with hefty quantities of fuel, water, and supplies aboard, we used just the after ballast tanks.

We experimented with optimum levels of ballast and found that the difference in boat speed between being overballasted and just right, in lighter winds, was not enough in a cruising context to worry about. We ended up carrying extra ballast most of the time, as this reduced heel and made the boat more comfortable.

Beowulf is a very, very powerful boat without her water ballast. She is probably 20 percent stiffer in a given breeze than was *Sundeer* when the ballast tanks are empty. And while there was

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This is what it is all about. An idyllic South Pacific lagoon (in this case Takaroa in the Tuamotus), a gentle trade-wind breeze, all the fresh coconut milk and meat you can eat, and warm water in which to snorkel.

a considerable difference in speed between being empty and filled (especially reaching where the difference could reach 3 or more knots!), the real difference we noticed was in comfort. Between 17 degrees of heel with tanks empty and 9 or 10 degrees with the after tanks filled, there is a huge change in how you view your surroundings.

By the time we'd arrived in New Zealand we'd eaten our stores and our fuel tanks were almost empty. So, when we left the Bay of Islands to sail to Auckland we tried out full ballast for the first time.

The difference was significant. In 24 knots of breeze from beam-to close-reaching, with a small jib set (just 300 square feet/28 square meters) we powered down the coast at a steady 15 to 16 knots, with less than 13 degrees of heel.

I had planned to use a series of 24-volt solenoid-actuated valves to control the water in the ballast tanks. But when the time came to install this system, realizing we didn't have any real-world cruising experience with seawater ballast, I decided to wait. We installed a series of six manually activated PVC ball valves to do the job.

By the time we'd reached New Zealand I had some definite ideas on how to improve what we'd started with. We eventually went to a system where a single Y-valve directed the flow from a powered pump to the port or starboard tank. With the fill at the *top* of the tank you could turn the pump on or off and not worry about the water draining back out to the sea (via the pump). This meant just one valve on the pump, set once on each tack.

Between the tanks, at their low spot in the middle of the galley/navigation area, there is now another Y-valve. This can be selected to let water drain across to leeward (before tacking or jibing), or set to empty via a standpipe behind the fridge box. The standpipe has a manual shut-off valve at its base, and an electric solenoid valve on the feed from the ballast tanks. To empty a tank all you need to do is open the solenoid valve. Thus with two switches in the pilothouse — one to

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run the ballast pump motor and the other the dump valve — we control the whole setup. When we tack or jibe there are two Y-valves to throw. All very simple and reliable.

Handling Under Power

It was under power where we got our biggest surprises. We knew from sea trials that we had good powering capabilities. Over time, as we powered in the light-air portions of our passages, we came to respect the capabilities of our Hundestadt controllable-pitch propeller.

By watching the exhaust-gas temperature and comparing it to rpm, we could adjust pitch so that we had just the right amount of load for the given conditions, keeping the engine at optimal load settings regardless of sea state or wind.

We experimented with different speeds, noting fuel consumption via day tank cycles. We quickly came to the conclusion that in most cases our fuel economy was not that much different at 11.5 knots that it was at 10 knots. And we ended up doing most of our powering in the 285-mile-per-day range.

However, it was under power in tight quarters that the Hundestadt really proved itself. With fully reversible blades, we could pitch the prop to work in either direction. (i.e., we could reverse the blade twist so that when the transmission was put into forward the prop would pull in reverse.) This had the effect of reversing the direction of stern walk. Once we learned how to use this characteristic we could then use stern walk to pull the back end of the boat into or away from any docking situation. We also had the ability to rotate in either direction.

We found that the amount of prop pitch corresponded to the amount of walk. If we wanted lots of walk, we'd over pitch the prop. On the other hand, if we wanted to back up straight, we'd reduce pitch until the boat had accelerated to where the rudder had a good bite. The net effect of all of this is to allow the operator to get into and out of some amazingly tight marinas.

Interior Changes

Living with the interior taught us a number of valuable lessons. First and foremost was that we do not *need* a beautifully executed interior to be happy cruising. *Beowulf*'s bare aluminum hull and deck on the interior, unpainted cabin soles, and rough joinerwork did nothing to degrade the fun we were having sailing, and the parties we held aboard were still a blast. Okay, we wouldn't be impressing any owners of fancy yachts when they came to visit, but wait 'til we left on a passage and disappeared over the horizon!

Before leaving we'd had made an elaborate set of covers to isolated the pilothouse from the rest of the boat in case lighting below created a problem with our night vision on watch.

We were pleasantly surprised to find out that these were not required. We had low-intensity bulbs in the galley/saloon area that did not affect vision that much in the pilothouse under most conditions. The two times it was a problem, we simply turned off the bulbs below or moved our watch keeping on deck.

Having the entire saloon/galley area open to the pilothouse substantially improved airflow below. We rarely had need of our fans, even when all hatches were shut tight in power-reaching conditions.

The next surprise we found was in the owner's stateroom. We came to like the open feel of this area, with just a bunk and no storage facilities. When the time came to lay out this part of the interior we took the "optional" space, which we'd intended on leaving empty, and turned it into a "dressing room." This is where all our personal gear is stored. There are a bunch of shelves (as much horizontal space as in our closet on land) and a large hanging locker. In addition to loads of counter space, the washer/dryer is located in this area so the space doubles as a laundry room when we're in port.

There were numerous small but important changes throughout the rest of the living quarters. Counter sizes were optimized, handrails were shifted, and the companioway ladders mocked up several times to make their use at sea safer.

We found that with all navigation taking place in the pilothouse we wanted our communication gear up there as well, and so moved the Satcom C terminal and our portable computer up.

The main saloon is laid out with longitudinal seating. This way, you can sit comfortably with your feet up when facing fore-and-aft. It also works well for napping on at sea when conditions are rough. The area outboard of the seatback houses the saltwater ballast tanks, which run from the forward bulkhead all the way back into the engine room. Ambiance is created with a combination of halogen spotlights (5 watts each) on dimmers and tube lights down the hullsides. The headliner system is very lightweight. The upholstered panels are made of 1/4-inch (6mm) ply which has been cut out in the center, leaving a frame 3 inches (75mm) wide. The edges are rounded slightly, then "Ultra Leather" fabric is stretched and stapled to the frame. The hand rail on the table is removable in port.

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The biggest question was how to approach the new furniture. In this we were faced with a dilemma. Kelly Archer, who had built many of our yachts in the past, was available to run the project. In turn, Kelly had access to a crew of skilled craftsmen with whom we'd initially worked in 1978 to build the first of the Deerfoot-series yachts. Kelly, Chris Hamon, Malcolm Walker, Barry Morton, Mick Richardson, and a team of other fine tradesmen and apprentices represented the very best yacht-building talent to be found anywhere on this earth.

It seemed a unique opportunity, perhaps the last in our lifetime, to do an exquisite *traditional* interior. So, we turned Kelly and the guys loose with the caveat "keep it light."

They responded wonderfully with the most beautiful joinerwork and varnish we've seen since the days of *Deerfoot I* and *Wakaroa*. And best of all, the furniture that went back into the boat was lighter than what came out.

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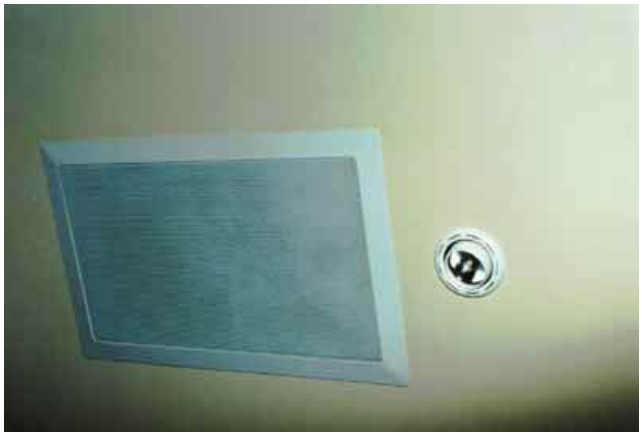
The headliner panels (right) have a "reveal" between them, allowing air to circulate and preventing mildew. They are held in place with small polished stainless steel clips — much more positive than Velcro (which I hate on headliner panels).

Throughout the boat we use these "eyeball" vents (above). They allow us to adjust air flow and to direct it in the direction where it will do the most good.



Spotlights are let into the headliner panels (left). The wiring for each panel is plugged at the end so that when the panel is dropped, the electrical circuits can be easily disconnected. Note the flush speakers. Made by Sonnance, these provide excellent sound without a bulky enclosure.

Above: The pilothouse, a key ingredient in *Beowulf*'s interior, "floats" above the galley/office area. The sole of the pilothouse forms the top of the fridge/freezer box. Since the sole are is too large to be safe at sea, we use a polished stainless steel divider bar which also serves as a foot brace when seated to weather.

The area forward of the two nav cabinets, up to the front of the pilothouse windshield, is open to the main saloon area below. This is very effective architecturally when sitting below as well as when in the pilothouse. Note the two handrails to use for traversing the companionway ladder at sea. The sailing instruments are positioned so that they are visible from both sides of the pilothouse and from the cockpit area.

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Above: A control panel is let into the face of the port nav cabinet for keeping track of various functions (alarm and otherwise) when on watch. From here we can monitor the bilge pumps, ballast pumping system, fuel day tank signals, etc.

Left: On the starboard side we have the engine panel. Here also are the circuit breakers to control gear that is normally switched when on watch (such as deck lights and electronics).

Right: With a controllable pitch prop, it's important to keep an eye on the temperature of the diesel's exhaust gases, as well as on the pitch angle of the prop.

The upper meter is a pyrometer with a probe inserted into the water injection elbow of the diesel engine. The temperature of the exhaust is the best indicator of the work the engine is doing.

As pitch is adjusted you keep an eye on the exhaust gas temperature to make sure it does not get too hot (which would indicate you are "lugging" the engine).

Left: Here's another view of the pilothouse furniture, looking up from the saloon. The seats and navigation cabinets are supported by a cantilevered aluminum beam that has been welded through the coamings. With no vertical supports, the area under the pilothouse is clear when looking through the main saloon, galley, and office — a big visual advantage.

Below: The office is along the starboard side of the hull, aft of the saloon. A long, high work surface is good for spreading out drawings, computers, video equipment or charts. A substantial amount of storage space exists beneath this work surface, as well as above it in the bin lockers.

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Above and right: At the aft end of the office counter is an athwartships seat, allowing you to look forward when working. As the work surface is 36 inches (0.9 m) high — an ideal height to work when standing — the seat is elevated slightly. This offers an excellent view out of the windows.

The galley is opposite the office and runs down the port side of the hull. Bin lockers on top provide ready access to cooking gear, dishes, and supplies. The lower lip of these lockers is 3 inches (75mm) high, creating an effective fiddle rail at the edge to keep the contents in place when heeled.

Counter tops are Corian. The counter fiddle is 4 inches (100mm) high, except in front of the sink where it is trimmed down. The polished stainless sink is mounted under the edge of the Corian counter material.

At the forward end of the galley, the counter turns inboard in an "L" shape. Here a stack of drawers face fore-and-aft, eliminating any problems with heeling.

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A large fridge and freezer box is located on the inboard side of the galley area.The fridge/freezer doors are built heavily to withstand the hinging and clamping pressure necessary to keep the edge seals tight.The fridge has a single gasket, while the freezer door has double gaskets.

Aft of the fridge/freezer box is a large area used as a pantry. Since the space is rectangular in shape, adjustable-height shelving can be used, set on stainless steel vertical tracks.

On the opposite side, in the office, this space is used for the electrical panel and related gear.

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Above: The "Owner's Suite" is located forward of the saloon. A step outboard of the bunk (shown to the right in the photo) makes it easier for the person sleeping outboard to get up at night without disturbing his or her partner. This step also simplifies the process of making the bunk.

However, there are some tradeoffs. For one, when sailing on starboard tack you do not have that nicely padded hull to lay against. Another problem is visual space. Moving the bunk toward the opposite side to make room for the step reduces sole space as well as visual sense of interior volume. However, *Beowulf* is large enough to accommodate the reduced floor space.

Note the large door opening into the saloon. It is 36 inches (0.9 m) wide. This brings the stateroom area and saloon together visually, enhancing the spaciousness of both.

Left: Opposite the bunk is a simple low seat with a table at the forward end (good for a TV). There are no lockers in this cabin since there is plenty of storage space forward in the "dressing room". Keeping furniture to a minimum in this area allows more aesthetic design freedom.

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Under the bunk is some prime bulk storage space.The problem in the past has always been efficient access.This time we made the entire top hinged, rather than using small cutouts. Now we can stow large objects like a TV or a computer monitor.The hinged section is supported by struts when raised, so we can rummage around at leisure — much better than wrestling with a bulky mattress.

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Rather than use a pocket (sliding) door, we decided on a single, large, hinged door with the top and bottom cut away for ventilation. This creates visual privacy, while maintaining a good airflow throughout the boat. The hinged door also stores more easily, which makes a very wide opening (in this case 36 inches/0.9 m) possible.

The door is held open and locked against the bulkhead by this simple swinging hook. Since we usually cruise by ourselves, the door is almost always in this position.

The door folds down the center for storage against the outboard section of the bulkhead. The bottom is cut up from the sole so that it swings over the outboard seat.

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A key design factor in the forward sleeping cabin was the fact that we had space forward for a "dressing room" where easily accessed storage would be located. Clothing is kept in a combination of open shelves and wire frame baskets (under the counters), both of which provide excellent ventilation and are light-weight. The total area is long — 8 feet (2.4 m) — but the sole area is restricted by the counters. Thus the space can be used at sea in moderate conditions.

A combination washer/drier is beneath the cabinet at the forward end of the space. It slides aft for maintenance.

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The guest cabins are located aft. On the starboard side is a double bunk, 48 inches (1.2m) wide at the head. Each cabin has a hanging locker at the forward end, a vanity with a sink, and en suite toilet area aft. Between the two cabins is a shared shower.

The aft toilet area has open shelving on the inboard (shown here) as well as outboard sides. This provides lots of space for clothes, linens, towels, and personal items. It is light in weight and, most important, well ventilated.

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In the port aft cabin we used upper and lower single bunks. Outboard of the bottom bunk (above the ballast tank) is a long shelf used for storing guitars and other critical cruising gear. The toilet compartment for this cabin opens via a watertight door into the engine room.

The pumping systems for the interior of the boat are located under the vanity where they are easily accessed. They are partially blocked from view by an Acrylic plastic panel which is removed and set on one of the bunks when you need to do maintenance.

At the forward end is a 60 GPM (230 liter) electric pump plumbed into the keel sump. This is operated by a float switch (or with a manual override). Then there is a regular diaphragm pump for the keel sump and for emptying the aft shower and wash basins. Finally, you have the pressure water pump and its accumulator tank.

With this approach, you can hear the pumps running. This lets you know when something is wrong in a most expeditious manner.

In the aft cabins we had a difficult transition between the vanity fiddle and the large radius of the shower unit. We solved this by holding the top edge of the fiddle back from the intersection.

Hatch coamings are always difficult to execute. In this case the timber was brought just inboard of the hatch base casting. A notch was then carved for each hatch dog.

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Despite the fact that we were building to a very tight weight budget, we used a lot of solid timber (rather than veneer). This timber, however, is quite thin. Here we see a full-sized view of the edge of the office counters, typical for all horizontal surfaces, including soles. There is 3/16 inch (4.5 mm) of solid teak epoxy glued to 1/4-inch (6mm) ply substrate. The solid teak looks much better than veneer, and allows for a mistake or two to be repaired.

A fiddle and locker door detail. Note the slight raised panel effect on the door, and how the routed edge is feathered at the corner. The fiddle is tapered on its edge, a nice visual effect.

A shipwright's work of art. The first step in the companionway is let into the top of the fridge box. This presents a number of difficult transitions between different planes of timber. We didn't even try to design this, but instead trusted Kelly Archer's skills and aesthetic instincts. The results speak for themselves.

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Systems Changes

The basic systems aboard, fridge, diesel heater, water heater, and the small watermaker all worked quite well. Our Balmar genset, however, was a big disappointment, operating for less than 20 hours on the whole trip. The little Kubota diesel itself was fine, but the alternators kept burning up.

As we looked at various remedies we realized that one of the major issues in terms of performance would be how much fresh water we carried. We had plenty of tankage to allow us to do without the complexity of a watermaker. However, we'd grown to love the lively feel of the boat when she was light and so decided to re-engineer our systems so we would feel comfortable carrying minimum fresh-water inventories.

Toward this end we acquired a 50-gallon-per-hour (194 liter) Village Marine engine-driven watermaker.

We then went back to our old friend Bob Sampson at Electrodyne for a pair of his highly efficient and bulletproof alternators. With remote-mounted diodes (to remove heat from the alternator casing) each unit would put out 322 amps at 28 volts, or *9 kilowatts* of total charging power!

After looking at various diesels we selected a 4-cylinder 50-horse Yanmar to power the alternators and watermaker. Running the engine at 1,700 rpm gives us plenty of power to handle these loads. Yes, we were adding about 220 pounds (100 kg) to the engine room, but we'd be saving a ton and a half by keeping our tanks light when we passaged.

Revised Displacement

By now you might get the idea that we like the way *Beowulf* sails. The problem is that once you get used to one level of performance (in terms of comfort and speed), the performance becomes second nature and you want more.

When we left California, with full fuel and water tanks, all our boatbuilding tools, and several tons of boatbuilding supplies (not to mention four months of food for four people) we were sailing right at our projected cruising displacement. The boat felt great.

By the time we'd reached New Zealand, the fuel tanks were just about empty, we'd eaten the last of the beans and peanut butter, and we were quite a bit lighter. And where *Beowulf* had felt good leaving California she now felt incredible under sail and power.

When we worked through the changes in the interior and engine room we found that if we were careful, we could end up going back in the water at a lower cruising weight than we'd come out. Yes, we were adding a ton and a half in the interior, engine room and some other areas. But by eliminating the boatbuilding stuff we'd carried, and by keeping freshwater tanks light when we were passaging (with our small watermaker as a backup) we'd be sailing *under* the original design displacement.

The Next Boat

There's always a next boat in our minds. And during the 8,000 miles of trials as we watched *Beowulf* perform her ballet with the sea, there was a running commentary on what could be done to improve her comfort, performance, and ease of handling.

With every other design we've done by the time we'd finished sea-trials I would have a notebook full of little things I'd wanted to change the next time. In the case of *Beowulf*, with the exception of some interior refinements and a couple of systems changes there's nothing on the list.

Skip and Melinda, however, were determined to test the concept a bit further. After following the design progress of *Beowulf* and then her building for several years they decided that they'd like a sistership. They put *Sundeer* on the market and before the ink on the listing was hardly dry she was gone.

We've changed their boat in a couple of minor ways. She has a slightly larger engine (230 horse compared to 170 — built on the same block) and a larger Hundestadt (VP3 model instead of VP2). To accommodate the larger Hundestadt the engine room has been lengthened 2 feet (610 mm). The hull shape has been changed ever so subtly to allow them to carry a bit more payload than we like to have with us.

The biggest change is in draft. Their boat will draw a little less (6.5 feet/2 m).

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Mattresses have 3/4 inch (19mm) of space around the edges to allow us to tuck in bedding.

Handrails are strategically placed throughout the interior. By using stainless steel we were able to reduce diameter, as well as increase the length of the offset between handrail and support base. This makes the handrails much easier to use.

The gap between the windows on the hull side and the interior panels is filled by a molded fiberglass ring, painted to match the fabric on the hull panels.

We splurged on weight for the aft vanity and galley sink counters. This 1/2-inch (12.6mm) Corian is supported by 1/4-inch (6.3mm) ply cut out in the center. This adds a very nice feel and is practical as well. The total hit weight was just under 35 pounds (16 kg).

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Beowulf at speed, during sea trials, after her interior fit out was completed. She is reaching at 13.5 knots in 18 knots of true wind.

In order to make the main and mizzen easier to handle when furling, we will add boom racks to contain the sail between the lazyjacks. The construction of the reef patches will be changed to soften these now very stiff areas. We are also going to eliminate one of the reefs, as their use seems problematical.

But in terms of basic systems, interior layout, and rig, the boats are identical.

Where To From Here?

With a completed *Beowulf* awaiting the open sea, we are not sure where we are headed. What we do know is that we'll be heading there faster and in more comfort than any sailor has a right to expect. If you see us anchored nearby, come by for a get-together.

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Ancient history to the present, stern to stern. *Wakaroa* (left) was one of the first in the Deerfoot series. *Beowulf* (right) is our latest design. Underwater they are radically different. *Beowulf* weighs about 3 tons less than *Wakaroa* in light ship trim, yet has 10 feet (3 m) more waterline length. Both boats have similar waterline beam, but *Wakaroa*'s half entry angle is 14.5 degrees, compared to *Beowulf*'s at 10.9 degrees. *Beowulf* is far more powerful, with righting moments at 30 degrees on the order of 230,000 foot pounds (32,000 kgM), while *Wakaroa* has half of this righting moment.

Wakaroa makes very fast passages, averaging right around five days for the 1,200-mile trip between New Zealand and Fiji. *Beowulf* did the same passage in 1995, in light airs, in 4 days, 3 hours. The boats are both easy to sail, although *Beowulf*'s higher stability factors mean she requires less changing of gears as the breeze heats up. Under power, *Wakaroa* cruises at 8 to 9 knots for about 1,000 miles. *Beowulf* cruises under power at 11 to 12 knots and has a 2,000-mile range.