VORTEX

A Swede 55 reinterpreted in wood

by Mark Malone

This new cruiser/racer sails smoothly and easily at 10 knots, tacks through 70° or less, cleans up in the races, and proves that some designs for fiberglass are worth a second look—in wood.

Most of us are familiar with the fiberglass boats that have been built from classic wooden boat designs: Friendship sloops, Herreshoff 12½s, Ingrids, and many others. But now that cold-molded wooden boat building in its myriad forms is so much in vogue, I wonder if we will begin to see a number of wooden boats being built from well-proven 'glass designs. Cold molding's flexibility allows it to reproduce the tight compound curves many fiberglass designs require, and coupled with its unparalleled rigidity, this opens wide a relatively new body of existing designs for reinterpretation in wood.

Steve White and his crew at Brooklin Boat Yard (Maine) recently turned out such a boat. Her name is VORTEX, and she is the first (to our knowledge) wooden Swede 55 in the world.

She is finished now and has sailed her first season with considerable success. In retrospect, it is amusing to think that in the beginning, Steve and Laurie White imagined that building a fast cruising boat for themselves might make a nice weekend and after-hours project. Nice, indeed. Seven thousand man-hours later, VORTEX lies prettily at her mooring, her beauty and detail announcing to all, "I am no weekend project." From a photo taped to the refrigerator door, her transition to wood and epoxy and paint involved a dilating commitment from her builder.

As modern designs go, this is an unusual boat in that she is designed purely for efficiency. The "55" in her name does not refer to her overall length, but rather the number of square meters of rated sail area she carries. Boats such as this—designed for level competition based solely on sail area—allow the designer a very free hand. They tend to be long and narrow, with low freeboard; in these respects, the Swede is no exception. Similar in shape to the Skerry cruiser, she is 52'6" long, with a beam of 10'. Her maximum freeboard is only 43".

Benjamin Mendlowitz

The Swede 55 was designed by Knud Reimers in 1975 for construction in fiberglass. Thirty of the boats were built by Fisksatra Varv in Västervik, Sweden, over the next seven years, a fairly good production run for a boat of this size. They proved fast and weatherly as cruisers and have acquitted themselves well around the marks both here and in Europe.

I suspect, though, that even with all this success, Reimers may not have been entirely satisfied with those boats. For one thing, they turned out to be several thousand pounds heavier than he intended. The builder had made the hull scantlings a bit heavier than designed, and then appointed the interiors with large quantities of teak cabin furniture and a teak interior liner. As built, the fiberglass boats sit some 4" below their designed waterlines (such changes tend to make a designer hot under the collar). Since Reimers at least once referred to the Swede 55 as his favorite in a long career of designing, perhaps it is fitting that it be tackled once again.

A fan of long, narrow sailboats, Steve had read an article about the Swede 55 in *Nautical Quarterly* (No. 6), and had tracked down CORSAIR, one of the earlier Swede 55s to be brought to this country. CORSAIR's owners ended up moving the boat to Brooklin Boat Yard for her annual winter storage, and Steve and Laurie enjoyed some cruising time aboard her. In November 1984, Steve contacted Knud Reimers and told him he wanted to build a wooden Swede 55.

Benjamin Mendlowitz

Reimers was delighted. He had a few ideas about how the performance of the Swede could be improved. Among them, not surprisingly, was the admonition to keep the boat as light as possible. He also told Steve that he suspected the boat would be a bit faster if the keel were deepened 4" and the lead weight increased 650 lbs, for a total of 8,200 lbs of lead. Reimers was in his 80s then, but had still been fiddling with his pet design. (Come to think of it, was there ever a designer who considered any design truly finished?)

Before construction began, Steve lofted the Swede's lines on Mylar film and then began modifying the drawings to suit cold-molded construction. Interestingly, he lofted only the body lines and the bulkheads that were not on stations. I would have thought that there would be a price to pay in hull fairness, but VORTEX's fair hull proves this is an acceptable shortcut (although not for amateurs) if the building crew is knowledgeable and talented enough—and if the designer has done a careful job of providing an accurate set of offsets. A new interior layout was designed, based on the original bulkhead positions. And a new sheerline was drawn; the wooden Swede would have a real wooden toerail, not an aluminum extrusion bolted to her deck.

Construction began in earnest in November of 1988, squeezed in around the busy yard's normal workload. The hull was built upside down, with strip planking comprising the first layer, the strips laid over permanent bulkheads at some stations and over molds at others. I've always thought that using bulkheads as molds wherever possible would save time building a hull. And indeed it does, up to a point. There are fewer molds to make up, but the early installation of permanent bulkheads slows down the sanding and finishing of the interior surface. I wonder which method is really faster?

The ¾ × 1¼" cedar strip planking was followed by a layer of ⅛" mahogany veneer, laid perpendicular to the centerline, then two additional ⅛" layers laid on opposing diagonals. There are no longitudinal stringers to collect water on their tops, and the backbone is flush and flat where it meets the bilge, leaving no bumps or crevasses where water might collect. All gluing was done with WEST SYSTEM brand epoxy.

VORTEX has some interesting structural details. Her wooden keel, for instance, is laminated mahogany, but one of the layers is marine plywood. Steve had noticed that on some of the older high-performance fin-keeled boats he came across in his repairwork, the laminated mahogany keel had cracked along the grain lines under stress caused by the ballast

weight. If excessive flex had caused the cracking, he reasoned that the cross-grain strength of a layer of ply might take a bit of the burden off the mahogany. We'll see if he's right in 20 years or so. I imagine he is.

Beneath the cabin sole, there are seven bronze floors bolted and bonded athwart the keel, running up the inside of the hull. The two farthest forward and aft are bolted to the main bulkhead and the bulkhead at the division between galley and saloon. The others are attached to the bunk fronts. The bunk fronts, in turn, run fore-and-aft between the two bulkheads and create a longitudinal girder in the center of the hull. Here, too, the idea is to distribute stresses created by the deep, heavy ballast keel.

There are four watertight bulkheads in the boat. The two main bulkheads are foam-cored, with ½" plywood facing on both sides; the others are solid ply. All joinerwork is bonded to the hull to provide maximum strength and rigidity. VORTEX's deck is a single layer of AA marine-grade fir plywood, made by Simpson, scarfed to length. Her coach roof is laminated out of three layers of light gaboon plywood, and the cabinsides are made up of 1" solid teak, bolted and bonded to the deck.

She is a nicely finished-out vessel, modern in every detail but without the sterility so commonplace in modern high-performance boats. Below, the boat has a bit of the feeling of a new Maine summer house; all the woods visible in the interior are local to Maine. The deckbeams and sheer clamp are spruce, the trim and drawer fronts are locust. All are blonde woods finished satin, so the interior is light and cheerful, with none of the funereal atmosphere of bright-finished interiors made of darker woods.

I like the interior, but for those used to beamier boats, I suppose it must seem a bit spartan. There is the usual V-berth forward—in fact, a large and roomy one. Just aft, the head is full width—unusual in a 52' boat. But instead of crowding a head and passageway in the same space, this allows a large head and a cleverly arranged shower.

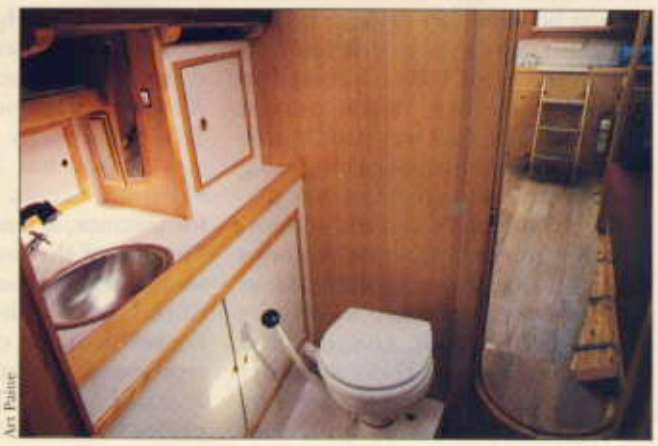
The main cabin is pure vanilla: two long settees, with a galley aft portside and a chart table aft to starboard. True, this does not constitute a palatial interior, but what's there is nice and solid. There is none of that spongy feel to the interior joinery one often encounters on a boat where weight-saving has been paramount. There are no flimsy lightweight plastic lighting fixtures or bits of trim that might look more at home on a house trailer. Still, her cold-molded construction meant that with no great effort made in the direction of weight savings, she came in a ton or so lighter than her 'glass step-sisters.

There is a very small after cabin accessible only from the cockpit. It has just sitting headroom and no floor space, the entire sole being covered with cushions forming an extra-large berth. The cockpit is a two-part affair, separating the helmsman from the main cockpit with a crossbar supporting the mainsheet traveler. The mainsheet winch, genoa sheet winches, and running backstay winches are within reach so the driver can tweak to his or her heart's content. That crossbar, by the way, houses two stereo speakers that produce an arresting, seemingly sourceless sound quality—lest we forget that this boat was meant for pleasure.

Beneath the cockpit sole, there is a Westerbeke 27 turning a folding prop. Can you imagine a modern production boat of similar scale with an engine so small? The little motor pushes the boat at 7.2 knots all out and 6.5 knots at cruising revs. So who needs a bigger engine?

The rig is rather small, too—a dainty 800 sq ft, in fact. Two can handle it without much trouble. But then, the rig doesn't need to be very big, because VORTEX only weighs 18,000 lbs and has little wetted surface on a 41' waterline. She is seven-eighths rigged. Hence, the headsails are small, smaller in fact than those frequently seen on 40-footers these days. She has running backs and double spreaders. True, the bendy rig does have an extra line or two to tweak, but tweaking on a boat like this brings such delightful results, one doesn't really resent the extra work. The spar was made up by Metalmast in Connecticut and then

Art Paine



Art Paine

VORTEX's interior is light and cheerful. Most of her joinerwork is bonded to the hull to provide maximum strength and rigidity. Her roomy, full-width head (right) does double duty as a passageway.

Art Paine

Modern gear and a divided cockpit designed for both comfort and function make VORTEX a pleasure to sail, even with a shorthanded crew.

shipped up to Brooklin overland on a very long trailer.

All of this amounts to what seems to me is the nicest advantage of a fine, easily driven hull: The boat's various systems can be so small and simple, so easily controlled. There are compromises here, for certain, but as a whole, the dance of compromise that resulted in VORTEX has been danced subtly and well.

Yes, it all fits together. This could be a cruising boat, and not nearly so extreme as she seems at first glance. I will be the first to admit that she is a different sort of cruising boat, but wouldn't most cruising sailors—given the choice—like their boat to sail smoothly and easily at 10 knots and tack across 70° or less?

Her performance to date has been little short of spectacular. Bearing in mind that no one had the slightest idea of what to expect of this design at anything close to her intended weight, I think all who have sailed on her have been impressed. Already, I've had a few rides on her I won't forget. Once, heading upwind with full main and a blade jib, we overtook a large auxiliary motoring at full tilt dead into a stiff breeze. We were tacking across 65° and bashing along at about 8½ knots. What delight! All this on a sunny afternoon with Jimmy Buffett on the stereo. OK, we had a sailmaker on board tugging at a line here and there, but the point is, this is a very fast boat.

And graceful. She makes extraordinarily little fuss as she moves through the water. At 8 knots, she leaves only the faintest quarter wave behind her. Several times I've had the peculiar experience of going below while the boat is reaching along in smooth water at 8 knots or so, and slowly, while chatting with someone down there, losing the sensation of movement. I had to poke my head out of the companionway to assure myself that we had, indeed, not stopped. The cabin is nearly silent. You can only just make out the sound of the water rushing past her hull by listening for it. Very civilized, and another result of her fine, fair hull.

Steve campaigned her a bit last summer and has shown a good deal of transom to his competitors. In the Eggemoggin Reach Regatta (Brooklin, Maine), she crossed the finish line first, but Steve disqualified himself from winning because, in his opinion, the old Off Soundings rule they race under cannot fairly rate fin-keeled boats.

In the New Bedford (Massachusetts) Heritage Days Race, she was the first boat to finish that completed the correct course. There seems to have been a bit of confusion there; a third of the fleet missed a mark.

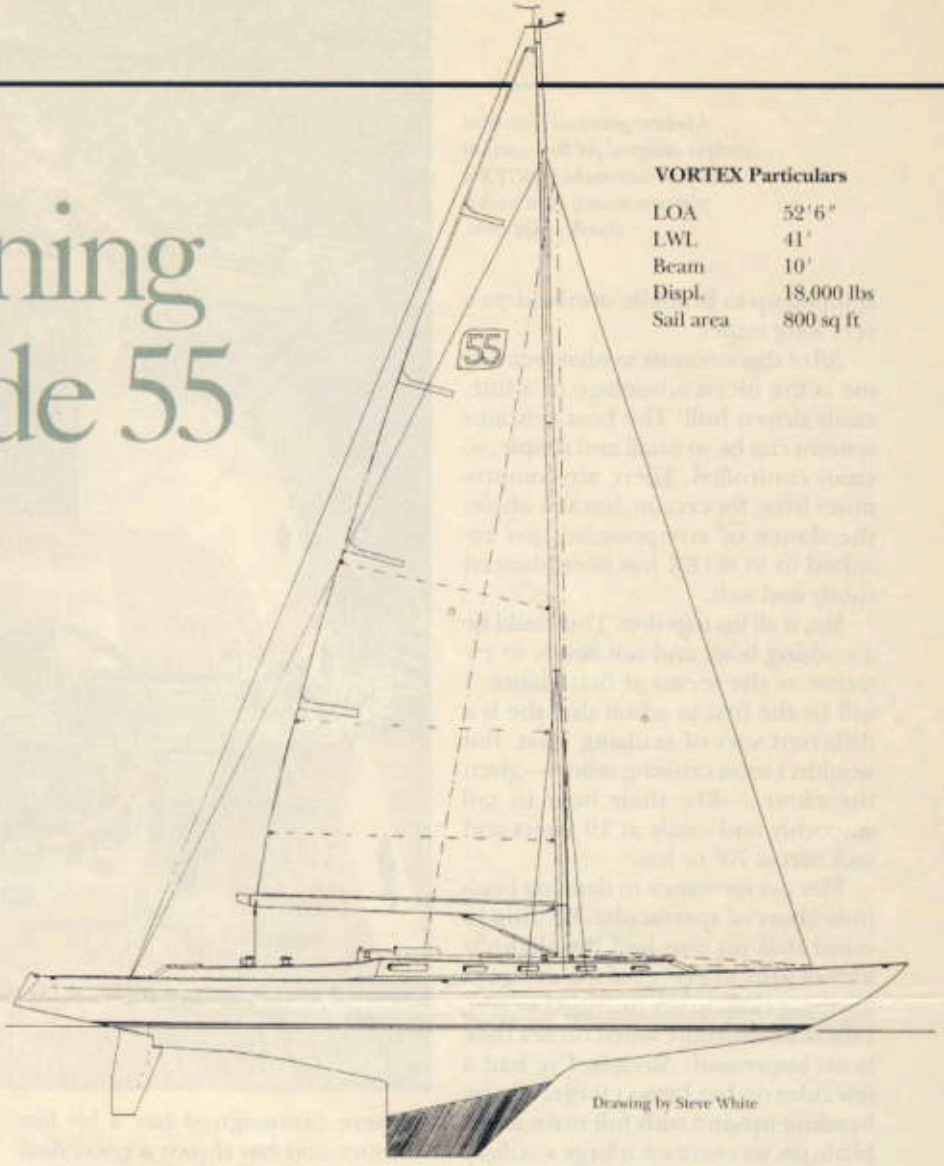
In the Museum of Yachting's Classic Yacht Regatta (Newport, Rhode Island), Steve entered VORTEX with the intention that she should be an unofficial participant. He knew VORTEX did not really fit the Museum's criteria for a "classic boat" in that she was designed some years after the rules allow. However, some miscommunication between the various committees arranging things resulted in her being an official entry. All this wouldn't have mattered much, except that VORTEX won Class B, was first overall in elapsed time, and first overall on corrected time. When called to the podium to receive his various awards, Steve tried to explain and surrender his claim to them. By then, though, the mistake had attained the patina of policy and VORTEX was required to keep her silver. We should all have such troubles.

As I write this, it's the end of VORTEX's first summer and I'm looking at her from a stretch of quiet water in Center Harbor. What fantasies she calls to mind! Sitting in the cockpit of my own boat (which suddenly seems very short and squatty to me), I let my mind wander, and in a moment I am at VORTEX's helm, reaching past the Rock of Gibraltar. I have one eye on the knotmeter (which reads 12 knots) and the other on the blue horizon ahead. I am on my way to the Italian Riviera. Or Sardinia. Or both—it's my fantasy—we'll go where I like.

Mark Malone is a screenwriter who lives in New York City.

Redesigning the Swede 55

by Art Paine



VORTEX Particulars

LOA	52'6"
LWL	41'
Beam	10'
Displ.	18,000 lbs
Sail area	800 sq ft

Drawing by Steve White

Yacht designers are often asked if a particular boat has been "designed for wood," or for "cold molding." The fact is, it's a rare design that can't be built from any number of materials. We've seen many older designs reinterpreted in fiberglass, but why would anyone be tempted to go back in time to the material of yesteryear, as the Whites have done? Now that VORTEX is out there showing her stern to almost every vessel in sight—including her fiberglass sisters—I believe you can make a good case in favor of wood construction (without even alluding to waterlogged non-isophthalic resins or, heaven forbid, blisters).

Considering Wood

The limiting factors involved in a boatbuilder's choice of material involve the physical properties of the stress-bearing surface of the hull. Every material that can be formed into a watertight surface will exhibit a ratio of strength to weight. Strength can be analyzed according to factors such as tension, compression, shear, stiffness "modulus," etc. Wood is very strong for its weight in all the applications common to boatbuilding. Any competent yacht designer can easily measure off the hull surface area of a design and apply this to an existing weight study, or even to an educated guess of the proportion of weight that must apply to the hull, in order to advise on the wood option. I think it's safe to say that only with very recent fiberglass "composite" designs ("cored" with balsa, foam, or a honeycomb material) would there be reason to doubt that the design could be built in wood.

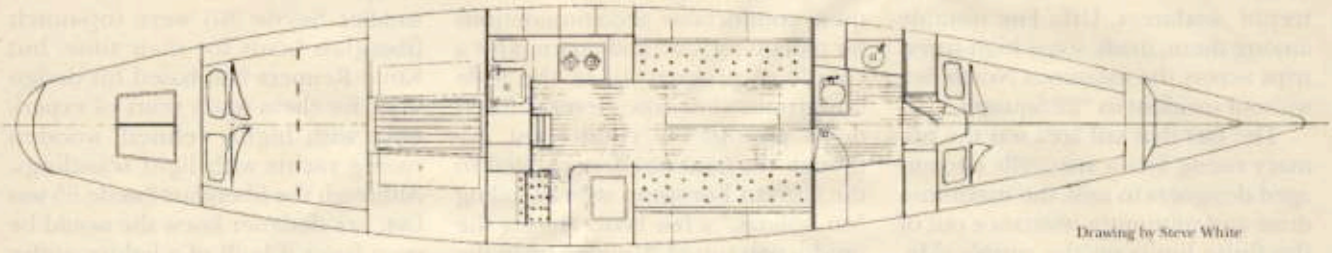
Certain hull shapes are more easily fashioned out of wood than others, and here it is important to draw the distinction between traditional plank-on-frame construction and cold molding. If carvel planking is your intention, it would certainly be wise to choose a design intended for conventional wooden construction. Cold molding, on the other hand, allows more highly sculpted shapes. (The IOR Rule encouraged some rather extreme bumps and hollows, and some very competitive boats were built by cold molding.) Another determining factor in choosing between framed and monocoque construction might be the accommodation plan. A great deal of interior space is sacrificed by building over a backbone framework. Switching to cold molding will enlarge all the cabin spaces. Even with traditional plank-on-frame construction, the use of the latest high-strength materials can make significant improvements in terms of weight, watertightness, appearance, and durability.

Choosing a Design

Given that there was a world of available yacht designs in existence that could easily be converted to cold-molded construction, how did the Whites settle on the Swede 55? When I asked Steve that question, he said that while most people factor in dozens of criteria when selecting a boat, he and Laurie agreed that for them, just two were important—speed first, beauty next. They wanted a boat that could really go—up and past the 10-knot figure. That cut down on the choices drastically, because above all else, you've got to go long to go fast.

Long and skinny would produce the speeds over 10 knots that the Whites wanted, but they were also looking for a boat that wouldn't seem out of place where they live, which happens to be dead center in the sanctum sanctorum of wooden boat heaven. One design whose looks really appealed to them was the fiberglass

VORTEX's Accommodations



Drawing by Steve White

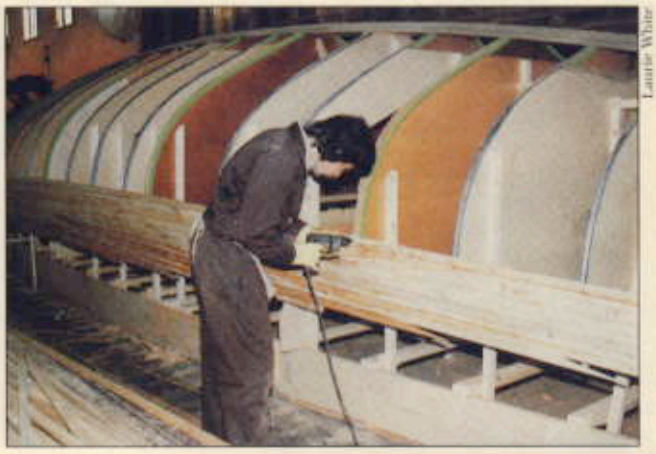
Swede 55. Despite the fact that the boat had never been built in wood, it was, in fact, derived from a whole generation of traditional wooden cruising and racing boats in Sweden.

The Development of the Swede 55

The original progenitor of the Swede 55 were much smaller sloops intended strictly for cruising. As early as the turn of the century, Sweden had a cadre of summer rusticators who cruised under sail among the "skerries" (small islands) along Sweden's rockbound coast. Their "Skerry Cruisers" were large on deck space and scant on interior appointments. Even before they began to be raced, the boats had evolved in the direction of extreme length and narrowness. Freeboard was very low. These factors, taken together, point to the fact that the waters they sailed were generally protected from ocean-scale seas, and the summer breezes were fitful most of the time. Early drawings show that the boats were never intended to accommodate an overnight party of more than two. Their cockpits were small, necessitated by low freeboard that made a roomy, self-bailing cockpit out of the question.

Inevitably, whenever very similar boats ply limited waters, a sort of Darwinian competition among the species ensues, speeding up refinement of the type. Competition also seems to spawn racing rules, and though rule-bashing seems to have been the order of the day in the yachting press ever since the inception of the IOR, any observer will have to admit that the Swedish rule under which the Skerries were handicapped led to the development of an improved species. Limiting crew to two was probably the original inspiration for what has to be one of the simplest and most successful racing handicap rules in history. The boats were already long, light, fast, and easily handled. Not wanting to alter a good thing, the measurement rule was tailored to the boats as they were, limiting only sail area. Was it any surprise that the extremes of length, narrowness, and low freeboard were tested further? Although eventually a few circuit breakers had to be added to the "Square Meter" (of sail area) Rule in order to hold outright radicalism in check, it's still clear that the rule encourages good shorthanded boats by minimizing the physical exertion of sailing without discouraging speed in any way.

Because a sail area of around 22 square meters encouraged a hull of moderate proportion and thus cost, at a size ideal as a weekender for two persons, the "22 and 30 Squares" eventually became the most popular racing classes in the Baltic. This spread of sail on the typical deep-keeled sliver produced a boat that was so easily driven on the momentum of its self-generated wave system that it could glide through the wind shadow of the hundreds of skerries. Very close-winded, with tiny jibs that could be tacked instantly, the boats could handle a sudden header



Laurie White

The hull was first strip planked over molds and permanent bulkheads. The two main bulkheads are foam-cored; the others are solid ply.

Laurie White

The exterior layers of cold-molded veneers extend from the sheer down to and over the deadwood, adding strength along the centerline.

by the captain's belated utterance of, "Ahem, hard-alee!" I suppose I'd be remiss not to mention that some intrepid seafarers, Uffa Fox notable among them, made some high-speed trips across the infamous North Sea without incident in "22 Squares."

The fact that sail area was the primary rating factor naturally encouraged designers to milk the maximum drive and minimum resistance out of the finite limits on the supply side. High-aspect-ratio sails with hollow masts that curved at the top into the theoretically perfect ellipse began to drive costs of the popular 22- and 30-Square-Meter racers to an extreme. Rating rules that fail to limit cost (virtually all of them) are destined to fail in the long run. Cost of construction was a major reason for the demise of the wooden meter boats after World War II.

Knud Reimers was the designer of choice during the salad days of the European meter boats, and in 1975 he drew an enlarged Skerry boat for production in fiberglass. Because it had 55 square meters of sail, it was called the Swede 55. The boat encompassed all of the fine aesthetic and performance attributes of its forebears, but was large enough to enclose quite comfortable accommodations for parents forward and quarters for a couple of progeny aft in the little bunkroom that was cleverly fitted down around the rudderpost. Although the boat was better suited to the spartan European style of sailing "on holiday," a few boats among the production run of 30 ended up in the United States. The Whites had the opportunity to sail one on their home waters and felt that it perfectly suited their qualifications for a high-speed cruiser that might be capable of standout performance around the classic regatta circuit.

The Redesign

Almost a generation of fiberglass boats was built very heavily with mat and roving—bulletproof, but heavy in the ends. Many of the hulls were more flexible in panel strength than the wooden boats they were replacing. By 1975, when the Swede 55 arrived on the scene, the state of the art had improved, although only a few designers of Grand Prix racing boats had started experimenting with lighter composites. The Swede 55 (and the smaller Swede 30) were top-notch fiberglass boats for their time, but Knud Reimers had based his design work for them upon years of experience with highly refined, wooden racing yachts with light scantlings. Although the fiberglass Swede 55 was fast, her designer knew she would be even faster if built of a lighter, stiffer material.

I don't think there's a designer living or dead who wouldn't jump at the opportunity to take his or her one favorite boat and, after cruising and competing in her for a few years, go over the concept with a fresh eye and a clean-slate budget. In a sense, that's what happened when Reimers got that first overseas phone call from Steve and Laurie White.

Steve knew he could build a lighter boat in wood, and was in substantial agreement with Knud Reimers regarding the changes that would be made. First, he would try to lighten the boat as much as he could, consistent with reasonable strength. Second, some of the weight savings could be applied to a heavier keel. And third, they would lower the VCG of the design by dropping the ballast a few inches. Most of the other changes were minor ones that would give the boat a "custom" wooden appearance to make her stand out from the fiberglass models.

Steve began the hull with strip planking, using locally available cedar, and then sheathed it with vertical and diagonal ⅛" mahogany skins. Carefully bonded and filleted bulkheads located no farther than 7' apart provide backup to the stiff wood skin. Even though this construction created a significant weight savings, Steve feels that the hull is so brutally strong that at least one ⅛" lamination could have been skipped.

Like any other laminated plywood hull, VORTEX required a far less massive backbone than a traditionally planked boat. In order to eliminate the theoretical weakness of having all the wood grain oriented in one direction in this critical stress-bearing member, the builder incorporated a layer of plywood in the lamination schedule. The athwartships veneers in this plywood layer help distribute

Laurie White

Seven bronze floors are bolted and bonded athwart the keel. Two are bolted to bulkheads, and the others attach to berth faces, creating a longitudinal girder.

Laurie White

Moved outside to be turned over in the Travelift, VORTEX gleams with a coat of slick VC-17 bottom paint, a Teflon-based formula with powdered copper, distributed by Courtalds Coatings.

any strains from one side of the hull to the other as well as inhibit any tendency for the backbone to split. External laminations continue as part of the skin from the sheer all the way down over the deadwood to the lead keel. By fully encasing the layers of deadwood, water intrusion is retarded and the veneer's fiber strength is applied more or less in the direction of stress, overcoming any tendency of the heavy ballast to hinge off the underbody.

The bonding of all bulkheads to the inner hull is a standard construction technique for any boat that is predominantly strip planked. It was relatively easy to make several of these in VORTEX watertight, so they could serve as collision bulkheads.

The Performance Payoff

If there is one condition in which the Skerry Cruisers have performed marginally, it's been in light air. But by judiciously avoiding weight and windage in the rig; employing double spreaders, mid- and check stays; and sparing little expense in the Mylar headsails, Steve supercharged VORTEX's light-weather performance. But the only real surprise with this long-legged boat is that she's so easy to sail. Much of this is due to the fact that well-designed, modern hardware really shows its stuff on a boat with moderate sail area. VORTEX is capable of surging along in heavy air with the knotmeter needle doing a metronome imitation between the number 10 and 15—without anyone doing acrobatics.

Although I gather it was the Whites' intention to keep the boat, they have fallen victim to their own success. There is no further necessity to tune and tweak VORTEX to the point where she'll win most of the classic regattas in her area. In her first season, she already did that! The process of taking an unknown and combining it with the skills of designers, builders, and sailors has been so much fun that Steve and Laurie and their crew at Brooklin Boat Yard are ready to do it again. There are plenty of good designs well worth trying—in wood.

Art Paine is a yacht designer who also captains yachts in the summertime and manages a wide variety of boatbuilding/restoration projects during the winter months. He lives in Bernard, Maine.

WoodenBoat Design Competition

In Search of the Perfect Skiff

We would like to thank the 149 readers who took the time and creative effort to respond to our call for entries in the Perfect Skiff contest. The quality of their designs is tremendous, as you will all witness when we announce and publish winners' entries later on this year. The judges have their work cut out for them!

John Vieira, Jr. (MA), Thomas Hill (VT), W.H. Sands (MD), Robert Steward (FL), T.C. Martin (Australia), C. Raymond Haig (RI), A.J. Watty (Canada), Robert Tabb (MD), Wayne Oliver (New Zealand), Hohn Holtrop (CA), Jim Michalak (IL), Mr. and Mrs. Howard Williams (Canada), D.B. Munro (Canada), Kenneth Brown (MI), Douglas Gait (Canada), J.B. Farmer (KY), Harold Bryan (Canada), Brad Rice (WA), Ed Frost (NJ), Gabriel Heyman (Sweden), John Hedberg (Sweden), Göran Hjort (Sweden), D.W. Murray (Scotland), John Teitscheid (FL), Charles Perkins (WA), George Cooper (MA), Dennis Rushforth (WA), John Hesp (England), B. Migchelsen (NY), Luc Casaer (Belgium), Philip Bolger (MA), Seward LaShomb (CA), Tom Doane (MA), David Train (VA), Steven Rogak (Canada), Douglas Peterson (CA), Marc Pauls (MO), Jefferson Chapple (New Zealand), John Thomson (NY), Don Kurylko (Canada), Charles Strayer (FL), Karl Stamhaugh (MD), Ronald Noe (CT), Walter Scott (FL), Robert Stephens (ME), Peter Watson (NY), Kurt Langford (AZ), Gene Medenwald (KS), Joseph Grez (PA), Robert Siegmann (FL), Steve Latham (Wales), Al Morgan (FL), Geremy Snapp (WA), Rob Denny (Canada), Danny Greene (Bermuda), Roger Simpson (Australia), David Becker (OR), David Webb (CA), David Brown (OH), Ken Swan (OR), Stephen George (WA), John Millar (Australia), Claudio Linhares (Brazil), K. McNeil (Canada), Edward Taylor (FL), Ed Stone (SC), Gerry Stengard (Canada), David Harrod (CA), Phil Jacobson (FL), Alan Craig (England), Jack Bowley (Canada), H. Douglas MacNary (TN), Gerald Crawmer (NY), Paul Wilson (Canada), George Hume (CA), David Baumgartner (MO), James Hollett (Canada), Ron George (CA), Chris Morejohn (USVI), Karl Zipf (DE), Tom Simmat (Australia), Robby Robinson (MA), Eric Sinn (MA), Andrew Cole (MA), Gibb Elliott (MA), Jason Bungert (MA), Mark Bowen (MA), John Kimball (MD), Andy Bullock (Australia), Harry Nash (WA), Charles Miller (IL), William Platt (PA), Willard Cutler (MA), Mark Smaalders (WA), Leo Newberg (MD), Jon Persson (CT), Delbert Cox (CA), Tom Ardito (CT), Tim DeKorte (CA), Richard Anderson (NJ), Eric Risch (CT), John Hackland (FL), Richard Hunt, Jr. (FL), Joseph Dobler (CA), David Scarborough (VA), Bob Ivano (MA), David Dowhos (Canada), David Stimson (ME), Tony Verga (IL), W.K. Nelson, Jr. (MT), Jim Thayer (CO), Susanne Alternburger (MA), William Butterfield (OR), David McLallen (NY), John Brooks (ME), John Harris (DE), Stephen Weld (MA), John Brady (PA), Michael McEvoy (NY), Kees Prins (WA), Mark Choquette (ME), Manfred Taus (NM), Jochen Robiller (MS), Graham Byrnes (NC), Klaus Schmitt (NY), Charles Cary (ME), Martin Devine (MA), Ron Haralson (Canada), Koichi Mitamura (Japan), Robert Webb (WS), Dennis Brown (WA), John Miser (IL), John Toates (CT), Carl Chamberlin (WA), James Denton (VA), Graham Langdown (Australia), William Kennedy (Canada), Michael DeRidder (New Zealand), Tom Feinthel (MN), James Pegues (TX), Jaques Chevallard (Canada), Michael Kroemer (CA), Clive Anderson (England), Douglas Taylor (CA), R.K. Greeven (New Zealand), Simon Fishwick (England), Jan Hedberg (Sweden), Christopher Krasemann (Canada), and Chris Ring (TX).