MY YACHT DESIGNS

AND THE LESSONS THEY TAUGHT ME

CHUCK PAINE

MY YACHT DESIGNS

AND THE LESSONS THEY TAUGHT ME

CHUCK PAINE

CHUCKPAINE.COM
PUBLICATIONS

My Yacht Designs and the lessons they taught me
Chuck Paine

First Printing 2010
Second Printing 2014 (pdf version)
Printed in South Korea

ISBN (cloth): 978-0-615-34993-0

designed by:
Nancy Starkman

published by:
ChuckPaine.com Publications, LLC.

printing facilitated by:
Star Print Brokers, Inc.
Bellevue, Washington
StarPrintBrokers.com

ChuckPaine.com

ACKNOWLEDGEMENTS

THIS BOOK IS DEDICATED FIRSTLY TO THE MANY CLIENTS WHO HAD sufficient faith in my abilities and those of my assistants to cause the construction of a yacht. Without you, these yachts and this book would not have been born.

I wish to thank my employees, skilled designers all, who did most of the actual work. If you like what you see in this book please realize that it was Mark Fitzgerald, Ed Joy, Lloyd Bracy, Art Paine, Chris Davis, Jim McQuaide, Doug Zurn, Maura Rogers, Jamie Hoffmann, Chris Van Heerden, Gram Schweikert, Larry Turner, Tom Lokocz, Will Ratcliff, Gayle Elfast, Bruce Alderson and Steve Davis, far more than myself, who have filled these pages with beautiful artwork.

Thanks also to my editors Art Paine and Dennis Caprio who suffered through the early iterations of my attempts to put these words together. Thanks to your critiques it is now, I believe, readable.

I would also like to thank the few photographers whom I have been unable to contact to ask permission to use your photos. Over the years many owners, passers-by and boatyard managers have given me snapshots or sales flyers depicting my designs, and I have taken the liberty of using some of them without knowing whom to thank. In a few instances I have used your photos because without them, the book would simply not have been complete. I have presumed your good will and hope you agree that it is a better book thanks to your efforts.

If this book is delightful to look at, it is owing to the skill of its book designer Nancy Starkman at Star Print Brokers of Bellingham, Washington. Not only did she create a work of publishing art, but she was a delight to work with.

Most of all my thanks go out to my wife Debby, who suffered through those early years while I perfected my craft shut into an inaccessible Maine farmhouse on a snow-swept hill, who shared my old fashioned ethics keeping the company books straight for forty years, and who nursed me through many a bout of self doubt. I couldn't have done it without you.

—Chuck Paine
December, 2009

NOTES TO ACCOMPANY THE SECOND PRINTING

IT IS A TRUISM OF THE HUMAN CONDITION THAT IN ANY CREATIVE effort you can always do something better if you do it a second time. In undertaking this second printing I have made the following changes:

A/ Eight pages have been added to the book in the form of four more two-page bleed photographs and their captions. The original book was lavishly illustrated; this second version that much more so thanks to my locating four additional high-quality images of my creations.

B/ A few of the other illustrations have been replaced by higher quality ones that have come to light subsequent to the first printing.

C/ Many of the photographs are of significantly better color and sharpness, as a result of improving technology. When I was assembling the photos for the original press run, very high resolution digital scans from 35mm slides cost $55 per scan, forcing me to use "moderately high res" scans to make the book economically feasible. Two years later, the same high res scans cost $1.99 per slide! Combined with my improving Photoshop skills, the improved quality of the photos should be obvious.

D/ A few incorrect dates and memory muddles, three typographical errors, and one line of missing text have been corrected.

E/ The chapter on the PAINE 14 has been completely revised with better photos thanks to a second boat being built to the design.

F/ This book is about lessons for would-be yacht designers and owners. By expanding the content of most of the photo captions accompanying the two-page spreads, I was able to work in a few more kernels of naval architectural wisdom.

G/ The majority of this book was designed by Nancy Starkman at Star Print Brokers and is exquisitely beautiful as a result. A few of the pages at the end of this updated version were added by myself, and may not come quite up to her high standard, and for this I apologize.

—Chuck Paine

I hope you enjoy this "new and improved" version of ***MY YACHT DESIGNS and the lessons they taught me***.

CONTENTS

The east shore of Jamestown, RI, in 1948 when Chuck Paine was four years old. Both steam-powered ferries that connected the island with Newport can be seen in mid-photo. The War had ended, the warships were mothballed, and boat owners by the hundreds celebrated on sunny summer weekends.

FOREWORD

BOOKS HAVE SOMETHING IN COMMON WITH yachts—they need to be designed. A book design, like a yacht design, is successful if it is pleasing to its owner. This means its designer has to have some idea who the owner is and why he or she might want to own one, yacht or book.

- *A book design, like a yacht design, is successful if it is pleasing to its owner.*

In crafting this book I have made six assumptions:

1. This is not primarily a technical treatise on yacht design. It is about hard won lessons. In a career as long and varied as mine you inevitably make mistakes and learn from them, you take risks and some come up winners. These lessons, be they revelations or missteps, are hard won gems, and I've highlighted them throughout the book

   - *...in blue, italic type after a bullet, like this.*

2. Beyond the nautical ones, there are larger lessons to be learned herein than simply how to design boats. My story is one of a boy from modest circumstances who made a living working for the upper stratum of society, designing its toys. There were those during my youth who opined that a yacht designer was an aristocrat who hung out at the yacht club bar and lived off inherited wealth. I learned that they were wrong—if you were born with abilities and worked harder than everyone else, and were lucky, you could do anything. And in 35 years my studio launched over a thousand marvelous yachts.

3. This book is full of pictures and each one is worth a thousand words. For many years I wrote the design review pages for Yachting Magazine. As such I got to attend their annual editor's conferences. We writers would sit around and complain about the fact that nobody actually read our beautiful prose. "People don't READ anymore", we'd bitch, "they just look at the pictures." In case there is a particle of wisdom encompassed within these sentiments this volume is lavishly illustrated. But do try to read the gray stuff in the two vertical columns—some of it is really quite enlightening.

   - *People don't read anymore, they just look at the pictures.*

4. Every reader has his own personal interests. Some prefer sailboats, others power, some traditional designs, some modern. For this reason I have divided the book into chapters by design type. One consequence is that the continuity of which design came before which other one is lost. But it also means that if you are reading to discover what you can about the proper amount of warping on the planing surface of a jetboat, you don't have to struggle through where the leading edge of a sailboat keel should be located.

5. This book does not contain all of the Paine designs by any means. Some excellent designs had to be truncated lest this tome become too heavy to carry! Please accept my apology if the boat of your dreams—or ownership—is missing.

   - *No, you do not get your money back if your boat is missing!*

6. I've limited the stories in this book to yachts that were actually built—with but one exception. My office was fortunate enough for decades to never have to do any work "on spec", an extreme rarity in the field of yacht design. This book is about lessons learned, and you don't learn lessons from dreamboats that haven't survived the rough and tumble of the marketplace. It's the easiest thing in the world for architects to do renderings. But if nobody wanted to build it, it probably wasn't worth building.

   - *Beware of spec designs—if nobody wanted to build it, it probably wasn't worth building.*

Yacht design is part art and part science. As is true of the other arts, there is no established career path—every designer's story is unique. The ratio of successful artists—rock star, diva, ballerina, painter, musician—to overqualified aspirants must be one in a thousand. The few who have succeeded at any of the arts have done so with a combination of talent, tenacity, and luck- the latter being by far the most important factor. The following chapter tells the story of the string of lucky breaks that enabled me to spend my life designing yachts.

How I Became a Yacht Designer

CHAPTER ONE

How I Became a Yacht Designer

AS FAR BACK AS I CAN REMEMBER I LOVED boats. I was brought up in my earliest years on an island—Jamestown, Rhode Island—in the middle of Narragansett Bay. The beauty of sky and water was all around, and during long and sultry summers I was surrounded by whole fleets of elegant schooners, Navy ships and bumboats, rustic fishing craft and even a steam-powered ferry that connected our humble island with glitzy Newport.

WW2 had just ended and my grandfather offered his daughter and my recently demobilized father one of the ramshackle little cabins he'd been renting to summertime fishermen for years—just for the summer. That summer stretched into seven years. Gramp's shack was made of recycled cardboard called "Homasote" and comprised all of 515 square feet. My grandfather would take my identical twin Art and me flounder fishing in his flat-bottomed skiff. First he'd dip the transparent waters with a net to get shiners, or silversides as he called them. Then we'd go further out and anchor, dropping a sinker to the invisible depths where an occasional unlucky flatfish would be staring hungrily upwards with its two asymmetrical eyes. True, we lived in a shack, but we'd never known anything else—it was just home to us. I was surrounded by the riches of Nature. Wealth was to be found outside the cramped walls of our little home—down at the shores of our beautiful island.

I learned from my grandfather that there were people in the world who were content to work eight hours every day, but for him work began at five in the morning and ended at five in the evening when the fishing began—seven days a week.

"The Shack" on Jamestown, much improved after 60 years.

My first idea of what I would want to do when I grew up and had to make a living—a dream shared with most boys on the island—was to be the captain of the ferryboat. But at about the age of seven it became my mother's version of daycare to leave my brother and me off at Wharton's Shipyard where we'd sit dutifully on a bench and watch Portuguese men fit steaming planks to the heavy oak frames of wooden boats. As soon as she'd driven away we'd abandon the bench and scramble along the seaside rocks to Round House Shipyard which like all boatyards in those days was left unlocked and was full of white hulled sailboats and outside, the sleek, narrow, double ended motor launch *THANIA*. Every one of them was designed and built by a company called Herreshoff Manufacturing Company up the bay in Bristol. And every one was indescribably beautiful. I think it was then that I decided I was going to design yachts.

My brother and I would debate the fine points among them; whether yawls gained or lost grace by that afterthought mast, whether or not overhangs could be stretched too far, whether schooners with two gaffs were more or less beautiful than those with Marconi mainsails, whether those newfangled and unsightly Genoa jibs were acceptable if they made boats sail faster. My mother surely equivocated about her kids' nautical obsession. She herself feared the ocean—it had stolen away more than one fellow islander during her youth. On the other hand, her two boys fed off each other's happiness in drawing boats, boats, and nothing but boats on their father's discarded shirt-cardboards.

At the age of eight my parents moved off the island to Warwick, a suburb of Providence. That was a sad day in my life. No more ocean, no more boats, no more Gramps. Though the tract house they had bought in the suburbs was much larger, my father worked even farther away from home. Both my parents were very intelligent. My father was a Phi Beta Kappa graduate of Brown University. My mother was equally smart, but in those days men went to college and women didn't. She was a beautiful woman in her youth and escaped island life for the bright lights and marriage prospects of Providence, which is where she met my father.

I was what they now call a gifted child. School was a bore for me because it was too easy. I got straight "A"s without needing to try. So I filled my time and my school notebooks with sketches, mostly of boats, remaining sufficiently tuned into what the teacher was droning on about to always be able to stick my hand up if called upon and give the correct answer. I did

enjoy some of my courses—English and Mathematics the most. When I got to junior high they'd figured out what to do with me, because in those days they had "tracking". Rather than have me suffer interminably as the teacher tried to explain to a kid in the back of the room what was intuitively obvious to me, they put all of the smart kids together in one class and gave us teachers who were capable of dealing with us. If you are reading this, thank a teacher. Thank you Rose Koralewsky (Latin), Dr. Rittman (art), Dr. McKean (physics) and Miss Schaeler (English). I only wish you were still alive to know how much you did for me.

Though school went well, home life did not. My father was chronically unemployed and my mother, saint that she was, went to work in Providence to pay for orthodonture and the mortgage and our daily bread. When I was nine years old she announced that we would all starve if we couldn't bring more money into the household and it was then when Art and I began our working lives. We each had a paper delivery route and at the end of every week the family would sit down together at the kitchen table with a pile of coins and bills in the center and divide up the spoils with a hefty percentage for the house. Only much later in my life did I notice that many of the people who became successful in America had one thing in common—they began their working lives as kids with a paper route.

The housing development where we lived was a long way from the ocean but I remained obsessed with boats. I read everything Edward Rowe Snow wrote about the sea, tied virtually every knot in The Ashley Book of Knots, and practically owned the copy of Whale Ships and Whaling in the local library. I had added lawn mowing and driveway shoveling to the paper route as a source of income and at age 13 was mowing the lawn of a fellow named Bill Berky. Bill and Ruth were unable to have children so they sort of adopted Art and me. He was a member of the East Greenwich Yacht Club which was attempting, along with others at the time, to redress the commonly held belief that yacht clubs were elitist by reaching out to the community of non-members. Bill came to my parents and essentially said, "Those kids of yours need an outlet other than work—would you let me sponsor them for our new community sailing program?"

The battle that erupted between my mother and father was volcanic. If they had divorce in those days this would surely have precipitated it, but divorce was a word not even spoken between deeply religious spouses like my parents. "Over my dead body!" yelled my Dad, who equated yacht clubs with sloth and hedonism. "They'll be juvenile delinquents in two years if we don't do this!" screamed my Mom. The argument went on for days with Bill Berky occasionally intervening in favor. My mother won that fight and in doing so my life was changed forever.

Up until this point I had never stepped foot in a sailboat. The program borrowed benevolent members' Bluejay class sloops and used racing to teach sailing. You fumbled around trying to trim the sails something like they suggested in the morning on a blackboard with chalk and arrows. If you got it a little more than fifteen other boats full of like-minded kids, they blew a horn and called you a winner! I never knew such fun as I had that summer. I was fourteen years old and was beginning to notice girls. Half the students were girls and East Greenwich was hot in the summer so sailing was done in bathing suits. You have to learn the anatomy of the opposite gender sometime and I contend there is no more healthy way for teens to do so than while the three of you (a safe number) are hiking your buns off trying to win a sailboat race.

The program was growing and the club sent out word that they would need more Bluejays next summer. They were boxlike plywood boats that could be relatively easily built from kits or with a bit more skill, from plans. Art and I had saved quite a bit of money from our various jobs- not enough money for a kit, but enough for the raw materials and plans. By then my father had to admit that rubbing shoulders with the highborn hadn't done his kids all that much harm and offered the garage over the coming winter. It was my first exposure to boat plans. We had to loft the boat, which we did in the basement. By the next spring she was finished. Since we had built her from scratch rather than the more common kit we named her *SCRATCH.* Not only did she float, but she "measured in" as an official raceable Bluejay. Over the next four years with the then much publicized "Paine twins" as crew, she won ninety out of a hundred races she entered from Narragansett Bay to the Hudson River.

The next big crisis in the Paine household had to do with college. My father had graduated from an Ivy League college Magna Cum Laude and it had done him no good at all. He was going to write the Great American Novel someday but couldn't find time to sit down to a typewriter. My mother knew if you were bright and worked your heart out who needed college? And despite the fact that the Paine family was descended from one of the wealthiest families in Providence they had lost every penny in the great depression. The fact was, the family was struggling to meet expenses, had nothing in savings, and it was announced that college for the Paine twins was out of the question.

I was ambivalent, not knowing what college was about except perhaps avoiding real work for four years. Then another mentor entered the scene. He was Charles F. (Chick) Street, commodore of East Greenwich Yacht Club. Chick Street was a graduate of the Naval Architecture department at MIT. He'd gone to MIT because, like me, all he ever wanted to do as a boy was design yachts, and Naval Architecture sounded at least vaguely similar. Instead he was working as a car salesman, at which he made pots of money. With a family and a big house and two kids to support it was too late for him to chuck in a healthy paycheck and do what he loved. So he decided to do it vicariously. He took me under his wing and basically said, if you go to college you can do this and if you don't you can't. He gave Art and me lessons at his home every weekend in everything he knew about boat design. I asked him, "Should I try to go to MIT?" He answered, "No, all they teach at MIT is big ship design and when you graduate the military will offer so much money that a poor kid like you will have no choice but to take it- and you'll never draw a yacht for the rest of your life."

- *If you want to be a yacht designer study yacht design, not naval architecture.*

Come junior year in high school this all came to a head. The other students in my accelerated classes were all applying to colleges. I was not—my parents said it was a financial impossibility. The high school guidance counselors were livid. They convinced me to apply to all of the colleges I liked, that I was a shoo-in

Turnover day.

15 year old Chuck showing off in SCRATCH.

to get scholarship money. If my parents wouldn't come up with the application fees they'd do so themselves. My parents relented—if the scholarships actually came through it might just be possible.

I was accepted at RISD in architecture, Pratt Institute in fine arts, and a couple of others that were equally unaffordable. It was like an early Christmas when, with trembling hands, I opened an envelope from Brown University- my first choice. By this time I had learned the first rule of acceptance to college—large envelope good, small envelope bad. The manila packet in my trembling hands was huge! Far more important than the acceptance letter it contained was a long list of pure gifts from many people, most long dead, a Rhode Island State scholarship from its taxpayers, a low interest college loan and a paying job to fill in the rest. Thanks to the generosity of a good many people I would never be able to thank, I was going to college!

At Brown I majored in Engineering, and as I like to tell people, I minored in sailing. I took every course in mechanical engineering that I thought would have anything to do with designing yachts. And I honed my writing skills—easy to do at an Ivy League school. I don't think there's ever been a successful yacht designer who wasn't also a facile writer—writing is an imperative in the yacht design game. I quickly became Team Captain of the Brown sailing team, and we were highly competitive. We won the Ivy League Championship one year and were always in the top three at any regatta. The only guy I couldn't consistently beat was my twin, who sailed for URI and simply won everything. Both he and I were chosen All-Americans in 1965 and as a consequence spent that summer team-racing in England which is probably where I caught the traveling bug.

- *Writing is an imperative in the yacht design game.*

In the spring of 1966, my graduation year, a famous yachtsman from Narragansett Bay decided to race his 37 foot Pearson Invicta in the Transatlantic Ocean Race. Milt Ernstof was fresh off winning the Bermuda Race and hungry for more. He reasoned that he had the best chance of adding to his silverware collection with a bunch of kids for crew who were too inexperienced to know when they were pushing a boat too hard. My best friend and "A" Division dinghy crew, Don DeLuca, got me invited- if I'd learn celestial and serve as navigator. We were all incredibly fit and enthralled with Milt- a man of the world with a remarkable sense of humor who'd made his fortune by the age of 44 selling surplus war materiel in India. All Milt had to do was open his mouth and you'd have to laugh. It was a summer of high adventure. I managed to find Bermuda using

nothing but a sextant and we started the race there bound for Copenhagen. Over the course of the next 21 days and nights we tore through every spinnaker Milt had on board- literally, set the boat on fire one night when the coal spilled out of the little stove we had on board for heat during a spectacular spreaders-in-the-water knockdown, and finally watched the rudder part company with our little ship one stormy evening hundreds of miles short of a landfall. I was miserable, I was cold, I was scared, and I could think of nothing more fun than sailing small boats around on big oceans, which I've continued to do for the rest of my life.

By the end of the summer I was home in the United States. I was 21 years old, way beyond broke with college loans that would take the next ten years of my life to pay off, and desperately looking for a job. The dream of becoming a yacht designer had to be deferred as starvation loomed. I took a drafting job at a textile winding machinery company in Rhode Island and lived in an apartment in Providence. I loved drawing for a living. I continued to draw boats in my spare time and as my savings increased so did my yearning to get moving toward what I believed was my destiny.

A year and a half into that job I learned that the placement departments at Brown and MIT had reciprocal agreements. As a Brown alum I had access to MIT, and they taught Naval Architecture so they must know companies that needed nautical draftsmen. On a whim one day I drove up there just for a look-see. I walked in and introduced myself to a tall, beautiful young woman a little too tall and a lot too beautiful to be a romantic prospect for the likes of me. But I'll always remember her name for the simple reason that it was unforgettable—Amy Blue.

Amy Blue took me on as a project. After an hour on the phone she had gotten me two jobs which, combined, would enable me to move to Boston. When she asked me, "Do you think you can get a security clearance?" I realized that one of my employers would be none other than our esteemed CIA, despite the bogus moniker that appeared on my paychecks. The other was a famous professor of Naval Architecture who needed an extra body coding data for one of his research papers. Encouraged, I took a shot—"I know you've got a towing tank here. Any chance of a job with them?" She got me that one too.

A few months later I was hunched over my desk in Dr. Kerwin's office when a fellow named Jerry Cashman came in to see my boss as he'd done numerous times before. Jerry worked for a famous consulting company in downtown Boston that designed nuclear power plants for naval ships' propulsion. He'd obviously spoken with Dr. Kerwin before he sidled over to my desk and said, "Mr. Paine?" "You mean me?" I answered. "How'd you like a REAL job?" he said.

J. E. Bowker Associates was indeed a real job. They paid me $7,200 a year to start—more money in 1968 than most men earned at the end of their working lives. I wore a jacket and tie to work every day. And the work was fascinating. Mostly I wrote computer programs in FORTRAN and designed pressure vessels using a computer program called "Seal-Shell 2". But in helping to design ships I was getting closer to designing yachts and that was all I cared about. They had a huge drafting pool with twenty or thirty men drawing in ink on linen to the exacting standards that the U.S. Navy insisted upon. Every line weight, every line type had to be perfect, and there was no erasing when you drew on linen.

I was the low man on the totem pole. All the work was "classified" since in those days there was a Commie behind every tree. Those were the days when computers lived in air conditioned rooms on floors that floated on springs and if you needed a powerful one there were only a few in the entire country. We'd run stress analyses and thermal transients and I'd be the poor schlep who'd fly out to Barberton, Ohio with a briefcase full of punch cards and then back the next day with a stack of green and white computer fanfold in the seat beside me. Once back in the office I would have to swear an oath that I had not taken my eyes off the stack even to take a pee at the back of the plane lest some Russkie might have photographed it with a wristwatch camera.

The Vietnam War was heating up and the morality of colonial powers imposing their will upon poor countries halfway around the world was being violently debated in the streets of American cities. No matter how I parsed it I couldn't escape the fact that the things I was designing weren't yachts, they were war machines. I pasted a peace decal on my rear bumper and came to the conclusion I had no choice but to quit the best job I'd ever had.

In the spring of 1969, at the age of 25, I made my decision. The idea of joining the Peace Corps had been floating around in the back of my conscience for awhile. I'd been the beneficiary of immense good fortune. I'd been exempted from military service on a technicality (I'd had asthma as a child). I'd been given, almost free of charge, an education that no amount of mere money could buy. I'd found work that was both fascinating and lucrative. John Kennedy's words gnawed at me; "Ask not what your country can do for you, Ask what you can do for your country." It was time to do something for someone other than myself for a change.

When I got my letter of acceptance they told me I'd be going to a place called Iran. I literally had no idea where on earth it was and had to look it up in an atlas. The Peace Corps had a place on their application where you could request three potential countries of service. I had put down Malaysia, Jamaica and Fiji because I'd be close to the ocean. You could reject an offer and when another placement came up they'd send it to you. But in a way I figured that was against the spirit of voluntarism. If they needed me in a place called Iran, that's where I'd go.

The Peace Corps flew me to Denver where a bus assembled a bunch of equally naïve kids, most younger than me, and drove us to a decrepit old CCC camp in the foothills of the Rockies. We stepped down from the bus and a darkish skinned person smiled at us and said, "Salaam a-leh comb". Eventually someone got what was happening and responded with something that sounded vaguely similar, in reaction to which the greeter smiled broadly. The Peace Corps had the best language training in the world, for the simple reason that once you stepped off that bus you spoke farsi, wrote farsi, and began to dream in farsi. We stood in line for injections, sometimes one in an arm and one in a cheek per pass-through. And to put the timing of that summer into context, they set up a television outdoors between our barracks one day and we all watched Neil Armstrong step backwards off a ladder and stamp his footprint onto the moon.

My barracks in the CCC camp in Morrison Colorado. It still looks like this 40 years later!

I had joined the Peace Corps with the hope of digging wells in some bucolic tropical Paradise. Instead they sent me to Tehran, the largest city I would ever inhabit in my life, in the middle of a desert. The Peace Corps Volunteers in Iran had a name for Tehran. They called it the a-----e of the universe—I'm sure you can substitute the appropriate body part. But they needed computer programmers at a government ministry called the Plan Organization. I'd have to quickly learn COBOL, another computer language. Would I do it? I had come this far—I figured there was no turning back.

First though, the Peace Corps had "in-country training". They wanted to make sure your farsi was good enough to survive, and that you wouldn't freak out with what they termed "culture shock". If you were going to wash out they wanted you to do it before you started your actual job, and quite a few did. I had no problem with the language—I was fluent after three months of training. To verify your cultural malleability they had one little test you had to pass before going to your job placement. You were given enough rials for bus fare and rudimentary sustenance and told not to show your face in Tehran for the next two weeks.

Students and teachers, the day before flying to Iran.

Tehran—not famous for its architecture in 1969.

I decided to go to the sea, which I was already beginning to crave. Iran is a huge country and there were virtually no paved roads in those days, but it was just possible to get to the Persian Gulf and back in the allotted time. I passed through Isfahan, one of the most beautiful cities on Earth. The Persians say of it, because it rhymes, "Isfahan, nesfeh jahan"—Isfahan is half of the world. I saw little villages hundreds of miles from electricity or telephones where one young squirt, for example, came up to me and seeing my light skin and blond hair asked where I was from. "Amrika", I proudly answered. "Ru mah, chetowr bood?" he asked. What was it like on the moon?

Six dusty days and a thousand mile dirt track later I arrived at Bandar Abbas, the most romantic place I

have ever been. I felt that I had truly left home for the first time in my life. The houses had huge mud brick chimney-like towers called "bahd geer" or "wind gatherers" that conducted even the lightest zephyr down into a central room where the residents would endure during the heat of the day. There were dhows that were built in ways that have not changed in a thousand years except now they had engines. There was oppressive heat and drenching humidity and earthy smells that I'd give anything to relive today. There was a fish market that materialized on the beach every morning and melted away an hour after sunrise. In one of the most fortunate hasty decisions I ever made in my life I had bought a small camera in Tehran, which is why you have not only these words to describe what it was like to live in Iran forty years ago, but pictures as well.

The dhow I took to Queshm.

I'd learned there was an even more remote place I could go. There wasn't a ferry or anything, but if you went down to the long pier lined with dhows in the morning and began to talk with their captains, eventually you might find one that was delivering freight to the island of Queshm, in the middle of the Persian Gulf. My dhow was small and smoky and slow, but by the end of the day it was approaching the island. I was living out of a small backpack with a thin sleeping bag rolled up at the bottom.

I had a bag of pistachio nuts and a can of Canada Dry for dinner. I knew there were no hotels or guest houses or restaurants anywhere on Queshm. My plan was to sleep on the beach. I stepped off the pier onto the sandy beach. There was nothing else there. If you went straight,—inland—there were a few mud-brick structures that looked like beehives. These were houses, by a remote stretch. There was no electricity except on the pier and at the teahouse, which had their own generators. All I had to care about in life was to choose, left or right? I went right—that is, west. The sun was just setting and with no source of light for reading or writing in a few minutes I'd be turning in.

The pier at Queshm.

Along the way—a recurring nuisance in Iran—I'd acquired a follower. Kids there were fascinated with foreigners and if they were lucky they'd get one that spoke English. Invariably they'd come up to you and pronounce the only two words they'd actually mastered..."hello meester". I would respond in pretty good farsi, "I speak farsi. What would you like?" This was usually enough to stimulate a brief conversation about the kid's village and the fact that he loved America and had an uncle who lived in Los Angeles. Then they'd leave you alone.

But this kid was more curious than most and he trailed along close behind. When I knelt down and unrolled my sleeping bag he became visibly agitated.

"Na kon Agha", he said. *Don't do that, sir.*

"Chera na?" I asked.

"Khatarnogh ast" he said. I didn't know the word "khatarnogh", but I did know that the word "khatar" meant *danger.*

"Chera khatarnogh eh, batcheh?" I asked. At this point he was jumping up and down with excitement.

"Mahr miod", he exclaimed. I knew that "miod" meant that something was coming, might come, had come or often came—they don't have as many verb tenses in farsi as we have in English. But I didn't know what "mahr" meant. We were at an impasse. I looked down at him and he looked up at me. I didn't want this punk kid telling me I couldn't sleep on his beach. But I saw that he was truly concerned. This kid was smart, though. You could just sense his little brain working.

He ran into the scrub at the edge of the beach and found a stick. With it he traced in the sand a long sinuous squiggle. "Shit!" I thought. SNAKE!

He led me to the local teahouse, and in about an hour they turned off the generator and the few patrons, all men of course, went home. They piled up a few Persian carpets on one of the tables for me to sleep on. I offered to pay them anything, and they took a few rials—perhaps three cents. Not a bad price for maybe saving my life.

Shahnazeh Sheesh, the street where I lived. Yes, those are three camels the balloon seller is staring at.

Years later I stumbled upon an issue of National Geographic with the article on "The World's Ten Most Venomous Creatures." And there it was, *Enhydrina schitosa,* whose venom is eight times more deadly than a cobra's.

I worked in Tehran for two years. Two years in Iran went by like twenty years at home! But I got to travel all over the Middle East, three times to Afghanistan and Turkey and to every corner of Iran. Tehran was a tough place to live, but Iran was fascinating and romantic and beautiful, and the Iranians were as good and kind as people are anywhere. And, being in the Peace Corps was an experience that I wouldn't trade for anything. I'd do it again in a minute if I had the health and strength I had when I was young.

As I neared the end of my tour of duty I began to think about my future. I'd continued to sketch boats, even went down to the bazaar and bought tools and wood and made a model of a little yacht I hoped to design and build when I returned. I'd seen the world, survived a difficult posting and a hundred intestinal diseases in Tehran, was becoming a good engineer, knew a lot about computers, and realized if I didn't do it now at age 27—right away when I returned to America—I'd end up just like Chick Street...working for money for the rest of my life.

- *Do it now!*

And that's exactly what I did. I returned to Boston in October of 1971 via a wonderful overland backpacking tour of Turkey, Greece and much of Europe. I slept for three whole days on my brother's floor in Marblehead. I ate rare hamburger and bought things without bargaining

The rooftop of my apartment in Tehran. At the left you can see the boat model I carved while I was there. Even in the middle of a desert, I couldn't stop thinking about boats.

and had solid stools. Then I got out the Boston yellow pages and looked up Naval Architects. There were four. Two that did only yachts...Dick Carter in Nahant and John Alden downtown. Two others who specialized in fish-boats and military craft. Nahant was closest to Marblehead and Dick Carter was famous. I knew I'd never get a job with him, given who he was, but I had to start somewhere, and I had months, years if necessary, because I simply wasn't going to give up on my dream, ever.

I remember it was a Friday. I drove my brother's Volkswagen van to Dick's office, parking it where I hoped he wouldn't see it. Art was into his countercultural phase at that point and his van was embellished with an all-over psychedelic paint job in day glow colors, with a smokestack sticking out the top. Not exactly the sort of vehicle one of the world's most famous racing yacht designers might expect a prospective employee to drive.

I walked in and met Dick Carter. He was not in a good mood.

Seems his number one guy, Jim Hartvig Anderson, the only person who knew how to run the time-shared computer, had just given his notice. I showed Dick my drawing portfolio. He asked a few questions. Money was important, of course—I was once again broke after working without pay for two years. I formed an idea of how much I would ask him for if it ever got that far. He didn't ask. He said, "I'll offer you such and such a salary." (It was a lot more than I was going to ask for). Then he says, "Can you start on Monday?"

The Carter Years

CHAPTER TWO

The Carter Years

I WORKED AT CARTER OFFSHORE FOR TWO years. Dick Carter was a yacht designer of the old school. He was wealthy, personable, and he spent much of his time sailing—or rather racing—his designs, mostly in Europe. He was a skilled helmsman—one of those guys (like my twin brother Art) who could win a sailboat race in almost any boat no matter whether it was fast or slow. These prodigies prevail by winning the start—a tactical exercise—then keeping the faster yachts behind them by blanketing, backwinding and out-tacking their opponents. This is a necessary skill if you're going to ply the racing yacht design trade. And it won him customers—one after the other.

- *If you design racing yachts, you have to be able to make them win.*

Dick would periodically return to the office having won some famous regatta and typically with at least one commission to design something even faster. He'd hand it to us—Yves Marie Tanton, Mark Lindsay, Bob Perry and me—to tweak according to his instincts to make it just a little stiffer, more close winded, better balanced or—most important of all—more favorably rated by the prevailing IOR rule. That was my job. I wrote computer programs to iterate on the GSDA (girth stations difference aft) or one of the other input variables to explore how much of a distortion might result in a rating reduction that the boat itself wouldn't actually feel all that much when you sailed it. Some of the most infamous and egregious distortions of the shapes of sailboat hulls that ever evolved from applied mathematics can rightly be blamed upon computer programs that I authored.

Those were an exciting two years. I was surrounded by geniuses. Yves Marie Tanton was the most skilled manual lines fairer in the world. I would hand him improbable points in space that would result in an unbeatable IOR rating and he would draw a buildable set of lines that was more or less fair and passed through these points. There were bumps, there were hollows, and there was a thing at the aft end of its hull that our detractors called the "golf tee rudder", hung on a skeg, that was capable of keeping a somewhat boat shaped object going in a straight line. Dick masterfully guided the tussle between rating reduction and actual boatspeed, and even made the boats look beautiful!

A fellow named Doug Peterson showed up and got hired. He slept on a sofa at my apartment in Cambridge. He left after a few weeks, having acquired a good sense of what it was that made Carter's designs so fast. A year later he had designed and built for himself a racing yacht named *GANBARE* and with it he won the One Ton Cup—a level rating class that Carter's designs had dominated for years. That boat propelled Doug to a prominent position as a world class "level rater" designer alongside Dick Carter and Britton Chance. It also showed me that one way you can insinuate yourself into the yacht design field was to design a yacht and build it for yourself. Of course that first boat had better be good, like Doug's, or it will be your last.

- *You can start as a yacht designer by building a boat for yourself. It had just better be good.*

Mark Lindsay had been designing and building small boats as long as I had. He was also a highly competitive dinghy sailor. He excelled in 505's and Flying Dutchmen. This was partially a result of his stature—my eyes came up to somewhere near the latitude of his chest. You needed leverage to keep one of these rocket ships level, and Mark's outsize frame hanging on a trapeze wire had plenty of that. But he was an excellent draftsman and he knew how to build boats. More importantly, he knew how to build them light.

Finally there was Bob Perry, who went on to be a supportive friend and arch-competitor for the remainder of my career. Bob was an amazing draftsman. We all drew in pencil on mylar, a method that produced drawings fast but was a smudgy business. Bob somehow kept his drawings clean. You did this by constantly sweeping the pencil dust off your drawing with a drafting brush. When Bob left Dick Carter's employ to found his own career he autographed his drafting brush and gave it to me, implying correctly that I needed to make more use of this particular tool. It has remained a prized possession to this day.

Along the way I honed my drawing skills and learned to design yacht structures to a scantlings rule—primarily Lloyds Standards since the majority of our yachts were being raced in Europe. I learned Dick's methodology for running an office too, though it was many years before I could afford the sort of staff that made it work. Dick didn't actually draw his boats. His philosophy was to conduct the orchestra, not to play the notes. He hired skilled people, treated them exceptionally well, steered and cajoled and encouraged them, and stayed out of the way. Years later I adopted the same strategy and it worked wonderfully for me too.

- *Conduct the orchestra, don't play the notes.*
- *Hire good people, treat them well, and stay out of the way.*

But first came the years of struggle that seem a necessity at the beginning of any artistic career.

First Ladies

CHAPTER THREE

First Ladies

WHEN I DECIDED TO LEAVE MY JOB working for Dick Carter in 1973 all I had going for me were some newfound skills and a lot of optimism and a few manual-drafting tools. To design anything as costly as a yacht for people outside your immediate family, you have to have a ***recognized name***. Some money also helps, and I had nothing like the startup capital that is expected in the field. What to do? I made a meager living working in boatyards, screwed my expenses down to the absolute minimum living rent free as a house-sitter, and if there was designing to be done, did it in the evenings for fees that were an embarrassment. My strategy for recognition was to design a boat for myself, build it with the savings I'd accrued working as a nuclear engineer and for Dick Carter, and see if anyone would take notice. The boat I chose to build was a 26-foot double-ender I named *FRANCES*.

- *To design boats for people outside your immediate family you need a recognized name.*

A few people did notice; most importantly a fellow named Tom Morris who had been building fiberglass sailboats in Southwest Harbor, Maine. Until that time Tom had been finishing off friendship sloop hulls and decks molded by another builder. We met through a mutual friend who knew of Tom's desire to build something with his own name on it—and of my interest in finding a builder for a series of future *FRANCESes*.

Tom Morris

In the summer of 1974 I took a day off from building my startup boat and drove up to Southwest Harbor to make my pitch to Tom. I had built a half-model of the *FRANCES*, which showed its shape far better than drawings ever could. He took one look at that model, his face broke into a huge smile, and I knew I had my first customer.

Tom and I took a liking to each other. I knew that if he finished them off nicely some of the credit would accrue to me as its designer. Over the years he built each boat like a little masterpiece, and he and later his son set about making me look good for a stretch of over thirty-five years.

- *Find a great builder and he'll make your designs look good.*

I thought of another way to attract attention to my name—I'd do everything in my power to see that any designs after *FRANCES* also got ladies' names. I'd become in the yachting gam "that young designer with all those girlfriends." For the next few years every design I did for Tom Morris, plus the few other builders who were willing to take a chance on me, were given women's names.

Meeting Tom was the luckiest break of my career. Tom had everything. He was young (four years older than me), ambitious, he exuded a love of sailing, and he obsessed about quality. In 1974 any yachtsman in the Northeast had to acknowledge the Hinckley name as the epitome of quality in the sailing yacht field. With his shop just across the harbor Tom lived in that formidable shadow for years. But he was determined that in his lifetime the Morris name would come to represent the best sailboat money could buy. In the end—partially because the Hinckley Company neglected the sailboat market for the more lucrative powerboat trade but mostly out of Tom and his son Cuyler's sheer tenacious efforts—he accomplished his goal. And nearly 200 of those beautiful sailboats were Paine designs.

But in 1974 that all stretched into an uncertain future. First, someone had to build a Chuck Paine design, and the only person with the confidence that it would actually float, was me.

26' Double-Ended Yacht

Frances

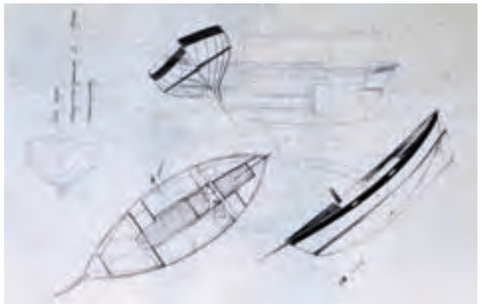
I built two FRANCESes. *This was the second—the one that floated.*

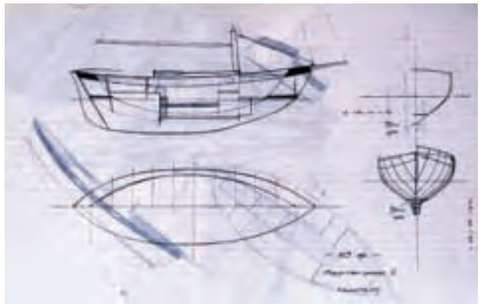
Dimensions	
LOA:	25' 10"
LWL:	21' 3"
Beam:	8' 4"
Draft:	3' 10"
Displacement, ½ load:	6,800 lbs
Ballast (lead):	3,500 lbs
Sail Area (100% Foretriangle):	340 sq ft
Disp/L Ratio:	316
Sail Area/Disp Ratio:	15.16

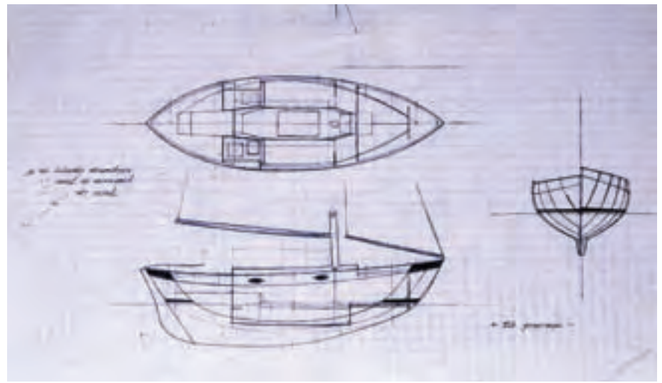
The Scottish fishing boats that led to FRANCES.

IN 1974 I MADE THE DECISION TO BUILD MY startup boat. I had worked for Dick Carter for two years, learned a lot, and had saved enough money to buy materials to build a boat—as long as it wasn't too big. Then Dick's work hit a slow patch and somebody had to go. I thought if my luck held I could do a little traveling and then hang out my own shingle as a designer, working part time as a boat carpenter to make ends meet. I had met a young lady (later my wife) who agreed to accompany me on a backpacking journey from Scotland to Nepal. I wanted to show her Iran and Greece and Afghanistan, my favorite countries in the world.

In Scotland I'd seen examples of heavy wooden fishing craft and thought if you put a sailing rig on something like that it would make a lovely little cruiser. All you'd need to do is take that central raised deck where a thumping great diesel hid and expand it a bit fore and aft to fit some accommodations. I carried a tattered notebook with me on that trip, and in it I sketched the little boat that would give me my start. Luckily I held onto that notebook for forty years, and here are the sketches:







I pulled *FRANCES'* drawings together after Debby and I flew home from India. Nepal had fallen by the wayside, the victim of an ill-advised sausage sandwich purchased from a street-side vendor in Peshawar. I'd been warned in Peace Corps training about the highly efficient water systems used in third world countries. Whereas we in the West require separate water supply and sewage removal pipes, many third world countries combine the two functions into a single roadside trench. Stupidly, I'd purchased a food item that had been washed in such a trench, necessitating a hasty flight home from New Delhi before death aborted a brilliant future.

I'd returned to Rhode Island and couldn't find affordable space large enough to build a 26 foot boat. So I put a classified ad in a newspaper in coastal Maine where everything was cheaper, and up came this retired colonel with the boatbuilding shop of my dreams who had tired of being a gentleman boatbuilder. He warmed to my story. If I paid the insurance and kept the place clean he'd rent it to me for next to nothing.

The rented shop in rural Maine where I built the first FRANCES.

I met Tom Morris at about that time. He was a few years older than me and was as much of a nut about sailboats as I was. Like me he'd tried making a living at more conventional things and abandoned security for what he sensed was his destiny. Neither of us cared much about the number of boats we might build or design. But we both cared a lot about creating a few really exceptional yachts, numbers be damned. Tom and I made an agreement whereby he'd build boats to my design and pay me a royalty on every boat he built. In a stroke of incredible luck he took a mold off my hull when it was still upside-down in Colonel Greene's shop.

The bad luck that ended my boatbuilding career for awhile.

The shop burned to the ground that October. The loss of that shop incinerated not only the first *FRANCES* but my job, such as it was. Colonel Greene had insisted I be insured and the insurance company paid off in full and in record time, so at least I had my grubstake back. But I had nothing to do for a living and the first Maine Winter of my life was coming on. I had to seriously consider what to do with my life. Was I really, honestly, the reincarnation of Nathaniel Herreshoff as

The *FRANCES* I built with my brother's help the summer after the first one burned. She had a traditional wood deck on a fiberglass hull out of Tom Morris's mold. While not perfect, she sailed reasonably well and was appealing enough to jump start a yacht design business. Using the stern rail as a traveler got the mainsheet nicely out of the cockpit area. The fold-down step on the side of the rudder gave me at least a chance of self-rescue if I ever went overboard, an idea that grew into an obsession near the end of my career.

Photo: Art Paine

I imagined myself to be or was that fire an omen that I had better re-examine my misplaced arrogance and go back to "real" engineering in Boston? I had enjoyed the nuclear power plant engineering I'd been doing a few years previously and though the nuclear part had fallen out of favor of late there would always be a need for power plants. Was designing yachts no more than an unattainable folly?

When in doubt, follow your dream. My girlfriend Debby and I found a remote hilltop farm to live in rent-free for the winter. You couldn't access it by car after the first snowfall so we bought cross-country skis and skied in and out. It had enough tankage for heating oil to get through the average winter and we had each other for warmth if the oil ran out.

The Farm. I spent two winters here drawing yachts for customers who didn't exist in case they might eventually arrive. They did.

- *When in doubt, follow your dream.*

I'd always wanted to learn to fly an airplane and thought if I ever got to be a successful designer I'd be able to use the skill to access all the yachts I'd be building. So I devoted that winter to getting my pilot's license and began planning to build another *FRANCES* in the Spring.

ONE-SIX SIERRA, *in which I learned to fly.*

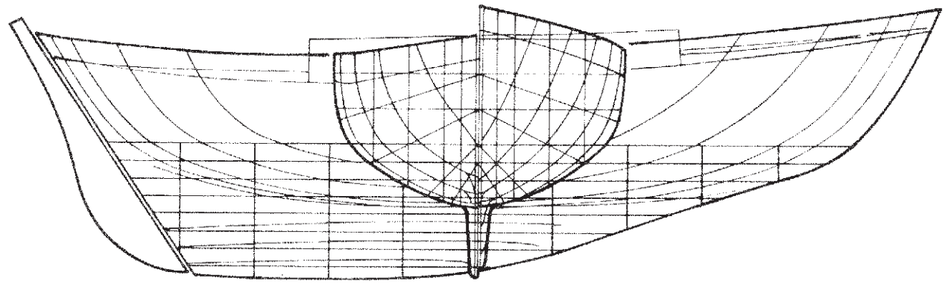
- *You have to climb back on the horse that threw you.*

In one of his many kindnesses that cemented our famous friendship Tom Morris invited my brother and me to build a second *FRANCES* in his shop the following summer. By the end of that summer Art and I had finished building our third boat together—the first *FRANCES* to actually hit the water. I sailed her to the 1975 Newport Boat Show, and Tom Morris and I showed her. To our immense pleasure people really loved the boat. Tom's order book began to fill and his royalty checks soon followed. I began to think maybe I might just make it as a yacht designer after all!

I often ponder what it might have been about the *FRANCES* that made it so popular. I think it must have been the aesthetics first and foremost. It looked like a boat that could take on the world. But the real surprise was how well it sailed. The design bar was pretty low in those days. The few fiberglass double-enders on the market had squared off keels that had nothing to do with water flow, or wide garboards that compromised half of the height of the keel because they were converted plank-on-frame designs. Or, in the emerging Taiwanese cases, stupidly fat keels because you couldn't get lead ballast in Taiwan and had to make room for much lighter cast iron. *FRANCES* wasn't perfect, but she had none of these flaws.

A bit of the Dick Carter racing philosophy had rubbed off on me during my two years working there. Dick's boats were competitive mostly because we distorted, contorted and abused the measurement points in the IOR rule to obtain favorable ratings. But we also did a few things that actually made the boats go through the water faster. Here are a few Dick Carter tenets:

- *Reduce the "frontal area" of a design, especially the keel. If it isn't there, the water doesn't need to go around it.*
- *Use true NACA foils for keels and rudders, not simply teardrops that look good.*
- *Flatten the canoe body in way of the keel, which increases the height (wingspan) of the keel.*
- *Reduce the fairing radius between the keel and the hull to the practical minimum.*
- *Lighter is always faster than heavier.*

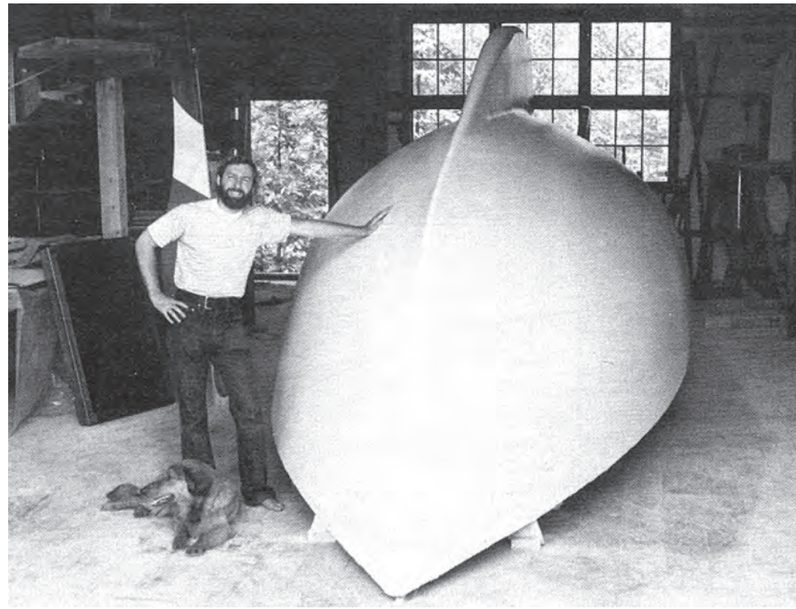


- *Keep the waterline beam as narrow as possible since this lowers resistance.*
- *Stiff boats are faster than tender boats.*

If you study the midship section of a *FRANCES* you can see most of these guidelines being followed. The hull was pared away below the points where the cabin sole needed width, the fairing radius between keel and hull was tight, and the waterline beam was narrow. This was obviously a shape without a lot of form stability, so I gave the *FRANCES* an unusually low center of gravity to compensate—nearly 6" below the waterline- thanks to an outside lead ballast casting that comprised more than half the weight of the entire boat.

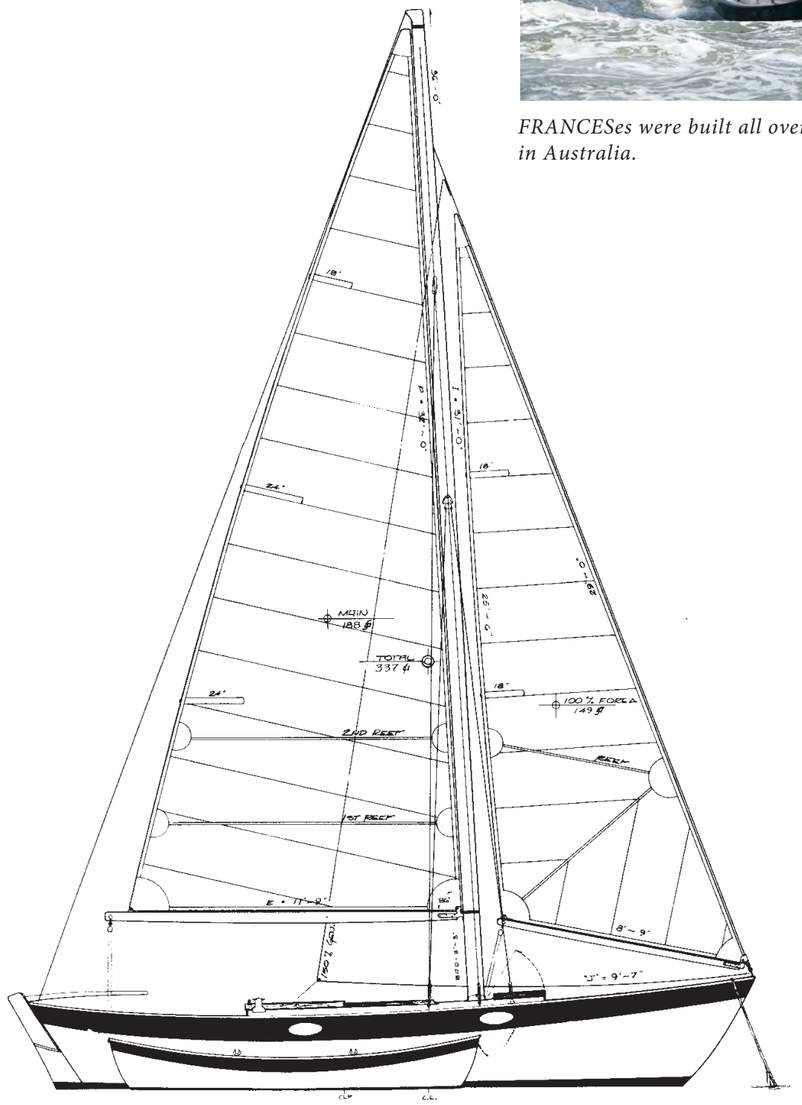
If I had it to do over again I'd change a few things. There were no seatbacks to lean against in the cockpit on my boat—a stupid oversight Tom Morris corrected as soon as he started building them. I would fit a deeper and shorter keel-making her stiffer and more wetherly. And I'd eliminate the upward tuck of the keel profile aft, which was put there to protect the rudder in the event of a grounding. But it also had the effect of releasing the built-up high pressure on the leeward side of the keel and allowing it to flow to the low pressure windward side. What resulted was a classic and at times sublimely beautiful wingtip vortex, which when hard pressed trailed aft like a six inch diameter snake for all the world to see. Beautiful yes, efficient no.

I adored my little *FRANCES.* She was beautiful, well mannered, stable, and just plain fun. Narrow of beam, her sleek lines cut through resistance like a dreadnaught. Point *FRANCES* toward a destination and she was unstoppable. Her timeless virtues seem to have disappeared from the modern world. They just don't build 'em like *FRANCES* anymore.



Me, Shep, and my first FRANCES *in 1974.*

FRANCESes were built all over the world. This is TOM THUMB, built in Australia.



It was an inspiration, drawing that peapod beside her. It was sort of like Pete, and Repeat.

32' Double-Ender

Sarah

Dimensions	
LOA:	31' 5"
LWL:	25' 10"
Beam:	10' 3"
Draft:	4' 9"
Displacement, ½ load:	11,100 lbs
Ballast (lead):	5,100 lbs
Sail Area (100% Foretriangle):	474 sq ft
Disp/L Ratio:	287
Sail Area/Disp Ratio:	15.24

The first SARAH. *I wanted her to be stiff so she had a lot of outside lead ballast. Here she's close-reaching in 20 knots apparent and not heeling all that much.*

***SARAH* WAS MY SECOND DOUBLE-ENDER,** designed in 1976. Unlike the *FRANCES* she had a canoe stern with the rudderpost further forward and tucked beneath it. She still had a full keel, just less of it in the fore and aft direction. The shorter keel gave her less wetted surface and generally better performance than any double-ender with an outboard rudder. I designed her for an aspiring boat builder in Traverse City, Michigan who thought he'd try to steal some of the thunder a boat called the Westsail 32 was creating on the west coast. Rumor had it that for all its popularity including a write-up in *TIME Magazine,* the latter sailed like a tethered rock. *SARAH* was an attempt to preserve the double-ended shape of the Westsail at something like the same length, but to offer a boat that sailed a whole lot better. Which it did.

Designing yachts is a relatively easy thing to do. It's inside work, with no heavy lifting. Getting other people to *PAY* you to design a yacht, however, borders on the impossible. Half the teenage males who ever belonged to a yacht club believed (as I did) that they can do it. And the number of legitimate yacht design clients at a given moment in time can be counted on the fingers of one hand. In order to actually get the work and make it pay, you have to look like, and in fact be, an expert. Which I was—but nobody knew it.

- *Designing yachts is easy. Getting others to pay you to design their yacht, not so easy.*

I had an inkling of all this when I returned home from India in 1973. I recognized that I had to capitalize on my experience at Carter's, which was priceless. Meaning I had to screw up my confidence and go on the selling trail. There was a brand new magazine starting up in Newport, Rhode Island that intended to specialize in cruising yachts.

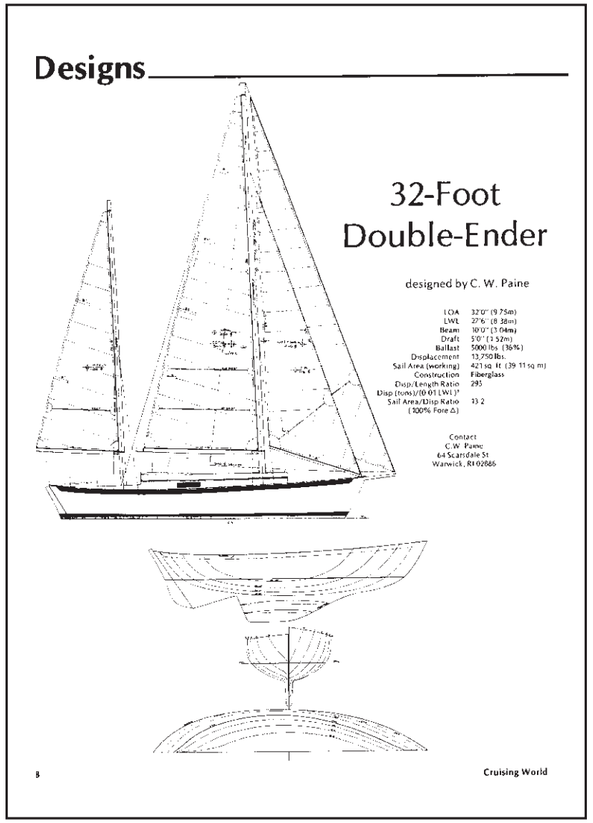
I walked unannounced into the new offices of *CRUISING WORLD MAGAZINE* on Thames Street in Newport and met Murray Davis, the editor. I told him I was starting a new design office that would apply racing yacht technology to the sort of yacht that he was going to make his specialty, and wanted to write about what I was going to do. He was wary but like magazine editors everywhere had to fill those blank pages between the advertisements with something, so he heard me out. In the end he agreed to publish the page you see at the right—a quickie preliminary design I'd pulled together for the purpose. And he said, "Write three articles, send them to me, and if they're any good you can write a whole series." I wrote the first two. He liked them and said, "I'll go with this—write as many as you can." Over the next two years I wrote ten articles on various aspects of high(ish)

performance cruising yacht design and this, along with the fact that Tom Morris was doing very well building my designs, gave me the start I needed to make a living designing yachts.

Shortly after the article on the 32-foot double-ender was published in Cruising World I was hired to design *SARAH*. It lacked the overly deep keel and stupidly short rudder and foolish skeg of my preliminary design—it was going to be actually built, so a bit more thought had to go into it. The first builder never got so far as to finish one complete boat. The molds for *SARAH* migrated from Michigan to South Dartmouth, Massachusetts where Lyon Loomis had a small shop. Lyon had better luck and built six *SARAHs* before he—or rather the marketplace—gave up on her. Lyon was very much like Tom Morris when it came to quality—his boats were way above average. But Tom saw early on the value of advertising and promotion. *SARAH* was a far better design than the Westsail 32, which sold in the hundreds. But nobody *knew* it. I learned from this experience that selling is not the sordid business I had once thought it was. Tom Morris went to boat shows and advertised in all the magazines and he sold boats. Lyon didn't do these things, and his excellent product died a premature death.

- *If you don't sell them, you won't build them, and folks don't get to have fun in them.*

I also drew plans for a cold-molded wood version, and at least one of these was completed. Back in those days I would do anything to put food on the table and this included selling plans to amateur builders. I gave this up shortly afterwards when I began to realize that only a tiny fraction of those who bought plans had any idea what was financially and maritally involved


Designs

32-Foot Double-Ender

designed by C. W. Paine

LOA	32'0" (9.75m)
LWL	27'6" (8.38m)
Beam	10'0" (3.04m)
Draft	5'0" (1.52m)
Ballast	5000 lbs (36%)
Displacement	13,750 lbs
Sail Area (working)	421 sq. ft. (39.11 sq. m)
Construction	Fiberglass
Disp./Length Ratio	293
Disp. (tons)/(0.01 LWL)³	
Sail Area/Disp. Ratio (100% Fore Δ)	13.2

Contact
C.W. Paine
64 Scarsdale St.
Warwick, RI 02886

8 Cruising World

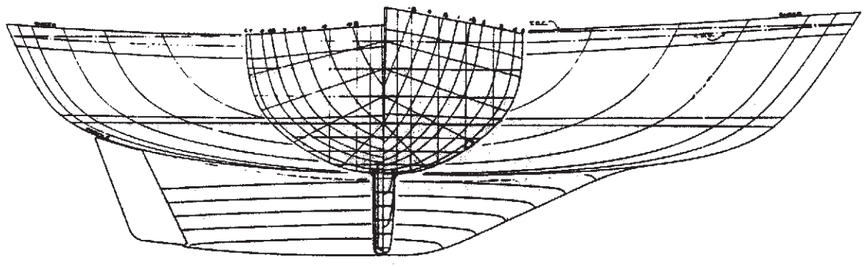
to actually finish building a boat. And that if you "sold plans" you weren't taken seriously as a designer.

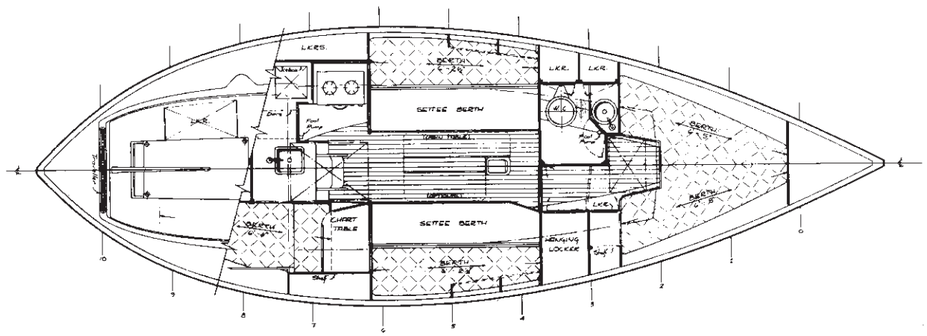
- *If you sell plans to amateur builders you won't be taken seriously as a designer.*

By this time I had three professional builders selling my designs and promoting the value of my name, not to mention sending the occasional royalty check. I also had other magazines requesting articles, which was a double blessing—it got my name out there and was another source of income. The boating field was still in a huge expansion phase, with expensive wooden yachts being replaced by less expensive fiberglass ones. As these things happen, Tom Morris liked the *SARAH* and was ready for another addition to his fleet. It was all so much easier in those days when America's economy was expanding rapidly and marinas were being built left and right with nothing to fill them. But I wasn't complaining.


SARAH *could really go on a reach!*


She was beamy enough to fit a pilot berth.


Once again you can see the Carter influence. With more beam, flatter deadrise, and a more NACA-like but still not perfect keel foil, she offered much better performance than the FRANCES.



The standard interior had two pilot berths. Most owners eliminated one of them and substituted stowage lockers on that side.

30' Double-Ender

Leigh

Dimensions	
LOA:	29' 8"
LWL:	23' 1.5"
Beam:	9' 7"
Draft:	4' 7"
Displacement, ½ load:	9,010 lbs
Ballast (lead):	4,400 lbs
Sail Area (100% Foretriangle):	440 sq ft
Disp/L Ratio:	316
Sail Area/Disp Ratio:	16.26

LEIGH *just loved a breeze.* *Credit: Onne van der Wal photo*

I DESIGNED *LEIGH* FOR TOM MORRIS IN 1977. Tom had enjoyed great success with the *FRANCES* and his customers were asking for something larger. *LEIGH's* hull was a canoe stern design with a full keel—a scaled down *SARAH. LEIGH* proved to be fast and stiff and just large enough for a small family to enjoy if nobody was too tall.

The canoe stern, heavy outside lead ballast, full keel, and moderate beam made her more seaworthy than her small size might suggest. The beautifully balanced sail plan and symmetrical hull design made *LEIGH* easy to steer—at this stage a consequence more of beginner's luck than the mathematical studies we developed a few years later which left nothing to chance. Careful trim of the sails could actually neutralize the helm completely allowing the helmsman time to walk away to ready ground tackle, check charts, or just relax. The long keel reduced the draft to the point where she could still get to windward in only five feet of water, a decided advantage for U.S. East Coast sailing.

LEIGH and the traditional Colin Archer derived North Sea double-enders, popular at the time, were as dissimilar as the Clipper ship and East Indiaman were a hundred and fifty years earlier. *LEIGH* was a sporty performer, and she changed folks' ideas about double-ender performance. Tom began selling the boats even before the molds were completed. Meanwhile Bob Perry was cranking out his beautifully designed alternatives built in Taiwan at half the price. But in the early Taiwan days "stainless steel" was any metal that was shiny and a magnet wouldn't stick to, and keels were fat things out of one-piece molds with cast iron puttied into them. You get what you pay for. Later, as quality improved in Taiwan it got a lot tougher for the domestic builders.

LEIGH's looks were a bit of an oxymoron—a little too lozenge shaped to my eye thirty years later, but taking volume out of the ends made her faster than she would have been otherwise—especially in light airs. Her cabin was boxy, making her look like a wooden boat with a very smooth paint job, and this was intentional.

The cutter sail plan was versatile and easily managed under most conditions, though Bob Perry was right when he called a cutter rig on anything of this size, a "clutter rig." A genoa jib could be carried, which really perked up the light air performance. Of course it tangled with the cutter-stay when you tacked, so Tom Morris invented a neat little fitting that made stowing the detached cutter-stay a simple matter. She was still manageable in winds up to 35/40 knots using the staysail alone—the primary advantage of a cutter rig. The yankee jib or genoa tended to be rigged with roller furling for an easy quick reef before resorting to the staysail.

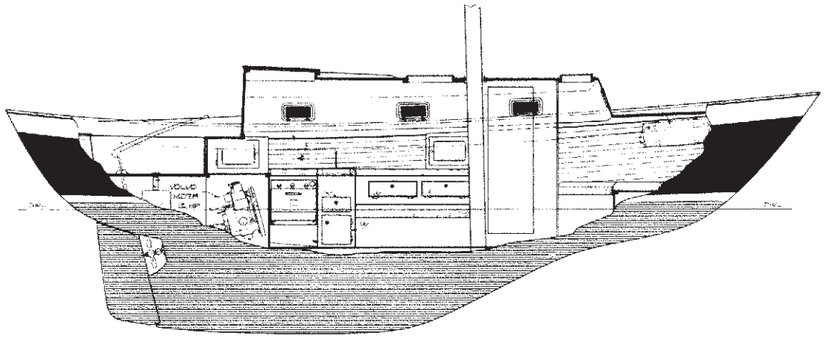
The deck and cockpit were designed for safety over style. The bulwarks were high and the side decks wide and of relatively flat camber—something of a bugaboo for me throughout my career. The argument could be made that an inch or two of camber is enough in a side deck, and many of our designs had no more than this making them much more comfortable underfoot than those with more crown. The cockpit was far enough above the waterline to drain quickly and remain dry, though it was a bit smaller than ideal for the usual four-person crew. The boxy cabin gave good shelter to the helmsman without obstructing forward visibility, at least until a spray dodger was fitted. The mainsheet on the early boats led directly into the cockpit, either from the end of the boom to aft of the footwell, or on some boats to a traveler on the bridge deck—a most inconvenient location in either case. Later, like nearly every other sailboat on the market, the traveler was moved forward and the mainsheet to mid-boom where it was a lot safer.

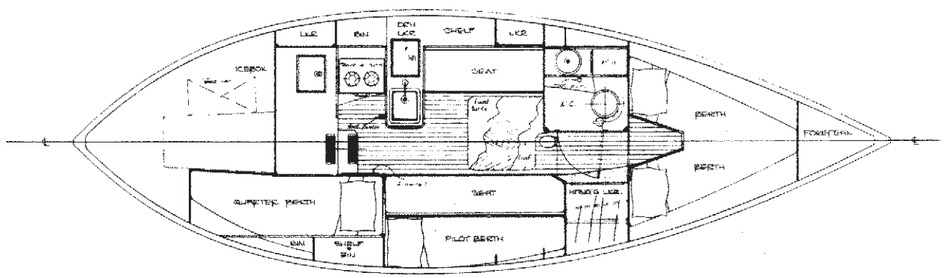
She'd sail faster with a smaller flag. *Credit: Onne van der Wal photo*

- *Keep side decks relatively flat. An inch or two of camber is enough.*

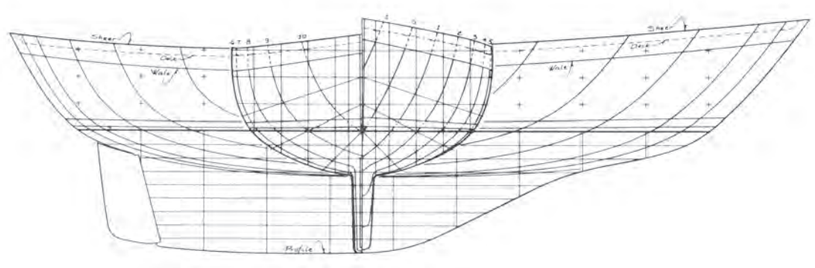
Morris built *LEIGHs* had a hand lay-up single skin fiberglass hull consisting of alternate layers of 1.5 oz. mat and 18 oz. woven roving. There were five such mats and three woven rovings above the waterline and six mats and four rovings from the waterline down. It was early Paine Yacht Design protocol to use more layers of thin material rather than fewer layers of thick. Of course this made for more handling during layup and the attendant higher costs, but it put less pressure on "overlaps" and I believe to this day that these layups outlast the cheaper ones with fewer, thicker layers. The decks were also hand lay-up balsa-cored fiberglass. The ballast was an externally mounted 4,400 lb. lead casting, faired to the hull and secured with seven bronze keel bolts. With this amount of outside lead ballast the boats were what we call in Maine, wicked stiff.

- *Use more layers of thin fiberglass rather than fewer layers of thick.*

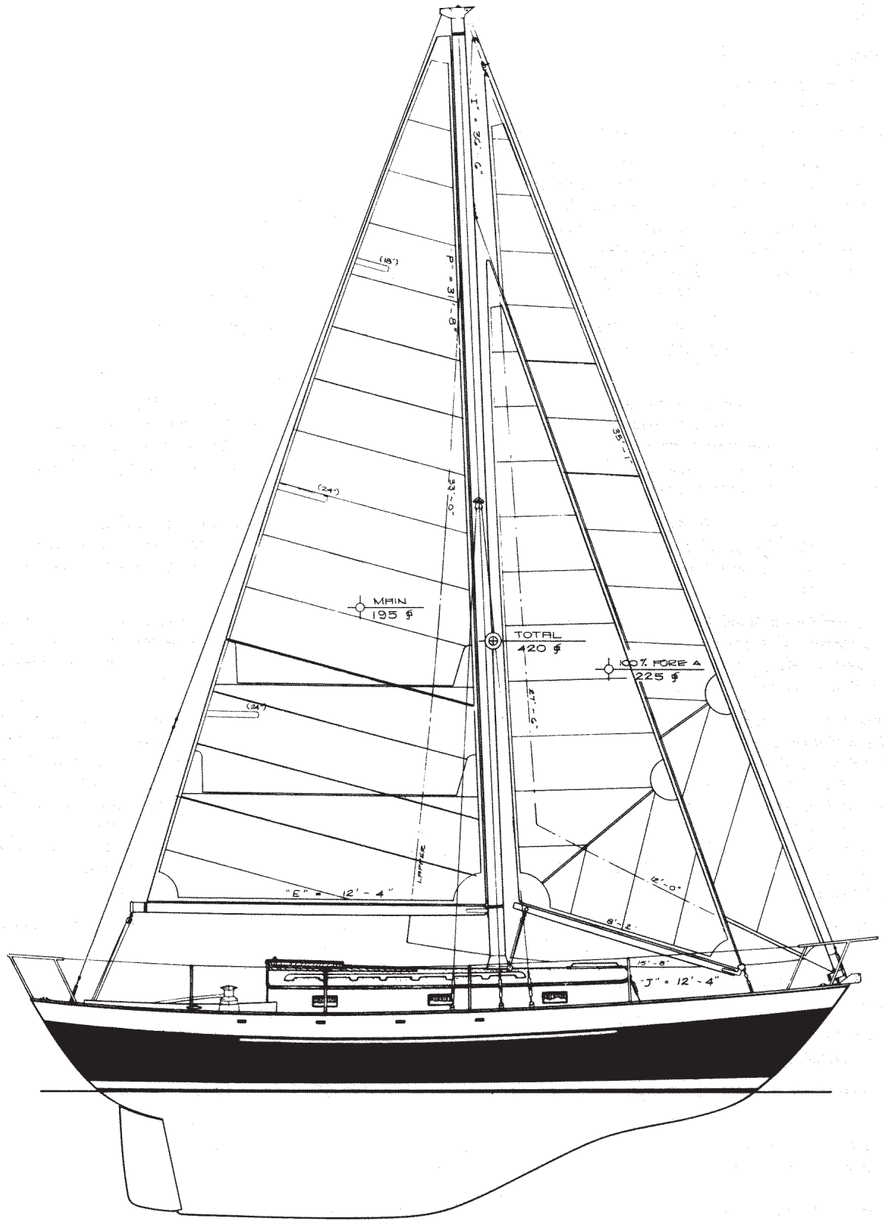




The most ambitious interior, berth wise. Three of the four berths were on one side, a shortcoming. Most boats replaced the tiller with a wheel, which got the helmsman further aft.



LEIGH *had flatter deadrise still than* FRANCES *and* SARAH. *It took me many years to abandon the tucked-up profile ahead of the rudder, which made the worst of a good situation from a pressure differential point of view.*



The boat balanced beautifully. I refused to be taken in by IOR rule influence, which favored overly short booms and too large foretriangles. On later boats the mainsheet was moved out of the cockpit where it couldn't possibly tangle with the crew.

The British Built *FRANCES*

Victoria 26

Dimensions	
LOA:	25' 10"
LWL:	21' 3"
Beam:	8' 4"
Draft:	3' 10"
Displacement, ½ load:	6,800 lbs
Ballast (lead):	3,500 lbs
Sail Area (100% Foretriangle):	340 sq ft
Disp/L Ratio:	316
Sail Area/Disp Ratio:	15.16

A British FRANCES *at the Warsash boatyard.*

The interior of a VICTORIA 26. *It was taken with a wide-angle lens making it appear much larger than it really is.*

AFTER TOM MORRIS HAD LAUNCHED A FEW *FRANCESes* the editor of *Yachting World Magazine* in Britain—Bernard Hayman—read an article in one of the American yachting magazines about the boat. He wrote a gushingly favorable review in *Yachting World*, lavishing praise upon the design that it probably didn't deserve. I suspect it had more than anything to do with the black and white photograph Tom had sent him of one of his boats, which was simply evocative of the fun you can have in a small boat. You be the judge—here's the photo:

The black and white photo Tom Morris sent to Yachting World.

Two months later *Yachting World* reported in its editorial,

"Two months ago a small double-ender was used to illustrate* Yachting World's *leading article, a return to simplicity in cruising. That single photograph has produced more correspondence and enquiries than any other boat in the last ten years. The boat? A* Frances 26*, designed by C. W. Paine."

As a consequence no less than four British boatbuilders competed to secure a license to build the *FRANCES* in the U.K. Tom and I chose the leanest and hungriest, Peter Gregory and the Desty brothers from Southampton. Peter and the Destys seemed a lot like us—young, ambitious, and ready to work their tails off to earn recognition in a field that tended to exclude upstarts. They began building *FRANCESes* in a tiny shop in Bitterne Manor and as demand grew expanded to a larger waterfront factory in nearby Warsash.

- *Photos taken with a wide-angle lens make yacht interiors look much larger than they actually are.*

- *In choosing partners, choose the ones that will work hardest.*

Peter Gregory was a marketing man—he knew nothing about boat building and left that to his partners. But boy, could he sell! He chose boats because they were expensive, and if you make a percentage selling something why not make a percentage of a big number? He always drove a huge BMW and lived at "Darkwater", a beautiful country estate in Lepe with a half mile garden—we'd call it a lawn—sloping down to the Solent. I was pretty shy when I started, and certainly never thought of myself as selling anything. I figured if you designed good boats and never got into debt and charged less than everyone else in your field, you'd get to the top eventually.

- *If you make a percentage selling something, make a percentage of a big number.*

Peter and Ida Gregory became close friends. I began to practically commute to England. I'd help out at London Boat Show every January and Southampton Boat Show every September. And there would be one or two other visits each year getting new designs up and running. I'd stay at Darkwater and Ida would be the most perfect hostess. Ida and I would sit up nights drinking whiskey and watching movies on video while Peter was off volunteering as president of the BMIF (British Marine Industry Federation) inventing ways for British boatbuilders to out-scheme the French while not in actual fact violating European Union rules against government subsidies. Then he'd come home and try to teach me to sell myself, which he considered important.

Peter taught me, "You sell the sizzle, not the steak. In boating the realities are yard bills, rainy weekends and a depreciating asset". But that was just the steak. He made sure that every photograph, every brochure, every advertisement depicted only those marvelous once-in-a-season days of warm sunshine and blue skies and pretty young women—never men—at the helm. I asked, "What will we do when all the marinas fill up?"

Peter told one of his salesman stories. "Two shoe salesmen go off to darkest Africa. One cables back to the home office—Might as well send me home—they don't wear shoes down here. The other wires back to his boss—Ship me all the shoes you can—nobody's got any yet." It's all in your attitude. He thought I charged too little for my work—except when I charged him, of course. "If you charge half as much as the other designers, the clients will assume you're half as good." I told him that I thought if you charged just a little less than your competitors, and did a little better work, the world would eventually beat a path to your door. The most difficult thing for me to accept was, "ask for the money." He led training sessions before every boat show and he'd coach us all, "Most of the punters who're coming to this boat show have no interest in ever buying a boat. But the ones who do are coming to our stand for a reason, and they can't wait to make a commitment. The only way you'll ever know one from the other is...Ask for the money!"

- *Sell the sizzle, not the steak.*
- *If you charge half as much as other designers, clients will think you're half as good.*
- *Charge a little less than everyone else and do a little better work.*
- *Ask for the money.*

I once asked Peter, "Why do you spend so much money going to the London Boat Show every year?"

Peter responded by asking, "What's the capital of America?"

"Uhhh—Washington?"

"No, I mean, if you're the best yacht designer in America, where do you go?"

"Go? I plan to stay in Maine."

"Well, if you're the best lawyer in Maine and want to get to the top, where do you go?"

"New York City".

"What if you live in California?"

"Then San Francisco."

"Or the Midwest?"

"Chicago."

"And what's the capital of America?"

"Washington."

"You see we Europeans have a tremendous advantage over America. We're city-states. If you're young and ambitious and you think you could become the best lawyer, or actress, or yacht designer, or you name it, in England you have no choice but to come to London. If you're French, then Paris. And so on. Our commercial centres are also our seats of government. America is too large an entity to hold together—its talent is too widely dispersed to enable its greatness to evolve. That's why you have to go to London Boat Show. If you're not at London Boat Show, you simply don't count."

London Boat Show in those days was held at Earl's Court Exhibition Centre, a high-ceilinged old building in the middle of which they'd build a pool and a Mediterranean village surrounding it with fully rigged sailboats moored stern-to in the European fashion. The Brits all love boating and the "gate" at Earl's Court would be huge compared to any American boat show. Debby and I would actually work the show, sitting belowdecks and answering those questions we could decipher given that some of the Scots and Welsh accents sounded pretty much like a foreign language to us. At 8pm every day they would close the show by playing "God Save the Queen" over the public address system and everyone, ourselves equally proudly, would stand at attention with our hands over our hearts until the echo faded away. I thought—working as hard as these people do—There will always be an England!

A few years later, when not one in ten people had any idea what one was, Peter said to me, "You have to have a website—in a few years magazine advertising won't be worth the paper it's printed on." "A web what?" I responded. But I knew by then not to question Peter when it came to marketing. He said, "Do you know how many people there are in the entire world named Chuck Paine? If you want a domain name called www.chuckpaine.com you had better grab it NOW!"

I had one of the first websites in the yacht design field, and I improved it in some way once every week for twenty years to keep it fun to read. For many years if you Googled "Yacht Design", or "Yacht Designers", www.chuckpaine.com would come up on the first page, "above the fold" as they say in the newspaper trade (meaning you didn't have to scroll down to see the link). Nobody really knows the Google search algorithm, but that probably meant that in the entire English speaking world more people were clicking my site than anyone else's, and I owe Peter for that.

- *You have to have a website. And you have to stay on the first page, above the fold.*

The one thing Peter and I could never see eye to eye on was debt. He had expanded his business very rapidly by borrowing the necessary funds. I had made a vow— ever since being burned twice by boatbuilders who had gone bankrupt owing my company a great deal of money—never to inflict the same pain on anyone else. Instead I'd use retained earnings to grow my business—and if that meant it grew more slowly, so be it. Peter thought—if there's opportunity out there and you need money to respond to it before your competitor does, that's what banks are for. I pointed out that if you never went into a bank you could never go bankrupt. Ten years later Victoria Marine was out of business and my business was thriving. So in this one respect, I was right.

- *If you never go into a bank you can never go bankrupt.*

I had learned from hard-won experience at the receiving end that the stage before going bust was the stage where payments to one's creditors were stretched out 30 days, then 60, then 90. I made it a rule to pay my bills the day they came in. I warned my employees on many occasions that if the corporate checkbook ever got to zero I would shut the doors rather than bilking bank depositors out of their savings or torturing my suppliers with late payments. And so I did, outlasting many competitors until the world changed in October, 2008 when I paid every bill I owed, and shut the doors.

- *Pay your bills the day they come in.*

Little did I know in 1978 where the opportunity to build a British version of my first design would lead. More than 500 Paine-designed sailing yachts were ultimately built in Britain, by two of its largest manufacturers. In later years I began to refer to Victoria Marine and Bowman Yachts as "my British Empire" and it all happened because Tom Morris sent a black and white photograph to a magazine in London.

Two versions of the *FRANCES* were eventually made-one with a short trunk cabin called the *FRANCES 26* and another with a longer cabin named the *VICTORIA 26.* The company derived its name from Peter and Ida's daughter—which fit in beautifully with my women's names theme. Victoria Yachts built over 100 yachts on the *FRANCES* hull and came back for three subsequent designs—the *VICTORIA 30, 34* and *38.*

The British Built *LEIGH*

Victoria 30

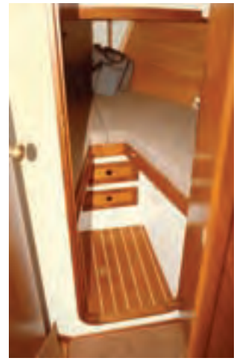
Dimensions	
LOA:	29' 8"
LWL:	23' 1.5"
Beam:	9' 7"
Draft:	4' 7"
Displacement, ½ load:	9,010 lbs
Ballast (lead):	4,400 lbs
Sail Area (100% Foretriangle):	440 sq ft
Disp/L Ratio:	317
Sail Area/Disp Ratio:	16.26

The VICTORIA 30 *had less trim than the Morris* LEIGH 30 *and the cockpit was extensively retooled, requiring less hand labour to complete. Many of the boats had laid-teak decks that looked great when they were wet—which was much of the time given the typical English weather.*

PETER GREGORY SAW TOM MORRIS BUILDING a larger version of the Frances and doing very well. It seemed a good bet to build the *LEIGH* in the U.K. Fiberglass "splashes" were taken from the *LEIGH* molds as they had been for the *FRANCES*, shipped to England and extensively retooled to give the design a more British flair. "Splashes" are essentially hull or deck moldings whose laminate is entirely mat as opposed to alternating layers of mat and woven roving. This is done to eliminate any trace of "print through" of the cloth weave pattern that might be present if woven materials were used. A smoother surface results, in anticipation of the new molds that are then taken from these parts.

Victoria Yachts built more than 50 of the yachts. Known as the *VICTORIA 30*, the British version was built to different standards that appealed to local tastes. The laminate was redesigned by Lloyds—a staid old marine company whose name approached deification by the British yachting set. In actual fact the Lloyds laminate was not as strong as the American one, but you couldn't sell boats in Britain without the Lloyds stamp of approval.

Peter chose to use inside ballast, most likely because it was nigh unto impossible to find a foundry in Britain that would do an acceptable casting job at a decent price. He made a virtue of necessity by terming inside ballast "encapsulated", which made it sound like an advantage. I'd been taught to revere outside ballast as the gold standard. But the Brits loved it, since it got rid of the keelbolts and any possibility that they might leak. Because I'd designed the Morris *LEIGH* to be overly stiff, nothing was lost in the compromise and the *VICTORIA 30* was unusually safe, well balanced and fast in the typically strong British winds.



The smallish forward cabin.

The fold-down cabin table.

30' Cruising Yacht

Annie

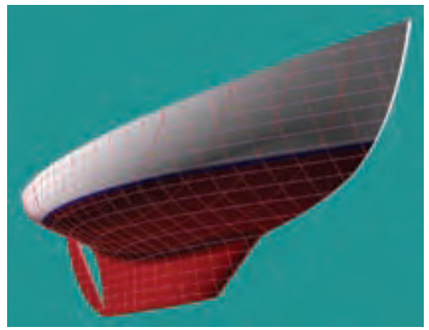
Dimensions	
LOA:	29' 8"
LWL:	24' 9"
Beam:	9' 8"
Draft:	4' 6"
Displacement, ½ load:	11,000 lbs
Ballast (lead):	4,400 lbs
Sail Area (100% Foretriangle):	446 sq ft
Disp/L Ratio:	324
Sail Area/Disp Ratio:	14.43

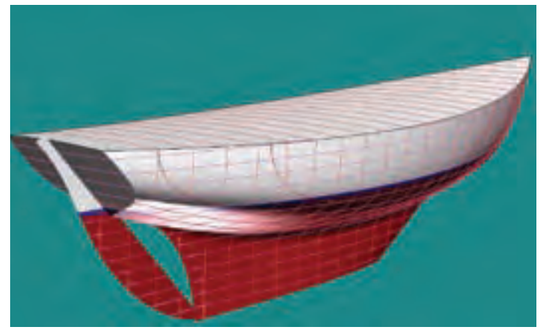
This is one of the early Morris ANNIEs. *She was so bloody stiff you could carry the number one genoa even in a twenty knot squall. Which she's about to do here.*

I BASED *ANNIE'S* DESIGN UPON AN EARLIER wooden boat designed by Ralph Winslow. I encountered my first Winslow "Four-Sum" in Pulpit Harbor, a few miles across Penobscot Bay from Camden. I was cruising my 26 footer *"FRANCES"* with my wife Debby, dog Shep, and a former roommate of Debby's. Now *FRANCES* was not much when it came to accommodations. Mine was the flush decked version, so you could only sit. Standing meant being outside, and in Maine in the summer that pretty much means out in the cold foggy drippy gloomy murk. So there we were, three young adults and the dog whose stink we were attempting to mitigate by placing him closest the Tiny Tot charcoal stove, when we heard the rattle of anchor chain being paid out alongside. Curious, I popped up to see who our new neighbor might be, and there emerged from the gloom the most lovely old wooden cruiser I had ever laid eyes on. She was a little longer than *FRANCES* and clearly much heavier, a true seagoing vessel if ever there was one. Like us, she sported a smokestack which was soon belching the black smoke and sweet smell of a real coal fire, and the glow from her little oval ports revealed her sole occupant, a fellow named Jim as we were later to learn. In time Jim rowed over to inquire just what sort of vessel ours might be. As we did of his, and that is how I became enthralled with the Winslow Four-Sum.

I designed *ANNIE* a couple of years later. She was based very closely on the 28-foot Winslow Four-Sum, but a foot and a half longer and built of fiberglass rather than wood. The idea was first of all to retain the many virtues of the Four-Sum. *ANNIE* was heavy, extremely stable, had a long keel, some hollow to the bow, an outboard rudder which made the fitting of a self steerer that much easier, and decks with very little camber so they were easy to walk on. The house had vertical sides making the fitting of opening ports appropriate, and even the cabin front was vertical and dead flat so you could fit one facing forward. With a lot of stability she could carry a large and powerful rig. The cockpit had unusually high seatbacks (a failing of my *FRANCES*), and it was low to the water so you always felt as if you were going fast with the water rushing past. *ANNIE* wasn't perfect. One flaw was that she developed a lot of weather helm when it blew hard. All long-keelers do this, but if I had it to do over again I would cut away more of the leading edge of the keel, and I'd fit a fully balanced rudder—an idea I dreamed up fifteen years after I drew *ANNIE's* lines. And she only had five foot, eleven inch headroom. Fine if you're vertically challenged like me, but not so great if like the majority of my male clients you're over six feet tall. Tom Morris opted into the design as soon as I showed him the drawings, and he built 16 of them.

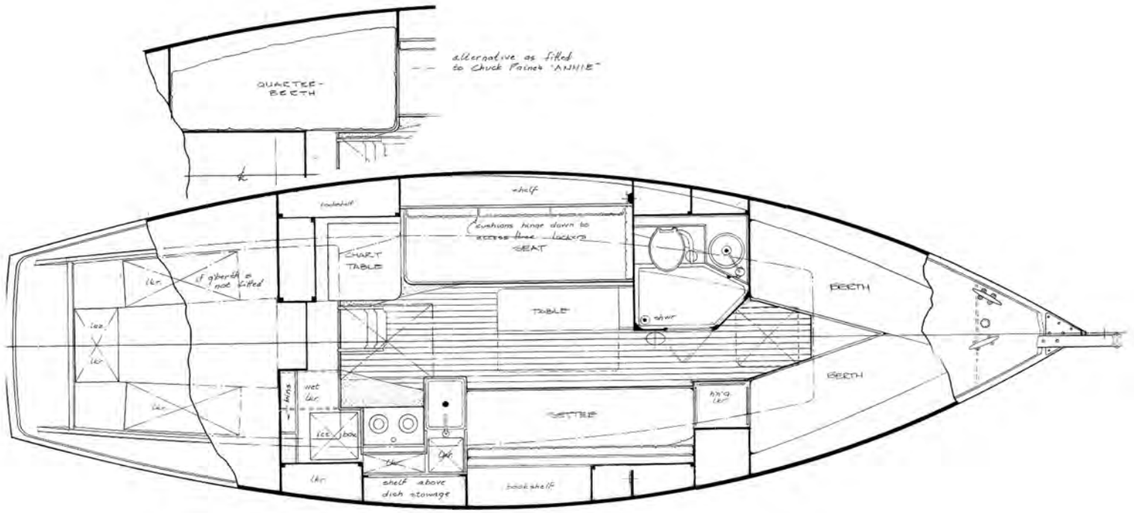
Before I retired I made a few small improvements to the original design—mostly a redesign of the keel and rudder to reduce the amount of weather helm generated in heavy airs, and a slight enlargement in both length and freeboard. Shown below is the hull I'd want to build today.





The "Mark II" version of ANNIE *incorporates two significant improvements. The keel is more cutaway forward than the original. And the Paine "full flow aperture" is used, allowing the rudder to be fully balanced for better steering than any of the traditional long keel designs. Designs you will encounter later in this book—*GUSTO, WINGS OF GRACE, *and the* CABO RICOs, *proved unequivocally that this development eliminates the steering problems exhibited by older long-keelers.*

Trim that jib-you're being photographed! *Credit: Onne van der Wal photo*



This is the interior I fitted to the ANNIE *I built for myself. With the quarter berth option, I wouldn't change a thing after twenty-five years.*

Here's Jim aboard OCCASION, *the Winslow Four-Sum that got me drawing the first* ANNIE.

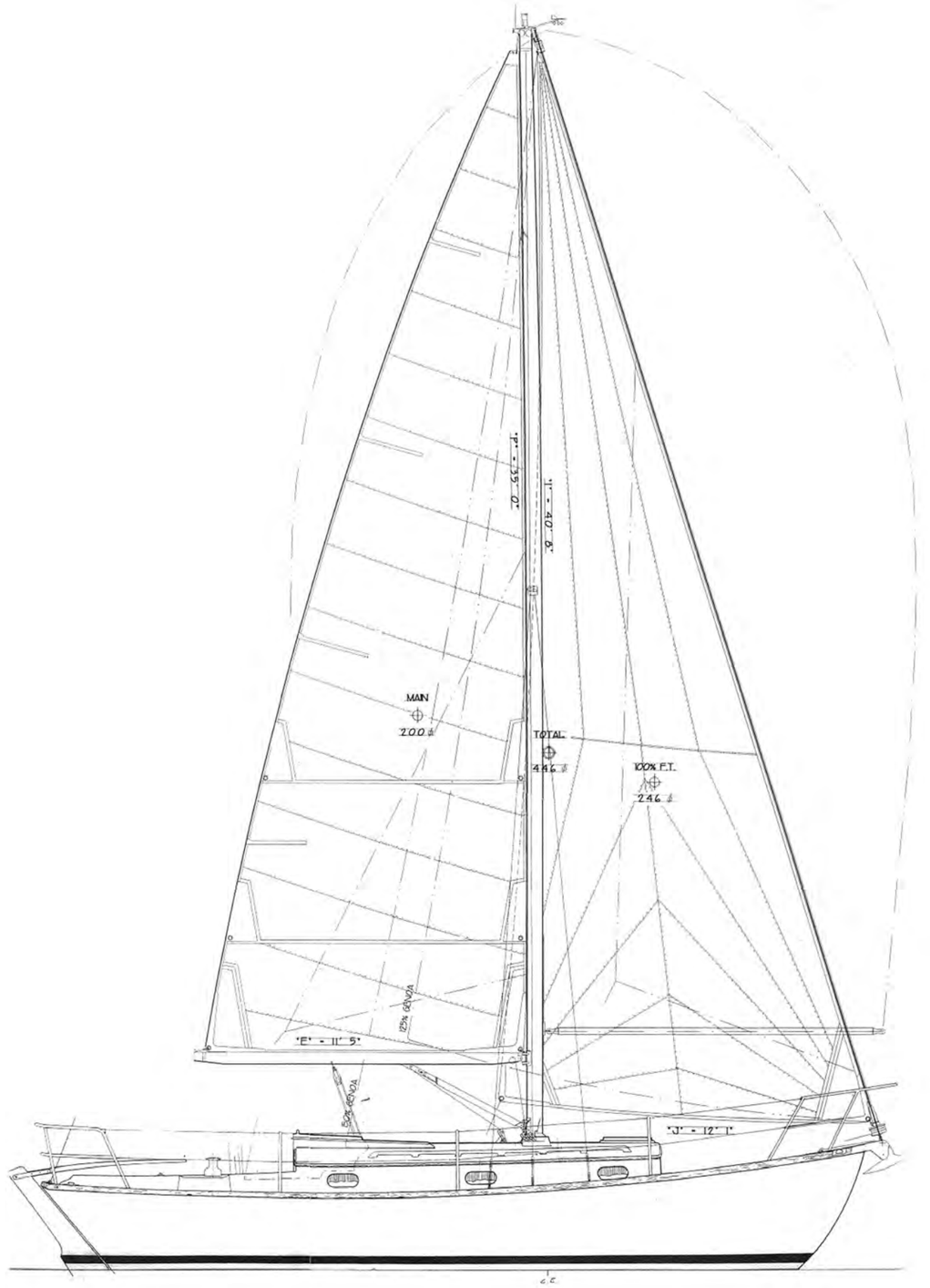
I built an ANNIE *for myself from a set of Morris moldings. The quarter berth was the nicest one in the boat.*

My ANNIE *had a seatback that hinged up to make an upper berth when needed. This gave a total of six places where one could sleep.*

Stowage tubs beneath the sole. You could remove the tubs to check the bilge.

The life raft stowed atop the hatch cover between the teak slats.

My ANNIE's *head. The flooring was made of Congoleum.*



The perfected sailplan has a tall sloop rig and minimal spar rake to reduce weather helm. The mainsheet is kept clear of the cockpit and I'd fit a mechanical boom vang. There's still a genoa jib since the design can easily carry it and it just makes the boat go faster.

24' Double-Ender

Carol

She was tiny. But you and a compatible shipmate could hunker down below and that self-steerer would take you to Paradise.

I DESIGNED CAROL IN 1979. THERE WAS NO CUSTOMER. Back then if you had well drawn plans, people would buy them and build boats for themselves in the backyard. Those were the dreamer days, when young people could earn a good wage if they were willing to work, and many dreamed of sailing over the horizon in something they built themselves. Boating magazines had articles on ways you could build a temporary boat shop in your backyard with plastic pipe and tarps.

By this point I was receiving steady royalty checks and was making a living building and selling a little trailerable sailboat that is illustrated in the Performance Cruisers chapter of this book. So I designed *CAROL* on spec, sold the plans, and assumed that a professional boatbuilder would someday come along and want to build it. I'm still waiting, 30 years later.

CAROL was in many ways my favorite pocket cruiser, a scaled down and "flattened" *FRANCES*. She evokes an adventurous spirit that prevailed in the happy times of the late '70s. At 24 feet in length she was as small as a prudent sailor would ever think of taking to sea. *CAROL* was the ultimate in making do with less—indeed a lot less. Her hull was unusually stable, she had tall bulwarks forward, and her rig was powerful. She could sail close to her hull speed of six knots when conditions were favorable, making for good sailing in moderate conditions. In a blow, because of her small size, she'd struggle just to keep from losing ground. While no boat of this size can truthfully be termed comfortable in the open ocean, *CAROL's* crew would at least be free of great concern for her safety, or their own. With her small self-draining cockpit well, raised deck, centerline hatches and strong self-righting tendency she was as seaworthy as the proverbial corked bottle.

Dimensions

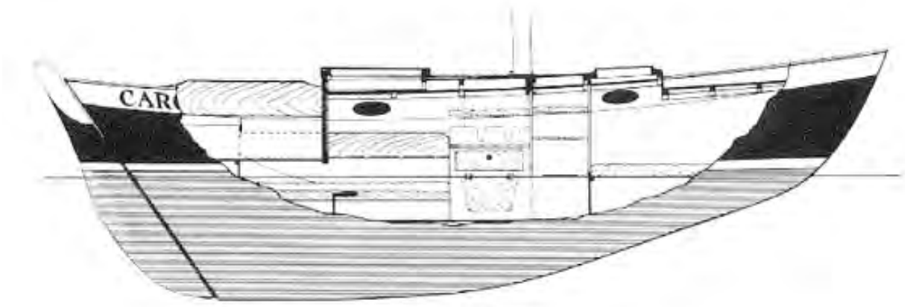
LOA:	24' 4"
LWL:	20' 0"
Beam:	7' 11.5"
Draft:	3' 6"
Displacement, ½ load:	5,709 lbs
Ballast (lead):	2,700 lbs
Sail Area (100% Foretriangle):	300 sq ft
Disp/L Ratio:	319
Sail Area/Disp Ratio:	15.03

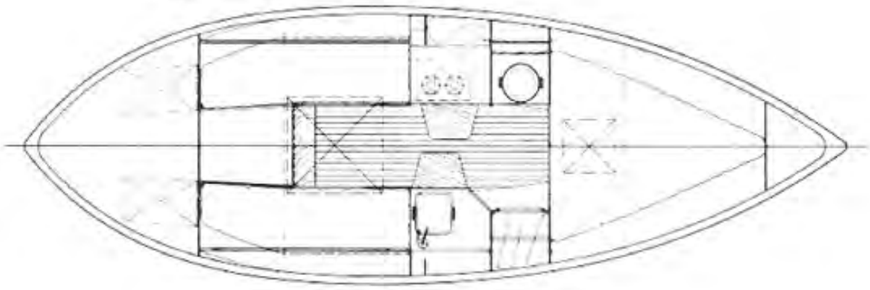
The interior arrangement was intended for just two persons. They could share the double berth forward in harbor, or the off-watch partner could choose the leeward quarter berth when at sea. There was just the absolute minimum sitting headroom in this design; indeed this was the pivotal factor that determined the overall size of this miniscule voyager. The design provided a place for the cook to sit and a bucket that could be used as a plumbing-free toilet to avoid having to go on deck for this necessity, except to chuck it overboard. The sea hood shown over the companionway provided a place to stand up for pulling on one's pants, at least when the weather permitted you to open the hatch.

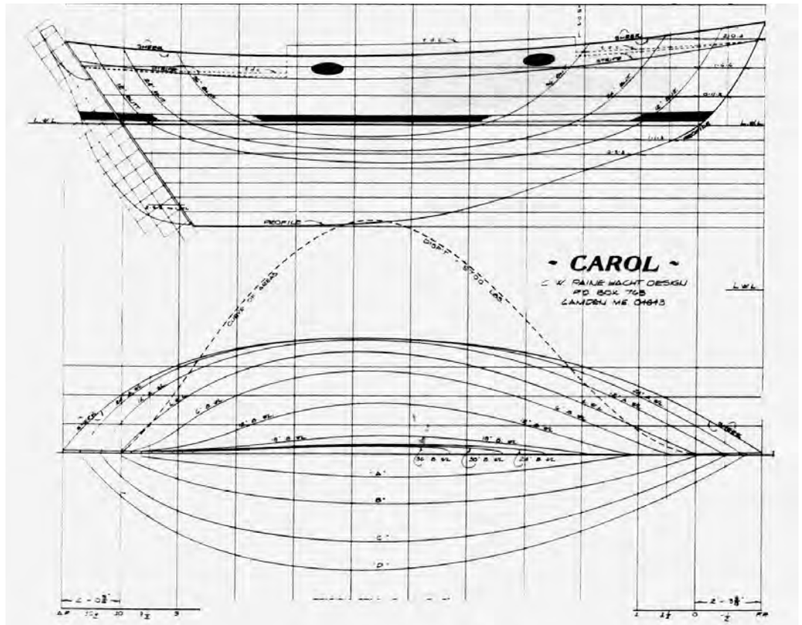
CAROL as originally designed had no auxiliary power, a pair of oars being shown for getting her home in a calm or maneuvering through an anchorage. Quite a few were fitted with tiny diesels, though, an idea that can be life-saving in difficult conditions. There are times when a yacht of this size can continue on under motor and a scrap of sail into wind and seas that would shove her onto a lee shore under sail alone.

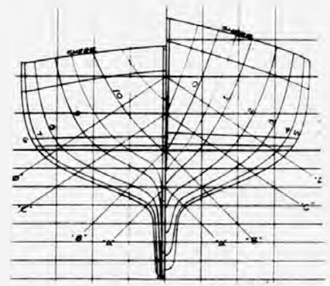
CAROL was narrow enough to trailer legally over the road in the USA, though at her weight she required a travelift or railway to haul and launch and a crane to step her mast. She was engineered to be home built in WEST system cold-molded wood construction. Those were the hippie years, with many young people seeing the wonders of the world living in a tent. A few, who thought it fun, bought books on WEST system construction and saw the wonders of the sea living in a *CAROL*.

- *On a small boat, an auxiliary engine can save your life.*



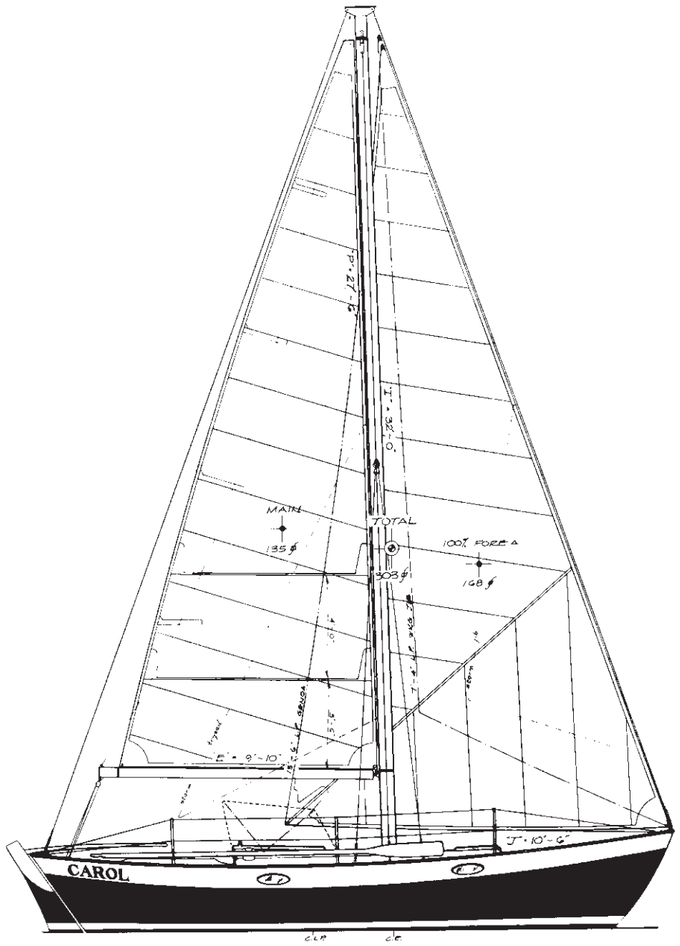






A small but comfy interior.

This time I remembered cockpit seatbacks to lean against.



The oars looked good on the drawing, but a little engine could save your life.

Morris 36

Justine

Dimensions	
LOA:	36' 3"
LWL:	29' 6"
Beam:	11' 7"
Draft: (fin)	5' 6"
Draft: (Scheel Keel)	4' 6"
Displacement, ½ load:	16,102 lbs
Ballast (lead):	6,500 lbs
Sail Area (100% Foretriangle):	627 sq ft
Disp/L Ratio:	280
Sail Area/Disp Ratio:	15.73

A JUSTINE 36 *doing what she loves to do best. There's no amount of wind this design doesn't revel in.*

Credit: Onne van der Wal photo

TOM MORRIS ORIGINALLY NAMED THIS DESIGN THE *"JUSTINE 36"* after his wife. Over the years the name was changed to *MORRIS 36*. There were a couple of aesthetic innovations that made the design distinctive. It had an improbable stern that looked for all the world like a transom stern that an outboard rudder would hang from, but minus the rudder. The actual rudder was tucked under the counter with its trailing edge emerging at the apex of the transom. Tom and I called this the "Morris Stern"—it worked beautifully and looked great. We should've built more designs with this stern. The wale stripe had a tooled-in recess with a "reveal" that caught the sun, disguising the high freeboard that resulted from deep bulwarks. Quite a few owners decided to pick this out with an overlay of gold leaf as you see above.

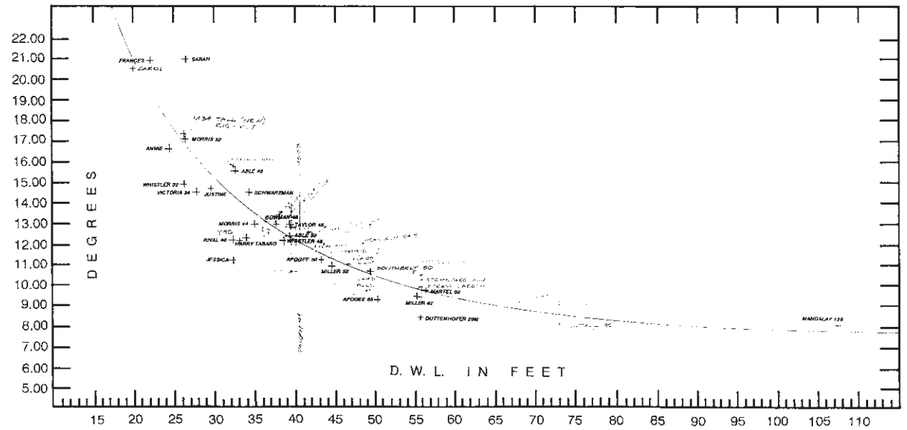
All my designs were designed to a stability curve that was stiffer than the prevailing norm. This derived from my personal preference for a stiff boat over a tender one. It made the boats faster to windward than others in a breeze, and more comfortable at all times since it's always nicer to move around on a surface that is more level. Why don't all yacht designers make their boats this stable? Because stability is penalized by racing handicap formulas, and the conventional wisdom was that if your designs didn't win races you'd never become a prominent yacht designer.

- *Design cruising boats to be stable and to hell with racing rules.*

MORRIS 36s had a solid fiberglass hull. They could've been built lighter if a core had been used, however nothing lasts longer than solid fiberglass. *JUSTINEs* have been sailing since 1984 and are still going strong. The cabin was intended to mimic that on a wooden boat. The sides were nearly vertical. Although this made it appear a

bit boxy, it encouraged owners to fit opening ports which led to much better ventilation than more "modern" looking yachts. In really heavy weather your only ventilation option is to open the ports on the lee side of a cabin— the dorades and hatches must be kept secured. Morris finished the *JUSTINEs* off with a varnished teak eyebrow and traditional wood handrails, expensive embellishments that made them virtually indistinguishable from real wooden yachts, but East Coast owners appreciated tradition and were willing to bear the higher costs.

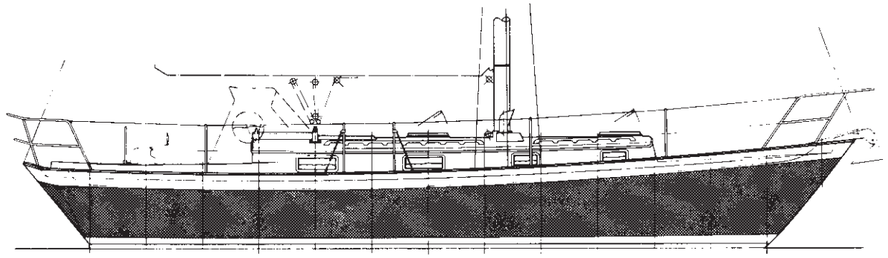
- *No fiberglass construction lasts longer than single skin.*



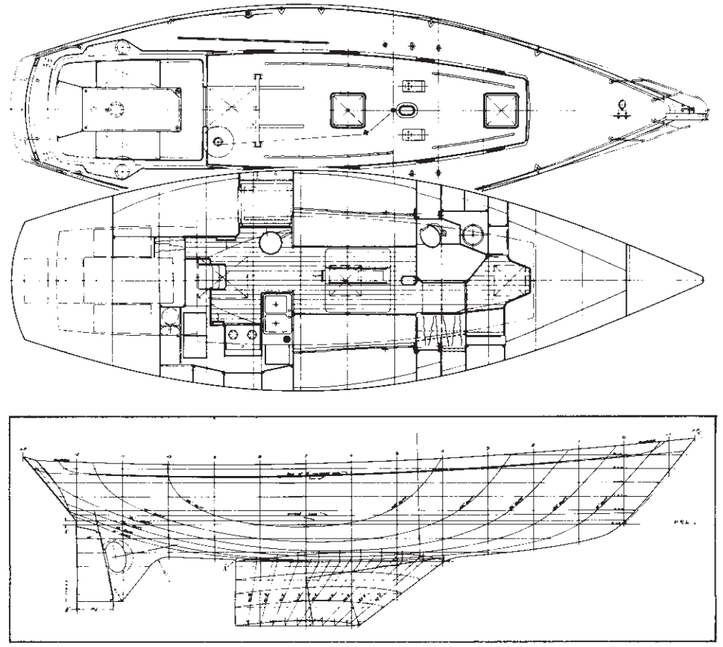
The Paine office stability curve. Dellanbaugh angle—a measure of stability—is on the left. Waterline length is at the bottom.

Every MORRIS 36 *interior was custom designed, most often by Tom Morris himself in the early years.*

- *Opening ports are the only ventilation option that can be left open in heavy weather.*



The conventional interior. It was hard to beat. Enclosed head, privacy forward, two pilot berths, nice galley, nav station. There's just nothing here that's not to like. Some boats chased shoal draft with a Scheel Keel. But with this deeper fin she really went to windward. I shoved the keel as far aft, and the ballast as far forward within it, as the numbers would justify. It balanced beautifully.



Give a JUSTINE *a breeze and she'll outsail nearly anything.* *Credit: Onne van der Wal photo*

38' Cruising / Racing Yacht

Jessica

JESSICA *carried a huge genoa when racing.*

Dimensions	
LOA:	38' 5"
LWL:	32' 1"
Beam:	11' 10.5"
Draft:	5' 5"
Displacement, ½ load:	16,158 lbs
Ballast (lead):	7,000 lbs
Sail Area (100% Foretriangle):	707 sq ft
Disp/L Ratio:	219
Sail Area/Disp Ratio:	19.63

I CALL *JESSICA* THE "FAMILY BOAT." NOT BLOOD FAMILY— my parents never owned a boat during my lifetime. *JESSICA* was, in a way, a wedding gift. Shortly after I met Debby her father Frank commissioned the design of his ultimate 38 footer. *JESSICA* was built in Maine by Roger Morse, with a glassed over plywood deck on a one-off fiberglass hull. It was my earliest design with any racing pretensions and luckily turned out to be a fabulous yacht. In fact I can say I have had more damned fun in that boat than a man has any right to. Frank left us on Christmas day 2005 and he and his beloved Nancy now sail together on some celestial shore.

During his time on this earth he became, on account of his daughter and that boat, my best friend. Great boats, as opposed to the consumer craft you see so much of at boat shows, can become things that tie generations together and create memories that live forever.

When he'd just retired Frank got infected by the ocean racing bug. So we raced *JESSICA* in three successive Marion-Bermuda races. Every one was memorable. Like so many of my designs, *JESSICA* was bloody stiff. Of course stability is measured and so is sail area, and *JESSICA* had a lot of both, so she carried a handicap rating that was hard to sail up to.

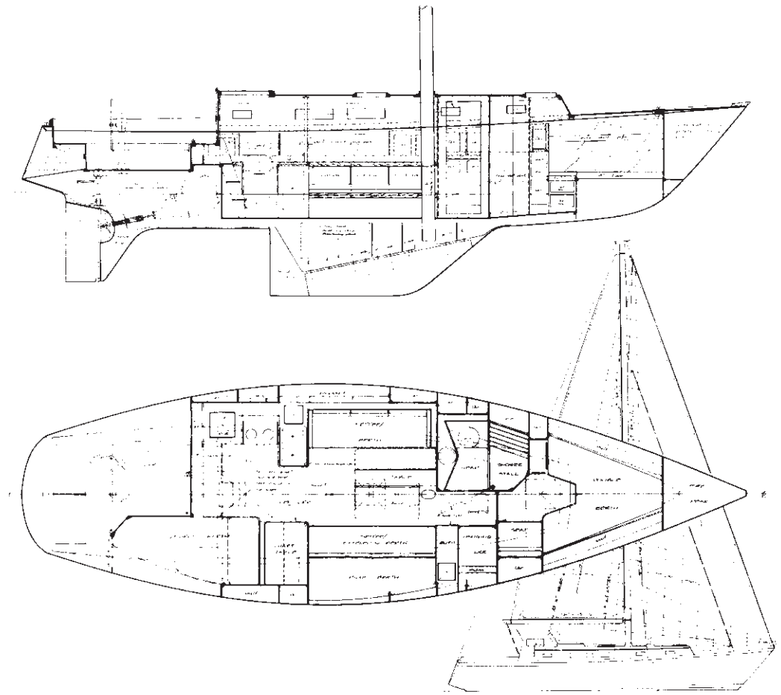
But we weren't expecting to win silverware—we were there for the fun of pushing a great sailing boat as hard in the black hours of the morning as at midday, and of finding that dangerous little reef fringed paradise after four days using nothing but a sextant and the stars. One race started off with very little wind but just as the fleet drifted past Cuttyhunk a dry cold front came down on us like a runaway train in Prussian blue, knocking down unsuspecting boats as it passed. We figured out pretty quick that we could carry the most sail by running two genoas up the headstay and stowing the main. It blew like the clappers from dead astern for four straight days but it was so dry we never even closed the ports though the Shipmate stove chewed away constantly on anything we had aboard that would burn.

As Frank got older he gave up racing and cooked up the "men's cruise." He'd gather a bunch of his doctor friends and spend two weeks sailing the boat as far into Canada as he could, and back. There was often at least one "token male" aboard, usually his incomparable Nancy who'd be the only one capable of cooking dinner and deliver a running commentary on pelagic birds while everyone else was communing with the rail gods. One crew would sail up the southern coast of Nova Scotia to Baddeck; the other would drive up and replace them for the long lumpy slog back against the wind. I got to go along on the downwind part, since I was working and on a schedule and most of the rest were retired. We'd do two overnights if there was a breeze, three or four if there wasn't. There are not a lot of East Coast sailors who sail east of Halifax. It's a foreboding rock strewn fog-enshrouded land that anyone who ever got together bus fare, left.

Her straight-forward interior—in a pinch she could sleep seven.

We'd grope our way dog-tired after two or three nights at sea into something that passed for shelter, running wing and wing into an invisible narrow gash between granite ledges that passed for a channel if you could find it. Once safely at anchor it was a lesson in the history of a continent's march westward, our own personal version of Annie Proulx's "Shipping News". While "real" yachtsmen from New York City and its environs outbid each other to speculate the prices of houses and land into the stratosphere, we hiked spectacular hillsides strewn with stunted wildflowers to abandoned farmhouses you could move into for a year or two with nobody within miles who'd care. I often tell people, "I've sailed the coast of Nova Scotia every summer for ten years. But I ain't SEEN it yet."

You can buy for very little money some wimpy fat boat-shaped object comprised mostly of three or four molded fiberglass parts designed by cost engineers and glued together by the teeming exploited masses of a third world country we'd rather trade with than engage in war. If you do, it will soon telegraph to anyone with two brain cells to rub together the fact that it was intended to spend its life in a marina. And that is not altogether a bad thing, don't get me wrong. But if you aspire to sail across the big scary ocean to tiny low islands with fascinating cultures, or to knock around the murky granite fringed verges of mysterious lands that the imperatives of survival have plowed under and left behind for generations, you'd want a yacht of real character. *JESSICA* was one of these.



28' Cruising Yacht

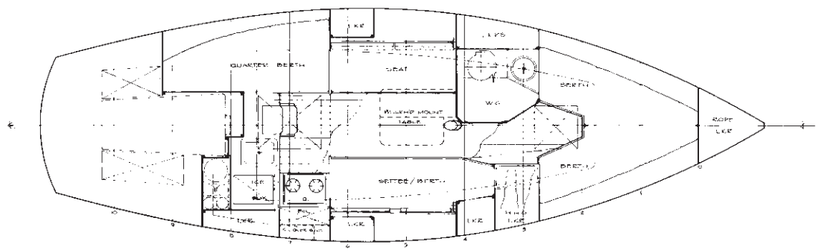
Linda

Dimensions	
LOA:	28' 2"
LWL:	22' 9"
Beam:	9' 2"
Draft:	4' 4"
Displacement, ½ load:	8,297 lbs
Ballast (lead):	3,900 lbs
Sail Area (100% Foretriangle):	410 sq ft
Disp/L Ratio:	336
Sail Area/Disp Ratio:	16.01

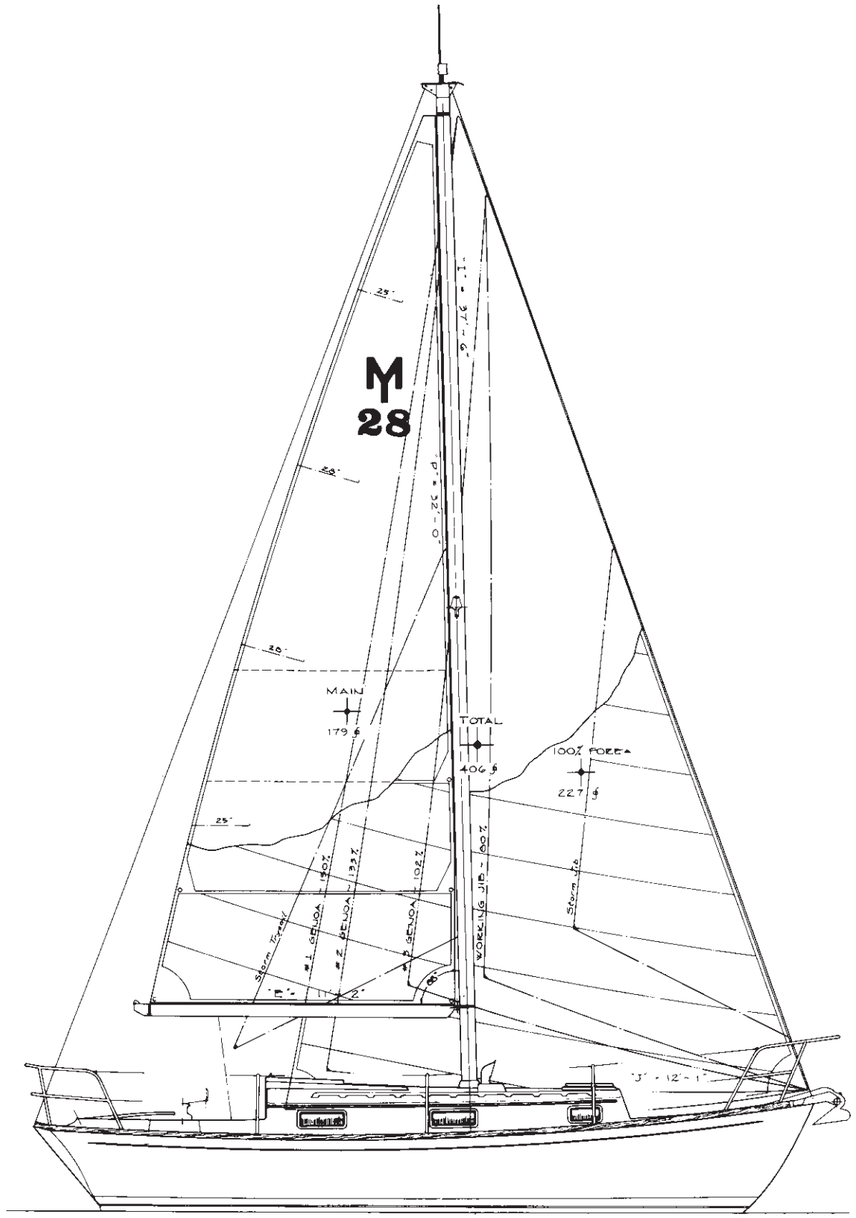
IN 1980 A FELLOW NAMED ALLAN STERN came along and asked Tom Morris for a long keel yacht midway between the 26 foot *FRANCES* and the 30 foot *ANNIE* and *LEIGH.* Conveniently, Allan said he was willing to name the design after his wife *LINDA.* Tom loved small boats and like all builders in those days he wanted to expand the designs he had on offer. And here was another potential lady—he just couldn't say no.

The stern was a scaled-down version of the one I had developed for the *JUSTINE 36.* The boat had a full keel but one that was as cutaway forward as it was possible to do. In fact it might have been too cutaway, in that this forced the leading edge of the ballast far enough aft that some of the boats had a propensity to be down by the stern if they had a lot of extra equipment stuffed under the cockpit, where it tended naturally to be added. The lightly equipped boats had no such problem.

LINDA was small, but she was a proper little mini-yacht, with by now predictable performance. They were built to a very high standard, and the owners loved them. Morris Yachts built sixteen of them in the 1980s and '90s.



The interior that worked best. Four people could cruise in this little boat reasonably comfortably.



Too many jibs! By now the roller furler had come into fashion and most owners just fit the 102% jib. The mainsheet went from the boom end to the afterdeck on wheel steered boats.

By 1980 the women's names ploy had outlived its usefulness, as has this chapter on "First Ladies". I had branched out into other aspects of yacht design—chiefly more high performance sailing yachts and modern replicas of wooden boats. By this time I had more than enough design work. I had given up my second jobs, including building boats on spec, and was supporting not only myself and my wife but a full time draftsman. The office grew eventually to five full time employees and a half million dollar yearly gross and launched over a thousand yachts from 15 to 125 feet in length. And it all started with a little peapod-shaped boat named *FRANCES* that I was forced to build twice.

Did people ever, really, talk about the young designer with all the girlfriends? Probably not. It wasn't clever enough, and America is too large a country for something like this to work. In a European city-state, it can, and once did. The cleverest marketing gimmick ever in the history of boat sales, in my opinion, was created not by the company itself but by its customers.

One of the companies I designed for in Britain was named Rival Yachts. As everyone knows the most difficult sales job in boating is for a guy to sell the idea of a boat to his reluctant wife. Rival Yachts muddled along selling sailboats until one day a customer said to his wife, let's call her Clare, "I'm going to buy a yacht, dear, and I'm going to name it after you." How could she say no to such an honour? So the boat became *"CLARE'S RIVAL".* As did many other *"SOMEBODY'S RIVALs".* Little did she suspect the truth of the matter that the damn thing would indeed become her rival—every weekend.

I've presented my ladies in the order of their birth. There was not much of a progression in terms of design qualities. The double-enders became more conservative with time—the final one, *CAROL*, even possessing a discernable garboard radius between the keel and the hull. The real progression was away from the double-ender and toward yachts with higher performance than any double-ender could offer.

Who were Frances, Sarah, Leigh and Annie?

Sorry. Gentlemen never kiss and tell.

My Method

CHAPTER FOUR

My Method

SOME OF MY READERS MIGHT BE INTERESTED in the method I developed for designing yachts. I would begin with whatever sketches or paintings or notes I might have assembled to try to form a picture in my mind of the boat I was trying to develop. Any architect, whether marine or terrestrial, sees the finished structure in his mind. Perhaps we all see finished yachts and buildings in our mind's eye, but the architect has the artistic skills to extract the object from his brain and put it on a piece of paper in a way that is convincing to others.

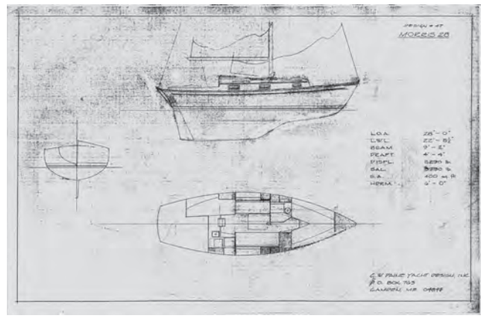
I drew with a mechanical pencil using 3H leads on 11" x 17" gridded vellum. My favorite was Clearprint brand, gridded in a light blue that disappears whenever you photocopy your drawing—which is why you see only faint traces of it in the examples below. With the advent of computer drafting this paper is getting hard to find now so if you aspire to architecture or boat design, buy and hoard a lifetime's supply. It is my contention that you will never do effective preliminary design of anything on a computer screen. If you aspire to being the best, learn the old ways.

- *You cannot do preliminary design on a computer.*
- *If you aspire to being the best, learn the old ways.*

The grid I used had 1/4" squares, with a much lighter intervening grid of 1/8" squares. I drew all of the boats at ¼" = 1' scale, and the grid made it unnecessary ever to reach for my architect's scale. I'd just count off the number of heavy blue lines for whole feet and use the lighter grid, which represented six inches, to help in interpolating for smaller fractions of a foot. With experience it became amazingly accurate and more important, very fast.

I'd draw the curves using a small collection of French curves and what are called ships' curves—basically long, gradual sweeps. I never owned a whole set of ships' curves—whole sets are hugely expensive and unnecessary. I had about ten of these curves that were sufficient for a lifetime of work. The one that I could not do without was the number 33, which I used for sheerlines in the profile view.

Note that the midship section is drawn at the left. I would iterate this shape until it gave me a cross-sectional area beneath the waterline that resulted in the displacement I wanted. How? I'd estimate the volume of the keel and add that separately. Then I'd assume a prismatic coefficient without the keel of 0.57 which is close enough at this stage to represent almost any sailboat hull. The desired displacement in pounds, divided by 64, gives the desired displacement (DISP) in cubic feet. The midship area A is simply DISP/(.57 x DWL). Because the midship section is drawn over the ¼" square grid, one can easily estimate the midship sectional area by counting the blue squares behind it.



A typical preliminary sketch—about two days' work. The sketch became the Morris LINDA 28.

For my first few years I struggled with lines fairing. Most likely this is because I compared my efforts to those of Yves Marie Tanton and Bob Perry, disgustingly talented prodigies who could fair lines to absolute perfection and make it look easy. I wanted my hull lines to be as good as theirs and lacking their gifts there was only one way to achieve this—which once again used old technology. For many years my crutch was to carve a half model of every yacht I designed. It took time, but I had plenty of that—every year I was faced with what is called a Maine Winter!

It was an ancient method, but this was before the advent of the use of computers for designing hull lines. I recognized that making a half model of a design made it totally fair by definition. And there's nothing that compares with holding a model in your hand. It is nautical legend that John Herreshoff—Nat's blind brother—would pass his hands over the half models of Nat's creations and feel bumps and hollows and weak and strong sectional shapes that nobody else perceived and that this is one reason why Nat developed the finest yacht designs in his time and perhaps ever. I used identical technology to do the same, despite the fact that I lacked the advantage of being blind.

The sugar pine board from which the lifts were cut.On the wall are some of the 20 half models I carved early in my career.

Tracing around the lifts to create the lines drawing.

The model lifts were woodscrewed to each other so as to be easily disassembled and traced onto the lines grid, yielding a perfect set of hull lines. This method had the added advantage of generating beautiful wall decorations for my design office.

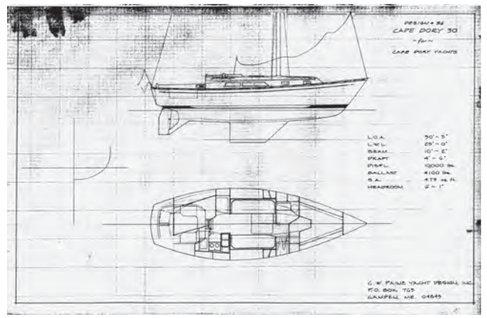
As the office grew and I acquired draftsmen I could give one of these sketches to him and he could quickly expand it to a larger scale using the grid rather than an architect's scale to make the transfer very quickly. I always encouraged my employees to question my judgment at any stage whenever they thought they could improve the design. In architecture a critique is taken as something very different from a criticism though the words derive from the same root. As more personnel joined the firm the designs got better. The more eyes pass over a design, the better it gets—an argument for running a large office rather than a small one. The next page provides examples of typical preliminary sketches.

Linda's model lifts.

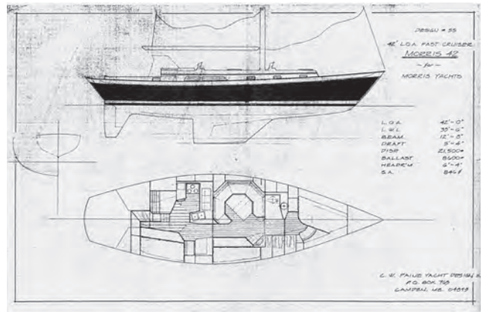
The lifts nearly together.

The lifts glued together and ready for paint.

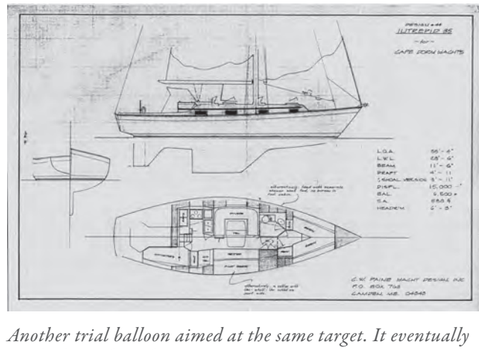
- *The more eyes pass over a design, the better it gets.*



A boat that never got built. I was trying to sell the boat I started in Tehran to Cape Dory Yachts.

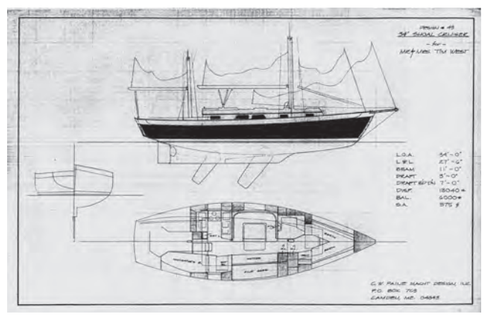


I did this one for Tom Morris. By this time he was pushing for the highest performance we could get, and that meant giving up the "Morris Stern" and fitting a classic counter stern. This became the MORRIS 44.



Another trial balloon aimed at the same target. It eventually resulted in a forty footer.

Given three days' time I could do them in perspective view. These were easier for non-technical types to understand.



Never built. But the customer built three designs with us—a WHISTLER 32, APOGEE 50 *and* YORK 34 *motorboat over the space of thirty years. I'd have loved to try the two centerboards.*

- *Learn to do manual preliminary drawings. Computer renderings take far longer than a buyer's attention span.*

Chris Davis was my first draftsman. Here he's using my gridded preliminary to scale up to the construction drawings. Today you could produce a better depiction using a solids modeling program like Rhino or SolidWorks. The boat would be in full color and you can have it reflecting in ripply water. But a rendering of that quality would take at least a month, by which time you'd have lost the customer. You still have to be able to do something like this quickly to entice customers. Some of the half models that I carved early in my career are in the background.

Performance Cruisers

CHAPTER FIVE

Performance Cruisers

WHEN I BEGAN WRITING MY SERIES ON yacht design for *Cruising World Magazine* in 1974 it was entitled, "Chuck Paine's Continuing Discussion on Performance Cruising." I wanted this series to complement the career I envisioned for my future. My goal was to continue the lifelong study of yacht aesthetics I'd begun in the boatyards of Jamestown, and adhere respectfully to the tenets that had been laid down by the great designers who had come before me—from the waterline up. From the waterline down I intended to apply racing yacht research to reshape and modern materials to lighten what was hidden underwater and attach the most efficient keel and rudder the client's tolerance for draft would permit. The combination of traditional topside aesthetics with modern shaping underwater was my definition of the Performance Cruiser.

There was another designer whose career paralleled my own. My old friend Bob Perry was designing his own "Performance Cruisers" on the West Coast. In most respects we were doing the same thing. In one respect there was a huge difference. Bob added an aspect of "performance" I never even considered—financial performance. Bob single-handedly colonized the yacht-building industry of Taiwan, a country whose wages were so low the workers were to all intents and purposes slaves. Many of his designs sold for literally half the price my builders were charging at a comparable size. As more and more low cost yacht builders from the Far East entered our markets many of the high quality / high cost American builders went out of business.

From 1974 until 1983 all of the work done in my office was done manually. This included hydrostatics, weight studies, structural and rigging calculations, and all drafting. I tried to adhere to the highest standards of draftsmanship in the industry. At first all of our drawings were done in pencil on mylar just as we had been doing at Carter Offshore. Then someone suggested we could get even higher quality if we drew in ink on mylar and we made that shift.

I insisted that all line weights and line types be correct, and even after the office shifted to CAD drafting in 1984 we continued to maintain the highest drafting standards. Some of our competition wavered as far as the aesthetics of their drawings were concerned once they went over to CAD. From a strictly practical point of view, they were right. Once the drawings could drive plate cutting routers and multiaxis milling machines, the thickness of a line on a computer monitor was immaterial. But we had the luxury of Maine's lower expenses and wage scale, combined with a steady stream of royalty income that subsidized our custom design fees, so we could put more time into our work than could any other American design office. This showed up in the appearance of the drawings.

Our first computer—an Apple IIe, bought in 1983.

In 1983 Apple Computers introduced the Apple IIe. It was a novel concept—a computer you could actually own and use in your home. As soon as I heard about it I rushed down to Boston to buy one...they were not sold anywhere in Maine. I had been forced to live without this very helpful tool for a decade. You could only have "timeshare" access to a computer in cities during those years, and I was located at the back of beyond.

For the three months after buying this miraculous little machine I would get up at four o'clock every morning and write computer programs in BASIC—my third computer language—until my draftsman arrived at 8 am. By the end of those months all calculations and weight studies could be done much faster and more accurately than previously. I also wrote programs for foil shaping, preliminary proportioning, databases to keep track of design parameters and ratios, and many other very useful tasks. As the years went by lines fairing was mechanized using AeroHydro software. Finally at about the turn of the 21st century we transitioned into three-dimensional drafting and solids modeling using Microstation and Rhino.

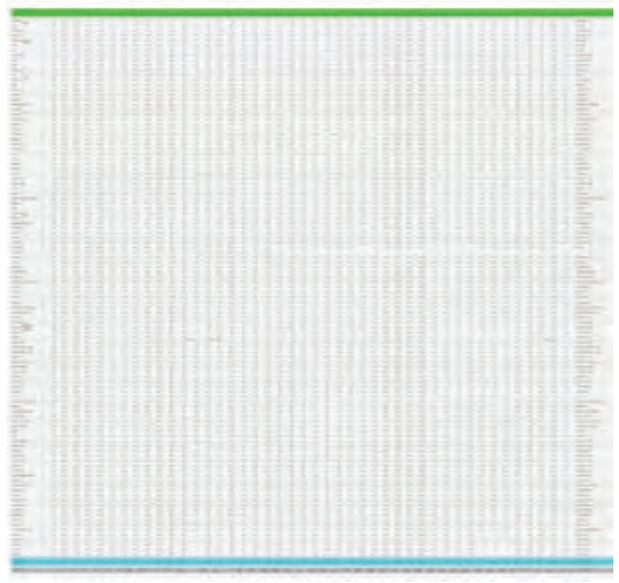
The first commonly available spreadsheet program was called Visicalc. I bought it in 1984 to create two design databases—one for sail, one for power. Of all the computerized tools we developed over the years I believe the database was the most valuable. Our spreadsheeted databases allowed us to enter a few dimensions early on in the design process. From these the database calculated related dimensions, geometric centers, dimensionless ratios and the like. In previous generations the "master designer" had to retain these proportions in his head, and the best of them designed fine yachts. With this tool every employee had immediate access to 44 factors that influenced a yacht's performance, and any divergence from successful previous models was instantly noticeable.

The following pages contain 20 designs that fall most logically into the "Performance Cruisers" category. They are presented in the order of their completion. The size, speed and stability of our sailboats tended to increase over time and the most recent of them were truly outstanding performers. The twenty most important influences upon a sailing yacht's performance that emerged over the thirty year span of our designing "Performance Cruisers" are as follows:

Ten Performance Enhancing Factors:

1. The bulbed keel.
2. The spade rudder.
3. Mathematically rational scantlings rules replacing experiential rules (replacement of Lloyds by ABS and ISO 12215 rules).
4. Replacement of chopped strand fiberglass mat and woven roving by unidirectional stitched fabrics.
5. Replacement of polyester by vinylester and epoxy resins.
6. Invention of folding propellers
7. Replacement of bronze fittings by those of lighter materials.
8. Advent of carbon fiber spars.
9. Replacement of wire rigging by rod.
10. Lighter and stronger sailcloth and panel orientations.

As these performance enhancing factors emerged over time so did others that detracted from performance. In all instances these derived from a revised perception of what "cruising" was all about. At the beginning of my career sailors expected to "rough it" when they went cruising. Sailboat cruising was looked at as one step above camping. By 2008 most people wouldn't think of going cruising in anything less luxurious than their more permanently anchored home. Added luxuries and safety features invariably increased weight and thereby diminished performance.



The sailboat database. It instantaneously tracked 44 important dimensions, ratios and centers, preventing our straying very far from a model that had proven successful.

Ten Performance Reducing Factors:

1. Extensive electrical systems (gensets, inverters, battery banks) to power lighting, entertainment and communication systems.
2. Heating systems.
3. Air conditioning systems.
4. Bow thrusters.
5. Roller furling sails and the hydraulic or electrical systems to power them.
6. Watermakers.
7. Large engines to permit motoring at hull speed
8. Refrigeration systems.
9. Larger fuel tanks to permit greater range and to power the added luxuries.
10. Larger water tanks to contain the watermaker's product and permit crew to actually wash themselves.

In our experience the average cruising yacht became lighter and faster with the advent of higher strength materials and techniques until around the mid-1990s. From that point on the inclusion of added luxuries and safety features significantly increased yacht weights, with the inevitable moderating influence upon performance.

24' Shoal Draft Cruiser

Bahama Sandpiper

CUTTER AND CAT-KETCH

Dimensions

LOA:	24' 0"
LWL:	22' 6"
Beam:	8' 0"
Draft:	4' 6" / 1' 6"
Displacement, ½ load:	4,100 lbs
Ballast (lead):	1,500 lbs
Sail Area (100% Foretriangle):	278 sq ft
Disp/L Ratio:	161
Sail Area/Disp Ratio:	17.36

The cutter rig made the most sense, though the cat-ketch was the one that attracted attention.

She was cute and fun to sail. The rudder swung up as you see, giving a mere 18" draft. But the centroid of the blade was so far from the pivot axis in this configuration that it was a bear to steer.

I MUST ASK MY READER TO TRAVEL BACK in time. In my final few months at Carter Offshore I had been the lead designer of a production fiberglass racer called the Carter ¾ Tonner. In this capacity I had shuttled by commuter airplane between Boston and Rockland, Maine where the mold tooling was being built by a company called Scheel Yachts. Two years later I had moved to the same part of Maine. Colonel Greene's shop happened to be located nearby. Scheel Yachts had gone belly-up but the principals were back at it—building boats—in an improbable assemblage of sheet materials that had been literally removed under cover of darkness from the Rockland dump and sheetrock-screwed together to somewhat resemble buildings. They called this embarrassing eyesore North End Marine. (It grew from these humble beginnings into the largest fiberglass tooling company in America). Since there were boats involved I naturally showed up one day and they remembered me—a former employee of a famous yacht designer, on the brink of starvation.

They offered me a tiny bit of office space free of charge in the hope that I might someday "make it" as a designer and thereby bring them customers. My drafting table was located beneath a valley between two sections of what passed for a roof. I couldn't work when it rained because of the steady dribble that landed about mid-board.

I designed the *BAHAMA SANDPIPER* for Carol Prosser of Rockland, Maine, a Baptist preacher whose son worked at North End. Carol was a risk taker. He proposed a deal whereby he would finance the molds to build anything I might choose to design, as long as they cost under $15,000. We would then sell kits and finished boats and we would both get rich. Clearly, this was a man who believed in a benevolent Deity.

I find that of all my designs I probably learned the most from this very early one, done just after I had built my second *FRANCES.* It was an intriguing boat, fun to look at, and we sold a few—way too few for all the work involved. But in attempting to design the best shoal water cruiser ever devised I was probably over-reaching. The error here was to assume that if you created a hybrid of two great boat types it had to be equally excellent.

Catboats sail amazingly well despite their unusual hull shape. They are extremely beamy and many of them have no ballast at all. They carry huge amounts of sail but I've never heard of one capsizing. And they can be sailed in a couple of feet of water downwind, maybe twice this to windward with the centerboard down.

Sharpies have the same shoal water capabilities. Some of them are very fast—much faster than a catboat. Again, the presence of little or no ballast makes them extremely light, which lowers resistance. But being both unballasted and narrow, capsize is a constantly upsetting possibility (pun intended).

What I tried to do was to sort of meld the two together. I had the advantage of fiberglass construction, which simplified some of the design problems. With no structural keel in the way I could place the centerboard trunk off-center, which helped the interior. There was plenty of space to easily lay inside lead ballast alongside it—more on one side than the other, of course. The trunk itself was of one-piece glass construction, glassed integral to the hull, and wide enough to get a paint roller into to apply antifouling. The rudder was an elaborate pivoting invention that worked well when it was fully down and never lost its grip on the water-unlike the catboat's "barn door" rudder that tended to be lifted out of the water when the boat heeled. The centerboard itself was of fiberglass and fat enough to present a true foil shape so it never stalled and didn't sideslip much at all.

But when you create a hybrid it is not only the favorable characteristics that get reproduced. The *BAHAMA SANDPIPER* took on some of the tenderness of the sharpie and all of the heavy helm of the catboat when the rudder was pivoted up as it had to be in shoal water. With a third of its weight in ballast it was a scary thing to pull on a trailer. In a way you might say it was a design before its time. Had carbon fiber masts been invented 30 years ago this design would have been more stable since its VCG would have been much lower. And it would have been possible to step the mast or masts without the assistance of a crane as was necessary with the heavy aluminum masts we had at the time. If it had been beamier it could have used less ballast and been a whole lot lighter.

- *When you create a hybrid it's not only the favorable characteristics that get combined.*

In undertaking the *BAHAMA SANDPIPER* Carol and I made some classic mistakes:

1. We designed a product for a market that didn't exist. We thought that with gas cheap people would flock to own trailerable fiberglass sailboats, which would combine the advantages of a boat and a travel trailer. We lost sight of the fact that motels had full headroom and stand-up showers and if you stayed in one every weekend of your life you wouldn't expend as much money as for one *BAHAMA SANDPIPER.*

   - *Before you design something, see if there's a market for it.*

2. We built the boat too well. This was great for our egos, but who wanted to put the price of two new automobiles into something that got used perhaps three weekends a year?

   - *If something is not going to be used very often it should be cheap.*

3. The boat was exactly 8 feet wide so it could be legally trailered day and night. If you created a true catboat/sharpie hybrid it would have been wider and a lot lighter since it would have required less ballast. We should have given up on night-time trailerability and made it 8½ feet wide and 1,000 pounds lighter.

   - *Anything you trailer behind a vehicle should be light.*

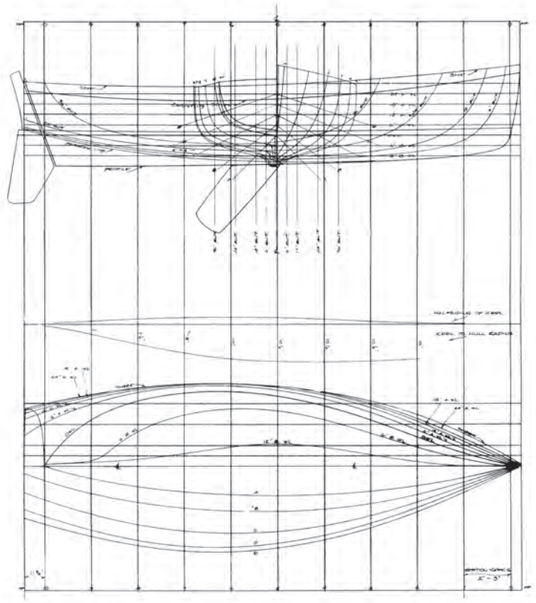
4. With all of the crap you throw into anything you drag around behind your car on a trailer she weighed maybe 4,500 pounds. Add the weight of the trailer itself and you had a case of one helluva tail wagging whatever dog you pulled it with. Today you'd build it wider and lighter, with less ballast, and carbon fiber masts. It would sail a little better and trailer a whole lot easier. But there'd still be no market—people would stay in motels and charter REAL sailboats when they felt the urge to go sailing.

With all her compromises the *BAHAMA SANDPIPER* was still a fun little boat to sail once you got her off the trailer and into the water. If the day ever comes when we're growing our auto fuel in fields rather than mining it and not dumping wing-loads of carbon into the upper atmosphere flying to our next yacht charter, you'll see something very much like this in our campgrounds and shallow estuaries.

We finished them to a very high standard. Too high.

The centerboard trunk was off center a few inches to starboard, the companionway to port. It all worked out very nicely.

A little bit wider and a lot lighter, these sweet lines would make a lot of sense.



40' Cruising Yacht

Intrepid 40

Dimensions	
LOA:	40' 0"
LWL:	32' 9"
Beam:	12' 5"
Draft:	5' 8"
Displacement, ½ load:	20,065 lbs
Ballast (lead):	7,422 lbs
Sail Area (100% Foretriangle):	757 sq ft
Disp/L Ratio:	255
Sail Area/Disp Ratio:	16.40

THE *INTREPID 40* WAS DESIGNED AS A SERIES production long distance cruiser for Andy Vavolotis, president of Cape Dory Yachts. In the late 1970s Cape Dory Yachts was a phenomenon. This Southern Massachusetts company was building probably one third of the mass-produced cruising sailboats in America. They had a fleet of Carl Alberg designed full keel yachts ranging between 22 and 45 feet. These were predictable, stable, nicely shaped yachts that could take you anywhere. Andy established a brand identity by painting the yachts the same colors regardless of size and fitting heavy bronze hardware and opening portholes cast by his brother Socrates. He had one of the most extensive dealer networks in North America and by the time he phoned me, was making a great living building boats.

He told me he wanted to establish a separate line of designs with more performance potential, but was unwilling to give up the single skin fiberglass hulls and heavy bronze fittings. I said that if he wasn't interested in building them lighter the only way to improve the performance was to shorten the keel, hinge the rudder on a skeg, and lengthen the waterline. I probably had the temerity to imply that my having worked for Dick Carter a few years earlier meant that there might be something about the shape of my hulls that made them faster also, though I didn't really believe this myself. But you have to sell yourself—nobody else will.

If you wanted an INTREPID 40 *you took it in brown and white—there were no other choices.*

- *You have to sell yourself—nobody else will.*

Designing for Cape Dory Yachts was a huge opportunity for me. Despite the women's names ploy virtually nobody knew who Chuck Paine was. I had written the series of articles for Cruising World Magazine on performance cruising design and that is how Andy had heard of me. In those days the name of the designer was a huge selling point—you couldn't sell designs that were done by just anyone. Since I considered myself only a little above just–anyone status I couldn't believe my good fortune.

Andy put a lot of effort and money into the *INTREPID 40.* The hull molds were beautifully faired and he built two deck molds—one for an aft cockpit and another for a center cockpit version. Eight boats were built before the project and indeed the entire enterprise fell victim to the Arab oil embargo, which raised the price of fiberglass resin at a dizzying rate and boat buyers clamped their wallets shut.

As part of our contract I was required to inspect the tooling and make suggestions for improvements before the molds were pulled. The factory was located south of Boston. It was about a five-hour drive from

The Intrepid line was beautifully finished belowdecks in varnished teak and white Formica.

my apartment in Tenants Harbor—which contained my one room office—to the factory in Middleboro. And five hours back. Given a few hours in meetings this added up to an impossibly long day.

But I could fly! The plane was about twice as fast as an automobile and it went in a straight line. And there were no traffic jams in the sky. By then I had 150 hours in my logbook and as any private pilot reading this will recognize, I hankered after a bigger, more powerful airplane. The local FBO had a Cherokee 140 that rented for $16 an hour wet. I could easily justify this since a two-day trip turned into one, plus it was fun. The following is what we pilots call, "a flying story".

On the day in question I got out to the airport just after sunrise. I had done the flight planning the night before. It would be a 2½-hour flight each way. Even if I spent four hours in meetings I'd be back well before sundown. I phoned 1-800-WX-BRIEF and the weather was promised to be perfect—light winds and clear skies. I had been trained, as all pilots are, never to count on actually taking off. There is a lengthy preflight checklist and you were trained that if any item, even the seemingly most trivial, isn't perfect—you just wheeled the thing back into the hangar and called the mechanic. You're taught, "There are old pilots, and there are bold pilots, but there are no old bold pilots."

- *There are old pilots, and there are bold pilots, but there are no old bold pilots.*

The checklist went without a hitch and I lifted off on my climb to 4500 feet. There is little sensation of speed in a light plane. You sit up there and more or less hover. I didn't wear a headset in those days so the sound of the engine droned away noisily. It's hardly boring though, at least in a plane with no autopilot. You concentrate on keeping the plane at the assigned altitude, as you have an encoding transponder—meaning Air Traffic Control has your target on radar and a readout of your altitude. It's bad form to stray very far one way or the other left or right, up or down. And if you did a reasonably competent job of staying on course and handling the radio frequency handoffs you could request a vector through the TCA rather than flying the long circumferential route around it—a luxury that the 9/11 hijackers denied private pilots forever afterwards. I had a beautiful view of Boston beneath my left wing and half an hour later landed at the little airstrip near the Cape Dory factory. I refueled the airplane so I'd have full tanks for the return trip and called from a phone booth for someone to come and pick me up.

Which took time—more than I had allowed. As did the meetings. Then of course Andy insisted on taking me to lunch at a nearby restaurant. I was way too polite to refuse. By mid afternoon, still at the factory, I realized this day was going to drag on a lot longer than I had anticipated. Thank goodness I'd thought to refuel the plane on the way in—the little FBO at the airstrip closed at five o'clock. But the airstrip was lighted and I was certified for flying at night.

I was driven back to the airport just as the sun was setting. It had already been a tiring day and I was a long way from home. I was getting hungry but the hamburger joint at the airport was closed. I grabbed two bottles of Coke and a candy bar from the vending machines. I downed one of the Cokes right then and there...there's nothing like a day of meetings to build up a thirst. The walk-around was uneventful and the takeoff checklist a-ok.

As I climbed out I raised Boston Center on the radio. They vectored me straight toward Pease Waypoint which would save me fifteen minutes' flying time and give me a spectacular nighttime view of the skyscrapers of Boston. The feeling of freedom and well-being that envelops you, alone in a small airplane, is indescribable to a non-aviator. I hung up there on a moonless night with the lights of a huge city stretched out beneath me like a twinkling carpet. Soon I became ravenous. It had been an awfully long time since lunch. I wolfed down the candy bar and washed it down with the second bottle of Coke.

And then it happened. My instrument panel blacked out!

Night flying is done by the instruments. Without them you know essentially nothing. You know that the engine is still running, because you hear it. And that's about all. Sight is useless. You don't know: your airspeed (vital), your altitude, whether you are climbing or descending, whether your wings are level, what your transponder code is, what frequency you are talking to on the radio, your engine rpms, and a whole bunch of other quite necessary things that you take for granted until, poof—they're gone! It's then that you go back to your training. 1. Don't panic. 2. Aviate, Navigate, Communicate. 3. Assess the situation.

My engine is running. I am reasonably level—thank God this happened over Boston where I can make out a horizon of twinkling lights, not an hour later over the pitch black emptiness of Maine. What else do I know? I know that if I key my mike, which is resting in my lap, I will be talking to someone—the last controller I had switched to. I don't remember his frequency, but I know if I want to I can let somebody know my situation. And he'll get me to an airport. I think I can land this thing by the sound of the engine even though I won't know my airspeed. But I sure don't like the idea.

Training. Of course. This is why you are required to carry a flashlight in your flight bag. Which is in the right hand seat, just the other side of an empty Coke bottle and a spent candy wrapper. I feel my way over there with my right hand. Fish around in the depths past the flight computer and aeronautical charts and the logbook. It's there. I extract it—why did it take me so stupidly long to think of this? Relieved, I slide the switch.

It doesn't light. Making it just like every other flashlight I have ever owned. A flashlight is by definition a thing that, when you actually need it, doesn't work.

- *A flashlight is by definition a thing that, when you actually need it, doesn't work.*

I'm feeling uneasy. Not close to panic yet, but not happy either. If I key this mike I am going to open one huge can of worms but it sure would be nice to have some company in this little drama. I'll be vectored to a well lit airport with a long runway and they'll keep all the other traffic out of my way and I'll come in with plenty of airspeed, judging by the engine sound, and just bleed off speed a few feet above the runway until the thing lands itself. I'll have to file a report with the FAA. Meanwhile my handler hasn't noticed anything yet so I must be reasonably close to my assigned course and altitude—if the latter had changed by more than a couple of hundred feet he'd have called and asked why.

Then I remembered one little item of trivia that my flight instructor, Maurice Roundy, had included amongst the hundreds of hints he'd worked into the fifteen or so hours he'd sat in the right seat as I tried not to kill him the winter after my shop burned. That if the panel light ever goes out, it most probably isn't the bulb itself. Nine times out of ten it's the receptacle. I reached up and felt around overhead for the fixture. I gave it a real hard rap. The light came on! I could see my instruments again. Whew!

Should I have made a precautionary landing? Probably. I considered myself a good pilot, despite my low hours, but not landing was a mistake. I was technically flying illegally, as I was flying at night without a functioning flashlight. But wherever I landed at this hour I couldn't buy a flashlight anyway. And I was immensely relieved. I hadn't keyed the mike, thank goodness, and I knew if the light went out again all I had to do was tap the receptacle. I quickly got back to my assigned altitude and flew the little circle that represented my airplane over to the vertical line that represented my course.

Boston and its reassuring lights slipped astern. I was tired but I was making my way rapidly home. By this time of night the thermal bumps had disappeared from the sky and the flight was as smooth as silk. All I had to do was keep this little icon that looked like the rear view of an airplane in the instrument in front of me headed just above the demarcation between the upper blue half and the lower brown half of a two inch diameter disc. And keep its wings parallel to that artificial horizon. A half hour went by and I was close to euphoria. Except for this one little thing. Which I tried to pretend wasn't happening but it just couldn't be denied any more.

I had to pee. In fact, I REALLY had to pee. Once I admitted the fact it rapidly became all I could think about. Why had I had the two damned Cokes? With each passing minute it became more urgent. At the rate the pressure was building there was no possible way I would make it home—I still had an hour to run. I was entirely on instruments—there was nothing around me but black. Ten minutes later the pain was excruciating. I was in a rented airplane. I couldn't just, you know, let go! What on earth was I going to do?

Everyone reading this knows the answer I'm sure. The Coke bottle. By some amazing stroke of good fortune it was a screw cap. The idea was fraught with difficulties. I was strapped low and tight into a seat belt and shoulder harness. I was alone in the plane and it had no autopilot—not even a wing leveler. And this was going to take some time, no doubt about that. I unzipped my fly and worked my underpants out of the way, not an easy thing to do. By this time I was sweating in pain. I let go of the yoke and positioned the coke bottle with my left hand. It was then I discovered the embarrassing fact that my spigot lacked the necessary proportions to be draped over the edge of the seat and directed accurately at a half-inch orifice. And as much as I had to go, my valve refused to release.

Hastily I unbuckled my seat belt and shoulder harness. Time was running out. I got up on my knees in the seat facing sideways, hunched over double with my head against the overhead blocking the recalcitrant panel light. I needed two hands to do this—nobody was flying the plane. I was panting. I took careful aim. The plane began a slow right turn on its own. I released.

Nobody who has been spared a similar experience can know the pleasure I realized as that Coke bottle quickly filled with warm fluid. At about mid-bottle I moved my head enough to enable the overhead light to illuminate the panel. The blue and brown disc was slanted at a 45-degree angle. I hastily cranked the yoke to wrest the plane upright, then resumed filling the bottle. Right to the top, when, after a feeling of relief that can only be compared to sex, I screwed the cap tightly down and resumed my position in the left seat, a wiser and much, much happier man.

Fifteen minutes later I had the green and white aerobeacon of Owls' Head airport in sight, decided on a straight-in long final to runway 03, pulled back the power to 1900 rpm and began a long, slow descent. I tuned the radio to the CTAF frequency and keyed the mike five times at one-second intervals. The familiar runway lights of my home airport came slowly on. I recited my landing mantra, G. U. M. P.—Gas on the fullest tank, "Undercarriage"—but mine was a fixed gear craft so I substituted two notches of approach flaps for "U", Mixture rich, P for this airplane was the electric fuel boost pump that had to be turned on for landing. There was no wind, no traffic for it was now late at night, and all I had to do was concentrate on driving down an imaginary ramp toward the runway numbers, flaring ever so slightly just at the end to pull off a "greaser", like grease being ladled into a pan, my only witness a bottle full of yellow liquid wedged behind my flight bag in the passenger seat.

- *Urinate, Aviate, Navigate, Communicate.*

32' Cruising Yacht

Whistler 32

The first few boats were rigged as cat-ketches. This one is "readin' both pages."

SHORTLY AFTER DESIGNING THE *BAHAMA SANDPIPER* I was hired by Crozier Fox, Tom Morris's neighbor and also a boatbuilder, to design a 32 foot keel-centerboarder that he named the *WHISTLER 32*. His boatyard Able Marine had been building small trailerable sailboats and wanted to add something larger. A brilliant promoter named Garry Hoyt had spent a couple of years and a great deal of effort extolling the virtues of the cat-ketch rig. It's a lot easier to steal an idea than to invent one and Cro and I just thought we'd grab a small chunk of the market Garry had created.

- *It's a lot easier to steal an idea than to invent one.*

The *WHISTLER 32* had a lot of virtues and few flaws. As had become my habit I carved a half model and used it to develop her conservative, beamy hull shape. The keel was shallow and undulated aft to meet the bottom of the rudder. This was a shape with a lot of wetted surface which I matched with a big sailplan. I believe this combination makes the best possible offshore cruiser since the hull has significant "engagement with the water" and can press on when boats with less lateral plane are overwhelmed.

Like the *BAHAMA SANDPIPER* before it I took liberties with symmetry in that both designs had the mizzen mast off-center to improve traffic flow. Nobody ever recognized the fact—one of those tree-falling-in-the-forest conundrums.

We also began to recognize that new materials enabled old problems to be put behind us. One problem that had plagued wooden centerboarders was leakage around the centerboard pin. We saw that this could be avoided if the pivot pin were kept entirely from penetrating the hull. I'd done this before on the Bahama Sandpiper and scaled it up in size to handle the much larger loads on the Whistler. The centerboard pin was captured in molded vertical slots and held

Dimensions

LOA:	32' 0"
LWL:	25' 10"
Beam:	10' 6"
Draft:	3' 10"
Displacement, ½ load:	11,923 lbs
Ballast (lead):	4,728 lbs
Sail Area (100% Foretriangle):	520 sq ft
Disp/L Ratio:	309
Sail Area/Disp Ratio:	15.94

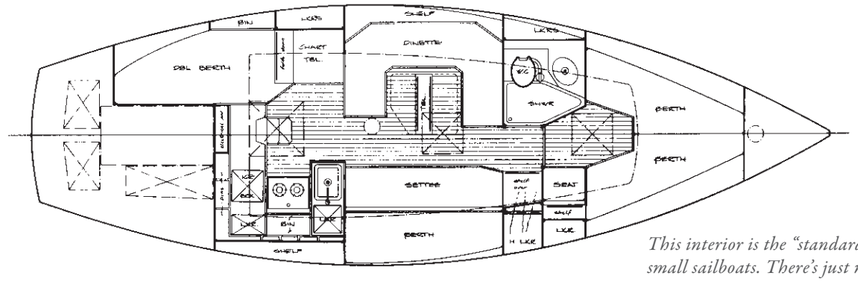
up by a welded stainless steel bracket that fit up into the trunk. The only deficiency that manifested itself with the passage of time was a propensity of the welds in the bracket to fail.

- *Nobody will notice if a mizzenmast is slightly off center.*

The cat-ketch rig was a bit of a gimmick. All cat rigs are inefficient because they put the mast at the leading edge of the airfoil which spoils the airflow over the sail. The ideal airfoil has a narrow radius at the front, thickening to a point between 30% and 40% of the way downstream, and tapering to a thin trailing edge. A sail lacks thickness—unlike a true airfoil—but can best tolerate a spoiler, such as a mast, if it is as far from the leading or trailing edges as possible. This is the reason a jib is so much more powerful than a mainsail. Try sailing a boat with an equal sized jib and mainsail, using only one of the sails. It will sail twice as fast with the jib alone as with the mainsail.

- *The last thing you want at the leading edge of any sail is a fat round bulge.*

A couple of years into the series Cro had me design a cutter rig. Though an afterthought this created a truly great boat. The advantage of the cat-ketch rig, though, was that dead downwind you could effortlessly wing out the sails on opposite sides—"readin' both pages" as the schooner men would say. To present the same sail area to the wind on a sloop or cutter you'd have to get out the whisker pole, and everyone knows most yachtsmen are too lazy to bother with that.



This interior is the "standard" for small sailboats. There's just no way to improve upon it.

I don't remember, but I'll bet her engine was running...too much speed for so little wind.

In the early days of fiberglass yachts anything that was different from a wooden yacht was looked at as an innovation. Here it was the nicely tooled notches adjacent the wheel to made it easier to get from forward to aft of the wheel without climbing up on the seats.

The cutter rigged WHISTLER 32 *was a great sea boat and went to windward better than the Cat-Ketch.*

Able Marine built beautiful interiors in varnished cherry and white.

48' Cruising Yacht

Whistler 48

Bob Kells adjusts the foot line on his brand new WHISTLER 48.

Dimensions	
LOA:	47' 8"
LWL:	39' 6"
Beam:	13' 11"
Draft:	5' 10"
Displacement, ½ load:	33,909 lbs
Ballast (lead):	13,600 lbs
Sail Area (100% Foretriangle):	1176 sq ft
Disp/L Ratio:	281
Sail Area/Disp Ratio:	17.29

- *How do you make a million dollars in the boat building business?—Start with three.*

IN 1981 CROZIER FOX WAS READY TO BUILD A LARGER design than his *WHISTLER 32*. He saw his neighbor Tom Morris adding a new design every other year and they lived within shouting distance of each other. So Cro had his eye out for the Main Chance. A fellow named Bob Kells came along wanting a 48 footer. He'd heard of me and two replica designs I'd done *(HARRY TABARD* and *CAPTAIN SMITH)* that are illustrated later in this book. And he appreciated the quality of work that was obvious in Cro's smaller *WHISTLERs.*

By this time the economics of the yacht building industry were pretty well known. Profit margins ranged between negative ten percent and positive five. Many yacht builders tended to be well meaning aficianados who built boats because they loved them. Come to think of it, they were a lot like me. The problem was how to stay in business, and the conventional answer was to offer more designs.

At the high end of the market—the low volume, high quality boutique builders—new models were often partially financed by "first owners". Someone like Bob Kells would come along who yearned for something different. He'd hire the designer and finance part or in some cases all of the mold tooling. Then the builder would return him a percentage on every sistership. Proving in many cases that boat owners are not the world's most canny investors. In a few rare instances, they got their "investment" back.

The driving force behind the *WHISTLER 48* was the pilothouse. Apart from this it was basically a scaled up *HARRY TABARD* (see the *SPIRIT OF TRADITION* chapter) with a Scheel Keel. In a way this pilothouse was a watershed for me. I could make it more practical with taller forward windows, or I could make it prettier by keeping the pilothouse low. For the rest of my career I worshipped at the altar of beauty and threw practicality to the winds when the two conflicted. Four yachts were built to the *WHISTLER 48* design and 28 years later they were still being maintained in new condition by their owners. So we must have done something right.

Able Marine built WHISTLER 48's *interior joinerwork that was the equal of Hinckley or Morris.*

50' Ketch

Palmyra

Dimensions	
LOA:	50' 0"
LWL:	40' 10"
Beam:	13' 11"
Draft:	5' 10"
Displacement, ½ load:	36,226 lbs
Ballast (lead):	13,680 lbs
Sail Area (100% Foretriangle):	1179 sq ft
Disp/L Ratio:	270
Sail Area/Disp Ratio:	17.23

TED COOPER WAS A SUCCESSFUL yacht broker in Marblehead and importer of the Baltic line of sailboats when the exchange rate went the wrong way. It looked like he could make a better living building boats in America so he bought a share of Able Marine. He had some ideas for new yachts that looked like worth taking a shot. And they were—within a few years he and Cro had developed the *APOGEE 50*, which won the Boat of the Year award, and *WOLF*—in the vanguard of a whole new concept of fiberglass motorboat called a "lobsteryacht". You'll see these designs later in the "Bermuda Series" and "Motor Yachts" chapters of this book.

I designed *PALMYRA* for Ted's father Henry. He liked the *WHISTLER 48* but didn't want a bowsprit. Somebody came up with the idea of molding a *WHISTLER 48* hull, sawing off the bow, and substituting another one more to Henry's liking. We didn't do it in exactly that way but developed a method that amounted to the same thing. I drew a set of lines with the new bow fairing in to the existing *WHISTLER 48* hull about ten feet back. We molded a *WHISTLER 48* hull, stopping the fiberglass layup just short of the centerline for a third of the boat's length. Fiberglass is pretty flexible stuff—it bends easily until internal reinforcement is added. We guessed it would bend sufficiently and it did. We pried the two halves of the bow apart and the new one-off bow was built forward of where the molded laminate stopped.

- *Fiberglass is flexible stuff. You can use this fact to develop customized sisterships.*

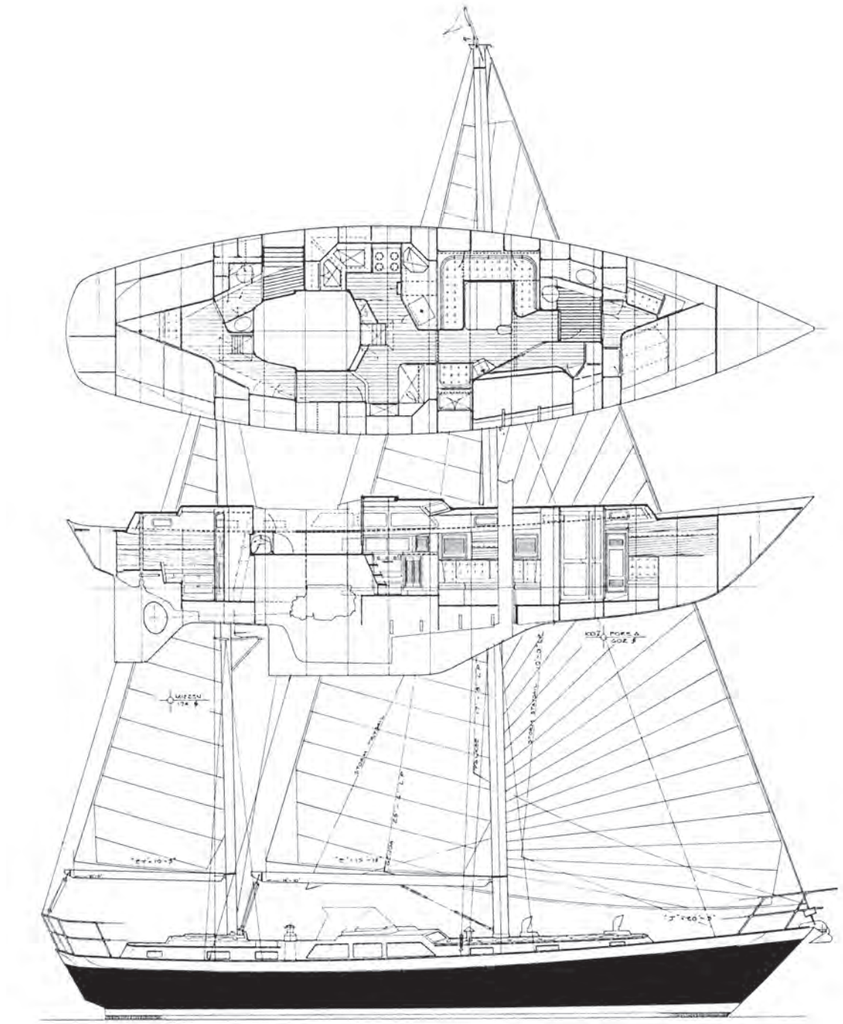
Even at this early date we had discovered the most important trick in getting a center cockpit design to look good—a trick that many didn't understand until decades later. For the purposes of what is called in architecture "massing", the most massive element of the profile of a yacht (or building) must be located in the right place. In the case of a center cockpit design the most massive element is the highest part of the cabin sides- the part that contains the tallest windows. For aesthetic reasons this should be located as far aft as possible- well aft of the middle of the sheerline.

This is also aft of the front of the cockpit. There is no reason why the large windows must be located forward of the cockpit—they are on a different surface than the cockpit sides. Note that the entire aftmost window of the three large ones is located aft of the forward end of the cockpit. This is a trick we used on our center cockpit designs for years before other naval architects adopted it.

Many years after *PALMYRA* was launched her new owner called and asked if anything could be done to improve her performance. I recommended three things: replace the ketch rig with a single stick, replace her aluminum masts with carbon, and most expensive of all, remove the Scheel keel and put on a deeper "Paine Keel", a proprietary geometry which I'll describe for you shortly. In the end he removed the mizzen and fitted a taller carbon fiber mast and a cutter rig. It resulted in much better windward performance.

- *On the same hull a cutter rig will outperform a ketch.*

The finished hull with its custom bow. It faired together perfectly.



- *Draw in ink—it demonstrates confidence in your work, and looks good in print.*
- *The most massive part of a center cockpit deck should be located as far aft as possible.*

By 1983 the standards of draftsmanship in my office were improved to the point where everything was drawn in ink. We paid strict attention to line weights and types. The inboard profile details were accurately rendered—if the owner specified louvered doors they were drawn that way.

34′ Cruising Yacht

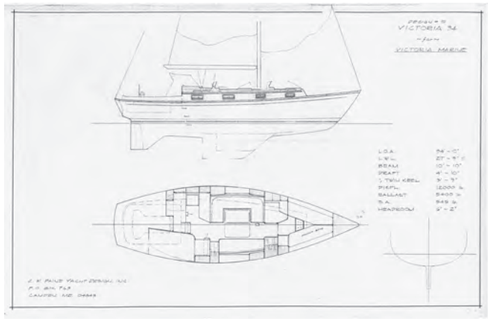
Victoria 34

Dimensions	
LOA:	34′ 3″
LWL:	28′ 4″
Beam:	10′ 7″
Draft:	4′ 10″
Displacement, ½ load:	12,719 lbs
Ballast (lead):	5,525 lbs
Sail Area (100% Foretriangle):	568 sq ft
Disp/L Ratio:	273
Sail Area/Disp Ratio:	16.68

Hull number one WINDERMERE. *She was bought by a visiting American at that critical first London Boat Show. Chuck Paine and his draftsman built her interior.*

BY 1985 VICTORIA YACHTS WERE firmly established building *VICTORIA 26s* and *30s* and the demand just kept on growing. At the London Boat Show in January of that year Peter Gregory began talking about a larger boat.

This time he did not want to restrict himself to a Morris design he could opt into but asked me where I thought the market was going. I answered larger, clearly, and towards higher performance than any double-ender could deliver. We settled on 34 feet and "British traditional", an idiom I believed I had come to understand better than any then practicing British designer. He asked me to send him a preliminary sketch once I got home to the States. If he liked it his plans were to introduce it at the next London show—that is, in less than eleven months' time—an ambitious schedule but with a lot of hard work by everyone concerned, just possibly achievable.



The preliminary sketch for the VICTORIA 34. *Peter basically left it unchanged.*

I sent him the sketch shown. By then we'd spent enough time together that I could pretty much predict what he was thinking and sure enough, he changed virtually nothing from my sketch—just reminding me that he needed drawings as fast as humanly possible if we were to accommodate his timeframe. He hired a company in Ipswich to build the hull mold and would build the deck tooling in his own factory. I began drawing the hull lines in early February and put Chris Davis to work on the other drawings. By early March the lines were completed and shipped off to Ipswich so that the hull plug could get going. Unlike many boatbuilders who treated the trade as a cottage industry Peter looked at it as a business. It was refreshing to have clear orders and fixed waypoints and to not worry about getting paid.

Peter and the company in Ipswich, which shall remain nameless, kept in touch by phone with Peter constantly chiding and urging that they progress at all deliberate speed. They assured him that the first hull would be delivered on time. In mid-August with 4 months left in the schedule I was asked to fly over and inspect the tooling. By then transatlantic flights were just part of my routine though this was before American Airlines thought up the morning departure from Boston which got you to London in time for a late dinner and a welcome bed. Before that wonderful innovation traveling to Britain was more than a bit grueling from a lack of sleep point of view.

When I was young and dreamed of becoming a yacht designer I'd pictured myself spending all of my time drafting, and the clients coming to me. What I became, I suppose, was an entrepreneur who did yacht design. The flight would depart Boston at 9 in the evening when you were ready after a long day for sleep—little of which was forthcoming. It was only a 6 hour flight and half of it was taken up with various irksome rituals such as the cocktail tray and the plastic-wrapped dinner and after if you were lucky a couple of hours' sleep the breakfast before landing. By five in the morning London time I'd be standing in the embarrassingly hour-long queue at passport control in the perpetually

sweltering arrivals lounge at Heathrow. Then after another embarrassing hour and a half at the car rental office filling out forms I'd be on my way down the M3 toward Southampton. By that time I had become a committed Europhile but if you asked me if there was anything America did better than Britain I'd tell you, "not much but with one important exception—Car Rental!"

I would often stay at "Park Farm Restaurant and Accommodations"—a lovely private hotel in Titchfield. The accommodations were four tiny rooms squeezed beneath slanted rough-hewn rafters in the attic. They were never fully booked so I could arrive at 7:30 in the morning and have access to my room. After a shower I'd drive to Warsash—a matter of mere minutes—and take what became my standard morning walk. England is laced with public footpaths and the one along the bank of the Hamble River between Warsash and Universal Boatyard is beautiful beyond description. I'd walk the footpath between the Hamble River, home to literally thousands of sailing yachts fully half of which were fascinating to me, and the fanatically preserved marshes of its eastern verges with their pelagic birds and priceless river-view country homes. Thus restored after the overnight ordeal I'd report to work at the factory at ten in the morning.

Park Farm Restaurant and Accommodations.

On this occasion I inspected the deck mold, which was coming along nicely. Peter and I discussed other details of the new boat and made plans to drive to Ipswich the next day to inspect the hull mold. The air was full of optimistic anticipation. Peter had laid out extensive pre-debut advertising for the new 34. There was going to be a glossy full colour brochure. The stand at Earl's Court would be the most elaborate ever. He'd hired young female greeters with perfect smiles and matching figures. He would want me there in a sales role of sorts, imperfect face and figure notwithstanding.

The public footpath from Warsash to Universal Boatyard.

We left for Ipswich at six in the morning in Peter's latest high-powered Autobahn cruiser. It didn't matter that the thing would happily top 150 without feeling a strain as the Romans had placed one of the world's largest cities inconveniently in the way. After half an eternity crawling around London on the M25 we arrived at the boatyard well after noon. The management met us at the gate. They appeared uncomfortable. Peter introduced his famous designer who had come all the way from America to see his beautiful hull. This presented a bit of a problem. It seems they hadn't actually started the tooling yet!

I was amazed at Peter's composure. Had it been me I'd have gone ballistic. Perhaps he'd had a suspicion that something was afoot and prepared himself mentally. But for sure we had a problem. A huge problem.

We discussed it all the long way home. He had invested so much by this point that any delay in actually selling new boats would put him under. To debut at the Southampton show—eight months later—would not work on two counts. He had rented the space at Earl's Court and it was too late to get his colossal deposit back. And didn't I remember his sage advice of a couple of years ago? There was only one London, and beside it Southampton paled to the level of insignificance in comparison. There was simply no choice. That first boat had to be at London Boat Show!

We parted company that evening. I had a flight out of Heathrow the next morning. Peter was dejected. He was hung up on the fact that until that time, in his experience you had to have a hull before you built an interior inside it.

I'd seen the way Tom Morris was building boats. He'd build the interior from the drawings to the point of near completion outside the hull, usually finishing it in a few large "units" before the hull came over from the molding shop. Then he'd 'glass it in and put the deck on.

I am in the final analysis an American. I don't believe there is ANYTHING that can't be done with sufficient good will and a lot of hard work. I saw a way out. As I said my good-byes to Peter I offered, "Well you know, I've built a few boats myself. And so has Chris, my draftsman. If it made any difference we could come over and build the interior for you. If you can get the hull by early November I think you can still make it."

- *There's NOTHING that can't be done with sufficient good will and a lot of hard work.*

A week later we had found someone to live in our home in Tenants Harbor and Debby and I, our infant son Nicholas, and Chris on a separate plane, were winging our way to London. There was no time to get the necessary work permits. We'd try to bluff our way through customs on three-month tourist visas. If they inspected our bags, which were absolutely clanking with hand tools, we'd be a goner and sent home. My one-eighth-Irish luck prevailed and the next day I was a boatbuilder again, living in a rented flat in Mercury Gardens, a modest housing estate in Hamble. One of the Desty brothers lent me a spare car so I could commute to work. Peter said I could have as many "chippies"—boat carpenters—as I needed. If Chris and I could build a boat interior in two months, the hull and deck would be ready to receive it.

I can't recall ever having had so much fun as I had that intense autumn I spent living in England. I had learned to love the Brits that first time abroad when I spent a summer competing there as a college sailing star. They seem to universally love the sea that surrounds them and the wonderful sport of sailing that had also ensnared me. All countries are chauvinistic and believe themselves the world's hardest workers—a weakness we share as humans. I have never worked as hard as I did for those ten weeks I supervised the building of that first *VICTORIA 34*, nor I am sure did the chippies who worked for me.

On my first day in the factory I got down on my knees on a few sheets of screwed-together plywood I'd painted white and slowly lofted pieces of the interior from the drawings Chris had done a few months earlier. I knew it was a bit of theatre but I had to start somewhere. I just had to trust that his drawings were accurate—if things didn't fit when the hull arrived we were toast. If the famous designer was willing to work that hard with his bare hands no young British chippie was going to be outdone, and they worked their hearts out for me. I suppose I respected them as no well-bred Englishman could respect someone who "only" did manual labour. But I didn't recognize "class" and that gave me a huge advantage. The chippies and Chris and I traded rounds (voluminous pints) of strong ale at the Rising Sun pub at the end of most days; and as the interior rapidly took shape we'd make weekly progress reports to the upper management every weekend over a meal at the Jolly Farmer Inn.

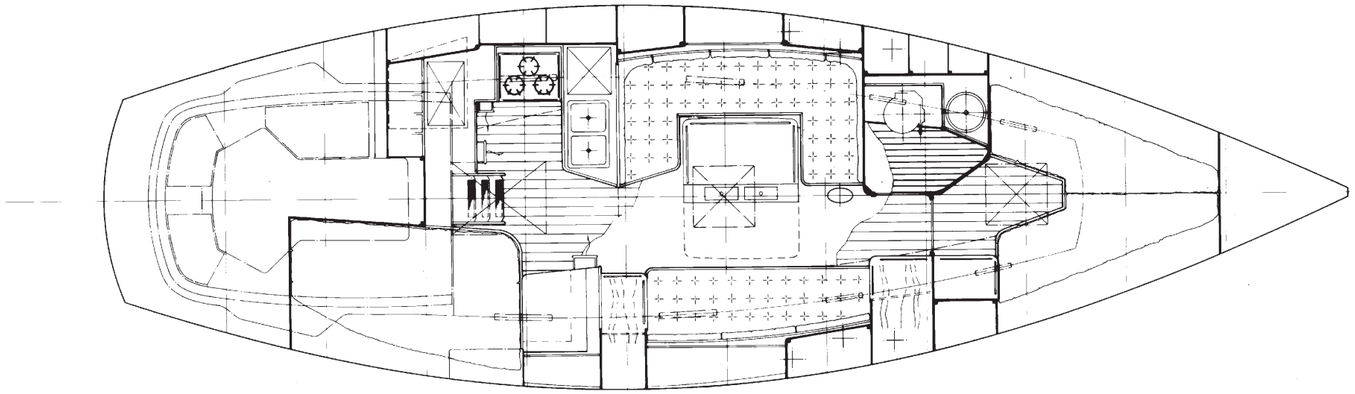
Debby and Chris and Nicholas and I flew home in early December—two weeks earlier than expected—feeling good about a job well done, all the moreso because three months earlier it had looked to be impossible.

As you might expect the *VICTORIA 34* made its debut at the 1986 London Boat Show gleaming in new paint and varnish with no aspiring boat-buyer the wiser about the narrowly averted miscarriage. Once again I endured that miserable night flight to arrive at a far too affordable London hotel to which I could not gain access until mid-afternoon, beyond the point of exhaustion. But by that point in my life I had come to the realization that that this was my destiny, and later that same evening I was standing in Earls Court Exhibition Centre between the impressive new stands Peter had contrived amidst his beautiful salesladies with the *VICTORIA 34* proudly displayed behind me as if it had existed forever.

The Jolly Farmer, where the executive decisions were made.

The first VICTORIA 34 *at London Boat Show, 1986. The engine and electrical systems weren't installed yet, but nobody knew.*

The interior Chris Davis and I built that autumn in Warsash.



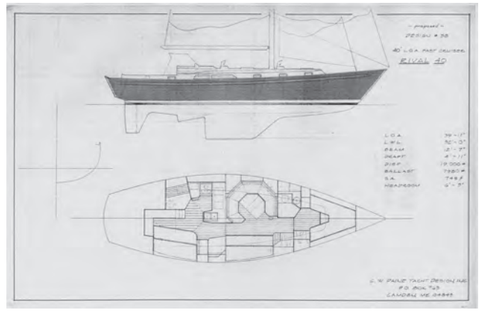
The final interior for the VICTORIA 34*—one of the most successful cruising yachts ever built in Britain.*

Bowman 40 & 42

Dimensions

LOA:	40' 0" / 42' 0"
LWL:	32' 0"
Beam:	12' 7"
Draft:	4' 11" / 6' 6"
Displacement, ½ load:	21,400 lbs
Ballast (lead):	7,110 lbs
Sail Area (100% Foretriangle):	748 sq ft
Disp/L Ratio:	292
Sail Area/Disp Ratio:	15.53

PETER GREGORY OF VICTORIA YACHTS NEVER tired of finding ways to attract customers. For the 1983 London Boat Show he came up with the idea of stationing his designer at a drafting table in the act of designing yachts. He had lined up a few members of the press to come and photograph me working there, even a television station from Southampton that had offered some airtime.



The sketch I did at the 1983 London Boat Show, targeting Rival yachts.

I had my weather eye open for a new British customer and Rival Yachts were at the top of my list. Their previous designer had passed away and the time would come when they would need a new design. I didn't want to be an ambulance chaser so struggled with how I would introduce myself without appearing overly aggressive. I was spared the trouble.

Just in case an opportunity might arise I decided to spend my time stuck at that drafting table sketching my idea of the next Rival Yacht. The largest yacht in the Rival line was a 41 footer and the next smaller a 38 so I figured forty feet was about right. I had the above sketch just about finished on my third day standing at Peter's drafting table when two impeccably dressed "city types" walked over and peered down curiously at what I was doing. It turns out they both owned Rival 36s and were at Earl's Court looking at larger boats. They loved their Rival 36's and would have preferred

Photo: Beken of Cowes

to stay with the same builder if only he had something larger. They took one look at my sketch and they had the answer. They dragged me and my sketch over to the Rival stand and introduced me to Charles Maunder, the Managing Director of Rival Yachts. They said in unison, "Charles, if you build this design and add it to your line, we'll both order one."

Charles Maunder, managing director of Rival Yachts.

Along the way the Rival name was dropped and the name of the company changed to Bowman. The *BOWMAN 40* and *BOWMAN 42* shared the same hull. The *BOWMAN 42* was lengthened in order to create more stowage space in the lazarettes and a sleeker appearance. And a deeper, higher performance keel and rudder were designed to replace the very shoal draft Scheel keel which had been standard on the *40*.

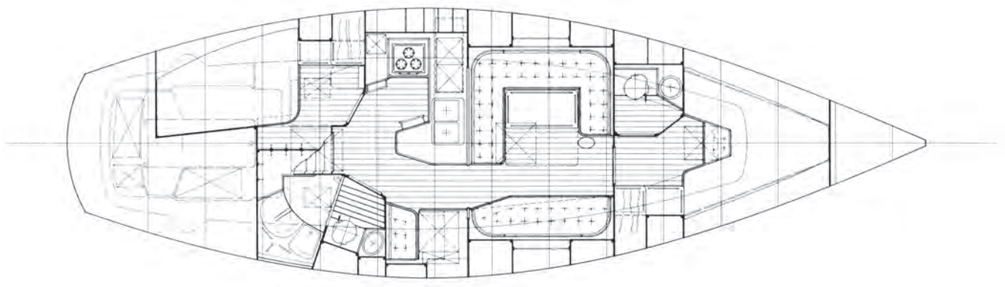
The deeper keel was a 6ft. 6 inch draft, slightly flared fin keel, and this keel was applicable if you wanted to race the boat. The rudder on the *BOWMAN 42* was a fully skeg supported type, in response to the demands of open ocean sailing. The yachts are now built by Rustler Yachts in Penryn, Cornwall.

The BOWMAN 42 *with her deeper keel and rudder was faster than the* 40. *With her high-cut yankee and loose-footed staysail she was as efficient as a cutter could be.*

BOWMANs *had conservative varnished teak interiors.*

I'd drawn a tooled fiberglass sitzbath in this area, but Charles thought, rightly, that this locker would be more appealing.

You'd see them everywhere. I rowed around this one somewhere in the lower Caribbean.



The BOWMAN 40 *interior as we drew it. The engine was beneath the cabinet inboard of the galley where it was easy to access. In those days British yachtsmen would look at a designer who drew an interior like this as though he had two heads. Because in 1983 nobody in his right mind would draw a 40 footer with two heads. The ladies loved it, and the boat became a best-seller.*

32' Cruising Yacht

Morris 32

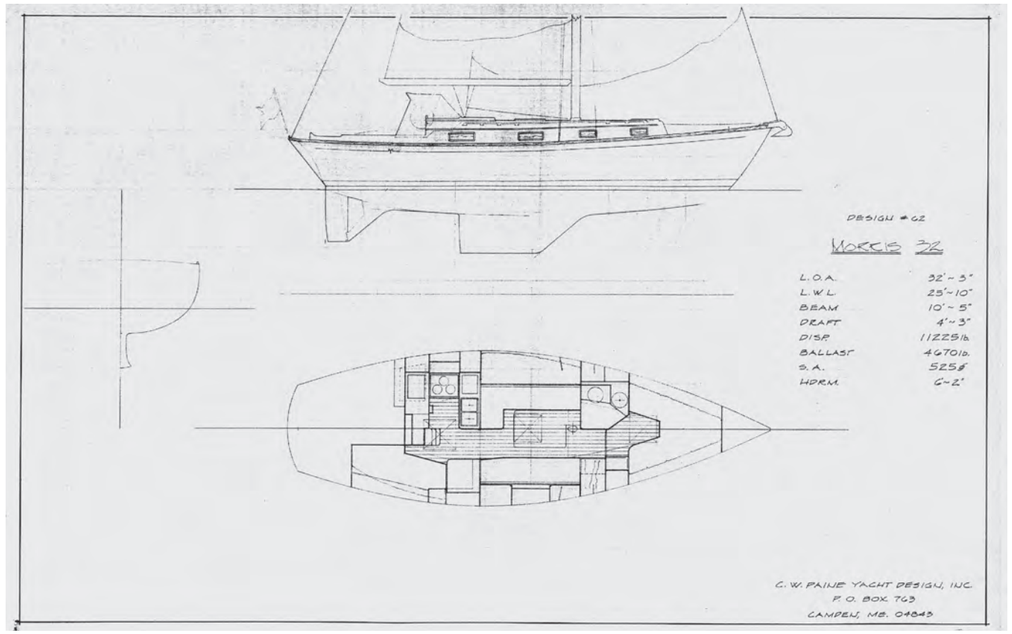
Dimensions	
LOA:	32' 2"
LWL:	25' 10"
Beam:	10' 5"
Draft:	4' 3"
Displacement, ½ load:	11,400 lbs
Ballast (lead):	4,670 lbs
Sail Area (100% Foretriangle):	514 sq ft
Disp/L Ratio:	295
Sail Area/Disp Ratio:	16.24

A pretty little yacht. Chuck Paine and Mark Fitzgerald oversaw the tooling. She had the "Morris Stern" and enough sheer to make her dry to windward.

Credit: Onne van der Wal photo

Billy Morris sailing his *MORRIS 32*. Here he's using his self-tending working jib, which drove her just fine in a lot of wind, and was ideal for singlehanding. There were genoa tracks so a much larger jib could be carried in light airs. The mid-boom mainsheet, led to a traveler just forward of the dodger, became a standard Paine/Morris practice. Most of the boats had a Scheel Keel, which enabled them to be used in quite shoal waters but restricted the pointing ability. Later on a deeper keel was made an option that gave her race-winning potential.

Photo: Onne van der Wal photo



My preliminary sketch for the MORRIS 32.

THE *MORRIS 32* WAS DESIGNED FOR TOM'S brother Billy. He was unmarried which is probably why the design didn't get a woman's name. Tom was on a roll by this time and working toward having a design at every two feet in length. Everyone knew that the sailing fraternity abhorred odd numbers. In 1987 Tom had in his fleet: the *FRANCES 26, LINDA 28, ANNIE 30, LEIGH 30, JUSTINE 36, MORRIS 38,* and *MORRIS 44.* Somebody inevitably had to step forward and commission a 32 footer, and that somebody turned out to be Billy.

Billy wanted shoal draft so a Scheel Keel made sense. I convinced Billy to fit an innovative skeg and rudder combination which had many advantages. Like a spade rudder, the rudder itself had almost its entire leading edge exposed to undisturbed flow. The rudder shaft was located aft of the leading edge near the center of pressure, which reduced the helm forces to nearly nil. Yet a skeg was still present to provide some structural support to the rudder and to protect it from damage in a grounding. Finally, the presence of the skeg provided excellent flotsam shedding for the propeller.

It was truly an excellent rudder for a cruising boat but I never went so far as to promote it very effectively. I thought of trying to get some leverage out of it by patenting it. I'd call it the PBSR—Paine Balanced Skeg Rudder. I even made an exploratory trip to the US patent office in Crystal City, Virginia to research the patent. Then I learned the sorts of fees patent attorneys charge, and the fact that I couldn't use my own drawings. I'd have to use a patent draftsman whose style was approved by the U.S. patent office bureaucrats. None of this came cheap. So in the end I concluded that obtaining patents in a tiny field like sailing yachts was nothing less than a form of financial suicide.

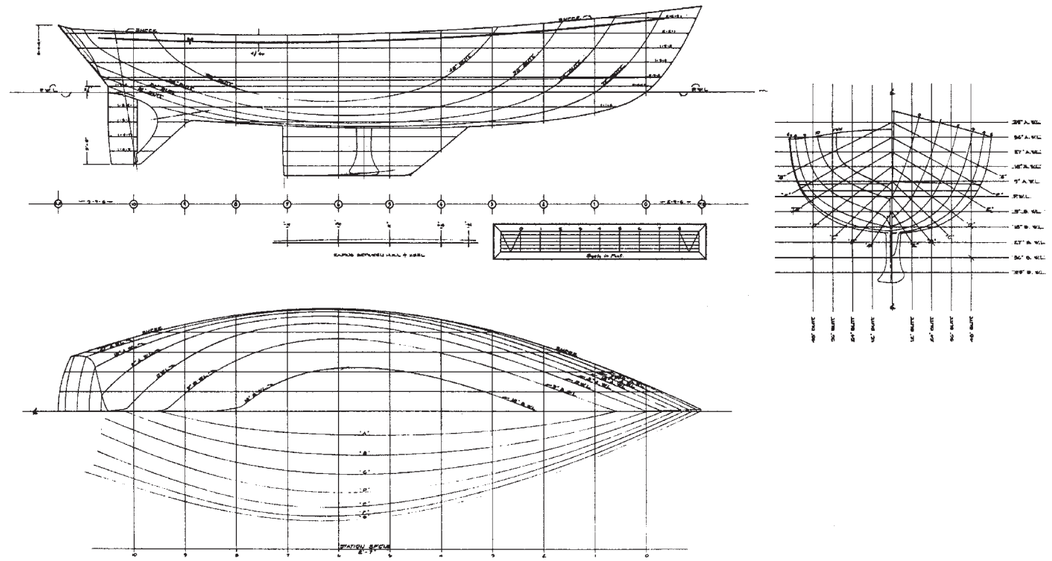
- *Obtaining patents in a tiny field like yacht design is a form of financial suicide.*

Tom and I discussing some important point.

After the design was completed Tom called and said, "I've got too many boats to build. Would you come up and supervise the tooling?" I had just hired Mark Fitzgerald as my latest draftsman and it was the highest priority when I hired anyone that he be a skilled boatbuilder as well as designer. Even though this year marked the transition between the early years when I struggled to find enough work and the following years when I struggled to get all the work done, it was ingrained in me never to turn down an opportunity. So Mark and I spent the next four months spearheading the construction of the *MORRIS 32* molds. It was fun to work in Tom's perpetually spotless shop with his always new and sharp tools alongside the finest boatbuilders in the world, and it provided much needed income.

On nice days Mark and I would commute by plane. We'd throw a bag of tools into the back seat of a Cessna 150 and bore holes in the sky for half an hour (versus 2 hours if we drove) to Trenton Airport. My strategy was to involve everyone in the shop—it was far too big a job for just two people to accomplish in a reasonable time. Tom agreed to this and everyone, even Tom and the managers, spent his half hour every day working on the *MORRIS 32* molds. Not only did this get the job done but I believe it was good for company morale—everyone who worked for Morris Yachts was made aware of the fact that developing new models was a vital part of the boat building business. And it taught me a little about leadership. You can lead from the rear, by issuing orders. Or you can lead from the front, by grabbing one end of a sanding board and asking someone else to grab the other. I believed in leading from the front. And it was good exercise. Later, when I had an office full of egos, this strategy served me well.

- *Lead from the front, by doing; not from the rear by issuing orders.*



The lines were moderate in every respect and she sailed beautifully. The rounded sections minimized wetted surface.

42' Cruising Yacht

Able 42

Dimensions	
LOA:	41' 9"
LWL:	32' 0"
Beam:	12' 8"
Draft:	5' 2"
Displacement, ½ load:	21,678 lbs
Ballast (lead):	8,000 lbs
Sail Area (100% Foretriangle):	804 sq ft
Disp/L Ratio:	295
Sail Area/Disp Ratio:	16.55

CRO FOX CONCLUDED THAT THE CRUISING fraternity had settled in at 40 to 42 feet as an ideal size. Although conservative in most respects the *ABLE 42* did have some innovative features. Along with the *MORRIS 44* which was designed the same year, it used the newly invented Paine Keel. And it used the "PBSR" skeg and rudder combination I'd devised for the *MORRIS 32*.

The interiors were custom designed for each boat. A modern styled pilothouse was tooled into the deck, giving a large area of the boat with "picture windows". This was our second attempt at a modern looking pilothouse, after *PALMYRA*. We kept it very low—too low to really enable it to be used for piloting. But it was good looking and didn't compromise visibility forward from the cockpit. The owners probably bought the boats because of the feeling of space the pilothouse and its large windows engendered, as well as the boat's excellent performance. Cro built them to a very high standard, but for some reason I will never understand to this day, only four of the yachts were ever built.

The "PBSR" skeg and rudder. The skeg was solid glass and was beautifully faired into a proper foil.

This one was open between the main and forward cabins.

The seat slid into a slot at the higher level to form a double berth.

The pilothouse windows eliminated any feeling of claustrophobia.

Morris 44

Dimensions	
LOA:	44' 6"
LWL:	34' 6"
Beam:	12' 9"
Draft:	5' 9"
Displacement, ½ load:	23,500 lbs
Ballast (lead):	8,930 lbs
Sail Area (100% Foretriangle):	885 sq ft
Disp/L Ratio:	234
Sail Area/Disp Ratio:	17.26

OPTIONS, the first MORRIS 44. *She had his logo tooled into the cove stripe—if you've got it, flaunt it, I urged my friend Tom.*

Photo: Art Paine

- *In selling yachts, if you've got it, flaunt it.*

IN 1991 TOM'S BUSINESS WAS GROWING RAPIDLY and he sensed he was ready for the next design. In those days a 44 footer was considered to be a big boat. Amongst his competitors Hinckley had their Sou'wester 42 and Alden Yachts an Alden 44. Able Marine had us working on their 42 footer—larger than anything Tom had on offer. Tom wanted to compete with the big boys. If it became successful a yacht of this size would put him, and me, on the map.

Tom wanted a good shorthanded cruiser. His clients tended to be man and wife teams, occasionally but not always with grown kids who could help. So the sailplan emphasized efficiency over brute area. The rig was tall with a good sized genoa and relatively short foretriangle and boom length. Our database was growing and we were tracking the helm balance geometry with three different mathematical algorithms. As we launched more boats and experienced their performance we became better at fine tuning the location of the sailplan's Center of Effort and the hull's Center of Lateral Resistance. I must admit when we drew this sailplan for the first time the rig looked too far forward on the hull. But we believed in science and trusted the numbers. The result was a yacht that never suffered lee helm and was exquisitely balanced in heavy airs.

- *If you develop a database with sufficient sample size, trust the numbers.*

The *MORRIS 44* was one of the best looking yachts we ever designed. All of the curves reinforced each other. The varnished eyebrow, railcap, recessed wale, guard rail, cove stripe and coaming cap were carefully drawn and redrawn until they married harmoniously. Note the primary winch plinth, whose height enabled the winch handle to sweep just above the middle lifeline so you wouldn't bash your knuckles. Morris would fit any portholes an owner wanted. These opening ports, of white painted cast aluminum, fitted without the usual outside finishing rings, are in my opinion the most pleasing to the eye of all the alternatives. One of the first yachts to use the newly invented "Paine Keel", she went to windward beautifully.

It was at this juncture that Tom began challenging me to break out of my conservative shell. He suggested, "If you're ever going to amount to anything as a designer, you've got to invent something." "What about a new keel...surely you can come up with something better than the Scheel Keel."

By then I was ready. I had studied all there was to study about keel design, had reviewed Henry Scheel's patent at the patent office near Washington, D.C., and was pretty sure I knew how to take the next step. In fact I'd already taken the risk of putting it on the *ABLE 42*. But hadn't sailed it yet. I usually liked to try something on one design before committing to it on another.

But there was no time and all I could do was to trust my instincts. In the end I was proved right—it worked beautifully. My office invented many other little improvements to the way yachts were made over the years, but by far the most original thing we ever designed was the "Paine Keel", which was an industry leader for a time.

- *If you're ever going to amount to anything as a designer, you've got to invent something.*

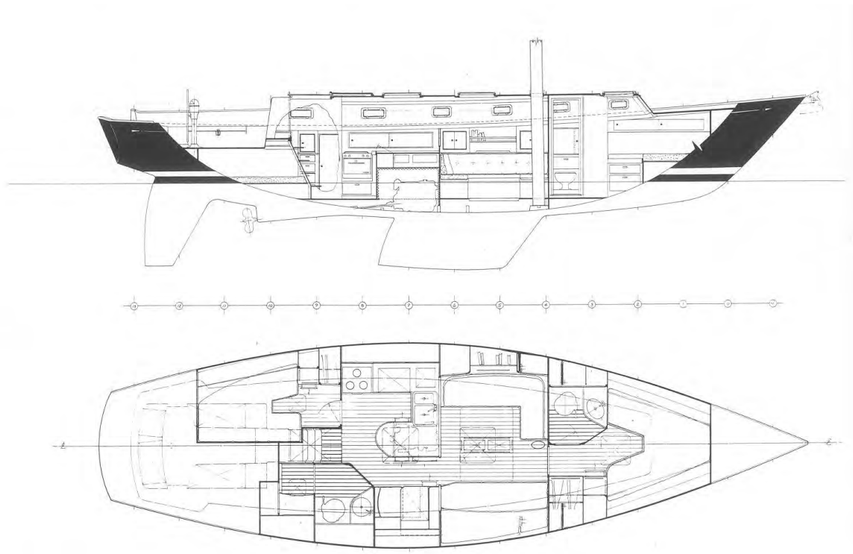
Belowdecks our objective was to provide two reasonably spacious cabins, considering the fact that they were stuffed into a pretty fine-ended hull, plus a central living area that worked while sailing as opposed to sitting in a marina. The mass marketers were moving towards interiors that "showed well" at showrooms and boat shows, but that worked poorly when heeled. And they required full-ended, ungainly hulls. Tom Morris coined the phrase, "Each one an owner's original" and indeed, no two of his interiors were ever the same. After two yachts were built at 44 feet we extended the stern and all subsequent yachts were built at the 46 foot length.

The hull was the essence of moderation. Tom and I simply wanted it to be one of the best looking hulls ever designed and a sweet sailor. The 23,500 pound displacement was achieved by using high strength materials and avoiding "liners". By this time Tom was using vinylester resin in the hull and deck laminates and bulkhead bonding. The fiberglass itself was upgraded to stitched rather than woven fabric. The fact that the fibers in these reinforcements are straight rather than crimped by the weaving process means that they stay straight when under tension or compression, increasing the strength and modulus of elasticity (stiffness) of the laminate. Just picture stretching and squeezing an accordion and you get an idea what happens to woven fibers under tension and compression.

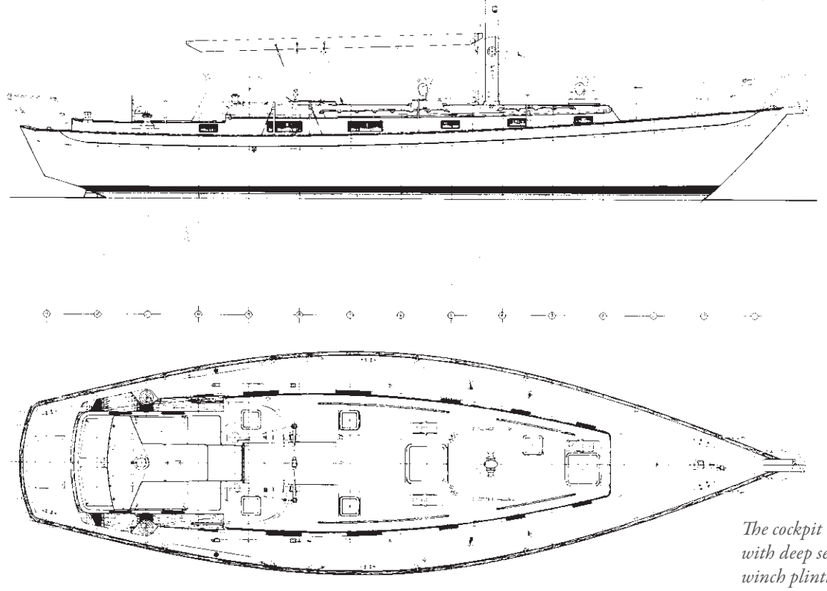
No fiberglass liners were used in either the underdeck or joinerwork construction. Fiberglass underdeck liners and molded "interior pans" are heavy—fiberglass laminate weighs 96 pounds per cubic foot, while plywood weighs 35. Liners are used only to make a yacht cheaper. Hand built ceilings and overheads had the additional advantage of making all areas accessible for access, rewiring or inspection. The presence of the bulb on the keel meant that less ballast could be used, further reducing the overall displacement.

The table pedestal aboard OPTIONS was designed to serve as a convenient stowage area.

The galley was made safer to use at sea by this comfy little nook.



With two heads, two cabins with double berths, a really large galley, and plenty of opening ports at eye height, the arrangement was hard to beat.

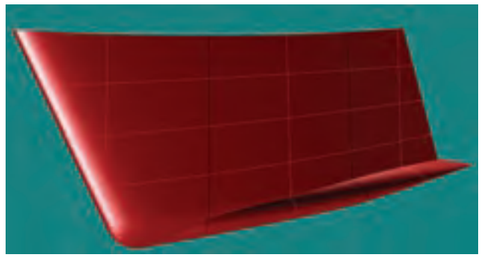


The cockpit was highly detailed with deep seatbacks, lowered winch plinths to ease your hands past the lifelines, and a beautiful dodger cowl. Placing the mainsheet traveler just forward of the cowl got this dangerous necessity beyond the reach of inattentive kiddlies' hands.

THE PAINE KEEL

FOR ITS FIRST TEN YEARS MY STUDIO FOCUSED on cruising as opposed to racing sailboats. This meant we were constantly dealing with the problem of shoal draft. Our clients viewed Cape Cod, The Chesapeake and the Bahamas as ideal cruising grounds. There's a lot of water in these areas but it's spread awfully thin.

For one of my "side jobs" I'd been working for Henry Scheel as a subcontractor. He literally had so many Scheel Keels to design he couldn't get them all done, so he had hired me to take some of the pressure off. His keel had revolutionized shoal draft performance but as time passed I realized I could probably improve upon it.

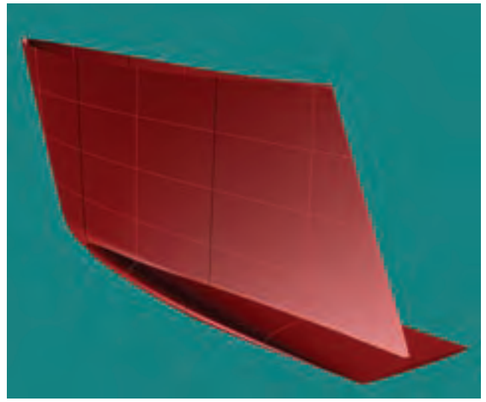


The Scheel Keel had been an idea before its time. It had a voluminous bulb, just as virtually all cruising keels now have, thirty years later. But it also had a small crease that crossed the flow streamlines, adding a bit of drag that seemed unnecessary. And most importantly, the Scheel Keel lacked an endplate.

Not wanting to step on Henry's toes I sketched up my idea and showed it to him. He agreed, it was fundamentally different from a Scheel Keel. Henry even allowed as how he thought my keel might work better, but he'd established a hugely successful brand and didn't want to kill the golden goose by strangling it himself. Within a few years Ron Holland, German Frers, S&S and every other cruising sailboat designer had a bulbed keel that looked, blurring your eyes a little, the same as mine—though there was no cross-pollination. Each was designed independently and they ended up looking much the same because efficient water flow and the advantages of a low center of gravity and an endplate pushed them toward the same shape.

All I needed was to sell it. I had convinced one builder—Able Marine—to use it on their *ABLE 42*. But I thought it had way more potential than a single design, and that if I could sell it to Tom Morris it would really take off. In 1985 when he was commissioning a new design Tom asked, "Can you design something better than the Scheel Keel?" I responded with, "I'd been hoping you'd ask." Tom said if it worked he'd put my keel on every new design he undertook. It did work well and equally importantly, it sold well—thanks largely to Tom.

The Fastnet disaster in 1979 had caused well-meaning intellectual reaction, including emphasis upon the Angle of Vanishing Stability. One undeniable way of increasing the AVS (the heel angle at which a yacht will not right itself, but go the rest of the way over) was to lower the center of gravity by getting the ballast volume lower. Clearly a bulb at the bottom of a keel would help.



The Paine Keel combined a NACA 63, 64 or 65 vertical fin with a bulb comprised of flattened ellipses. The thickness ratio started at 9% to 10% at the hull, increasing to 10% to 12% where it met the bulb. The bulb tapered to a flat plate at the aft end, which served to capture the pressure differential.

Ben Lexcen had designed a yacht that had won the America's Cup for Australia. One reason was that it had "wings" on its keel, whose purpose was to prevent the high pressure fluid on the lee side of the keel leaking across its bottom to fill in the low pressure on the windward side. Another device for accomplishing the same result was an endplate. Yachts of quite modest draft with Paine Keels (and competing bulbed keels) commonly achieved an AVS between 120 and 140 degrees. Almost all of our sailing yachts from 1985 onward were fitted with the Paine Keel.

ART PAINE

IN 1984 THE PACE OF WORK AT MY STUDIO really began to heat up. Customers were popping up from everywhere. I could grind out just so many preliminaries but only in black and white, given my habitual method, and it seemed that my few remaining competitors had discovered color. I honestly believed by then that my design method, my parent hull model, my database, my engineering skills, my draftsmen, were somehow a cut above. But if the others got color renderings to the customers before I could respond, no matter how just short of perfection they might be, well...they would get the design jobs and I wouldn't. Response time is everything! By then I had a staff of helpmates who could elaborate and complete a design to perfection if I could just get them the work. They were like a nest full of fledglings, eager to prove themselves but needful of a beak full of sustenance that came from me, and I just couldn't fish fast enough.

- *Response time is everything!*

The solution to my dilemma was staring me in the face like a mirror. Like a...twin!

Art Paine was every bit as talented as me. More so, actually. In college he had majored in art and illustration while I ground my way through the tedium of engineering. He drew and painted for four years while I wrote computer programs. I knew he had, like me, daydreamed his way through countless lectures sketching yachts in his college notebooks. Not only could he illustrate yachts for me; he had designed quite a few himself and knew all of the calculations and other steps required. It was immensely helpful to me that instead of hiring another full-time designer who might at times be underutilized, I could just "plug in" my brother whenever the workload demanded. He offered to help, I accepted, and Art Paine became an integral part of reeling in customers for many years thereafter. Art was the consummate artist. He'd work on his own terms only—never more than two days a week so he could watch his kids grow up—and you'd better not criticize his choice of colors. But he never missed. If he'd been able to put up with the occasional spoiled-child customers, and been as good at mathematics as I was, he'd have been writing this book and not me.

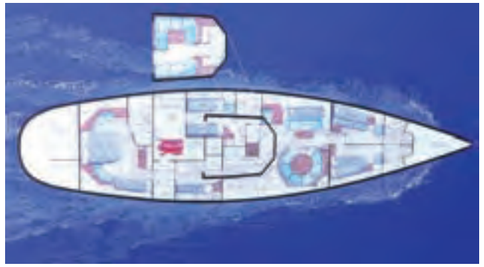
Art Paine.

Art was not only a skilled boatbuilder but he had designed quite a few notable yachts himself including AIRFORCE, *shown here starting the 1986 BOC Challenge round the world race.*

Art and I simply thought identically about yacht design. And that meant for many years many "Chuck Paine Designs" were in reality Art Paine designs, a result of the genetic miracle of placental cloning.

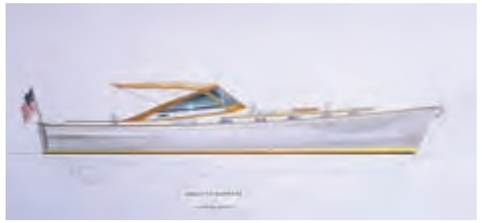
Shown on the next two pages are a sampling of preliminary designs that were done by Art, from which many beautiful yachts evolved. Much of the credit for the "Chuck Paine" portfolio should rightly go to my brother. Yacht designs always begin with art. Our yacht designs often began with Art.

ENTERPRISE *preliminary interior.*



FRUITION's *original interior concept.*

FRUITION *preliminary sketch.*

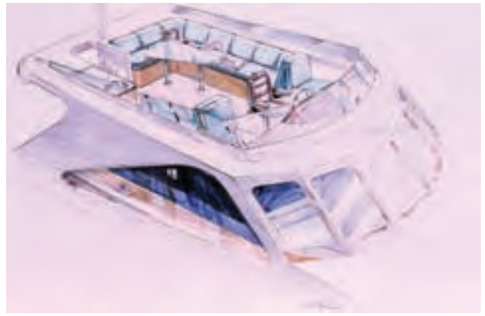


Art Paine rendering of scaled up WOLF.

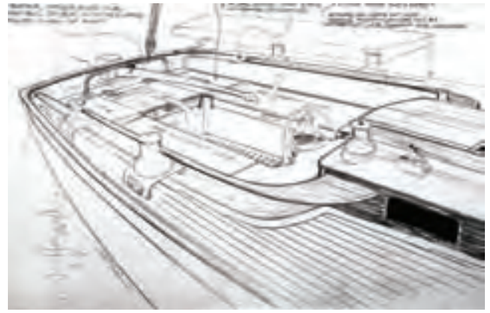
Preliminary 48 footer for Hinckley Corporation. Never happened—they opted instead to build Picnic Boats.

72 foot ketch. Way too small. Owner had us do an 80 footer.

GULFSTREAM 74 EXPRESS *cruiser lower bridge.*



"GULF STREAM 74" *flybridge. Not shown in this book—The owner decided not to build it.*



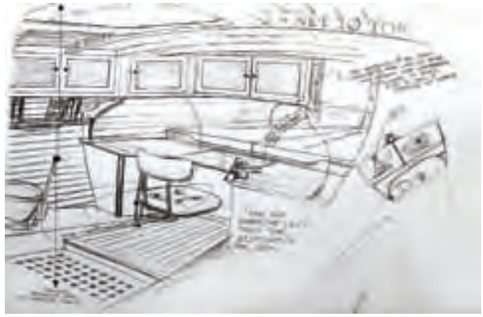
Cockpit for John Riddell's ROCKPORT 30.

ROCKPORT 30 *profile.*

Sixty footer for Bill Strassberg. He built it but at 62 feet.

Interior concept for Able Custom 34-footer.

Salon for same in the inimitable Art Paine style.



John Riddell's unique forward cabin in the ROCKPORT 30.

Recessed flybridge in 74 foot motor launch.

Patty Jayson's PURITY *resulted from this painting.*

48' Cruising Yacht

Bowman 48

A BOWMAN 48 *in the Solent. The teak deck was standard and added visual warmth to our otherwise rather prosaic aesthetic approach. The Brits loved this real cutter rig. I'd learned just how close to the centerline you had to sheet the staysail when it spends its life in the backwind of the yankee.*

Dimensions	
LOA:	48' 2"
LWL:	37' 6"
Beam:	14' 2"
Draft:	5' 10"
Displacement, ½ load:	31,700 lbs
Ballast (lead):	10,987 lbs
Sail Area (100% Foretriangle):	1038 sq ft
Disp/L Ratio:	268
Sail Area/Disp Ratio:	16.58

WITHIN TWO YEARS OF ITS INTRODUCTION THE *BOWMAN 40* had become one of the best selling yachts in Britain. Charles Maunder saw the upward trend in yacht sizes and decided to add a larger yacht. He wanted the hull to be as similar to the *40* as we could contrive, except that a Paine Keel would replace the *40's* Scheel Keel for better performance.

The deck was another matter. He hired us to design a "pilothouse" style aft cockpit version while his in-house design department undertook the deck-salon version. Looking at the two versions today I have to admit I like theirs better. Les Davies was the head of their design department and was clearly a very talented designer in his own right.

What Les did was to emulate the "Deck Salon" configuration made popular by another British boatbuilder—Oyster Marine. It featured a raised area forward of the center cockpit, whose front was incised into this area. The side windows could be made much taller for a better view and to admit more light into what would otherwise be a dark space.

At Charles's request the design was completed with all of the necessary gear, tankage, etc. to begin world cruising immediately. In this way the potential embarrassments of designing for weekend coasting, and then adding the weights necessary for a round the world voyage, were eliminated. Even the generator was included in the standard sales package, and the yacht sailed brilliantly with full cruising equipment, simply because she was designed with these weights in mind from day one. Of course the sales department had to deal with the inevitable queries why the boat cost half again as much as everyone else's.

The aft-cockpit deck featured an integral "pilothouse" which enabled large windows to be fitted in order to avoid the cramped feeling that would result from a conventional low house. I put the word "pilothouse" in quotes because in all honesty the forward windows were not tall enough to permit inside steering, i.e. piloting. We had used this approach three times before and would do so many times in the future. The feeling of light and connection with the view that resulted from the large windows was the justification and from this point of view the deck worked very well.

The *BOWMAN 48s* were fast in comparison with traditionally styled yachts of the time, and had a lovely motion and forgiving steering and stability characteristics at sea.

Aft cockpit version. It was maybe a bit plain.

Deck salon version. It wasn't.

The interiors were finished in flat panels of teak. The quality of the teak had to be excellent, as was its finish.

125' Megayacht

Mandalay/Kaori

Dimensions	
LOA:	125' 0"
LWL:	107' 6"
Beam:	28' 2"
Draft:	10' 0" / 18' 0"
Displacement, ½ load:	393,098 lbs
Ballast (lead):	100,000 lbs
Sail Area (100% Foretriangle):	7182 sq ft
Disp/L Ratio:	141
Sail Area/Disp Ratio:	21.40

MANDALAY *as originally built.*

MANDALAY (NOW RENAMED KAORI) was commissioned in 1991 and has since been sailed some 100,000 miles. She was the largest aluminum sailing yacht built in the United States at the time of her launching. The term "Megayacht" had just been coined, and she was one of the earliest American examples.

Mark Fitzgerald. His determination got us the job.

Paine Yacht Design was not the primary designer of *MANDALAY.* That honor went to Ernest M. Brierley who had a design office in Camden at Wayfarer Marine Corporation just upstairs from ours. He specialized in lobsterboats but had managed a refit of the owner's previous *MANDALAY,* a 93 footer, and so impressed that yacht's professional captain that he was invited to submit a proposal for a new and much larger yacht. He subcontracted the preliminary sketch to us, since sailing yachts were our specialty. I had recently hired Mark Fitzgerald, chided him with my mantra "response time is everything," and Mark worked more or less nonstop to draw the preliminary rendering that got us the job of a lifetime. When Ernie had a signed contract in his hand he realized he would need help—this was a BIG JOB—and the two offices worked together for the next two years to crank out the drawings.

Partnerships are never easy, but Ernie Brierley was one of the sweetest men to ever walk the face of this earth, and there was never a difficult moment during the two highly productive years it took the two offices to design the yacht. *MANDALAY* was beautifully finished by the Palmer Johnson yard in Sturgeon Bay, Wisconsin. The schooner rig was chosen in order that her mainmast could just fit beneath the Brooklyn Bridge, since she would be based at Oyster Bay and often used to tour New York City.

We realized early in the design that safety was a big issue on something of this size. Just a brush by one of her sheets could knock a man overboard. She had 7,000 square feet of sail and the controls would eventually have to be brought down to a deck full of lives and limbs. Since guests tended to avoid going forward of the pilothouse the major problem was the mainsheet. Our solution was to bring this to a hollow aluminum "sheeting arch" so the dangerous part was well above everyone's head. It was then led internally over a series of sheaves to a reel type winch. Then there were the jibsheets. Even the strongest and most skilled of crew could not safely get a jibsheet emerging from the clew of her huge genoa onto an open winch without being literally shaken to death. Captive winches were just being developed at the time; indeed without their emergence it would have been folly to undertake the design of something as colossal as *MANDALAY.* Thanks to these winches her sail handling was safer than the majority of large yachts of her vintage—though it was still forbidden for any but her trained crew to operate the winches.

Refit for a new owner in 2006 and renamed *KAORI,* this yacht has pleased her owners with luxurious accommodations and fine sailing performance. As recently as the year 2007 she continued to collect silverware, finishing first overall in a fleet of 27 of the world's most famous megayachts at the St. Barths Bucket. Her schooner rig was very much of a compromise, but her hull lines were all about performance as her DISP/L ratio of 141 and SA/DISP of 21.4 should attest.

Our research of the extant megayacht fleet yielded a critique by their captains that the single-stick yachts had a propensity to be tender, and consequently spent much of their lives under power rather than sail. *KAORI* has exhibited none of these flaws, yielding 12 – 13 knot sailing speeds at comfortable heel angles. She has always been a fine performer, and has won both of the North American megayacht regattas, the Nantucket Bucket and the St. Barths Bucket.

On a yacht of this size there are three aspects to the design. Our part was the naval architecture, exterior styling and deck layout, and structural engineering. The second aspect, and it's huge, is the HVAC (Heating, Ventilation and Air Conditioning) detailing, wiring and plumbing runs, safety engineering, propulsion engineering and the like. This was done by Palmer Johnson shipyard and involved over ten full time engineers. Finally, the interior design is typically done by a specialist, as the interior finish on a yacht of this calibre often rivals that of a European palace. Jane Plachter-Vogel of Ft. Lauderdale was the owners' choice. What she taught us about the interior design of large yachts could easily fill another book.

First of all Jane convinced the owners to spend roughly $100,000 to have a full size mockup of the interior built. Ernie rented a vacant warehouse conveniently across Camden harbor from our offices and hired Art Paine to build the mockup. This alone was a huge job.

The owners' stateroom with king sized bed.

So as not to confuse the owners during their inspection visits the different levels of the two-deck interior were accurately constructed, so that sightlines and stair angles could be judged and revised.

Contributing to the design of *MANDALAY* was a huge leap for my career. It allowed me to triple the number of draftsmen in the office and enhanced its reputation. Once you've designed a 125-footer it's a darnsight easier to convince prospective clients that you can handle anything smaller.

- *Once you've designed a large yacht it's easier to sell the design of anything smaller.*

The main salon looking aft.

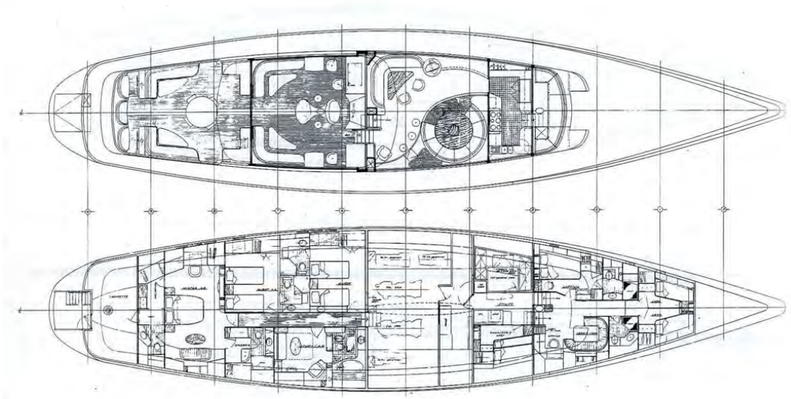
Art's mockup in cheap plywood and silly putty. Many aspects of the interior were altered here before finish details were drawn.

It's a long way up there.

Looking forward in the main salon.

It took ship size gear to handle her huge anchors.

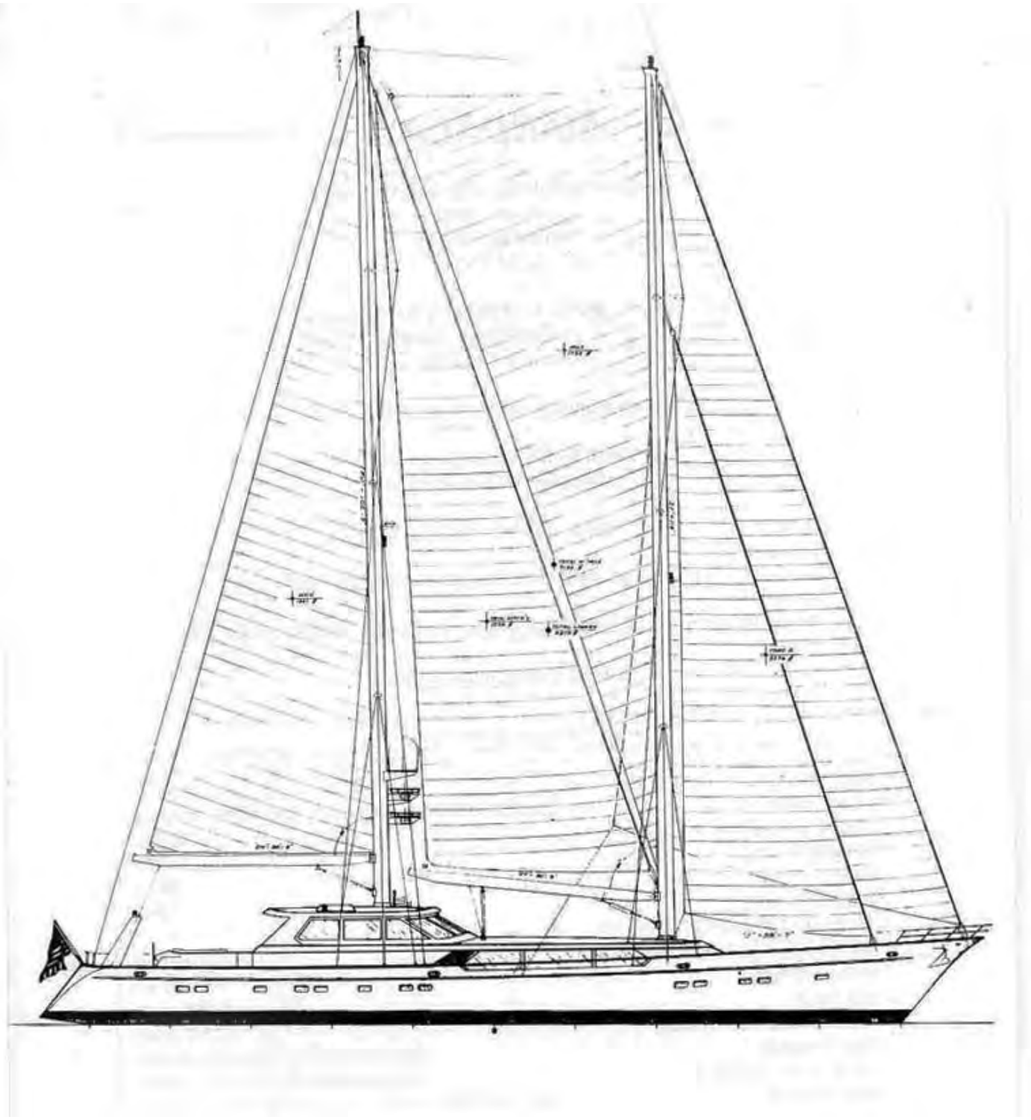
One of the owners' his and hers heads.



MANDALAY's *Arrangement. The owners were aft but the paid crew, all five of them, had nice digs forward.*

KAORI winning the St. Barths Bucket regatta. At 125 feet in length, she was one of America's first "megayachts". Originally built with a huge arch at the stern to handle the mainsheet, we were hired to extend the pilothouse roof to shade the outside dining area, which enabled the mainsheet to be relocated and a dinghy crane to be fitted. When you get something that weighs 400,000 pounds going this fast you know you're sailing!

Credit: Onne van der Wal photo



The original sailplan filled the available space with sails. But in time it proved too hard to handle and was replaced with a more conventional foresail in place of the "upside down" sail. At the same time the new owner replaced the aluminum masts with carbon fiber. Since the weight of the original rig was massive, the performance gains were significant. Notice the cut-down bulwarks in way of the main salon windows—the railcap was continuous from bow to stern. Notice also that for a megayacht she had very low freeboard, somewhat mitigating the rather voluminous superstructure. During her refit in 2006 we extended the pilothouse roof aft to serve as a sun cover for the lounging area there. It enhanced her looks and served as a sort of metal Bimini.

38' Cruising Cutter

Victoria 38

Dimensions

LOA:	37' 9"
LWL:	29' 7"
Beam:	11' 7"
Draft:	5' 8"
Displacement, ½ load:	15,000 lbs
Ballast (lead):	5,900 lbs
Sail Area (100% Foretriangle):	643 sq ft
Disp/L Ratio:	278
Sail Area/Disp Ratio:	16.20

THE VICTORIA 38 WAS A FINAL collaboration with Morris Yachts and ourselves, created from splashes of the *MORRIS 38*. We designed a Paine Keel for the *VICTORIA 38* and we finally prevailed upon their management to use a bolted-on outside lead casting rather than the inside ballast used on all previous Victorias. This made the VICTORIA 38 one of the stiffest yachts sailing on the Solent.

- *Outside ballast always gives better performance than inside.*

VICTORIA 38 *interiors were hand-built in teak. The quality was too good for a market that was more interested in lower prices. Note the slanted section of cabin sole. It was there to cover fiberglass girders, required by Lloyds, that took the mast compression loads. I never liked this, nor I am sure did residents of the forward cabin. I'd have raised the entire cabin sole a couple of inches and tolerated the reduced headroom that resulted.*

JUMBLY GIRL *was the first of four* VICTORIA 38 *yachts. This was the only Victoria design with a Paine Keel and it went to windward smartly in a breeze. She was truly sailing this fast—the engine was not running. Many yacht promoters run the engine during sailing photos. Nobody would ever know...it's purely a matter of integrity.*

The interior was basically a scaled up *VICTORIA 34.* Each one was custom designed by Victoria's in-house designer Bob Hathaway. Unlike the earlier Victorias no fiberglass liners were used anywhere, which lowered the center of gravity of the yacht. It also lowered the profit margins to nil. The absence of liners gave the four *VICTORIA 38s* that were built an entirely custom feel, but added significantly to their building cost.

- *Fiberglass liners reduce cost but they also raise the center of gravity.*
- *Don't judge a yacht's performance by the ad photos. The engine may be running.*

In deference to British tastes we designed a true British cutter rig for this yacht. The foretriangle consisted of a very high cut jib which they called a "Yankee", interestingly enough, though you never saw one over on this side of the Atlantic. Then we drew a very low footed staysail that was sheeted each time you tacked, making it much more efficient (at the expense of that extra work) than anything that would be self-tending. Almost half of this sail's area was beyond the overlap of the Yankee. It had become obvious to us by this time how close to the centerline such a staysail had to be sheeted.

Regrettably the *VICTORIA 38* was the kiss of death for Victoria Marine Ltd. Just as was happening back home, more and more foreign builders were invading the British market. Many of them had the advantage of third world wage scales and, we all suspected, hidden government subsidies. Though their finish quality was nowhere near that of a Victoria or Bowman, their prices were something like half, and they did float.

Bowman 45

You were "spoilt for choice" as the Brits say in the late 1980s if you aspired to seeing the world by sailing yacht. The BOWMAN 45 *offered a rugged hull of proven performance that could be handled by a couple.*

Dimensions	
LOA:	45' 0"
LWL:	35' 0"
Beam:	13' 0"
Draft:	5' 9"
Displacement, ½ load:	27,000 lbs
Ballast (lead):	8,930 lbs
Sail Area (100% Foretriangle):	890 sq ft
Disp/L Ratio:	281
Sail Area/Disp Ratio:	15.82

European boatyards had access to higher quality teak than did Americans. You should be able to see the difference.

THE BOWMAN 45 WAS ADAPTED FROM THE SLIGHTLY earlier *MORRIS 44.* Charles Maunder of Bowman Yachts obtained a license from Tom Morris to replicate the *MORRIS 44* and sell the design in Europe. Splashes were taken from the *MORRIS 44* molds and shipped to England. Invariably in this process egos get involved and the second set of tooling gets refinements. In this instance Bowman Yachts knew that their yachts would be heavier than those built in America, because they were built to Lloyds scantlings which resulted in thicker, heavier laminates. So Bowman added four inches to the height of the hull. Since the yacht sunk something like two inches deeper in the water than those built by Morris, the topside height was two inches greater. Charles Maunder insisted this would make her a better boat and that nobody would ever notice it. Me, it's the first thing I saw. Still, Bowman Yachts was building the yachts to such a high standard I could hardly complain.

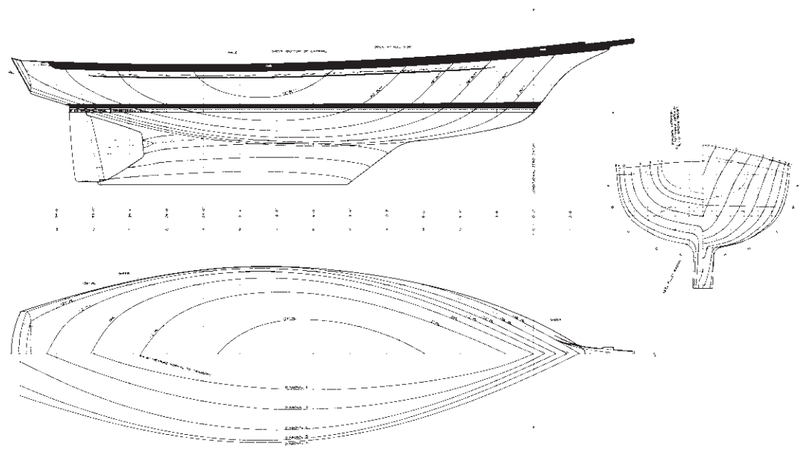
Cabo Rico 40 & 42

Dimensions	
LOA:	40' 0" / 42' 6"
LWL:	32' 0"
Beam:	12' 8"
Draft:	5' 3"
Displacement, ½ load:	26,800 lbs
Ballast (lead):	10,400 lbs
Sail Area (100% Foretriangle):	909 sq ft
Disp/L Ratio:	345
Sail Area/Disp Ratio:	16.88

Even at a D/L ratio of 345 she could really go because she had lots of sail.

WHEN FRASER SMITH INVITED ME to Fort Lauderdale to see if I might be the right designer for a new addition to his line of heavy displacement production sailboats built in Costa Rica I almost lost the job for us right off by claiming that nobody could design a sailboat with a D/L ratio over 350 that could sail. Fraser's most successful design was his *"CABO RICO 38"* of which he'd built hundreds—and its D/L was an eye-popping 404! He wanted my new boat to be equally heavy, if possible, but to sail better. I countered that the only way to make it sail better was to build it lighter. In the end we settled on a D/L of around 350 which was heavy enough to please Fraser and acceptable to me. The boat sailed beautifully, so Fraser was right.

Cabo Rico yachts were popular with owners who valued a comfortable motion, lots of stowage and bulletproof scantlings, combined with a decent but not spectacular turn of speed. This 40 footer, introduced at the Fall 1998 boat shows, retained all of the comfort and safety of her older sisters, with a traditionally styled hull and unique low wetted surface keel. It was the keel that made this yacht different from others that had the rudder attached. We had learned that at a given draft all "long keels" were far longer than they needed to be to prevent sideslipping. While it was easy enough to pare away the front of the keel to reduce its length, the other end had to be far enough aft for the rudder to turn the boat.



A voluminous hull with a keel that was made just as short as a "long keel" can be. Note the outsized "propeller aperture". This drawing shows the 42 footer with its lengthened stern and increased bow flare.

The first *CABO RICO 40* during her sea-trials off Ft. Lauderdale. The boat was so beautifully balanced you hardly needed to steer her at all. She proved to me that heavy boats with big rigs could sail just fine if the hull was shaped right. Because the rudder was, technically, attached to the keel she was correctly promoted as a "long keel yacht". That said, we designed the keel as short as humanly possible, which made it unexpectedly efficient.

What we did to shorten the aft end of the keel was to enlarge the "propeller aperture" to comply with my PBSR approach. This created something resembling a spade rudder with a hinge on the bottom. It worked so well we used it on every subsequent long-keel design that came out of our office. The waterlines were fine forward, for such a heavy model, with a little bit of flare to the topsides forward to keep her from burying her snout. Fraser loved the way the boat sailed—everybody did. His one critique was that he thought the boat was "wet" to windward. Which it was, I suppose, in comparison to his previous models—in my view because my design sailed faster and closer into the wind than they did. Go fast into oncoming wind and waves—you get wet!

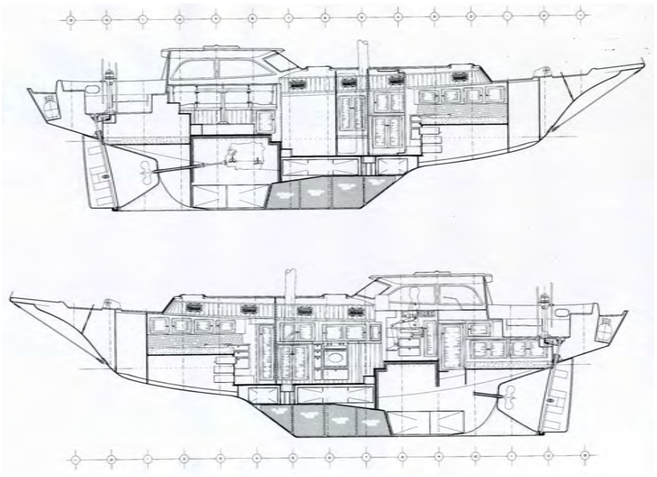
- *Go fast into oncoming wind and waves, and you get wet.*

Fraser had good reason for staking out the heavy displacement end of the market. It enabled all of the tanks to be located beneath the cabin sole. This freed up the more easily accessed areas beneath settees and bunks for personal stowage. He insisted that there be no exposed wood beneath the cabin sole—it was all completely glassed over to be sealed from contact with bilge water. Since I've seen ten year old fiberglass boats whose bulkheads had been turned to mishmash by rot beneath the sole, this was a very good idea. And he insisted upon internal, encapsulated ballast. This dovetailed with the tanks being located in the keel, since you didn't have any keelbolts needing inspection and therefore could place the tanks anywhere you liked.

The sailplan was of moderate height so it could pass beneath Intracoastal Waterway bridges, but spread over a goodly extent fore and aft. A cutter foretriangle was fitted, keeping the size of the three working sails manageable and permitting changing down from the cockpit by roller furling the yankee jib. While a genoa could be carried if the owner wished, it was by no means a necessity—she went just fine with the smaller yankee. The double spreader rig provided excellent lateral support to the mast, and fore and aft lowers added redundancy to the staying.

The *CABO RICO 42* proved to me that with enough sail area and a well designed hull even a D/L of 345 can be made to sail quite well. The yacht was an absolute delight to helm since the rudder was almost neutrally balanced. After a few boats were built she was "stretched" to 42 feet and a pilothouse version added.

The proportion of varnished teak to white was just about perfect. The galley was large and secure.



The pilothouse version There was staved teak overlay everywhere, which accounted for some of the weight. She had a lot of ballast too, which made her extremely stable despite its being encapsulated.

56' Expedition Yacht

Seal

Dimensions	
LOA:	55' 11"
LWL:	47' 4"
Beam:	15' 10"
Draft:	3' 2"
Draft (keel down):	8' 9"
Displacement, ½ load:	55,000 lbs
Ballast (lead):	8,930 lbs
Sail Area (100% Foretriangle):	1552 sq ft
Disp/L Ratio:	232
Sail Area/Disp Ratio:	17.71

SEAL *had a large, heated deckhouse with thermopane windows and short, sheltered cockpit—seldom used in the severe subarctic weather. The deck reels housed lines for mooring to shore, anchors being useless in the conditions often encountered by* SEAL's *adventure charters. The aluminum was unpainted since scraping against ice was unavoidable.*

WHEN I WAS YOUNG I WOULD devour as many accounts of cruising under sail as I could find. In my reveries I explored the remote islands of the world with Eric and Susan Hiscock, Irving and Electa Johnson, or Miles and Beryl Smeeton; every voyage a grand adventure with an uncertain outcome. With the tropical areas of the world increasingly filled with cruise ships, luxury casinos and megayacht havens, the get-away-from-it-all aspect of cruising has become more difficult to experience. Our studio was honored with a rare commission to design a vessel to transport those who still crave a taste of the hardy lifestyle to the few remaining wild places on earth—Tierra del Fuego, Antarctica and the stretch of unimaginably rough water in between.

Kate and Hamish Laird were the alternate skippers of *PELAGIC*, a highly successful Antarctic charter sailboat in the late 20th century. They decided to build their own boat, believing there was a market for another adventure charterer in the high Southern latitudes. We had design expertise, but no idea how to meet the challenges of such a hostile working environment. For this we simply had to listen, and turn the Lairds' hair-raising stories into a strongly built voyager in welded aluminum.

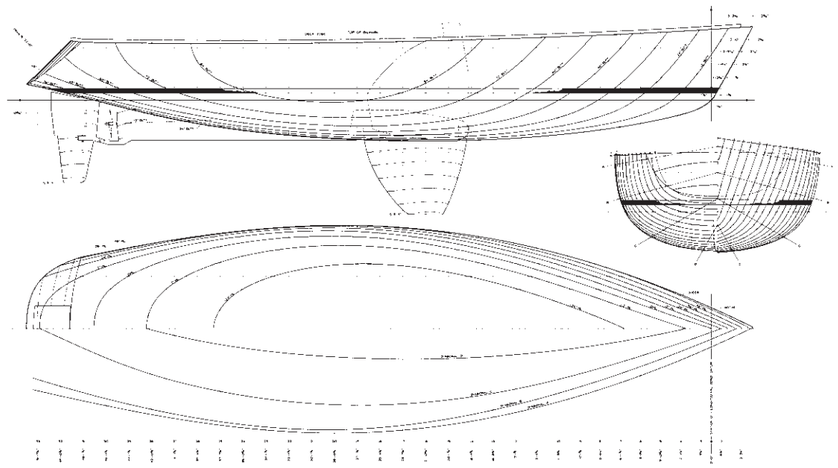
The boat was heavier than had been our recent custom in order to accommodate the stores and gear that eight people would require on expeditions that could last as long as 60 days. Her unpainted hull was designed to be rugged enough to withstand contact with the ice floes that occupy Antarctic sheltering spots. Since these areas are often poorly charted, the boat featured a fully retractable keel and rudder to deal with the inevitable groundings. This combination of features provided the added benefit of a more comfortable motion at sea than lighter designs, since stability was obtained by mass rather than a combination of hull form and draft—a desirable characteristic in an area where 50-knot blows every week are the norm!

The layout was the direct result of the Lairds' long experience. The cockpit size was kept to the absolute minimum. Of necessity most of one's time is spent "inside" this yacht rather than on deck. The interior was designed to give maximum light and a fabulous view to the galley and dining areas contained within the big double glazed windows of the pilothouse. The sleeping accommodations were belowdecks within the heavily insulated and necessarily windowless hull. Electrical accessories were kept to a minimum and auxiliary power was provided by a beefy Cummins 6B-5.9M diesel. The rare pioneers who book passage aboard this unique, purpose-designed expedition yacht are rewarded with vistas like the ones below. The cruising adventure still lives!

SEAL was designed in anticipation of conditions like this. She is the strongest aluminum hulled yacht our studio ever designed. Her rudder could safely hit an iceberg, which it once did at a speed that would have damaged a conventional fixed rudder beyond any hope of repair.

Penguins and seals at South Georgia Island.

Photos © Hamish Laird, www.expeditionsail.com



The rudder would flip up if you hit an iceberg. The keel had to be manually retracted, but would yield a bit if you struck at speed. Although a utilitarian vessel the lines are still sweet and she's reportedly hit 10 knots at times.

No fluff, but she could take on nearly anything.

A curious humpback checks out SEAL's *whale-like underbody.*

63' High Latitude Cruiser

Onora

Dimensions	
LOA:	62' 9"
LWL:	53' 10"
Beam:	16' 2"
Draft:	7' 6"
Displacement, ½ load:	63,000 lbs
Ballast (lead):	21,000 lbs
Sail Area (100% Foretriangle):	1497 sq ft
Disp/L Ratio:	181
Sail Area/Disp Ratio:	15.85

A study in grays. You can't choose the low bidder if you expect a yacht to look like this.

Photos: Ivor Wilkins, offshoreimages.com

THESE OWNERS HAD COVERED A LOT OF MILES IN THEIR previous yachts. They wanted a metal boat so they could cruise the high latitudes and not worry too much about ice. Although she derived her shape from our Bermuda Series she was more heavily built and equipped and commensurately heavier so she rightfully belongs in this chapter. With some ice strengthened sections plus more tankage and insulation than our average yacht she weighed in at a displacement/length ratio of 181 at half load. Her dominant feature was the pilothouse, which was heated and contained two watchstanding berths plus a little table which served as an "upstairs" dining area. The yacht was launched by Kelly Archer Boatbuilders of New Zealand in April 2004.

The yacht naturally had a "Paine Keel". The combination of a draft of seven and a half feet and a rig of modest height made this yacht one of the most stable we ever designed—a reaction to the strong winds anticipated in the high latitudes. The sailplan was cutter rigged with a selection of three roller furled jibs available. One or the other of these sails would serve in winds from very light to a full gale. The mainsail was of rugged construction and had three reefs rather than the usual two—again in recognition of the likelihood of encountering strong winds.

I always discouraged my patrons' finishing their aluminum yachts in raw, unpainted alloy. For purely selfish reasons—I wanted my designs to look good, which would make me look good. In this case the owner threw financial care to the winds and paid a young fortune to have Kelly Archer vary the textures with some areas polished, some swirl ground, others painted in a gray that would contrast beautifully with the natural color of the metal. It's possible of course for aluminum to be left bare, as it corrodes only very slowly. But it's a yacht, after all, and a yacht ought to look like one!

- *Yes, you can leave aluminum unpainted. But it's a yacht, and it ought to look like one!*

Onora showing how close she can point into the wind. She was narrow enough for the outer jib or genoa to be sheeted outside the capshrouds to the rail. The mainsheet was carried to the pilothouse top with no traveler, eliminating a piece of equipment that I consider dangerous and unnecessary on a pure cruiser. The hinged stern ladder could be simply flipped overboard for swimming or rescue.

Photo: Ivor Wilkins offshoreimages.com

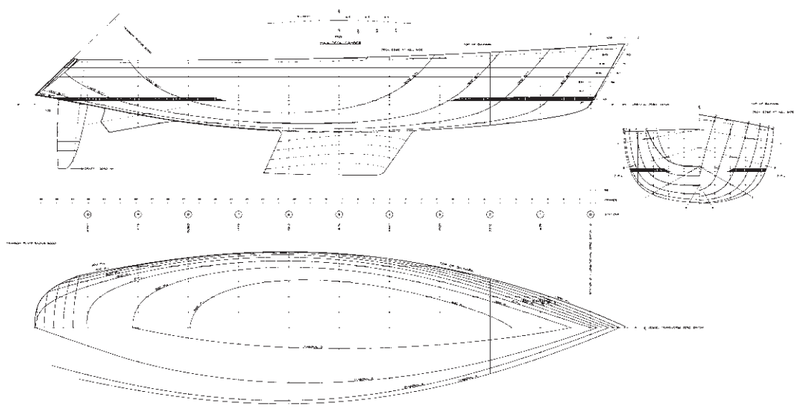
A shippy look with simple but beautifully finished surfaces. The hull ceilings were made vertical to look more like "walls".

By making the wainscoting and interior liner vertical the cabin felt more like a room than something fitted into a yacht hull.

The galley countertops had high, sculpted Corian fiddles.

The dinette with its "foldover table" which folds to half this size.

All photos: Ivor Wilkins, offshoreimages.com



ONORA's *lines were the essence of moderation. The bow had a slight hollow. The sections were flattish for stability but narrowed enough aft to minimize stern slap. Because Kelly Archer was a premium builder whose workers would happily build anything a designer might draw, we challenged them with the rudder and dorsal fin. The rudder was as shapely as would have been expected if it were milled out of foam and glassed over—Kelly's lads just had to beat on aluminum plate until they got it right. The fin was to protect the propeller shaft and give the prop itself something to hide behind when the vessel was motoring through bergy bits. The Paine Keel bulb is not shown on this drawing but that too was present to make life miserable for the poor worker who had to form it out of aluminum plate.*

56' Cruising Yacht

Cabo Rico 56

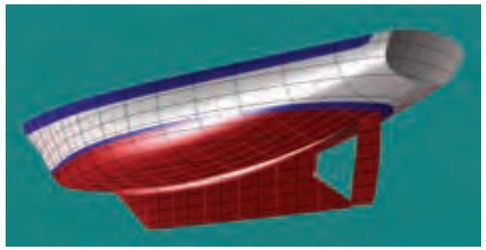
Dimensions	
LOA:	56' 0"
LWL:	42' 6"
Beam:	15' 8"
Draft:	6' 6"
Displacement, ½ load:	51,300 lbs
Ballast (lead):	18,750 lbs
Sail Area (100% Foretriangle):	1497 sq ft
Disp/L Ratio:	298
Sail Area/Disp Ratio:	17.35

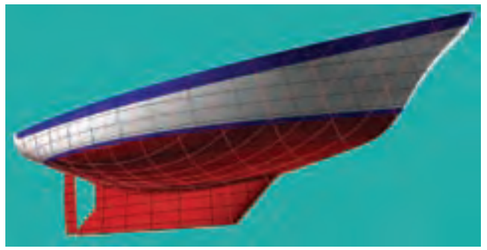
The CABO RICO 56 *was stable and fast. Such was the state of the new yacht market following 9/11 that this lovely creation was greeted by a protracted yawn. It was such a great yacht that it might prove to be a late bloomer, though, when the market revives.*

CABO RICO YACHTS LAUNCHED THE FIRST *CABO RICO 56* in 2002. Her naval architecture was similar to the *CABO RICO 42,* just scaled up to twice the volume. By this time I'd managed to convince Fraser Smith that a DISP/L ratio of less than 300 was still heavy in comparison with the majority of the fleet, which had collectively gone on a diet. Like the *42* she had a minimal length full keel and the balanced, keel supported rudder. Her interior accommodations were for either two large or three small sleeping cabins with an exceptionally large main salon. She was a big boat-large enough to have two really spacious heads and a unique aft boat maintenance room that the owners just loved. Two yachts were delivered before the financial crisis pretty much put boat buying on hold.

Like *ONORA,* her sailplan accommodated differing wind strengths with a choice of three headsails. By this time this had become the paradigm for serious offshore yachts. A large, roller furling (but not roller reefing) headsail was provided for light airs on a close reach, and could be carried in stronger breezes off the wind. A conventional genoa was next and was the sail that could be used hard on the wind—being flatter cut—and in up to 25 knots or so of apparent wind. Finally a small, heavily constructed staysail was available to cope with winds up to gale force. The mainsail could either be of conventional configuration with three reefs; or a LeisureFurl boom could be fitted, providing infinite reefing depths.

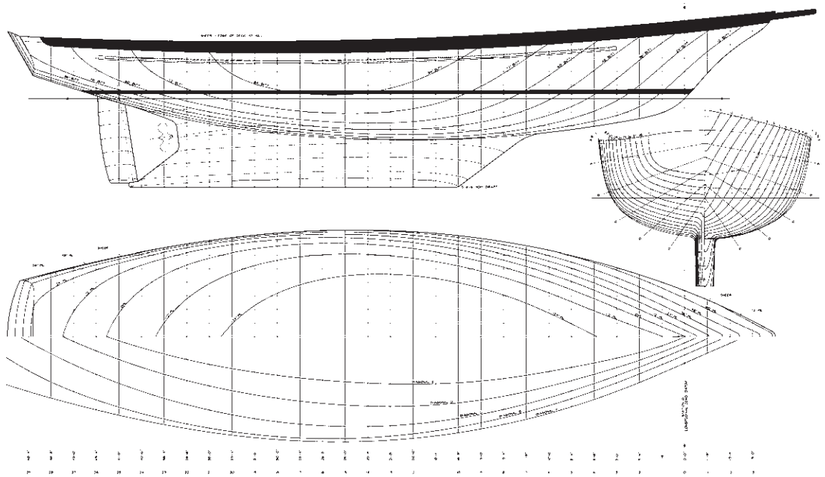
This yacht proved the value of a nicely shaped heavy-ish displacement hull driven by a proportionally large rig. With a displacement/length ratio of 298 there was clearly a lot of boat here. It was capable of accommodating much more tankage for fuel and water than the average production yacht. The motion of such a hull at sea is more comfortable than a lighter yacht, even when being driven at her hull speed of 8.74 knots. The character of this yacht could be compared with a Mercedes Benz or Rolls Royce as opposed to the common automobile. It took a little longer to get her up to speed, but once there, she'd blow by most anything her size with the passengers riding in comfort and safety.





The full flow aperture reduced wetted surface and the balanced rudder reduced the effort required to steer.

Her traditional sections parted the seas rather than trying to beat them down. The tight garboard radius increased the effectiveness of the otherwise quite shallow keel.

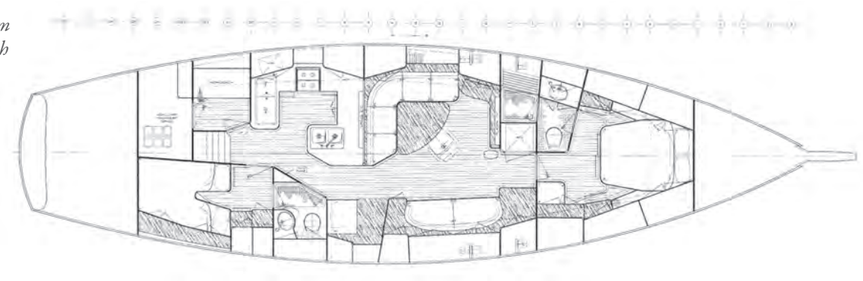


The wood was a Costa Rican plantation grown teak.

The galley had a large and safe "cook nook".

When I saw as nice a yacht as this attracting only two customers it became obvious to me that something was amiss in the marketplace. Still, a new day will dawn and when it does yachts like this with timeless virtues will be worthy of further study.

The engineer's room aft, with workbench and vice, made maintenance a lot easier.



65' Cruising Yacht

Te Mana

Dimensions	
LOA:	65' 0"
LWL:	56' 6"
Beam:	16' 10"
Draft:	7' 7"
Displacement, ½ load:	75,000 lbs
Ballast (lead):	19,200 lbs
Sail Area (100% Foretriangle):	885 sq ft
Disp/L Ratio:	186
Sail Area/Disp Ratio:	14.83

The pilothouse was large, benefiting the interior. The design was all about space and viewing the surroundings, hence the large windows. The arch over the transom was hydraulically operated to double as a gantry to stow the dinghy.

Photo: John Snyder

THE 65' *TE MANA* WAS LAUNCHED in early summer 2005 at the Kanter yard in Ontario. The clients wanted wide open spaces for living aboard—no cramped, dark sailboat interior for them! They wanted very nearly the interior of a motoryacht on a sailboat hull. They asked, "Which of your sailboats in our size range would tolerate the weights we're talking about and still go nicely under sail?" I thought about this for awhile and chose the hull from *DAWNBREAKER III,* shown in the "Bermuda Series" chapter of this book.

It was an excellent choice. I figured you could sink *DAWNBREAKER's* hull deeper in the water and she'd still sail fine. Mark Fitzgerald had designed a dozen motoryachts of about this size and took over leadership of the project—he understood better than I did what the clients were looking for. We added to the existing hull's freeboard to compensate for the extra immersion and lengthened the stern so the transom wouldn't drag. Though you might be tempted to call her a motorsailer by her looks she really does sail well, and the owners are delighted with her.

The patrons chose to build in aluminum for its strength and longevity. In order to make dockside living more enjoyable the cockpit was designed to emulate a porch. It had a flat floor with none of the "hopping in and out of a bucket" that is involved with most sailboat designs. Eliminating the sunken footwell also resulted in a nice full beam stateroom beneath it with nothing dangling down for you to hit your head on.

The fully air conditioned, high ceilinged interior had nearly the same spacious feel as the owners' Florida home. The view from the "picture windowed" main salon was even better because it could be moved easily when you tired of the neighbors.

With a LOA of 65' 0", LWL of 56' 6" and beam of 16' 10", *TE MANA* had a lot of interior volume. Her stern had a sugar scoop transom with two watertight transom doors to access the rear storage area. Additional storage was located forward in the fo'c'sl. The cutter rig was of modest height but spread a considerable amount of sail owing to the large genoa. In considering SA/DISP ratios you must make allowances depending upon whether a genoa is carried since the overlapping part of the genoa is not included in the measured area. A roller furled staysail of very small size was designed to carry on in really blustery conditions. *TE MANA* used a Paine Keel with a draft of only 7' 7" since she made her home in western Florida.

- *In considering SA/DISP ratios make allowances for whether there is a genoa or not.*

TE MANA was designed around its creature comforts. She had 42,000 btu of air conditioning, powered by a large Caterpillar generator which occupied the aft end of the engine room to starboard. A hinge-up workbench was provided above the genset. The main engine was a 185 horsepower Caterpillar diesel that drove the yacht at 10 knots. Other systems included a watermaker, washer and dryer, windlass, autopilot, GPS, radar, all the expected electronics, and both bow and stern thrusters. Like her "Bermuda Series" sisters, *TE MANA* offered excellent sailing and motoring characteristics. She combined luxury with oceangoing stability and safety in a size that a couple thought would be manageable without need for additional crew. They're still together, and there's still no crew.

The pilothouse. The "loose" table made it feel like a home.

Photo: Billy Black

The cockpit was on a single level. The twin wheels were way outboard so you could see past the pilothouse.

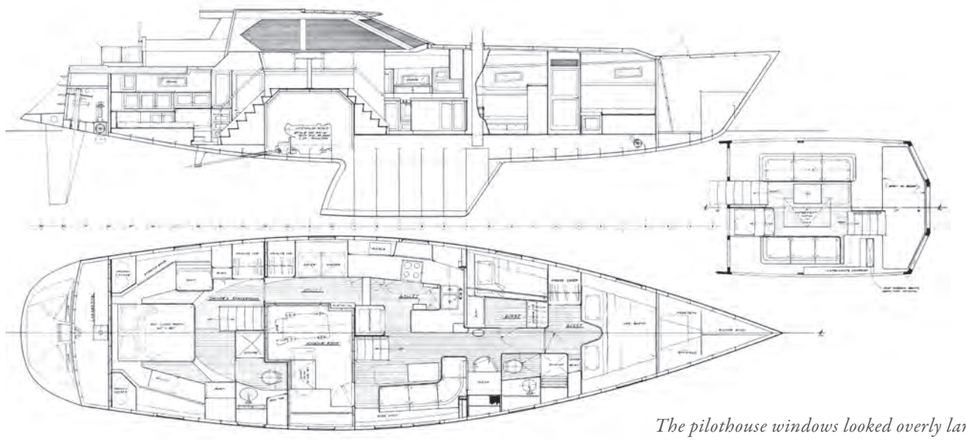
Photo: Kanter Yachts

Main salon looking starboard.

Photo: Billy Black

The aft owners' cabin had lots of stowage.

Photo: Billy Black



The pilothouse windows looked overly large in the drawing. Until you actually sat up there. Then you'd lean back and drink in the view around you, feeling like the Duke of Puke. The engineroom had full headroom and was accessed through a door from the starboard side of the main salon.

Kanter 48

Vela

Dimensions	
LOA:	47' 11"
LWL:	41' 4"
Beam:	14' 2"
Draft:	7' 2"
Displacement, ½ load:	39,000 lbs
Ballast (lead):	11,825 lbs
Sail Area (100% Foretriangle):	1097 sq ft
Disp/L Ratio:	247
Sail Area/Disp Ratio:	15.26

KANTER YACHTS LAUNCHED THIS WELDED aluminum cruiser in 2008 for a Colorado owner. *VELA* was intended for singlehanded offshore cruising so safety was paramount. With no-one else aboard to come back and pick you up and a self-steerer insuring she would charge on forever in a straight line, nothing trumps it. Her tall sailplan was balanced by a moderate draft Paine Keel. By this stage in my career my clients would listen to well intended advice and if they cared about performance they would accept the draft that went with it. The rudder was skeg supported with my PBSR approach—the same rudder and skeg that began in 1983 with the *MORRIS 32.* The propeller was thus well protected where it was less likely to snag lobster pot lines or other nautical flotsam.

The owner had very specific requirements for the interior. Unlike most center cockpit designs, which step down both the sole and the overhead beside the cockpit, the cabin sole in this design was on a single level. Thus there was no possibility of tripping as one moved forward or aft through the yacht. There was a large single head, centrally located, which had a spacious shower stall. The guest cabin was forward and featured a large double berth and a lot of stowage. In a pinch the starboard main salon settee could be slid out to form a third double berth.

VELA *during sea trials on lake Ontario. She excelled in more wind than this but was no slouch in light airs.*

Photo: Paul Watterworth

VELA *galley looking forward.*

The yacht's joinerwork was clean, European style in varnished cherry set against white flat paneling. Immediately adjacent the companionway to starboard was a locker with a bin atop it for items such as flashlights, safety harness and the like so they'd be close at hand when going on deck. The wet locker was just to port of the companionway so wet items could be stowed immediately without dragging them through the cabin.

There was 174 gallons of integral aluminum tankage for fuel and 200 for water—a lot of tankage for a yacht of this size. This included a separate, removable stainless steel drinking water tank. A few years previously there was a scare about a possible connection between aluminum cookware and Alzheimer's disease, and many of our alu yacht clients responded by fitting a dedicated stainless tank for the drinking water. The deck drains were valved to permit rain catchment. Solar panels were fitted atop the hard dodger and a wind generator was available to assist in topping up the batteries. Therefore no mechanical generator was required.

The afterdeck was sized to snugly cradle a RIB which was deployed and retrieved using a purpose-built crane—the reason the transom corner post looks too big. There were large deck lockers, one of which could also be accessed through a transom door to enable the owner to stow his windsurfer.

VELA was begun by a bachelor who intended to see the world singlehanded. Along the way Catherine appeared and signed on as crew, and wife. It does my heart good to think of the two of them sailing together on their strong and lovely *VELA.*

Her bright, simply styled interior. I had tried for years to promote studded vinyl tile for cabin soles and finally got somebody to listen. The choice of white was daring but won't look this good forever.

VELA *had a center cockpit with high seatbacks. There was a windowed shelter over its forward half.*

Photo: Paul Watterworth

Galley looking aft.

Owners' cabin.

Lyman-Morse 54

New Morning

Dimensions	
LOA:	53' 9"
LWL:	47' 3"
Beam:	15' 3"
Draft:	7' 7"
Displacement, ½ load:	47,507 lbs
Ballast (lead):	16,000 lbs
Sail Area (100% Foretriangle):	1337 sq ft
Disp/L Ratio:	187
Sail Area/Disp Ratio:	16.31

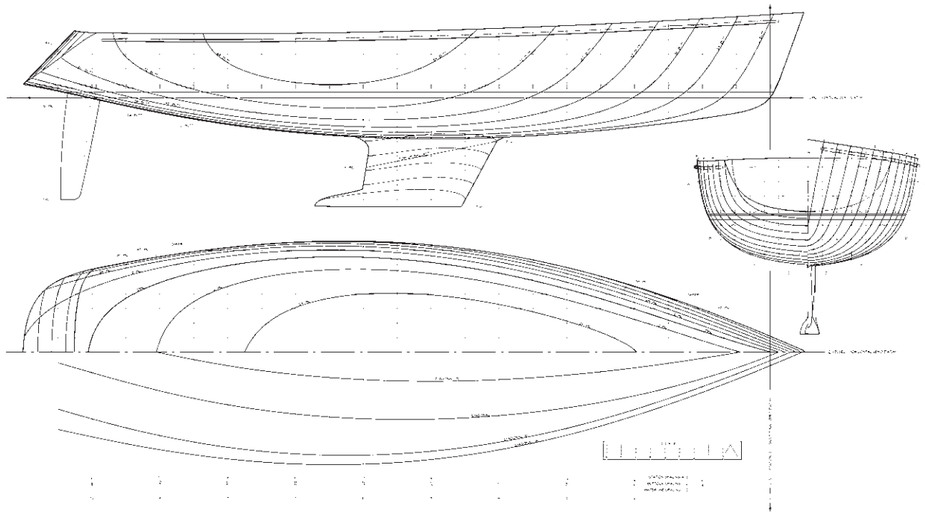
Unlike many light displacement designs NEW MORNING *performs very well in light airs. Her owners spec'd opening ports in the house sides which really improved her ventilation.*

NEW MORNING BECAME our final Performance Cruiser design, and I believe our best. She was built by Lyman Morse Boatbuilding of Thomaston, Maine for a California couple. The interior and deck design were driven, almost obsessively, by her owners. The hull design was all Chuck Paine, and for those few who can understand the subtleties of something that is essentially pointed at one end and blunt at the other, I'll try to describe the final tweaks. She began from the Bermuda Series "parent model"—a shape that had been developed over some thirty iterations. Because it worked, we were loath to change it much..."don't fix it if it ain't broke."

- *Once you find a hull shape that works, don't fix it if it ain't broke.*

As the years went by that hull model, like my own hull, put on a little weight. While it's true that construction materials and methods continually improved in strength-to-weight ratio and we responded accordingly, the number and weight of luxuries fitted aboard sailboats burgeoned even faster. So *NEW MORNING* had a DISP/L ratio of 187, contrasting with the 130s for some of our earlier Bermuda Series designs. Despite the added weight she was actually faster, because she had a much taller rig with a carbon fiber mast and Nitronic rod rigging, and a deep enough keel with a large bulb at the bottom to keep it standing upright. Stability equates with speed and this design had gobs of it.

Over the past few years we had been iteratively lowering the hull profile between the cutwater and the front of the keel, making the bow sections more veed in the process. All light displacement hulls pound going into the wind and waves, but this one pounded less than most because of the deeper bow profile. The stern was likewise made less flat in section than the majority of light displacement hulls. It was kept flattish above the rudder so that the water flow at the top of the rudder would remain dammed throughout the rudder sweep, but was then arced upward to diminish the flatness as rapidly as possible. This was done to reduce the "stern slap" that all modern hulls create. The tradeoff between flat sections aft—which make a yacht faster—and rounded sections that reduce stern slap, is a classic zero-sum game. I believe *NEW MORNING's* aft sections came close to the golden mean of this intractable compromise.



A stern that evolved somewhat broader than our earliest designs, with the sections "softened" and veed in compensation. The stem knuckle was immersed deeper and the forward profile lowered to reduce pounding. The keel was deep enough to permit its area to be significantly reduced. As a rule of thumb, for every inch of increased depth you can reduce a keel's length by two. Its bulb was lengthened to enable the ballast to be distributed extraordinarily low. There is hollow to the bow, just as Herreshoff would have drawn it a century ago. Some aspects of yacht design seem to go full circle, given time.

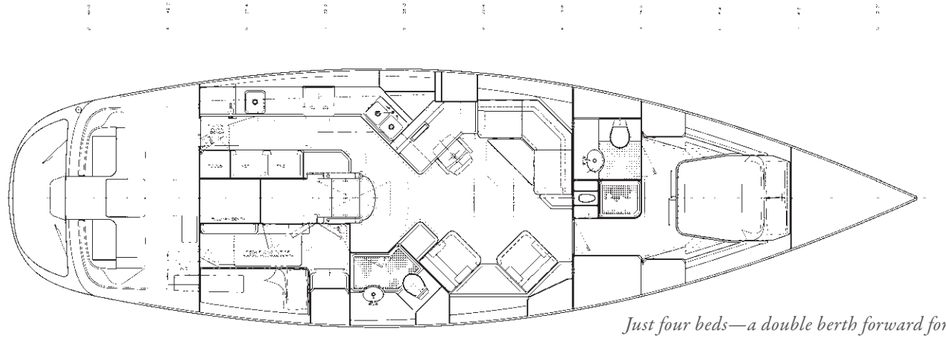
Art Paine sitting in the mockup. The upholstery was fiberglass insulation wrapped in cheap yard goods. Art tried unsuccessfully to sell the clients one of his paintings by hanging it there.

- *For every inch you increase a keel's depth, you can decrease its length by two.*

The owners were intimately involved in perfecting every detail, and their efforts yielded one of the most innovative interiors ever built. As always we drew an early preliminary interior, which they promptly rejected. We were being too conservative—they wanted something groundbreaking. I suggested they hire an independent interior designer and they asked us to recommend someone. It was an easy choice.

Jane Plachter-Vogel of Fort Lauderdale had worked with us on previous projects, including *MANDALAY* and a number of our motor yachts. We found her to be immensely talented and creative. Jane took the owners' requirements at face value. They wanted an interior for two people. Jane said, "Yes, Ma'am" and drew them what they wanted.

In keeping with their insistence that no expense be spared to get it right the owners hired my brother to build a full size mockup of the interior. He found a heated building not far from our office and hired a helper to pre-create the interior in cheap plywood and cardboard, cockpit and all, within a very accurate slat assemblage to represent the hull. It was very useful, as mockups always are—you can envision just so much from scale drawings. You never change anything more than an inch or two, but those inches cumulatively add up to a whole lot of difference.



Just four beds—a double berth forward for use in port and two singles aft (one is hinged down and doesn't show well in our drawing) for at sea. Both had access to a nearby head.

The open space created by the novel plan made *NEW MORNING* feel like a much larger yacht than 54 feet. The sightlines were excellent from the galley to the navigation console and indeed throughout the entire yacht with the doors left open, as they would be with just two persons aboard. The cabin sole was on a single level with no steps on which to trip. A sloping stairway replaced the usual ladder between the cockpit shelter and the main accommodations. The yacht's joinerwork was beautifully crafted in a variety of light colored figured woods. It was very modern in style, and visually exciting.

There was an unusual amount of tankage for fuel and water making the yacht self sufficient for extremely long passages. A watermaker traded fuel for fresh water when necessary. Solar panels were fitted atop and forward of the hard dodger, and there was a wind charger on a stern post. The owners were at the vanguard of the "green" movement which was becoming increasingly popular as I wrote this. Their use of renewable energy made a generator unnecessary.

Air conditioning was available only in the forward cabin, the reasoning being that this was the cabin that would be used in marinas where electrical power was available. The cockpit was extremely well detailed, with highly tooled drainage channels surrounding the many beautifully tailored lockers. This created the best organized and easiest accessed stowage of deck gear we ever devised on a yacht.

I loved the way *NEW MORNING* sailed. As a yacht designer I'd sailed nearly 200 of my own designs during their sea trials. And as a yachting pundit and competitive racer I'd sailed at least this many by other designers. *NEW MORNING* was as fine a performer as the best of them, rivaling many of the stripped out racers I'd helmed.

- *If the clients can afford it, you learn a great deal from a mockup.*
- *Make the companionway steps into a stairway, not a ladder. They're used a lot.*

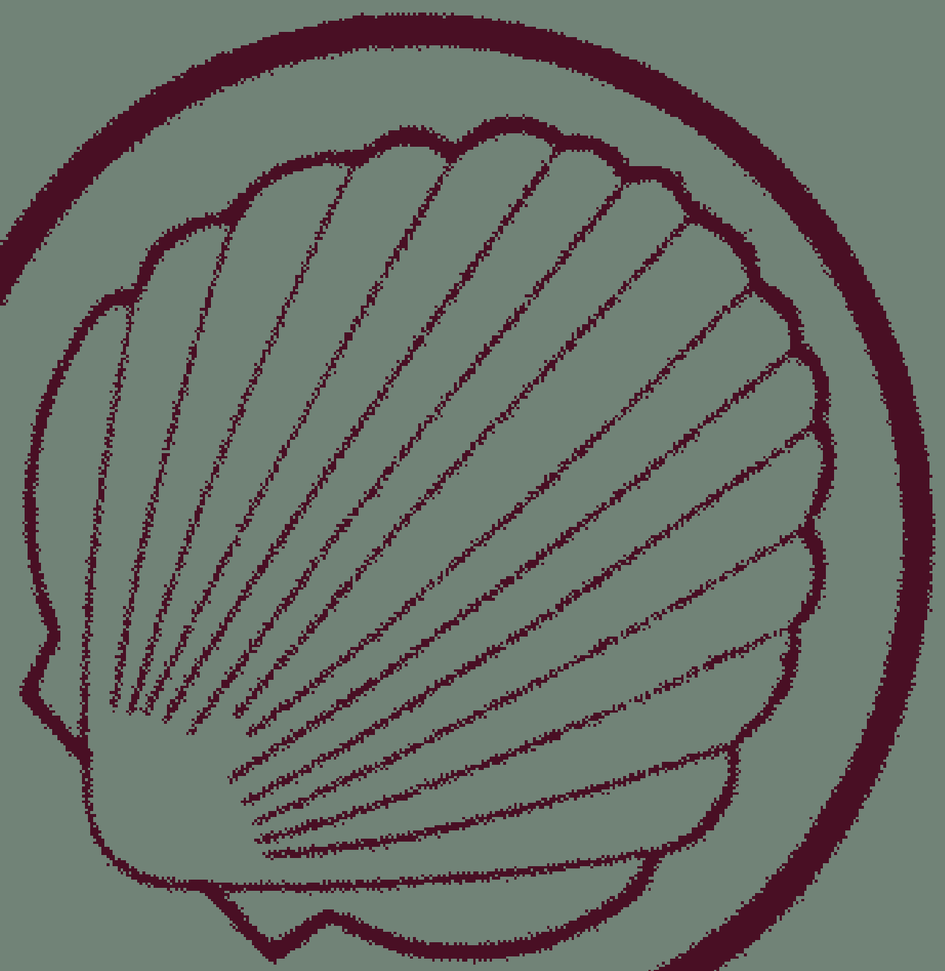
Looking forward. *Photos: Billy Black*

The narrow linear galley made it safe when heeled.

NEW MORNINGi s the epitome of the term “performance cruiser”. Despite being loaded with luxuries she’s capable of sailing like this! Note the profusion of solar panels. These and the wind generator rendered a mechanical genset unnecessary.

Photo: Billy Black

The Morris Ocean Series



CHAPTER SIX

The Morris Ocean Series

THE PARTNERSHIP WITH MORRIS YACHTS was the springboard for the success of Paine Yacht Design. Without the lucky break of meeting an artisan who was as driven to prove his abilities as was I, my fledgling studio would never have gotten off the ground. Our original designs, *FRANCES, LEIGH, LINDA, ANNIE* and *JUSTINE* were well received and helped lift Tom Morris' yard and my design office out of obscurity to a position of prominence on the American yachting scene.

Tom Morris realized early on that nobody ever came to a boat show and asked, "What's old?" They wanted to know what's new, and that meant developing new designs as frequently as could be economically justified. It certainly helped that Tom and I had established friendly relations with two large English companies who were willing to share the design and tooling costs for the more traditional designs. Paine Yacht Design's job was to make the English versions look English, and the Morris versions American.

- *Nobody ever came to a boat show and asked, "What's old?"*

By the time the ladies' names ploy had played out the Morris name had become recognized for a high quality of build, alongside those of Hinckley, Alden and Able. Buyers were looking for ever larger yachts amid an economy that seemed unstoppable, pausing to take a breath only for short recessions. For thirty years Morris Yachts and Paine Yacht Design matured alongside each other and by the year 2008 had built over 180 exceptional yachts together. Only on September 11, 2001 did I see the storm clouds looming. "That could be the end of this great run." I thought to myself, and sadly, despite the government's efforts to restore a boom that was fundamentally unsustainable, I was proven right by the financial crash of 2008. Morris Yachts, with a sounder capital base and under new leadership by Cuyler Morris, succeeded where I failed. I never cared enough about money to build up a rainy-day fund. But Morris Yachts will, I sincerely hope and expect, go on to build another 180 even more beautiful Paine designed yachts.

Tom and I looked at each other first of all as friends. Many of our "contracts" were handshakes, others brief notes I scratched together that would send a lawyer into fits of laughter. We made and kept many promises to each other, and in an industry where late payments and non-payments to designers are the rule rather than the exception, neither Tom nor his son Cuyler ever missed a royalty. Our mommas brought us up right. At times Tom and I fought like an old married couple, but always about how the other one could make our mutual designs even better.

Two of the Morris fleet came their way as one-off racing yacht projects. Morris Yachts built the 48 foot *REINDEER* for Newbold Smith and the 45 foot *FIREFLY* for Patrick Wilmerding. Both were old school yachtsmen wanting decent performing racers but with the comfortable interiors and the luxurious fit-out at which Morris excelled. Tom then negotiated with the owners for permission to build the designs with detuned sailplans and reduced keel draft, creating fast cruising yachts with race inspired hulls—the *MORRIS 486* and *MORRIS 45.*

Morris Yachts bought the assets of Able Marine out of bankruptcy in the year 2000. Included were the molds for the *ABLE APOGEE 50.* Tom asked us to develop an upgraded version of the *50,* renamed the *MORRIS APOGEE 51,* and to extrapolate the hull tooling into a larger version with a center cockpit deck, which became the *MORRIS 52.*

Tom Morris was a contrarian and an optimist—basically the opposite of me in temperament. I tended to be risk averse and pessimistic. Every two years Tom would come to me and say, "I think we should do a new boat." I'd respond, "We're in a bit of an economic slump right now. I wouldn't want to contribute to a project that might, you know, fail." He'd say, "Now is the best time to do something new—we'll be ready with a new design when the economy recovers." On the following pages you'll see some of the finest sailboats ever built in America. Thank goodness he didn't listen to me!

Morris 46

Tom Morris sailing the MORRIS 46. *Photos: Onne van der Wal*

Dimensions	
LOA:	45' 11"
LWL:	34' 6"
Beam:	12' 9"
Draft:	5' 9"
Displacement, ½ load:	23,000 lbs
Ballast (lead):	8,280 lbs
Sail Area (100% Foretriangle):	885 sq ft
Disp/L Ratio:	232
Sail Area/Disp Ratio:	17.26

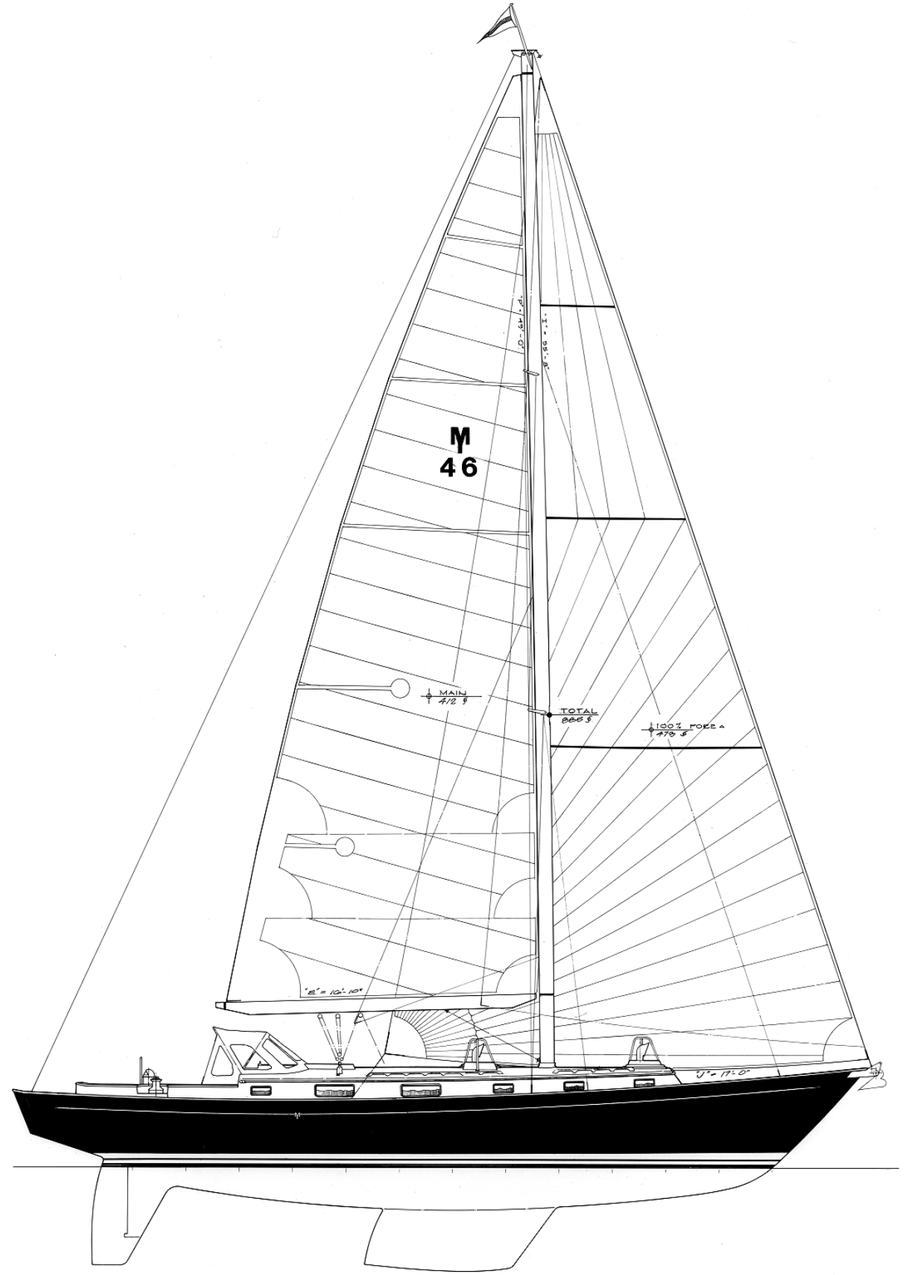
The 46DS had a tall, genoaless rig.

THE MORRIS 46 WAS A "STRETCHED" VERSION OF THE *MORRIS 44.* In 1993 we were asked to extend the counter to a smaller transom. This enabled a larger lazarette locker to be fitted abaft the cockpit coaming. A taller rig with a non-overlapping jib was designed in response to Tom's wish to eliminate genoa jibs on his fleet whenever possible to make them easier to sail. Fourteen of the yachts have been built to date. The *MORRIS 46* was selected Boat of the Year in 1994.

In 2001 Tom asked us to design a deck salon version on the same hull. It was a case of the market beating him down—we'd both been asked a thousand times at boat shows why you couldn't have a full beam aft cabin in a hull that sailed like the *MORRIS 46.* You could, though the superstructure did tend to visually dominate the svelte hull.

Raised salon aft cabin. *Photo: Onne van der Wal*

One owner wanted a traditional look, so the plywood structural bulkhead was overlaid to mimic raised panels with rails and stiles.



The MORRIS 46 *rig was so far forward it looked like a yawl with the aft mast missing. But the numbers said put it there, and the numbers were right. This drawing shows the shorter, genoa jib sailplan.*

Morris 42

Dimensions	
LOA:	41' 11"
LWL:	33' 0"
Beam:	12' 7"
Draft:	5' 3"
Displacement, ½ load:	19,800 lbs
Ballast (lead):	8,815 lbs
Sail Area (100% Foretriangle):	771 sq ft
Disp/L Ratio:	245
Sail Area/Disp Ratio:	16.86

The MORRIS 42, *like the 46, had a tall genoaless rig. The aft end of the boom ended up nearly at the aft end of the spray dodger, making gybing the mainsail relatively safer. It also put the mainsheet forward of the companionway where it couldn't wrap itself around someone's neck.*

Photo: Onne van der Wal

THE MORRIS 40/42 FILLED A GAP IN MORRIS YACHTS' fleet between the *MORRIS 38* and *46.* It was a somewhat easy gap to fill. The *BOWMAN 40* had become a huge success in England and Tom was convinced that an Americanized version would do even better over here. It was a Chuck Paine design, so no conflict there. He'd been on the giving end of two transfusions to Britain—both to Victoria Marine. Why wouldn't this sort of thing work in the opposite direction?

So a deal was struck, splashes were shipped over, and my office was hired to make the inevitable improvements. Number one on the list was to replace the Scheel Keel that was standard on the *BOWMAN 40,* with a Paine Keel. Of course the by now well recognized Morris Yachts cove stripe and logo were tooled into the new hull mold. Morris built 11 yachts at 40 feet and 3 more after she was stretched to 42 feet in 2005.

We designed a tall rig with a sail area/displacement ratio of 16.86 to perk up the performance in the lighter airs so often encountered in America. The numbers in the dimensions panel tell the story. Morris Yachts has been able to build many of the yachts at the target displacement of 19,800 lbs. Bowman had struggled to achieve their intended weight of 21,400 pounds owing to their use of heavier Lloyds scantlings. The American version has 23 additional square feet of sail yet it is just as stable thanks to the wider, more voluminous keel bulb.

Morris uses more advanced laminates than did Bowman. Lloyds' standards at the time gave little credit if one used unidirectional rovings, a lower proportion of chopped strand matt, or a stronger resin. In America the structural standard of choice was ABS (American Bureau of Shipping) rules for the classing of racing yachts. ABS rules, rightly, permit the use of thinner, lighter laminates if their mechanical properties—particularly the Elastic Modulus—are superior. The fiberglass shop at Morris Yachts has been reliably achieving glass to resin ratios of 50%, the mass-production industry standard being 33%. All glass parts are laminated using vinylester resin which retains its strength longer when immersed in water than does the more common polyester resin.

We retained the high bulwarks of the *BOWMAN 40* for safety moving about on deck. While the *BOWMAN 40* bulwarks were filled solid with fiberglass putty the Morris bulwarks are made hollow, lightening this part of the hull by hundreds of pounds. A custom highly polished stainless steel weldment enables two anchors to be kept ready at the stemhead. Morris Yachts were among the first American builders to make use of such a fitting. It took a little getting used to visually when it was a new idea. A year or so later you just expected it and looked past it, as we do lifelines and biminis and radar posts on today's cruisers.

The *MORRIS 42* is fitted with 10 opening ports plus 6 housetop hatches for ventilation and light. The cockpit is deep and has properly angled seatbacks for comfort and three tightly gasketed seat lockers. Visibility forward from the helm over the long, low house is good without needing a humped helmsman's seat. Some of the later owners replaced the skegged rudder with a carbon fiber spade, giving the design racing yacht handling.

The interior is perfect for two couples with the occasional guest or two. There are most often two double berth cabins—an after cabin which is in an ideal location to use at sea, and a larger forward cabin. Most of the yachts are fitted with two heads—a lesson learned from the *BOWMAN 40.* Long queues at tooth brushing time are eliminated and a spare toilet made available in case one is out of service. The U-shaped galley allows the cook to reach any part of the worktop area while still remaining securely nestled in a safely snug nook.

I consider 42 feet the perfect size for a combined coastal/offshore voyager. It's large enough to possess a reasonably comfortable motion in the open ocean yet small enough to reef the mainsail singlehandedly and to push away from the dock if it's not blowing too hard. If I ever win the lottery you'll know 'cause I'll have Cuyler build me a *MORRIS 42.*

- *The golden mean of wood to white is 60:40.*

The proportion of varnished wood to white should be 60:40. Doesn't matter which is 60 and which is 40. Then if you varnish it like this, it looks scrumptious!

Photo: Onne van der Wal

Morris 34

WANDERER *looked pretty as a yawl.*

Dimensions

LOA:	33' 9"
LWL:	26' 3"
Beam:	10' 5"
Draft:	5' 2"
Displacement, ½ load:	11,400 lbs
Ballast (lead):	4,670 lbs
Sail Area (100% Foretriangle):	530 sq ft
Disp/L Ratio:	295
Sail Area/Disp Ratio:	16.74

ANDIAMO *was the first* MORRIS 34. *She was built for yacht club racing.*

I'M NOT SURE WHO MET KEN JOHNSTONE first...Tom or me. Ken came to an Annapolis Sailboat Show looking for a 34 foot cruising yacht that he could also race. At that time the nearest thing we had was the *MORRIS 32* and its Scheel Keel meant in all honesty she should be steered clear of a starting line. Which I told Ken in our first conversation. But I also assured him that the hull had sweet lines, and with the right keel and a taller rig and some restraint when it came to optional equipment she'd be a fine competitor.

Ken signed on given that we'd lengthen the mold to fit a counter stern with a pretty little transom and design a racing keel and taller rig. We designed a fin keel that really enhanced the windward performance, and she was steered with a tiller which was lighter in weight than a binnacle and wheel and provided quicker response. We designed a deeper rudder that would work nicely with the existing PBSR skeg, but Ken wanted the sort of performance only a spade rudder could deliver. Tom found a way to blank out the skeg in the hull mold to make it work.

ANDIAMO was simply a delight to sail—so much so that she was chosen Boat of the Year in 1999. In her first three races in her home waters of Charleston, South Carolina she came home with three wins. At the same time she was a solid offshore cruiser with opening ports, radar, refrigeration and enough tankage to cruise to Bermuda and back—exactly what Ken wanted.

She had a large navigation table.

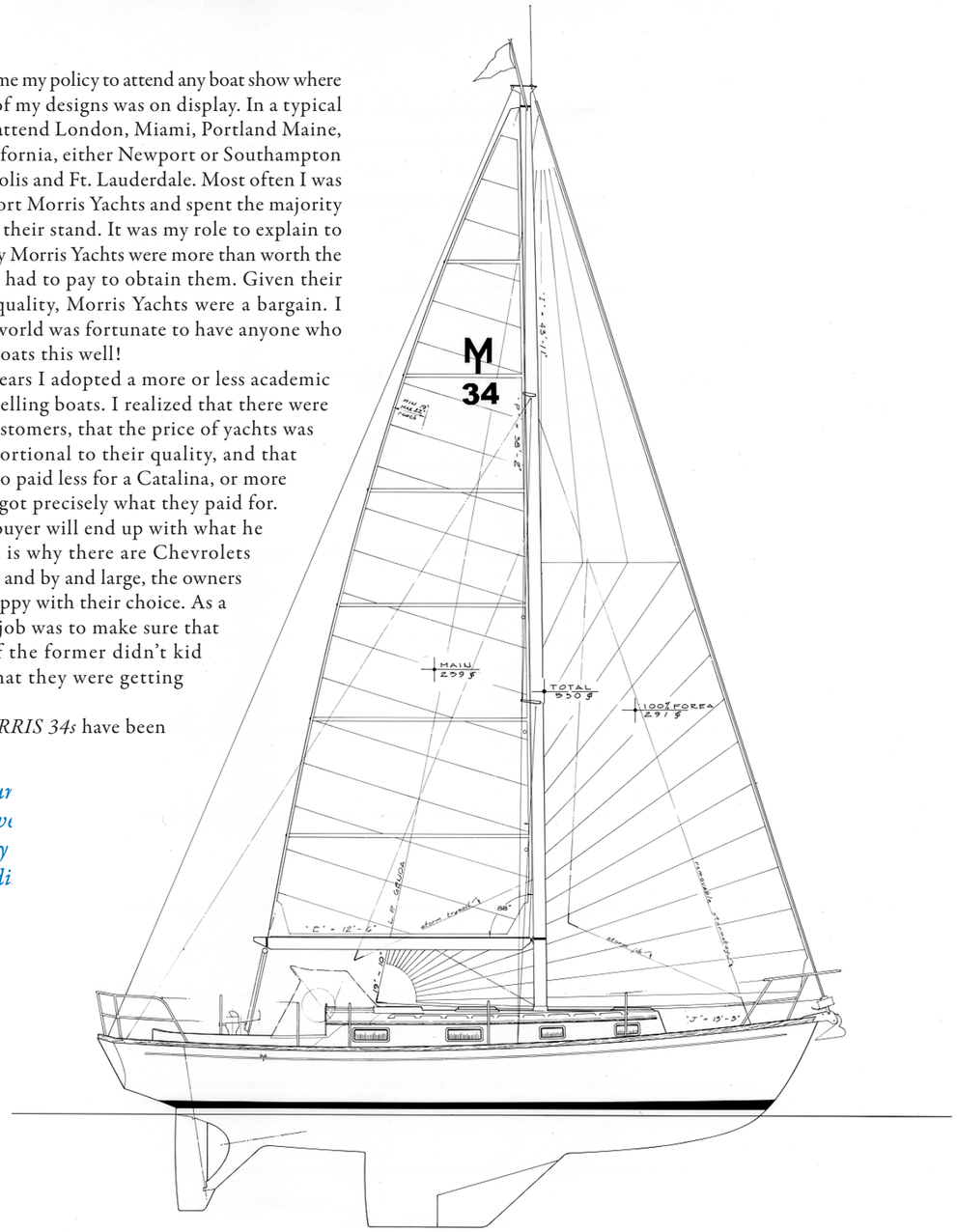
The interior was finished off in "Herreshoff style."

It had become my policy to attend any boat show where one or more of my designs was on display. In a typical year I would attend London, Miami, Portland Maine, Oakland California, either Newport or Southampton (UK), Annapolis and Ft. Lauderdale. Most often I was there to support Morris Yachts and spent the majority of my time at their stand. It was my role to explain to customers why Morris Yachts were more than worth the premium one had to pay to obtain them. Given their outstanding quality, Morris Yachts were a bargain. I believed the world was fortunate to have anyone who could build boats this well!

Over the years I adopted a more or less academic approach to selling boats. I realized that there were all sorts of customers, that the price of yachts was directly proportional to their quality, and that customers who paid less for a Catalina, or more for a Morris, got precisely what they paid for. In the end a buyer will end up with what he wants, which is why there are Chevrolets and Mercedes and by and large, the owners of each are happy with their choice. As a salesman my job was to make sure that the buyers of the former didn't kid themselves that they were getting the latter.

Seven *MORRIS 34s* have been built to date.

- *Help your*
  Attend ev
  show they
  boat on di



We designed a fin keel of the appropriate aspect ratio and area for a yacht of this displacement. Then a deeper (than the MORRIS 32*) rudder that would be usable with the existing skeg, which Ken abandoned in favor of a true spade rudder. Morris yachts blanked out the mold to remove the skeg—not a simple job.*

47' 4" Racing/Cruising Yacht

Reindeer

Dimensions	
LOA:	47' 4"
LWL:	41' 10"
Beam:	13' 9"
Draft:	8' 0"
Displacement, ½ load:	24,000 lbs
Ballast (lead):	11,000 lbs
Sail Area (100% Foretriangle):	1080 sq ft
Disp/L Ratio:	148
Sail Area/Disp Ratio:	20.77

Her large windows, bent to continue the line of the housetop, were an innovation we had tried unsuccessfully to sell to the Hinckley Corporation.

Photo: Art Paine

I CALL *REINDEER* A "GENTLEMAN'S RACING YACHT". Real racing yachts are much lighter in weight, have pipe berths and a toilet out in everyone's view, a flush deck and no transom. *REINDEER* was built for Newbold Smith of Philadelphia—about as experienced a yachtsman as ever pulled on seaboots. He had raced his previous *REINDEERs* in all of the classic races, cruised them to Labrador and written a book about his exploits. I still don't know how we landed him. Maybe he'd gotten tired of putting new keels on his last boat trying to improve its performance. I promised him we would get the first keel right, and we did.

Newbold was a demanding and enthusiastic patron and he made possible one of the finest sailing yachts to be built in years. *REINDEER* was launched in September of 1998 at Morris's Bass Harbor yard. She was intended as a fast yet durable IMS and PHRF racing yacht. "Fast" and "Durable" had gotten to be mutually exclusive concepts in "real" big boat racing toward the end of the last century. Competitive yachtsmen were throwing away three year old boats that had cost a million dollars! Newbold and I both thought this was unconscionably wasteful.

Newbold Smith had come into the office looking for a modern styled racer/cruiser. Fortunately we already had something exciting to show him. A year or so earlier we had been invited to submit a proposal to the Hinckley Corporation for a new design to refresh their line of sailboats. They had invited four design firms to submit their ideas.

This was a huge opportunity and I took the view that we were simply not going to let anyone else get this job. It would, I thought, lead inevitably to a whole new line of Hinckley sailboats—job security for a decade for whomever they chose to do this design. By this time the office had become prosperous beyond my wildest dreams and my sole motivation was to create a few masterpieces for my legacy. It was my job to maintain the esprit de corps in my studio and one way was to make working there fun for the employees. Many times my wife, who sat at the front desk, would joke with visiting customers, "Chuck doesn't need employees, he needs an audience!" Little did I suspect what my crew of artists held in store for me when I tried to sell that design to the Hinckley Corporation.

A fellow named Shep McKenney had sold his hotel chain for millions. Loving yachts and needing a challenge, he'd bought an interest in the Hinckley Company and become its president. My brother had something to do with this: Art was Shep's yacht delivery captain. They'd sailed his Bermuda 40 Scheherazade offshore between the Chesapeake and Maine together. Art had influenced McKenney to consider becoming a boatbuilding company CEO and steered him toward Hinckley's, the builder of his own beloved yawl. Shep and Art were from different worlds but nonetheless had much in common, including free spirits, a rampant sense of humor, and an intense love of beauty. Shep was a very happily married man and during those long night watches made no secret of his admiration for his wife, who had it all, beauty, brains...and shapeliness exceeding that of the proudest clipper-ship figurehead! Long passages were shortened by extended discussions regarding the shapes of hulls, keels, classic automobiles, vintage warbird aircraft...and other things. Because of Art's friendship with Shep, I even thought we might have the inside track to snag this opportunity.

I gathered my lads together and gave them my pep talk. I reminded them (Art Paine, Mark Fitzgerald, Ed Joy, and Lloyd Bracy) that I considered them to be the finest boat designers on the planet. There were no time constraints—Hinckley were a classy company and they'd offered to pay for our best work, no matter how long it might take or how much it might cost. We would have our own little design contest in the office and assemble the best of everyone's ideas into our proposal.

The yacht would be built using the most modern materials and techniques. But it could never be really light, because the Hinckley clientele were the crème de la crème, financially, and would fill any new yacht with every imaginable luxury. I decided to illustrate a single hull and two deck configurations, one an aft cockpit and the other a deck salon. We would do three drawings. And, of course, we'd do them in Shep McKenney's personal favorite choice of colors with the name of his own boat, Scheherazade, emblazoned on the transom. Hey, we practically had this job in the bag!

By the day before I was to drive up to Manset to give my presentation we had the three drawings nearly complete. First there was the sailplan, which we hired airbrush artist Bruce Alderson to draw in color. Then a perspective rendering of the aft cockpit by Art, more or less an excuse to show the transom with Shep's boat name lettered on it. It also showed in a way that no other drawing could, the innovation we dreamed up for this boat—side windows that were bent so as to continue the line of the house sides and coaming.

The third and final drawing showed how both an aft cockpit and a deck salon configuration would look on the same hull. In order to make this comparison obvious within the short span that the muckety-mucks at Hinckley might spare me for my presentation, we did this drawing with the aft cockpit on an overlay. Even took the time to draw a handsome young couple at the wheel, obviously enjoying themselves. Once the customers had soaked in the beauty of the aft cockpit I would open the overlay and the center cockpit beneath it would be revealed.

The drawings were not quite finished at 5 o'clock the evening before I was to give my sales spiel. The guys all agreed to stay late until it was done. It would be there in the office, they promised me, at 6 the next morning, ready for me to take with me to my sales meeting, without fail. And it was—all carefully wrapped in cellophane lest it rain.

So there I stood next day in the conference room of arguably the most famous sailboat builder in America. You can take the boy out of the shack but in a sense you can never really take the shack outta the boy. I can honestly say it was just a tad intimidating. In attendance were several of Hinckley's in-house designers, no slouches in their own right when it came to design talent. I was surrounded by the scions of America's upper class—if we can admit that our melting pot retains at least a vestige of European-style aristocracy. The upside of the scenario was that premier New England yacht-building executives were intimately familiar with what a yacht was truly supposed to look like. They seemed increasingly pleased with the look of the illustrations over which my crew had burned the midnight oil.

The aft cockpit drawing by Art Paine. It showed the bent side windows, faceted aft face of the pilothouse, teak clad area forward of it—purely for looks—and varnished wood hatches that were always favored by the Hinckley Company. Most important, though, it showed the name of Shep's boat.

I was particularly proud of the overlay sketch my guys had prepared of the cockpit area, because it depicted not only the many minor but unique facets of this unusual design, but how you could use the same hull for both an aft and center cockpit. Time to open the flap and show them the deck salon version...

Art's rendering of the HINCKLEY 48 *deck salon cockpit.*

The room erupted in laughter—thank goodness. This was why the guys chose to work late! One thing I knew—the Hinckley Company would not soon forget the day Chuck Paine came to town to give his presentation.

I got the word a week or so later that they'd loved our design, and probably would have even chosen it over those of the other architects, but they had made the decision to take the company in a whole new direction and build a little Bruce King designed powerboat called the Hinckley Picnic Boat. Which is how Morris Yachts ended up building *REINDEER*.

Newbold Smith loved everything about the aborted Hinckley 48. He wanted Tom Morris to build it which suited me fine—maybe Tom would even decide to build it as a series. As indeed he did, taking his company in the direction that Hinckley had chosen not to go.

The hull and deck were of E-glass and Kevlar reinforcements in epoxy resin over CoreCell closed cell foam core. Tom Morris knew enough not to mess with epoxy. He subcontracted Mark Lindsay at Boston Boatworks to build the hull and deck. They used "wet-preg" to wet out the cloth reinforcements. I'll never forget watching the process on one of my inspection visits. They had this one guy who was capable of running the wet-out machine. The cloth came off rolls at the back, through a series of wide rollers and a vat full of catalyzed resin, then emerged at the front- 50 inches wide and soaked with wet epoxy, the stickiest substance known to man. This guy would somehow wrestle the limp, sticky cloth emerging from the machine at an alarming rate into a roll a few inches in diameter—which took two hands obviously—and when it got so heavy a guy like me wouldn't have been capable of holding it, use his elbow to bump this wooden lever that hung down from somewhere that would turn off the motor before he became an epoxified mummy.

Newbold raced her in point to point races and also cruised her extensively. The rig was very powerful with a large mainsail and a foretriangle that carried a 155% overlap genoa when racing. Smaller, flatter sails were used when cruising. She celebrated her birth by winning her first race—the final race of the Annapolis Fall Series, followed in 1999 by winning the Monhegan Race, and has placed near the front of the fleet in many subsequent races over the years.

She differed from the racers of her day by having a much more complex, and heavier, deck. It had a raised pilothouse with actual windows you could see out of and a cockpit in which one could comfortably sit—seatbacks and all. Since he was based on the Chesapeake, Newbold restricted her draft to 8 feet—deep enough to get her to windward quickly yet just usable in his home waters if he kept his eyes on the chart. The raised pilothouse meant a raised sole beneath it, which he filled with tankage for cruising (the tanks could be emptied for racing) and which enabled a wonderful view through large windows. A complete and luxurious interior was fitted, including two fully enclosed heads—both with showers, fully appointed galley with refrigeration and Corian countertops, microwave and convection ovens, and lots of lockers for stowage. And the windows of the pilothouse sides had that unique bend at about mid height. This crease, besides being aesthetically appealing, had the practical effect of making the windows 86 times stiffer than flat panes would have been!

She was distinctive with her bent windows. A couple of years later we changed the hard crease to a gradual bend on succeeding boats, making them look more like automobile windows. They say in oil painting, "put it down, and leave it." Ten years later, I wish we had left well enough alone.

The hull had an absolutely fair shape with flat buttocks—what Dick Carter used to call "long legs", with a long waterline and sharp entry. It was the owner's view that any rating rule invoked loopholes which would be plugged over time, and he wanted his yacht to be raceable for at least a decade. So all bumps, hollows, slab topsides, or other rating exploitations were avoided. I retained the "post keel bulge" in the profile which by that time I came to sense, intuitively, makes a hull faster, coinciding as it does with the trough of the yacht's wave train. You can quantify just so much of sailboat hull design—and we did every mathematical study known to man. After that point, though, it's art.

The keel was a massively bulbed racing/cruising compromise with its upper half of welded stainless steel and its lower half of lead. Racing or cruising, *REINDEER* was flawless. Ten years after her birth, she was still doing both.

With her exceptional stability she could carry large spinnakers high on the wind. She was diabolically fast, hence the sail number. *Photo: Art Paine*

Newbold Smith helming *REINDEER* on a beam reach with his big spinnaker. Her bent windows were a stylistic innovation. Even with the pole against the headstay there's no helm to speak of. The spade rudder was huge and as far aft as we could place it. She was stiff enough to avoid needing everyone's butt on the rail as is the case with pure racers. It's a lot more fun to hang out on deck, like this.

Photo: Art Paine

Morris 486

Dimensions	
LOA:	48' 6"
LWL:	43' 3"
Beam:	13' 10"
Draft:	6' 6"
Displacement, ½ load:	28,100 lbs
Ballast (lead):	10,700 lbs
Sail Area (100% Foretriangle):	1081 sq ft
Disp/L Ratio:	163
Sail Area/Disp Ratio:	17.62

You can tack this jib without cranking, if you time it right. This is the shorter, Intracoastal Waterway rig. Photo: Onne van der Wal

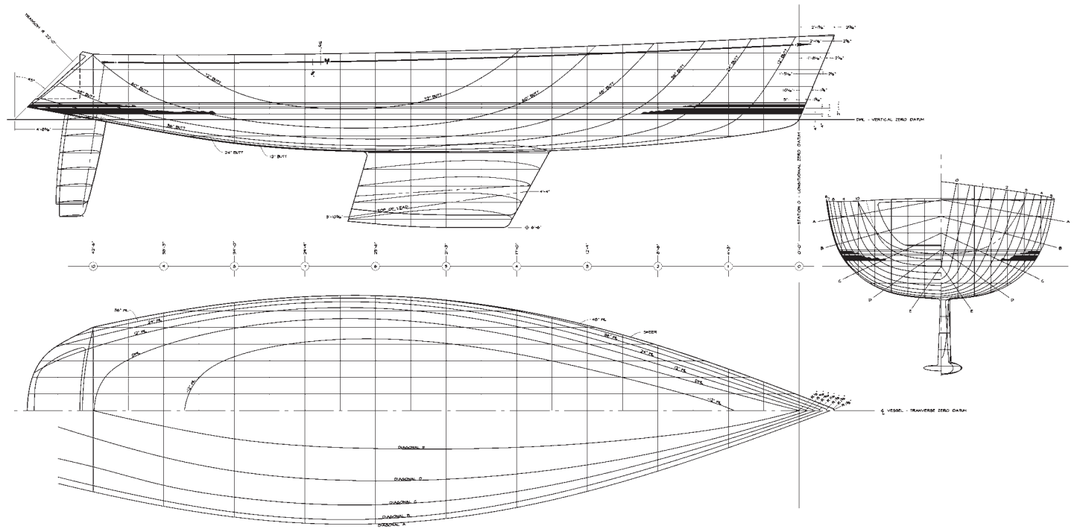
AFTER SAILING *REINDEER* A FEW TIMES TOM Morris got the idea of a detuned, more cruising oriented version. With a little shorter mast, a lot shallower keel, and the same hull simply increased in freeboard a couple of inches for a bit more headroom, she would still be faster than nine out of ten cruising yachts on the market and unlike *REINDEER*—need no crew to speak of. So he hired us to do the redesign in 2000. Since she wasn't quite 49 feet long he called her the *MORRIS 486.*

The biggest change was to replace *REINDEER's* pure epoxy with vinylester resin so she could be built using female molds. Vinylester resin preserved most of the strength of *REINDEER's* laminates while enabling her to be gelcoated and female molded. The gelcoats used at the time were incompatible with epoxy resin. Epoxy boats were therefore typically built on male molds "from the inside to the outside". The vinylester resin made her less prone to developing print-through over time, and there was no need for costly post-curing as was the case with epoxy.

under power. Until this time Tom had resisted fitting sail drives to his yachts because they contained a higher proportion of aluminum parts that require more careful maintenance. But the performance advantages that result from their lighter weight are compelling.

Two sailplans have been designed— one that just clears beneath Intracoastal Waterway bridges, and another, much taller rig that emphasizes performance. The large overlap genoas *REINDEER* carried are replaced by a 100% foretriangle jib that sheets inboard of the upper shrouds. Thus the 486 has a high pointing angle without the necessity for exhausting winching each time she is tacked. Like her predecessor the *MORRIS 486* sports a slender but well stayed carbon fiber mast using slightly swept back spreaders. The chainplates are arranged so that passage forward along the side decks is totally unimpeded.

As is true of all Morris yachts the *MORRIS 486* exhibits the finest craftsmanship available from any American boatbuilder. The fit and finish, selection of wood grains, and attention to detail are in all respects



The 486 uses a Paine Keel that draws a moderate 6 1/2 feet. A carbon fiber balanced spade rudder is fitted. With the keel's longer fore-and-aft extent the lead ballast can be concentrated nearly entirely in the bulbed portion of the keel, resulting in an unusually low center of gravity. A 52 horsepower Yanmar engine with a sail drive delivers speeds of well over eight knots the best available. Owners, or more accurately their wives, work with the Morris design department to custom design their yacht's interior. *CHESHIRE CAT,* illustrated here, was finished in highly varnished honduras mahogany, with a staved white overhead and teak and holly sole. The quality of finish is limited only by the depth of one's pockets.

With an interior as highly finished as this, it's not exactly camping!

Looking up into the pilothouse on CHESHIRE CAT.

The table leaves fold out to double its size, and the fiddles hang down in this configuration rather than digging into your arms. I call this a "foldover table", and when it fits I believe it's the best type of table to use on a yacht.

Photos: Onne van der Wal

CHESHIRE CAT *had a LeisureFurl boom and a genoaless rig.*

Firefly

Dimensions

LOA:	45' 2"
LWL:	40' 6"
Beam:	13' 3"
Draft:	8' 1"
Displacement, ½ load:	22,500 lbs
Ballast (lead):	8,600 lbs
Sail Area (100% Foretriangle):	1000 sq ft
Disp/L Ratio:	151
Sail Area/Disp Ratio:	20.08

THE CUSTOMER HAD SEEN *REINDEER*, talked to its owner, and came into my office wanting a smaller version. "I'd like a 45 foot version of *REINDEER",* he said. He wanted Tom Morris to build her.

"Why not just build a sistership?" I responded. "It's only about two feet longer than you want, and it will save you a lot of money in design fees and more than that amount in new tooling." He answered, "My wife said any longer than 45 feet, and it's divorce." I suggested he tell his wife they could have a bigger boat for lots less money.

A week later he came back into the office. He'd talked to his wife. "I'd like a 45 footer" he said.

Like Newbold Smith, this owner wanted a racing yacht with more luxuries than any self-respecting racing yacht ought to have. He was willing to concede the windward-leeward contests to lighter, deeper drafted yachts. He preferred to concentrate on the local races—Downeast Race Week and the Marblehead-Halifax—round the buoys races that could be won by carrying spinnakers at the margins of control if the hull were stiff and well behaved and the rudder big enough.

FIREFLY was launched in late July of 2000 at Bass Harbor. Her hull and deck were once again subcontracted to Mark Lindsay at Boston Boatworks, since they were of epoxy composite construction. Tom and Cuyler had the good sense to sub out the epoxy parts, concentrating on the lightweight but beautiful fit-out that their company was really good at. *FIREFLY* made her racing debut in the Down East Race Week series, in which she finished first in class and fleet, and campaigned very successfully at the Silver Jubilee in Cowes the next year.

FIREFLY *racing at 2007 Antigua Race Week. Photo: Onne van der Wal*

Cuyler Morris bought the yacht back for a sabbatical over the winter of 2006/7. He left the racing sails at home, sailing south with well cut but low-tech Dacron cruising sails. He competed in Antigua Race Week in 2007, and in a five-race series won every race in his class, with his wife and three small children on the rail. *FIREFLY's* stability is what made the difference—along with Cuyler's considerable helming skills. *FIREFLY* was able to carry her full racing sail at 22 knots apparent without reefing, a real advantage in the windy Caribbean.

FIREFLY getting the gun at Antigua race week.
In five days of racing, she won every race.

Photo: Onne van der Wal

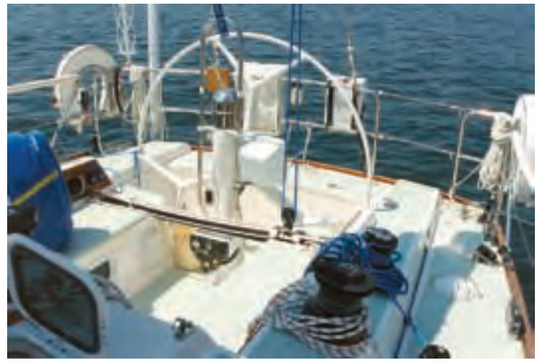
FIREFLY was a scale-down of *REINDEER*. She had a similar extremely fair hull, the stainless steel and lead bulb keel, the bent windows, and a cockpit with seatbacks forward of the helm. She avoided the extremely lightweight construction that was required for first place grande prix finishes. This flimsy type of yacht has perhaps a three year useful life. *FIREFLY* was very strongly built, and will still be racing in twenty years' time.

The keel was designed in collaboration with designer Jim Taylor of Marblehead, who specialized in racing yachts. He and I had a lively debate over stability. He pointed out that all of my yachts were way more stable than anything he was used to. He even sent me the USYRU database to prove it. I responded I couldn't imagine you could really go to windward against a stiff breeze in any of the boats in that database. But people did, he pointed out—you just had to reef early and nurse them to the weather mark, after which you cracked off and flew downwind. And he emphasized, repeatedly, "stability is measured—and penalized." He ended up taking a few hundred pounds of lead out of the keel that I had wanted. And as it happens, he was right—the boat was still bloody stiff!

The interior was both beautiful to the eye and practical for use at sea. There was an abundance of beautifully varnished butternut—a lightweight, honey colored wood. Her cabin soles were of teak and butternut, while her fiddles, cushion retainers, and many of the interior surfaces were solid butternut. This avoiding entirely the "stripped out" look of many contemporary racers. Berths were provided for eight persons to sleep on comfortable, thick cushions. The galley was large and had an unusual amount of usable countertop. The interior surfaces of the hull—often simply painted in stripped-out racing yachts to save weight—were lined with a solid butternut staved ceiling. The entire interior of this yacht exuded comfort, yet she was exceedingly fast—a rare combination and a testimonial to the skills of those who built her.

Photo: Onne van der Wal

The salon had traditional pilotberths and settees with exquisite joinerwork.



The large carbon fiber wheel got the helmsman outboard for visibility.

FIREFLY *leading the bigger boats for line honors at Antigua Race Week. Those three kids on the rail added up to maybe one conventional Antigua deck ape.*

45' Racing/Cruising Yacht

Morris 45

Dimensions	
LOA:	45' 4"
LWL:	40' 7"
Beam:	13' 3"
Draft:	7' 0"
Displacement, ½ load:	23,000 lbs
Ballast (lead):	8,815 lbs
Sail Area (100% Foretriangle):	952 sq ft
Disp/L Ratio:	154
Sail Area/Disp Ratio:	18.83

POPPAEA *showing off.* *Photo: Onne van der Wal*

THE MORRIS 45 IS THE FEMALE MOLDED version of *FIREFLY.* Tom and Cuyler reasoned a revised *FIREFLY* with a shallower keel and vinylester laminate would be as good an idea as the *MORRIS 486.* The *MORRIS 45* has a genoaless foretriangle, cruisable draft and an even more luxurious interior. In an effort to push her racing potential the rig, appendages and rating have been optimized for each owner by Jim Taylor.

With a displacement/length ratio of 154 the yacht falls into the "moderately light" category. Today, in 2010, I'd say really light begins at under 150—though I know this will diminish with time. The bow has a low prismatic entry with a half angle at the DWL of less than 15 degrees. The keel is a bulbed racing oriented compromise, this time designed in its entirety by Jim Taylor.

- *Light displacement today means a DISP/L ratio under 150. They'll laugh at this statement in twenty years.*

A MORRIS 45 *salon with traditional pilot berth to port with stowage lockers to starboard.*

The tall *MORRIS 45* rig does not require use of its runners except in extreme conditions. The standard jib is a working jib, not a genoa. It has so little overlap that a husband and wife team can, after a few practice tacks, time the sheeting so there is no winching required at all if it isn't blowing too hard. The mainsail is a real powerhouse on all points of sail. The mast itself is a moderately bendy triple spreader section designed by Morris Yachts in collaboration with Jim Taylor.

The deck has convenient handholds and a tenacious hand-applied nonskid. One thing that distinguishes the Morris Yachts from other builders is their means of providing traction underfoot. Virtually all other yacht builders use molded-in nonskid patterns. The problem with these is that they must release from a female mold, meaning their little hills and valleys cannot be too aggressive. Morris use a grit based, hand applied nonskid that works like sand on an icy road. It makes a real difference when the deck is wet.

The *MORRIS 45* is a true racing/cruising yacht of the old school—beautiful to look at and fun to sail without any necessity for trained crew.

The beautifully crafted nav station. *Photos: Onne van der Wal*

The *MORRIS 45 NEXT BOAT.* The windows were altered to look like those on an automobile. The carbon fiber sprit made it possible to gybe the asymmetrical spinnaker without its tangling with the headstay and narrowed the "dead zone" sailing downwind. By this point we were collaborating with race-yacht designer Jim Taylor, who designed her colossally tall carbon fiber rig and deep keel and rudder.

Photo: Onne van der Wal

Morris 51

Dimensions	
LOA:	51' 0"
LWL:	45' 8"
Beam:	14' 0"
Draft:	6' 4"
Displacement, ½ load:	34,000 lbs
Ballast (lead):	11,875 lbs
Sail Area (100% Foretriangle):	1088 sq ft
Disp/L Ratio:	178
Sail Area/Disp Ratio:	16.59

The MORRIS 51 *has a molded fiberglass dodger over the companionway. Two people can sit beneath it out of the wind and spray. The varnished spray deflectors continue forward as seatbacks, which adds a warm note of color to the cockpit.* HOMEFREE *has been sailed around Cape Horn and back.* *Photo: Onne van der Wal*

MORRIS YACHTS BOUGHT THE ASSETS OF ABLE Marine in the year 2000. Of the various sailboat models included only the *APOGEE 50* retained viability. The name was changed to *MORRIS 51* from *50* because in fact the yacht had always been that length. So much for the superstition about odd numbers...twelve of the 51 footers have been built and collectively they have been sailed numerous times around the world.

My "Bermuda Series" of long waterline designs, featured in the following chapter, had become an established paradigm for serious offshore sailors by the turn of the century. The *ABLE APOGEE 50* had been the only Bermuda Series design available in fiberglass out of molds—all of the others were one-offs requiring a lengthy design and build process before you could actually own one. Able Marine had built them to a high standard but of course the Morris family wanted to raise the bar still higher. The serrated aluminum toerail used by Able was replaced by sculpted varnished teak that looked a lot classier. The addition of an incised gold leaf cove stripe with the Morris logo made the very businesslike hull look more like a yacht.

The construction of the *MORRIS 51* uses sandwich composite construction in order to keep the laminates light and stiff. In keeping with the Bermuda Series theme there are two watertight bulkheads to make the yacht unsinkable, as long as you keep the doors shut. Virtually all of the machinery is isolated aft in a separate engine room where it can be easily serviced without removing any surrounding cabinetry. Despite the emphasis upon strength and safety, these construction techniques permit the yacht to be built at a displacement/length ratio under 180 (depending upon the amount of luxury equipment specified). The result is a yacht that is capable of speeds between 9 and 10 knots when there is enough wind.

The Morris engineering department finds ways to make a lightweight interior look like this. It's not easy. *Photo: Onne van der Wal*

Morris Yachts builds these yachts to an outstanding standard of finish. Each yacht is customized for its owner. Once a hull is spoken for a project manager is assigned who makes sure every phone call, email, visit or sketch the owner or his wife submits gets reflected in the yacht. It's amazing how easily a finished yacht can differ from what the owners envision without this sort of attention by one and only one person at the boatyard.

Because the light, narrow hull is so easily driven the sailplan does not need to be overly large. The *MORRIS 51* is therefore manageable by a couple in their later years without the need for younger crew. Her high potential speed under sail permits her to be slowed down in stormy conditions in order to quiet the motion and still make progress towards the destination akin to that of a heavier yacht being driven at full tilt. Because she can reliably achieve close to 200 nautical miles per day, active storm avoidance is possible given good weather information by radio or satellite.

The deck is set up for singlehanded sailing. The sheltered, cushioned settees beneath the hard dodger permit the deck crew to escape the nastiest of weather. The winches are sited within easy reach of the helm and an arm's length from the aft end of the dodger, consistent with the singlehanded objective of the design.

The *MORRIS 51* takes a high speed, fine ended hull for offshore voyaging and combines it with yacht-like exterior detailing and an interior that even the most demanding of ladies would be happy to call home.

The forward berth is good sized and surrounded by stowage. *Photo: Onne van der Wal*

HOMEFREE, a *MORRIS 51.* The hard dodger was attractive and a real asset in Patagonian waters. Of the many cockpit shelters we designed, I like the looks of this one the best. The windows were small enough to be unlikely to break and glue-glazed into tooled fiberglass recesses, eliminating unsightly mechanical fasteners.

Photo: Onne van der Wal

Morris 52

Dimensions	
LOA:	52' 0"
LWL:	44' 4"
Beam:	14' 3"
Draft:	6' 9"
Displacement, ½ load:	43,950 lbs
Ballast (lead):	11,875 lbs
Sail Area (100% Foretriangle):	1228 sq ft
Disp/L Ratio:	225
Sail Area/Disp Ratio:	15.78

FAR OUT *has a tall genoaless rig, teak decks and over-the-top amounts of varnished teak trim which the owner asked me to design personally. I'm especially proud of the pillow shaped name board.* *Photo: Onne van der Wal*

CUYLER MORRIS WAS JUST ASSUMING LEADERSHIP of the company when the decision was made to add a yacht of this size to the "Ocean Series." Since the *MORRIS 51* already existed and had proven to be a good sailor it was decided to develop the *MORRIS 52* from its hull.

Morris Yachts had begun to be pigeonholed by their competitors as builders solely of aft cockpit yachts. Their only center cockpit design was the 46 footer. With yachts increasingly sold at boat shows where a full-width aft cabin became an almost requisite wife-pleaser, Cuyler and Tom realized it was time to meet the challenge. But they would do it in a hull that didn't require a fattened stern with its detrimental impact upon performance. Extending the stern of the *MORRIS 51* kept the transom from becoming immersed once the quarter wave developed despite the fact that the more extensive interior pushed the hull a couple of inches deeper in the water.

We had been studying deck salon designs for years and had learned the tricks that make them work. In one way or another you have to achieve comfortably high cockpit seatbacks to counteract the feeling of vulnerability that results from sitting to all intents and purposes on top of the house. Raising a pilothouse top forward of the cockpit makes the cockpit itself feel lower and more protected. With the seating plane so high you want to make it easy to get up to it from the side deck. We cut down the seatback forming an obvious step-through where you could grab the wheel as a handhold. The cockpit seats were made long enough to stretch out on to take a nap.

- *Center cockpits often lack decent seatbacks. You just have to find a way to provide them.*
- *Provide an obvious path from the side deck into the cockpit.*
- *Don't make a center cockpit so short you can't stretch out and sleep there.*

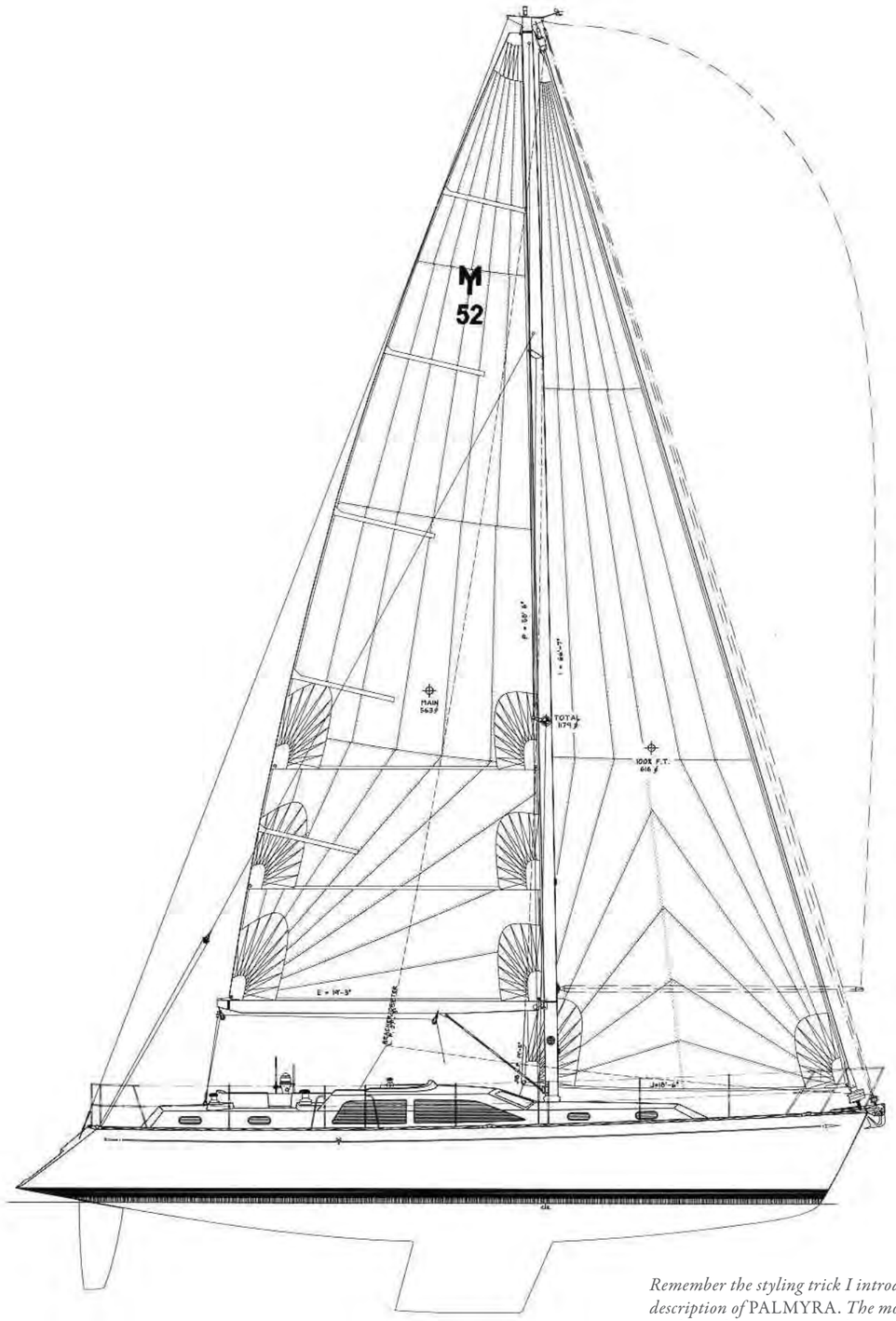
Everyone knows that the bigger windows are, the better. So we copied the bent windows from our *MORRIS 486* and *MORRIS 45*. This took a bit of the curse off their size and made the yacht look distinctive and modern. Automobiles gave up on flat windows twenty years ago and I remain amazed that other boatbuilders failed to pick up on the idea as we did.

The low VCG that results from the 6' 9" Paine Keel permits a rig of moderate proportions to be fitted, with a sail area of just under 1230 square feet. An alternative 6 foot draft shoal keel and 64 foot bridge clearance rig is available for those who wish to traverse the Intracoastal Waterway.

The seats are long enough to sleep on, there are notched coamings for easy entrance, and good sightlines over the low pilothouse. The notches are put directly abreast the wheel—the one place you would not need seatbacks anyway.

Looking forward in the pilothouse. You get a good idea here of the benefit of the large windows. *Photo: Onne van der Wal*

Morris Yachts were the Paine office's star performers. With the sole intention of building the highest quality sailing yachts in America, one at a time, Tom and Cuyler ended up launching over 180 Paine designs that made me look a lot more clever than I really was. In fact they built one more spectacular yacht of our design—a 62 footer named *VISIONS OF JOHANNA*—but she belongs more appropriately in the next chapter.



Remember the styling trick I introduced in my description of PALMYRA. *The most important aesthetic objective is to get the visual mass of the house as far aft as possible. The largest windows draw the eye, and they are on a surface—the house side—that is not connected in any way to the cockpit. So we placed the aft end of the large pair of windows well aft of the forward end of the cockpit—which is indicated here by the tiny discontinuity just forward of the genoa sheet.*

The Bermuda Series

CHAPTER SEVEN

The Bermuda Series

BY 1988 THE OFFICE WAS BUSY DESIGNING traditionally styled fiberglass production sailboats. But American yacht builders were finding it increasingly difficult to sell their products. The market could absorb just so many high quality, high priced "performance cruisers". At the same time demand for yachts appeared to be slowing, foreign builders were adding to the supply. I was running out of builders to approach with new ideas. We had diversified into motoryachts and custom one-off sailboats and that was going well. But I was ambitious and wanted the office to grow. If we were going to expand my portfolio I had to find a whole new market. Before I did, somebody else found it for me.

A designer named Steve Dashew had begun designing two lines of sailing yachts he called his Deerfoot and Sundeer series. The former were custom one-offs, mostly in aluminum; the latter were of fiberglass out of molds and produced in sufficient numbers to be sold at very attractive prices. Steve was a gifted writer and a visionary. I was completely taken in by his concept for the ideal high speed ocean voyager. His designs were long and narrow and of light displacement, a shape that is at its best downwind, the direction one heads when setting off around the world. He was absolutely right in every respect as to the validity of this sort of yacht for world cruising. I thought his ideas were so right that there would be room for another designer and I thought that designer ought to be me.

Dashew's yachts were utilitarian in appearance. I agreed with his argument that a true voyaging yacht ought not to be embellished, overly stylized, or made so redolent of ludicrous excess as to insult the indigent residents of tropical cruising stopovers. And equally that such a yacht freed its owners of the downtime required to maintain it in yacht condition—that they could better spend their time immersing themselves in island cultures than applying layers of varnish.

But I thought—wrong as it might have been from a practical point of view—there might be a great market for this sort of yacht built to high standards and gleaming in shiny Awlgrip—the sort of thing I'd been doing for a decade. My clientele would convince themselves that a beautiful yacht finish would at least have the practical advantage of a higher resale value. I'd design the same sort of yacht as Dashew, stealing a bit of his thunder, but I'd try to combine a few elements of ostentatious yacht-like beauty with a businesslike, functional look. And by this time I had the technology and office staff to insure that they'd sail truly fast. The only question was—how to get started?

Most other design offices spent a great deal of time producing preliminary renderings in an effort to attract customers. The pages of the yachting magazines were and still are full of drawings of trial balloons that will never actually get built. I had a clear picture in my mind's eye what my new series would look like, but I had a rule in my office—never put pen to paper without getting paid for it.

- *Never put pen to paper without getting paid for it.*

What we needed was a first customer. That customer came along in 1988 in the person of Steve Taylor, a Bostonian who wanted a 46 footer. He'd considered Dashew for his designer but wanted to keep the process close enough to home to actually look over the designer's shoulder from time to time. His budget was sufficient to build his yacht in epoxy composites—the best possible method for building a light displacement yacht of this size. His yacht would be light and strong and if we did our job right and she were also beautiful, could be promoted to get us the notoriety we needed to build alternatives to Dashew's "deers". In order to squelch the notion that Taylor's design was just a one hit wonder, I came up with the name "Bermuda Series". The Series part meant others would follow. Over the course of twenty years we built 39 Bermuda Series yachts.

The First Bermuda Series Yacht

Meridian

Dimensions	
LOA:	45' 7"
LWL:	39' 8"
Beam:	12' 7"
Draft:	6' 0"
Displacement, ½ load:	23,670 lbs
Ballast (lead):	10,180 lbs
Sail Area (100% Foretriangle):	909 sq ft
Disp/L Ratio:	178
Sail Area/Disp Ratio:	17.64

MERIDIAN *didn't know how to go slow. Note the full-length slat bulwarks and hatch bubble for inside steering. The aesthetics were businesslike but not industrial. I've always liked the slat bulwarks.* *Photo: Art Paine*

THE 46 FOOTER *MERIDIAN* WAS THE FIRST YACHT IN our "Bermuda Series". She was designed for Steve and M.E. Taylor of Boston and built by the Concordia yard in South Dartmouth, Massachusetts. Steve and M.E. simply love *MERIDIAN.* For years afterwards I hoped they'd want a larger version but they had the wisdom to stick with what worked for them. If you ever find a boat or a spouse that pleases you the most foolish mistake you can ever make is to try to trade up.

- *If you find a boat or a spouse that pleases you, only a fool would trade up.*

Steve Taylor provided the opportunity for me to design my first truly high performance sailing yacht. In conceptualizing the Bermuda Series we recognized Steve Dashew's excellent work along the same lines. Dashew can be credited for exploring the virtues of a relatively narrow, light displacement, long waterline, plumb-stemmed hull shape. Inevitably, though, we had other ideas that we wanted to try. We would use a very low center of gravity bulbed or winged keel. I never liked Dashew's immersed transoms. They're fine—and fast—downwind. But they must, I thought, slow a boat significantly when it is pitching its way to windward. A transom corner six inches above the static waterline becomes immersed anyway as soon as the boat gets going, negating any argument about waterline length.

M.E. Taylor shows how fast she can make *MERIDIAN* go. The hole in the pulpit allowed a bowsprit and a huge light air reacher to be carried. She was the first Bermuda Series yacht and spawned 37 similar, but larger designs.

Photo: Art Paine

The design began with VPP (Velocity Prediction Program) analysis. I'd been using a DOS based program until this time but used this opportunity to upgrade to a more powerful methodology. I began using a subcontractor—Peter Schwenn of Velocity, Inc.—to run velocity predictions. He ran the VPP for *MERIDIAN* in both half load and full load conditions, and speeds just short of ten knots were predicted in 20 knots of true wind. I continued to hang my hat on a reputation for a stiff yacht. Peter predicted comfortable heeling angles without any crew action, a result of the extremely low VCG keel. *MERIDIAN's* keel had solid lead wings which added stability (and drag), while a sistership *G-FORCE* used a more conventional Paine Keel. Of the two I now believe the latter had a slight edge.

MERIDIAN's construction used vacuum bagged epoxy employing a combination of fiberglass and kevlar in the skins over a one-inch closed cell foam core. The epoxy resin required that the yacht be post-cured in a purpose built oven to complete the curing process. Not only was the basic shell of exotic construction but the overall design philosophy was similar to that used on all-out racing yachts. There were neither matched flanges nor fasteners at the hull to deck joint. The hull and deck were mated together, radiused, and epoxy-glassed together inside and out. One feature that I pushed for, and love to this day, is the full length bulwark boards that are completely separate from the deck and supported by the lifeline stanchions. They are both highly practical from a safety point of view and real cool to look at.

- *Glassing a deck to the hull results in a significant weight savings.*

The final rudder was supported by a braided carbon fiber and epoxy rudderpost, and was of large area with a boring but forgiving "NACA 00" foil. The owner at first tried for a "breakthrough" rudder, hiring a West Coast hydrodynamicist to design it. When I first saw the foil which was very fat and had its point of maximum thickness nearly halfway along the chord, I told Steve, "You sure ain't gonna steer a boat with that thing!" Sometimes years of experience trumps mathematical theory, and in this instance I was regrettably right. The second rudder, which we designed in our office without the benefit of graduate level mathematics, steered her beautifully.

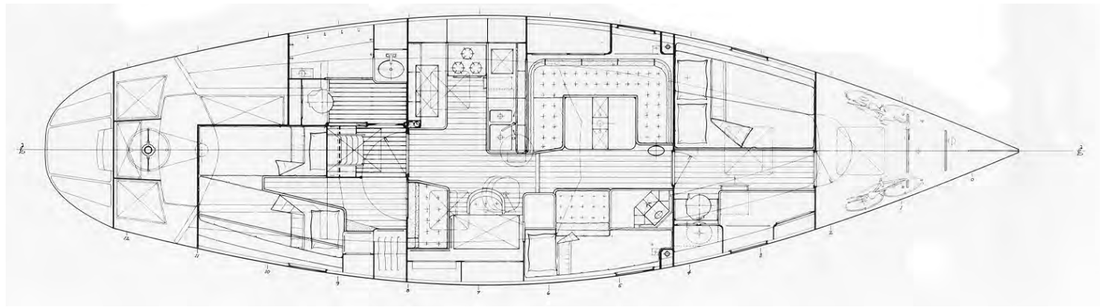
- *Sometimes years of experience trumps mathematical theory.*

The interior had a large combined head and shower room immediately adjacent the companionway. The idea was that the retiring watch-stander could take a brief freshwater shower before going off watch. Opposite it was the offshore cabin with a double berth that converted into two sea berths for passagemaking. The compromise here was that in order for the inboard berth to fit comfortably beneath the cockpit sole it and its opposite number had to be low to the floor.

The galley was conventional, but featured overhead cabinets to increase stowage. The navigation area to starboard had an oversize chart table and a raise-and-lower seat which enabled the yacht to be steered with one's head in the hatch bubble. The owners' stateroom forward featured a double berth with stowage beneath it, and lockers and stowage to starboard. Forward of this was a deck accessed stowage room with bins for extra sails, extra anchors and line, etc. and racks for the owners' mountain bikes.

The sail plan was of modest area thanks to the light displacement. The high aspect ratio foretriangle reduced the genoa overlap. The mainsail was large and powerful and had full-length battens. This design began my lifelong campaign against mainsheet travelers, which I consider dangerous on a cruising boat. Two mainsheets, one port and one starboard, were fitted so the boom could be placed wherever Steve desired, though it did mean a lot of spaghetti on the cockpit floor. We developed simpler solutions for getting rid of the traveler on subsequent designs. The yacht could be sailed at respectable speeds with the small non-overlapping staysail in anything over 20 knots true wind speed.

- *Mainsheet travelers should be avoided on a cruising boat.*

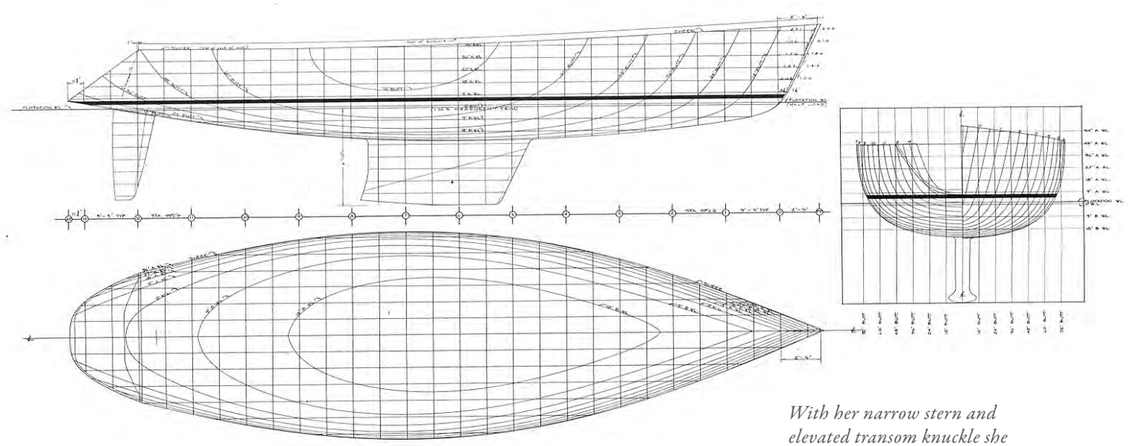


The structural arches in way of the mast enhanced the interior décor.

The nav table had a lightweight helm seat that could be rotated into three different positions that all made sense.

The seatbacks turned the corner to act as splashboards to keep the helmsman's butt dry.

Lightweight but attractive mahogany joinerwork in the galley.



With her narrow stern and elevated transom knuckle she didn't bury her bow when she heeled. As the Bermuda Series evolved the sterns got somewhat broader and the bows finer. Of the two keels I favor this one.

Able Apogee 50

WESTRI, *hull number one. She sailed to Antarctica and back.* APOGEE 50s *were seriously fast with their very long waterlines and light displacement.* WESTRI *had in-mast furling, which I've never liked. It makes the mast too big.*

Photo: Art Paine

Big hull windows let in a lot of light. The standard of finish was very high.

Photo: Art Paine

Dimensions	
LOA:	51' 0"
LWL:	43' 8"
Beam:	14' 3"
Draft:	5' 10"
Displacement, ½ load:	33,144 lbs
Ballast (lead):	11,875 lbs
Sail Area (100% Foretriangle):	1066 sq ft
Disp/L Ratio:	178
Sail Area/Disp Ratio:	16.53

THE DESIGN OF THE *APOGEE 50* WAS initiated by Ted Cooper, head salesman at Able Marine. Ted had seen *MERIDIAN* and talked to the owner who verified its performance. By that time Steve Dashew was selling his Sundeer Yachts, and taking out full-page magazine ads extolling the benefits of long waterline, light displacement yachts. Ted thought a version finished to a very high standard might appeal to his customers. He was right. By the time Able Marine went belly-up they had built nine *APOGEE 50s* and could likely have sold more had they not gotten into financial difficulty.

The boats were stunning performers. *WESTRI* was taken to the Annapolis Boat Show and won overall Boat of the Year in 1993, which established my Bermuda Series as the higher quality (and much higher price) alternative to Dashew's Sundeers. *WESTRI* was sailed to Antarctica and back.

Aluminum Sailing Yachts

Bougainvillea 62

Dimensions	
LOA:	61' 6"
LWL:	55' 9"
Beam:	15' 5"
Draft:	6' 10"
Displacement, ½ load:	55,000 lbs
Ballast (lead):	15,000 lbs
Sail Area (100% Foretriangle):	1422 sq ft
Disp/L Ratio:	142
Sail Area/Disp Ratio:	15.73

With light displacement and a short rig you could press on sail and really fly.
Photo: Courtesy Kanter Yachts

THE BOUGAINVILLEA 62 BEGAN WITH an unpainted 60' one-off for a Canadian who wanted to sail across the Atlantic. He introduced us to his chosen builder—Kanter Yachts of southern Ontario. The original boat was very light, narrow and fitted with waterballast. The owner succeeded in completing his transatlantic. When the yacht was put up for sale she was bought by an American, lengthened two feet to match the revised design, and painted. Renamed *ANTHEM,* she resides in Annapolis and is highly admired and recognized there. Four yachts were built to the design—two of which were sailed around the world.

We were able to keep the rig small, thanks to the light displacement and sharp lines of the hull beneath it. The half-angle of entry at the waterline, whose sharpness correlates with low resistance, was a scant 16 degrees. With an efficient sailplan on short spars these boats could really fly when the wind blew. Both headsails were roller furling for sail reduction which became the norm in the 1990s. Later a third roller furling reacher would be added in place of the spinnaker you see here, and that became the accepted foretriangle for cruising. These yachts could carry very large reaching and running sails, and with these sails it was possible to achieve speeds into the low teens if you had the cojones. The draft was only 6 ft. 10 inches thanks to the bulbed keel. All of the boats could be driven from the security of their pilothouse. The welded 5083-H116 aluminum construction provided chafe resistance combined with reasonably low maintenance.

One of the yachts, *PEACE & ALOHA,* was built for a couple who had had very little sailing experience. They were typical of many of our clients during the halcyon days of the 1990s. As an illustration of their experience level, neither had ever slept aboard a sailing yacht at night while someone else was steering. Their only experience with a yacht of anything like this stature was chartering—which precluded night sailing. But they could afford a million dollar yacht and were bitten by the travel bug. A few sage hands in and around my office believed a 62 footer was too large for anyone at their experience level to handle and that the boat would be up for sale within a week of its launching. We were proven delightedly wrong.

I first met David and Ellen Ernisse at the Kettle Creek Inn in Port Stanley, Ontario. I played my role as architect, trying to help them get the yacht they wanted. Once it was launched they faced the moment of truth. Dave was out of shape after years of pushing digits through computers; Ellen was lightly built but spunky. When they departed Port Stanley into Lake Erie one of them had to sleep while the other sailed on through the night. It must have taken a lot of courage. Once through the Erie Canal they made for Camden. One of their fuel tanks had begun to weep diesel—the most dreaded of failures in a new aluminum yacht. I had offered the resources of our office to do what we could to devise a fix.

They brought *PEACE & ALOHA* to Camden to have her fuel tank repaired at Wayfarer Marine Corp. where our office was located. The boat was hauled and they lived aboard amid the diesel reek while everyone tried to find the source of the leak. The stress level was palpable. One day Dave came into my office in pain and I drove him way too fast to the local Emergency Room fearing the worst.

Meanwhile Ellen, originally the more reluctant of the partners, rallied and held the dream together. Still, the odds-on bet in my office was that the boat would be on the block as soon as the leak got fixed.

One year later I was in New Zealand for an international yacht designers' conference. I got wind of a rumor that *P & A* had made it to Tauranga, about four hours' drive south of Auckland. Curious, I hired a car and drove down.

And there they were. Dave very much alive, looking gorgeous in a trimmer body and a dark tan. Ellen sporting a knowing smile and taking far less credit than she obviously deserved. If ever there was an advertisement for the ethic of converting mere money into an object that can extract you from a life of gainful employment and make life on this planet truly worth living, Dave and Ellen and *PEACE & ALOHA* personified it.

By rigging their mainsail with a LeisureFurl system they had solved the most burdensome chore of the shorthanded crew. Ellen claimed fitting this one piece of gear had made the difference between their going on and quitting. In my innermost thoughts I knew that to get a yacht like this around the world you have to fit it with an Ellen Ernisse—but I kept this sentiment to myself. They boastfully reported that in cruising the Pacific in company with other yachts they always completed inter-island passages two to three days earlier than their companions. Would that life ashore could be reduced to such simplicity.

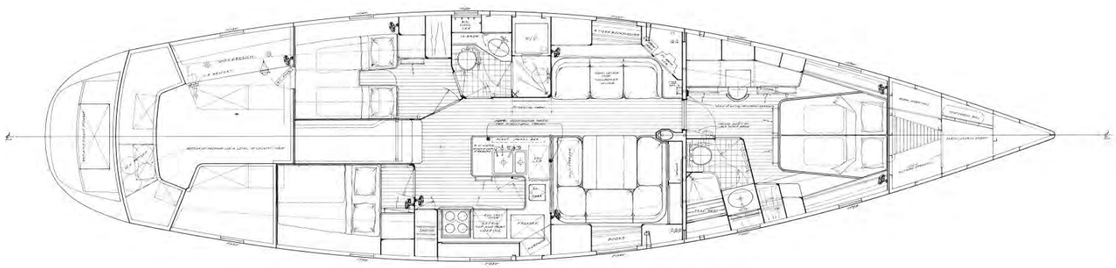
The *BOUGAINVILLEA 62* was a great design but I nearly killed it with the name. My idea was simple enough—each Bermuda Series design would be given the name of a flower grown on Bermuda. I got as far as *BOUGAINVILLEA 62* and *HIBISCUS 45,* my intended name for *G-FORCE* and her sisterships. I received immediate flak from just about everyone. "What do you think we are," a friend asked, "a bunch of poof-das?" He opined, "Let's face it, it's males who buy these boats. We don't want any suggestions to the contrary." He even suggested that the line be renamed—after military hardware. "How about the Howitzer 62, and the Kalashnikov 45?" If I'd made the change I'm sure we'd have sold more boats.

David wrote to me after they had sold the boat:

> *"She is the best boat design on the planet!* PEACE & ALOHA *enhanced our lives immeasurably. We would also say to future cruisers...just do it! Go for your dream! They will be some of the best years of your life!"*

The sharp entry, full length guard rails, and strong anchor roller are obvious as are the ten dorade vents for ventilation.

The pilothouse was watertight to the cockpit and interior. The varnished teak seatbacks that turned into splashboards were a nice aesthetic touch, carried over from MERIDIAN.



The owners had three early twenty-something kids. They convinced their two sons Jason and Eric to come along for a sail around the world. This motivated the three cabin interior. They were obsessed with having fans in certain locations and asked us to make sure they showed up on one of the drawings. They look like black bugs in this plan.

20 Meter Cutter

Evolution

Dimensions	
LOA:	65' 8"
LWL:	56' 9"
Beam:	17' 1"
Draft:	6' 10"
Displacement, ½ load:	75,500 lbs
Ballast (lead):	21,098 lbs
Sail Area (100% Foretriangle):	804 sq ft
Disp/L Ratio:	192
Sail Area/Disp Ratio:	15.69

Eric Duttenhofer waves goodbye to Bequia at eleven knots with Laura at the helm. The unusual cutter rig with the low cut yankee and mast well forward worked well. Unlike most cutters, setting the staysail made a perceptible difference in speed.

EVOLUTION AND HER NEARLY IDENTICAL sistership were two very high quality Dutch built designs. They also very nearly caused the demise of Paine Yacht Design, so there's a story here. In fact, two stories—one of how easily success can come when you're on a roll, the other of how failure lurks unseen in the shadows.

We began the design in 1993 for Eric Duttenhofer of Coconut Grove. He contacted us from Andorra—that little principality in the Pyrenees between France and Spain. He was living there because he thought his young daughter would get a better education in Europe than in Florida. We communicated by telephone and telex. The newfangled machine called the telefax looked like a great new invention but only the FBI could afford them. He chose Gouwerok in Aalsmeer to build his aluminum hull, deck and superstructure. Centraalstaal, the world's most advanced metal ship construction facility at the time, computer-cut and bent the aluminum parts. The fit-out was done by Willem Dorr of Lemmer.

One day when the design was nearly finished and the metalwork well along Eric phoned me from the residential hotel in Amsterdam where he had moved to be close to his nascent yacht. "Hey, Chuck", he says, "How'd you like to sell a sistership?" I was hungry for success in those days—fact is, I was still hungry for the next meal. So I said, "Sure, what do I have to do?" He answered, "Be on a flight to Amsterdam tomorrow night if you can. I've met this fellow and I'm sure he'll build one just like mine."

Had it been anyone besides Eric at this point in the conversation I'd have been devising ways to let him down easy. Every customer who ever commissioned a custom yacht thinks his dreamboat is the best thing that ever came along—and that the world will beat a path to the designer's door in order to have one. Would that this were true. In this case there was the little matter of a million dollar plus price tag to be considered. But Eric was the real deal—he'd grown up in boats and if he thought this guy was for real, he probably was. He understood my situation pretty well but I did remind him, "This airfare represents a significant proportion of my net worth." "I promise you," he said, "this deal's as good as done."

Business involves risks and this one seemed worth taking. I had mouths to feed, not least my own. Two nights later I was on a flight to Holland. Another of those dreaded night flights across the pond. I got, maybe, two hours' rest—you could hardly call it sleep. At six in the morning Dutch time and eighteen hours without sleep, brain time, I emerged from passport control at Schiphol. Eric was there to meet me having just awoken from a comfortable night's sleep and ready to boogie. He drove me to the nicest hotel I had ever been in, a converted trader's mansion just inside the Centrum. We had a wonderful breakfast of which my cardiologist would not have approved. My room was furnished with French antique furniture and gilded baroque bric-a-brac and a vast bed that beckoned softly. But bed was not in the cards.

Eric had the whole day planned. He was going to give me the one-day tour of the Dutch boatbuilding industry. "Could I just maybe freshen up a bit and we leave maybe about noon?" I suggested, already knowing the answer.

By noon we'd completed the yachtsman's tour of Vitters shipyard and were on our way to Huisman. These were, I have to admit, amazing destinations for a guy who wanted to design classy yachts. But I was starting to nod off at times—thank God Eric was driving. He took me to meet Willem Dorr, who would do the finish work on what Eric assured me would be the two yachts. Then as the sun began to set and my own lights to go dim he drove me to the final act—dinner with the prospective customer.

Jerry Case was Canadian and looked much too young to afford a yacht like this. He met us at the restaurant, which specialized in exotic game. All I had to do was "be positive and say yes when he asks." Sure, Eric. All I wanted to do was go back to my hotel, but that was not on the menu. What was there was mostly unrecognizable to me—where I came from we ate mostly clams. This place had rattlesnake and wild boar and pate de foie gras. I ordered something unrecognizable in Dutch hoping it would taste like chicken. An hour's pleasantries later at the point when I sensed I was about to plant my face in my plate I knew the time had come. "Are you in, or are you out?" I asked, an accurate recollection of the exact words from twenty years ago. Twenty thousand dollars hung in the balance—2% of a low estimate of the cost to build his yacht—my standard sistership fee. An eternity passed. He answered "That's fine. I'll wire you the money before you get home." It would be a masterpiece of understatement to report that I slept well that night.

Caned locker fronts were used to eliminate mildew.

The aft head had a tub. Everybody loved this and it got copied on many of our subsequent designs.

I flew home the next morning. The emergence of a second boat had no real effect upon the design. The basic Bermuda Series hull had been tweaked to match the extensive outfit of the now two yachts. The bow was raised a little in order to reduce the amount of spray finding its way aboard. Bermuda Series hulls were if anything too fast to windward and this made them wet. The deck was surrounded by high double plate bulwarks; there were extremely large combined hawsehole/scuppers through which a very large eye splice could be fed. There was no railcap to require maintenance, nor indeed any wood at all on deck. It was a stark look, which we relieved with subtle (and expensive) styling reveals that made all the difference—the boats were strikingly beautiful.

There were three watertight bulkheads, with engine driven pumping of all four compartments. Lifting lugs were welded to the hull structure, strategically placed in relationship to deck hatches so the yachts could be hoisted on board a ship by slings if necessary. All noise producing machinery was located in the aft engine room behind a watertight bulkhead. The yachts were extensively outfitted. With central heating, overspec insulation, damage control piping, long endurance refrigeration and freezer capacity, and very long range tankage, these yachts were heavier for their length than our previous Bermuda Series designs, having a displacement/length ratio of 192. Still, with lots of stability and a good sized sailplan, these yachts could really fly in the high winds of the open ocean.

Laura Duttenhofer steering—there was no wheel, just the autopilot.

The mainsheet, reefing and primary halyards led in underdeck conduits to a sheltered sail handling area aft of the pilothouse. Three electric winches and halyard fall bins were available there to keep the cockpit clean of spaghetti. Another electric winch was located aft of the mast for offwind sail hoisting or for hoisting a shipmate up the mast. The anchor handling was through enclosed chutes, the anchors and their cables oversized, the warping drum protruded above a clean foredeck. The cockpit had extensive storage for dive tanks, the liferaft, dinghy outboard, dinghy fuel, etc. A deck accessed stowage compartment forward of the accommodations was used for the stowage of light sails and fenders.

The enclosed pilothouse, accessed via a sliding metal door, was the focal point of the design. Located within were a watchstander's berth, chart table with flush mounted navigation instruments and radios, heated oilskin locker, and helm seat. The pilothouse was heated and had all-around visibility. Natural ventilation was provided by two overhead hatches. A sliding pocket door in the aft wall enabled ventilation when open, and closed watertight against gaskets for security.

The lines emerged from welded underdeck conduits and fell into custom line bins.

The yacht was designed to sail without a genoa jib. The foretriangle was filled by a combination of a roller reefing, self-tending staysail and a low-cut yankee of minimal overlap. With no genny used the spreader base could be made quite wide, resulting in unusually effective athwartship support and a small mast section. Best of all, the diagonals were attached well inboard making passage forward unimpeded by the shrouds.

EVOLUTION didn't take long to get by you. Note the vertical battens in the jib leech, an idea that should be copied more often. Eric and Laura could pick that big, heavy HBI out of the water and onto its cradle on the foredeck in a couple of minutes thanks to the powered halyard winch aft of the mast.

But I promised you another story.

This story began on a Friday. The design was essentially finished, and many of the metal parts completed awaiting space in the shop to begin the setup. Gouwerok asked us to provide them a detail of the engine girders, and I assigned the job to Mark Fitzgerald. After about an hour he came into my office and said, "Well, I can do it but for some reason the outer edge of the girder seems a bit wobbly." "What, wobbly?" I said. "Impossible!" I walked into his office and looked over his shoulder at his drawing. Sure enough, every other frame seemed to be a little bigger than the other. We measured the difference—exactly six millimeters, about a quarter of an inch.

I thought about this for a second. Hmmm, this was precisely the thickness of the hull plating. Mark was simply matching the outer edge of his girder to the outer edge of the frames. Which had by this point been built, for not one boat but two, and lay stacked against the wall of the Gouwerok yard. Eric had sent me a photo of them all. They had cost, he'd told me, over $250,000. Roughly five times my entire life savings.

The blood ran to my face and I began to hyperventilate. I asked Mark to check some other edge of the frames—say the sheerline. Sure enough, every other frame was 6mm larger there, too. At this point I began to get an inkling of who might have screwed up. And it was looking a lot like me.

The state of the art in computerized lines fairing at the time enabled you to fair the hull mathematically using "rational B-splines". Once it was fair you could do the boatbuilder a huge favor by not only giving him the outer surface of the hull at full scale, eliminating the necessity for full size lofting, but you could also do a "thickness deduction". The software would deduct the thickness of the wood planking or metal plating, giving the builder the outside edge of each frame. This saved him an inordinate amount of work. But if you did this and overlaid the frame drawings one atop the other on your full size CAD drawing, many of the frames in the mid-length of the boat would lay so closely atop one another that it would be impossible to distinguish one from the other. So it was standard practice in my office to provide two drawings—one for the odd numbered frames, and one for the even. With half as many frames depicted on each drawing the confusion was eliminated.

You know how they say never buy an automobile that was built on a Friday? Same with boat designs. Here's what must have happened. In my office the lines plans for the sailboats were always done by me personally. I'd gotten them done and faired and checked and the frame stations located. I'd divided the frame stations into two drawings- one for the even and one for the odd frames. It was early Friday—plenty of time before the weekend to do the thickness deductions. When you screw up, you never really remember, because you don't do it consciously. And I never did remember. But what I must have done was to complete the thickness deductions on the even numbered frames, and then some distraction must have come along as they did all the time—after all, I was the boss. When Monday morning came around I plotted off the two drawings and shipped them to Holland.

Many months and a quarter million dollars later I realized what had happened. One of my drawings had had the 6mm plating thickness deducted, and the other one hadn't. Mark and I checked the drawings once again. That was it, plain as day. And that was, I knew as surely as I knew it was Friday afternoon, the end of Paine Yacht Design.

Being late Friday East Coast time it was well into the evening in Holland. I phoned anyway—maybe somebody was working late. I got the janitor at Centraalstaal—he didn't speak much English. No, none of the principals was still there. "I'll phone first thing Monday...Ich telephoniere Montag", I tried, knowing that Dutch shared some words with German. Between my German and his English he managed to inform me that no, don't bother; Monday would be one of those Bank Holidays that they're famous for in Europe. So I'd get to spend not two but three interminable days and nights worrying as I'd never worried before in my life before getting the definitive word that my career as a yacht designer was at an end.

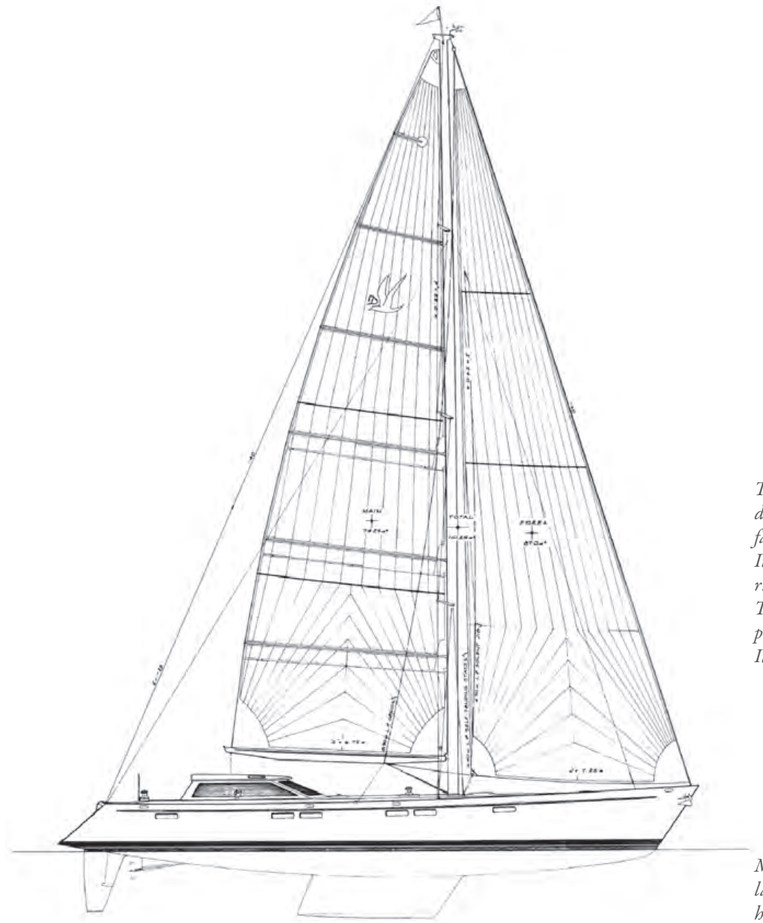
I set my alarm for three o'clock Tuesday morning—nine A.M. in Holland. I'd been through every possible scenario you're probably thinking of. No, we could not build one boat ¼ inch bigger than the other one, nor trim 6 millimeters off the outer edge of the oversize frames. There was simply no fix but to remake all of the even numbered frames. For two boats. Which would ruin me, financially, for life and put four other very skilled men with collectively three wives and four dependant children on the unemployment rolls.

I got through pretty quickly to the managing director at Centraalstaal. Thank God he spoke English. I tried to pace myself, to present my unimaginably stupid mistake with a measure of equanimity. Not far into my soliloquy he cut me off.

"Mr. Paine", he says, "You are dealing with the Dutch. We have been building yachts for centuries. Of course we discovered your error within hours of seeing the drawings—so you have worried for nothing. Your two boats are, like all the boats we build in Holland–perfect." Much relieved—no, immensely relieved, I could only think to ask, "Why didn't you tell me about this six months ago, when you found the error?"

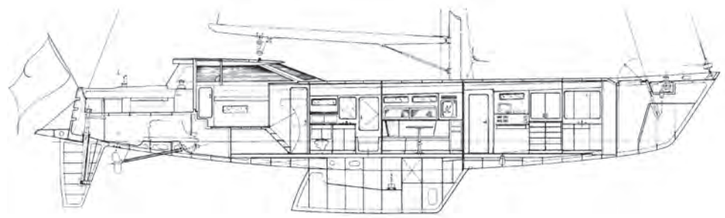
"We Dutch are traders", he answered. "The last thing we would do is to upset a valued customer with such a triviality."

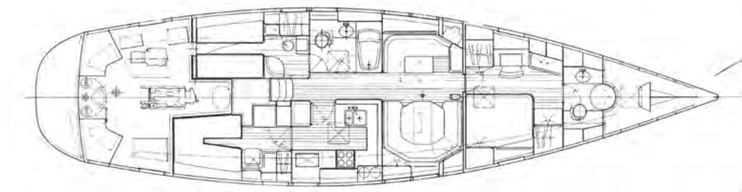
- *Check your work thoroughly. Check work done on a Friday more thoroughly.*



The rig was tall for a light displacement yacht, and situated far forward on the hull. It balanced perfectly. The cutter rig was a bit of an experiment. The foot of the staysail aligned precisely with that of the jib. It worked exceedingly well.

Mark Fitzgerald would work late into the evenings to finish his drawings. In the morning I'd show up and all sorts of creatures would have taken up residence. In his mind a drawing wasn't finished without them. This late night work never showed up on his time sheets, so how could I object? Plus, he was right—yacht design is art, and it's only finished when it's finished.





- *Yacht design is ART, and it's only finished when it's finished.*

Able Apogee 58

Sea Leaf and Pilgrim

SEA LEAF *had a full width aft cabin with a centerline double berth beneath the cockpit. This was made possible by the owners' modest stature, a decided advantage if an architect is to make a design like this work.*

PILGRIM *(nee* TARA*) had a wood-free deck for low maintenance. She was well ventilated with eight dorade vents and ten deck hatches—but no opening ports.*

SEA LEAF's *light interior joinerwork and dark upholstery work contrasted nicely.*

PILGRIM's *raised panel joiner work.*

Dimensions	
LOA:	58' 0"
LWL:	50' 0"
Beam:	16' 6"
Draft:	7' 0"
Displacement, ½ load:	46,900 lbs
Ballast (lead):	17,402 lbs
Sail Area (100% Foretriangle):	1501 sq ft
Disp/L Ratio:	168
Sail Area/Disp Ratio:	18.47

SEA LEAF AND PILGRIM (NEE TARA) WERE 58 FT. Bermuda Series yachts built by Able. The hull was an extrapolation of the *APOGEE 50* and sailed equally well. Both owners dreamed of long voyages and both pulled it off—*SEA LEAF* to the Eastern Mediterranean and *TARA* to New Zealand. *SEA LEAF* was recognizable by her panoramic pilothouse with wraparound style windows. The cockpit had a large seating area yet the footwell volume was small for a yacht of this size. There was a cockpit table that would seat six. The wheel was five feet in diameter—large enough to permit outboard seating when sailing on the wind. The main deck and cockpit sole were teak clad. Her bulkheads and cabinetry were of quarter sawn maple with birds eye maple veneer on the larger panels. The sole was maple with narrow teak bands, a reversal of the normal teak and holly theme. The overheads and hull linings were of foam-backed leather grained vinyl.

TARA was the second yacht and about as different as a sistership could be while still sharing the same hull. She had no teak whatever on deck and a more conventional interior with the most appealing joinerwork of any yacht ever to come from our office. The cherry wood was carefully selected for its grain and color, arranged into raised panel overlays with rails and stiles, and varnished to the nines.

Able Marine intended to build more of these yachts but had growing financial problems. As I saw it Able suffered from the timeworn strategy of charging less for a yacht than it costs to build and hoping to make it up in volume. Then in 1994 a tragedy occurred that is known to every boatbuilder in the state of Maine—the death in a fall of the owner's son Hank while working alone after hours at the yard. The loss of his firstborn child took the heart out of Henry Cooper, and the yard soldiered on for a few more years before selling out to Tom Morris. The enterprise had consumed a significant portion of the Cooper family fortune, but it left a legacy of yachts that are loved by their owners to this day.

- *If you charge less for a yacht than it costs to build you'll never make it up in volume.*

Cancan

Dimensions	
LOA:	53' 5"
LWL:	47' 10"
Beam:	12' 8"
Draft:	5' 2"
Displacement, ½ load:	21,678 lbs
Ballast (lead):	8,000 lbs
Sail Area (100% Foretriangle):	804 sq ft
Disp/L Ratio:	295
Sail Area/Disp Ratio:	16.55

Kind of funny to see a sailboat going this fast to windward without heeling. But it was comfortable and definitely faster when you took the trouble to use the waterballast.

Photo: Courtesy Kanter Yachts

JOHN CHOWNING OF CALIFORNIA came to see me about building a boat in 1991. One of the nicest customers ever to walk into the office, John was a Stanford professor and a professional musician though he used computers to make his music, not vibrating strings. I never met a musician I didn't like. He'd been following the singlehanded racing scene and was intrigued with water ballast. At that time the conundrum was which to use—salt or fresh water? The argument in favor of seawater was that there were times you didn't need extra ballast at all and if it was salt you could just pump it back into the sea, lightening the whole yacht. We agreed though to use fresh water since he wanted to have plenty on board and reckoned if he was stuck with it for showering he might as well keep it on the windward side.

John had access to highly skilled slave labor in the guise of Stanford graduate students. So he hired a few of them to design his waterballast transfer system. You might think it simple but there were pitfalls to be dealt with. In the end you'd press either the red or the green button on a panel aft of the helm and that would start the process. When the proper tank was completely full the water would travel up the vent pipe where there was an optical sensor that would turn off the pump. Not being an electrical kind of guy I was utterly amazed when it worked flawlessly. I'd seen what often happens to anything electrical aboard yachts and always told customers "electrons and salt water don't mix".

The little slanted rows of red/green lights told you how full that side's tank was getting.

- *Electrons and salt water don't mix.*

The fully battened mainsail not only provided increased efficiency owing to its slightly more elliptical shape but also eliminated flogging which prolonged the life of the sail. As on Sea Leaf the LeisureFurl in-boom mainsail stowing system was fitted and it proved to be utterly reliable. My only criticism would be that nobody would ever accuse it of being pretty.

There were two egress routes so you were never too badly trapped when you needed to excuse yourself during the middle of a meal. Note the bulkhead windows.

Photo: Courtesy Kanter Yachts

- *Dinettes should have more than one egress route lest people get "trapped".*

The interior provided two large private cabins, each with ensuite access to its own head. In a departure from tradition we pierced the main bulkhead with two large "windows", complete with curtains, permitting the entire interior to be presented to the eye when the owner wanted. This can only be done on a metal yacht since the main bulkhead has to have enough "membrane strength" to do its job, but when it can be done it really opens up a yacht's interior.

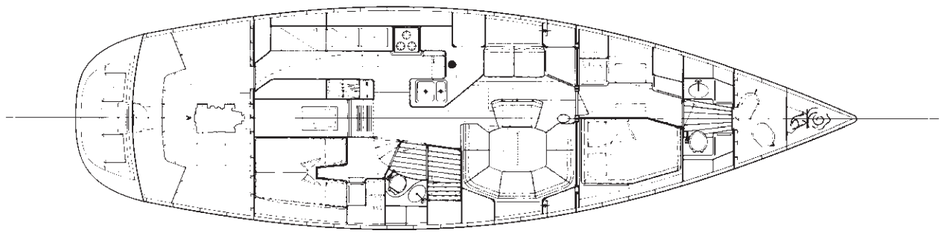
We used this sort of "linear" galley on a number of designs of this size and there is nothing safer when it's rough. On either tack you can brace yourself in place with nowhere you can get flung. At its aft end the galley got to feeling a little tight—but you'd only rarely go there. There was a watertight door into the port side of the aft engine space. This was a lot quicker and safer than having to go through a cockpit seat hatch. Like all Bermuda Series yachts of this size the aft engine room idea required that the engine use a veedrive. This was the sole negative associated with these mid- fifty foot designs. Veedrives put the shaft seal beneath the engine where it was hard to access for service and maintenance.

- *Avoid veedrives. They put the shaft seal under the engine.*

CANCAN was built of welded 5083 alloy aluminum. Kanter Yachts of Ontario were popular with many of our clients because they could build a lot of yacht for the money. They could build a custom design for little more than you would pay for a comparably sized stock American production boat. How did they do it? Partially by being Canadian, partially by actually caring about costs as the market began to focus on price, and finding ways to pare them.

In America at that time, boat (and other) manufacturers paid the lion's share of health care costs for their workers. In Canada and other countries with socialized medicine the taxpaying citizens paid these costs rather than the businesses. Since health care accounts for 20 percent of an advanced economy this gave Kanter a competitive advantage. Kanter also reduced costs in other areas. They charged extra to putty fair the underwater areas. Some customers paid the extra freight, some just kept the money. Bermuda Series hulls were sufficiently fast you'd never know the difference once the boat was in the water. European builders at the time primed and painted the interiors of their alu hulls. This was downright foolish since afterwards it was all covered over with insulation. The Kanter family looked at it dead logically (though they hailed from Europe)—why paint something that will never be seen again? During the late 20th century—a period of moderate to low inflation—some of their customers would enjoy their boats for a few years then sell them for the price they'd paid. For some strange reason this pleased them.

CANCAN is berthed in Sausalito, completed a maiden voyage out to Hawaii and home via Alaska, and is much loved by her owner.

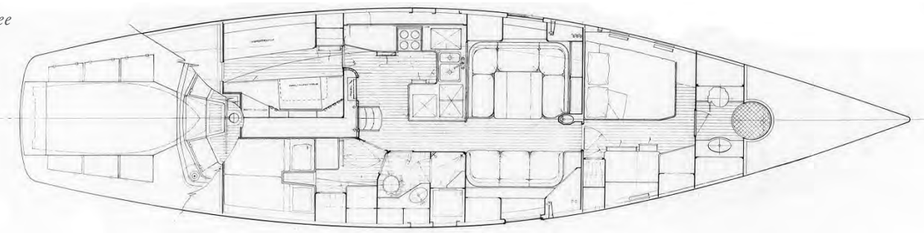


The linear galley was secure and presented a lot of working surface. The big black dot on this drawing represented a bucket to stick the Thermos bottle into—one of my great ideas that few customers picked up on. I once sailed from Beaufort, North Carolina to St. Thomas with two University of Virginia grads. The boat was slow to windward and the winds were against us so we had lots of long night watches. They would tell jokes on these watches, and being Southerners these jokes were often at the expense of our darker complected brethren. One day the maid came in and proclaimed, of all the marvelous inventions she had seen in her life none was more amazing than the Thermos bottle. "I put leftover soup in dat bottle and by dinnertime tomorrow it still be warm enough to be serve. And I pour cold lemonade into dat bottle and a day later it still be chill. "Lord a mercy", she queried, "How Do It Know?"

Whimbrel

Dimensions	
LOA:	61' 6"
LWL:	5' 9"
Beam:	15' 5"
Draft:	6' 10"
Displacement, ½ load:	54,000 lbs
Ballast (lead):	17,000 lbs
Sail Area (100% Foretriangle):	1416 sq ft
Disp/L Ratio:	139
Sail Area/Disp Ratio:	15.93

WHIMBREL *after her maiden sail from Australia to England.*



The most interesting of the three sisterships had a large dinghy well aft for a 14-foot outboard boat. It was winched out of the water on rollers like those on a boat trailer. Yachts of this siz become traveling homes and moored don't provide you wi. recreation. For this you need power or sail. Otherwise all you do for recreation is drink, which can be a problem among some of the cruising fraternity.

- *You need a small boat aboard for recreation. Otherwise you drink!*

WHIMBREL AND TWO NEAR SISTERSHIPS WERE built of aluminum in Brisbane, Australia to our *"AUSSIE 62"* design. The third was the most interesting, having a short midship deck shelter and a large dinghy well aft which housed the hard dinghy on offshore passages. All of the Aussie builders worked hard to keep the weights to the absolute minumum and as a result all three yachts were outstanding performers.

It's interesting to me how one length—62 feet—attracted so many customers. During the 1990s we launched ten Bermuda Series yachts at this length. Though there were significant differences in the deck and interior designs these yachts had essentially the same hull. This hull must have hit a "sweet spot" in terms of performance, interior volume and perceived value. Although they were all capable of 200 mile days at sea they were not so large as to require paid help to maintain them nor to push them away from the dock. Their sailplans were small enough relative to the length of their hulls to not be visually intimidating. And their interiors were sufficiently similar to home to enable the wives to go along with the program.

One boatyard's interpretation of European style cabinetry built with Australian labor.

Enterprise

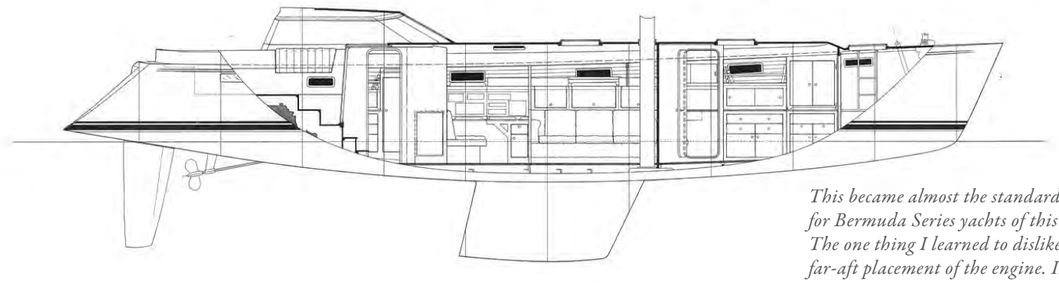
ENTERPRISE *was sailed 15,000 miles to visit her designer in Camden, Maine.*

Dimensions	
LOA:	51' 9"
LWL:	44' 9"
Beam:	14' 11"
Draft:	6' 6"
Displacement, ½ load:	33,559 lbs
Ballast (lead):	12,000 lbs
Sail Area (100% Foretriangle):	1169 sq ft
Disp/L Ratio:	169
Sail Area/Disp Ratio:	17.98

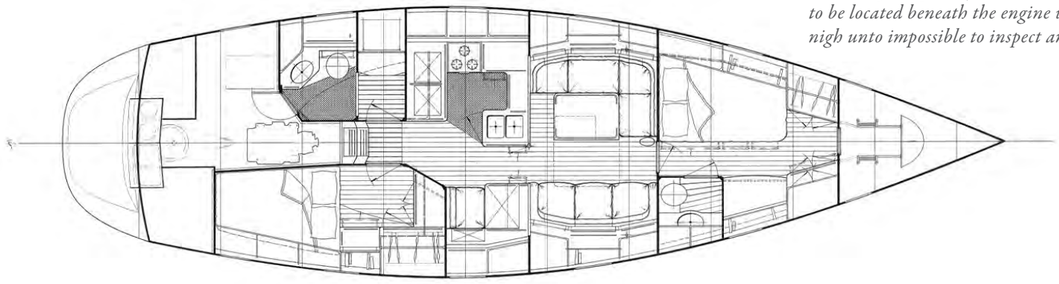
ENTERPRISE WAS AN EXTRAPOLATION OF THE *APOGEE 50*. She was built in Sydney and Brisbane, Australia using epoxy composite construction. Her Australian owner tried to buy an *APOGEE 50*. He made the long flight to Able Custom Yachts twice before realizing that tariffs in his home country plus an undervalued Aussie dollar would preclude his importing an America yacht. In the end he built a larger boat of epoxy rather than vinylester for less money. Building a custom yacht in two separate locations took him much longer than simply buying an *APOGEE 50*. But he did save some money.

ENTERPRISE was begun at McConaghy's in Sydney—Australia's highest quality sailing yacht builder. The owner then shipped the partially finished yacht home to Brisbane for finishing. He was determined to have a new yacht for himself. He realized that the hull and deck were beyond his abilities as a building contractor, but that managing carpenters and subs to finish it was not. It's an approach that can work if the owner / builder knows his limitations and doesn't kid himself about the cost. Far too many of these attempts end up with a half finished hull and a divorce, but he knew what he was getting himself into and built himself a stunning boat.

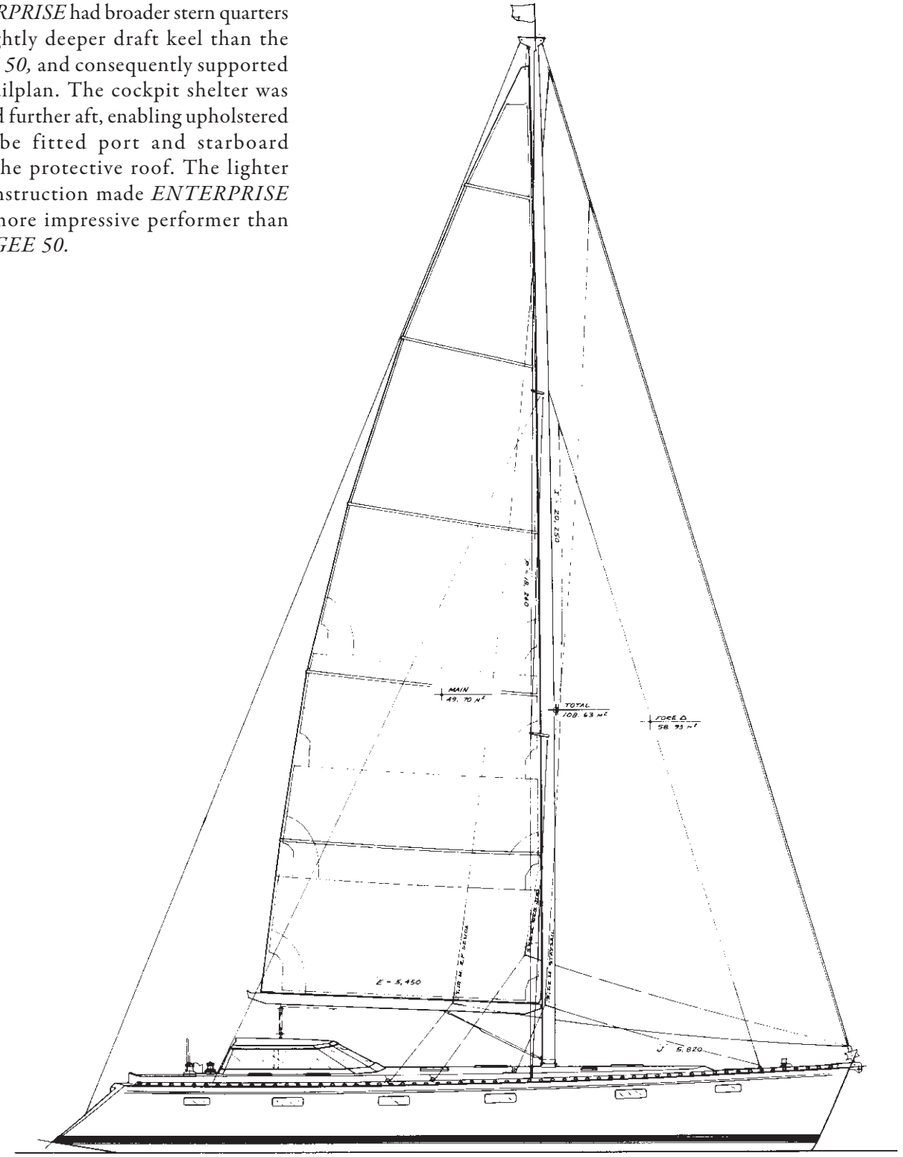
- *Boat finishing attempts often end up with a half-finished hull and a divorce. Know what you're getting into!*



This became almost the standard interior for Bermuda Series yachts of this size. The one thing I learned to dislike was the far-aft placement of the engine. It forced you to use a vee-drive. Vee-drives are inherently noisy and force the stern gland to be located beneath the engine where it is nigh unto impossible to inspect and adjust.



ENTERPRISE had broader stern quarters and a slightly deeper draft keel than the *APOGEE 50,* and consequently supported a taller sailplan. The cockpit shelter was positioned further aft, enabling upholstered seats to be fitted port and starboard beneath the protective roof. The lighter epoxy construction made *ENTERPRISE* an even more impressive performer than the *APOGEE 50.*



This sailplan probably cost half the normal fee while still (just) doing the job. No sailcloth panels are drawn, nor handgrips, dorades or the like. Drafting is when all is said and done, "spreading ink." The less ink you spread, the less you have to charge. It's not as pretty a drawing, though. With this tall sailplan ENTERPRISE *could easily have won races in her time, though it does require reefing earlier than many of our designs.*

- *The less ink you spread, the less you have to charge.*

80' Ketch

Fruition

FRUITION *was launched in late 2001. Her very light displacement made her extremely fast on a reach.*

Photo: Tim Wright

I FIRST MET THE BRITISH CUSTOMER AT A SOUTHAMPTON Boat Show. He'd read two articles I'd written for British yachting magazines about our Bermuda Series. He owned a somewhat shorter and much heavier cruising yacht that he dearly loved, but he wanted to go faster. At one point in our first conversation he told me he'd made his money in the fruit business and his present boat was named Fruity Fruits. If I owned a yacht named Fruity Fruits and a name as clever as *FRUITION* came to me, I'd want to build a new yacht too!

Dimensions

LOA:	80' 0"
LWL:	73' 0"
Beam:	19' 6"
Draft:	8' 9"
Displacement, ½ load:	115,000 lbs
Ballast (lead):	36,000 lbs
Sail Area (100% Foretriangle):	2519 sq ft
Disp/L Ratio:	132
Sail Area/Disp Ratio:	17.32

At 80 feet, *FRUITION* and her near sistership *LEONORE* were the largest of our Bermuda Series. *FRUITION* was built at Kanter Yachts. 80 feet is probably the upper limit for this type of yacht, whose objective is to be piloted much of the time by a single person. It only works with another person (call him the "engineer"), ensconced in his own cabin, available to repair the generator or hydraulic system that enables the owner to control the power of the sails on a yacht of this size. The ketch rig kept the sheet loads manageable at the expense of a few degrees of pointing angle. A large flat deck was provided aft for a 4.7 meter hard bottom inflatable, a sailing/rowing dinghy, and a windsurfer—providing that at-anchor recreation I spoke about previously. A lightweight carbon fiber hoisting boom stowed alongside the mizzenmast to snatch these small craft out of the water and into their chocks. In order to keep the yacht light the deck was finished with a grit based, painted nonskid. Only the cockpit was teak clad. A scoop shaped transom had a deck near water level that facilitated boarding from the dinghy and was used for swimming and diving. There were full length guard rails to protect the topsides, placed so as to shade her numerous hull windows.

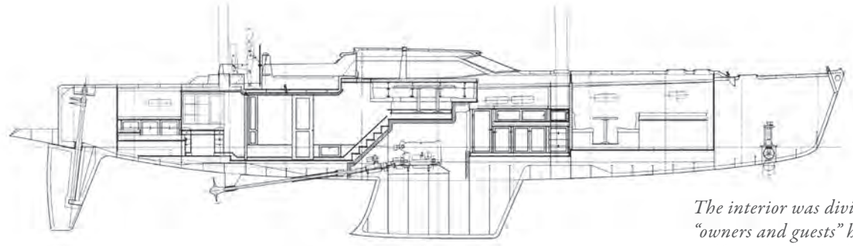
The pilothouse was of a long, low design. Twin wheels improved visibility past the pilothouse—at least when manually steering. Most of the time steering a yacht of this size is done from inside the pilothouse using autopilot controls. Engine controls and some navigation monitors were provided there as well. A dinette capable of serving seven persons occupied the port side of the pilothouse; it was elevated so that the diners could enjoy the view from their seating positions. Another dinette was provided belowdecks for use by the crew. The pilothouse was fully watertight, with a sealed door to the cockpit so that it could be heated or air conditioned and kept dry in heavy weather.

There were two identical guest cabins aft, both with private access to their own heads with separate shower stalls. The owner's suite further aft had a double berth and a seaberth, and a private companionway to the deck. A combination of good stability and a narrow hull made this yacht a very high speed passagemaker in tradewind conditions. When the wind didn't blow a powerful main engine was connected to the variable pitch propeller by a Hundested VP4 control unit, capable of up to 12 knots under power.

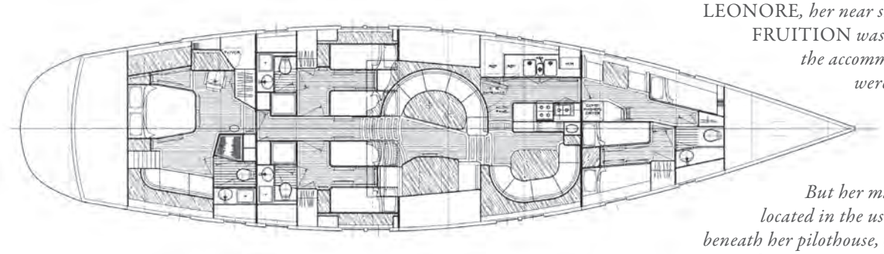
- *Write articles for European magazines. The market for new sailing yachts is stronger there than in America.*

The elevated pilothouse made a favorite dining location.

The owner's aft cabin had large hull windows.



The interior was divided between the aft "owners and guests" half, and the forward half which was the domain of the crew. She makes an interesting comparison with LEONORE, *her near sistership.*

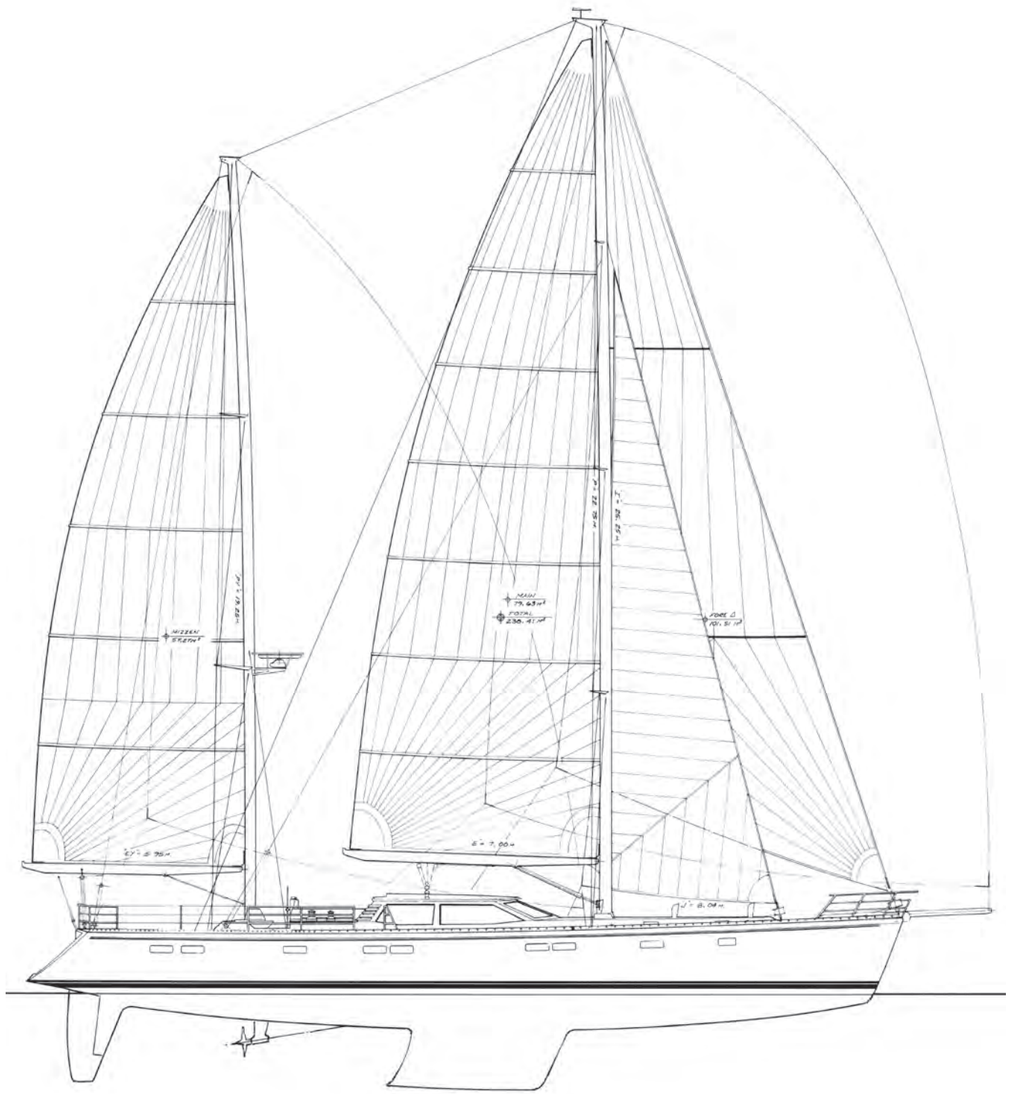


FRUITION *was designed to favor the accommodations, which were very appealing.*

But her machinery was located in the usual location beneath her pilothouse, where access to some of it was restricted. LEONORE's *owner put the priorities in the opposite order. He had us draw a huge, full headroom machinery room first in a prime area of the hull, and fit whatever accommodations we could around it.*

FRUITION was all waterline. She had welded pipe racks on her booms to capture the main and mizzen when they were lowered. Note the design of the guard rail and the way its forward end tapers into the hull, a detail I pushed Kanter Yachts to get right. The owner had her designed as a reaction to his previous yacht, which he considered too slow. *FRUITION* wasn't that.

Photo: Tim Wright



FRUITION's *sailplan spread a lot of sail with a low center of effort.*

Quicksilver and Threshold

Dimensions	
LOA:	54' 6"
LWL:	49' 6"
Beam:	15' 3"
Draft:	6' 9"
Displacement, ½ load:	44,000 lbs
Ballast (lead):	16,000 lbs
Sail Area (100% Foretriangle):	1259 sq ft
Disp/L Ratio:	189
Sail Area/Disp Ratio:	16.16

QUICKSILVER AND THRESHOLD WERE launched in 1999 and 2002. By this time the Bermuda Series was well established and the customers did not need a lot of convincing. These boats were fast, strongly built in alu by Kanter, and had that wonderful pilothouse. I liken it to the porch I built on my wife's old Maine farmhouse. Before I restored it, her house had an entry from which you stepped out of the warm interior into whatever the Maine winter chose to hit you with. Then I built that porch and life changed immeasurably for the better.

QUICKSILVER *Photos: Courtesy Kanter Yachts*

A pilothouse is the nautical analogy to a glassed-in Maine porch. Most Bermuda Series pilothouses could be sealed off from the cockpit (so they can be heated and cooled just like "indoors") and from the "downstairs" so that when it's wet from the oilskins, or darkened for nighttime visibility, none of this activity intruded upon life below. Importantly for the types who commissioned these yachts and set out on circumnavigations—usually with a reluctant wife as crew—Bermuda Series pilothouses removed some of the vulnerability to flooding that is a consequence of a single sliding companionway opening. Bermuda Series yachts had two such closures. In nasty weather the companionway between the pilothouse and downstairs could be kept closed. Even if one were pooped by an errant wave with the after companionway open, the yacht was safe from flooding.

The pilothouse's large tempered glass windows provided an excellent view. There were settees port and starboard, long enough to be used for sleeping. The starboard settee had a forward facing steering station with a chart and nav instrument table forward of it, making it a great place to keep watch when running under engine or motorsailing. The port settee was more luxurious, being notched to accommodate a small table. The tricky part was caused by the fact that you needed a "foot bucket" to slide your feet into when facing forward in the starboard pilothouse seat. This intruded upon headroom below and as the series progressed we invented all sorts of cabinets beneath this bucket to prevent your ever wanting to stand there.

The galley was very large and provided a secure notch for the cook to wedge into in when rolling. A separate refrigerator and freezer were provided, as was plenty of stowage for cutlery and provisions. Extending aft from the galley was the piece da resistance...a stowage room / larder / laundry room with a washer / dryer located at its aft extremity.

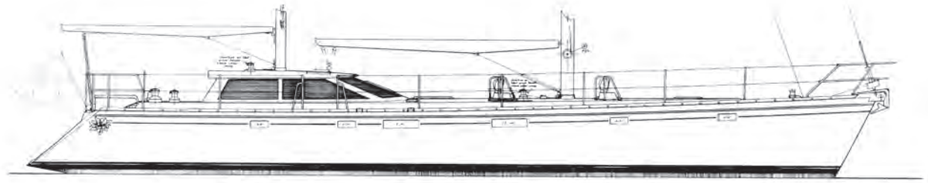
Dawnbreaker II & III

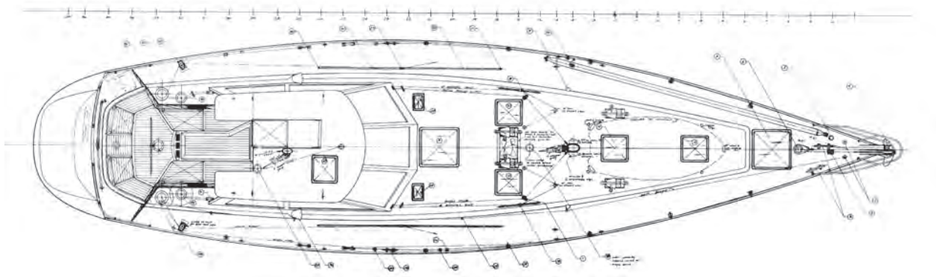
Dimensions	
LOA:	64' 0"
LWL:	55' 0"
Beam:	16' 9"
Draft:	7' 4"
Displacement, ½ load:	63,000 lbs
Ballast (lead):	19,500 lbs
Sail Area (100% Foretriangle):	1631 sq ft
Disp/L Ratio:	160
Sail Area/Disp Ratio:	16.48

DAWNBREAKER III. *Her owner, a repeat customer, enjoyed the process of designing custom yachts. He built two yachts with us—one at 62 and one at 64 feet in length. I'd begun winning the little battles by this stage in my career—No mainsheet traveler!*

DAWNBREAKER II, the ketch. The owner could manage the sails himself since they were not overly large.

Chris Kanter did a nice job showcasing the figured Koa wood used in her interior. *Photo: Courtesy Kanter Yachts*





DAWNBREAKER II's *deck plan. Look carefully and you'll see the mizzenmast is off-center to starboard. Nobody who sailed the boat ever noticed, and it made the interior work. We'd done this twice before.*

THIS OWNER FIRST CAME TO US IN 1991 WITH his ideas for a 62 foot ketch. He wanted something long and narrow that despite its length could be singlehanded. He had a marina slip at Hilton Head Island and wanted to be able to cruise the Intracoastal Waterway, which limited the permissible mast height to 64 feet and the draft to as little as we would tell him would enable him to go to windward.

We did some studies and concluded he could get good performance despite the mast height and draft restrictions. He'd need very light displacement for the aluminum construction he insisted upon, to compensate for a less than optimum sailplan and far less than optimum draft. And he'd have to rein in his luxuries to keep her light. *DAWNBREAKER II* ended up at 6' 10" draft—more than he would have liked but the least we could sanction for decent performance. The spars were slender, which helped, and the mizzen had outsize roach which helped a bit more.

The owner loved his ketch, but by the year 2000 he'd made some money and discovered he could almost get her original price back on the resale market. So he came to us for a new boat. He'd liked the look of his previous yacht, so that was retained; particularly the pilothouse, which he felt was the most stylish one we had devised. "Just make the windows a little taller," he said, "So I can see out better." A cutter rig would get him to windward faster, and he'd tired of the Waterway, preferring to sail offshore. The new design and his tolerance for deeper draft allowed us to fit a 7' 4" draft Paine Keel for better windward performance. In the meantime all sorts of luxuries had been invented for sailboats and he had to have them all. So the new yacht was of heavier displacement to accommodate all the new goodies.

The cutter rig was set up for singlehanded sailing, with all three foresails including a small and heavily built storm staysail set on Profurl roller furling. The mainsail was slab reefed, and fell into racks welded to the sides of the boom, contained by permanently fitted lazyjacks. An electric winch was fitted aft of the mast to permit mainsail hoisting and reefing without resorting to aerobics. There were three jibs to choose from. On the forwardmost stay was a large and full cut polyester / twaron reacher that could be carried in light to moderate airs. The genoa was next, a heavier and flatter cut sail that could be used to windward up to 25 knots. The small and very rugged staysail could be used along with the genoa, or carried alone in gale conditions. This three-jib foretriangle became a paradigm for our future offshore cruisers.

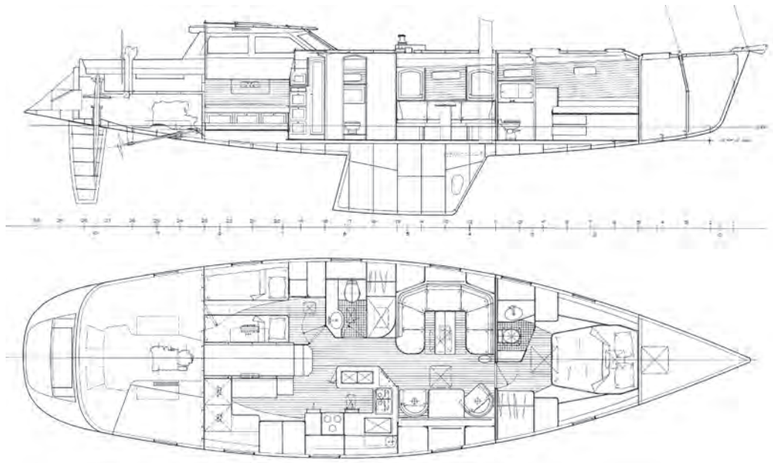
The deck was in many ways similar to his earlier yacht. This time he selected a twin wheel cockpit so that he could sit outboard of the side of the pilothouse for a better view forward. There were more hatches, since he used the air conditioning as little as possible, preferring natural ventilation when he was swinging to the anchor or a mooring. A very large anchor handling platform was designed, enabling him to carry two 160 pound anchors at the ready—sort of like carrying around two moorings, but by golly they'd hold in anything.

- *They haven't built the anchor that is too big.*

DAWNBREAKER III making the most of her light air genoa in a light breeze. Bermuda Series yachts, like most racing yachts, would sail faster than the wind speed in light airs. Their own boatspeed would increase the apparent wind in a virtuous cycle. There's maybe seven knots of true wind here, but she's going eight knots through the water, creating an apparent wind of about 12 to 13 knots. Her huge, lightweight code zero reacher could also be used off the wind in up to 15 knots of apparent wind, meaning 25 knots true.

A bright interior of painted bulkheads and varnished cherry accents. With the table leaves folded in, there were fiddles. These weren't high enough, though.

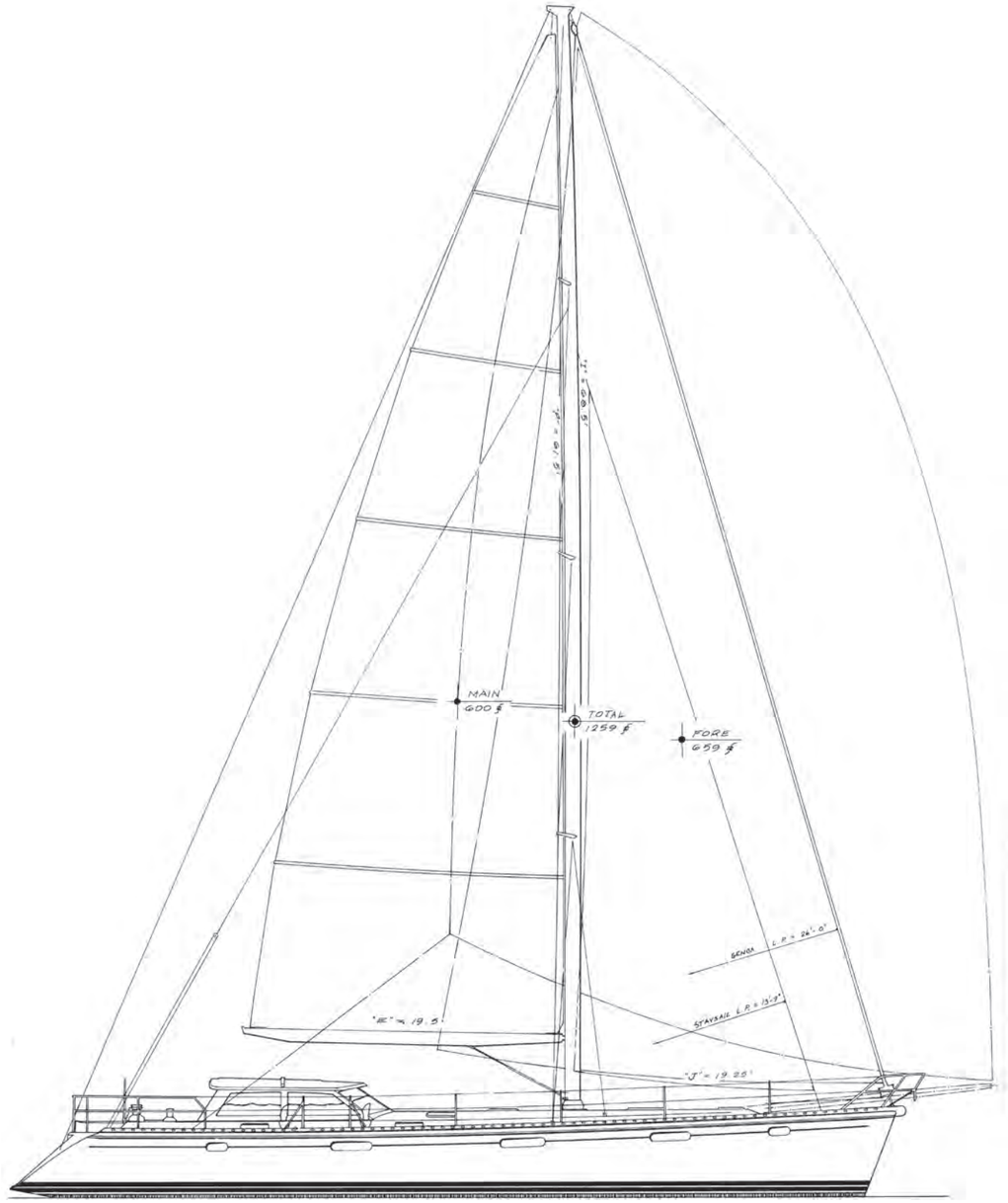
The table had leaves that folded in for easy access. In this configuration the tabletop was flat and didn't cut into your flesh.



THRESHOLD's *belowdecks arrangement provided two widely separated double cabins, two heads and a separate shower stall. The forward cabin had a centerline double that could be accessed from either side so that neither sleeping partner needed disturb the other to go for a pee. The aft cabin to port had two single seaberths and a deck hatch mounted above their feet on the rear bulkhead to access the engineroom.*

The galley was lit by hull windows and overhead hatches.

A lovely interior in white paint and varnished cherry.



QUICKSILVER *and* THRESHOLD *had a tall rig placed well forward on the hull. Like so many of our designs the boat balanced perfectly even though it you extend the leach of the mainsail down it meets the waterline one quarter of its length forward from its aft end.*

Lustrous

Winter sea trials in Boston. Going to windward in 25 knots was COOOLD!

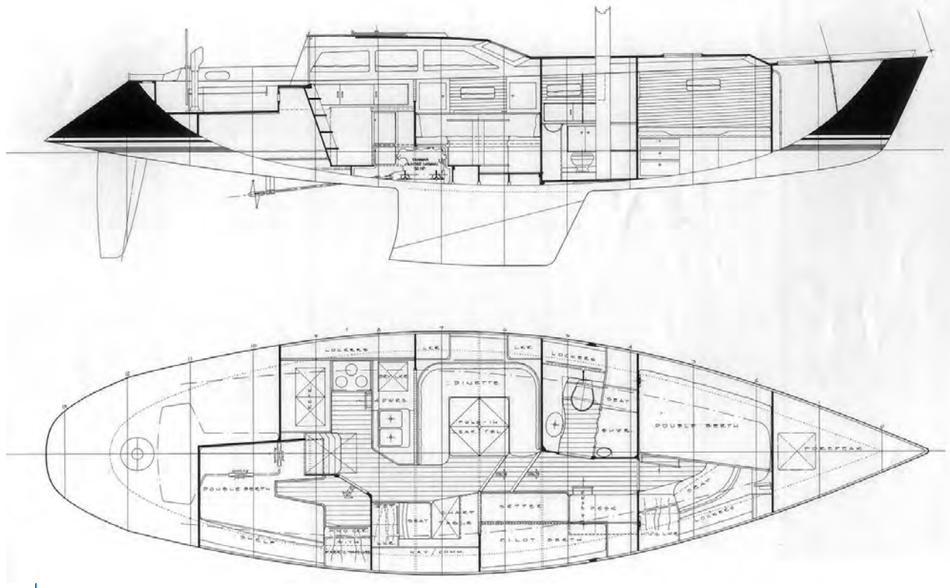
THE BOSTON BOATWORKS CUSTOM 46 FOOTER

LUSTROUS was launched in December 2001. *LUSTROUS* was high-tech in all respects including epoxy resin, carbon spars, composite chainplates, and unidirectional S-glass reinforcements in the deck and internal framework. *LUSTROUS* was built for a young Microsoft executive who rigged her with a genoa-less 100% jib trimmed inside the capshrouds for shorthanded cruising.

Dimensions	
LOA:	45' 9"
LWL:	39' 3"
Beam:	12' 6"
Draft:	6' 0"
Displacement, ½ load:	23,670 lbs
Ballast (lead):	10,000 lbs
Sail Area (100% Foretriangle):	930 sq ft
Disp/L Ratio:	178
Sail Area/Disp Ratio:	18.05

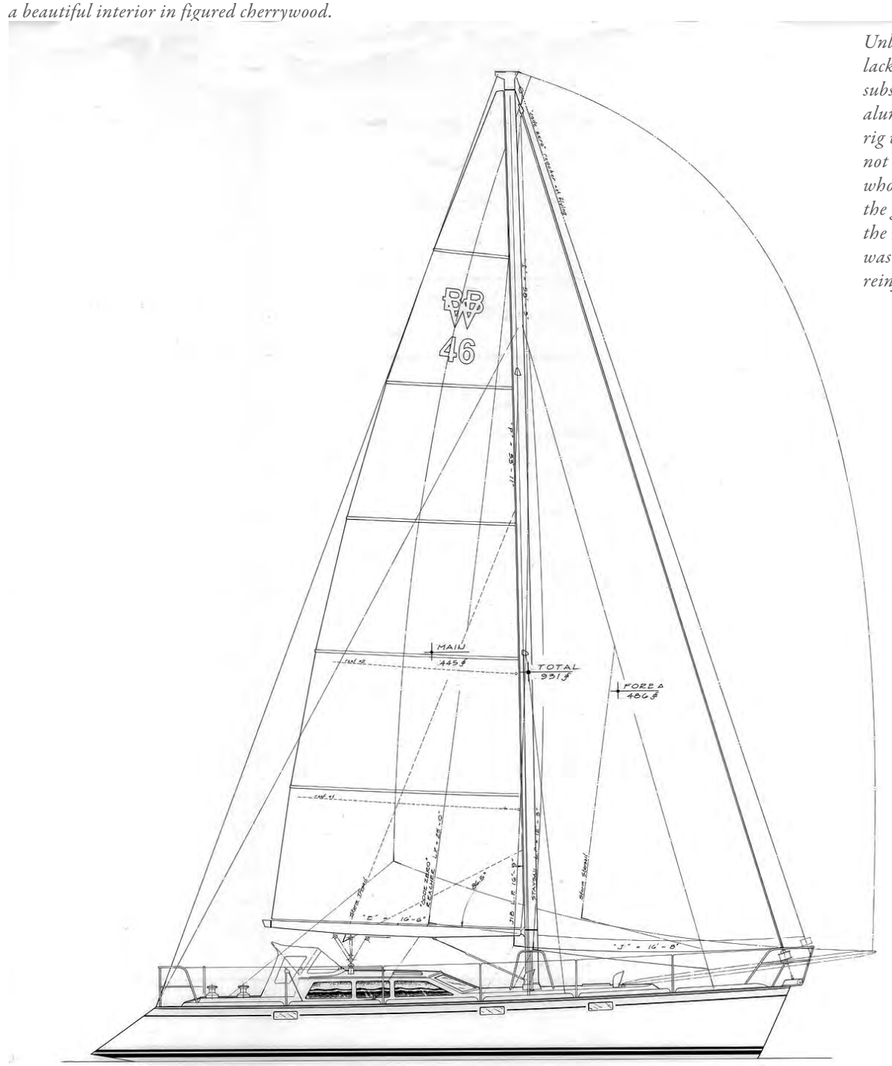
There was also a large reacher-drifter, which trimmed to the rail. *LUSTROUS's* hull shape was an updated version of *MERIDIAN*—her stern was a bit broader—and she used the Paine Keel. The sail plan was of generous area for the displacement with a tall mast to compensate for the lack of a genoa. This was the owner's preference. To my dying day I will favor a shorter mast combined with a genoa jib for offshore sailing. A stormstaysail stay was provided well inboard for setting the storm jib.

- *To my dying day I will favor a shorter mast combined with a genoa jib for offshore sailing.*



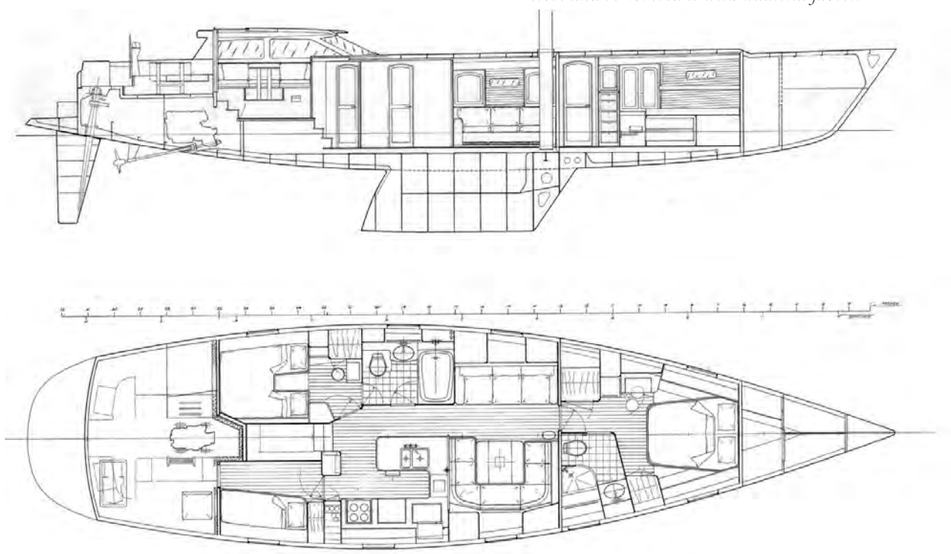
The interior had a large galley and dinette to port. Opposite was the offshore cabin, with a divided double berth which converted into two separate narrow seaberths for passagemaking. There was a combined head and shower room immediately forward of the main salon, and opposite this to starboard were a settee, pilot berth and desk—presumably for writing the next generation of Windows software. The navigation and conning area to starboard was large, with a good sized chart table and seat, and a conveniently situated wet locker. The owners' at-anchor stateroom was forward.

Mark Lindsay and his crew at Boston Boatworks built a beautiful interior in figured cherrywood.



Unlike MERIDIAN *she lacked the bulwark board, substituting a serrated aluminum toerail. Her rig was taller since she did not use a genoa jib. The jib whose leech you see where the genoa's would be is the reacher/drifter which was tacked to a specially reinforced bow pulpit.*

The interior was of varnished wood with painted panels. The proportion bordered on 70:30 but it still worked nicely. The owner asked, "Why can't yachts have sofas as comfortable as the ones we have at home?" So we found one at a furniture store and re-covered it with nautical fabric.



We gave up trying to get perfect rudder profiles out of aluminum builders. If we made it easy to build they'd get the foils right which was more important than the profile shape. Hence the straight leading and trailing edges, which were rewarded by a rudder that did the job beautifully. A Paine Keel of this depth got her to windward smartly.

The anchor platform had two huge anchors and ½" chain at the ready. It was like carrying two moorings. But they held!

Morris Custom 62

Visions of Johanna

Dimensions	
LOA:	62' 3"
LWL:	55' 0"
Beam:	16' 0"
Draft:	6' 8"
Displacement, ½ load:	56,500 lbs
Ballast (lead):	19,500 lbs
Sail Area (100% Foretriangle):	1525 sq ft
Disp/L Ratio:	152
Sail Area/Disp Ratio:	16.57

VISIONS OF JOHANNA *uses a 100% jib to windward. She is seriously fast. Once the sails are set you'd have to put the engine in reverse to keep her below nine knots.* *Photo: Alison Langley*

BILL AND JOHANNA WALKED INTO THE OFFICE one day in 2001. They were a phenomenon we rarely saw—Maine customers. The majority of our customers hailed from thousands of miles away. Maine is a poor state and yachts—especially custom designed yachts—cost lots of money. But they both were high earners and loved boats. They had cruised their Alden 44 all over the western Atlantic and wanted to know more about my Bermuda Series. I'll never forget what Bill said in my conference room, referring to his love for Jo and his desire to build a new boat for them to continue cruising together. I'll never forget it, but I can't repeat it in print.

Over the course of the design they became almost family. Jo's son Gram was a student at Webb Institute of Naval Architecture whom we'd had as an intern for a few weeks the past winter. Since we were already swamped before getting this particular commission we hired him to come in for the summer to do the weight estimate. Perhaps because the design was destined to be his home it was the best weight estimate we'd ever done. This was made more difficult by the fact that this yacht was going to have everything new that could possibly be fitted to a yacht (except air conditioning, which leads to a story). The complexities and weights of

The home entertainment area/office opposite the dinette.

Photos: Onne van der Wal

A view of the large galley. The watertight door to the engine room just shows.

things that have yet to be invented are hard to predict. She floated spot on her lines despite being of quite light displacement.

Bill had a preliminary agreement from French and Webb to finish the yacht once he brought in a completed hull and deck...F&W were wooden boat builders and wouldn't touch fiberglass. Bill went ahead and had Boston Boatworks build the hull, deck and ballast. As crunch day came closer, F&W did some self examination and decided this yacht was a bit beyond their capabilities (which freed them up to build *WINGS OF GRACE*—see the Spirit of Tradition chapter. *WINGS* was well within their comfort zone and in itself a magnificent and highly complex undertaking.) In an illustration of how in life things just work out for the best, Morris Yachts ended up completing the yacht and of course the detailing was perfect everywhere you looked.

The hull and deck were, like *REINDEER* and *FIREFLY* before her, post cured epoxy composite over CoreCell core. Bill insisted on very shoal draft so the Paine Keel's bulb was long and large. She had a completely enclosable pilothouse with a forward facing conning station, large chart table and watchstander's berth.

Only after the yacht had been sailing a few years did I come to understand firsthand how this completely altered the boating experience for the better.

Twin wheels make seeing forward past the intentionally narrow pilothouse a possibility for the eponymous and diminutive Johanna. Not that you ever manually steered her except during docking maneuvers—steering of *VISIONS* and anything like her is done by pressing little red (+) and (–) buttons. Her specification included a carbon fiber rudder, composite chainplates, Evolution shaft system, over-spec engine room insulation (you literally can't hear the engine when you start it), and a plethora of interior luxuries. All of this combined with lovely Morris Yachts joinerwork in Honduras mahogany and lots of attention to insulation and ventilation (no less than 18 deck hatches.) Therein lay the only element of wishful thinking in the entire design. We lost sight of the fact that all of the hatches in the world do nothing for ventilation when you can't open them, meaning anytime there is spray coming on deck. Which is basically all the time in a boat that goes through the water at ten knots!

Fold down steps provide a walkthrough to the transom.

There's no wood on deck forward of the cockpit.

After I had a heart attack in 2006 I began to slow down at work. For 35 years I'd been working full tilt and turned down scores of invitations to help clients see the world in the most wonderful yachts imaginable. The office was running itself just fine under Mark Fitzgerald and Ed Joy and I'd had a scary wakeup call. Time to have some fun! So when Bill called and asked me to sail with him, twice in two years, I accepted gratefully. Since then we've sailed *VISIONS* over 3000 miles together. When I showed up in Bermuda for the first passage carrying a seabag full of foul weather gear and seaboots Bill asked, "What the hell did you bring all that stuff for?" "Night watches", I answered. He laughed and explained that on *VISIONS* nobody ever goes on deck at night, except once every watch for a quick look-round, navigating from inside the pilothouse. And on the longer passage of over 2000 miles I actually steered manually for, maybe, one hour. Mostly you'd just sit in the cockpit during daylight and marvel at the rate at which the wake flew by, and at night in the pilothouse seat watching the radar and the AIS. It's not sailing, exactly, but it's a great way to see the world living in a waterborne luxury apartment.

We sailed *VISIONS* from Newport R.I. to Cartagena, Colombia, in 9½ sailing days. It was a wonderful, boisterous, high speed romp. We never did less than 200 nautical miles in a 24 hour day. But belowdecks in the Caribbean in May it was like living in an oven, except that an oven doesn't have 100% humidity. Then we arrived in Cartagena, the hottest place I have ever been in my life with the exception of the Persian Gulf. After one night aboard without any sleep I opined, "I'm going home in two days, and I have a prediction to make. You'll have air conditioning on this boat before two weeks is out."

I'll finish this chapter with a couple of quotes from the Captain's log that tell the story better than I ever could.

Southwest North Atlantic 25 50N 70 34W
21 May, 2009
0700

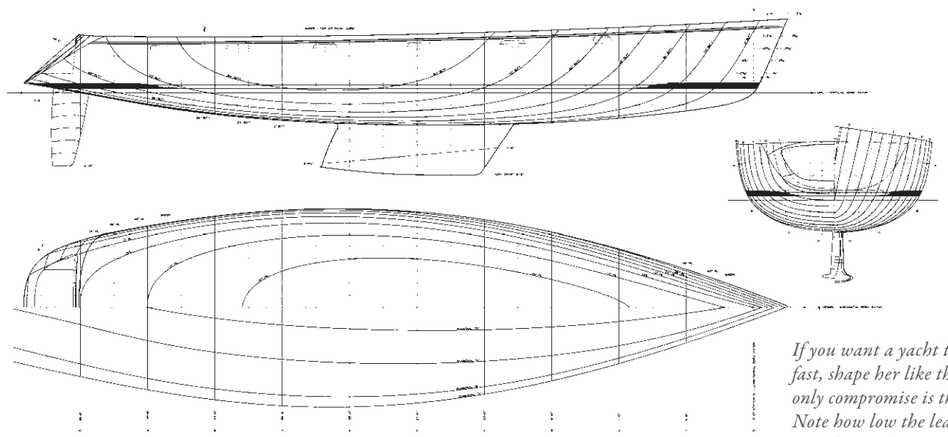
"Overnight, the wind has picked up and we are finally beginning to see some seas. Yesterday, the wind actually eased a bit from mid morning to midnight, usually less than 15 kn T from just north of east. Wind direction currently unchanged, but wind speed has increased to 19 – 22 kn. Seas, which were surprisingly docile yesterday, are making their presence known, now 6 – 9 ft. Our boat speed remains an awesome 9.8 kn @ 17 kn wind, and 11 kn @ 22 kn wind—in other words, we are TRUCKIN'. While a bit rolly, Visions of Johanna is handling these conditions with aplomb, and never has felt unsafe, nor have we felt insecure. She continues to exhibit a lovely balance of speed and seaworthiness."

And this last from Gram, whom we left alone aboard the boat in Cartagena after we all flew home:

"Well, Chuck wins the bet...and it took less than two weeks. After two sleepless nights due to extreme heat and no wind and stories of the San Blas being even hotter at times I managed to procure a used Air Conditioning unit from our friend David on Brudair."

So now she's PERFECT!

- *If you're headed for the tropics, fit air conditioning!*



If you want a yacht to go fast, shape her like this. The only compromise is the keel. Note how low the lead/glass interface is. So she's still plenty stable—just not all that close-winded.

Tom Morris at the helm of *VISIONS OF JOHANNA*. She's now been sailed to New Zealand, with her designer aboard for the first leg from Newport to Columbia. Note all of the opening hatches on her deck—trust me, there are eighteen of them. She was built using racing yacht techniques... epoxy resin, hand-applied laminates, vacuum bagged, heat-formed core with no perforations, post-cured in a purpose built oven. The quality of finish on *VISIONS*, like everything Tom did, was gorgeous.

Photo: Alison Langley

80' Ketch

Leonore

LEONORE *was ketch rigged to reduce the size of each sail. Note all the solar panels and the "hard" Bimini.*

Photo: Ivor Wilkins, offshoreimages.com

Dimensions	
LOA:	80' 0"
LWL:	73' 0"
Beam:	19' 6"
Draft:	8' 9"
Displacement, ½ load:	115,000 lbs
Ballast (lead):	36,000 lbs
Sail Area (100% Foretriangle):	2566 sq ft
Disp/L Ratio:	132
Sail Area/Disp Ratio:	17.37

BEFORE WE MET THIS CUSTOMER WE THOUGHT HE was shopping for a used boat. His most likely candidates were our 66' *EVOLUTION* and two Deerfoot 74s. A look at these boats in the Caribbean convinced him the combination of features he was looking for would require a new and larger design and he began vetting designers. His top prioity was access to the engine. He found that among the approximately 100,000 sailing yachts available on the used boat market not one in his size range had decent access to the machinery—at least by his standards. He invited me to his home in Key West and hired me to do some preliminary work on a 74 footer. He discovered that 74 feet was too small to accomplish all that he wanted and had us start over at 76 feet. When that effort was half complete he had us scrap it again and design *LEONORE* at 80 ft.

He decided to build his new boat of aluminum. By this time our office had designed over twenty Bermuda Series yachts in aluminum and had evolved an elaborate arrangement of vertical frames, integral tanks and longitudinal stringers to enable it to comply with the ABS code and still stay reasonably light.

Our internal framing grid was another proof of the truism "you get what you pay for." Aluminum yachts can be built much cheaper if you use thicker plating and fewer internal members. In fact there were some French yards at the time that built (admittedly smaller) yachts using extremely thick plating and no internals at all. But the lightest metal structures use thinner plating and an extensive grid of relatively small framing to back it up. Because much more labor goes into fabricating and bending these internals—whose combined length would add up to over a mile on *LEONORE*—and welding the plating to it, the cost is far greater. But it's lighter and stronger than any other methodology.

- *You get what you pay for.*

The owner thought it would be a good idea if he could handle his eighty footer by himself in an emergency. This meant mechanical help. Just furling the sails on a yacht of this size is hard work for a young athlete. But he wanted to believe that if his youthful crew were ever incapacitated he might be able to make do, if he took things slowly.

That required electrical and hydraulic systems and lots of them. Since the generator would be large and the hydraulic systems likewise he had us block out an engine room that was the biggest space in the vessel. He was singleminded about this—every time we tried to encroach upon his engineroom to make the rest of the accommodations work better he slapped our wrists. The engineroom on *LEONORE* was larger than some I have seen on 100-footers. But of course he was right. We needed every inch of it before the design was finished.

The engineroom was made watertight and soundproof and had full standing headroom. The scores of filters and pumps on a vessel of this size don't get the necessary attention if they are squeezed in without sufficient space to sit and work comfortably.

- *Filters and pumps don't get the necessary attention if the machinery is squeezed in.*

On his previous circumnavigation the owner reckoned he spent 1/3 of his time sailing, 1/3 motorsailing and 1/3 under power alone. Consequently *LEONORE's* engine and propeller were sized to be able to drive the yacht at 10 knots with a badly fouled bottom, and there was permanent tankage for 600 gallons of fuel. A separate fuel tank—conspicuously plaquarded for reserve only—enabled another 300 gallons to be carried on the long, windless Pacific passages.

- *An extra fuel tank for the windless Pacific is a good idea.*

There was not a stick of wood on deck—just low maintenance Awlgrip surrounded by a reassuring bulwark without a railcap, like *EVOLUTION* and *VISIONS of JOHANNA*. The pilothouse was low enough for the helmsman to see over to the bow—given that he was standing on the custom step aft of the wheel we designed for that purpose. Forward of the helming area the cockpit was lowered for protection from wind and spray and shaded beneath overhead porches that extended aft from either side of the pilothouse.

The interior was designed for just two couples, plus the paid crew. The owners' suite and guest cabin were heated and air conditioned, and had access to private heads. The crew's cabin was forward. Beneath the cabin sole there was a powered treadmill and NordicTrak—a reaction to too much sitting and not enough exercise during the owner's previous circumnavigation. With so little space devoted to sleeping the pilothouse and downstairs lounge with its library and gas-fired fireplace could be expanded in size so as to be really pleasant.

The yacht was built by Kelly Archer Boatbuilders in Albany, New Zealand. Shortly after I met the owner I'd invited him to meet me in Auckland where I was attending a design conference. Naturally I gave him tours of all the appropriate aluminum yacht builders. When he saw the work that Kelly was doing I was pretty sure he'd go in that direction, despite a price estimate that took your breath away. If you know yachts a look at the photos in these pages will show you he got the quality he was looking for.

View up into the pilothouse from the galley/dining area.

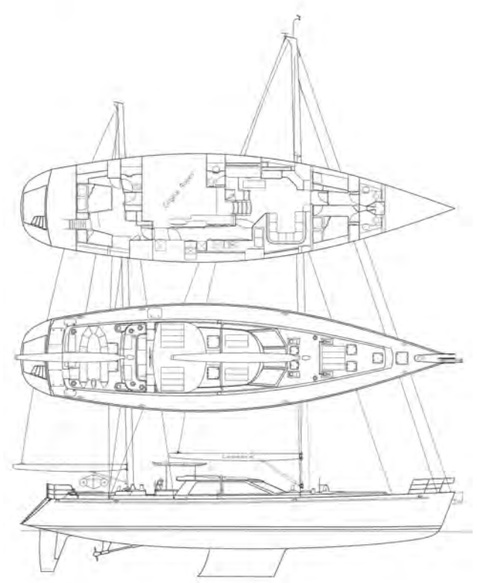
View forward from the galley. *Photos: Michael Ng*

The pilothouse had a dining area to port with the inside steering station to starboard. We always put the steering station on this side because vessels with the right of way, whether under power or sail, come from this direction.

The owner had the choice of a seaberth at sea or a double in port. There was a private companionway to the afterdeck for his use.

Photos: Michael Ng

- *Always put steering stations on the starboard side. Right-of-way vessels come at you from this direction.*



LEONORE's *hull was similar to that of* FRUITION, *but deeper and heavier, since it had heavier machinery weights. The engineroom was by far the largest space in the vessel. Since her launch* LEONORE *has done a cat's cradle of Pacific crossings to some of the world's most remote and fascinating cultures.*

LEONORE was our largest Bermuda Series design. In undertaking each new design series my studio began as an unknown quantity. Somehow we had to thrust ourselves into the yachting public's cognizance and carve out a living within what was already a crowded niche. The Bermuda Series began as an attempt to rewrite a colleague Steve Dashew's exciting Deerfoot and Sundeer designs in our own handwriting. Our designs were more conservative, perhaps out of fear of upsetting what I saw as our more conformist clientele; though *MERIDIAN,* with her narrow stern and light displacement and near vertical stem profile, was definitely "out there" when she was launched in 1988.

Over time our designs gravitated towards the center, shedding any intention to attact attention and aspiring only to be thought of as "good boats." *LEONORE* was not, like so many light displacement sailboats, "hang on for dear life" exciting off the wind but hopeless to windward. Her performance was a notch above the expected in all conditions—light or heavy, upwind or down. I have come to recognize this gradual transition from radical to conservative in the careers of all the yacht designers I have admired and emulated.

As the office's reputation grew I filled it with co-workers whose skills rivaled and then eclipsed my own—not to mention the network of computers, plotters and CAD stations that became a necessity when drawings transformed into digital strings of ones and zeros. With all this capability it seemed a shame to turn our back on by far the largest outlet for the talents of any yacht design firm—motoryachts—which are the subject of the next chapter.

Motor Yachts

CHAPTER EIGHT

Motor Yachts

ERIC WHITE WAS THE PRESIDENT OF NORTH End Composites—the fiberglass tooling company that lent me my first office so I could get started designing yachts. We remained friends as both of our businesses grew. Mine eventually grew to five employees which made it one of the largest yacht design firms in America at the time—showing just how tiny the field of yacht design really is. I am sure there are more custom harpsichord designers in America than there are yacht designers!

- *Yacht design is a tiny field. If you want to make a living, design harpsichords.*

Eric's company specialized in building molds so that other companies could build fiberglass boats out of them, and grew to employ well over 100 workers making it without question the largest of its kind in America. He counseled me about the boat business and two things he taught me stuck. First, he asked, "Why do you insist on designing sailboats? Don't you realize that sailboats represent only one tenth of all the boats built in the United States? If you really want to be successful you've got to design motorboats."

- *If you aspire to being a successful yacht designer you've got to design motorboats.*

The other thing he advised was, "You'll never even cover your expenses working by yourself. You've got to have employees. As the owner of the business you should make five bucks from the hourly billing for every employee. Do the math—the more employees you have, the more money you'll make!" I countered, halfheartedly, that I wasn't in it for the money. But I did have to admit the prospect of making a decent living had some appeal.

- *To make a living as a designer you've got to have employees.*

By the mid 1980s I'd had draftsmen working with me for years. I was lucky. Despite the occasional dry patch I never had to lay off an employee. The yachting field was growing. As the years went by I had to add to my staff to grow with it, and I harbored in my mind the intention, next time I had to take on another designer, to find someone who knew something about motorboats.

Mark Fitzgerald came to work for me in 1987. He had been working for Jack Hargrave of West Palm Beach for seven years. Jack was the grand master of motoryacht design and Mark had learned from him all he could about motorboats. As soon as he signed on I had the confidence to begin selling our expertise in design for both sail and power. From that day forward we always had at least one motorboat on the drawing boards and toward the end of my career the powerboats consistently outnumbered the sailboats.

We spent our first years designing "lobsteryachts"—motoryachts designed to look like the most beautiful of the wooden lobsterboats from builders with names like Bunker and Ellis and Win Lash. Their styling was important but it extended only down to the waterline. Beneath it we contrived modern vee bottoms with spray chines and the heavier displacement required to accommodate the weights of luxurious accommodations and twin engines. Working lobsterboats have round chines so as not to snag the pot as it is hauled up over the side and their heaviest weight is a barrel full of bloody fish-heads... the stench is weightless.

Another little motorboat was a 28 foot launch for a customer who came back to us two more times for larger designs. It led eventually to our designing a series of mid- thirty foot single engine cruisers.

In architecture one tends to crawl—or get forced—into comfortable niches. Our niches became the aforementioned lobsteryachts, welded aluminum raised-pilothouse motoryachts between 50 and 75 feet in length, and jetboats. While we were rarely hired to design refits nor to do consulting on the sailboat side—always doing entire sailboat designs—Mark Fitzgerald attracted a thriving business engineering bits and pieces of motorboats designed by others. Though these jobs contributed enormously to keeping our growing number of mouths fed, this book is a celebration of the completed designs that we're most proud of, and the lessons they can teach my readers, and many of these were propelled by internal combustion rather than by sail.

Downeast Express Cruiser

Wolf Class 44

Dimensions	
LOA:	43' 11"
LWL:	41' 9"
Beam:	13' 6"
Draft:	3' 11"
Displacement, ½ load:	36,000 lbs
Engines:	up to 2 x 500 hp
Top Speed:	22 – 28 knots
Cruise Speed:	18 – 25 knots
LBS/HP:	36 – 40

WOLF *at thirty knots.* *Photo: Art Paine*

THE *WOLF CLASS 44* EXPRESS CRUISER BEGAN as the brainchild of Ted Cooper, the chief salesman for Able Marine. In 1991 he came to the same realization I had. If the market for yachts was slanted ten to one in favor of powerboats why restrict yourself to sailboats? He had a customer sniffing around and he asked us for some preliminary renderings.

George Baker of New York City was the customer. He was what we call in the trade, qualified. Meaning a yacht of this size and the over-the-top finish Ted had in mind wasn't going to cost him his last nickel. When George saw Mark Fitzgerald's beautiful preliminary drawing he signed on immediately and Paine Yacht Design had its first powerboat project. George Baker wanted a "lobsteryacht" before many people knew what a lobsteryacht was. What Ted and he envisioned had way longer legs than a custom yacht for single customer, so the decision was made from the outset that this project would be out of female molds and be promoted as a series. By 2008 Able had built four yachts to the design and Morris Yachts a fifth. Those numbers don't sound like all that much but these boats simply reeked of elegance and were what we call in Maine, "some ole deeyah!"

What George and Ted envisioned was a boat that looked like the most beautiful wooden lobsterboat ever built, but that went a lot faster. Faster, that is, than the conventional lobsterboat you see in the tourist calendars that does fifteen knots flat out. We do have the famous lobsterboat races here in the state of Maine where lobstermen take conventional lobsterboat hulls and cram in the biggest engine that will fit. These races have been known to result in memorable incidents where these monstrosities get to chine walking progressively until they flip over and throw spray for a hundred yards. We were aiming at 25 to 30 knots without a hand on the wheel.

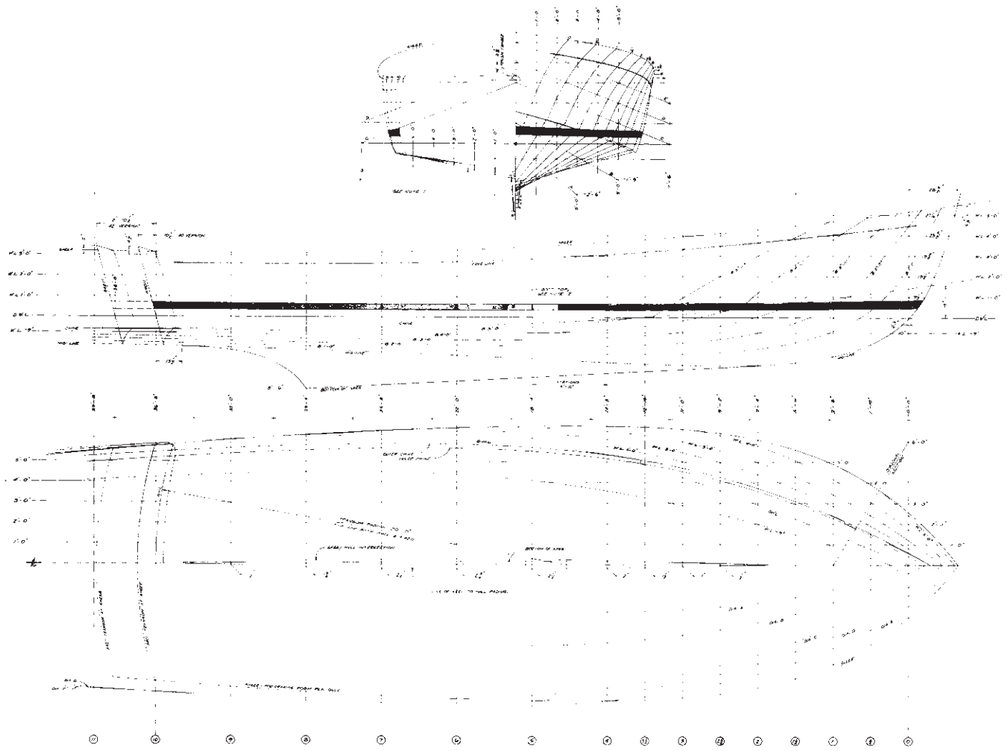
Mark Fitzgerald combined a vee bottom with an aesthetic statement that was derived largely from sailboats. He managed to marry the look of a postwar Bunker & Ellis with a high-tech bottom. Able wisely avoided the temptation to sell bare hulls to fishermen—a very common trade in Maine. Doing so would have required that round chines be retained—round chines, for all their hydrodynamic inefficiency, don't snag lobster traps when you haul them up over the side. The warped vee bottom had spray chines so the yacht could be driven at much higher speeds than lobsterboats. Along the way Art Paine came up with the sensuous curve of the side windowsill and partially Awlgripped side windows with a wolf logo in the corner, plus the audacious sailboat-style cove stripe. Who in his right mind would put a cove stripe on a motorboat? Able Marine substituted their flag logo for the wolf, but we forgave them.

With the planing bottom the Downeast Express Cruiser would cruise smoothly at between 25 and 30 knots depending upon the size of the engines. George reasoned that one buys a motorboat to go fast, and his contribution to this program was to power his with a pair of highly tuned Merlin 450s. They didn't last very long, but they pushed her at over thirty knots in her trials. Surely, I remarked at the time, this would make a creature of such unpretentious loveliness a "wolf in sheep's clothing". Is it any wonder, then, that he named her *WOLF?*

WOLF was an assemblage of sexy curves. She climbed effortlessly onto plane and threw her spray well clear of the topsides. The owner wanted the huge mast so he could hoist a dinghy into the cockpit—which I never saw him do. I loved the rag-top. Most owners would have us design something made of fiberglass, but nothing looks more yachty than canvas, especially if it's the right color.

Photo: Art Paine

This design was all about aesthetics, including the way she moved through the water. George loved sailboats and wanted WOLF*'s interior to look like one. So there were varnished corner posts and high fiddles around all of the worktops.*



Mark Fitzgerald's hull lines for the Able 44. I knew nothing about motorboat hulls when I hired him but when I saw these lines I knew I'd hired the right person. Note how nearly parallel the buttock lines are from the midsection aft to the transom. This is a good indicator of the efficiency of a planing bottom. Forward of amidships the topside shape is driven by the aesthetics. There'll typically be one section—here it is station 4—that is a straight line, forward of which the lines are concave and aft of which convex. The bottom sections may be entirely straight lines or may trend ever so slightly convex as one moves forward toward the bow.

RLK 28 Launch

Firenze

Dimensions

LOA:	28' 2"
LWL:	26' 0"
Beam:	8' 8"
Draft:	2' 9"
Displacement, ½ load:	6,670 lbs
Fuel Capacity:	100 gallons
Fresh Water Capacity:	40 gallons
Engine:	Volvo 245 hp
Top Speed:	27 knots
Cruise Speed:	22 knots
LBS/HP:	27

FIRENZE'S PATRON HAD BEFRIENDED

Bob Lincoln, a custom canoe builder on Mount Desert Island. Bob had been looking for something to build that was more challenging than the next canoe. Mark Fitzgerald had grown up around the beaches of Cape Canaveral and driven every one of the early fiberglass classics. He could tell a Mako from an Aquasport without looking at the logo (I certainly couldn't) and he knew what made a single engine boat plane without sticking its snoot in the air. When a customer came into the office wanting an upscale launch that would perform just as well and be built of wood Mark was keen to do it.

FIRENZE had a medium displacement warped vee bottom—a shape we didn't change all that much in twenty years. This type of launch benefits from a chine flat and building one entirely into the perimeter of the wooden

Bob Lincoln taking his baby for a spin. Cold molded wood boats can be built quite light. Note how lightly she treads on the water.

FIRENZE *was 15 years old when this photo was taken. Her owner treated her like a member of the family and didn't stint on the maintenance.*

bottom would have been extremely complex, so Mark used an external chine strake that stood proud of the topsides. Outboard boats have proven that this type of hull likes the engine's weight as far aft as possible, so in this case an "outdrive" made sense for this owner who didn't want to see and hear the engine. This little launch was going to have wood embellishments well beyond what would be strictly necessary for strength so weight had to be pared somewhere else. The solution was to use a gasoline engine rather than diesel since it was much lighter in weight. The 245 hp Volvo DuoProp yielded a speed of thirty-three knots during her trials though added weights and windage dialed that back a bit in her dotage.

The combination of a large tent-like cockpit cover that folded to nearly disappear forward of the windshield, plus two berths and an environmentally friendly Lectra-San beneath the mahogany and holly clad foredeck, made fair weather overnights possible. We specified unusual thicknesses of sound insulation around the aft engine space and an oversize 100 gallon gasoline tank to enable long sprints to be accomplished in relative quiet.

- *A single engine launch likes the engine weight as far aft as possible.*

Note how neatly the cockpit tent folded forward of the windshield and how nicely the ash and mahogany complement each other.

Bondi Tram

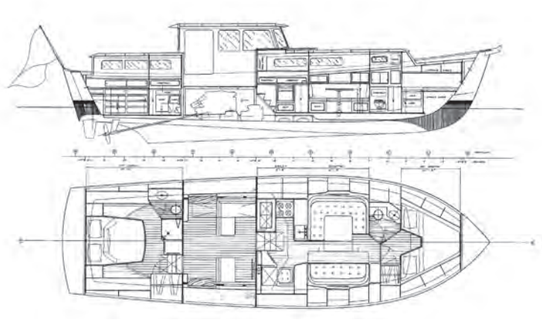
Dimensions	
LOA:	45' 0"
LWL:	41' 3"
Beam:	14' 3½"
Draft:	3' 11"
Displacement, ½ load:	35,000 lbs
Fuel Capacity:	460 gallons
Fresh Water Capacity:	330 gallons
Engine:	Twin Caterpillar 300 hp
Top Speed:	21 knots
Cruise Speed:	16 knots
LBS/HP:	117

BONDI TRAM WAS A CUSTOM 45 FOOTER BUILT at Kanter Yachts. We quite literally never met the customer. Manfred Kanter picked his brains and forwarded on his requirements to us. It was a methodology that was repeated for many of our succeeding Kanter built yachts. It worked because the Kanters understood metal boats much better than the owners did. Manfred knew just how much interior volume would be lost to the metal framework so by the time the brief got to us we didn't have to exercise protracted diplomacy disappointing the owner.

Chris Kanter did the interior décor on all of our Kanter motoryachts. He got the mix of varnished wood versus white panels versus colorful fabric just right on BONDI TRAM. *Photos: Courtesy Kanter Yachts*

The owner required a boat low enough to cruise the canals of Europe and shallow enough to someday cruise the Bahamas. There would be a mast, of course, but it would be capable of hinging down so as to remove itself from the bridge clearance equation. At the same time the boat had to perform well in rough seas since it would be kept in the Channel Islands. The owner was familiar with Manfred Kanter and his crew—he had owned a Dieter Empacher designed/Kanter built sailing yacht for many years before switching to power. *BONDI TRAM* was in many ways a powerboat with a sailboat personality.

The hull had a warped vee bottom with a chine flat that widened considerably as it passed through the last eight feet to the transom. The deadrise at the transom was shallow at 7 degrees, and at the bow it was a steep 65 degrees. If the deep-vee community has one legitimate criticism of this type of bottom it is the lack of parallelism that occurs from bow to stern. Mark Fitzgerald tried to eliminate most, if not all of the twist from amidships to the stern (the area of bottom which is crucial to planing performance). But he retained steeply wedged forward sections for more comfortable running in seas. *BONDI TRAM's* hull planed cleanly at 15 knots though it didn't have a lot of power. The large chine flats were there to help lift the relatively heavy aluminum hull. Unlike a deep vee this type of bottom is less prone to violent rolling when stopped or idling along with seas from abeam.



About as much accommodation as you can cram into a hull. But her profile was still low. The down-angle transmissions helped save a few inches of height.

The interior was laid out for two couples in separate staterooms—one forward and one aft. The idea of an aft cabin is hardly new, but here it was kept low and the superstructure's mass minimized by fitting windows all around. If you can see through it, it's almost like it's not there. The main salon had a large dinette to port for meals and a settee to starboard for relaxing. The galley was "U" shaped making it a bit more secure for meal preparation when it was rough.

- *If you can see through it, it's like it's not there.*

Purity

Dimensions	
LOA:	34' 4"
LWL:	31' 3"
Beam:	11' 3"
Draft:	3' 6"
Displacement, ½ load:	14,000 lbs
Fuel Capacity:	350 gallons
Fresh Water Capacity:	110 gallons
Engine:	Yanmar 350 hp
Top Speed:	23 knots
Cruise Speed:	18 knots
LBS/HP:	40

PURITY *trimmed level at a speed of 20 knots and didn't throw a lot of spray.* *Photo: Art Paine*

PURITY WAS CUSTOM BUILT FOR THE only female customer in 35 years to ever walk through my door. I wonder what it was that kept the fair sex away—was it my ugly puss? I'd have loved to design yachts for other women if they were anything like this one. She was a delight to work with.

PURITY was built using cove-and-bead CoreCell and Vinylester resin. It was an excellent method that resulted in a light and strong hull. CoreCell was the premium quality closed cell foam core at the time. You could buy it in strips that had a cove on one edge and a bead on the other. The strips would lock into each other keeping everything fair until the glue between the strips cured. Then you'd cover the inside and outside surfaces with fiberglass, creating a cored hull that was considerably stronger than one out of a mold—because the laminators would press the glass skins into the core, with serrated rollers. They could visually insure as they applied it that each skin made total contact with the core. When a cored hull is built in a female mold on the other hand, one of the skins of necessity has the opaque core pressed into it, making visual verification of contact impossible.

Which brings us to the subject of cored hulls. I've become suspect of them. Not one-offs like *PURITY* or *VISIONS of JOHANNA* or indeed any built with epoxy resin or the skins pressed onto the core. But the industry uses polyester resin in the skins—a resin that is half as strong and one fourth as adhesive as epoxy. In the early days of cored hulls a layer of saturated mat was placed against the cured outer skin and the core pressed into it before the resin cured. Then sandbags or, in the case of cheaper 'glass shops, wishful thinking was applied to be reasonably sure that there were no voids. Over time core bonding putties were developed that were stickier and thicker than wet mat so as to have better gap filling properties. And vacuum bagging replaced applying weight to suck the core into the putty—if you could get the bag into place before the catalyzed putty cured. Still, cores contribute to the structural strength of the "core sandwich" only when the skins remain firmly attached and the core remains dry. If a skin is ever breached by grounding or was never fully bonded in the first place, or a loosened thru-hull admits water between the skins, all bets are off.

The head was luxurious for such a small boat.

A keyhole bulkhead kept the interior from feeling too cramped.

PURITY's bottom was essentially a scale-down of *WOLF.* The forward sections were steeply veed while the stern had modest deadrise. The variation in deadrise between the forward and aft sections meant that by definition she had a "warped vee" bottom. They were more difficult to sell because nobody liked to buy anything that could be called warped. It just didn't sound right. But they worked just fine because the bow of a planing hull has one job to do and the stern a different one.

- *Laminating a skin to a core is less prone to delamination than laminating a core to a skin.*
- *Be suspect of cored hulls unless they are built by a reliable builder.*
- *One-off cored hulls are inherently more reliable than female molded ones.*
- *Epoxy is roughly twice as strong as polyester and four times more adhesive.*
- *Warped bottoms are fine as long as they're designed by sane minds.*

Wolf 36

Dimensions	
LOA:	36' 0"
LWL:	32' 11"
Beam:	11' 3"
Draft:	3' 6"
Displacement, ½ load:	17,400 lbs
Engines:	Twin 300 – 370 hp Diesels
Speed:	up to 32 knots
LBS/HP:	24 – 29

Hull number one, fitted with twin 420 hp Cummins', teak pilothouse and sliding side windows, running at 26 knots. She could go over 30 at wide open throttles.
Photos: Art Paine

Hull number two—closer to the original express cruiser concept, with a hardtop. She looked a bit like a WOLF *cub, which I liked. Everyone in the industry copied this look but I believe nobody ever made it look prettier.*

THE *WOLF* 36 CLASS WERE BUILT AS A SERIES BY Able Marine and finished to high standards. *PURITY* ran so well that Henry and Ted Cooper thought it made sense to combine a slightly scaled-up *PURITY* hull with *WOLF's* aesthetics. Mark Fitzgerald scaled up *PURITY's* hull to 36 feet and tweaked the lines to better accommodate the twin engines he knew would be coming since at the time the powerboat market was moving headlong in that direction. You'd think fuel was being given away and I wonder today at the psychology that led intelligent people to throw care and our rapidly deteriorating environment to the winds. I think it may have been that they sensed the era of Western dominance of the world's resources was rapidly drawing to a close and they'd best grab a few final years of oil-fueled pleasure before the Chinese and Indians and the rest of the world laid claim to their fair share of what was left. I can foresee a day in the not too distant future when unnecessary consumption of an irreplaceable resource will draw a prison term but we were all blind to such a possibility in 1994.

The *WOLF 36s* were built using Vinylester resin and Kevlar/glass reinforcements over a vacuum bagged CoreCell closed-cell foam core. Vacuum bagging the core made it unlikely (but not impossible) that core-to-skin voids might exist. When we designed the original *WOLF* I hadn't gotten to the point of fully trusting cored laminates for powerboat bottoms given the beating they took. By the time these smaller versions came along so had core bonding putties and vacuum bagging, and the entire hull was designed as a cored sandwich. A foam cored stringer system was used to reinforce the highly stressed bottom panels. All interior bulkheads and cabinetry were fully bonded to the hull so as to contribute to the fullest extent possible to the structural integrity of the hull. Both single and twin engine versions had a long skeg for protection of the bottom (though the skeg sizes differed in the two versions).

The concept of the yacht was to offer lots of outdoor lounging area for sightseeing and fishing, combined with a small but luxurious interior suitable for two or three persons. In many ways it was aimed at the same market as the newly introduced and instantly successful Hinckley Picnic Boat. The *WOLF 36s* were conventionally powered but the advantages of jet drives in lobster-pot strewn Maine waters were not lost on us and in the near future we began to design a series of jetboats that gave the Hinckley company a run for their money.

The interior was divided by a "keyhole" bulkhead with a door or curtain, affording a bit of privacy to those who used the forward cabin. Aft of this was a galley to starboard with a settee to port which could be quickly fitted with a removable dining table. This settee could also be used as a berth for an occasional guest or child. The head was to starboard, and was huge. It could be fitted with a shower curtain giving enough room to take a shower without banging one's elbows. As was true of all Paine/Able collaborations the cabinetry was customized to each owner's taste either by our office or the in-house design department at Able Marine. Upstairs, the bridge deck could be left open or as was done on *PURITY,* fitted with canvaswork to form another private area for dining or sleeping in fair weather, or fully enclosed.

The Able yard stressed luxury in their fit-out with the result that their boats could never be accused of being light in weight, though most owners put in a lot of horsepower which got the LBS/HP down to the mid twenties where a boat really gets up and goes. Mark was looking for a builder who would devote himself to building his designs light—because jet power demanded light displacement if it was to work well and he wanted to take on the legendary Hinckley Picnic Boat. He found what he was looking for only five miles away from our office in Rockland, when he met an ambitious young boatbuilder named Michael York.

Our First Jetboat

York 36

HOME RUN, *the first, single jet boat, was used to commute to an artist's retreat.* *Photos: Jamie Bloomquist*

Dimensions	
LOA:	35' 8"
LWL:	32' 8"
Beam:	11' 8"
Draft:	1' 7"
Displacement, ½ load:	13,600 – 14,000 lbs
Engines:	400 – 700 hp
Prismatic Coefficient:	.73
LBS/HP:	20 – 34

With twin jets JAMBO *could really scoot! A jetboat should ride on top of the water, like this.*

YEARS BEFORE A BOAT WAS EVER BUILT A customer came into the office and offered us the opportunity of a lifetime. He wanted to have some fun designing a boat—the longer it took, the better. He'd fund a new design and then maybe, someday, after he'd had as much fun as possible getting it designed, he might build it. He never did.

Our patron challenged us to break new ground—his boat had to look like nothing that had ever come before. He got started before jet propulsion was reliable enough, at least for him. His boat had to be of very low resistance so it would go really fast with only one engine. In this respect he was twenty years ahead of his time. We worked on this project, slowly but steadily, for three years.

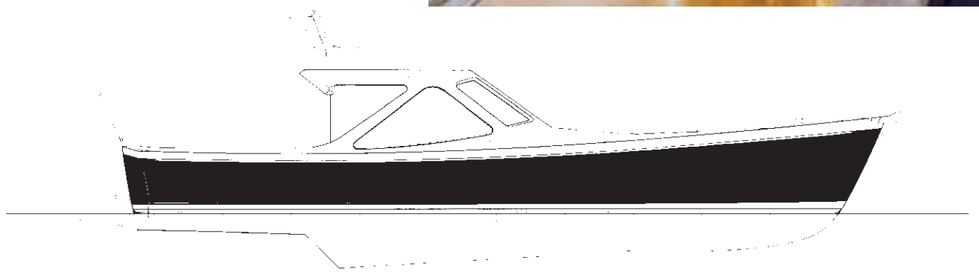
The budget was unlimited so the idea of a scale model came up. Mark would do all of the usual studies to get the weights and centers in the right places, then he'd commit to a hull and build a model. We would test it on the pond across the street from his home. The model ran beautifully, trimmed level and heeled inward in a turn, just as Mark had predicted. The client had had a lot of fun for something like $40,000 but when push came to shove he wasn't quite ready to multiply that figure by ten to scale it up to full size. In the meantime the office learned a lot and had a whole new concept in its portfolio to try to sell to someone else. And the hull was intended to be seriously light, meaning it would be perfect for jet propulsion.

So the model pictured on the next page was not the *YORK 36,* it was our "Project X". But without it the *YORK 36* would never have seen the light of day.

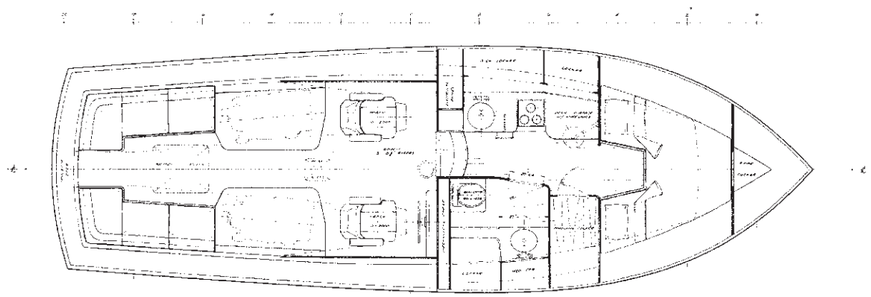
The wife of a famous Maine artist whose work hangs in the Museum of Modern Art got the idea of giving him a new boat for his 80th birthday. The couple liked to escape the throngs of rapturous admirers who hounded him by retreating to an island, and that meant boats. The fellow who drove the boat for her met Michael York, who ran a small boat shop in Rockland. Mike showed him the drawings of Project X and some photos of the model, and just like that he had an order. The clients were tired of stopping to unwind lobster pot lines off the prop of their current lobsterboat commuter and insisted on jet power. Mike knew without asking that this meant a lot more design work but he promised that at least it would look as much like Project X as possible.

Mark knew that jet propulsion changed the dynamics of the hull. The engine/shaft/impeller/reversers combination was heavier and located further aft than a conventional engine/gearbox/shaft and propeller. Add to this the lost buoyancy of the water in the impeller tube and there's a lot more weight in the aft end of the boat. Then you take a column of water moving at very high velocity from beneath the hull and raise it a foot vertically before it is ejected which adds to the propensity to exacerbate trim problems. All of this meant he could not use the former hull but had to design a new one that would marry properly to the jet propulsion. The four yachts that were ultimately built proved to be fast and very pretty alternatives to that other famous jetboat. Every one of these boats was what we call in Maine, WICKED FUN!

Mark Fitzgerald built this test model as part of the design's development. It was powered by a tiny but amazingly powerful model aircraft engine that drove it at the proper scale speed to use it to test steering and trim. The rudder and throttle were radio controlled.



A truly unique look. The model demonstrated and the finished yachts proved, it actually was pretty.



JAMBO, the twin jet version. The interiors of all the boats were similar. The torque tubes that drove the jet drives were toed in like the engines but attached through universal joints to the drives themselves which were parallel to the centerline.

Kanter 62

First Star

Dimensions	
LOA:	62' 2"
LWL:	55' 9"
Beam:	18' 4"
Draft:	5' 10"
Displacement, ½ load:	99,400 lbs
Power:	Lugger 340 hp
Reduction Ratio:	3 : 1
Fuel Tankage:	2,800 US gal
Fresh Water Tankage:	500 US gal
Disp/Length Ratio:	256
Range:	3,100 miles
Maximum Speed:	11 knots
Cruising Speed:	10 knots
LBS/HP:	292

FIRST STAR WAS LAUNCHED IN 2002 FOR A Texas couple. They wanted 3100 mile range so they could take her transatlantic via the Bermuda to the Azores route. She had the standard raised pilothouse configuration, though the interior was naturally tailored to the owners' wishes—the primary justification for expending the time and money to build a custom design. Because of the difficulty of keeping varnish on anything south of the Mason-Dixon Line we were asked to make use of styling features and subtle color variations to achieve an attractive yacht despite the absence of any wood trim.

- *Color can be used, along with massing, line and texture, to make an object attractive.*

The pilothouse looking forward. The door to the side deck and twin helm seats are clearly shown.
Photos: Courtesy Kanter Yachts

FIRST STAR *was an excellent rough water boat. Her maiden voyage was from Ontario to Texas. She looked great without so much as a stick of wood trim.*
Photos: Courtesy Kanter Yachts

FIRST STAR had a round bilged bottom whose turn of the bilge tightened into a chine aft. Mark had learned the advantages of this hull shape when he'd worked for Jack Hargrave years before. The sea hadn't changed in the interim—the reason why hull design is so conservative whether for power or sail. Shapes that worked a century ago still work today and will until the end of time. Hargrave had recognized the fact that the bow of a boat has one job to do and the stern another- whether or not the hull aspired to get up onto a plane. *FIRST STAR* had a single spray rail and a relatively high prismatic coefficient of 0.67. The draft of just 5' – 10" was notably shallow, given the presence of a full length keel. The keel was present to reduce the grounding risk and to dampen the yacht's roll. Her welded aluminum construction made for great strength at a lightish displacement, necessary since she would be powered by a single engine. The 3:1 reduction gearing from engine to shaft speed increased the range since a slow turning propeller is more efficient than a fast one. If fuel prices increase as surely they must then low resistance, low powered designs like this will become increasingly popular.

- *When fuel prices rise, low resistance will trump higher power to get to a given speed.*

The galley looking aft. The owners preferred a clean, modern look. This is how Chris Kanter responded in varnished wood, marble and stainless steel.

FIRST STAR was designed to accommodate only two couples. This resulted in the owners' suite being unusually large. The owner's suite had "his and hers" bathrooms. Between them was a central shower room that also served as an antechamber to the engineroom via a watertight door. This was a common solution to isolating the owners' suite from the noise of the engineroom and one that is unlikely to be improved upon. The engineroom had nearly full standing headroom and the single engine made for easy access to both of its sides. *FIRST STAR* used a Lugger 340 hp main engine and a Northern Lights 20 kw genset.

There were tanks for 2800 gallons of fuel and 500 gallons of fresh water. The tanks were integral, as is common with welded aluminum construction, contributing their own strength to that of the hull and forming a double bottom wherever they occurred. If you think about it, one-sixth of each tank's surrounding cube—the bottom—is already there which lightens the overall construction of the yacht. The day tank, waste tank and gray water tanks were removable since this is after all a boat and on a boat if anything can possibly go wrong, it will. The yacht had transatlantic range if driven at a speed of between 9 and 10 knots, given favorable wind and current conditions. *FIRST STAR* was our first large motoryacht. Mark was able to optimize her two level interior while keeping the profile low thanks to years of experience designing this sort of yacht at the Hargrave office. The success of this design led to his designing four other yachts with similar configurations.

- *Integral tanks contribute to the strength of the hull.*
- *Integral tanks lighten the construction weight of a yacht.*
- *On a boat, if anything can possibly go wrong, it will.*

The owners wanted to showcase their wine collection, hence their "cave" was on open display.

Photos: Courtesy Kanter Yachts

Northern Light

Dimensions

LOA:	66' 2"
LWL:	58' 6"
Beam:	19' 9"
Draft:	6' 6"
Displacement, ½ load:	118,000 lbs
Power:	Lugger 600 hp
Reduction Ratio:	3 : 1
Fuel Tankage:	3,100 US gal
Fresh Water Tankage:	500 US gal
Disp/Length Ratio:	263
Range @ 10 knots:	2,600 miles
Maximum Speed:	12.7 knots
Cruising Speed:	11.5 knots
LBS/HP:	197

THE CLIENT FOR *NORTHERN LIGHT* HAD SEEN the aluminum motoryachts yachts Mark was doing for Kanter customers but wanted to build in New Zealand. By that time I was familiar with the Kiwi boatbuilding scene and we had begun building there with the 80 foot ketch *LEONORE*. I also knew—as did anyone with two brain cells to rub together—that the Kiwi dollar was grossly undervalued. It flies in the face of "informed market theory", but there were planeloads of Northern Hemisphere residents flying down to take advantage of a currency aberration everyone knew couldn't last. You either bought real estate or you built a yacht there and used it until the currencies came back into equilibrium. If I'd had any money I would have done the same. But I was a yacht designer—not the sort of job where one accumulates the sort of wealth to play these games.

Our pilothouse motoryachts looked much the same. The raised pilothouse was protected behind a Portuguese bridge. Aft of the pilothouse was the main salon and a good sized cockpit, and there were full side decks on both sides for passage fore and aft without entering the cabin. This might seem obvious but by the year 2000 some of our competitors were eliminating the side decks on one or both sides of the yacht, making the cabin that much wider. This worked wonders for the living space but made it entertaining to say the least to bring such a vessel into a dock. The one-siders explained this away by pointing out that most motoryachts had a preferred docking side, never placing the other side next to the dock. Many of these yachts were in truth waterfront real estate that never got moved from year to year and for these the wider main cabin made eminent good sense. Our office always prided itself on its aesthetic prowess and in our biased opinion the presence of the side decks as a "negative space" plus a lot of artistic effort made our standard model among the best looking of this type of motoryacht available. This alone justified the side decks in our view.

NORTHERN LIGHT *was built for a past commodore of the New York Yacht Club. He and his family cruised her from New York to Greenland and through Europe and the Mediterranean.*
Photo: Chris Lewis

NORTHERN LIGHT had a similar hull to *FIRST STAR,* with a prismatic coefficient of 0.647. The owner was talking about taking the iceberg strewn northern route via Greenland and Iceland to Europe. So we added an area of 10mm bottom plating forward to make the chance of an occasional collision with ice survivable. The flattened stern shape was dictated by the desirability of reducing the tendency to roll so as to make the yacht more comfortable at sea. It also increased fuel efficiency and range, because a hull that rolls less easily relies less upon its stabilizers, reducing their drag.

- *A hull that rolls less easily relies less upon its stabilizers, reducing drag.*

There were full headroom accommodations beneath the pilothouse and into the bow. The interior arrangements were customized for the original owner, of course. *NORTHERN LIGHT* had four double cabins and three heads—two with separate shower stalls. This was one more cabin than is usual in a pilothouse motoryacht of this size, as there was a dedicated crew cabin. The full width owner's cabin had ensuite access to its private head, as did the guest cabin forward. The owners' suite could be accessed either from the pilothouse or by a separate stairway from the main salon, reducing the claustrophobic feeling that can result from a single access below. This became another of my bugaboos, and quite a few of our customers chose to have us design their motoryacht rather than buying a stock one for a lot less money primarily because we had figured out how to work in two stairways. What if there were a fire in the forward stairway—and it was the only stairway?

- *Two stairways in a motoryacht is a huge advantage, especially for claustrophobic owners.*

Main Salon looking forward. There's a circular stairway behind the curved kneewall.

The owners' double faced sideways which gave an opening port where the headboard would have been.

The main salon looking aft.

We worked a clever slide-out pantry under a stairway.
Photos: Chris Lewis

The engineroom was full of machinery, but beautifully laid out for access to it all.

The engineroom beneath the salon was large with easy access to machinery. It had full headroom for a person like me who is vertically challenged. *NORTHERN LIGHT* had a Lugger 600 horsepower main engine and a Lugger LP 445T 130 horsepower wing engine that would keep you going if the main engine were down for service. There was also a Northern Lights 20kw genset. She had sufficient tankage to get across the Atlantic by either of two routes. The northern route refueled at Greenland and Iceland, the southern route the Azores and Bermuda. The owner actually pulled it off with his young family as crew, spending a fascinating year in Europe.

NORTHERN LIGHT was built under the management of John Vitali at Diverse, Ltd. in Auckland. On the strength of the beautiful job he did on *NORTHERN LIGHT* he went on to build the larger *ADAGIO,* our final motoryacht design.

Kanter 74

Levant

Dimensions

LOA:	74' 0"
LWL:	66' 2"
Beam:	19' 9"
Draft:	5' 4"
Displacement, ½ load:	140,000 lbs
Power:	Twin Catepillar 340 hp
Reduction Ratio:	2 : 1
Fuel Tankage:	4,800 US gal
Fresh Water Tankage:	500 US gal
Disp/Length Ratio:	216
Range @ 10 knots:	2,800 miles
Maximum Speed:	11.5 knots
Cruising Speed:	9.5 knots
LBS/HP:	206

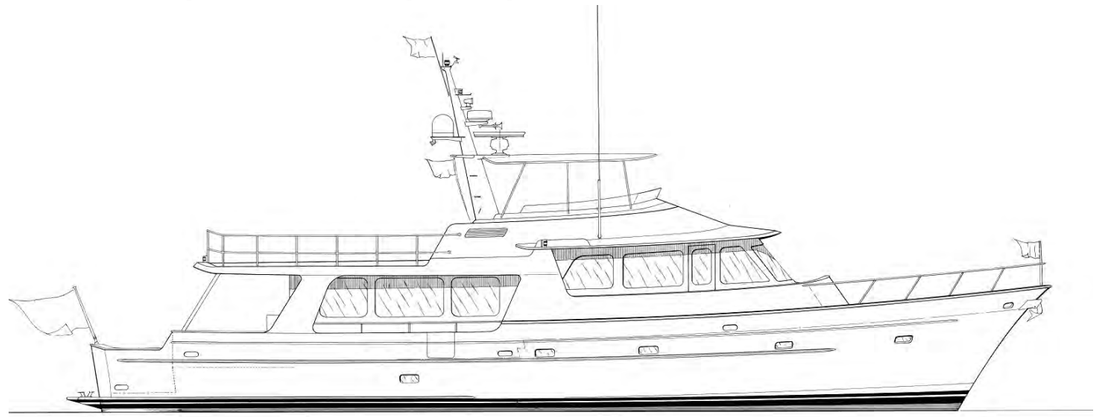
HERE WE GO AGAIN. ONCE YOU GET A design right the first time—and it's a struggle—people seek you out in your comfortable niche. Our fifth motorboat for Kanter Yachts, the 74 foot *LEVANT,* for a Swiss client, was launched in 2004. The design began as a 68 footer but was stretched to 74 feet as the owner discovered in increments how much each additional foot would gain him.

The aesthetics just got better as the yacht increased in length owing to the convenient fact that humans don't get taller as their boats get longer. This same hull would have worked fine at 68 feet but the owner wanted to expand the cockpit. Lengthening the design kept making the boat look better so he heard no complaints from his architects.

- *Lengthening a given design just keeps making it look better.*

The accommodations were for two couples plus a third cabin for a paid crew. The owner's suite had a large washroom to port, full bath with a toilet and bidet to starboard (they were Swiss after all—I was tempted to ask what you use the damn thing for but didn't want to embarrass myself)—and centrally located shower room. The other cabins, including the crew's, had ensuite access to their heads. I'd have used the word "private" but everything sounds better in French. Like the previous designs the engineroom was accessed via a watertight door from the shower room. This configuration uses the heads and shower as a sound buffer between the engine room and the accommodations.

Photo: Courtesy Kanter Yachts



Lengthening the cockpit and using a second break in the sheerline lowered the perceived profile and made her more interesting to look at.

The pilothouse looking to starboard. The ladder to the flybridge became our standard design.

The heavy moldings around the worktops and kickspaces everywhere lent an aura of luxury to the ambience.

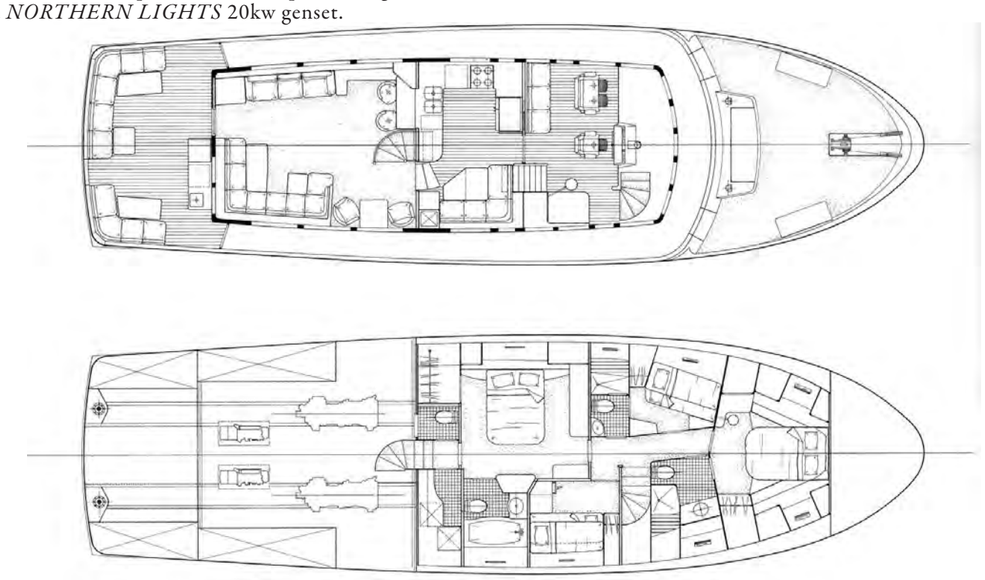
The engineroom had good access to all parts of the engines.

The main salon looking forward.

Photos: Courtesy Kanter Yachts

The engine room had full standing headroom between the engines and even decent access to their outer sides—a reason to build the largest motoryacht you can if it has two engines. On smaller designs, access to the outside of the engines can be diabolically difficult. *LEVANT* used twin Caterpillar C12 340 hp main engines and a *NORTHERN LIGHTS* 20kw genset.

- *Judge any twin engine design by how easy it is to get at the outside of the engines.*



52' Canal Clearance Yacht

Troll

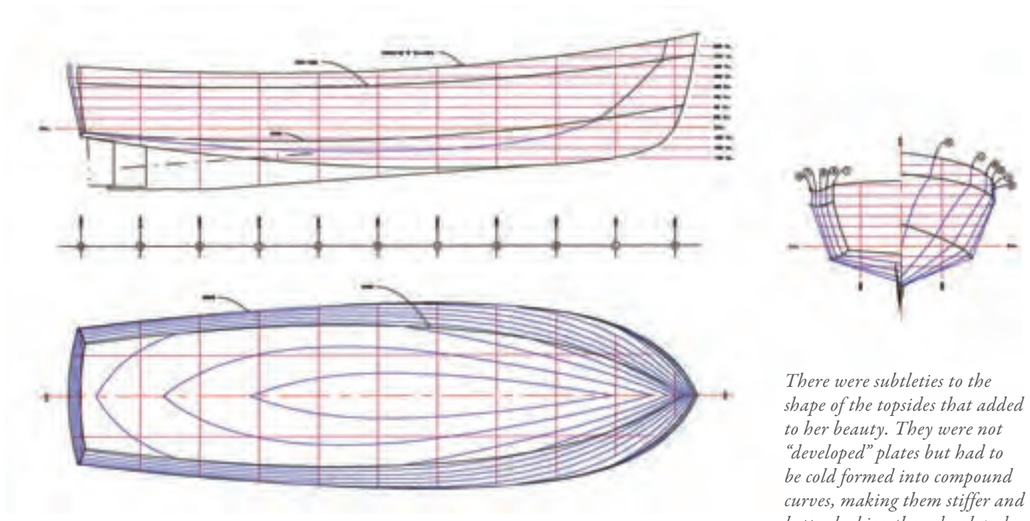
Dimensions	
LOA:	52' 0"
LWL:	50' 0"
Beam:	14' 11"
Draft:	5' 3"
Displacement, ½ load:	54,500 lbs
Fuel Capacity:	460 gallons
Fresh Water Capacity:	330 gallons
Engine:	Twin Perkins 75 hp
Top Speed:	8.5 knots
Cruise Speed:	8.0 knots
LBS/HP:	363

GÉRARD AND CATHERINE BACHY WERE repeat customers. Early in my career they built and owned *CAPTAIN SMITH*—one of my first sailing yacht designs (see page 236). In her they cruised for many years around the Mediterranean and across the Atlantic. They decided to build a new strongly built aluminum cruiser of shallow draft with bridge clearance for the larger European canals. They also envisioned crossing the Med so wanted nothing to compromise her seaworthiness.

TROLL *cruising Europe in late 2007. With her mast lowered she could squeeze beneath the bridges over Europe's larger canals.*

The moderate displacement hull had a warped vee bottom. The deadrise at the transom was shallow at 5 degrees. This raised the propeller so it wouldn't be likely to re-dredge too many ancient channels. Amidships the deadrise was 20 degrees. The topsides were not flat in section. More cheaply built metal trawlers use the so-called "developed" shape that permits sheets of metal to be wrapped over the frames without any hammering. I'd always preferred compound curved shapes which to my eye are more beautiful and managed to convince Gérard and Catherine to go this route. An added advantage is the superior stiffness that a compound curve imparts.

- *Compound curved plating is stiffer than "developed" plating.*

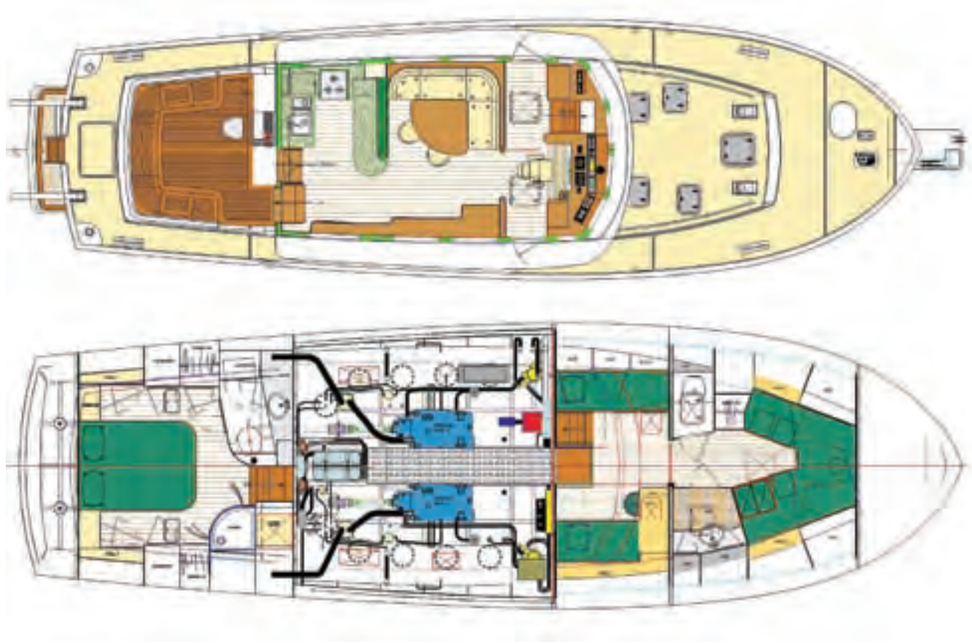


There were subtleties to the shape of the topsides that added to her beauty. They were not "developed" plates but had to be cold formed into compound curves, making them stiffer and better looking than developed shapes would have been.

The interior was laid out for the owners and their guests to live as far apart as possible at opposite ends of the hull. An aft cabin was hardly new, but here it was kept low enough for a cockpit to be put atop it without negating acceptable bridge clearance. Gérard knew from experience that you're most comfortable judging the bridge clearance with your head out in the air, so there was an outside steering station at the front of the cockpit from which you peered just over the pilothouse top.

There was extensive tankage in wing tanks abreast the engine room as well as a central tank forward. The twin 75 horsepower Perkins diesels were big-block engines detuned to a commercial rating at 2400 RPM. They should last longer than anyone reading this book. Although neither a bow thruster nor active stabilizers were fitted when she was built, provision was made for the possible addition of these features by welding in the necessary bow tube and midships thickening plates and the specification of a power takeoff on the starboard engine gearbox.

The main salon had a large L-shaped dinette to port and a cupboard to starboard. There was a navigation station adjacent the helm for piloting using a paper chart. The Galley was "U" shaped and that much more secure for use at sea. The central salon was surrounded by large windows for natural lighting, had access to the side decks port and starboard, and overhead hatches for additional light and ventilation. Forward of the main salon and down five steps was a "ship's office" with sea berths port and starboard plus two desks for reading or computing. As I write this the Bachys are maintaining a wonderful blog of their adventures (www.bachy.net) just as they did in their sailboat.



Looking forward through her large pilothouse windows.

Looking aft at the stairway up to the cockpit, trunk down to the aft cabin, and the galley.

Her neat engine room. Her engines were small so access to their outer sides was easy.

Lyman-Morse Jet 38

Annie Rose

Dimensions	
LOA:	38' 4"
LWL:	35' 7"
Beam:	12' 2"
Draft:	2' 3"
Displacement, ½ load:	20,590 lbs
Disp/L Ratio:	204
Power:	Yanmar 6CX-GTE2 500 hp
Jet:	Hamilton 362
Top Speed:	23 knots
Cruise Speed:	20 knots
LBS/HP:	41

ANNIE ROSE *had a torpedo stern with a slot for the dinghy.* *Photo: Billy Black*

ANNIE ROSE WAS A SINGLE JET CRUISER. SHE was a one-off, but two other clients came along later and ordered near-sisterships. Fiberglass is flexible stuff and although the subsequent yachts differed significantly from *ANNIE ROSE* it was possible to remove parts of the original molds and graft on others—mostly in the stern—so that a single set of tooling was able to serve three owners with different ideas.

The client had liked the looks of *PURITY* and the *ABLE 36,* but he preferred the shoal draft and lobster-buoy shedding qualities of a jet. He chose a single large engine rather than two small ones to achieve his target speed of a bit over twenty-three knots. The design of jet hulls was advancing rapidly as designers leapfrogged each other in pursuit of the optimum shape, weight distribution, disposition of lifting strakes, and solutions to the handling problems.

The essential jetboat conundrum had become well known amongst its aficionados. Like outboard powered hulls, the thrust was located aft of the resistance—an inherently unstable situation. Outboard motor lower units had evolved into effectively rudder-like devices, but jets provided all of the thrust and none of the finlike appendage of an outboard motor. Our insight on the Lyman Morse 38s was to move the jet nozzle forward of the stern so that some of the resistance was exerted aft of the nozzle. It definitely advanced the science a little.

- *Move the thrust forward of some of the resistance if you can on a jetboat.*

The deck design was an attempt to address a vexing dilemma—what to do with the dinghy? The cockpit flowed seamlessly into the stern platform at the same level with beautifully varnished transom gates that could close off the transition. When running with the dinghy aboard the gates could be opened and the dinghy hauled right into the cockpit. With this configuration any of the popular dinghies could be carried, indeed even a small centerboard sailboat like a Laser could be accommodated, and swimming for the whole family was made more fun.

This book is about lessons and the lesson on this page is about SCRIMP. SCRIMP is an acronym for Seeman (the inventor) Composite Resin Infusion Molding Process. It is a proprietary vacuum bagging process in which the outer layer of fiberglass (or carbon fiber or other reinforcing fabrics), the core, and the inner reinforcement layer are all laid into the mold dry. A vacuum bag is applied, and the catalyzed resin pulled into the laminate with a vacuum. Its advantages are many. It is environmentally responsible in that the styrene that is given off in the curing process is not released into the atmosphere but captured. The placement of the various bolts of fabric can be done with high precision as the laminators are not forced to rush to get it into place before the resin cures. SCRIMP laminates are less likely to delaminate than other cored laminates. The reason is that there are holes pre-drilled throughout the core in order to conduct resin from the inside to the outside of the core in the impregnation process-otherwise only the inside skin would get wet-out. When the resin in these thousands of holes cures it forms "nails" that key the skins to the core.

The sole detriment to SCRIMP construction is its weight. A Scrimped laminate tends to be heavier than the same laminate, hand applied. Those thousands of nails of cured resin are not weightless. For this reason we always had Lyman-Morse SCRIMP a sample piece of our designed laminate which we would weigh for use in our weight estimate.

- *A Scrimp laminate is heavier than the alternatives.*

The design of torpedo sterns is extremely difficult and you seldom see it done right. I thought we did okay on ANNIE ROSE though my reader must always be the judge. You want to minimize the bulk of the buttresses in the corners. We did this by lowering the freeboard aft and making the incised area—what you might call the transom—as wide as possible. There has to be compound curvature, i.e. the corners cannot just be portions of cylinders but must bulge outward like a segment of a football.

ANNIE ROSE was luxuriously fitted out as you can see from the photos. Luxury is weight, and weight the enemy of performance. In crude round numbers, a displacement to horsepower ratio of around 40 gets you a cruising speed of 20 knots and a ratio of 25 pushes this up to 30. Had the embellishments been skimpier she would have gone faster, though in Maine you can think just so fast when you're dodging the next lobster pot. Twenty knots is as fast as my 65 year old brain can think.

- *Luxury is directly proportional to weight, and inversely proportional to speed.*

ANNIE ROSE vindicated our theory concerning thrust and resistance. She was directionally stable and not difficult at all to steer. She was our first Lyman-Morse build and her standard of finish convinced us to add them to our list of recommended builders. We went back to them for four more boats.

The steering station had twin Stidd seats.

The workmanship was gorgeous and the fit-out luxurious.
Photos: Billy Black

York 42 Twin Jet Cruiser

Rangitiki

Dimensions	
LOA:	42' 6"
LWL:	38' 0"
Beam:	13' 8"
Draft:	2' 7"
Displacement, ½ load:	32,500 lbs
Fuel Capacity:	450 gal
Fresh Water Capacity:	125 gal
Power:	Twin Yanmar 440 hp
Top Speed:	27 knots
Cruise Speed:	24 knots
LBS/HP:	37

RANGITIKI *was launched a year later than planned in 2006. She ran smoothly and exuded quality.*

Photo: Jamie Bloomquist

THE CLIENTS HAD HEARD ABOUT Michael York and his *YORK 36* jetboats. They wanted to fish occasionally but didn't like the sportfisherman look. They knew they wanted a jetboat, wanted Mark Fitzgerald to design it, and thought it made sense to have it built by somebody who knew his work. The hull was an expansion of the *YORK 36.* Mark had gotten a feel for the challenges of jet power and at a certain point a designer gains the confidence to start inventing—if the patron is willing to take the attendant risks. The problem with jetboats is that they can be squirrely. They want to do anything but go in a straight line. Picture holding a fire hose anywhere but at the nozzle and you get a good idea of the problem.

One solution was twin jets. Two fire hoses linked together are a lot less squirrely than one. At 42 feet this was easily achievable. Fins right at the transom also help. Both the Hinckley Company and Mark had experimented with combinations of fins on jetboats that work like the feathers at the aft end of an arrow.

- *Fins at the transom help stabilize a jetboat.*

Anytime you create lift (in this case sideways force) you also create drag. Wouldn't it be nice if you could make the fin go away when you didn't need it? And that's what Mark did—he designed a carbon fiber fin that retracted into a trunk like a sailboat centerboard. With twin jets this was easy because he could place a single very large fin right on the vessel's centerline between the nozzles. Sometimes seemingly great ideas bite you in the butt, but this one worked every bit as well as expected. The fin was hydraulically activated by pushing a button and you'd only put down enough fin as conditions warranted—in shoal water you'd pull it up entirely.

The deck styling included wraparound windows, which were of bent glass to eliminate "flat reflections". A large flybridge, beautifully rounded lockers, and steps from the cockpit to the side decks illustrate the attention to detail that went into the deck. Of course details like this took more time than anyone could have anticipated.

Mike had his own workers build the mockup right in the hull.

Jane Plachter taught us about "presentation"—you hide the toilet so it's the last thing you see.

The gold plated fixtures looked wonderful against the blue Corian.

RANGITIKI was powered by twin jets. The sculpted steps made it easy to move from the deck to the cockpit. The builder, Michael York of Rockland, Maine, was located very near our office, so one of the staff was often there helping out with minor details. You can't find any imperfections. If you want a perfect custom yacht, choose a builder the architect can easily get to and offer him whatever it takes to stay involved until the yacht is launched.

Photo: Jamie Bloomquist

Early on in the design we drew a preliminary interior and the owners asked, "How can you do even better?" We gave them our two standard answers to this question—hire Jane Plachter, and build a mockup. Jane didn't change the way anything worked but she came up with the octagon in the middle and like everything she ever did for us, it transfixed the whole concept. Mike knew by then he had caring customers and began trying to hire carpenters who'd elevate his shop to a whole new level of finish quality. But workers like this don't come along every day; meanwhile time flew by. Eventually he was able to hire the right workers and they created a first class varnished teak interior.

Mike paid a lot of attention to sound suppression. The many details that go into this besides hefty amounts of sound insulation could fill another book. His efforts reduced the normal din to 72 decibels at top speed and less at cruise. Her twin Yanmar 440 diesels yielded a top speed of 27 knots. There was sufficient deadrise forward to permit running at this speed even in choppy conditions. The water jets were KaMeWa FF310s.

The yacht was steered with coordinated Rolls Royce "VectorStick" electronic directional controls for easier maneuvering in tight quarters, mitigating a common jetboat problem.

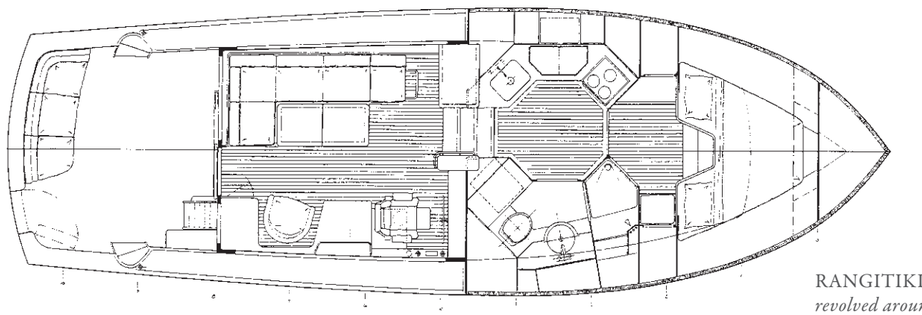
RANGITIKI was delivered to her owners a full year late. The owners were apoplectic and Mike was apologetic. But he'd simply refused to cut quality to get it done any faster. All good things come with time. Rangitiki was good—as good as boats get. And she came with time—a lot more of it than the owners were prepared for. Two years later that lost year was forgotten when the owners realized they owned one of the finest jetboats anywhere.

- *All good things come with time.*

Note the rounded corners on the console—and everywhere else. I loved the one-eighth of a softball shaped block of teak on all the outside corners.

I got to feeling fat and sedentary at age 62. So when Mike called and asked me to carve the foundry pattern for the bow cleats I cut my billing rate in half and spent two weeks in his shop making the pattern for these beauties. Sometimes the only way for an architect to get a detail right is to do it himself.

- *Sometimes the only way for an architect to get a detail right is to do it himself.*



RANGITIKI'S *interior revolved around Jane Plachter's clever octagon.*

Lyman-Morse 58 Motorsailer

Ranger

Dimensions

LOA:	57' 10"
LWL:	52' 1"
Beam:	14' 2"
Draft:	4' 6"
Displacement, ½ load:	48,900 lbs
Sail Area (100% Foretriangle):	831 sq ft
Fuel Capacity:	1050 gal
Fresh Water Capacity:	340 gal
Main Engine:	Deere 4045DFM 105 hp
Reduction:	3.74 : 1
Speed:	10 knots
LBS/HP:	466

JUST BECAUSE YOU SURVIVE FORTY YEARS designing yachts doesn't mean you're always right. I was sure this above all our powerboat designs would be the one that would spawn a whole fleet of sisterships that would keep us busy for years. Instead, the phone never rang. Still, I'll bet if you're reading these words a decade after they were written folks will be clamoring to own yachts like this, if they own yachts at all.

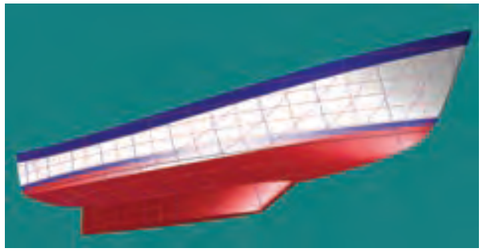
The primary reason why ocean voyaging has traditionally been done under sail rather than power, is motion. The presence of sails and a keel, working as motion dampers in their respective fluids, makes a sailboat less prone to rolling than a powerboat. The downside is that sailboats spend their lives heeling at a 20 degree angle, are slow in light winds and motionless in none. This owner didn't care about going faster than a sailboat. He just wanted to cover a lot of ocean without burning much fuel. He knew 10 knots was a reasonable target for a 58 foot boat. Despite the fact that he had once been a yacht designer himself in the John Alden office, he commissioned us to put his ideas on paper. We thought he made manifest a concept of wonderful potential for the future. Mark my words, the day will come when he will be proved right—there's just so much oil left under the ground!

RANGER was not just a motoryacht with a steadying sail; she was the embodiment of the term motorsailer. She was designed and optimized for motorsailing, which is what the majority of cruising sailors do these days anyway. Sailors know what a boost in speed is made just by having the engine ticking over slowly when under sail, or the sails up and drawing when under power. *RANGER* was intended to always have the engine running, so that the yacht traveled at a given speed (10 knots) at all times, no matter the state of the wind. Thus she made good 240 nautical miles per day, or over 1000 statute miles every four days, no matter what. While a speed of 11.1 knots was achieved at wide open throttle, the engine speed was later governed to prevent its use at over 2300 rpm so as to maximize the life of the engine. And the world's oil reserves.

The construction was of welded aluminum with a hard chine. Like *TROLL* her plates were not flat in any section. Various boatyards contacted during the bidding process insured us that the increased cost of the very slight plate hammering was trivial in comparison to the strength (and superior aesthetics) gained. *RANGER* was finished in raw aluminum and sandblasted to look as commercial as possible so as not to upset the natives—just as Steve Dashew would have recommended.

Since *RANGER's* draft had to be severely limited to cruise the Bahamas and the French canals, the keel was made very long and shallow. Given a reasonable thickness ratio this made a true NACA foil keel wide enough to fit within its volume something quite large, something like the engine. With the engine so low it served as ballast, the prop-shaft ended up just about horizontal, and the engineroom wound up with an area of standing headroom forward of the engine. Much of the fuel tankage fitted into the keel forward and aft of the engine space, as did a small amount of lead ballast. During sea trials we learned that *RANGER* would sail at around six knots on any point of sail from a beam reach to a dead run. She couldn't go to windward, but neither could a Spanish galleon and hundreds of them got to where they were going just fine for centuries.

Unless you do something to stop it, a powerboat will roll like a bucket at sea. The solutions for the oceangoing powerboat are either active fin stabilizers



The computer renderings give a good idea of the low resistance hull shape. The hull was narrow with straight buttock lines. The keel was long, wide, and shallow. You could stand down in the keel which created an area of headroom forward of the engine.

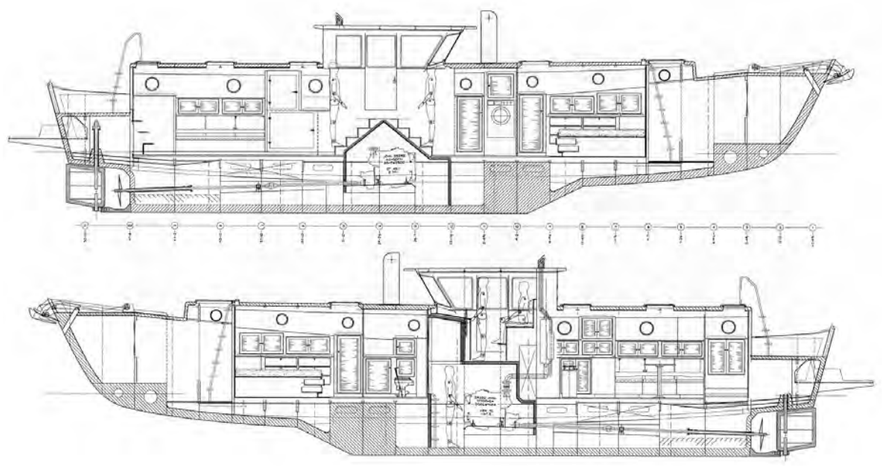
Ed Joy designed RANGER *with me looking over his shoulder, perhaps nudging a little. The fin stabilizers were very effective at reducing rolling.*

or hydrodynamic stabilizers ("fish") trailed in the water from poles. Since one driving force behind *RANGER* was economical running its owner chose the less expensive of the two solutions. The A-frame poles used to trail the "fish" were also used as sheeting points for the jib (or jibs), making a virtue of their necessity. Many offshore voyages follow the traditional trade wind routes, which puts the prevailing wind on the stern. In this situation the two-ply outer jib could be separated port and starboard, doubling the area of sail exposed to the wind. These jibs were sheeted to the ends of the steadying poles so as to project as large an area as possible.

In fixing the sail versus power aspects of the design the stability of the yacht had to be dealt with. If too stable it would roll rapidly, and if less stable it would heel excessively when motorsailing on anything shy of a beam reach. Computer studies yielded a stability figure that insured a comfortable roll period in those instances when the roll stabilizers might be ineffective (when stopped in a seaway for instance) yet sufficient to keep the yacht from heeling more than ten degrees in most wind strengths when the sails would be used. The intact stability was such that the yacht will recover from a 120 degree knockdown—a very impressive figure that is comparable to pure sailing craft and far in excess of the 70 to 90 degree recovery angle common among conventional motor yachts.

The interior fit-out was relatively simple and optimized for two couple cruising. Like *TROLL* the forward and aft cabins were widely separated by the midship pilothouse. Forward raking windows mimicked those of the offshore fishermen and the effect upon forward visibility was favorable, especially when it was rough.

RANGER's mast was stepped in a tabernacle so that once across the Atlantic she could be used for a year or two in the French canals. Her owner is thrilled with her and the day will come when she will be looked at as a yacht before her time.



Lyman-Morse Twin Jet 38

Maestro

Dimensions	
LOA:	38' 10"
LWL:	35' 5"
Beam:	12' 2"
Draft:	2' 5"
Displacement, ½ load:	24,500 lbs
Power:	(2) Yanmar 6LY2A 440 hp
Jets:	Hamilton 292
Disp/Length Ratio:	248
Top Speed:	34 knots
Cruising Speed:	26 knots
LBS/HP:	28

MAESTRO *had no exterior wood trim. With her stainless steel windshield and fittings she looked more modern than* ANNIE ROSE *and required virtually no maintenance.* *Photo: Billy Black*

MAESTRO'S OWNER HAD LIKED *ANNIE ROSE* but wanted more speed and a traditional transom stern. With the bottom shape as a given more speed meant either building the yacht much lighter or significantly increasing horsepower. To get her weight per horsepower ratio down to 28 with the same 500 hp engine she would have to have weighed 14000 pounds—an impossibility. To exceed 30 knots at this horsepower her fiberglass construction would have had to be replaced by epoxy and carbon fiber. And the luxuries would have had to be severely curtailed. It's not easy to talk people who can afford a custom yacht into giving up their stone countertops! The only alternative was to fit twin engines and strive to keep her as light as possible.

MAESTRO used twin engines to increase her horsepower from *ANNIE ROSE's* 500 to a total of 880. Speed is not directly proportional to horsepower. First of all the two engines with their doubling of the heavy jet drives and their entrained water columns as well as the increased fuel required to power them increase weight at the same time they increase motive force. Adding engines to increase speed is somewhat like a

MAESTRO flew right along thanks to plenty of power. Her styling in gray paint and stainless steel was crisp and modern.

Photo: Billy Black

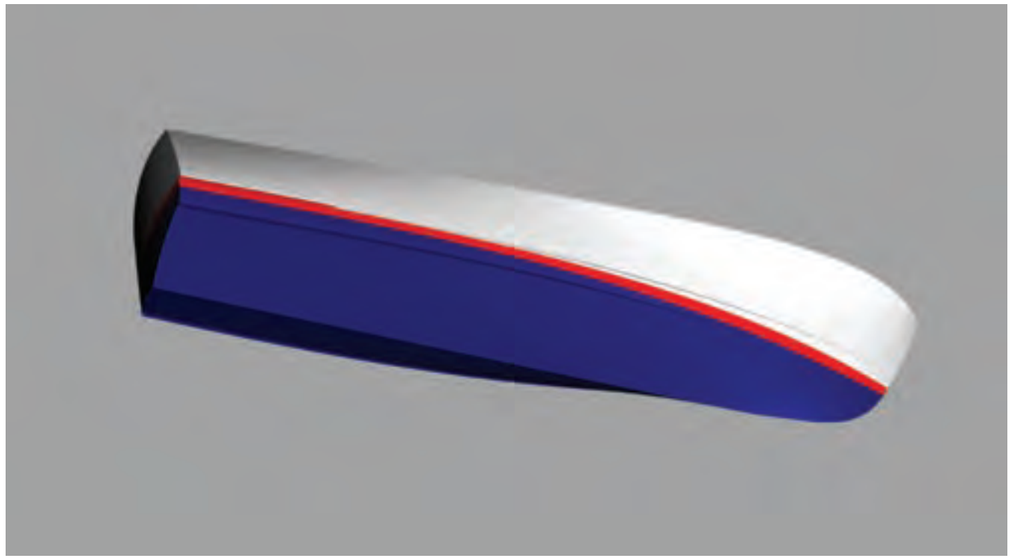
dog's chasing its tail in this respect. Also, resistance is not directly but exponentially proportional to speed. A yacht's resistance at 40 knots is not double that at 20 knots; it is (approximately) four times greater.

MAESTRO was delightfully fast at 34 knots, though, and she possessed a stark, simple beauty.

- *Adding engines to increase speed is like a dog's chasing its tail.*

The stainless steel windshield maximized the glass area. Stainless steel is very strong so a little of it goes a long way, structurally.

MAESTRO *had a very high standard of interior finish.*
Photos: Billy Black



MAESTRO *and her sisters had two longitudinal strakes. One was a narrow conventional chine strake where the bottom met the topsides. The other was a discontinuity in the topsides a few inches above it. Strakes like this deflect spray downward and exert a lifting force to help the boat dance above the surface. They also add strength. Take a flat piece of paper and see how floppy it is. Then put a zigzag crease in the same sheet and you'll see how much stiffer it is in one direction.*

York 34

Snarleyow

Dimensions

LOA:	33' 10"
LWL:	28' 11"
Beam:	10' 10"
Draft:	2' 10"
Displacement, ½ load:	12,800 lbs
Fuel Capacity:	220 gal
Fresh Water Capacity:	40gal
Engines:	Cummins QSB5.9 – 370 hp at 3000 rpm
Top Speed:	24 knots
Cruise Speed:	21 knots
LBS/HP:	35

SNARLEYOW *getting her bottom wet for the first time.*

THE CLIENT FOR THE YORK 34 WAS WELL known in our office—this was his third design from Paine Yacht Design. He had sailed in New England all his life, even took his *APOGEE 50 WESTRI* to Antarctica and lived to tell the tale (see page 146). Thousands of nautical miles and more than a few years further along he decided it was time to simplify his life with a motorboat. He looked at many available stock boats of this size and test drove the most appealing ones. In the end he preferred the flexibility and fun of custom building his own boat. The single screw powered *SNARLEYOW* was the result.

New technology was the motivating force and a source of fascination for the client. Using previous models like the *YORK 42, YORK 36* and *LYMAN-MORSE 40s* as guidance, he knew the 34 would not be overly experimental. The double chined hull with a deep spray rail provided good performance and a dry ride when running in choppy Buzzards Bay. The boat had a single Cummins QSB5.9 diesel. There was a full-length keel with a metal grounding bar to protect the running gear. The propeller tucked up into a shallow hull tunnel to keep the draft just under three feet, which was no mean feat.

The interior provided overnight accommodations for two. Antarctica would not be the destination, but two-hundred mile runs up into Maine and back every summer were. The boat was self sufficient for that period of time. *SNARLEYOW's* interior, though small, was definitely adequate—even bordering on luxurious. Small spaces are the most difficult to design and detail, but Michael York put as much thought and workmanship into this, his smallest cruising boat, as he did his 42 footer. The owner reasoned, if you're going to own something, you might as well own something really nice, and Michael York agreed.

The propeller tunnel shows clearly. You could run aground and wade safely ashore.

She had every convenience you'd expect on a forty footer.

Privacy would not be an issue on a boat for two persons so no door was needed.

Lyman-Morse 40 Twin Jet Express

Aujourd'hui

With essentially the same horsepower as MAESTRO, AUJOURD'HUI *achieved similar performance while reverting to the look of* ANNIE ROSE.

Photos: Billy Black

Dimensions	
LOA:	39' 10"
LWL:	35' 5"
Beam:	12' 2"
Draft:	2' 5"
Displacement, ½ load:	24,500 lbs
Disp/L Ratio:	248
Power:	(2) Cummins 435 hp
Jets:	Hamilton 292
Top Speed:	34 knots
Cruising Speed:	26 knots
LBS/HP:	28

VIVRE POUR *AUJOURD'HUI!* THE OWNERS of *AUJOURD'HUI* aspired, as did the prospective owners of every vessel in this book, to live for today. *AUJOURD'HUI* mimicked *ANNIE ROSE's* torpedo stern and large bathing platform, and fitted the most sumptuous interior of the three including an etched glass, illuminated piece of artwork where a main bulkhead would normally be. Her twin 435 hp Cummins diesels gave her the ability to put the miles quickly behind her. She was our first boat to utilize Blue Arrow technology that allowed "mouse" control while docking. Her owners were spared the uncertainties of experimentation thanks to her predecessors, yet by working with custom yacht designers were able to create something entirely of their own making.

She had twin Stidd seats and a custom mahogany console.

The illuminated glass bulkhead created l'ambiance d'aujourd'hui.

72' Expedition Yacht

Adagio

Dimensions	
LOA:	72' 2"
LWL:	68' 6"
Beam:	63' 9"
Draft:	5' 3"
Displacement, ½ load:	145,600 lbs
Fuel Capacity:	2850 gal
Fresh Water Capacity:	685 gal
Main Engine:	Twin Cat C12 – 340 hp at 1800 rpm
Top Speed:	12.7 knots
LBS/HP:	213

The newly completed ADAGIO leaving her berth in Auckland, New Zealand.

Photo: Courtesy John Vitali

THE DESIGN OF *ADAGIO* WAS begun in West Palm Beach, Florida in the spring of 2006. By that time I was stepping back from my role as chief salesman for the office, sending instead either Mark Fitzgerald or Ed Joy to spend those lonely nights in too affordable hotels far from home. The prospective owner, an Australian, sent his representative to Florida to meet with Mark Fitzgerald. He was your typical Aussie and his first words to Mark were, "This boat has got to be good, safe, reliable, simple, and completely clear of bullshit! The owner has a keen eye for art, aesthetics and quality. It's a big challenge...think you're up to it, mate?"

The owner's representative had some experience with Hargrave yachts in his years doing boatyard management in Australia. He and the owner had agreed that the typical Hargrave design was without question the right type. But Jack Hargrave had passed away so a protégé was the best and only alternative. Mark had started his design career in 1977 at Hargrave's office just blocks away from where this first ADAGIO briefing took place. Now he was being asked to prove what he had learned from the master.

ADAGIO at anchor in New Zealand, where she was built. The slide-out cockpit awning was one of the many custom features her designers were asked to invent. We even designed her sailing tender, a miniature *HERRESHOFF 12½* with a removable keel so she wouldn't stick out like a sore thumb. That's her up on the boat deck in her tight-fitting gray cover. You'll see her in the next chapter.

Photo: John Vitale

After some discussion and investigation of the cost/benefit/quality equation it was decided to build *ADAGIO* in New Zealand. John Vitali of Diverse Projects, NZ, had built *NORTHERN LIGHT* in New Zealand for an equally demanding client. The yacht had come close to what this owner was looking for and so John was hired.

John Vitali wasn't technically a yacht builder, but a manager of people. He'd put thousands of ocean miles under his keel racing maxi yachts. I suppose you'd call his job description "Project Manager." He built yachts by coordinating a team of subcontractors. John understood the ocean in its placid and angry moods. John also understood that every person on a team was key to its success. Assembling an all-star team of boatbuilding talent was easier for John in New Zealand than in Australia and despite the legendary Rugby rivalry that was fine with the owner.

ADAGIO's design was driven by the intention to provide the owner and his crew the amenities, comfort, and safety typically found on much larger yachts. Many yacht owners build the largest yacht their finances allow. But this owner wanted the proper size yacht for the mission, not one so large its design could be pulled off easily. This isn't to say the design was the smallest yacht possible; it was the right size.

The owner cared very much about quality. Build things right, burn as little fuel as possible, of course. But he was concerned about quality of life meaning spending one's time 'living'—not cleaning glass and polishing paint 'til it hurt. This owner would not be happy if his crew became slaves to his boat. He recognized that crewing a boat is a demanding job and that the vessel had to be kept up to the highest standards. But this task must also be manageable, leaving time for relaxation and appreciation for where you might be at the moment. He knew that a happy crew led inexorably to a happy owner.

Mark had designed quite a few successful yachts at more or less this length, in my studio and many years earlier at Jack Hargrave's. He discerned that 72 feet (22 meters) was the right length to fit a large exterior aft deck with accommodations stuffed beneath it, and for the boat to have the visual proportions that would be pleasing to the eye. It is true that a heavy displacement long-range cruiser can be a bulky vessel, but Mark contended it could be beautiful if done right. He sketched it up, and to my eye it was, as he thought, right.

The rendering was pretty accurate. We added some hull windows but otherwise this is how she looked. By this time in naval architectural history the state of the CAD drafting art used solids modeling software that made the design photo-realistic. But it lacked the human element, making the designs look like ghost ships. I hired an artist (Steve Davis) to paste in some examples of our species, using Photoshop, which made the rendering much more realistic and fun to look at.

Her performance and seakeeping were ensured by a hull theory that was rooted back in the Hargrave office decades ago. Like Mark's previous motoryachts *ADAGIO* had a round-bilged forward bottom transitioning to a chine aft, with a spray step in the hull side to keep green water and spray down where it belonged. The bow had convex forward sections as I'd always been taught was right, but relatively narrow entry angles. Hargrave developed this shape back in 1960 with the early Burger Yachts. The ocean hadn't changed and never will. There was no need to change the shape.

Cruising speeds of 10.5 to 11.5 knots could be reliably achieved, even in heavy going. Large rudders powered by Kobelt steering gear gave plenty of directional control even at slow speed. I've never designed a rudder that was too big. Tankage was provided for 2854 U.S. gallons of fuel and 686 gallons of fresh water.

- *I've never designed a rudder that was too big.*

The accommodations were set up for three couples and two crew—more ambitious by one cabin than the previous motoryachts shown in this book. The owners, of course, enjoyed a full width amidships cabin with our by now obligatory two entries. It had a bathroom to port and an entry vestibule with wine chiller and additional storage to starboard. There was a forward cabin with a centerline double berth. The aft crew cabin offered a double berth with a single bunk above, and had a private head and shower. We think that unlike many yachts with the crew cabin aft beneath the cockpit, this one looked okay, appropriate, right. The salon was sized to lounge four to eight people without their feeling too far apart or too close together. A flat screen TV was concealed below the counter to starboard with other audio equipment to port. Electric window blinds could be lowered to blackout the room and create a darkened shipboard theater. Opening windows allowed natural ventilation, and when the weather required that they be closed, a forced ventilation system brought outside air to the interior.

The interior styling was crisp, modern and rectilinear.
Photos: Courtesy Robinson Marine Interiors

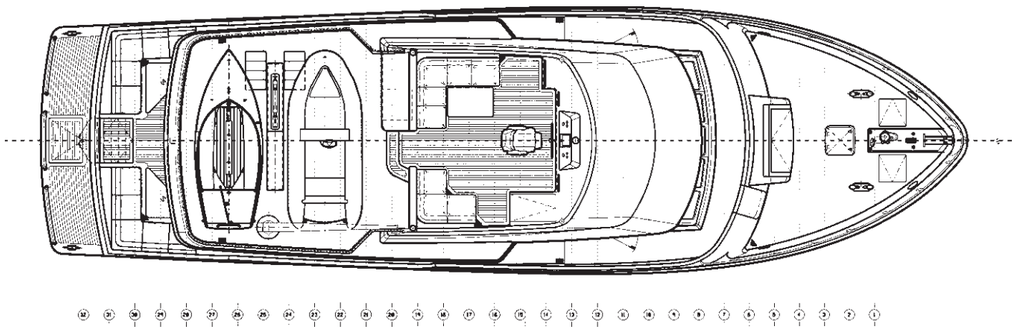
This treatment only works when the surface finishes are absolutely perfect.

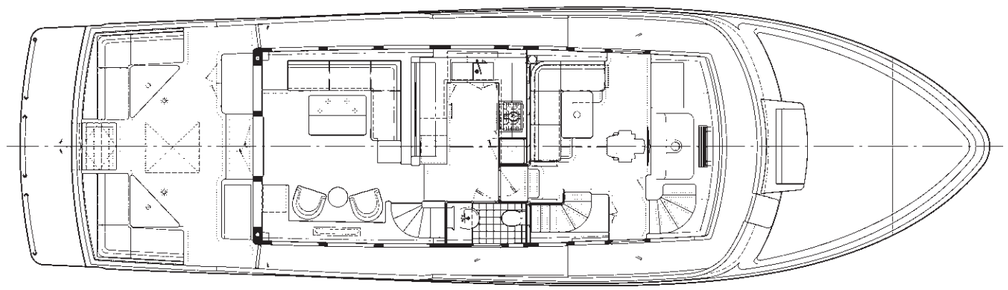
The galley was located at the center of gyration of the vessel. At sea the crew could actually get their food down even in heavy going. It had the finest appliances and modcons available, of course. Its central location also provided easy delivery aft to the salon and forward to the pilothouse. A nice feature was a disappearing screen in the aft galley counter that could be raised and lowered to provide visual privacy to the salon should the owners wish.

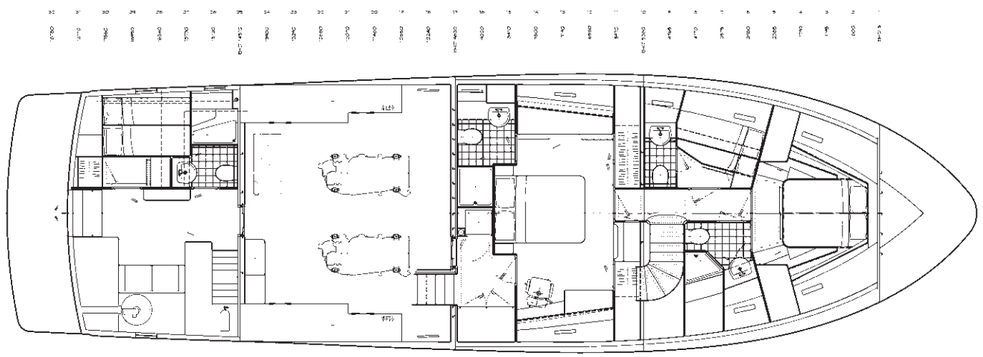
The pilothouse was the command and control center and shipboard office. The foundation for navigation was the Simrad GB-60 glass bridge with dual displays. A raised settee provided good visibility forward when underway and a comfortable lounge with working desk when moored. All computer and communication hookups were available through the dinette table central post.

The general layout with central engine room allowed inspection through the boat in an efficient way. The engineroom could be accessed through a watertight door either via the amidships vestibule or directly from the aft crew's quarters. With a complete PLC monitoring system in both the pilothouse and captain's cabin, checking systems and operational safety was immediate and simple. A 24 volt 1500 amp-hour service battery bank was located under the aft scuttle stairway for DC power. An Onan 27 Kw genset provided AC power. All combinations from 50 or 60 Hz shoreside sources could be brought on line with the ASEA power conversion unit.

The flying bridge had port and starboard lounges, a storage unit with added freezers for long term cruising and a fixed awning overhead for shade. The boat deck was home to two watercraft. The primary RIB was 14' 6" in length and waterjet powered. There was also a custom-built Chuck Paine designed 14 foot ballasted keel sailing craft based on the popular Herreshoff 12½. It had a removable keel that stored in a deck locker in order to reduce the visual impact of its height when stowed on the boat deck, and an unstayed carbon fiber rig. (See *REDWING 10½* on page 244).







The owner and his wife have planned to range from the South Pacific to the west coast of South America, and on to Alaska. For the crew the trip is meant to provide a high quality of life on a very well found, beautiful, and comfortable vessel. The name *ADAGIO* means music played slowly with feeling. I'd like to believe that life is being played this way aboard my design *ADAGIO.*

Spirit of Tradition

CHAPTER NINE

Spirit of Tradition

AS I REFLECT ON MY LIFE'S WORK IT OCCURS to me that the yachts I most enjoyed designing fell into the Spirit of Tradition category. So I've saved that most delicious course of this banquet for last. Just as sailboats are more challenging to design than motorboats because there are so many more factors involved, (stability, keel, rig balance, strength against rigging and keel loads, and most important of all, beauty)—traditional designs are most fascinating of all because they add the element of historical research. The designer must balance on the fine edge between the natural drive to "do something better" and appropriate respect for those who might have been even more masterly pliers of our ancient trade.

Historically based designs spanned the entire history of Paine Yacht Design. In fact the first design I ever did on my own was not *FRANCES* but a Bermuda Sloop that never got built—C. W. Paine Yacht Design Inc's design number 01. Design number 01's owner abandoned the enterprise after I had spent a fair sum of his money working on it, but changed course and commissioned a 42 foot fiberglass hulled cutter named *HARRY TABARD* instead.

The process of designing Spirit of Tradition yachts always began with a patron, of course. Never put pen to paper without payment, remember? The patron would bring in an older design that was invariably a thing of beauty and say, "Make it look like that." And I would—but I do have an ego after all and life as a creative person is about making the world just that little bit better. So I and my mates would apply academic research with respect to hydrofoils, new materials that had emerged since the proffered design was completed, computerized ways to predict all manner of performance factors to four decimal places, and most importantly the collective talents of a room full of artists who had converged under my tutelage to my nautical version of Santa's workshop in Camden, Maine. And if we did our job well we'd nudge the history of yacht design forward just a smidgeon.

The term "Spirit of Tradition" applies, loosely, to sailing yachts that race in certain regattas in New England and Europe. Essentially if you have a yacht built of wood—including the most modern techniques of gluing wood and foam and carbon fiber together in the shape of a sailboat—and the race organizers accept your application—you have a Spirit of Tradition yacht. In some instances the requirement for a wood hull is winked at if the yacht looks right, and for this reason I have included in this chapter one fiberglass and one aluminum yacht that I think belong here. What these yachts have in common is an effort to emulate and if possible advance a form that follows the function that the sea alone imposes upon a sailing yacht. If vertical cabin sides enable opening ports to function better and they remain the best means of ventilating a cabin on the open sea then we will be using vertical cabin sides in the year 3000. If a sheerline that is high at the bow and low in the waist marries most closely to the shape that the generated wavetrain assumes along the side of a hull then it will stand the test of time and today's straight sheerlines pass into oblivion. If a raked stem consumes the least energy responding to the buoyancy of an oncoming wave then the vertical profile we see today will vanish as soon as the handicap formula that favors it is replaced by a more sensible one. If the seated human body expects to encounter a seatback when it leans backward, then yachts will in the fullness of time have cockpit coamings as traditional yachts always have.

Some may scoff that the designs in the following pages are "old fashioned." But fashion is just that, and if it is whimsical or merely an attempt to come up with something "new" because what is "old" has ceased to sell, it will ultimately fail. Fashion goes in cycles and eventually circles back to shapes dictated by the immutable forces of nature. I'll tell you this—we'll be catching our breaths at the sight of J-class yachts with their preposterous rigs and long overhangs at bow and stern and low freeboard and flat, teak clad decks in a thousand years because in all that time the sea will never fail to conform itself to their shape in a way that moves it through the interface between water and air with the least possible resistance.

It took me all of my life; but at the end of my career I had learned how little I really needed to contribute to the art of yacht design. In coming to understand that which was understood years before my time by men with names like Alden and Herreshoff and Crocker and Rhodes, I believe I created my finest work. At the very least, it was in creating the designs illustrated in the final pages of this book that I obtained the greatest satisfaction in my many years designing yachts. These designs were my finest hour.

42' Cruising Cutter

Harry Tabard

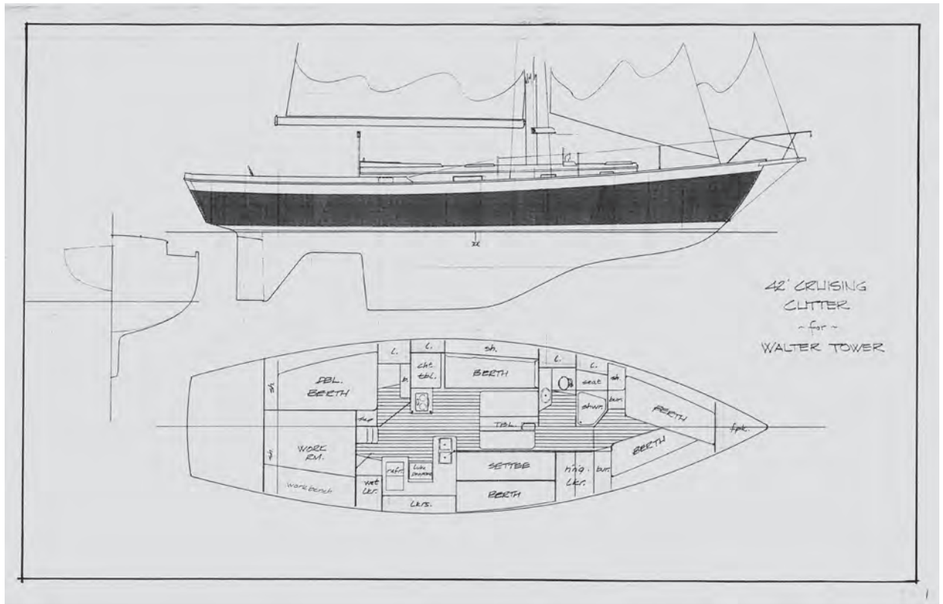
Dimensions	
LOA:	42' 1.5"
LWL:	33' 10"
Beam:	12' 8"
Draft:	5' 5"
Displacement, ½ load:	24,749 lbs
Ballast: (lead):	9,200 lbs
Sail Area (100% Foretriangle):	911 sq ft
Disp/L Ratio:	285
Fresh Water Capacity:	685 gal
Sail Area/Disp Ratio:	17.16

HARRY TABARD *was loosely based upon the work of John Alden. Here she's reaching along smartly off of Tenants Harbor Maine.*

ONCE MORE I MUST ASK MY READER TO TRAVEL back in time, to 1978 when I was first beginning to grab a foothold in the career that became my life's work. My first design that would fall into the Spirit of Tradition category—had it been invented at the time—would be *HARRY TABARD.* She was designed in 1979 for Walter and June Tower, a Boston couple who lived across the street from the man whose daughter I was dating who would become my father-in-law. This was my first attempt at emulating one of the legendary naval architects. I occasionally wonder why the clients didn't simply bring in a stock design by Alden or Winslow or Rhodes and have me convert it to fiberglass construction. I'd spent years studying every book I could find by the great designers who preceded me. Now I was being given a chance to see if I'd learned anything.

My take on the hull shape was to push it towards the distinguishable canoe body and separate appendages that were just becoming the accepted ideal for good performance. The topside shape was strictly dictated by the aesthetics. But the underbody was all mine, and I pared away any vestiges of wineglass shape. The keel was a long fin, with a separate rudder supported by a big skeg. This was almost sacrilege at the time. It was only a few years earlier that a designer named Ted Brewer had the temerity to challenge the sanctity of the continuous keel profile by chipping away tenuously at the wetted surface with what he termed the "Brewer Bite." The one concession I didn't get from Walter that I would have preferred was outside ballast—I didn't yet have the authority to insist on it as I would have a decade later. At least the ballast was lead rather than much cheaper iron, so she ended up more than stiff enough as you can discern from the photos.

I was still working alone when I designed *HARRY.* And still far from able to earn a living solely by designing yachts. So as soon as the drawings were done and I was once again unemployed I went to work for *HARRY'S* builder as a boat carpenter. It's not a bad thing to design a boat and then see whether the drawings tell the builder everything he needs to know, because you *are* the builder.



The preliminary sketch I did to sell HARRY TABARD.

- *Work as a boat builder and you'll learn what your drawings need to show him.*

When you're the new hire at a boatyard they always give you a s--t job to see if you'll show up for work the next day. I'll never forget the one I was given. HARRY was to have a fiberglassed shower stall. This is a great idea for the owners of the boat—there's nothing more impervious to freshwater nor easier to keep clean than a shower stall that is lined with fiberglass like a tub, even to its rounded corners. But someone has to sand all of that raw fiberglass smooth, and that poor bastard ended up to be me. So in I went with a disc grinder and a particle mask. I remember when I was a kid there was a "joke shop" in our town and one of the jokes they sold was "itching powder". Sanding out that shower stall I discovered where they get it from.

That grating let the heat from the stove pass through into the main cabin.

The coal stove was centrally located.

Head and separate shower to port, plus a very large veeberth.

There's something indefinably magical about a traditional interior when it's done right, as it was on *HARRY.* Like a centuries old London pub or gentleman's club, it seems to welcome you in and put its arms around you and make you feel all gooshy inside. At 42 feet there was enough volume to be quite comfortable, even when sailing offshore with lots of other bodies around. The coal fired stove was centrally located, making it a focal point for cruises up the Labrador coast which is where *HARRY* seemed habitually to point her nose. The plywood deck was teak clad and surrounded by unusually high bulwarks. They gave a real feeling of security, though of course their weight reduced the performance somewhat. All of the portholes were opening and located on vertical house sides so they let in light and air but not a lot of spray. Having a true wood house her house front was vertical too, making possible a couple of opening ports facing forward. Some people criticize these calling them gun ports, but with them open the whole interior was blasted with fresh air which can be a real blessing when it's hot.

Walter Tower will contend to his dying breath that *HARRY* was the finest yacht ever built. But I'm a yacht designer and capable of learning something in over thirty years of work. What would I change if I had it to do over again?

I'd vee the forward sections a bit more, and at the same time narrow the entry angles a degree or two. The midship section is still as close to perfect as I can conjure, so no change there. Likewise the stern sections—don't fix it if it ain't broke. The most telling improvement would be to the keel. *HARRY* had a long, shallow NACA 00 foil fin keel with inside ballast. A Paine Keel with outside ballast would lower the center of gravity markedly, making the yacht that much faster. I'd now use a laminar flow foil section- something I usually avoided on cruising designs since they are not helmed to perfection by rock stars; indeed they are often helmed by Otto the Pilot rather than the human hand. But there was sufficient lateral area here to compensate for a more critical NACA 64 section. These few tweaks would enable a modern *HARRY TABARD* to point a few degrees closer to the wind on each tack which can add up to days off a long passage if the wind blows from the wrong direction. Still, for a first effort in a new genre *HARRY* contributed to the trajectory of my career because she satisfied the one overriding objective of a custom design—she was immensely pleasing to her owner.

What else would I change? I'd take the image of Harry Tabard (the innkeeper in Chaucer's Canterbury Tales) off the sail.

A very traditional look—but she could really go on a reach! The sail emblem was the owners' idea—another battle lost by the architect!

38' Cruising Cutter

Captain Smith

A scaled down HARRY TABARD *built in aluminum.*

Dimensions	
LOA:	38' 5"
LWL:	30' 6"
Beam:	11' 9"
Draft:	4' 9"
Displacement, ½ load:	19,282 lbs
Ballast (lead):	8,170 lbs
Sail Area (100% Foretriangle):	753 sq ft
Disp/L Ratio:	303
Sail Area/Disp Ratio:	16.35

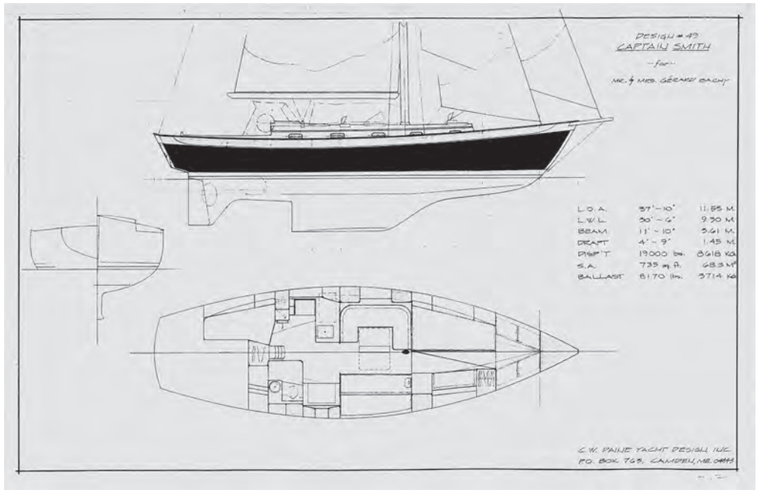
BY 1980 I WAS BEGINNING TO LEARN HOW TO PROMOTE my little business. At that time print was the only news medium that counted in the sport of yachting. I was writing regularly for Cruising World Magazine and irregularly for a few others. Naturally they wanted their contributing editors to appear to be experts so they were happy to publish any design by one of their star writers. I would send them glossy reproducibles of the major drawings, then photos of each yacht after the boat was launched. It was great publicity, and it *was free.*

- *Send reductions of the drawings and photos of finished designs to the magazines.*

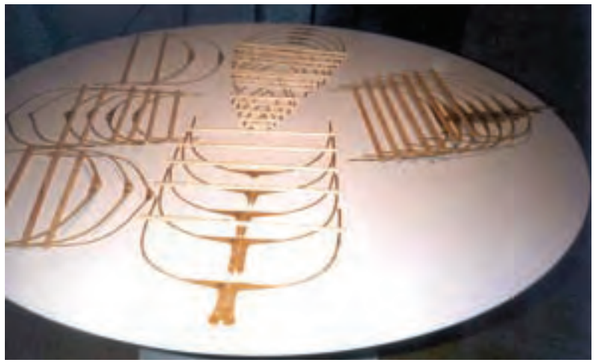
Gérard and Catherine Bachy of France saw the articles on *HARRY TABARD* and inquired about something just a bit smaller. I zipped off my quick preliminary sketch and back came a retainer check—it was that easy.

This book is about the lessons I learned from designing yachts. One lesson I learned from this one was about Socialism. We Americans are taught that socialism is some sort of evil. Give them an inch of socialism and they'll take a mile of communism, right? Gérard worked at CERN, the vast underground nuclear research facility on the French-Swiss border. France had a policy at the time that if your business could in any way make use of a new technology called CAD (Computer Aided Drafting) you could access a national CAD system paid for by the taxpayers of France—but only if it was French. This was before CAD software was close to being available for purchase in the United States—only our military had access to it.

Gérard taught me what could be done with CAD since it is he who, in his spare time, drew all of the



The preliminary sketch for CAPTAIN SMITH.



The model that Gérard Bachy built using the French national CAD system.

CAPTAIN SMITH *taking shape.*

The finished interior.

structural drawings for his own yacht. Then to prove that they all fit perfectly together he built the model you see in these photos. Only a decade later could Paine Yacht Design finally obtain from our own Free Enterprise System anything approaching the productivity tool that France offered businesses who wanted it free. Which proved to me that socialism—when practised by a country that believes in it and knows how to keep it from running amok—can give its businesses a huge competitive advantage.

CAPTAIN SMITH was essentially a scaled down *HARRY TABARD.* The only real difference was that she had a Scheel Keel. At the time I was designing Scheel Keels as a subcontractor for Henry Scheel, and it was generally recognized to be the best bulbed keel yet contrived. I wasn't all that sure about its shape, but it did get most of the ballast in a very voluminous bulb so Scheel Keel equipped yachts stood up well to their sail.

CAPTAIN SMITH was built of aluminum by META, in Tartare, France. Gérard and Catherine sailed *CAPTAIN SMITH* for twenty years and came back to us for the aluminum motor cruiser *TROLL*.

Because Gérard had CAD and I didn't, and he was skilled at boat engineering himself, he commissioned only a partial design. The handover point was where the structural drawings began. I did calculations of the required section modulus of each of the structural members, and Gérard took over from there. He kept an intriguing website and wrote a book about his "Atlantic Circle" entitled Le Voyage de Captain Smith. I challenge anyone to read this website and not aspire to buy a small sailboat and use it to explore the oceanic world—at least if you can read French.

43' Cutter

Anasazi

Dimensions	
LOA:	42' 9"
LWL:	33' 7"
Beam:	12' 5"
Draft:	6' 0"
Displacement, ½ load:	29,489 lbs
Ballast (lead):	11,000 lbs
Sail Area (100% Foretriangle):	1101 sq ft
Disp/L Ratio:	356
Sail Area/Disp Ratio:	18.56

The three jibs were authentic but proved to be a nuisance and were replaced by two. The fully battened mainsail was a bit of an oxymoron. But look at her go! *Photo: Maura Rogers*

THE CLIENTS WERE LIFELONG ADMIRERS OF John Alden's designs for heavy displacement, full keel yachts, whose aesthetics began the design process. Having owned a carvel planked wooden yacht for many years they wanted to preserve the insulating qualities and the "feel" of a wooden yacht. But their previous yacht essentially sunk out from under them. As a result they were not immune to the advantage of eliminating the seams that translate into leaks as the years go by, and the fastenings which turn to dust as they lose their zinc. I designed their WEST system epoxy cold molded wooden cutter *ANASAZI* in 1992. She was built by Cape Cod builder Damian McLaughlin, Jr. The design emphasized high strength, a comfortable motion at sea, and impressively good sailing performance for such a heavy yacht. The hull was 1¼ inch thick laminated Douglas fir in four layers. Not only is such a hull very strong but it can be lived aboard even in stormy conditions while remaining reasonably dry, warm and quiet thanks to the insulating qualities of the wood hull.

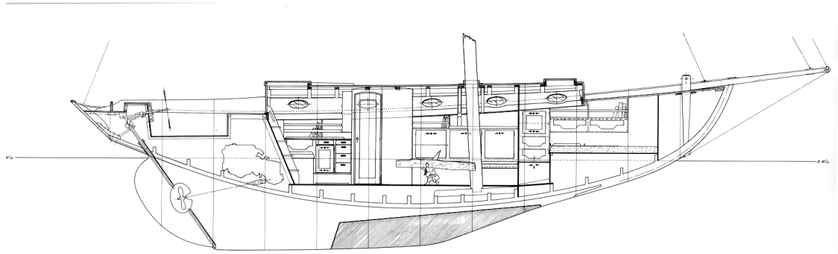
Tradition was strictly adhered to in every possible respect—we knew enough not to mess with something that had been perfected over the course of many years. The steering gear was a machined bronze assemblage from Lunenburg Foundry in Nova Scotia that had its origins aboard fishing schooners that you would have seen in Captains Courageous. The mast and boom were hollow four-stave Douglas fir sections built by Basil Day of Thomaston, Maine—one of the last masters of a vanishing art now sadly gone to that boatbuilding shop in the sky. Her standing rigging was galvanized plow steel with hand spliced eyes, about as old fashioned as it gets. The anchors were oversized reminders of a bygone era that paid no attention to weight reduction but were capable of remaining firmly attached to Mother Earth in really nasty conditions.

This design illustrates my still young design studio's willingness to take on interesting projects not necessarily aimed at pushing the performance envelope. Though as a bonus this thing with its super tall rig (SA/DISP of 18.46) went like hell once you got it going. We paid attention to the owners' wishes to design a yacht which replicated the reassuring characteristics of older yachts without imposing our own egos too strongly into the matter. The only aspect of this hull that would distinguish it from an older John Alden design would be the absence of a garboard radius. We scoured the East Coast for suppliers and artisans capable of replicating "obsolete" spars, fittings and sub-assemblies, using the telephone and word-of-mouth. This was years before you could locate these items with ease using the Internet. In the end the owner came up with a virtually unknown builder who was capable, thanks to minimal overheads, of building a lot of boat for a very reasonable cost.

ANASAZI has covered tens of thousands of miles and the process of having her designed and built has been documented in Gary Schwarzman's book, "The Architect's Apprentice".

The owner gives his launching day speech.

As traditional as yacht interiors get.



Another Mark Fitzgerald drawing. Who's that little guy in the main cabin?

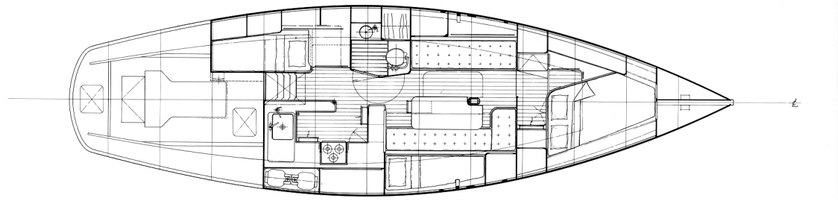
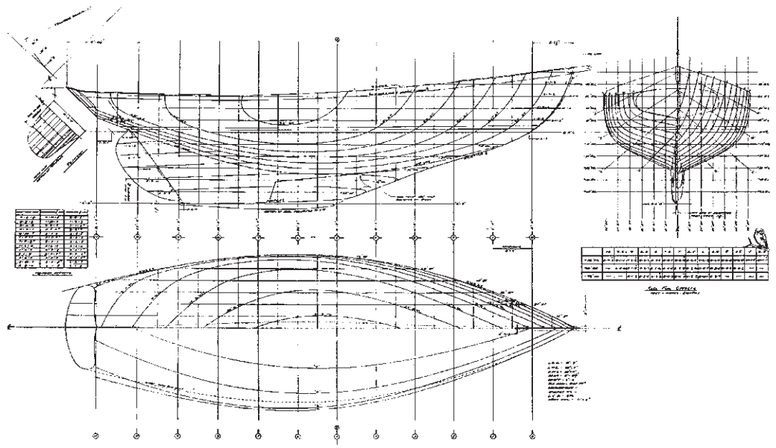


Photo: Maura Rogers



The only "modern" element to these lines is the absence of a garboard radius, which improved the performance and made the cold molded construction a little easier.

An Interpretation of the Herreshoff "Fish"

Pisces 21

The first PISCES 21, SERENDIPITY, *beating to windward on a blustery fall day.*

THE *PISCES* 21 IS OUR ADAPTATION OF THE famous Herreshoff FISH. The original FISH was Nat Herreshoff 's direct scale-up of his famous H 12 ½. She is built in both fiberglass and cold-molded wood by Classic Boat Shop in Bernard, Maine. We completed the design in the year 2000. There have been near replicas of the FISH before...this is but the latest interpretation of the classic Herreshoff design. These small yachts are finished to the very highest standard. They are among the finest daysailer / weekenders on the coast of Maine or anywhere else.

Variations from the Nathaniel Herreshoff's original FISH design were subtle and very carefully considered. When you start with perfection it's folly to change much, and we wanted *PISCES* to be accepted for racing in existing FISH fleets.

PETUNIA, *Chuck's beloved Herreshoff 12 ½ built in 1937. Chuck has devoted 40 years of his life to restoring her. When Chuck talks to* PETUNIA *he tells her he hopes she'll grow up to be a* PISCES 21.

Dimensions	
LOA:	20' 9"
LWL:	16' 3"
Beam:	7' 2"
Draft:	2' 11"
Displacement, ½ load:	3,250 lbs
Sail Area (100% Foretriangle):	265 sq ft

She carries very little weather helm.
Photos: Courtesy Classic Boat Shop

The keel was made slightly more cutaway forward. The ballast ingot was lengthened and its top surface lowered to lower the VCG. Its streamlines are a slightly altered NACA foil—more efficient, dare I say, than the foil Nat used, which he thought right 'cause it resembled the lines of a fish. Many of the boats have been fitted with carbon fiber masts which markedly increases their stability. Still, like the original FISH, they have big rigs and reward a bit of experience with stimulating performance. Classic Boat Shop had built 50 of their lovely *PISCES* by 20016.

- *When you start with perfection don't change much.*

The PISCES *is much larger but intended to behave much like a Herreshoff 12 ½. With her proportionately larger sailplan she's a lot faster in light airs. But you do have to know when to reef!*

They have a lovely bow profile.

We designed a gaff rig for the PISCES *in 2006 for racing at Seawanica Corinthian Yacht Club.*

The PISCES *has a big sailplan, so she can ghost along in very little wind.*

This one has a teak deck and an inboard engine.

Launching day. *Photos: Courtesy Classic Boat Shop*

44' Cold Molded Cutter

Gusto

Dimensions	
LOA:	43' 8"
LWL:	36' 1"
Beam:	13' 7"
Draft:	5' 9"
Displacement, ½ load:	28,500 lbs
Ballast (lead):	11,500 lbs
Sail Area (100% Foretriangle):	953 sq ft
Disp/L Ratio:	269
Sail Area/Disp Ratio:	16.45

Note the pointed front to the raised deck, the sinuous shape of the upper edge of the windscreen, the elliptical hull windows disguised by the painted wale stripe...yacht design is ART! *Photo: Art Paine*

GUSTO WAS A TRADITIONALLY STYLED CUTTER BUILT in cold molded wood. She was the first of three designs that we ultimately built at French & Webb in Belfast, Maine. My office engineered the construction for epoxy saturated cold molded wood construction just as I believe Sam Crocker or John Alden would have done had the technology been available in their time. The interior and deck details were meant to evoke the feeling of the beginning of the past century. Given a reasonable amount of maintenance by their owners, I'm pretty sure cold molded yachts will outlast all other methods of construction. Most important to this owner and myself were the feel and sound of the yacht when she moved through the sea—the quiet splish and splash of a heavily built wood hull and a shape that goes through the water like a loaded freight train.

We got the opportunity to design *GUSTO* somewhat by chance. Years before, the owner had been having steering problems with his 30 foot wooden cutter and hired us to fix them. Long after I'd forgotten having done this little job he sauntered into my office in Camden. He asked me which of my designs would be my own choice for a retirement cruiser. At that point I think the Morris 42 was at the top of my list but he was intrigued with the idea of building a wooden boat. I tried to interest him in *EXPANNIE,* my scaled-up *ANNIE* (see page 246), but at 36 feet it wasn't close to big enough to accommodate his lanky frame.

He needed something much larger. Fourty-four feet made for a true sea boat, with full headroom throughout for his 6' 2" height. He liked the Sam Crocker style raised deck, which steps down two thirds of the way back from the bow. But there wouldn't have been enough headroom if the forward deck were simply left flush, so we invented a truly unique cabin that swept aft in graceful curves

GUSTO was a big, oceangoing boat but she could be easily steered with a tiller. The blue wale stripe was dark enough to make her hull ports almost disappear. All of her deck hatches were on the centerline so they could safely be left open at sea. It was blowing 25 knots when this photo was taken but she's happily reaching along under full sail at eight knots and barely heeling at all.

Photo: Art Paine

from a pointed front. Then he came up with the idea of adding a shapely glass windshield with a canvas top to keep the wind and spray off in rough weather. The combination of these elements made *GUSTO* a distinctive assemblage of sensuous curves. I once got into a correspondence with a yacht designer named Tom Fexas. He hated my Bermuda Series and phoned to tell me so. He pointed out the fact that their profile looked like three straight lines—the straight stem, the straight sheerline and the straight transom. He said, "Nature abhors straight lines—you'll never see one drawn by the original Artist." I thought for awhile and pointed out that the horizon was straight, but with that single exception he was right. He'd have loved *GUSTO*.

"Could I possibly steer a boat this big with a tiller?" he asked. "Yup, I think so", I answered. Fortunately I had been thinking about the problem for a long time, and had designed a number of fin-and-skeg boats that went part way towards the solution—the ones with the PBSR. By this time my office had launched over 50 yachts with spade rudders. They all had low helm forces since their rudders didn't pivot at the forward edge but at a point very near the center of hydrodynamic pressure. Why not design a spade rudder to look like a traditional outboard rudder with a gudgeon at the bottom? The only challenge was to get the right amount of blade area forward of the pivot axis, an exercise rife with risk as if one goes the slightest bit too far the tiller would take charge and thrust the helmsman overboard. But with all that spade rudder experience we knew we could get the pivot axis in the right place, and *GUSTO* turned out to be an exquisite yacht to helm.

Her traditional styling might deceive an observer into thinking that *GUSTO* was no more than a heavy cruiser. But her owner enjoyed racing her in Maine's Spirit of Tradition regattas. She had too much wetted surface to be really competitive in light airs, but in one race with a bit of a breeze we led the entire fleet including the seventy footers boat for boat, thanks to a brilliant start by her builder Todd French. The large sailplan, carbon fiber mast and rudder, Nitronic 50 rod rigging, Marelon as opposed to bronze through-hulls, and an extensive kit of state of the art electronics all helped, as did the push-button winches which enabled her to be tacked smartly. She had a big genoa and grinding its sheets in by hand would have taken forever. The full length keel and rudder had true NACA foils and she was a stimulating performer when the wind blew.

- *Electric winches are a great tactical advantage if not penalized by the handicap rule.*

GUSTO's interior was finished in a traditional ambiance with overlays of beaded panels covering the plywood bulkheads to mimic early 20th century joinerwork. Her accommodations were for two in a double quarter berth, traditional settee/berths amidships with seatbacks that swung up to form pilot berths, and an overflow veeberth in the forward cabin. The galley was made more secure by a niche for the cook to brace himself in. It had a three burner gas stove and a refrigerator/freezer that was both top and front opening. The focal point of the entire interior was a large and fully equipped navigation and communication station. Two heads were fitted, both with showers and Vacuflush toilets. Auxiliary power was a Yanmar 55HP diesel driving a 20" diameter Maxprop.

I know her owner got everything he wished for in his beloved *GUSTO*. He loved to sail singlehanded and would call me from halfway to Bermuda just to thank me for designing a boat that was going through the water so well. And if years from now he begins dreaming of an even larger yacht I'm pretty sure he could scale her up to 50 feet or so to make her a true flush-decker and squeeze the center of pressure of an even more improbable airplane wing sized rudder a millimeter or two closer to the pivot axis so even her magnificent big sister could once again be steered with...a TILLER!

No fluff here—just an honest sailboat interior. The client even had us custom design the sexy contour of the fiddles, and the boatyard had shaper cutters machined to mill them.

Note the heel-adjustable bunks, held in place by handy billies adjustable from within the berths. These cushions could be lowered down to vertical to be used as seatbacks.

31' Cruising Yacht

Tangier

Dimensions

LOA:	31' 3"
LWL:	26' 0"
Beam:	10' 0"
Draft:	4' 7"
Displacement, ½ load:	13,400 lbs
Ballast (lead):	5,092 lbs
Sail Area (100% Foretriangle):	595 sq ft
Disp/L Ratio:	316
Sail Area/Disp Ratio:	16.87

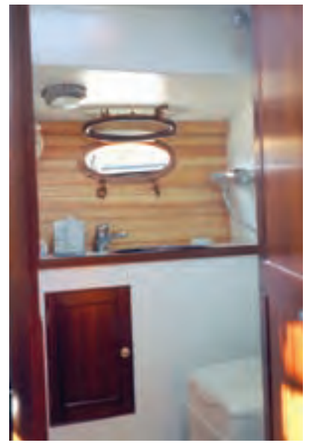
TANGIER *departing Camden on her maiden sail home to the Chesapeake.*

TANGIER'S PATRON WAS AN inventor by trade. We didn't often encounter customers who would custom design a boat this small. This man had done his soul searching and realized he could have just as much fun inventing a little boat as a big one, and knew he would never have time or cruising grounds deep enough to really use anything larger.

He had loved his venerable 23 foot Stonehorse cutter but had grown tired of being unable to stand up. This man loved the "small boat" ethic...the ability to go out for an hour's sail on a whim or to ghost up shallow creeks beyond the sight of his deeper-drafted fellow man. Since he stood 6 ft. 5 in. tall in his stocking feet, headroom was the defining factor in choosing the length and configuration of his new steed. Indeed for those of more modest stature this same yacht would serve well without the necessity for the low house aft of the mast. This pocket cruiser even had a carbon fiber mast, and carbon spreaders faux painted to match the genuine Sitka spruce boom and jib-boom.

The yacht began construction at Multi-Composites in Rockland, Maine in 2001 and was launched in August of 2003. Her construction was based on the use of epoxy and was a hybrid, using CoreCell foam with fiberglass skins in the hull and epoxy saturated cold molded wood for the deck. The interior was everything a very tall man might desire, with comfortable places to sit and stand, a choice of a double or single berth, both of which easily accommodated his outsize stature, and a lovely custom made Luke wood stove to serve as a focal point on those late autumn sails. There was even an enclosed head.

The interior was wide open and lined in honey colored white pine.



The head with its opening port.

The cutter rig was large, since *TANGIER's* home waters did not offer a lot of wind in the summer. Combined with a lot of stability, the result was a yacht that reached her hull speed quickly. Her full keel made groundings a non-issue, important on the Chesapeake Bay, and the balance was well tuned so the tiller stayed very near the centerline no matter the wind strength. A slightly bendy mast was fitted along with a J24-style backstay adjuster, which with a slight tweak would remove any weather helm in the puffs.

The accommodations consisted of essentially one big room, a unique interior space which no production builder would dare to try to sell to a wide market. You could see from one end of the interior to the other, making the yacht feel a lot longer than her modest 31 feet. It was all lined with carefully selected clear white pine, bunged and varnished and very soothing to the eye. After many years of designing and then getting the feel of every conceivable way to line out the interior of a hull I have come to the conclusion that nothing beats varnished white pine for this purpose.

The owner invented many of her features such as the staysail boom vang, corner fireplace, rescue steps on the rudder, and flip-up seats beneath the quarter berth. He dreamed these things up and commissioned our office to draw them so they could be built. I believe he had a lot of fun creating this unique design, and he can now look forward to a lifetime of cruising on something that is truly his own creation. This design and build project was an example of what a person could do at the beginning of this century with a lifetime of ideas and a budget of something like double the cost of a mass-produced yacht of similar size.

Steps on the rudder permitted self-rescue. This got me thinking how impossible it was to get back aboard a small boat if you ever fell overboard. I thought of an even better way to do so on my next design, as you will see.

The custom bronze staysail vang enabled the staysail to be roller furled, and kept the boom from "kiting" when off the wind in heavy air.

If you were less than six feet tall, you might choose to eliminate the low deckhouse. Only in the field of yachting is there an advantage in being short.

Herreshoff Style Daysailers

Pentimento and Paine 26

Dimensions	
LOA:	25' 5"
LWL:	20' 3"
Beam:	8' 2"
Draft:	3' 6"
Displacement, ½ load:	5,525 lbs
Ballast (lead):	2,470 lbs
Sail Area (100% Foretriangle):	360 sq ft
Disp/L Ratio:	297
Sail Area/Disp Ratio:	18.43

PENTIMENTO *sailed exceptionally fast, even in light airs. I liked her so much I hope to build a slightly enlarged version for myself someday.* *Photo: Mark Fitzgerald*

PENTIMENTO WAS LAUNCHED IN JUNE OF 2005. SHE WAS essentially a replica, styled after the work of the Wizard of Bristol, Nat Herreshoff. In keeping with his best work *PENTIMENTO* was of heavy displacement with wineglass sections, a hollow bow, carvel planked over frequently spaced but slender frames, with a long keel and outboard rudder. In other words, she was just like a scaled-up Herreshoff 12 ½. She even had the sculpted and varnished gunwale strake made famous by the Herreshoff yard. She was built by Dave Corcoran at Bullhouse Boatworks in Arundel, Maine.

PENTIMENTO's sailplan consisted of a large mainsail and small, self tending jib—just like the Herreshoff 12 ½. Herreshoff understood why a sailplan with a small jib and big main makes sense. Going to windward the jib with its undisturbed leading edge imparts a lot more drive per unit area than the main. The main can be very large because its drive is somewhat reduced by an aerodynamic spoiler (the mast) when going to windward. Offwind though, it is brute area that counts, the main blankets the jib, and there is no spoiler effect from the mast. So the larger the main and smaller the jib—which is blanketed no matter its size when sailing downwind—the more efficient the sailplan. In a way it's a rig that "reefs itself" going to windward.

- *A sailplan with a large main and a small jib adjusts itself to upwind vs downwind sailing.*

Your author and a couple of friends borrowed *PENTIMENTO* for a day. There's nothing on earth a boat lover could possibly enjoy more than sailing a boat like this. I loved it so much I designed a nearly identical one for myself. Mine will be slightly bigger in all dimensions and will have a self-bailing cockpit and an aluminum or carbon fiber mast, but she'll look as much like *PENTIMENTO* as possible.

Photo: Mark Fitzgerald

Nobody appreciates Herreshoff designs more than I do. I've spent much of every long Maine winter for over forty years beneath my 1937-built H 12 ½ *PETUNIA* digging away at what had once been fastenings with miniature chisels, scorps and gouges. Stuffed between the galvanized frame of her boat trailer and the too low bulge of her bottom planking I've devoted up to half an hour per de-zincified former woodscrew extracting its headless and threadless corpse with skills that had I chosen to become a dentist rather than a boat lover would have made me a wealthy man. There's not a subtlety of her shapely hull that I have not come to love at way too close range. When they find my cold form slumped over a drafting table many years from now it's this shape I'll have been drawing.

PENTIMENTO was fitted with an electric motor for auxilliary power. This turned out to be a bad idea for the original owners, who lacked a waterfront dock and kept the boat on a mooring. Once the batteries were discharged, recharging involved getting them out of the boat, into a dinghy and ashore to a source of electricity. This proved nearly impossible—it's no fun lifting automobile batteries over varnished coamings. Since the batteries also powered the electric bilge pump the result was once a nearly sunk boat.

For a person with a dock and electricity at the end of it, the electric motor would have been a fine idea. She could be driven for five hours at hull speed before requiring recharging of her batteries, and the motor was unerringly quiet. Although it's conventional thinking, a small single-cylinder diesel would have made a lot more sense.

- *Anyone fitting an electric motor has to think about how to charge it.*

The builder insisted upon building the boat without a self-bailing cockpit, for reasons that never made any sense to me. Had she been built with a self draining cockpit the bilge pump would have been

My beloved PETUNIA. *If I drew ten different versions of this masterpiece they wouldn't be enough.*

Photo: Art Paine

far less important. He also designed the spars himself, and they were larger and heavier than I would have liked. In fact a new owner hired me to convert to a carbon fiber mast and a shorter-boomed mainsail so a permanent backstay could be fitted, and this made her a far better boat.

- *A boat over 25 feet in length should have a self bailing cockpit. Electric bilge pumps are unreliable.*

I really liked *PENTIMENTO.* She was a spirited performer with her large sailplan. In fact I liked her so much I began designing a slightly larger version for myself. I'd call mine the *PAINE 26.* It would be a few inches longer and wider, with a self-bailing cockpit and some ideas I learned from *TANGIER*. She will look as much like *PENTIMENTO* as possible.

Paine 26

Dimensions

LOA:	25' 7"
LWL:	20' 3"
Beam:	8' 6"
Draft:	3' 6"
Displacement, ½ load:	5,760 lbs
Ballast (lead):	2,600 lbs
Sail Area (100% Foretriangle):	804 sq ft
Disp/L Ratio:	360
Sail Area/Disp Ratio:	17.93

I'll paint mine in "Florida colors" and move south. Those strips in the jib are the "DVT" which is explained on the next page. The biggest change is the fitting of a permanent backstay. It makes her less of a Herreshoff copy than PENTIMENTO, *but safer in the event of an unintended gybe.*

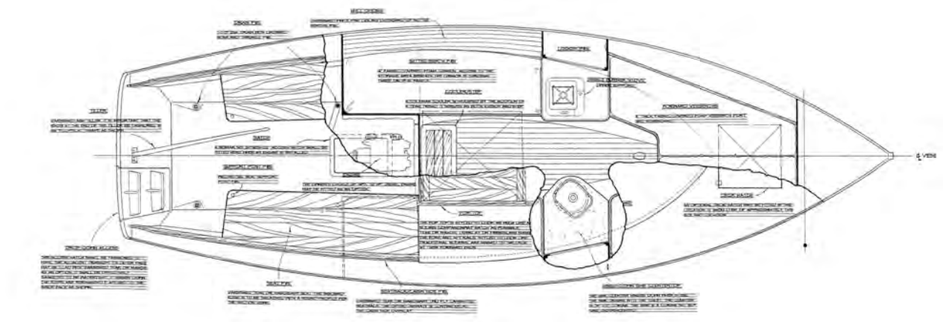
I'll build her using cold molded wood because I believe if a design is good enough then boats from its plans should be built to last a century. This design can be raced, cruised, lived aboard for most of a summer if that is my idea of fun, and enjoyed without fear of obsolescence- all without burning a drop of irreplaceable fossil fuel. Importantly—potentially life-savingly—this design has a feature that makes it easy to re-board from the water, unlike any similar yacht ever built. I'll fit a small diesel engine but won't use it much. I doubt I'll consume one (20 gallon) tank of fuel in an entire year. But as I mentioned earlier in this book, a little engine can save your life in certain, very rare circumstances.

The sailplan will consist of a large mainsail and small jib set on a jibboom so as to be self tending. The jib will be supplied with my innovative sewn-in carbon straps which replace other more clumsy jib vanging devices. (I call this invention D.V.T.—Dang Vang Thangs). Once the sails are set this should be the easiest to handle and most versatile sailplan ever devised. No mainsail boom vang will be used, and the pressure of the wind in the main will lift the boom as the wind increases, partially depowering the mainsail in puffs. The mast will be of aluminum, making it reasonably inexpensive, and I'll paint it to look like wood from a distance. The other spars will be varnished Sitka spruce, purely for looks. When more complex sailplans require reefing one can "fisherman's reef" this one by merely letting out the mainsheet and letting the jib backwind the forward third of the main.

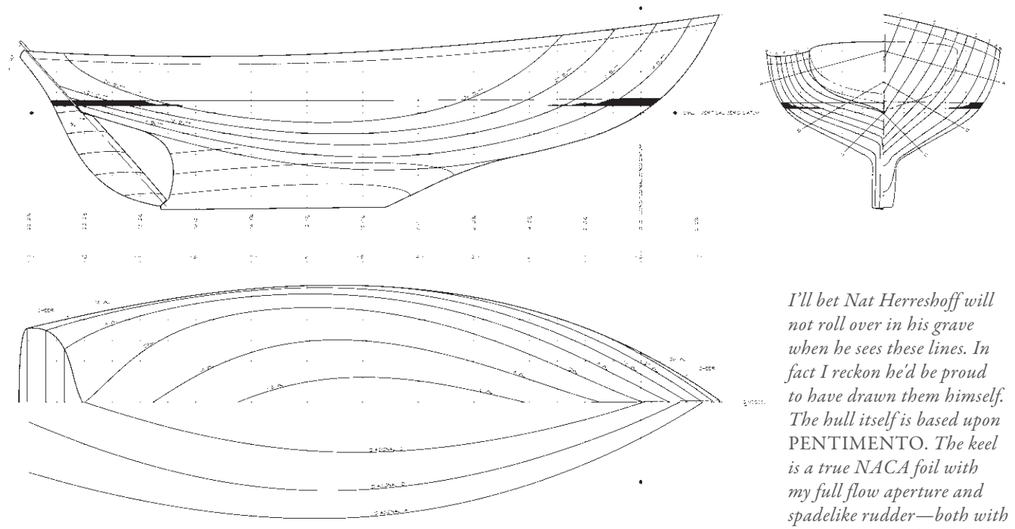
The large cockpit is ergonomically designed to be extremely comfortable, with excellent back support provided by the properly angled varnished mahogany coamings. It has a "bathing beach" aft of the seats, complete with a hinge-down transom door and ladder that will make swimming from this boat fun and easy. A small latch on the outboard face of the transom will enable a person overboard to open the transom door unassisted and climb back aboard. With the halyards, self tending jibsheet, roller furling line and a single mainsail reef led to the aft end of the cabin there will be no reason ever to leave the safety of the cockpit except to drop or retrieve a mooring or anchor.

The interior is simple but arranged to make time spent aboard very pleasant. There will be two forward berths and two cushioned midship settees which can also be used for sleeping. A marine toilet is to starboard beneath a hinge-up sink counter. A small propane stove for cooking, Corian sink with manual fresh water pump and tank, and Coleman cooler for the beer which doubles as a companionway step are shown on the drawings. The interior detailing will be, of course, "Herreshoff style" with varnished mahogany trim, and varnished white pine ceilings amidships similar to *TANGIER*. The companionway opening does not slide but hinges up and contains a marine fabric "pop top" tent, providing a nice area of full headroom.

I'll probably never build it given the state of the economy. It's a lot more important that we pay our debts and care for those of our neighbors who are less fortunate than are are we, than it is that I should have this boat. But the power of the human intellect is immeasurable. Somebody will find a way to harness the tides, and when they do I'll be given the opportunity to test this shape against the winds. Like *PENTIMENTO,* my *PAINE 26* will prove her predictable handling, easy motion and stimulating sailing performance.



Notice the drop down door through the transom, to permit swimming and self resuce. The countertop with a sink attached to it is made of Corian and hinges up out of the way when you need to use the toilet. An Igloo cooler doubles as the step from the cockpit into the boat. The companionway hatch looks exactly like a traditional one but hinges up rather than sliding to reveal a canvas "pop top" tent so there is an area of full headroom with it open.



I'll bet Nat Herreshoff will not roll over in his grave when he sees these lines. In fact I reckon he'd be proud to have drawn them himself. The hull itself is based upon PENTIMENTO. *The keel is a true NACA foil with my full flow aperture and spadelike rudder—both with very narrow trailing edges.*

I did this oil painting to keep the dream alive until I get her built.

Scaled Down Herreshoff 12 ½

14 ft. loa. "Paine 14"½"

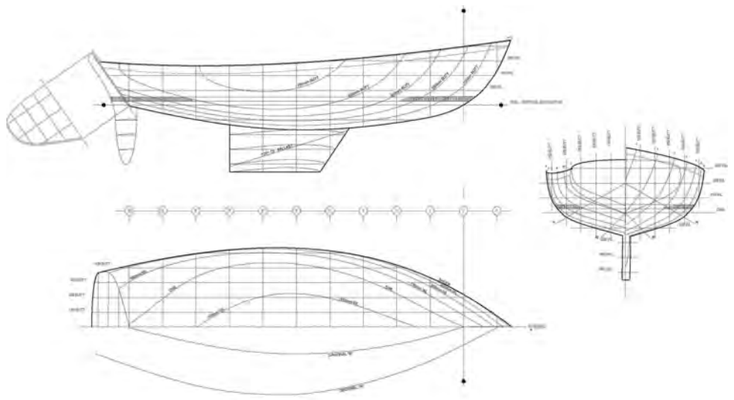
The second PAINE 14 built, "Amelia".

THE PAINE 14 IS A SCALED-DOWN *HERRESHOFF 12½* with a fin keel. The topside aesthetics replicate almost exactly the lovely and curvaceous Herreshoff shape. She's so similar that when you see her in the water you're tempted to think she's an H12 being sailed by very large persons. At 14 feet overall she'll serve those who want a smaller and sportier boat than a true 12½, and one that is more easily built and maintained. The fin keel has far less wetted surface and three inches less draft than the H12.

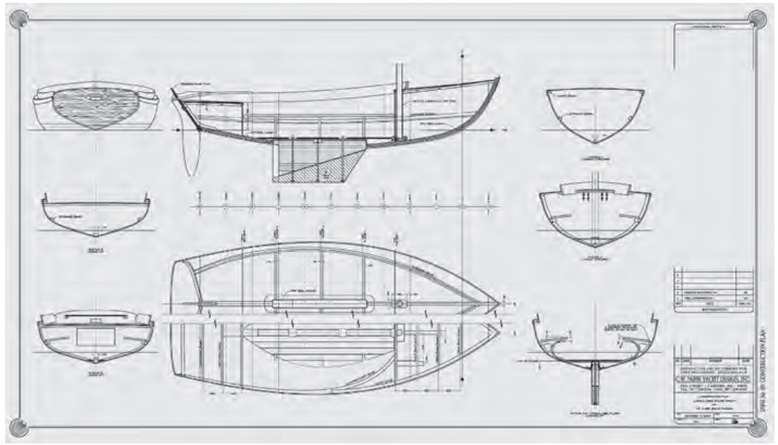
Dimensions	
LOA:	14' 0"
LWL:	11' 2"
Beam:	5' 3"
Draft:	2' 3"
Displacement:	860 lbs
Ballast (lead):	395 lbs
Sail Area:	95 sq☒
Disp/L Ratio:	271
Sail Area/Disp Ratio:	18.79

An unstayed carbon fiber rig is used so that you can quickly rig and set sail. The boat's weight at 850 pounds is sufficient to make her a true small yacht of real gravitas, safe and fun to sail even in really windy conditions, like her predecessor. Since she weighs about 60% of the weight of a *HERRESHOFF 12 ½*, she is much safer to trailer and easier to launch and retrieve making her the ideal boat to tow to intriguing new destinations and plunk in the water for the weekend.

The *PAINE 14* can be built in either of two ways. The first yacht to the design, *REDWING*, was built in New Zealand using multiple layers of 1/8" veneers over a purpose-built mold. Thus there were few frames needed once the mold was built, and the interior was clean and smooth. Alternatively she can be built over numerous small- sectioned laminated frames- a method that would enable a single person with time on his hands to more easily undertake her construction. Once the frames are erected the planking is epoxied on in two layers fore-and-aft, similar to the familiar double-planking technique. Each layer is ¼ inch thick, the first layer glued and ring-nailed to the frames and the second glued to the inner layer with the seams staggered. In either case the final result is completely leakproof and should endure for many decades.



The hull lines pay respectful homage to Nat Herreshoff's wonderful 12½, but with flatter deadrise and a true NACA foil fin keel. Construction is of cold molded wood and all detailing strictly replicates the true H 12½.



As with all designs, the devil's in the details. The plans are beautifully detailed, and the individual pieces are small and light enough to enable a skilled person working alone to build her in a garage. The watertight bow and stern tanks make her unsinkable.

She has nearly identical ergonomics to a H12½—just a tad smaller. You sit on the perfectly slanted wooden seat, lean back and the cockpit coaming cradles your back like a kitchen chair, your hand falls onto the elliptical rounded knob of the tiller, and your feet against the edge of the opposing seat when she heels. The carbon mast is inserted into a fiberglass tube like a Laser dinghy so no stays are required. In anything less than 20 knots of wind, she's considerably faster than a 12 ½.

She's a heavily ballasted keelboat, so she's safe in a whole lot of wind yet easily trailered to new locations.

THE PERFORMANCE OF THE PAINE 14 is, as one might expect from her numbers, downright stimulating. The helm is nicely balanced in both light airs and heavy. The boat's acceleration in a puff is amazing. In less than a boat length it accelerates to hull speed. With the full jib and a reefed main, it can handle 20 knots of wind. And in stronger winds, she can be sailed under complete control without the jib- an extremely rare capability amongst today's fleet of small boats. This is also helpful in picking up a mooring or coming alongside a dock. You can roll up the jib first, clearing the foredeck and its mooring cleat of the nasty slapping jib-boom, and get safely cinched up with a clear field of view.

Those who have read other chapters of this book will recall that one of my bugaboos in the latter years of my career has been self-rescue. If you fall overboard on even a yacht of low freeboard like this, it is impossible to get back aboard. You can imagine the potential consequences. So I made the decision that no future design of mine would lack this vital capability. The PAINE 14 is fitted with a simple step on the trailing edge of the rudder. You never know it's there until you need it, but if you ever do, you'll thank its designer a thousand times over.

The partially balanced rudder, showing the rescue step.

The Paine 14 is the first yacht ever fitted with the PAINE DVT jib-vanging system. Until now all jibs, and jibs set on jib- booms especially, had the annoying habit of losing effectiveness as the jibsheet is paid out. The jib clew would rise, rather than rotate around the headstay as one would prefer. When this happens the lower part of the jib is overtrimmed and stalls, while the upper part is let out too much and loses all its drive.

The PAINE DVT invention consists of a series of carbon fiber battens, fitted parallel to the luff, and extending from the leech to the foot of the sail. These battens both stiffen the leech of the sail as do other battens, but in extending to the foot of the sail prevent it from rising. (Note some other photos in this book show the older, conventional jib). Being parallel to the luff, the battens do not interfere with the ability of the jib to be roller-furled.

Off the wind, the sail goes OUT, not UP!

The PAINE 14 carbon fiber mast requires no stays and weighs with its halyards a mere 20 pounds, so it is as easy to deploy as that on a Laser dinghy. Easier, actually, as the sail need not be attached before stepping the mast. We invented a nifty way to attach the sails to the spars very quickly… no tedious fitting of little slides to little tracks, so the boat can be launched and gotten going in a matter of minutes.

Strap open. The simple Velcro-strap attachments render obsolete tracks and slides, and mast hoops, with all of their expense and tedium, and make getting a small boat rigged and sailing almost instantaneous.

Strap closed.

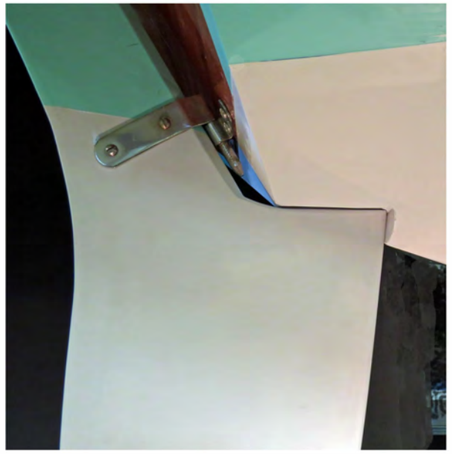
AMELIA chasing PETUNIA. It didn't take long in this light airs for the more efficient 14-footer to overtake her predecessor.

CAN YOU SINK A PAINE 14? The only way to find out is to try. This is how far you can heel her fully swamped. The bow and stern tanks keep her floating level until you decide to bail her out. One boat even has a battery-powered bilge pump, so all you have to do is wait awhile and she' pumps herself out automatically.

She floats with about ten inches of freeboard when fully swamped. If you swamp an original H 12, the bow tank will keep her afloat for awhile, but floating with the bow pointing straight up, and no place to safely await rescue. Not so the PAINE 14.

Swung to starboard- no gop.

Swung to port, no gap.



On centerline- no gap.

MIND THE GAP!

This design has a balanced rudder, making it exquisite to helm. This means that some of the rudder blade area is forward of the pivot axis. This is great for the helm balance, but since the aft end of the boat has deadrise, as soon as the rudder is swung off-center, a gap opens up between the rudder and the hull. It's like a forward facing pair of scissors.

One week this past summer I took my friend Dennis sailing. It was blowing pretty hard, and just as I cast off the mooring a gust caught us on the wrong tack, forcing us to sail over the dinghy painter which was tied to the mooring float. Needless to say, in she went, and almost immediately we were tethered stern to wind, and a lot of it. The forces involved are huge. There was no choice but to wrestle the mainsail down- no small feat- and roll up the jib to remove the pressure. Then fish around underwater with the boom crutch to finally release the jammed rope, near the point of exhaustion. Not exactly a day of elegant relaxation on the water.

Then just to drive the point home we sailed over a lobster pot line an hour later and did the same thing all over again!

I was determined that this would never happen again. I considered the other ways that have been used to mitigate the problem: A windsurfer fin installed just forward of the rudder, or pieces of shock cord that stretch across the open maw- but neither is entirely proof against a jam for as we all know on a sailboat, if anything possibly can go wrong, it will! So I have invented an absolutely jam-proof solution to the problem. Since many other designs have the combination of a balanced rudder and veed hull, I offer my solution for your benefit. It will be fitted to all Paine 14s and York 18s and any similar yachts I might design in the future.

What I did was to swing the rudder off-center to its maximum possible turning angle. Then I extended the top of the rudder up until it just cleared the hull at this angle. Of course then when you articulate the rudder toward the centerline there is a hull in the way. This I carved away into a section of the surface of a cone, such that the top of the rudder just "sweeps" the concave cone with a paper-width of clearance- far too little for anything to force its way into the gap.

It works great. The amount of turbulence created by the little discontinuity is trivial. And no more embarrassing and potentially dangerous rudder jams!

The PAINE 14 is an elegant, easily transportable keelboat for the person who can afford the very best. It sails exquisitely and looks absolutely scrumptious.

Scaled Down Herreshoff 12 ½

Paine 15

L.O.A.:	15'-0"
L.W.L.:	11'-11"
BEAM:	5'-7"
DRAFT	2'-5"
DISP:	1050 Lb.
BALLAST:	465 Lb.
SAIL AREA:	111 Sq. Ft.

The second PAINE 15. She sails at hull speed in a 7-knot wind! *Art Paine photo.*

I GAVE MY "YACHT CLUB TALK" at the New York Yacht Club on 44th Street in April of 2016. I'd had a few months' warning–enough time to design a whole new boat. I'd been thinking for a long time that the club needed a small boat, and a hugely elegant one that would appeal to this well-heeled group, that they could race in Brenton Cove. That way their races would become a spectator sport, with the windward mark just beyond the flagpole at Harbour Court in Newport.

So I decided to pitch the idea at my talk. My wife and I slept in the *Corsair* room in J.P. Morgan's bed. I thought if I sold enough of the boats someday I might become a tycoon, too. All I'd have to do is scale up my little *AMELIA* and put HC on the sailplan, for Harbour Court.

I even did a painting of the fleet, each yacht a different color like the bluejays of old East Greenwich.

By moving the main bulkhead forward a bit and making the stern tank slightly smaller I was able to increase the length of the seats by well over a foot. Combined with the increased beam of the scale-up this results in the cockpit being almost the same size as that on a 12½.

The other difference is that the mast is easier to step and unstep than on the *PAINE 14.* The carbon fiber mast on the 15 is a bit heavier, so I made the decision to place it just aft of the main bulkhead so that it could be swung up Iwo-Jima style, into a lovely bronze gated fitting identical to that used on the 12½ and its fiberglass derivatives.

An exquisitely beautiful family-sized yacht. *Art Paine Photo.*

The Harbour Court 15- now renamed the Paine 15. They are now being built by French and Webb in Belfast, Maine.
Norm Talbot photo.

18' Daysailor

York 18

L.O.A.:	18-1"
L.W.L.:	14'-7"
BEAM:	6'-6"
DRAFT	2'-10"
DISP:	1635 Lb.
BALLAST:	695 Lb.
SAIL AREA:	157 SqFt.

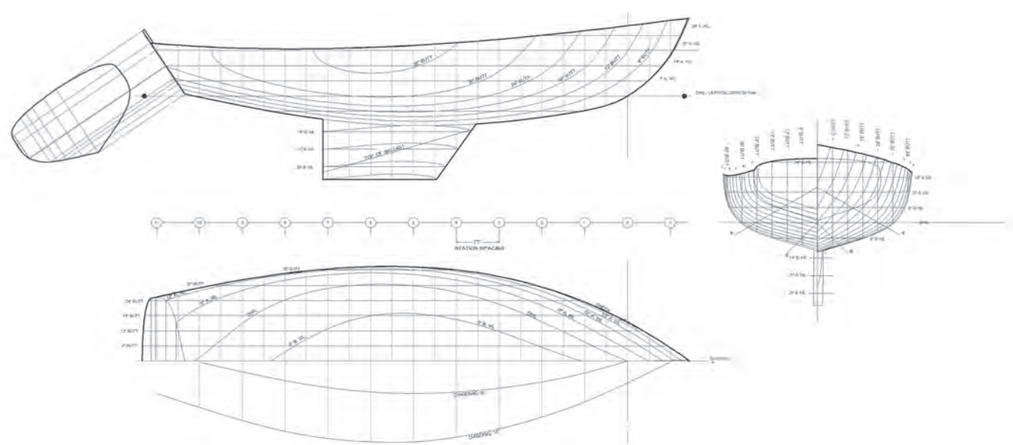
The primary difference with its predecessors is the spade rudder. The vertical battens in the jib prevent it "kiting" and twisting off, increasing her speed significantly.

THE YORK 18 IS THE LARGEST of three new designs which combine a traditional, Herreshoff-inspired aesthetic with a modern high performance fin keel and separate spade rudder. Her hull, decks and rudder are of fiberglass, but there is sufficient varnished teak or mahogany trim to make them look like the most elegant of wooden boats.

Like her smaller sisters he has a modern, innovative sailplan. She carries a freestanding carbon fiber mast, and no headstay, side shrouds nor backstay, eliminating their aerodynamic drag, The mainsail is attached to the mast and boom using simple Velcro straps, and the jib sports full-length vertical battens. The amount of driving force generated by this rig is remarkable.

This beautiful new yacht is a wolf in sheeps' clothing. Her blade-proportioned high aspect ratio jib is self-tending, does not twist off like other high aspect blades thanks to the vertical battens, and enables her to be short-tacked to windward up a narrow channel without touching a jibsheet.

The York 18 is built to order to each owner's taste. The price is unexpectedly reasonable given the unexcelled quality of finish. Built entirely by hand, you have to have a bit of patience until yours is delivered. Contact: Mike York, York Marine, Rockland, Maine.



Expannie 36

Dimensions	
LOA:	36' 3"
LWL:	30' 0"
Beam:	11' 8"
Draft:	5' 2"
Displacement, ½ load:	18,125 lbs
Ballast (lead):	7,000 lbs
Sail Area (100% Foretriangle):	672 sq ft
Disp/L Ratio:	285
Sail Area/Disp Ratio:	17.16

A classic beauty. The custom stern rail incorporates the dinghy davits and Bimini. She's just big enough to be a whole lot of fun without costing an outright fortune.

ANNIE *was a splendid little yacht—just a little too small. Scale her up to 36 feet and she'd be the finest offshore yacht ever built.*

CLIENTS OFTEN ASKED WHICH OF MY MANY designs would be my choice for my own retirement cruiser. "Easy", I always responded, "a scaled up version of my beloved 30 foot *ANNIE."*

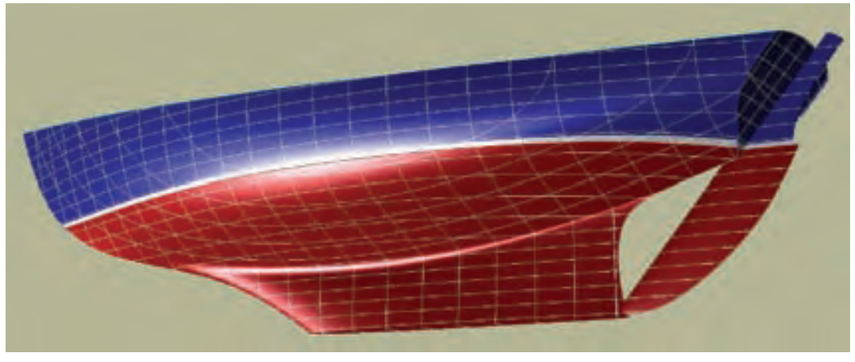
ANNIE had everything, I contend—she was beautiful to look at, had a wonderfully easy motion at sea owing to her heavy displacement, and never finished worse than first in any race she entered—admittedly with me at the helm. I know from broad experience that heavy boats need not necessarily be slow—it is the ratio between propulsive force (sail area) and resistance (displacement and wetted surface) that counts. So a heavy boat can be plenty fast, if the sailplan is large enough. And *ANNIE* was also extremely stable. Everyone knows that small boats whose decks stay reasonably level underfoot are far more pleasant to spend time aboard than ones that sail on their ear, and they're much faster to windward.

At the turn of the century I began designing my own retirement cruiser, one that never got built because the press of my growing business precluded any thoughts of retirement. It was an expanded ANNIE, which I appropriately named *"EXPANNIE".* I was ready for a larger boat than 30 feet and so the question then became, by how much to scale her up and what, if anything, to change.

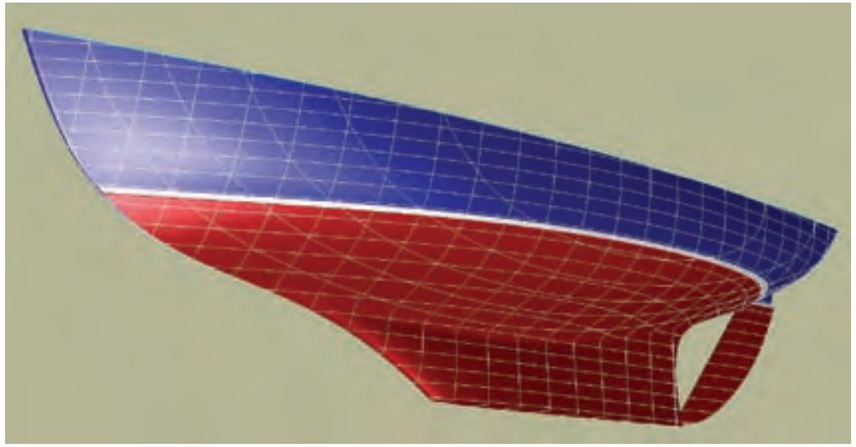
In *EXPANNIE* I attempted to preserve all of the wonderful characteristics of the little progenitor and to solve the two deficiencies that *ANNIE* suffered; too little headroom, and a heavy helm when hard pressed. The headroom was easy—just scale her up to 36 feet or so and the problem solved itself. The helm was another matter. Conventional wisdom had it that a full length keel ended in a rudder which pivoted at its forward edge, meaning as soon as it was deflected, a large moment was created. The bigger the boat, the bigger the rudder, the bigger the forces. But as the forces got larger, the tiller could not—its business end could only be deflected a couple of feet and still be usable by a seated helmsman. For these reasons tiller steered boats with outboard rudders often cease to work very well above the mid to upper thirty foot length. But we'd solved that problem in developing *GUSTO* and *WINGS OF GRACE* and the *CABO RICO 40,* featured elsewhere in this book. I know this final iteration will steer like a dream.

I've put a lot of miles under my keel in literally hundreds of boats. I know the virtues of larger yachts (steadier motion, less heeling, more wide open interior spaces less prone to getting seasick, more stowage for the toys one collects). And I also know the virtues of smaller (lower initial and maintenance cost, easier to handle with manual winches, easier to push away from the dock, less resplendent of embarrassing wealth which might be an affront in the poor countries where I would want to cruise) and perhaps most important, shallower draft for that winter in the Bahamas.

Thirty-six feet is just large enough to qualify as "oceangoing" and to accommodate the four person crew I consider ideal for congenial companionship aboard a boat. It's just the right size to put the portholes precisely at eye height. And large enough also to accommodate the ideas that I have been collecting for a lifetime, such as the gimbaled berths that allow the two sleeping crew to really get a good night's sleep while the other two sail, and a truly large and properly ventilated shower room so that I and my guests can enjoy the rare experience of being clean and living on the ocean at the same time.

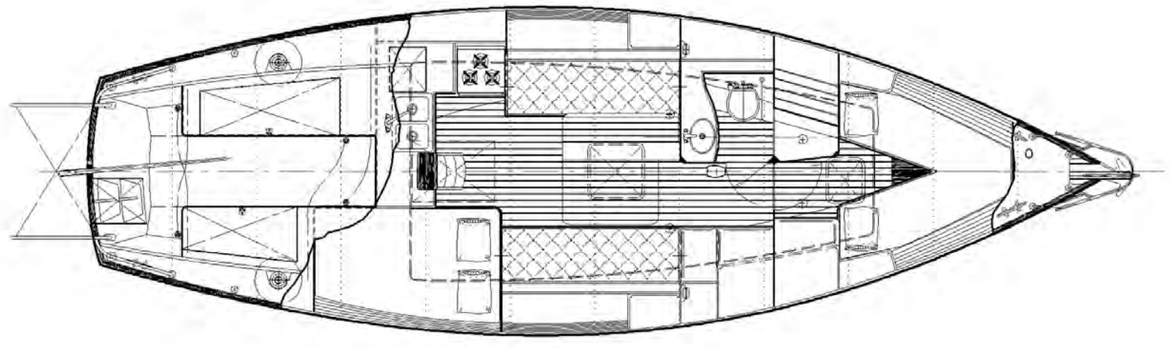


EXPANNIE's *sweet hull—a few tweaks of* ANNIE's *lovely lines and a rudder you could probably turn without using the tiller just by grabbing the rudder head. The rudder will be made of carbon fiber to be extremely light. Part of the effort of steering a boat involves overcoming the inertial forces of the rudder's mass. Newton's first law of motion states, "An object at rest tends to stay at rest". The effort required to articulate a stationary object, including a rudder, is proportional to its mass—meaning its weight.*



The forefoot profile is severely cut away to reduce weather helm. Note how sharply veed the forward sections are—a necessity if a small yacht is to be reasonably comfortable going to windward offshore.

EXPANNIE is a yacht designed according to the KISS principle, distinguishable from her contemporaries by what she does not have as opposed to what she does. She will leave ashore electric winches, watermaker (she'll have an easily valved rain catchment system), wind instruments (I was born with cheeks for this purpose), television (she'll have books and an iPod and a laptop computer instead for entertainment), and anything that provides luxury at the cost of consuming electrons.



- *A heavy boat can be plenty fast, if the sailplan is large enough.*
- *A rudder should be light in weight to reduce its inertia.*
- *Keep it simple, stupid!*

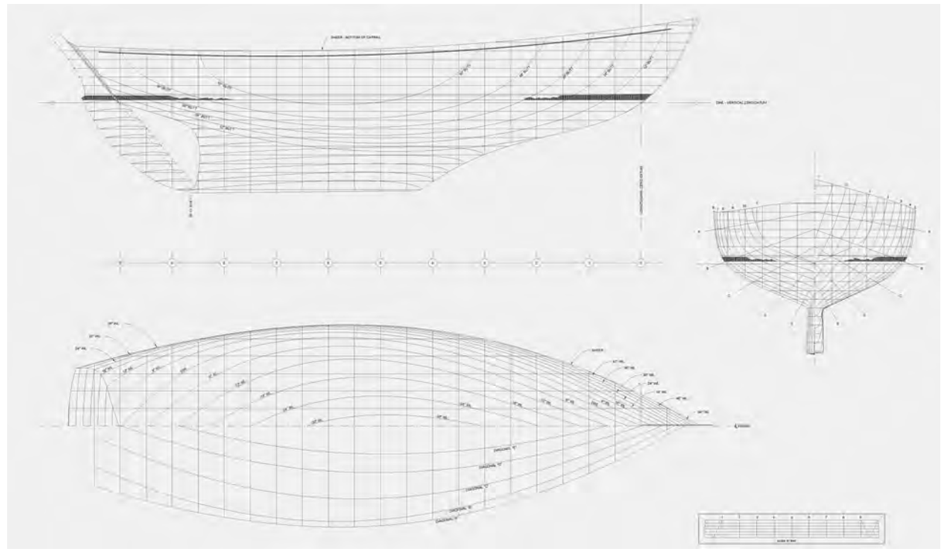
The cockpit is large and exhibits the open aft area and "stairway to the sea" that I consider almost a necessity on a modern long distance voyager. There will be an unobtrusive latch on the outside of the transom reachable from in the water. A person overboard would swim to the transom, pull the latch, and the access device will hinge down into the water, enabling self-rescue. It will be a delight for swimming also. The berths in the main cabin will be gimbaled so to stay level when the yacht is heeling. The quarter berth is intended to offer the captain a bit of luxury commensurant with his rank, though honeymooners might call it a double.

EXPANNIE will have excellent central heating, pressurized hot and cold water for that shower I love, all opening ports, numerous dorade ventilators for what little they're worth, a few electric fans, very significant tankage for fuel and water, a chartplotter, a sextant and tables for navigation if the satellites go down, superbly cut but simple non-laminated Dacron sails, slab reefing, a roller furling genoa, a reliable diesel engine, a small radar for cruising in Maine and (foggy) parts east, and a two-part Dave Gerr "Nester" dinghy that stows easily on the cabin top and can be sailed once at the anchorage. With so few electrical whiz-bangs to go wrong and require fixing, she'll spend most of her time actually out sailing.

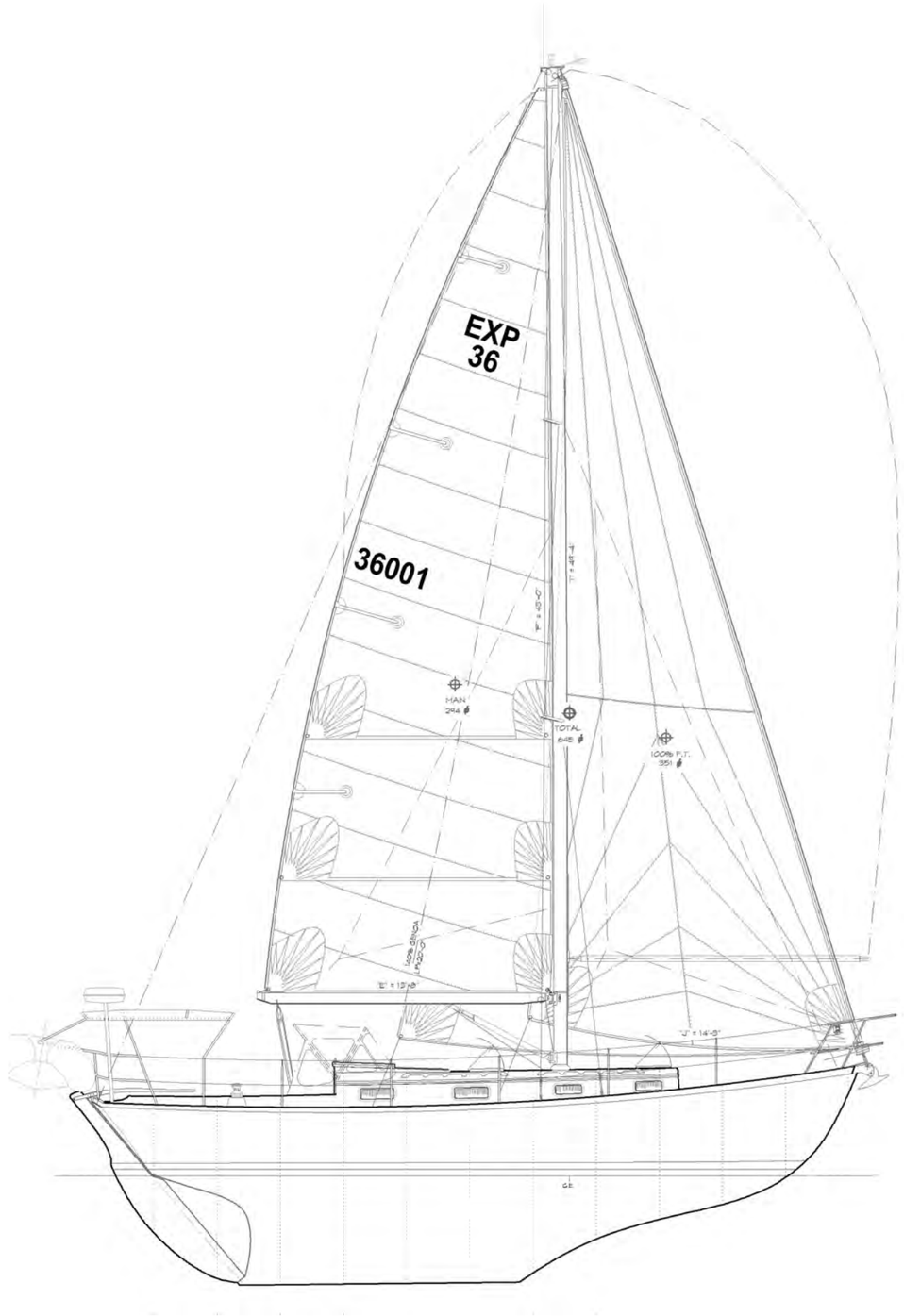
EXPANNIE's *gimbaled berths. They can be fixed in place and the leeboards removed for use as settees.*

The two part "Nester" dinghy. She twists bigtime but I haven't broken her yet.

"PUNCHING TO WINDWARD" is my painting of my dreamboat leaving the Gulf of Maine on its maiden voyage to Bermuda. The after end of the cockpit was revised after the painting was completed.



The most beautiful set of lines I ever drew. If mankind were forced to go to sea in single yacht design, I sincerely believe this should be it.



The 140% genoa would be used in the summer, the 100% jib in winter tradewinds far south of Maine. All ports will be opening, including one facing forward and two aft adjacent the companionway. Opening ports on a nearly vertical surface are by far the best means of ventilation on the open ocean. The rig looks too far forward, just as it did on the Morris 46 and many of our designs. But this is the final sailplan by a bloke whose database contains 150 sailboat designs and who haslaunched over 1000 yachts. It will be most perfectly balanced.

French & Webb 45

Erica

Dimensions	
LOA:	45' 7"
LWL:	32' 6"
Beam:	12' 0"
Draft:	7' 4"
Displacement, ½ load:	18,250 lbs
Ballast (lead):	7,700 lbs
Sail Area (100% Foretriangle):	869 sq ft
Disp/L Ratio:	237
Sail Area/Disp Ratio:	20.06

ERICA *carried a huge spinnaker, which was a lot of fun/work to trim.* *Photo: Alison Langley*

ERICA'S OWNER WAS A REPEAT CUSTOMER. He came into my office in the summer of 2004 thinking maybe he'd build a new boat. Mark had designed *FIRENZE* for him fourteen years before. He'd enjoyed the little motorboat, maintained it in new condition all those years, thought maybe we might be able to create a sailboat he'd love just as much.

This was as close to a carte blanche project as we ever saw, and in all branches of architecture carte blanche projects always turn out the best. In such efforts the patron has complete confidence in the architect. He is interested in seeing what a creative team can dream up, given an unlimited budget. He tells the architect what he wants at the beginning, doesn't change his mind as the drawings take shape, and stays out of the way.

- *In all branches of architecture carte blanche projects turn out best.*

This project exemplified the fun that can be had by all concerned in building a custom designed yacht. The owner was closely involved and interested in the drawings yet wise enough to leave the technical aspects to the experts. He chose a yacht of sufficiently small size vis a vis his budget that there were no monetary constraints. Everyone involved in the design and construction was encouraged to do their absolute best and the yacht would end up costing what it cost. The patron entered into that most foolish of follies—building a custom yacht—for the pure joy of creating something within the short span of a life that makes it worth living.

Most of all he wanted a beautiful boat, made of wood. She'd be blind fastened and epoxy glued and vacuum bagged so that you could see the wood, most of it highly varnished to show off its grain. And he loved racing, having gotten the bug knocking around in dinghies in Connecticut as a child. So she'd have to be fast. For too many years he had devoted himself to the adult pursuit of work—now it was time to go sailing again.

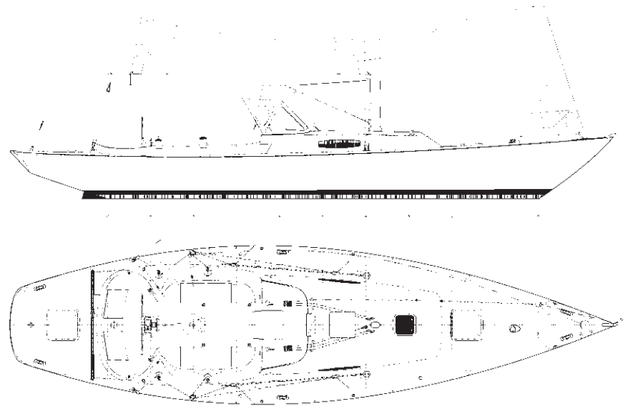
His vision was not of some stripped out torture chamber, but a cruiser/racer that would be comfortable for overnighting to Pulpit Harbor and exciting to sail all by himself if the spirit moved. He wanted a huge cockpit 'cause he had lots of friends and kids and wanted to bring them along. And he wanted to have at least a chance at winning the Maine WoodenBoat series of races; Castine to Camden, 'Feeder Race' to Brooklin, the Eggemoggin Reach Regatta. Could it be done? We knew of course that it could, and *ERICA* was the result. Having seen the workmanship on *GUSTO* and *WINGS OF GRACE,* he chose French & Webb of Belfast, Maine to build her.

The handicap rule was considered, but only slightly. These wooden boat races used what they call the "Classic Yacht Rating" rule—which fails to consider either displacement or stability. As such it is eminently exploitable. Obviously you beat this rule by choosing a certain sail area and building the sailboat beneath it just as light, deep, and with as little wetted surface as possible. But this client didn't want his boat to be so stripped of amenities as to be no fun to cruise. He wanted a boat that was exciting to sail, even if it meant reefing when the breeze piped up. So, as is so often the case, a compromise was struck. We designed an oversized sailplan with a genoa jib for light air racing and a fractional rig with a masthead asymmetrical spinnaker to eliminate the need for a pole. He agreed he'd use a more easily handled 100% jib when he wasn't racing which would rein in this charger a bit when there was no crew aboard.

Every aspect of building *ERICA* was a delight. Her owner loved coming into the office, never second-guessed our decisions, and cheerfully paid all the bills. The builders were located nearby enough to ask our advice when interpretations of the drawings were necessary and up somebody would go—usually me—to do the head scratching. Projects built at yards near the designer's office always turn out that little bit better. The launching party was the biggest event of that summer in Belfast, Maine. Maybe in all of Maine. The crowd was estimated at over a thousand.

- *Owners make projects fun for themselves by never questioning the bills.*
- *Projects built at yards near the designer's office always turn out a little bit better.*
- *Have a big launching party. You'll never forget it.*

ERICA *was a wooden boat, so everything was wood. She had a sprung raw teak deck. Everything else was varnished or painted. The elliptical shape to the helmsman's cockpit and rounded corners to the seatbacks forward of it were not accidental. The covering board and cockpit seatbacks were white Awlgrip and the coaming tops raw teak. Given carte blanche, all of the artists in the office had a say and we didn't adhere to convention in calling out the color or material of these various surfaces. We thought she ended up great, though on reflection I'd paint the cabin sides white. The cockpit table forward of the helm also served as the mainsail trimmer's control center. The mainsheet emerged from the table top, the traveler controls came to the same location and the hydraulic panel built into its side enabled the trimmer (often me) to control the sheet, traveler, vang and backstay from a single position.*



Chuck Paine trimming the jib on *ERICA* with her builder Todd French at the helm. She could point five degrees higher than virtually any boat around her. *ERICA's* cockpit was all curves, and curves are sexy. We designed a huge rig so she'd sail very fast when racing in light airs. In cruising mode the owner would use a working jib in place of the genoa.

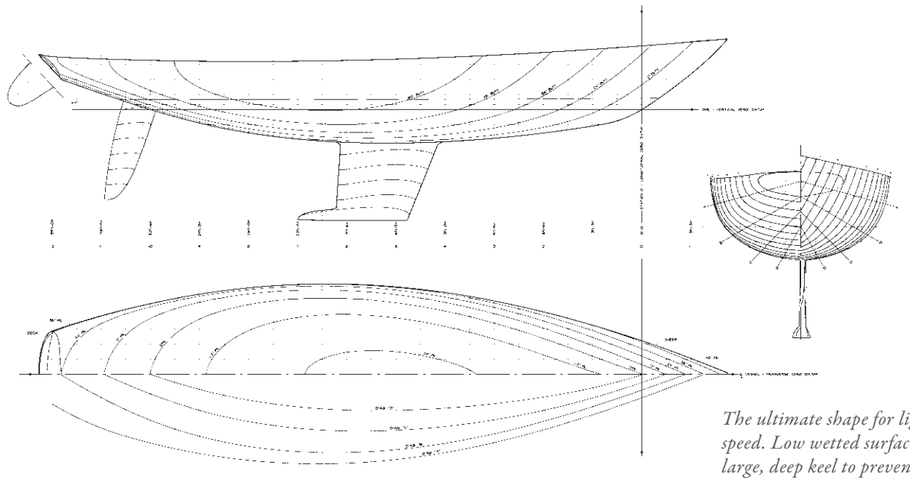
Photo: Alison Langley

The owner let me do the interior décor. I said to him, "The sea's a gray and cold place at times. So when it comes to choosing fabrics, go wild!" The seatbacks folded up and back to reveal wide berths port and starboard.

Somebody remarked at the launching—with its varnished mahogany exterior and Sitka spruce interior, it's like living inside a guitar. She was certainly no stripped out racing machine.

- *When it comes to fabrics, go wild!*

ERICA was conceived in an attempt to add beauty to the world. From the day I first put pencil to shirt cardboard in the 1950s copying shapes I'd seen in *YACHTING* and *RUDDER* magazines, I drew yachts because when I managed to get the curves just right I was staring at something intrinsically beautiful. In the final analysis, it's their beauty that justifies yachts' existence and their considerable expense.



The ultimate shape for light air speed. Low wetted surface with a large, deep keel to prevent stalling. The leading edges of the keel and rudder were raked aft to shed the ever present Maine lobster pots. The big keel bulb got the ballast very low.

Wings of Grace

Dimensions	
LOA:	50' 0"
LWL:	39' 6"
Beam:	14' 0"
Draft:	6' 0"
Displacement, ½ load:	44,600 lbs
Ballast (lead):	15,000 lbs
Sail Area (100% Foretriangle):	1430 sq ft
Disp/L Ratio:	323
Sail Area/Disp Ratio:	18.19

WINGS OF GRACE *combined a traditional profile with a luxurious interior. Plus she was drop dead gorgeous.* *Photo: John Snyder*

I'VE CHOSEN *WINGS OF GRACE* AS THE FINAL chapter in this book not because she was the final design completed—that honor fell to *ADAGIO*—but because she exemplified the sort of yacht that justifies the effort, skill, and formidable amount of money that goes into building a custom designed yacht. In an ideal world my studio would have designed nothing for 35 years other than yachts like *WINGS OF GRACE.* I believe traditionally styled heavy displacement yachts like *WINGS* make the very best offshore cruisers. *WINGS* was an epoxy saturated cold molded wood ketch modeled after John Alden's finest work. I'd like to think she's the sort of design he would have drawn given the knowledge of NACA foils and epoxy glued wood construction. Had he lived long enough to build her, he'd have even painted her black.

The owners wanted a seakindly shape, high bulwarks for safety, and a lot of tankage. We responded with a hull that displaced a respectable 44,600 pounds at halfload. Her design was to a large extent aesthetically driven and the true aficionado will appreciate her elliptical transom and portholes, wood hatches and skylight, recessed wale stripe with incised gold leafed cove stripe, and sprung teak deck. She was exquisitely built by French & Webb of Belfast, Maine who had recently proven themselves with the 44 foot cutter *GUSTO.*

The yacht featured the NACA foil full keel modified by the use of an oversize aperture and balanced rudder that had worked out so well on *GUSTO.* The combination of moderate draft and a long, low ballast ingot at the very bottom of the keel resulted in a low center of gravity. She was ketch rigged using a cutter foretriangle with both jibs roller furling. With a rig of moderate height but large area (Sail Area/Disp Ratio of 18.19) this yacht was very fast in reaching conditions. In heavier airs she could be sailed fully balanced by furling the mizzen and carrying on under main and jibs or, like all ketches, with just the jibs and mizzen. The rudder was partially supported by the keel, yet its leading edge was exposed to flow over nearly its entire length enabling it to be fully balanced—an idea we would always push for by now. The propeller was also nicely protected against fouling by the presence of the keel.

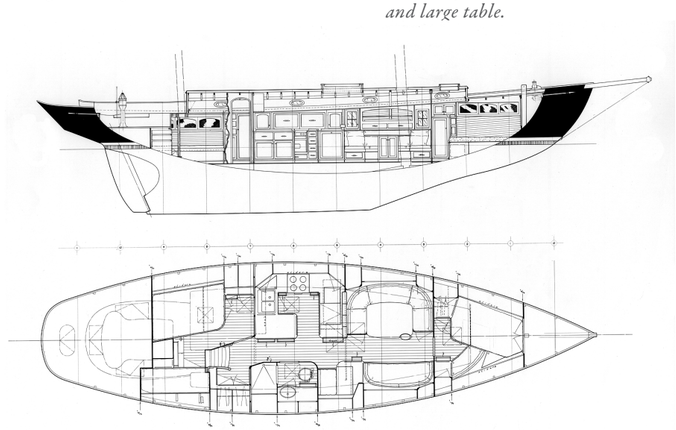
WINGS OF GRACE had carbon fiber spars faux-painted to look exactly like Sitka Spruce. As luck would have it the primary winches had to be located close to three items of rigging that couldn't be moved, engendering hours of CADD work making sure you could turn the winch handle without chafing your knuckles. The builder flew to the Midwest to find a single length of teak for the cabin sides—a scarf joint on something as visible as this simply wouldn't do. Aft of the staysail sheet track is a custom designed polished stainless steel fairlead that gets the sheet down to deck level where it leads fair to its winch aft of the cockpit. One pattern to serve both sides wasn't good enough—there was a slight angle and we designed them as a handed pair. Each fitting is recessed into the cabin-top radius to look like it grew there. The elliptical portholes are all of a slightly different size—smaller as you go forward—and fastened without finishing rings onto the inside of the house side using "sex bolts", a newly invented fastener that would prevent them being punched out by a breaking wave. The devil is in these details, and if you get them all right a yacht is beautiful, and that is what a yacht must be above all else.

Photo: Billy Black

The quick little rendering I did to get the clients started.

The lovely curved settee and large table.

Photo: Jamie Bloomquist



The interior was optimized for just one couple with their teenage son occasionally aboard. The main salon was beautifully appointed, with settees upholstered with pleated curved seatbacks. The aft owners' cabin had a large double berth and spanned the entire width of the hull for a feeling of spaciousness. The son's cabin was forward, with a berth large enough to be shared. A single large head and separate shower stall were centrally located—with only two persons aboard most of the time there was no need for a second head. The galley was much larger than one expects on a yacht of this size, with plenty of stowage in a variety of lockers and drawers. In a pinch the interior could sleep six persons though this was never in the owners' plans.

The side decks were bordered by high bulwarks and the vertical cabin sides. There was simply no place to slip to on these decks, and the natural sprung teak surface had excellent traction. Custom designed handrails of varnished teak supported by jewel-like polished stainless steel upstands extended the length of the cabintop. A power winch was provided aft of the mast to assist in hoisting halyards and reefing the sails. The owner even commissioned our drawing of the panel widths and seam locations of the sails as they would have looked back in John Alden's time, down to the miters in the jibs. The cockpit was shaped as an ellipse, making it a lovely spot for socializing. There was stowage port and starboard beneath the seats. With the sailplan divided into four relatively small sails the winches could be manual and of relatively small size. I remember arguing with the winch vendor over the size of the primary winches. I thought the ones he had recommended were too small, basically because they looked small when we imported them onto our CAD drawings. As happened so often, the vendor was right and I was wrong. I learned over the years to trust the vendors—they know their stuff better than anyone else possibly could. A custom varnished teak binnacle supported a very traditional compass enclosure. The wheel was the focal point of the cockpit, a nautical adaptation of a 1950s Porsche 356 wheel custom built of highly polished stainless steel and varnished teak.

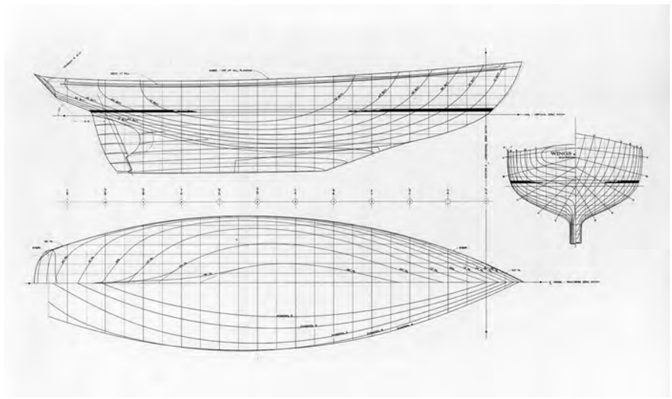
- *Trust the vendors—they know their stuff better than anyone.*

A perfect cockpit for socializing.

Her lovely elliptical transom.

Photos: Jamie Bloomquist

- *If you design an elliptical transom the shape has to be perfect or it will look awful.*



WINGS OF GRACE's *hull lines. These lines were drawn on a computer, but my protégé Ed Joy was allowed whatever time it would require to combine the various surfaces using Multisurf software to make them look as if they were hand drawn. We were fortunate in attracting a clientele who would pay for all this!*

Auxiliary power was provided by a Yanmar 92 horsepower diesel driving a Maxprop feathering propeller via an Aquadrive. She had an auxiliary generator and air conditioning as well as many other luxuries normally found only on much larger yachts.

WINGS OF GRACE was the essence of a custom designed and built yacht. Nothing of this elegance and exceptional performance was available in anything approaching mass production, nor ever will be. The owners of this yacht enjoyed every minute of the 2 ½ year design and build process—indeed that's a large part of the fun. Now they have a keepsake that will fill them with pride for a lifetime.

I was lucky. By the time I was ten years old I could freehand the profile of a yacht and when I turned the drawing right side up, it would look right. (You draw boat sketches upside-down because their curves are all concave upward and that is the way your hand naturally pivots). For 40 years I had the good sense never to stop.

- *Draw sketches upside down—this is the way your hand pivots drawing yacht curves.*

A yacht is very much like a woman. Like Frances, Leigh, Carol and Annie. If she's beautiful, you'll forgive all her flaws.

- *A yacht is like a woman. If she's beautiful you'll forgive all her flaws.*

Running a yacht design business is a bit like American football. You're way in the lead and hitting your stride, excelling at what you do best. You drop back for the next long pass and there are receivers everywhere. You cock your arm to throw. Then something hits you from behind and your face is in the dirt. Ah, well, I'd won lots of games by October, 2008 and without doubt some ambitious young player will come along soon and make my record look insubstantial in comparison.

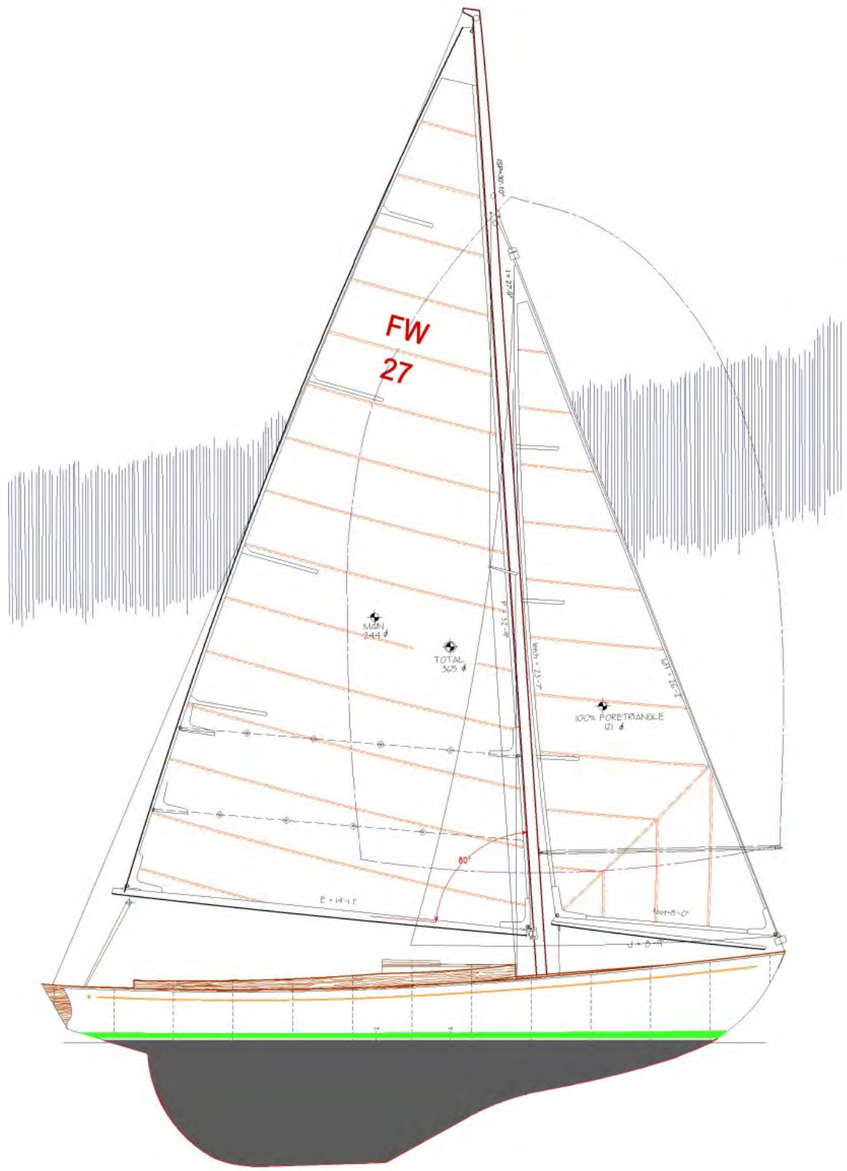
The perfected Herreshoff Alerion

Bella Luna

I WAS HIRED IN 2015 TO MAKE improvements to Nat Herreshoff's Alerion, and to develop computer faired lines and loftings. Like many other boat lovers I loved this design from the moment I first saw Nat's original at Mystic Seaport in my early teens. But after much study I discovered that the original design had some serious flaws, being very tender and hard to steer. Rumor has it that Nat added over 600 pounds of internal ballast to his to attempt to stiffen her up, but that was not enough. When he got a sistership commission he designed Sadie, now in the Herreshoff museum in Bristol, RI. He made Sadie 5″ beamier, heavier, and lengthened the bow to bring the jibstay and thus the center of effort of the sailplan further forward. While this improved matters the design still was very tender and still developed way too much weather helm.

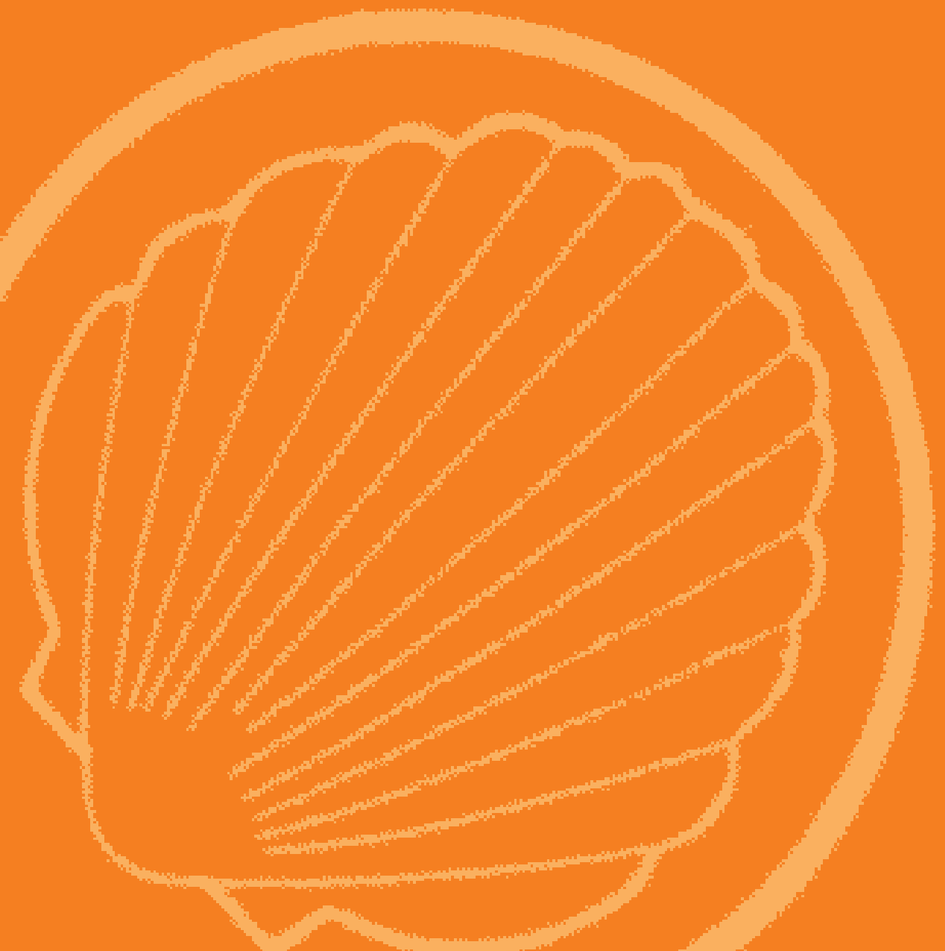
With all this history as my guide, I used Sadie's beamier hull and a 21st-century keel to make her reassuringly stable, and my 40 years of study to perfect her helm balance. And it worked- this is truly a perfected Alerion.

The obvious answer to the stability problem was to fit a full, relatively deep keel with its outside ballast over two feet lower than the centerboard versions. This resulted in more than enough stability to please present-day sailors. The weather helm was corrected by making the rig a little taller and moving the leech of the mainsail further forward, with the added benefit that the rig could then be fitted with a permanent backstay. Bella Luna, built by French & Webb in Belfast, Maine, is wonderfully stiff- able to handle over 20 knots apparent wind without reefing- and an absolute delight to helm in all conditions. And she's just as beautiful as the original, as the accompanying photos should illustrate.



Everyone knows how much I admire the work of America's master yacht designer. Ever since I bought Petunia in 1973 (Herreshoff 12 1/2 hull number 1405- built in 1937), I have come to love Nat Herreshoff's designs. If you'd like to hire someone with the combination of sufficient reverence for his work, combined with twenty-first-century knowledge of yacht design, to contribute to a modern day interpretation of Nat's work, I would be glad to assist you.

The Lessons My Designs Taught Me



CHAPTER TEN

The Lessons My Designs Taught Me

1. *The only measure of a yacht or a book's success is—is it pleasing to its owner?*
2. *People don't read anymore, they just look at the pictures.*
3. *Beware of spec designs—if nobody wanted to build it, it probably wasn't worth building.*
4. *If you want to be a yacht designer, study yacht design, not naval architecture.*
5. *Writing is an imperative in the yacht design game.*
6. *Do it now!*
7. *If you design racing yachts, you have to be able to make them win.*
8. *You can start as a yacht designer by building a boat for yourself. It just better be good.*
9. *Conduct the orchestra, don't play the notes.*
10. *Hire good people, treat them well, and stay out of the way.*
11. *To design boats for people outside your immediate family you need a recognized name.*
12. *Find a great builder and he'll make your designs look good.*
13. *When in doubt, follow your dream.*
14. *You have to climb back on the horse that threw you.*
15. *Reduce the "frontal area" of a design, especially the keel. If it isn't there, the water doesn't need to go around it.*
16. *Use true NACA foils for keels and rudders, not simply teardrops that look good.*
17. *Flatten the canoe body in way of the keel, which increases the height (wingspan) of the keel.*
18. *Reduce the fairing radius between the keel and the hull to the practical minimum.*
19. *Lighter is always faster than heavier.*
20. *Keep the waterline beam as narrow as possible since this lowers resistance.*
21. *Stiff boats are faster than tender boats.*
22. *Designing yachts is easy. Getting others to pay you to design their yacht, not so easy.*
23. *If you don't sell them, you won't build them, and folks don't get to have fun in them.*
24. *If you sell plans to amateur builders you won't be taken seriously as a designer.*
25. *Keep side decks relatively flat. An inch or two of camber is enough.*
26. *Use more layers of thinner fiberglass rather than fewer layers of thick.*
27. *Photos taken with a wide angle lens make yacht interiors look much larger than they really are.*
28. *In choosing partners, choose the ones that will work the hardest.*
29. *If you make a percentage selling something, make a percentage of a big number.*
30. *Sell the sizzle, not the steak.*
31. *If you charge half as much as other designers, clients will think you're half as good.*
32. *Charge a little less than everyone else and do a little better work.*
33. *Ask for the money.*
34. *You have to have a website. And you have to stay on the first page, above the fold.*
35. *If you never go into a bank you can never go bankrupt.*
36. *Pay your bills the day they come in.*
37. *On a small boat, an auxiliary engine can save your life.*
38. *Design cruising boats to be stable and to hell with racing rules.*
39. *No fiberglass construction lasts longer than single skin.*
40. *Opening ports are the only ventilation option that can be left open in heavy weather.*
41. *You cannot do preliminary design on a computer.*
42. *If you aspire to being the best, learn the old ways.*
43. *The more eyes pass over a design, the better it gets.*
44. *Learn to do manual preliminary drawings. Computer renderings take far longer than a buyer's attention span.*
45. *When you create a hybrid it's not only the favorable characteristics that get combined.*
46. *Before you design something, see if there is a market for it.*
47. *If something is not going to be used very often it should be cheap.*
48. *Anything you trailer behind a vehicle should be light.*
49. *You have to sell yourself—nobody else will.*
50. *There are old pilots, and there are bold pilots, but there are no old bold pilots.*
51. *A flashlight is by definition a thing that, when you need it, doesn't work.*
52. *52. Urinate, Aviate, Navigate, Communicate.*
53. *It's a lot easier to steal an idea than to invent one.*

54. *Nobody will notice if a mizzenmast is slightly off center.*
55. *The last thing you want at the leading edge of any sail is a fat round bulge.*
56. *Fiberglass is flexible stuff. You can use this fact to develop customized sisterships.*
57. *On the same hull a cutter rig will outperform a ketch.*
58. *Draw in ink—it demonstrates confidence in your work, and looks good in print.*
59. *The most massive part of a center cockpit deck should be located as far aft as possible.*
60. *There's NOTHING that can't be done with sufficient good will and a lot of hard work.*
61. *Obtaining patents in a tiny field like yacht design is a form of financial suicide.*
62. *Lead from the front by doing, not from the rear by ordering.*
63. *In selling yachts, if you've got it, flaunt it.*
64. *If you develop a database with sufficient sample size, trust the numbers.*
65. *If you're ever going to amount to something as a designer, you've got to invent something.*
66. *Response time is everything!*
67. *Once you've designed a large yacht it's easier to sell the design of anything smaller.*
68. *Outside ballast always gives better performance than inside.*
69. *Fiberglass liners reduce cost but they also raise the center of gravity.*
70. *Don't judge a sailboat's performance by the ad photos—the engine may be running.*
71. *Go fast into oncoming wind and waves, and you get wet.*
72. *Yes, you can leave an aluminum yacht unpainted. But it's a yacht, and it ought to look like one.*
73. *In considering SA/DISP ratios make allowances for whether there is a genoa or not.*
74. *Once you find a shape that works, don't fix it if it ain't broke.*
75. *For every inch you increase a keel's depth, you can decrease its length by two.*
76. *If the clients can afford it, you learn a great deal from a mockup.*
77. *Make the companionway steps into a stairway, not a ladder. They're used a lot.*
78. *Nobody ever came to a boat show and asked, "What's old?"*
79. *The golden mean of wood to white is 60:40.*
80. *Help your builders. Attend every boat show they have a boat on display.*
81. *Light displacement today means a DISP/L ratio of under 150. They'll laugh at this statement in twenty years.*
82. *Center cockpits often lack decent seatbacks. You just have to find a way to provide them.*
83. *Provide an obvious path from the side deck into the cockpit.*
84. *Don't make a center cockpit so short you can't stretch out and sleep there.*
85. *Never put pen to paper without getting paid for it.*
86. *If you find a boat or a spouse that pleases you, only a fool would trade up.*
87. *Glassing a deck to the hull results in a significant weight savings.*
88. *Sometimes years of experience trumps mathematical theory.*
89. *Mainsheet travelers should be avoided on a cruising boat.*
90. *Check your work thoroughly. Check work done on a Friday more thoroughly.*
91. *Yacht design is ART, and it's only finished when it's finished.*
92. *If you charge less for a yacht than it costs to build you'll never make it up in volume.*
93. *Electrons and salt water don't mix.*
94. *Dinettes should have more than one egress route lest people get "trapped".*
95. *Avoid veedrives. They put the shaft seal under the engine.*
96. *You need a small boat aboard for recreation. Otherwise you drink!*
97. *Boat finishing attempts often end up with a half-finished hull and a divorce. Know what you're getting into!*
98. *The less ink you spread, the less you have to charge.*
99. *Write articles for European magazines. The market for new sailing yachts is stronger there than in America.*
100. *To my dying day I will favor a shorter mast combined with a genoa jib for offshore sailing.*
101. *They haven't built the anchor that is too big.*
102. *If you're headed for the tropics, fit air conditioning.*
103. *You get what you pay for.*
104. *Filters and pumps don't get the necessary attention if the machinery is squeezed in.*
105. *An extra fuel tank for the windless Pacific is a good idea.*
106. *Always put steering stations on the starboard side. Right-of-way vessels come at you from this direction.*
107. *Yacht design is a tiny field. If you want to make a living, design harpsichords.*
108. *If you aspire to being a successful designer you've got to design motorboats.*
109. *To make a living as a designer you have to have employees.*
110. *A single engine launch likes the engine weight as far aft as possible.*
111. *If you can see through it, it's like it's not there.*
112. *Laminating a skin to a core is less prone to delamination than laminating a core to a skin.*
113. *Be suspect of cored hulls unless they are built by a reliable builder.*
114. *One-off cored hulls are inherently more reliable than female molded ones.*
115. *Epoxy is roughly twice as strong as polyester and four times more adhesive.*
116. *Warped bottoms are fine as long as they're designed by sane minds.*
117. *Color can be used, along with massing, line and texture, to make an object attractive.*
118. *When fuel prices rise, low resistance will trump higher power to get to a given speed.*
119. *Integral tanks contribute to the strength of the hull.*
120. *Integral tanks lighten the construction weight of a yacht.*
121. *On a boat, if anything can possibly go wrong, it will.*
122. *A hull that rolls less easily relies less upon its stabilizers, reducing drag.*
123. *Two stairways in a motoryacht is a huge advantage, especially for claustrophobic owners.*
124. *Lengthening a given design just keeps making it look better.*
125. *Judge any twin engine design by how easy it is to get at the outside of the engines.*
126. *Compound curved plating is stiffer than "developed" plating.*
127. *Move the thrust forward of some of the resistance if you can on a jetboat.*
128. *A Scrimp laminate is heavier than the alternatives.*
129. *Luxury is directly proportional to weight, and inversely proportional to speed.*
130. *Fins at the transom help stabilize a jetboat.*
131. *All good things come with time.*
132. *Sometimes the only way for an architect to get a detail right is to do it himself.*
133. *Adding engines to increase speed is like a dog's chasing its tail.*
134. *I've never designed a rudder that was too big.*
135. *Work as a boat builder and you'll learn what your drawings need to show him.*
136. *Send reductions of the drawings and photos of finished designs to the magazines.*
137. *When you start with perfection don't change much.*
138. *Electric winches are a great tactical advantage if not penalized by the handicap rule.*
139. *A sailplan with a large main and a small jib adjusts itself to upwind vs. downwind sailing.*
140. *Anyone fitting an electric motor has to think about how to charge it.*
141. *A boat over 25 feet in length should have a self bailing cockpit. Electric bilge pumps are unreliable.*
142. *A heavy boat can be plenty fast, if the sailplan is large enough.*
143. *A rudder should be light in weight to reduce its inertia.*
144. *Keep it simple, stupid!*
145. *In all branches of architecture carte blanche projects turn out best.*
146. *Owners make projects fun for themselves by never questioning the bills.*
147. *Projects built at yards near the designer's office always turn out a little bit better.*
148. *Have a big launching party. You'll never forget it.*
149. *When it comes to fabrics, go wild!*
150. *Trust the vendors—they know their stuff better than anyone.*
151. *If you design an elliptical transom the shape has to be perfect or it will look awful.*
152. *Draw sketches upside down—this is the way your hand pivots drawing yacht curves.*
153. *A yacht is like a woman. Is she's beautiful you'll forgive all her flaws.*

CONCLUSION

ALL GOOD THINGS MUST COME TO AN END, including this book and my long career as founder and chief designer of C.W. Paine Yacht Design, Inc. I retired in December of 2008 and closed the Paine Yacht Design Corporation. A heart attack the previous year provided much of the motivation. There's nothing that focuses the mind better than the realization that the world will go on turning without you. Partially also my retirement was imposed by the financial downdraft of 2008 which sent many of those who might have become my design clients—and most of my existing ones—scrambling to rescue what was left of their savings. Surely when the financial washout has faded from memory people of means and taste will once again aspire to building beautiful boats. And when that happens, God and my rebuilt heart willing, I'll be right back at it.

In 2008 I sold the nearly 200 designs of Paine Yacht Design to my employees Mark Fitzgerald and Ed Joy. It is they, along with Lloyd Bracy, Chris Davis, Jim McQuaide, Doug Zurn, my twin brother Art, and my wife Debby, who far more than I can be credited with creating a fleet of some of the finest yachts ever built. If placed end to end the products of their artisanry would stretch more than six beautiful miles! This book is intended as a celebration of their untiring efforts over many long years. Mark and Ed have gone on to establish their own design offices wherein you may delve further into the legacy of Paine Yacht Design and gain access to construction rights should you wish. The best of the yachts featured in this book are as good as they get and surely more of them ought to be built.

Looking back on my career I realize how fortunate I was to have ventured into it when I did. My aspiration to design yachts coincided with an unprecedented post-World War II expansion of Northern hemisphere economies. Before that war the number of people who could afford to build a yacht numbered in the hundreds. The mass-production of yachts in order to make them more affordable came into being with the advent of fiberglass. Governments and Wall Street expanded the money supply through massive borrowing against the well-being of future generations, and the illusion of economic growth without limit encouraged the wealthy and even the not-so wealthy to purchase my creations. If you detect a caveat in this sentence you sense correctly. The limits that global warming and resource depletion and debt repayment and humane care for the disadvantaged among us will impose upon future consumption are only now being perceived. They have put the final bracket on my wonderfully productive career as I suspect they will upon many facets of the boatbuilding industry.

Allow me to make some predictions of the future course of yacht design, which may spill over into musings about the future in general.

Yachts of the future will be fewer in number, better in quality, and built to last longer than those of today. They will be made use of more constantly than those of past generations. As will, I believe, all manmade products. Our earth cannot for much longer sustain mass-consumption for its own sake and the day will come when we will be ashamed to have ever willingly called ourselves "consumers". We are depleting the finite gifts stored within the crust of our planet at an alarming and suicidal rate. Not being suicidal by nature, man will cease doing so. Nor can we thoughtlessly continue converting fossil fuels into carbon and depositing it into the atmosphere at anything like the pace we have done in the recent past. We will have no alternative but to produce far fewer "things", which last far longer, and find ways to share these less numerous items more equitably so that each of them produces sufficient enjoyment to compensate for the unavoidable environmental damage its construction entails.

With fewer yachts in our future it will surprise me if many of the world's marinas are not closed, their pilings plucked from the mud and their environments returned to the wading birds they displaced. We will rediscover the preciousness of watery marshes and value them more highly than receding rows of faded gelcoat. As a hopeless boat lover my first visit to any new city on many a business trip included walking the floats of every marina I could find. With each passing year it became more obvious to me that the majority of these yachts ceased to actually be used. Many of the sailboats would be stripped of their sails, the motorboat bottoms fouled with marine growth. Surely if any resource goes unused past a reasonable length of time it should be ground up into its constituent elements and a new use found for them, and many mass-produced "yachts" fall into this category.

An essential reality of yachts is that they are a form of overgrown toy—a toy for those of considerable means, one must admit, but a toy nonetheless. Like all toys, yachts bestow the greatest joy when brand new. While the shelf life of a yacht is a great deal longer than a Barbie Doll or GI Joe, there can be as little joy in owing many a ten-year old "yacht" as there is in owning a much fondled doll a fortnight after Christmas. A yacht's monetary value passes through the same stages as any other toy, decreasing rapidly to near nil when the other kids on the block all boast of having one just like yours.

Which begs the question what to do with the surplus yachts built during recent decades of wanton overconsumption which serve no remaining purpose. I have heard it suggested that fiberglass can be recycled by incineration. The resin will burn away creating heat which can produce power by generating steam as is common in household waste recycling. The remaining glass is inert, non toxic, and could be used as filler in pavement, insulation, tiles or the like. Needless to say the ballast keel, in the case of a sailboat, will be of either lead or iron, which can be 100 percent recycled.

I believe—and I know it's a far from commonly held belief—that in the near future humanity's entire motivation for economic activity will undergo a revolution. Acquisition and consumption—the former motivations for work—will be replaced by an effort to redress the terrible (and terror-ism engendering) disparity between rich and poor. The embarrassing fact is, "We" have far more than enough; "They" are dying of starvation. Only when we have addressed this disparity will the rewards of yacht ownership be justifiable for those who take the lead in bringing about a fairer, safer from terrorism, and more ecologically sustainable world.

Which brings me to my musings of the yacht of the future. A yacht is and will always be a frivolity, a toy, a plaything—nobody ever needed one. It exists solely to engender, for odd sorts of people like myself who appreciate them, pleasure. One of the joys a yacht elicits is prestige. It sets its owner, or, if my musings of the future are anything like correct, its part-owner, apart. Since large yachts confer more prestige than midsize ones, I expect them to become ever larger in the future.

Having let the "luxury" genie out of the bottle, I expect future yachts will contain all of the luxuries we have become used to in our homes plus many that are yet to be born. There will be a stimulating competition to power these devices by ever lighter-in-weight and more energy efficient means. As worldwide communications become cheaper many yachts will serve as workplaces for their owners, (or co-owners) which will enable them to be more constantly on the move. Less reliance will be placed upon fossil fuels to power the next generation of yachts (as well as all other vehicles). Solar and wind and biologically generated fuels will replace oil and coal as surely as they will ashore. As yet undreamed-of devices will emerge which, when trailed in the wake of the sailboat of the future, will leave its tanks or more likely its batteries or hydrogen bladder fuller upon reaching its destination than when it departed.

Anyone who ever even dreamt of owning a yacht had best be financially successful, for yachts will ever be far from cheap to buy, maintain, or get rid of. The one way in which yachts will become more affordable will be the emergence of new ways to share their ownership. I was a reasonably clever guy who came into a world full of newly prosperous individuals wanting beautiful yachts. Many of these new owners failed to consider how much time out of their working lives could be devoted to actually using them. Surely in the near future some lad far cleverer with a computer than I ever was will write a computer program that will enable twenty or so would-be yachtsmen to share one very beautiful yacht as if it were solely their own. One really exceptional yacht will replace nineteen mass-produced ones and the environmental depletion involved in producing them. One really lovely marina will replace nineteen that can be restored to habitat for pelagic waders whence those fewer and lovelier yachts may wander.

I foresee yacht ownership going full circle with renewed interest in small yachts- ones that can be easily gotten going and do not involve huge economic impact to build or maintain. The "daysailor" craze of the present will continue for the simple reason that it makes the most sense for people too busy to spend long stretches of time on the water. The most fun in boating is to be had close to the shore, for it is there that there is a view apart from two shades of blue or gray separated by a straight line. This fact plus a renewed interest in thrift will result in a resurgence of small sailboats. Once an alternative to fossil fuels has been developed—and it

will happen far sooner than most think—motorized yachts will once again supplant sail for the simple reason that they are far easier to use.

There will always be yachts. In the future we will find ways to make more frequent use of them. The era of mass-production to grind out as many as possible will be replaced by one of artistic competition to create a few magnificent ones that will be broadly shared. And what lovely creations of the next generation of designers they will be!

My favorite poem, by Robert Frost, is entitled "Fire and Ice".

Some say the world will end in fire,
Some say in ice.
From what I've tasted of desire
I hold with those who favor fire.
But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice

My career spanned a period in human history during which we in the Western nations seemed devoted to consuming earth's gifts within a single generation. Our economies were on fire and I played my part in the orgy—indeed I reveled in it. It was a nice party and I did what God put me on this earth to do—I fathered over one thousand beautiful yachts.

As I write these words the party's over. How long we remain mired in the deep freeze of economic retrenchment no-one can say. I can predict, though, that human ingenuity and the necessity for survival will eventually contrive a way for us all to live sustainably and equitably and to clean up after the party. And when that happens, a few of us will celebrate by going to sea in yachts.

The world will end for each of us, inevitably, whether by fire or ice. When I was fourteen years old I built a plywood boat and took it out on windy days when my mother didn't know where I was and tempted fate as all teens do. I stripped down to my cutoff jeans with my favorite girlfriend by my side and we hung from the hiking straps and got her off on a plane with the spray flying in our faces like a firehose. When you pulled in on the sheets she'd leap like a thorobred out of the starting gate and we'd just scream at the top of our lungs in the searing sun.

I'll never understand why ANYONE wouldn't spend their life designing yachts.

Chuck Paine
December, 2009

EPILOGUE

MANY READERS OF THIS BOOK will be aware that I retired from full-time yacht design in 2008. By that time C.W. Paine Yacht Design, Inc. had grown to be a large firm by yacht design standards, with an annual gross approaching $400,000, five employees each with a CADD station and software licenses and company matched 401(k) plans and paid vacation and sick leave and annual bonuses. It had become, without my knowing it at the time, "too big not to fail".

Meanwhile Mr. Bush was fighting two distant wars and giving his cronies tax cuts at the same time and deregulating the financial industry- after all, the free market would police the banks, right? When the inevitable crash came, it came fast- in the beginning of October, 2008 the office had signed contracts on more design work than ever before in our history. By the end of October, 2008, every client- including two billionaires- had canceled his order. "Yeah, I know we have a contract. But the world has collapsed- so sue me!" Four full-time and two part-time employees, with collectively five wives and seven dependent children, were put out onto the street.

I have to admit, though, that after the initial shock I enjoyed my forced retirement. I've traveled the world and spent much of my time drawing and painting. I teach painting occasionally, and even manage to sell my artwork, which most artists don't, and make an income of perhaps one-tenth what I did as chief designer of a yacht design firm, which is enough.

Recently, though, the old itch has returned. I see as-yet unborn yachts in my sleep, crying "let me out." And a few of my old boatbuilder friends have asked, or rather pleaded with me, to design "just one more." And fool that I am, I have said yes. The Paine 15, York 18, York 19 and Bella Luna are the results, and they are now included in the pages of this e-book. I was also hired by an enthusiastic new owner to redesign the mast and sailplan of my ten-year old Paine 25, and felt obliged to accept.

So yes, I'm designing yachts again. Nothing very large- I have to do all the drawings myself. And no motorboats- I just don't know enough about them. And I'm 75 years old and who knows which breath might be my last? If you want something that looks like it was designed by Nat Herreshoff, but with a modern keel and rudder, and if you're patient enough to put up with a half-time designer, and above all if you are an ethical person who will actually pay my modest fees, I might just do it for you.

York 18

York 19

Bella Luna

Paine 15