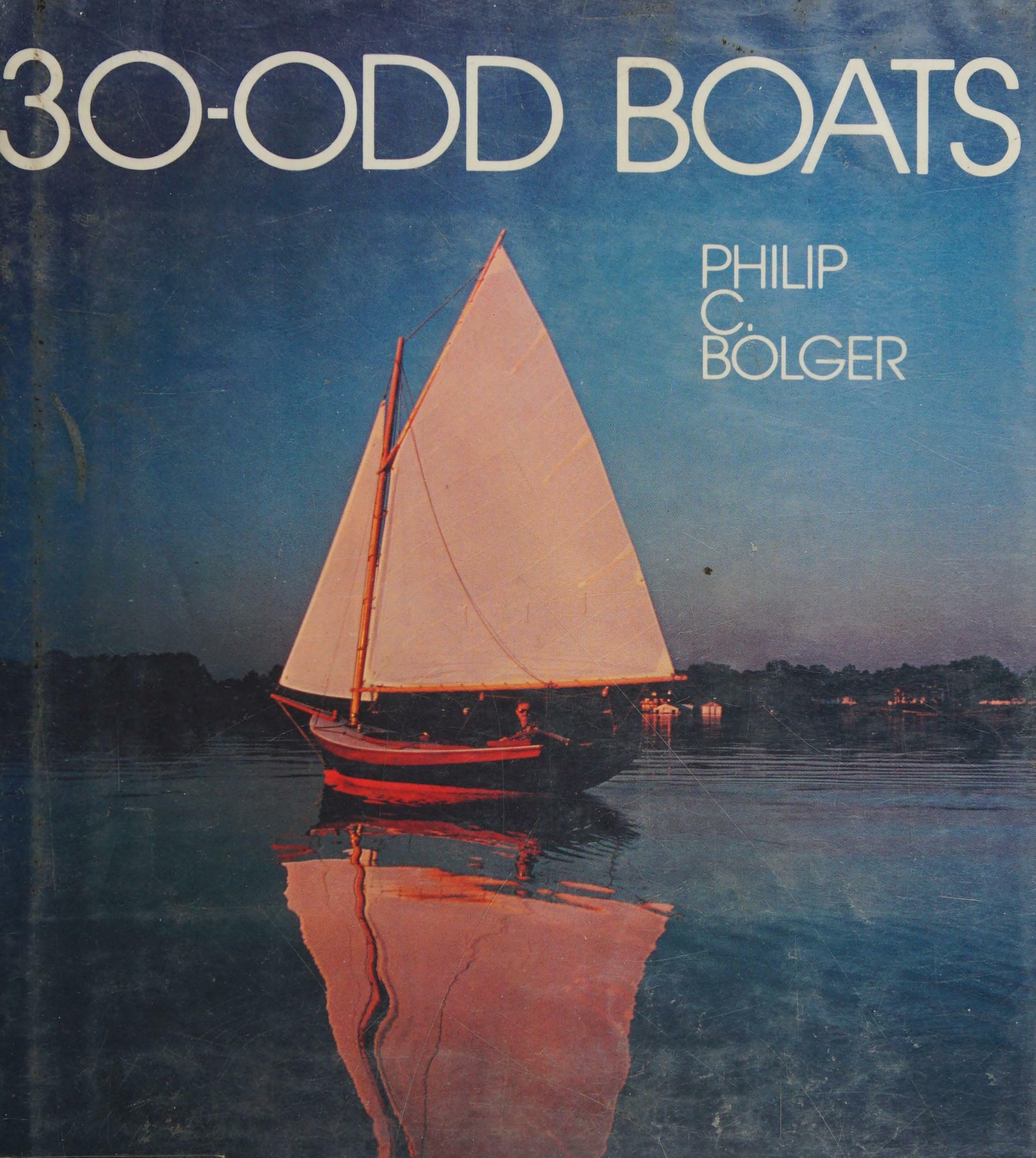
30-ODD BOATS

PHILIP C. BOLGER



ISBN 0-87742-

PHILIP C. BOLGER

30-ODD BOATS

Naval architect Phil Bolger lets his imagination soar once again in this, his fourth book of boat designs. The Bolger flair appears in every one of these 39 designs—from an 11½-foot sailing pirogue to a 26½-foot steam launch to a 115-foot full-rigged ship. In between are simple daysailers, cruising sharpies, fast powerboats, and lovely, traditional sailing craft. His talent and eccentricities are self-evident—and only he can describe his own output in such an analytical yet entertaining fashion.

The plans are reproduced large enough to allow close scrutiny, and there are designs for building in steel, aluminum, and wood (including cold-molding).

Bolger tells you the origin of each design—sometimes a straightforward commission, sometimes a request for a solution to a specific problem, sometimes a contest that piqued his interest. And his solutions never fail to be unique. He also documents a few of his failures by sharing the lessons he learned.

Even the names and labels Bolger attaches to his boats are imaginative: *Charity*, for example, is labeled LCLM (for landing craft lawnmower); *Sparkler* is a poor relation to a Lightning; *Fiddler II* is a marine van. Etc.

Interspersed among the relevant design comments (on leeboards, yulohs, bow steering, dipping lugs, sailboards) are philosophical arguments for and against various causes: taxation, equal rights, planned obsolescence, etymology, low-cost housing. The Bolger mind never rests.

If you're already a Bolger fan, you now have a new prize for your collection; if you haven't met him via his earlier books, you have in your hands a great opportunity.

INTERNATIONAL MARINE PUBLISHING COMPANY
Camden, Maine 04843

30-ODD BOATS

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PHILIP C. BOLGER

INTERNATIONAL MARINE PUBLISHING COMPANY
Camden, Maine

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OTHER BOOKS BY PHILIP C. BOLGER

Small Boats
The Folding Schooner and Other Adventures in Boat Design
Different Boats

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Typeset by Journal Publications, Camden, Maine
Printed and bound by The Alpine Press, Stoughton, Massachusetts

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Published by International Marine Publishing Company
21 Elm Street, Camden, Maine 04843
(207) 236-4342

Library of Congress Cataloging in Publication Data

Bolger, Philip C., 1927-
30-odd boats.

1. Boats and boating. I. Title. II. Title: Thirty-odd boats.
VM321.B676 1982 623.8'223 82-80403
ISBN 0-87742-152-8 AACR2

Chapter 8 was originally published in *Boating* magazine. Chapters 3, 10, and 19 are based on articles originally published in *The Small Boat Journal.*

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Dedicated to the memory of Nicholas Montgomery

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Preface

This menagerie was put together to entertain and stimulate, as I've been entertained and stimulated by books of boat designs, above all those of the late William Atkin, whose career I'm more or less imitating. Like him, I'm an uneven designer and some of my efforts are much better than others. The best ones — say, the rowing-sailing dinghy in Chapter 3 and the working lobsterboat in Chapter 25 — aren't necessarily the most fun to study. I've been as candid about them as can be expected of any mortal.

I'm a card-carrying Libertarian. That means fundamentally that I think force and fraud are the only things that ought to be outlawed. I think taxation is theft, that "public property" is abused property, and that "public funds" are always mostly wasted. I think aircraft carriers and space shuttles could, and should, be built by voluntary associations an order of magnitude more efficiently than they're being built by government agencies. Just nearby in Salem, Massachusetts, coming up on two hundred years ago, the frigate *Essex,* a major warship representing as big a chunk of the

gross national product as a nuclear cruiser does now, was built by an informal group of merchants using local talent throughout. The United States Navy had no say in her design, construction, or financing, but it manned and campaigned her with famous results.

However that may be, I'm forcing nobody to build impractical boats, only acting as an impenitent accomplice when somebody wants to build one. Fraud would lie only in suggesting that they are always, or even often, as good as we hope.

Philip C. Bolger
Gloucester, Massachusetts

30-ODD BOATS

1

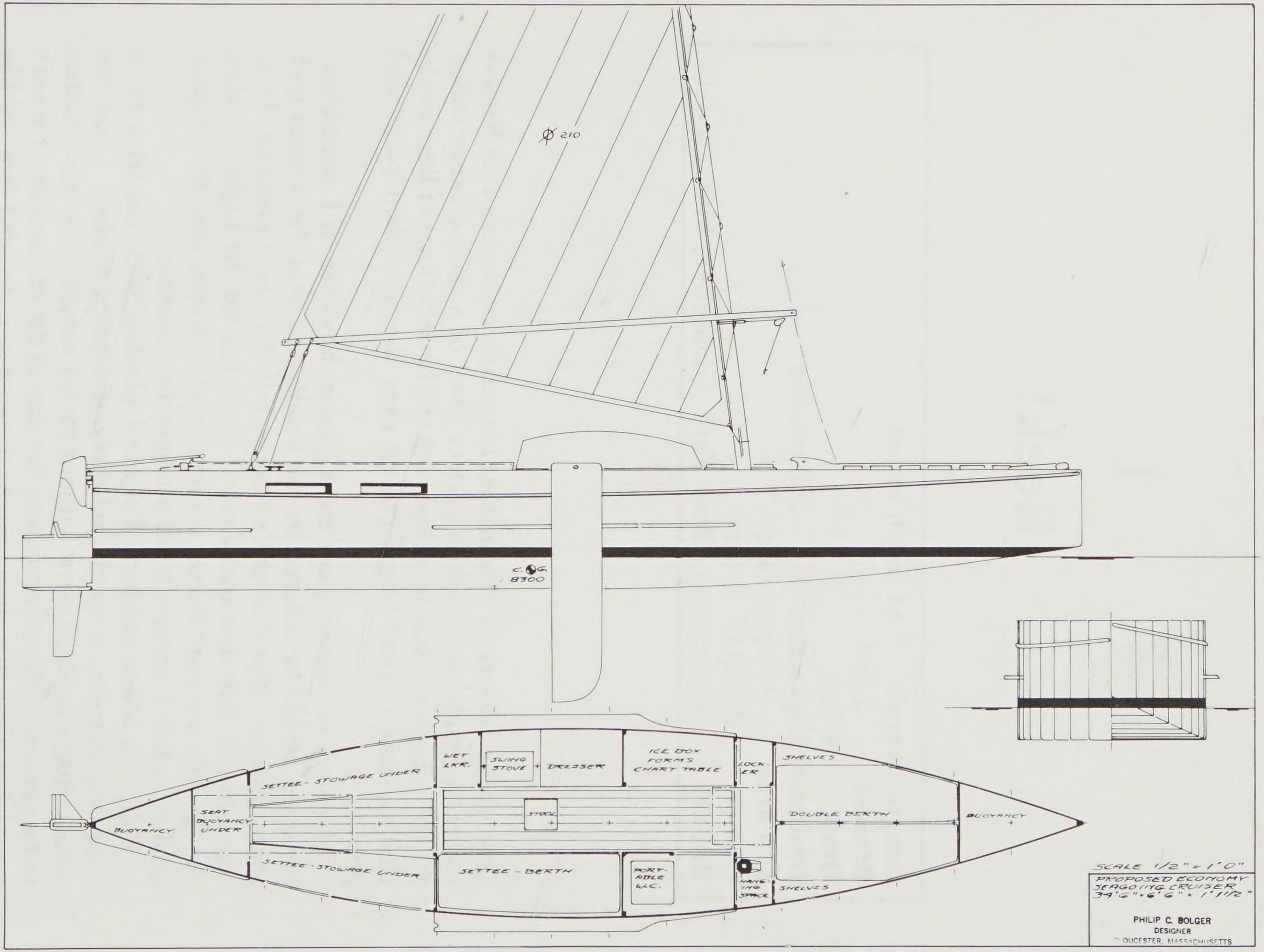
Eeek!

Length overall	11 feet 6 inches
Breadth	2 feet
Draft	4 feet
Designed displacement	280 pounds
Sail area	24 square feet
Owner	Philip C. Bolger
Builder	Montgomery Boat Yard, Gloucester, Massachusetts

One of the editors of *WoodenBoat* magazine commissioned Robert Baker to design and build a perfect jewel of a sailing canoe called *Piccolo*. The result was in a class with the better efforts of Benvenuto Cellini, and I spent hours poring over the published plans and photos.

Her very perfection gave me a qualm, however. If I owned her, my sport would be marred by the deadly fear that she'd meet with some disaster. Not that she's fragile, but that she's precious. Dare one run her into that rocky cove? Take her on the highway when the drunks are out? Better somebody else should take the responsibility, while I admire from a respectful distance.

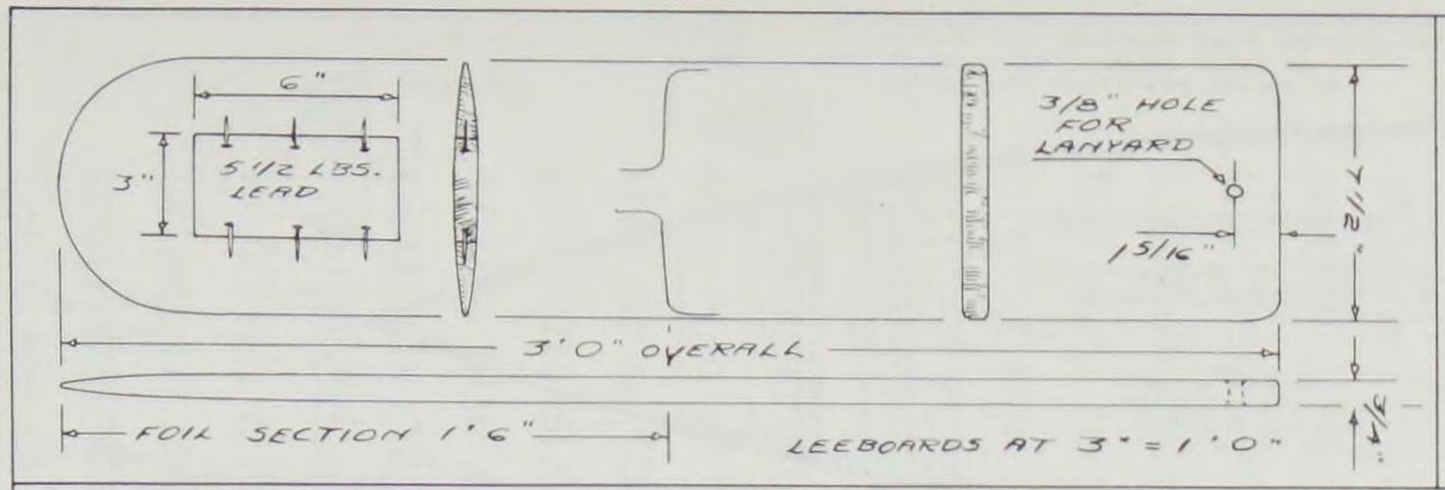
Full stop. New subject. I'd been playing with the idea for a seagoing sharpie, a quick-and-dirty seaworthy cruiser. I had the notion that a pointed stern without rocker would allow more ballast to be carried without increasing the size of the midsection. I wasn't sure what vices this shape might develop and decided that I'd like to try it first at a smaller scale.

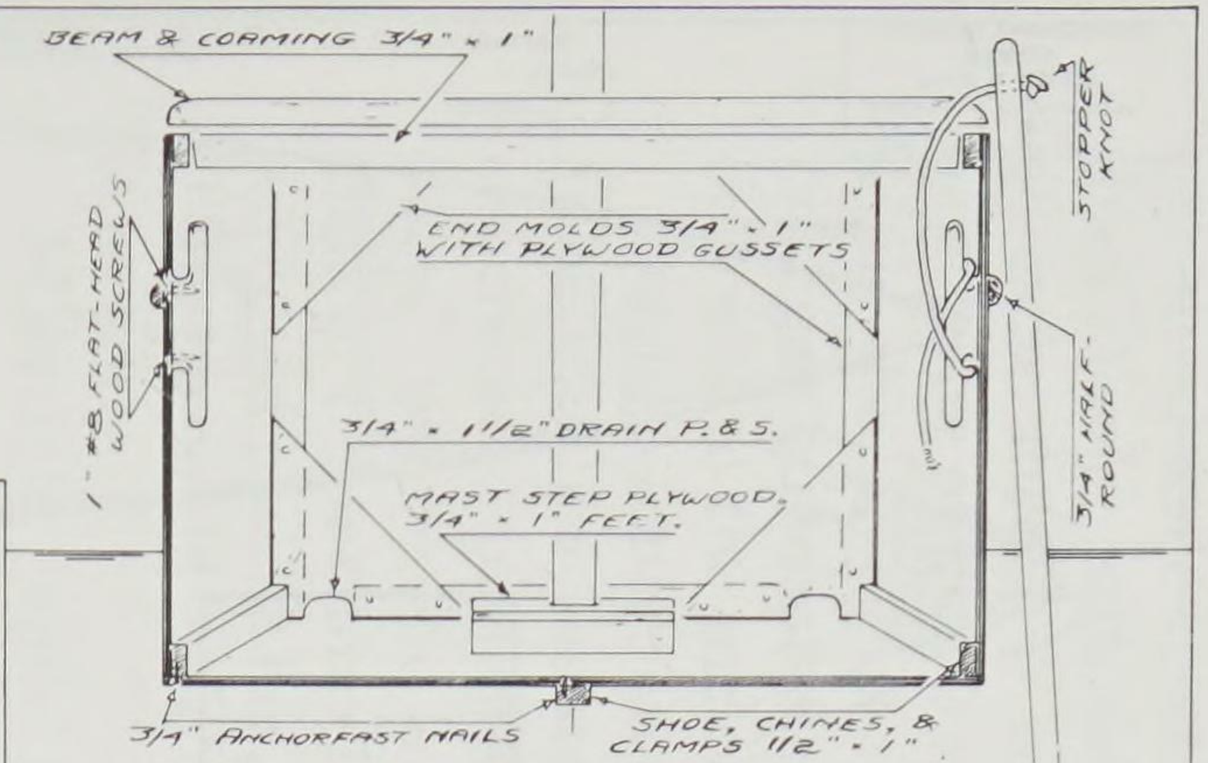


SCALE 1/2" = 1'0"

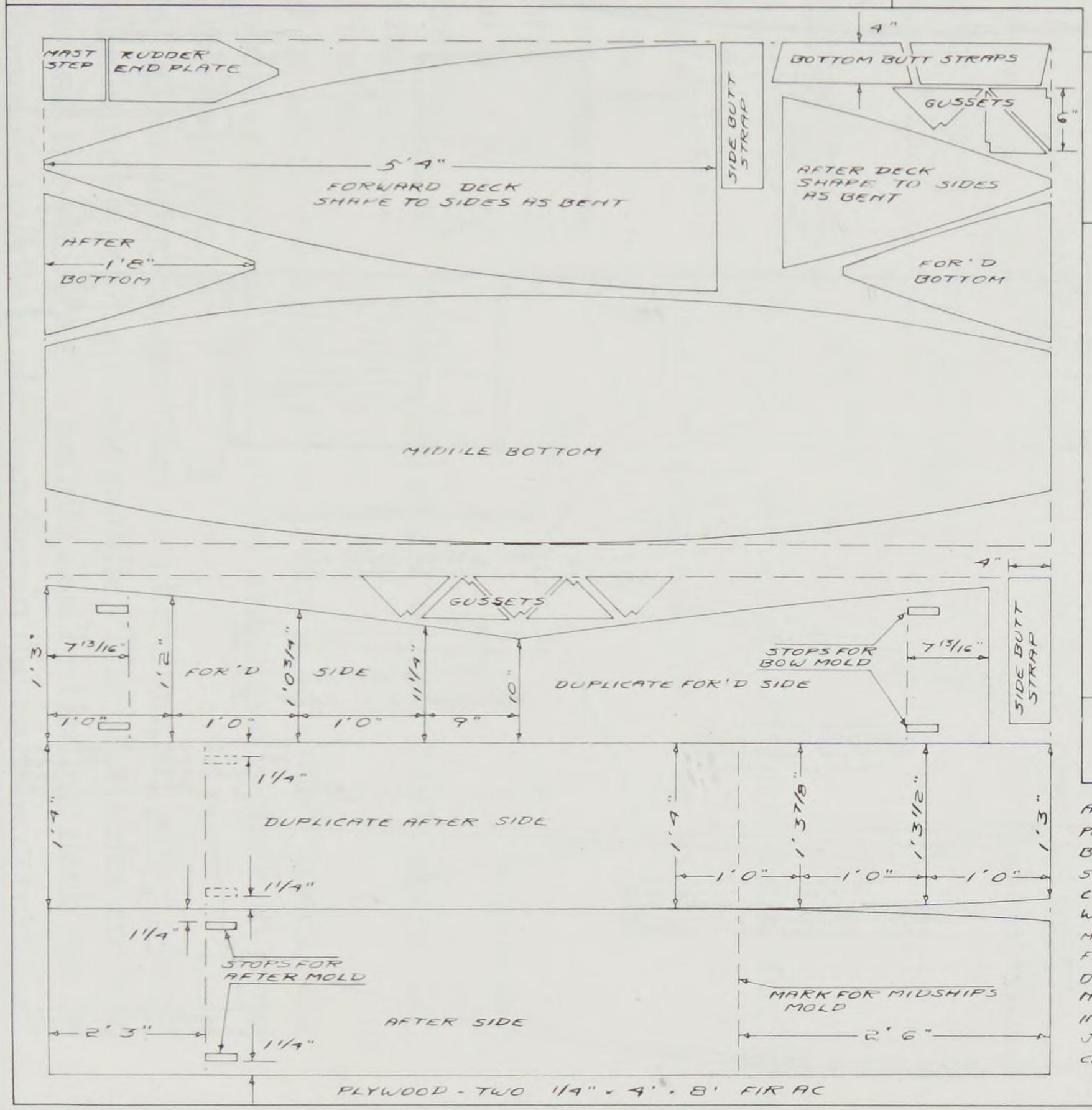
PROPOSED ECONOMY SEAGOING CRUISER
34'6" x 6'6" x 1'1 1/2"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

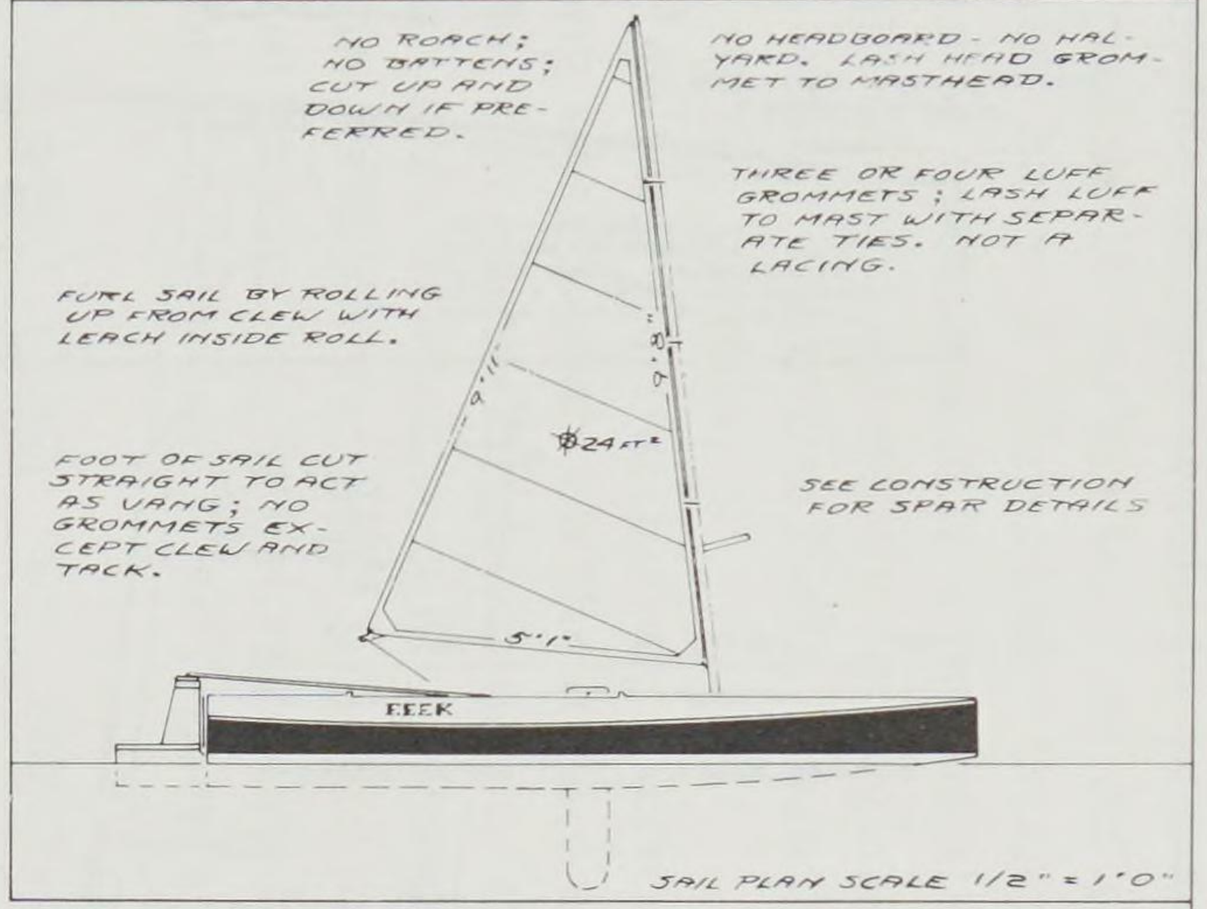




MIDSECTION LOOKING FORWARD - SCALE 3" = 1'0"



PLYWOOD - TWO 1/4" x 4' x 8' FIR AC



SAIL PLAN SCALE 1/2" = 1'0"

ASSEMBLY: READ 'INSTANT BOATS' BY H.H. PAYSON. ASSEMBLE SIDE PANELS ON BUTT STRAPS. ATTACH STEM & SKEGPOST TO ONE SIDE. BEND SIDES AROUND MOLDS AND CONNECT ENDS; TIE IN TO MIDSHIPS MOLD IF NECESSARY. INSERT AND FASTEN CHIMES AND CLAMPS. MARK AND INSTALL BOTTOM. FINISH BOTTOM WITH WEST EPOXY OR FIBERGLASS SHEATHING. INSTALL SHOE AND MAST STEP. FILL PEAKS WITH STYRENE FOAM BLOCKS CUT TO FIT; CLEAT FOAM UP CLEAR OF BOTTOM FOR DRAINAGE. INSTALL DECKS. OUTFIT AND RIG AS SHOWN OR AS THE SPIRIT MOVES. N.B. WITHOUT BALLAST, BOAT IS SELF-RIGHTING BUT CANNOT BE BOARDED BY A SWIMMER. JURY-RIG AN OUTRIGGER WITH BUOYANT CUSHION OR P.F.D. LASHED TO UNSTEPPED MAST.

SCALE 1 1/2" = 1'0" AND AS MARKED

DESIGN #407
11'6" x 2'0"
EEEK CRUISER
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

REVISED & REDRAWN 6/20/81

FOUR 2" EYE BOLTS FORM GUDGEONS

2'

LINK ATTACHES WITH 1/4" LANYARD. STOPPER KNOT UNDER TILLER: BELAY AROUND LINK.

TILLER LINK 1" × 1" × 6'0"

TILLER LINK SHOULD HAVE RETAINING LANYARD ALLOWING ABOUT 8" TRAVEL EACH WAY FROM NEUTRAL.

SHOCK CORD RETAINERS

4'6" PADDLE

3'10 3/8"

SHEET 10' LONG
SHOTTER 5" LONG
BOTH 1/4" NYLON
NO OTHER RIGGING

SHOTTER DUMB SHEAVE

MAST 11'6" OVERALL
TAPER 2'0"
3/4"
1 1/2"

BOOM 1" SQUARE 6'0" OVERALL

MAST FROM 1 1/2" SQUARE SPRUCE
TAPER 1'4"
1 1/2"
1 1/4"

1/4" × 3 1/2" BELAYING PIN EACH END

SHEET BELAYS UNDER CLEW PENDANT ON SAME PIN.

CLEAT FOR TACK PENDANT AND FALL OF SHOTTER

REMOVABLE HEADREST

PEAK FILLED WITH CUT STYRENE FOAM BLOCKS VOLUME ABT. 3 FT.³ POSITIVE BUOYANCY ABOUT 180 LBS. CLEAT FOAM UP CLEAR OF BOTTOM FOR DRAINAGE.

CUSHIONS OR BEDDING ROLL

6" LEEBOARD CLEAT P. & S.

PEAK FILLED WITH CUT FOAM - VOLUME ABOUT 5.75 FT.³ - POSITIVE BUOYANCY ABT. 350 POUNDS

WATERLINE AT 280 LBS. DISPLACEMENT

1'4"

1'4"

1'3 7/8"

1'2 5/8"

1'5 1/2"

8"

BALLAST LEAD CUT IN TWO OR MORE SECTIONS FOR CARRYING.

1'6"

1'2 5/16"

TILLER 1 1/2" × 3 1/2" × 1'3"

CHEEKS 3/4" × 1 1/2"

RUDDER FROM 3/4" × 7 1/2"

BATTENS 1/2" × 1"

1'6 3/4"

6"

STEM FULL SIZE

18 1/2"

MOLD TO BRACE SIDES 22 3/8" APART TO INSIDE OF PLYWOOD.

75 LBS. LEAD BALLAST

CENTER OF BUOYANCY TRIMMED AS SHOWN

RETAINING BATTEN

3'8 3/4"

STERN FULL SIZE

20 1/2°

11 1/2° BEVEL

SECURE BALLAST WITH A STAFF RUNNING INTO A HOLE IN STERN BUOYANCY BLOCKS.

REVISED AND REDRAWN 6/21/81

9 1/2° BEVEL

SCALE 1 1/2" = 1'0"

DESIGN #40T
11'6" × 2'0"
BEEK CRUISER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

Aha! Association — the thing they say computers can't do yet. A one-third scale model of the sharpie would be just a little smaller than *Piccolo,* with side panels 16 inches wide to get three out of a 48-inch sheet. I would have a disposable cruising canoe, a caricature of *Piccolo* suitable to be risked in irresponsible adventures while the precious original reposed safely in a glass case with a nitrogen atmosphere. I would name her *Eeek!,* a tuneless squeak as opposed to the melody of the piccolo.

David Montgomery built her for me during a series of low tides, as he was busy launching stored boats on the high waters. He's an experienced professional, but he hadn't built one of these "instant boats" before and wasn't able to work steadily enough for best efficiency. It took him 16 hours to get her hull finished and painted so we could paddle her, and another eight hours to finish off the rig. I think he could have done it in two days if he'd been able to work at it steadily.

Materials, with some scrounging, cost about $500. (Were *Piccolo*'s much more? Perhaps not; she must have been all labor.)

With a seven-foot double paddle (a Bart Hauthaway paddle, much too good for the likes of *Eeek!*), she went pretty well, into and across "wind 20 knots gusting to 30," not much troubled by a small chop. The sides are too high to be comfortable with a double paddle, and they have the disconcerting effect of limiting the lean of the paddler's upper body. Once she gets over to a certain angle, long before the gunwale goes under, a paddler sitting upright has no way to recover. Unless he instantly drops flat on his back — an unnatural reaction for most — he's pulled past beam ends and spilled out into the water. The boat will then right herself but resist all his efforts to get back in from the side or either end. It's necessary to tie a life jacket to the end of the paddle, or, much better, to the unstepped mast, and lash this makeshift outrigger across the deck to make her hold still to be mounted. (It's likely that if the bottom six inches or so of foam buoyancy was removed from the ends, she'd be much easier to get into. She'd still have about 300 pounds of positive buoyancy and would also have a place to stow the paddle down inside.)

With the rudder shipped, the tiller can be clamped with enough offset to make handy use of a single paddle. The high sides are less troublesome and the shorter flat paddle can be tied on deck out of the way. The single paddle is also handier in the narrow creeks that are her most suitable habitat.

Under sail you lie flat on your back with your eyes just above the

Eeek*'s first trial under sail. (David Montgomery photograph)*

gunwale. This puts the weight low enough to give a respectable range of stability. She sails and handles quite well. Not to stay with a Laser, you understand, but she gives a good feel of sailing, points well, and tacks and jibes reliably. The supine helmsman's feet against the heel of the mast enable him to lever himself over to the weather side to increase her power to carry sail. The sprit boom, holding the clew down, allows the sail to be flattened in a breeze and keeps it docile running before the wind.

Sail can be furled by sitting up very carefully, starting the snotter, freeing the clew, and rolling the sail up with the leech inside. One tie at the foot will hold it in a neat sausage up the mast. (This method of furling works well at least up to the 140-square-foot sail of my *Dovekie*; I'll be interested to see how much farther it can be carried, since it has considerable advantages over rolling around either the luff or the foot.) From a sitting position, one can lift the mast out and lay it on deck, or drop it overboard to use as a drogue. Given the choice, I'd just as soon beach her before furling; I'd hazard the guess that I would capsize her about one time in five of trying it afloat.

Eeek! unballasted is, in fact, most suitable for very shallow or very narrow water — preferably fairly warm water. With ballast she becomes less of a balancing act. With 40 pounds on her bottom, she can be entered over bow or stern without resorting to the outrigger trick, and of course she's much less likely to go over in the first place. With 75 pounds, she seems not desperately dangerous to go alongshore in. The lead can be in small enough chunks to be taken out and carried easily; its effect on her portability would be an extra round trip or two over the portage from the car to the water. The stripped hull weighs 60 pounds. The deep stern's buoyancy allows the ballast to be placed at the after end of the cockpit, where it doesn't interfere with sleeping in her. It makes quite a neat foundation for a pillow. With the sail stretched over the cockpit, she becomes a snug camping shelter — as long as the resemblance to a coffin doesn't put you off.

2

Dynamite

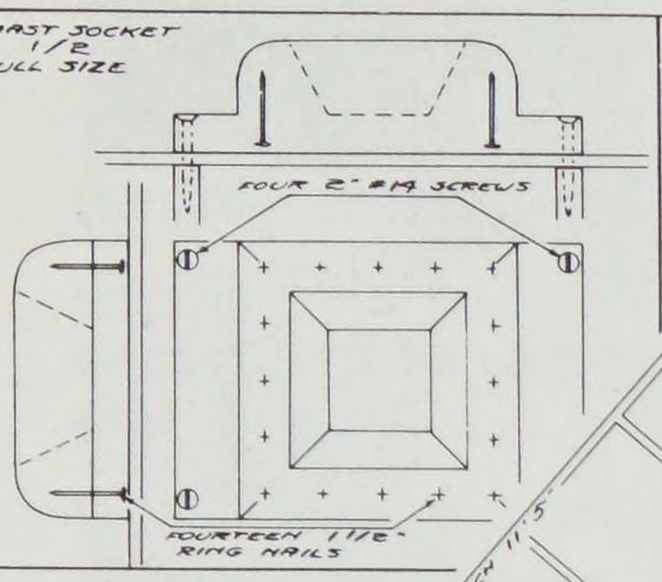
Length overall	15 feet 11 inches
Breadth	2 feet
Draft	3½ inches/2 feet
Designed displacement	250 pounds
Sail area	43 square feet
Builder	Harold H. Payson, South Thomaston, Maine

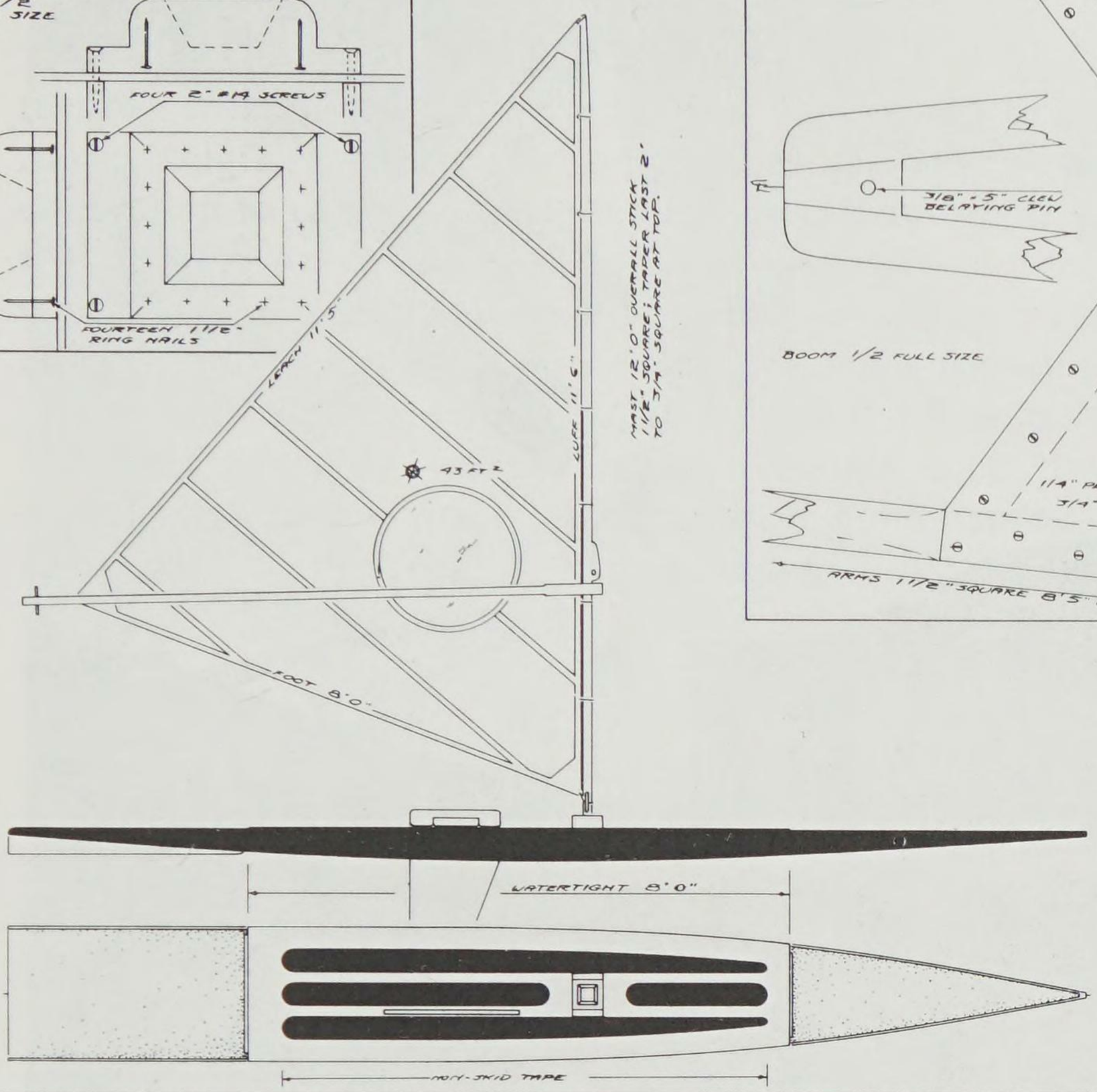
Harold (Dynamite) Payson, plywood expert and plans merchant, asked me to design a free-sail board for his stock. I was dubious, having found board boats hard to do well. As for the free sail, my older brother made one about 1938 that was meant to be used on skates, but I liberated it in his absence and used it in a dinghy I had at the time. I doubted that this experience qualified me to go into competition with Windsurfer.

However, when Dynamite makes a suggestion I always give it a lot of thought. He's one of those people who don't overwhelm you with brilliance on first acquaintance, but you gradually notice that whenever you get an opinion out of him, he always turns out to be right. I know two or three other people like that, and I sometimes wonder if civilization doesn't depend on them. I toy with a theory that there's a certain minimum number of them needed, and when a country — say, Iran — drops below the critical number, it disintegrates, socially if not physically.

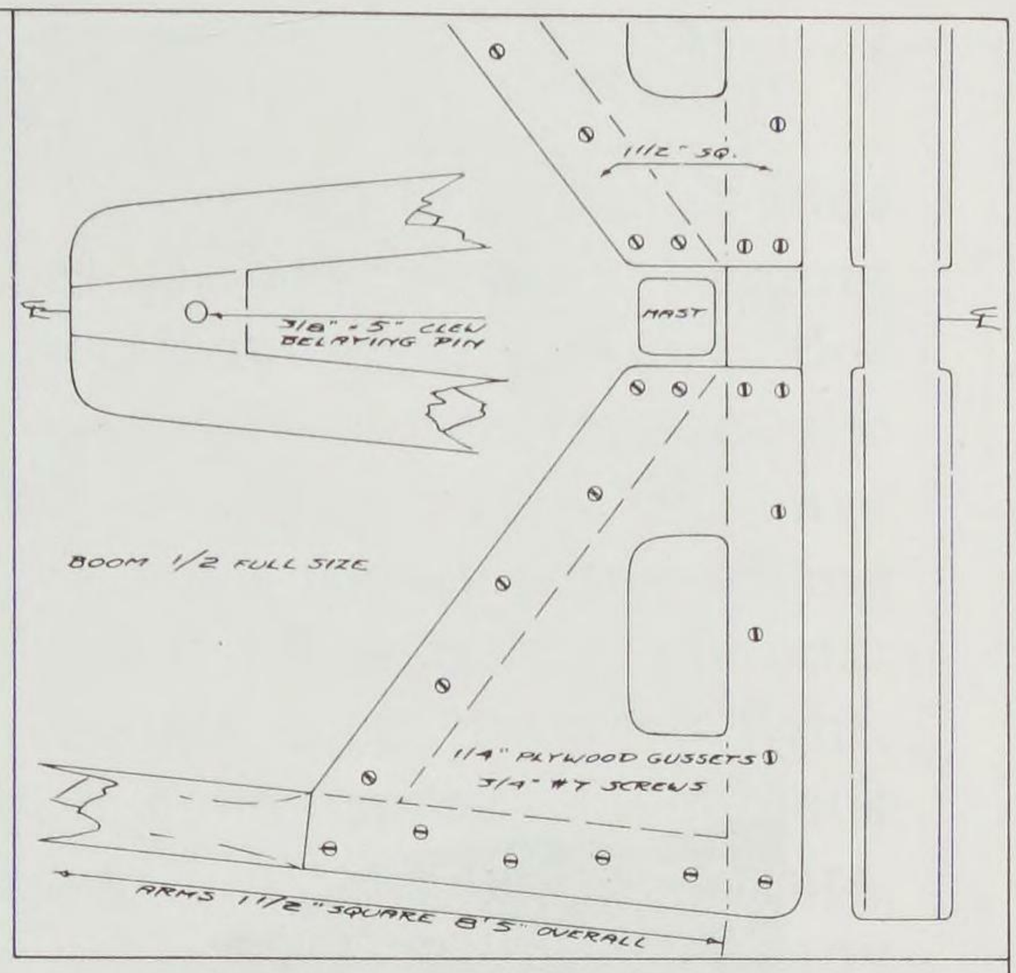
Thinking about it sporadically, I reflected that the reason I'd had

MAST SOCKET
1/2
FULL SIZE





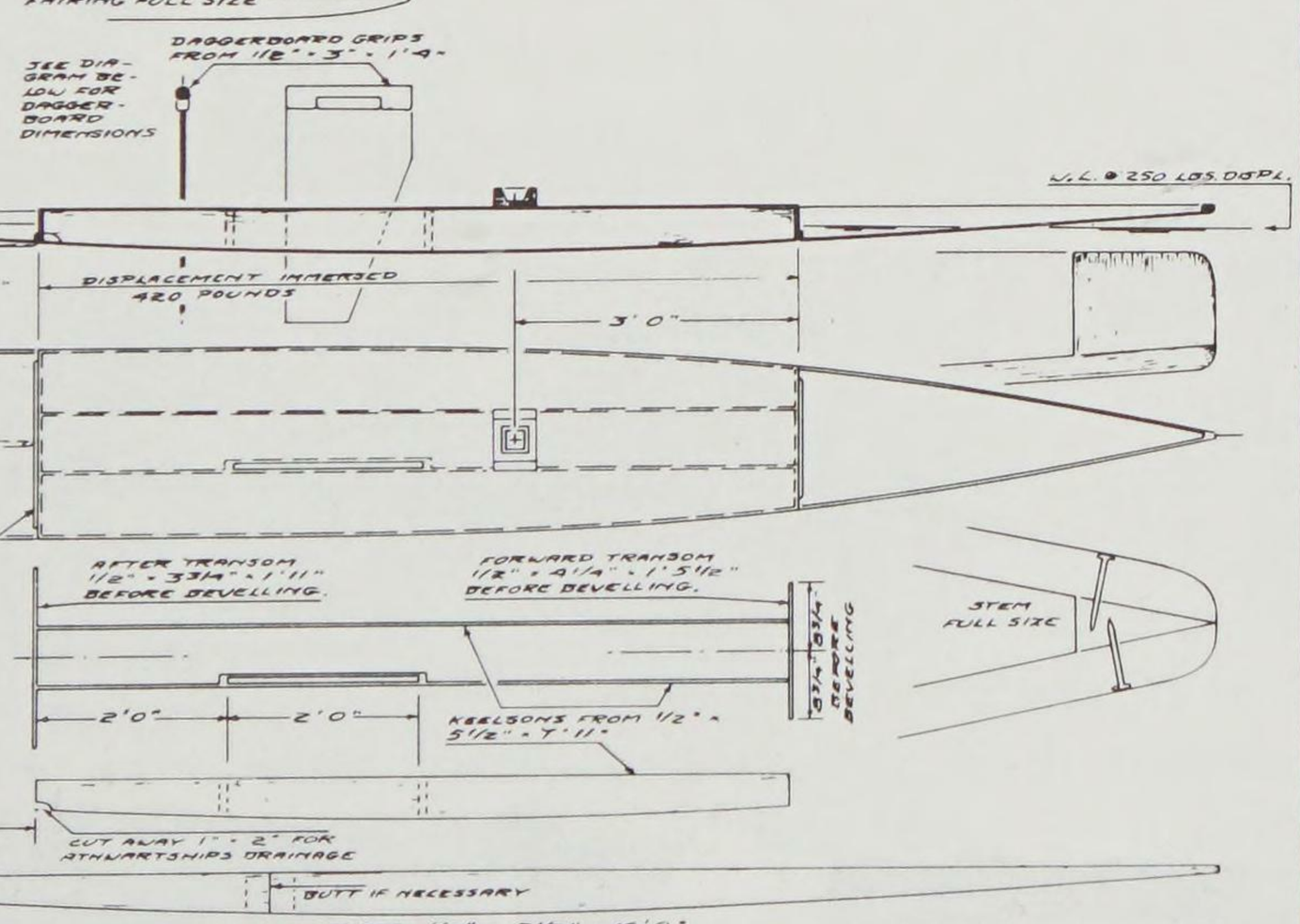
MAST 12'0" OVERALL STICK
1 1/2" SQUARE; TAPER LAST 2'
TO 3/4" SQUARE AT TOP.



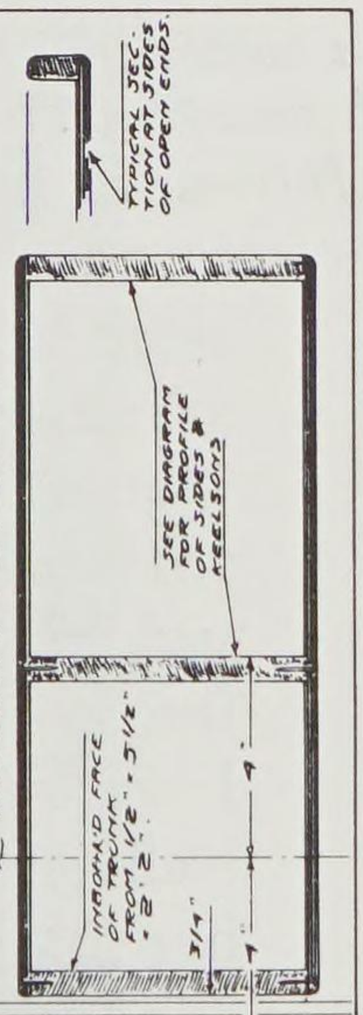
SCALE 1" = 1'0"
DESIGN #406
15'11" - 2'0"
for H.H. PAYSON & Co.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DAGGERBOARD EDGE
FAIRING FULL SIZE



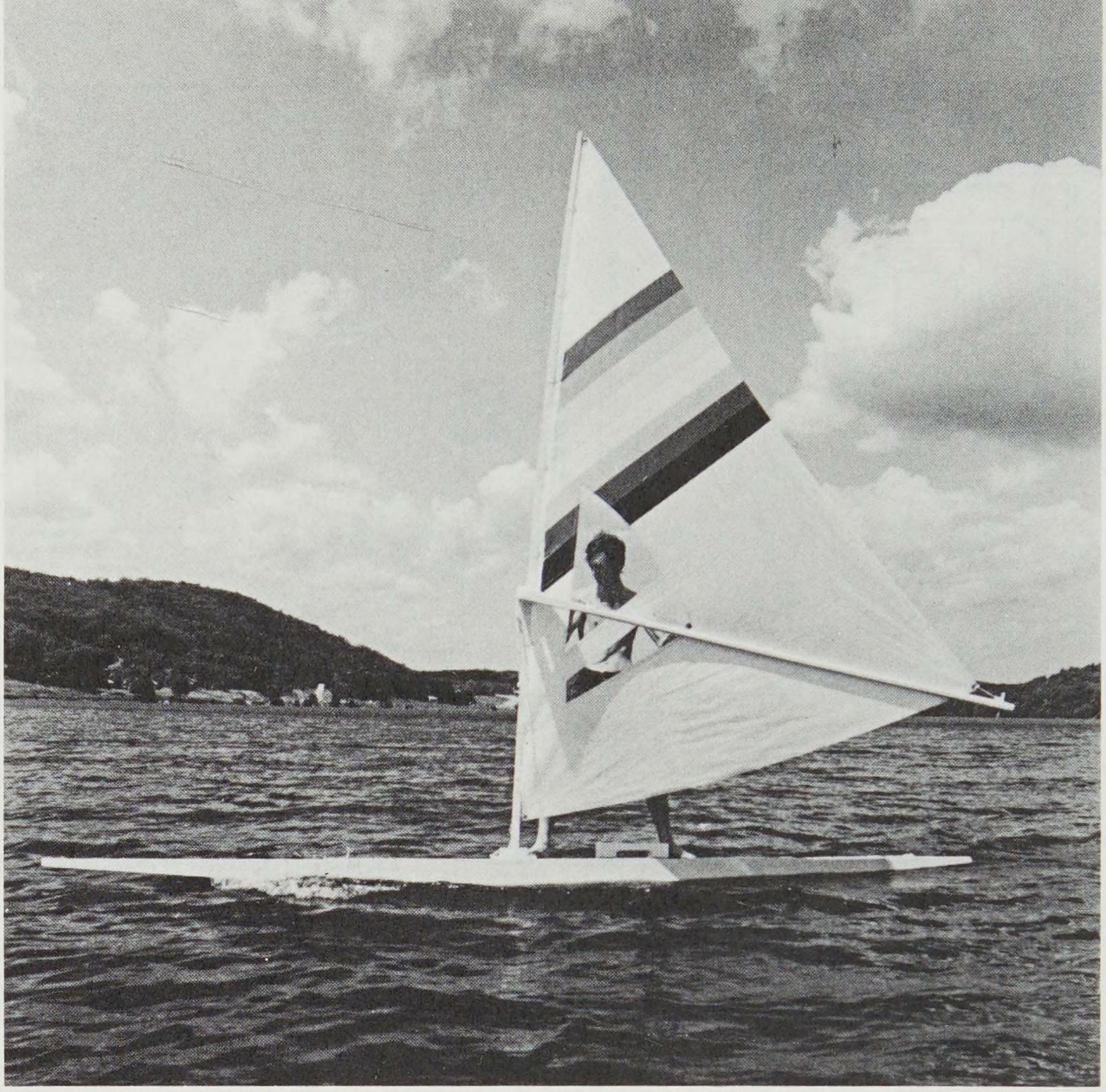
TWO 1/4" - 4' - 8' SHEETS AC PLYWOOD NATURAL WOOD SPRUCE OR CEDAR



SCALE 1" = 1'0"
AND AS MARKED

DESIGN #406
15'11" - 2'0"
for H.H. PAYSON & Co.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



for a bigger sail.
Julian photograph)

mite *has a wake*
swath of mown
(Jeff Julian
raph)

trouble with board boats was the weight of the decking. It adds more weight than the bottom because it has to have framing equivalent to the support the bottom gets from water pressure. But the deck is only needed to enclose enough volume to float the weight. I worked it out that an 8-foot-by-2-foot box would have enough buoyancy, needing no butts. Then a free-flooding fairing could be added at each end to smooth up the flow around the box. Needing no deck or frame, these fairings could be very light. Harold was skeptical about this reasoning and carved a foam block to fit in the bow, in case the sailboard developed nose-diving habits. As usual, he was right; the foam was needed in winds of any strength.

I thought of giving the sides a slight flare. Using the same straight side planks, this would have swept the bow higher. One's first thought is that this would be better in choppy water, but I'm not so sure. I was sure that the low bow would be faster in smooth water. She was simpler to build (also to design, which may have biased me) without flare, and I let that decide the issue.

The straight-arm boom was like the 1938 sail. I think this geometry was invented by A. S. deW. Herreshoff, but his had twin heel lifts and the cross-bar was a strut in pure compression. The socket is my own idea. I love to suggest crudities like this, which look so primitive that nobody thinks they'll work. Sometimes they do, and this one apparently does if the retaining strop is exactly the right length. It'll be appreciated by anybody who has tried to invent a cheap universal joint.

I wasn't on hand for the trials. Never having sailed one of these things, I was glad to leave it to an expert. Dick Cadwalader was the test pilot. Harold reported: "At first trials of the board I thought for a time that the thing would never take off and go because of the shifty N.W. winds. I was with Jeff Julian, the photographer in *June Bug* [see Chapter 3], and we were about neck and neck until a puff of wind caught the board and off it went and left us in a hurry. I watched the wake very closely and what little there was, was flattened right out. The water behind her looks as if someone had mowed a swath of lawn with a good sharp lawnmower . . . . Dick says she does everything a good board should do plus having good stability . . . ."

A few small corrections, precise height of the boom and such, have been incorporated in these corrected plans. Considering my innocence of experience, choose one of the following: (1) Bolger has superior grasp of the principles of naval architecture; or, (2) he's shot with luck; or, (3) free-sail boards are not very hard to design.

As noted on the plans, the rig is trainer size. We discussed increasing it but concluded that the design was aimed at novices. I gather that somebody who has mastered these things will want more sail, but such a person should also know how much she wants. Every so often somebody asks me how much sail area some given boat should have. I then ask how strong the wind will be.*

---

*In Patrick Ellam's fascinating book *Sopranino,* he mentions having suggested to his designer, the late Laurent Giles, that a certain jib should be about 60 square feet in area. Giles said, apparently with a straight face, "Wouldn't 62 be better?" Ellam seems to have swallowed this Gamesmanship gambit whole. I've often wondered if Giles expected him to or not.

3

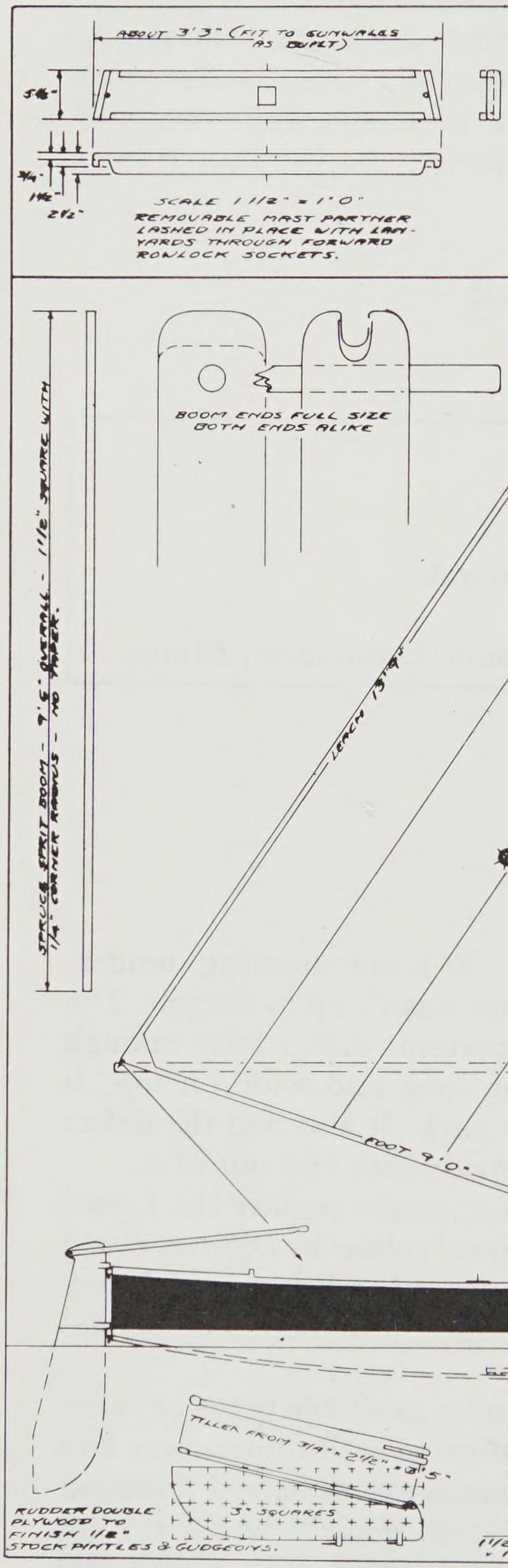
June Bug

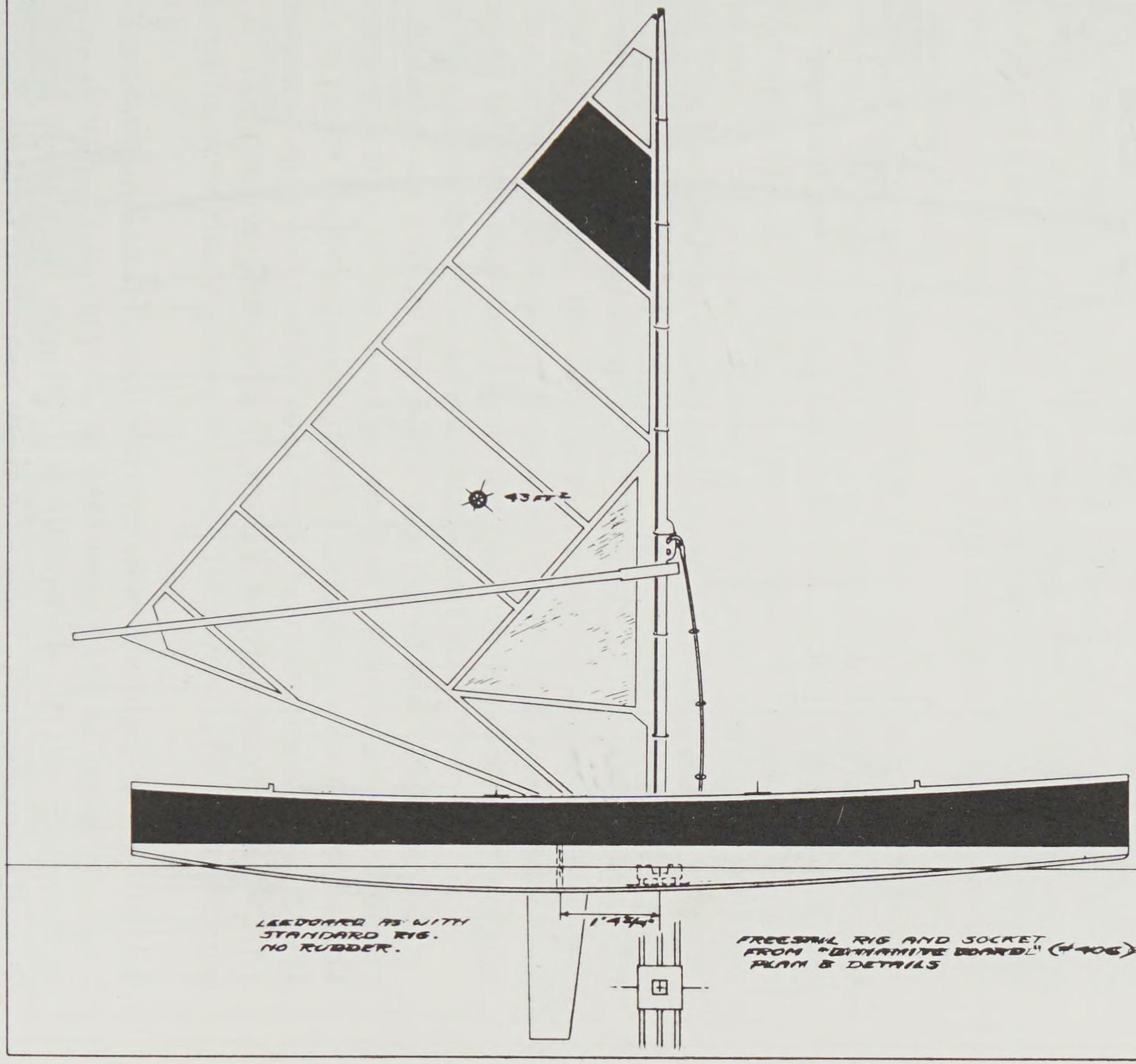
Length overall	14 feet
Breadth	3 feet 3½ inches
Draft	4½ inches
Designed displacement	450 pounds
Sail area	59 square feet
Builder	Harold H. Payson, South Thomaston, Maine

June Bug was originally designed as a home-mooring tender, without a rig, to replace a light dory that wasn't up to the job. The dory, being short and narrow on the bottom, didn't have enough carrying capacity. Contrariwise, being long and wide on top, it took up too much space in the dinghy park. It also had the defect that its flaring sides required a giant stride into and out of it.

I also had in mind that the new design might replace the *Crystal* pulling lifeboat on my own cruiser. *Crystal* (plans in *Different Boats*) is a rather graceful 15-footer that has served well but is so heavy that she's laborious and tricky to launch and haul out single-handed.

What I wanted was the best compromise available between maximum capacity and stability on minimum overall dimensions and weight, with reasonably good performance under oars. I aimed at 1,000 pounds capacity in quiet conditions, good lines for rowing with up to 400 pounds load, and an empty weight under 100 pounds. The midsection is identical to that of the *Tortoise,* a


ABOUT 3'3" (FIT TO GUNWALES AS BUILT)
5½"
¾"
1½"
2½"
SCALE 1 1/2" = 1'0"
REMOVABLE MAST PARTNER LASHED IN PLACE WITH LANYARDS THROUGH FORWARD RONLOCK SOCKETS.
BOOM ENDS FULL SIZE BOTH ENDS ALIKE
SPRUCE SPRIT BOOM - 9'6" OVERALL - 1½" SQUARE WITH ¼" CORNER RADIUS - ONE END SHOWN.
LEECH 13'9"
59 FT.²
FOOT 9'0"
LUFF 14'3"
LASH HEAD OF SAIL TO MASTHEAD - NO HALYARD. LASH LUFF TO MAST WITH SEPARATE TIES, NOT LACING.
CORNER RADIUS
2'
2'
2'
2'
2'
2'
1'
¾"
1½"
1 3/16"
1 7/16"
1 11/16"
1 15/16"
1¾"
SPRUCE SPAR 15'8" OVERALL - SQUARE SECTION WITH ¼" CORNER RADIUS
STRUCK OFF FOR MAST
¾" - 3/4" - 1'7" BATTEN BLOCKED OUT FROM CHINE TO FORM LEEBOARD SLOT
MAST SQUARE PLYWOOD, 1½" SIDE
SPRUCE OR FIR MAST
¾"
1'
1¾"
1¾" SLING & THIMBLE FOR ¼" SHOTTER
1'4"
1½"
REVISED 2 FEBRUARY 7/10/81
SCALE 1" = 1'0"
3'7½"
LEEBOARD DOUBLE TO FINISH 1½"
10"
1'8"
1½" x 2½" x 10"
TWO ¾" x ¾" x 6"
RUDDER DOUBLE PLYWOOD TO FINISH 1½" STOCK PINTLES & GUDGEONS.
TILLER FROM ¾" x 2½" x 3'5"
3" SQUARES
OPTIONAL SAILING RIG MAY USE SAIL & SPARS FROM: TEAL, SURF, ELEGANT PUNT, LADYSLIPPER.



SCALE 1" = 1'0"

DESIGN #400
M 1'0" - S 3'3 1/16"
for H. H. Pawsey & Co.

[illegible]

DUPLICATE FORWARD SIDE

SIDE BUTT STRAPS

MAST STEP

EXPANDED SIDES - 12" INTERVALS DIMENSIONS FROM STRAIGHT EDGE OF SHEET.

17" 16 3/16" 15 3/4" 15 3/8" 15 1/8" 15" 15" 15 1/8" 15 3/8" BUTT

6 1/8" 4" 2 7/16" 1 1/4" 1/2" 1/8" 1/8" 9/16"

MARK FOR FRAME

MIDSHIPS THWART

AFTER THWART

TRANSOM

AFTERDECK

BOTTOM BUTT STRAP

15 3/4" 16 1/4" 16 3/4" 17 3/16" 18 1/8" 18 3/4" 19"

3 3/4" MARK FOR FRAME 3" 6"

1 1/8" 1 7/8" 2 3/4" 3 3/4" 4 3/4" 5 11/16"

FRAME #1 WEB

FRAME #2 WEB

14 3/8" 7" FRAME #1 30 1/8"

7 7/8" 15" FRAME #2 38 1/2"

11 3/16" TRANSOM 23"

FRAMES & TRANSOM TO INSIDE OF PLANK BEFORE BEVELLING.

LEEBOARD HALF

BOTTOM BUTT STRAP

AFTER BOTTOM - PICK UP TRUE SHAPE FROM ASSEMBLED SIDES

SIDE BUTT STRAPS

LEEBOARD HALF

FOREDECK

FORWARD BOTTOM

RUDDER HALF

FORWARD THWART

RUDDER HALF

REFER TO 'INSTANT BOATS' BY M.M. PAYSON FOR ASSEMBLY METHOD

OPTION: IF SPACE UNDER END DECKS IS PACKED WITH FOAM BLOCKS, TOTAL POSITIVE BUOYANCY WILL BE ABOUT 400 POUNDS.

DECK AT ENDS

GUNWALE FULL SIZE

6" CLEAT

USE WITH 6' OARS

6" CLEAT

W.L.@ 1000 LBS. DISPL. LBS. PER IN. IMMERSION 17.5

10" 3 1/2" 10"

10 1/2° BOTTOM BEVEL

FOOT BRACE BATTENS

STEM FULL SIZE 19"

BUTT STRAPS DOUBLE. TO FINISH 1/2" x 4"

LIMBER HOLES 1" x 2"

CHINE LOG 3/4" x 1"

BOTTOM SKIDS 3/4" x 1 1/2"

WATERLINE @ 450 LBS. DISPL.

11° SIDE BEVEL

NO BEVEL ON #2

2

1 BEVEL 11°

TYPICAL CHINE SECTION FULL SIZE

ALL PLYWOOD 1/4"; FASTENING FRAMING ETC. 3/4" - 1", 3/4" - 1 1/2", AND 3/4" - 2 1/2". 3/4" RING NAIL FASTENINGS.

SCALE 1" = 1'0"

DESIGN #400
19'0" x 5' 3 1/2"
for M.M. PAYSON & Co.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

6½-foot punt (also in *Different Boats*), which has good stability for its weight. I stretched it out to get clean enough lines to row fast around the needed displacement, but no longer than necessary on account of the weight and storage objectives. The 14-foot length selected is arbitrary. A case could be made for a slightly longer boat with less bottom rocker, or a slightly shorter one with more rocker.

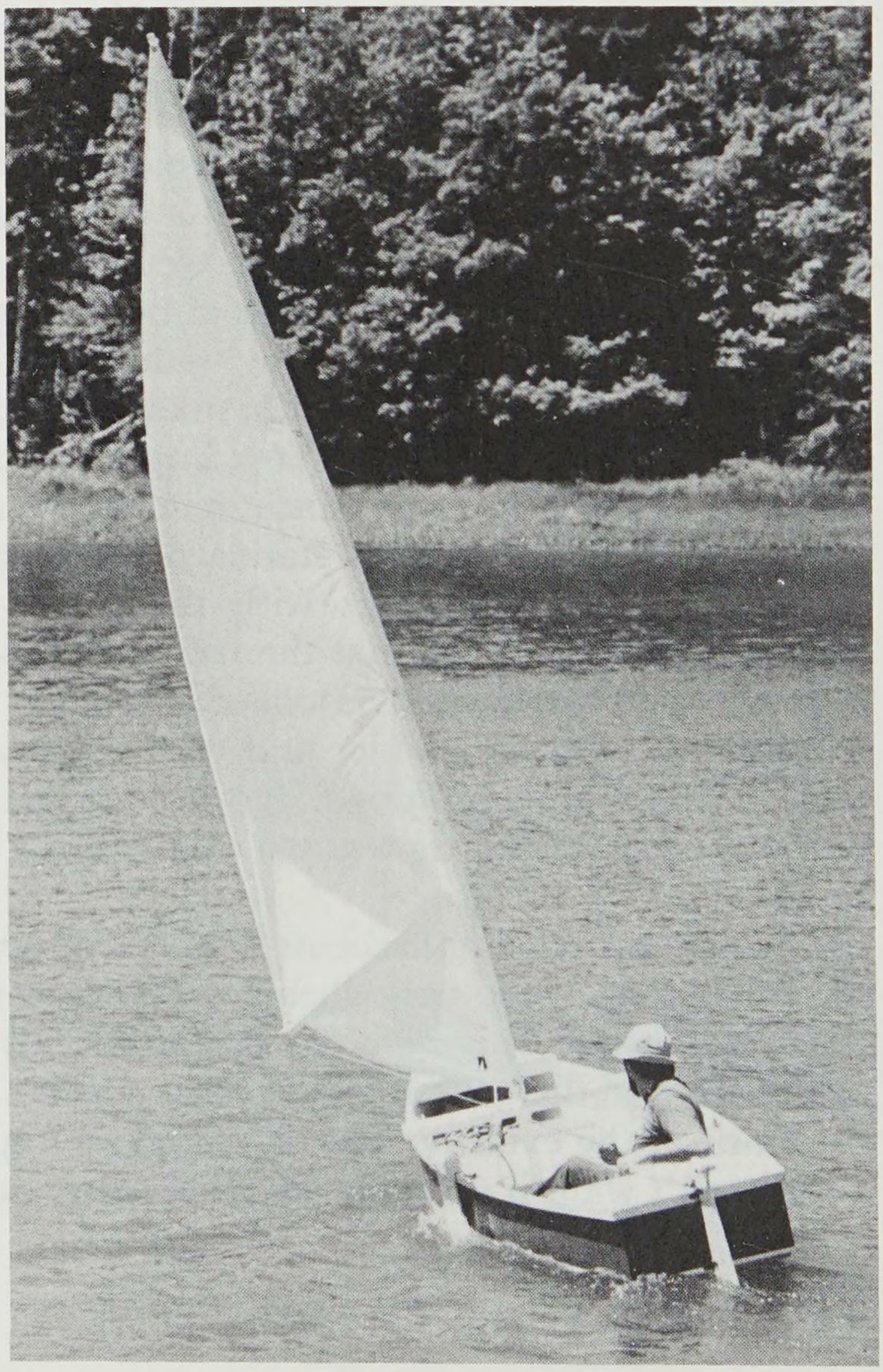
The decked-over ends were sized to allow the boat to be launched vertically off a high wharf or from the deck of a high-sided vessel, either end first, without shipping water. This feature can be a god-send in out-of-the-way places; on a cruiser it eliminates the expense and clutter of a davit or other launching gear. The volume under the decks, if filled solid with foam, amounts to about 400 pounds positive buoyancy, so located and shaped that the boat can be righted and bailed out by a single swimmer. Matching up the amount and location of buoyancy in the ends with a suitable height for the sides amidships to use the easily stored 6-foot oars produced the sheerline shown.

The rig was an afterthought. When Harold Payson decided to try the design, I suggested that he put one of his standard "instant boat" rigs into her, as it seemed to be about the right size. The *June Bug*'s bottom profile, designed for rowing, is a bit too flat aft to be optimum for all-around sailing, but it's near enough if the crew doesn't let her heel too much and keeps the weight well in the middle of the boat. The combination of light weight and good stability produced a lively performance under sail. I daresay there are plenty of faster boats, but I doubt many people will notice that if the faster one is not alongside. Providing a leeboard and rudder used up some leftover plywood, since the boat wasn't originally proportioned to make the most of standard sheet sizes.

I insisted on trying her with the rig of the *Dynamite* board, because it seems to me that the free-sail's possibilities in different kinds of boats are being overlooked; I thought it'd be nice to be able to dispense with the rudder and with the mast thwart that blocks one of the rowing positions. It wasn't a great success, however, perhaps because that rig was too small for the boat to be interesting to use.

Cheapness and simple construction were not high on the wish list for this design. It is very cheap and very easy as boats go, but I don't see what I'd want to do differently if the budget was unlimited and the craftsmen the most expert. Perhaps rounding off the chine at the extreme bow would be an improvement, but I certainly don't want it rounded anywhere else, nor do I want any flare

Dynamite Payson masters the free sail in June Bug. *(Jeff Julian photograph)*



June Bug *would like the weight a little farther forward. (Jeff Julian photograph)*

in the sides or any arc or vee in the bottom. Any such thing would either call for her to be wider (and heavier and more bulky) or else reduce her stability. (See the account in Chapter 27 on the *Swallow* design, and how I got into expensive trouble with her.)

The purist approach results in a very good boat that looks cheap and nondescript. So why not add just a little flare of side and a corresponding rake of stem? Then the sheer could come out of a straight-edged sheet and save at least one long saw cut and possibly a sheet of plywood; i.e., she'd be cheaper as well as look "more like a boat." There's an attractive argument that a good boat will look good, and if it doesn't, the designer hasn't made the best of his requirement, or the requirement is too demanding to be prudent. May be. But it also makes me uneasy to deliberately design in something that I'm sure is wrong for the service, and in this case I decided not to do it.

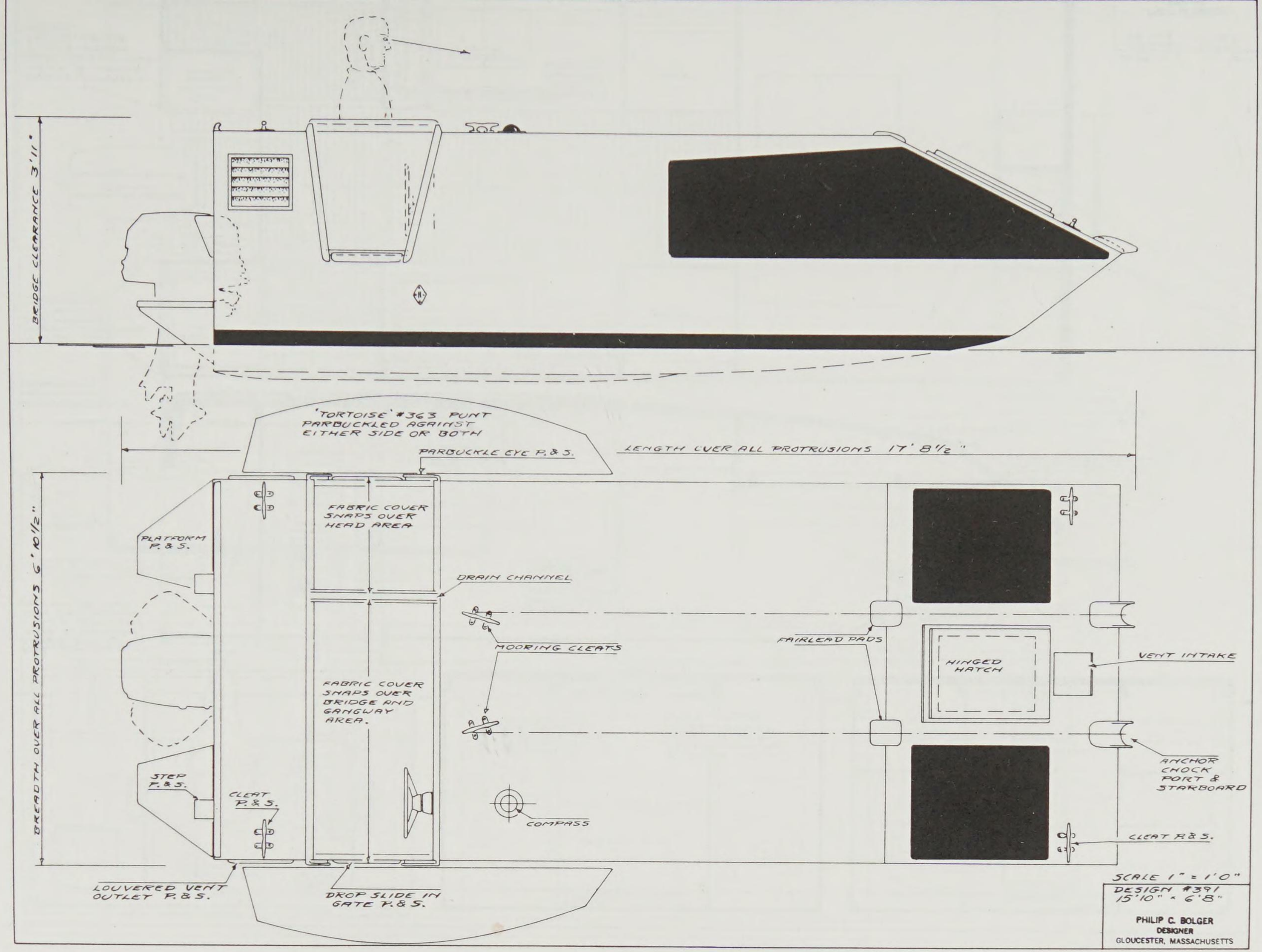
4

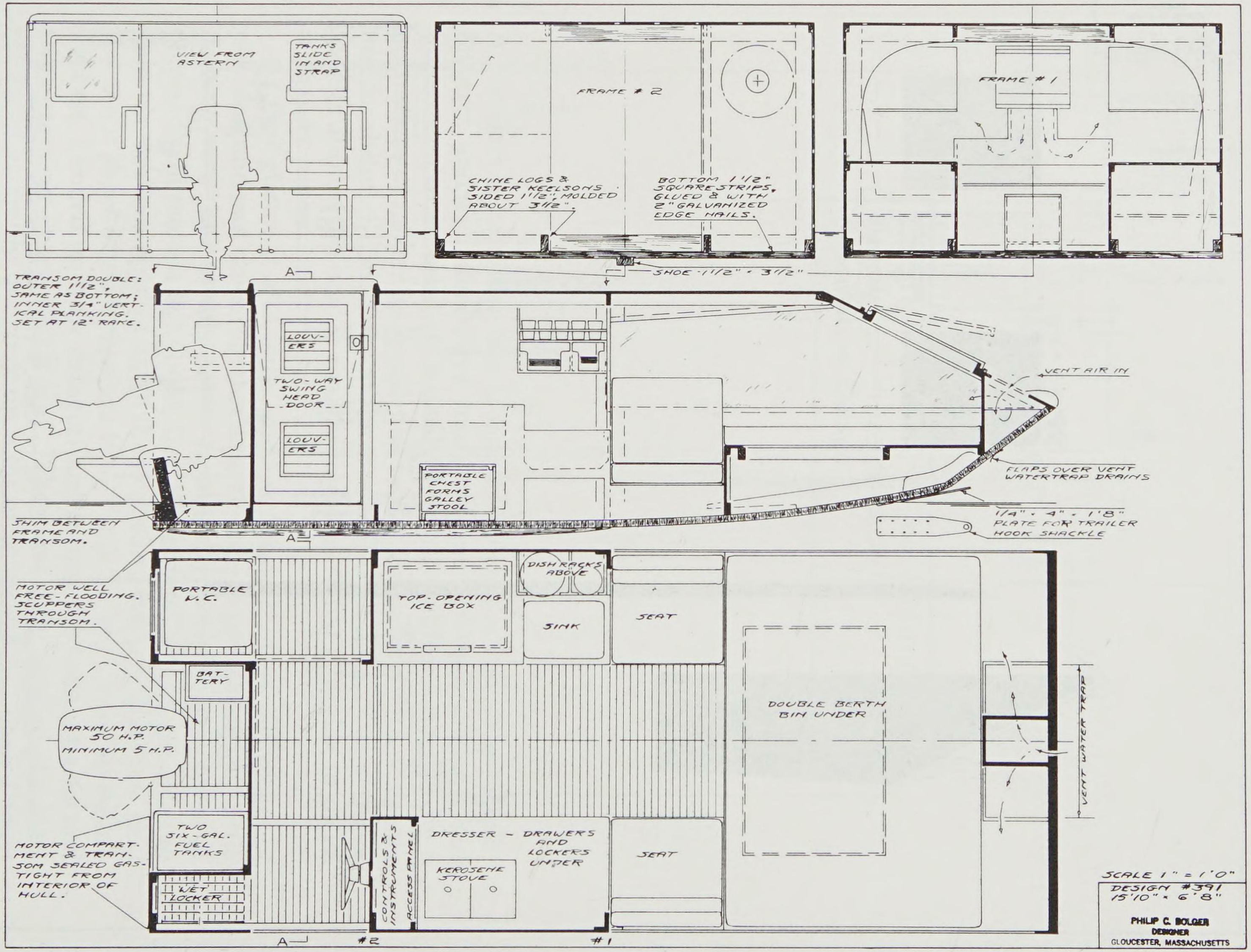
Fiddler II

Length overall	15 feet 10 inches
Breadth	6 feet 8 inches
Speculative Design	

A compact rectangular box is a space-efficient shape in principle. Spheres and cylinders have more volume for their surface, but unless you're in orbit, it's hard to use the volume neatly. In a powerboat of moderate speed, the box is about as good a shape as any for the after end. Even at the forward end it doesn't need much modification if the boat is shallow and you're not planning to drive it against waves.

At first glance it also looks good structurally. Cut out sheets of plywood and nail them together square-edge to produce a cozy little floating van. But at this point, troubles crop up. Thin sheets of plywood will make a light boat, fast and economical to run, easy to haul up, and not apt to punish the gears and brakes of the tow car. But a flat sheet of thin plywood is — limp. When I tried to stiffen the box, I ended up with stringers and frames and strongbacks and webs running every which way. They not only spoiled the simplicity of assembly but took up a lot of room inside. Then I tried adding curves, bulging the sides, humping the top either crosswise


BRIDGE CLEARANCE 3'11"
'TORTOISE' #363 PUNT
PARBUCKLED AGAINST
EITHER SIDE OR BOTH
PARBUCKLE EYE P. & S.
LENGTH OVER ALL PROTRUSIONS 17' 8 1/2"
BREADTH OVER ALL PROTRUSIONS 6' 10 1/2"
PLATFORM P. & S.
FABRIC COVER SNAPS OVER HEAD AREA
DRAIN CHANNEL
MOORING CLEATS
FABRIC COVER SNAPS OVER BRIDGE AND GANGWAY AREA.
FAIRLEAD PADS
HINGED HATCH
VENT INTAKE
ANCHOR CHOCK PORT & STARBOARD
STEP P. & S.
CLEAT P. & S.
COMPASS
CLEAT P & S.
LOUVERED VENT OUTLET P. & S.
DROP SLIDE IN GATE P. & S.
SCALE 1" = 1'0"
DESIGN #391
15'10" x 6'8"
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



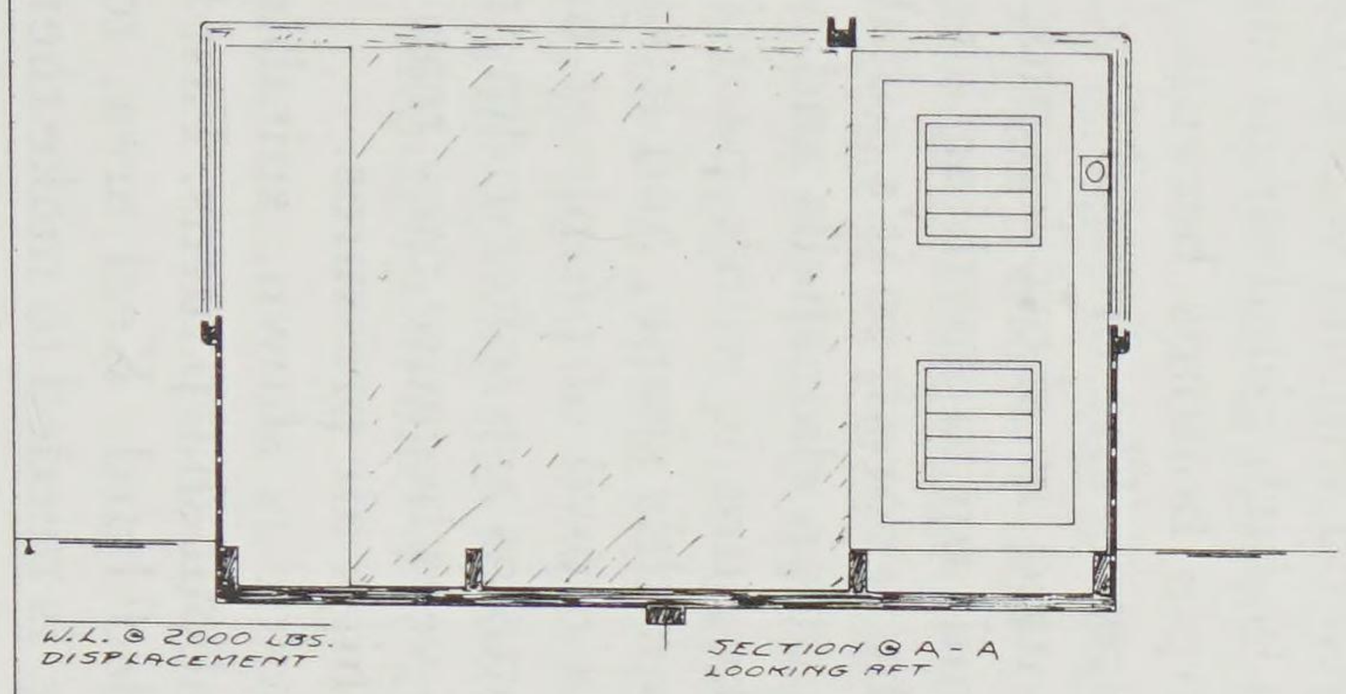
SCALE 1" = 1'0"

DESIGN #391
15'10" x 6'8"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

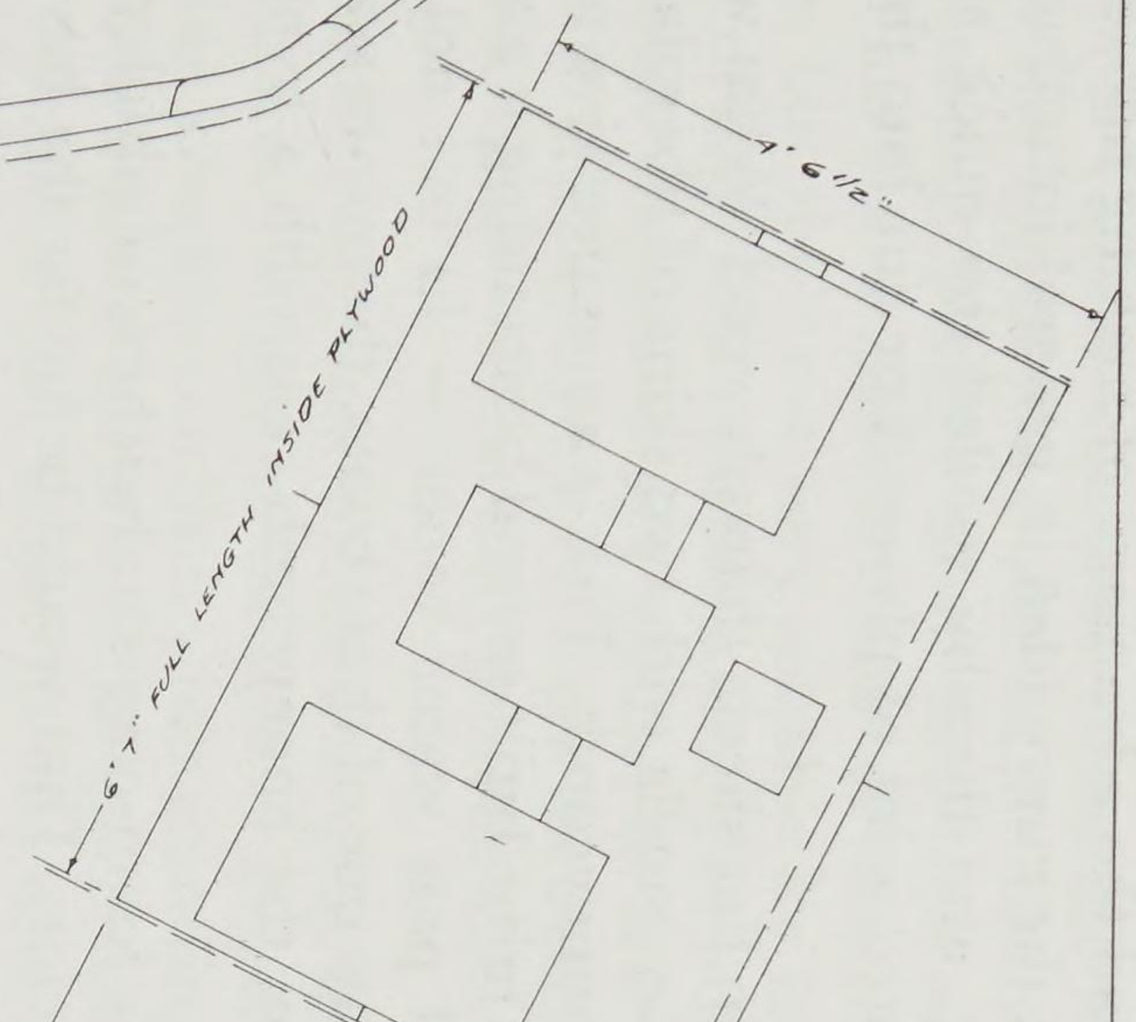
CHANNEL
PORT SIDE
ONLY

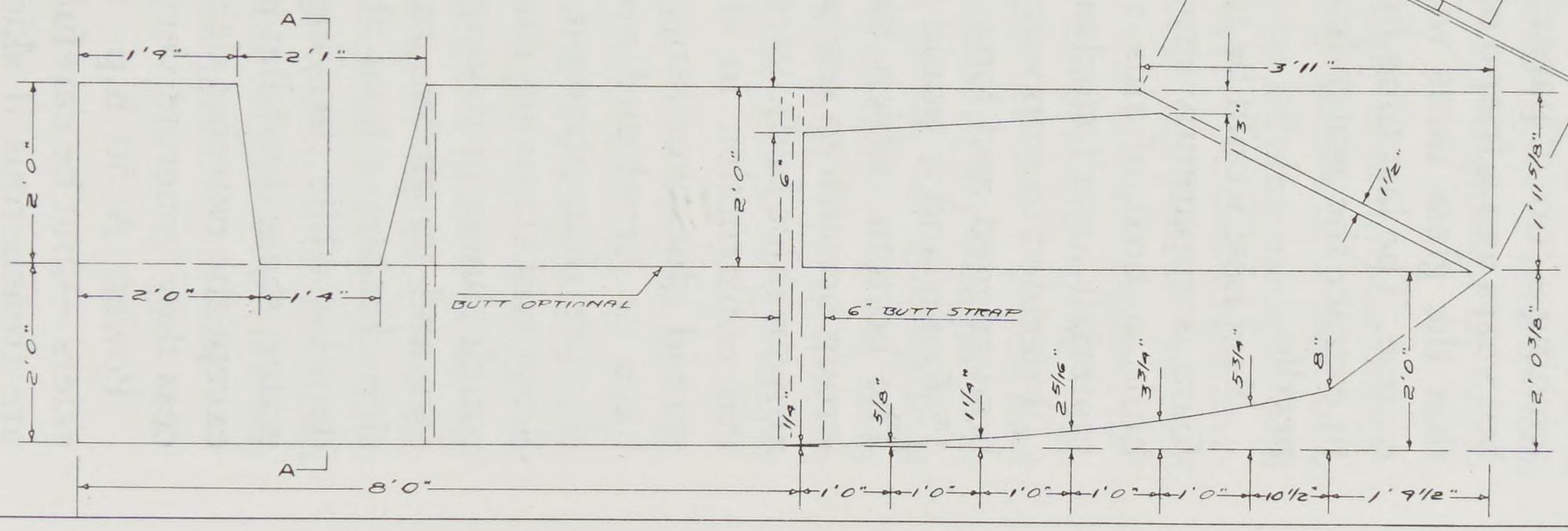
LONGITUDINAL SECTION
16" OUT FROM CENTERLINE



W.L. @ 2000 LBS.
DISPLACEMENT

SECTION @ A - A
LOOKING AFT





SCALE 1" = 1'0"
DESIGN # 391
15'10" x 6'8"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

or endwise, rockering the bottom forward and arcing it aft. The arc-bottomed transom had the advantage of making her less likely to trip on fast turns, but the curvy idea in general introduced a lot of bevels, some varying, and thereby spoiled the quick assembly again. It also either wasted a lot of plywood or cut into the useful space.

Metal is worse to use in flat sheets than plywood. What would be really nice would be these panels with two skins of fiberglass sandwiching a core of paper honeycomb. That's an impressive material, but years ago a friend of mine built several boats using it and found that the glass skins will pass water vapor — in but not out, of course. The last time I saw one of those boats, the owner was trying to extract the water from the honeycomb cells with a hypodermic needle . . . .

Next best would be the foam-core sandwiches, of which the PVC foam is apparently superior. That would be by far the best way to build a boat of this shape, but it's expensive, and the proper materials aren't stocked in every hardware store.

I decided to stop worrying about weight and dwell on making the boat rugged and long lived. Half-inch plywood; that's a lot in a 15-footer and it would be hard to bend in if there were any bends. The bottom, which has the only curve in the design and is the wrong breadth to use plywood without waste (breadth is set by the athwartships bed), uses 1½-inch glued strips instead. Builders like this construction in sharpie bottoms because it saves having to spread glue over large areas. The dressed 2 x 2s, most of which have no bevel and are used in short lengths, usually work out cheaper than plywood built up to anything like the same solidity. Scars and scratches can be ignored, so it's suitable for beaching on rough shores or drying out on clamshells and beer cans. A pair of fore-and-aft girders make sure it won't pant in pounding. I designed a larger boat about this shape, and it sank with great suddenness while carrying a crowd of people at high speed in rough water; these dead-flat bottoms are softer-riding than any other type except the extreme deep-vees because they trap air, but in the process they generate very high air pressures.

Power: A 50 h.p. motor is shown, suitable for towing water skiers — but be careful about sharp turns. Fast flat-bottomed boats are treacherous if skidded hard. Keel area, to make them track around without skidding, is needed to make them safe. If I were going to let youngsters loose in something like this with the big motor (but I wouldn't), I would double the size of the shoe and test hard to

see if that was enough. In fact, I think I'd either have about 30 h.p., which I guess would be about the least that would drive her out over the top of the water at the likely weight of this construction, or else drop right down to 5 h.p. and let her plow at 5 or 6 knots. This last would save a lot of first cost. You wouldn't go far, perhaps, but she's not very suitable for long distances anyway, on account of high fuel consumption. The little motor would be plenty for control, and she'd get around as fast as a small sailboat. The motor is so effectively cut off from the rest of the boat — and motors are now so quiet — that long periods underway might not be much hardship.

The cutting off of the motor was done mainly to eliminate the exhaust hazard. Carbon monoxide is sneaky (I know of a case of a man being knocked out by it while standing on a flying bridge), and behind that square tail is a lethal gas chamber. You can't risk having *any* openings that might let the demon in on you. None; no opening windows, no doors. Caulk around the control cables.

I'd thought of having the controls forward, carrying out the van theme, but had to conclude that the weight couldn't be carried there. I've gone over various handling situations in my imagination — weighing anchor, getting into a marina berth, coming up to a trailer, and so on — and as far as I can see, they're all at least workable without having to climb on top of the boat. The two punts should be handy to let one half of a couple do the marketing without marooning the other.

The real point of all this is that a boat like this isn't as easy to design as it looks. I tried it the first time in 1951. This one is much better than that one, but it's still much too complex, expensive, and heavy for me to be proud of it. I was going to put it aside unfinished and have another try in the year 2011, but then I decided I would more or less finish it off and let experienced builders amuse themselves figuring how to get the labor and materials bill down to a point where the result would be worth the investment. Others can enjoy a few minutes imagining the views that might be seen from the great bed, out through the one-way-glass picture window.

5

Sparkler

Length overall	19 feet
Breadth	4 feet 11 inches
Draft	6 inches/3 feet
Designed displacement	1,360 pounds
Sail area	99 square feet
Speculative Design	

Sparkler's design was the result of an old Lightning sailing close by me on a fine afternoon with just the right amount of wind to show her best paces. I've always admired the crisp elegance of that design. It's characteristic of Sparkman & Stephens' work that it's impossible to point to any special feature and say *that's* why the boat is so handsome. Even designing racing machines, that firm never used freakish features unless they were absolutely necessary to be competitive, and when they had a cruiser or a one-design commission, their choice always tended toward polished understatement.

When I see a design I like, I almost always start scheming on a simplified version. I think that puts me in a minority, as most people seem to have more fun elaborating. But the Lightning has performance to spare. The one that passed me wasn't going anywhere in particular. Its crew was just enjoying the sensation of spirited sailing. I thought I might be able to get enough of that to be satisfying, and something of the same kind of unobtrusive good looks, for perhaps half the investment and a worthwhile saving in upkeep. Hence *Sparkler*.

SCALE 3/4" = 1'0"

DESIGN #409
19'0" x 4'11"
SPARKLER

PHILLIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

SPRUCE MAST 20'10" OVERALL - SQUARE SECTION FULL LENGTH
SOLID - GROWN OR LAMINATED

2'0" 2'0" 2'0" 2'0" 2'0"

3/4" 1 9/16" 2 1/8" 2 7/16" 2 9/16" 2 5/8"

SPRUCE SPRIT BOOM 13'0" OVERALL - 1 5/8" SQUARE

SPRUCE SPINNAKER POLE
7'0" WITHOUT JAWS - 1 5/8" SQ.

SNOTTER DUMB SHEAVE
FROM 1 5/8" x 3 3/8"
x 3 7/8" - 1 1/2" SCREWS

1/2" x 4 3/4" PIN
1/2" x 3/4" SLOT

SCALE 3" = 1'0"

SNOTTER 3/8" DACRON

OUTBOARD END OF BOOM SIMILAR.

MAINSAIL MAY BE CROSS-CUT; NO ROACH OR BATTENS IN ANY CASE.
NO HEADBOARD; LASH HEAD AND LUFF TO MAST WITH SEPARATE TIES, NOT A LACING. FURL BY ROLLING UP AROUND CLEW WITH LEACH INSIDE FURL.

ABOUT 5'

LEACH 19'2"

LUFF 18'0"

99

40

FOOT 11'2 1/2"

OPTIONAL SPINNAKER
FLAT SINGLE-LUFF
REACHING CUT
LUFF 13'6"
LEACH 11'6"
FOOT 7'0"

3/4" - 1" - 5 1/2" CAVIL P. & S.

2 5/8"

2'3"

2"

W.L. @ 1360 LBS. DISPL.

2'1 1/2" 2'0 1/2"

10 1/2" 1'6 3/8" 6 1/2"

2'1 1/4"

4'4 7/8"

RUDDER
DOUBLE 1/2" PLYWOOD
FAIR UNDER-WATER EDGES.

LOCATE PINTLES BY TRIAL - LOWER PINTLE AT LEAST 1" LONGER THAN UPPER.

4'0"

TOGGLE ON 24" LANYARD

HOLE FOR STOPPER KNOT

RADIUS 3'6"

2'0"

1/16" METAL PLATE EACH SIDE

6"

SLOT 1/2"

CENTERBOARD
DOUBLE 1/2" PLYWOOD.

LEAD 1" - 6" - 6" = 14.6 POUNDS

6"

8'0" 8'0" 3'4 7/8"

1'6" 1'7 1/8" 1'8 1/2" 1'9 5/8" 1'10 1/2" 1'11 1/8" 1'11 5/8" 1'11 7/8" 2'0"

BUTT

STOPS FOR AFTER FACE OF FOR'D FRAME

AFTER FACE OF MIDSHIPS MOLD

BUTT

4"

ROCKER DIMENSIONS ON 12" INTERVALS FROM STRAIGHT UPPER EDGE OF PANELS

4'11" TO STOPS FOR FORWARD FACE OF AFTER FRAME

2"

EXPANDED SIDE PANELS - TRUE SHAPE - NO DEDUCTIONS

2'4" 1'11 1/8"

7° BOTTOM AFTER FRAME BEVELS

1'10 1/4" 1'8"

1'5 3/16"

2'4 3/8"

TEMPORARY MOLD NO BEVEL

1'11 1/4"

1'10 13/16"

1'8"

1'11 1/4"

1'2 9/16"

BOTTOM 3° FOR'D FRAME BEVELS

SIDE 13°

11° SIDE

BLOCK ON END OF BOOM

STANDING END OF SHEET

3/8" SHEET

SHEET TURNING BLOCK

FLOORBOARDS 3/4" LOOSE IN THREE SECTIONS

4 1/8

TILLER FROM 1 1/2" x 2 1/2" x 4'5"

HEADBLOCKS 1 1/2" SQ. FOR'D 1'7 1/2"; AFT 1'8"

1'1 1/4"

MOORING CLEAT 1 1/2" x 2 1/2" x 12"

BEAM 3/4" x 2 1/2"

CHOCK

W.L. @ 1360 LBS. DISPL.

ABOUT T.3 CU.FT. FOAM 420 LBS.

SAWN STYRENE FOAM ABOUT T.9 CU.FT. BUOYANCY 475 LBS.

8 1/2"

5 1/2"

4'0 5/8" 4'5" 2'0 1/4"

BUTT STRAPS 1/2" x 4" x 1'9"

STEM 1 1/8" x 2'5" x ABOUT 2'6 1/2"

CAP FROM 2 1/2" x 2 1/2" x ABOUT 2'1"

23°

OUTER BOTTOM BUTT

STEP 3/4" x 3 1/2" x 2'11 1/2"

7"

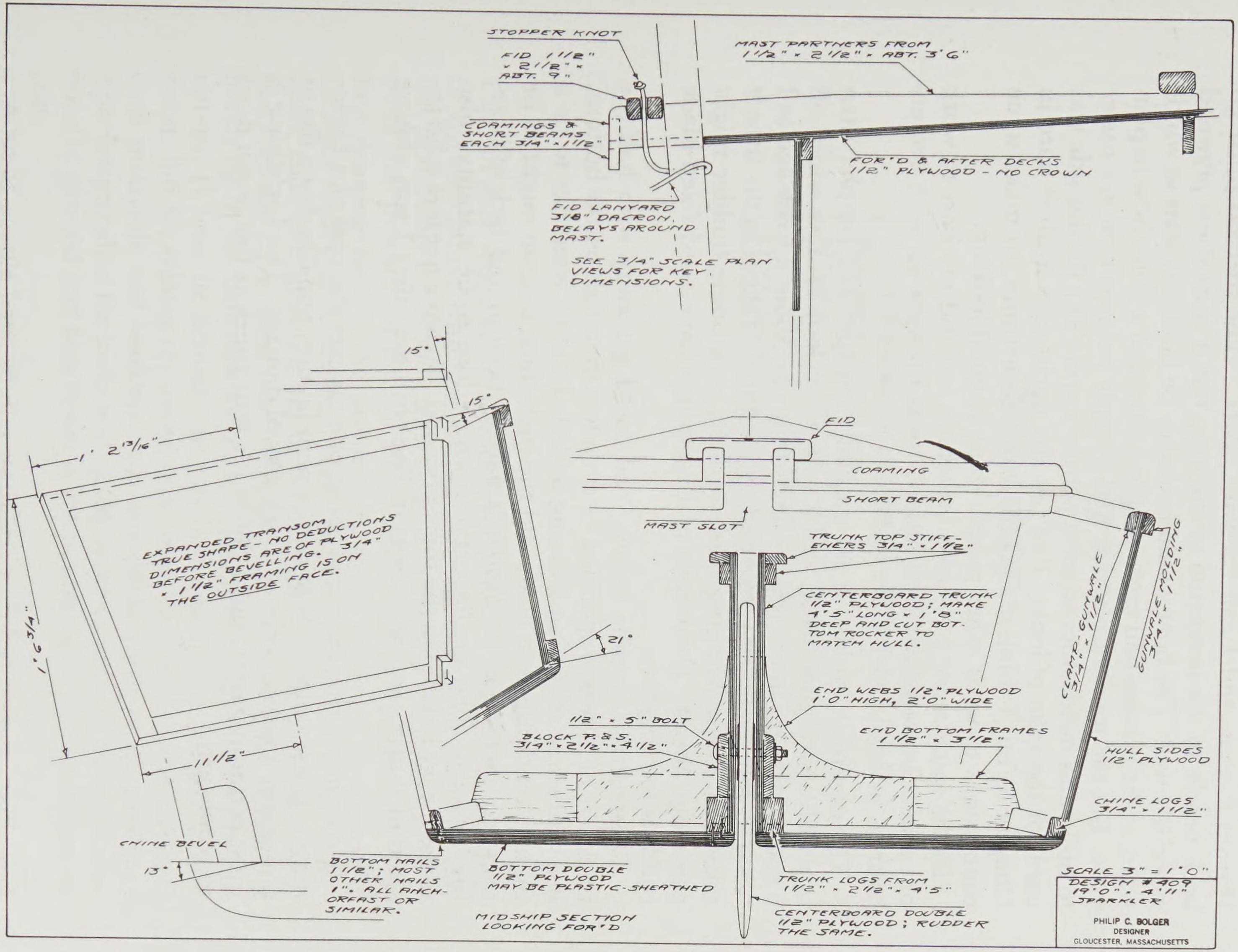
INNER BOTTOM BUTT

SCALE 3/4" = 1'0"

DESIGN #409
19'0" x 4'11"
SPARKLER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

"FOR ASSEMBLY METHOD READ "INSTANT BOATS" BY H.H. PAYSON (INTERNATIONAL MARINE PUB. CO.)


STOPPER KNOT
FID 1 1/2" x 2 1/2" x ABT. 9"
COAMINGS & SHORT BEAMS EACH 3/4" x 1 1/2"
FID LANYARD 3/8" DACRON. BELAYS AROUND MAST.
SEE 3/4" SCALE PLAN VIEWS FOR KEY DIMENSIONS.
MAST PARTNERS FROM 1 1/2" x 2 1/2" x ABT. 3'6"
FOR'D & AFTER DECKS 1/2" PLYWOOD - NO CROWN
15°
15°
1' 2 13/16"
EXPANDED TRANSOM TRUE SHAPE - NO DEDUCTIONS DIMENSIONS ARE OF PLYWOOD BEFORE BEVELLING. 3/4" x 1 1/2" FRAMING IS ON THE OUTSIDE FACE.
1' 6 3/4"
11 1/2"
21°
CHINE BEVEL
13°
BOTTOM NAILS 1 1/2"; MOST OTHER NAILS 1". ALL ANCHORFAST OR SIMILAR.
BOTTOM DOUBLE 1/2" PLYWOOD MAY BE PLASTIC-SHEATHED
MIDSHIP SECTION LOOKING FOR'D
FID
COAMING
SHORT BEAM
MAST SLOT
TRUNK TOP STIFFENERS 3/4" x 1 1/2"
CENTERBOARD TRUNK 1/2" PLYWOOD; MAKE 4'5" LONG x 1'8" DEEP AND CUT BOTTOM ROCKER TO MATCH HULL.
CLAMP-GUNWALE 3/4" x 1 1/2"
GUNWALE MOLDING 3/4" x 1 1/2"
END WEBS 1/2" PLYWOOD 1'0" HIGH, 2'0" WIDE
1/2" x 5" BOLT
BLOCK P. & S. 3/4" x 2 1/2" x 4 1/2"
END BOTTOM FRAMES 1 1/2" x 3 1/2"
HULL SIDES 1/2" PLYWOOD
CHINE LOGS 3/4" x 1 1/2"
TRUNK LOGS FROM 1 1/2" x 2 1/2" x 4'5"
CENTERBOARD DOUBLE 1/2" PLYWOOD; RUDDER THE SAME.
SCALE 3" = 1'0"
DESIGN #409
19'0" x 4'11"
SPARKLER
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

She's the simplest kind of flat-iron skiff, assembled in the way Harold Payson and I call "instant boats." The method must go back nearly to the invention of the saw, but it suits sheet plywood especially well. The boat would probably be faster, at least to windward, if the bottom had more profile rocker and a fuller bow in plan view. But the moderate rocker and sharply pointed bow are easier to build and handsomer to most people's eyes. The flaring side was used for the sake of looks. I've put the purist case against flare in Chapter 3, but I think it's good for me, sometimes, to make some concessions to what other people think is good looking.

In the same spirit I rejected leeboards and did my best to work out a neat centerboard installation. I was brought up with centerboards, which is why I like leeboards so much . . . .

The one-piece rudder is substantially cheaper and simpler than one with a swinging blade, and it's neater to look at. I've wiped off a couple of them in my time — including one about a week ago as I write — but it's possible to build two or three of them in the time it takes to make a swinging-blade rudder, so a home builder might come out ahead. Thousands of Lightnings have used fixed-blade rudders for 40 years.

Construction is quite heavy. You could get away with half the thickness of plywood specified — even less than half on the bottom, if it had some stiffening framing added. I didn't want her to be a flighty, tender-feeling boat, and the inch-thick bottom ought to be some compensation for *Sparkler*'s narrow bottom and lack of bearing forward. The gentle curves, which lose some stability, also make it easy to bend in the thick plywood. To have her feel solid instead of flimsy, and *be* so, was in line with the effect I was aiming for.

I'd estimate that the rig is about one quarter the cost of a Lightning's, is less vulnerable to component failure, and lies down flat at a moment's notice without much risk of damage. The Lightning is most certainly faster, but I doubt it's four times as fast, even dead to windward.

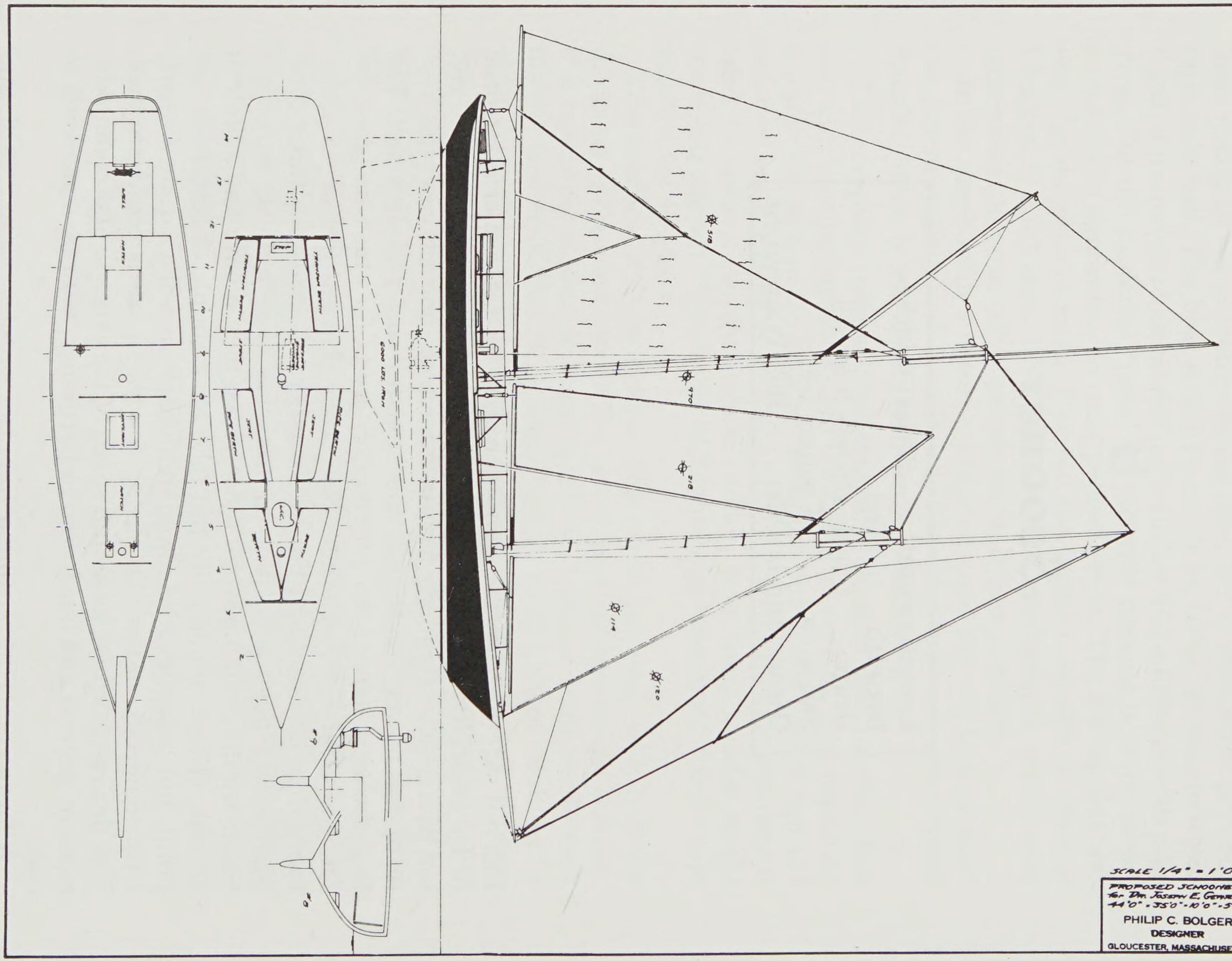
6

Scooner

Length overall	23 feet 6 inches
Breadth	5 feet
Draft	6 inches/3 feet 8 inches
Sail area	204 square feet
Owner and builder	Bob Wainwright

I'm not sure whether the emotion roused by a schooner is intrinsic or by association with the splendid vessels that have used the rig, but practically everybody feels it. Even a chubby schooner has a little of that power, but the full effect needs a slim and sleek hull. The first drawing here is the preliminary study for one I designed for Dr. Joe Geary of Rochester, New York. He put five or six years' spare time into building her in his backyard. If his insurance company could have seen him running his million-dollar surgeon's hands up to the bandsaw all those years, they'd have had a litter of kittens. (I hear he actually did take off a couple of fingers at one point, but his colleagues sewed them back on.) She's quite a vessel, with materials and workmanship few yacht yards could produce. The design called for looks and speed at the expense of accommodations in general and headroom in particular, with no concession to cost.

A lot of people have similar impulses with less money, skill, and patience. For them I designed The Folding Schooner, 31 feet,


SCALE 1/4" = 1'0"
PROPOSED SCHOONER
for Dr. Joseph E. Gentry
44'0" • 35'0" • 10'0" • 5'6"
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #395
23'6" x 5'0"
Tor Boat w/MAN/MOMENT

SCALE 3/4" = 1'0"

DAGGERBOARD

SECTION 1/2
FULL SIZE

TRAILING EDGE

LEADING EDGE

5'3"

3'4"

FAIRED EDGES

1'8"

RUDDER
FAIRING SAME AS
DAGGERBOARD - SEE
DETAIL FOR FITTINGS

1'3.5"

1'10"

1'4"

1'9¼"

3'6"

FASTENING CHECKS
3/4" x 3/2"

FOOT 5'6"

FOOT 8'2"

FOOT 12'9"

LEECH 8'5"

LUFF 7'5"

LEECH 11'8"

LUFF 9'6"

LEECH 15'4"

10'0" CLEW TO THROAT

14'6" CLEW TO THROAT

LUFF 11'6"

HEAD 7'0"

HEAD 7'11"

27

65

62
(EXTRA)

134

204

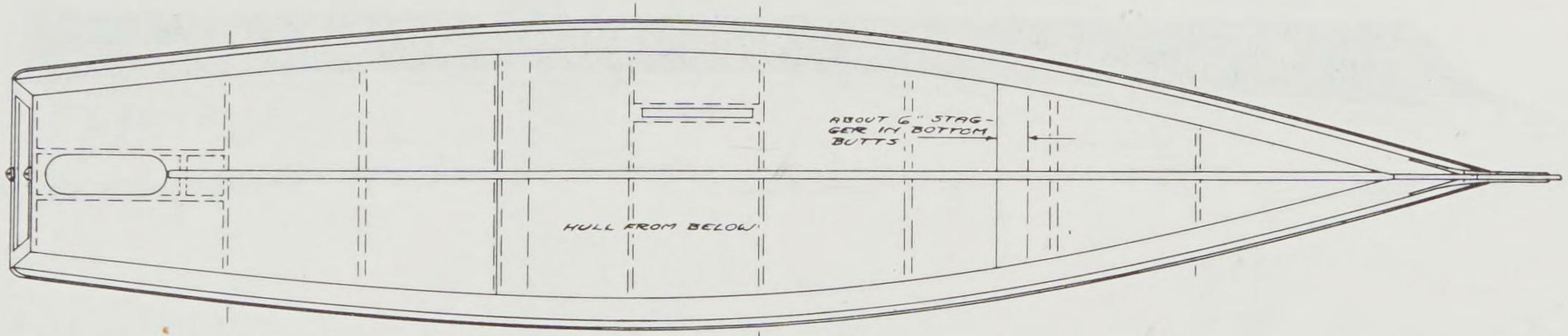
112

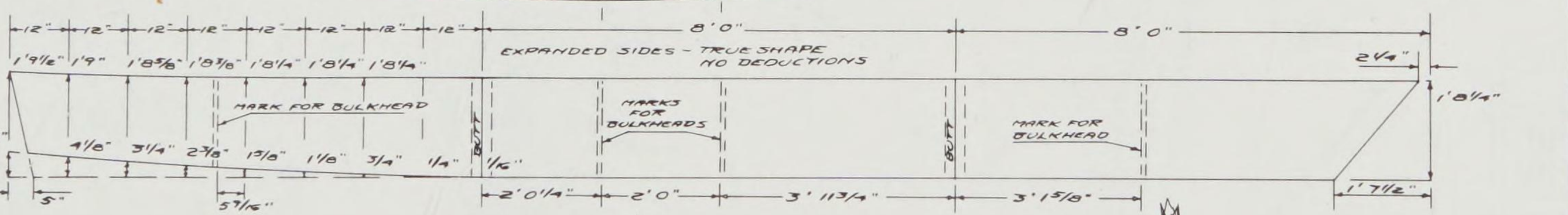
69 REEFED

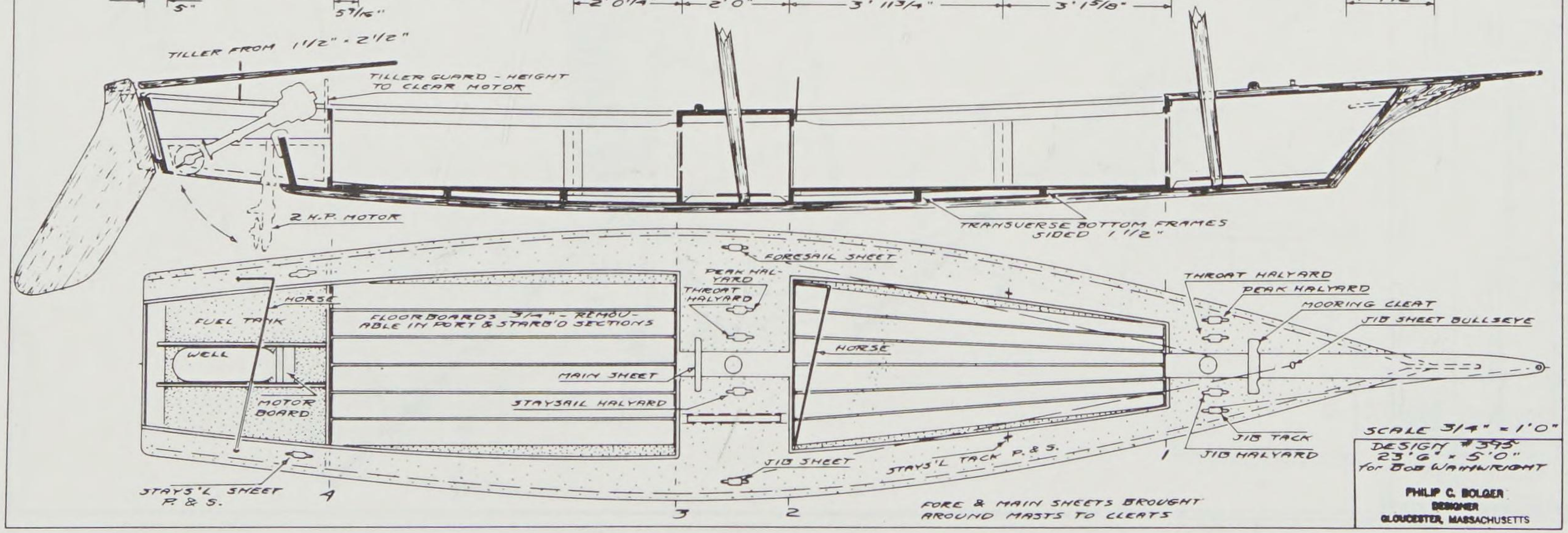
STAYSAIL
LUFF 13'0"
LEECH 11'0"
FOOT 11'2"
SET FLYING

RUDDER GUDGEONS
FULL SIZE

¼" DIA
ROUND
HEAD
SCREWS







SCALE 3/4" = 1'0"

DESIGN #393
23'6" - 5'0"
for Bob Wahlwright

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

TRAIL KNEES 3/4"

4 5/8" 13/4" 5 1/4" 8 5/8" 10 5/8" 11 1/4" 11 1/4" 1'0 3/4"

6" 6" 6" 6" 6" 6"

4 1/4"

FALSE STEM SIDED 3/4"

13°

DECK @ SIDE FULL SIZE

CHINE FULL SIZE

13°

STEM FULL SIZE

20°

20°

SNAP HOOK ON SHEET STANDING END

HORSE 1 1/2" NYLON

8"

SECTION 1'9" FOR'D OF TRANSOM

6" HALYARD CLEATS BOLTED THROUGH DECK

FIT SHELVES AS NEEDED

MAST STEPS DOUBLE 1/4" ON 1 1/2" SQ. FEET

DAGGER-BOARD TRUNK 1/4" : 3/4" : 1 1/2" FASTEN-ING CLEATS

MIDSHIP SECTION

1'0"

DAGGERBOARD DOUBLE 1 1/2" TO FINISH 1"; SEE SHEET 3 FOR PROFILE

12° SIDE BEVEL

1'6 1/8"

18°

1'1 1/2"

TRANSOM

1'5 1/8"

1'2 3/4"

6 1/2° SIDE BEVEL

1'11 1/8"

1'5 3/4"

BULKHEAD #4 (WATERTIGHT)

BOTTOM BEVEL 4°

1'6 7/8"

1'5 3/4"

SIDE BEVEL 3 1/2°

2'4 1/2"

DECK STIFFENER 3/4" x 5 1/2" x 2'2"

1'8"

BULKHEAD #3 NO BEVEL ON ANY EDGE

1'7 1/2"

1'11 5/8"

SIDE BEVEL 14°

2'3 1/2"

1'6 7/8"

BULKHEAD #2

BOTTOM BEVEL 1°

1'7 1/2"

1'10 5/8"

1'2 1/2"

BOWSPRIT 1 1/2" x 5 1/2" x 7'1"

9"

BULK-HEAD #1

BOTTOM BEVEL 3 1/2°

1'7 1/2"

9 3/4"

SCALE 1 1/2" = 1'0"

SIDES & DECK 1/4"
BOTTOM DOUBLE 1/4" = 1/2"
CLAMP & SHOE FROM 1 1/2" SQUARE
CHINE 3/4" x 1 1/2"
BULKHEADS & TRANSOM 1/4"
BACKING FRAMES 3/4" x 2 1/2"
DECK STRINGERS 3/4" x 2 1/2"; 3/4" x 1 1/2" IN WAY OF BULKHEADS

REQUIRED READING:
'INSTANT BOATS' BY H.H. PAYSON
INTERNATIONAL MARINE PUB. CO.

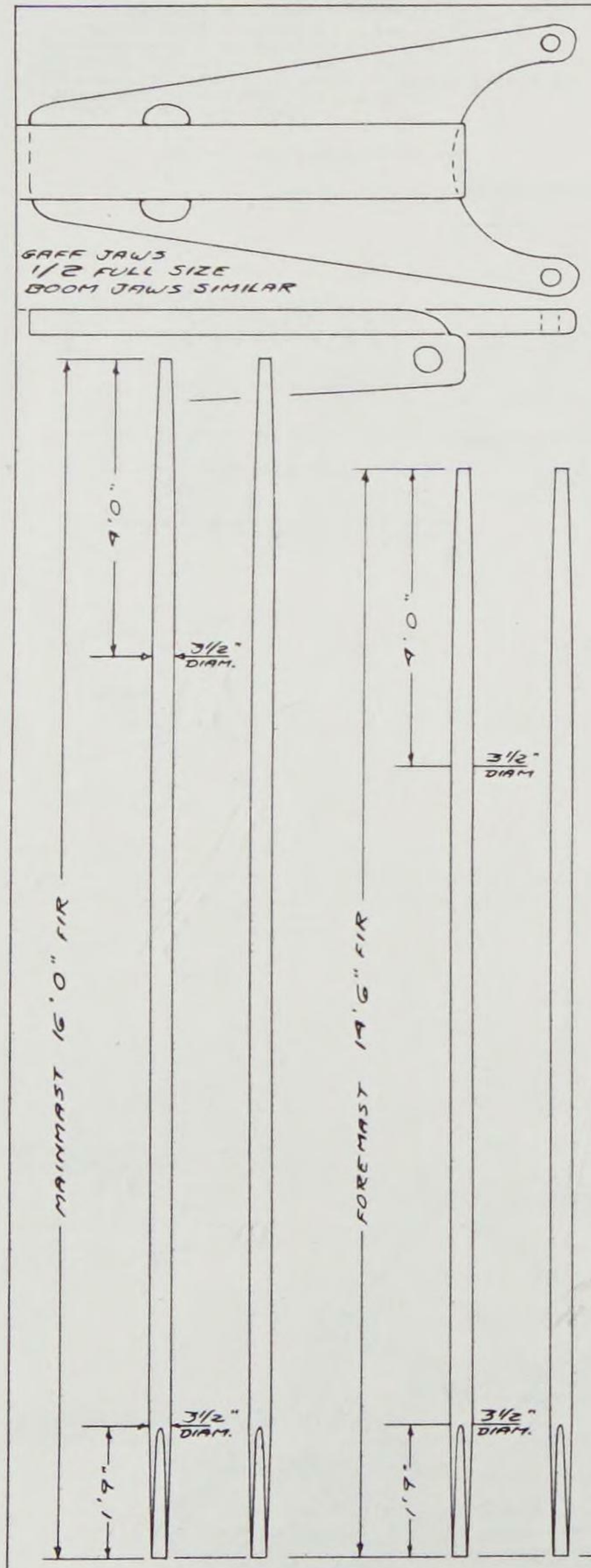
DIMENSIONS TO INSIDE OF PLANK BEFORE BEVELLING. ALL BEVELS ARE CONSTANT. PLYWOOD ON UNBEVELLED SIDE IN EVERY BULKHEAD.

DESIGN #395
23'6" x 5'0"
for Bob Wahlwright

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PART	STANDING END	VIA	FALL
① MAIN SHEET	BECKETED AROUND BOOM	BLOCK ON TRAVELLER; BLOCK SLUNG FROM BOOM	AROUND MAST TO CLEAT
② FORESAIL SHEET	SNAP HOOK ON TRAVELLER HORSE	BLOCK SLUNG FROM BOOM	" " " "
③ JIB SHEET	SPLICED AROUND CLUB	BULLSEYE ON BOWSPRIT	AFT TO CLEAT
④ TRAVELLER HORSES HELD WITH STOPPER KNOTS UNDER DECK (MAIN) OR THROUGH B.H.^{RS} (FORE)			
⑤ MAIN STAYSAIL SHEET	CLEW OF SAIL		LEESIDE CLEAT
⑥ MAIN PEAK HALYARD	SPLICE AROUND GAFF	FAIRED HOLE IN MASTHEAD	DECK CLEAT
⑦ " THROAT "	" " "	FAIRED HOLE BELOW MASTHEAD	" "
⑧ FORE PEAK "	" " "	FAIRED HOLE IN MASTHEAD	" "
⑨ " THROAT "	" " "	FAIRED HOLE BELOW MASTHEAD	" "
⑩ JIB HALYARD	HEAD OF SAIL	BLOCK SLUNG TO MAST	" "
⑪ MAIN STAYSAIL HALYARD	" " "	" " "	" "
⑫ MAIN TOPPING LIFT	STOPPER KNOT UNDER BOOM BATTEN	AROUND MASTHEAD THROUGH DUMB SHEAVES	STOPPER KNOT UNDER BOOM BATTEN; ADJUST TO BE SLACK WHEN SAIL IS SET
⑬ GAFF PARRELS HELD WITH STOPPER KNOTS UNDER JAWS; PARRELS SLACK TILL GAFF IS PEAKED			
⑭ LUFF TIES KNOTTED LOOPS AROUND MAST; TO BE LOOSE & EASILY DETACHED			
⑮ MAIN STAYS'L TACK	TACK OF SAIL		SNAP HOOK TO DECK EYE
⑯ JIB TACK	SPLICED AROUND CLUB	FAIRED HOLE IN BOWSPRIT	MOORING CLEAT

FIVE BLOCKS NEEDED, ALL SINGLE FRONT SHACKLE ABOUT 1 3/4" SHEAVE.



MAST HEEL TAPER OFF IN FLATS TO 2 1/8" SQUARE AT HEEL.

SCALE 3/4" = 1'0" & AS MARKED

DESIGN #395
23'6" x 5'0"
for Bob Wainwright

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

Lacking good action photos of the two schooners discussed, the author included this one of Minstrel III, *a fisherman-type schooner he designed about 15 years ago. Her fore gaff needs peaking, but she was rolling along all the same. (E.S. Cowperthwaite photograph)*

described in one chapter of my book of that title. So far I've sold close to 400 sets of plans, plus several thousand copies of the book, and a fleet of them have been built. She's still a big backyard project, although I know of one that was built in a motel room, one end at a time, and launched in the motel's swimming pool. Every so often somebody would suggest a smaller version, and finally Bob Wainwright commissioned this design. She incorporates his ideas. I'd proposed a simpler version with jibheaded sails and no deck, but he insisted, and I've since concluded that he was right.

He wanted speed, enough to spice the quaintness. I piled on sail, 266 square feet counting the main staysail. The schooner rig is about the best for allowing lots of area without going high. Reaching in a fresh breeze and not too much sea, with four or five people on the rail to hold her up, she can pass almost anything short of a C-cat. I flinch at the phrase "planing hull," because I think it's misused and overused. Almost anything will plane if there's power enough, but this little schooner will skitter like a bobsled.

In stronger winds, or with a light crew, she can shorten down, like my other small schooners, to full foresail and reefed mainsail, still perfectly balanced. The geometrical center of sail area (I don't say "center of effort," because that implies a much better knowledge of the thrust vectors than I or anybody has) is abaft the nominal center of lateral plane. This puts some of the side thrust on the rudder, which, being powerful and far aft, carries it with very little angle and helps lift her to windward.

The two cockpits are long enough to sleep in, supposedly with the sails for tents, although I didn't get around to examining in detail just how that would be arranged. The motor and fuel are cut off from the rest so there won't be spilled outboard mix underfoot. I see that I also didn't show the very necessary cover for the aperture of the motor well. Probably I didn't see any specially neat way to fit it and hoped the builder would come up with a better idea than any of mine. This is a well-established designer's gambit and sometimes works.

7

Sharpshooter

Length overall	23 feet
Breadth	5 feet 7 inches
Builder	Waterlines, Inc., Southold, New York

This design was a sharp lesson in over-ingenuity. It was meant to be the first item in a proposed boat plans business, and I took my assignment to be to come up with something distinctive, to draw attention and get the enterprise started.

I've lost count of how many of these "square-tail dories" I've designed since 1954, when I first picked up the idea from a magazine article. It must be at least 20 different variations from 15 to 45 feet long. Results on all the others went into this one, plus the prefabricated no-jig construction that Harold Payson and I had worked out. She was about the last word in proportioning hulls to use stock plywood with minimum waste. That part worked out well. The prototype was built without many problems by a man who'd never built a boat before, and it came out the intended shape. She ran well, making 11.25 m.p.h. with a 10 h.p. motor, carrying 510 pounds; and 25 m.p.h. with 25 h.p. She could even be rowed well enough to be useful at times. She was naturally a very dry boat and apparently pounded no more than other shallow-bodied outboards — not destructively, at any rate.

GALVANIZED OR ALUMINUM AWNING BOWS

DECK EDGE FULL SIZE

BRIDGE DRAIN LIMBER

20°

TRIM TAB 1/2 FULL SIZE

BRACE & LASH AWNING BOWS TO FORM STERN PULPIT

40 H.P. MOTOR SHOWN. MAXIMUM 50 H.P. MINIMUM 25 H.P.

RAISED HATCH FITTED WITH SIDE AND END CURTAINS TO ENCLOSE HATCH-WAY.

CHINE FULL SIZE

DRAIN LIMBER

4" THICK FOAM BLOCK AGAINST BRIDGE SIDE P. & S.

CUT AWAY IN WAY OF BRIDGE SIDES

GUNWALE STRINGER FULL SIZE

STANCHIONS P. & S.

8" CLEAT

DRAIN WITH PLUG

STEM FULL SIZE

FOAM BUOYANCY

MOUNTING BLOCK FOR AWNING BOWS P. & S.

MOTOR WELL FITS TWO SIX-GALLON TANKS

HINGED HATCH PORTABLE TOILET & STOWAGE UNDER.

REMOVABLE BENCH OPTIONAL

SCUPPER P. & S.

FOAM BUOYANCY PACK FOAM IN PLACE BE-FORE INSTALLING BOTTOM

2" SCUPPERS

TRIM TABS P. & S.

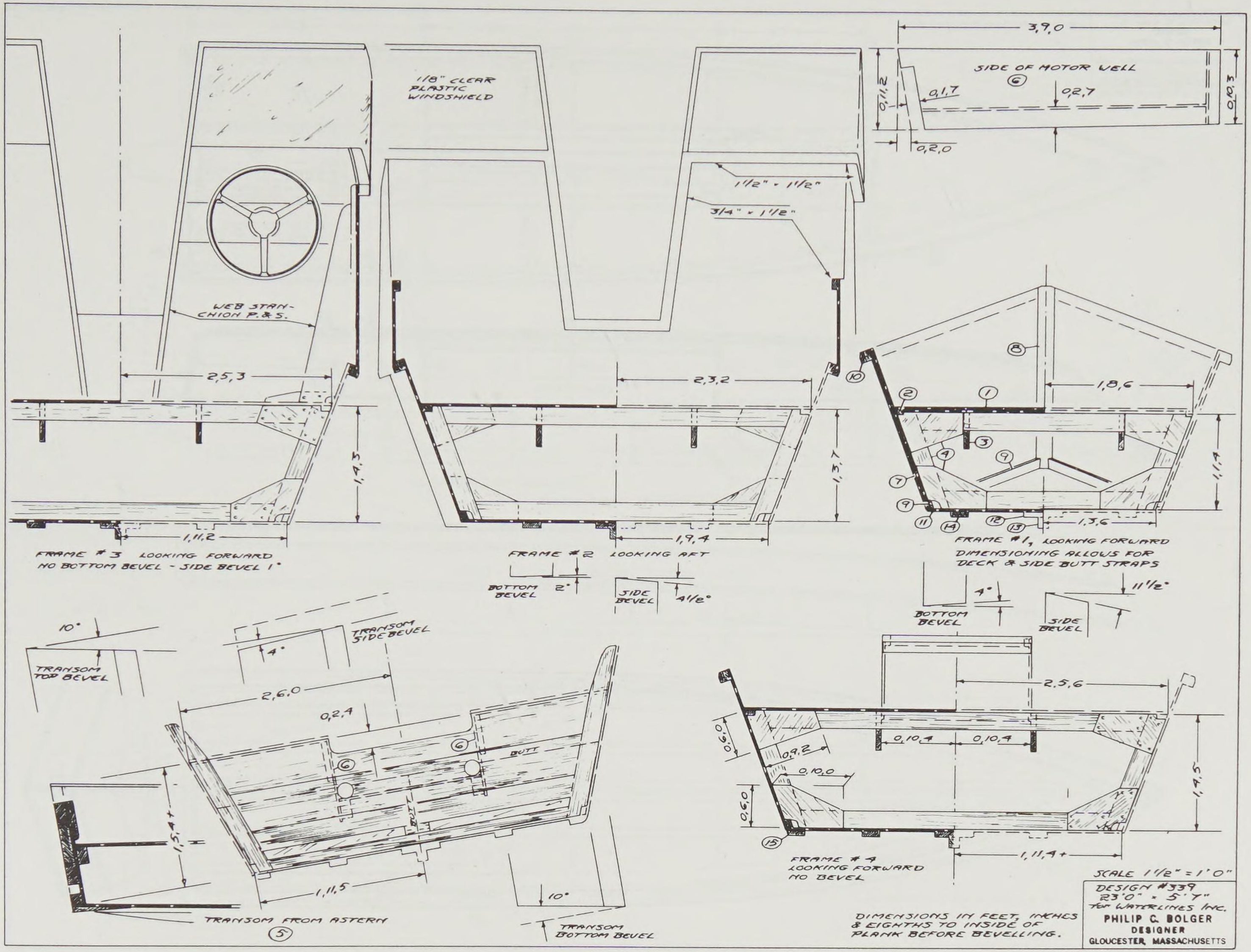
5'7.3 | 3'5.0 | 3'5.0 | 3'5.0

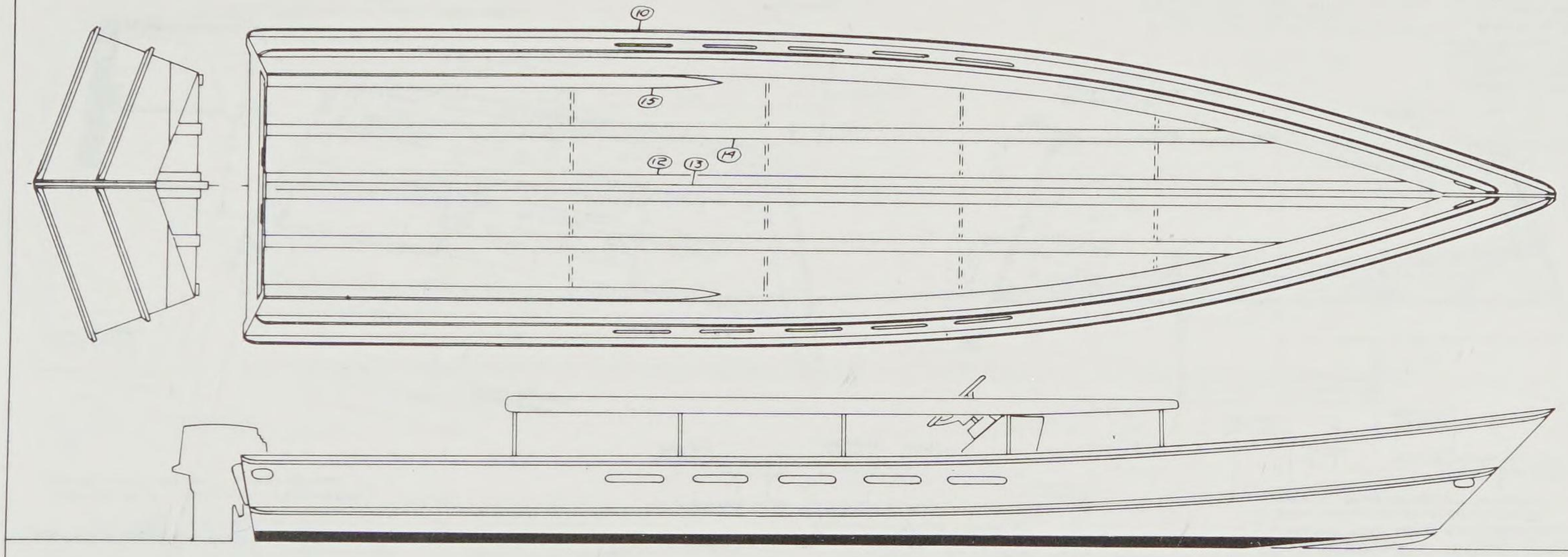
#4 #3 #2 #1

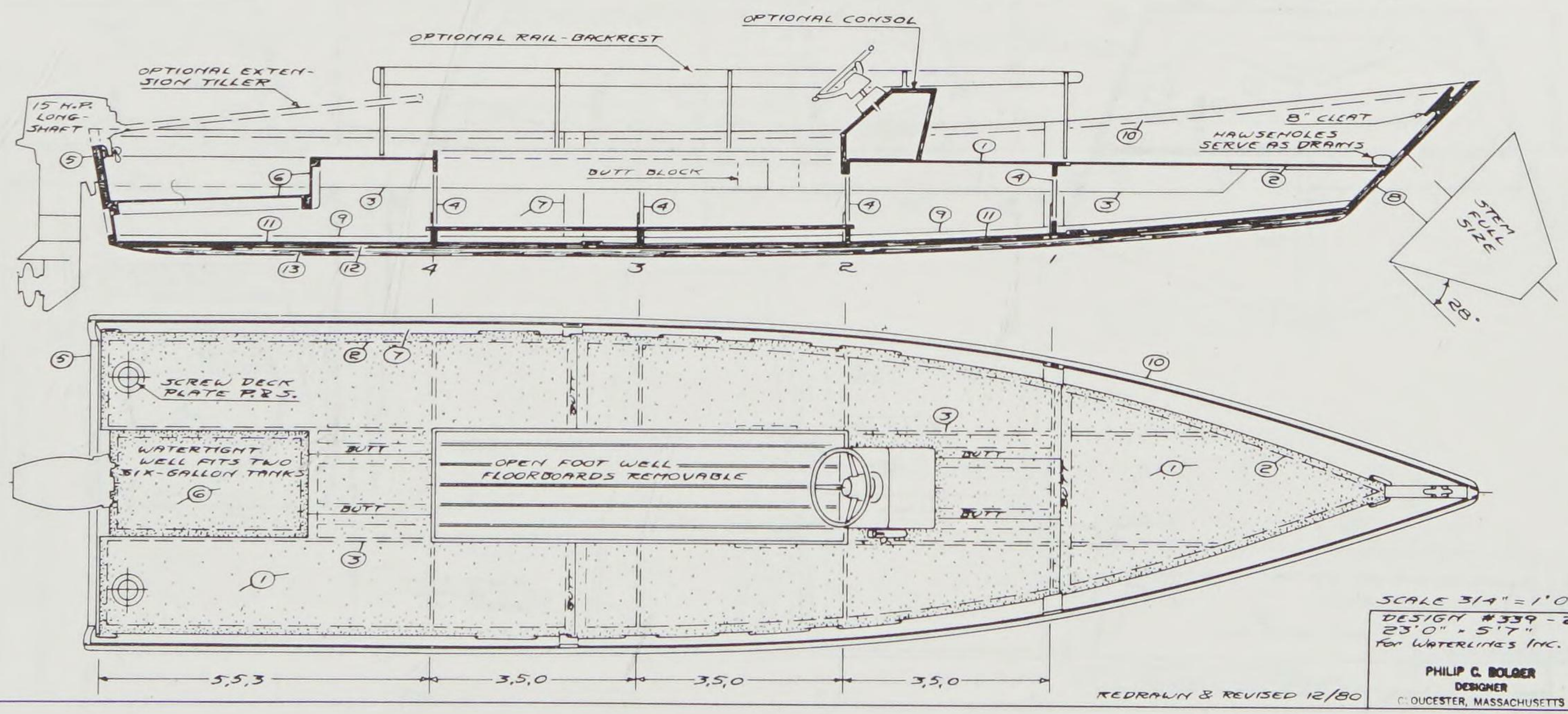
MARK FRAME LOCATIONS ON ASSEMBLED DECK PANEL

SCALE 3/4" = 1'0"

DESIGN #339
23'0" - 5'7"
for WATERLINES INC.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


1/8" CLEAR PLASTIC WINDSHIELD
WEB STANCHION P.&S.
2,5,3
1,4,5
1,11,2
FRAME #3 LOOKING FORWARD
NO BOTTOM BEVEL - SIDE BEVEL 1°
1 1/2" x 1 1/2"
3/4" x 1 1/2"
2,3,2
1,3,7
1,9,4
FRAME #2 LOOKING AFT
BOTTOM BEVEL 2°
SIDE BEVEL 4 1/2°
3,9,0
SIDE OF MOTOR WELL
0,11,2
0,1,7
0,2,7
0,10,3
0,2,0
1,8,6
1,1,9
1,3,6
FRAME #1, LOOKING FORWARD
DIMENSIONING ALLOWS FOR
DECK & SIDE BUTT STRAPS
4°
BOTTOM BEVEL
11 1/2°
SIDE BEVEL
10°
TRANSOM TOP BEVEL
4°
TRANSOM SIDE BEVEL
2,6,0
0,2,4
BUTT
1,5,4+
1,11,5
TRANSOM FROM ASTERN
10°
TRANSOM BOTTOM BEVEL
2,5,6
0,9,0
0,9,2
0,10,4
0,10,4
0,10,0
0,6,0
1,4,5
1,11,4+
FRAME #4
LOOKING FORWARD
NO BEVEL
SCALE 1 1/2" = 1'0"
DESIGN #339
23'0" x 5'7"
FOR WATERLINES INC.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS
DIMENSIONS IN FEET, INCHES
& EIGHTHS TO INSIDE OF
PLANK BEFORE BEVELLING.



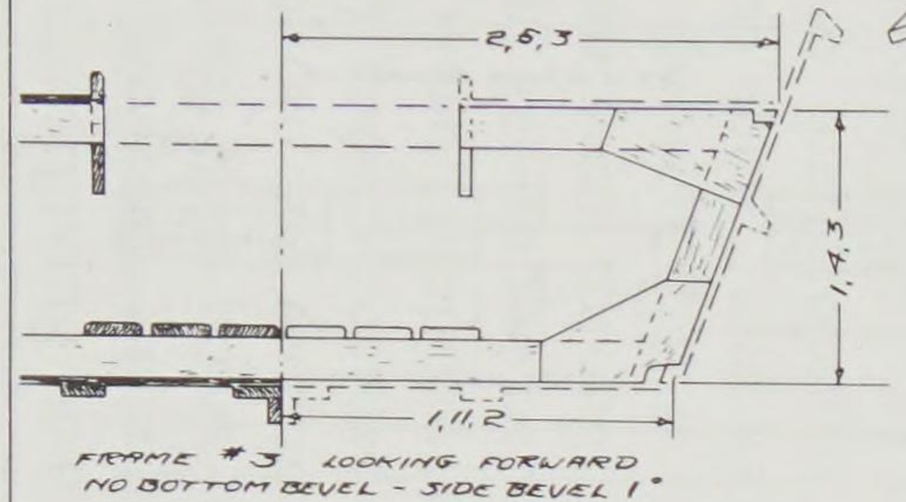


SCALE 3/4" = 1'0"

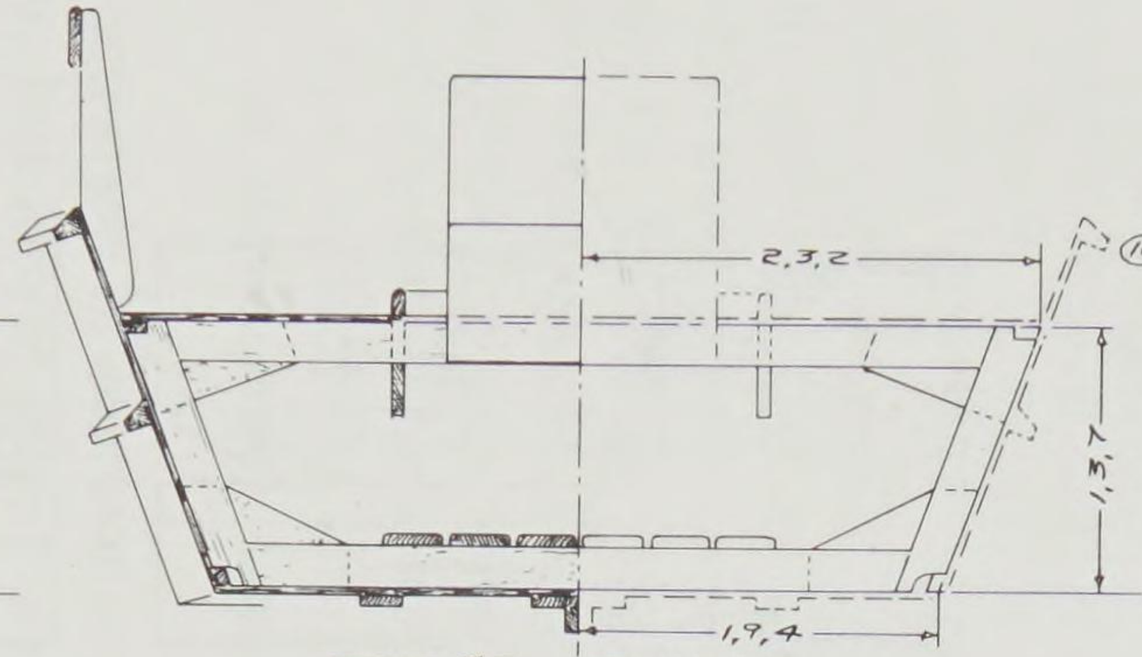
DESIGN #339 - 2
23'0" - 5'7"
FOR WATERLINES INC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

REDRAWN & REVISED 12/80



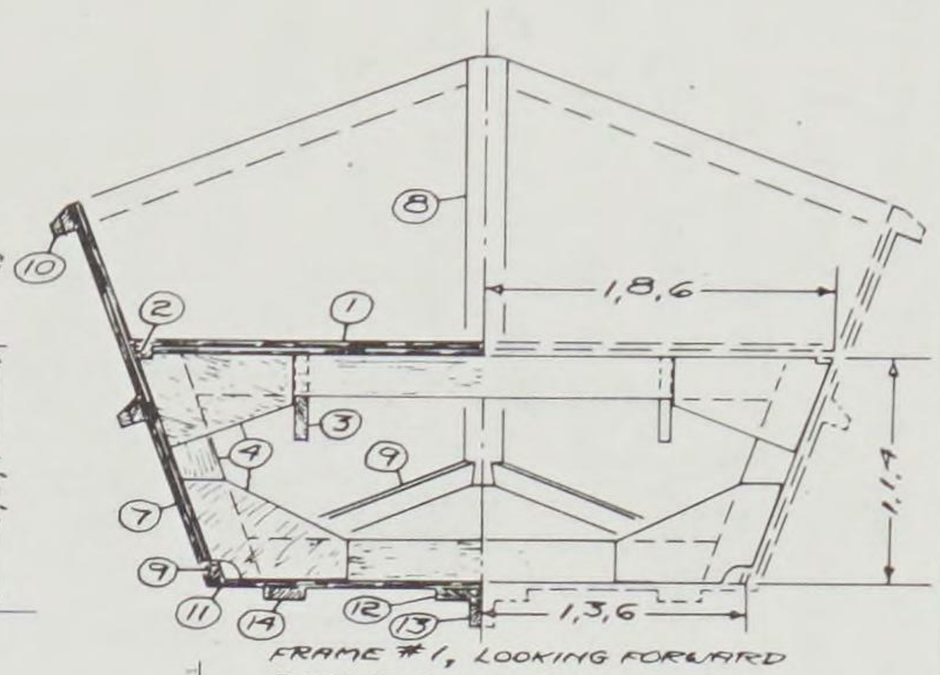
FRAME #3 LOOKING FORWARD
NO BOTTOM BEVEL - SIDE BEVEL 1°



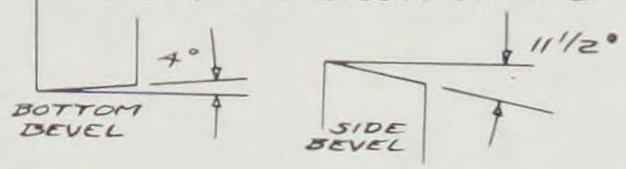
FRAME #2 LOOKING AFT

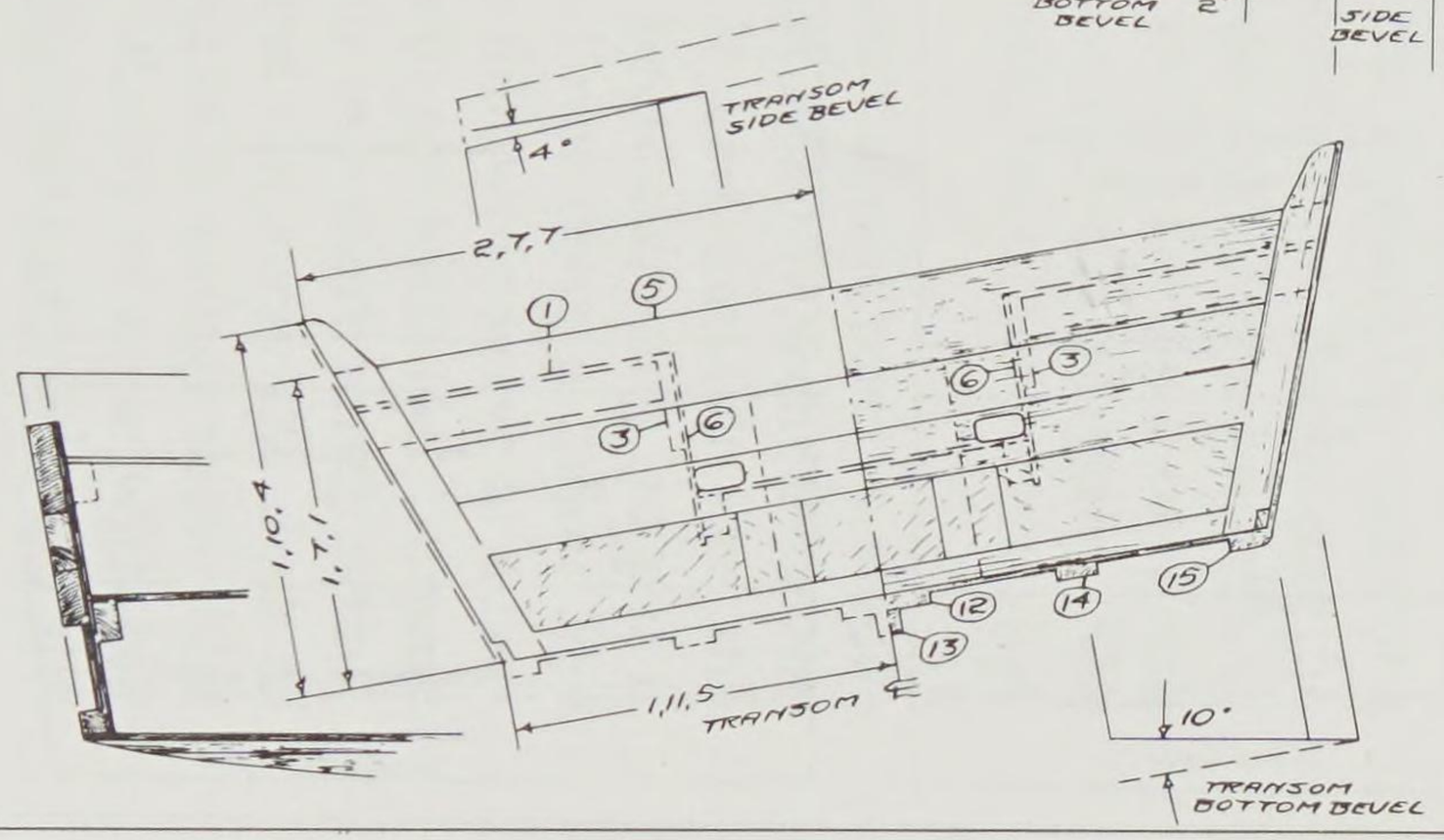
BOTTOM BEVEL 2°

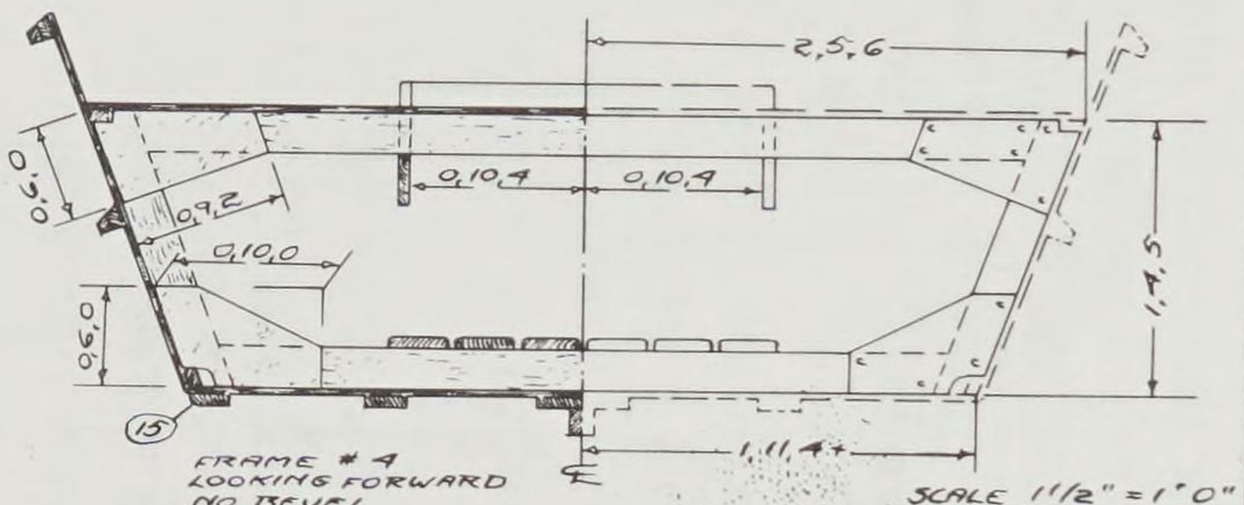
SIDE BEVEL 4 1/2°



FRAME #1, LOOKING FORWARD
DIMENSIONING ALLOWS FOR
DECK & SIDE BUTT STRAPS







FRAME #9
LOOKING FORWARD
NO BEVEL

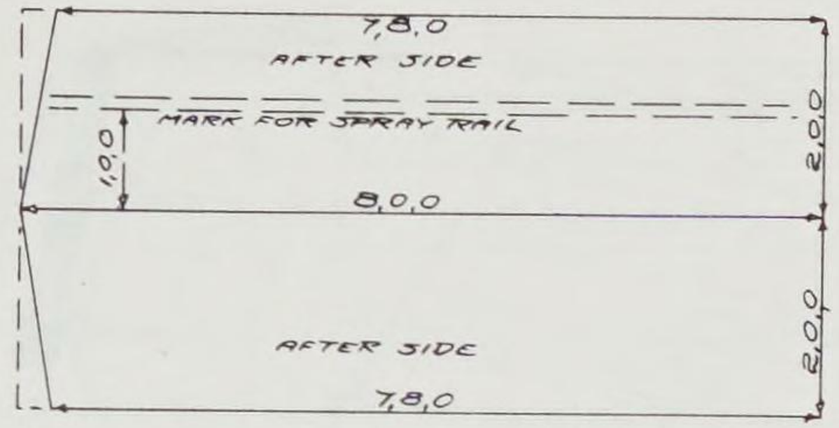
SCALE 1 1/2" = 1'0"

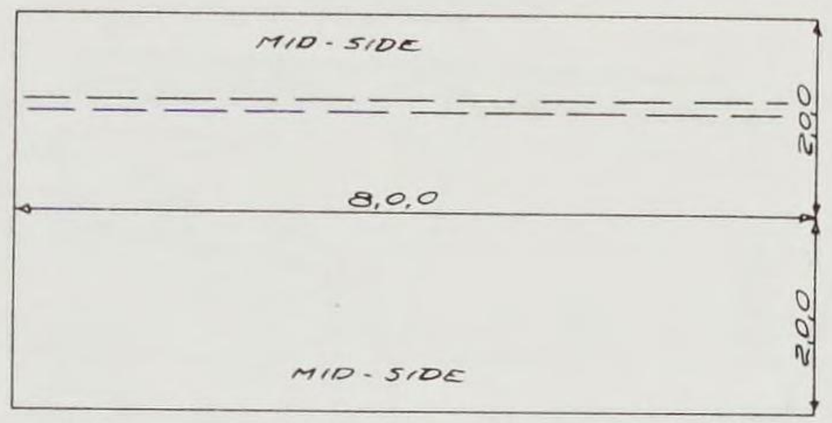
REDRAWN & REVISED 12/80

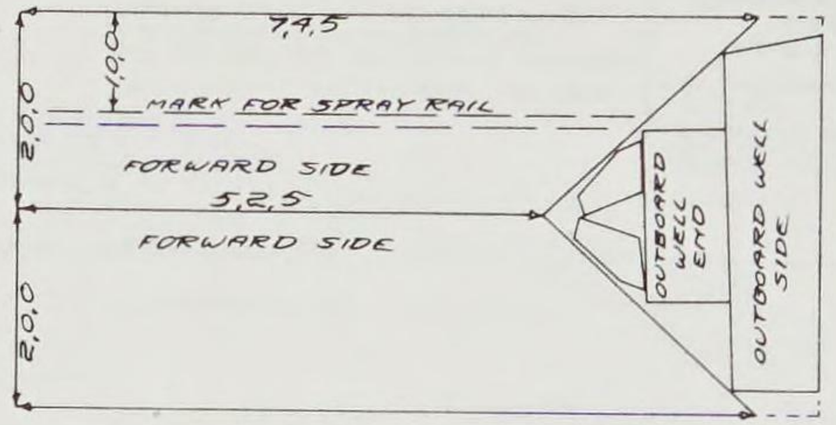
DIMENSIONS IN FEET, INCHES & EIGHTHS TO INSIDE OF PLANK BEFORE BEVELLING.

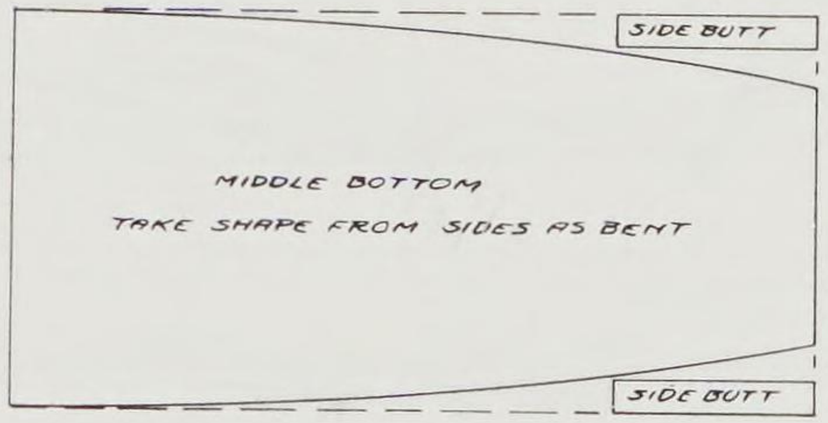
DESIGN #339-2
23'0" - 5'7"
AGT WATERLINES INC.

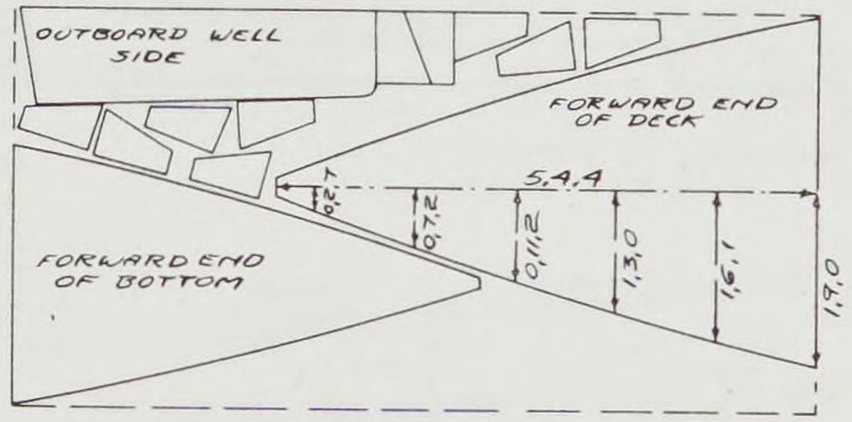
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

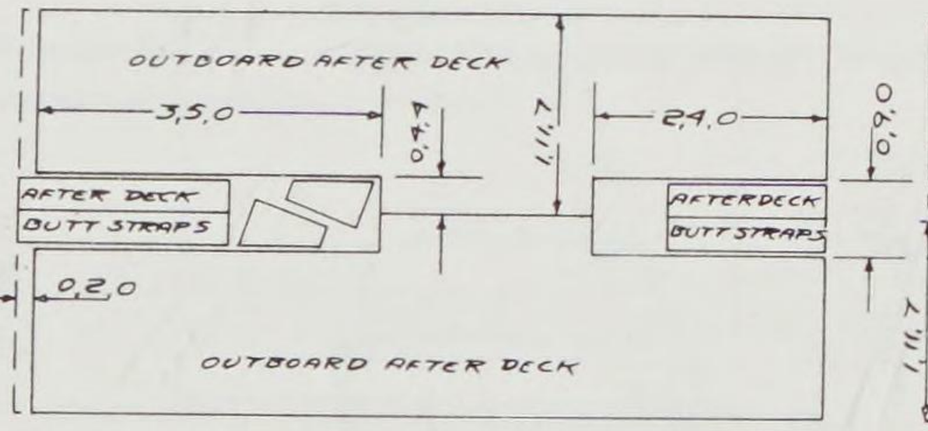


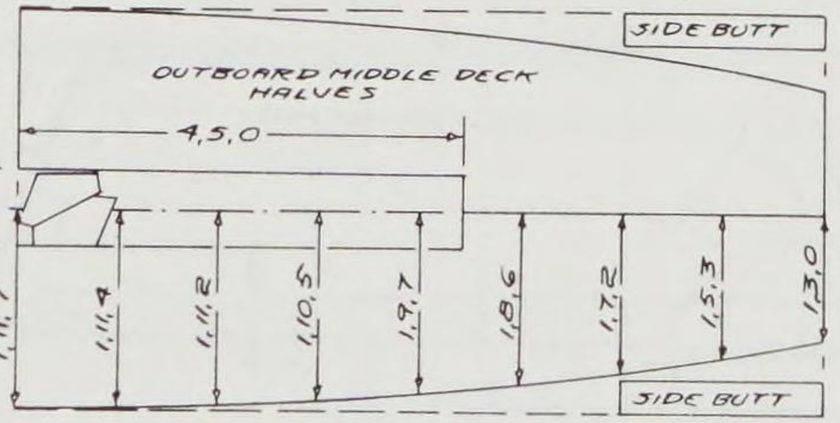


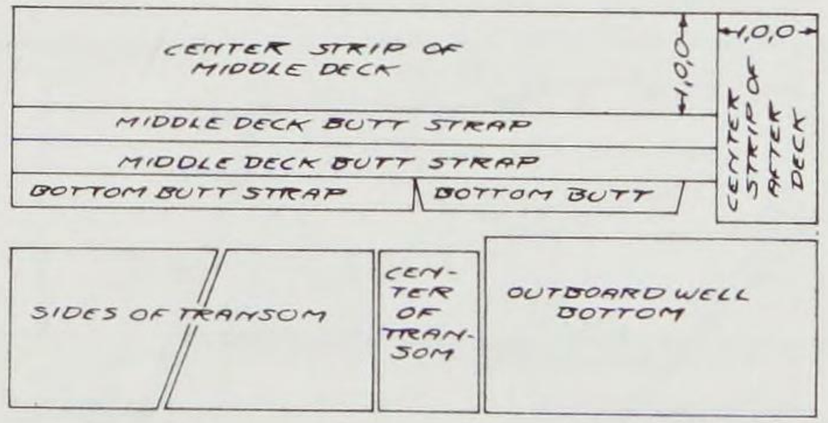












SCALE 3/4" = 1'0"

DESIGN #339 - 2
23'0" x 5'7"
FOR WATERLINES, INC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

REDRAWN & REVISED 12/80

So far, so good. But I had decided that I could make her self-righting by giving her the high flush deck and the bridge structure to carry some buoyancy high up; that is, far out if the boat got down on her side. I imagined a spectacular demonstration with the boat recovering from bottom-up with water cascading off her deck. I'm not sure Burge Whiteside, who commissioned the design, was as enchanted by this vision as I was, but he liked the "Russian destroyer" styling it produced.

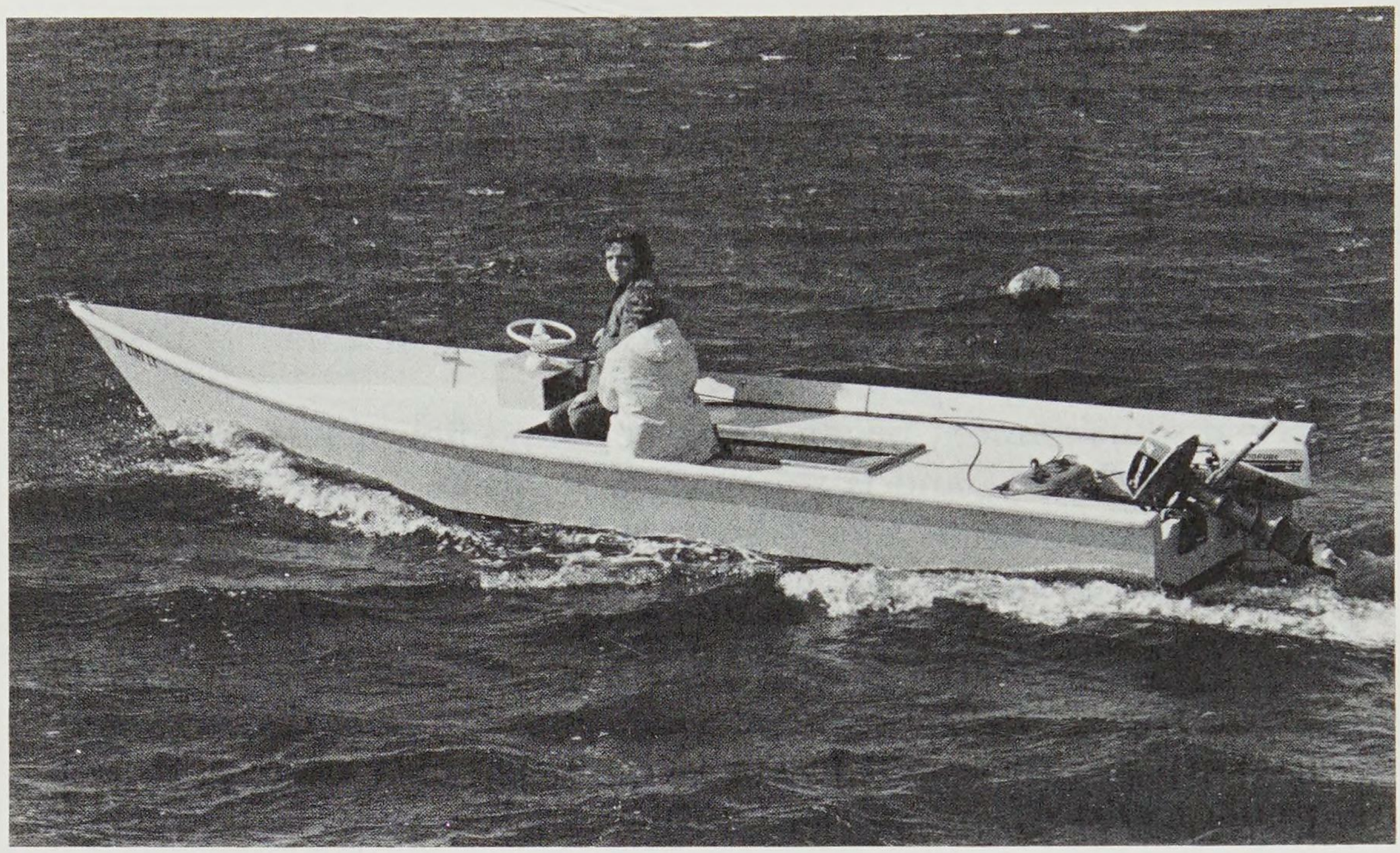
His disillusionment began when he found how tender she was. She felt top-heavy, and is so, though not quite in the way a first glance might suggest. The superstructure isn't that heavy. The trouble is the height of the weight of crew and passengers, especially since the layout encourages them to stand up.

Confident that she was safe, I brushed off the complaints, arguing that it was a safety feature that reminded people to keep their weight centered. "She'll warn you of a stability problem in good time," I said, "not like these stiff boats that will flip bottom-up all of a sudden." This isn't a terribly stupid position, by the way, though it probably isn't one that would do a salesman much good. It's possible that I'd have gotten away with it to some extent if the boat hadn't revealed a dismaying vice. As she crossed the wake of a heavier boat on the same course, she started to yaw. Burge put the wheel over to straighten her out, whereupon she lurched horribly. Everybody grabbed for handholds, which pulled the boat over still more, while the yaw continued. Burge pulled the throttle. She stopped at once, as these light boats will, and recovered her balance.

It was a demonstration of sorts of my point about reserve stability and buoyancy, but it was pure luck that nobody went over the side and maybe through the propeller. It had not felt like the gradual heel I had talked about, and had been alarming, to put it mildly. Further testing showed that it had not been a fluke. She would do it every time she went through a following wave at a certain angle. Nobody could get up the nerve to see what the ultimate position would be if she wasn't stopped, nor was there much point.

We had to abolish my superstructure and cut away the deck to make a footwell, as the photo and second set of drawings show. She was no longer self-righting. The boast of ability to cope with big breaking seas had to be dropped. But the lurching ceased, and she became a well-mannered, forgiving boat.

Relieving her of the weight of the upper works also made her even faster and cheaper to build and run than she'd been originally,



Sharpshooter *is sleeker and no longer scary, without the tophamper. (Mike Richter photograph)*

and it improved another of her virtues — she left very little wake to disturb her surroundings at any speed.

So *Sharpshooter* ended up an excellent boat, but I was much embarrassed at what Burge went through getting there. He, however, had improved the time by inventing the Dolphin spline weight, the one with the molded-in grips, so much handier to use than the old patterns that nobody who has tried them will use any others if he can help it. Waterlines, Inc., has been so busy filling orders for these and other improved marine drafting equipment that selling boat plans ceased to have a high priority.

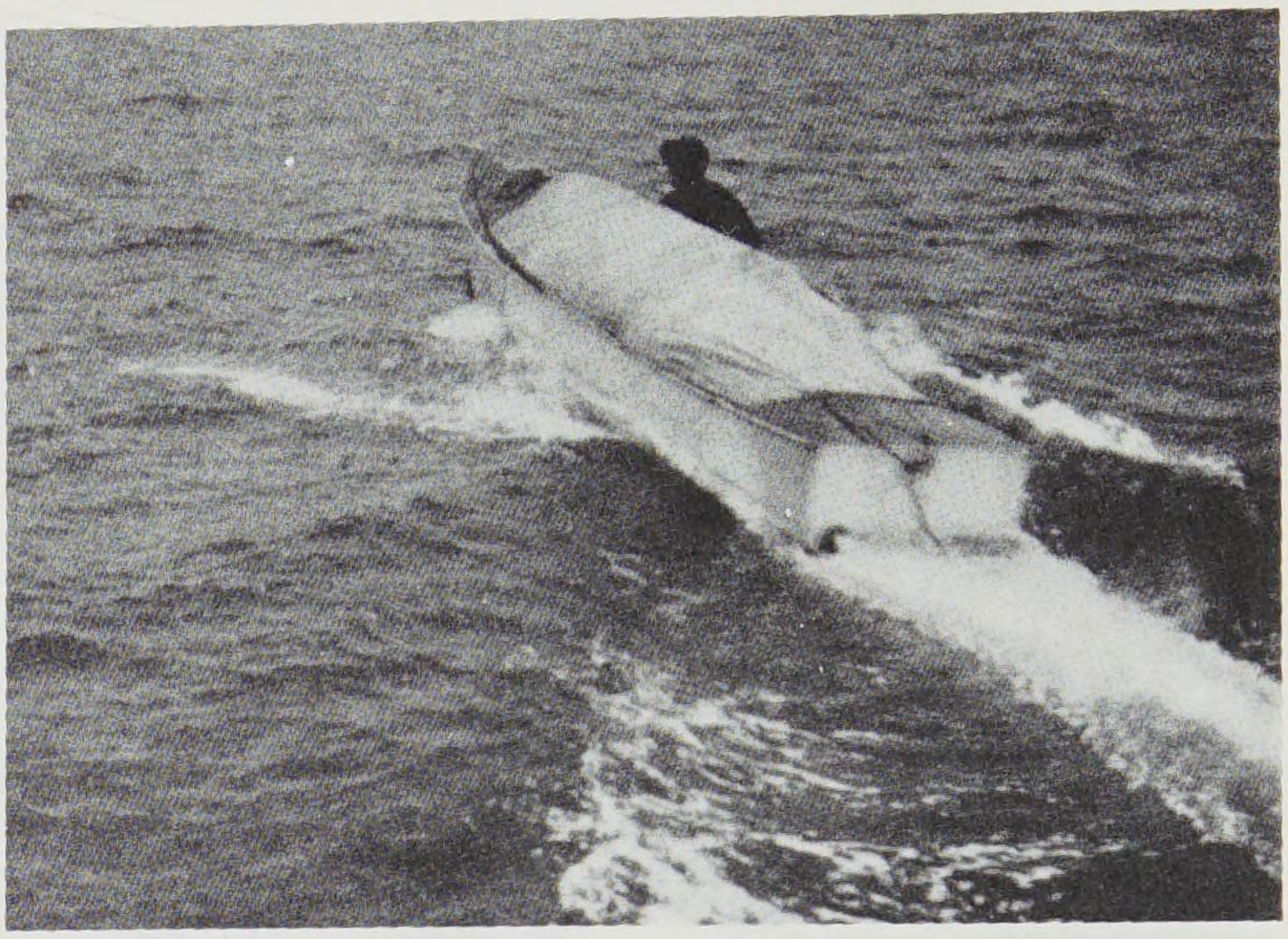
8

Viper

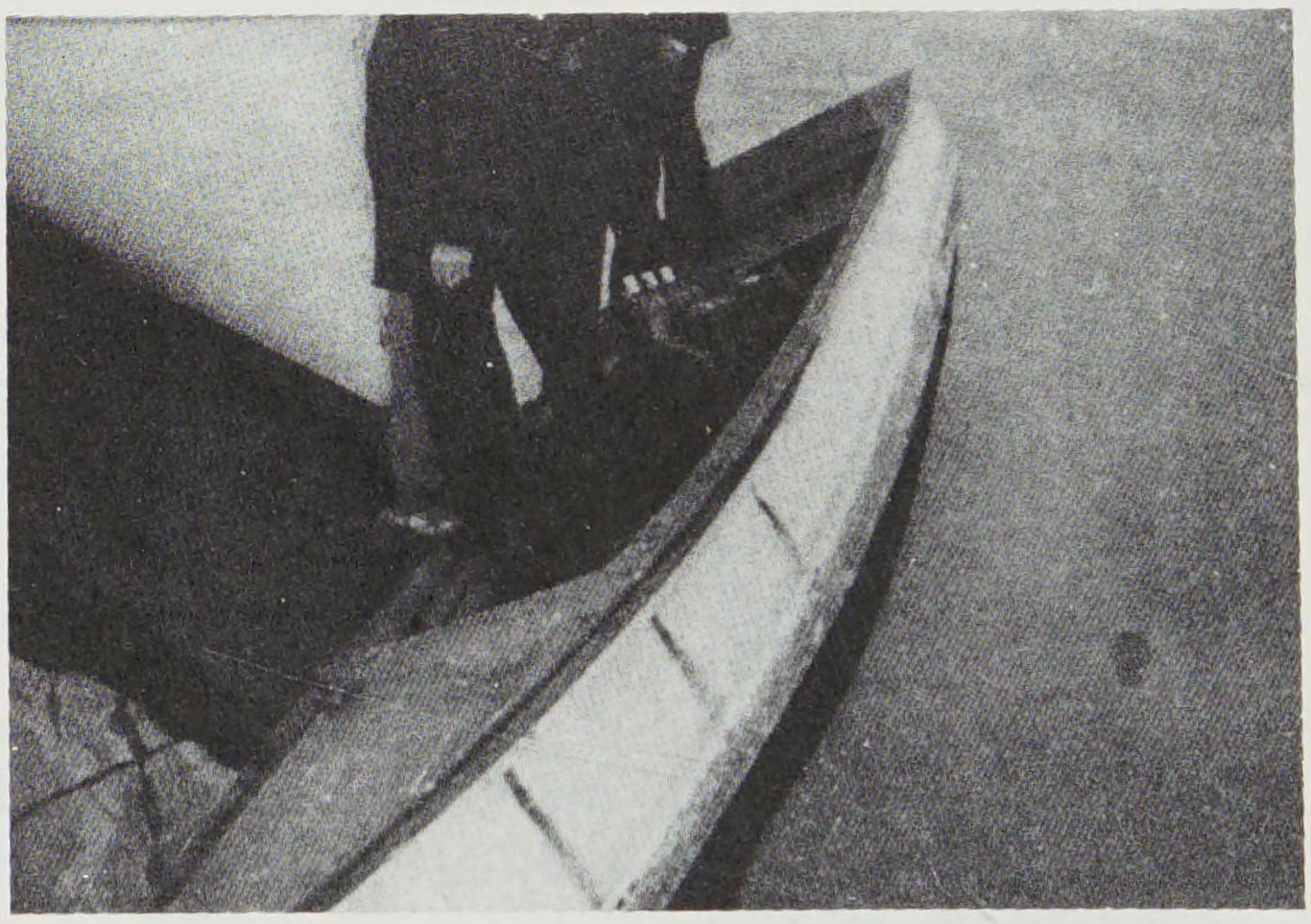
Length overall	20 feet 2 inches
Breadth	3 feet 8 inches (4 feet 3 inches over spray boards)

Fast powerboats in 1910 were wet, tender, cramped, and expensive. Planing types were beginning to appear, but they were still mostly impractical, the designers being obsessed with vertical lift. So, when Albert Hickman, then of Pictou, Nova Scotia, published "A Remarkable Speed Boat" (in *The Rudder,* February 1910), he met with a starved market.

Viper, he claimed, was simple and quick to build, had good stability, could run in rough water, and was as fast as anything of her power and much faster than most. A photo showed four people standing on the gunwale; she's obviously on the point of going over, but the demonstration was spectacular by contrast with the knife-bowed, barrel-sectioned speedboats of the time. Other photos showed her skimming over waves. He admitted it was bumpy, and an overall spray hood besides the hull spray boards suggests that she wasn't what we'd call a dry boat nowadays, but considering the temperature of the Gulf of St. Lawrence, and the walls of spray thrown up by most fast boats at the time, she looked very workmanlike.



Viper II *at 18 miles.* (The Rudder, *February 1910*)



Viper II *with 12 h.p. engine and four men, weighing 670 pounds, on gunwale.* (The Rudder, *February 1910*)

A speed of 18.18 statute miles per hour was claimed with 12 h.p., and her trim and wake in the photos make the claim fairly plausible. Hickman had worked out an elaborate theory to account for her behavior. He thought, at the time, that the simple shape that made her so quick to build was also optimum for speed; that flaring sides, deadrise bottom, and sectional curves were all affectations adding drag as well as expense. He was a deadly debater. A pompous professor wrote a condescending article explaining that his

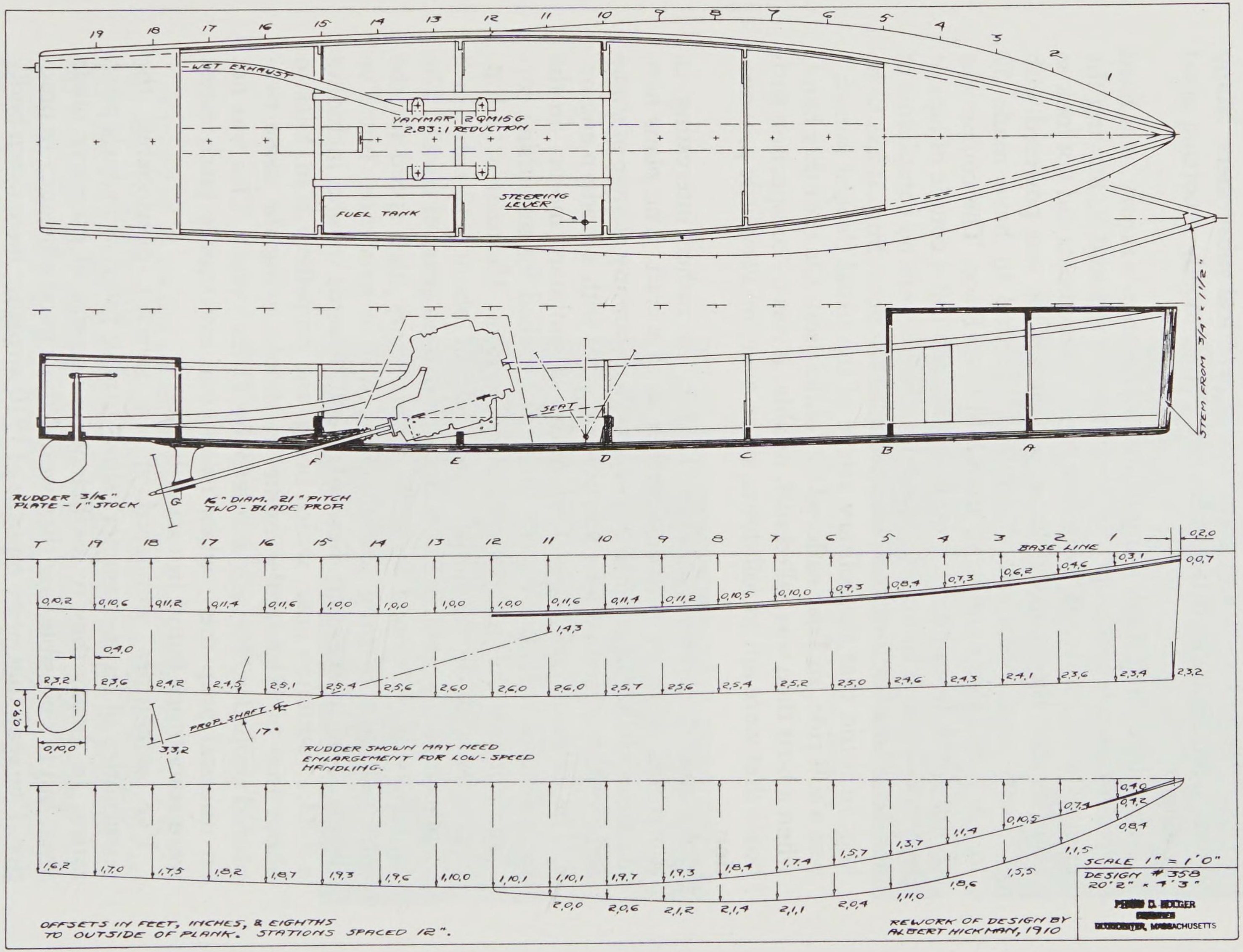
theories were unsound, and Hickman chopped him to bits in a couple of pages — to the great glee of practical subscribers. Many boats were built from the published plans, mostly reporting good results.

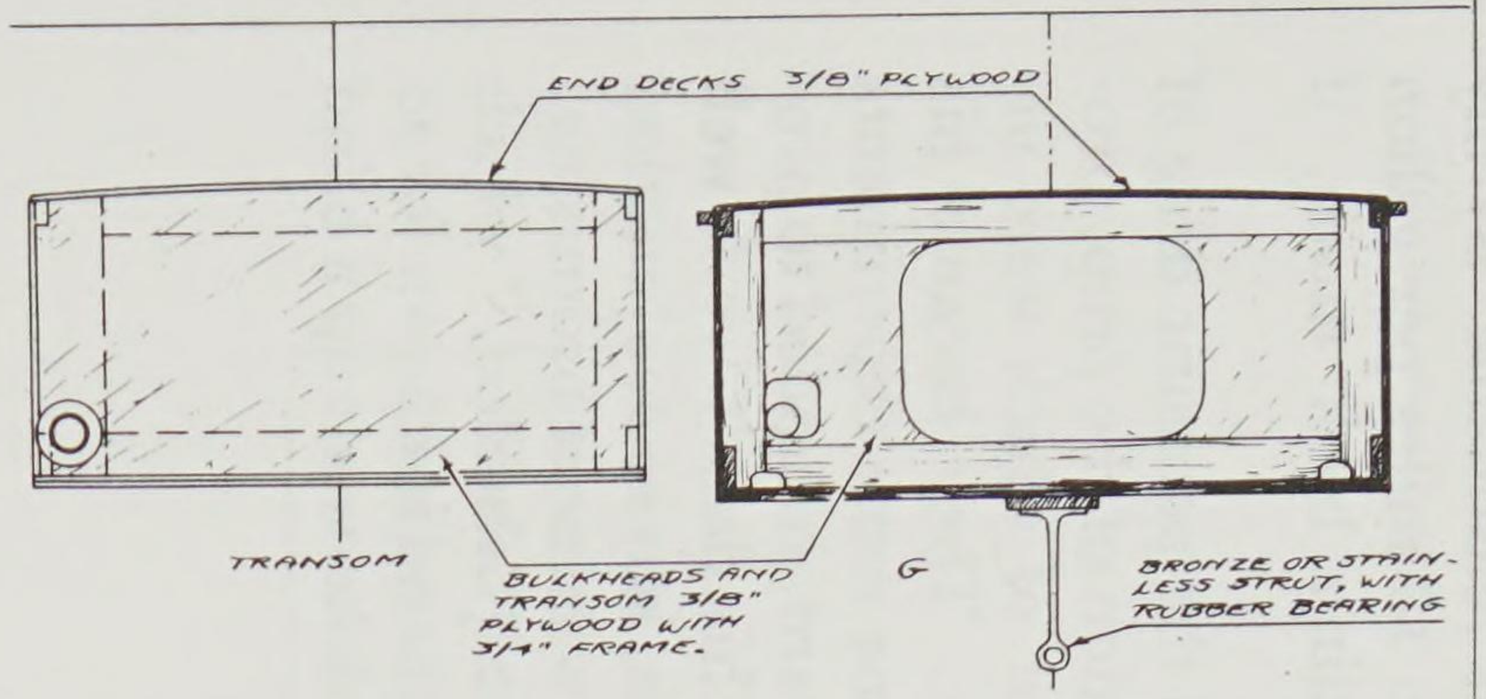
The steep shaft angle, important to Hickman's theory, was hard for most people to accept. Several builders reduced it, moving the engine farther forward, but the action of these boats did not look as good as that shown in Hickman's photos. One was powered with "a forty-sixty horsepower" engine, claimed to have made 32 m.p.h., and was entered in the Gold Cup Race. The course was choppy and the engine temperamental. She did a couple of laps at less than 20 m.p.h. and dropped out. There were no complaints of accidents or handling vices except for heavy pounding. It has to be kept in mind that the solitary virtue of the usual "speed launch" was a soft ride, so *Viper* suffered by comparison. On the other hand, when a boat then was called stiff, or able, it was by comparison with boats that were apt to roll down, often over, on very little provocation.

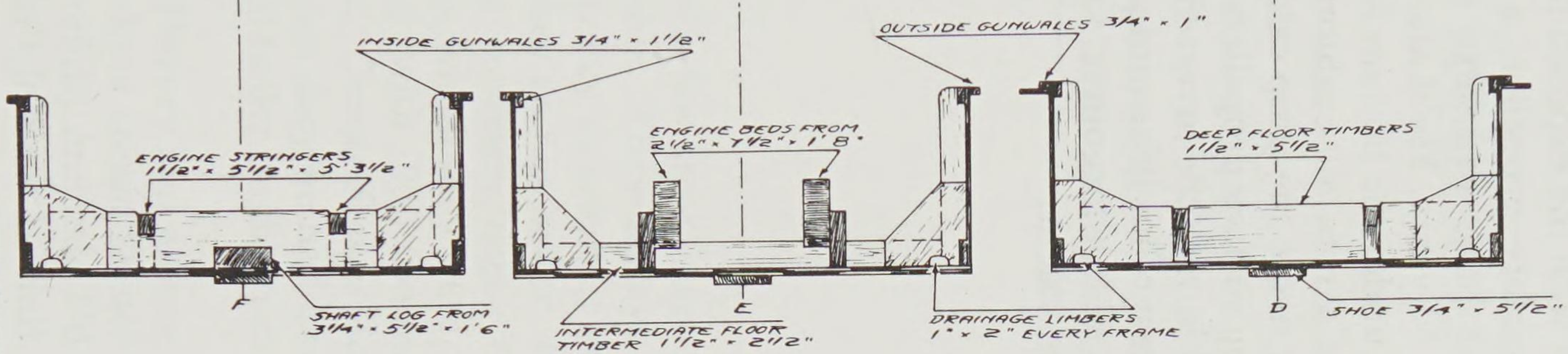
As may be, 18 m.p.h. on 12 h.p. is rather interesting in something as easily thrown together as this craft. The plans here are from Hickman's published offsets, without any change of shape or layout, but framed for sheet plywood and with a modern engine.

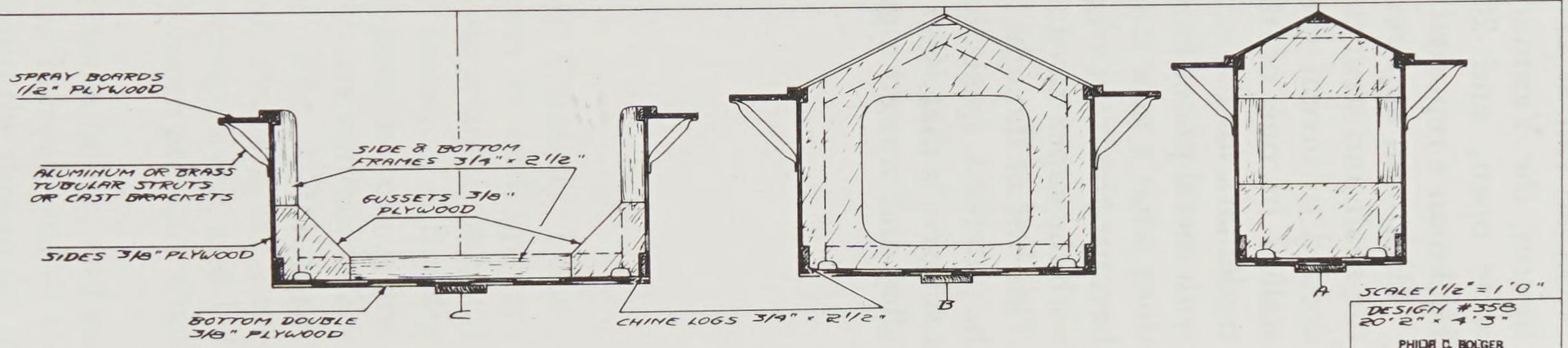
The obvious power plant would be an outboard motor, on the stern or in a well, but for the fun of it I looked for something corresponding to the original propulsion system. Hickman's 12 h.p. engine was a three-cylinder two-cycle of about 112-cubic-inch displacement, weighing 355 pounds; it had no gears or clutch. The 12 h.p. was developed at 1,100 r.p.m., very high speed for the time. There's nothing like this curiosity in existence, but I've shown a 15 h.p. Yanmar diesel of about the same weight, including a 2.83:1 reduction gear, which brings the propeller r.p.m. back to about that of Hickman's engine. It should swing the same two-bladed propeller, 16-inch diameter by 21-inch pitch. This was not an unusual prop then, when two-to-one oversquare pitch ratios were sometimes found in racing boats.

I've sometimes wondered if we weren't overlooking the possibilities of large-diameter, slow-turning props with high pitch ratios. In theory they're inefficient on account of excessive blade area, but it's possible that they would show good efficiency in practice. I've read that some replicas of 1910 airplanes have flown badly or not at all, apparently because modern engines can't swing the original large propellers. Since this seems to puzzle aeronautical


19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
WET EXHAUST
YANMAR 2QM15G
2.83:1 REDUCTION
FUEL TANK
STEERING LEVER
STEM FROM 3/4" x 1 1/2"
SEAT
F E D C B A
RUDDER 3/16" PLATE - 1" STOCK
G
K" DIAM. 21" PITCH TWO-BLADE PROP
T 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
BASE LINE
0,2,0
0,0,7 0,1,1 0,2,6 0,3,4 0,4,3 0,5,2 0,6,0 0,6,5 0,7,3 0,8,4 0,9,3 0,10,0 0,10,5 0,11,2 0,11,4 0,11,6 1,0,0 1,0,0 1,0,0 1,0,0 0,11,6 0,11,4 0,11,2 0,10,6 0,10,2
1,4,3
0,4,0
2,3,2 2,3,4 2,3,6 2,4,1 2,4,3 2,4,6 2,5,0 2,5,2 2,5,4 2,5,6 2,5,7 2,6,0 2,6,0 2,6,0 2,5,6 2,5,4 2,5,1 2,4,5 2,4,2 2,3,6 2,3,2
0,8,0
0,10,0
3,3,2
PROP. SHAFT ℄
17°
RUDDER SHOWN MAY NEED ENLARGEMENT FOR LOW-SPEED HANDLING.
0,7,0 0,7,2 0,8,4 0,9,3 0,10,5 1,1,4 1,3,7 1,5,7 1,7,4 1,8,4 1,9,3 1,10,1 1,10,1 1,10,0 1,9,6 1,9,3 1,8,7 1,8,2 1,7,5 1,7,0 1,6,2
2,0,0 2,0,6 2,1,2 2,1,4 2,1,1 2,0,4 1,11,0 1,8,6 1,5,5 1,1,5
SCALE 1" = 1'0"
DESIGN # 358
20'2" x 7'3"
PHILIP D. BOLGER
WORCESTER, MASSACHUSETTS
OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK. STATIONS SPACED 12".
REWORK OF DESIGN BY ALBERT HICKMAN, 1910







REWORK OF DESIGN BY ALBERT HICKMAN, 1910

DESIGN #358
20'2" x 4'3"

PHILIP L. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

engineers, perhaps naval architects might get a similar surprise. Hickman ran at 17 percent slip, which seems reasonable. By my figures, the Yanmar-powered *Viper* should go 18 miles per gallon wide open, and 20 m.p.g. without throttling back much, if Hickman's reported speed is correct.

Hickman, apparently more concerned with the parasitic drag of the shaft and strut than with the exposed position of the prop, proceeded to invent the surface propeller, a pair of which were installed in one of these hulls the next year. They became his trademark for the next 40 years. He'd also done some experiments with metal plates fitted under the bottom forward, intended to produce what's now called a ram air cushion. This didn't work well because the trapped air made the prop cavitate, but in conjunction with the super-cavitating surface propellers, it was more promising. This line of thought led him to the inverted-vee "Sea-Sled," which he patented, spent the rest of his life promoting, and is known for so exclusively that *Viper* is all but forgotten. I think he went up a blind alley and wasted a great talent.

9

Firebrand

Length overall	26 feet 6 inches
Breadth	4 feet 3 inches
Draft (propeller)	2 feet 1 inch
Designed displacement	1,120 pounds
Owner and builder	Harcourt Hervey III

Off and on I've designed a few steam launches. Candidly, I don't find them very impressive. They always seem to end up very primitive; dirty, bulky, tricky to operate, and surprisingly noisy. I don't understand why they're not better. For instance, if Stanley steam automobiles were routinely using 600-pounds-per-square-inch boilers 70 years ago, which they were, why are contemporary steamers limping along with 250 pounds? The 1,200 p.s.i. destroyers (*Irwin Rommel, Charles Francis Adams, Brisbane,* etc.) are said to be troublesome, but they've had long service lives, and I'd have thought that a small boiler ought to carry more pressure than a big one.

As may be, Harcourt Hervey had an engine and a boiler, and an acquaintance had an 11-knot steam launch that Hervey wished to outrun. I looked at it carefully and said I'd refund the design fee if my proposed design didn't leave it behind. The owner turned out to be a lawyer by profession and sent me a document to sign embodying the guarantee. Last time I heard from him he was still

DESIGN # 368
26'6" x 4'3"
Jan Harcourt Heavey III

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

FOR ASSEMBLY METHOD SEE
'INSTRMT BOXES' BY H.H. PHYSON

SCALE 3/4" = 1'0"

SEAT BACK

SEAT

10 GALS. WATER

CONDENSER

SHROUD

10 GALS. FUEL

STUFFING BOX

1/2" = 10'1/2" MOTOR BED

BEARINGS

BOOMER

STACK

12" QUAD PENNT

CABLES

DACRON SPRAY HOOD

FABRIC & STRINGERS REMOVABLE FOR SMOOTH-WATER RACING.

33°

STEM FROM 3/4" = 1'1/2" = 1'9 1/4"

STEERING WHEEL STAND'D

1/4" = 3" = 17" FIN

DRAIN TUBE

1" D. MONEL SHAFT

CAST BRONZE OR WELDED S.S. STEVT SEE DETAIL

13°

48" DIAM. x 36" PITCH MICHIGAN TWO-BLADE PROP.

9"

8"

12"

1" STOCK

1/2" CORMING

SMOKE BOX

R.J. SMITH TYPE III MONOTUBE BOOMER

BEARING CUP

"PANTHER" JUNIOR 15 H.P.

6

3" COMM. STACK

4'2 1/8"

1'3"

1'8"

TRANSOM INSIDE OF PLANK.

2 7/16" BEVEL

1'4 1/2"

1'11 1/2"

3'11/2"

2'1"

6" RADIUS

SEAT BACK

NO BOTTOM BEVEL

BOTTOM BEVEL 1/2"

BOTTOM BEVEL 2 1/2"

SIDE BEVEL 2°

SIDE BEVEL 5 1/2°

SIDE BEV- EL 10°

BASE LINE

STOPS FOR SEAT BACK

T 1/4"

3"

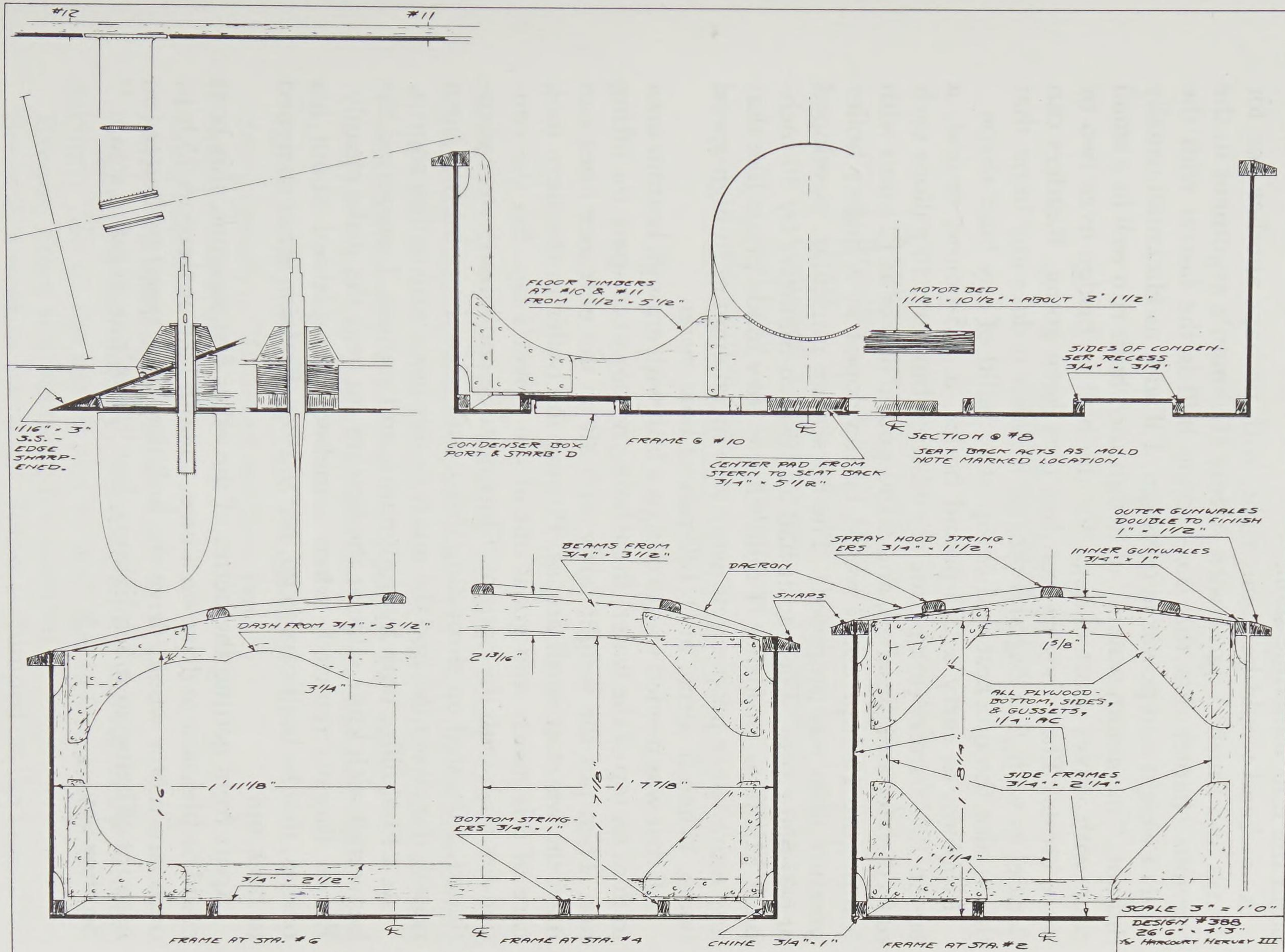
EXPANDED HULL SIDES - TRUE SHAPE - NO DEDUCTIONS

GUNWALE HEIGHTS FROM BASE LINE

1'11"	2'0"	3 1/4"	3 1/4"	3 1/4"	3 1/4"	2'0"	3 1/4"	2'0"	3 1/2"	2'0"	3 7/8"	2'0"	4 1/2"	2'0"	3 1/2"	2'0"	6 1/2"	2'0"	2' 8 1/4"				
3 1/4"	1'9 1/8"	1'8 7/8"	1'8 3/8"	1'8 5/8"	1'8 1/4"	1'9 1/4"	1'10"	1'11"	2'0 3/8"	2'1 3/4"	2'3 1/2"												
8 3/4"																							
2'6"																							

WATERLINE AT 1120 LBS. DISPLACEMENT

RAKING FOLDS DOWN FORWARD



FOR'D THREE FRAMES HAVE AFTER SIDES ON MARKED STATIONS OF SIDE PANELS.

DESIGN #388
26'6" - 4'3"
"Harcourt Hervey III"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

organizing the machinery but proposed to take a weekend off and build the hull sometime soon.

A weekend would be about right, with perhaps another one for details and finish. I agree with Albert Hickman's argument in the previous chapter that this box-section hull is the fastest with the kind of weight and power in question. I'll add, as Hickman usually did not, "in smooth water," although such hulls run well in a small chop with waves short enough for the hull to bridge over two or three crests. Then they're wet, but they keep going. Readers can decide, as with *June Bug* and others, whether it does any harm that this is also the quickest and cheapest to build of any boat shape.

Problem: to carry a 225-pound boiler, a 125-pound engine, a 60-Ah 12V battery (to operate the oil-fired burner), 10 gallons each of feed water and diesel oil, and a 150-pound driver at 12 knots with 6 h.p. (the 15 h.p. noted would be developed at a higher boiler pressure than was proposed). The horses are muscular, developed at 600-650 r.p.m. The owner had an 18-inch-diameter by 36-inch-pitch Michigan propeller. I didn't know they made props like that any more, since people quit using low-speed engines in high-speed boats. When it turns, an 1,100-pound boat *moves*.

All that was needed was to design a hull with enough bottom area to float on top of the water, there being no power to spare for lifting her. Then put the weight fairly well aft so the entrance lines can meet the water at small angles. Putting the boiler in the stern took care of this neatly and got it out of the driver's lap. Set the condensers flush with the bottom. Outside tube condensers were mentioned. I insisted on shrouding them, and once the point had been raised, the owner devised the much neater box construction shown.

As a final fillip, both hydrodynamic and stylistic, I suggested the beavertail with knife edge at the bottom, to vent the wake cleanly. Ettore Bugatti retorted, when somebody complained about his brakes, that he built cars to go, not to stop. *Firebrand* is not designed to back up!

Apart from getting the better of the other fast steamer, this boat could be pleasant to drive on a nice, smooth lake or river. A 15 h.p. outboard motor would drive the hull the same speed or better (on account of being so much lighter), but "'tain't as sweet as steam." So they say.

10

Burgundy

Length overall	28 feet
Breadth	6 feet 3 inches
Draft	3 feet 8 inches
Designed displacement	3,500 pounds
Sail area	271 square feet
Speculative Design	

Act I, Scene 1. Bolger is showing Bradford Story, boatbuilder, a scheme for building a 45-foot schooner very cheaply by assembling its hull out of thin panels of plywood, prefabricated, and sheathing it with straight-edged natural wood planks for rigidity.

Story: "That's the way Dan Burnham built that skiff a few years ago."

Bolger: "Is that a fact? How did it work out?"

Story (gently): "It rotted out in a year."

Bolger (dashed): "Oh."

Long silence.

Story: "What's the plywood for?"

Bolger (absentmindedly, thinking Story should know without asking): "So all the panels can be built flat before assembly."

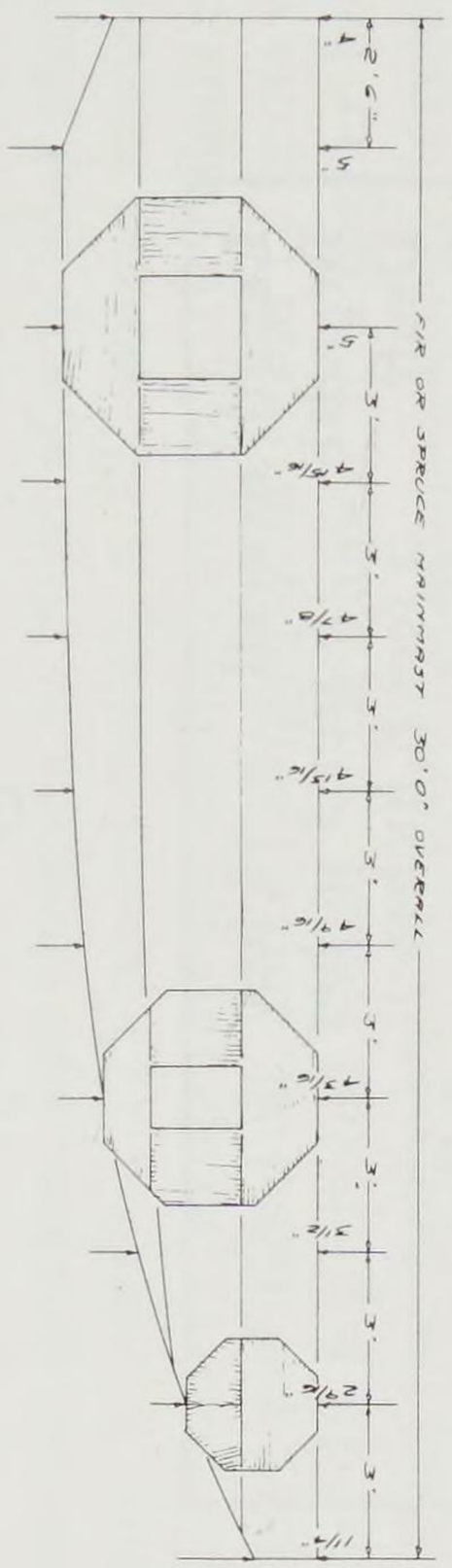
Exeunt, Story not pursuing his question.

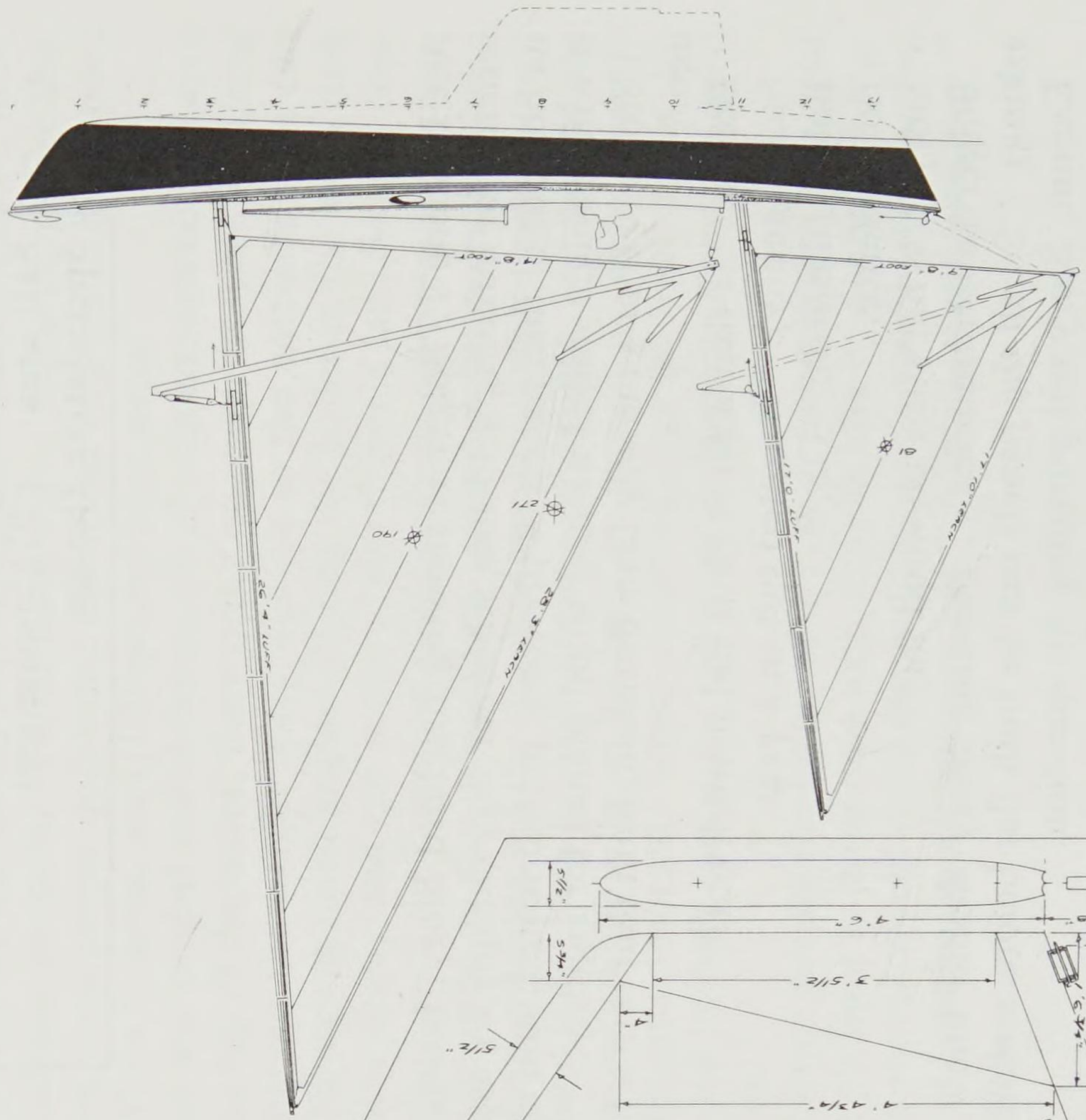
Scene 2, a week or two later. Bolger is slumped on the base of his spine in an armchair, sipping California Burgundy and staring into vacancy. He is evolving crafty ways of assembling boats. His eyes

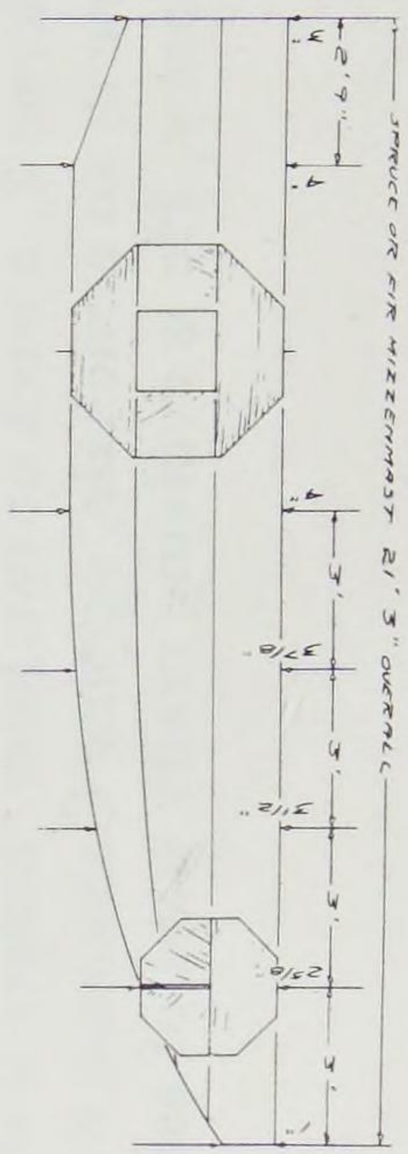
SCALE 1/2" = 1'0"

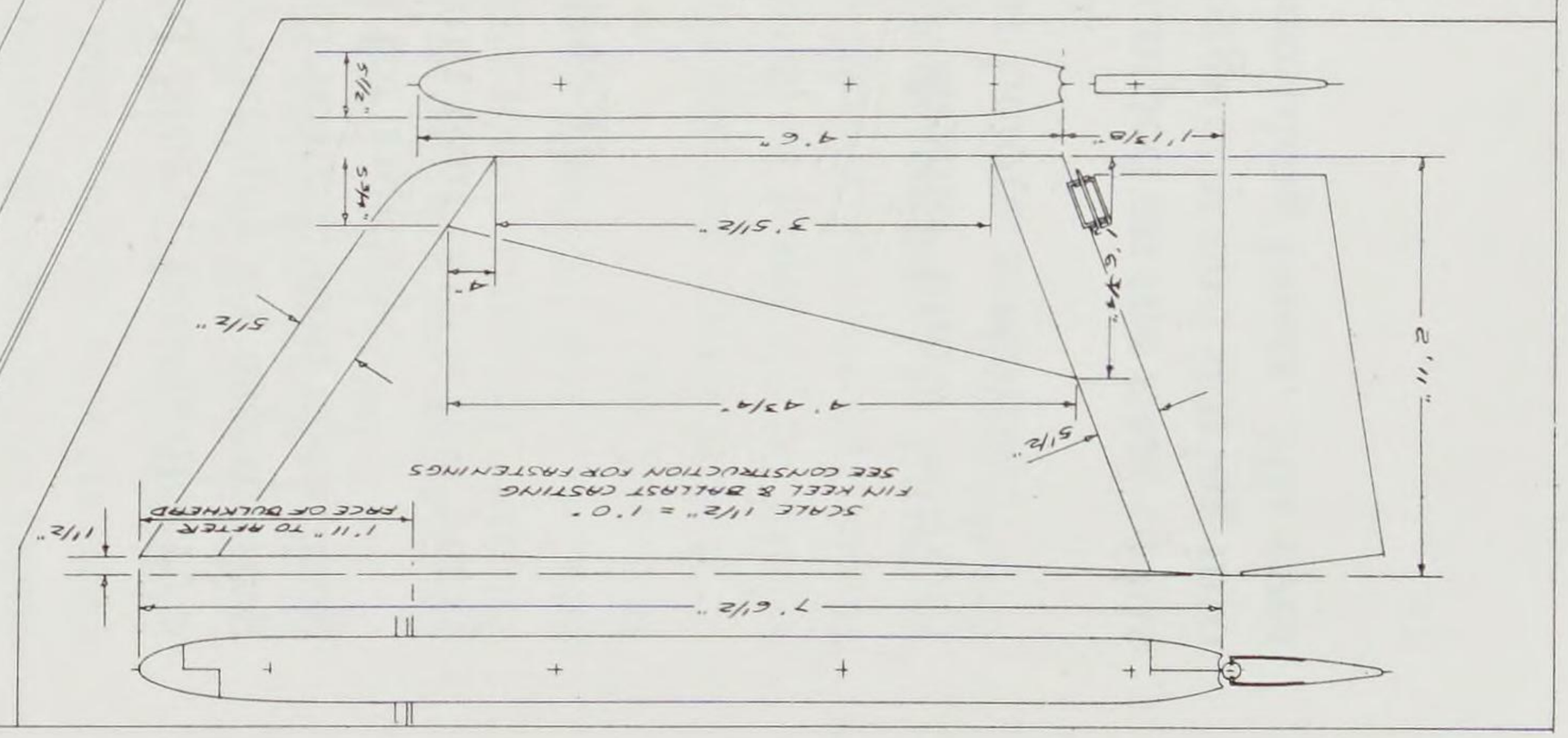
DESIGN #384
28'0" x 6'3" - 3/8-
for Stacy SHIPYARD

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS









PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN # 389
20'-0" x 6'-3"-3'-0"
for Dory Shipyard

SCALE 3/4" = 1'-0"

CHINE BEVEL CONSTANT 15/16"

MIDSHIPS MOLD - BULKHEAD
NO BEVEL ANY SIDE
SCALE OF MOLDS 1 1/2" = 1'-0"

SHEER & CHINE STRAKES 11/2"
SIDE PLANKING 3/4"
BOTTOM PLANK 1 1/2"
DECK & TRUNK TOP 3/4"
EDGE-NAILED STRIPS
FIBERGLASS-SHEATHED.
COAMINGS 3/4".
DECK CROWN 4"IN 6'-0" DERM.

2'-47/16"

4'-2"

3'-0"

1'-7 1/2"

1'-4 7/8"

2'-3 7/8"

MAST STEPS FINISH
1/2" x 11" x 2'-1"

AFTER MOLD
FORE'D MOLD
MOLDS FROM 1", 3/4", WITH
1/2" PLYWOOD GUSSETS

MAST PARTNERS
3/4" x 7 1/2"

2'-3 1/4"

1'-11 3/4"

STEM FULL SIZE - 3/16"
FROM 1 1/2" - 3'-3"
TEMPORARY BRACKETS FOR CLAMPS

CAM FROM 2 3/4" - 4 - 3'-3"

DOUBLE BEVEL

WATERLINE @ 3500 POUNDS DISPLACEMENT

3/4" FLOORBOARDS IN FOUR FULL-WIDTH SECTIONS

1270 LBS. LEAD BALLAST

STEM CAP 3'-3"

3/4"

1 1/16"

7 1/8"

2"

1'-11 1/4" LEAPING EDGE OF FIN

TRAILING EDGE OF FIN 0 3/4"

3 3/4"

MOL. 12/80
STEM TO CONCRETE
SLEEVE TO 10" ABOVE
BOTTOM - ELIMINATE
STEERING BOX.

STEM CAP 3'-3"

3/4"

1"

1 1/2"

1 7/8"

1 7/8"

1 3/4"

CENTER OF BUOYANCY

SCULL NOTCH

DECK

COMB

DELRIN PIN #85

12' SKEG

BLADE

2"

SIDE BEVEL OF FORE'D MOLD

13°

BOTTOM BEVEL OF FORWARD MOLD

3°

BOTTOM BEVEL OF AFTER MOLD

3 3/4°

SIDE BEVEL OF AFTER MOLD

13°

STRINGER RAIL 1/2" x 2 1/2"

KEEL TAPERED FROM 1/2" - 1 1/2"

3/4"

3/4"

STEERING BOX

DRAFT FULL LENGTH BEFORE BEVELLING
2'-5 1/4"

13'-3"

8'-5 1/8"

6'-6 5/8"

11'-8 3/4"

CLEATS - 1 1/4" SQUARE

STOPS FOR FOR'D MOLD

MARK FOR AFTER FACE OF MIDSHIPS MOLD

STOPS FOR AFTER MOLD

13'-4 3/4"

8'-3 1/8"

6'-6 5/8"

13'-3 1/2"

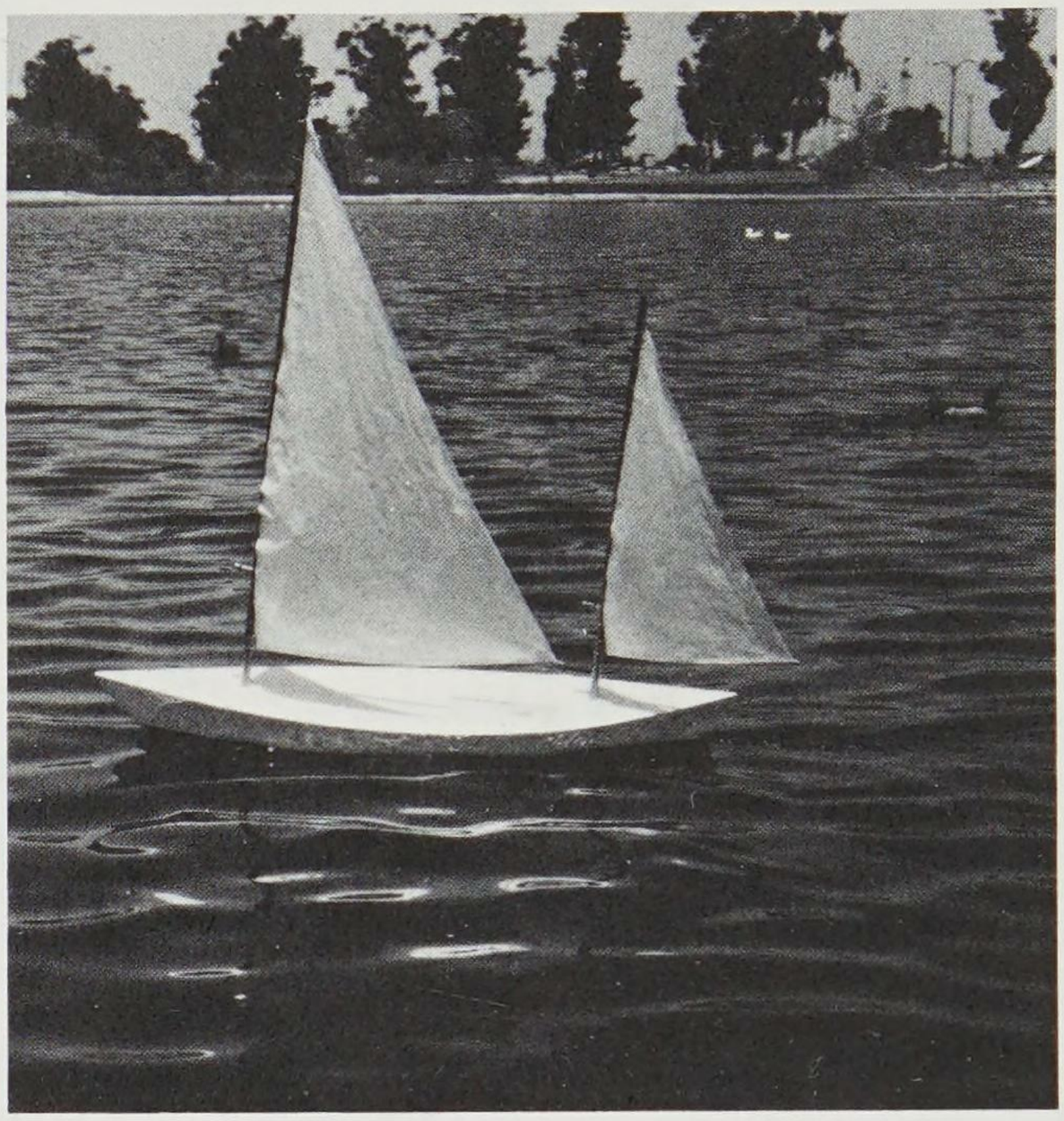
CAMT FRAME OPPOSITE POST

TENSION CLAMPS - 3/4" x 1 1/2" x 3'-3"

1 1/2" x 3 1/4" BLOCKS

BEVEL 2/6

3" - 4 PER 1'



A sailing model of Burgundy *made by Thomas Fulk. (Thomas Fulk photograph)*

suddenly widen. In a far corner of his mind, he hears Story's voice say again, "What's the plywood for?"

What indeed? If the sides of the hull were straight parallel-edged panels, they could be assembled out of straight planks of natural wood just as easily as of plywood; more easily, since they wouldn't have to conform to industrial plywood dimensions. The bottom could be cross-planked the old sharpie way, straight-edged and random widths.

Act II, Scene 1. Story and his father are building a Francis Herreshoff *Rozinante* canoe yawl. They estimated $24,500 for her and are making a point of pride of not having an overrun. Her owner will be getting something of a bargain in terms of labor time. They think the price is too high for the owner and too low for them.

Story: "Almost $25,000 for a little daysailer! It's an outrage!" He tells how long it took him to build the keel.

Bolger (standing by, mesmerized by the beauty of Herreshoff's proportions): "Half the weight of that lead keel is just to hold down the deep part of the hull, which is trying to float up." (He is mistaken about this; it's meant to give the boat added momentum.)

That's enough of the play conceit. Bernard Shaw I'm not. But what came of it was this design. She's meant to perform the same service as the heroine of *The Compleat Cruiser,* which everybody should read. Someday I hope somebody will publish an unabridged edition; I doubt the Sheridan House version is much more than half of it.

Burgundy is built of the same materials as *Rozinante*: oak and pine, bronze and lead. The work would be done with the same care, and she ought to last as well, which is to say, indefinitely. She's the same length, breadth, and draft, and her cockpit and cuddy are comparable. The cuddy doesn't have the deep footwell, but it has more sprawling space. We thought of replacing the *Rozinante*'s canvas easy chair with a couple of folding aluminum beach chairs.

Burgundy's action in rough water won't be as smooth, but she'll throw a lot less spray, and she's much more buoyant for her weight so ought to be more forgiving of bad handling and bad luck. In a fresh breeze she's almost certainly the faster of the two. One of the most exciting races I've ever been in was between three International 210s and three Triangles — beautiful 1925 Alden sloops the same length overall as the 210s but with twice the displacement and nearly twice the sail area. I was in the crew of Frank Cunningham's *Bahiana,* a Triangle. The handicappers allowed us eight minutes' start on the 210s. There was a rail-down breeze with a big sea running, and we beat Bob Sides's 210, *Spray,* by one second. What has stayed in my memory is a vivid picture of *Spray* soaring like a gull over the crests of the waves as she walked up on us on the final beat to the finish. In a breeze of wind, the shallow-bodied, lightly ballasted boat with a small rig will beat a heavy, deep-bodied boat with a big rig, whatever may happen in light airs and a leftover slop.

Burgundy's all-up weight (I hope) is not much more than the lead keel casting of *Rozinante.* All her planking, and all her framing except for the deck beams, is straight-edged and constant bevel. The sides are built flat, bent around three molds, and the bottom planking is screwed straight on. She has no true keel, no clamp, no floor timbers, no breasthooks, no rabbets. Except in the coaming, there's no cut-and-try work at all, and no loft work.

Aloft, she has no standing rigging: no wire, no tangs, no terminals, no turnbuckles, no chainplates. The sprit booms dispense with travelers, vangs, and half the sheet blocks and cordage. She has no halyards, sheaves, or tracks. The sails are furled by being rolled up around the leeches, *Dovekie*-style, and instead of being reefed, they're feathered, by setting up on the powerful snotters. All this saves more than money; weight aloft is saved by the slender mastheads that don't have to accommodate sheaves or stand the stresses of halyard falls (same principle as the halyard hooks in fine-tuned racing machines). Wind resistance is an order of magnitude less, and aerodynamic efficiency is improved by letting the luffs drop over to the lee side of the masts. Since there's no compression

from standing rigging or from a jib's luff tension, the stresses imposed on the hull by the rig are very small, which further simplifies the structure and improves its longevity.

Incidentally, with this rig she can be gotten underway and put to bed in about 10 seconds each.

The result of all this process of elimination is that she could be built for less than a third of the price of a *Rozinante.* So Brad thinks, and he would like to build one to prove it.

There's a catch. *Rozinante* is one of the all-time masterpieces of art. For visual satisfaction, three *Burgundy*s don't equal one *Rozinante.* Notwithstanding Brad's Yankee outrage, I think the *Rozinante* is worth what she costs. But for somebody who doesn't have the price of a Rubens original, there may be some merit in a *Playboy* centerfold.

11

Wish II

Length overall	20 feet
Breadth	5 feet 7 inches (6 feet 6 inches over leeboard guards)
Draft	8 inches/3 feet 2 inches
Designed displacement	2,170 pounds
Sail area	178 square feet
Speculative Design	

This design was meant to be a stock plan. It was going to be Design #400 and a monument to my mastery of sharpie design. When I actually found time to work on it, it turned out to be #399, appropriate for an ambitious design that missed being good.

Being discontented with it, I haven't made any effort to get one built, but I'm confident that it isn't a bad boat in most ways. I'm sure it would be a good sailer, safe in any ordinary weather or in a gale if it held together and was handled competently. The rig is like others, bigger and smaller, that drive boats well, including to windward, and have fewer vices, at least in the small sizes, than any other type I know of. She should be a straightforward job to put together, keeping in mind that an untried, detailed plan generally turns out to have some detailed mistakes lurking in odd corners.

It's neither as simple nor as cheap as I meant it to be. It takes a minimum of 18 sheets of plywood, which implies a lot of fastenings and glue, and work, and so many other bits and pieces that it turns into a more substantial investment than it looks. It's obviously poor business to build an expensive boat that looks cheap.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN # 392
20'0" - 5'7"

SCALE 3/8" = 1'0"

TRANSVERSE SCALE 1/2

TAPER TO SQUARE AT HEEL

3"

3'6"

FIR MAINMAST 25'6" OVERALL - MAY BE SOLID STICK

SPRUCE MAIN BOOM 16'0" OVERALL

SQUARE SECTION 1 1/4" CORNER RADIUS

2 3/8"

2 1/2"

2 3/8"

4 7/8"

4 1/2"

5"

4'

3'

3'

3'

3'

4'

4'

4'

4'

1 1/2"

1 1/2"

3'

3'

3'

3'

4'

3'

6" PLUG

1 1/2"

MAIN MASTHEAD @ 11'2" = 1'0"

CONTINUOUS LOOP - KNOT IN FREE ENDS.

FRONT, MAST AND SEIZE WITH

PUSH MIZZEN HEAD TO MASTHEAD NO HALYARD

SEPARATE LOWER TIES

92

142

178

128

36

TAPER TO SQUARE AT HEEL

2 1/2"

2'4"

3 1/2"

3 3/4"

2 3/8"

3'

3'

3'

FIR MIZZENMAST 15'1" OVERALL

1 1/2"

SQUARE SECTION NO TAPER

MIZZEN BOOM 8'0" OA

RAISED LEEBOARD RESTS IN SLOT ON END OF GUARD.

6'6" x 3'2" TORTOISE PUNT ON DECK

LEEBOARD PIN P. & S.

RAISED SLIDING HATCH

WATER TIGHT AFTERDECK

MAIN SHEET CLEAT P. & S.

CAVILS FOR SHOTTER PORT SIDE & HALYARD STARBOARD.

1½" 5'9" 2½" 2¼"

FIR BOOMKIN 8'0" OVERALL SQUARE SECTION FULL LENGTH

¾" x 2½" STRUT BRACES LEEBOARD GUARD TO MOLDING

VIEW FROM ASTERN

W.L. @ 2170 LBS. DISPLACEMENT

INITIAL POSITION OF MAINMAST IN STEPPING

KNEE & BEAM

3'4"

1

2

3

VIEW FROM AHEAD

DRAIN HOLES IN BOTTOM

6'6"

SLATS REMOVABLE

SEAT P. & S. REMOVABLE

PORTA-BLE W.C.

VENT

MIZZEN STEP

BERTH P. & S.

FOLDING PIPE BERTH P. & S.

OPTIMUS HEPOSSHE STOVE

VENT

FREE-FLOODING FOR'D WELL

FREE-FLOODING AFTER WELL

OPTIONAL FORM P. & S. (SEE NOTE)

DEADLIGHT P. & S.

2'13/4" 6'6 1/4" 8'4" 3'0"

BALLAST: 600 - 800 POUNDS OF LEAD OR IRON UNDER SEAT-BERTH SLATS FOR'D & ABAFT #2 BULKHEAD & BOLTED THROUGH BULKHEAD (PREFERABLY) AND/OR HULL BOTTOM.

N.B. POSITIVE BUOYANCY IS NOT POSSIBLE WITH LAYOUT AS SHOWN. IF REQUIRED, FOAM BLOCKS TOTALLING ABOUT 16-18 CUBIC FEET CAN BE INSTALLED ABAFT #2 BULKHEAD AS INDICATED BY BROKEN LINES, AT THE EXPENSE OF THE "AFTER STATEROOM".

SCALE: 3/4" = 1'0"

DESIGN #399
20'0" x 5'7"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN # 399
20'0" - 3'7"

SCALE 3/4" = 1'0"

REQUIRED READING BEFORE CONSTRUCTION.
'INSTANT BOATS' BY H.H. PAYSON (INTER. MAR. PUBS.)

SHEET 1

BUTT STRAPS

TRANSOM

SHEET 2

SHEET 3

HATCH SLIDE

EDGE OF SHEET USED AS BASE LINE

AFTER FACE OF BULKHEAD

FOR'D FACE OF BULKHEAD

FOR'D FACE OF MOLD

AFTER FACE OF MOLD

BUTT

UNDERSIDE OF DECK

STEM AND CAP FULL SIZE

26°

SHEET 4

SHEET 5

SHEET 6

EXPANDED SIDES - MARKS & STOPS FOR MOLDS, BULKHEADS, & BUTT STRAPS INSIDE.
MARKS FOR MOLDINGS, GUARDS, & PAINT LINES OUTSIDE.

MARK & CUT OUT SPAWN CHINE LOG - DO NOT INSTALL UNTIL SIDES ARE BENT IN PLACE !

BUTT STRAP

BULKHEAD #1

BUTT STRAP

MARK FOR TOP OF ANTI-FOULING

LEEBOARD GUARD

TOP OF MOLDING

SHEET 7

AFTERDECK CENTER PANEL

FOREDECK CENTER PANEL

BULKHEAD #2 SIDE

EXPANDED BOTTOM
PICK UP TRUE SHAPE FROM WORK

BUTTS OF OUTER COURSE

BUTTS OF INNER COURSE

SHEET 8

AFTERDECK SIDE PANEL

BULKHEAD #2 SIDE

BUTT STRAPS

AFTERDECK SIDE PANEL

EXACT DECK SHAPES FROM WORK

BUTT

BUTT

FOREDECK

HATCH OPENING

AFTERDECK FLAT

BUTT

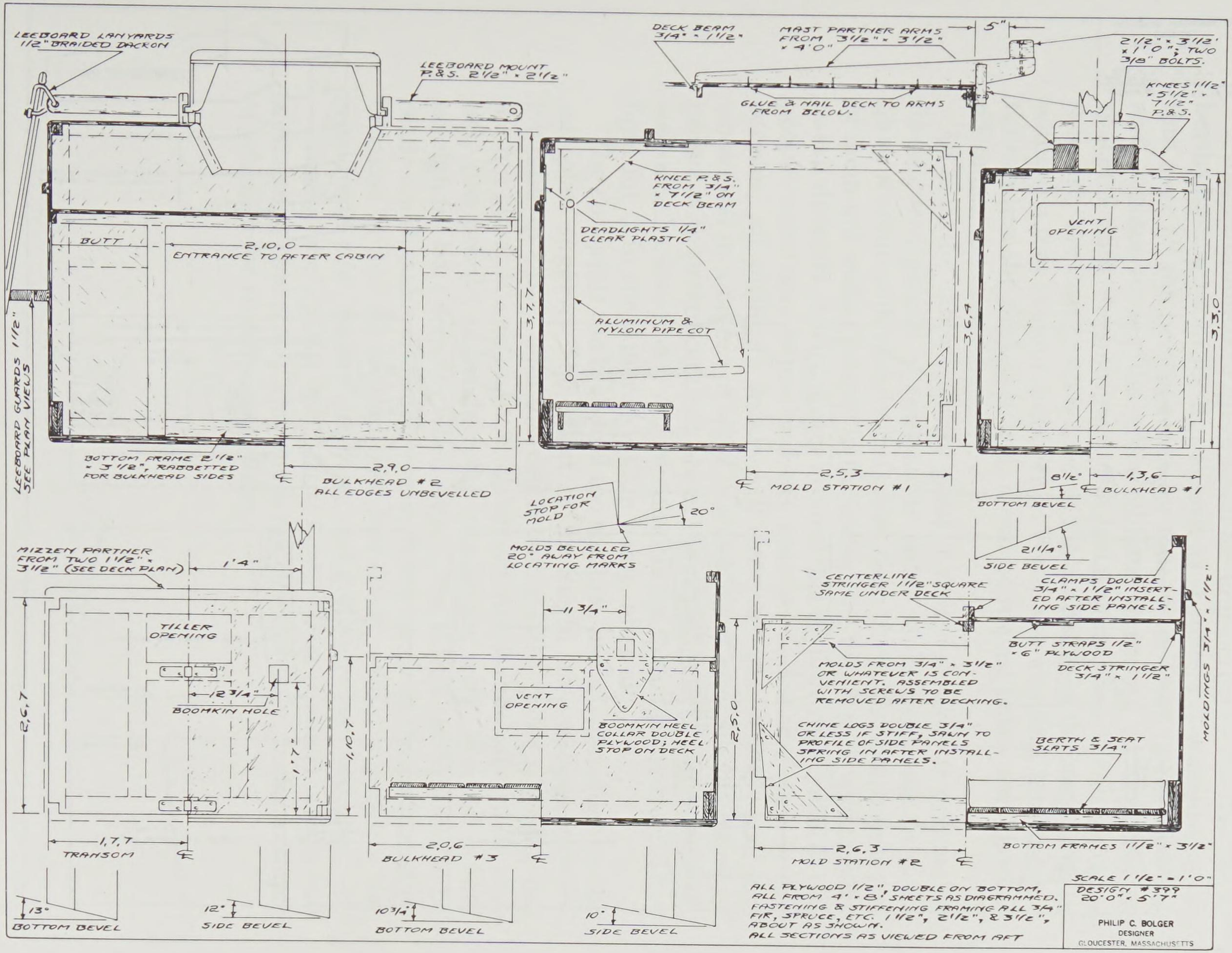
BUTT

SHEET 9

FOREDECK SIDE PANEL

BUTT STRAP

FOREDECK SIDE PANEL


LEEBOARD LANYARDS 1/2" BRAIDED DACRON
LEEBOARD MOUNT P.&S. 2 1/2" × 2 1/2"
DECK BEAM 3/4" × 1 1/2"
MAST PARTNER ARMS FROM 3 1/2" × 3 1/2" × 4'0"
5"
2 1/2" × 3 1/2" × 1'0"; TWO 3/8" BOLTS.
KNEES 1 1/2" × 5 1/2" × 7 1/2" P.&S.
GLUE & NAIL DECK TO ARMS FROM BELOW.
KNEE P.&S. FROM 3/4" × 7 1/2" ON DECK BEAM
DEADLIGHTS 1/4" CLEAR PLASTIC
ALUMINUM & NYLON PIPE COT
VENT OPENING
LEEBOARD GUARDS 1 1/2" SEE PLAN VIEWS
BUTT
2,10,0
ENTRANCE TO AFTER CABIN
3,7,7
3,6,4
3,3,0
BOTTOM FRAME 2 1/2" × 3 1/2", RABBETTED FOR BULKHEAD SIDES
2,9,0
BULKHEAD #2 ALL EDGES UNBEVELLED
2,5,3
MOLD STATION #1
8 1/2"
1,3,6
BULKHEAD #1
BOTTOM BEVEL
LOCATION STOP FOR MOLD
20°
MOLDS BEVELLED 20° AWAY FROM LOCATING MARKS
21 1/4°
SIDE BEVEL
MIZZEN PARTNER FROM TWO 1 1/2" × 3 1/2" (SEE DECK PLAN)
1'4"
TILLER OPENING
12 3/4"
BOOMKIN HOLE
2,5,7
1,7,7
1,10,7
1,7,7
TRANSOM
11 3/4"
VENT OPENING
BOOMKIN HEEL COLLAR DOUBLE PLYWOOD; HEEL STOP ON DECK
2,5,0
2,0,6
BULKHEAD #3
CENTERLINE STRINGER 1 1/2" SQUARE SAME UNDER DECK
CLAMPS DOUBLE 3/4" × 1 1/2" INSERTED AFTER INSTALLING SIDE PANELS.
BUTT STRAPS 1/2" × 6" PLYWOOD
DECK STRINGER 3/4" × 1 1/2"
MOLDS FROM 3/4" × 3 1/2" OR WHATEVER IS CONVENIENT. ASSEMBLED WITH SCREWS TO BE REMOVED AFTER DECKING.
CHINE LOGS DOUBLE 3/4" OR LESS IF STIFF, SAWN TO PROFILE OF SIDE PANELS SPRING IN AFTER INSTALLING SIDE PANELS.
BERTH & SEAT SLATS 3/4"
MOLDINGS 3/4" × 1 1/2"
BOTTOM FRAMES 1 1/2" × 3 1/2"
2,6,3
MOLD STATION #2
13°
BOTTOM BEVEL
12°
SIDE BEVEL
10 3/4°
BOTTOM BEVEL
10°
SIDE BEVEL
ALL PLYWOOD 1/2", DOUBLE ON BOTTOM, ALL FROM 4' × 8' SHEETS AS DIAGRAMMED.
FASTENING & STIFFENING FRAMING ALL 3/4" FIR, SPRUCE, ETC. 1 1/2", 2 1/2", & 3 1/2", ABOUT AS SHOWN.
ALL SECTIONS AS VIEWED FROM AFT
SCALE 1 1/2" = 1'0"
DESIGN #399
20'0" × 5'7"
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

SCALE 3/4" = 1'0"
DESIGN #399
20'0" x 5'7"

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

RUDDER COMPONENTS SEPARATED

1/2" PIVOT BOLT

SHEET 16

FOREDECK BUTT STRAP

MIZZEN STEP

MAINMAST STEP

RUDDER HALF

RUDDER CHEEK

RUDDER HALF

BUTT STRAPS

TOP OF BULKHEAD # 2

OUTER BOTTOM #1

GUSSET

SHEET 17

LEEBOARD HALVES

MOLD GUSSETS

LEAD BALLAST 1"
x 8 1/2" x 8 1/2"
= 30 LBS.

6.10

6.10

12'4

SHEET 18

LEEBOARD HALVES

SHEET 13

OUTER BOTTOM #4 HALF

AFTER VENT

INNER BOTTOM #5

SHEET 14

RUDDER BLADE HALF

HATCH SIDE

INNER BOTTOM #4

MAINMAST STEP

SHEET 15

RUDDER BLADE HALF

HATCH SIDE

INNER BOTTOM #3

SHEET 10

OUTER BOTTOM #5 HALVES

OUTER BOTTOM #4 HALF

SHEET 11

OUTER BOTTOM #3 HALVES

COMPANION-WAY PROP-IN SLIDE

HATCH FRONT

HATCH TOP

SHEET 12

FORWARD VENT

INNER BOTTOM #1

INNER BOTTOM #2

I was determined to make room for four berths — the real thing, berths having room for feet as well as shoulders. I wanted ventilation over all the berths, room for four to sit down to eat together, and a place to use the toilet without intruding on the sleeping spaces. I think the solution to this last is quite neat. When the cabin is in use, the Portapotti is used in the outhouse in the stern, with or without a tent around and over it. When she's sailing, and at other times when the deck is in use, it can be moved below and chocked off under the raised hatch.

In fact, the cabin is pretty good. I should think four reasonably uninhibited people of compatible tastes could camp out in it for quite a while with more satisfaction than hardship. But unless two of them are willing to stay in the cabin, she won't trim well enough to sail decently. I tried to get around this by providing ports so two people could stay below and still see out. Sailed that way by two couples, all sitting to windward, she'd be spectacularly stiff and would sail in a breeze of wind in a fashion to astonish a good many people with preconceptions about the capabilities of flat-bottomed, wall-sided leeboarders. Any volunteers for the bilgeboy role? They fight for it in the America's Cup boats, after all . . . .

The cockpit is too high and too shallow, as the silhouettes on the sail plan suggest. The effect of its height on stability isn't intolerable in a boat with this much ballast (600 to 800 pounds), but it's not good. It's also a little farther aft than it should be, even with only two people, to produce the best sailing trim. The rail is high enough for bare security when sitting, but it feels too exposed to be really comfortable in rough water. A big hatch in the middle of it, to stand in and sit around with feet down, would improve it but would add cost, reduce security, and guarantee wet bedding.

Finally, she's plain ugly. *Jessie Cooper* (next chapter) is ugly but with strong character. This one is nondescript-ugly. I offer a couple of schemes for dazzle-camouflage.

12

Jessie Cooper

Length overall 25 feet 6 inches
Breadth 7 feet 6 inches
Draft 1 foot/5 feet 6 inches
Designed displacement 6,150 pounds
Sail area 365 square feet
Owner and builder William J. McKibben, Victoria, British Columbia, Canada

There's a twilight phase between routine requirements and specifications that are impossible to meet. It's made up of wish lists that can be met on paper but perhaps shouldn't be because they result in freaks that encumber estates even if the original owner never admitted he'd made a mistake. I've got one of that kind myself; I'm happy, but my executor isn't going to like it.

When the freak represents somebody's financial heart's blood and is freakish partly so he can conceivably pay for it, it's time to be especially wary. Cheap new construction is usually a delusion in the long run. High-class, expensive construction that becomes cheap in its old age almost always makes more sense. I get impatient with people who resent the building of expensive apartment houses for rich people and talk about putting up "low-cost housing for the poor," as if the expensive buildings weren't the low-cost housing of the future. They're usually the same people who have made a career out of making life miserable for anybody who risked an investment in low-cost housing, thereby making sure nobody but very hard types will try it.

STAINLESS FRICTION STRIP

MASTHEAD @ 3" = 1'0"
MAIN HALYARD DUMB SHEAVE ATHWARTSHIPS

1½" 6" PLUG EACH END
3/4" STAVES
SQUARE FULL LENGTH
1½"
2 3/4" 3 1/4" 3 1/2" 3 3/8" 2 7/8"
3' 3' 3' 3' 3'
SPRUCE OR FIR — MAIN BOOM - 20' 0" O.A.

6'6" TO HALYARD EYE U-BOLT
SQUARE FULL LENGTH
3/4" STAVES
6" PLUG EACH END
1½" 2"16" 3¼" 3½" 3½" 3⅛" 1½"
3' 3' 3' 3'
SPRUCE MAIN YARD 18'6" OVERALL

LASH HEAD TO MAST NO HALYARD - FURL BY ROLLING UP LEACH.

SEPARATE SLACK TIES

19'5"
18'0"
8'6"
THIMBLE

MIZZEN BOOM 11'2" + 39 11'6" O.A.

23'9"
19'0"
PARREL VERY SLACK
TOPPING LIFT P. & S.
289
365
RUN FREE IN THIMBLE
21'3" CLEW TO THROAT
STOPPER KNOT
LIFT SPAN P. & S.
CLEAT
19'6"
SINGLE ARGHT SHACKLE BLOCK

ALL TAPER OFF OUT SIDE OF 2 STAVES
CORNER RADIUS VARIES WITH STAVE THICKNESS
8" PLUG
2½"
3'3/16"
4 5/8"
5 1/8"
5 3/8"
5½"
4"
HEEL TAPER TAKEN OFF IN FLAT PLANES.
FIR OR SPRUCE MAINMAST 25'6" OVERALL
TAPER 5'6"

SCARVES IN SPAR STAVES ABOUT 10:1.
1½"
2 3/4"
3½"
3 15/16"
4 1/8"
4 1/4"
3¼"
2" PLUG
FIR OR SPRUCE MIZZEN MAST 23'4" OVERALL
TAPER 3'6"

TRANSVERSE SCALE OF SPARS 6" = 1'0" (1/2)
SCALE 3/8" = 1'0"

DESIGN #389
25'6" - 7'6" - 1'0"
FOR JAMES H. BEAL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

MAST STARB'D SIDE

MAST STARB'D SIDE

TILLER FROM 2 1/2" SQUARE - 5'

STANDING END OF MAIN SHEET

CUT DOWN RUDDER IF NECESSARY TO CLEAR MOTOR

REMOVABLE STEP

AIR INTAKE LOUVERS REMOVABLE

DRAWERS & LOCKERS TO SUIT OWNER

W.L. @ 6150 LBS. DISPLACEMENT

980 LBS. STEEL BALLAST

RUDDER 1 1/2" WITH 1 1/2" CHEEKS

2'6"

1'0"

5'0"

3/4" END PLATE

1'11 1/4"

DAGGER-BOARD STARB'D

2'0"

HOLES FOR PIN

10'0" DAGGERBOARD

4'9" FAIRED EDGES

FAIR ON CIRCULAR ARCS TO 1/8" EDGES ROUND OFF EDGES.

2 1/2"

SEC. @ MOTOR CENTERLINE

SHIM OUT TO ABOUT 10° MOTOR MOUNT RAKE

MAX. MOTOR 15 H.P. MIN. 5 H.P.

WINDOWS 1/4" LEXAN

BOOKS

BOOKS

KEROSENE RANGE IN GIMBALS OVEN UNDER

SINK

DRAIN

DRESSER

STOWAGE UNDER SEAT P. & S.

SHELF

FOR'D WELL FREE-FLOODING; DRAINED THROUGH HOLES IN BOTTOM OF HULL

STORAGE HOLD HATCH OVER PROVIDES CABIN THROUGH-VENTILATION AT ANCHOR

DOUBLE BERTH

TABLE STOWS UNDER DECK

STEP

PORTABLE TOILET

MAST STEP

LADDER

TOP-OPENING ICE BOX - 10 CUBIC FEET

TRANSOM SEAT PORT & STARB'D

SHELF

HANGING SPACE

MOTOR

1'4"

1 1/2" - 3 1/2"

MIZZEN STEP

3 1/4" - 3 1/2" BLOCKING

DRAIN HOLE P. & S. (WELL ABAFT #6 IS FREE-FLOODING)

6

5

4

3

2

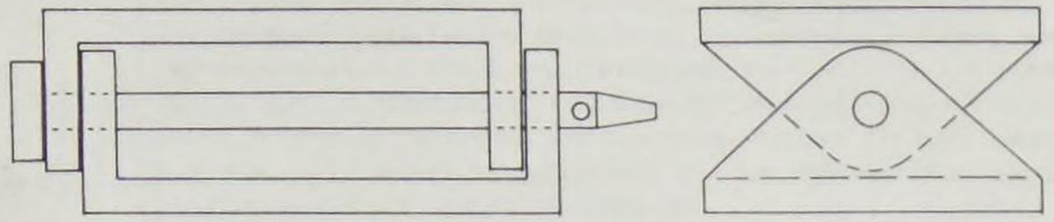
5 3/4"

CENTER OF BUOYANCY IN TRIM SHOWN

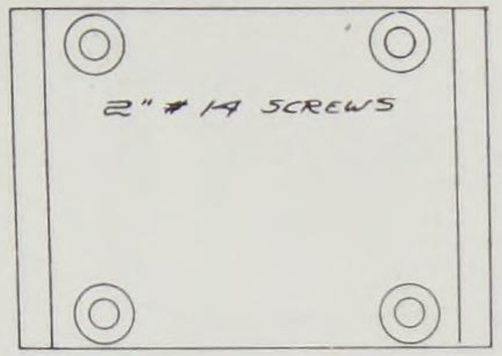
SCALE 3/4" = 1'0"

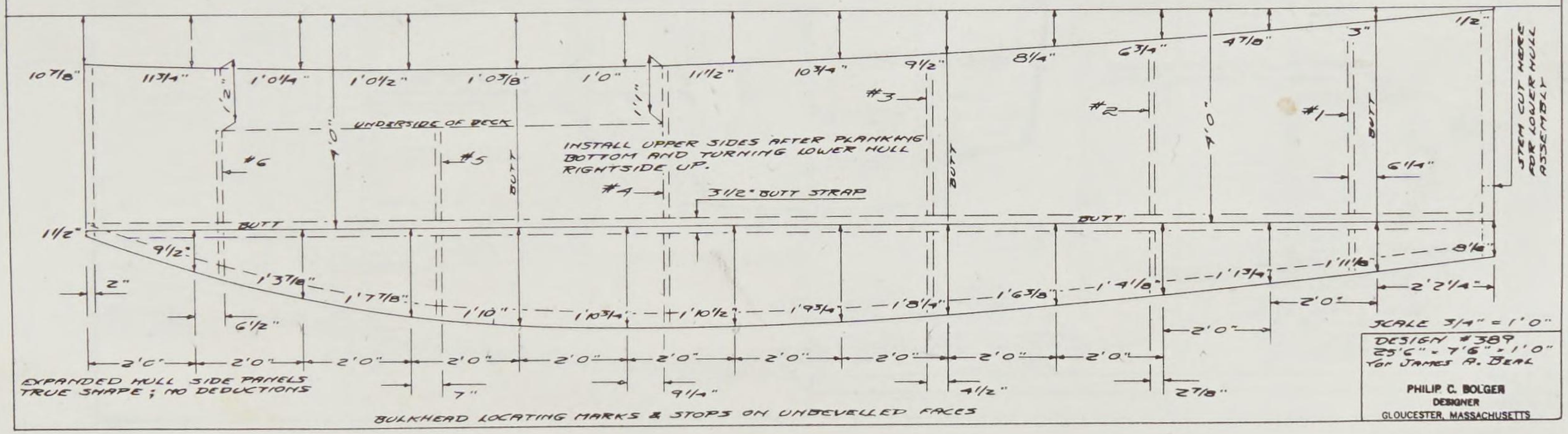
DESIGN #389
25'6" - 7'6" - 1'0"
for JAMES A. BEAL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



RUDDER MOUNTS FULL SIZE





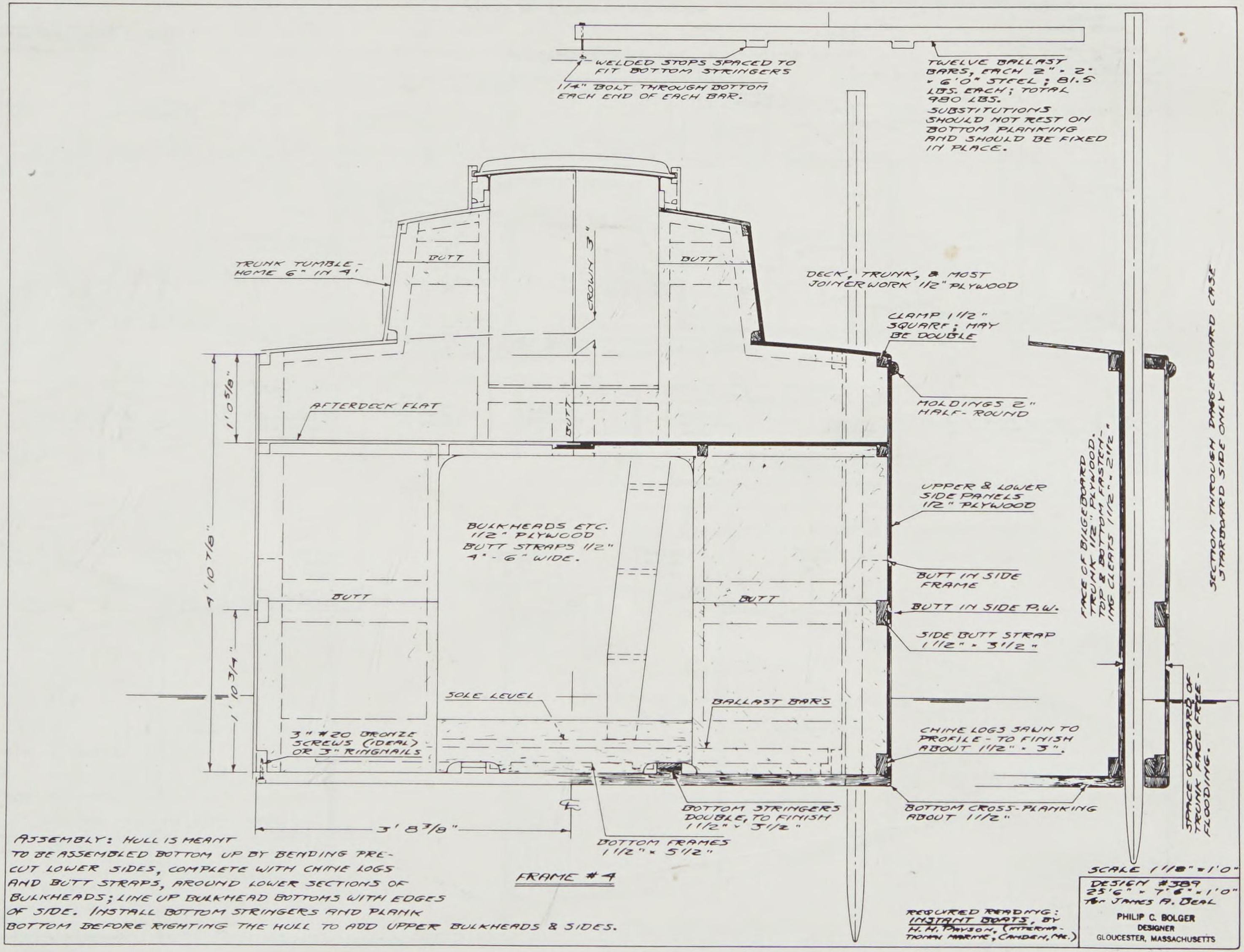
EXPANDED HULL SIDE PANELS TRUE SHAPE; NO DEDUCTIONS

BULKHEAD LOCATING MARKS & STOPS ON UNBEVELLED FACES

SCALE 3/4" = 1'0"

DESIGN #389
23'6" - 7'6" - 1'0"
For JAMES A. BEAL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



FRAME #4

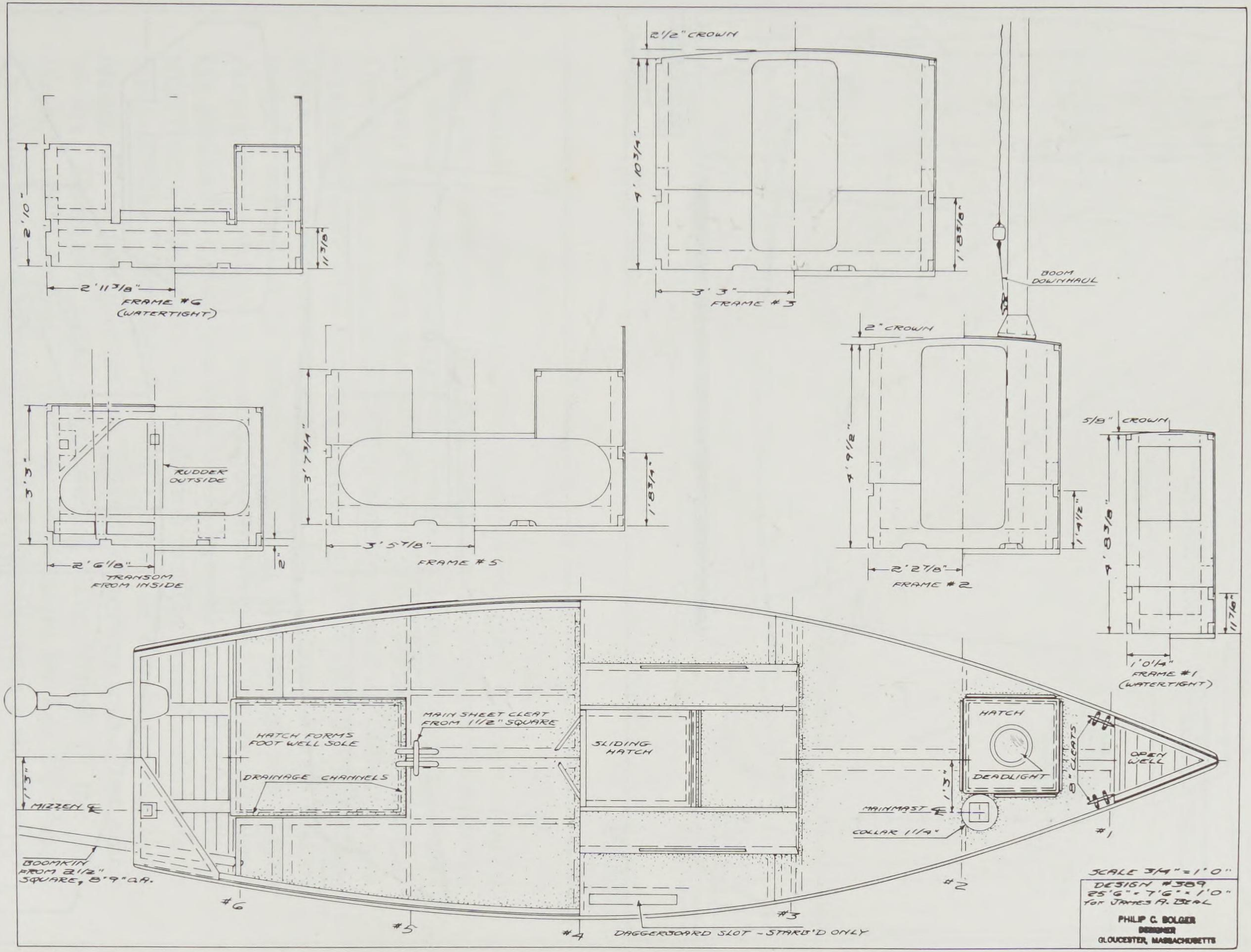
ASSEMBLY: HULL IS MEANT TO BE ASSEMBLED BOTTOM UP BY BENDING PRE-CUT LOWER SIDES, COMPLETE WITH CHINE LOGS AND BUTT STRAPS, AROUND LOWER SECTIONS OF BULKHEADS; LINE UP BULKHEAD BOTTOMS WITH EDGES OF SIDE. INSTALL BOTTOM STRINGERS AND PLANK BOTTOM BEFORE RIGHTING THE HULL TO ADD UPPER BULKHEADS & SIDES.

REQUIRED READING: INSTANT BOATS, BY H. H. PAYSON, (INTERNATIONAL MARINE, CAMDEN, ME.)

SCALE 1 1/8" = 1'0"

DESIGN #389
25'6" x 7'6" x 1'0"
for JAMES A. BEAL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


2'10"
2'11 3/8"
FRAME #6
(WATERTIGHT)
1'3/8"
2 1/2" CROWN
4'10 3/4"
3' 3"
FRAME #3
1'8 3/8"
BOOM
DOWNHAUL
2" CROWN
4'9 1/2"
2'2 7/8"
FRAME #2
1'4 1/2"
5/8" CROWN
4'8 3/8"
1'0 1/4"
FRAME #1
(WATERTIGHT)
1'7/8"
3'5"
RUDDER
OUTSIDE
2'6 1/8"
TRANSOM
FROM INSIDE
2"
3'7 3/4"
3'5 7/8"
FRAME #5
1'8 1/4"
HATCH FORMS
FOOT WELL SOLE
MAIN SHEET CLEAT
FROM 1 1/2" SQUARE
SLIDING
HATCH
DRAINAGE CHANNELS
1'3"
MIZZEN
BOOMKIN
FROM 2 1/2"
SQUARE, 8'9" OA.
#6
#5
#4
DAGGERBOARD SLOT - STARB'D ONLY
#3
HATCH
DEADLIGHT
8" CLEATS
OPEN
WELL
1'3"
MAINMAST
COLLAR 1 1/4"
#2
#1
SCALE 3/4" = 1'0"
DESIGN #389
25'6" x 7'6" x 1'0"
FOR JAMES A. BEAL
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

MAIN SPRIT BOOM 21'0" OVERALL

3/4" STAVES

SOLID STICK 1 3/4" SQUARE

SOLID STICK 2 1/2" - 3 1/2" TAPER TO 1 1/2" SQUARE

3'6"

NO HALYARD ON MIZZEN. LASH HEAD TO MAST. SEPARATE LUFF TIES, NOT A LACING. FURL BY ROLLING UP FROM CLEW WITH LEACH TAUT.

SCALE 1/8" = 1'0"

RIG & LAYOUT OF SCHOONER - ST. PIERRE MAIL FOR JON KNUDSON 26'10" - 9'0" - 3'6"

PHILIP C. BOLGER DESIGNER GLOUCESTER, MASSACHUSETTS

TRANSVERSE SCALE OF SPARS 1" =

STEEL FIN BALLASTED WITH SCRAP STEEL TOTAL WEIGHT ABOUT 1800 LBS.

DRESSER STOVE TO SUIT

SEAT

BERTH STOWAGE UNDER

STEP

W.C. STOWS UNDER

DRESSER SINK TO SUIT

SEAT

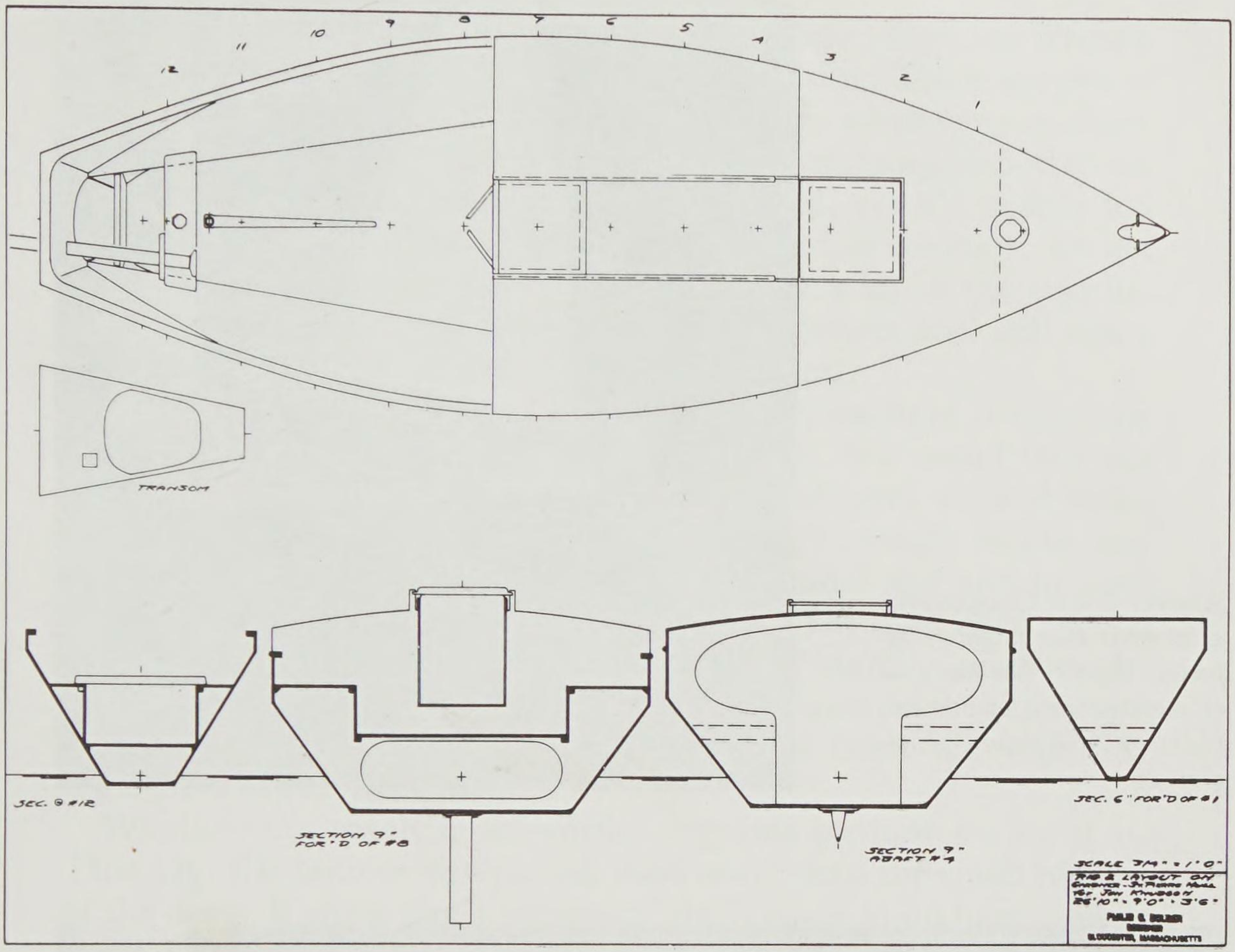
BERTH STOWAGE UNDER

MIDSECTION LOOKING AFT

SCALE 3/4" = 1'0"

RIG & LAYOUT OF SCHOONER ST. PIERRE MAIL FOR JON KNUDSON 26'10" - 9'0" - 3'6"

PHILIP C. BOLGER DESIGNER GLOUCESTER, MASSACHUSETTS



Excuse the digression. *Jessie Cooper* is one more attempt to build new low-cost housing. Jim Beal wanted something mobile to retire to; something fit for a single man (with occasional female company) to keep house in permanently without great hardship or squalor. One big bed, a couple of comfortable seats and a dining table, a workable galley with standing headroom, a fair amount of stowage space, and a separate washroom. So far, routine. But he had to build it himself or he couldn't afford it, and though not a tyro carpenter, he wasn't a boatbuilder or interested in becoming one. He also had a dream of a long cruise, around to the Pacific Northwest from Philadelphia, and specified that the boat should be fit to take offshore. Probably he won't, but the capability has been known to be valuable on the Inland Waterway and other small waters. There's a great poem called "The Wreck of the *Julie Plante*," which begins, "Was wan dark night on Lac St. Pierre/ The wind she blow-blow, blow." (Lac St. Pierre is a slight widening of the St. Lawrence River.)

At this point, take a look at the drawings of the St. Pierre dory

Above: Jessie Cooper *sails a lot better than might be expected.* Below: *She has a lot of room on deck and below. (Murray Kilshaw photographs)*

cruiser, built on John Gardner's lines developed from the French motor surfboats, with upper works of my devising. These are pretty generally considered fit to go into open water, whatever you think of my tastes in rig. It's longer overall and wider than Jim laid down as the maximum he could find space to build, yet it's plainly too short and narrow on the bottom to take his living quarters. To get even sitting headroom, it had to be built up a lot in the middle; there's no way it could have standing headroom and still carry enough sail to drive it, even with the deep keel.

I decided that if we built *Jessie*'s hull high enough, it could be ballasted to be self-righting without the flare. We could take the maximum deck dimensions the builder would agree to, and make the bottom that size too. With that, she had enough length and beam on the bottom to be downright stiff under sail and to have respectably long sweeps in her sailing lines. The high deck, which makes her roomy and ensures her range of stability, pushes the booms up high and reduces her effective sail area, since the height of rig a boat can stand has to be figured from the waterline regardless of her freeboard.

Whether the result is seaworthy depends on how strong it is. That big, flat bottom will punish itself more than the small bottom of the dory. If she doesn't break up, she'll come to no harm. She's more weatherly than the dory because she can stand up to more sail and has sharper entrance lines. Most of the time her motion will be much more comfortable, too, but once in a while there'll be a shattering crash worse than anything likely to happen to the dory.

The fact is, I haven't quite met the requirement. I don't really think *Jessie* is fit to go to sea in. But if I trusted the bottom fastenings, I'd say she was fit, in a pinch. I'd rather try an Atlantic crossing in her than in quite a few boats that have made it, including *Sea Bird* for one. The dory doesn't even come close to answering the other half of the problem — a fit place to live in port — and it's much less efficient in sheltered water under either sail or power.

Jessie's sides are too high to get out of a single plywood sheet width. The horizontal butt saved a lot of plywood and encouraged an old sharpie trick — setting up the lower sides only, upside down to plank the bottom, and turning her over before adding the upper part of the sides. With a bottom too thick to get out of one layer of plywood, and too wide to make economical use of standard sheets, the old-fashioned planked bottom seemed sensible. I don't think Beal has started his boat, but Bill McKibben has finished a boat to the design (in fact, the name is his: "Jessie Cooper was my wife's

grandmother, no ravishing beauty but well loved . . . .'') and reported no problems with the construction. I have a hunch, though, that he's the type of builder who will correct the designer's mistakes as he goes along and not think of complaining about something that might have been made easier. He thinks the way I try to. When he decided he would need a ladder to get aboard, for obvious reasons, he had the wit simply to cut holes in the sides of the hull, in way of the free-flooding end wells, for hand and foot holds. Beautiful! They might even function as freeing ports. This idea will be found in subsequent designs of mine. I'm working on a *real* freak for him now, but that's another story.

13

Skillygalee

Length overall	29 feet
Breadth	7 feet
Draft	1 foot 6 inches/5 feet 3 inches
Designed displacement	5,000 pounds
Ballast	1,000 pounds (inside lead)
Sail area	364 square feet
Owner and builder	Thomas A. Fulk, Concord, California

Skillygalee is the most recent descendant of my sharpie *Pointer,* built at Essex in 1960. I kept her 11 years, the longest time I've ever had the same boat, and she was poked into most of the holes in the coast between Nantucket and Vinalhaven. She wasn't a good design, being horribly tender among other problems, but she was suggestive. She could sail when she wanted to. I did a little triangular-course racing in an arbitrary-handicap menagerie class and beat a Pearson Triton (competently sailed but without a spinnaker) boat-for-boat four times running, making up more on the reaches and runs than I lost on the beats. One glorious Sunday with guests on board (I usually sailed singlehanded), we beat an incompetently handled Yankee One-Design, boat-for-boat. I've spent nights in *Pointer* in places like the Eastham Arm of Nauset Inlet, where I don't recommend taking anything but a sharpie, and Hatch's Harbor, the tidal outlet of the marsh back of Provincetown, where I don't even recommend taking a sharpie after trying it once. I'll bet *Pointer* was the last cruising boat ever to go in there and get out again on her own.

Pointer *ghosting toward the Isles of Shoals about 1965. (Kirk Williamson photograph)*

Black Skimmer *herself flying down the Rappahannock, about 1975. (Mike O'Brien photograph)*

Mr. Fulk came to me because he'd made a sailing model of *Burgundy* (Chapter 10) and been impressed with its liveliness. He wanted a beaching cruiser to use for a while on San Francisco Bay and then trail to Lake Michigan, where he knew a paradise of islands and ledges he reckoned life wouldn't be long enough to exhaust. The name, he tells me, is a corruption of *Ile aux Galets,* used by the local boatmen for the area in question. There used to be a vessel here in Gloucester named *Skilligolee,* which I was told was an old slang word for a swordfish. No derivation was offered, and Fulk's explanation is more plausible.

He was thinking of something like the Chapelle *Egret* design. He'd never seen one, but I had. It's a wonderfully handsome boat but with all *Pointer*'s weaknesses plus a centerboard that makes her cabin uninhabitable. I wrote that my *Black Skimmer* sharpie could, and did, sail rings around her — blow high, blow low. *Black Skimmer* is a 25-footer with leeboards, a false clipper bow, and her mizzen stepped off-center, none of which features pleased Mr. Fulk's eye. He's an experienced boat carpenter, and my first thought was that he ought to build a more refined shape than the sharpie. He agreed, though he commented that he wanted to be able to finish the boat before he died of old age. (That's not necessarily hyperbole: six doors up the street from where I'm writing, a man started to build an Alden sloop about 1928. He died about 1940, and his son kept on working on her. About 1975 *he* died and his daughter sold the unfinished hull to somebody across town. Well-seasoned timber . . . .) At any rate, when I took a good look at it, I concluded that since she had to have a high, flat bow overhang for beaching, the gains by complicating the shape weren't worth the trouble. So we reverted to the sharpie.

Skillygalee is a lengthened *Black Skimmer.* The stretch allows an inboard rudder with centerline mizzenmast and a centerline engine that can be shrouded somewhat to be less obtrusive than most outboards. The owner would have had an inboard well if I'd given him any encouragement, but you really have to insist to get me to design a well. The damned things have all the drawbacks of inboard engines, some drawbacks all their own, and none of the advantages.

He did take to the off-center centerboard (offcenterboard? Why not?), and we passed sketches back and forth, trading access to the stowage behind it against space in the cabin proper. Once it was far enough over to clear a centerline hatch, I was content to let him decide. A fleet of single-leeboard boats has taught me that boats take no notice of that kind of asymmetry.

	PART	DIAM.	STANDING END	VIA	FALL TO
①	MAIN SHEET	1/2"	BOOM BLOCK BECKET	MAST BLOCK; BOOM BLOCK	MAST 'V' CLEAT
②	" SHOTTER	"	KNOT UNDER BOOM HEEL	MAST BLOCK; BOOM SHEAVE; DECK BLOCK	DECK CLEAT
③	" HALYARD	3/8"	HEADBOARD	MASTHEAD BLOCK	PARTNER BELAYING PIN
④	" BOOM LIFT	"	MID-BOOM	CHEEK BLOCK	"
⑤	" LAZYJACKS	1/4"	PORT MAST CHOCK	ENDLESS SPAN; MAST BUMB SHEAVE	PORT MAST CLEAT
⑥	MIZZEN SHEET	"	BOOM END	BOOMKIN BLOCK	HEEL STOP CLEAT
⑦	" SHOTTER	"	BOOM HEEL SLOT	MAST BLOCK	PORT MAST CLEAT
⑧	" HALYARD	"	HEADBOARD	MASTHEAD BLOCK	STARBOARD MAST CLEAT

BLOCK ONE DIAM.	LOCATION	TYPE
2"	BOOM END	SWIVEL SHACKLE WITH BECKET
2"	MAST	SWIVEL SHACKLE
1 7/16"	MASTHEAD	" "
1 7/16"	MAST	CHEEK BLOCK
1 7/16"	MAST	DUMB SHEAVE
3/4"	END OF BOOMKIN	SWIVEL ON PLATE
3/4"	MAST	SWIVEL SHACKLE
3/4"	MASTHEAD	" "

TWO LOCATION	TYPE
MIZZEN MAST	SWIVEL SHACKLE
BOOM HEEL	SPAR SHEAVE

THREE LOCATION	TYPE
STARB'D PARTNER ARM	SWIVEL ON DECK PLATE

SPRUCE MAIN SPRIT BOOM 22'6" OVERALL

TRANSVERSE SCALE FULL SIZE

8" PLUG

3/4" STAVES

8" PLUG

ENDS OF BOOM @ 3" = 1'0"

4" PLUG

SPRUCE MIZZEN 20'0" OVERALL

TRANSVERSE SCALE FULL SIZE

STAVES 1 1/2" BEFORE TAPERING MAY BE GROWN STICK

SECTION @ HEEL

14'2" TO SHOULDER OF HEADBOARD

33'0" TO SHOULDER OF HEADBOARD

30'0"

12'0"

9'7"

19'3"

288

364

76

M.B. SAILMAKER: SAILS MAY BE CROSS-CUT IF PREFERRED; NO ROACH OR BATTENS IN ANY CASE.

LIFT CHEEK BLOCK

STOPPER CHOCK STARB'D
DUMB SHEAVE PORT

SPRUCE MAINMAST 35'6" OVERALL — 11 STAVES AS SHOWN

3'

3'

3'

3'

3'

JEAMS ATHWARTSHIPS

AFTER STAVE STRAIGHT

7/8" TRACK

TRANSVERSE SCALE FULL SIZE

STAVES 1 5/8" BEFORE TAPERING

SECTION AT HEEL

SPRUCE MIZZEN BOOM 12'0" OVERALL

TRANSVERSE SCALE FULL SIZE SQUARE WITH ABOUT 1/4" CORNER RADIUS GROWN STICK

MIZZEN BOOM ENDS @ 3" = 1'0"

SCALE 1/2" = 1'0"

DESIGN #416
59'0" x 7'0" x 1'6"
for THOMAS A. FULK

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

SCALE 3/4" = 1'0"

DESIGN # 4/6
EAGLE - 7.0 - 1/6
for THOMAS FR. FULLER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

HULL OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK; NOT USED IF DESIGNED ASSEMBLY SEQUENCE IS FOLLOWED.

EXPANDED TOPSIDE PANELS; TRUE SHAPE BEFORE BEVELLING - NO DEDUCTIONS. INTERVALS 1'0"

CENTERBOARD TRUNK INBOARD WALL, INSIDE PLANK, CABIN DECK ETC. SEE SHEET 2 FOR CENTERBOARD.

RAISED DECK CABIN (CONSTANT)

STEM FULL SIZE

CHINE LOG FULL SIZE

DEADWOOD #1, #2, & #3

BULKHEAD #1

BULKHEAD #2

BULKHEAD #3 (NO BEVEL)

BULKHEAD #4

BULKHEAD #5

TRANSOM @ INSIDE OF PLANK BEFORE BEVELLING

#1 SIDE BEVEL

#2 SIDE BEVEL

#4 SIDE BEVEL

#5 SIDE BEVEL

#1 BOTTOM BEVEL

#2 BOTTOM BEVEL

#4 BOTTOM BEVEL

#5 BOTTOM BEVEL

BULKHEAD DIMENSIONS TO INSIDE OF PLANK BEFORE BEVELLING

NOTE THAT OFFSET STATIONS TO OUTSIDE OF PLANK DO NOT CORRESPOND TO MEASUREMENT INTERVALS ON SIDE EXPANSION

MORT & STRETCH WELL SIDES. DIMENSIONS APPROXIMATE; CHECK AGAINST WORK.

SECTION @ #22
LOOKING AFT

SECTION @ #21
LOOKING FOR'D

SECTION @ #17
LOOKING FOR'D

SECTION @ #15
LOOKING FOR'D

SECTION @ #11
LOOKING FOR'D

SECTION @ #4
LOOKING FOR'D

MIZZEN SHEET CLEAT
FREE-FLOODING MOTOR WELL 9.9 H.P. O.M.C.
PIN RACK
WATERTIGHT FOOT WELL
OPEN TO C.B. CASE
SLIDING HATCH
CENTERBOARD SHEAVE
CENTERBOARD CLEAT
SHOTTER CLEAT
MAINMAST
HALYARD PIN
TOPPING LIFT PIN
MOORING PIN
FREE-FLOODING WELL
VENT INTAKE P. & S.

1" × 1 3/4" — 2" × 3 1/2" — 3'5" — 1 5/8" × 2"
FIR BOOMKIN IC'2" OVERALL

TRANSOM FROM ASTERN

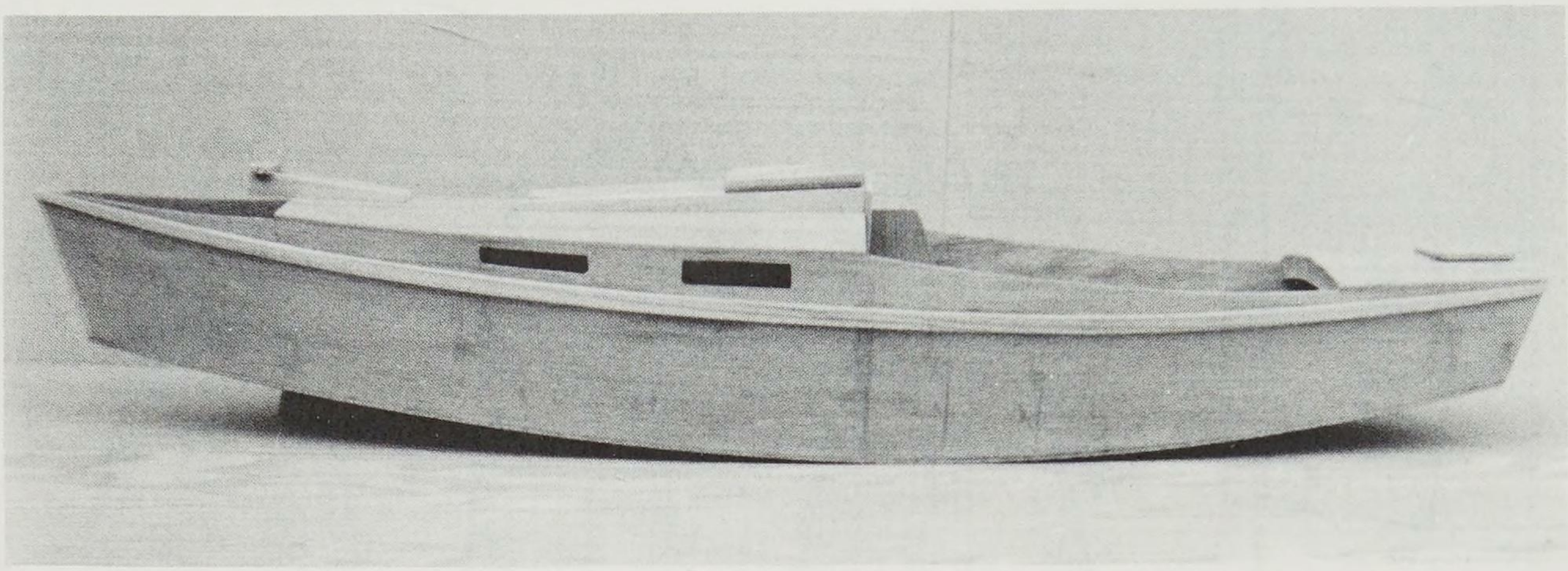
BULKHEAD #4
BULKHEAD #3
BULKHEAD #2
BULKHEAD #1
BULKHEAD #5

1/2" PENDANT
2" D. SHEAVE
CENTERBOARD TRIPLE 1/2" PLYWOOD
90°
HOLE FOR STOPPER KNOT
3'6 RADIUS
3'6 RADIUS
FAIRED EDGES
0'7.0
0'7.0
0'7.0
0'9.0
2'0"
LEAD BALLAST 1 1/2" × 7" × 12" — 51 POUNDS
EDGE FAIRING @ 3" = 1'0"

SCALE 3/4" = 1'0"

DESIGN #916
29'0" × 7'0" × 1'6"
FOR THOMAS P. FULK

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



Model of Skillygalee *made by Thomas Fulk. (Thomas Fulk photograph)*

He vetoed the laced luffs I usually show for sails; the obvious poor aerodynamics of the tracked luffs bothers me, but I'm inhibited from arguing too hard by the fact that the laced ones don't seem to be any better, even to my biased observation. Hence my interest in luggers.

The glued-strip cross-planking is quicker and cheaper to build, and will stand grinding on rough beaches better, than the double or triple plywood that's the other obvious choice. It's apt to leak, which is not needed at all in a boat with no bilge to speak of, and there's the unpleasant possibility that it will squeeze itself off the chine amidships by swelling hard. By using soft, damp cedar with the annual rings laid the right way, and by taking pains with the glue and the chine fastenings, we hope to get the advantages and avoid the troubles.

The "instant boat" assembly is similar to a dozen others I've done — scores, if you count small, open boats. It's modified to avoid having to cut-and-try the centerboard case and footwell sides; I hope not over-cleverly. The traditional New Haven sharpies shown in Howard Chapelle's books were designed to be built in series with a lot of production tooling, something 19th-century builders knew more about than they are usually given credit for. Built one-off in a shop that's not used to them, they're apt to be dismayingly expensive. The one-off prefabrication method shown here goes much faster, with a really substantial saving over a boat

of more complex shape — always provided that neither I nor the builder makes the wrong kind of mistake. For the suspicious-minded, I've provided a complete, redundant set of offsets with which she can be laid down and the projections reworked at full scale.

KEY TO CONSTRUCTION PLAN

All plywood ½'' in 4' x 8' sheets, with ½'' by 6'' butt straps as shown. Natural wood can be any wood that takes glue well; either spruce or mahogany will serve for most parts; Douglas fir would be a good compromise for any part. Recommended reading before beginning construction: *Instant Boats,* by H.H. Payson (published by International Marine Publishing Company, 1979).

1. Bulkheads plywood with 1'' framing as diagrammed. Check that all have the same flare before assembly.

2. Floor timbers on #2 and #4 bulkheads 2½'' by 3½''; ¼'' bolt through bottom planking each end of each floor timber.

3. Transom plywood with 1½'' framing on outside; bottom frame should be mahogany to take motor.

4. Stem from 2½'' square, beveled to diagram.

5. Frame extension on bulkhead #3 from 1'' by 3½'' by about 3'6''.

6. Topside panels plywood to diagram; port and starboard mirror images with butt straps inside and marks for moldings, etc., outside; secure stem to one side panel.

7. Chine logs beveled to diagram from 1½'' by 2½''. Test flexibility; if bend is hard, they can be split with a fine saw horizontally at after end, vertically forward; or they can be laminated as convenient to about the same size. Don't secure them to side panels before sides have been bent.

8. Clamps from 1½'' square; no bevel in way of raised deck; 7 degrees bevel for flat afterdeck; may be laminated; don't attach to sides until latter have been bent to final curve.

9. Clamps in way of bow well sawn to profile sweeps from 1½'' by about 3½''.

10. Centerboard (actually off-center, as marked) trunk plywood to diagram; check end heights against bulkheads.

11. Trunk logs from 1½'' by 5½'' sawn to profile on bottom edge.

12. Trunk headblocks and other internal blocking sided 2'', molded 1½'' except under raised deck, where 3½'' is needed to accept 4-foot-wide plywood.

13. Well sides plywood with 1'' by 1½'' framing; check dimensions against bulkheads and transom; allow extra wood along after bottom edge to allow a good fit for bottom planking.

Assembly: Block up bulkheads and transom, bottom-up, to approximate level. Line up with, and secure to, centerboard trunk and well sides. Plumb with temporary bracing.

Stand side panels up against bulkhead #3. Bend in ends, preferably simultaneously at both ends of hull; if not simultaneously, in small increments at alternate ends. Fasten together at stem and secure to bulkheads and transom. See *Instant Boats* for detailed procedure and finishing.

14. Bottom planked with 1½'' square glued strips, laid with annual rings running vertically for best resilience to accommodate swelling and shrinking. Edge nail with 3'' galvanized wire nails set as much as possible; space nails about 4½'' and stagger 1½'' from one strip to another. In way of ballast, four or five ¼'' by 4'' carriage bolts up through chine logs on each side. Other chine fastenings can be 3'' screws or barbed nails every other strip, or every third strip near ends of hull. The same to transom, bulkhead frames, and floor timbers on about 6'' spacing and staggered as much as possible.

When bottom is finished, right hull.

15. Bottom stringers between bulkheads 2½'' square.

16. Strongback 2½'' square, beveled to take berth flat; bolt ends to chines.

17. Mast heel collars plywood; mainmast triple to finish 1½'', mizzen double to finish 1'', both set on 2½'' square bottom cleats.

18. Ballast: two lead castings, each 2½'' by 11'' by 3'9'', each weighing about 500 pounds. Cast flat and bend to lie on rockered bottom; four ¼'' bolts through bottom from each.

19. Decks and well plywood; no framing needed except for two 1'' by 1½'' short beams each side of footwell, as indicated on deck plan.

20. Mainmast partner arms sawn from 3½'' by 5½'' by about 7'6''; glued to deck and screwed from below to stiffen the deck.

21. Mainmast partner 2½'' by 3½'' by 1'1'' bolted to arms; should be hardwood. Location allows mast to be inserted almost horizontally before erecting.

22. Partner stanchions from 1½'' by 3½'' by 1'11''.

23. Drain holes port and starboard through bottom, with wood or metal aft-facing clamshells outside for suction drainage and to prevent spouting. Don't use flap valves. Note that since bow and motor wells are free-flooding, care should be taken to make bulkheads #1 and #5 thoroughly watertight.

24. Skeg sided 2½''; suggested to be a perimeter frame with plywood sides as shown, but can be built up solid. Sternpost 2½'' by 3½'' by 2'2'' brought up through bottom and bolted to outside of bulkhead #5, as shown, to brace skeg against side impacts.

25. Rudder 2½'' thick tapered to ¾'' trailing edge; dimensions as diagrammed. Wood stock 2½'' diameter from 2½'' by 5½'' to form leading edge of rudder blade, connected to 2'' by 10½'' trailing end by plywood walls and end plates. Tiller 3'10'' overall; check that tiller engages pin rack without bearing on afterdeck.

26. Berth sheathing ¼'' cedar, set clear of sides on ¾'' by 1½'' cleats; make sure forward bays drain and ventilate thoroughly; fasten with flush copper nails.

27. Deadlights ¼'' clear plastic screwed to inside.

28. Sliding hatch plywood, running in grooves inside runners, to drain outboard of separate hatch coaming. Runners solidly glued to and screwed from deck to form longitudinal deck beams.

14

Lion's Paw

Length overall	38 feet 9 inches
Breadth	9 feet 2½ inches (or 10 feet over leeboard guards)
Draft	1 foot 9 inches/5 feet 9 inches
Designed displacement	15,000 pounds
Sail area	708 square feet plus 225 square feet in main staysail
Owner and builder	Allan M. Bostick, Jr., Quincy, Florida

Allan Bostick built a *Black Skimmer* sharpie to my plans and sailed her on the Florida Panhandle coast. Like everybody I know of who has one of those, he became very fond of the boat.

Not being willing to let well enough alone (he wrote me), he decided that he'd like to build a bigger version for longer cruises. I've written elsewhere about my objections to big sharpies, but one with a steel hull makes much better sense than one built of either plywood or natural timber. I'd also been cherishing a scheme for a long time for assembling a big steel sharpie right-side-up with the edge of the bottom projecting as the plans show.

The idea was to allow all the plating to be prefabricated flat, keep all the principal welds downward, and eliminate the bad day when the boat has to be rolled over. The bottom would be real armor plate, ⅜ inch thick, fit to ground out on sharp rocks. The projecting edge at the chine not only allowed the downward welds but also protected the thinner side plating when she grounded, as sharpies do, by dragging her chine. An excrescence of this kind along the

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN # 404
36'9" - 9'2⅞" - 1'9"
Iter Hiiam M. Gbmtcm, Jtr.

SCALE 3/8" = 1'0"
AND AS MARKED

1/2" = 1'0"

MASTS, DOUGLAS FIR, GAFFS & BOOMS SPRUCE.

HEEL TAPER 6.0"

MAINMAST 35'1" WITHOUT TRUCK

ALL TAPER ONE OUTSIDE OF 2 1/2" STAVES

PLUG TAPER 3'2"

FORE & MAIN MASTHEADS IDENTICAL

PLUG - TRUCK FROM 2 1/2" SQ.

7 1/8"
7 1/4"
6 7/8"
6"
5 1/8"
4"
3'3"
5'0"

HEEL TAPER 5.5"

FOREMAST 31'0" WITHOUT TRUCK

HEEL TAPER TAKEN OFF IN FLATS TO 6" SQUARE AT HEEL.

STEP TO CLEAT 5'0"

SPACE AS MARKED

JIB CLUB 11'-4" OVERALL

1 1/2" FULL LENGTH SOLID

2'0"

2'1"

1'11"

5"

GAFFS 13'5" WITHOUT JAWS
(FORE & MAIN GAFFS IDENTICAL)

1 1/2" LINES THROUGH

3'0"

1'6"

5'6"

FORE BOOM 15'4" OVERALL

2'0"

2'2 1/4"

2 3/4"

2"

MAIN BOOM 21'6" OVERALL

TAPER SAME BOTH ENDS - SQUARE SECTION THROUGHOUT - 3/4" STAVES

2'0" PLUG IN FORE

5'0" PLUG IN MAIN BOOM

2"
2 5/8"
3"
3 1/4"
3 3/8"
3 1/2"

1 1/2" = 1'0"

MAIN STAYSAIL
LUFF 30'0"
LEACH 25'9"
FOOT 17'6"

101
257
225
423
708
162
350
40'0"

28'0" FOOT

18'3" LEACH

17'7" LEACH

14'11" FOOT

20'5" LEECH TO TACK

12'2" FOOT

24'11" LEECH TO TACK

TRANSOM

RAISED DECK CROWN CONSTANT FROM #1 TO #5 (NOT A CIRCULAR ARC)

FRAME #7

FOOT BRACES P. & S.

VENT OUTLET SEE INBOARD PROFILE. DECK OPENINGS FOR'D & AFT.

RIGHT-HAND PROP PREFERABLE

TRANSOM & ALL FRAMES VIEWED FROM AFT; ALL 1/8" PLATE

FRAME #6

FRAME #5

DROP PANEL

TANK VENT

FRAME #4

LOFT ST. 13 TRANSOM

#1 #2 #3 #4 #5 #6 #7

SEE INBOARD ARRANGEMENT FOR SECTION OF LEEBOARDS. (TWO IDENTICAL)

FRAME #3

FRAME #2

FRAME #1

EDGE OF SIDE PLATING

STEM & FALSE KEEL 1/4"

AFTERDECK FLAT UNDERSIDE

UNDERSIDE OF RAISED DECK AT SIDE

RAISED DECK CENTERLINE (UNDERSIDE)

FOREDECK FLAT 1/8"

WATERLINE AT 15,000 POUNDS DISPLACEMENT

INSIDE OF BOTTOM

BASE LINE FOR HEIGHTS CENTERLINE FOR HALF-BREADTHS

OFFSETS IN FEET, INCHES, & EIGHTHS, TO INSIDE OF PLATE. TO BE USED FOR NORMAL LOFTING, ONLY IF DESIGN IS TO BE ALTERED.

SCALE 3/4" = 1'-0"

DESIGN #40A
38'9" - 9' 2 1/2" - 1'9"
FOR ALLAN M. BOSTICK, JR.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

BOWSPRIT END @ 3" = 1'0" SCALE

1/16" - 1" x 7'12" STAINLESS

LIGHTS, MASTHEAD SYSTEM
SIDE LIGHTS, STERN
COMBINATION & BOW 20 FT.
ON FORECAST (SEE SAIL PLAN)

@ MAIN STAYS'L HALYARD CLEAT P.&S.

FUEL FILL

MAIN SHEET CLEAT P.&S.

MAIN SHEET SWIVEL BLOCK

PIN RACK

DECK OPENING UNDER

GEAR & THROTTLE

COMPASS

TILLER BENCH

SCUPPER P.&S.

@ MAIN STAYSAIL SHEET CLEAT P.&S.

LIFELINE STANCHIONS

HATCH

REEL WINCH FOR LEEBOARD PENDANT P.&S. MINIMUM ADVANTAGE 10:1.

LEEBOARD MOUNT P.&S.

FORESAIL SHEET STANDING END PAD EYE.

SLIDING HATCH

FORESAIL SHEET SWIVEL BLOCKS

FORESAIL & JIB SHEET CLEATS

SCUPPER P.&S.

LEEBOARD PENDANT CRANE P.&S.

LEEBOARDS REMOVED

1/8" BRACE TO LOWER MOLDING (SEE FRAME #9)

MAIN STAYS'L TACK PAD EYE P.&S.

DEADLIGHT HATCH

REVERSIBLE VENT SHROUD

6" x 6" VENT OPENING

JIB SHEET SWIVEL BLOCK

PAD EYE FOR STANDING END OF JIB SHEET

2'3"

BOWSPRIT 9'0" STICK

1/4" BOLTS P.&S.

10" MOORING CLEAT - 3/8" BOLTS THRU DECK.

WARP & CHAIN CHUTE P.&S. SHEATHED WITH STAINLESS.

5'4"

TOP BEARING

1 1/2" STOCK

PIPE BERTH STOWED (STARB'D)

1/8" - 6"

1/8" - 1 1/2"

1/8" - 2'0" x 2'0"

1/4" SKEG

1/4" - 1 1/2"

1/4" - 4"

1/4" - 1 1/2"

1/8" - 1'0" - 2'1"

SEE DETAIL

12" DIAM. 8" PITCH TWO BLADE FOLDING PROP; 1" DIAM. SHAFT; CUTLESS BEARING.

OIL SPILL DAM P.&S.

1/8" DOUBLER PLATES OUTSIDE LEEBOARD RAILS 1 1/2" STD. PIPE

1/8" BRACKETS FORE'D & AFT

LEEBOARD SECTION @ 3" = 1'0"
FIR OR MAHOGANY FAIRING EPOXY-BONDED

1/4" RADIUS

HOMEL FUEL TANK
12" - 14" - 48"
32 GALLONS
TWO BAFFLES

DRAIN COCK UNDER

SEAWATER OUTLET

SILENCER

RUDDER TRUNK

WESTERBEKE 90 DIESEL DIRECT DRIVE

FLEX-NECK STUFFING BOX

PIPE BERTH

WET HANGING SPACE

#7

#6

DISH RACKS

DRESSER

KEROSENE STOVE ON GIMBALS

DRESSER

SINK

LADDER

TRANSOM BERTH BIN UNDER

DROP-LEAF TABLE

TOP-OPENING ICE BOX USED AS CHART TABLE

RADIO LOCKER

TRANSOM BERTH BIN UNDER

#5

#4

SHELVES

HANGING SPACE

CURTAIN

PORTABLE TOILET

BERTH BIN UNDER

BERTH BIN UNDER

#3

#2

#1

1'6"

BOWSPRIT FLANGE 1/8"

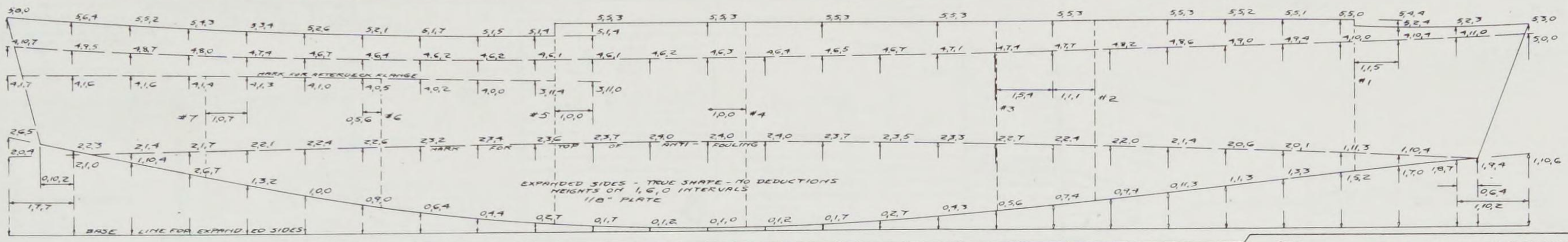
PUMP: EDSON 117A PORTABLE WITH #116 CARRYING BOARD BILGE OPEN UNDER ICE BOX & DRESSER OPPOSITE FOR SUCTION ON EITHER TACK.

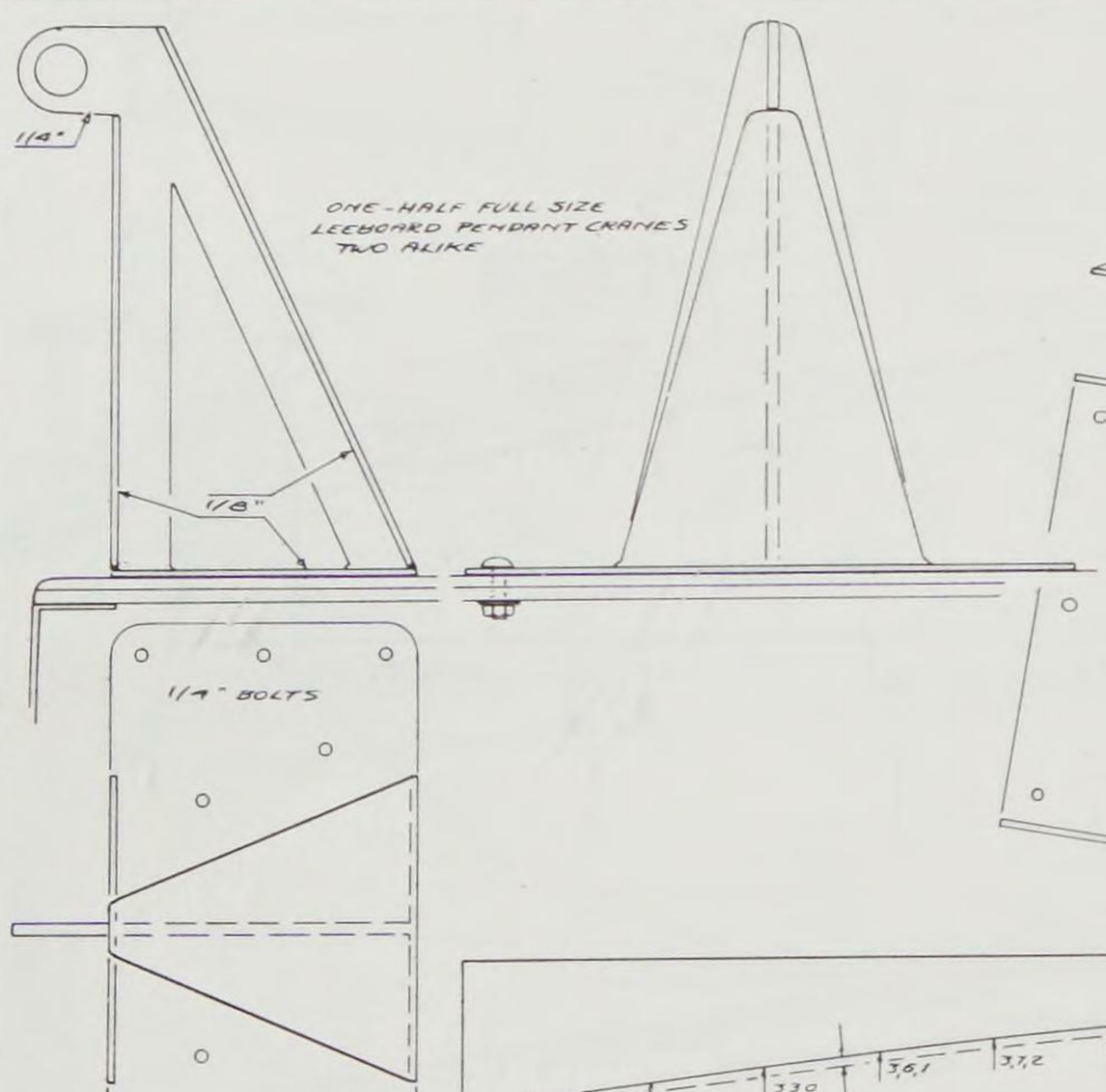
ANCHORS: RECOMMENDED CQR PLOW, ONE EACH OF 45, 35, & 25 LBS.

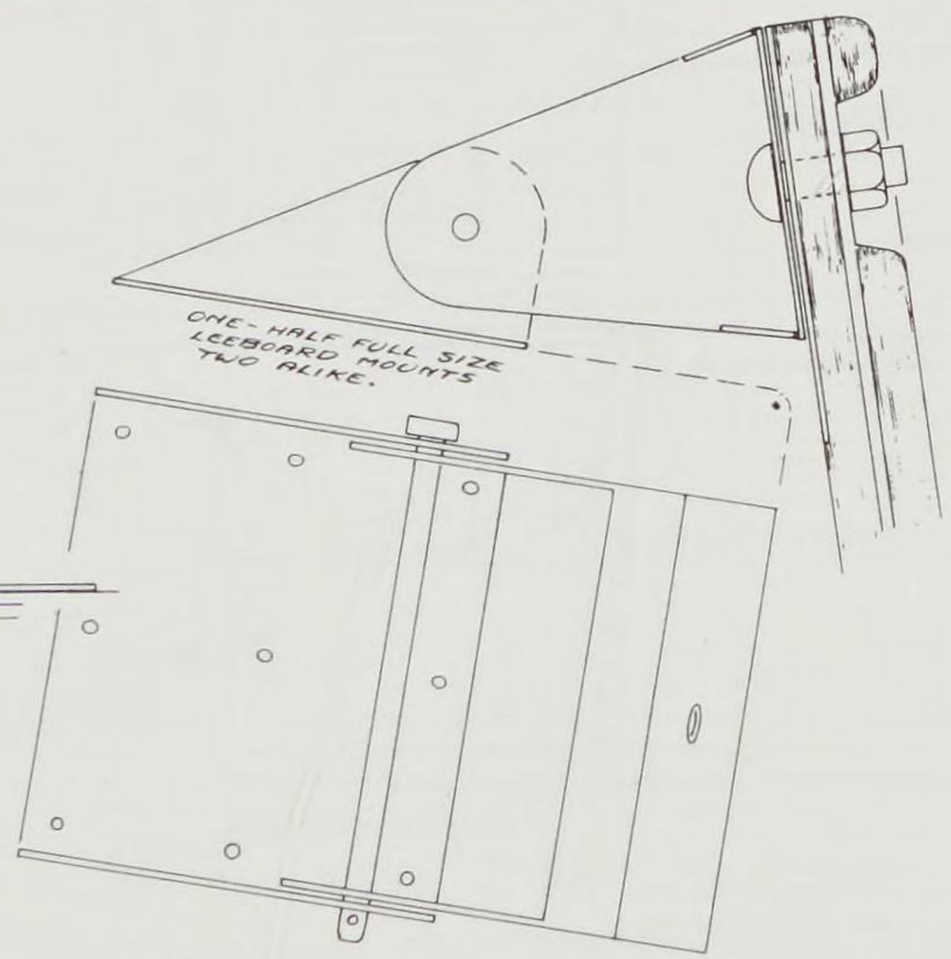
SCALE 3/4" = 1'0"

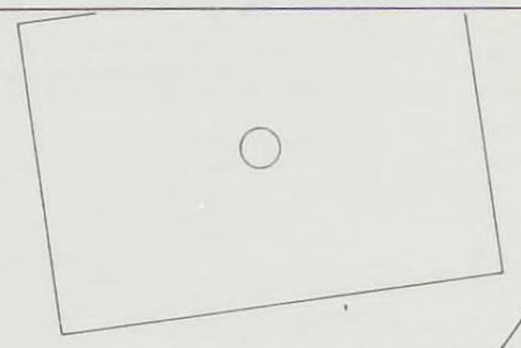
DESIGN #404
38'9" - 9'2½" - 1'9"
for ALLAN M. BOSTICK, JR.

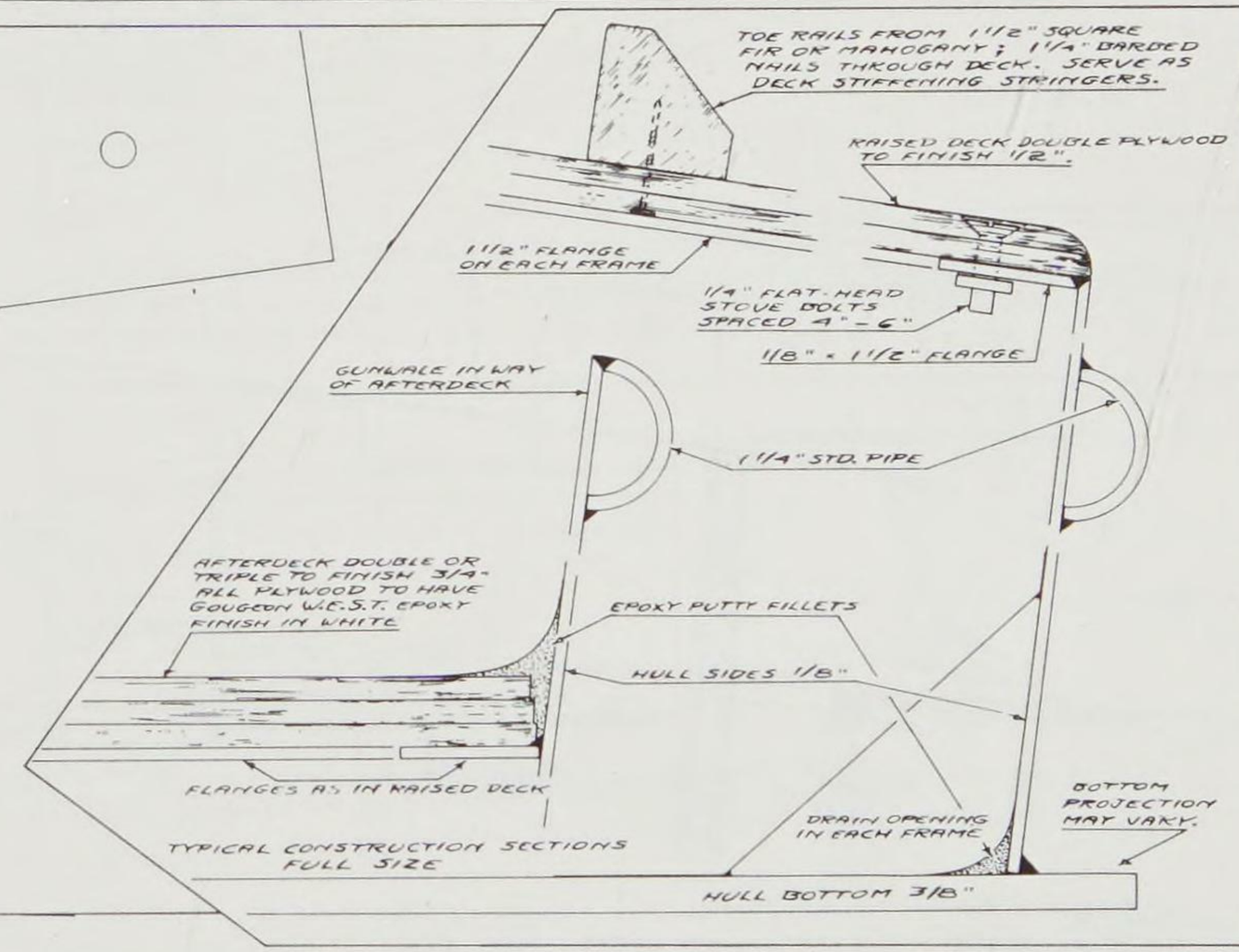
PHILIP C. BOUTELLE
DESIGNER
GLOUCESTER, MASSACHUSETTS

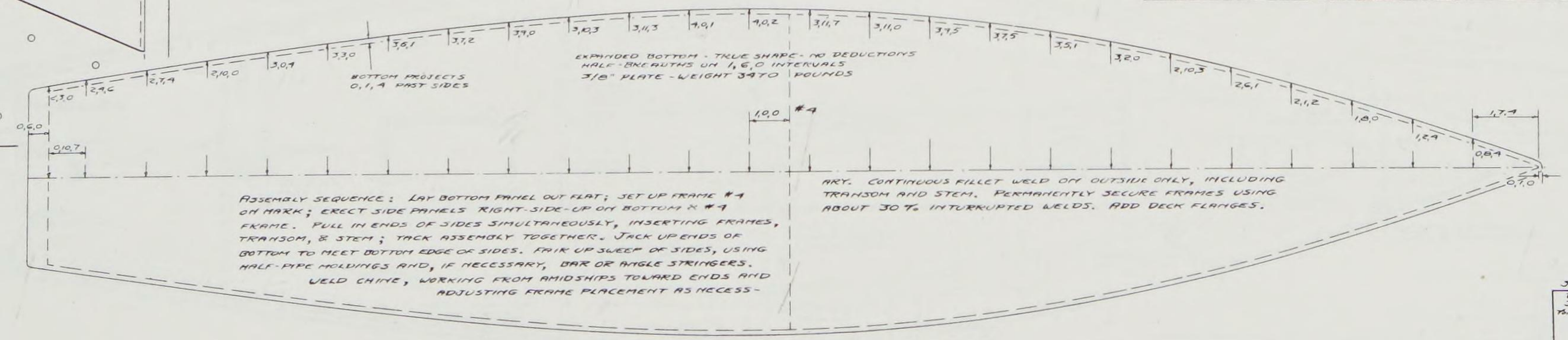












ASSEMBLY SEQUENCE: LAY BOTTOM PANEL OUT FLAT; SET UP FRAME #4 ON MARK; ERECT SIDE PANELS RIGHT-SIDE-UP ON BOTTOM & #4 FRAME. PULL IN ENDS OF SIDES SIMULTANEOUSLY, INSERTING FRAMES, TRANSOM, & STEM; TACK ASSEMBLY TOGETHER. JACK UP ENDS OF BOTTOM TO MEET BOTTOM EDGE OF SIDES. FAIR UP SWEEP OF SIDES, USING HALF-PIPE MOLDINGS AND, IF NECESSARY, BAR OR ANGLE STRINGERS. WELD CHINE, WORKING FROM AMIDSHIPS TOWARD ENDS AND ADJUSTING FRAME PLACEMENT AS NECESSARY. CONTINUOUS FILLET WELD ON OUTSIDE ONLY, INCLUDING TRANSOM AND STEM. PERMANENTLY SECURE FRAMES USING ABOUT 30% UNINTERRUPTED WELDS. ADD DECK FLANGES.

SCALE 3/4" = 1'0"

DESIGN #40A
35'9" - 9'2½" - 1'9"
for ALLAN M. BOSTICK, JR.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

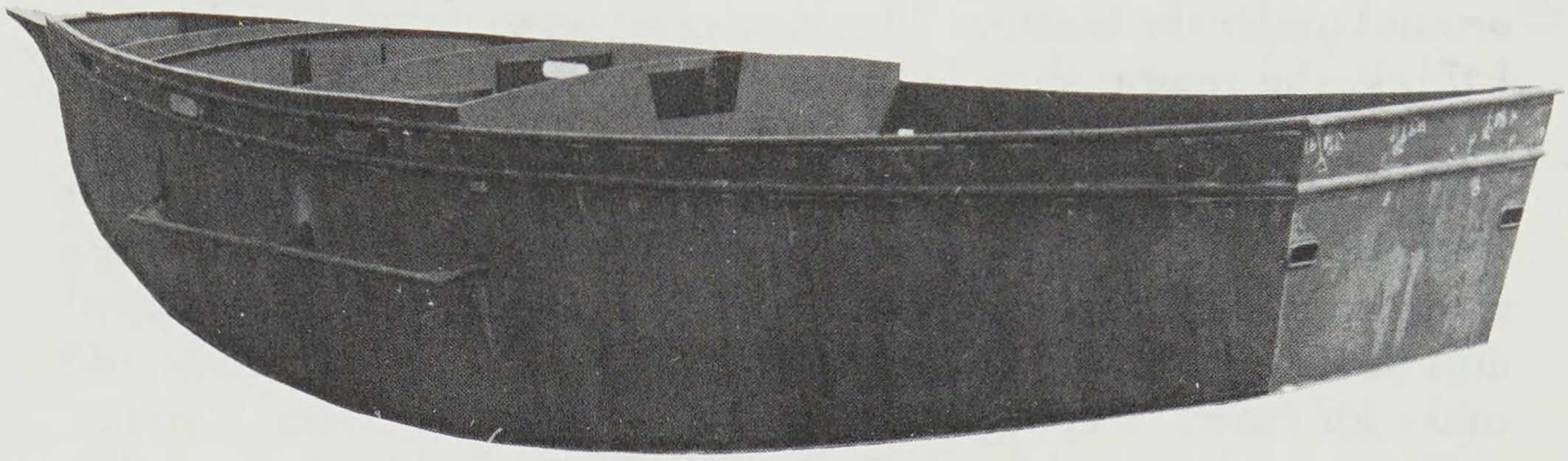
chine doesn't seem to create much added drag in a hull of these proportions, perhaps because it inhibits turbulent flow from the sides around under the bottom. This kind of eddying flow at the chine is, I think, the reason sharpies aren't good sailers in light airs unless the water is perfectly smooth. I try to minimize it by carrying the bottom higher at the bow than other designers do, with the result that my sharpies are noisier, but faster, than other people's sharpies. I've suggested carrying an air bag that could be inflated and tucked under the bow overhang at anchor. I think this would make for easier sleeping, but nobody has reported trying it so far.

The novel assembly worked perfectly, possibly because her builder is neither a boatbuilder nor a welder but apparently one of those handy men who can do anything, including things professionals don't know are possible. I certainly expected more welding distortion in the sides and the flat transom than I can see in the photos. He complained that the huge side panels were inconveniently limp: "When you stand the middle up, the ends lie down." But he coped all right.

Sharpies, even steel ones, only make economic sense if they have cheap engines, cabins, decks, and rigs, as well as cheap bottoms. I drew a Westerbeke because I didn't have a drawing of the old Perkins scrounged out of a defunct tractor. New marine diesels are too rich for the blood of a boat like this. The cabin and deck are about as straightforward as possible. I thought of adding a low trunk on top of the raised deck to get 6 feet or more headroom, but I didn't like its looks and convinced myself that the complication wasn't warranted.

The rig has too many spars to be as economical as I'd like to see, especially with the tricky scissors-action sprit booms. These are supposed to have the advantages of holding the clews down without the usual long projection ahead of the masts. Whether they're worth the complications, as opposed to a Munroe-type sprit boom with an offset jaw on the mast, will take some demonstrating. At any rate, the rig is relatively cheap in material cost. There's too much labor, but in an owner-built boat, the designer can harden his heart.

These schooners with the foremast far forward look odd to most people, but they work very well. The drawbacks — lack of working space around the foremast and too much weight out in the bow — aren't overriding in an inshore cruiser. Notice the clustering of the centers of sail area with various combinations of sails. The heavy-weather rig is full foresail and double-reefed main. The rig is really a cat-schooner with a jib added for balance with a big mainsail.



Lion's Paw *is a great shapeless steel box at this point, but note no ripples in the plates. She was assembled as she stands and will stand until launching day. (Allan M. Bostick, Jr. photograph)*

Back when Cape Cod cats were hotly raced, they all sprouted bowsprits and jibs, not because the jibs helped them much, but because, with jibs, they could use longer main booms and still steer.

In schooners with less than 1,000 square feet of sail, it seems to me that this rig obviously works better in every way than the more usual type with a big foretriangle and a small foresail. That type of schooner is a close relative of a cutter. The object is to sail with a smaller mainsail than the cutter's, but to cut up the foretriangle with the foremast so the sails set there will stand without the exorbitant rigging tensions a cutter needs to be close-winded. Nowadays the tensions can be dealt with routinely, so it could be argued that medium-sized schooners no longer make sense at all. I wouldn't go as far as that myself, although I do think that the staysail schooner is obsolete to the dubious extent that it ever made sense. Anything a staysail schooner can do, a cutter can do better, more easily, and more cheaply.

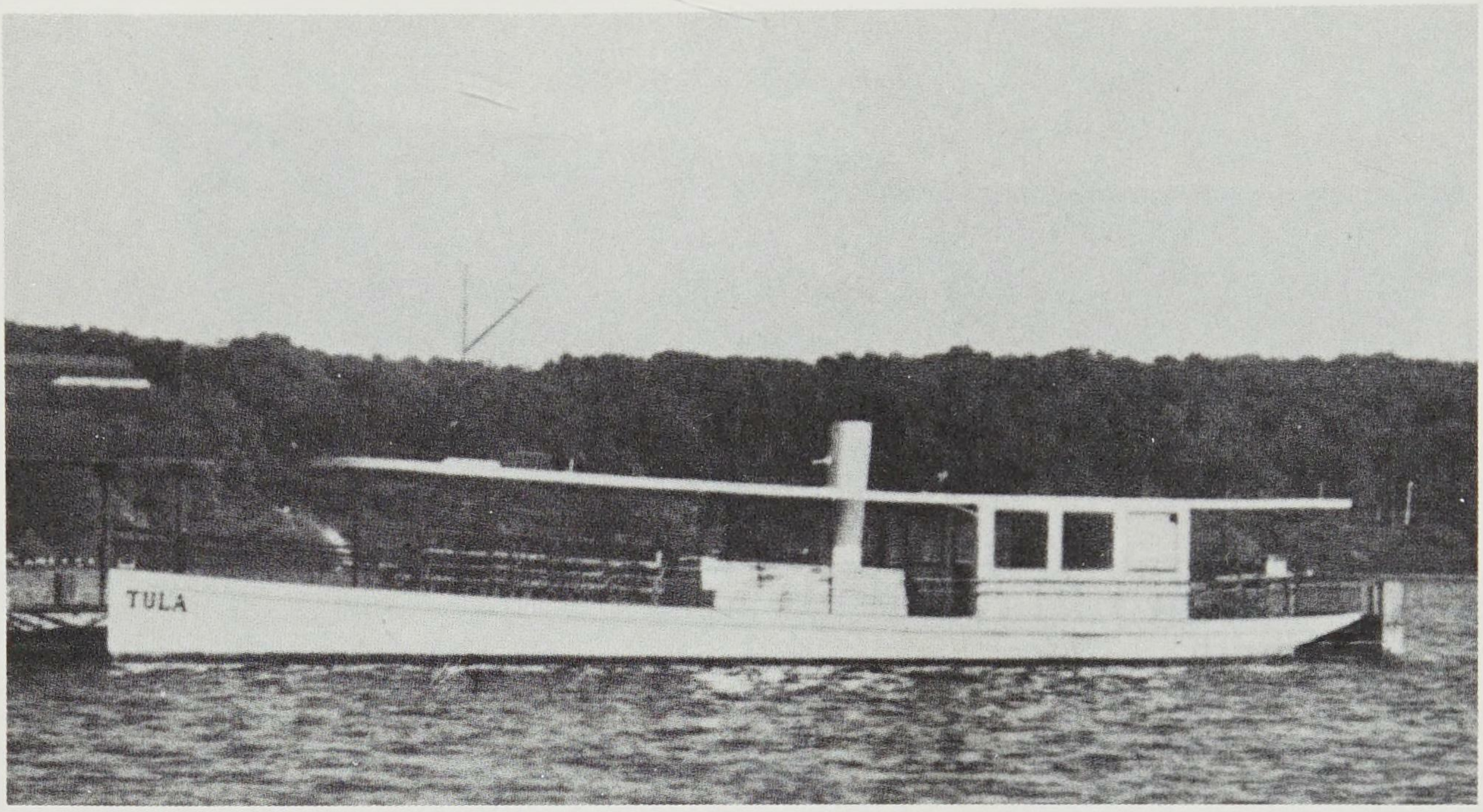
15

Lake Launch

Length overall	44 feet 11 inches
Breadth	9 feet 1 inch
Draft (propeller)	2 feet 5 inches
Designed displacement	8,500 pounds
Owner	Robert E. Pegel
Builder	Sailing Specialists, Williams Bay, Wisconsin

Lake Geneva, in Wisconsin, is 7½ miles long by 2 miles wide, with a pleasantly irregular shape and bold shores giving an average depth of 60 feet. Bob Pegel sent me a privately printed book called *Full Speed Ahead* by Larry Larkin, a history of boating in general and steamboating especially on the lake. The book is so well done and so entertaining that I'm sorry there's no publisher, or even printer, listed in it. It's worth asking for if you happen to be in those parts.

Like a lot of lakes in wooded hill country, I gather Lake Geneva tends to get long stretches of flat calm interspersed with screeching squalls, so the wealthy people who summered there tended to have steam launches in which they could count on being able to show their guests the pretty shores. A distinctive type was evolved, with a long, shaded foredeck forward, power plant and controls amidships, and house aft, as imitated in this design. There were, of course, more modern types on the lake (including at one time a 70-mile-an-hour Hacker, the reasoning behind which escapes me), but the traditional type still seems to make sense. The first one goes

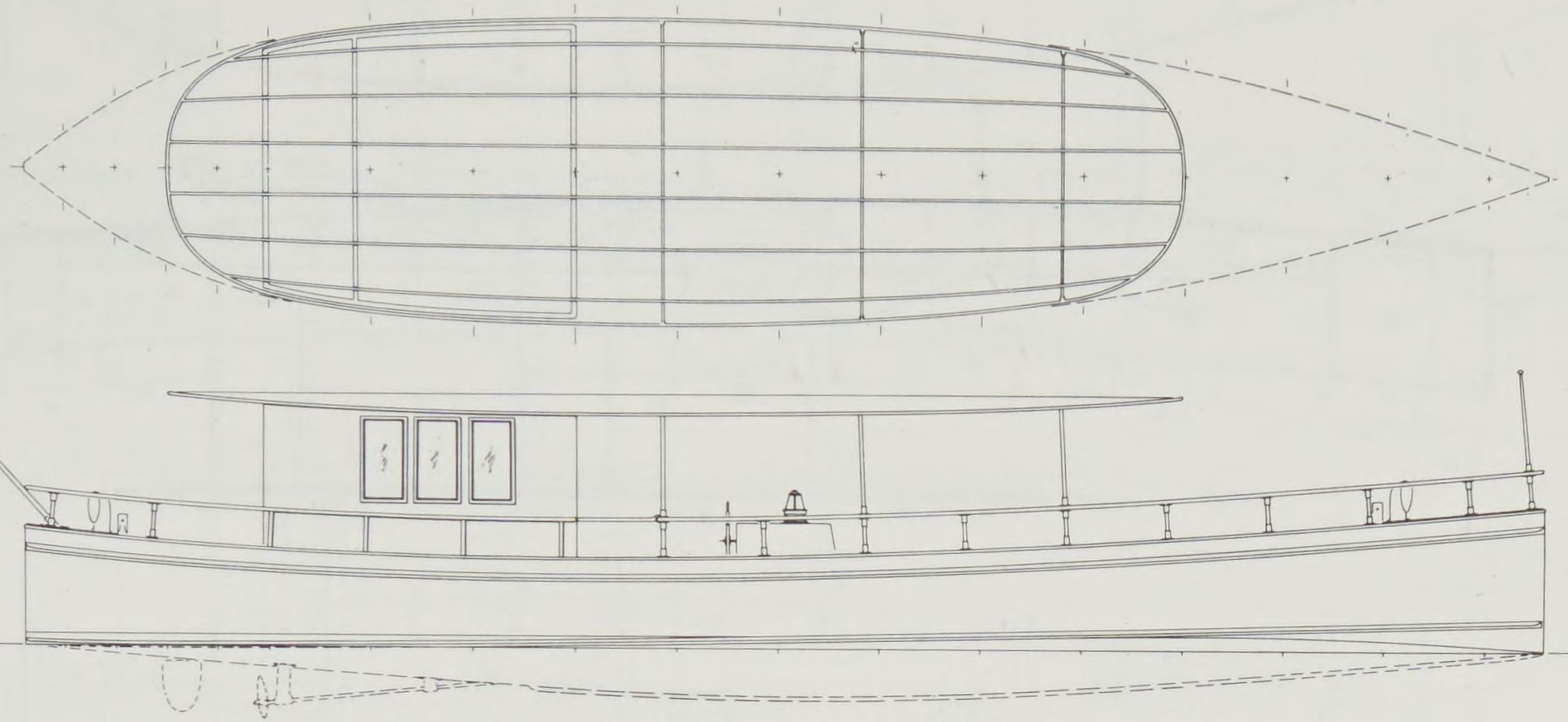


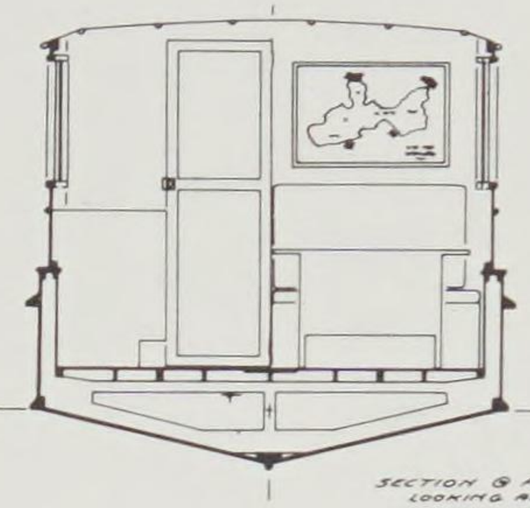
Tula, *a typical Lake Geneva steam launch. When she was new, the house was bright varnished and the stack polished brass. (Photograph from* Full Speed Ahead, *© 1972 by Larry Larkin)*

back to 1875, and the last one, which had gasoline power, was built in 1913. Several are still in use, or were when Larkin's book was written in the 1960s. Pegel thought of building another one, perhaps more than one.

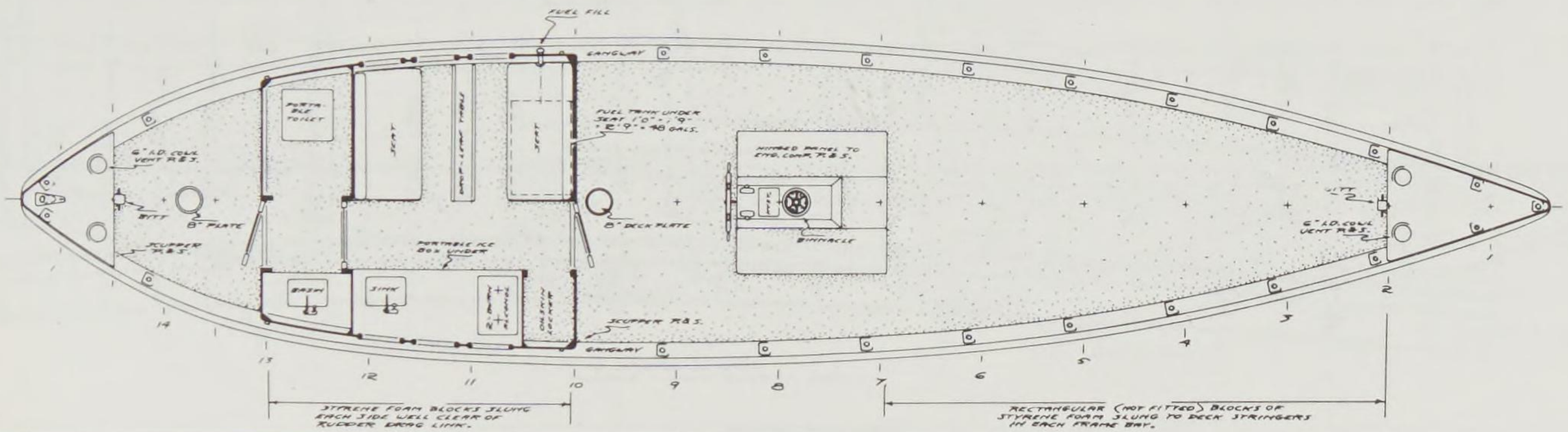
He specified plywood construction for the usual reasons — quick construction and immunity to drying out in a boat that would spend a lot more time in storage than in use. Its lightness was desirable to keep her wake to a minimum. Seven or eight m.p.h. cruising speed seemed all there was much point to on a lake that size, and 50 or 60 h.p. would be enough to make that, with plenty of reserve for squalls. There's no propeller protection because there's nothing to protect it from. A skeg would just be trouble to build, create drag underway, and increase her turning circle, more or less. She doesn't need it for structural rigidity; that's provided by the stiff girders of her sides, to which the keel is stiffly braced with sawn frames.

I gave her deadrise, thinking a flat bottom would be noisy. With this shape there won't be much bow wave, and what there is will be mostly under her. The chine isn't swept up as is usually done in vee-bottomed plywood boats — partly to save the messy transition from a lapped joint to a butted one where the bottom meets the





SECTION @ FRAME #11
LOOKING AFT



STYROFOAM BLOCKS SLUNG EACH SIDE WELL CLEAR OF RUDDER QUAD LINK.

RECTANGULAR (NOT FITTED) BLOCKS OF STYROFOAM SLUNG TO DECK STRINGERS IN EACH FRAME BAY.

SCALE 1/2" = 1'0"

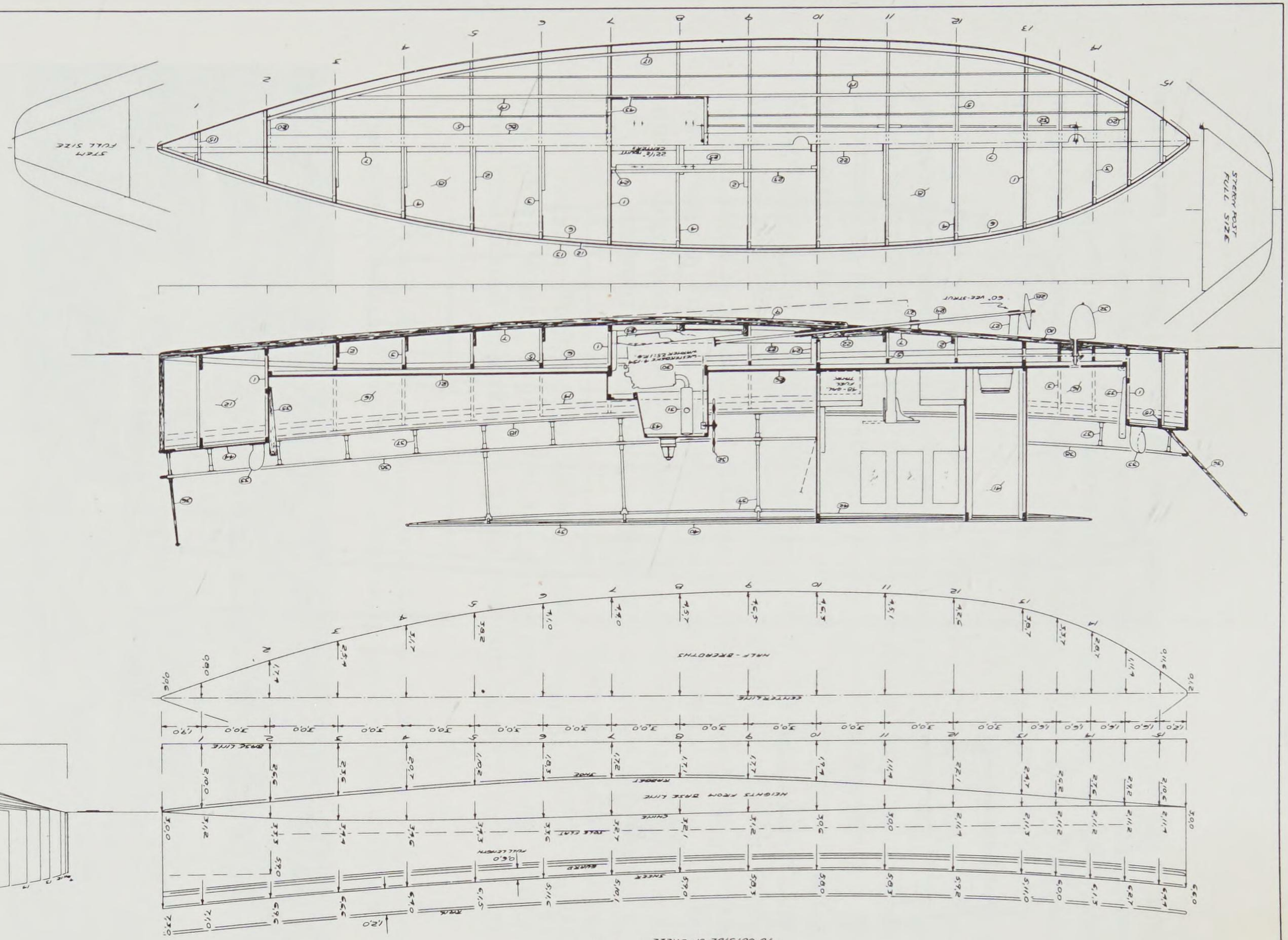
DESIGN #290
44'11" x 9'1" x 2'5"
For ROBERT C. POGEL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN W E90
44'11" x 9'1" x 2'5"
76: ROBERT C. PEASE

SCALE 1/2" = 1'0"


STEM FULL SIZE
STERN POST FULL SIZE
22'6" MAST CENTER
60° VEE-STRUT
WEATHERVANE & ITEM NUMBER CALLOUT
TWO-BAY FLUKE TANKS
CENTERLINE
HALF-BREADTHS
HEIGHTS FROM BASE LINE
RABBET
INSIDE
OUTSIDE
BASE LINE
KEEL CAST
CENTRE
KEEL
SHEER
DECK
BULKHEAD
BULKHEAD
BULKHEAD

FR. #15

BULKHEAD @ 14 1/2
LOOKING AFT

FRAME #14

FRAME #13 1/2
LOOKING FOR'D

FRAME @ #8

FRAME @ #6

FRAME @ #5

FRAME @ #3

FR. @ #1

BASE LINE FOR OFFSETS

BULKHEAD #13
LOOKING FOR'D

BULKHEAD #10
LOOKING AFT

SUGGESTED
BASE LINE FOR
BOTTOM-UP
BUILDING

8'0"

FRAME #9
LOOKING FORWARD

BASE LINE FOR OFFSETS

BULKHEAD #7
LOOKING FOR'D

FRAME @ #4

BULKHEAD #2

SCALE 1" = 1'0"

DESIGN #290
44'11" x 9'1" x 2'5"
for ROBERT E. PIGEL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

side, partly because I thought the straight stem to the waterline was more in keeping with the style than a rounded-back stem. A bow like this is very bad in a seaway. When it digs into a wave, the water running down around the chine from the sides makes awful turbulence under the bottom. The boat drives very hard and steers wildly. But on a small lake, a gale of wind doesn't have room to make waves that would bother her.

The blunt-pointed stern is nothing like any of the old launches, which usually had elliptical fantail counters. I couldn't come up with a sheet-construction imitation of such a counter that was both visually convincing and reasonably efficient. I thought of a round counter like on a New Haven sharpie, but they're expensive to build, and I was afraid it would produce a rolling wake. A flat vertical transom would work best but was unacceptable aesthetically. This stern runs practically as well if the boat is long enough in proportion to her speed and displacement, and the rounded-off corners are sometimes handy alongside a wharf. They also leave no dead space aft to carry exhaust fumes along with the boat. Notice how the bilge ventilation is arranged with intakes at the extreme bow and exhaust all the way aft. If the engine hatches can be tightly gasketed, I'd hope to be able to talk without raising my voice anywhere forward of the house with the little diesel at cruising speed.

The awning, white Dacron, is carried over the house, which has no solid top. The arrangement is light and cheap, gives a pleasant effect when the sun shines through it, and discourages people from congregating up there.

16

Currach

Length overall	24 feet
Breadth	7 feet 7 inches
Designed displacement	2,500 pounds light, 6,400 pounds maximum load
Builder	Ron Barnes, St. Augustine, Florida

I always thought a currach was a tarpaulin stretched over a lath frame, but Ron Barnes tells me that in County Galway now, it's a carvel-planked, sawn-frame, heavily built, outboard motorboat with auxiliary oars. For all I know, the Gaelic word may just mean "boat."

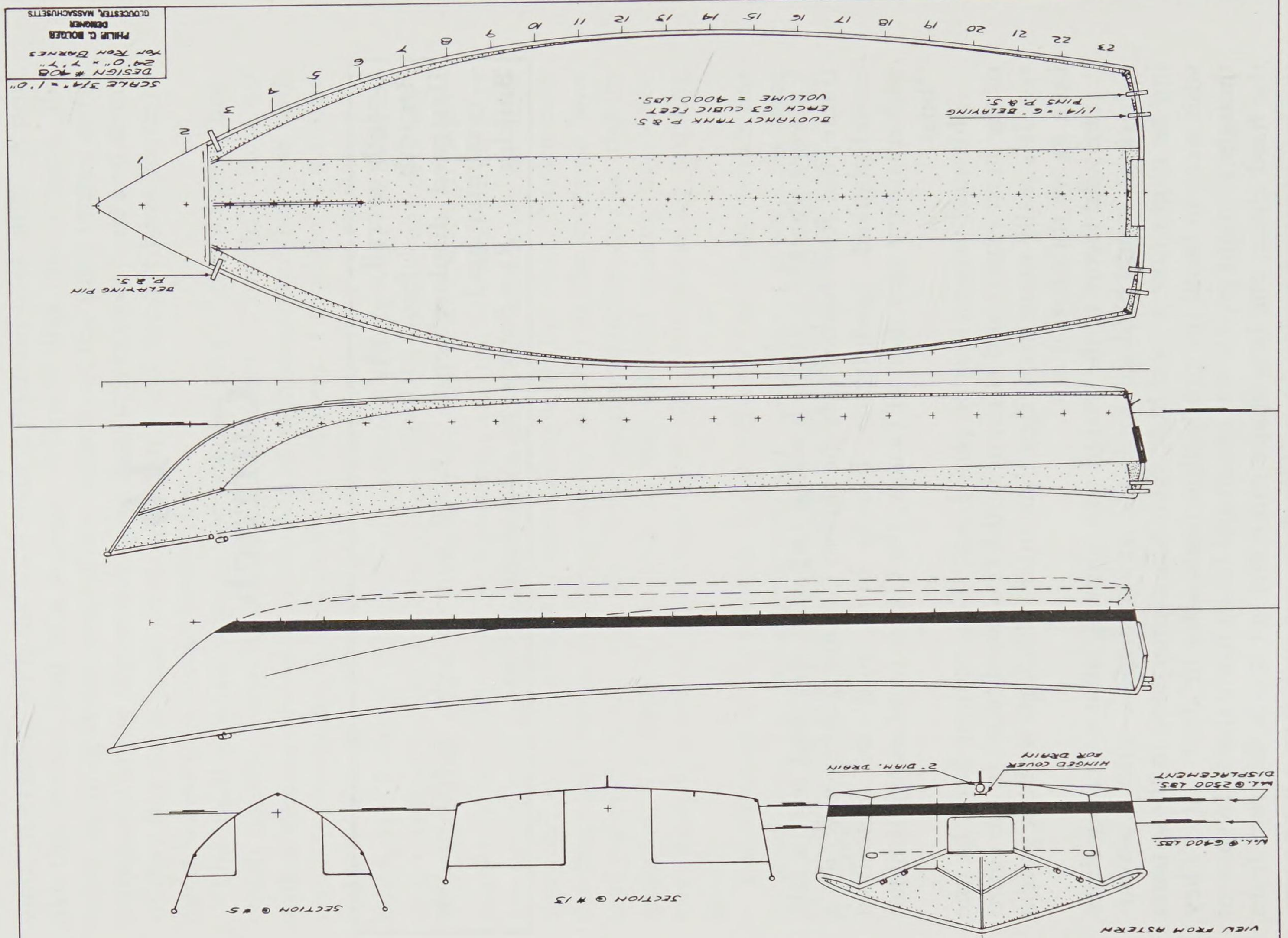
This steel version was proposed, and the prototype built, by one of the most expert and efficient builders of steel boats in the country. It's really more his design than mine, although we both gave a little as we thrashed it out.

The wild factor in the design was guessing what a Galway shore fisherman would hold still for in the way of shape — always assuming he might take a steel hull. Ron has connections in those parts who were to build the production boats after he'd set it up. They thought it might go if it was cheap and had a lively sheer. In spite of the hard chine, the bow shape came out not much different from the indigenous wooden ones. The stern was tucked in a little more than I might do it if I were planning without prejudice for the 20- to

SCALE 3/4" = 1'0"

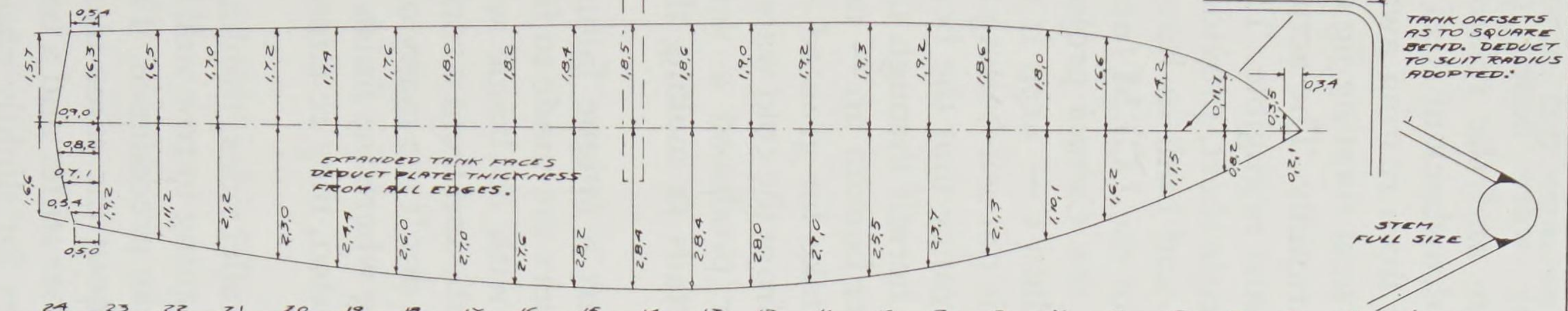
DESIGN # 708
24'0" x 7'7"
TWIN TEEN BARNES

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



KEEL & SKEG
FULL SIZE

GUNWALE
FULL SIZE



TANK OFFSETS AS TO SQUARE BEND. DEDUCT TO SUIT RADIUS ADOPTED.

STEM
FULL SIZE

24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
3,0,0	2,11,0	2,10,0	2,9,4	2,8,7	2,8,4	2,8,1	2,8,0	2,8,0	2,8,0	2,8,2	2,8,4	2,9,0	2,9,4	2,10,2	2,11,0	3,0,0	3,1,0	3,2,1	3,3,4	3,5,0	3,6,4	3,8,2	3,10,0	GUNWALE
0,10,2	0,9,7	0,9,4	0,9,1	0,8,7	0,8,4	0,8,4	0,8,4	0,8,6	0,9,0	0,9,4	0,10,1	0,11,0	1,0,0	1,1,3	1,3,0	1,4,6	1,6,6	1,9,0	1,11,4	2,2,2	2,5,1	2,8,3	2,11,5	CHINE
0,9,2	0,8,5	0,8,2	0,7,7	0,7,6	0,7,4	0,7,4	0,7,4	0,7,4	0,7,4	0,7,4	0,7,5	0,8,0	0,8,3	0,9,0	0,10,0	0,11,4	1,2,0	1,6,0						BUT. 24"
0,8,0	0,7,6	0,7,4	0,7,2	0,7,2	0,7,1	0,7,1	0,7,1	0,7,1	0,7,1	0,7,1	0,7,1	0,7,2	0,7,3	0,7,6	0,8,4	0,9,4	0,11,0	1,1,4	1,5,5	2,1,4				BUT. 18"
0,7,1	0,7,0	0,6,7	0,6,7	0,6,7	0,6,6	0,6,6	0,6,6	0,6,6	0,6,6	0,6,6	0,6,6	0,6,6	0,6,6	0,6,7	0,7,2	0,7,7	0,8,7	0,10,4	1,1,0	1,4,7	2,2,2			BUT. 12"
0,6,4	0,6,4	0,6,4	0,6,4	0,6,4	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,3	0,6,4	0,6,6	0,7,1	0,8,0	0,9,4	1,0,4	1,6,0	2,4,4		BUT. 6"
0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,2	0,6,6	0,8,2	0,11,6	2,1,0	2,3,4		KEEL
	0,9,4	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,4	0,4,1	0,4,6	0,5,2						SKEG

2,8,5	2,10,6	3,0,5	3,2,4	3,4,0	3,5,5	3,6,6	3,7,6	3,8,4	3,9,1	3,9,2	3,9,2	3,8,6	3,8,0	3,6,7	3,5,2	3,3,1	3,0,4	2,9,1	2,5,2	2,0,5	1,7,4	1,1,4	0,7,0	GUNWALE
2,4,4	2,6,5	2,8,4	2,10,4	3,0,1	3,1,4	3,2,7	3,4,0	3,4,6	3,5,2	3,5,3	3,5,2	3,4,6	3,3,7	3,2,3	3,0,4	2,10,0	2,7,0	2,3,3	1,11,2	1,6,4	1,1,4	0,8,0	0,2,3	CHINE
																						0,6,6		W.L. 30"
																				1,5,0	0,10,4	0,3,4		W.L. 24"
																2,6,0	2,0,0	1,6,2	1,0,3	0,6,1				W.L. 18"
												2,7,1	2,1,5	1,8,0	1,2,4	0,9,0	0,3,4							W.L. 15"
3,3,7	2,11,0	2,6,0	2,1,1	1,8,2	1,3,2	0,10,2	0,5,2	0,0,2																W.L. 12"

HALF-BREADTHS

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLATE.

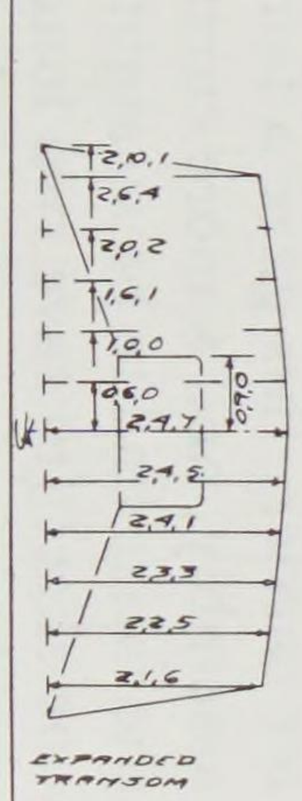
CHINE
FULL SIZE

SECS. #19 - #24

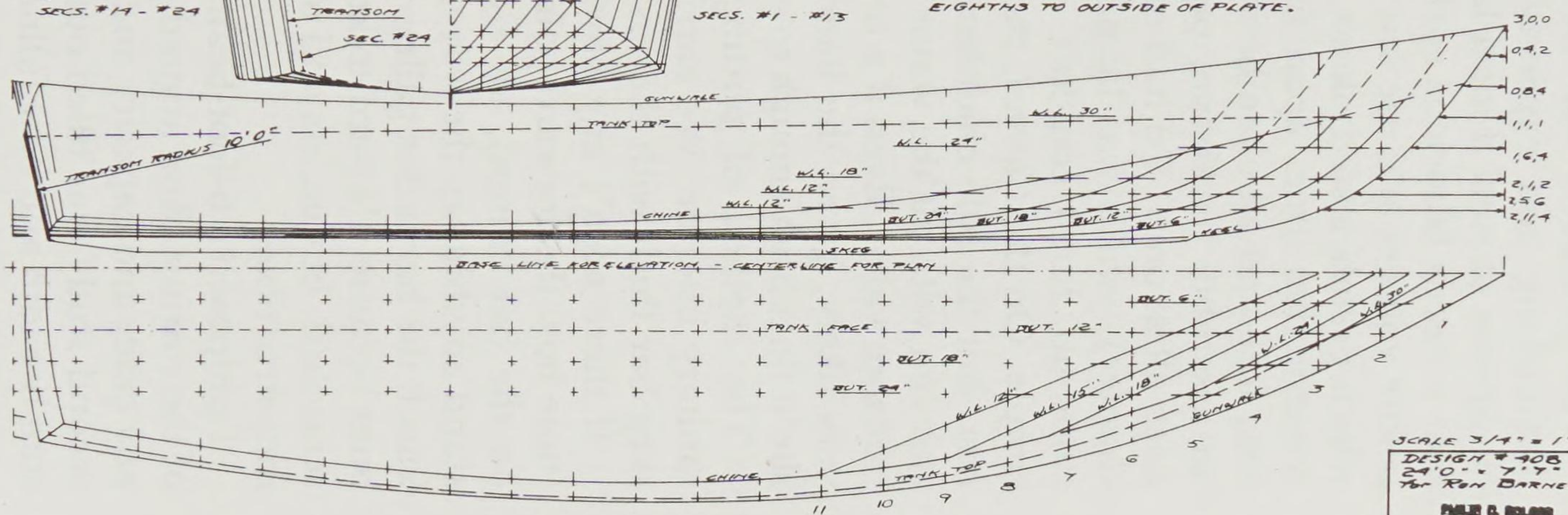
TRANSOM

SEC. #24

SECS. #1 - #13



EXPANDED TRANSOM



40-h.p. outboards that were already in use. A case can be made for it if the boats are loaded amidships.

The prospects for steel boats in Galway were based on diminishing and expensive supplies of timber and the relative cheapness of steel if local labor was used. The drawback of steel is that it needs laborious surface finish to keep it from rusting away before you get any use out of it. Ron devised a neat rotating jig on which prefabricated plates could be assembled rapidly. The actual construction time, apart from finishing, is almost negligible. The long fore-and-aft chambers, each bent from a single sheet, provided an assembly backbone, permanent stiffening, and built-in buoyancy all at once. I'd had much the same idea for the LCLM (next chapter), which was launched about the time the *Currach* project came up, but I couldn't — or, at any rate, didn't — keep it so simple. On the *Currach,* the centerline footwell is not self-bailing at rest, but the side chambers have so much buoyancy that the boat can run with all the water she'll hold and bail herself through the transom valve. Even if a breaking sea turned her bottom up — not very likely, given the handling skill we could take for granted — she'd float high enough to provide some refuge from the cold water.

The method of putting this boat together produced a very sanitary interior. We carried this into such details as making the skeg bar flush with the inside of the plating.

If there aren't any hard stress points to start a fatigue failure (note how the forward points of the side chambers are made to fall on the bar chines), an eighth-inch steel hull with no frame will stand anything in the way of battering. It will rebound from a rock, knock the barnacles galley-west, and not leak. I don't see many old ones because it's hard to keep rust from starting where the finish is scratched, but unless and until they're badly rusted, they're almost indestructible.

I proposed a 6-foot-beam hull with rather parallel sides, thinking of the rowing. Ron argued that the boat wasn't going to row well in any case, and capacity and stability ought to take precedence. The second study was filled out in the middle on about the same transom breadth and bow fullness. Besides making her stiffer and a better carrier, this gave a fairer sweep to the sides for slightly easier assembly, and a more currach-like style. Since the inboard faces of the tanks had to be straight if the face and top were to be bent from one sheet (to save two long welds), this made the flats oddly wide amidships, but we concluded that there was no functional objection.

All this may be a lot of hard thinking with a very ordinary outcome, but what we set out to produce was exactly a *good* ordinary boat.

17

Charity

Length overall	25 feet 6 inches
Breadth	8 feet
Draft	9 inches
Designed displacement	5,000 pounds
Owner	The Trustees of Reservations (Massachusetts)
Builder	Winninghoff Boats, Rowley, Massachusetts

Great Misery Island, out off Manchester in Salem Sound, Massachusetts, once had a casino on it, but the casino burned before my time. The last time I rowed that way, a good many years ago, the island was an ornamental rise of granite covered with cat briar and poison ivy.

The Trustees of Reservations took it over, along with other islands, and set about making a park of it. Eventually they tamed it to the point where grass grew instead of the barbed and toxic entanglements. Then the grass needed cutting, not only as an amenity but also for fire control. They were faced with the problem of how to get a couple of heavy-duty power mowers ashore on an island that no longer has any landing except a rough beach with upwards of nine-foot tidal range. I don't think anybody looked into the economics of a big pulling boat overloaded with scythes.

Gordon Abbott, the executive director of the association, was at school with me. He may or may not have recalled that I had tried to talk his father into rerigging the Hand motorsailer *Bluebell* as a dip-

DESIGN #398
29'6" x 8'0"
For The Twisters Of
Kennebunkport
DESIGNER
PHILIP C. BOLGER
GLOUCESTER, MASSACHUSETTS

SCALE 3/4" = 1'0"

TOTAL POSITIVE BUOYANCY 100 FT³

50 FT³ FOAM BUOYANCY UNDER

RAMP STOWS P.&S.

50 FT³ FOAM BUOYANCY UNDER

BEACH RAMP REMOV-ABLE

DECK BOX FOR P.D., ANCHORS & WARPS

DROP-IN PANEL; CHAIN "NO-LOSE" LANYARD

INBOARD RAMP 5'10" x 2'0" REMOVABLE

GUIDE & LASHING RAILS FOR MOWERS

HINGED TOP

HINGED TOP

ENGINE CONTROLS

STEERING CABLES P.&S.

DRAUER P.&S.

4" MIN. DECK REINF.

55 H.P. MOTOR

1 2 3 4 5 6 7 8

TRANSOM FROM ASTERN

1/4" x 1 1/2" EXTERNAL STIFFENERS

DRAIN P.&S.

FILLING PORT P.&S. 4" x 12"

1 1/2" x 12" OAK MOTOR PAD

℄ BOW FROM AHEAD

DROP-IN PANEL

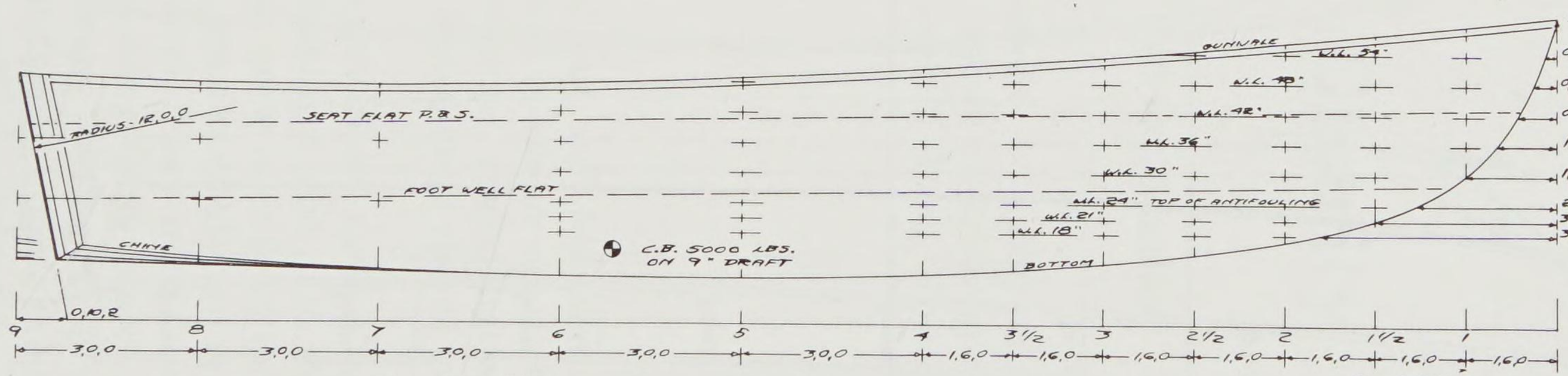
HEIGHTS FROM BASE LINE

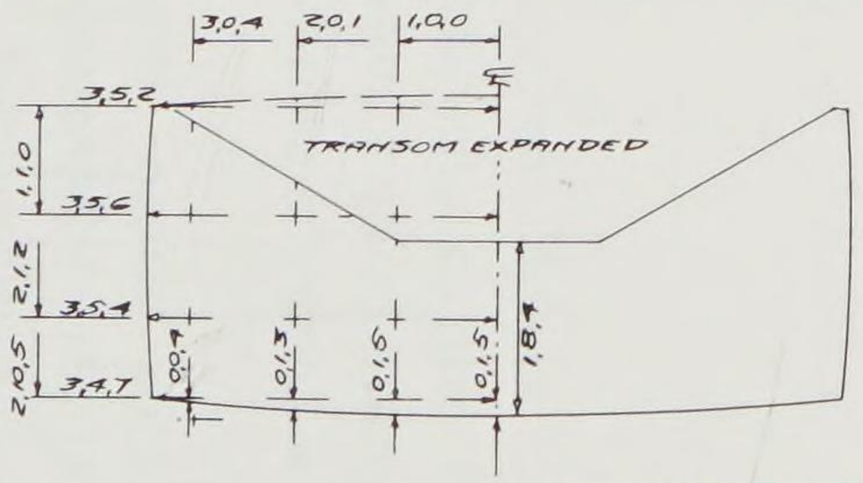
	9	8	7	6	5	4	3½	3	2½	2	1½	1
GUNWALE	4,1,0	3,11,5	3,11,3	3,11,6	4,1,0	4,2,6	4,4,0	4,5,2	4,6,6	4,8,3	4,10,0	5,0,0
CHINE	0,0,0	0,0,7	0,10,5									
BUT. 36"	0,3,1	0,0,3	0,10,3									
24"	0,1,2	0,11,4	0,10,3									
12"	0,0,2	0,11,1	0,10,3									
BOTTOM ℄	0,0,0	0,11,1	0,10,3	0,9,4	0,9,2	0,9,7	0,10,6	1,0,1	1,2,1	1,4,6	1,9,0	2,6,2

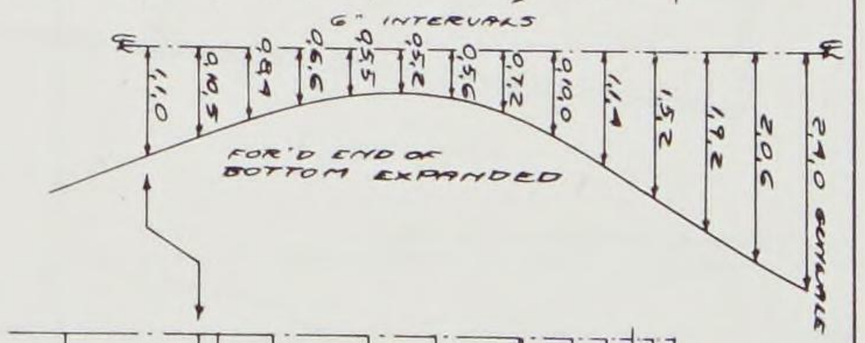
HALF-BREADTHS

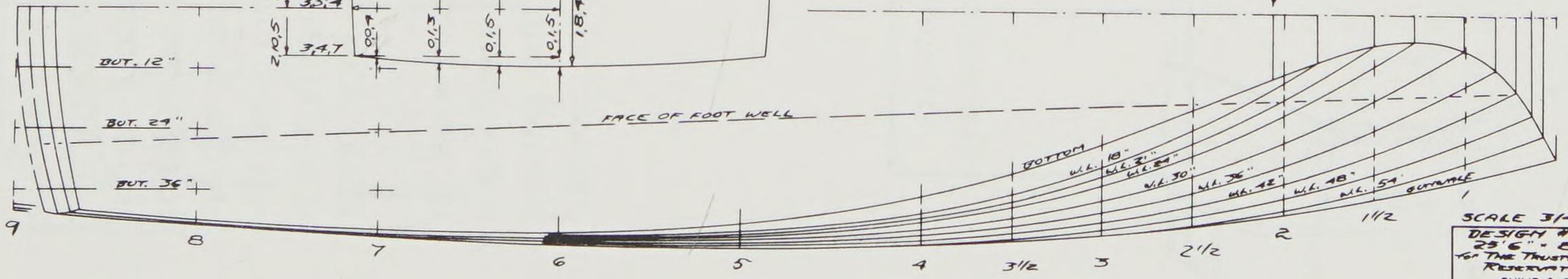
	9	8	7	6	5	4	3½	3	2½	2	1½	1
GUNWALE	3,4,0	3,7,0	3,9,1	3,10,5	3,11,0	3,10,2	3,9,3	3,8,0	3,6,1	3,3,6	3,0,4	2,8,6
W.L. 54"									3,5,7	3,2,6	2,10,6	2,5,1
48"					3,11,0	3,10,0	3,8,7	3,6,7	3,4,0	3,0,4	2,7,4	2,1,0
42"					3,10,4	3,9,1	3,7,5	3,5,4	3,2,0	2,9,4	2,3,4	1,7,7
36"	3,4,2	3,7,0	3,9,0	3,9,7	3,9,7	3,8,1	3,6,2	3,3,3	2,11,3	2,5,7	1,10,6	1,1,7
30"					3,9,2	3,7,1	3,4,6	3,1,0	2,8,0	2,1,4	1,4,7	
24"	3,3,5	3,6,4	3,8,4	3,9,1	3,8,5	3,5,4	3,2,5	2,10,0	2,4,0	1,8,1	0,10,1	
21"					3,8,2	3,4,7	3,1,4	2,8,2	2,1,5	1,5,0	0,6,0	
18"					3,7,6	3,4,0	3,0,0	2,6,4	1,11,0	1,1,4		
BOTTOM	3,2,7	3,6,0	3,7,6	3,8,0	3,6,2	3,0,4	2,8,0	2,2,0	1,7,0	1,0,0	0,6,0	0,1,0

OFFSETS IN FEET, INCHES, & EIGHTHS.



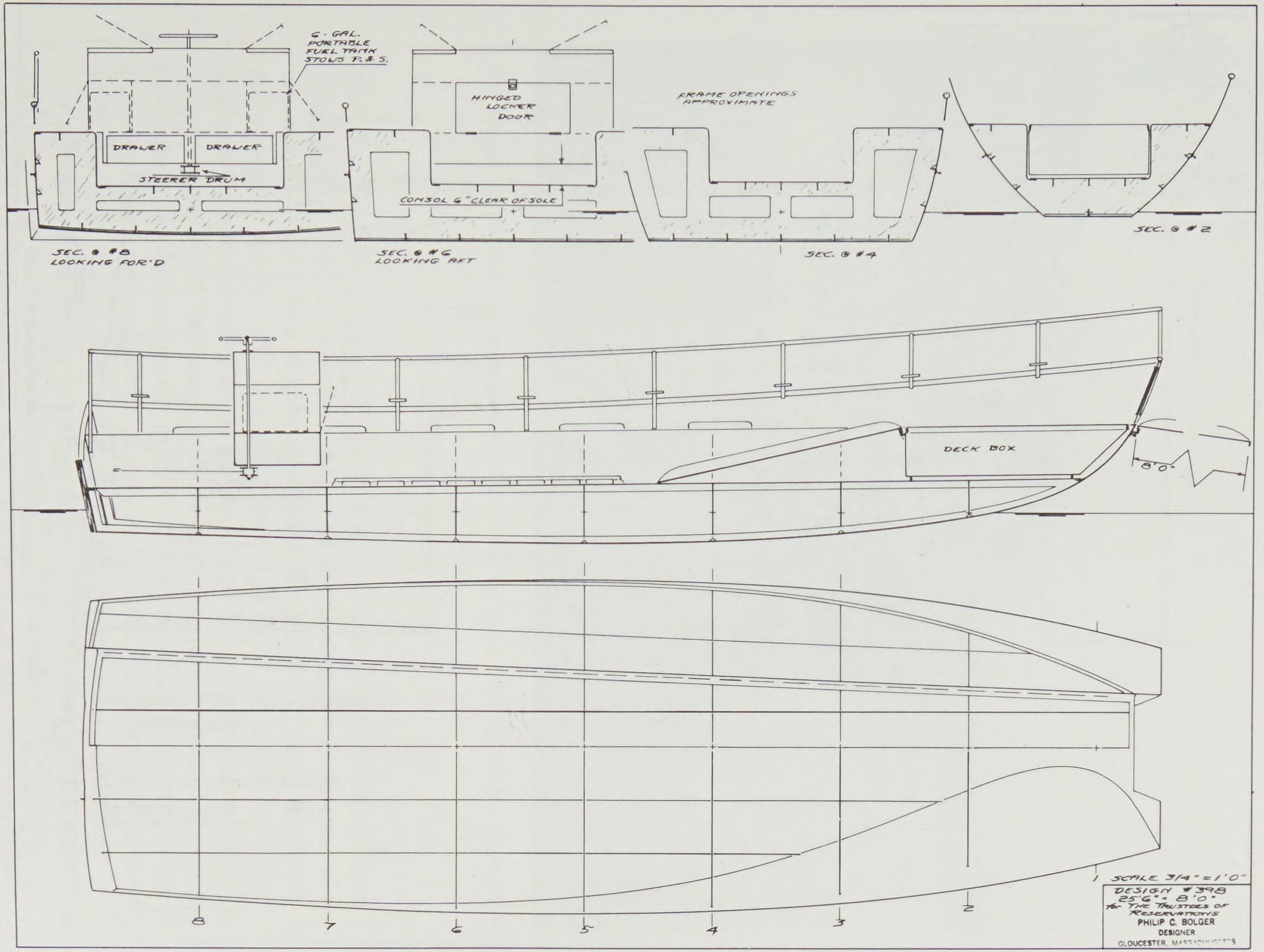


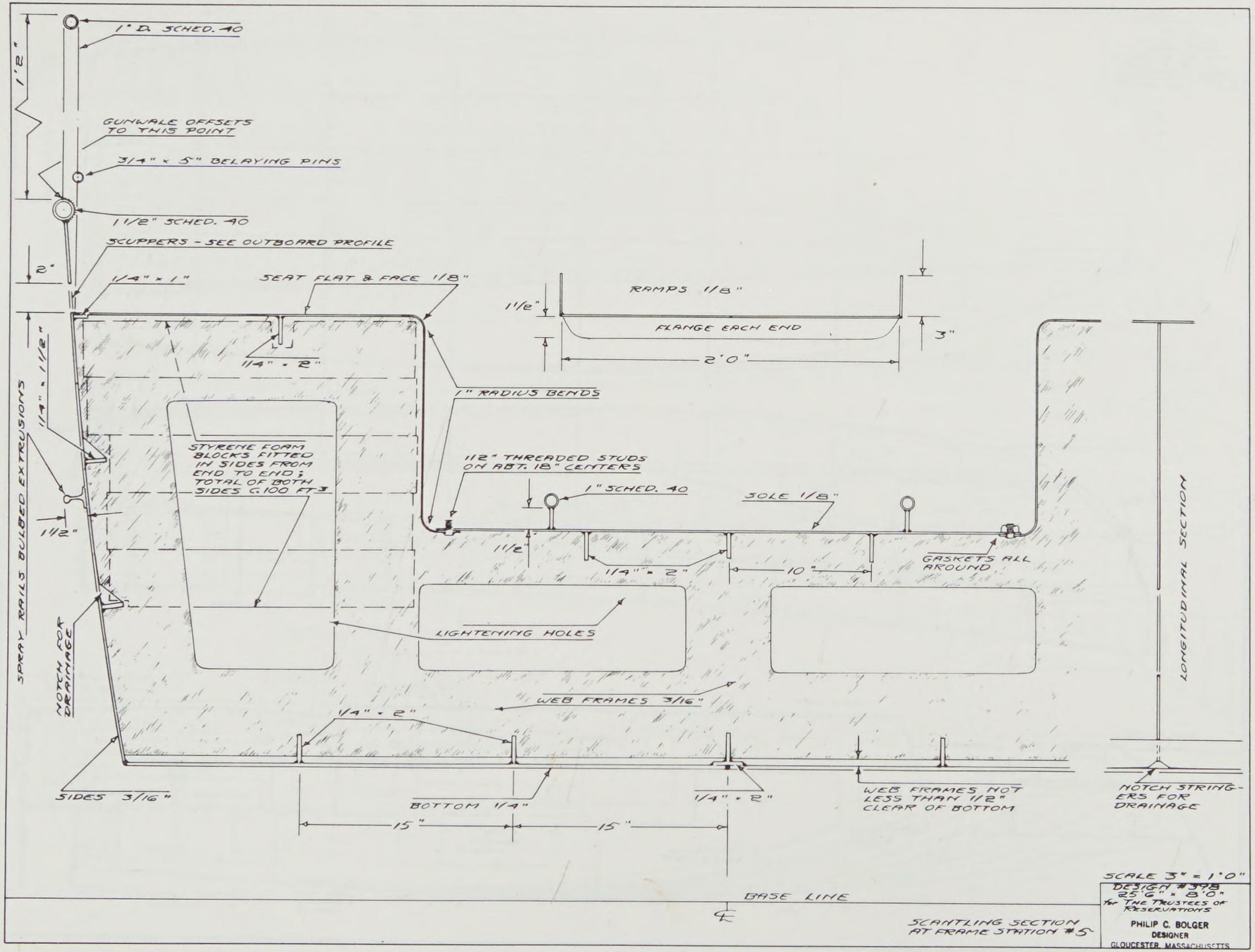




SCALE 3/4" = 1'0"

DESIGN #398
23'6" - 8'0"
for THE TRUSTEES OF RESERVATIONS
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


6 GAL. PORTABLE FUEL TANK STOWS F. & S.
DRAWER
DRAWER
STEERER DRUM
SEC. 8 #8 LOOKING FOR'D
HINGED LOCKER DOOR
CONSOL 6" CLEAR OF SOLE
SEC. 8 #6 LOOKING AFT
FRAME OPENINGS APPROXIMATE
SEC. 8 #4
SEC. 8 #2
DECK BOX
8'0"
8
7
6
5
4
3
2
1
SCALE 3/4" = 1'0"
DESIGN #398
25'6" x 8'0"
for THE TRUSTEES OF RESERVATIONS
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


1" D. SCHED. 40
1'2"
GUNWALE OFFSETS TO THIS POINT
3/4" x 5" BELAYING PINS
1 1/2" SCHED. 40
SCUPPERS - SEE OUTBOARD PROFILE
2"
1/4" x 1"
SEAT FLAT & FACE 1/8"
1 1/2"
RAMPS 1/8"
FLANGE EACH END
3"
2'0"
1/4" x 2"
1" RADIUS BENDS
STYRENE FOAM BLOCKS FITTED IN SIDES FROM END TO END; TOTAL OF BOTH SIDES C.100 FT-3
1/2" THREADED STUDS ON ABT. 18" CENTERS
1" SCHED. 40
SOLE 1/8"
1 1/2"
1/4" x 2"
10"
GASKETS ALL AROUND
LIGHTENING HOLES
WEB FRAMES 3/16"
1/4" x 2"
SPRAY RAILS BULBED EXTRUSIONS 1/4" x 1 1/2"
1 1/2"
NOTCH FOR DRAINAGE
SIDES 3/16"
BOTTOM 1/4"
1/4" x 2"
WEB FRAMES NOT LESS THAN 1/2" CLEAR OF BOTTOM
15"
15"
LONGITUDINAL SECTION
NOTCH STRINGERS FOR DRAINAGE
BASE LINE
SCANTLING SECTION AT FRAME STATION #5
SCALE 3" = 1'0"
DESIGN #378
25'6" x 8'0"
for THE TRUSTEES OF RESERVATIONS
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

A fine example of the kind of shenanigans the trustees did not want. (Harold Vickery photograph)

ping lugger (see Chapter 22, but I agree that it would have been vandalism), but he put the matter of the lawnmowers to me. He stipulated, first, that the boat should be built for long life with minimum upkeep, and second, that it should be unsuitable for high-speed shenanigans so as not to tempt his younger employees.

I was intrigued, having formed a poor opinion of extant landing craft designs while being dumped out of them on various simulated-hostile shores; never the real thing, or I doubt I'd be around still — with the best will in the world, my talent wasn't for soldiering.

I produced this cross between a Swampscott dory and a garvey and refer to it as the LCLM (landing craft lawnmower). Obviously, any beach landing boat has to be almost if not quite flat bottomed, and it's my observation that a perfectly flat bottom drives more

easily and rides no harder than one that is not quite flat. That stretch of water can be rough, however, and a boat with a wide, flat bottom can punish herself fearfully in a chop. Aluminum plate ⅜ inch thick can stand a lot of such treatment, but it was also desirable to have the passengers arrive fit to do some work, not hammered to jelly. A sharp bow is some help if judgment is used as to course and speed relative to the waves, but that was out in a landing boat.

I designed a long, convex-section overhang like the Swampscott dory, then sliced it off in the garvey profile enough to make room for the gate. This gave enough profile curve to make the thick bottom plate very stiff. Aft, where the bottom straightened out, it's worked into an arc section, again to stiffen it and also to make her bank her turns. A 70 h.p. motor was contributed, about three times the power needed for the desired modest speed, so there had to be some concern about skidding dangerously in a boat that couldn't have any fixed lateral plane and that for simplicity's sake we didn't want to equip with a centerboard or leeboards. The big motor and the up-curve of the bottom at the chines aft combine to make her trim like a praying mantis (as a journalist reported) at her top speed of about 18 knots. Since the Trustees didn't want her run at any such speed, we didn't add tabs to correct the trim. The high bow is even handy, since she can be made to run half her length dry on a steep beach. She does blow away in a beam wind, of course, but between fairly heavy normal loads and good handling, this hasn't been a serious problem.

Jack Winninghoff built her very solidly. I'm used to leaning on his advice where aluminum is concerned, but we went round and round because he would have preferred to build something that looked more like a boat. I got my way in the end because I could always argue plausibly that each proposed change would hinder her in some way from doing the job she was built for.

In fact, I'm told she is very serviceable — just as well, because, with her construction, she'll probably be around for a long time. The long bow ramp turned out not to be needed for the lawnmowers. She runs up the beach so far that it's quicker just to lift them through the open gate, but the ramp is kept for occasional dignified landings of the senior Trustees.

18

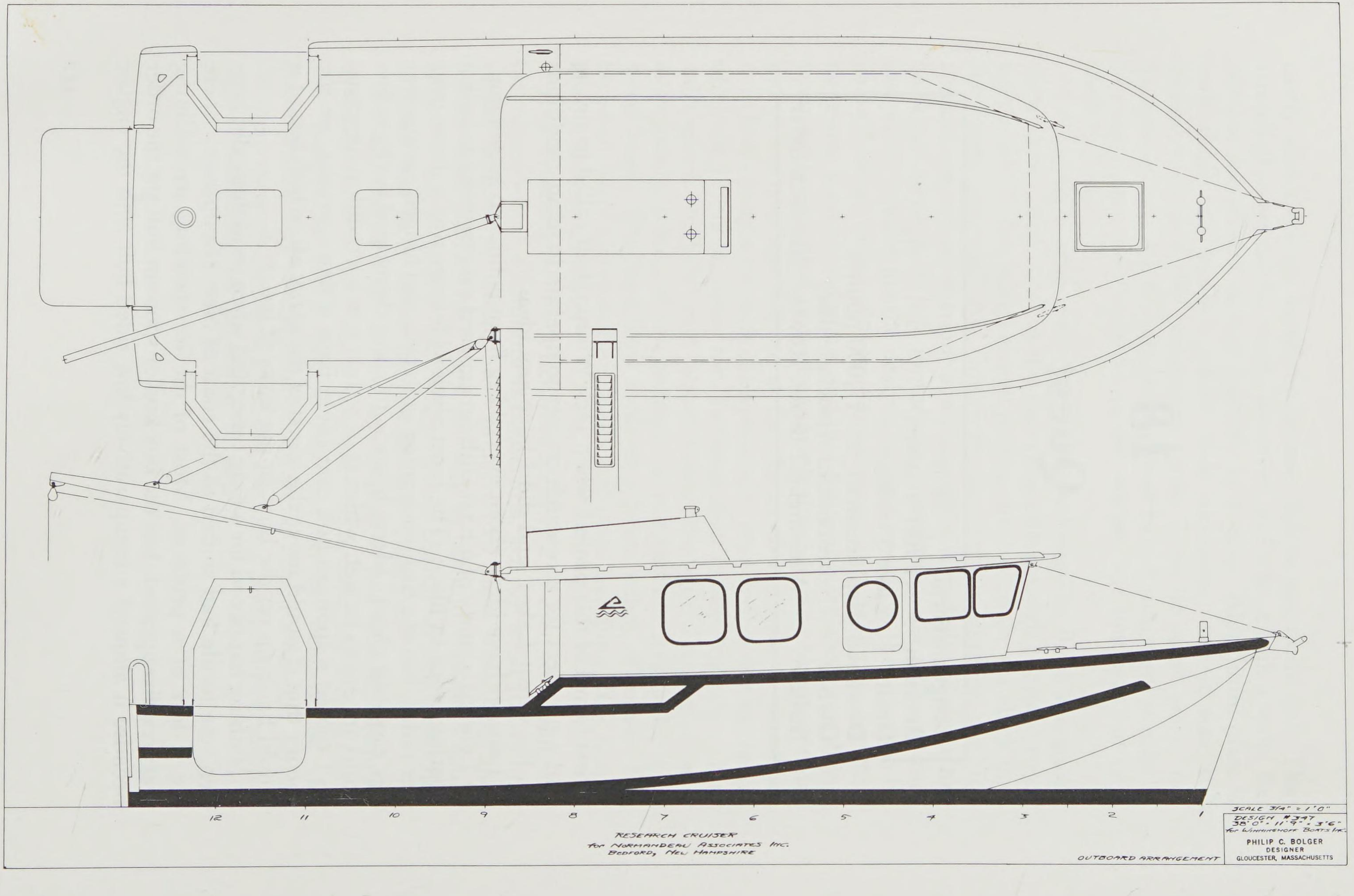
Quest

Length overall	38 feet
Breadth	11 feet 9 inches
Draft	3 feet 6 inches
Designed displacement	17,000 pounds
Owner	Normandeau Associates Inc.
Builder	Winninghoff Boats, Rowley, Massachusetts

I first heard of this project when Jack Winninghoff called to say he had a prospect for a research cruiser to operate in icing conditions on the Great Lakes, and did I have any ideas?

I always have ideas about everything from politics to astronomy, so I got up a study of a boat with no exposed excrescences to lock a coating of ice in place. The most obvious feature was a dome over her radar, but she had telescoping grab rails and hinged covers over her mooring cleats. Metal boats with sheet-developed surfaces forward are apt to be wet, which is of course how ice buildup happens, so I touted a sponson hull that could have a fine entrance, on the theory that it would move the worst of the spray aft, where less of it would hang up on the boat in the form of ice.

Nothing happened for a long time, and when something did happen, the locale had shifted to the coast of New Hampshire, where ice is less of a problem. Most of the ice-shedding streamlining features disappeared, but the box keel or sponson hull got the order because it allowed a comparatively low-sided hull with the engine



RESEARCH CRUISER
for NORMANDEAU ASSOCIATES INC.
BEDFORD, NEW HAMPSHIRE

SCALE 3/4" = 1'0"

DESIGN #347
38'0" · 11'9" · 3'6"
for WINNINGHOFF BOATS INC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

OUTBOARD ARRANGEMENT

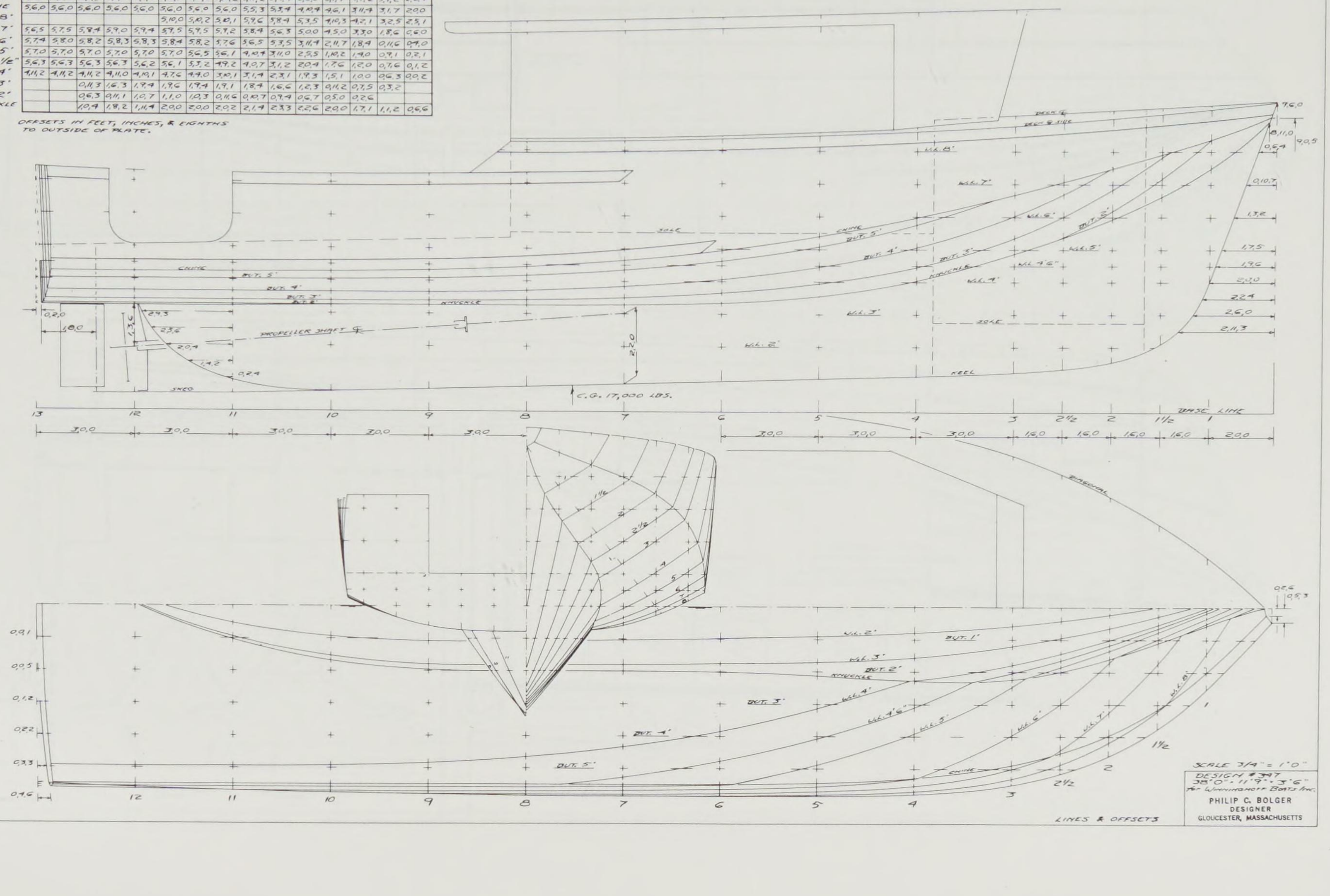
HEIGHTS FROM BASE LINE

	13	12	11	10	9	8	7	6	5	4	3	2½	2	1½	1
DECK	7,5,1	(7,3,5	7,3,0	7,3,0	7,3,2	8,3,0	8,3,4	8,4,4	8,5,4	8,7,2	8,9,5	8,10,5	9,0,0	9,1,5	9,3,4
						7,2,7	7,4,5								
CHINE	4,3,0	4,3,0	4,3,1	4,3,3	4,4,0	4,5,2	4,7,5	4,11,3	5,1,6	5,11,6	6,8,1	7,0,7	7,5,6	7,11,0	8,7,3
OUT. 5'	4,0,3	4,0,3	4,0,3	4,0,4	4,0,7	4,2,0	4,4,1	4,7,4	5,0,7	5,7,0					
4'	3,7,7	3,7,7	3,7,7	3,7,7	3,7,7	3,8,4	3,10,1	4,0,7	4,5,4	5,0,6	6,0,3	6,8,3			
3'	3,4,6	3,4,6	3,4,6	3,4,6	3,4,6	3,5,0	3,6,0	3,7,7	3,11,2	4,5,4	5,4,1	6,0,1	6,10,0	7,8,6	
2'	3,3,1	3,3,1	3,3,1	3,3,1	3,3,1							5,4,4	6,2,2	7,2,0	8,4,3
KNUCKLE			3,2,4	3,2,7	3,3,1	3,3,8	3,3,2	3,4,0	3,6,5	4,0,4	4,10,4	5,3,4	5,11,2	6,7,4	7,3,5
KEEL	3,2,4	3,2,4	0,11,2	0,7,4	0,8,1	0,9,2	0,10,1	0,11,2	1,0,2	1,1,2	1,2,4	1,3,7	1,6,3	2,1,2	4,0,0

HALF-BREADTHS

	13	12	11	10	9	8	7	6	5	4	3	2½	2	1½	1
DECK	5,6,0	5,7,2	5,8,3	5,9,0	5,9,4	5,10,0	5,10,2	5,10,2	5,10,2	5,9,4	5,6,0	5,1,7	4,7,2	3,9,2	2,6,4
CHINE	5,6,0	5,6,0	5,6,0	5,6,0	5,6,0	5,6,0	5,6,0	5,6,0	5,5,3	5,3,4	4,10,4	4,6,1	3,11,4	3,1,7	2,0,0
W.L. 8'						5,10,0	5,10,2	5,10,1	5,9,6	5,8,4	5,3,5	4,10,3	4,2,1	3,2,5	2,3,1
7'	5,6,5	5,7,5	5,8,4	5,9,0	5,9,4	5,9,5	5,9,5	5,9,2	5,8,4	5,6,3	5,0,0	4,5,0	3,3,0	1,8,6	0,6,0
6'	5,7,4	5,8,0	5,8,2	5,8,3	5,8,3	5,8,4	5,8,2	5,7,6	5,6,5	5,3,5	3,11,4	2,11,7	1,8,4	0,11,6	0,1,0
5'	5,7,0	5,7,0	5,7,0	5,7,0	5,7,0	5,7,0	5,6,5	5,6,1	4,10,4	3,11,0	2,5,5	1,10,2	1,1,0	0,9,1	0,2,1
4½"	5,6,3	5,6,3	5,6,3	5,6,3	5,6,2	5,6,1	5,3,2	4,9,2	4,0,7	3,1,2	2,0,4	1,7,6	1,2,0	0,7,6	0,1,2
4'	4,11,2	4,11,2	4,11,2	4,11,0	4,10,1	4,7,6	4,4,0	3,10,1	3,1,4	2,3,1	1,7,3	1,5,1	1,0,0	0,6,3	0,0,2
3'			0,11,3	1,6,3	1,7,4	1,7,6	1,7,4	1,7,1	1,6,4	1,2,3	0,11,2	0,7,5	0,3,2		
2'			0,6,3	0,9,1	1,0,7	1,1,0	1,0,3	0,11,6	0,10,7	0,7,4	0,6,7	0,5,0	0,2,6		
KNUCKLE			1,0,4	1,8,2	1,11,4	2,0,0	2,0,0	2,0,2	2,1,4	2,3,3	2,2,6	2,0,0	1,7,1	1,1,2	0,6,6

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLATE.



SCALE 3/4" = 1'0"

DESIGN #397
38'0" - 11'9" - 3'6"
for Winnington Boats Inc.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

LINES & OFFSETS

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #327
38'0" : 11'7" : 3'6"
for Lightnenor Boats Inc

SCALE 3/4" = 1'0"

FRAME

EXTENDED TRANSOM
FROM 65 STERN

WATERTIGHT BULKHEAD
@ #10 1/2

FRAME @ #9+ 2 1/4"

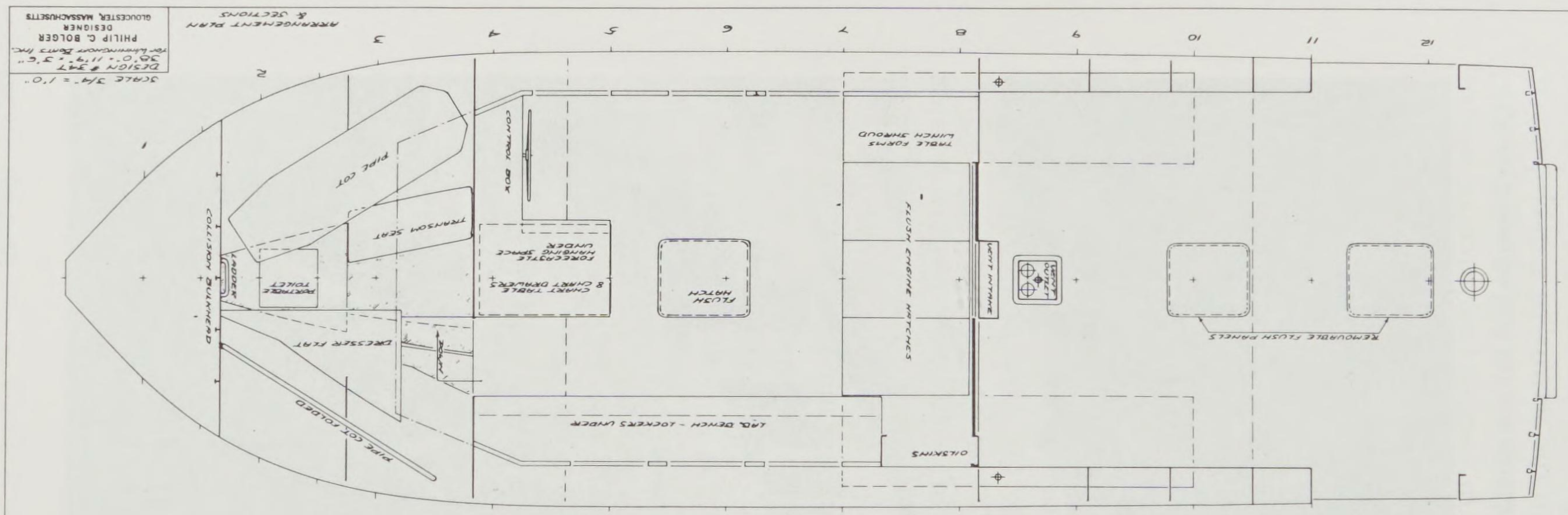
FRAME @ #9+ 3/4"

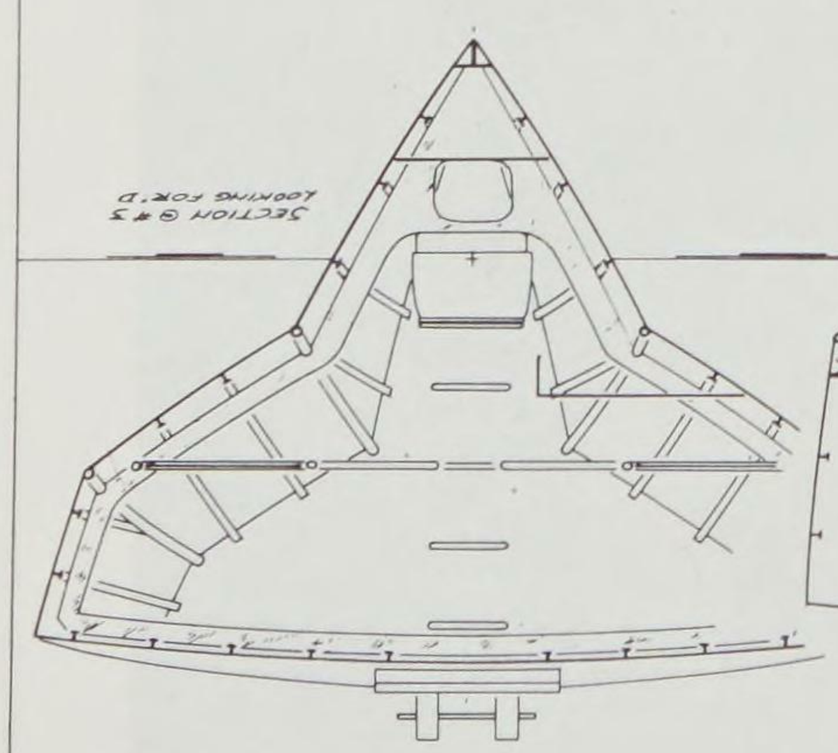
ARRANGEMENT PLAN
& SECTIONS

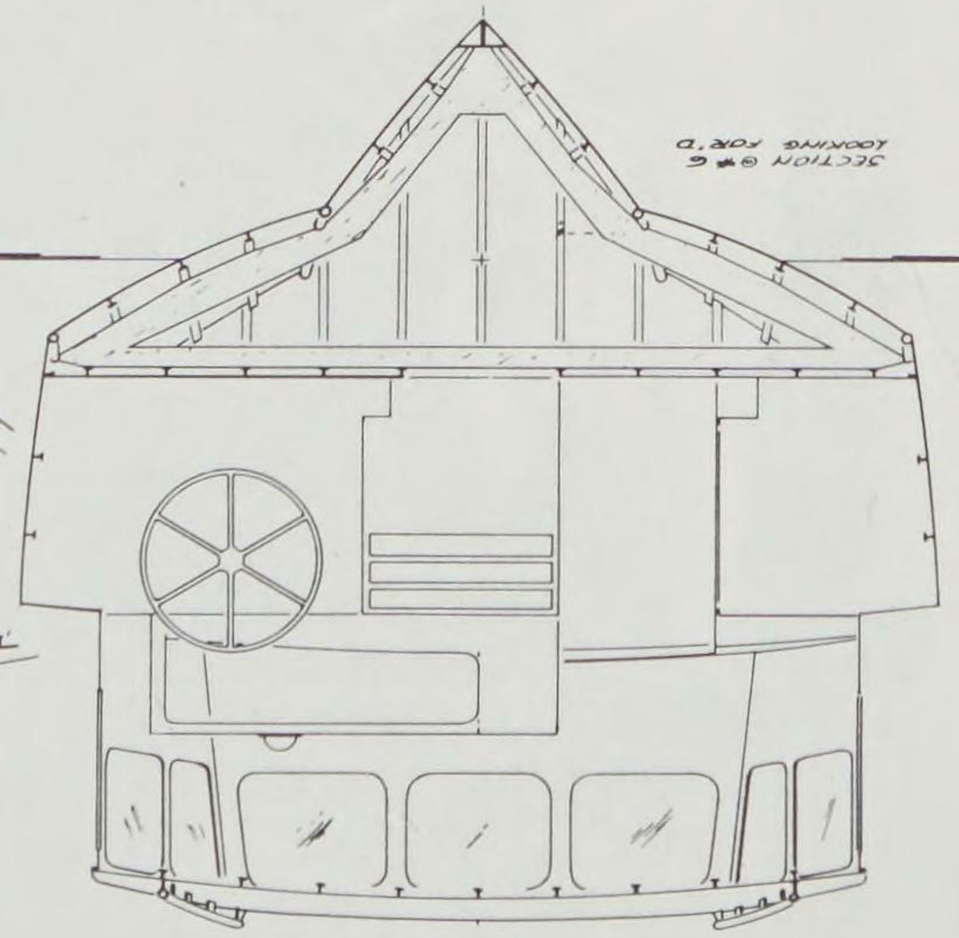
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

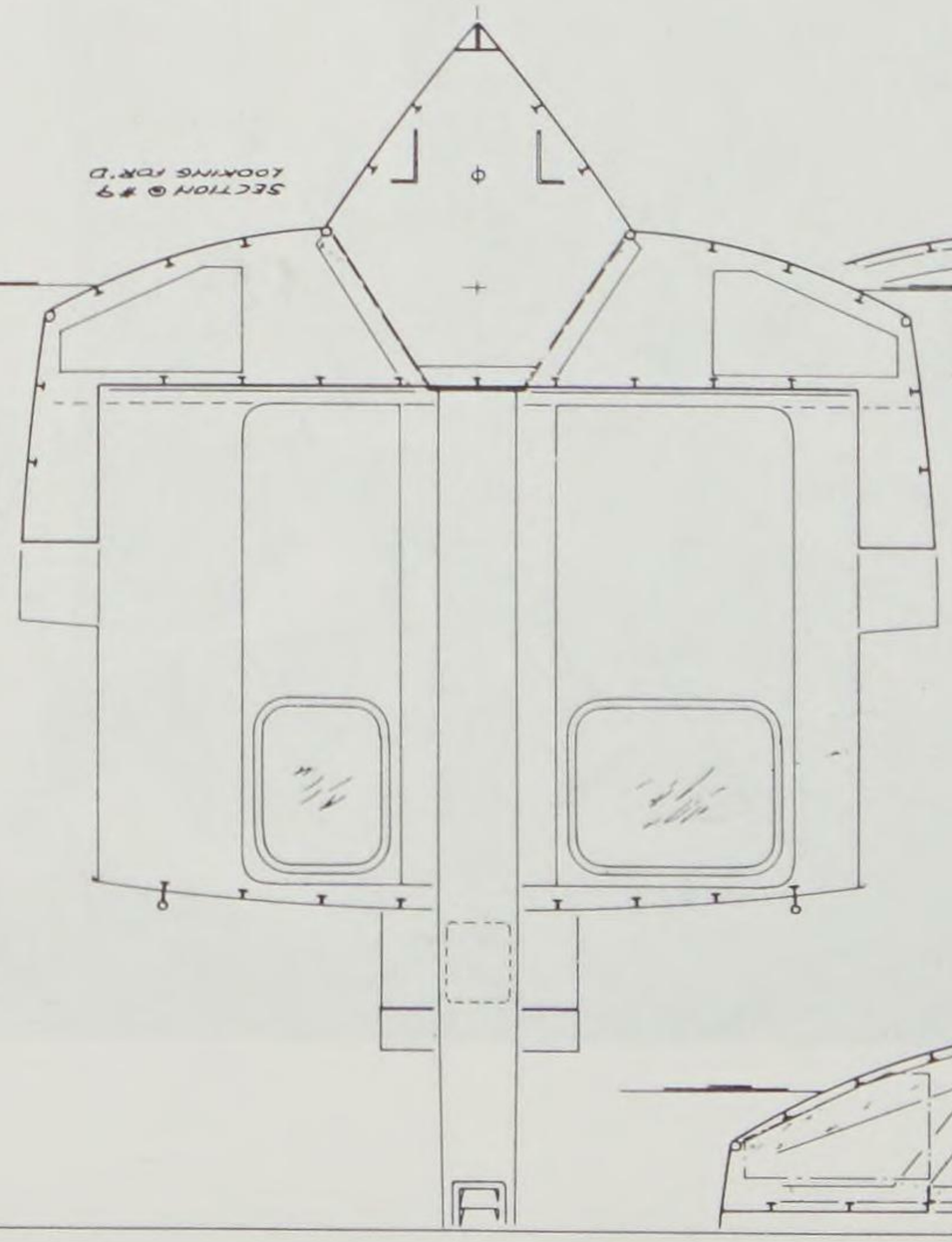
DESIGN #327
30'0" - 11'9" - 3'6"
for Livingstone Boats Inc.

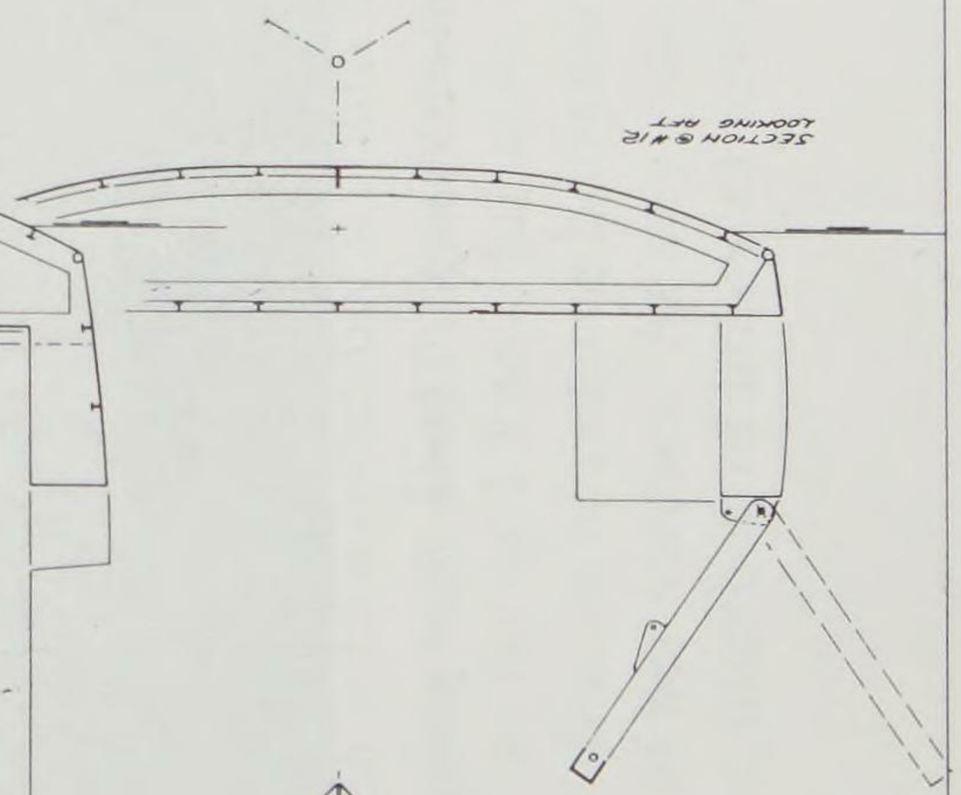
SCALE 3/4" = 1'0"

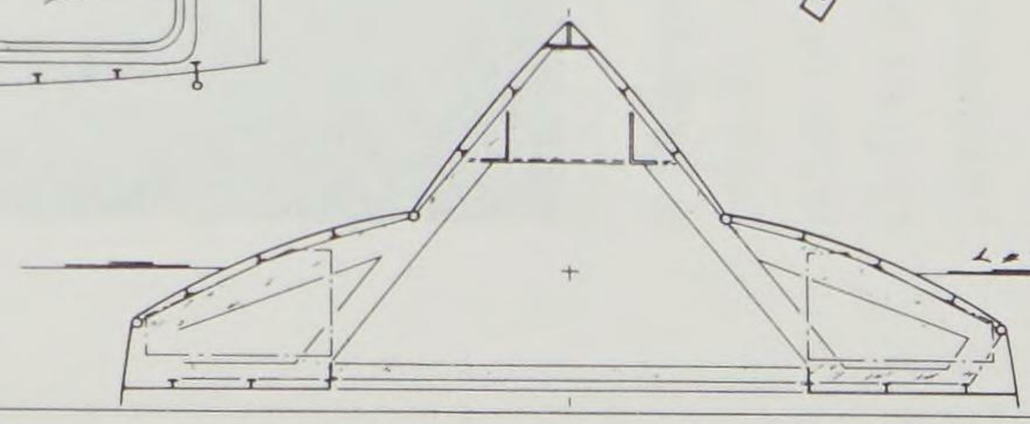












Quest*'s sponson hull has considerable reserve buoyancy. (Thomas Byers photograph)*

buried under a flat working deck. The drawback of the arrangement is that the Perkins V-8 diesel seems to have been poured into the bilge and allowed to harden, which tempts mechanics to vilify the designer as they try to change the oil, but it produces good reserve stability.

I'd finally awakened to the conclusion that keels like this one give a much better distribution of displacement if they have parallel sides for most of their length, with the fairing just at the ends. If it's faired in a smooth sweep from end to end, like a canoe, as I used to do it, the ends are so sharp that there's no useful volume there. It took me about 25 years, averaging about one design of this type per year, to arrive at this conclusion. Having got that far, I thought if a parallel mid-body was good, perhaps a wasp-waisted shape would be better, but when I designed a vessel that way, the owner took fright and abandoned the project, so I haven't had a chance to try it yet.

Any boat steered from inside a deckhouse has a problem with the view from the helm. Back in the 1930s, a common type was the "sedan cruiser," evolved from an open cockpit, through an awning, then a windshield, then sides, until the boats were being handled from a curtained living room, and nobody could see where they were going. Eventually they all developed flying bridges, which are now evolving into living rooms in their turn, with dubious effects on stability in some cases. In *Quest,* the prospective master of the boat specified the far-forward, forward-raked windshield, the door beside the wheel, and the chart table handy to the helm. I don't care much for forward rake because when you have to shelter a hatch in the deck, such a rake greatly increases the volume and wind resistance of the house. However, I did sympathize with his desire to see where the lobster pot buoys were.

I'd understood that she had to carry some heavy gear at the after end of the cockpit. It wasn't in place when I had her out for trials, and the weights forward had crept up and ahead on me in building, with the result that at the lower speeds she trimmed "like a bull going to war," as Francis Herreshoff used to say, tail up and head down. Still, she bettered her contract speed of 12 knots, maneuvered well including in strong beam winds, ran against a head sea with a tolerably smooth and dry action, and steered well in a following sea. Her only vice was a nasty quick roll in a beam sea, which, as far as I know for now, is in the nature of a deep-bodied boat with a lot of reserve buoyancy. In other words, I think it's the defect of her virtues. At any rate, I'm told she has piled up an impressive number of hours of service.

19

Mikim

Length overall	24 feet
Breadth	7 feet 10 inches
Draft	2 feet 5 inches
Designed displacement	4,200 pounds
Owner	Lawrence Mitchell
Builder	Montgomery Boat Yard, Gloucester, Massachusetts

I had been looking at small powerboats from the point of view of a casual day outing, and it seemed to me that most of them came up wanting: too expensive, too noisy, power arrangements too hard to maintain, either not enough shelter or the wrong kind, and too good a target for thieves. At rather slight instigation from *The Small Boat Journal,* I worked up this exploratory design.

It was picked up and ordered built by Lawrence Mitchell at the Montgomery Boat Yard — very appropriately, since she's based on a whole fleet of boats designed by the late Nicholas Montgomery, who first taught me boat design and had, I think, more to do with the kind of designer I am than anybody else. He was a theorizer and experimenter, and he turned out some wild ones in the 50 years that he ran the boatshop in Gloucester. But in the time I knew him, the bread and butter was motorboats like this one, built from his models by his son Herbert. They ranged from 16 feet to 75 feet on a couple of dozen different but related models. Six of them were commercial fishermen built during World War II, 20 years ahead of

PHILIP L. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #376
27'0" × 7'10" × 2'3"
Tom Small Dory Journal

SCALE 3/4" = 1'0"

1 2 3 4 5 6 7

8" CLEAT P.&S.

VENTILATORS (SEE DETAIL)

DRY EXHAUST

SLACK LIFELINE P&S.

COMBINATION RUNNING LIGHT

FLOORBOARDS REMOVABLE

SKIDS FOR SMALL BOATS

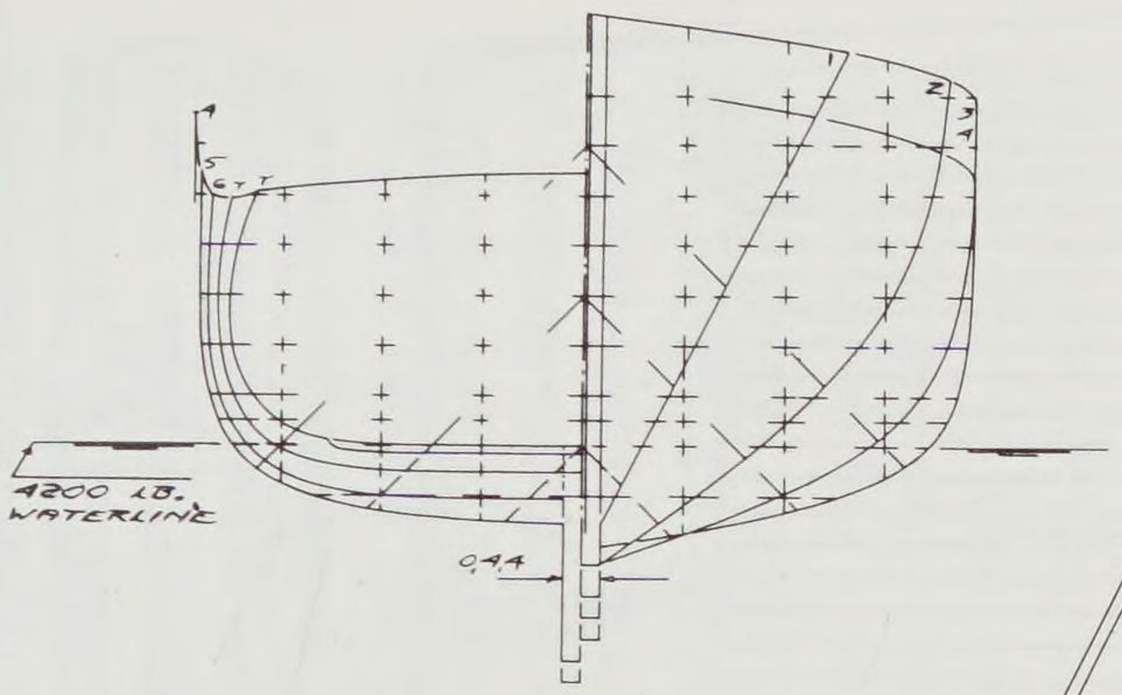
OUTSIDE OF TRANSOM

ILEX
CAMDEN

BULKHEAD #4

BULKHEAD #4

N.B. SUPPRESSION OF ENGINE NOISE DEPENDS ON TIGHT SEAL OF #4 BULKHEAD; DOOR AND STUFFING BOX PANEL SHOULD BOG TIGHT, SLEEVE STEERING CABLES, ETC.



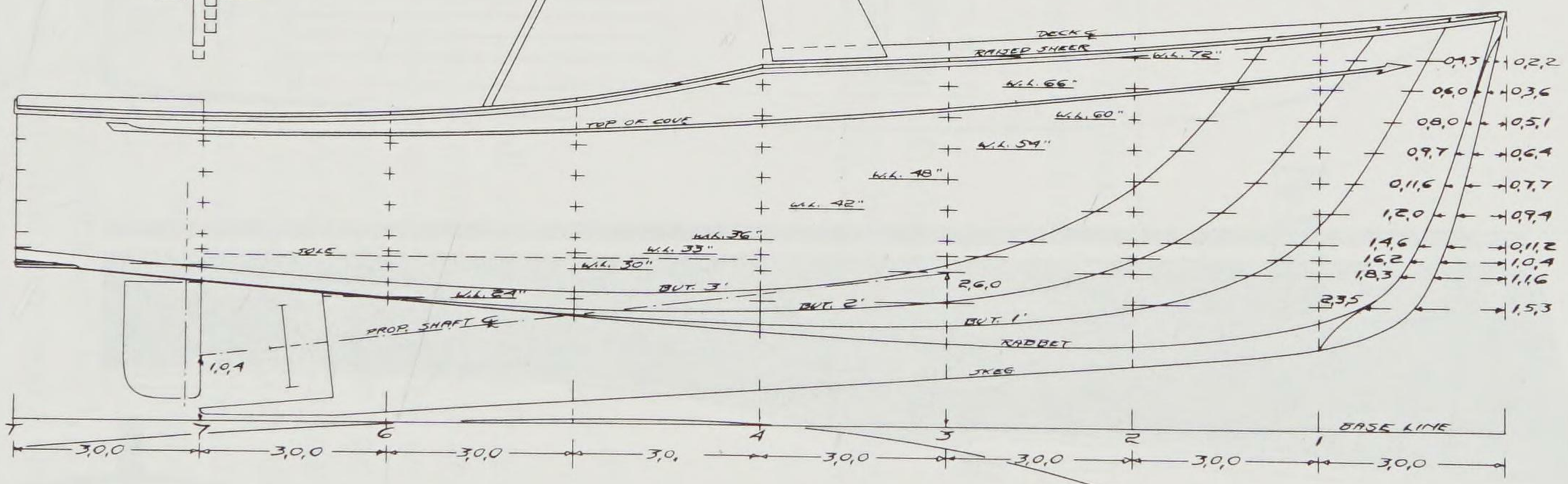
HEIGHTS FROM BASE LINE

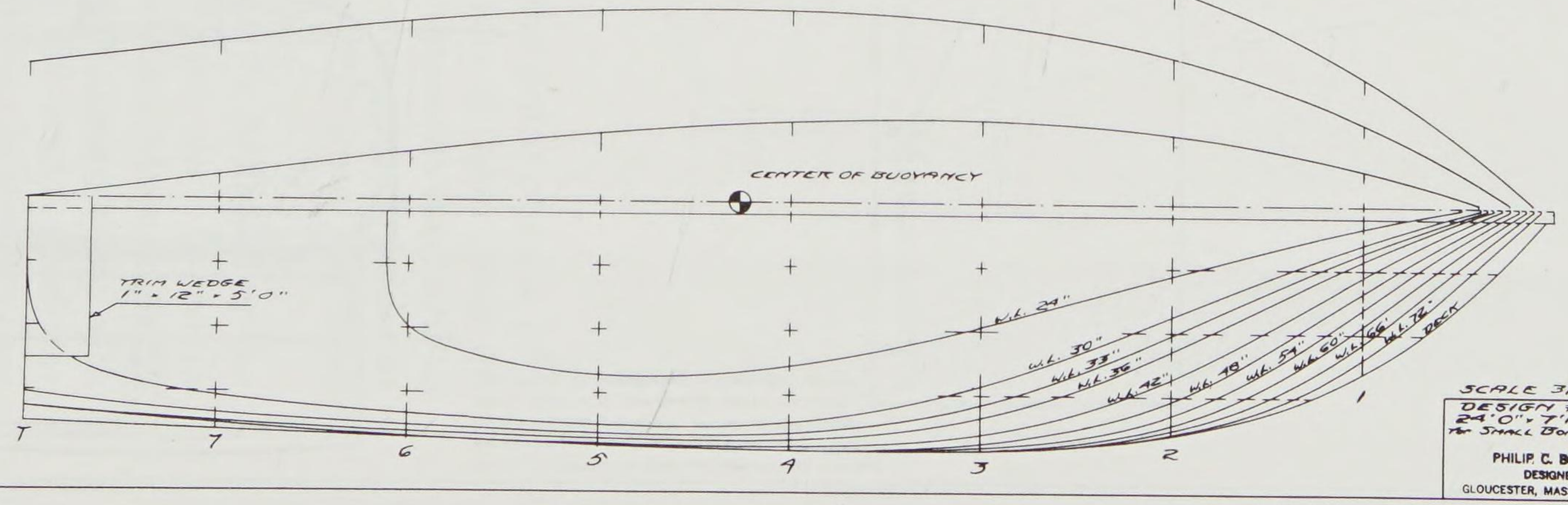
	T	7	6	5	4	3	2	1
DECK ℄	5,2,4				6,0,7	6,2,5	6,4,5	6,7,1
SHEER	5,0,4	4,11,4	5,0,0	5,3,0	5,9,7	5,11,4	6,1,7	6,5,2
COVE		4,8,1	4,8,0	4,9,0	4,11,0	5,1,7	5,5,3	5,9,3
OUT. 3'	2,8,6	2,5,4	2,2,7	2,1,3	2,2,2	2,7,3	3,10,4	
2'	2,6,2	2,3,0	2,0,0	1,10,0	1,10,0	2,0,3	2,8,4	5,2,6
1"	2,6,0	2,2,6	1,11,6	1,9,0	1,7,4	1,7,4	1,10,7	3,3,5
RABBET	2,6,0	2,2,6	1,11,6	1,8,5	1,6,0	1,4,0	1,3,7	1,8,6
SKEG		0,1,0	0,1,6	0,4,2	0,6,6	0,9,3	1,0,0	1,3,6

HALF-BREADTHS

DECK	3,3,0	3,6,1	3,8,4	3,9,6	3,10,5	3,10,5	3,7,4	2,7,3
W.L. 72"							3,7,2	2,4,6
66"					3,10,5	3,10,5	3,6,4	2,1,5
60"	3,3,2		3,8,4	3,9,6	3,10,5	3,10,4	3,5,3	1,10,4
54"	3,5,2	3,7,2	3,8,6	3,9,6	3,10,5	3,9,6	3,3,4	1,7,3
48"	3,6,2	3,7,5	3,8,7	3,9,6	3,10,4	3,9,1	3,0,7	1,4,2
42"	3,5,7	3,7,2	3,8,4	3,9,4	3,9,6	3,7,4	2,8,6	1,1,2
36"	3,3,3	3,5,6	3,7,4	3,8,4	3,8,4	3,4,2	2,3,4	0,10,2
33"	3,0,3	3,4,0	3,6,1	3,7,3	3,7,2	3,1,7	2,0,4	0,8,6
30"		3,1,0	3,4,0	3,5,6	3,5,2	2,10,2	1,9,0	0,7,2
24"			2,0,0	2,8,4	2,6,6	1,11,2	1,1,3	0,4,1

OFFSETS IN FEET, INCHES, & EIGHTHS, TO OUTSIDE OF PLANK.





SCALE 3/4" = 1'0"

DESIGN #376
24'0" x 7'10" x 2'5"
for SMALL BOAT JOURNAL

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #376
24'0" x 7'10" x 2'3"
Typ. Small Boat Journal

SCALE 3/4" = 1'0"

INSIDE OF TRANSOM

RUDDER SECTION @ 3" = 1'0"

1/2"

1/8"

SECTION @ #4

SEC @ #3

SEC @ #1

DEADWOOD & STEM SIDED 4 1/2"; BREASTHOOK 2 1/2";
HORN TIMBER CHEEKS 1/2"; FLOOR TIMBERS 3 1/2"
AND 2 1/2"; 3/8" BOLTS; FRAMES 1/8" x 1 1/2";
PLANKING 7/8"; ENGINE BEDS 3 1/2" x 4";
CLAMPS 1 1/2" x 2 1/2"; DECK BEAMS SIDED 1 1/2"; MOLD-
ED 2 1/2"; DECKS 3/4"; GLASS OR FABRIC-SHEATHED;
TRANSOM 7/8" WITH 1 1/2" FRAME; #4 BULKHEAD 1/2"
WITH 1 1/2" FRAME.

16"O.D. x 16" R 11 KNOTS @ 3/4 K

SPRING STEERING CHAIN

PORTA-BLE TOILET

4" QUAD-RANT

FUEL TANK 14" DIAM. 36" LONG. ROUND

JURY TILLER

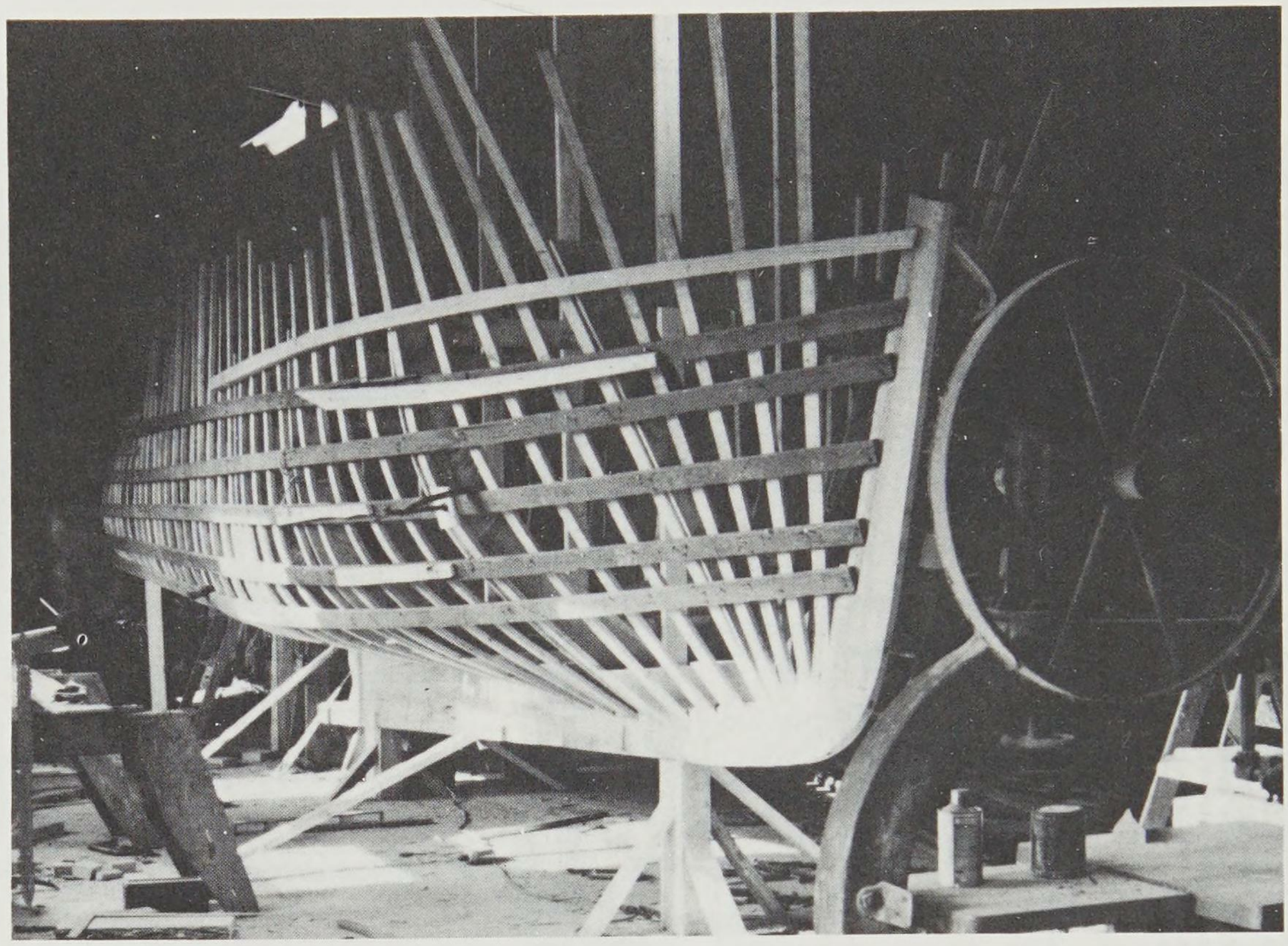
CARLIN SAWN FROM 1 1/2"

CAVIL

HINGED PANEL

LAGGED EXHAUST

LEXTERDENE 30
2x1 RED CEDAR
PLANK REV.



Mikim *timbered out. (David Montgomery photograph)*

their time in model and construction. Herbert built those vessels with just two semiskilled helpers; he said recently that he remembers doing it, but not how it was possible.

This design has most of their characteristics: the flat floor and plumb sides carried well forward, flat stern cut up to the waterline (the big draggers had round counter sterns and much shorter runs, of course), and modestly raking stems with a fair amount of forefoot. All of these boats were stiff and buoyant and threw less spray than people generally put up with at low speeds now. They could maneuver in a way that made steerable drives and twin-screw layouts quite unnecessary, twisting around at a standstill on small bursts of power, and they would also go straight without much helm correction. Some of them were middling fast, but they all looked their best idling along quietly with no fuss and no wake, in rough water or smooth.

I kept the bent-frame carvel wood construction because it's still the fastest and cheapest way to build a one-off boat that will stand

up. It lends itself to "quick and dirty" building without spoiling the boat: the small, flat frames can be slapped in at a great rate, and planking out from the garboard will fair the frame naturally so that little trouble needs to be taken with lofting and mold setup. A boat of this type was once stored unfinished, without deck beams installed. The cover over her collapsed in a blizzard and she filled up with such a weight of snow that her sides were squeezed out and down practically flat on the ground. In the spring they got some chains around her and pulled the sides back up, refastened her at stem and transom, and finished her up for sale. That was quite a few years ago, and she seems to have stood up as well as most; you have to look at her carefully to notice that she isn't quite the same shape on each side!

I've tried to design out as many of the rot traps as I can. The sheerline is one that Herbert Montgomery favors because it leaves no place for a puddle to stand when the boat sits bow-down on her cradle in storage. Hatches are nice but expensive. So are cowls and watertrap boxes. The vents shown keep the air stirred up with much less investment than either. (*Mikim* herself, as opposed to the speculative design, does have a conventional forehatch placed to form standing room for picking up a mooring.) The shelter is as simple as possible while giving sun and rain protection as you try to miss the pot buoys.

The forward position of the engine used to be common 60 years ago. With a heavy or powerful engine it's very inefficient, but with something weighing under 500 pounds and a boat meant to cruise at 7 or 8 knots, I see no harm in it. With the dry exhaust, it allows an installation about one order of magnitude simpler and cheaper, in initial cost and maintenance, than an outdrive, and it ought to lend itself to really effective silencing if somebody took trouble enough to seal the holes in the bulkhead.

I drew a diesel on the plans, but for this kind of short and intermittent use, a gasoline engine makes good sense. *Mikim* has a 6-cylinder engine, salvaged from her perished predecessor, but it is really too big for her. Something like a Universal Atomic Four might be ideal. She'd drive well with a lot less power than that, but people who tout very small engines tend to overlook what happens to ultra-low-powered boats when they have to buck a head sea. It's pleasanter to run at half-throttle with plenty of reserve behind; engines run well below their peak power are easier to silence and last longer.

The boat is of trailerable dimensions, but if she were going to live

on a trailer, she'd have to be of some other, more expensive construction to stand the drying out. The shape would be very good for cold-molding.

20

Libboo

Length overall	25 feet 6 inches
Breadth	10 feet
Draft	2 feet 9 inches
Designed displacement	7,300 pounds
Owner	Dr. Robert L. Baxter
Builder	J. Ervin Jones, East Boothbay, Maine

Dr. Robert Baxter was 80 years old when he ordered this boat. He'd had a series of high-class cruisers, and I took it as a considerable compliment that he came to me for a design. He gave me a description of how he meant to use her, without telling me what he expected her to look like. I came back with a cartoon that suggested more of an indoor-type boat than he liked. He batted that back, and eventually we worked up these plans, very accurately and neatly rendered by Ervin Jones.

She's meant to be used around Nantucket Sound, seldom going far from home. The owner thought 6 knots would be as much speed as he needed, but I argued for over-powering her because what he wanted was to be at ease about sudden bad weather — "above all, seaworthy," he wrote. In fact, she came down from Maine at 7½ knots at 2,000 r.p.m. of the 40 h.p. Westerbeke diesel, but what he found satisfying was the tuglike power developed by the deep, 20-inch-diameter propeller. The deep keel, shallow stern, and big rudder let her maneuver in strong winds in a fashion unknown to

8 7 6 5 4 3 2 1

STERN LIGHT RECESSED

SCUPPER P. & S.

8" CLEAT P. & S.

FLUSH TOP-OPENING ICE BOX

4' GATE

4" DECK PLATE

HINGED PANEL DOGS DOWN ON GASKETS

FLUSH HATCH

MAST SOCKET

DRAIN CHANNELS DUMP TO COCKPIT

HINGED FLUSH HATCH

ENG. CONT.

INST.

COMPASS

OUTBOARD WINDOWS HINGED

SLIDING HATCH

SLIDE SHROUD ANCHOR WARP STOWS INSIDE

3"-18" OPENING

3" BITT

SWINGING ANCHOR CHOCK

4" BITT P. & S.

FUEL FILL

MAST BOX 1 1/2" STAVES TO FINISH. 5 1/2" SQUARE, 10'6" OVERALL

BOOM 3 1/2" SQ. 9'0" OVERALL

SPRAY HOOD

BOW LIGHT NOT TO REFLECT ON DECK.

FORESTAY

SIDELIGHTS RECESSED

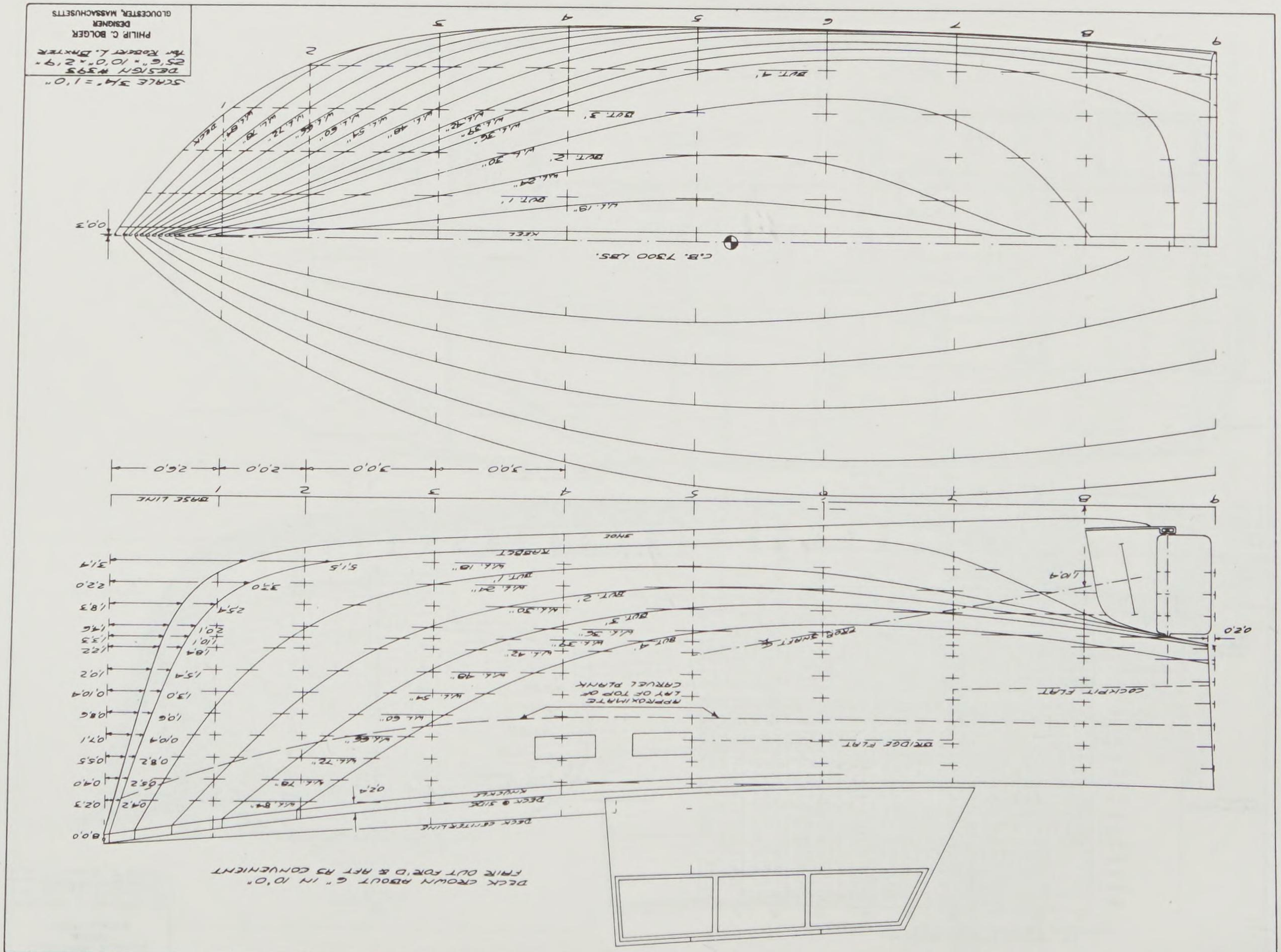
8 7 6 5 4 3 2 1

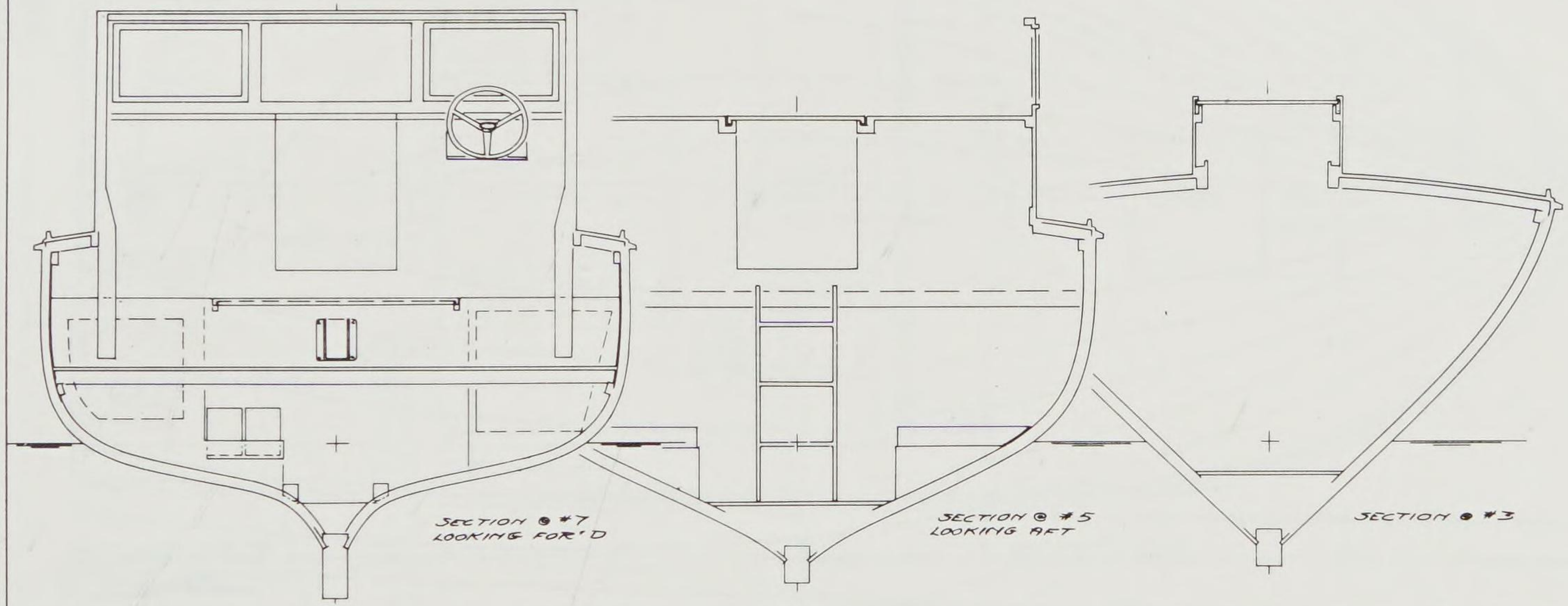
ENGINE EXHAUST OUT BOTH SIDES

SCALE 3/4" = 1'0"

DESIGN # 393
25'6" x 10'0" - 2'9"
for ROBERT L. BAXTER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


SCALE 3/4" = 1'0"
DESIGN #395
25'6" x 10'0" x 2'9"
Tom Fossett & Dexter
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS
C.B. 7300 LBS.
DECK CROWN ABOUT 6" IN 10'0"
RISE OUT FOR'D & AFT AS CONVENIENT
DECK @ SIDE
CENTER LINE
TRANSOM
SHEER
BOTTOM
COCKPIT FLOOR
BRIDGE DECK
APPROXIMATE LAY OF TOP OF CARVEL PLANK
BASE LINE



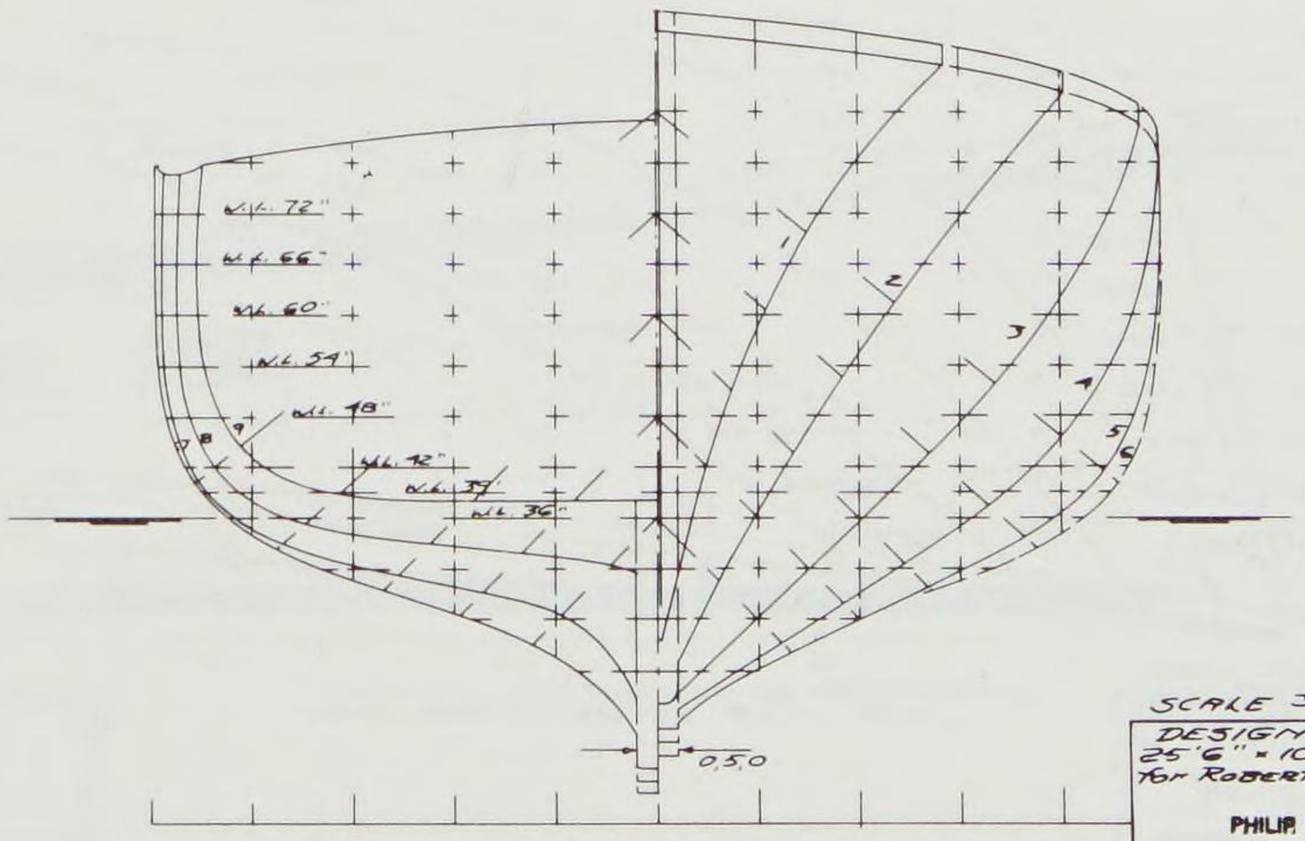
HEIGHTS FROM BASE LINE

	9	8	7	6	5	4	3	2	1
DECK @ SIDE	6,5,5	6,9,7	6,9,6	6,5,4	6,7,1	6,9,4	7,0,6	7,4,6	7,7,6
BUTTOCK 4'	3,7,2	3,2,0	2,10,5	2,10,0	3,0,4	3,9,2	5,2,0	7,1,5	
3'	3,2,4	2,10,0	2,6,4	2,4,4	2,5,4	2,11,0	3,11,2	6,11,3	
2'	3,2,0	2,8,4	2,3,7	2,0,5	1,11,7	2,3,0	2,11,3	4,7,2	6,6,4
1'	3,2,0	2,7,3	2,1,0	1,7,5	1,6,3	1,7,4	2,0,0	3,0,6	4,10,3
RABBET	3,2,0	2,5,5	1,2,5	0,10,4	1,0,0	1,1,5	1,3,2	1,7,2	2,5,4
SHOE	3,2,0	0,3,4	0,4,7	0,6,3	0,8,0	0,9,5	0,11,2	1,2,1	1,9,3

HALF-BREADTHS

	9	8	7	6	5	4	3	2	1
DECK	4,5,6	4,10,3	4,9,4	4,11,4	5,0,0	4,11,7	4,9,4	4,0,4	2,10,2
W.L. 84"							4,9,4	3,10,5	2,4,7
78"					5,0,0	4,11,7	4,8,2	3,5,4	1,11,6
72"	4,6,2	4,8,4	4,10,4	4,11,4	5,0,0	4,11,3	4,5,6	3,0,3	1,7,4
66"	4,6,4	4,8,6	4,10,5	4,11,4	4,11,6	4,10,3	4,2,4	2,7,5	1,4,0
60"	4,6,3	4,8,7	4,10,6	4,11,4	4,11,3	4,8,4	3,10,4	2,3,2	1,0,6
54"	4,5,5	4,8,4	4,10,3	4,11,1	4,10,4	4,6,0	3,6,0	1,11,1	0,10,1
48"	4,3,6	4,7,4	4,9,5	4,10,3	4,8,6	4,2,2	3,0,7	1,7,1	0,7,7
42"	3,10,4	4,4,2	4,7,3	4,8,1	4,5,3	3,8,6	2,5,7	1,3,2	0,5,7
39"	3,3,0	4,1,2	4,5,2	4,6,0	4,2,6	3,5,2	2,3,6	1,1,4	0,5,0
36"		3,8,0	4,2,0	4,2,6	3,11,2	3,1,4	2,0,6	0,11,6	0,4,1
30"		0,4,0	2,10,3	3,4,0	3,0,5	2,4,6	1,6,2	0,8,2	0,2,5
24"			0,10,4	1,10,1	2,0,0	1,7,3	1,0,0	0,5,0	0,1,0
18"			0,4,3	0,9,4	0,11,4	0,9,4	0,5,3	0,1,6	

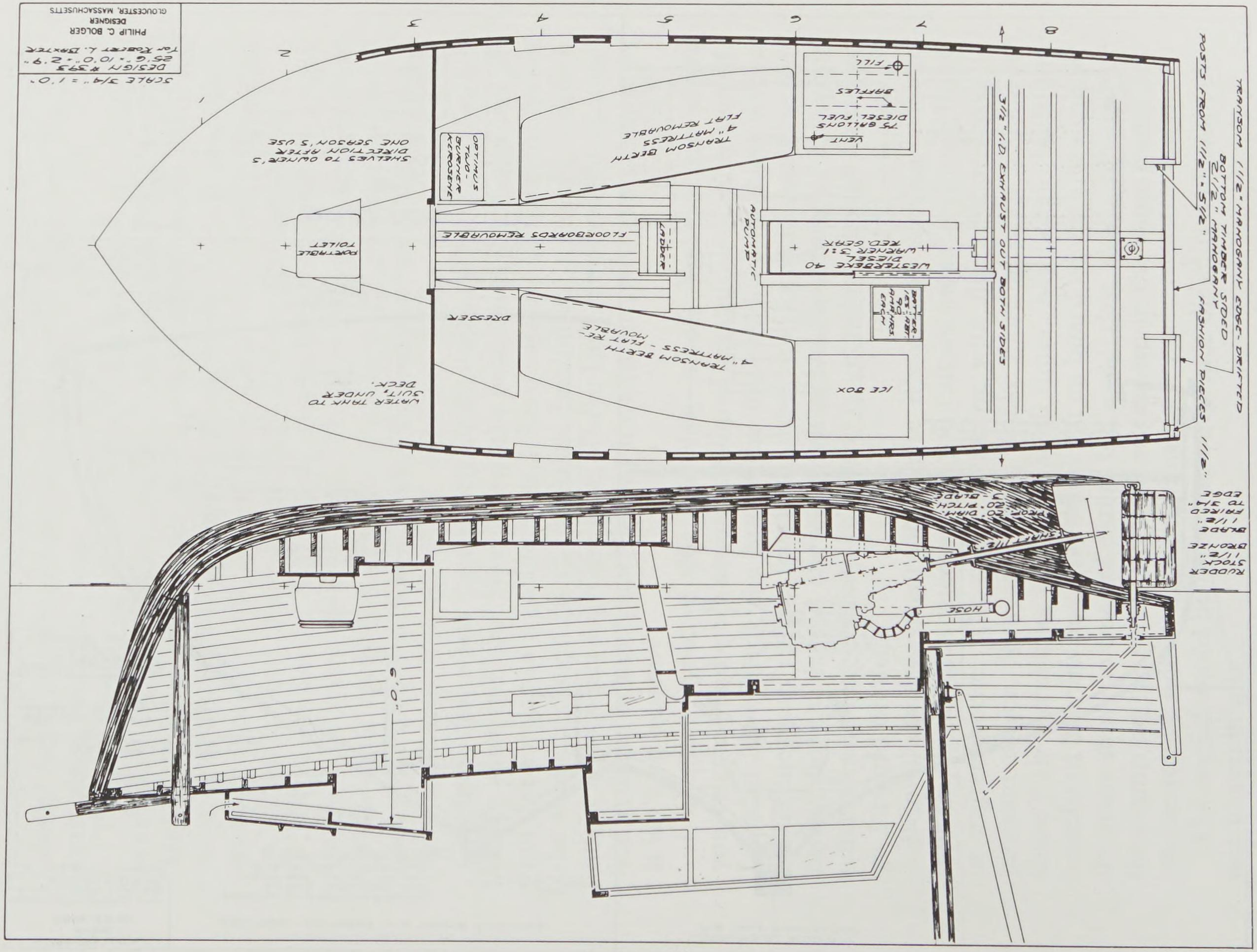
OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK.

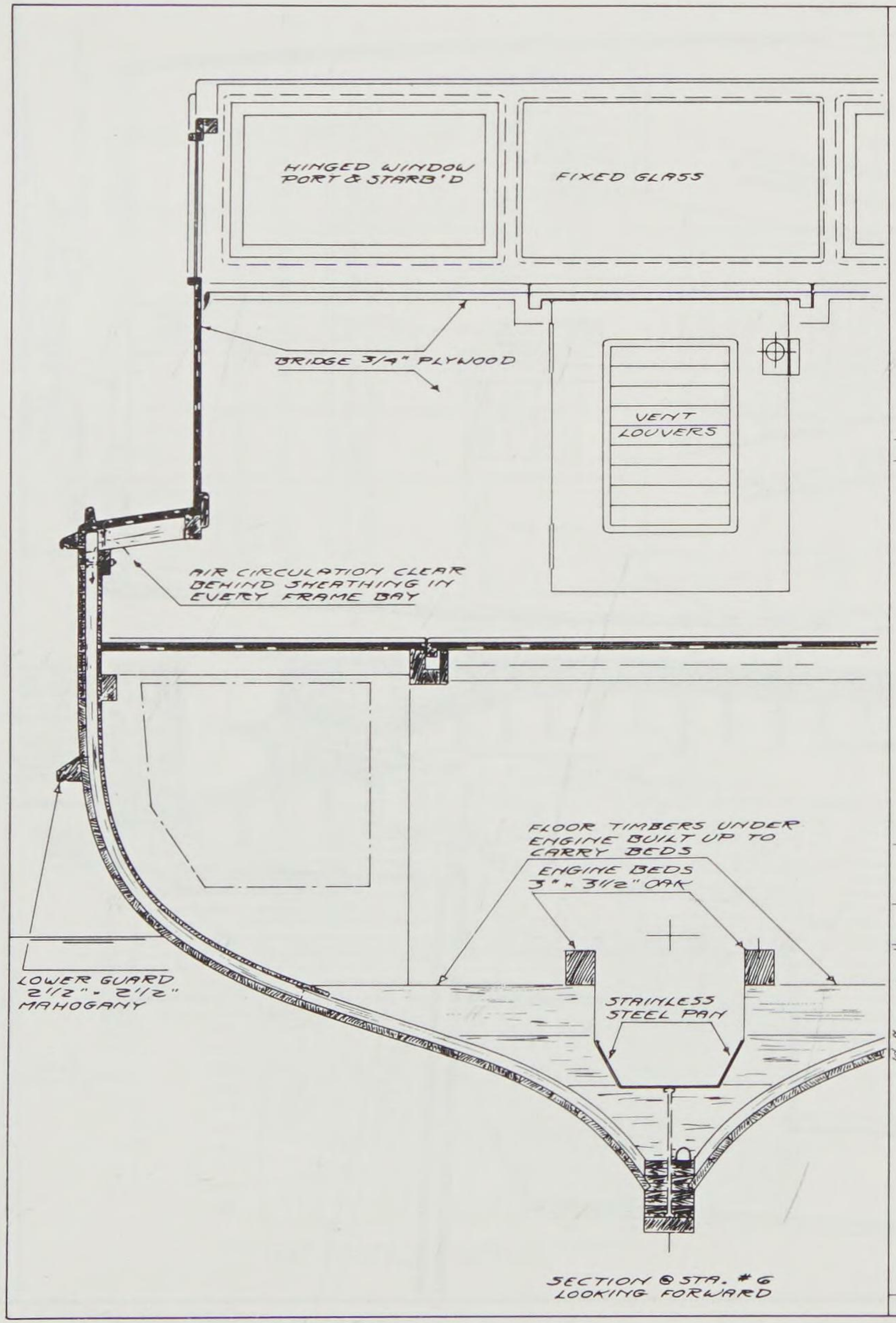


SCALE 3/4" = 1'0"

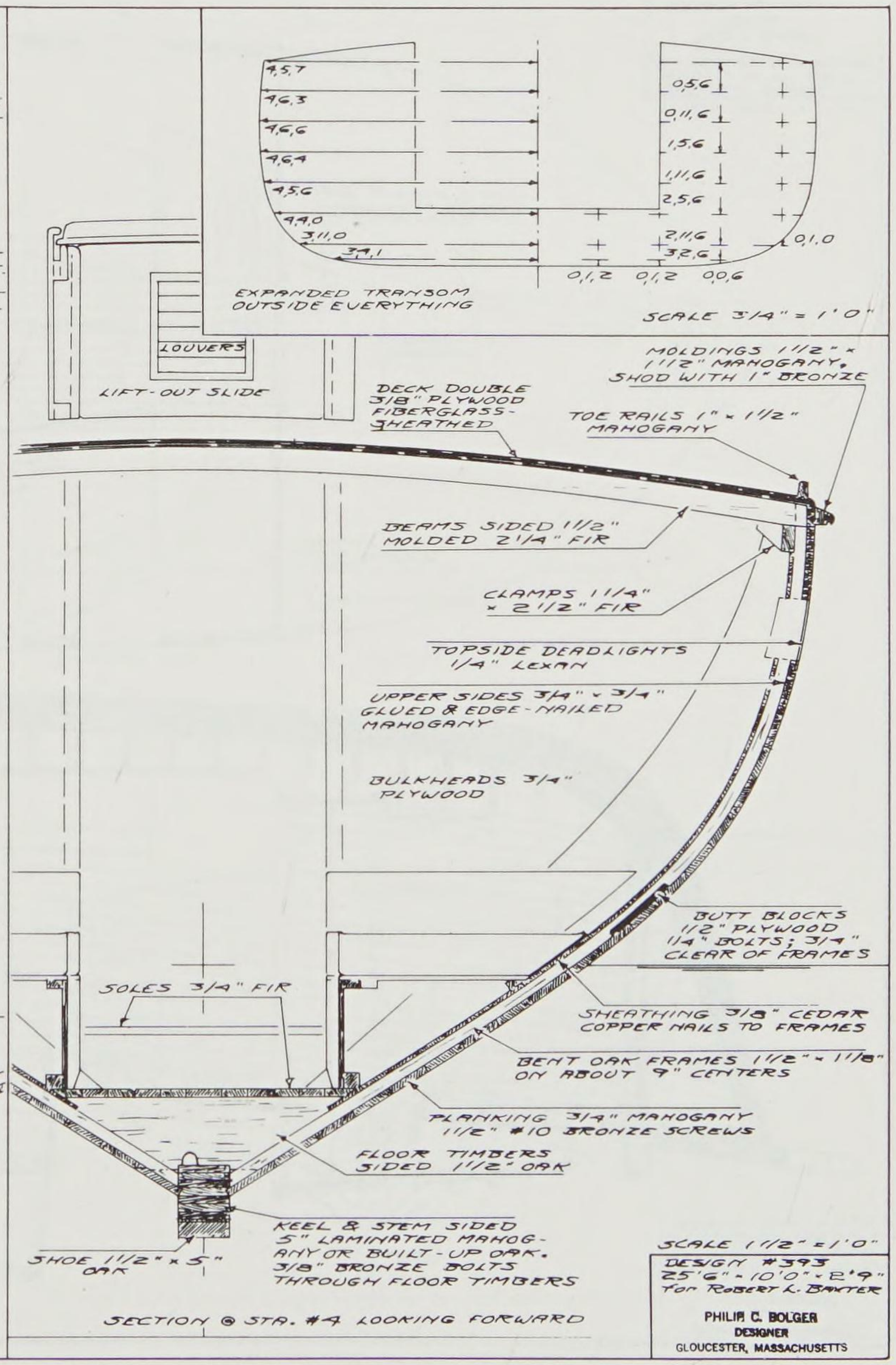
DESIGN #393
25'6" x 10'0" x 2'9"
for ROBERT L. BAXTER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


SCALE 3/4" = 1'0"
DESIGN #393
25'6" - 10'0" - 2'9"
Tor Robert L. Baxter
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS
CUTAWAY DRAWING
TRANSOM
POST FROM 1 1/2" x 5 1/2" MAHOGANY
BOTTOM TIMBER 1 1/2" x 5 1/2" OAK
FRAMING RIDGES
3/12" EXHAUST OUT BOTH SIDES
FILL
VENT
75 GALLONS DIESEL FUEL
BAFFLES
TRANSOM BERTH 4" MATTRESS FLAT REMOVABLE
OPTIMUS 100 - BURNER KEROSENE
SHELVES TO OWNER'S DIRECTION AFTER ONE SEASON'S USE
WATER TANK TO SUIT, UNDER DECK.
PORTABLE TOILET
FLOORBOARDS REMOVABLE
LADDER
AUXILIARY PUMP
WESTERBEKE 40 DIESEL 3:1 MARINE REDUCTION GEAR
ICE BOX
4" MATTRESS - FLAT REMOVABLE
DRESSER
RUDDER STOCK 1 1/2" BRONZE
BLADE 1 1/2" FRAMED TO 3/4" EDGE
PROP - 20" DIAM. - 20" PITCH - 3 - BLADE
SHAFT 1 1/2"
HOSE
6'0"



SECTION @ STA. #6 LOOKING FORWARD



SECTION @ STA. #4 LOOKING FORWARD

SCALE 1 1/2" = 1'0"

DESIGN #393
25'6" - 10'0" - 2'9"
for Robert L. Baxter

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

people brought up on shallow-bodied flying machines with steerable propellers. With a boat like this, a skilled handler can do almost anything that can be done with twin screws, with less concern about fouling a prop.

The low speed requirement let me cock her stern up above the waterline. This would be an easily driven shape at 6 knots. At 7½ knots, it's little or no better than a more modern stern, but it did allow very fine lines at and below the waterline forward, and consequently a nice smooth, dry action in a head sea. Lots of buoyancy in the upper part of her bow keeps her from pitching deeply.

The shallow stern, with the low sportfishing cockpit, didn't leave much room under the deck there. The big removable panel, instead of the usual deckplate, gives good access to the rudder port, but I thought it'd be just as well to keep the exhaust out of there. Hence the transverse "North Sea" exhaust. These things have the drawback that when the lee outlet rolls under, the exhaust belches out to windward and blows across the boat. Here it's far enough aft not to be much of a problem, and there's the advantage that less of the fume is caught by the dead air behind the transom, where it might eddy in through the gate. There isn't much carbon monoxide in diesel exhaust, but they say it's a carcinogen, and at any rate, it isn't an amenity.

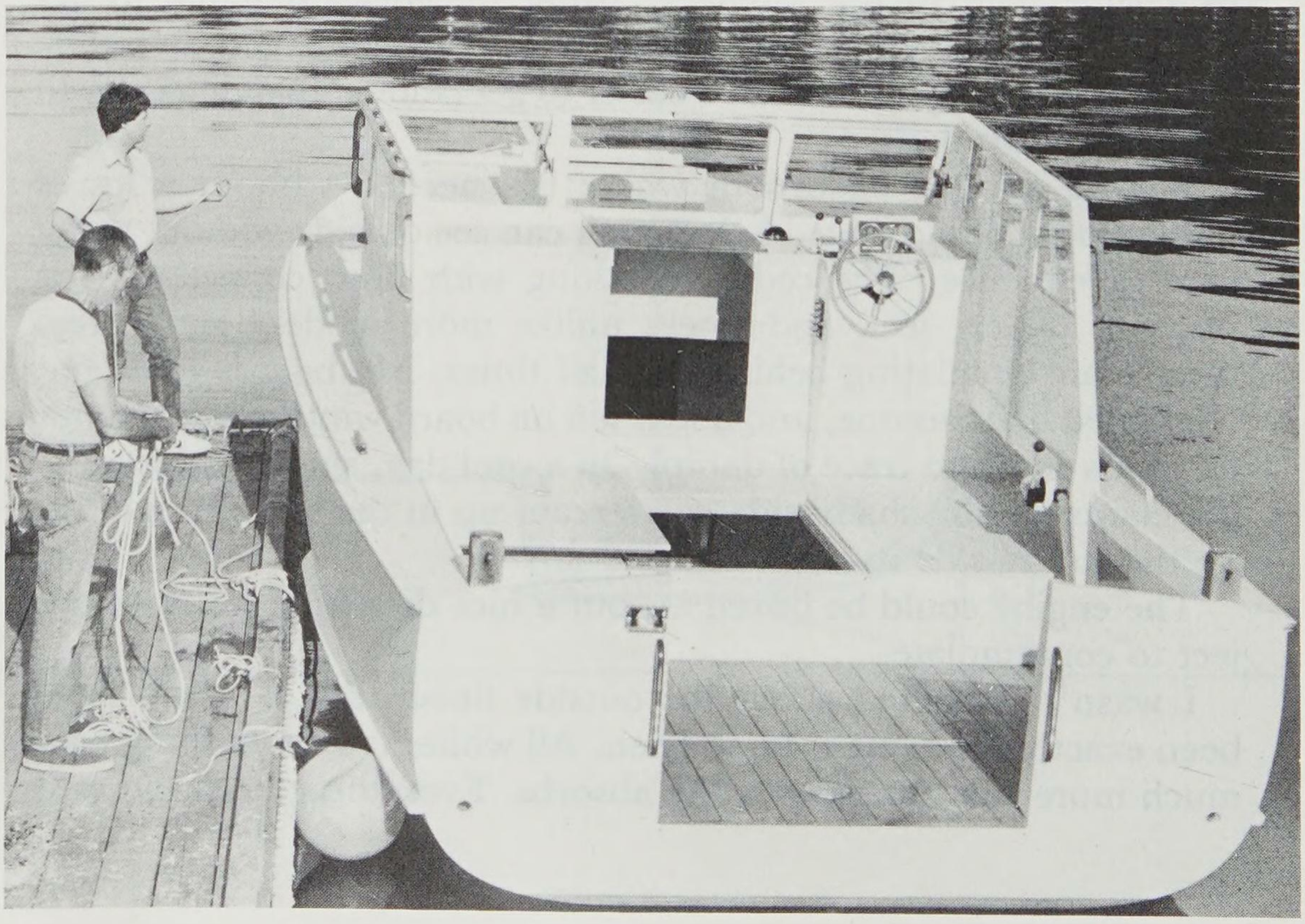
I like the layout of this boat very much. You can see where you're going and work around on top of her quickly. Left to myself, I would have made the bridge the full width of the boat with a centerline gate to the foredeck, using the forward hatch to get below, but the layout chosen is less apt to be damaged alongside wharves and bigger boats. It's easier to get below, though harder to go forward on deck.

Below, she has headroom where it's needed without a lot of tophamper. While seated below, you can see outside without being in a greenhouse. The cedar sheathing with flush copper nails is pleasant to see, feel, and smell; unlike more modern structures, there's air circulating behind it at all times. My boat is built and ventilated like this one, and books left on board winter and summer for years show no trace of damp. On a cool day, smoke blown over the clamp on the shady side will stream up in the same frame bay on the sunny side in half a minute.

The engine could be boxed in, but a nice diesel is a pleasant object to contemplate.

I wasn't consulted about the outside finish, but it would have been exactly the same if I had been. All white; it's astonishing how much more sun not-quite-white absorbs. Everything neat and well

Above: Libboo *at cruising speed. The disturbed water is all astern of her.* Below: *A nice job of boatbuilding. (Boutilier photographs)*



fitted, but nothing that will leave a bad conscience if it's not polished all the time. A finish like this needs less attention than a fiberglass boat to be equally shipshape.

There was a time, 70 years or more ago now, when you could order a boat like this in March and take her away before June. No more. Now it takes nine months, and the timber isn't as good, although the fastenings and power plants are much better. The long delivery time is about the only reason I can see against ordering a one-off to suit your personality. Cost is no more, and quality is at least as good on a long average.

21

Shadow

Length overall	25 feet 6 inches
Breadth	7 feet
Draft	10½ inches/1 foot 9 inches (motor lower unit)
Designed displacement	2,750 pounds
Owner	Outboard Marine Corporation

Design competitions are really for young designers, and I ought to let them alone, but I'm apt to be tempted when I see how something interesting would fit the rules. In this case, greed came into it, since Outboard Marine Corporation put up a really generous prize.

They wanted a demonstration of how their new Sea Drive could be exploited. This is a big outboard motor mounted entirely outside the boat without the usual hole in the stern. It weighs about 450 pounds, and entrants were called on to suggest boats with a trailer weight of under 2,000 pounds, to be hauled by light cars.

It seemed to me that the motor was very heavy and powerful for a normally proportioned boat of that weight. I thought a light boat would behave best with that motor if it was stretched out long, which also makes the boat easier to line up for hauling. It doesn't necessarily add much to the weight if you don't fill the extra length with joinerwork, though it does complicate road handling.

I figured that a cold-molded hull 25 feet long could meet the

PHILIP L. BOSMAN
NAVARCH
GLOUCESTER, MASSACHUSETTS

DESIGN #403
25'6" x 7'0"
for Outboard Marine Corp.

WOOD CONSTRUCTION
PROTOTYPE & LOCAL MODEL

DRY WEIGHT 1400 LBS.

SCALE 3/4" = 1'0"

CLEATS EIGHT-INCH
BRONZE FOUR-BOLT
MOUNT.

25-GALLON
FUEL TANK
IN WATER-
TIGHT RE-
CESS P.&S.

NILE PRATT R&S.

STEP

STOVE

STEP

STER

SOLID BUOYANCY
UNDER P.&S.

TRANSOM P.&S.

SOLID BUOYANCY
UNDER P.&S.

TRANSOM P.&S.

CONNING
PLATFORM

PORTABLE
W.C.
UNDER

O.M.C.
SEA-DRIVE
1.6 LITER

"AEOLIAN" VENT

GRAB RAIL R&S.

"AEOLIAN"
VENT

ANCHOR
PLATFORM

6'6"

6'6"

3'0"

1'10"

FOAM

FOAM

4" MATTRESS

4" MATTRESS

ZIPPER
P.&S.

12-POINT

ZIPPER

BI-
COLOR

3"

REMOVABLE
LIGHT STAFF
BA35 PB
INTERNATIONAL

20-PNT.

KNITE DACRON SPRAY HOODS

HOOD SIDES TURNED
UP TO FORM AWNING

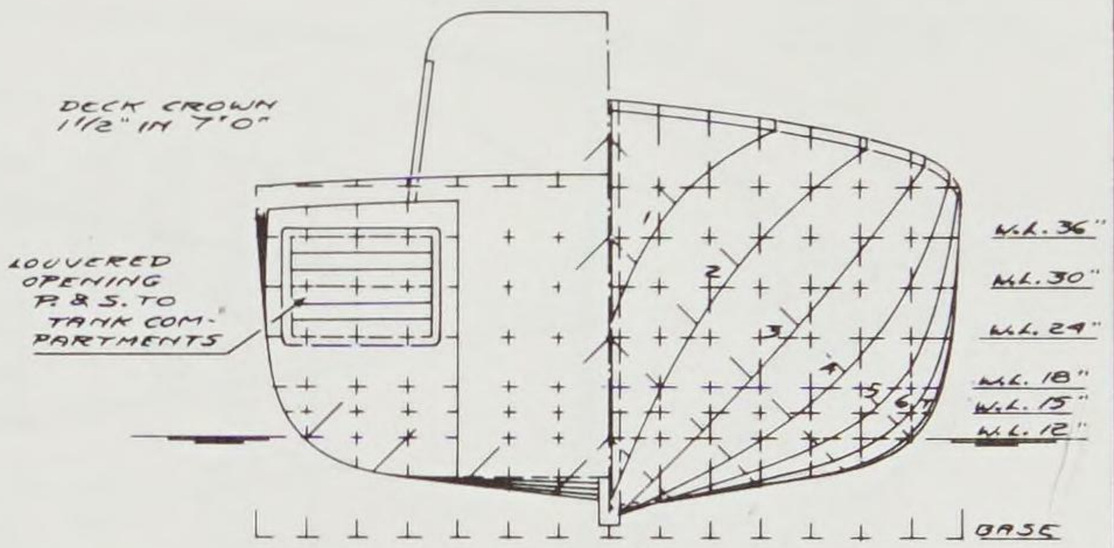
HEIGHTS FROM BASE LINE

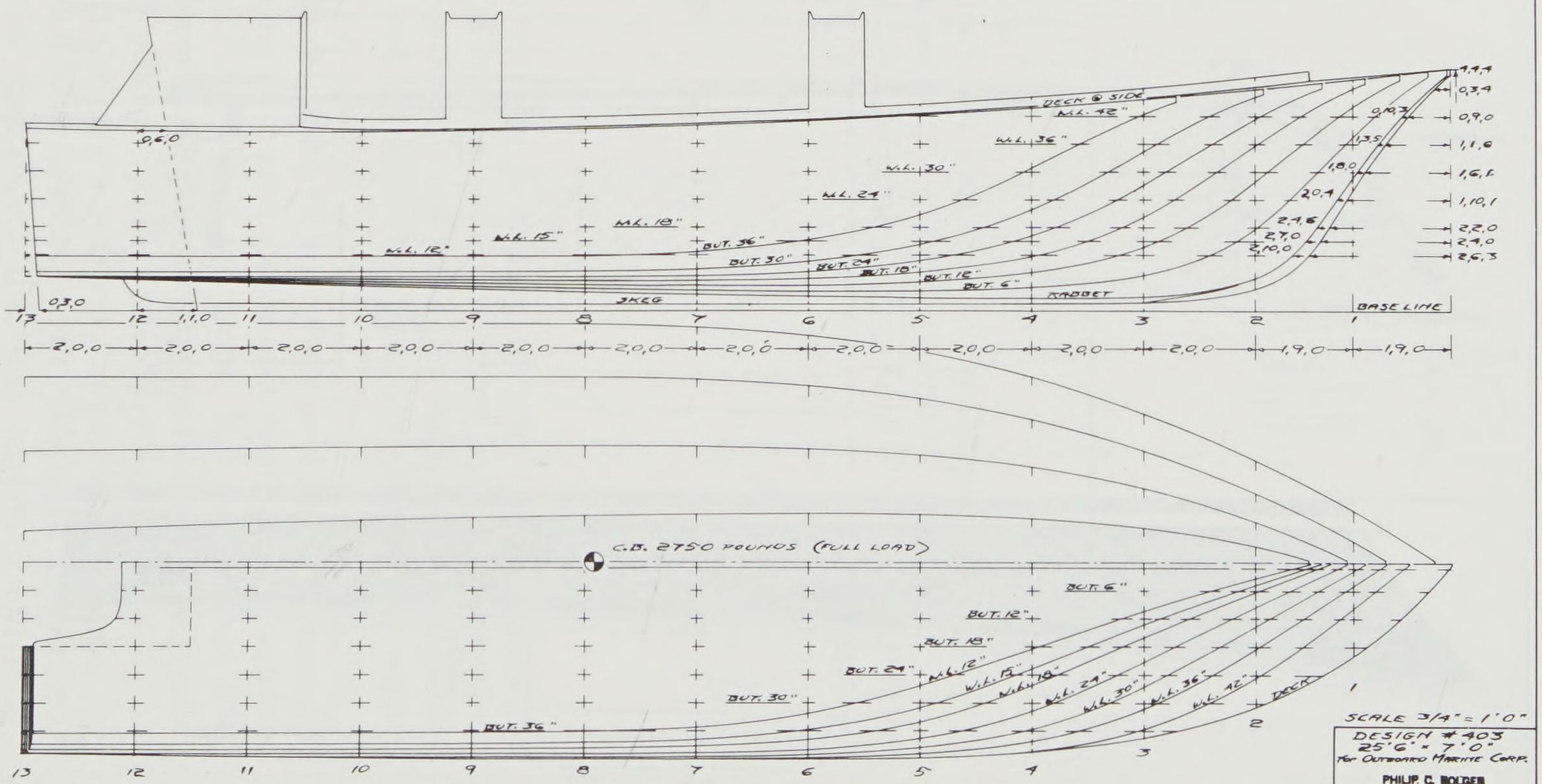
	13	12	11	10	9	8	7	6	5	4	3	2	1
DECK	3,3,1	3,2,5	3,2,4	3,2,4	3,2,6	3,3,2	3,4,0	3,5,0	3,6,2	3,7,7	3,9,6	3,11,7	4,2,0
BUT. 36"	0,11,5	0,11,5	0,11,5	0,11,5	0,11,5	0,11,6	1,0,5	1,3,3	1,8,5	2,7,0	3,6,4		
30"	0,8,3	0,8,3	0,8,3	0,8,3	0,8,3	0,8,4	0,8,7	0,10,4	1,2,2	1,9,7	2,10,4	3,10,0	
24"	0,7,3	0,7,3	0,7,2	0,7,2	0,7,2	0,7,3	0,7,4	0,8,4	0,10,7	1,4,0	2,3,1	3,5,2	
18"	0,7,2	0,7,1	0,6,7	0,6,5	0,6,4	0,6,4	0,6,4	0,6,7	0,8,3	0,11,6	1,8,2	2,11,6	4,0,0
12"	0,7,2	0,6,7	0,6,4	0,6,1	0,5,6	0,5,4	0,5,4	0,5,4	0,6,2	0,8,2	1,1,5	2,3,7	3,8,0
6"	0,7,2	0,6,6	0,6,1	0,5,5	0,5,2	0,4,6	0,4,3	0,4,0	0,4,3	0,5,0	0,7,5	1,5,4	3,1,4
RABBET	0,7,2	0,6,5	0,5,7	0,5,2	0,4,5	0,4,0	0,3,4	0,3,0	0,2,6	0,2,6	0,3,0	0,7,0	2,4,5
SKEG		0,3,0	0,1,4	0,1,4	0,1,4	0,1,4	0,1,4	0,1,4	0,1,4	0,1,4	0,1,6	0,4,6	2,1,6

HALF-BREADTHS

	13	12	11	10	9	8	7	6	5	4	3	2	1
DECK	3,4,5	3,5,1	3,5,4	3,5,7	3,6,0	3,6,0	3,6,0	3,6,0	3,5,6	3,4,5	3,1,4	2,6,6	1,8,0
W.L. 42"									3,5,6	3,4,4	2,11,6	2,0,5	0,9,5
36"	3,4,6	3,5,2	3,5,4	3,5,6	3,5,7	3,5,7	3,5,7	3,5,5	3,4,6	3,2,2	2,7,2	1,6,4	0,5,0
30"	3,5,0	3,5,1	3,5,2	3,5,3	3,5,4	3,5,4	3,5,4	3,5,0	3,3,4	2,11,5	2,2,4	1,1,5	0,1,7
24"	3,4,6	3,4,7	3,4,7	3,4,7	3,4,7	3,4,6	3,4,5	3,4,0	3,1,4	2,7,6	1,9,2	0,9,4	
18"	3,3,7	3,3,7	3,3,7	3,3,7	3,3,7	3,3,5	3,3,1	3,1,6	2,10,0	2,2,2	1,4,0	0,6,2	
15"	3,2,6	3,2,6	3,2,6	3,2,6	3,2,6	3,2,3	3,1,7	2,11,5	2,7,0	1,10,6	1,1,2	0,4,6	
12"	3,0,3	3,0,3	3,0,3	3,0,3	3,0,3	3,0,1	2,11,2	2,8,2	2,2,2	1,6,4	0,10,3	0,3,3	

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF SHELL.





SCALE 3/4" = 1'0"

DESIGN # 403
25'6" x 7'0"
for Outboard Marine Corp.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

LAMINATED CLAMP TO FINISH 1" x 1 1/4" FROM STEM TO ABOUT # 4.

CAP SAWN OR LAMINATED, SIDED 2 1/2"; FAIR TO 1" FACE WITH 3/4" HALF-OVAL BRONZE BAND.

STEM LAMINATED TO FINISH 2 1/2" SIDED, 3" MOLDED

BASE LINE

6 5 4 3 2 1

GRAB RAILS FROM 2 1/2" SQUARE

LAMINATED SPRAY HOOD COAMINGS 1 1/4" x 1 1/2"

INSTRUMENT PANEL

SPRAY HOOD GALLOWS, DOUBLE TO FINISH 1 1/4"

TANK SPACE ABAFT TRANSOM HAS NO OPENINGS TO INSIDE OF HULL.

1/4" LEXAN WINDOW

TRANSOM 1/2" PLYWOOD

BEAM FROM 3" x 5"

ABOUT 3.3 CUBIC FEET FOAM BUOYANCY BLOCKS EACH SIDE.

TRANSOM FRAME & BACKING 1 3/4"

OPENING TO BUOYANCY VOLUME BELOW TANKS

THROUGH-BULKHEAD PANEL FOR ACCESS TO INSIDE OF WHEEL BOX.

COAMINGS 1/2"

DECK 1/4" PLYWOOD

CARLINES 3/4" x 1 1/2"

OUTSIDE CLAMP FROM 1" SQUARE

BULKHEADS DOUBLE TO FINISH 1/2"

CONNING PLATFORM & TRANSOMS 1/4" PLYWOOD

REMOVABLE FLOORBOARDS 1/2"

BLOWN OR SAWN FOAM UNDER TRANSOMS & CONNING PLATFORM; PROVIDE CONDENSATION DRAINAGE.

APRON 3/4" x 5"

BATTERY PORT SIDE

PLATFORM FOR PORTABLE TOILET

SKEG SIDED 2 1/2"

SHELL THREE COURSES TO FINISH 3/8"

GOUGEON L.E.S.T. EPOXY KIT

SCALE 1 1/2" = 1'0"

DESIGN # 403
23'6" x 7'0"
for OUTBOARD MARINE CORP.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

BASE LINE

SECTION @ #11 LOOKING AFT

SECTION @ #10 LOOKING FOR'D

SECTION @ #7 LOOKING FOR'D

weight limit if it was mostly open. That much length allowed entrance lines as fine and sharp as there's much point in, to lay her spray low and close alongside and need no heavy and noisy spray-suppressing excrescences, and still have plenty of length left for some flat floor and firm bilge. A shallow hull like this will slam hard if she's made to leap from wave to wave but will slice through a small chop with exquisite smoothness. I once got some tank testing done on a hull something like this and found that she lost only about 10 percent of her speed in a steep sea of her own length or less. I don't know the fuel consumption of the Sea Drive, but I surmise that a two-cycle motor that size doesn't shine in economy, so the ability of a hull on these proportions to drive efficiently at much-reduced throttle would be welcome at times.

Putting the toilet room aft as a kind of outhouse has intrigued me lately. It fitted the Sea Drive beautifully; I thought it might win me the prize. The rest of the boat had to be almost open to meet the weight limit, but by putting up channeled gallows, she could be fitted with fabric covers without much complication. All tented in, she'd feel both roomy and snug. She has a highly aerodynamic shape for highway speed. With the sides folded up, there would be shade. With her quiet bow wave, and her motor, smooth and quiet in the first place, stashed out behind the outhouse, she ought to feel like a magic carpet underway.

I didn't get a prize. I haven't seen the winning design, but I understand it was for a much shorter boat. I'd guess that the judges suspected that my proposal, in normal service and especially if it had to be converted to solid fiberglass for mass production, couldn't be built nearly as light as I claimed and still stand up to the power. They probably also thought that customer acceptance of the unusual layout was too big a gamble. The design is available if somebody wants one. It was meant for a prototype and could be built economically one-off by any of scores of small boatshops using a Gougeon WEST epoxy kit. The one-off would probably be about the same price as a production boat, because it wouldn't have to carry a lot of overhead and merchandising costs. It does, however, involve long planning, cash payment, and some risk, since such builders rarely are able to make good on a warranty.

22

Flying Splinter

Length overall	9.0 meters (29.5 feet)
Breadth	2.09 meters (6.86 feet)
Draft	.39 meter (1.28 feet) hull or .70 meter (2.29 feet), motor lower unit
Designed displacement	1.77 cubic meters, or about 3,900 pounds
Sail area	17.1 square meters or 184 square feet
Owner	Stanley Woodward

Stanley Woodward commissioned this design for commuting and daysails out of his place on the east side of Mallorca in the Balearic Islands. She wasn't built, but I'm putting the plans in this book because I want to talk about the rig.

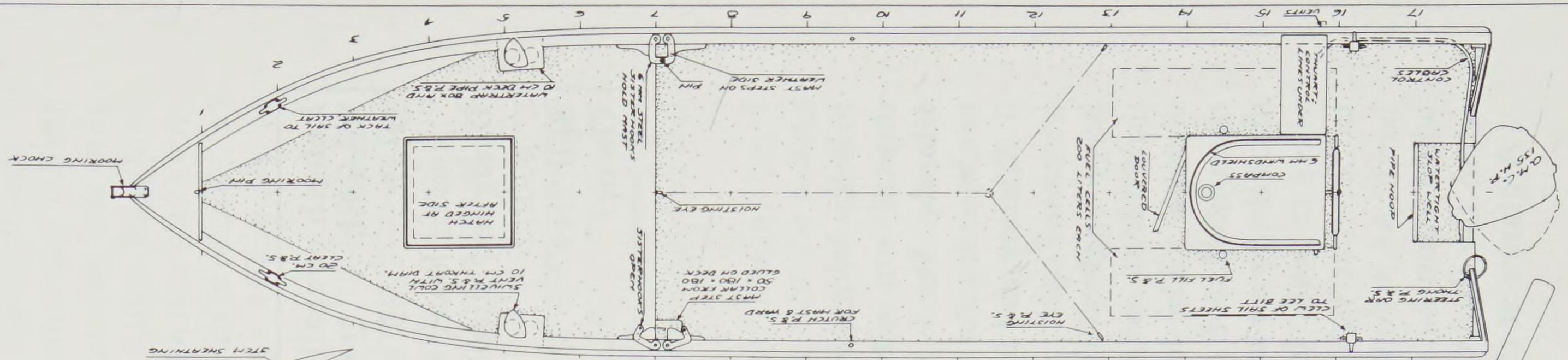
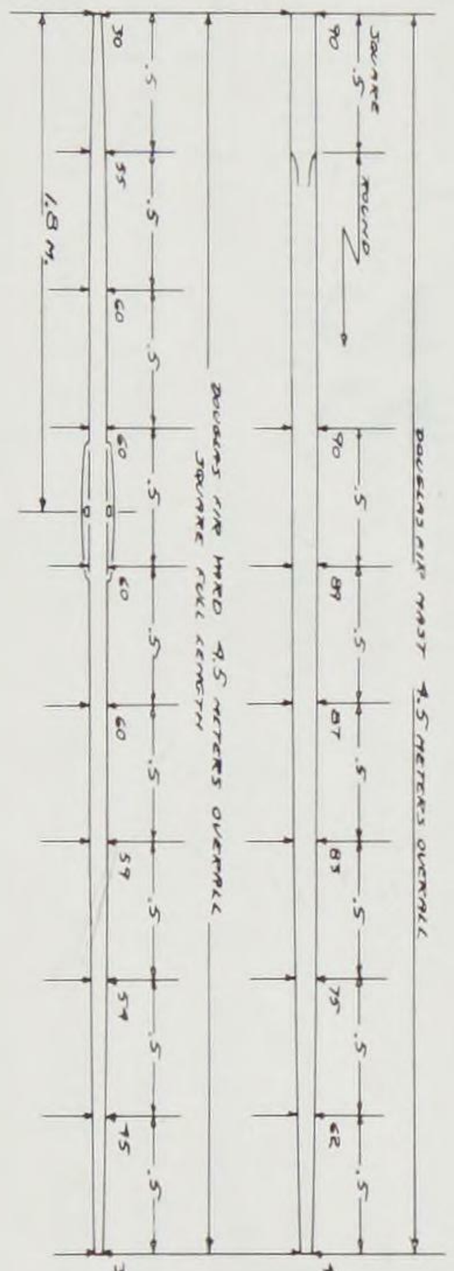
Stanley and I are both addicted to extremes — in this case, an extreme of light construction to go fast, perhaps 40 knots, with the huge single outboard motor. The high fuel consumption per hour didn't look so bad, since she was only meant for short runs in good weather. The longest run she'd normally make would be around the island to Palma, a couple of hours at her speed. She was designed to run smoothly in a small chop, not to leap from wave to wave in really heavy weather as the race boats do; I wouldn't want to bet that you couldn't break her up in a heavy sea if you tried hard. As a corollary, she is shaped to be dry, soft, and buoyant when running slowly in a big ugly sea, and not bury either end when the throttle is pulled back suddenly.

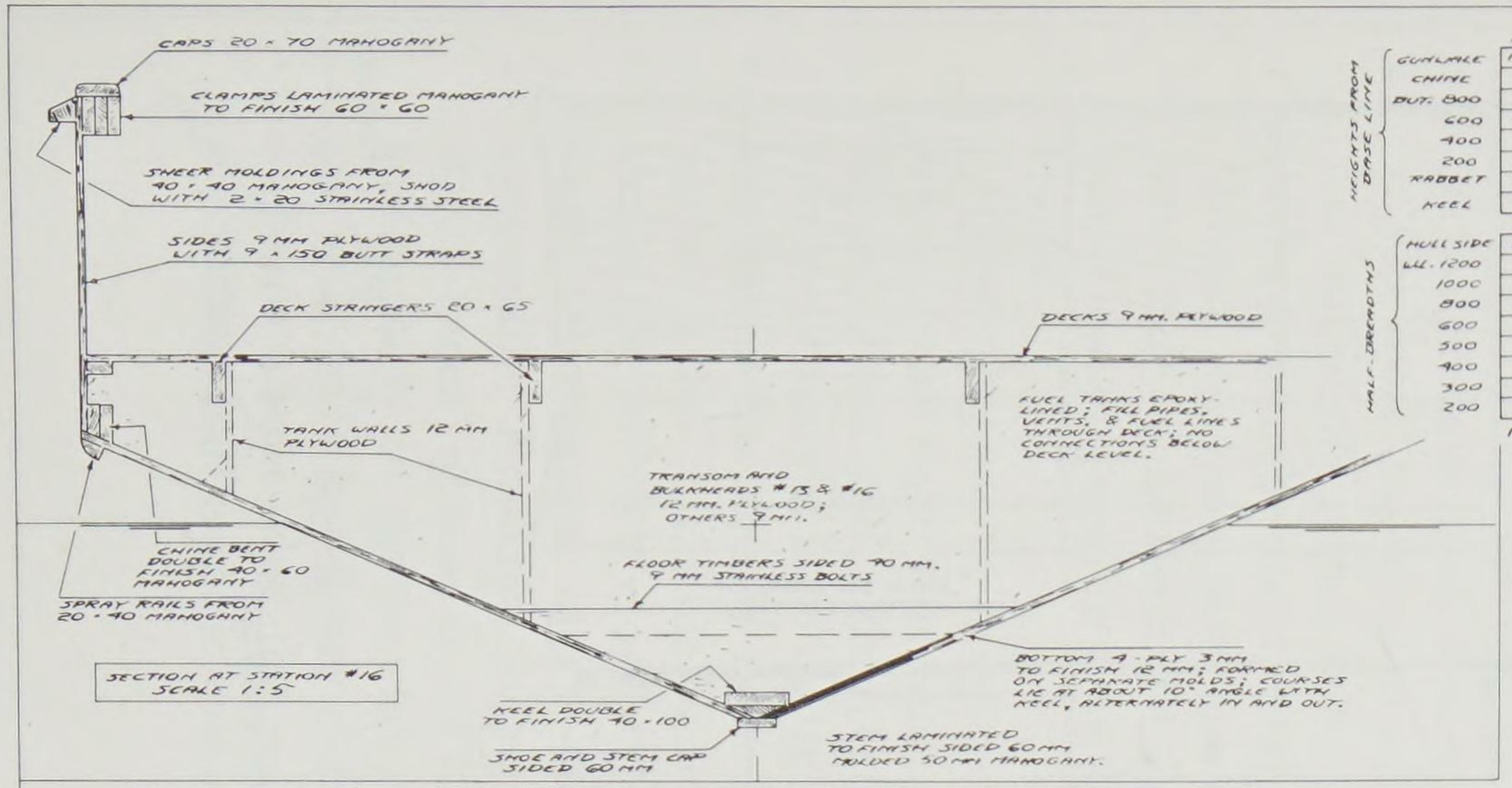
A glance at the body plan suggests that she would be very tiddly

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN # 319
for Shirley Wood Lmrd
9.0 - 2.09

SCALE 1 : 15





SECTION AT STATION #16
SCALE 1:5

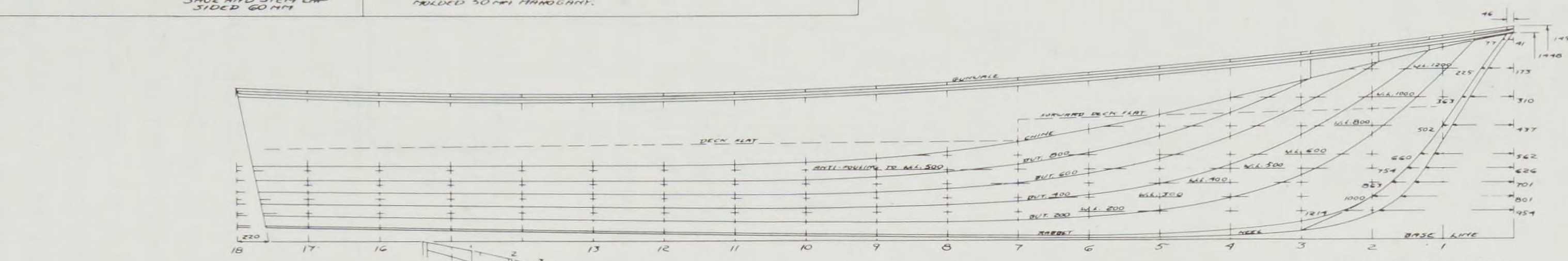
HEIGHTS FROM BASE LINE

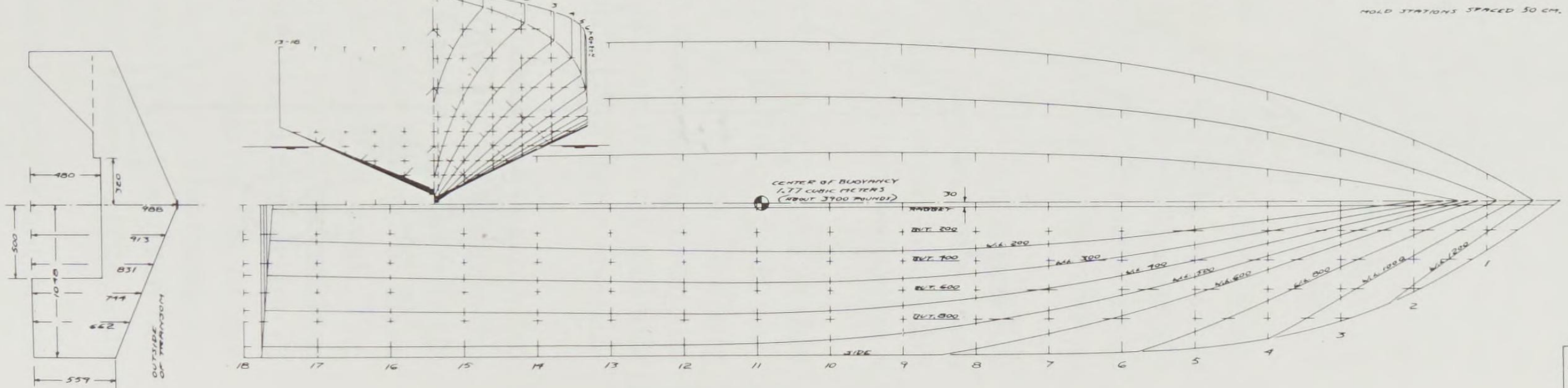
	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
GUNWALE	1080	1062	1049	1039	1034	1036	1040	1051	1068	1088	1119	1144	1180	1220	1268	1319	1374	1433
CHINE	530	530	530	530	530	530	532	538	551	578	627	693	780	881	999	1119	1240	1350
BUT. 800	432	430	429	427	424	422	422	422	430	450	481	537	619	732	876	1103		
600	352	347	343	340	336	332	329	325	329	342	367	406	470	571	723	943	1220	
400	268	261	257	250	245	240	234	230	230	237	251	278	320	396	530	738	1031	
200	187	178	170	162	157	150	145	139	132	131	131	143	169	210	297	457	742	1172
RABBET	116	107	99	89	80	71	65	58	50	41	38	33	32	41	72	123	300	801
KEEL	103	93	84	76	68	58	50	41	33	28	21	16	11	16	27	59	179	697

HALF-BREADTHS

	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
HULL SIDE	1048	1048	1048	1048	1048	1048	1048	1048	1048	1048	1046	1043	1032	1006	942	822	623	391
WL. 1200																	571	218
1000																663	373	102
800														890	681	450	233	30
600											1003	900	780	633	468	293	132	
500	970	972	973	973	974	972	971	962	940	878	829	744	640	517	372	228	91	
400	721	729	739	740	744	752	759	758	740	706	656	592	506	402	289	169	59	
300	480	490	501	512	523	532	540	544	540	519	483	437	373	297	205	119	30	
200	239	252	268	283	300	312	322	330	332	330	313	287	248	191	126	63	8	

OFFSETS IN MILLIMETERS TO OUTSIDE OF SHELL





SCALE 1:15
DESIGN #319
9.0 × 2.09
for STANLEY WOODWARD

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

13 MM. GALV. STEEL ANCHOR SHACKLE TAKES THREE LEGS OF HOISTING SPAN.

ALL SECTIONS LOOKING FORWARD

10 MM

10 MM

10 MM STEEL FLANGE ANGLE P. & S.

BOTH TANKS VENT STARBOARD SIDE

STOWED LEEBOARD

6 - 190 - 200 MM STEEL PLATE TEN 6 MM BOLTS THROUGH B.H.

#17 #15 #13 #11 #9 #7 #5 #3 #1

AFTER LEGS OF HOISTING SPAN 10 MM DIAM 3.25 M. LONG

FORWARD LEG 10 MM - 3.50 M.

THREE 10 MM STEEL EYE BOLTS TO DECK & T BULKHEAD

N.B. HOISTING GEAR FOR STRIPPED HULL, WITHOUT MOTOR OR FUEL

MAST FORMS PORT RAIL YARD & SAIL STARB'D

CONSOL TOP HINGED

PARTNER KNEES FROM 40 - 90 - ABOUT 250

40 - 100 STIFFENER

BREASTHOOK 6 MM

LEEBOARD CLEATS P & S.

FAIR STEM CAP TO SHARP EDGE; SHEATH WITH 1 MM COPPER.

PORTABLE TOILET

HOLD BOARD OFF HANGER WITH 1 MM PAD

SPACES OUTBOARD OF FUEL CELLS AND AFT BULKHEAD #16 FORMED.

CHECK OUT STEM AS NEEDED

DECK FRAME

BOTTOM FRAME

6 MM BAFFLES

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

HOLES FOR STEER. CHAIN

THWART OUTSIDE

SCALE 1 : 15

DESIGN #319
9.0 - 8.09
for Stanley Woodward

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

at rest when loaded as lightly as the designed waterline implies. As soon as she heels a little, or has some way on to pile waves under her chine, she would pick up stability quickly. In fact, even with the cold-molded construction, I doubt she'd weigh as little as 3,200 pounds any time she wasn't drastically stripped out for a demonstration. Ray Hunt once designed a boat with a body plan something like this with a tunnel running along on top of her keel from the transom well forward. The tunnel would flood when she was stopped, to damp down her motion, and drain as she picked up speed.

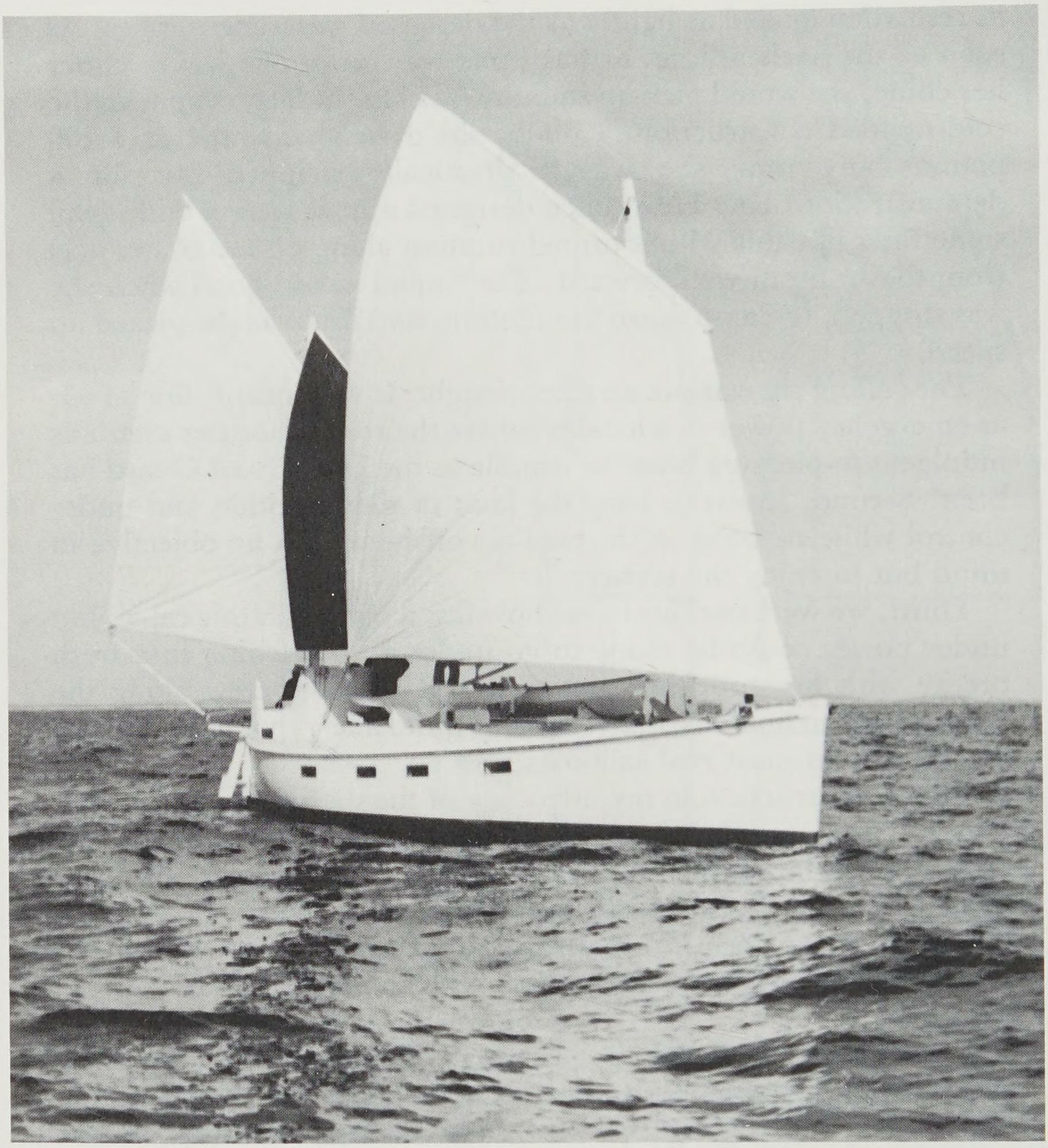
The sailing rig was not an afterthought. It was meant, first of all, as emergency power in a locality where the sea authorities aren't as indulgent to pleasure boats in trouble as the U.S. Coast Guard has been. Second, it was to keep the boat in silent motion and under control while relaxing in the cool air offshore with no objective in mind but to enjoy the scenery.

Third, we were curious to see how fast a boat with this capability under power could be made to go under sail, reaching in a fresh breeze with her propeller retracted and a heavy crew along the weather rail to hold her up. It seemed quite likely that it would be a lot faster than most real sailboats ever go.

The usual reaction to my advocacy of the dipping lugsail is that I'm out of my mind. It has to be lowered right down on deck, carried around the mast, and reset, every tack. In the case of *Flying Splinter,* the mast also has to be unstepped and restepped on the other side of the deck. I'll grant that any boat with this rig will lose out if she engages in a tacking duel with something more conventional . . . .

Nevertheless, a hundred years ago there were thousands of straight-sail fishermen and pilot boats with this rig all around the British Isles and along the west coast of France. Only reliable engines brought it to extinction. It was universally agreed to drive any given hull faster than any other rig that could be used. The reason is that it has the clear luff and direct sheet lead of the modern genoa jib, which it closely resembles (including the characteristic of being laborious to tack). The photos show the dipping lug of my motorsailer *Resolution* lifting her along in a light air. The cutdown ocean-racer rig now usual in motorsailers wouldn't have given her steerageway in the conditions shown. In a fair sailing breeze, this sail will drive her faster than her engine will.

Think about what this sail allows. The mast height is not much more than half what it would be with a genoa of similar power. In



The author's Resolution *carries 800 square feet with the mizzen staysail set, but the dipping lug is doing most of the work. (Dana Story photograph)*

Resolution's 450-square-foot lug, the mast is pivoted and counterweighted to swing up and down with a finger. In *Flying Splinter,* the 184-square-foot area needs a mast only 16 feet overall, light enough to be erected with one hand. Neither boat has any standing rigging; there's not an inch of wire on either boat.

A good many people who are used to tall rigs don't seem to grasp how much resistance can be reduced in strong winds by lowering

Note how Resolution*'s dipping lug lifts as it pulls. (Dana Story photograph)*

masts. The scream and clatter of a breezy day in a contemporary anchorage is notorious. Not long ago, *Resolution* nearly had the marina's float cleats up by the roots because her masts had been left standing. Short as they are, the difference when they were swung down flat, under 8 feet above the waterline, was dramatic. She became docile at once.

It's obvious that a dipping lug can have more area than a jibheaded sail in any given boat, because the top part of the sail, which has most of the heeling leverage, is eliminated. The long yard aloft can be very light, with no comparison in weight to the top part of a mast that must stand the astronomical tensions needed to make a genoa luff stand straight. In fairness, no dipping lug can be as close-winded as the last word in genoas, but the argument is about what makes sense in motorboats and motorsailers. In particular, it's about how much clutter, expense, and wind resistance one should put up with to avoid the maneuvering defects of the dipping lug in boats that don't ordinarily maneuver under sail. Some other time, I'll account for several years' sporadic trials in handling *Resolution* under sail. For coping with a total loss of engine power, it's quite feasible, even singlehanded. Not handy, but feasible.

Since designing *Flying Splinter,* I've had a couple of chances to try the sweep steering shown here. It has not worked well, and if *Splinter* is ever built, she'll be given a deep, narrow rudder with two sets of gudgeons, one set on each side of the stern, with the tiller set nearly athwartships, so the rudder can be on the lee side and the helmsman on the weather rail.

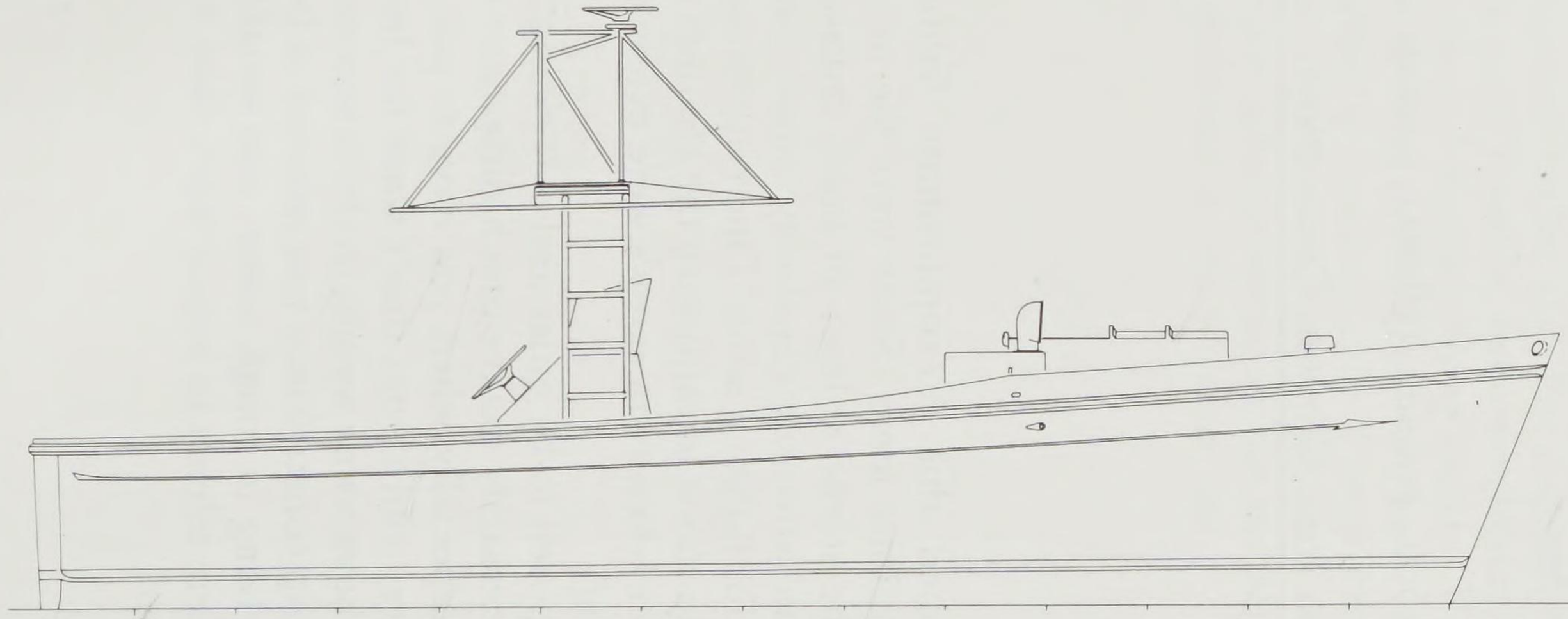
23

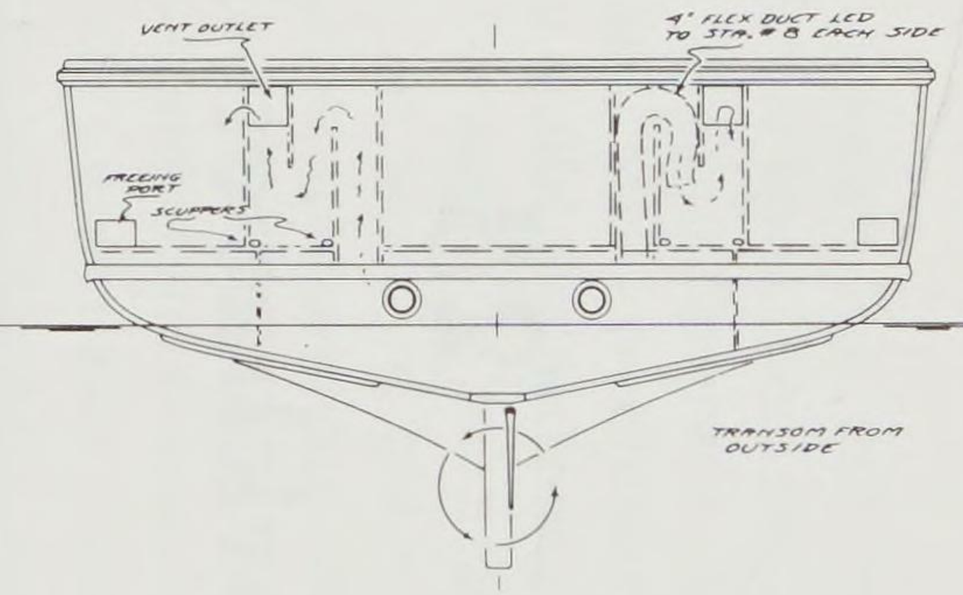
Yorkhaven 30

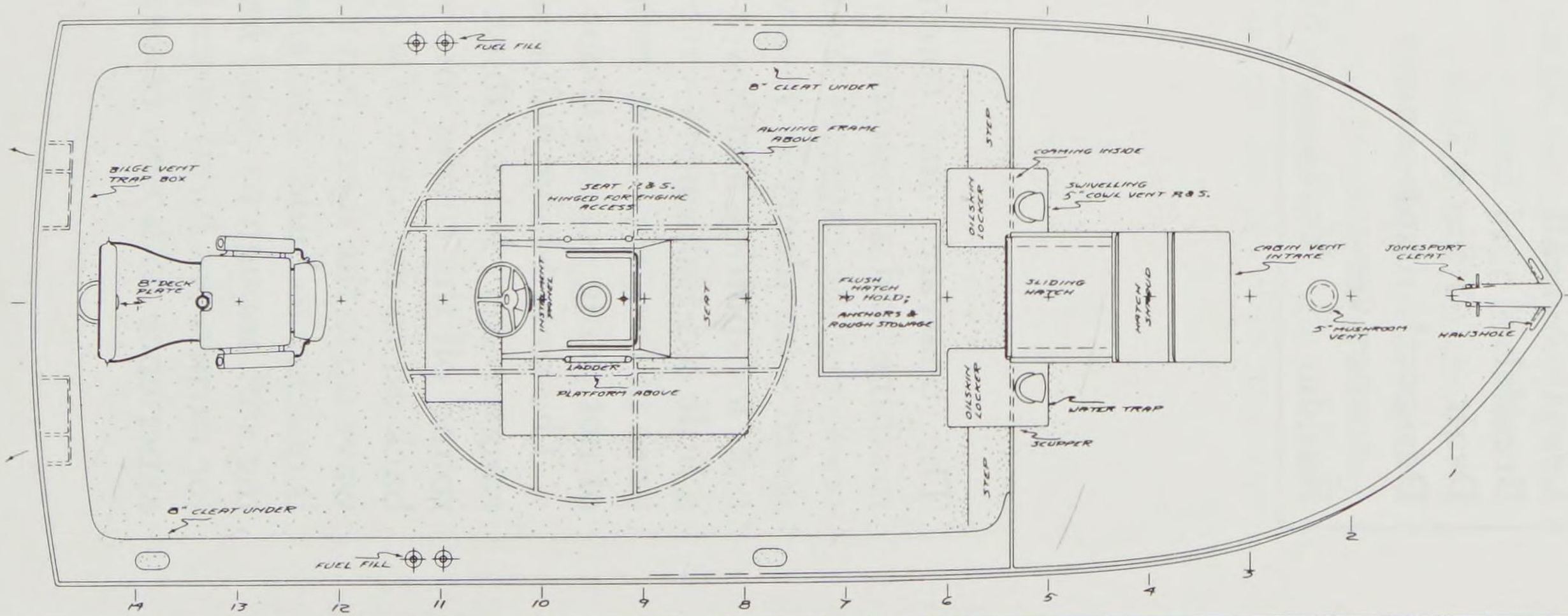
Length overall	30 feet 2 inches
Breadth	11 feet
Draft	3 feet 1 inch
Designed displacement	8,500 pounds (10,500 pounds in cruiser version)
Builder	Yorkhaven Marina, Inc., Clinton, Connecticut

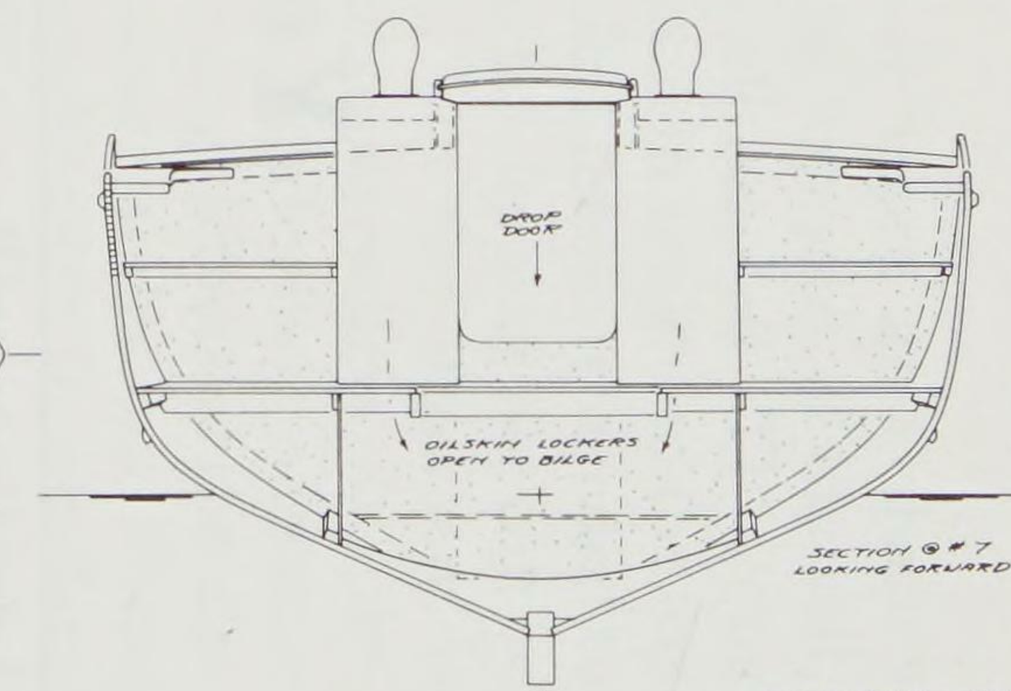
The boatyard that commissioned this no-compromise fishing machine had a customer with definite ideas. Some were the usual ones: no line-catchers around the stern; at least 20 knots cruising speed with plenty in reserve; quick-turning capability; tower controls for spotting and lower ones for fighting a fish. One request was a little old-fashioned — the single screw to minimize the chances of lines in the prop. I can remember when twin screws were evidence of not being serious about fishing.

The round-bilge hull was supposed to be quiet and soft riding in rough water. I don't think it necessarily makes much difference to round off the corner this way, especially when you have to put it back on in the form of a big spray rail if you don't want the bow wave up to the sheer, but it does have some weight in chine logs and is quicker to build. The glued-strip construction was selected as being stiff enough to stand hard driving in rough water, and suitable for carpenters hired more for their talents in repair work than for experience with new construction.









SCALE 3/4" = 1'0"

DESIGN #878
30'8"-2'10"-11'0"-3'1"
FOR YORKHAVEN MARINA INC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

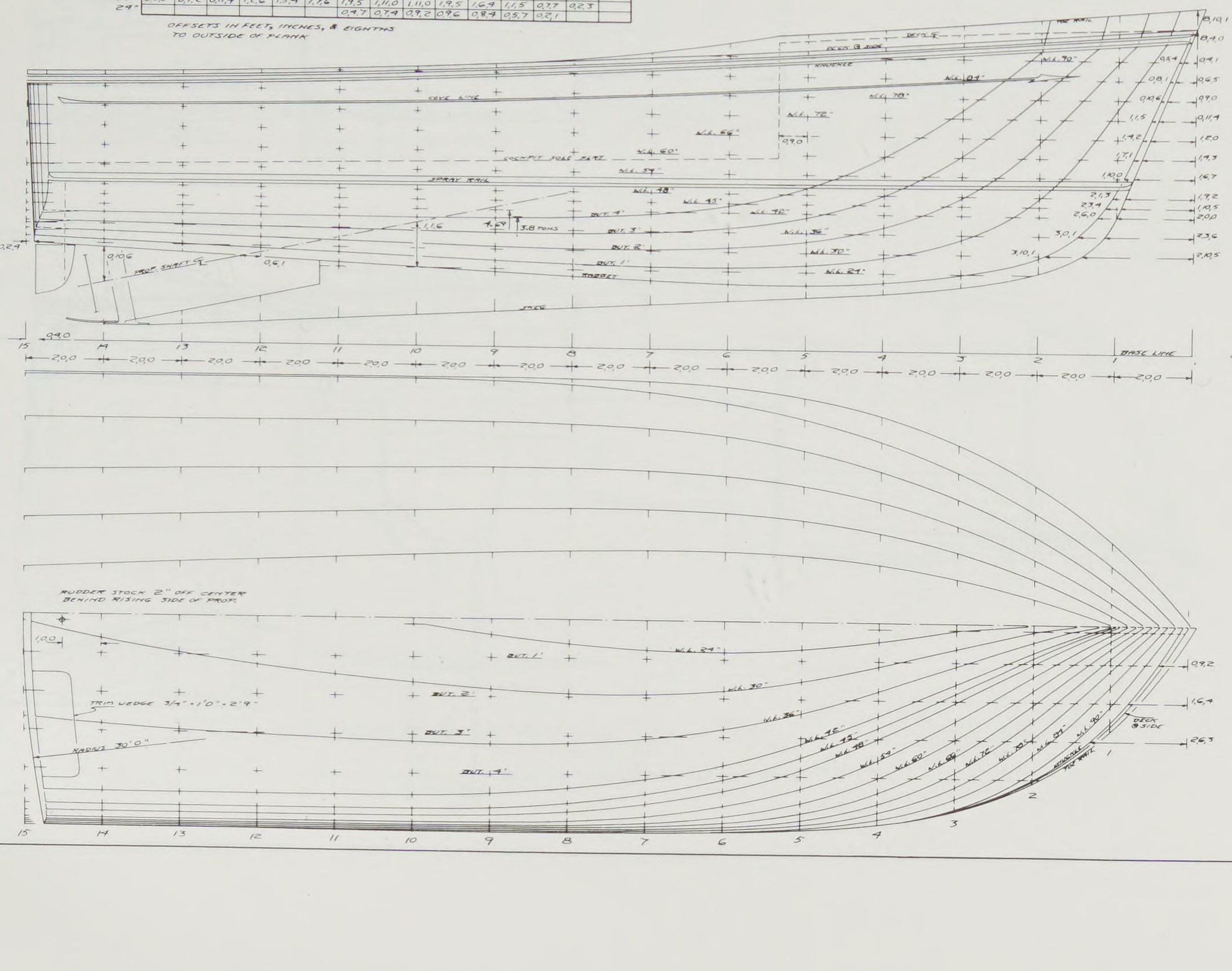
HEIGHTS FROM BASE LINE

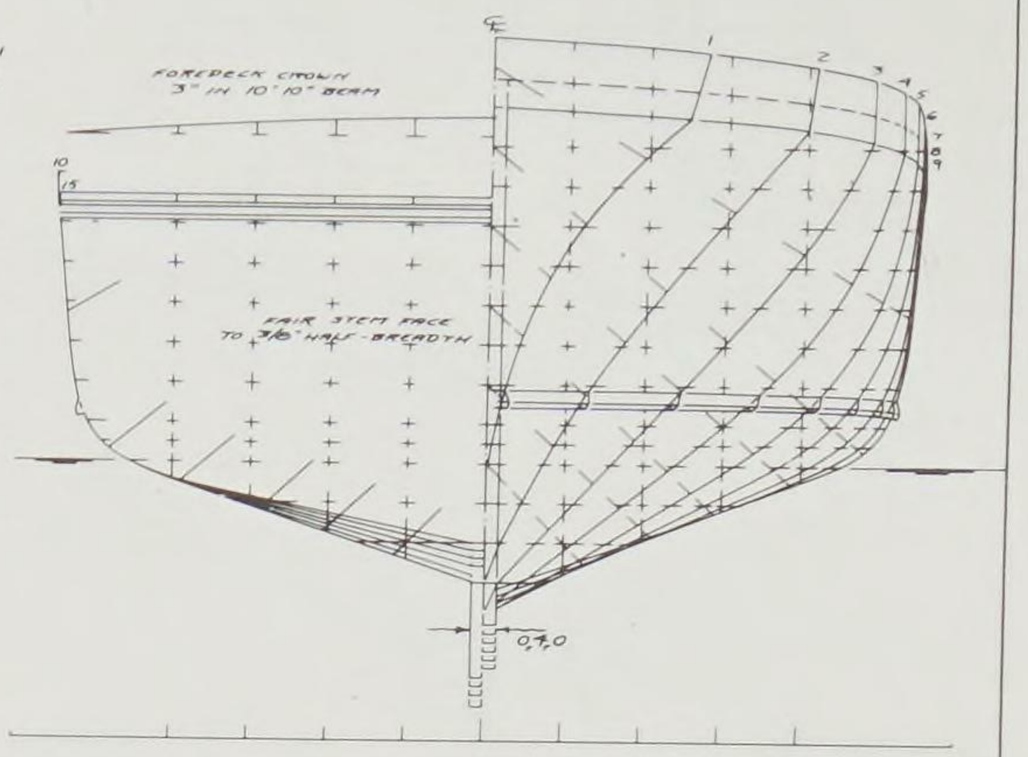
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
TOE RAIL								7'4.2	7'6.5	7'10.0	8'1.0	8'2.5	8'3.9	8'6.2	8'8.1
DECK SIDE	6'10.3	6'10.5	6'11.1	6'11.6	7'0.9	7'1.4	7'2.9	7'3.6	7'5.0	7'6.9	7'8.0	7'9.4	7'11.1	8'0.6	8'2.3
KNUCKLE	6'6.3	6'6.5	6'7.1	6'7.6	6'8.4	6'9.9	6'10.9	6'11.6	7'1.0	7'2.9	7'4.0	7'5.4	7'7.1	7'8.6	7'10.3
COVE		6'1.0	6'1.3	6'1.7	6'2.4	6'3.0	6'3.7	6'4.7	6'6.0	6'7.2	6'8.4	6'10.0	6'11.4	7'1.0	
OUT. 4'	3'3.5	3'3.9	3'3.9	3'3.9	3'3.9	3'3.5	3'3.9	3'4.0	3'5.2	3'8.1	4'1.7	4'11.6	6'2.9	7'8.9	
3'	3'0.7	3'0.9	3'0.2	3'0.0	2'11.5	2'11.3	2'11.0	2'11.0	2'11.5	3'1.2	3'4.6	4'0.0	5'0.3	6'7.0	
2'	2'10.9	2'9.7	2'9.2	2'8.5	2'8.0	2'7.3	2'6.6	2'6.3	2'6.9	2'7.2	2'9.3	3'2.1	3'11.9	5'4.6	7'5.0
1'	2'8.0	2'7.1	2'6.2	2'5.2	2'4.3	2'3.9	2'2.9	2'1.6	2'1.2	2'1.1	2'2.1	2'4.6	2'10.9	3'11.5	6'3.0
RABBET	2'6.0	2'4.7	2'3.5	2'2.9	2'1.2	2'0.1	1'11.0	1'10.0	1'9.0	1'8.0	1'8.0	1'9.0	1'11.6	2'5.2	4'2.3
SKEG			0'5.9	0'6.7	0'8.2	0'9.9	0'10.7	1'0.1	1'1.9	1'2.6	1'4.1	1'5.7	1'8.0	2'0.9	3'6.0

HALF-BREADTHS

TOE RAIL											5'5.9	5'7.9	5'7.9	4'0.1	4'1.2	2'8.7
DECK	5'5.6	5'5.6	5'5.7	5'6.0	5'6.0	5'6.0	5'6.0	5'6.0	5'6.0	5'5.7	5'5.7	5'5.9	5'7.9	5'7.9	4'0.4	2'7.1
KNUCKLE	5'5.3	5'5.6	5'5.7	5'6.0	5'6.0	5'6.0	5'6.0	5'6.0	5'6.0	5'5.7	5'5.9	5'7.9	5'7.9	4'9.6	4'0.1	2'6.0
W.L. 90"										5'5.7	5'5.9	5'7.9	5'7.9	4'9.4	3'9.6	2'1.1
84"							5'5.7	5'6.0	5'6.0	5'5.6	5'5.3	5'7.1	5'1.0	4'6.3	3'7.9	1'7.0
78"	5'5.5	5'5.5	5'5.5	5'5.5	5'5.5	5'5.5	5'5.5	5'5.5	5'5.2	5'4.5	5'3.7	5'1.9	4'8.2	3'10.1	2'6.0	0'10.2
72"	5'5.0	5'5.0	5'5.0	5'5.0	5'5.0	5'5.0	5'5.0	5'5.0	5'4.5	5'3.7	5'1.9	4'8.7	4'0.7	2'11.0	1'2.0	
66"	5'4.9	5'4.9	5'4.9	5'4.9	5'4.9	5'4.9	5'4.8	5'4.3	5'3.7	5'2.9	5'1.3	4'8.6	3'9.0	2'1.0	0'7.2	
60"	5'3.7	5'3.7	5'3.7	5'3.7	5'3.7	5'3.7	5'3.7	5'3.5	5'2.7	5'0.3	4'8.0	4'0.2	2'11.6	1'8.3	0'4.7	
54"	5'3.0	5'3.0	5'3.0	5'3.0	5'3.0	5'3.0	5'2.7	5'2.3	5'1.0	4'7.3	4'5.6	3'6.4	2'6.2	1'4.0	0'2.7	
48"	5'1.0	5'1.0	5'1.0	5'1.0	5'1.0	5'1.0	5'0.5	4'11.4	4'9.0	4'4.6	3'10.0	3'0.0	2'0.4	1'0.2	0'1.9	
42"	4'10.7	4'10.7	4'10.7	4'10.7	4'10.7	4'10.7	4'10.4	4'8.7	4'6.0	4'1.1	3'6.0	2'8.5	1'8.6	0'10.3	0'0.6	
36"	4'6.5	4'6.5	4'6.5	4'6.5	4'6.5	4'6.5	4'6.0	4'4.1	4'1.2	3'8.6	3'1.7	2'4.7	1'6.7	0'8.6	0'0.3	
30"	4'2.6	4'2.6	4'1.2	4'0.3	3'11.2	3'11.1	3'10.5	3'9.3	3'8.06	3'7.4	2'11.3	2'4.3	1'8.2	1'1.3	0'5.4	
24"	0'8.0	0'7.2	0'11.4	1'2.6	1'5.4	1'7.6	1'9.5	1'11.0	1'11.0	1'9.5	1'6.4	1'1.5	0'7.7	0'2.3		
								0'9.7	0'7.4	0'5.2	0'2.6	0'0.7	0'2.1			

OFFSETS IN FEET, INCHES, & EIGHTHS
TO OUTSIDE OF PLANK





SCALE 3/4" = 1'0"

DESIGN #278
30'2" - 27'10" - 11'0" - 3'1"
for YORKMAVEN MARINE, INC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

SECTION @ #11
LOOKING AFT

OPENING IN AWNING
STAND'D ONLY

CRUSADER CH 350
1.92:1 REDUC. GEAR

SHAFT TYP
MOMEL

19" DIAM. - 22" P.
THREE-BLADE

SECTION @ #10
LOOKING FORWARD

ABOUT 12 CU.FT.
FOAM BUOYANCY

ABOUT 7 CU.FT.
FOAM BUOYANCY

ABOUT 19 CU.FT.
FOAM BUOYANCY

40 GALS. GAS.

40 GALS. GAS.

EXHAUST

EXHAUST

BATTERIES

40 GALS. GAS

40 GALS. GAS

ABOUT 12 CU.FT.
FOAM BUOYANCY

ABOUT 7 CU.FT.
FOAM BUOYANCY

ABOUT 19 CU.FT.
FOAM BUOYANCY

COMPANION
SLIDE DROPS
INTO BILGE

SHELF

SEAT - BERTH

STEP

TOILET
HYDER

ABOUT 29 CU.FT.
FOAM BUOYANCY

SEAT - BERTH

SHELF

14 13 12 11 10 9 8 7 6 5 4 3 2 1

SECTION @ #5
LOOKING FORWARD

SCALE 3/4" = 1'0"

DESIGN #278
30'2" - 27'10" - 11'0" - 3'1"
for YORKHAVEN MARINA INC.

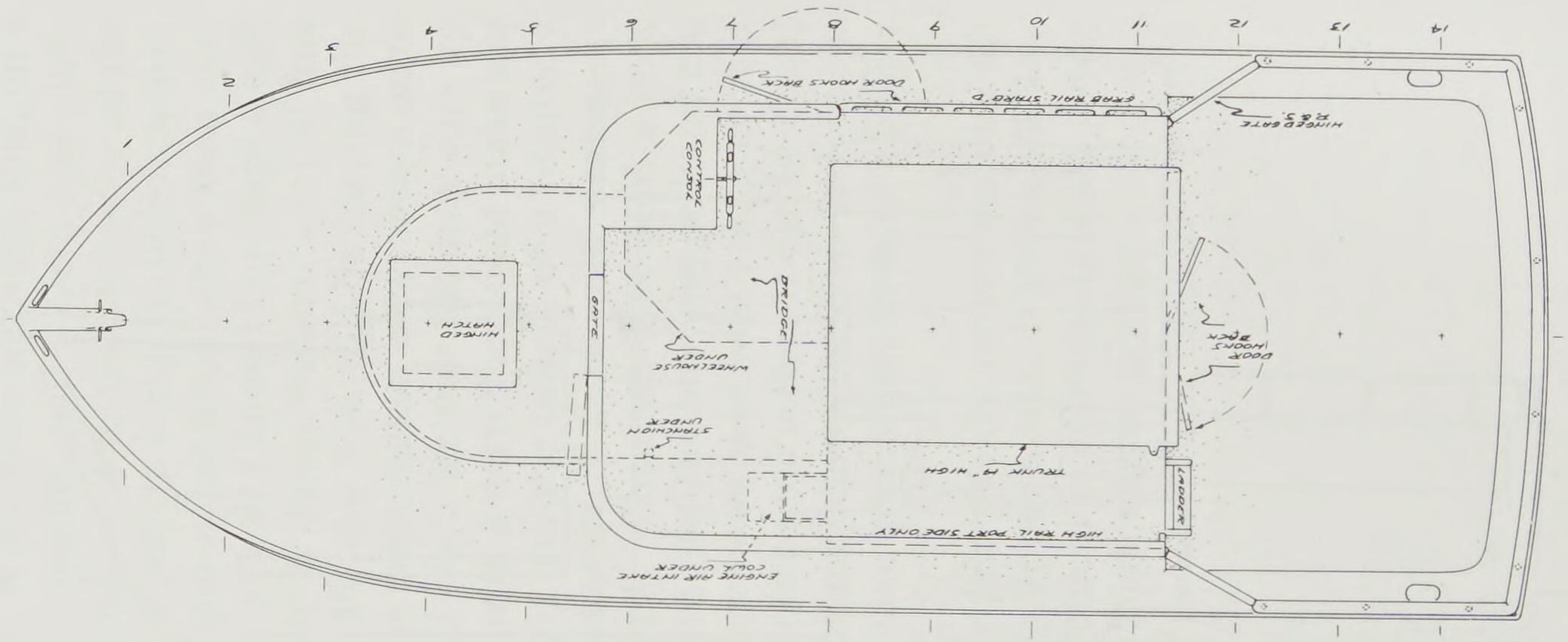
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

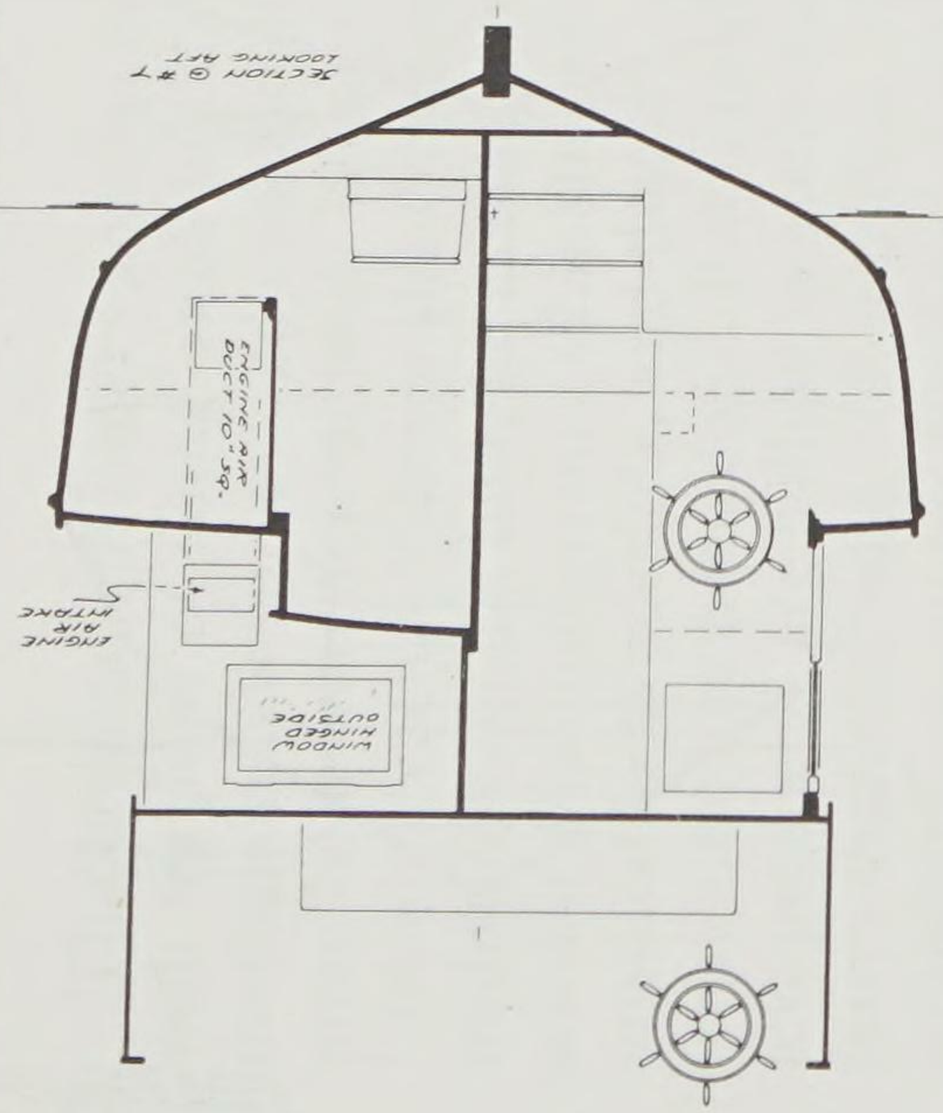
DESIGNED POSITIVE BUOYANCY
EXCLUDING WOOD STRUCTURE
95 CU.FT. 7½0-LB. FOAM = 5900 LBS.

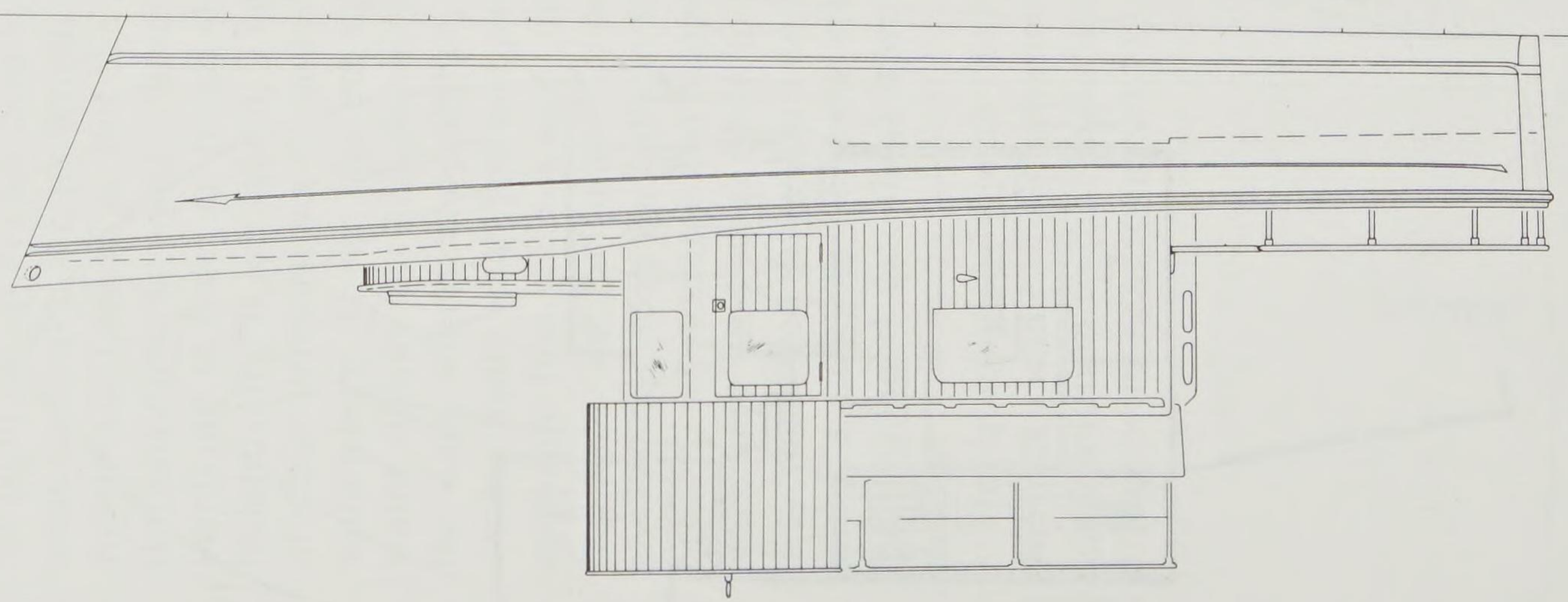
DESIGN #27B-C
for YARMOUTH Machine
PHILIP C. BOLGER
DESIGNER
GLOUCESTER MASSACHUSETTS

OUTBOARD ARRANGEMENT
MODIFIED 2/74

SCALE 3/4" = 1'0"







TRUNK REMOVABLE

SKYVENT

CATERPILLAR D 160 1.47:1 RED. GR.

1 7/16" SHAFT

19" D. x 20" P. 3-BLADE PROP.

9.8 CU.FT. TOP OPENING ICE BOX

FUEL TANKS 4'0" LONG 13 CU.FT. 97 GALS.

9"

1'9"

2'0"

1'3"

SECTION @ #10 LOOKING AFT

97 GALS. FUEL

ENGINE AIR INTAKE DUCT

BEDDING & BUNK STORAGE

SHELVES TO SUIT

100 SQ. IN. MIN. SEC.

SEAT

DROP-LEAF TABLE

SEAT

TOILET

BASIN

TRANSOM BERTH

LOUVERED VENT OUTLET 10" x 20"

DRAG LINK TO HELM STATIONS

STEP

UP

ICE BOX FORMS DRESSER

SINK

SPACE FOR 3-BURNER RANGE & OVEN IN GYMBALS

DISH RACKS ABOVE

FITTED LOCKERS

BERTH

97 GALS. FUEL

14 13 12 11 10 9 8 7 6 5 4 3 2 1

SECTION @ #5 LOOKING FORD

SCALE 3/4" = 1'0"

DESIGN #278-C for YORKMAVEN MARINA

PHILIP C. BOLGER DESIGNER GLOUCESTER, MASSACHUSETTS

INBOARD ARRANGE. MOD. 2/74

The original customer canceled out, but Ed Pardi was still taken with the idea of doing some building in the off-season. He did a mother-in-law survey and concluded that customers for the tournament boat were few indeed. What people wanted, it seemed, were "trawler yachts." Since they'd already done the lofting and some moldwork on the hull, he asked me to adapt it as a trawler yacht. I tried it with misgivings, thinking at first that the hull was about as unsuitable as possible, and that it was a false economy to try to use what little had been done. But it worked out surprisingly well. Very few prospects are willing to settle for 8 knots now, and to go much faster than that in a hull less than 28 feet on the waterline calls for straightening out the stern in a fashion that doesn't change a whole lot right on up to race-boat speeds. A deep-vee stern like this, on a boat so heavy for its length and breadth, will have a big, dirty roostertail behind it, but the alternative is to transfer some of the displacement forward, where it will put up a big, dirty bow wave, implying at least as much drag and a lot more spray than turbulence that is left astern. There's no way I know of to shape a hull of these proportions to make 10 or 12 knots without a lot of fuss somewhere. If she can get up to 15, this hull will be leaving the water cleanly. At 8 knots she'll have suds against her transom up to the static waterline or higher, but I can't see that the drag goes up dramatically when you compare it with a stern that would make less apparent fuss. Either way, the boat has the benefit of a relatively fine bow. As for following sea behavior, I think wild steering is always due to a bad shape forward. Whenever I've seen a boat broach, what seemed to happen was that the bow stopped and the stern kept on going. I try to design bows that won't stop even if they're shoved down hard and deep into the water. It can be done, and it's easier to do if the stern shape allows the bow to be kept lightly loaded. I do think it would have been smart to show a bigger rudder.

I'm quite pleased with the layout, despite (or maybe because of) the tricky and complex shape of her upper works. It strikes me as a good solution to the small-boat problem of combining a big flying bridge with headroom on top of a high engine profile.

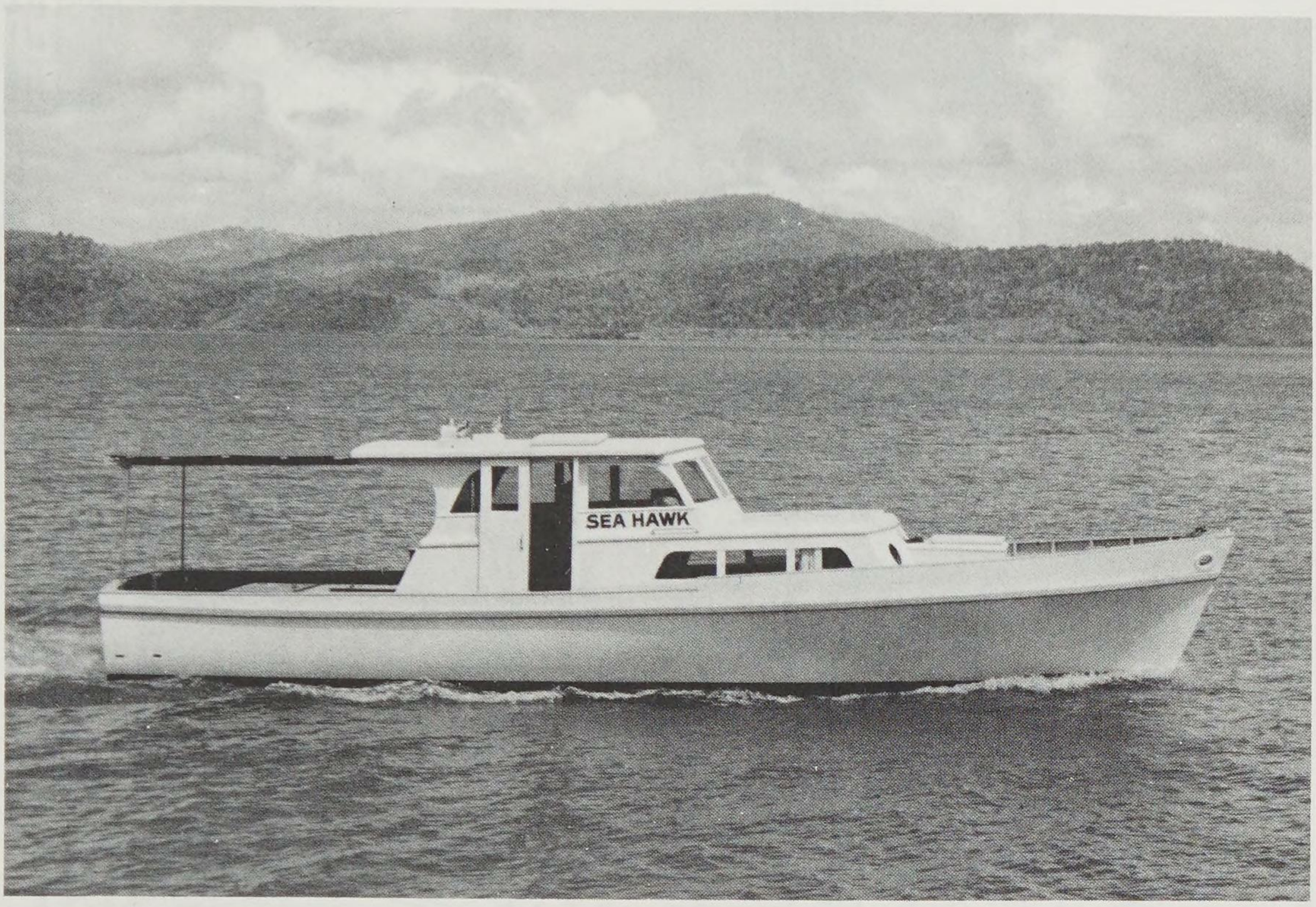
24

Sea Hawk

Length overall	38 feet
Breadth	12 feet
Draft	3 feet 3 inches
Builder	Graham Hawkes, Airlee Beach, Queensland, Australia

The photo of *Sea Hawk* shows the coast of Queensland in the background. Behind the camera is the Great Barrier Reef. A beautiful place. I've never seen it, but everyone who has agrees, from Captain Cook and Sir Joseph Banks, the first Europeans to describe it, on down to Nevil Shute and Arthur Clarke. Like a good many tropical paradises, it's a good place to keep your wits about you. The labyrinth of coral was nearly the death of Cook and Banks, and while the indigenous land life of Australia is peaceable, the sea creatures are not. Moreover, it can blow in those parts; at one time Cook's *Endeavour* was dragging two anchors and upwards of a thousand feet of cable, and she didn't bring up until they sent down her topmasts — not just her topgallants, her *topmasts*. It's easy to picture the kind of chop a wind like that would put up in the shallow lagoons among the islands of the reef.

When I made this design, I was taking a busman's holiday as resident designer with MYABCA in Puerto de Pollensa, Mallorca.



Sea Hawk *idling in her home waters. (Graham Hawkes photograph)*

I had two men under me there, Peter Collett and Javier Vivier, the only time I've ever had drafting help, but I seem to have done all the drawing and tracing on this one myself. Mallorca was a better place than Gloucester to work out a design for a tropical country. The shaded areas of *Sea Hawk* are restricted by her need to lie alongside high wharves, but they're substantial. The forward awning was intended to allow the main cabin hatch to be open without the sun blasting in, or the rain in season. Cabin ventilation is about as good as it can be without a power boost; this was one reason for the low deck forward.

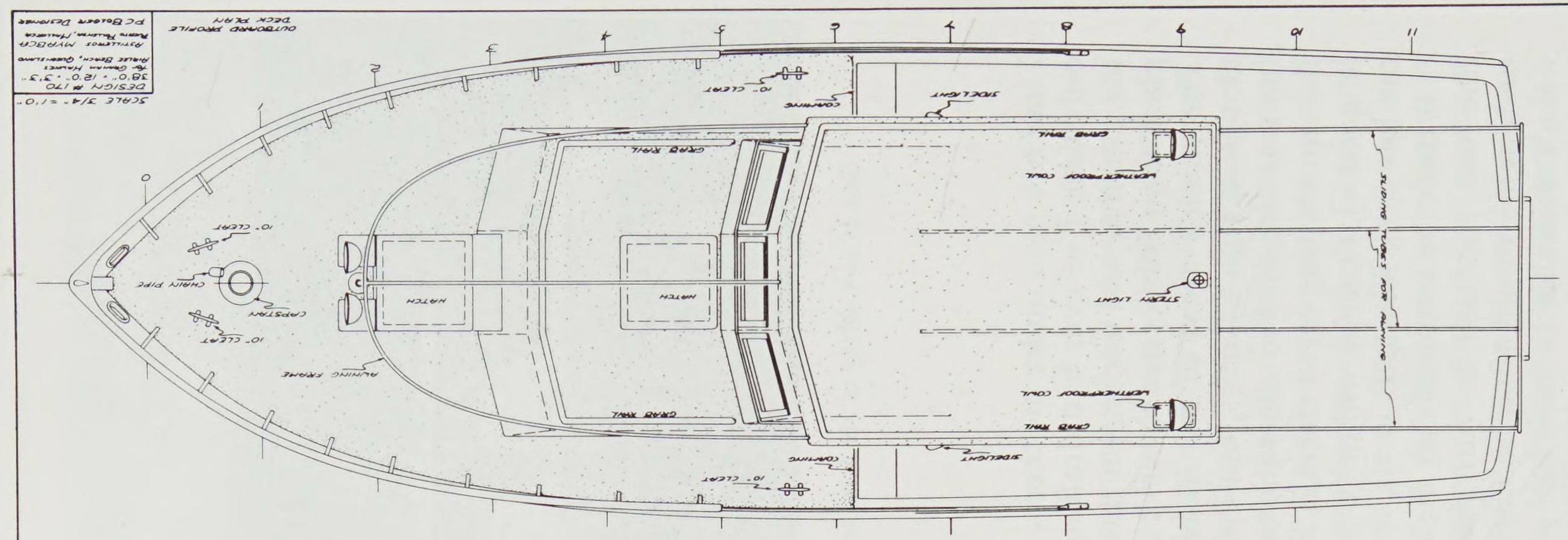
It could be assumed that she'd never have to cope with a big sea. She was modeled to run smoothly in a chop. Her crew and passengers would often be interested in underwater matters, so it wasn't desirable to have her any higher sided than necessary. A straight sheer combined with an exaggerated flare, like this, is a mean proposition to plank carvel. The plans indicate plank seams allowed to turn up off the sheerline, which works well enough despite the resulting feather ends. That and the odd lay of the

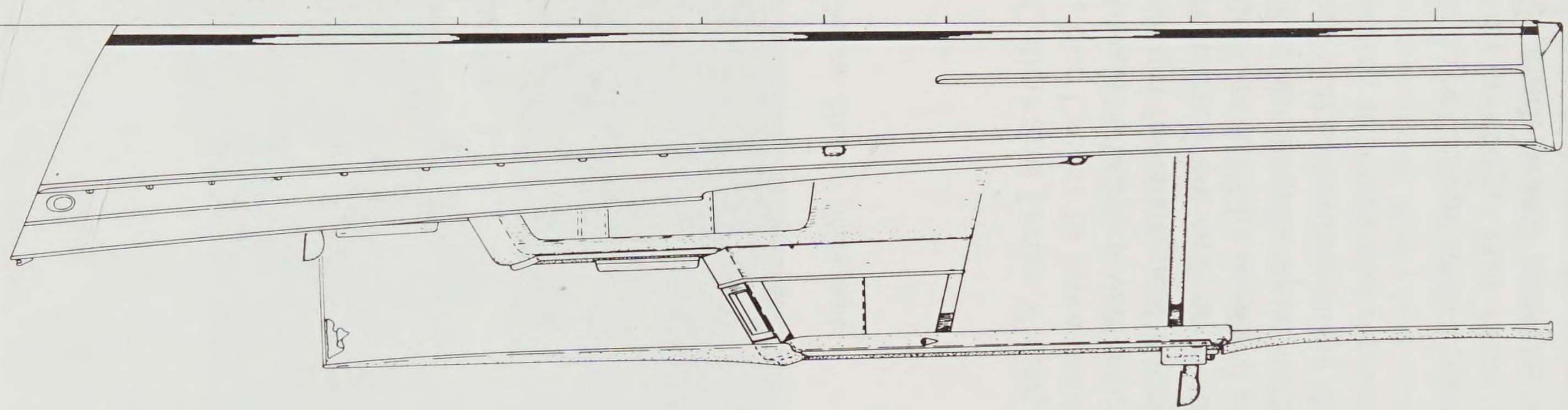
OUTBOARD PROFILE
DECK PLAN

SCALE 3/4" = 1'0"

DESIGN # 170
38'0" x 12'0" - 3'3"
36- Omnia Nauset
Male Street, Qlete-Island

Mythilenos MYABCA
Marie Kaluna, Thalassa
PC Boaters Usonage

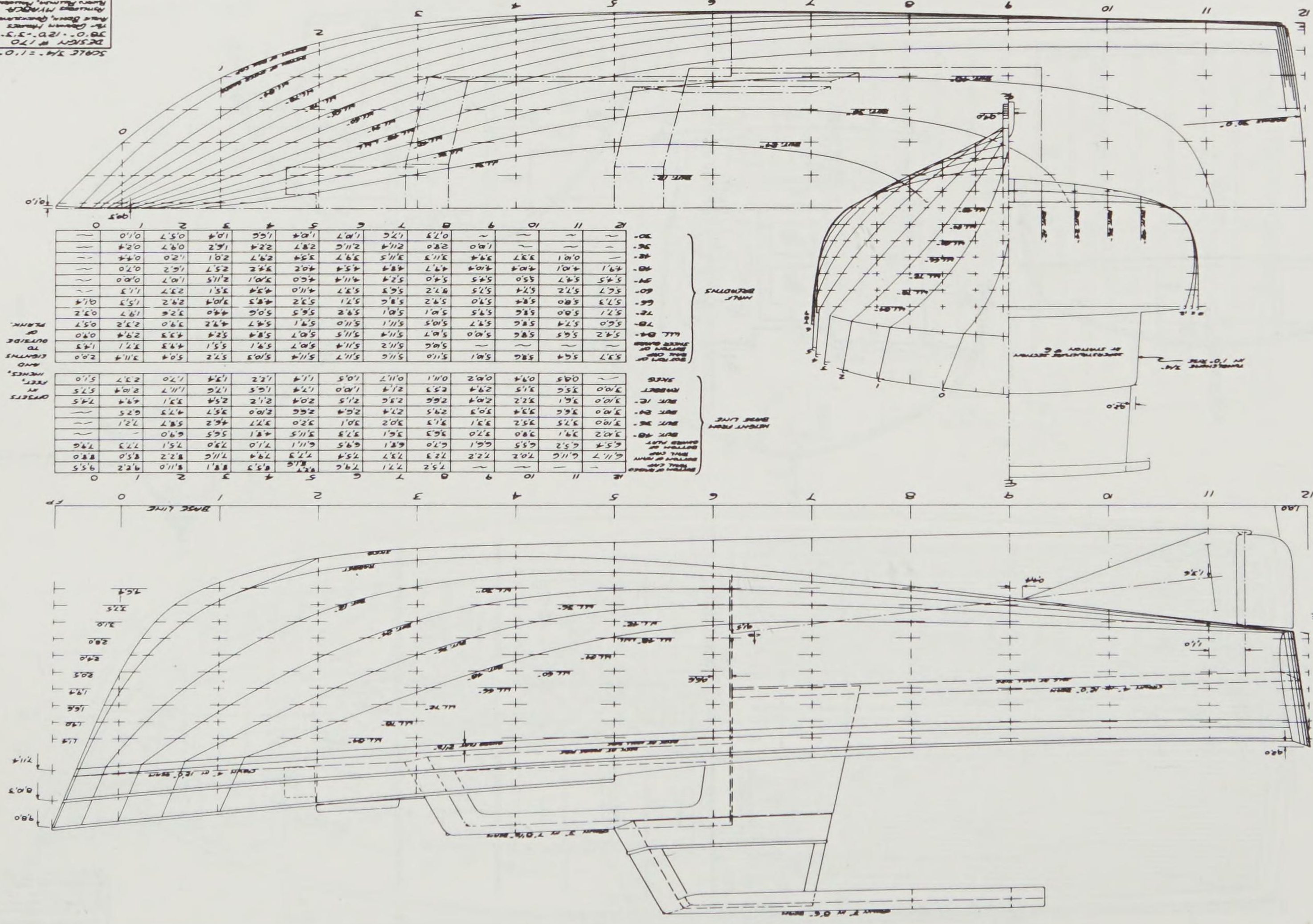




LINES AND OFFSETS

SCALE 3/4" = 1'0"

DESIGN OF 170
70'0" - 12'0" - 3'3"
Planing Motor Yacht
Near Beam, Deep Arc
Hull Bottom Planes
Aaron Palumbo, Naudain
P.C. Blazer Designer



ALL SECTIONS LOOKING FORWARD

SECTION @ STA. #9

SECTION @ STA. #7

SECTION @ STA. #5

SECTION @ STA. #2

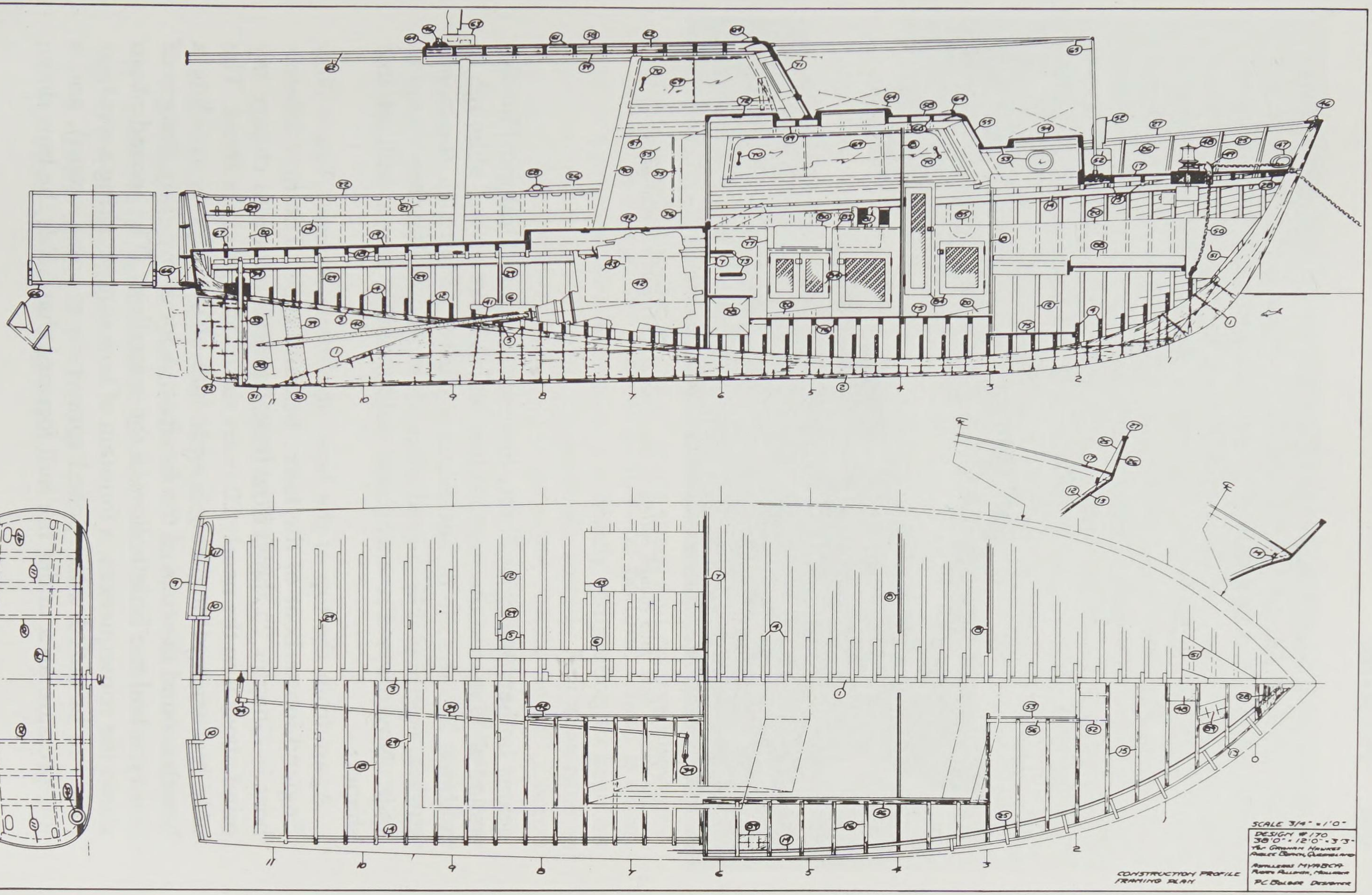
24 1/4"
10"
3"
9"

STOVE GAS UNDER
10" CLEAT
FUEL FILL 65 GALS.
VENT-DUCT
BOARDING LADDER
GRAB-RAIL
6" DECK-PLATE
WEATHERTIGHT-AFTERDECK
RAISED ENGINE HATCHES
VENT-DUCT
SHELTER
10" CLEAT
FUEL FILL 65 GALS.
STEP
STEPS
ICE BOX
STOVE
SINK
LOCKER
BASIN
DISH RACKS
STORAGE NETS
BERTH
BILGE PUMP
10" STEP
7" STEP
CHAIN BOX
SEAT
TABLE DROPS TO FORM BERTH
SEAT
SHELVES
BERTH
STORAGE NETS

11 10 9 8 7 6 5 4 3 2

CONSTRUCTION & ARRANGEMENT
SECTIONS; ARRANGEMENT PLAN

SCALE 3/4" = 1'0"
DESIGN # 170
38'0" - 12'0" - 3'3"
for GRAHAM HANKES
APPLE BEACH, QUEENSLAND
BUILDERS MYABCA
PLANS PELLERIN, MONTREAL
PC BELAIRE, DELAWARE

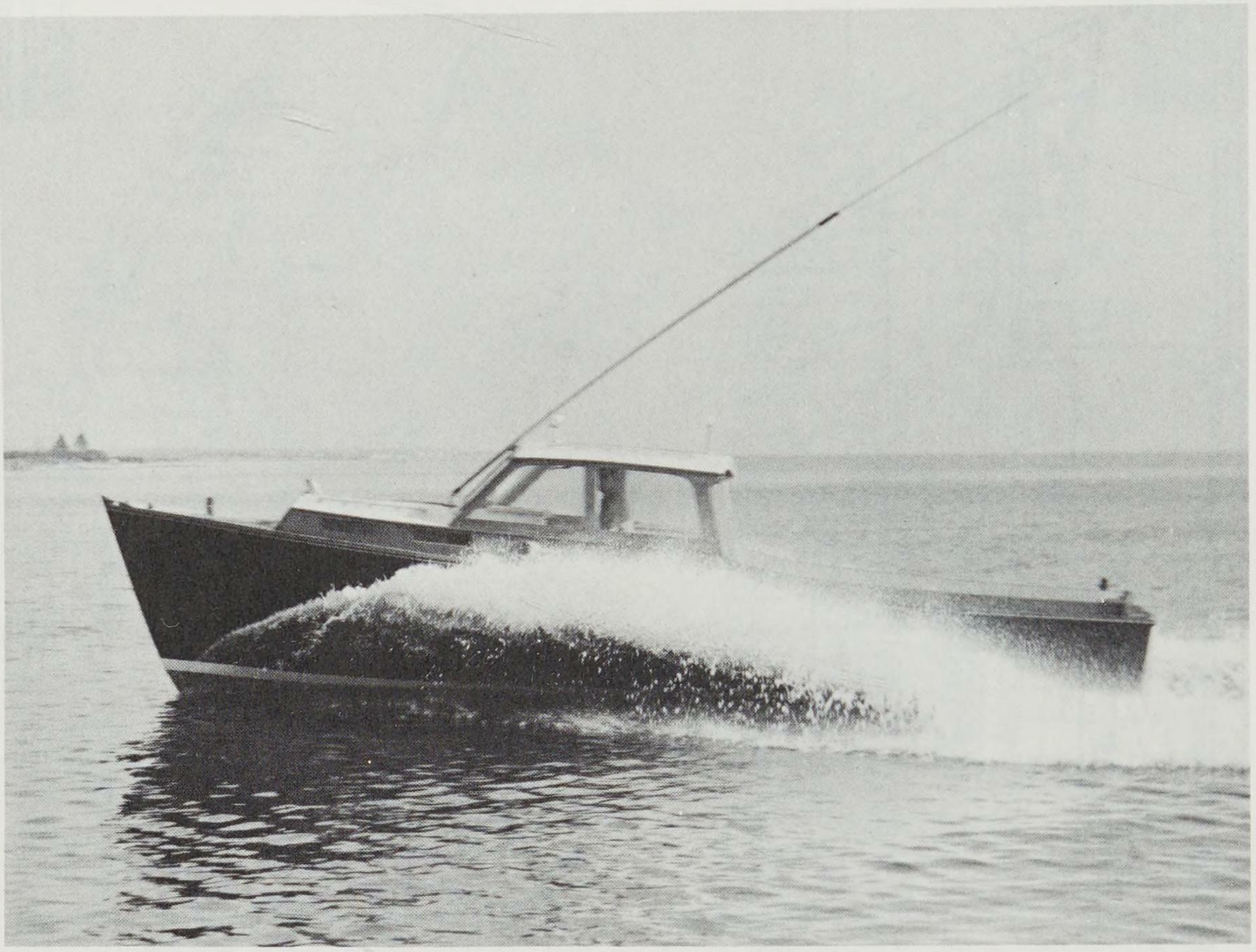


CONSTRUCTION PROFILE
FRAMING PLAN

SCALE 3/4" = 1'0"

DESIGN # 170
38'0" × 12'0" × 3'3"
YELLOWBRICK MARINE
PINELEE CREEK, QUEENSLAND

ARTILLERIE MYABOR
PIETER ALLEMAN, HOLLAND
P.C. BALDER DESIGNER



She doesn't have quite enough hollow in the entrance. (Michael's Studio photograph)

seams bothers many builders, however. I think Graham Hawkes spiled all planks to the stem rabbet, which looks better, although in a shape like this, it means either a cluster of butts in the upper strakes, or else planks curved so much in spiling that they're apt to split. Nowadays I'd encourage cold-molding for a hull of this shape.

Apart from the top of the bow, the shape is much like a New England lobsterboat of the later, beamier type. The new lobsterboat in Chapter 25 shows how little I've had reason to change my mind about it in the nearly 20 years since I designed *Sea Hawk*. The only real trick to modeling a wide hull of this type is avoiding a bunch around the turn of the forefoot. A lot of my early designs of this type had too little hollow in the waterlines. The second photo shows the consequences: a fountain of bow spray making a wet boat (this can be cured with applied spray rails to some extent), and a low-pressure area under the hull forward that holds the bow down

and has been known to cause wild steering. I must have designed this sea skiff in the early or middle 1950s. By the time *Sea Hawk* came along, I'd learned the lesson, though you can see the failing recurring in the photo of *Quest* (Chapter 18), since I've never found a way to combine simple curves (for metal or plywood), a deep forefoot, and a wide beam — and still have a clean entrance.

Sea Hawk is more dayboat than cruiser. I cheated on the forward berths in a fashion that's quite common but that I usually try to avoid, pushing them ahead until there's no room for two pairs of feet unless the sleepers are shorter than should be assumed. The tendency for people to grow taller is a phenomenon architects don't need at all. Back before World War II, it was said that a Japanese battleship could be 5,000 tons lighter than an American one of equal capability because her decks could be closer together. I think basketball must be responsible, and I advocate relocating the basket about 10 feet higher, to give tall players less advantage.

Sea Hawk's deck is nice. I used to design a lot of powerboats with comparatively deep bulwarks, like this. They were expensive to build and prone to rot in conventional timber construction, but no problem in glass, cold-molding, or metal. The real drawback is that the boat either looks very high sided, or is in fact very low sided to the deck — to the detriment of inside space and reserve buoyancy.

Note the chain, for anchoring on coral bottom. Chain is good, but it's so expensive that there's a deadly temptation to keep on using it when it's become dangerously rusted. Not that rope is much better in that respect. I've got some "yacht braid" Dacron that I bought instead of gold, as an inflation hedge.

I seem to have mislaid whatever I heard about *Sea Hawk*'s performance. She had a Perkins diesel of about 130 h.p. I'd guess her top speed would be about 11 knots and her most efficient cruise around 8½ knots. (She's barely idling in the photo, of course.)

SPECIFICATIONS

1. Stem, knee, hull, and skeg sided 4"; ½" galvanized bolts.
2. Shoe 1½" x 4", secured with 4" screws with heads exposed; ¾" half-round galvanized or bronze stem band carries far enough aft to cover forward end.
3. Horn timber 2¼" by 7½"; ½" bolts to floors.
4. Floor timbers sided 1½".

5. Two galvanized steel strap floors under stuffing box from ½'' by 1½'' stock about 3' long.

6. Engine beds sided 3½''; exact profile and spacing to suit mounts of selected engine; ½'' bolts to floor timbers; ½'' by 3'' by 6'' steel brackets at forward end bolted through bulkhead.

7. Midships bulkhead ¾'' fir plywood with 1'' by about 3½'' backing and stiffening frame; butt straps as necessary ¾'' by about 6'' plywood.

8. Partial bulkheads ½'' plywood with ¾'' framing.

9. Transom: ⅞''.

10. Side frames of transom gate 1½'' by about 3½''.

11. Other framing of transom 1¼'' thick, 2½'' or 3'' wide; athwartships radius beams needed to hold curve to be removed when hull has been planked and decked.

12. Frames steam-bent 1¼'' by 1¾''; 9'' spacing on centers.

13. Planking ⅞'', or 1'' if soft wood; 1¾'' large-diameter bronze wood screws throughout to framing.

14. Clamp 1¼'' by 2½''; cockpit sole clamp the same; main clamp blocked off frames in bow to avoid excessive twist as shown.

15. Deck beams sided 1½'', molded 2½''; 12'' spacing on centers.

16. Short beams sided 1½'', molded 2½'', spaced about as shown.

17. Main deck ⅝'' plywood; butt straps ¾'' by 6'' plywood; fiberglass-sheathed.

18. Cockpit sole beams sided 1½'', molded 2½'', 12'' spacing.

19. Cockpit sole ⅞'' teak or edge-grain fir in 2'' strips; extend sole to inside of frames only for ventilation.

20. Sheathing ⅜'' grooved seam, without openings from sole to clamp, in cockpit, main cabin and toilet room, in forward cabin, above berths only as shown.

21. Sheathing planks above clamp in cockpit only ¾'', with vent opening in each frame bay as shown.

22. Cockpit rail cap 1'' by 4¾'', with drip groove on underside.

23. Molding 1'' by about ⅝'' half-oval of same stock as rail cap (#22), carries line of cap along outside of bulwark to the stem.

24. Guard molding from 2¼'' by 2½'' stock, beveled and with drip groove as shown, shod with 1¼'' bronze half-oval; guard to be fastened with well-countersunk 3½'' screws to frames, to be torn off without major hull damage.

25. Bulwark stanchions from 1¼'' stock, set through deck and under clamp about as shown.

26. Bulwarks ⅞'', scuppered at each stanchion; at break of deck, notch bulwark down over after end of deck plywood and continue to the stern as part of the topside planking.

27. Bulwark rail cap 1'' by 2½''; fastening cleats under, between stanchions, about ¾'' by 1½''.

28. Breasthook 1½''; ½'' bolt to stem.

29. Stanchions supporting cockpit sole about 1'' by 3½''.

30. Skeg extensions ½'' by 4'' bronze; two ⅜'' bolts to wood skeg.

31. Rudder skeg ½'' by 4'' bronze; three ⅜'' bolts to skeg extensions.

32. Rudder blade 1½'', rounded off on leading edge and faired to about 1'' trailing face.

33. Rudder stock 1½'' bronze or Monel, keyed for tiller arm and top squared to take jury tiller working through 6'' deck plate; the tiller, not shown, can be ¾'' standard pipe or anything convenient, and should have about a 4' radius; rudder port standard square-base type.

34. Two tiller arms of 8'' center-to-center radius, connected by a 1'' pipe drag link with sleeve for adjustment and one-plane toggle end fittings; the drag link should have two supporting blocks built up from floor timbers to prevent sagging.

35. Aluminum 26'' diameter six-spoke smooth-rim steering wheel driving a worm-geared steerer.

36. Wheel box of about ¾'' stock, without openings to cockpit; interior accessible through a panel of about 1'9'' by 2' through bulkhead; instruments and engine controls to be selected by builder.

37. About 5'' spherical compass.

38. Propeller: three-blade high-speed type, for Perkins 6.354 with 2:1 reduction gears, 23'' diameter by 18'' pitch; for other engines, consult designer.

39. Cast bronze strut with rubber bearing.

40. Shaft 1¾'' diameter bronze, length according to selected engine, but not more than 10'.

41. Cast bronze shaft log with flexible-neck stuffing box.

42. Engine shown is the Perkins S6M and indicates maximum length available.

43. Raised engine box with double-hinged ¾'' plywood top for ready inspection; build battery box port or starboard as convenient.

44. Fuel tanks Monel 4' long fore-and-aft, with two baffle

plates; other dimensions as shown; flexible connection to "no-lose" deck plates; take vent tubes out hull sides above guard molding; tanks to be connected with a shut-off on each tank and one on the injector end.

45. Coamings at break of deck ⅞"; note large scupper at this point to serve as dockline hawse.

46. Exhaust to be water-cooled with in-line silencer, if any; water-jacketed section at forward end if necessary to give tailpipe a good pitch down to the stern.

47. Navigation lights: Wilcox-Crittenden, "wing-tip" type or similar compact type; bow, stern, and side lights as shown; interior and other lights builder's choice.

48. Hawseholes lined with cast bronze, well rounded off.

49. Electric capstan, with wildcat for chain, similar to Ideal B.H.W.

50. Deck pipe bronze about 2" diameter.

51. About 150' of ⅜" chain (furnish sample to, or buy from, capstan manufacturers) shackled to eyebolt in chain box.

52. Chain box of welded steel or brazed copper with after wall not less than ⅛".

53. Water trap boxes for 4" throat cowl vents port and starboard of about ¾" stock; deck pipes stand 8" above deck and boxes have 2" by 4" scuppers.

54. Trunk with ⅝" plywood sides and ¾" plywood top and forward end; oblong portlights opening outside.

55. Hatches with loose pin hinges to open forward or aft, fitted with adjusters to brace open at any angle.

56. Sides of deckhouse and pilothouse ⅝" plywood.

57. Deck carlins 1¾" by 3½".

58. Tiller block of deckhouse side from 2½" by 3".

59. Tops of houses ½" plywood, fiberglass-sheathed.

60. Liners of house tops Celotex or other sound-absorbent sheeting.

61. Beams of deckhouse sided 1¼", molded 2".

62. Beams of pilothouse sided 1¼", molded 2½" at sides, 3½" on centerline.

63. Aluminum tubes fitted through pilothouse beams from end to end, exactly parallel, to be a loose fit for 1" outside diameter pipes, which slide out to support the awning.

64. Cowl vents 4" throat diameter, with trap boxes as shown, 4" inside diameter ducts form stanchions of shelter top.

65. Grab rails from 1½" by 2".

66. Welded pipe frame for forward awning.

67. Swimming ladder sides 1¼'', rungs from 1¼'', vertical tie rods ¾'' brass tubing; pivoted on bracket welded from ¼'' steel. See detail.

68. Grab rail with 5'' screws to sole beam, shod on top with brass half-oval.

69. Cast-bronze closed chocks, made special, or stock to taste.

70. Sliding windows of pilothouse and deckhouse ¼'' shatterproof or tempered glass, working in scuppered metal channels as shown.

71. Metal handles for sliding windows.

72. Forward windows of pilothouse all hinged to swing out and fitted with adjusters to brace open at any angle, and with latches to close tightly.

73. Double-hinged companionway hatch ¾'' plywood, to fold back as shown.

74. Companionway steps, loose in wood brackets at sides.

75. Limber holes for free drainage from bow to stern; also see that planking butt blocks are drained and incidentally that they are not more than ⅞'' thick so as not to block ventilation under sheathing.

76. Cabin soles ½'' plywood, sheathed in cork tile, textured synthetic rubber, or other material to taste; forward cabin sole laid loose; main cabin has removable panels along the centerline, as shown.

77. Sole beams 1¼'' by 2½''.

78. Top-opening icebox; inside dimensions 1'5'' by 2'10'' by 2', about 8 cubic feet; metal lining inside 3¾'' foam insulation core; ¼'' plywood exterior sheathing; a watertight partition welded to metal lining runs fore-and-aft about 15'' or 16'' from inboard end and extends up to within 3'' of underside top to divide the ice compartment (inboard) from food compartment (outboard).

79. Icebox sump tank stainless steel, galvanized, or copper, 1'2½'' by 1'4'' by 1'11'' (will take all the melt from one filling of ice); sump to be piped to bilge pump with shut-offs to switch from bilge suction. Alternatively, and better, an automatic electric bilge pump of the Lovett type by Longport Marine Company, Longport, New Jersey, may be installed abaft station #4 and the icebox drain taken directly to the pump box, without the necessity of a sump tank.

80. Navy plunger-type or rotary-type bilge pump to suit.

81. Two-burner bottled gas or alcohol stove; make sure it will fit

into the indicated recess; if gas, cylinder to stow under port-side step abaft break in deck.

82. Stainless steel sink with overboard drain and pump to suit.

83. Freshwater tank may be a duplicate of one of the fuel tanks, installed abaft the fuel tank on the opposite side to the battery bank.

84. Dresser of plywood, sheathed with stainless steel or Formica; build dish racks from samples furnished by owner.

85. Locker doors ventilated by slatting as shown, or otherwise to taste.

86. Circular stainless steel basin draining overboard, with pump to suit; through-hull connections of drains and pumps to be in boot-topping paint line, i.e., above waterline, and fitted with bronze seacocks.

87. Marine toilet builder's choice.

88. Dinette forms double berth; stowage under seats accessible by removable panels under cushions; ventilated by slatted panels inboard.

89. Forward berths with 4'' plastic foam cushions; ½'' plywood flat.

90. Hollow cast-bronze 10'' cleats with four-bolt bases, six in all.

91. Posts of pilothouse sides from 3½'' by 5½''.

25

Lobsterboat

Length overall	32 feet
Breadth	11 feet
Designed draft	3 feet 2 inches
Designed displacement	8,950 pounds
Owner	Philip Legro
Builder	Montgomery Boat Yard, Gloucester, Massachusetts

I stopped in one day at the Montgomery Boat Yard and found Herbert Montgomery just closing a deal to build a lobsterboat for Phil Legro. That was about 10 a.m. We talked it over for an hour, and I went home to make some cartoons, preliminary studies done with a Bic pen on typewriter paper. About the middle of the afternoon I took the studies back. By the next morning, they approved one. Three or four days later, I took in the drawing reproduced here, and they began laying her down the same day. Design can go fast when all the parties know just what they want.

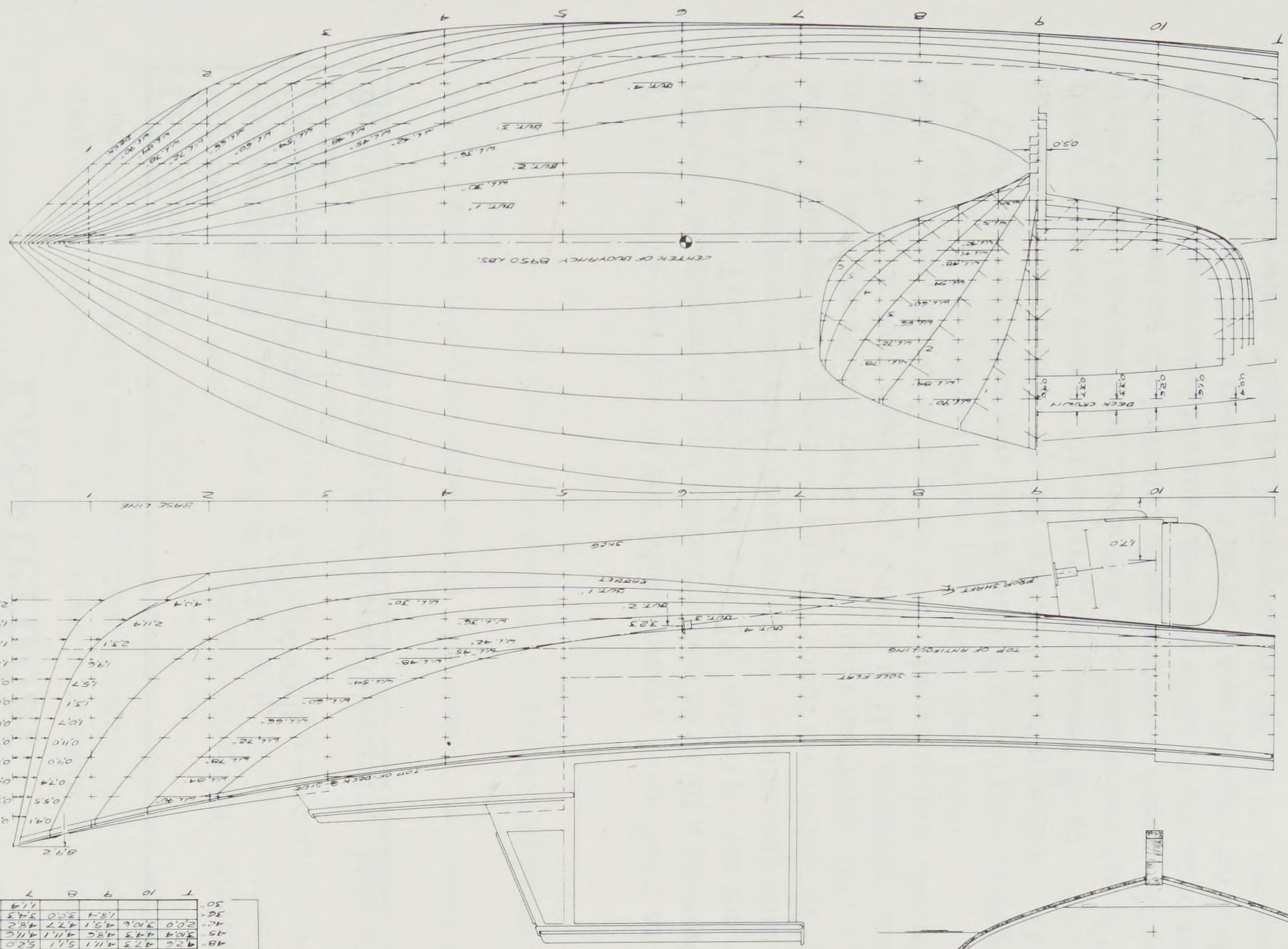
Only the body plan was laid down full size. I gave enough offsets for each mold to show up the mistakes and misprints. They were pretty accurate except for a string (corrected here) where I wrote three when I meant four. Since that put them a foot out of the way, it wasn't hard for the loftsman to see what was wrong. No construction plan was needed because she was to be of standard type, and scores of them have been built there. I was brought up in that yard in the days when Nicholas Montgomery did all the designing with

MONTGOMERY
BOAT YARD

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #413
32'0" - 11'0" - 3'2"
for Phillip Lebaro

SCALE 3/4" = 1'0"



OFFSETS IN FFT, INCHES, & EIGHTHS
TO OUTSIDE OF PLANK.

		1	2	3	4	5	6	7	8	9	10	T	
	50"					1'4	1'8 5/8	1'8 1/2	1'9 7/8	0'11 0	0'4 3/8		
	46"						(1'8 3/4	3'2 0	3'4 3/8	3'2 6	0'8 1/2	0'1 0	
HALF-BREADTHS	42"					2'0 0	3'0 6	4'1 7	4'8 1/2	4'7 3/4	3'0 0	2'0 5	
	48"					4'7 3	4'11 1	5'1 1	5'2 0	5'0 2	4'6 5	2'6 7	
	54"					4'6 3	4'10 2	5'1 2	5'3 1	5'4 0	5'0 0	4'2 7	
	60"					4'7 2	4'11 0	5'1 7	5'3 6	5'4 4	5'5 1	5'3 0	
	66"					4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'5 6	5'4 7	
	72"					4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'6 0	5'5 6	
	78"											4'8 0	
	84"												
	90"												
	96"												
	102"												
	DECK					4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'6 0	5'4 3	4'11 2
	90° WL.												
	84"												4'11 2
	78"											5'4 3	4'8 4
	72"					4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'6 0	5'5 6	4'8 0
	66"					4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'6 0	5'4 7	4'11 7
	60"					4'7 2	4'11 0	5'1 7	5'3 6	5'4 4	5'5 1	5'3 0	4'8 0
	54"					4'6 3	4'10 2	5'1 2	5'3 1	5'4 0	5'0 0	4'2 7	3'11 0
	48"					4'2 6	4'7 3	4'11 1	5'1 1	5'2 0	4'6 5	3'8 0	3'2 6
	42"					3'4 0	3'10 6	4'5 1	4'7 7	4'8 2	4'4 7	3'7 5	3'0 0
	36"					2'6 0	3'0 3	3'5 0	3'6 4	3'5 5	3'0 0	2'3 0	1'8 0
	30"					1'8 0	2'3 0	2'6 0	2'7 0	2'6 0	2'0 0	1'4 0	1'0 0
	24"					1'0 0	1'4 0	1'6 0	1'6 0	1'5 0	1'2 0	0'8 0	0'6 0
	18"					0'5 0	0'7 0	0'8 0	0'8 0	0'7 0	0'5 0	0'3 0	0'2 0
	12"					0'2 0	0'3 0	0'3 0	0'3 0	0'3 0	0'2 0	0'1 0	
	6"												
	SKEG												
	RABBET												
	1'												
	2'												
	3'												
	4' BUT												
	SHEER												

HEIGHTS FROM BASE LINE

	T	10	9	8	7	6	5	4	3	2	1
SHEER	6'8 0	6'5 0	6'2 7	6'1 7	6'2 7	6'5 0	6'8 4	7'1 2	7'4 0	8'3 2	
BUT 4'	3'6 3	3'6 4	3'4 0	3'2 5	3'0 0	2'11 1	3'1 1	3'6 0	4'5 0	6'3 7	
3'	3'6 0	3'5 6	3'3 3	3'1 6	2'11 3	2'8 4	2'5 5	2'2 4	2'3 0	2'6 6	3'6 0
2'	3'6 0	3'5 2	3'3 3	3'0 7	2'8 1	2'4 1	2'1 7	1'9 6	2'0 2	2'5 3	3'0 0
1'	3'6 0	3'5 0	3'2 4	3'1 0	2'7 4	2'4 1	2'1 0	1'10 5	1'9 5	2'2 7	3'2 2
RABBET	3'6 0	3'5 0	3'2 4	3'0 3	2'7 4	2'4 1	2'1 0	1'10 5	1'9 5	2'2 7	3'2 2
SKEG	3'6 0	3'2 4	2'11 0	2'5 3	1'11 0	1'7 4	1'2 0	0'11 0	0'8 3	0'5 7	0'3 6

	1	2	3	4	5	6	7	8	9	10	T	
DECK	4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'6 0	5'6 0	5'4 3	4'11 2	3'10 7	1'11 2	
90° WL.												
84"										3'10 7	1'6 6	90° WL.
78"										4'1 1	3'4 1	84"
72"										5'4 3	4'8 4	78"
66"	4'8 0	4'11 2	5'1 7	5'3 7	5'5 2	5'5 6	5'4 7	4'11 7	4'0 0	2'4 3	0'7 6	66"
60"	4'7 2	4'11 0	5'1 7	5'3 6	5'4 4	5'5 1	5'3 0	4'8 0	3'6 6	2'0 0	0'6 1	60"
54"	4'6 3	4'10 2	5'1 2	5'3 1	5'4 0	5'3 1	5'0 0	4'2 7	3'1 0	1'7 6	0'4 4	54"
48"	4'2 6	4'7 3	4'11 1	5'1 1	5'2 0	5'0 2	4'6 5	3'8 0	2'6 7	1'4 0	0'3 2	48"
42"	3'4 0	3'10 6	4'5 1	4'7 7	4'8 2	4'4 7	3'7 5	3'0 0	2'0 5	1'0 0	0'1 1	42"
36"	2'6 0	3'0 3	3'5 0	3'6 4	3'5 5	3'0 0	2'3 0	1'8 0	1'2 0	0'6 0	0'1 0	36"
30"	1'8 0	2'3 0	2'6 0	2'7 0	2'6 0	2'0 0	1'4 0	1'0 0	0'8 0	0'4 0		30"
24"	1'0 0	1'4 0	1'6 0	1'6 0	1'5 0	1'2 0	0'8 0	0'6 0	0'4 0			24"
18"	0'5 0	0'7 0	0'8 0	0'8 0	0'7 0	0'5 0	0'3 0	0'2 0				18"
12"	0'2 0	0'3 0	0'3 0	0'3 0	0'3 0	0'2 0	0'1 0					12"
6"												6"
SKEG												SKEG
RABBET												RABBET
1'												1'
2'												2'
3'												3'
4' BUT												4' BUT
SHEER												SHEER

HALF-BREADTHS

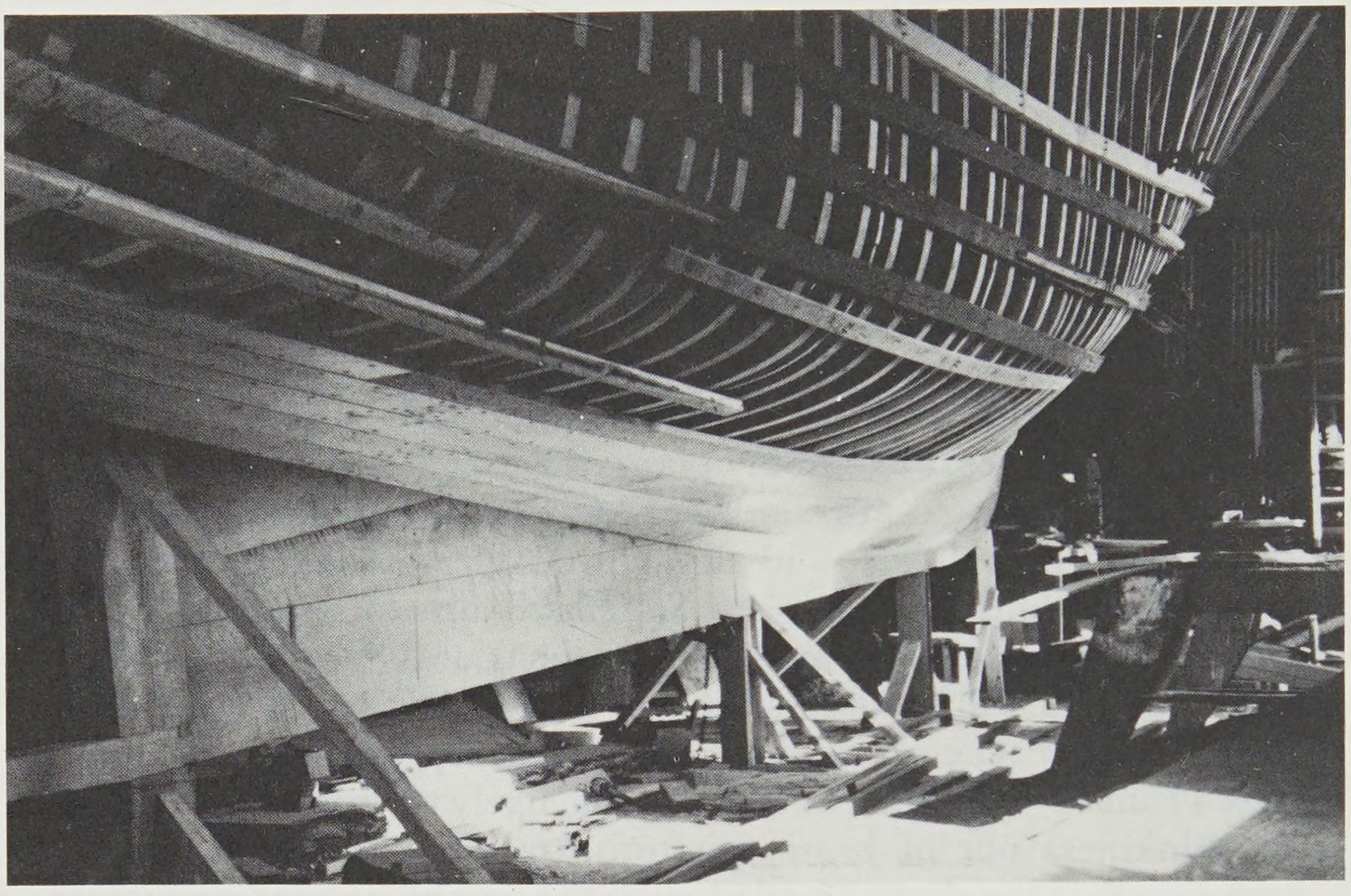
half models, with nothing on paper. Those interested in what the construction plan would have been like, if there'd been one, should have a look at Royal Lowell's book, *Boatbuilding Down East* (International Marine, 1977). It's definitive, by a man who has designed more lobsterboats than anybody in history, if you count fiberglass duplicates. The only criticism of that book I've ever heard is that it doesn't include lines and offsets, a lack herewith rectified.

This set of lines came out unusually happily. She's a smoothed-up and toned-down version of the larger lobsterboat *Genny W,* built in Essex a few years ago to my plans. That boat has been very successful, but her looks are controversial. Everybody likes this one — the owner, the builders, and all the bystanders. The difference between these lines and those of *Sea Hawk,* drawn nearly 20 years earlier, may not seem to amount to much, but they're worth studying. Part of the difference is that *Sea Hawk* was designed to meet a lower, steeper type of rough water; the rest represents a lot of practice. I think I've learned as much as I'm likely to learn about fairing the kinkiness out of beamy motorboats, and it's somewhat interesting that the shape I settled on as the best all-around performer happens to be a very straightforward job to frame and plank. In building this boat, no frame was broken in bending and no plank needed steam.

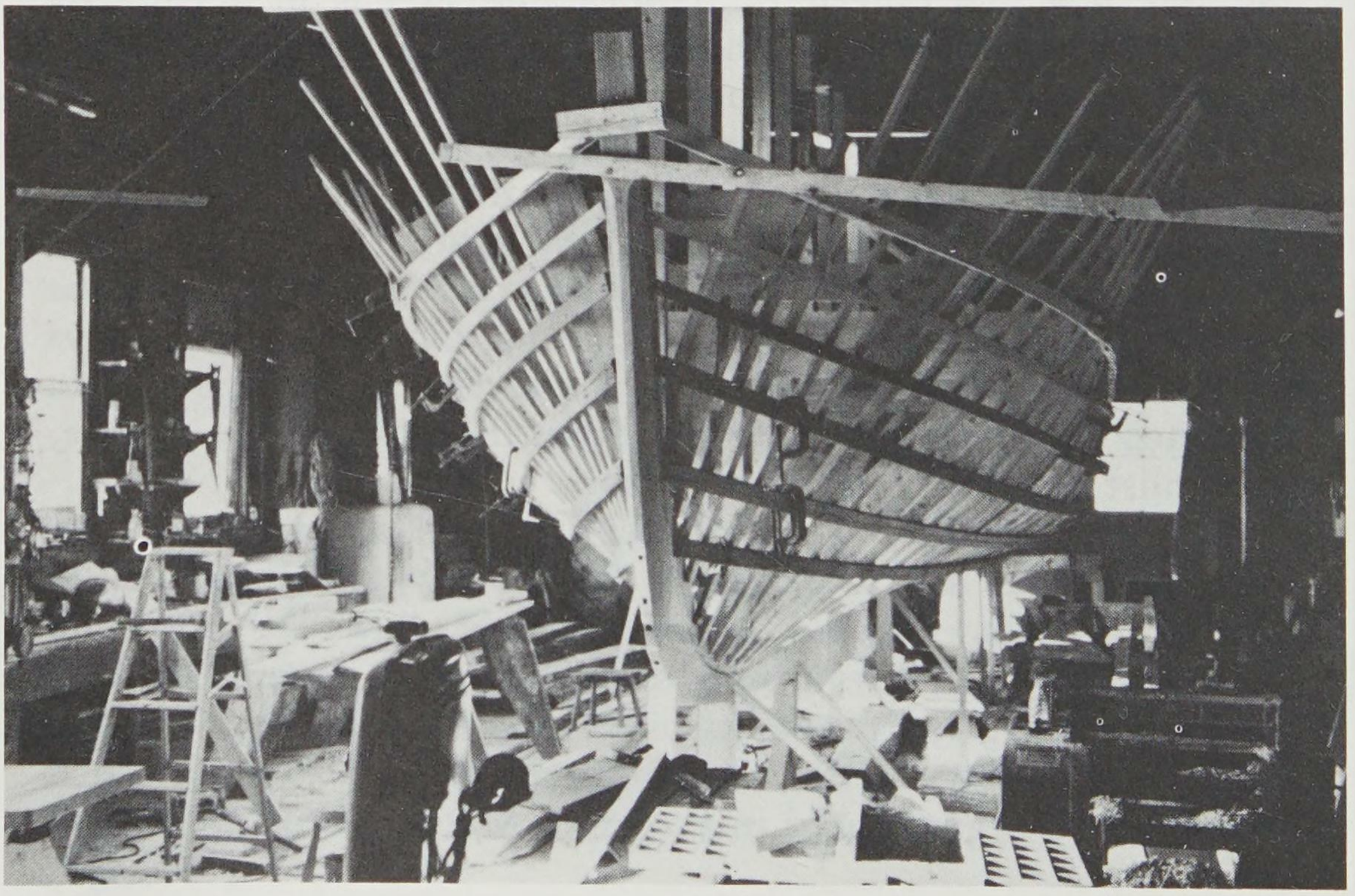
The photo of her in frame shows how nicely the turn of her bilge flows up into the flare of the bow. It carries buoyancy and reserve stability well forward and damps down pitching. On the lines drawing, see how the outermost buttock line sweeps in a perfectly smooth curve for its full length. It took me many years to learn how to do that, and even now I don't always get it as good as this one. Turn to the picture of *Mikim* in Chapter 19, at the same stage in the same shop, for a boat with a hard place in this line that's not easy to pick up on paper but can be seen in the boat.

This is an inshore lobsterboat, working close to home. I presume that her owner is partly responsible for the minefield of pot buoys that encloses Marblehead Harbor. I marvel that the lobsters can find their way between the traps. From the looks on the surface, they must practically pave the bottom.

What was needed was quick, certain handling; a steady platform; and space and buoyancy to carry a big load of traps all at once. This last is economically important; it allows her to pick up her gear quickly on forewarning of a gale, and to preempt the best places after the gale. It is the inability to carry many traps that has made obsolete the graceful, slim lobsterboats that I used to watch William Frost's gang build in Portland, Maine, in the 1950s.



Above and below: *The lobsterboat has a powerful body . . .*
. . . and easy entrance. (David Montgomery photographs)



High speed wasn't so important here. She can probably get up to 11 knots with the Ford 330 diesel, but her model is best at about 8 knots. The forward engine location isn't suitable for fast boats. One of the cartoons I offered was for a faster boat with the engine much farther aft, some transom in the water, and a shallower body. It had to have a longer skeg and a steep shaft angle, and the engine took up a lot of space in the cockpit. We all agreed that this one would work better.

26

Cagliostro

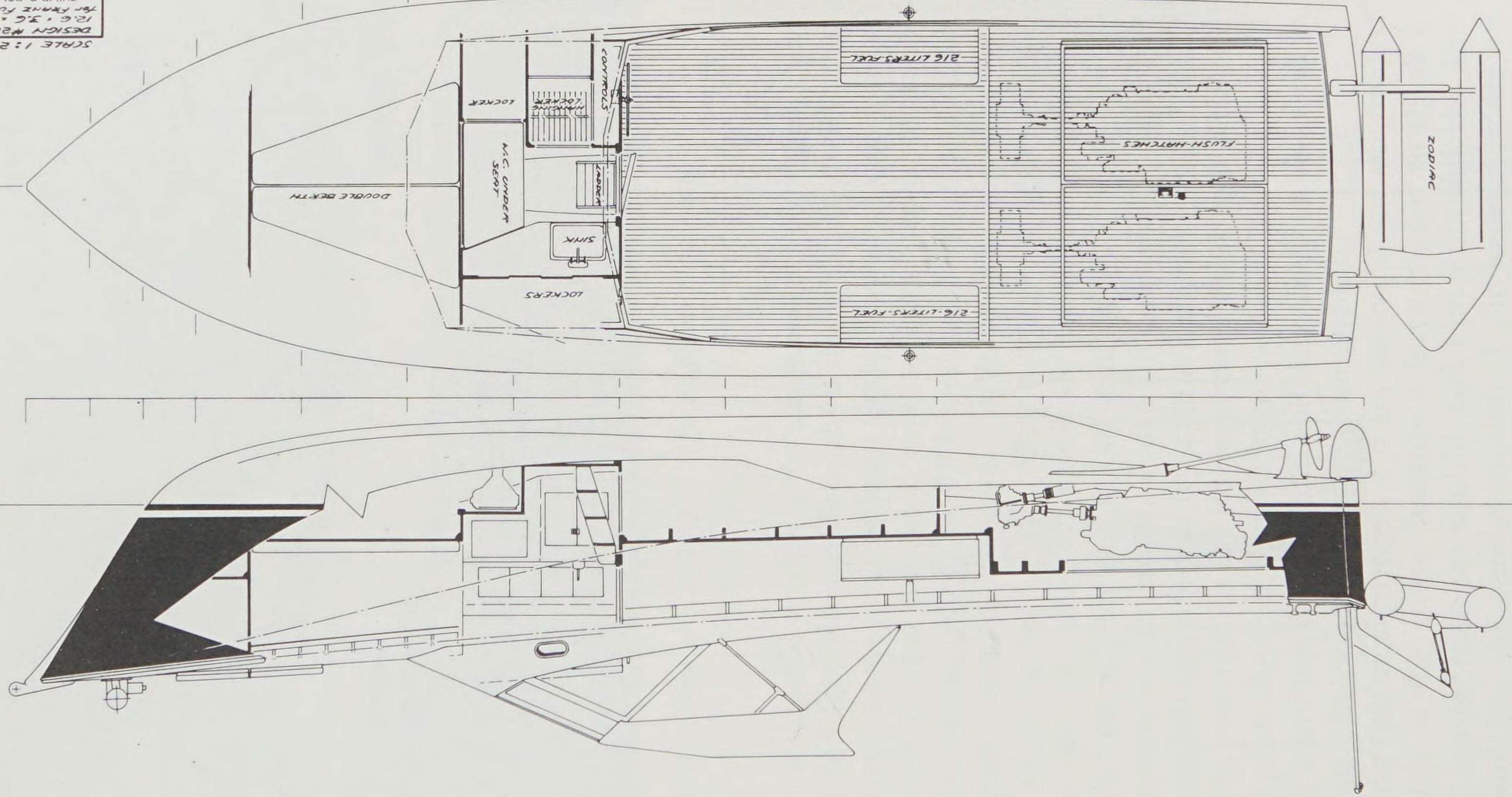
Length overall	12.6 meters (41.3 feet)
Breadth	3.6 meters (11.8 feet)
Draft	.85 meter (2.8 feet)
Owner	Franz Furrer, Viareggio, Tuscany, Italy

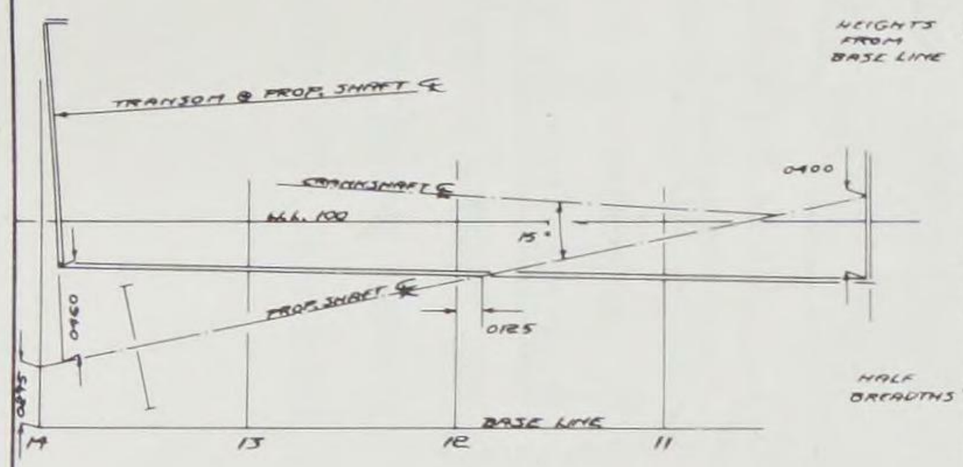
This was the third boat Franz Furrer had built to my designs for day trips and scuba diving along the Italian coast, over to Corsica and Sardinia, and occasionally as far as France. They were all similarly arranged, with big cockpits or bridges and cuddies forward with one berth and minimum galley. He and his guests sleep ashore when cruising, leaving one man aboard as shipkeeper.

He always made a great point of rough-water capability. I tried to produce it, but I admit I thought he was overemphasizing the need. I'd seen too many pictures of the placid Mediterranean lapping on the beaches. But it happened that between the second boat and this one, I had occasion to help Eugene (Nucu) Giossan sail a yawl from Elba to St. Tropez. We started in the kind of weather the pictures show. Presently it began to breeze on from ahead, and being shorthanded, we went into Maccinagio for the night. No sooner were we tied up than it began to blow as I've seldom seen it blow, screeching down off the Corsican mountains and blasting clouds of spray off toward Italy. This, I'm told, is called the *libeccio*. About

DESIGN #2294 (R3)
12.6' x 3.6' x .85'
for FRANZ FURRER
PHILIP C BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

SCALE 1:20





WEIGHTS FROM BASE LINE

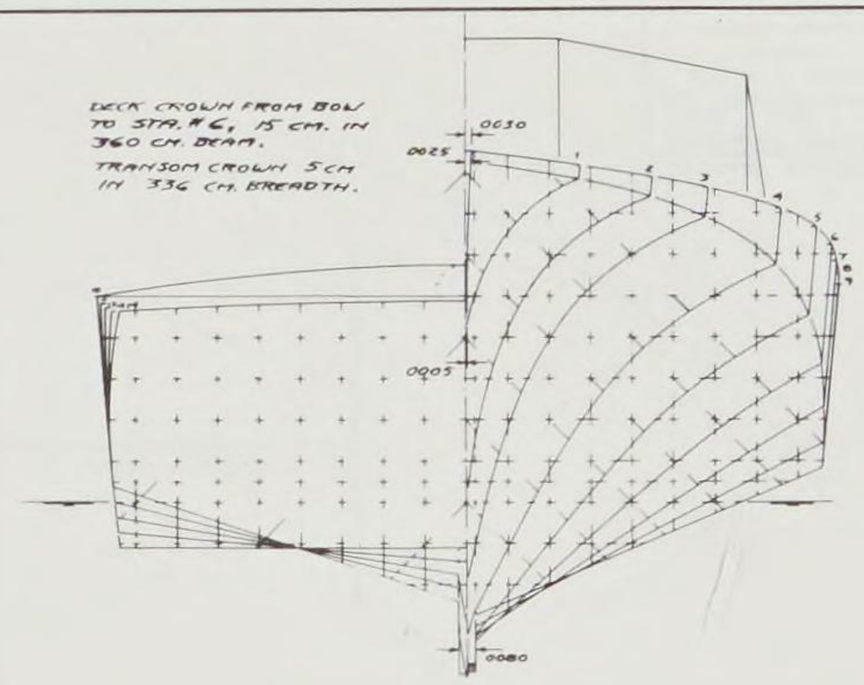
	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
DECK	1930	1930	1941	1969	2000	2048	2101	2167	2242	2328	2420	2523	2576	2632	DECK
CHINE	0780	0851	0925	1000	1076	1165	1270	1458	1668	1909	2148	2381	2480	2564	CHINE
BUT. 160	0780	0844	0910	0976	1040	1114	1224	1386	1609	1873					160 BUT.
140	0780	0826	0876	0923	0973	1032	1120	1263	1481	1762	2104				140
120	0780	0811	0842	0874	0906	0949	1019	1135	1340	1633	2000				120
100	0780	0795	0811	0825	0840	0860	0910	1005	1183	1471	1866	2312			100
80	0780	0779	0775	0773	0774	0777	0805	0869	1018	1279	1691	2198	2441		80
60	0780	0759	0740	0723	0705	0689	0700	0732	0838	1053	1455	2040	2326		60
40	0780	0743	0710	0673	0637	0608	0590	0598	0652	0802	1147	1769	2155	2491	40
20	0780	0728	0675	0622	0571	0521	0484	0461	0475	0659	0781	1369	1840	2302	20
RABBET	0780	0713	0650	0583	0519	0453	0400	0355	0333	0360	0483	0791	1295	1990	RABBET
KEEL	0780	0713	0431	0150	0160	0170	0180	0193	0214	0258	0362	0639	1070	1860	KEEL

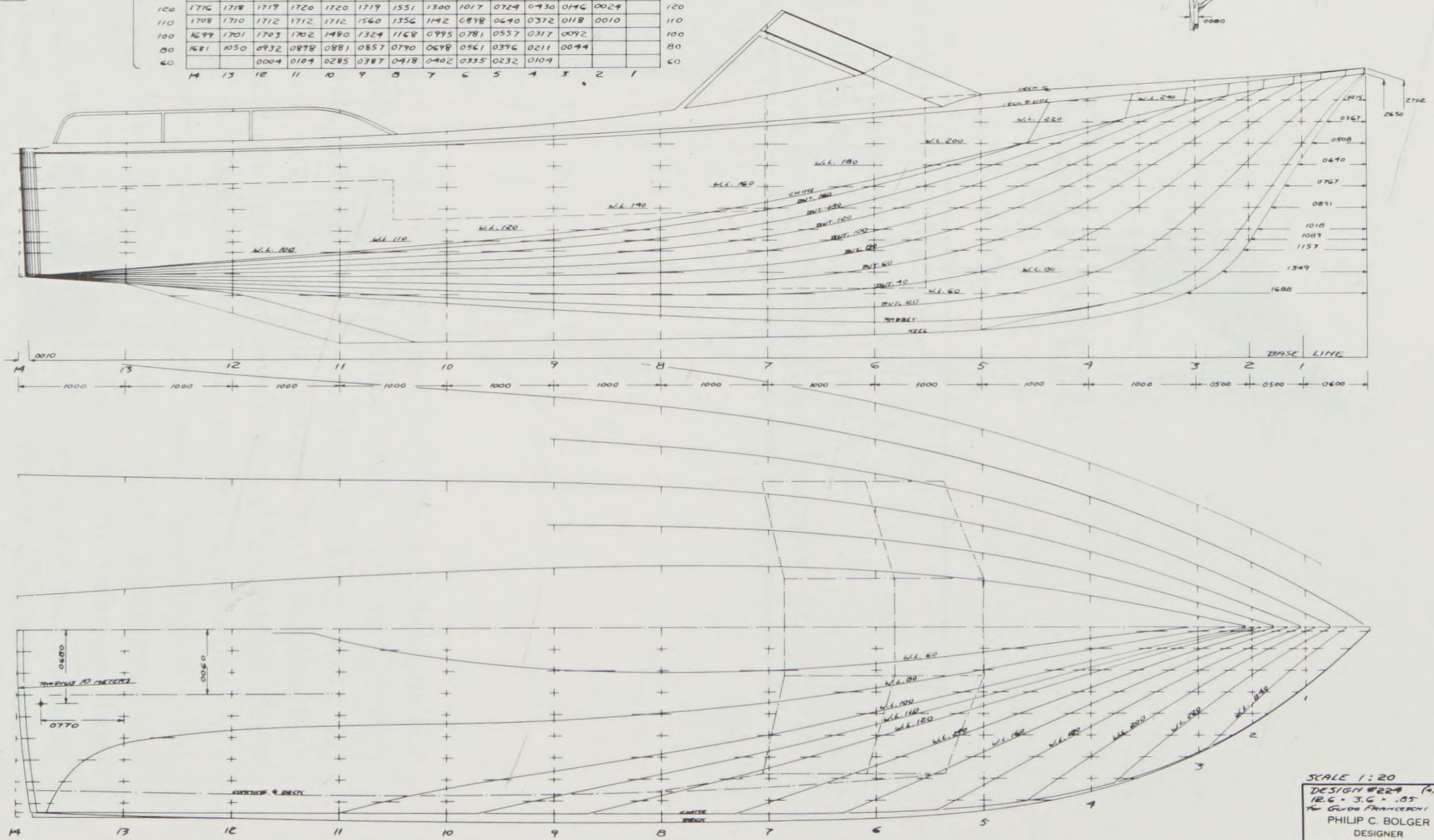
HALF BREADTHS

	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
DECK	1674	1715	1745	1770	1788	1798	1800	1790	1766	1694	1521	1169	0878	0551	DECK
CHINE	1679	1688	1694	1702	1708	1714	1721	1721	1711	1653	1493	1155	0890	0594	CHINE
W.L. 240											1519	1158	0715	0287	240 W.L.
220									1762	1681	1500	0800	0492	0128	220
200					1788	1795	1790	1774	1743	1662	1195	0560	0272	0092	200
180	1700	1722	1743	1760	1771	1778	1771	1756	1726	1460	0918	0905	0182		180
160	1720	1730	1740	1750	1755	1758	1752	1739	1589	1155	0713	0293	0111		160
140	1722	1725	1730	1735	1738	1739	1734	1620	1279	0920	0559	0211	0060		140
120	1716	1718	1719	1720	1720	1719	1551	1300	1017	0729	0430	0146	0029		120
110	1708	1710	1712	1712	1712	1560	1356	1142	0898	0640	0372	0118	0010		110
100	1699	1701	1703	1702	1480	1324	1168	0995	0781	0557	0317	0092			100
80	1681	1050	0932	0878	0881	0857	0790	0698	0561	0396	0211	0094			80
60			0004	0184	0285	0387	0418	0402	0335	0232	0104				60
	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

OFFSETS IN MILLIMETERS TO OUTSIDE OF PLANK

DECK CROWN FROM BOW TO STA. #6, 15 CM. IN 360 CM. BEAM.
TRANSOM CROWN 5 CM IN 336 CM. BREADTH.

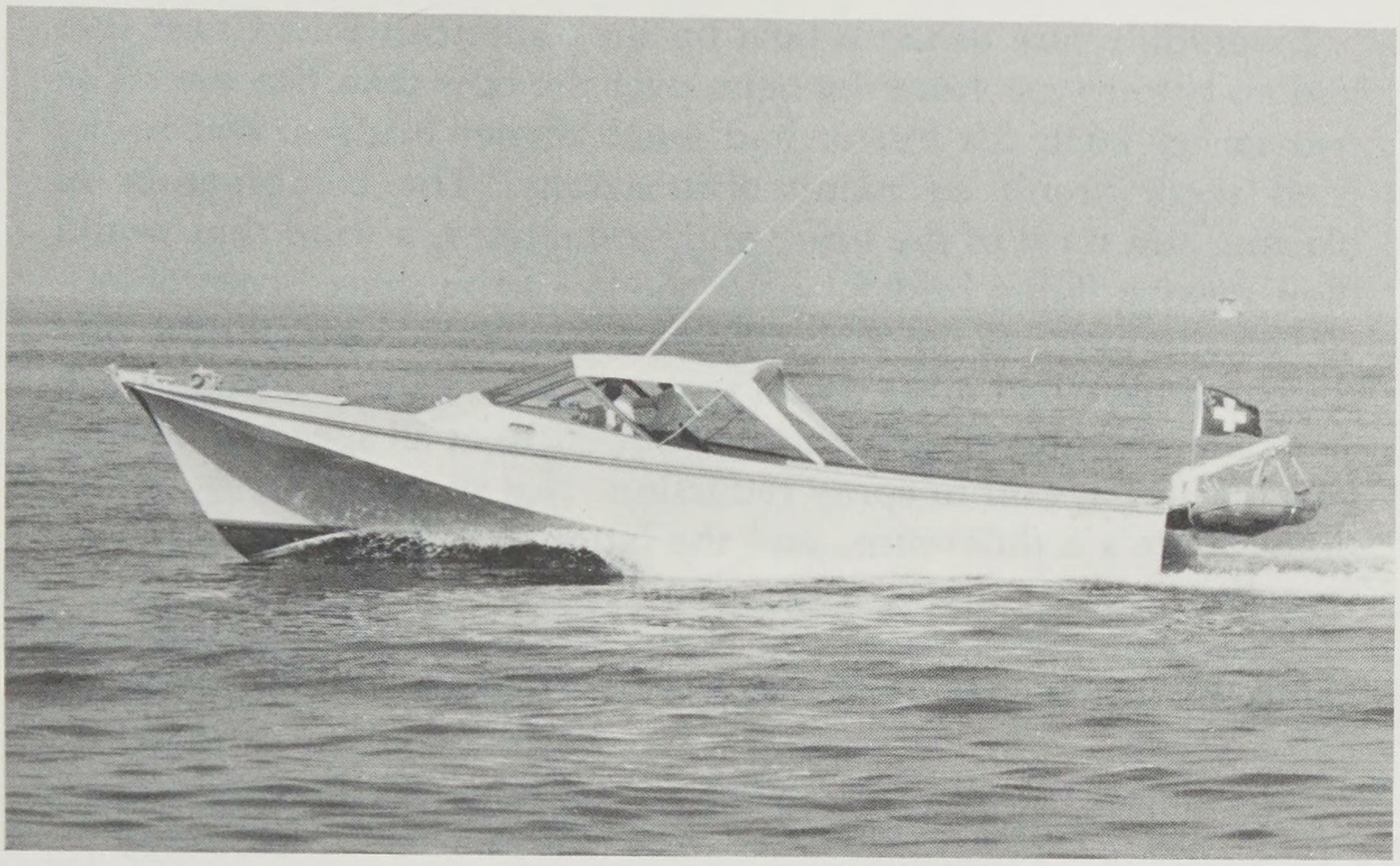




SCALE 1:20

DESIGN #229 (4/69)
12.6 - 3.6 - .85
for Guido Franceschi

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



Cagliostro *cruising at 2,050 r.p.m. (Franz Furrer photograph)*

the third day we imagined it was moderating and set out again. The yawl was a stiff and fast Sidney Herreshoff design. She stood up to it nobly, but as soon as we got out from under the lee of Cap Corse, the scend of the seas kept her from making much good to windward. The mizzen anemometer hit 55 knots on every crest. A Sixth Fleet heavy cruiser passed us to leeward with the seas breaking over her lofty decks all along her length. After a couple of hours of this, Nucu looked at me and said, "I think we make a craziness." I nodded hard, and we put her about and scuttled back under cover.

With that experience in mind, I designed *Cagliostro,* and her owner has not yet felt the need to try again. I daresay he wouldn't pick such a day to run over to the Riviera, but I think that if he did, this boat would plug along at 8 or 10 knots without hurting herself and with as easy a motion in pitch and roll as is likely to be found in a boat that doesn't bury herself submarine-fashion.

If I were doing this design now, I'd try to avoid the downward slope of the chine at the stern, because I have reason to think it makes her drive harder than she should, but I do still think the flat-bottomed transom has the easiest motion. I did several boats on variations of this model, all slightly disappointing in speed and all highly praised for comfort in rough water. *Cagliostro* can cruise at about 15 knots with her twin 130 h.p. Perkins flat-6 diesels.

I wouldn't care to use a boat on the American East Coast that had no better view from the helm over the bow than this one. The two earlier boats for Furrer had much higher bridges. But in the Med there aren't so many obstructions. The combination of blasting sun most of the time, and, sometimes, a wind that would blow away a flying bridge, made the low helm more acceptable.

The sharpness of the bow may be exaggerated. It could be that she could have had more useful space forward without losing much capability. But the shape of wave it produces at all speeds does suggest that it pays off in spray reduction. Not suppression — reduction. There's a difference, and the latter is better if it can be accomplished.

It's a matter of taste, of course, but I think *Cagliostro* is close to being the handsomest boat I've ever designed.

27

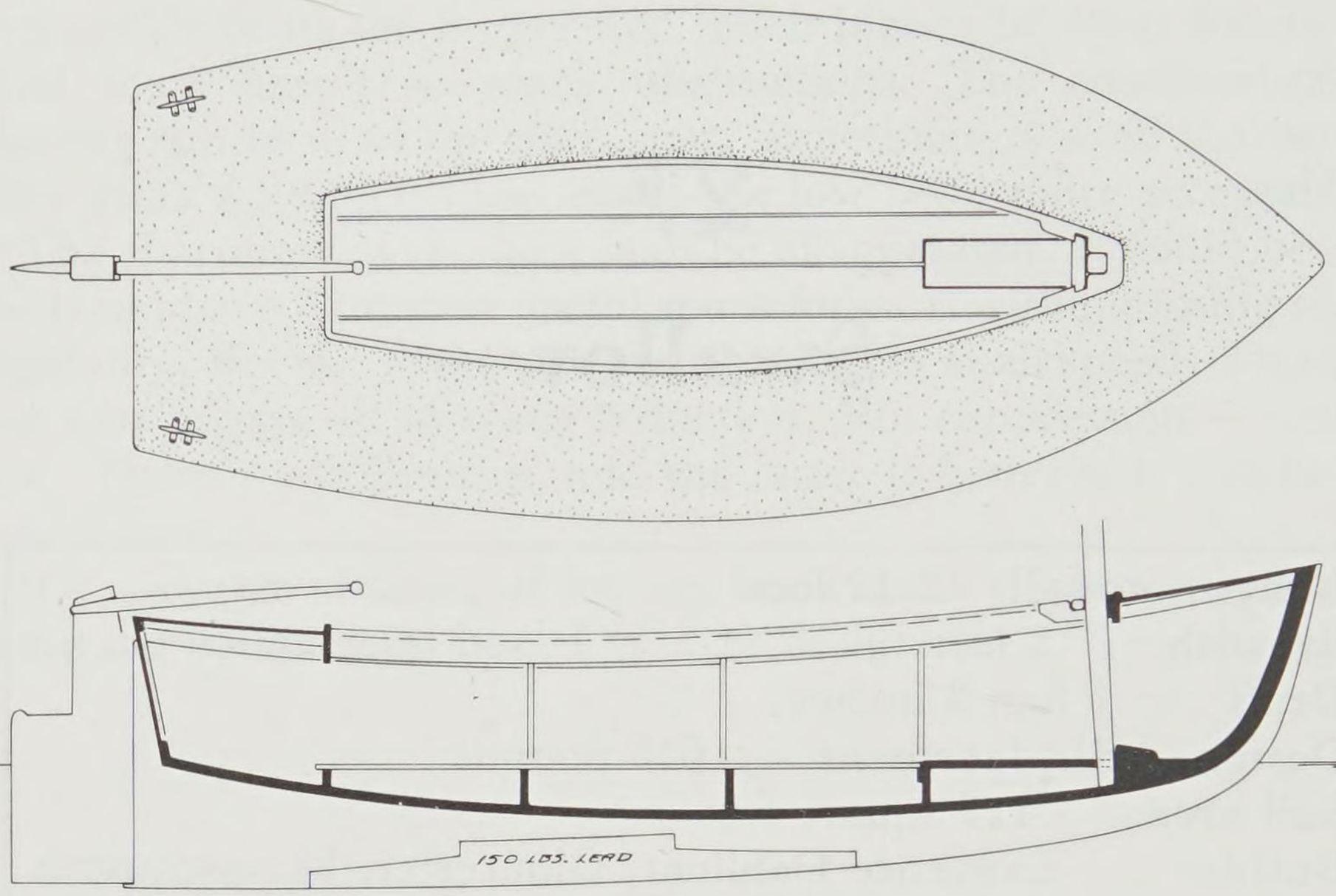
Swallow

Length overall	12 feet
Breadth	5 feet
Draft	1 foot 3 inches
Designed displacement	615 pounds
Sail area	117 square feet
Builder	Lawrence Dahlmer, Gloucester, Massachusetts

Swallow was an attempt to realize an old ambition of mine — to design a daysailer that would be all sailing and no preparation, a boat to step into and sail, and then step out of and walk away. I wanted her spirited but forgiving, as little dependent on having close attention paid to her position and handling as possible. I'm absentminded myself, so I try to design boats that other absent-minded people can sail.

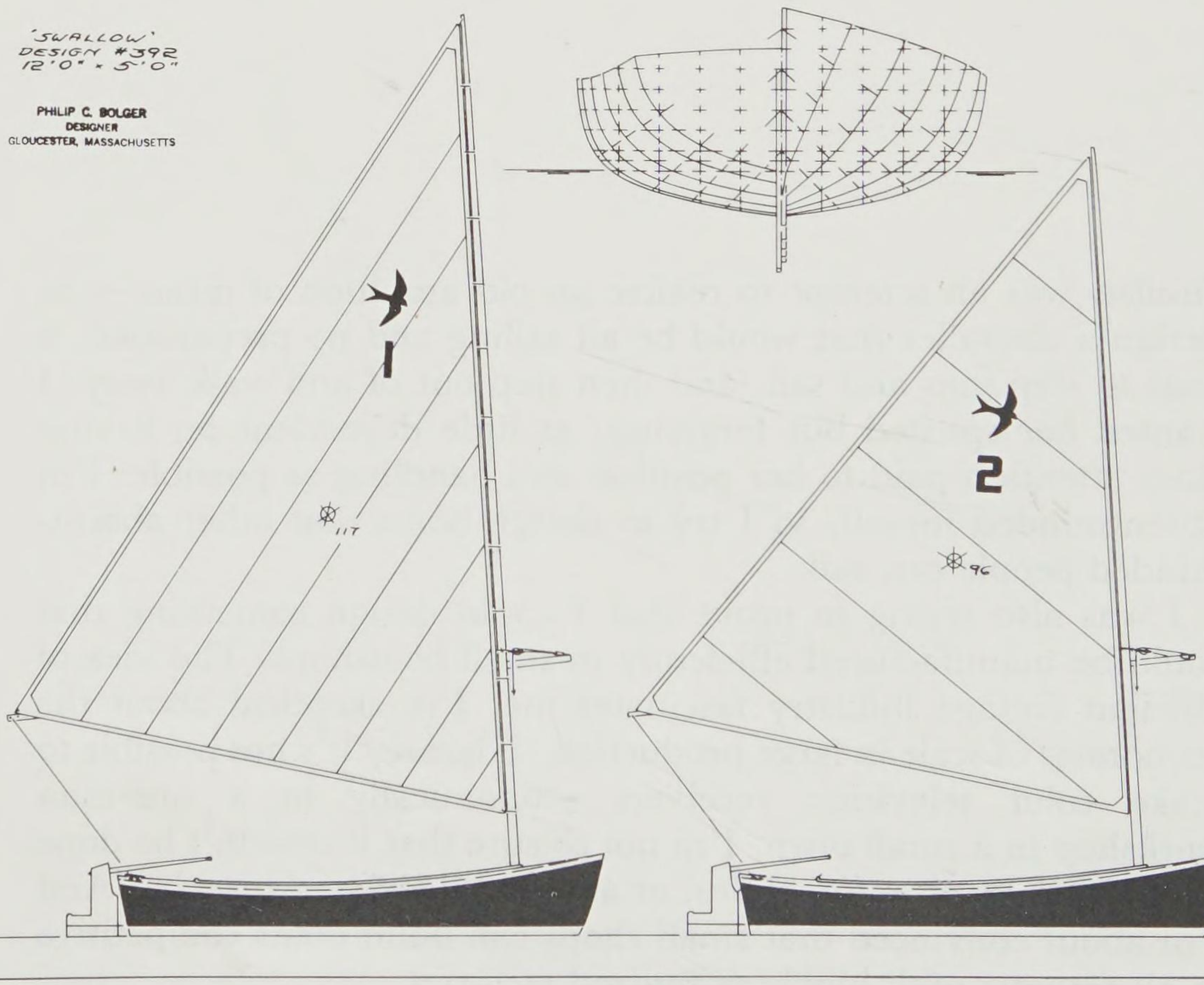
I was also trying to prove that I could design something that could be manufactured efficiently in small boatshops. The idea of efficient cottage industry fascinates me. I'm skeptical about the economies of scale in large production. I daresay it's not possible to make color television receivers economically in a one-man workshop in a small town. I'm not so sure that it couldn't be done with airplanes or automobiles, or at least gliders and bicycles. And I'm about convinced that small shops can build boats competitive in all respects with highly organized factories.

The trouble with this notion has been that small shops custom-



'SWALLOW'
DESIGN #392
12'0" x 5'0"

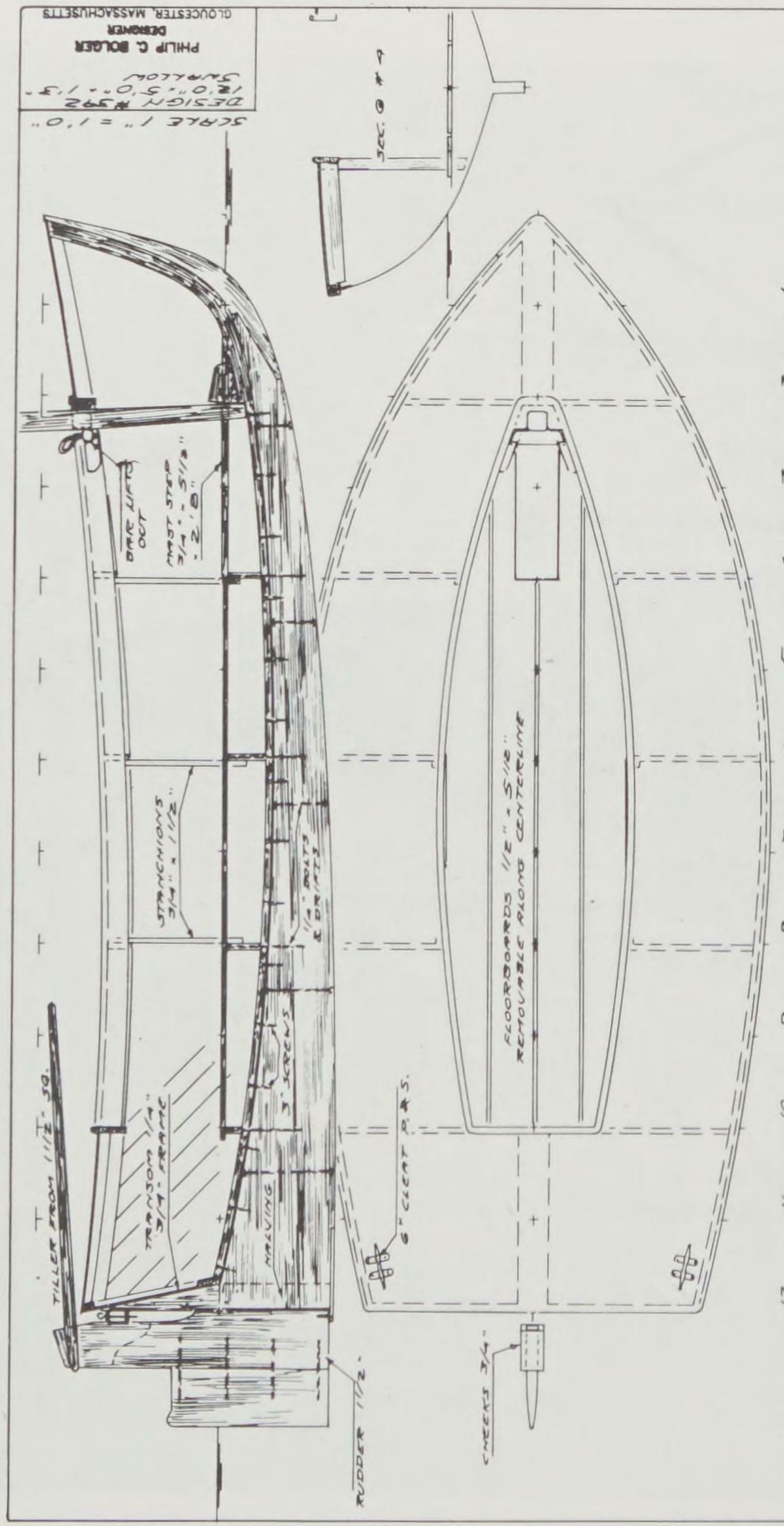
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DESIGN #392
12'0" x 5'0" x 1'3"
SWALLOW

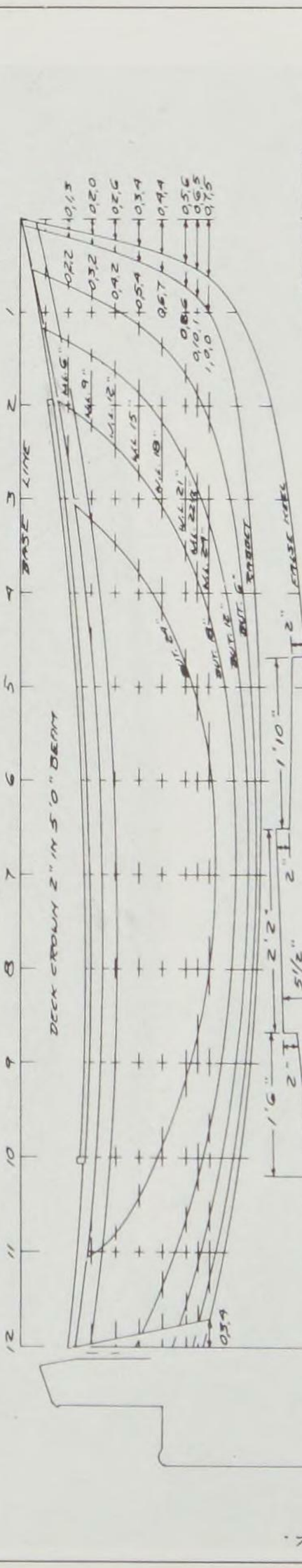
SCALE 1" = 1'0"

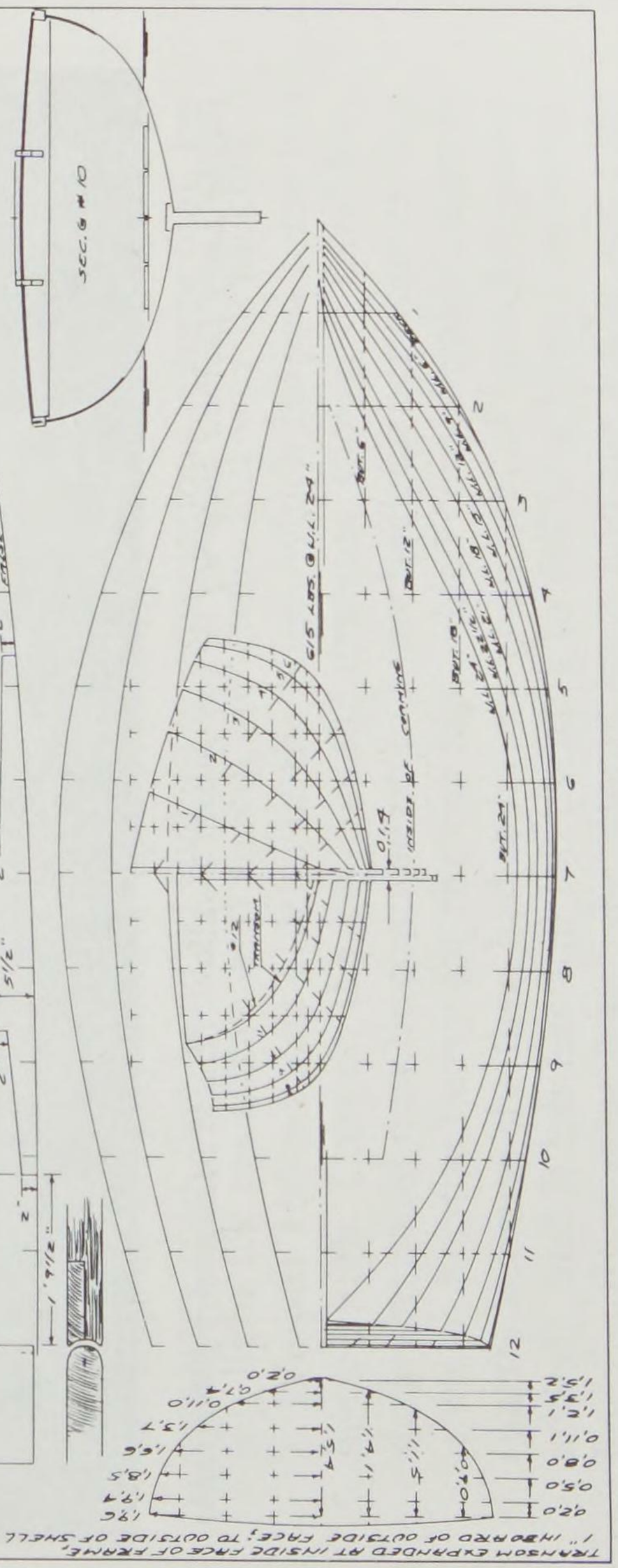


OFFSETS IN FEET, INCHES, & EIGHTS TO OUTSIDE OF PLANK.

	STA. 1	STA. 2	STA. 3	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	STA. 9	STA. 10	STA. 11	STA. 12
HEIGHTS FROM BASE LINE												
DECK @ SIDE	0'2 4	0'4 7	0'6 6	0'8 2	0'9 2	0'10 0	0'10 5	0'10 3	0'9 3	0'7 3	0'4 4	0'0 0
BUT. 24"	0'2 4	0'4 7	1'5 4	1'4 7	1'0 0	2'0 3	2'3 2	2'4 7	2'5 0	2'5 0	2'4 4	2'3 0
18"	0'5 4	1'1 2	1'11 0	1'11 2	2'2 1	2'5 0	2'7 0	2'7 6	2'7 7	2'7 4	2'6 4	2'4 6
12"	0'7 4	1'4 7	2'1 0	2'2 2	2'4 0	2'6 4	2'7 6	2'7 7	2'7 6	2'6 6	2'5 2	2'2 7
6"	0'9 4	1'8 7	2'3 3	2'4 4	2'5 0	2'6 6	2'7 4	2'7 2	2'6 4	2'5 2	2'3 4	2'0 2
RABBET	1'0 2	2'0 7	2'5 5	2'6 0	2'6 2	2'6 4	2'6 2	2'5 6	2'4 4	2'2 6	1'11 2	1'7 0
KEEL	1'1 2	2'2 0	2'6 6	2'6 6	2'6 4	2'6 2	2'5 6	2'4 6	2'3 2	2'0 2	1'9 2	1'4 4

	STA. 1	STA. 2	STA. 3	STA. 4	STA. 5	STA. 6	STA. 7	STA. 8	STA. 9	STA. 10	STA. 11	STA. 12
HALF-BREADTHS												
COAMING DECK. WAT. 6"	1'8 4	2'0 1	2'2 2	2'3 0	2'3 2	2'3 2	2'3 0	2'2 6	2'1 4	1'10 0	1'6 4	1'0 0
9"	1'9 2	2'0 0	2'2 0	2'2 0	2'2 0	2'2 0	2'1 6	2'1 2	2'0 0	1'8 6	1'4 2	0'9 2
12"	1'7 7	1'11 3	2'1 2	2'1 4	2'1 4	2'1 4	2'1 2	2'0 6	1'11 4	1'7 4	1'2 6	0'7 4
15"	1'5 4	1'9 7	2'0 5	2'0 6	2'0 6	2'0 6	2'0 4	1'11 6	1'10 4	1'5 7	1'0 7	0'5 7
18"	1'1 8	1'7 5	1'11 5	1'11 6	1'11 6	1'11 6	1'11 4	1'10 6	1'9 4	1'3 7	0'10 3	0'3 4
21"	0'8 1	1'3 7	1'9 0	1'9 2	1'9 4	1'9 4	1'9 2	1'8 4	1'7 2	1'1 4	0'8 2	0'2 2
22½"	0'3 5	1'0 6	1'7 1	1'7 2	1'7 4	1'7 4	1'7 2	1'6 4	1'5 2	0'11 2	0'6 6	0'1 4
24"		0'8 4	1'4 4	1'4 6	1'4 7	1'4 7	1'4 6	1'3 7	1'2 6	0'9 7	0'5 1	0'0 6





TRANSOM EXPANDED AT INSIDE FACE OF FRAME, ½" INBOARD OF OUTSIDE FACE, TO OUTSIDE OF SHELL.

Builder Larry Dahlmer humoring the over-sparred Swallow. *(David Montgomery photograph)*

arily build rare types of boats, usually highly specialized. The demand for such boats is scattered, so you end up with the ridiculous situation that the small boatshop has to ship its products as far as the centralized factory, with much less chance of doing it economically. So I tried to design a mass-market boat, the most generalized sailboat I could imagine. It was supposed to be marketed only in the immediate neighborhood of the builder, with word-of-mouth advertising, cash-and-carry delivery, no dealer mark-up, and minimum capital tied up in stock.

I don't see anything wrong with this reasoning, but I bungled the design. *Swallow* is the name of the keel sailing dinghy featured in several of Arthur Ransome's books. (If you haven't read *Swallowdale,* or *Coot Club,* or *Secret Water,* or *Swallows and Amazons,* and the others, I'm sorry; it's probably too late. But if you have children, start them early. The books are all in print in England.) I'd been discovering that these long, shallow keels can work surprisingly well, and I thought that one would simplify both the construction and the handling of a daysailer.

I thought the boat would be easier to sell if it was light enough for cartop carrying, and I took advantage of the cold-molded construction to make it so. The prototype weighed about 180 pounds. I gave her a rather slack bilge to make the molding easier, thinking that plenty of beam would get back the lost stability. I thought of the keel as being neutral buoyancy, which it isn't; it floats up appreciably. And I oversparred her because I was worried about her sailing qualities with the old-fashioned keel. I figured that at this scale, crew weight could hold up the rig easily, even though it was very big and tall for the boat.

The result was a desperately tender and tricky boat. I sailed her around in a gentle breeze, concentrating fiercely. She would float high on her side without shipping water if capsized, but I was afraid she'd go all the way bottom-up if I let her get that far, and the water was very cold. She handled well up to expectations, except that, being light for resistance and speed, she easily lost way in tacking.

We put 150 pounds of lead in the bilge, which helped some but not enough. Cast on the keel, as the drawing shows, it fixed her, since she could now be counted on to come back on her bottom. But it made her too heavy for the car top, added considerable expense (partly because she then had to have a good deal of foam buoyancy added), and it left her still too exciting to sail in a breeze of wind. For frostbiting, at least, she should have had the lower sail plan shown.

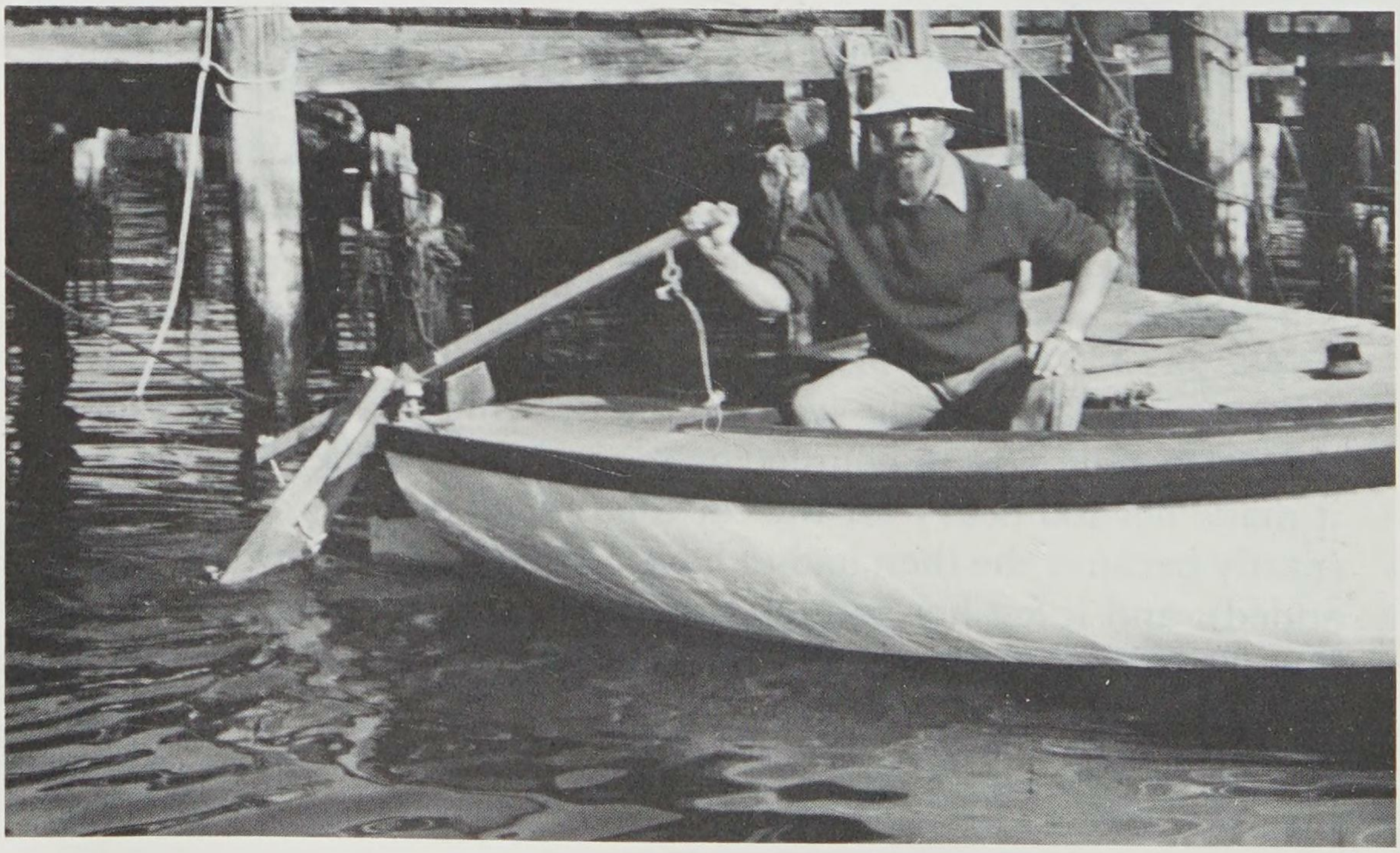
Back to the old drawing board. *Swallow* is a pretty little boat. She's a lively sailer, dry, and a good carrier. She's not the boat I had in mind, which should have had a harder bilge, a flatter bottom, a wider stern, a keel made of a denser material than fir, and three or four feet less mast.

Swallow's Yuloh

Swallow is a suitable boat for yuloh propulsion, light but with a long keel to keep the tail from wagging the dog. Her short length made the folding feature appropriate, though it was mainly a by-product of my wanting to try an adjustable-pitch blade. The angle of the knuckle between the blade and loom of a yuloh controls the pitch of its blade in action. In this version it can be altered by changing the length of the lanyard from the heel of the loom through the slot in the blade.

Larry Dahlmer made the thing accurately, but the man who furnished the metalwork came up with a universal joint of his own devising, so I didn't get a test of how well the designed open rest would have worked. The joint supplied had the annoying drawback that it couldn't suddenly be taken away to unclutter the stern for

The author brings Swallow *in from a power trial. (David Montgomery photograph)*



SCALE 3" = 1'0"

SMALL YUKON

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

OVERALL LENGTH FOLDED 5'5"

BLADE 1 1/2" x 7 1/2" x 4'0"

GRIP 1'0"

1'10 3/4"

1'8 1/4"

1'6"

4'11" 1 1/2" SQUARE

3/8" x 6" BOLT

1/2" DECLARING PIN

HINGE PLATES - FULL SIZE
MAKE FROM 1/4" x 2 1/4" x 8"

1/4" RIVETS.

3/8"

BEARING SPIKE
FULL SIZE
1/4" x 1 3/8" - 6"

1/2" DIAMETER

1/4" x 2 1/4"
BOLT EACH END

BEARING SOCKET
FULL SIZE

1/4" BOLTS OR LAGS

2"

6"

2"

90°

sailing. The corresponding advantage was that it wouldn't hop off at the wrong time. It happened to have a limited travel that made the usual lanyard on the loom unnecessary. I'd meant to try taking this to a point farther forward on deck than the straight-down angle of the classic Chinese yuloh, but, as the photo shows, it would work without any lanyard control at all.

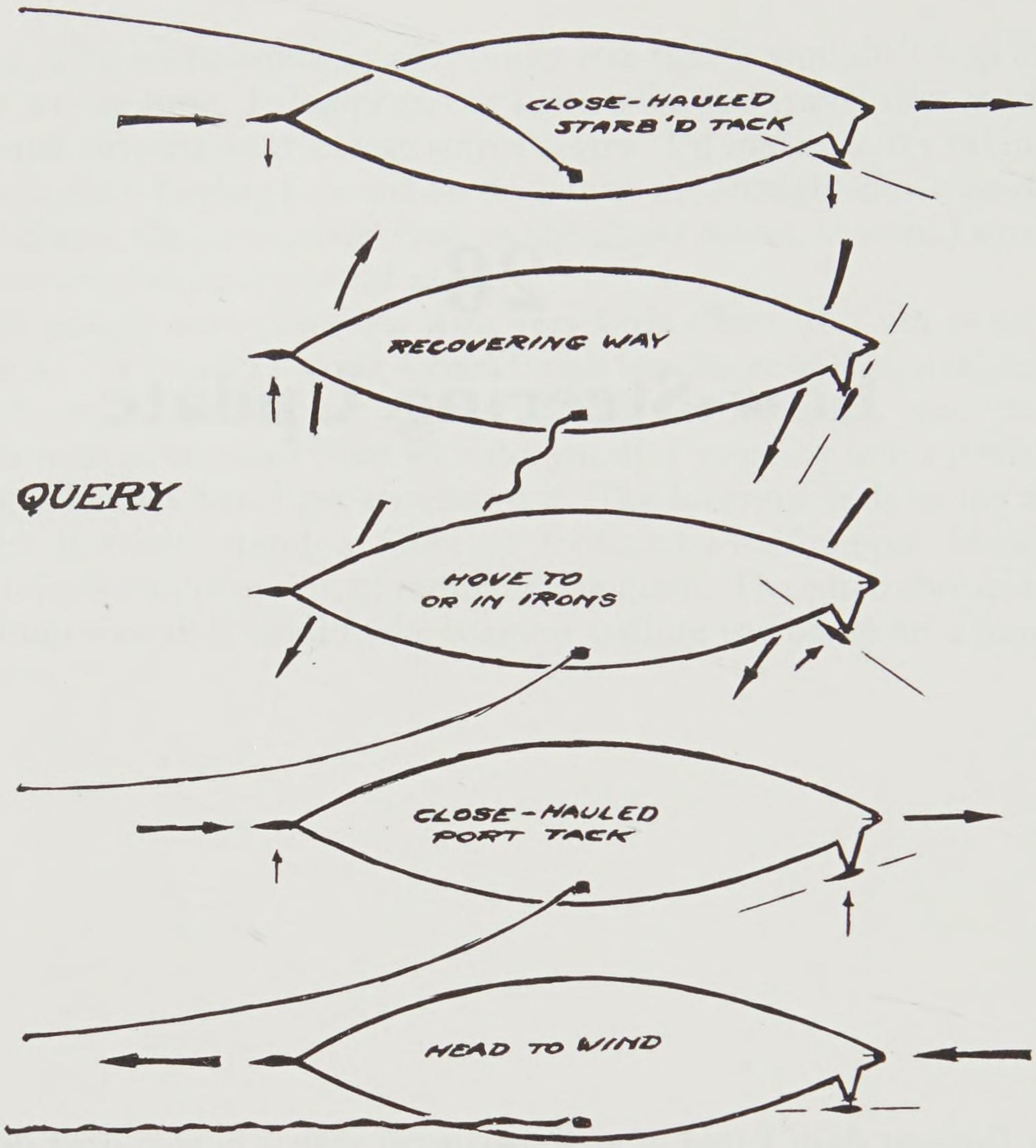
This gadget drove *Swallow* with very little effort, but not nearly as fast as I'd hoped. I think I could scull her faster with a straight-bladed oar, or paddle her as fast, though I'd probably wear out sooner with either than I did with the yuloh. I'm going to try it with a longer blade when I get around to it. The leverage feels to me as though it could stand a foot- or foot-and-a-half-deeper blade, especially with the option of reducing the pitch. The pitch shown in the photo was all it would take without stalling the blade on a hard stroke.

28

Bow-Steering Update

In *Different Boats* I told of an experiment with a bow-rudder design that sailed so well that I was in danger of having delusions of grandeur. My thought had been that multihull boats would behave better in various ways if they were designed with bow rudders, like iceboats, and balanced to carry lee helm. The experiment was done with a monohull boat because it was cheaper, but its performance opened up some glowing ideas. It was only sailed in gentle breezes and smooth water because the rig was flimsy for irrelevant reasons, and I didn't want to break it.

With my account of this trial, I showed a design for a proposed catamaran, simplified in every way I could think of, with dorylike hulls of crude shape. This boat was eventually built by Colin Frankham of Auckland, New Zealand, and at once dashed my hopes. It sailed tolerably well but lost way badly in tacking. In brisk winds they couldn't get it through stays at all without helping it with an oar. I'd noticed in the first trial that the boat could easily be hung up in stays. I made a virtue of it at the time, thinking that it

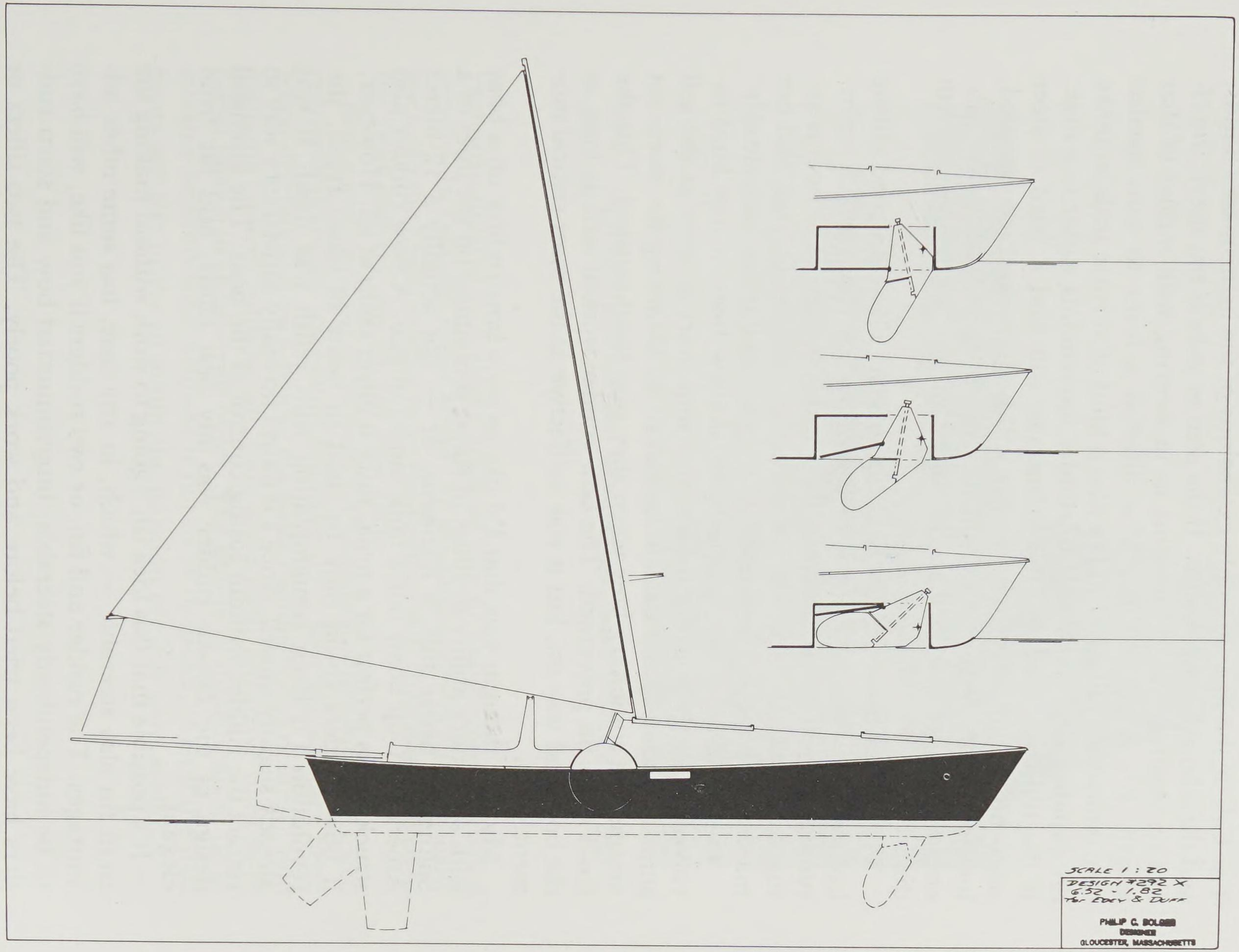


was remarkable to have a cat-rigged boat that would heave-to steadily with her bow well up to the wind. The diagram shows how she could be made to fall off again, but the maneuver involved falling off to a beam reach. It certainly wouldn't do to have to go through it on every tack.

While I was still chewing on the bad news from New Zealand, Peter Duff tried a bow rudder on a production *Dovekie,* number 50 of these rowing-sailing cruisers that I designed for Edey & Duff a few years ago and described in *The Folding Schooner*.

The drawing shows the way I meant this boat to be arranged, but in the hurry of fitting out, she was given a makeshift rudder and a perfectly awful lashup of slack lines to a too-short tiller.

I remember that it took me some time to grasp that when you fit a rudder with an arm and drag link, as in *Eeek!* (Chapter 1), or with a yoke and tiller lines, as used to be common in long rowing boats,



SCALE 1 : 20

DESIGN #292 X
6.52 - 1.82
for Body & Duff

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

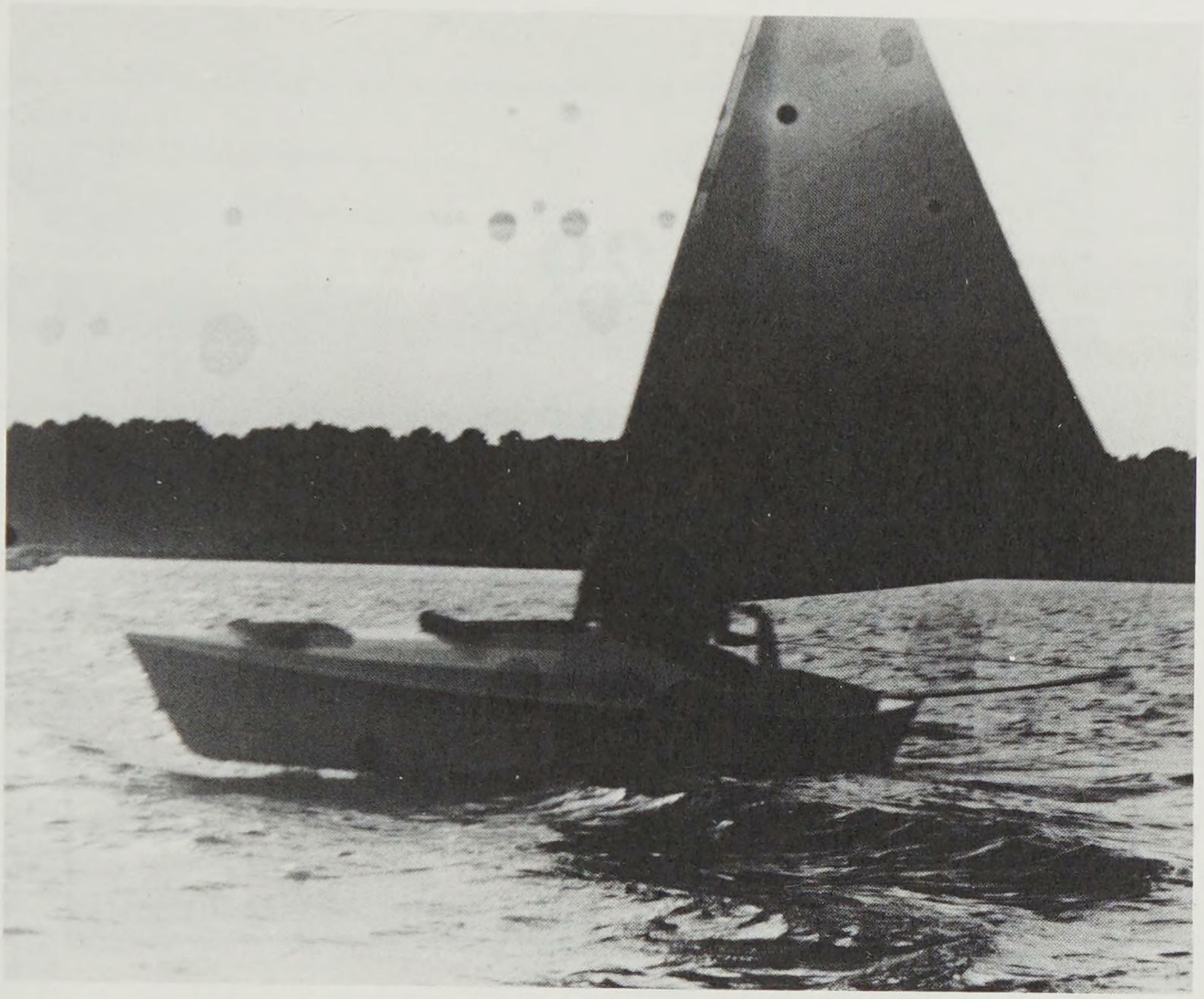
it's the arm on the rudder, or one half of the yoke, that is the tiller. The link or the lines are only extensions of the helmsman's hands, and their length is irrelevant. If the arm or yoke is too short, the effect on control will be the same as in steering with a tiller of that length. It's usual to think of a tiller as a lever to gain needed mechanical advantage, but it's also a kind of vernier scale to make the rapidity and magnitude of rudder movements easier to gauge. If the tiller is too short, the helmsman will find it hard to steer smoothly. The rudder movements will be jerky and exaggerated, inefficient for control, and will produce high resistance. Lengthening the tiller will add to the speed of any boat, though with diminishing returns.

The photo shows the first trial of this boat. There's a good sailing breeze and a bumpy lee-side-of-Buzzards-Bay chop, which unfortunately splashed the camera at the wrong moment. The boat is going very well. She seemed faster than a standard *Dovekie,* and her manners were good, except that she, too, would not tack cleanly.

The problem is that in the light, shallow boats of the kind involved in all these experiments, you stop short as soon as the sail stops thrusting. They have to be tacked by slithering the stern out around the stationary bow when they stop head-to-wind. This the fixed stern fin prevented. The bow rudder worked well as long as the boat had way on, but it was ineffective at the most critical moment.

My first thought was that I'd like to try a bow rudder on a boat with a lot more ability to shoot in stays, something on the lines of a Soling, or better still, a *Rozinante,* or — not actually a 12-meter America's Cup boat, but a tank model of one. A bow rudder also struck me as perfect for a proa, since it never tacks at all. However, if bow rudders could only be used in boats of those types, the revolution I'd been contemplating with relish was dead. It was already slightly unwell, since I'd found no really satisfactory way to retract the rudder without losing control of the boat. The intended design of the *Dovekie* rudder was my best effort, and far from elegant.

It's possible that this idea isn't going to work without making the stern fin also steerable — which, in any case, has some other advantages. The rudder and fin, or two rudders if you like, will have to be independently steerable; interconnected bow and stern rudders have been tried before and work poorly. The two tillers or wheels won't make sailing as complicated as it may seem at first glance, because in ordinary sailing the after one will be fixed,



The bow-steerer full of aches and pains but making good speed to windward. (Ian Duff photograph)

perhaps adjusted to a slight angle of one or two degrees to cancel leeway. In tacking, it can simply be released and will automatically swing to the angle needed to let the stern swing, then it is refixed as the boat gathers way on the new tack.

Bow steering ought to be pursued because it offers superior speed reaching (because instead of building up a howling weather helm when driven hard on a reach, the helm diminishes to neutral), and superior control running off, plus some most attractive options of cabin layout in shoal-draft boats. The ability of these boats to lie in a stable head-to-wind attitude is not to be despised, even if the trial boats are too prone to adopt the position of their own accord.

29

Fancy

Length overall	15 feet 7 inches
Length, waterline	13 feet 3 inches
Breadth	6 feet 6 inches
Designed displacement	725 pounds
Sail area	160 square feet
Owner	William J. Book
Builder	Ernest Tarr, Gloucester, Massachusetts

Ernie Tarr said he had an order to build a sailboat for long-distance trailer hauling. He said his customer wanted her to "look like a Friendship sloop." My snap reaction was that it wouldn't be easy to think of a type as unsuited to the purpose as the deep, heavy, inside-ballasted, carvel-planked Friendships. Presently I reflected that there had been the Muscongus Bay sloops, also built and sailed around Friendship, Maine, and that they had been light, lapstrake centerboarders. They looked similar afloat, and I concluded that what was meant was that William Book liked the looks of a clipper-bowed gaff sloop with a strong sheer and an inboard rudder.

Ernie agreed. We got up a proposal, and in due course, *Fancy* resulted. Ernie is a master. The sheer was perfect, the lay of the planking beautiful (that is quite a trick on the first boat to a new model), and all the joinerwork fitted and matched nicely. The owner contributed a pile of hardware of the most expensive variety and stinted not at all on sails and gear.

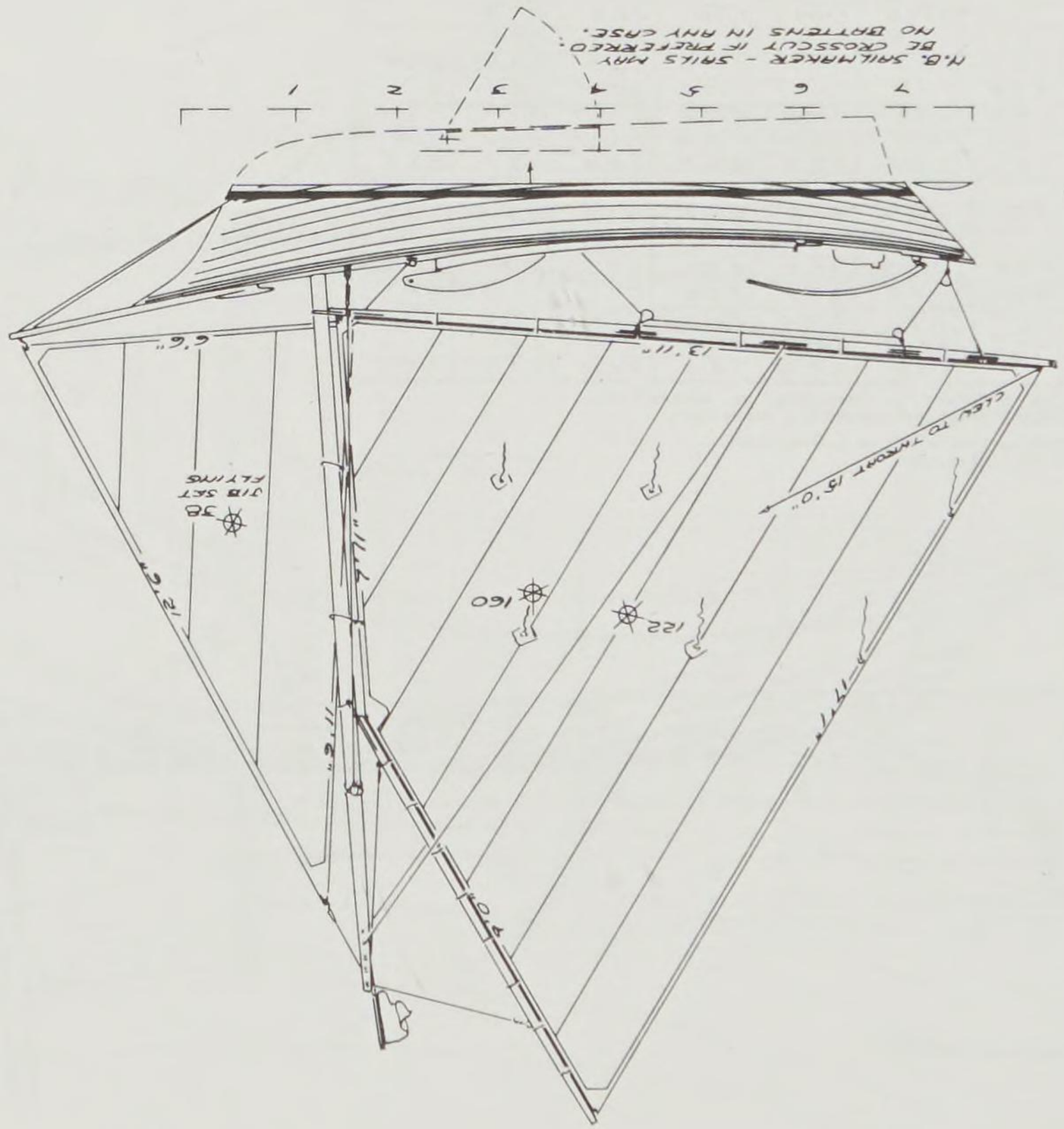
Except for Dacron sails, stainless steel wire, and silicone seam

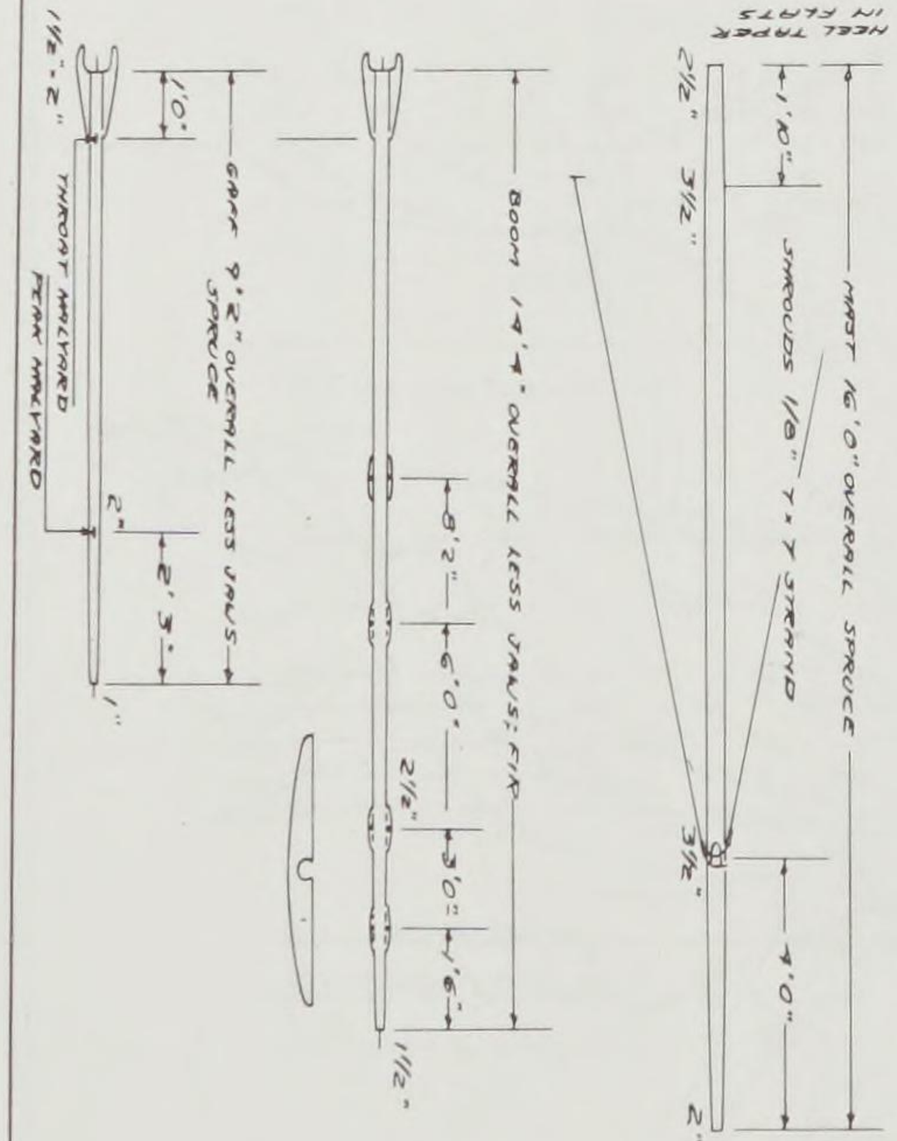
DESIGN #394
AS 17'-6" × 6'-1 1/4"
THE CRUISER

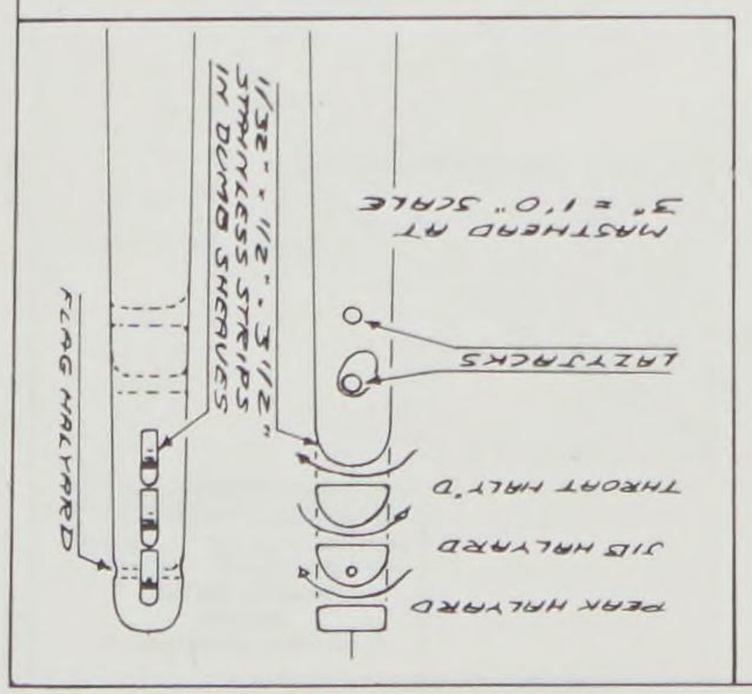
DESIGNED
PHILIP C. BOLGER
GLOUCESTER, MASSACHUSETTS

SCALE 1/2" = 1'0"

N.B. SAILMAKER - SAILS MAY BE CROSSCUT IF PREFERRED. NO BATTENS IN ANY CASE.







PART	DIAM.	LENGTH	STANDING END	FALL	REMARKS
MAIN SHEET	3/8"	50'	BOOM END	C.B. CASE	THREE SWIVEL SHACKLE BLOCKS ABOUT 1/2" SHEAVE
PEAK HALYARD	1/4"	32'	GAFF	DECK CLEAT	SHACKLED TO GAFF EYES; THROUGH MASTHEAD DUMB
THROAT HALYARD	1/4"	30'	"	" "	SHEAVES.
LAZYJACKS (2)	1/4"	16' × 2	MASTHEAD	BOOM CLEATS	STOPPER KNOTS AT MASTHEAD; ADJUST AT BOOM CLEATS
JIB HALYARD	1/4"	30'	HEAD OF JIB	DECK CLEAT	THROUGH MASTHEAD DUMB SHEAVE TO DECK CLEAT.
JIB TACK DOWNHAUL	3/8"	28'	JIB TACK	MOORING CLEAT	DUMB SHEAVES IN BOWSPRIT AND STEM.
JIBSHEETS (2)	3/8"	15' × 2	JIB CLEW	DECK CLEATS	THROUGH DECK BULLSEYES TO DECK CLEATS

HEIGHTS FROM BASE LINE

	T	7	6	5	4	3	2	1
DECK	3,0,3	2,9,6	2,7,2	2,6,3	2,6,6	2,8,3	2,11,2	3,3,0
BUTTOCK 30"			1,10,6	1,4,4	1,3,0	1,6,6	2,9,3	
24"	3,0,3	1,6,1	1,6,3	1,1,5	1,0,0	1,2,4	2,0,2	
18"	2,2,0	1,11,3	1,3,6	0,11,6	0,10,6	1,0,0	1,6,6	3,0,4
12"	1,10,4	1,9,0	1,1,7	0,10,7	0,10,1	0,10,7	1,5,6	2,5,0
6"	1,8,0	1,7,2	1,0,6	0,10,4	0,10,0	0,10,2	0,11,7	1,9,0
RABBET	1,6,0	1,6,0	1,0,0	0,10,2	0,10,0	0,10,0	0,10,1	1,1,4
KEEL	1,6,0	1,6,0	0,2,4	0,3,2	0,3,7	0,4,4	0,5,1	0,7,5

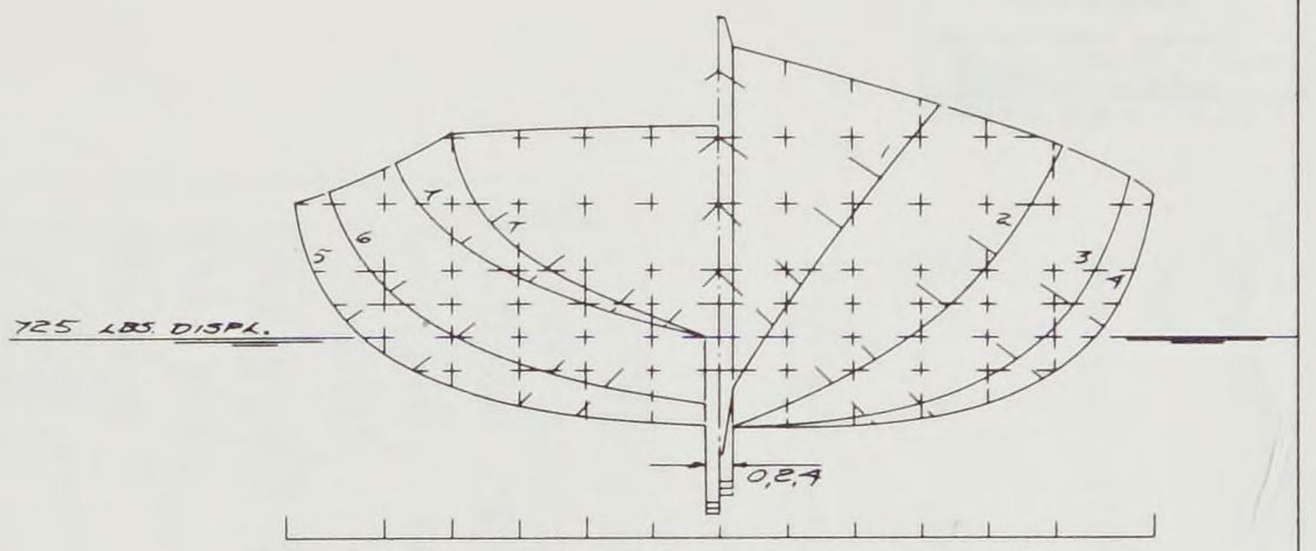
HALF-BREADTHS

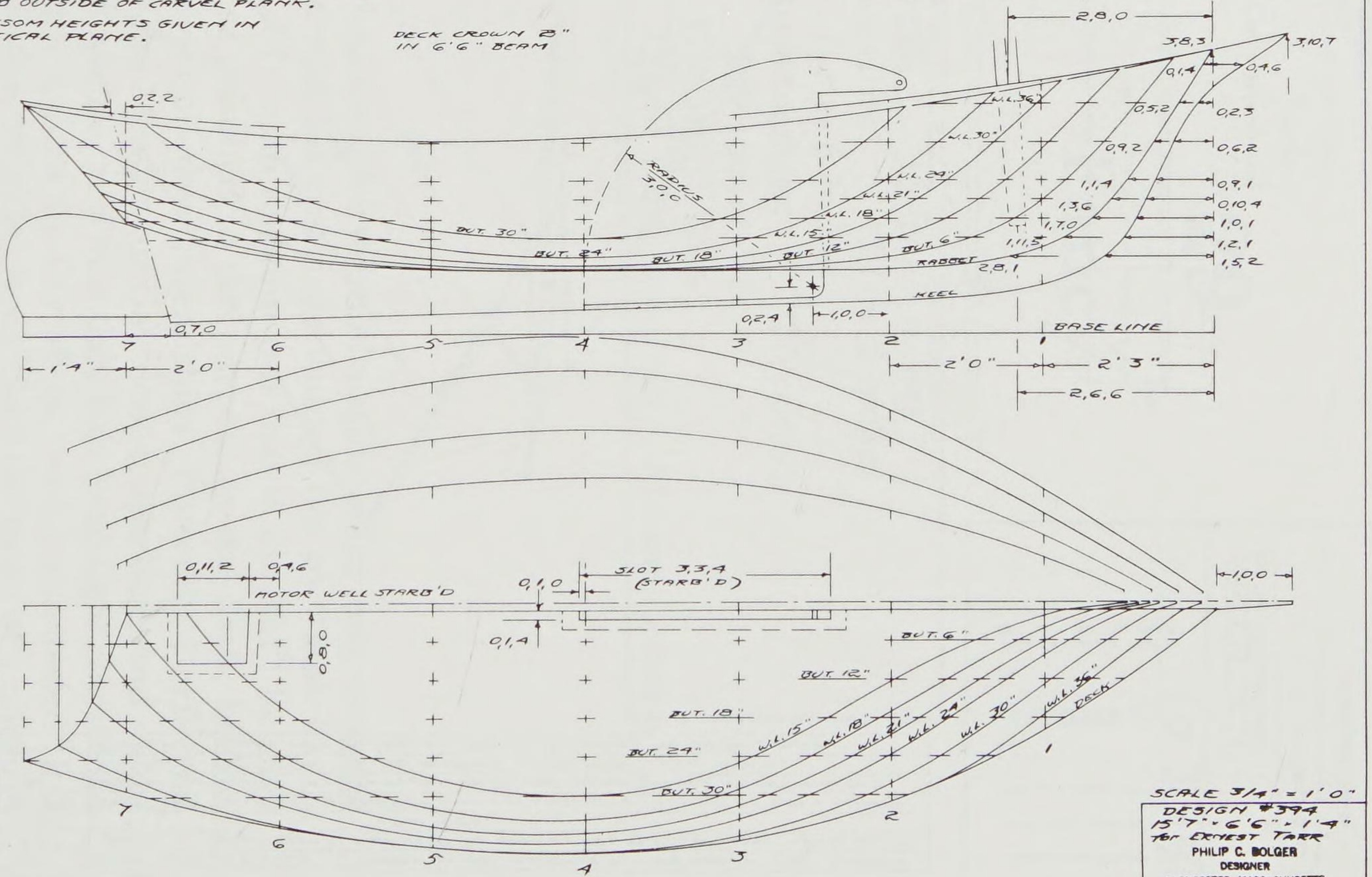
DECK	2,0,0	2,5,0	2,10,7	3,2,0	3,3,1	3,1,0	2,7,0	1,7,7
W.L. 36"	1,11,7							1,5,4
30"	1,9,6	2,2,6	2,10,4	3,1,7	3,3,0	3,0,3	2,4,1	1,0,5
24"	1,3,0	1,7,2	2,7,2	3,0,3	3,1,2	2,9,6	1,11,6	0,8,2
21"	0,8,5	1,0,0	2,4,1	2,10,6	2,11,6	2,7,5	1,8,5	0,6,0
18"	0,1,2	0,1,2	1,11,4	2,8,0	2,9,6	2,5,1	1,5,0	0,4,0
15"			1,4,0	2,3,2	2,6,0	2,1,0	1,0,2	0,2,1

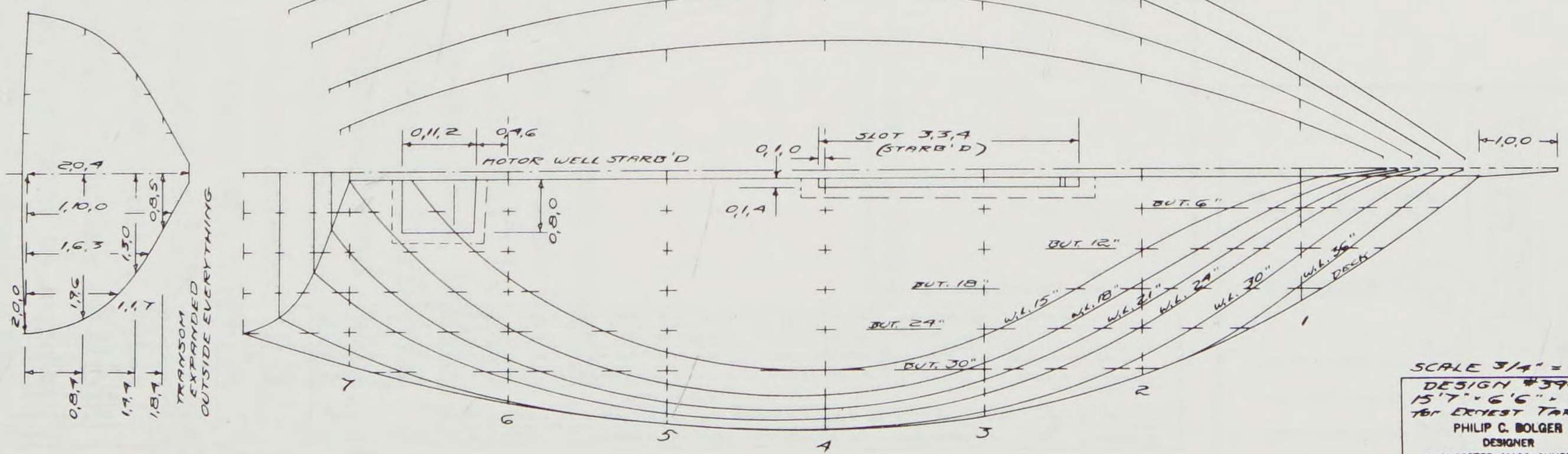
OFFSETS IN FEET, INCHES, & EIGHTHS AS TO OUTSIDE OF CARVEL PLANK.

TRANSOM HEIGHTS GIVEN IN VERTICAL PLANE.

DECK CROWN 2" IN 6'6" BEAM



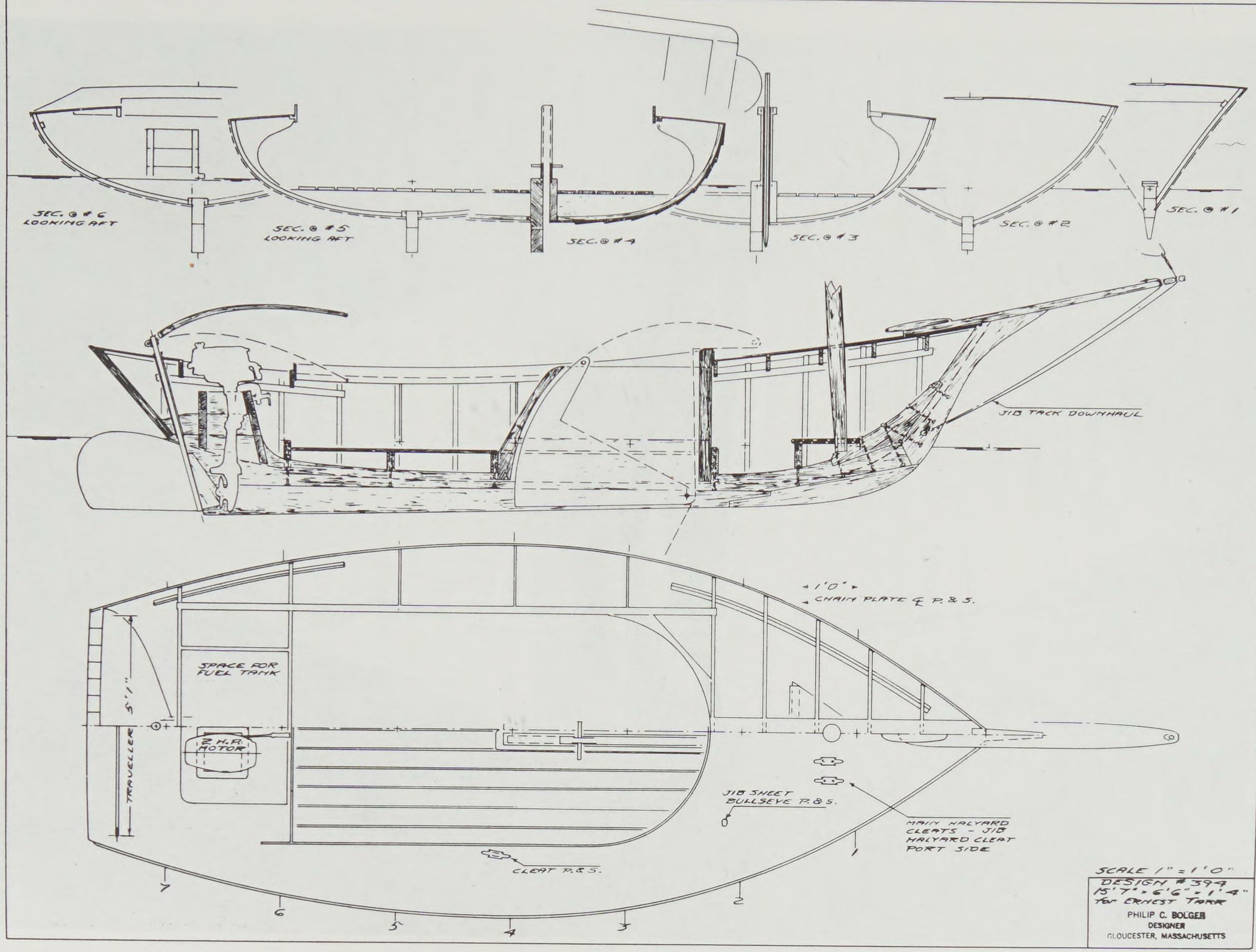




SCALE 3/4" = 1'0"

DESIGN #394
15'7" - 6'6" - 1'4"
for Driest Tarr

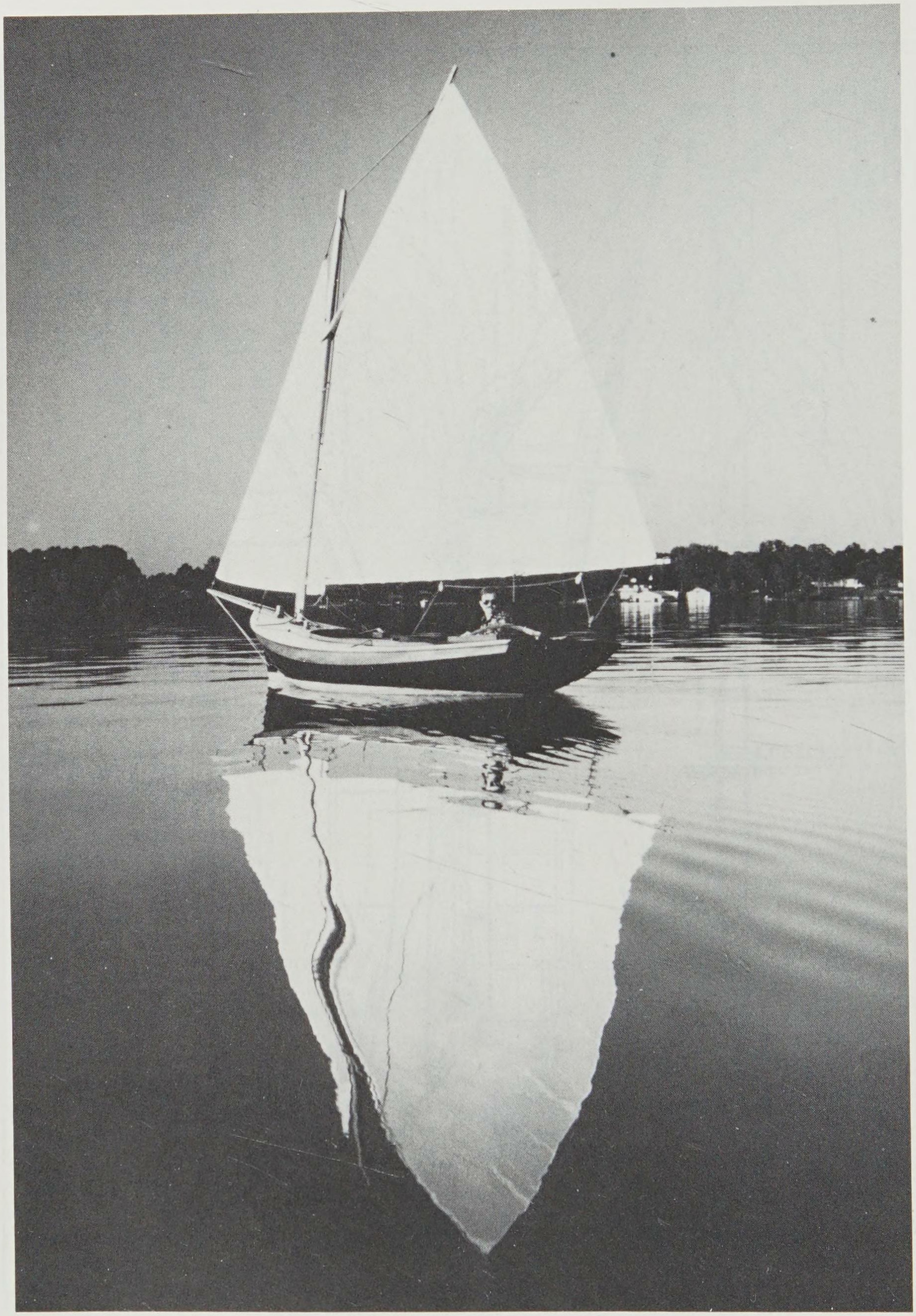
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



SCALE 1" = 1'0"

DESIGN #399
15'7" x 6'6" - 1'4"
FOR ERNEST TARR

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



Fancy *in a tranquil mood. (William Book photograph)*

compound, her construction was high-grade 19th century, copper-riveted, with canvased decks. I'm not an enthusiast for the latter, having lived with too many that were perishing, but when they are new and juxtaposed with newly varnished oak, they have a lovely soft look that's much more attractive than the hard sheen of a fiberglass-sheathed deck. As for the oak, I've remarked that it looks wonderful for about a half-hour after the launching, but that's exaggerated; it'll look well for a day or more if it doesn't rain. In this case, the boat lives inside a fitted jacket on its trailer. The rumor that the jacket is fleece lined is not true.

The plans are sparse, having been made not as a straitjacket but as general guidance for a builder trusted by both owner and designer. The only unusual features are the large amount of external keel, meant to stiffen and protect her in launching (and incidentally to allow her to sail to windward with her centerboard all the way up), and the centerboard pivoted alongside the keel and outside the rabbet, which allows a thin keel and eliminates one potential leak. The centerboard is ⅜-inch steel. I meant it to be plywood, but the steel does have a comforting righting effect in a knockdown.

I can't think of any functional excuse for these raking sterns. For the overall length, they throw away waterline length and bearing, and the sharp bevel calls for them to be thick in way of the plank fastenings. An upright transom, or a tumblehome stern in the contemporary fashion, would obviously be better, but I couldn't stand the looks of it married to a bow like this (and the bow is highly functional) any more than anyone else. I've often thought of offering a reward for a good reason why pretty girls shouldn't chew gum. A legitimate excuse for a stern of this kind would be welcome in the same way, as it makes me uncomfortable to draw something degraded in action by its aesthetics.

At any rate, she sails and handles very well, in spite of having to drag the propeller of the 3 h.p. Johnson (I despise inboard wells like this, but it's unthinkable to obtrude the motor into view). The owner is gradually improving the well plugging to keep down the surge and the smoke. She's stiff and dry in a chop and can heel quite a lot without rooting, so she's more amenable to relaxation than most light centerboarders.

30

Wisp

Length overall	20 feet
Breadth	4 feet
Draft	4 inches/2 feet 8 inches
Designed displacement	400 pounds (light load) or 685 pounds (maximum load, 6 inches draft)
Sail area	72 square feet
Owner and builder	Gary Novak, Center Moriches, New York

Gary Novak wanted to build a beach cruiser, for his own use and as a prototype for a possible stock boat, "as graceful and refined in appearance" as the functional requirements would allow. It was to sleep two, "in relative comfort"; be light enough to carry on top of a fair-sized car; sail well and row fast; and be "reasonably seaworthy." He specified that it should not have leeboards, and he stated a preference for cold-molded cedar construction.

I've always found that length was helpful in a cartopper. You can lift one end at a time into place with good leverage. Putting that together with the desirability of wide decks for going through rough water, I thought of having the two people sleep end to end instead of side by side. Then I kept pulling out the ends, for grace and refinement. There's hardly anything to compete with a long canoe stern for beauty, and it seemed a pity to clutter it with rudder and yoke, so I suggested the Uffa Fox-type rudder frame and trunk. Gary admitted to some dismay at having to build three trunks (rudder and two bilgeboards), but he liked the resulting looks as much as I did. Anybody who doesn't has no romance in her soul.

MASTHEAD.
NO HALYARD
ROLL SAIL UP TO
MAST FROM CLEW
TO FURL.

MAST DETAILS @ 1/2 FULL SIZE

TANGS 1/16" x 1/2"
THIRTY-TWO 3/4"
ROUND-HEAD SCREWS
SWAGED JAW TERMINALS

STEP

3/4"

3/4"

3/4"

5'0"

2'0"

1 5/8"

2'0"

1 7/16"

3/4"

SQUARE SECTION FULL LENGTH

SPRUCE

MAST 16'1" OVERALL

7'1" TO SHOULDER FOR SHOTTER

NO HEADBOARD
LASH HEAD OF SAIL
TO MASTHEAD.

SEPARATE LUFF
TIES - NOT A
LACING.

14'1"

14'0"

8'1"

10'0"

52

72

20

JIB WITH
WIRE LUFF
SET FLYING

7'7"

9'11"

19 18 15 14 13 12 11 8 7 6 5 4 3 2 1

SHROUDS 1/8" 7 x 7 S.S.
SET UP WITH LANYARDS
TO CHAINPLATE SHACKLES.

1/4" DACRON
SHOTTER

TYPICAL
MAST
SECTION
FULL
SIZE

SHOTTER PIN

STOPPER KNOT

SPRUCE SPRIT BOOM 8'0" OVERALL
SHOWN FULL SIZE

SHEATH MAST
WITH FIBERGLASS
IN WAKE OF
SHOTTER

SECTION
FULL
LENGTH
NO TAPER

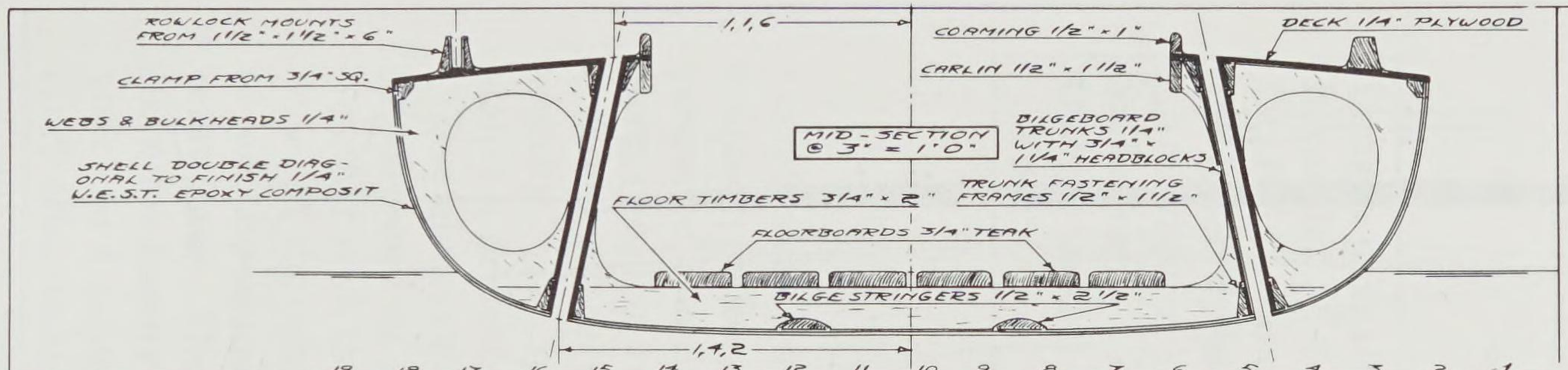
PIN FOR CLEW ROPE

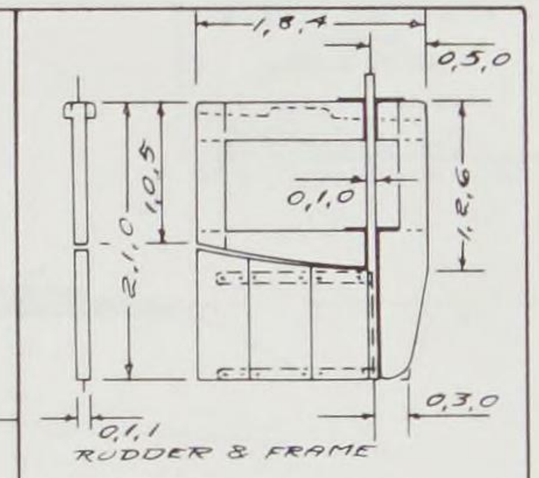
PIN FOR STANDING END
OF MAIN SHEET

SCALE 3/4" = 1'0"

DESIGN #411
20'0" x 14'0"
for GARY NOVAK

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS





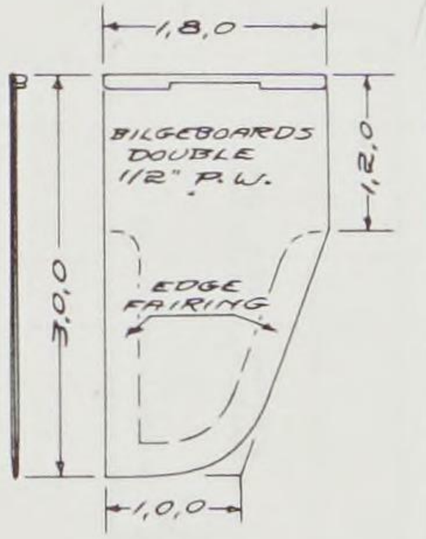
HEIGHTS FROM BASE LINE

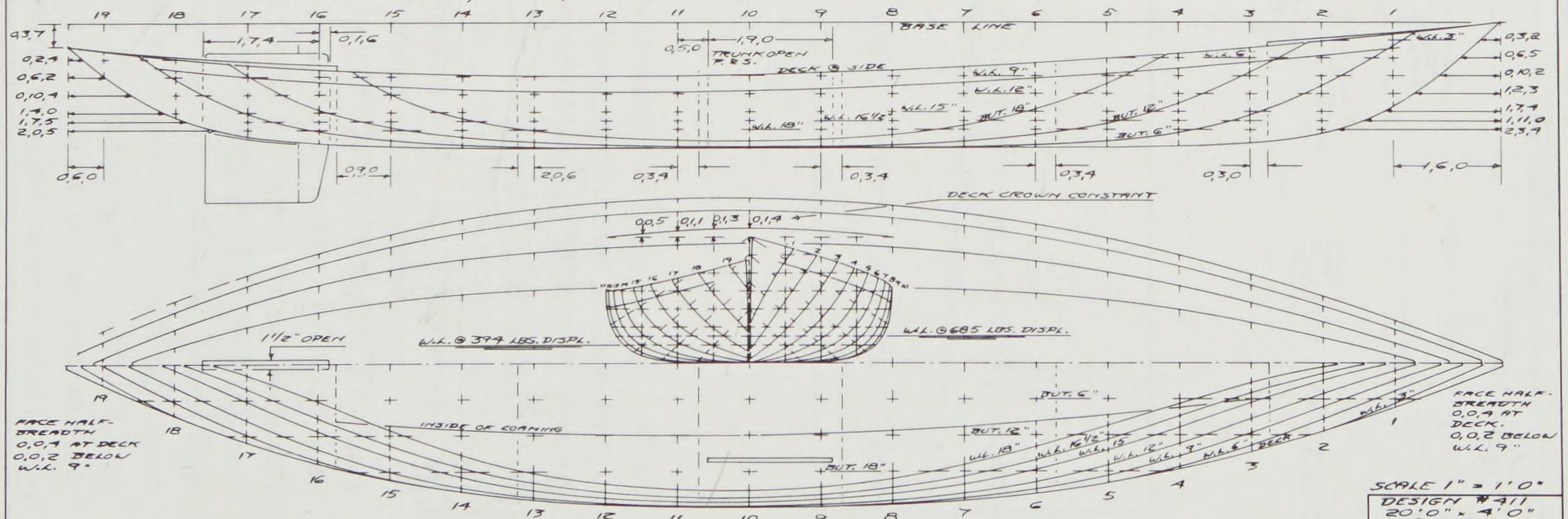
	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
DECK	0,1,5	0,6,0	0,7,0	0,7,6	0,8,3	0,8,6	0,9,0	0,9,0	0,9,0	0,8,6	0,8,3	0,8,0	0,7,4	0,6,7	0,6,0	0,5,1	0,4,2	0,3,1	0,2,0
COVE		0,7,6	0,9,0	0,10,0	0,10,5	0,11,2	0,11,5	0,11,6	0,11,5	0,11,4	0,11,1	0,10,5	0,10,1	0,9,4	0,8,5	0,7,6	0,6,6	0,5,5	0,4,3
BUT. 18"					1,0,0	1,1,0	1,1,6	1,1,2	1,1,6	1,1,7	1,1,5	1,1,6	1,1,5	1,2,5	0,10,3				
12"			0,8,7	1,2,4	1,5,4	1,7,2	1,8,1	1,8,4	1,8,6	1,8,7	1,8,6	1,8,5	1,8,0	1,7,7	1,5,0	1,1,5	0,8,6		
6"		0,9,4	1,3,2	1,6,2	1,7,6	1,8,4	1,8,7	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,8,6	1,8,4	1,7,7	1,6,4	1,3,4	0,10,5	0,9,0
KEEL	0,8,6	1,3,7	1,7,0	1,8,2	1,8,6	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,9,0	1,8,6	1,8,2	1,6,5	1,2,2

HALF-BREADTHS

CORAMING					0,10,3	0,11,1	0,11,5	0,11,7	1,0,0	1,0,0	0,11,6	0,11,2	0,10,5	0,9,6	0,8,6	0,7,3	0,6,0		
DECK	0,3,3	0,8,5	1,1,0	1,4,5	1,7,3	1,9,2	1,10,6	1,11,4	1,11,7	2,0,0	1,11,7	1,11,4	1,10,6	1,9,5	1,8,0	1,5,5	1,2,6	0,11,3	0,7,3
W.L. 3"																			0,6,6
6"	0,2,3	0,8,5														1,5,2	1,1,6	0,9,3	0,4,5
9"		0,6,2	0,11,6	1,4,0	1,7,1	1,9,2	1,10,6	1,11,4	1,11,7	2,0,0	1,11,6	1,11,3	1,10,4	1,9,0	1,6,6	1,3,4	0,11,5	0,7,2	0,2,7
12"		0,3,6	0,6,3	1,2,2	1,6,0	1,8,5	1,10,2	1,11,2	1,11,5	1,11,6	1,11,3	1,10,6	1,9,4	1,7,6	1,5,0	1,1,3	0,9,2	0,5,0	0,1,2
15"		0,1,0	0,4,2	0,11,3	1,3,4	1,6,7	1,9,1	1,10,3	1,11,0	1,11,1	1,10,5	1,9,5	1,8,1	1,5,6	1,2,4	0,10,6	0,6,4	0,2,7	
16 1/2"			0,2,0	0,9,2	1,1,5	1,5,3	1,7,7	1,9,4	1,10,2	1,10,3	1,9,6	1,8,5	1,6,7	1,4,0	1,0,5	0,8,6	0,4,7	0,1,6	
18"				0,6,3	0,11,1	1,3,2	1,6,2	1,8,1	1,9,0	1,9,2	1,8,4	1,7,2	1,4,7	1,1,7	0,10,3	0,6,6	0,3,2	0,0,6	

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF SHELL

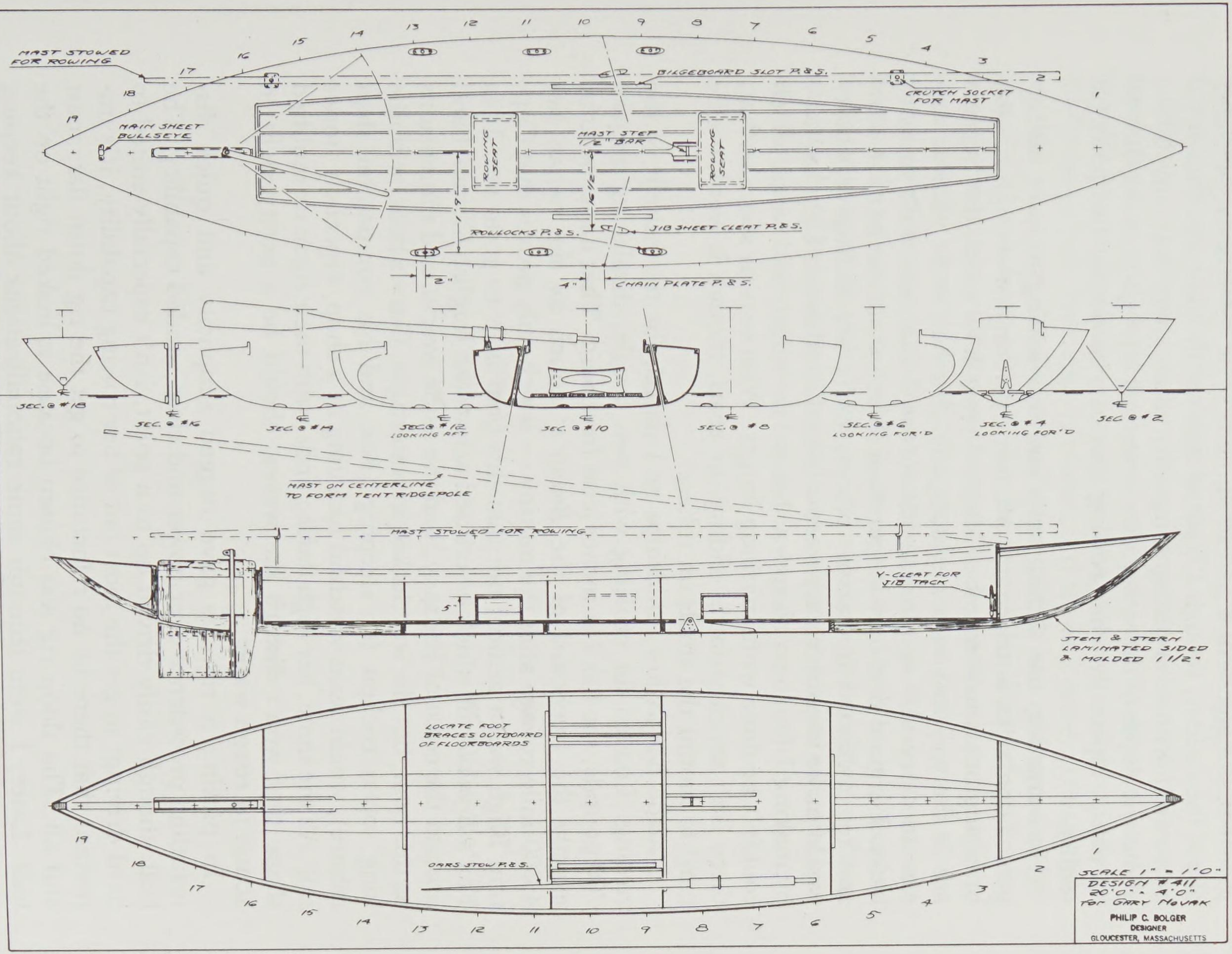




SCALE 1" = 1'0"

DESIGN #411
20'0" x 4'0"
for GARY NOVAK

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


MAST STOWED FOR ROWING
BILGEBOARD SLOT P. & S.
CRUTCH SOCKET FOR MAST
MAIN SHEET BULLSEYE
ROWING SEAT
MAST STEP 1/2" BAR
ROWING SEAT
19'-9"
16 1/2"
ROWLOCKS P. & S.
JIB SHEET CLEAT P. & S.
2"
4"
CHAIN PLATE P. & S.
SEC. @ #18
SEC. @ #16
SEC. @ #14
SEC. @ #12 LOOKING AFT
SEC. @ #10
SEC. @ #8
SEC. @ #6 LOOKING FOR'D
SEC. @ #4 LOOKING FOR'D
SEC. @ #2
MAST ON CENTERLINE TO FORM TENT RIDGEPOLE
MAST STOWED FOR ROWING
Y-CLEAT FOR JIB TACK
5'
STEM & STERN LAMINATED SIDED & MOLDED 1 1/2"
LOCATE FOOT BRACES OUTBOARD OF FLOORBOARDS
OARS STOW P. & S.
SCALE 1" = 1'0"
DESIGN #411
20'0" x 4'0"
for GARY NOVAK
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

He did insist on making the rudder and bilgeboards shallower than I first suggested. I had to agree that he was right, especially about the rudder, though I'll plead that my thought was that she'd be rowed, with everything retracted, when there was any doubt about the depth of the water. She rows well enough to make that no hardship, especially when rowing four oars, or rather two pairs (of sculls).

He wanted to use sliding seats and was willing to have outriggers. I don't like outriggers at all, having done just enough rowing in racing boats to remember after 40 years how much the 'riggers are in the way as you come alongside. She had to be wide in any case to carry sail — plenty wide to use 7-foot oars with inboard locks. I argued that oars longer than 7 feet would be hard to stow and too awkward in narrow places, while her sailing capability would make it unnecessary to row in bad conditions. I got my way by making 7-foot oars disappear behind the bilgeboard cases, which couldn't be done with anything longer. With oars as short as that, there isn't much point in sliding the seats, though it wouldn't be hard to mount the stools on rollers.

I made her as low amidships as I dared, for the benefit of the rowing. Loaded for cruising with two people, displacing around 700 pounds, she has 7½ inches least freeboard. That happens to be exactly the freeboard of the *Bounty*'s launch as she began her 4,000-mile voyage after the mutiny — which only proves that Captain Bligh was a genius, not that this boat is fit to go to sea. Uffa Fox's *Brynhild,* in which he cruised across the English Channel and around the coast of Brittany, had the same weight and dimensions as this boat, but she was decked in watertight. Gary's boat, with the long, open cockpit for sleeping (Fox and his companion slept ashore), would want watchful handling in a chop, especially under sail. All the same, her high flaring ends, with their clean unsnubbed shape that won't disturb the waves, should be a pretty sight in action in rough water.

In picking a rig, we gave rugged simplicity and quick dismantling precedence over power and close-winded capability. The hull, though easily driven up to a point, isn't especially suited to hard driving; to get the most out of her rowing capability, it's important that there be no reluctance to get the rig down flat, mast and all. The sloop rig was chosen because it looked right on the hull. Later, I went through some rationalizations about keeping weight out of the ends of the boat and minimizing the number of spars. The shrouds have snapshackles to the chainplates, with all

the tension produced at the jib tack pendant. Enough tension, I hope, to keep the luff of the handkerchief jib from sagging much in any conditions she'd otherwise enjoy.

This is a gold-plater, something I'm seldom immediately comfortable with. Witness my reaction to *Piccolo* in Chapter 1. I tend to go off and try to produce something cheap and expendable that will do the same job. As a matter of fact, I'd already done a cheap boat in this category, the Payson *Zephyr* (plans and pictures are in Harold's book *Instant Boats*). But the fact is that I'm not vehement in defense of my philosophical bias. Gold-platers are works of art, and they're worth what they're worth. I hear that a good many people who followed the fad for buying paintings as investments are beginning to suspect that they've been taken; but if so, it's because their judgment of art was poor. Or, of course, it might have been simply that they paid too much for something that was nevertheless worth a lot.

31

Keel Whaler Sloop

Length overall	20 feet
Breadth	6 feet
Draft	3 feet
Designed displacement	2,680 pounds
Sail area	233 square feet
Owner	Edgar Denton III
Builder	Peter Music, Kingston, Ontario, Canada

Edgar Denton had a 28-foot Tancook schooner called *Lymnaea* built by Peter Music. He used her for daysailing, mostly singlehanded, on Little Sodus Bay and out into Lake Ontario. I gather she's a good sailer, as he came to her out of Lightnings, among other respectable performers, but he began to feel she took an unnecessary amount of time to get underway and put to bed.

My *Yarrow* design (plans are in *Small Boats*) pleased him, being practically a miniature *Lymnaea,* but he wanted her lapstrake, since there was skill available to do a pretty job of lining off the strakes, and he liked the looks of the gaff rig if it could be made reasonably weatherly. I reassured him about the rig, pointing out that the gaff rig was driven out of racing because the Universal and International Rules both penalized large sail area indiscriminately, taking no account of the advantages of rigs whose shape allows the boat to carry more sail without being knocked down. So it came to be taken for granted that a small sail set high was "more efficient" than a large sail set low. The logic of this, if any, eludes me. I once saw a

Yarrow *getting to windward in workmanlike fashion. (*Sailing *magazine photograph)*

champion 5.5-meter beaten hull-down by a 50-year-old Massachusetts Bay 18-footer (18-foot waterline, that is). They were the same length and weight as near as made no odds. The old boat had half again the sail area, but her three-man crew worked less strenuously, with much simpler and cheaper gear, than the same number in the "modern" boat. If a big rig is cheaper and easier to handle than a small rig, and heels the boat less, I'd be glad to hear somebody try to justify giving the small rig a rating advantage.

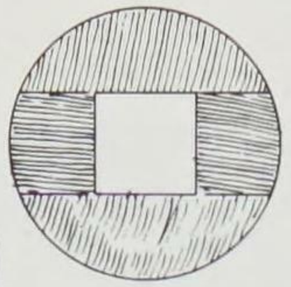
However that may be, wanting these changes and thinking that

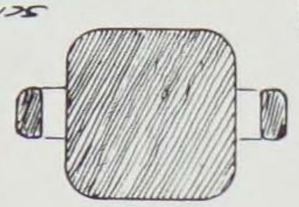
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

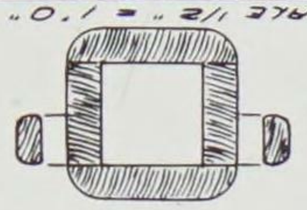
DESIGN # 376
20'0" x 6'0" x 3'0"
for Edgar Denman III

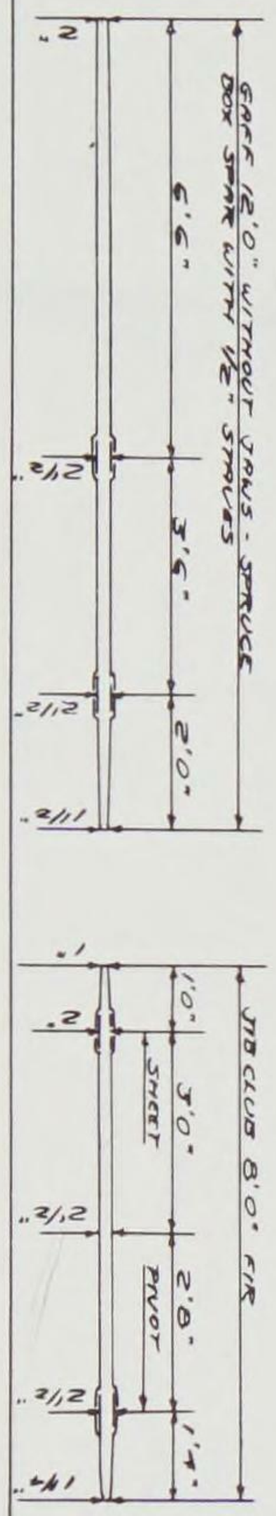
SCALE 1/2" = 1'0"

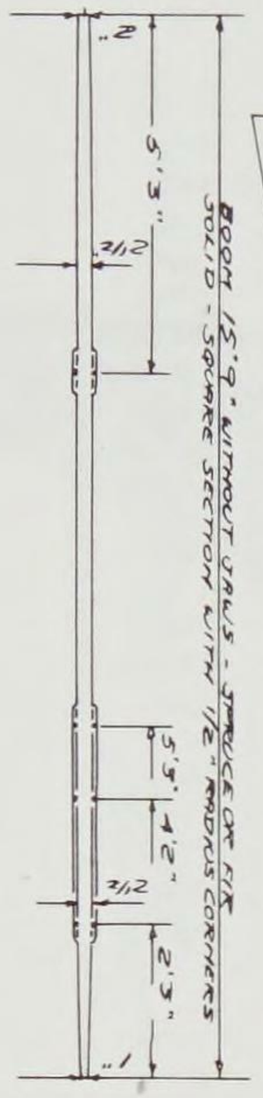
SECTIONS
1/2 FULL
SIZE.

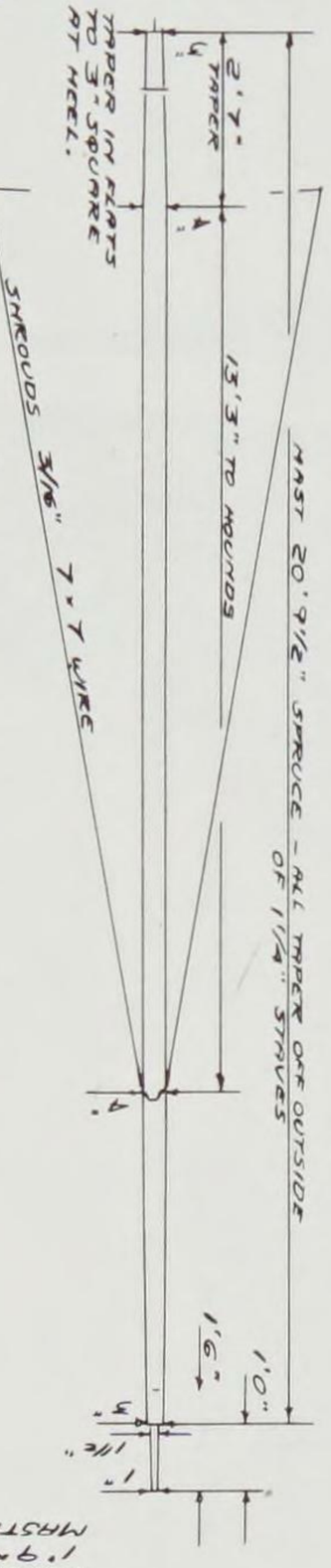


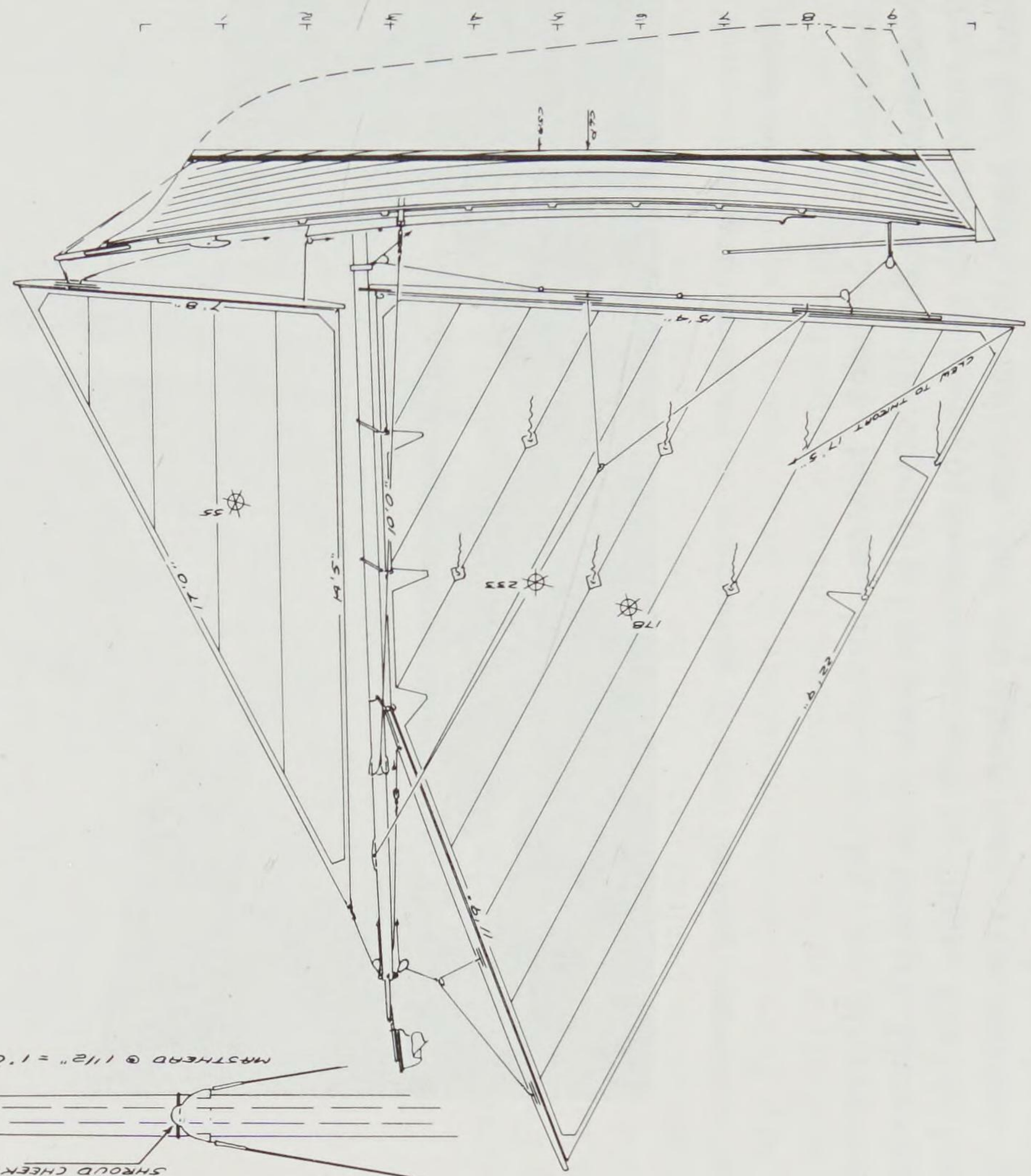


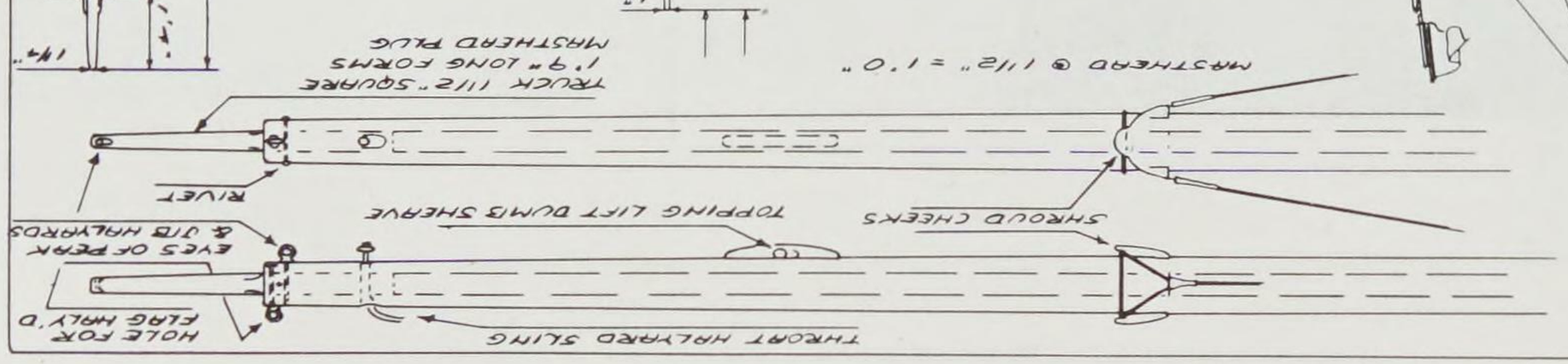








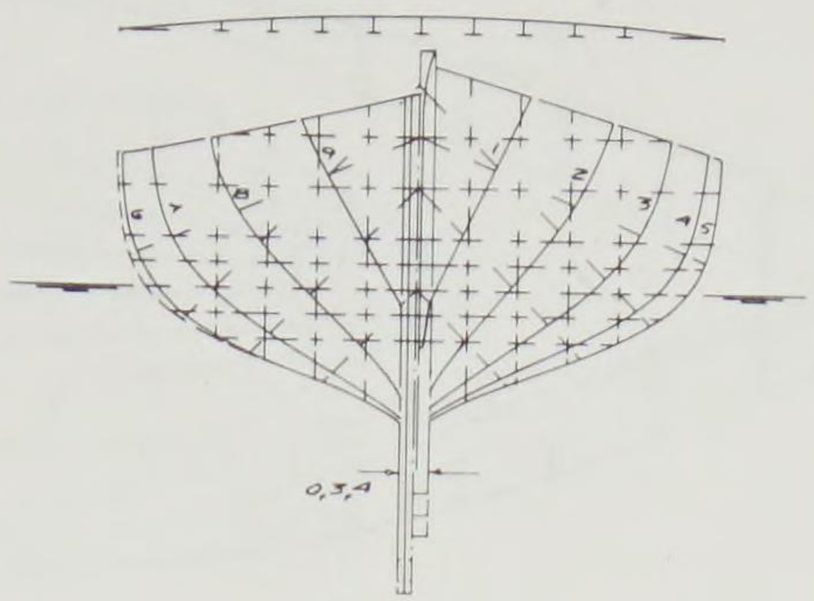


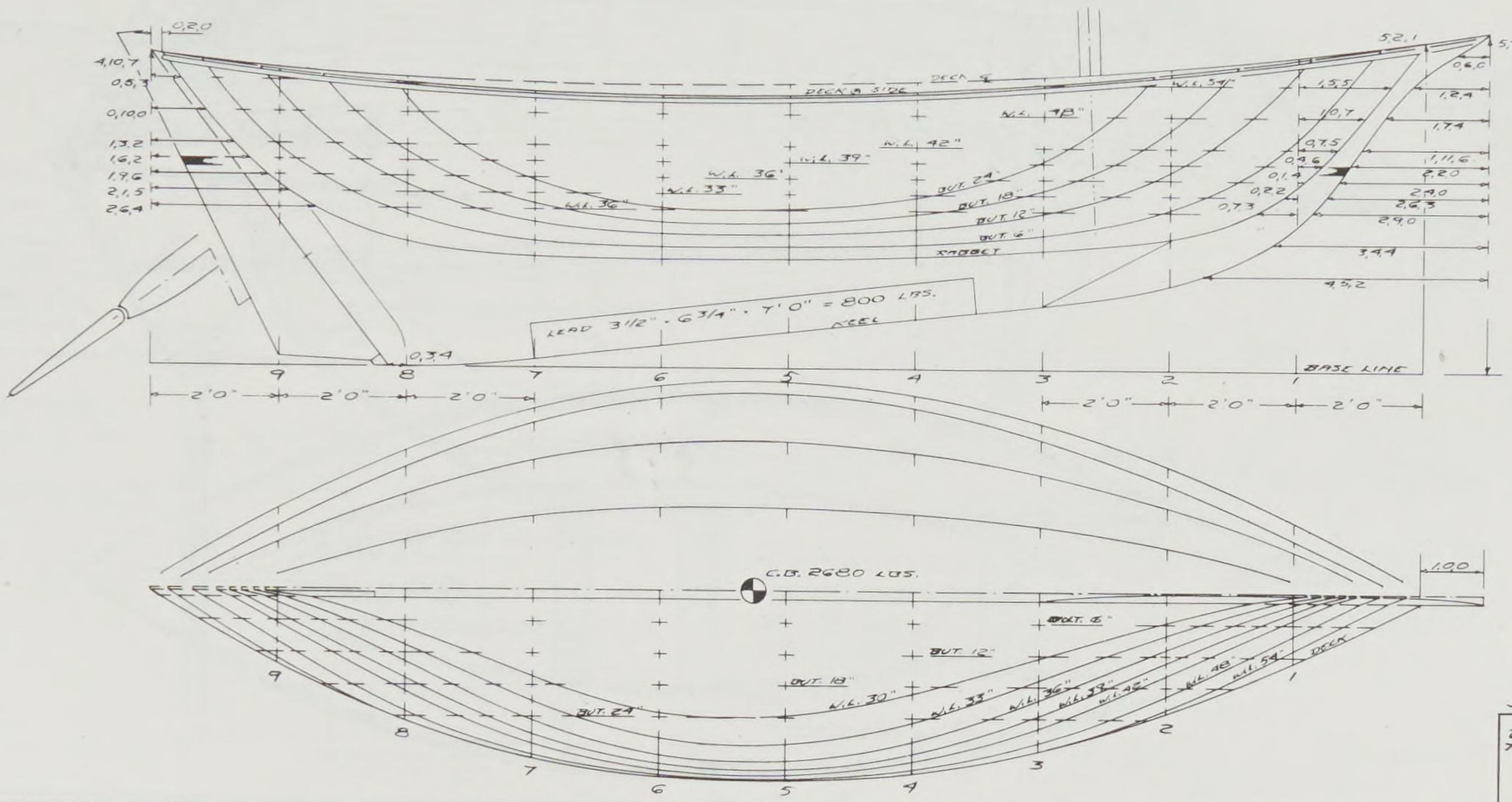


		9	8	7	6	5	4	3	2	1
HEIGHTS FROM BASE LINE	DECK & SIDE	4,7,6	4,5,4	4,4,1	4,3,4	4,3,4	4,4,4	4,5,7	4,8,0	4,10,6
	BUTTOCK 24"		4,2,4	2,11,4	2,6,2	2,6,1	2,8,4	3,3,4		
	18"		3,4,6	2,7,0	2,3,4	2,3,4	2,5,2	2,9,7	3,9,1	
	12"	4,3,7	2,10,4	2,3,4	2,1,4	2,1,2	2,2,4	2,5,4	3,1,4	4,8,3
	6"	3,5,3	2,4,6	1,11,7	1,10,7	1,11,0	1,11,4	2,1,3	2,6,2	3,7,5
	RABBET	2,10,2	1,11,4	1,9,1	1,8,5	1,8,5	1,9,2	1,10,4	2,0,6	2,10,5
	KEEL	2,3,0	0,0,0	0,1,4	0,4,1	0,6,7	0,9,4	1,0,0	1,3,7	2,3,2
HALF-BREADTHS	DECK	1,2,1	2,0,6	2,7,5	2,11,3	3,0,0	2,10,4	2,6,0	1,11,0	1,1,1
	W.L. 54"	1,1,2							1,10,3	0,10,6
	48"	0,10,0	1,11,0	2,7,1	2,11,1	2,11,7	2,9,7	2,4,4	1,7,5	0,8,0
	42"	0,6,4	1,7,1	2,5,2	2,10,0	2,11,0	2,8,3	2,1,6	1,3,6	0,5,1
	39"	0,4,6	1,4,5	2,3,3	2,8,7	2,10,0	2,7,0	1,11,4	1,1,2	0,3,6
	36"	0,2,5	1,1,5	2,0,6	2,7,1	2,8,2	2,4,5	1,8,4	0,10,6	0,2,2
	33"	0,1,3	0,10,4	1,9,0	2,4,0	2,5,0	2,1,0	1,4,7	0,8,2	0,1,2
	30"	0,0,7	0,7,2	1,4,3	1,11,2	1,11,5	1,7,4	1,0,4	0,5,6	0,0,5

OFFSETS IN FEET, INCHES, & EIGHTHS
AS TO OUTSIDE OF CARVEL PLANK.

DECK CROWN 2" IN 6'0" BEAM

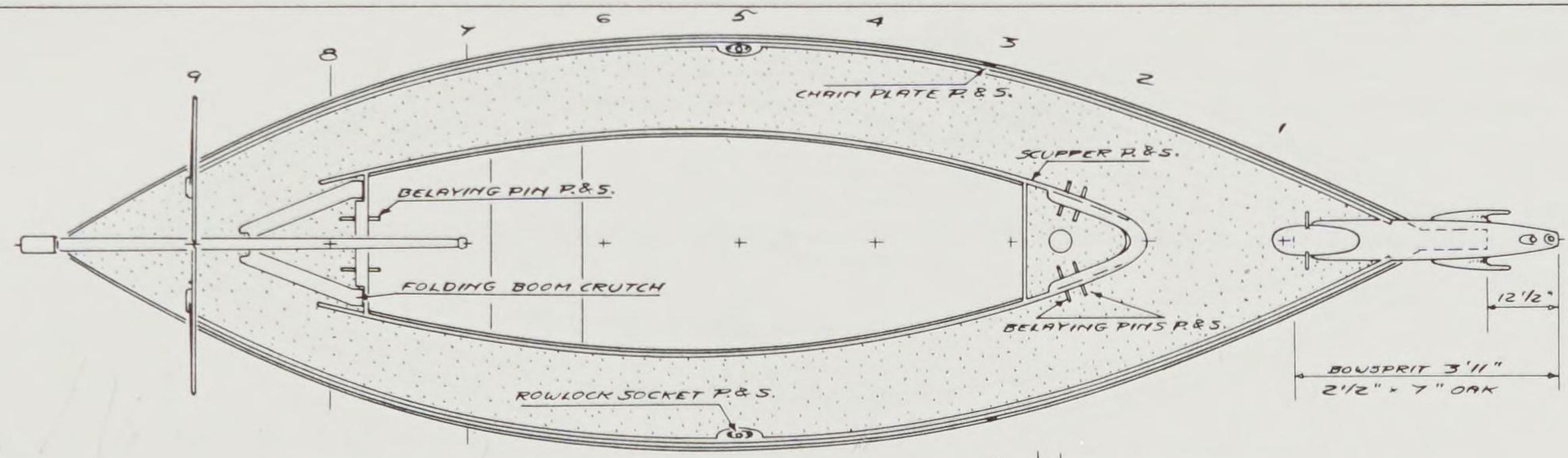


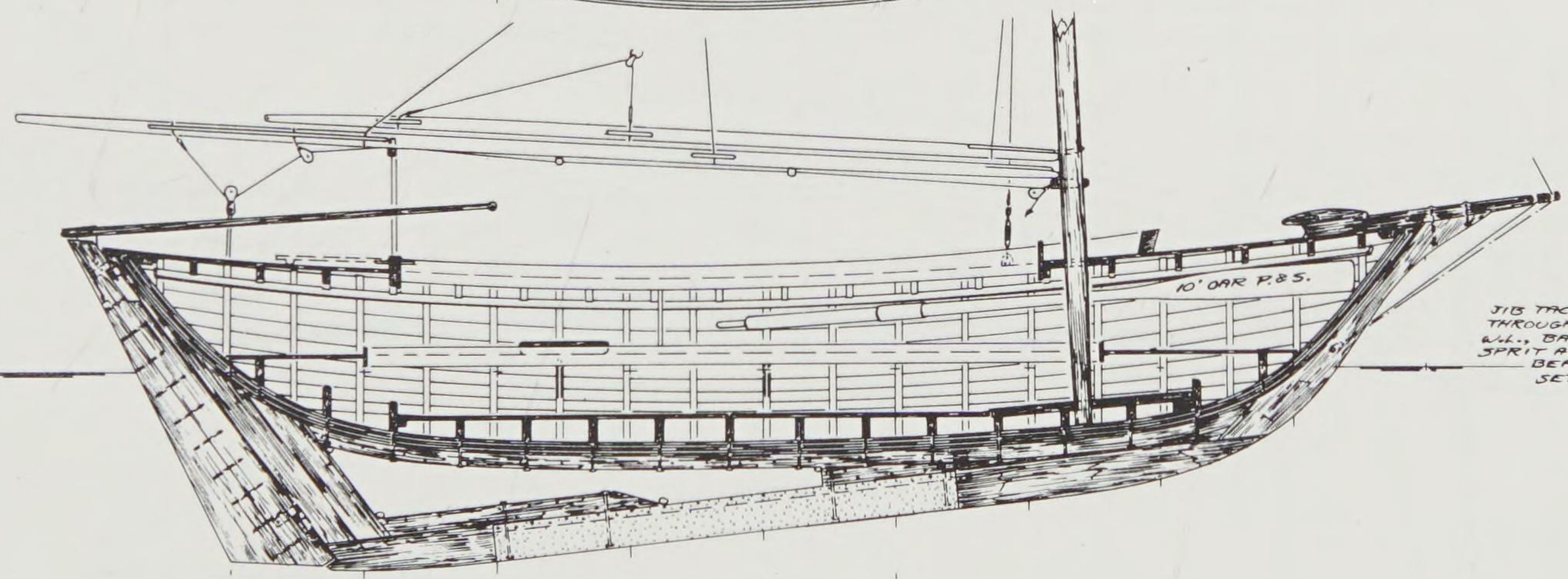


SCALE 3/4" = 1'0"

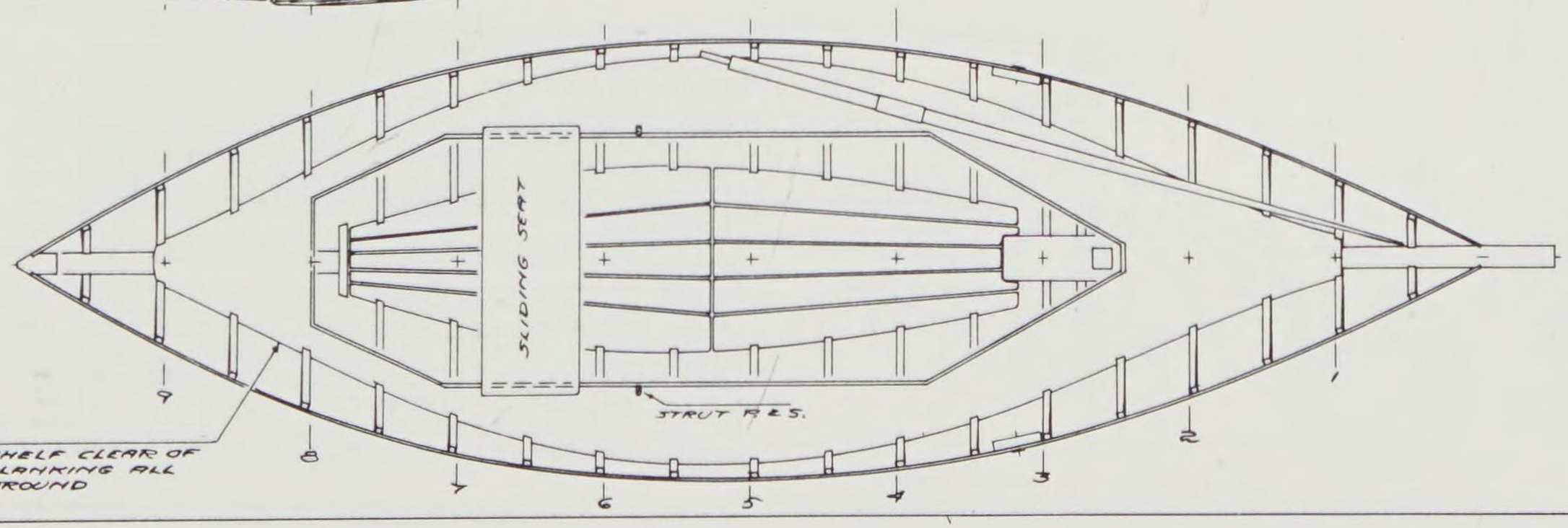
DESIGN #396
20'0" · 6'0" · 3'0"
for EDGAR DENTON III

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS





JIB TACK LINE RUNS DOWN THROUGH DUMB SHEAVE NEAR W.L., BACK UP THROUGH BOWSPRIT AND INBOARD. SET UP BEFORE HOISTING SAIL: SET UP SAIL WITH HALYARD.

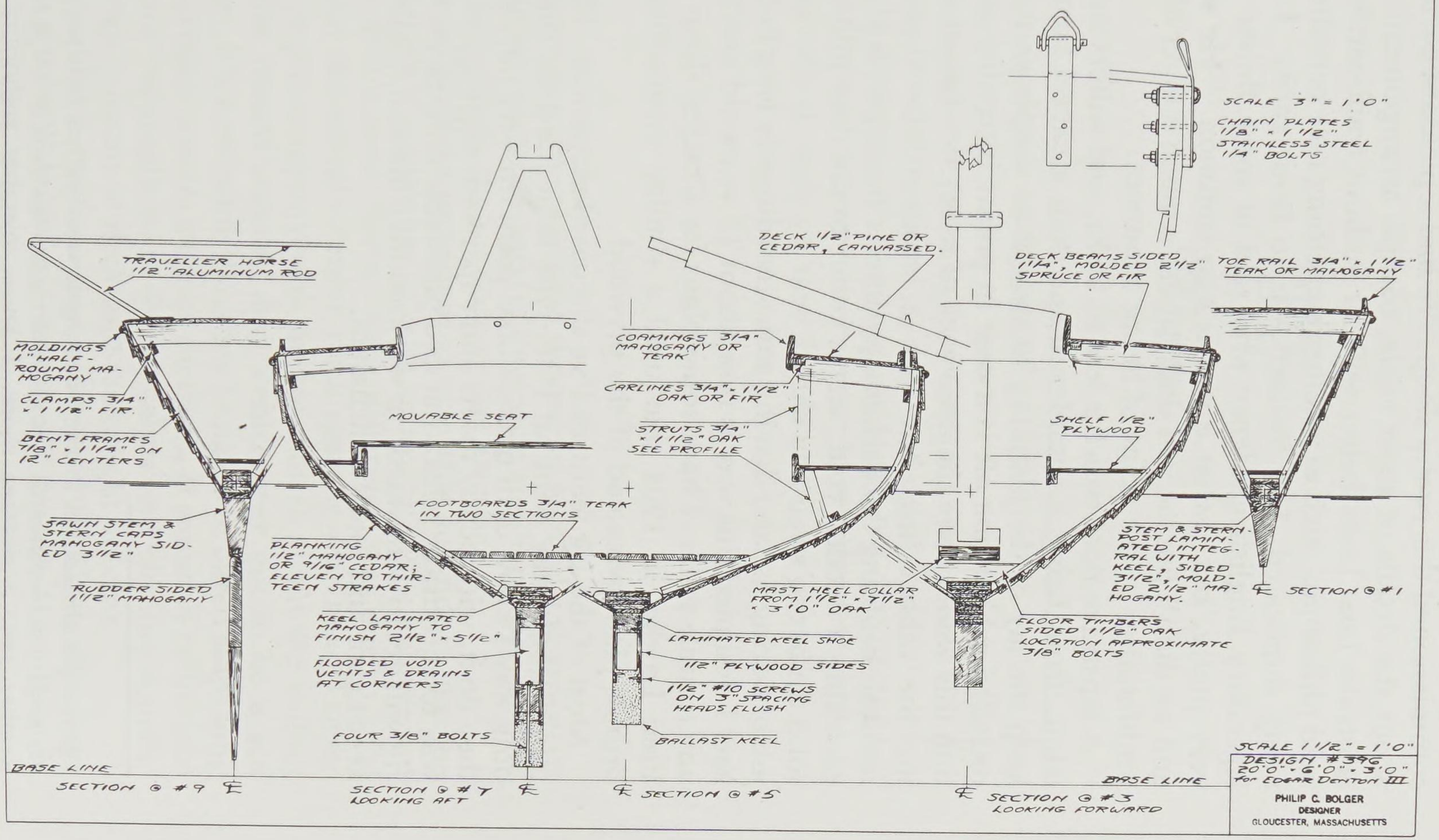


N.B. SHELF CLEAR OF PLANKING ALL AROUND

SCALE 3/4" = 1'0"

DESIGN #396
20'0" x 6'0" x 3'0"
FOR EDGAR DENTON III

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



DESIGN #396
20'0" - 6'0" - 3'0"
for EDGAR DENTON III

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

he'd prefer a somewhat larger and stiffer boat than *Yarrow,* Denton commissioned this pretty sloop. We had a pleasant correspondence about the details of sheet leads, cockpit arrangements, whether a lapstrake boat looks better with or without trailboards, and some mild philosophy such as whether something nice benefits or loses by being duplicated. His instinct was to favor rarity. I quoted the legendary English gardener who said of some flower that it was very pretty, but "what a pity it's so common." He said touché, and we didn't pursue it. I doubt there's much danger of this design proliferating to the point of being common.

A lapstrake boat benefits less in looks, and suffers more in extra labor, from being a complex shape than a carvel boat. I tried to keep the lay of the planking to sweeps as simple as possible. The rounded rabbet line aft is a case in point. In traditional construction this would have the drawback of many deadwood seams crossing the rabbet line, but with a laminated backbone, it seems natural. Building the keel as a perimeter frame, with plywood walls enclosing a flooded void, seems better to me than piling up a lot of solid timber to swell and shrink year by year. It also saves a mean job of boring for and driving some inordinately long bolts. The first keel I designed this way is now about 15 years old and hasn't given any trouble so far. I have some plans for a racing sloop designed by Fred Lawley in 1904 that used a similar construction but with bronze plating instead of the plywood.

Most of the rig features I've discussed elsewhere. This boat certainly won't stay with an IOR-type boat hard on the wind. The only way I know of to make a boat point the way they do is the way they do it, with bendy masts and super-taut staying, and it isn't the way to encourage relaxation and profitable reflections. This kind of rig will get to windward* in workmanlike fashion, while her skipper keeps cool and looks nonchalant.

---

* I wish people wouldn't write "beating to weather"; it feels to me like scraping my nails on a blackboard. The direction is *windward.* Weather is an adjective: the weather rail, a weather shore. I know towering authorities use them indiscriminately, but I say, why are there two different words if they mean the same?

32

Pico

Length overall	6.5 meters (21.3 feet)
Breadth	1.84 meters (6 feet)
Displacement	.82 tonne (1,850 pounds)
Sail area	15.8 square meters (170 square feet)
Owner and builder	Claudio Poropat, Trieste, Italy

I received this commission because the owner wanted a sharp-stern leeboard sailboat about 6½ meters long with auxiliary oars, and he knew I'd designed just such a boat — the *Dovekie*.

What complicated the proceedings was that he didn't like the *Dovekie* much and disagreed with a lot of my opinions about what was good in such a boat. Some of the difference was due to local conditions. An old friend of mine once spent a year near Trieste and used to regale company with horror stories about the sailing conditions that roused wonder that Venice ever got to be a sea power. In fact, it's noticeable that they hung on to oared ships long after most maritime powers gave up on them. It sounded rather like sailing on some mountain lakes — flat calms and blasting squalls. Hence the large amount of deck and watertight volume.

Most of our differences were just matters of "I like it this way, not that way," such as the leeboard mounts on Francis Herreshoff's geometry. Leeboards hung this way are held tightly to the hull by the water flow if they're raked aft at all, so they are

SEE CONSTRUCTION SHEET FOR FITTING GEOMETRY

0120

0120

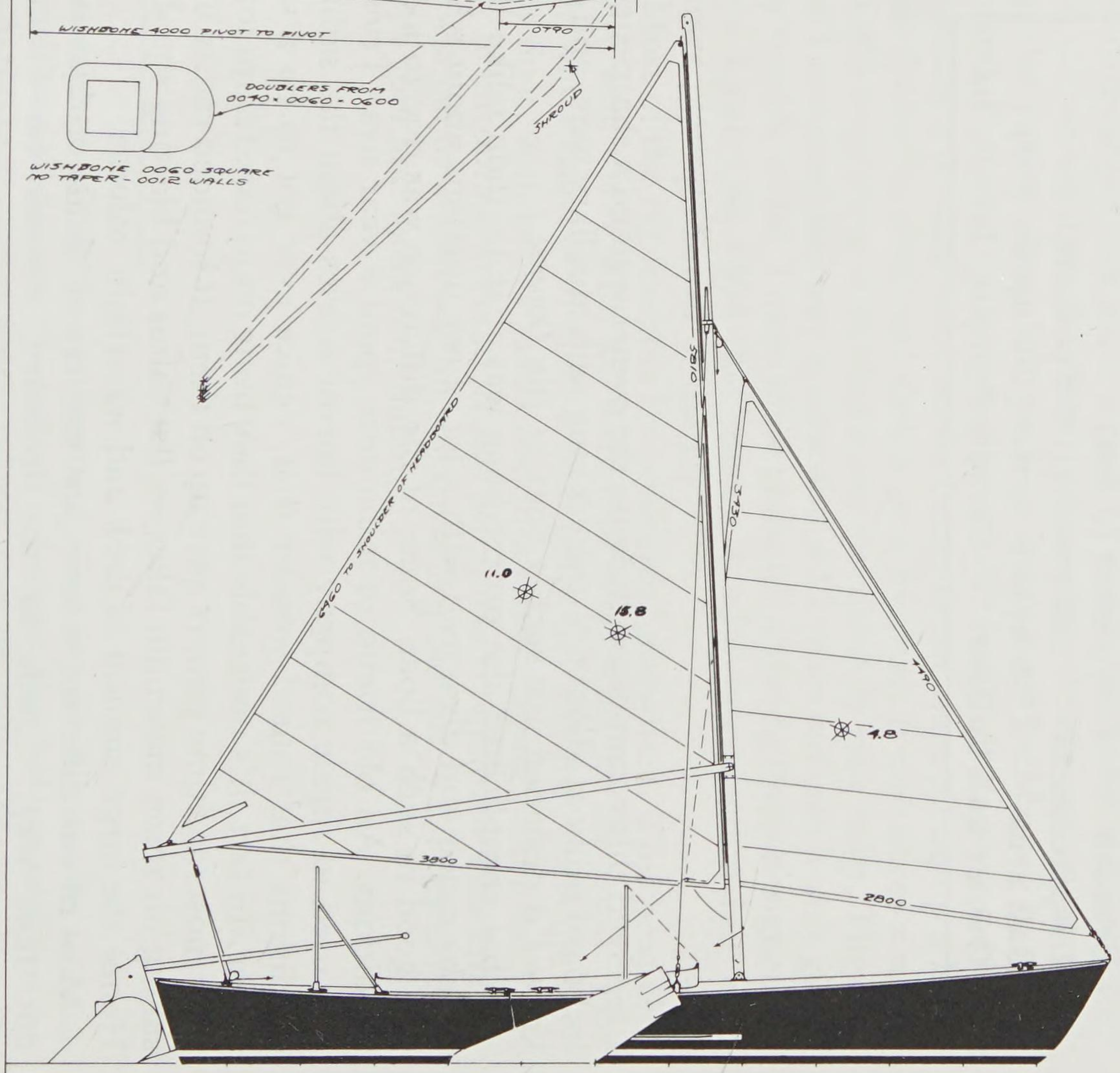
WISHBONE 4000 PIVOT TO PIVOT

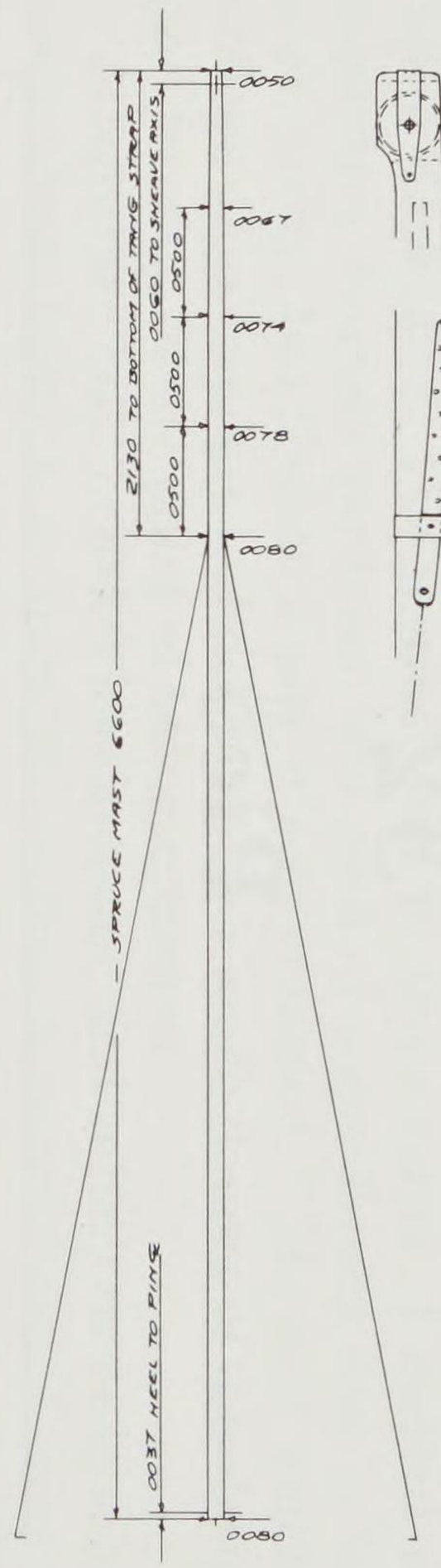
0790

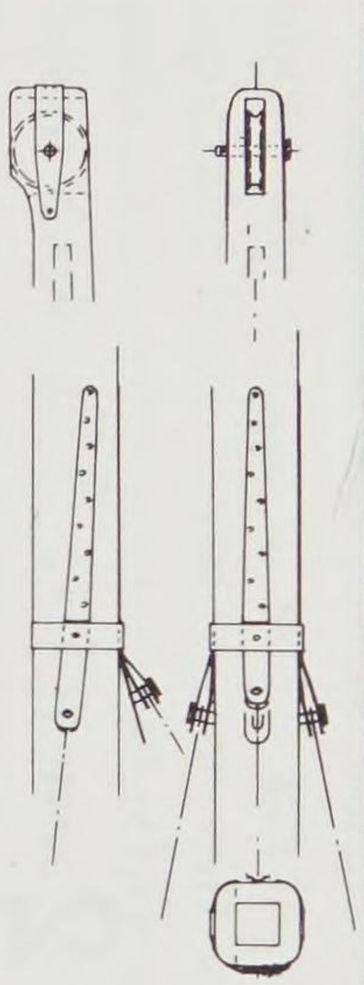
DOUBLERS FROM
0090 x 0060 - 0600

SHROUD

WISHBONE 0060 SQUARE
NO TAPER - 0012 WALLS



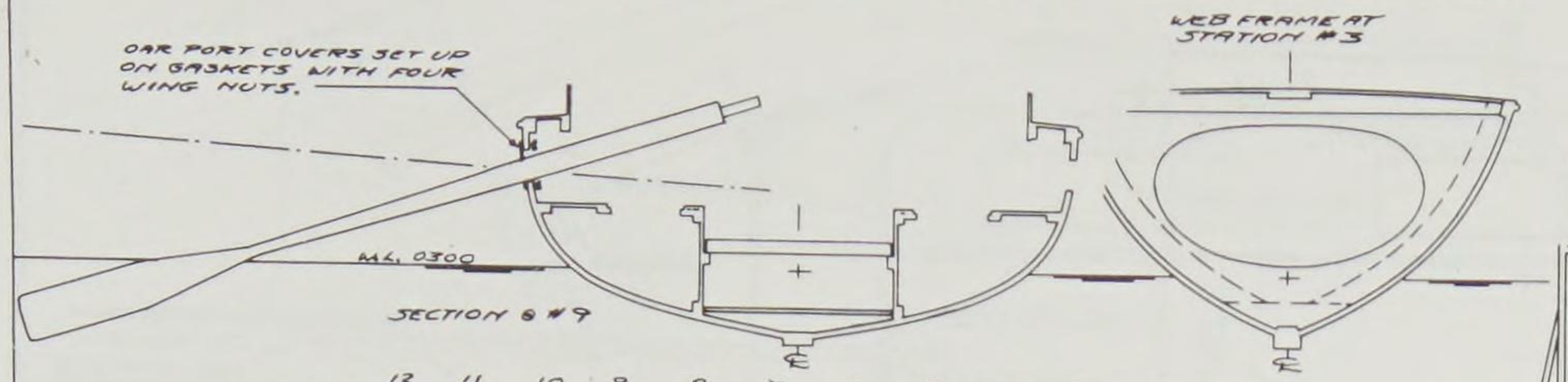




12 11 10 9 8 7 6 5 4 3 2 1

SCALE 1:20
DESIGN #386
6500 x 1840
for CLAUDIO POROPAT

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



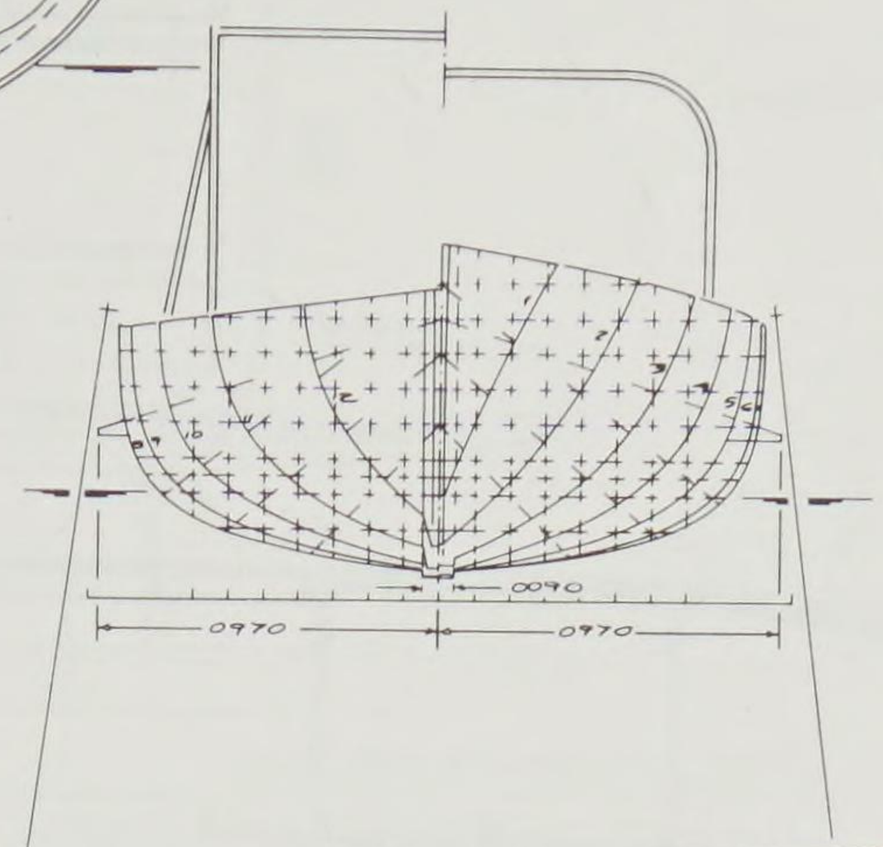
HEIGHTS FROM BASE LINE

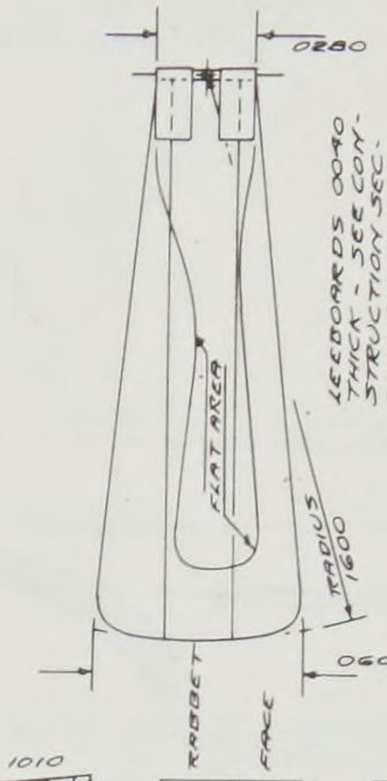
	12	11	10	9	8	7	6	5	4	3	2	1
DECK	0836	0801	0780	0770	0769	0773	0789	0809	0835	0867	0907	0953
BUT. 0700			0408	0280	0228	0219	0240	0311	0469	0800		
0600		0571	0315	0222	0183	0179	0190	0240	0350	0578		
0500		0409	0252	0183	0155	0150	0160	0177	0278	0439	0790	
0400		0320	0209	0156	0134	0130	0135	0163	0218	0336	0598	
0300	0531	0253	0176	0135	0118	0112	0115	0139	0173	0261	0458	0910
0200	0390	0208	0142	0115	0100	0100	0100	0115	0140	0200	0340	0719
0100	0288	0170	0119	0100	0088	0088	0088	0094	0108	0149	0239	0512
RABBET	0240	0152	0105	0088	0082	0082	0082	0085	0090	0124	0190	0390
KEEL	0155	0098	0070	0066	0066	0066	0066	0068	0073	0100	0159	0300

HALF-BREADTHS

	12	11	10	9	8	7	6	5	4	3	2	1
DECK	0390	0648	0800	0880	0913	0920	0910	0881	0821	0719	0559	0328
W.L. 0900											0557	0298
0800	0382	0648						0880	0819	0700	0506	0242
0700	0368	0638	0793	0879	0913	0920	0909	0870	0799	0659	0455	0190
0600	0333	0611	0782	0868	0910	0916	0900	0857	0768	0617	0400	0190
0500	0281	0569	0757	0850	0893	0907	0884	0829	0719	0548	0332	0093
0400	0210	0490	0692	0810	0868	0878	0851	0777	0647	0467	0255	0052
0350	0167	0440	0648	0772	0840	0850	0821	0741	0602	0418	0211	0032
0300	0120	0376	0580	0726	0798	0811	0779	0688	0534	0355	0163	0010
0200	0033	0188	0383	0550	0693	0662	0621	0512	0366	0203	0057	

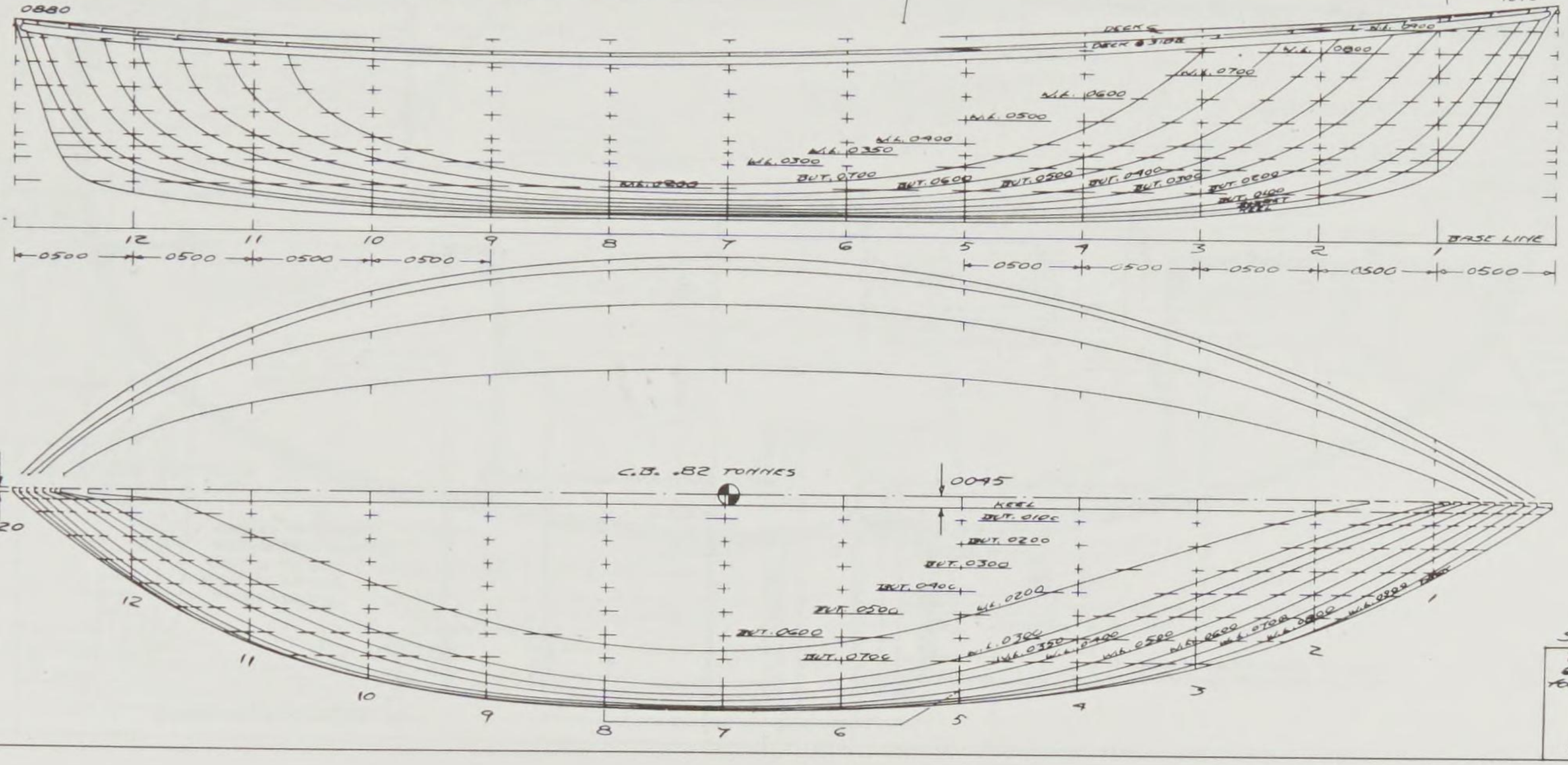
OFFSETS IN MILLIMETRES TO OUTSIDE OF PLANK.
DECK CROWN 0050 IN 1840 BEAM





FACE	RABBET
0023	0061
0056	0100
0090	0141
0122	0191
0159	0254
0200	0366
0312	0670

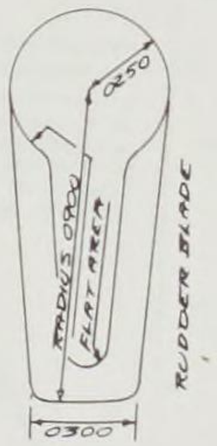
OFFSETS IN FROM AFTER PERPENDICULAR.



KABBET	FACE
0110	0062
0175	0119
0244	0177
0319	0240
0390	0303
0481	0385
0690	0500
0950	0772

OFFSETS IN FROM FORWARD PERPENDICULAR.

HALF-BREADTH OF FACE
0025
0019
0014
0011
0010
0010
0010
0010



SCALE 1:15

DESIGN #386
6500 - 1840
KEN CLAUDIO PORCPAT

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

OUTHAUL BELAYING PIN

WISHBONE CLEW YOKE 0003 S.S. 0025 ROUND-HEAD SCREWS

0019 TRACK

WISHBONE GOOSENECKS 0003 STAINLESS STEEL

STEM STRAP 0002 - 0030 0040 ROUND-HEAD SCREWS 0006 SHACKLE FOR TURNBUCKLE

SHROUD CHAIN PLATES SIMILAR

SCALE 1:2

SCALE 1:2

AWNING

HINGED PANEL

JAM CLEAT FOR OAR LANYARD

HINGED PANEL

W.L. 0300

LEAD INSERT

12 11 10 9 8 7 6 5 4 3 2 1

CHAIN PLATE P & S.

LEEBOARD CLEAT P & S.

SEAT P. & S. - STOWAGE UNDER

SPRAY HOOD BOW FOLDED

GALLOWS

SWIVEL BLOCK

TILLER SLIDES AFT TO CLEAR GALLOWS STANCHIONS

FOOT-BRACE NOTCHES P & S.

SLIDING SEAT

MAIN SHEET CLEAT

PAD EYE

MOORING CLEAT P & S.

ACCESS PANELS

JIB SHEET CLEAT P & S.

ROWLOCK P. & S.

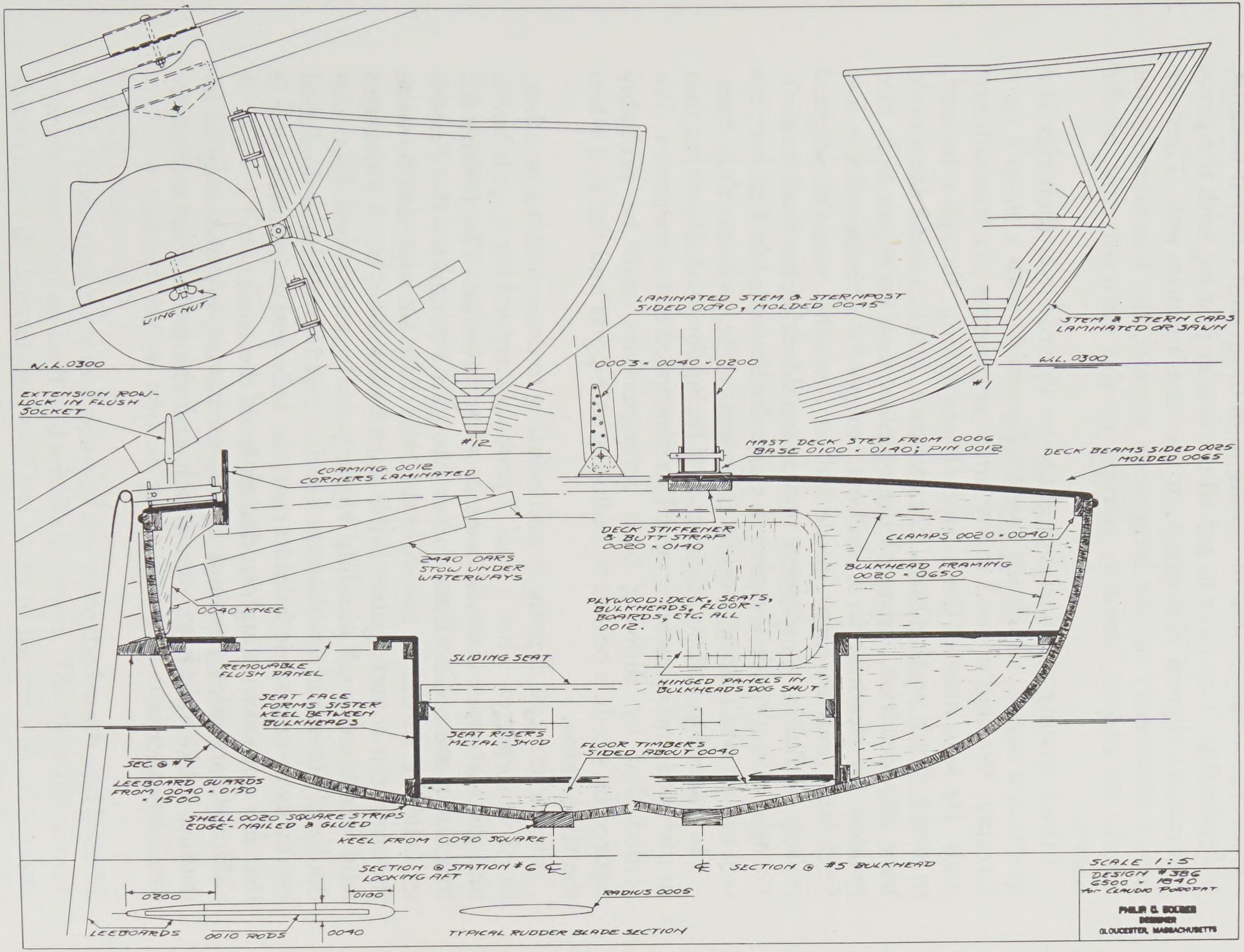
LEEBOARD PIVOT P & S.

12 11 10 9 8 7 6 5 4 3 2 1

SCALE 1:15

DESIGN #386
6500 × 1840
FOR CLAUDIO PORCHAT

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


WING NUT
N.A. 0300
#12
LAMINATED STEM & STERNPOST SIDED 0040, MOLDED 0095
0003 × 0040 × 0200
STEM & STERN CAPS LAMINATED OR SAWN
W.L. 0300
#1
EXTENSION ROW-LOCK IN FLUSH SOCKET
COAMING 0012 CORNERS LAMINATED
MAST DECK STEP FROM 0006 BASE 0100 × 0140; PIN 0012
DECK BEAMS SIDED 0025 MOLDED 0065
DECK STIFFENER & BUTT STRAP 0020 × 0140
CLAMPS 0020 × 0040
2440 OARS STOW UNDER WATERWAYS
BULKHEAD FRAMING 0020 × 0650
0040 KNEE
PLYWOOD: DECK, SEATS, BULKHEADS, FLOOR-BOARDS, ETC. ALL 0012.
REMOVABLE FLUSH PANEL
SLIDING SEAT
HINGED PANELS IN BULKHEADS DOG SHUT
SEAT FACE FORMS SISTER KEEL BETWEEN BULKHEADS
SEAT RISERS METAL-SHOD
FLOOR TIMBERS SIDED ABOUT 0040
SEC. @ #7
LEEBOARD GUARDS FROM 0040 × 0130 × 1300
SHELL 0020 SQUARE STRIPS EDGE-NAILED & GLUED
KEEL FROM 0090 SQUARE
SECTION @ STATION #6 LOOKING AFT
SECTION @ #5 BULKHEAD
0200
0100
LEEBOARDS
0010 RODS
0040
RADIUS 0005
TYPICAL RUDDER BLADE SECTION
SCALE 1:5
DESIGN #386
6500 - 1990
for CLAUDIO PORDAT
PHILIP G. BOOKER
DESIGNER
GLOUCESTER, MASSACHUSETTS

quieter and less apt to swing out and crash back in a seaway. I suspect the arrangement of having high drag, and I fear it because it's inflexible. You have to get all the angles just so, with the pivot axis exactly aligned 90 degrees, or they don't render well. They are shown incorrectly on the large-scale section; the transverse pivot should be canted upward, normal to the outward cant of the boards.

I think rowing auxiliaries ought to be able to lower their rigs at a moment's notice, which isn't very compatible with a sloop's tight forestay. We had a good many other arguments via transatlantic mail. He won most of them, since I was willing, though reluctant, to admit that it was his boat. For instance, I didn't think she should have any deadrise, being of the opinion that there are only two reasons for deadrise in a sailboat: to get headroom with a low freeboard, and to carry inside ballast low (this was the original reason — Baltimore clippers had sharp deadrise for that reason). Poropat said it made it easier to clean the bottom, but I'm sure his real reason was that he thought it looked better, as it certainly does.

He wanted to row standing up and facing forward. I've tried that in the Med and elsewhere, and I'm convinced it wastes power. We settled that by showing both arrangements, and he probably figured he needn't bother to build the side ports and the seat when the time came.

I seem to recall digging in and refusing to do something or other, but I've forgotten what it was. I probably argued for a sprit boom and got the expensive wishbone as a compromise. The fittings for this boom are copied from Jasper Morgan's design for the *Vamarie* gaff. It's better before the wind than the diagram suggests, because the shroud it comes against is the slack leeside one, but it illustrates why wishbones and standing rigging don't marry well. It's undoubtedly better in use than the crude affair I would have produced on my own, and apart from its cost, the only real objection I have is that it's not easy enough to detach from the mast.

Notwithstanding carpings about not having my own way in all details, I like this boat very much and think she's an extremely sensible concept.

33

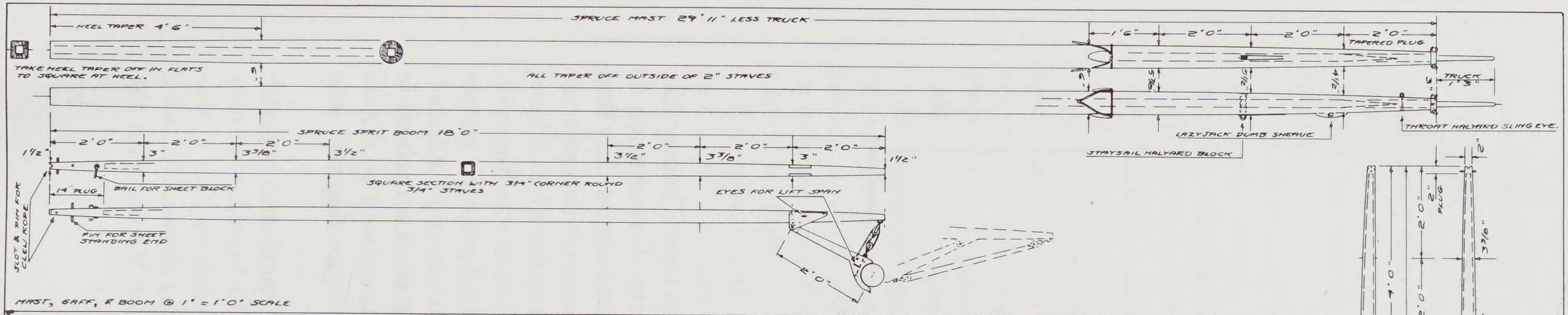
Africa

Length overall	28 feet 8 inches
Breadth	7 feet
Draft	3 feet
Designed displacement	8,800 pounds
Sail area	501 square feet (three lowers)
Owners	Elizabeth and Bradford Story
Builder	Story Shipyard, Essex, Massachusetts

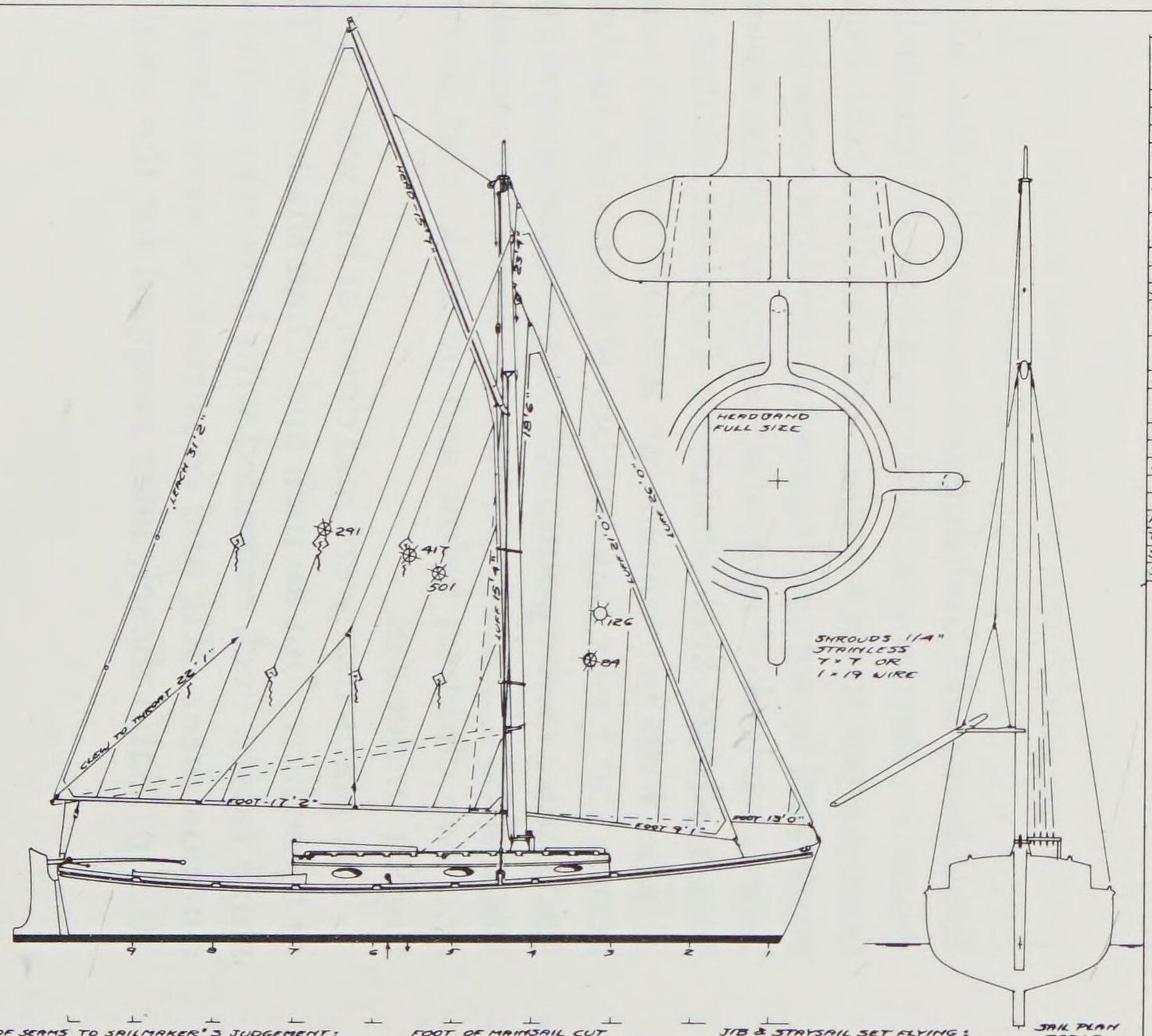
Brad Story was building my motorsailer *Resolution* (see Chapter 22) when we started to talk about a new design for him. I used to go in once a week to look at the work, and I'd take a cartoon, usually one suggested by something he had said the week before. Over a year or more, we looked at a wild variety of ideas, some quite nice. There was a 35-foot keel whaleboat I still regret, but it was too big.

The wish list was for an austere auxiliary, shoal enough to get across the Essex Bay bar but able enough to "run over to Africa" and, more to the point, able to go cruising and get back on schedule regardless of ordinary weather. She was to accommodate two adults and two children below and on deck, and be neither sluggish nor flighty under sail.

The plans that were laid down at last were the length and breadth of these here, but an inch and a half shallower. The boat had a midships raised deck extended with bulwarks to the ends to give a continuous sheer. Rig and construction were about as shown. It had a 10 h.p. Sabb diesel, later swapped for the smaller Yanmar on the



MAST, GAFF, & BOOM @ 1" = 1'0" SCALE



LAY OF SEAMS TO SAILMAKER'S JUDGEMENT; NOT NECESSARILY AS SHOWN.

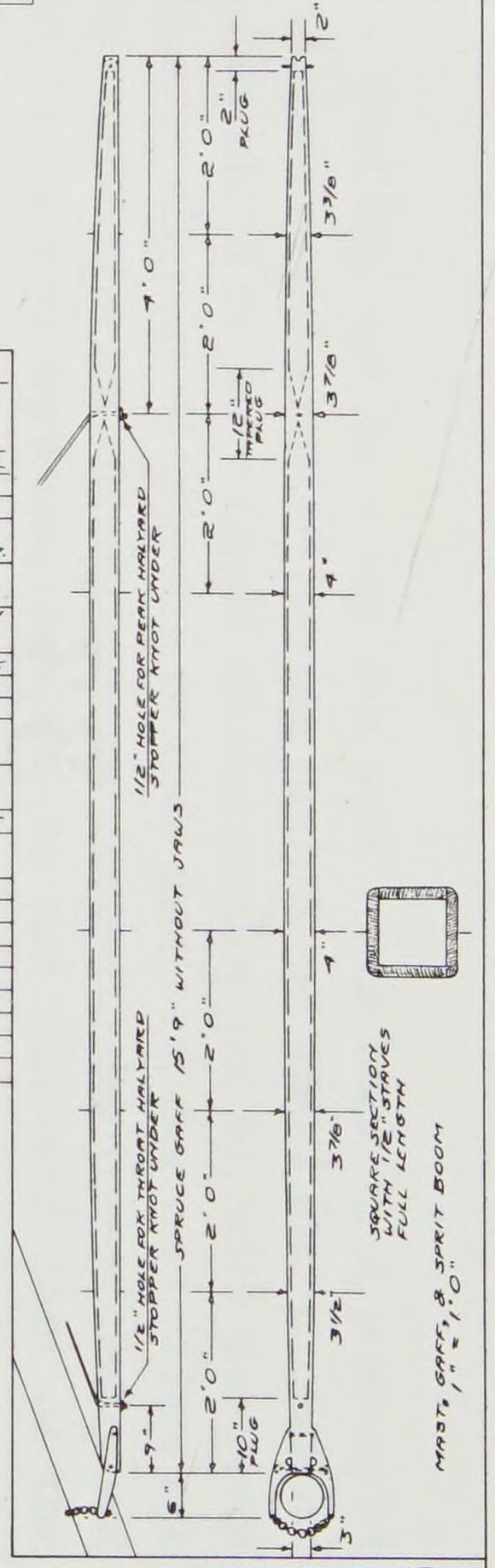
FOOT OF MAINSAIL CUT STRAIGHT & REINFORCED TO ACT AS BOOM VANG.

JIB & STAYSAIL SET FLYING; REINFORCE LUFFS TO STAND WITHOUT STAY SUPPORT.

SAIL PLAN SCALE 3/8" = 1'0"

PART	DIAM.	STANDING END	VIA	FALL
MAIN SHEET	1/2"	END OF BOOM	PORT DECK BLOCK. BOOM BLOCK. STARB'D DECK BLOCK	STARB'D BITT
PEAK HALYARD	3/8"	HOLE THROUGH GAFF	MASTHEAD BLOCK	MAST PIN RAIL
THROAT HALYARD	"	" " "	BLOCK ON SLING	" " "
BOOM LIFT	"	SPAN ON BOOM	MASTHEAD BLOCK	" " "
LAZYJACKS	"	THIMBLE ON BRIDLE PORT SIDE	AROUND MAST THROUGH DUMB SHEAVE.	THIMBLE ON BRIDLE STARB'D.
LAZYJACKS BRIDLE	1/4"	KNOT ENDS TOGETHER STARB'D FOR'D SIDE.	ENDLESS LOOP THRU. LAZYJACK THIMBLES & SAIL FOOT GROMMETS.	ENDLESS
SNOTTER	3/8"	BOOM BLOCK BECKET	BLOCK ON JAWS BOOM BLOCK	BELAYING PIN IN JAWS
STAYSAIL SHEETS	"	CLEW	BULLSEYE ON TRUNK	CLEAT ON TRUNK
JIB SHEETS	1/2"	"	BLOCK ON RAIL	COMMING CLEAT
STAYS'L HALYARD	3/8"	HEAD OF SAIL	BLOCK ON MAST	MAST PIN RAIL
JIB HEAD ROPE	1/8" 7 x 19 WIRE	SPLICE TO HEAD OF SAIL		SHACKLE TO HEADBAND.
JIB TACK ROPE	"	SPLICE TO TACK		SHACKLE TO STEM BAND
STAYS'L TACK ROPE	1/2"	SPLICE TO TACK		BELAY TO BITT

BLOCKS FOR	NO.	LOCATION	FOR ROPE DIAM.	TYPE
MAIN SHEET	2	DECK AT STERN	1/2"	SWIVEL & DECK PLATE
"	1	BOOM END	1/2"	SIDE SHACKLE ON BAIL
JIB SHEETS	2	RAIL AMIDSHIPS	1/2"	SWIVEL & DECK PLATE
SNOTTER	1	BOOM END	3/8"	UPSET SIDE SHACKLE WITH BECKET
"	1	JAWS	3/8"	UPSET SIDE SHACKLE
PEAK HALYARD	1	MASTHEAD	3/8"	UPSET SIDE SHACKLE
THROAT HALYARD	1	SLING FROM MAST EYE	3/8"	UPSET SIDE SHACKLE
STAYS'L HALYARD	1	MAST EYE	3/8"	UPSET SIDE SHACKLE
STAYS'L SHEETS	2	TRUNK TOP	3/8"	BULLSEYES



SCALE AS MARKED

DESIGN #350
28'8" - 7'0" - 3'0"
for BRADFORD STORY

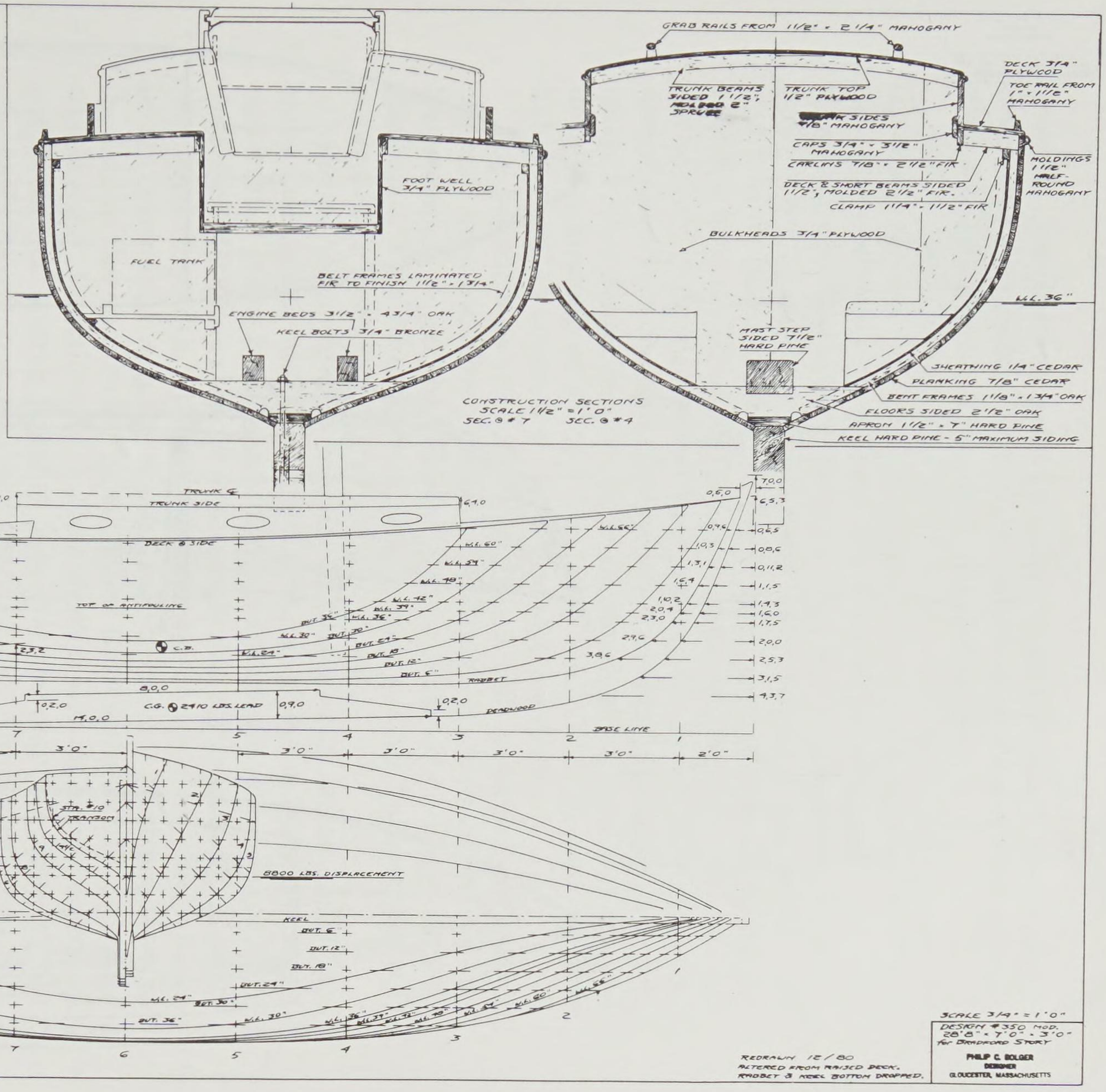
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

REDRAWN & REVISED 12/80

HEIGHTS FROM BASE LINE	10	9½	9	8	7	6	5	4	3	2	1
TRUNK SIDE					6,0,3	6,0,0	6,0,0	6,0,4	6,1,6		
DECK ℄	6,7,4	5,7,3	5,5,6	5,3,4	5,2,5	5,2,7	5,3,5	5,5,4	5,7,6	5,10,4	6,2,1
TOP OF DECK AT SIDE	5,8,6	5,6,1	5,4,2	5,1,6	5,0,6	5,0,6	5,1,5	5,3,4	5,6,0	5,9,4	6,1,7
BUT. 36"				3,5,2	2,7,7	2,4,3	2,6,2	3,2,1	5,3,3		
30"			3,10,0	2,9,2	2,2,6	2,0,4	2,1,4	2,7,0	3,9,3		
24"	1,7,6	3,10,3	3,3,4	2,5,0	1,11,4	1,10,0	1,10,4	2,2,1	3,0,4	3,0,7	
18"	4,0,6	3,5,6	2,11,2	2,1,6	1,9,2	1,8,0	1,8,1	1,10,5	2,6,0	4,1,4	
12"	3,9,0	3,2,0	2,7,2	1,10,6	1,7,2	1,6,0	1,6,2	1,7,6	2,0,3	3,2,1	5,11,2
6"	3,6,1	2,10,0	2,2,6	1,7,2	1,4,6	1,4,1	1,4,2	1,4,6	1,6,6	2,2,6	4,8,3
RABBET	3,4,3	2,6,2	1,10,0	1,3,4	1,3,0	1,3,0	1,3,0	1,3,0	1,3,4	1,7,2	3,3,5
DEADWOOD			0,0,0	0,0,0	0,0,5	0,1,4	0,2,2	0,3,2	0,4,1	0,5,1	0,9,6	2,6,0

HALF-BREADTHS	10	9½	9	8	7	6	5	4	3	2	1
DECK	2,2,0	2,5,3	2,8,2	3,1,3	3,4,6	3,6,0	3,6,0	3,4,5	3,0,2	2,3,6	1,0,7
W.L. 66"	2,2,0	2,5,3							3,0,2	2,2,2	0,9,6
60"	2,1,4	2,5,0	2,8,2	3,1,3	3,4,6	3,6,0	3,6,0	3,4,4	2,11,2	1,11,4	0,7,2
54"	1,11,1	2,4,2	2,8,1	3,1,3	3,4,6	3,6,0	3,6,0	3,4,1	2,8,4	1,8,3	0,5,2
48"	1,5,0	2,1,4	2,7,0	3,1,2	3,4,6	3,6,0	3,5,6	3,3,4	2,7,2	1,5,2	0,3,4
42"	0,4,7	1,6,4	2,3,0	3,0,2	3,4,2	3,5,7	3,5,2	3,1,7	2,4,0	1,1,7	0,2,3
39"		1,1,6	1,11,4	2,10,7	3,3,5	3,5,5	3,4,5	3,0,4	2,2,0	1,0,4	
36"		0,9,0	1,7,2	2,8,7	3,2,4	3,4,6	3,3,4	2,10,4	1,11,4	0,10,6	
30"			0,10,2	2,1,5	2,10,2	3,1,4	2,11,5	2,5,0	1,6,0	0,7,6	
24"			0,3,4	1,2,5	2,0,6	2,4,7	2,3,1	1,8,4	0,11,6	0,4,3	
KEEL		0,2,0	0,2,2	0,2,4	0,2,4	0,2,4	0,2,4	0,2,4	0,2,4	0,2,0	0,2,0
	10	9½	9	8	7	6	5	4	3	2	1

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK.

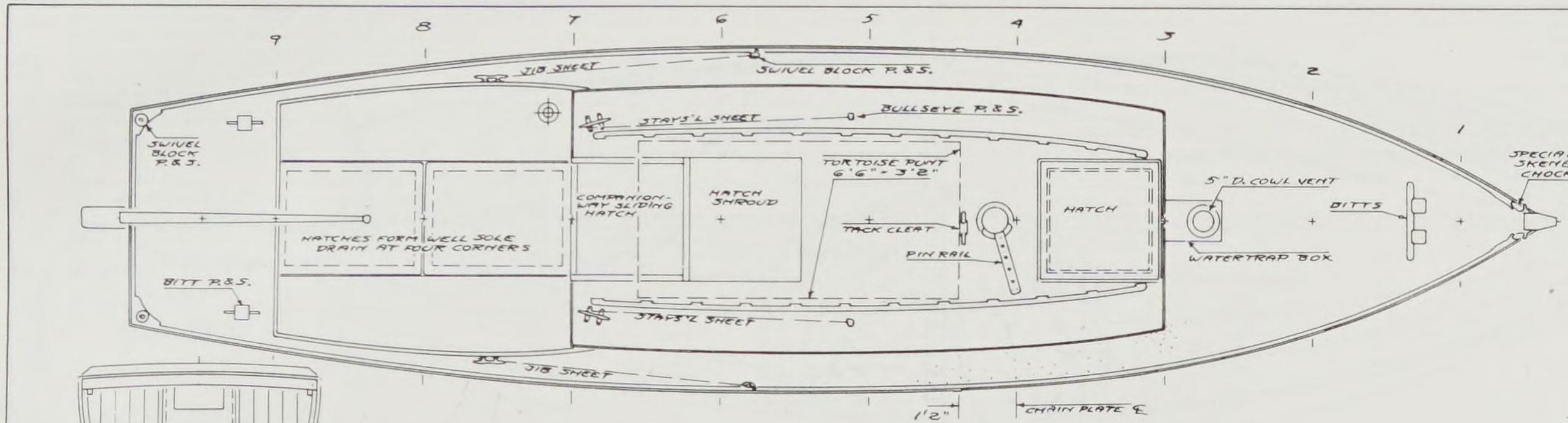


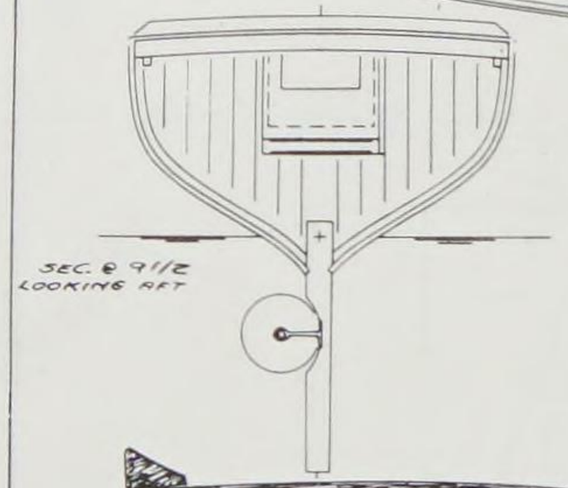
SCALE 3/4" = 1'0"

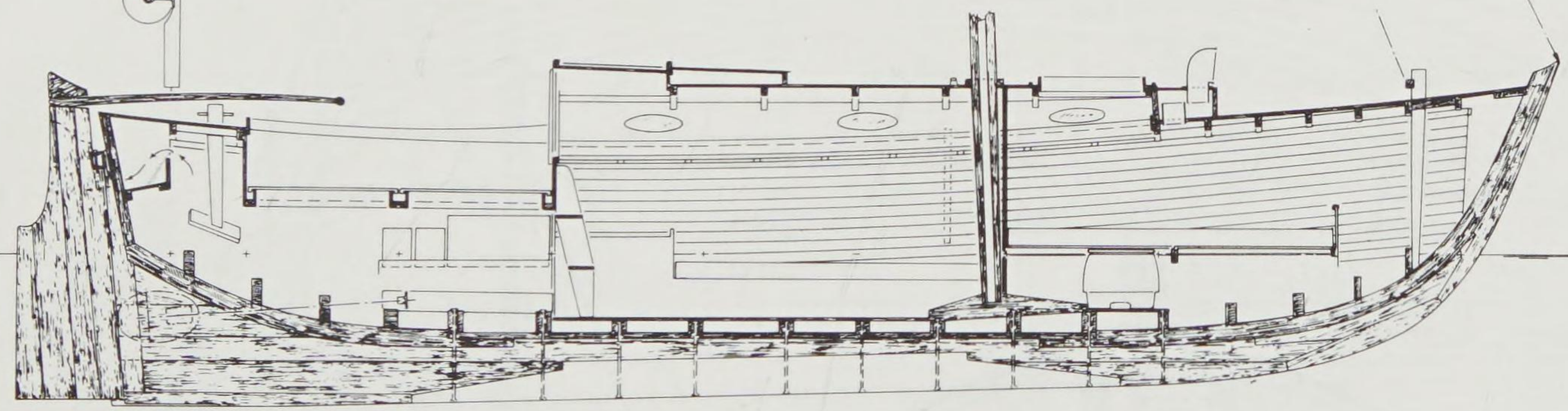
DESIGN #350 MOD.
28'8" x 7'0" - 3'0"
for BRADFORD STORY

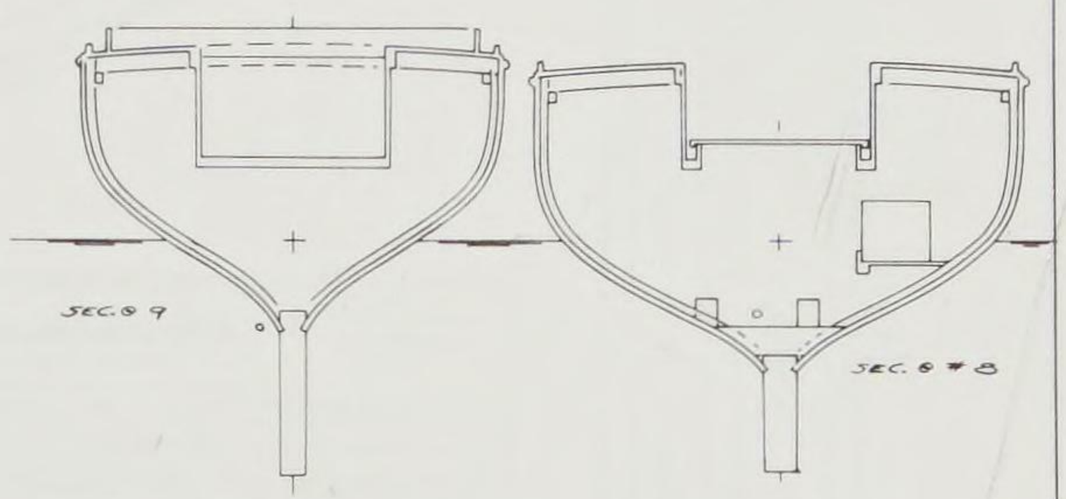
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

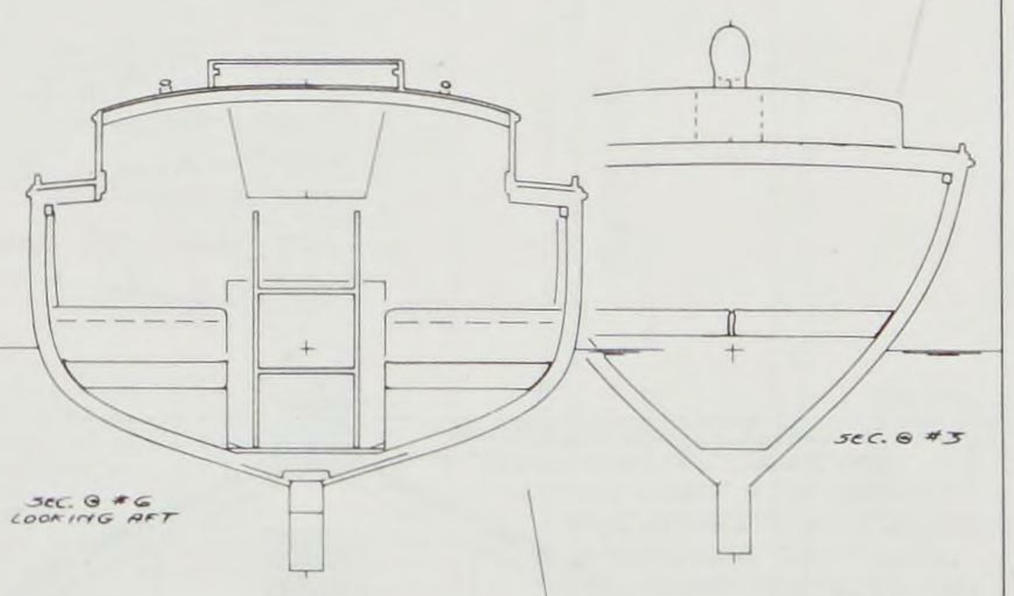
REDRAWN 12/80
ALTERED FROM RAISED DECK.
RABBET & KEEL BOTTOM DROPPED.

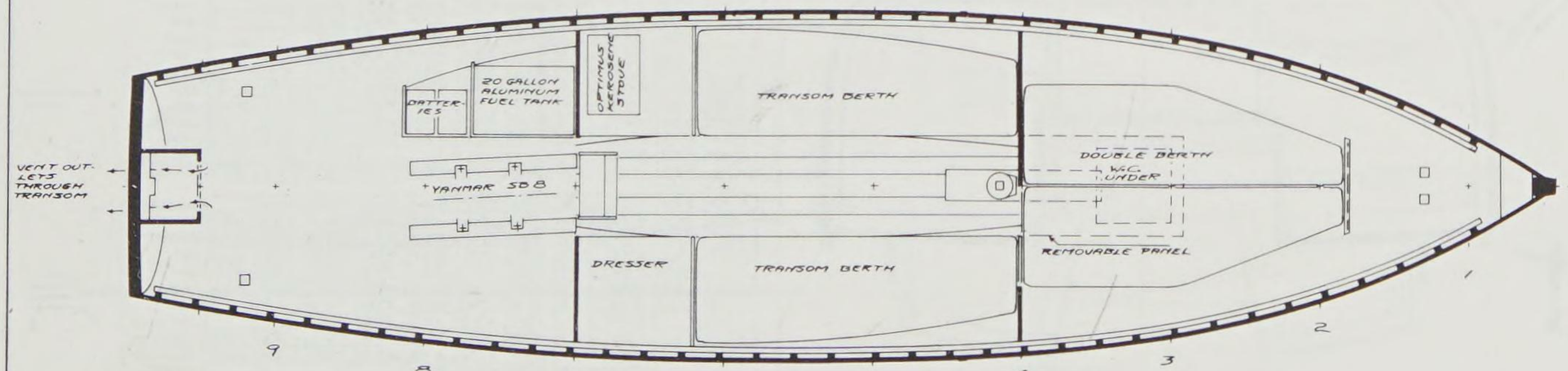


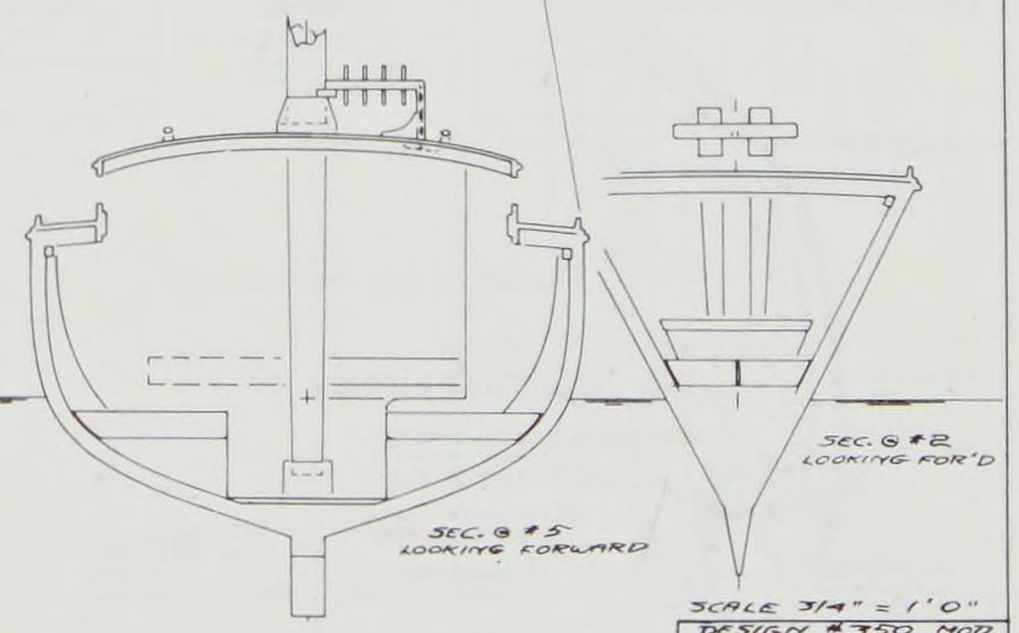












SCALE 3/4" = 1'0"

DESIGN #350 MOD.
28'8" x 7'0" x 3'0"
FOR BRADFORD STORY

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

grounds that the big Sabb propeller would hurt her performance under sail too much. The sacrifice of speed under power was probably a knot and a half, or more in rough water.

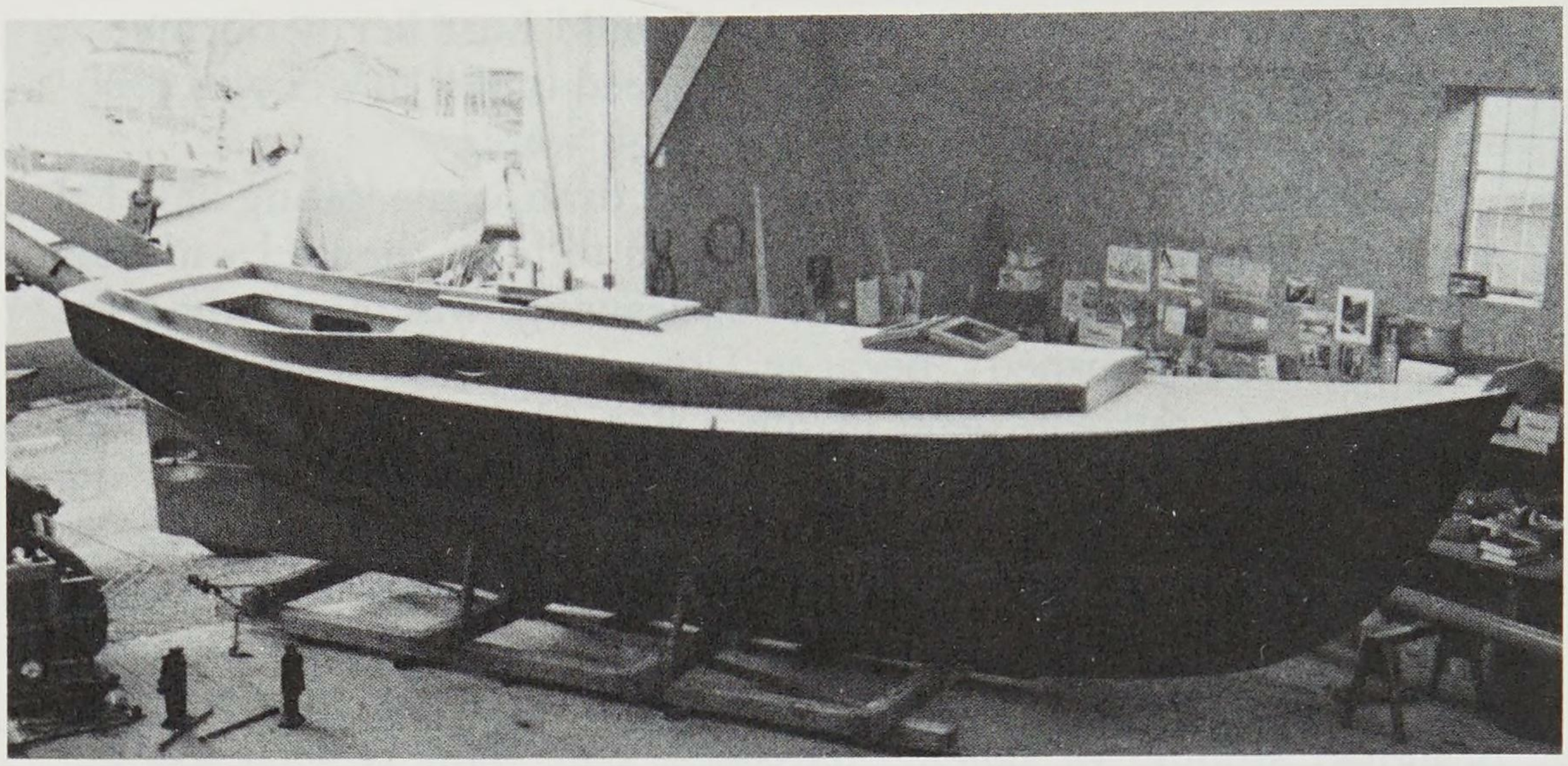
Brad added the inch and a half to her draft while lofting her. I'd designed her with the section curving in to meet the keel with less deadrise than shown here (this set of drawings was made when she was about half finished), because I try not to put more displacement than I can help deep in the water where it just needs that much more ballast to hold it down. Brad argued that dropping the rabbet a little would make her easier to plank and allow space for an apron over the garboards without cutting the floor timbers, and he maintained that the difference in displacement was petty. He correctly added the same amount to the depth of the keel to retain the designed amount of salient, flat-sided keel. This is what lets her hold on well to windward on such a shallow draft.

The proportions we'd selected show a stiff, powerful midsection as small as would allow comfortable sitting. Then we pulled her out long enough to get the four-berth cabin and long cockpit without snubbing. You'll hunt a long time before you find a bow that will go against a head sea as cleanly as this one.

Matters went forward happily (my boat was sitting out in the snow unfinished, but I was in no rush) until the sloop was planked up. At that point Brad took a dislike to the looks of the stern. With the raised deck line run out to the stern, the transom did look oddly high for its breadth. I should have drawn it with some tumblehome in the quarters. I went in one day and he had cut her back down to the line of the end decks. These plans have been redrawn to show what he did. Functionally, I don't think it was an improvement. It cut down her reserve stability (not that she couldn't spare it, but you can't have too much) and space below. Almost any boat with only sitting headroom below really ought to be built with a raised deck so that you can lean back. The waterways are too narrow and the construction more complicated. In theory, I don't like the change at all. But it produced a very graceful sheerline.

As for the cabin, it may look bare and unimaginative on the drawing, but the cedar sheathing fastened with exposed copper nails, with air circulating behind it so it's always warm and dry, makes it a very pleasant place to retreat to on a wet day. It doesn't have the busyness of more ingenious arrangements, and as a result, it's cheaper, more flexible, and more restful.

The rig is supposed to look traditional except for the scissors-action sprit boom. It remains to be seen whether this gadget is



The Story cutter leaving her building shed. There's no denying that the trunk cabin construction adds grace. (Dana Story photograph)

worth the complication. The alternative is a straightforward sprit boom with an offset jaw. The mainsail and its gaff are light enough to use single-part halyards. The jib is set up permanently to the masthead, its luff wire doubling as a headstay. It is furled by rolling it up by hand from the clew inward with a wringing motion, as described in Chapter 1 and elsewhere. Much bigger sails than this one can be furled quickly in this way, with little to go wrong and a neat, reliable furl resulting. It can't be done from the cockpit, of course, as a luff-rolling sail could, but I haven't been happy with roller-furling jibs since one rolled the headstay up in itself, in the mid-watch, off soundings, in a rising breeze — and wouldn't go in, out, up, or down. That was a good many years ago, but I'll never forget it!

The forestaysail is set flying and would be removed for short tacking to clear the foretriangle for the jib. This sail is probably worthwhile to improve the airflow over the lee side of the mainsail, but its main purpose is to provide balance and control in heavy weather, when the jib is furled and the mainsail deep reefed. It is also the sail to back when heaving-to, for which both the hull and the rig are unusually suitable. The cutter rig's strong point is that it gives many sail combinations with a minimum number of spars. This one tried to retain that advantage while eliminating a lot of blocks and cordage that I hope to prove aren't needed at this small scale.

NOTE: This boat's name is actually *Romp,* after the revolutionary fishing schooner designed and built by Brad's great-great-great-grandfather in 1847. I've kept the "drawing board name" I gave her to save confusion with another *Romp* I wrote about in a previous book.

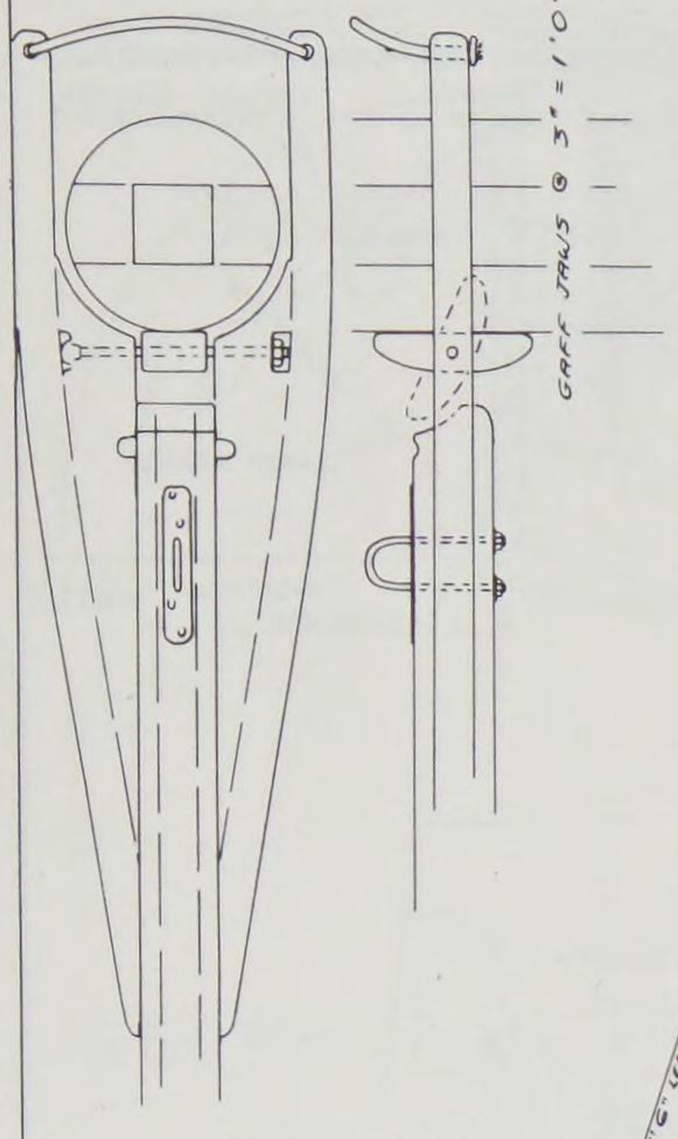
34

Palo de Agua

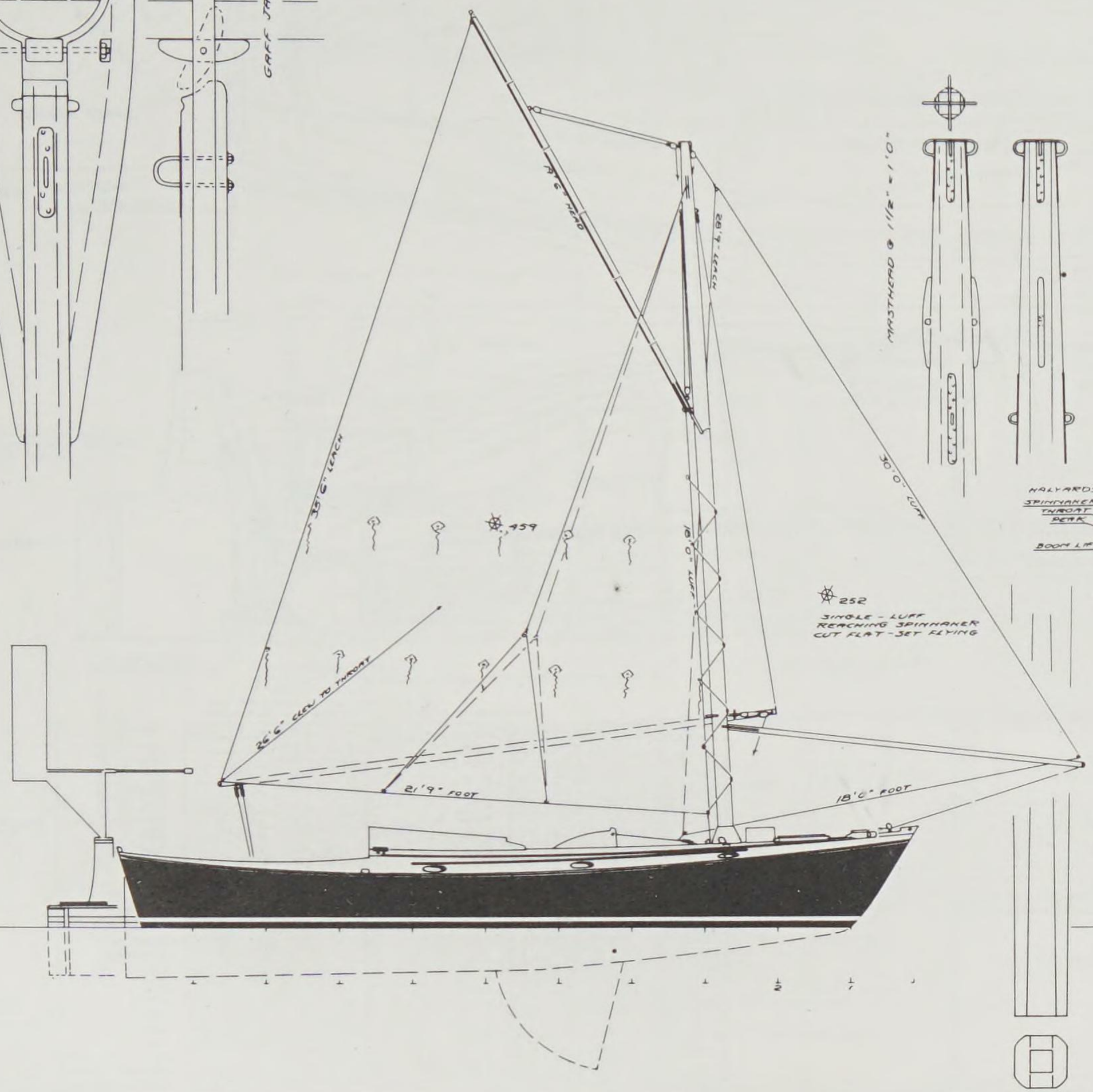
Length overall	35 feet 4 inches
Breadth	8 feet 6 inches
Draft	2 feet 3 inches
Designed displacement	12,500 pounds
Sail area	459 square feet
Owner and builder	Fred Springer-Miller, Manchester, New Hampshire

The requirement here was the same as with *Jessie Cooper* (Chapter 12) — a mobile home for a single man — but the constraints of space, cost, and structural simplicity were mostly lifted. The sea-going requirement was more explicit and convincing. She was to be fit to go up and down the Gulf of Mexico in all ordinary weather, but to be beached easily for maintenance and shelter. Diesel power with a well-protected propeller was for river work, mostly in South America. Her name is *Palo de Agua.*

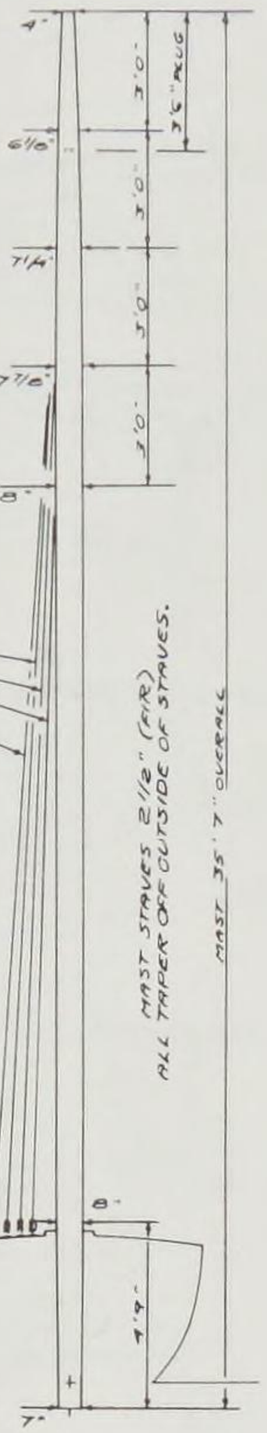
The owner was taken with an old design of mine for a 26-foot centerboard sloop, but he needed more space and weight-carrying ability. I suggested that instead of scaling her up, we cut her in two and move the ends apart — on paper, in this case, but it's an ancient method of enlarging a boat cheaply. I remember seeing it done to a fishing dragger in Gloucester when I was a child. If the original model was suitable, you can often make a boat carry double the original load, at the same speed or faster, without any increase in power, which teaches a profound lesson about the proportions of boats.

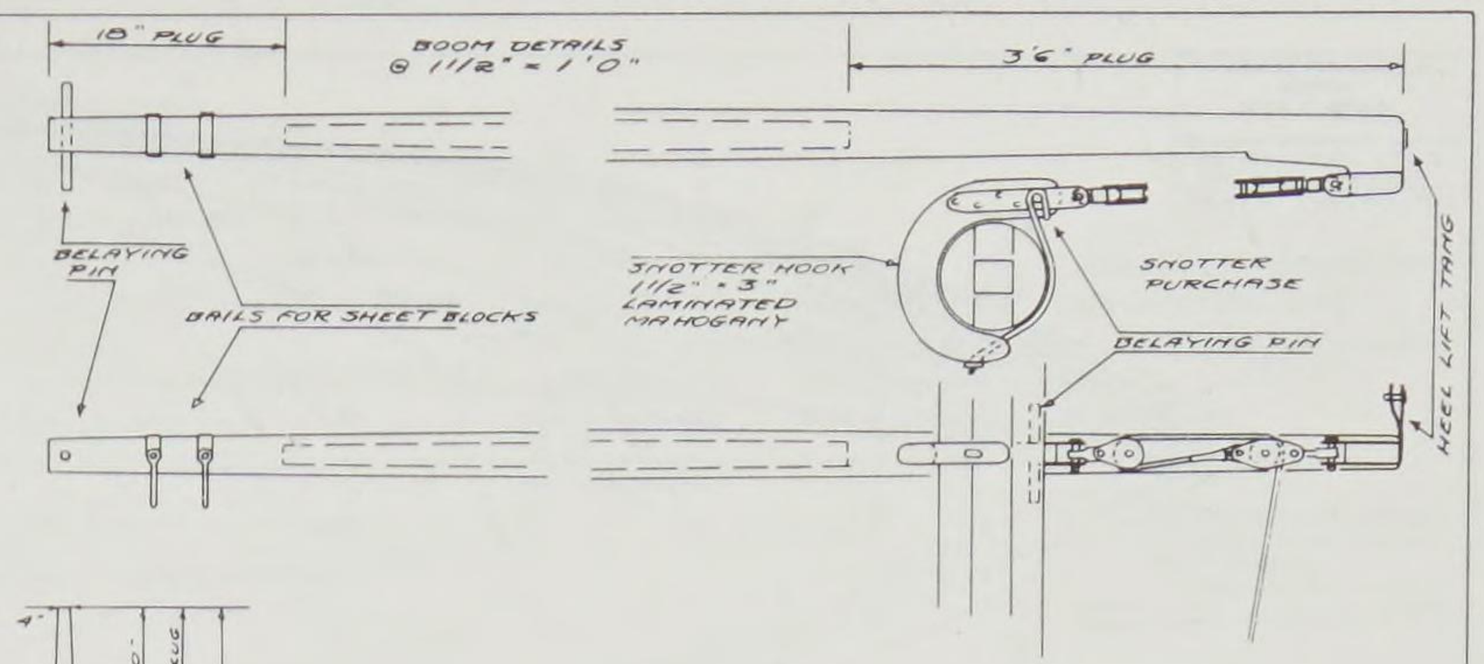


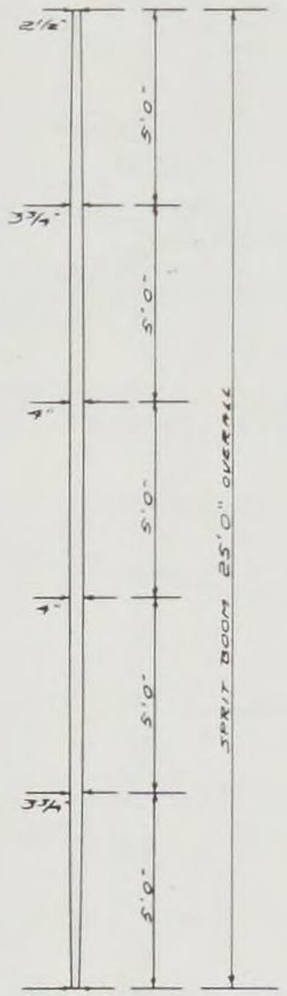
GAFF JAWS @ 3"=1'0"

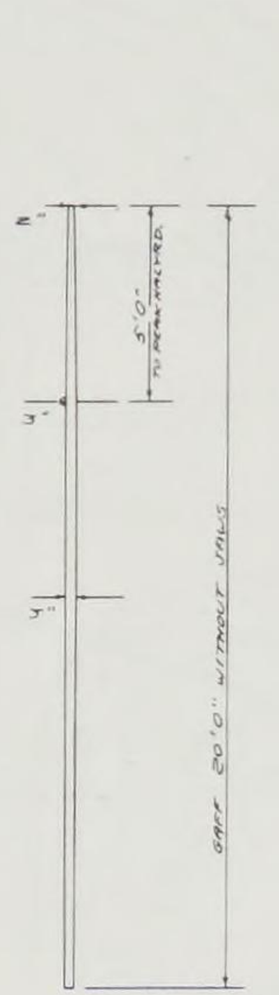


252
3 INCH - LUFF
REACHING SPINNAKER
CUT FLAT - SET FLYING

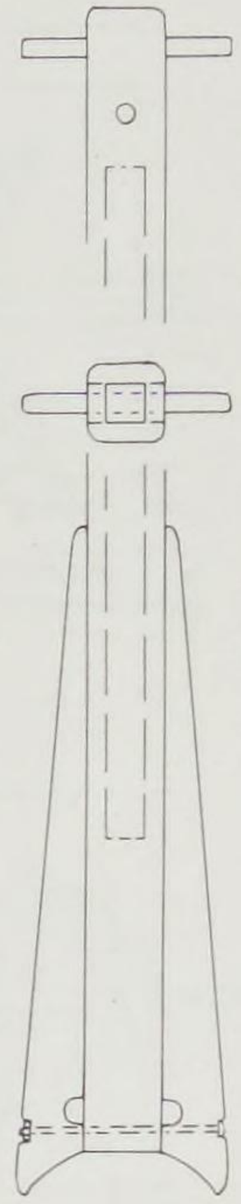








GAFF, BOOM, & SPINNAKER POLE
ALL SQUARE BOX SPARS WITH
3/4" STAVES; ALL DOUGLAS FIR.



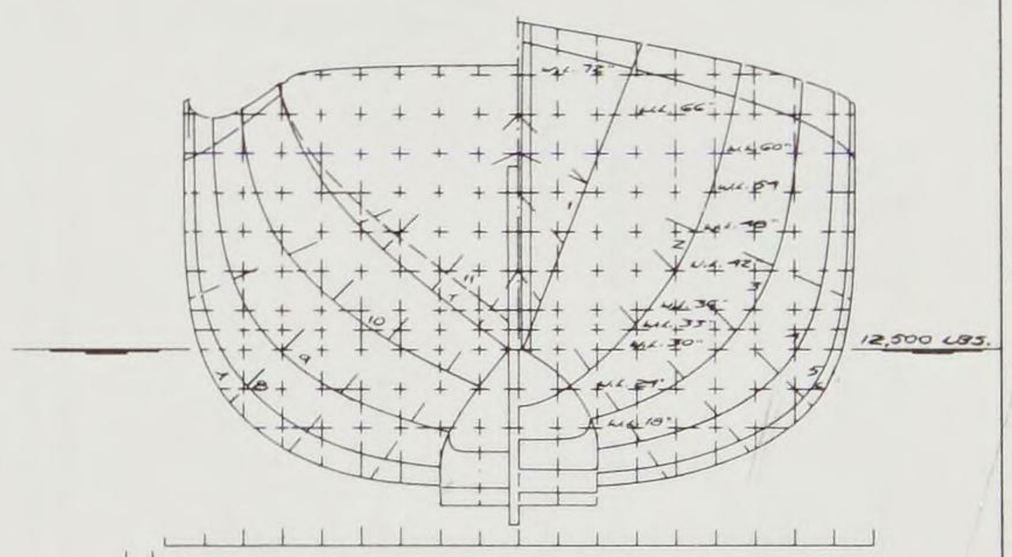
SCALE 3/8" = 1'0"

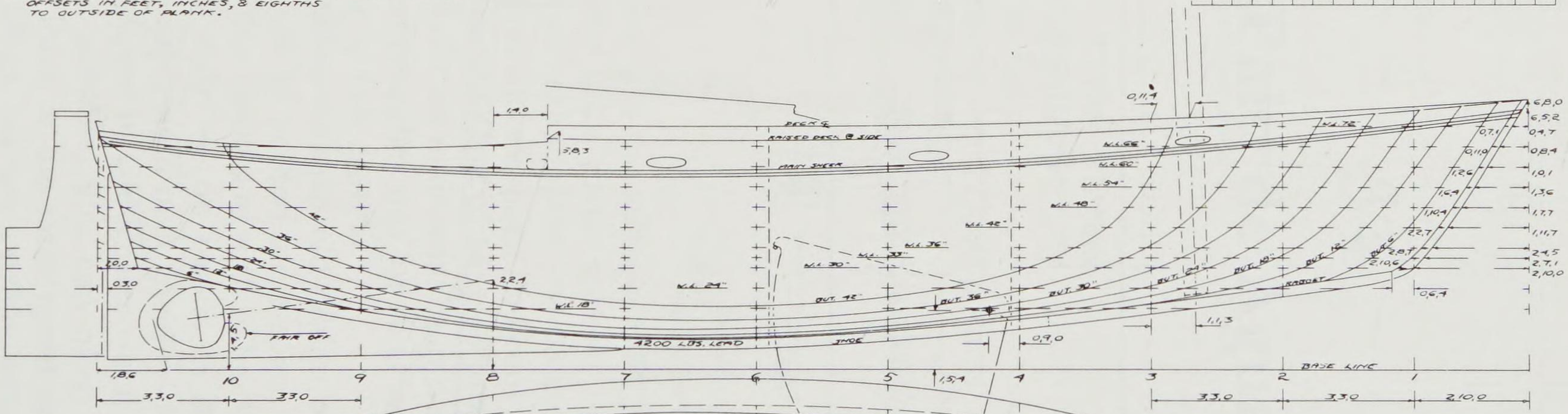
DESIGN # 373
35'4" - 8'6" - 2'3"
NEA RACE STRINGER-MILLER

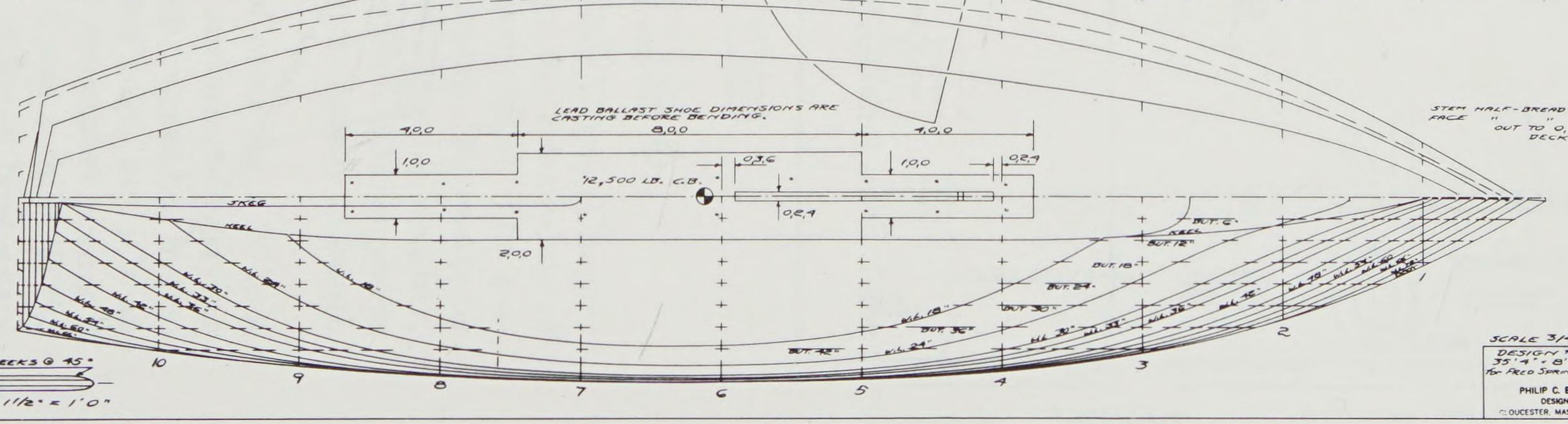
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

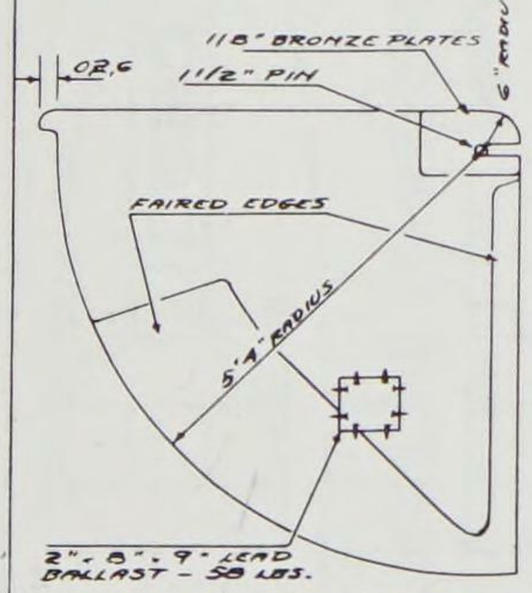
		11	T	10	9	8	7	6	5	4	3	2	1
HEIGHTS FROM BASE LINE	RAISED DECK	5,10,5	5,10,5	5,6,7	5,5,4	5,6,2	5,7,7	5,7,5	5,8,0	5,9,2	5,11,1	6,1,5	6,4,6
	MAIN SHEER	3,9,0	3,9,0	3,4,3	3,1,2	4,11,4	4,10,6	4,11,0	5,0,0	5,2,0	5,5,0	5,8,4	6,0,7
	BUTTOCK 42"			3,3,0	3,1,2	2,1,0	1,7,4	1,6,5	1,9,4	2,5,3	4,9,2		
	36"	3,8,6	3,8,2	3,4,6	2,5,4	1,7,3	1,3,0	1,2,6	1,5,2	1,11,1	3,0,6		
	30"	4,10,1	4,8,0	3,3,0	2,1,0	1,4,2	1,0,1	1,0,2	1,2,6	1,7,6	2,5,3	4,8,4	
	24"	4,4,0	4,0,5	2,10,1	1,9,6	1,2,0	0,10,4	0,10,5	1,0,7	1,5,3	2,0,6	3,6,0	
	18"	3,11,0	3,7,0	2,6,4	1,7,4	1,0,6	0,9,4	0,9,4	0,11,6	1,3,7	1,9,6	2,9,6	6,2,3
	12"	3,6,2	3,2,0	2,3,1	1,5,5	1,0,0	0,9,1	0,9,1	0,11,2	1,2,6	1,7,4	2,3,6	4,11,2
	6"	3,1,7	2,9,4	2,0,4	1,2,3	0,9,0	0,6,1	0,6,1	0,8,2	0,11,6	1,4,3	1,11,1	3,7,6
	RABBET	2,10,3	2,6,0	2,0,4	1,5,4	1,0,0	0,9,1	0,9,1	0,11,2	1,2,6	1,7,2	2,0,4	2,9,6
	SHOE & SKEG	0,3,0		0,3,5	0,4,2	0,4,7	0,6,1	0,6,1	0,8,2	0,11,6	1,4,3	1,9,4	2,6,0
HALF-BREADTHS	DECK	3,0,4	3,0,4	3,6,2	3,10,4	4,0,3	4,3,0	4,3,2	4,2,4	4,0,1	3,7,2	2,10,0	1,7,0
	W.L. 72"											2,9,6	1,5,0
	66"	2,11,0	2,11,3	3,6,2	3,10,4	4,0,3	4,3,0	4,3,2	4,2,4	4,0,0	3,6,7	2,8,4	1,2,6
	60"	2,7,3	2,8,5	3,5,4	3,10,4	4,0,3	4,3,0	4,3,2	4,2,4	3,11,7	3,6,2	2,7,0	1,0,4
	54"	2,2,0	2,4,4	3,4,0	3,10,1	4,0,3	4,3,0	4,3,2	4,2,4	3,11,5	3,5,3	2,5,0	0,10,0
	48"	1,7,4	1,11,2	3,1,2	3,9,3	4,0,2	4,3,0	4,3,2	4,2,2	3,11,2	3,4,3	2,3,0	0,7,4
	42"	0,11,4	1,4,6	2,8,7	3,8,0	4,0,1	4,2,6	4,3,0	4,1,6	3,10,4	3,2,4	2,0,0	0,5,2
	36"	0,3,6	0,9,3	2,2,4	3,5,2	3,11,6	4,2,1	4,2,4	4,1,0	3,9,0	2,11,3	1,7,6	0,2,6
	33"		0,5,4	1,10,2	3,3,2	3,10,6	4,1,4	4,2,0	4,0,4	3,7,7	2,9,2	1,5,3	0,1,6
	30"		0,1,4	1,5,2	3,0,4	3,9,2	4,0,5	4,1,3	3,11,5	3,6,3	2,6,6	1,2,2	0,0,4
	24"			0,6,0	2,4,4	3,4,7	3,9,5	3,10,4	3,8,4	3,0,7	1,10,5	0,7,2	
	18"			0,6,0	1,1,4	2,7,3	3,4,2	3,5,1	3,1,3	2,1,5	0,10,4		
	KEEL	0,1,4	0,1,4	0,6,0	0,10,4	1,0,0	1,0,0	1,0,0	1,0,0	1,0,0	0,11,0	0,7,7	0

OFFSETS IN FEET, INCHES, & EIGHTHS
TO OUTSIDE OF PLANK.









CORE PARALLEL WITH LOW EDGE - CHEEKS @ 45°

CENTERBOARD EDGE FAIRING @ 1 1/2" = 1'-0"

STEM HALF-BREADTH 0,2,0
FACE " " 0,0,4
OUT TO 0,1,0 AT DECK.

SCALE 3/4" = 1'-0"

DESIGN #373
35'-4" · 8'-6" · 2'-3"
for FRED SPRINGER-MILLER

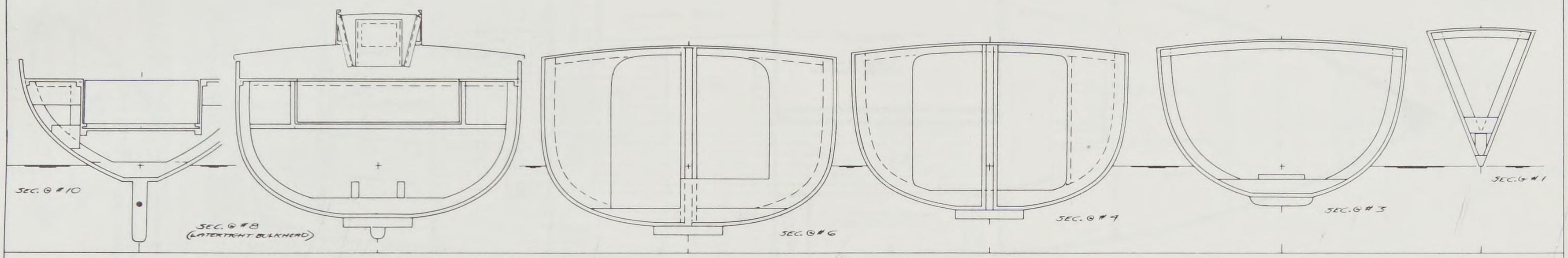
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

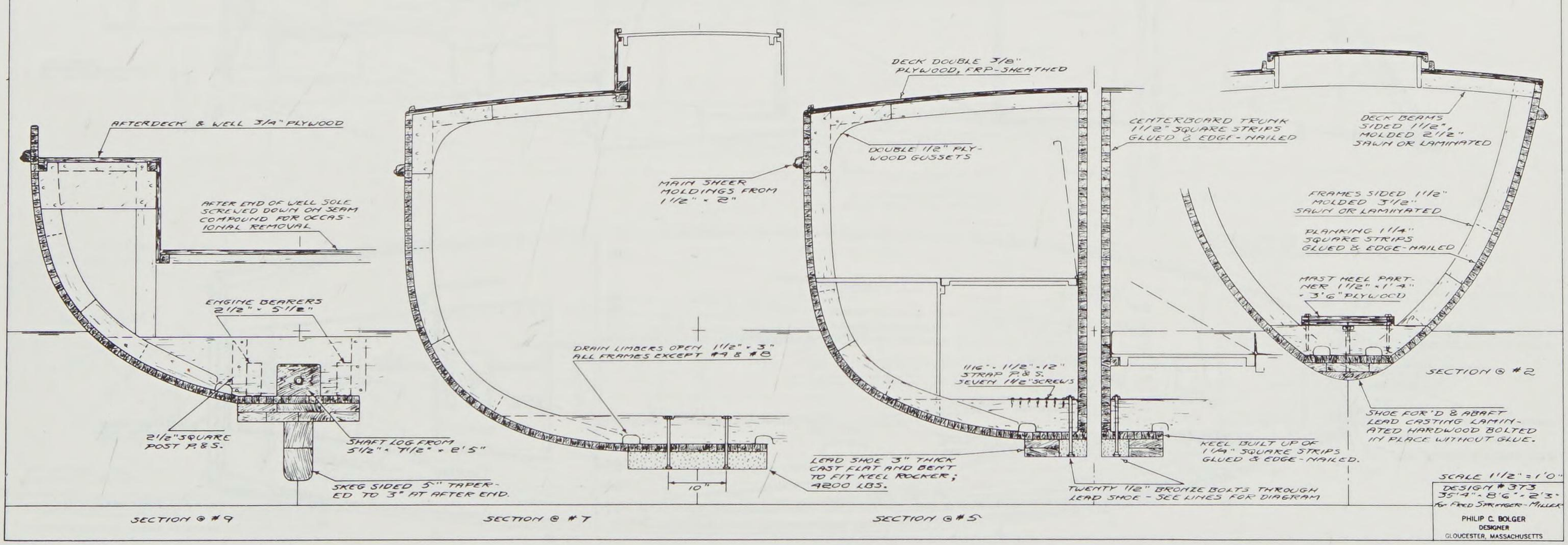
BELAYING PIN P&S.
MAIN SHEET CLEAT
PAD EYE
REMOVABLE BOX OVER 6" DIAM. DECK PIPE
ENGINE HATCH
LOUVERED VENT
DECK BOX
INSTRUMENT PANEL
COMPASS
VENT SHROUD
SWIVEL BLOCK
SPINNAKER POLE STOWED
SPINNAKER SHEET
SHOTTER
PAD EYE
SWIVEL SHATCH BLOCK P&S. FOR SPINNAKER SHEETS
SWV. SHATCH FOR SHOTTER
CENTERBOARD PURCHASE
BULLSEYE FOR TACK
TACK CLEAT
PEAK HALYARD
THROAT HALYARD
SPINNAKER HALYARD
SWIVEL SHATCH BLOCKS
BOOM HEEL LIFT CLEAT
SPINNAKER SHEET
3½" SQUARE CATHEAD P&S.
BELAYING PIN P&S.
1½" DIAM. MOORING PIN
SWIVEL SHATCH BLOCK FOR SPINNAKER FORWARD GUY
REMOVABLE SHROUD BOX OVER 5/8" - 6" VENT OPENING.
'TORTOISE' PUNT CHOCKED UP TO CLEAR C.B. PENDANT
SEE DETAIL FOR RUDDER & STEERING VANE
EXHAUST
DRAIN
WESTERBEKE 2:1 R.G.
TEAKOIL SKEG FOR STERNPOST
TWO-BLADE 14" DIAM. 10" PITCH SOLID PROP. (57½ H.P. @ 2000/1000 R.P.M. @ 34%)
1" DIAM. SHAFT
INTERMEDIATE FLOORS 2½" SQUARE
CENTERBOARD TRUNK HEADBLOCKS 2½" - 2½" - ABT. 7'9½" FOR'D
2½" - 3½" - ABT. 5'2" AFT
DEADLIGHTS 3/8" LEXAN
VENT HOLE P&S.
SCUPPER P&S.
TRANSOM - RUDDER REMOVED
DISH RACK SPACE
DRESSER
SWAGE STOVE
DRESSER
BOOK SHELVES
CHART & RADIO FLAT & CABINET
BOOK SHELVES
12V 90 A.H. BATTERIES
LIFT-OUT SHAT
SWIVEL STOOL
FOLDING DESK
LADDER
PORTABLE TABLE
PORTABLE U.C.
STEP
32 GALLONS DIESEL FUEL
DOUBLE BERTH BIN UNDER
HINGE LINE
LOCKER
TRANSOM SEAT
SHELVES ETC. TO SUIT P.&S.
10 9 8 7 6 5 4 3 2 1

SCALE 3/4" = 1'0"

DESIGN #373
35'4" - 8'6" - 2'3"
for FRED SPRINGER-MILLER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS


SEC. @ #10
SEC. @ #8
(WATERTIGHT BULKHEAD)
SEC. @ #6
SEC. @ #4
SEC. @ #3
SEC. @ #1


AFTERDECK & WELL 3/4" PLYWOOD
AFTER END OF WELL SOLE SCREWED DOWN ON SEAM COMPOUND FOR OCCASIONAL REMOVAL
ENGINE BEARERS 2 1/2" x 5 1/2"
2 1/2" SQUARE POST P. & S.
SHAFT LOG FROM 5 1/2" x 7 1/2" x 2'5"
SKEG SIDED 5" TAPERED TO 3" AT AFTER END.
MAIN SHEER MOLDINGS FROM 1 1/2" x 2"
DRAIN LIMBERS OPEN 1 1/2" x 3" ALL FRAMES EXCEPT #9 & #8
10"
LEAD SHOE 3" THICK CAST FLAT AND BENT TO FIT KEEL ROCKER; 4200 LBS.
DECK DOUBLE 3/8" PLYWOOD, FRP-SHEATHED
DOUBLE 1/2" PLYWOOD GUSSETS
1/16" - 1 1/2" - 12" STRAP P & S. SEVEN 1 1/2" SCREWS
TWENTY 1/2" BRONZE BOLTS THROUGH LEAD SHOE - SEE LINES FOR DIAGRAM
CENTERBOARD TRUNK 1 1/2" SQUARE STRIPS GLUED & EDGE-NAILED
DECK BEAMS SIDED 1 1/2", MOLDED 2 1/2" SAWN OR LAMINATED
FRAMES SIDED 1 1/2" MOLDED 3 1/8" SAWN OR LAMINATED
PLANKING 1 1/4" SQUARE STRIPS GLUED & EDGE-NAILED
MAST HEEL PARTNER 1 1/2" x 1'4" x 3'6" PLYWOOD
KEEL BUILT UP OF 1 1/4" SQUARE STRIPS GLUED & EDGE-NAILED.
SHOE FOR'D & ABAFT LEAD CASTING LAMINATED HARDWOOD BOLTED IN PLACE WITHOUT GLUE.
SECTION @ #9
SECTION @ #7
SECTION @ #5
SECTION @ #2
SCALE 1 1/2" = 1'0"
DESIGN #373
35'4" - 8'6" - 2'3"
for FRED STRATTNER - MILLER
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

We kept the beam and freeboard of the 26-footer, but I made her a little deeper bodied, thinking that the extra length would allow it and her motion wouldn't be so corky.

Construction is glued-strip planking, for a thick and tough shell, tolerant of abrasion, without much cost or weight penalty. It also reduces the hazard of shipworm attack, since the worms won't cross a glue line. The slab of lead is cast flat and bent to the rocker easily with a few jacks. It's wide enough for her to stand upright on it pretty reliably.

The layout is planned so one can do everything sitting down with the help of a stool on casters. The double bed, ventilated and accessible from either end, marriés quite neatly with the trunk that enables the massive centerboard to be lifted out through the deck as she lies on the beach.

The cat rig was my suggestion. Most of the objections to cats disappear if you pull them out long enough on a given midsection. The bow runs out far enough ahead of the mast to keep its weight from making her dive, and the stern carries past the end of the boom for convenience in reefing. In this case, it also makes room for the big steering vane to swing clear through a full circle.

The vane is supposed to get around another complaint against cats — that they can't be trimmed to hold a course with the tiller free. Most vanes are makeshift and tend to break off in short order, but this one was designed in from the very beginning, and the underwater part, at least, is well protected and braced. The geometry of the whole thing is more straightforward than usual. The owner is an engineer, and I relied on him to produce efficient bearings and neat components to make my generalized diagrams work.

It's likely that the steady improvement in electronic autopilots will soon make vane steering obsolete, but the trim tab on the rudder might still be handy if it allowed the electronic helmsman to work with less power input.

To relieve the vane of as much stress as possible, the boat was designed with the big skeg aft balanced by the centerboard well forward. It's supposed to be possible to make a fine adjustment of her balance through a wide range by raising and lowering the board. This configuration is also good for steadying an anchored boat. It steadies the stern against the slight swing that presents the boat at an angle to the wind and starts her sailing sideways until the anchor warp from the bow trends far enough out to tack her. Once this action starts, there's positive feedback that soon has her sailing all

over creation if she's lying with a long scope. Lateral plane forward doesn't help, but some aft does; the real cure is short scope and a riding sail aft.

In a gale, this boat is supposed to lie to a sea anchor by the stern with her centerboard all the way up. For a hurricane, I would favor rolling her far inland and staking her down at an early warning. Her general design makes such a procedure unusually practical.

35

Apogee

Length overall	38 feet
Breadth	9 feet (9 feet 8 inches over leeboard guards)
Draft	2 feet (5 feet 10 inches maximum leeboard drop)
Designed displacement	10,700 pounds
Ballast	2,000 pounds lead
Sail area	631 square feet (674 square feet with loose-footed jib)
Owner	Eldon D. Thompson

"The name *Apogee,*" writes owner Eldon Thompson, "reflects both my involvement in engineering telecommunications satellites and my desire to use this boat to get as 'far out' in my normal orbit as possible."

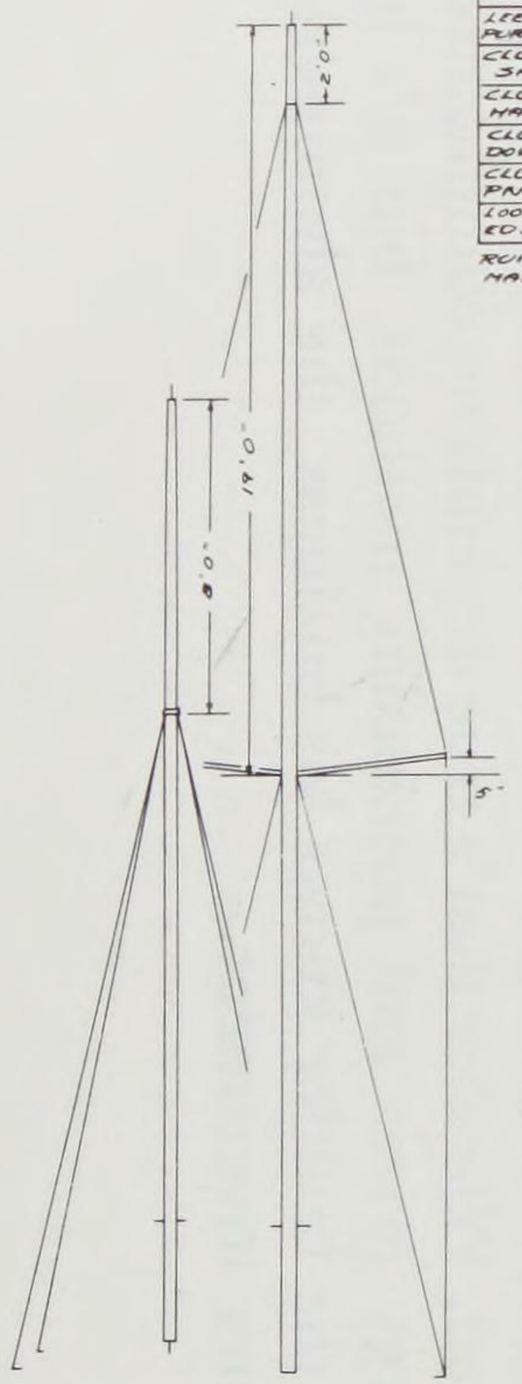
He wanted to be free to use shallow canals and rivers with strong currents and low bridges, but also to be able to go anywhere on the Great Lakes with confidence. He had admired the later *Meadow Lark,* Allan Vaitses' lengthened version of the 1948 L. Francis Herreshoff leeboarder design, but he thought it wasn't quite as able as he needed. The boat was to be built one-off in Canada and he concluded that metal made the most sense, with aluminum, it seems to me, the clear preference. It has been argued that aluminum is little or no more expensive than steel if the steel is a thoroughly finished job that won't start rusting away as soon as it's launched. Whether that's true depends on complicated calculations of energy prices and purchasing methods, but it's hard to doubt that if the builder knows his business, the aluminum boat will be the better investment.

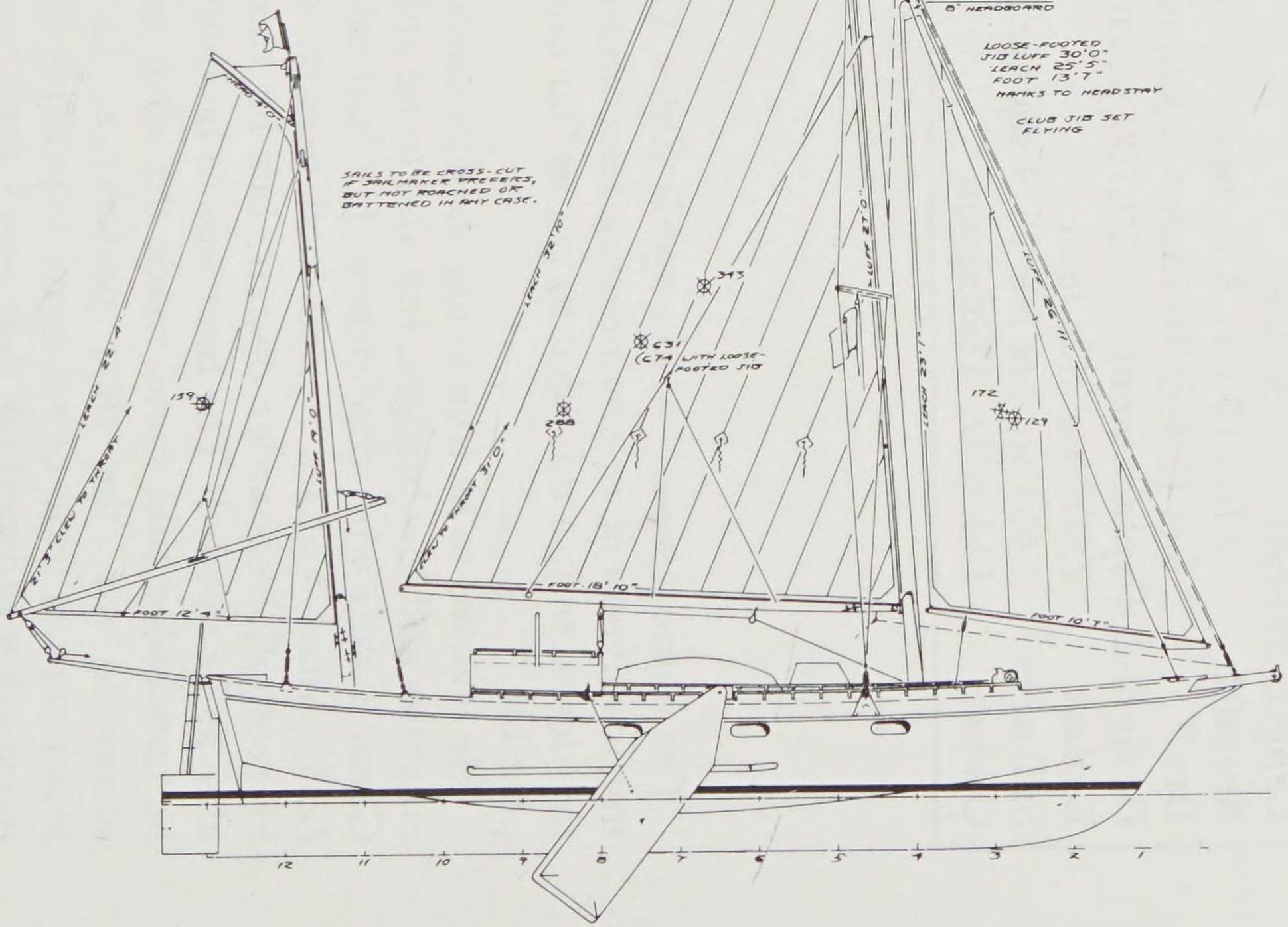
PART	STANDING END	VIA	FALL	DIAM.
MIZZEN SHEET	BECKET OF BOOM BLOCK	BOOMKIN BLOCKS	CLEAT NEAR BOOMKIN SOCKET	3/8"
MIZZEN PEAK HALYARD	GAFF EYE	MASTHEAD BLOCK	TABERNACLE CLEAT	"
MIZZEN THROAT HALYARD	GAFF SLIDE	MAST SHEAVE	"	"
MIZZEN TOPPING LIFT	CENTER OF BOOM	MAST DUMB SHEAVE	"	"
MIZZEN LAZY-JACKS (2)	SPAN ON FOOT OF SAIL	MASTHEAD DUMB SHEAVE	ENDLESS SPAN	1/4"
MIZZEN SHOTTER	BECKET OF MAST BLOCK	SHOTTER HEEL BLOCK	TABERNACLE CLEAT	3/8"
MAIN SHEET	BECKET OF BOOM BLOCK	TRAVELLER BLOCK. TABERNACLE BLOCK	TRUNK SIDE	1/2"
MAIN PEAK HALYARD	GAFF EYE	MASTHEAD BLOCK	TABERNACLE CLEAT	"
MAIN THROAT HALYARD	GAFF SLIDE	MAST SHEAVE	"	"
MAIN TOPPING LIFT	PORT SIDE OF BOOM	MAST DUMB SHEAVES. BLOCK STRAPPED TO SIDE OF BOOM	BOOM CLEAT	"
MAIN LAZY-JACKS (2)	BOOM EYE	TOPPING LIFT EYE	BOOM CLEAT	3/8"
LEEBOARD PENDANTS (2)	LEEBOARD EYE	BLOCK ON RAIL CRANE	PURCHASE BLOCK	1/4" 7x19 WIRE
LEEBOARD PURCHASES (2)	BECKET OF RAIL BLOCK	PENDANT BLOCK	RAIL CLEAT	1/2"
CLUB JIB SHEET	DECK EYE	BLOCK SLUNG ON CLUB. DECK TURNING BLOCK	TRUNK SIDE	3/8"
CLUB JIB HALYARD	HEAD OF SAIL	MAST BLOCK	TABERNACLE CLEAT	1/2"
CLUB JIB DOWNHAUL	HEAD OF SAIL	CRINGLES ON SAIL. EYE AT CLUB AXIS	PIVOT CLEAT	1/4"
CLUB JIB PIVOT ROPE	RAIL ON CLUB		BOWSPRIT CLEAT	1/2"
LOOSE-FOOTED JIB SHEETS	CLEW OF SAIL	DECK BLOCKS	TRUNK SIDES	1/2"

RUNNING RIGGING - BRAIDED DACRON UNLESS SPECIFIED;
MAIN HALYARD MAY BE WIRE TAILED OUT WITH ROPE.

PART	LOCATION	TYPE	NUMBER	FOR ROPE DIAMETER
MIZZEN SHEET	BOOM RAIL	FRONT SHACKLE WITH BECKET	1	3/8"
	BOOMKIN	SWIVEL ON BOOMKIN EYES	2	"
MIZZEN PEAK HALYARD	MASTHEAD	SIDE SHACKLE	1	"
MIZZEN THROAT HALYARD	MASTHEAD	SPAR SHEAVE	1	"
MIZZEN SHOTTER	MAST EYE PLATE	FRONT SHACKLE WITH BECKET	1	"
	BOOM EYE	SIDE SHACKLE	1	"
MAIN SHEET	BOOM RAIL	FRONT SHACKLE WITH BECKET	1	1/2"
	TRAVELLER	SWIVEL ON SLIDE	1	"
	BOOM RAIL	FRONT SHACKLE	1	"
	TABERNACLE RAIL	" "	1	"
	DECK EYE	UPSET FRONT SHACKLE	1	"
LEEBOARD PURCHASES	PENDANT FALLS	FRONT SHACKLE	2	"
	EYE ON RAIL	UPSET FRONT SHAC. WITH BECKET	2	"
LEEBOARD PENDANTS	RAIL CRANES	UPSET FRONT SHACKLE FOR WIRE	2	1/4" WIRE
CLUB JIB SHEET	SLING TO CLUB	SIDE SHACKLE	1	3/8"
	DECK EYE	SWIVEL	1	"
JIB HALYARD	EYE ON MAST	FRONT SHACKLE	1	1/2"
LOOSE-FOOTED JIB SHEETS	DECK EYE P.&S.	SWIVEL	2	"

BLOCKS - WOOD OR PLASTIC SHELL

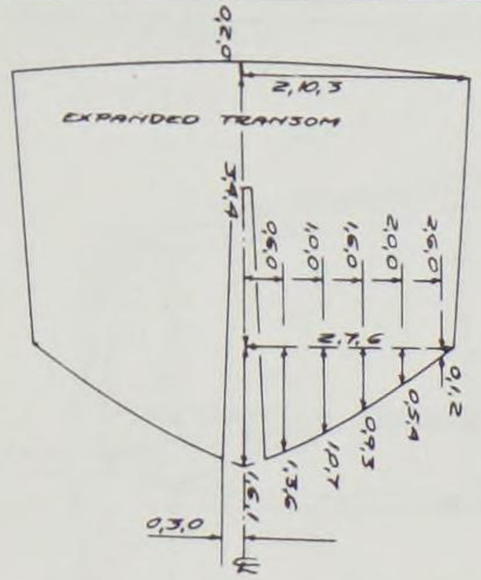




SCALE 3/8" = 1'0"

DESIGN #397
30'0" x 9'0" x 2'0"
for Elbon D. Thompson

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



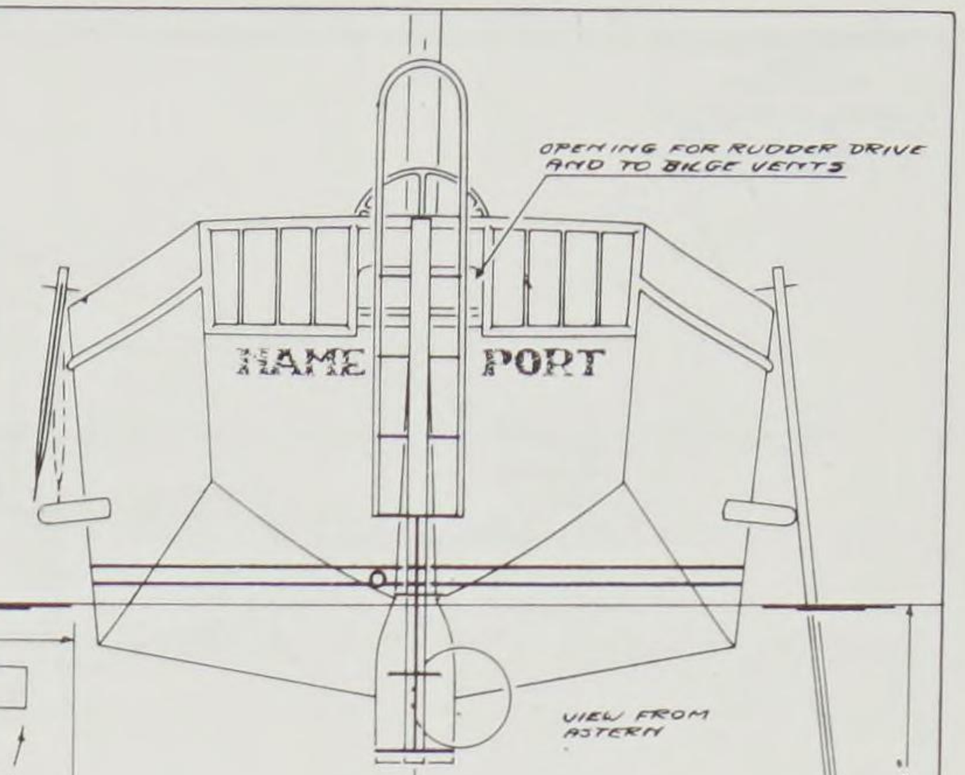
HEIGHTS FROM BASE LINE

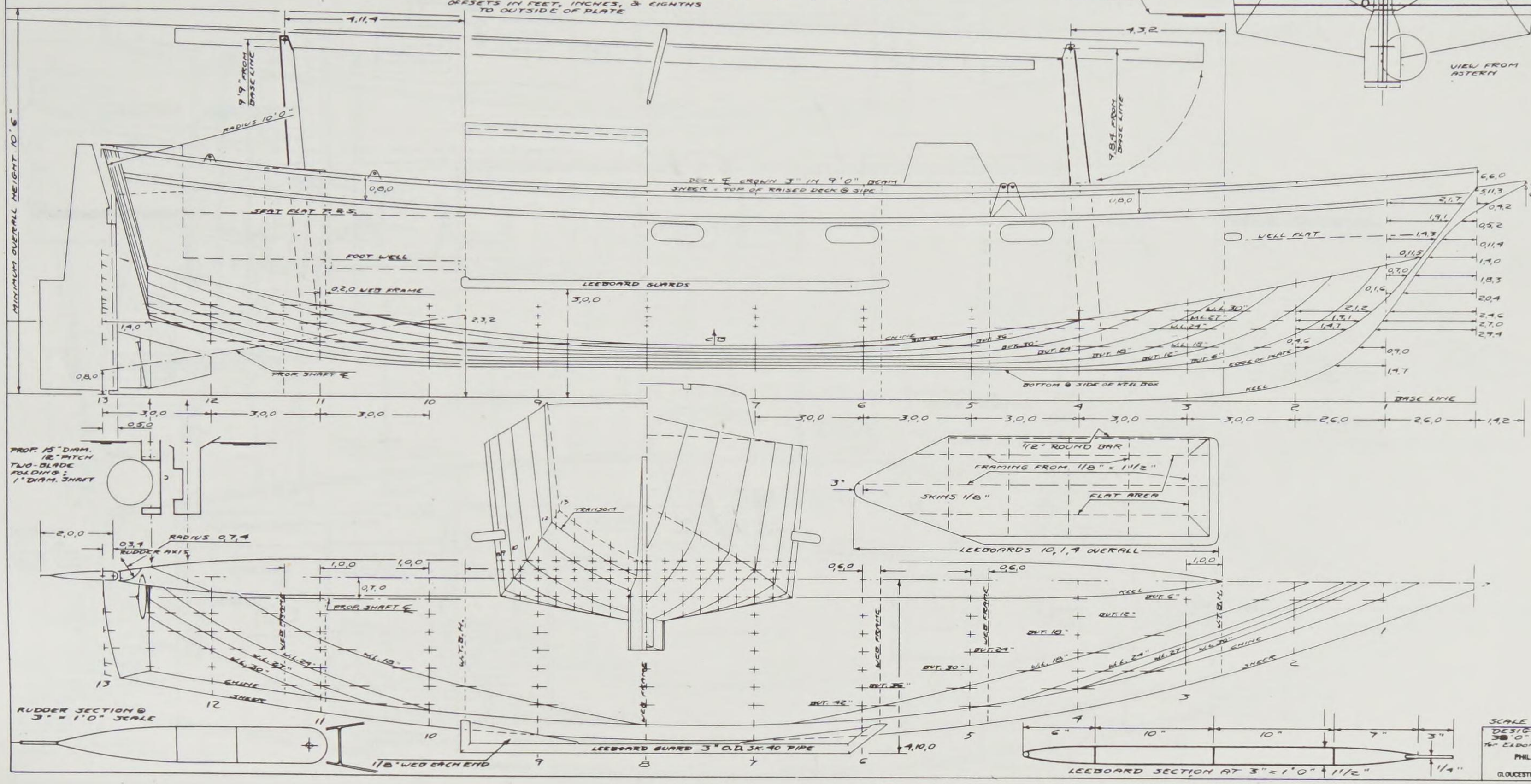
	13	12	11	10	9	8	7	6	5	4	3	2	1
SHEER	6,10,9	6,5,6	6,2,1	5,11,5	5,9,7	5,8,6	5,8,2	5,8,9	5,8,7	5,9,6	3,11,0	6,1,1	6,3,2
CHINE	3,10,9	3,1,5	2,6,0	2,0,0	1,8,1	1,6,0	1,5,6	1,7,2	1,10,3	2,2,7	2,8,5	3,3,3	3,9,9
BUT. 42"				1,10,6	1,6,1	1,4,5	1,4,9	1,5,5	1,8,7				
36"			2,3,0	1,7,9	1,4,3	1,3,9	1,3,2	1,3,6	1,6,9	2,2,6			
30"		2,9,7	1,11,0	1,5,0	1,2,6	1,2,3	1,2,2	1,2,2	1,3,7	1,9,2			
24"	3,6,6	2,5,9	1,7,9	1,2,9	1,1,3	1,1,2	1,1,1	1,1,2	1,1,6	1,4,7	2,4,2		
18"	3,2,9	2,2,0	1,4,7	1,0,6	1,0,1	1,0,1	1,0,1	1,0,1	1,0,2	1,1,6	1,9,9		
12"	2,10,7	1,10,7	1,2,9	0,11,2	0,11,0	0,11,0	0,11,0	0,11,0	0,11,0	0,11,3	1,4,0	2,7,0	
6"	2,7,3	1,8,2	1,0,7	0,10,1	0,10,0	0,10,0	0,10,0	0,10,0	0,10,0	0,10,0	1,0,2	1,10,9	
KEEL-STRUCKLE	(24,9)	1,8,0	1,0,7	0,10,1	0,10,0	0,10,0	0,10,0	0,10,0	0,10,0	0,10,0	0,10,5	1,9,2	2,10,1
KEEL	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,1,0	0,6,3	2,7,3

HALF-BREADTHS

	13	12	11	10	9	8	7	6	5	4	3	2	1
SHEER	2,9,0	3,3,9	3,9,0	4,1,2	4,4,1	4,5,6	4,5,6	4,4,0	4,0,4	3,7,0	2,10,6	2,0,0	1,1,5
CHINE	2,5,0	2,10,6	3,4,0	3,8,0	3,11,0	4,0,3	4,0,5	3,10,6	3,6,5	3,0,2	2,3,3	1,4,2	0,5,1
ALL. 30"	0,2,5	2,0,5	3,4,0								2,1,2	0,11,3	
27"		1,7,6	3,0,0								1,11,0	0,9,3	
24"		1,2,3	2,7,4	3,8,0							1,8,4	0,7,2	
18"			1,8,5	2,7,0	3,5,4			3,7,3	2,11,1	2,1,5	1,2,4	0,2,1	
KEEL		0,5,1	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,6,0	0,5,4	0,2,2	0,0,1	0,0,1

OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLATE





SCALE 3/4" = 1'0"

DESIGN # 397

38'0" · 9'0" · 2'0"

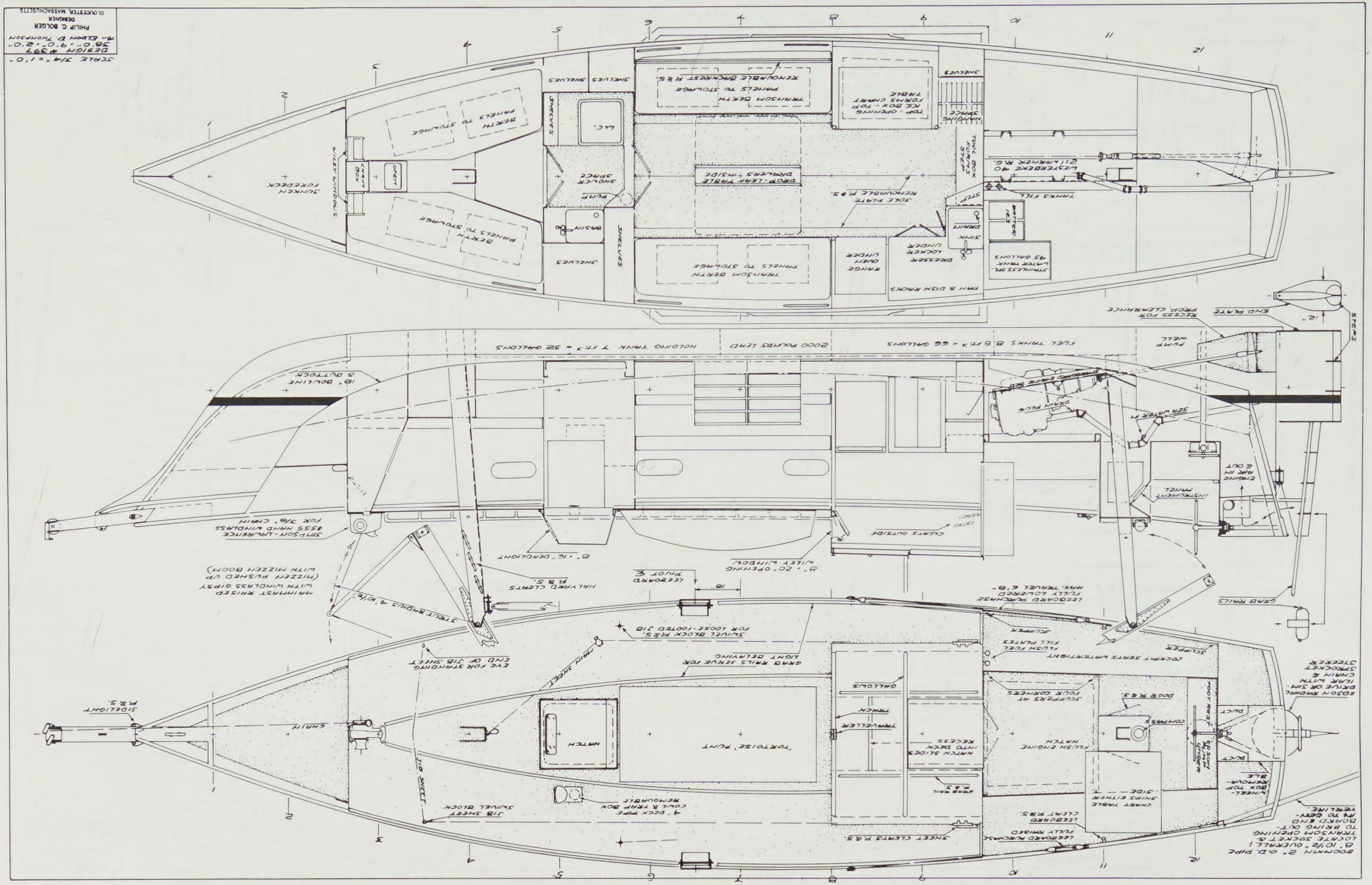
for Eldon D. Thompson

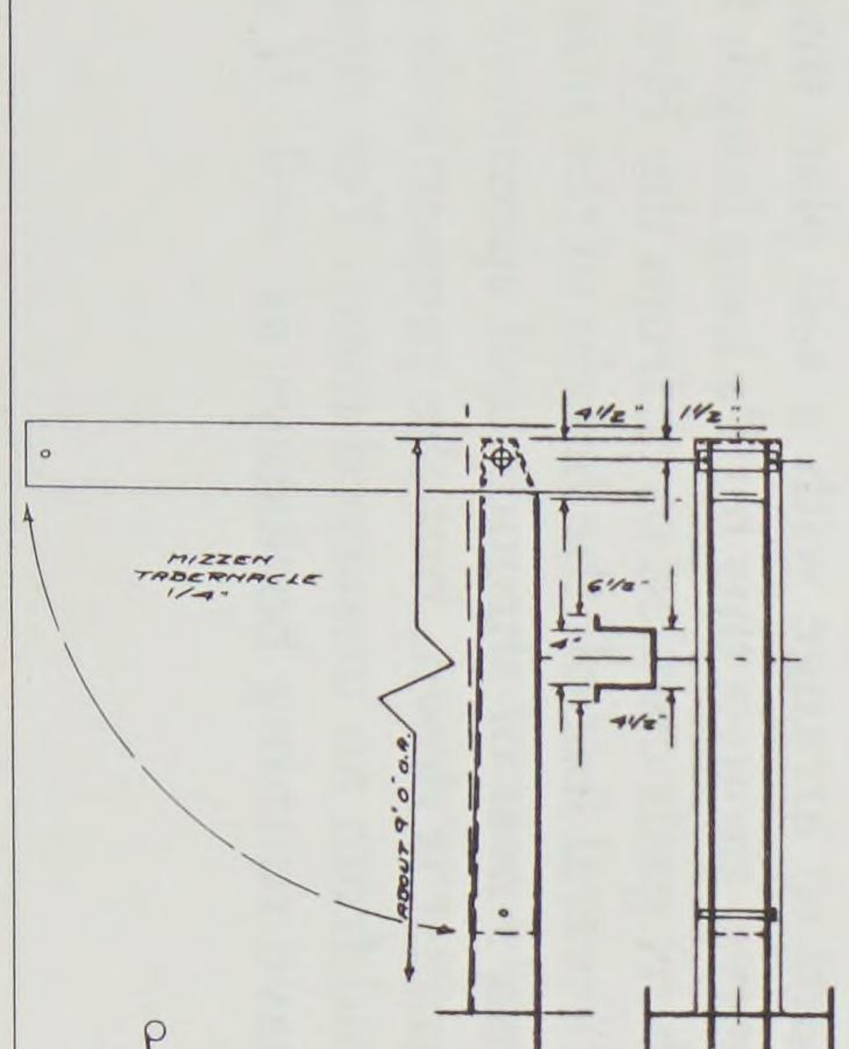
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

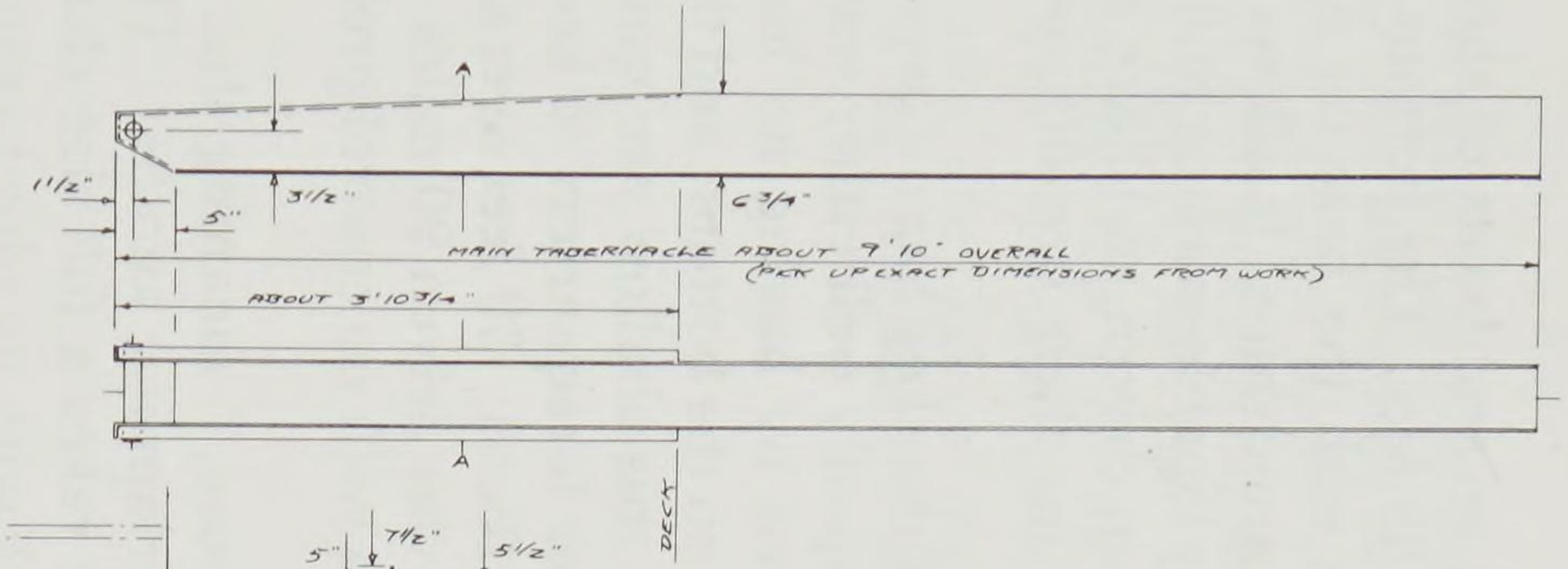
SCALE 3/4" = 1'0"

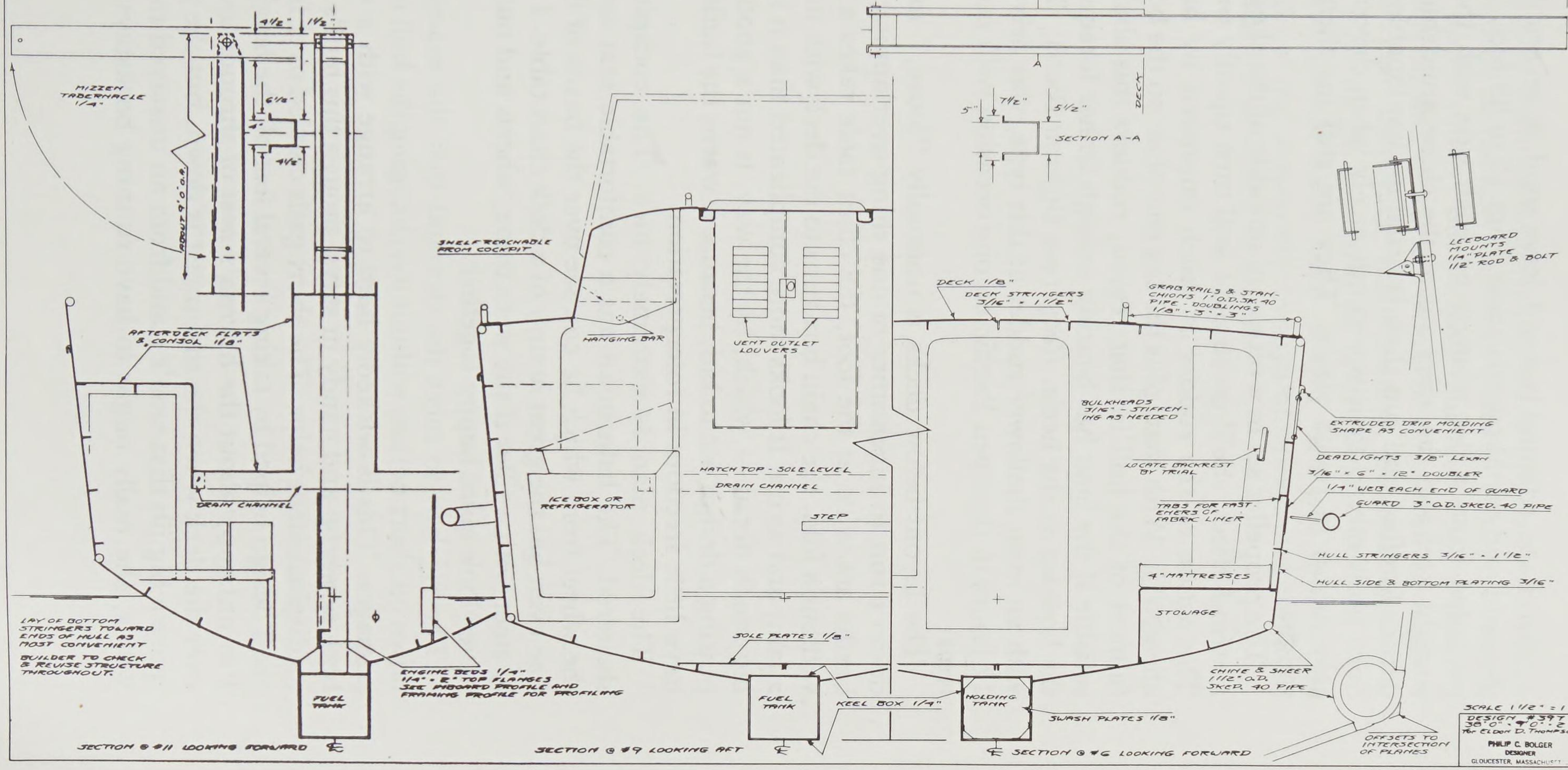
DESIGN #397
36'0" x 9'0" x 2'0"
fm ELDON B. THOMPSON

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS









SCALE 1 1/2" = 1'0"

DESIGN #397
35'0" x 9'0" x 2'0"
for ELDON D. THOMPSON

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

The shape adopted is one I have used in several boats of sheet plywood and metal construction from 15 to 95 feet. The bottom is projected from a flat triangle on each side with the base on the straight keel and the apex out at the chine amidships. It allows a deeper forefoot and run than is usual in developable-surface hulls. Such hulls spread their waves out nicely when driven and have an easy action in rough water. They are stiff for their breadth and weight.

The propeller set in a recess on one side of the skeg has no asymmetrical effect; she'll go straight and turn equally well either way. The action of the rudder is much improved by having no hole ahead of it. With that, plus the big end plate on the bottom, and the fullness of the hull in that region, rudders this shallow are quite reliable if the boat has bearing enough in her forequarters to keep the bow up as she heels. *Romp* (see *Different Boats*), 30 feet overall, with an even shallower rudder of this type, was driven 90 miles in 12 hours in the open Pacific on one occasion with no control problems.

The layout below decks is unusually "loose," meaning that it doesn't run to ingenuities of one thing overlapping another. The berths are wide at the foot, the chart table takes a full-size chart without a fold, the chain box runs to the deck with no pipe to cause a jam, and so on. It looks more complicated than it is due to showing much detail — which, by the way, is not a good idea if you're putting a design out to bid, because it warns the builder that he will have little freedom in interpretation.

The deck plan is extremely nice. The cockpit is deep and sheltered. The helmsman has a comfortable seat on either side of the wheel from which he can see over the heads of the passengers. She even has the great luxury of a deck chart table. I would certainly steer with a tiller if she were mine; wheels and outboard rudders never look quite happy together.

The rig had to meet the demand that the masts should swing down on short notice, without overhanging the hull much, for canal passages. This is wickedly hard to arrange with a sail plan that's both powerful and handy in stays, though this hull's long length for its displacement helps. The short gaffs carried over from the Herreshoff design helped by taking several feet off the height of the masts. I'm unhappy about the hurrah's-nest of shrouds and spreaders all over the deck when the mainmast is down, but the proportions require a big jib that won't stand from an unstayed mast. For strong winds, she really ought to have running backstays as well. If she

were mine, I'd have a simple dipping lug (see comments in Chapter 22). She then would be cheaper, faster in a straight line, and much more efficient under power, but so laborious and slow in tacking that all maneuvering and short runs would be done with the engine. As rigged, she can short-tack singlehanded, because leeboards mounted this way can be left down on both sides.

The boomkin should have been drawn two feet longer. As shown, the bight of the mizzen sheet wraps under the end and fouls if it isn't overhauled precisely in a jibe.

36

Hesperus

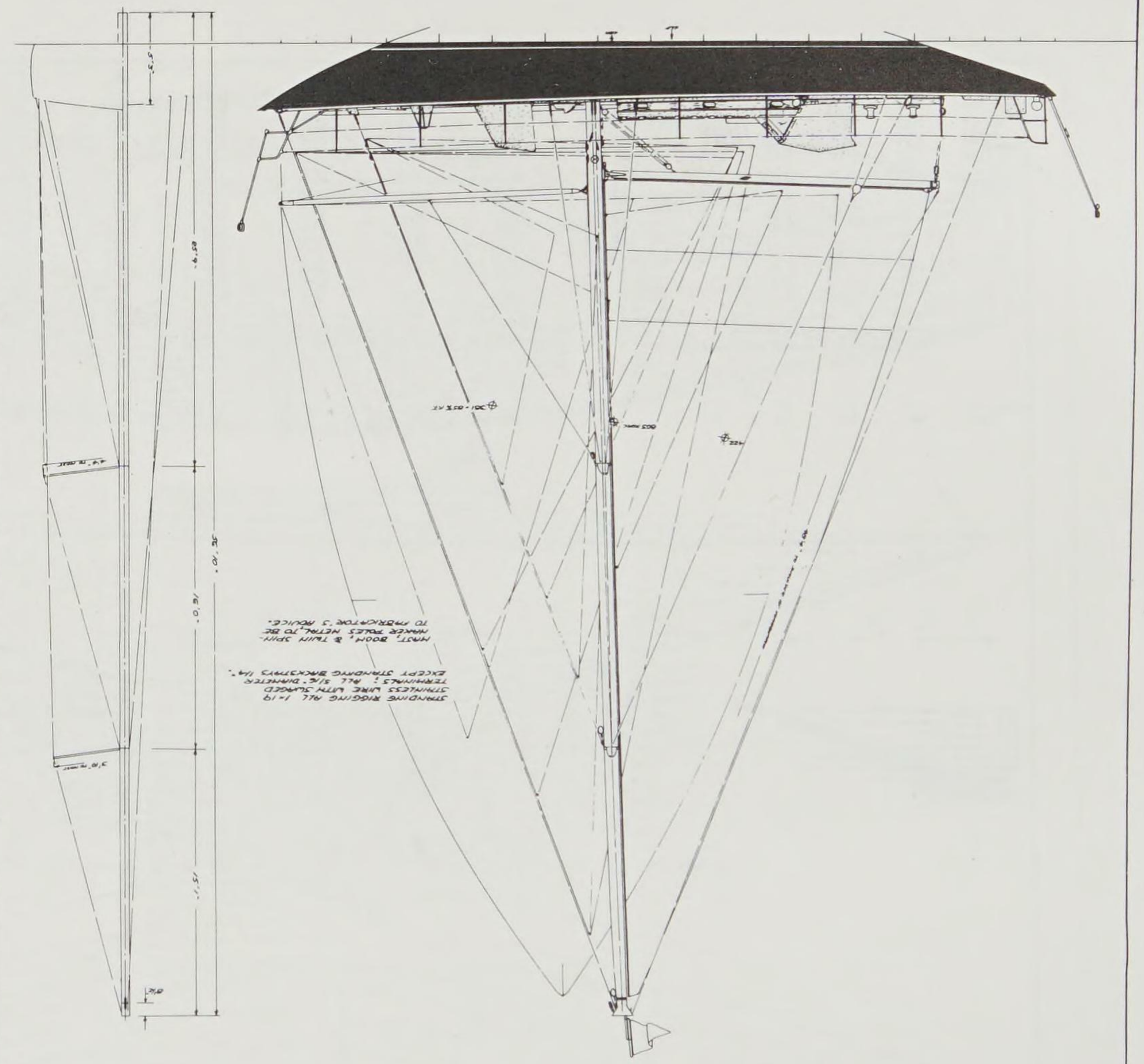
Length overall	45 feet
Length, waterline	30 feet
Breadth	10 feet 6 inches
Draft	6 feet 9 inches
Designed displacement	21,600 pounds
Ballast	9,070 pounds lead
Sail area (nominal)	803 square feet

In 1962 *Yachting World* magazine held a competition for a "flat-out" ocean racer of 30-foot waterline, an Admiral's Cup boat. I entered, not yet having become revolted at what thinking in terms of rating rules does to the mental processes. This isn't a real rule-cheater, though. The draft is the maximum allowed by the Royal Ocean Racing Club's rule at the time, but otherwise the design was mostly conceived to *look* racy. The judges only gave it third prize because, although they said she "would undoubtedly be a very fast boat," they thought she would rate too high to be a winner.

An IOR boat of 1982 would easily outsail her if its rig didn't disintegrate. The difference is mostly in the rig, and in my opinion the "improvement" is an unhealthy dead end comparable to the huge, flimsy gaff rigs of the early 1900s, which would also drive a boat spectacularly fast until they fell down. Back in the late 1930s, the Star class pioneered in demonstrating how fast a boat could be driven by the use of skinny masts bent in compression. When I was

SCALE 3/8" = 1'0"

DESIGNED #1/SB
PHILIP C. ROUDEK
NAVAL ARCHITECT
& Marine Consultant
BOSTON, MASSACHUSETTS



RUNNING RIGGING & BLOCKS. MAST TOTAL - TO BE REVISED BY MASTER & BOOSTER

SHEET 9/A

PART	NO	WIRE & ROPE	BLOCKS					BOOST
MAIN HALYARD	1	45' 5/8" SWIV. 7-19 WIRE; 30' 5/8" MANILA.	6" CLEAT	1	7"	SWAGE	SWIVEL	
				1	7"	SWAGE	CHECK SWIVEL	
				1	7"	SWAGE	SHACKLE	
MAIN TRCK	1	7' 1/4" Ø MANILA	Ø CLEAT	1	7"	SWAGE	SIDE SHACKLE	NCS
				1	7"	SWAGE	FRONT SHACKLE	NO
MAIN SHEET	1	110' 1/2" DACRON	6" CLEATS	1	4"	BOLT	SIDE SHACKLE	NO
				1	4"	SWAGE	SIDE SLIDE WITH SLIDE	NO
				2	4"	SWAGE	SWAGE EYE PLATE	NO
MAIN OUTHAUL	1	10' 1/8" 7-19 WIRE; 9 3/8" MANILA TAIL.	6" CLEAT	1	7"	SWAGE	SLIDE SHEAVE	
				1	7"	SWAGE	CHECK PAR WIRE	
BOOM VANG	1	16' 7/16" DI MANILA	Ø CLEAT	1	4"	SWAGE	SWIVEL SNAP SHACKL	NO
				1	4"	SWAGE	SWIVEL SNAP SHACKL	YES
				1	4"	BOLT	SWIVEL SNAP SHACKL	NO
BOOM GUY	1	40' 7/16" DI NYLON/	SNAP SHACKLE					
TOPPING LIFT	1	40'6" 1/8" DI 7-19 WIRE	SHACKLE EACH END					
STAYSAIL HALYARD	1	33' 1/4" DI 7-19 WIRE; 40' 3/8" DI MANILA TAIL.	Ø CLEAT	1	4"	SWAGE	UPSET FRONT SHCKL	NO
STAYSAIL SHEETS	2	41' 5/16" DI 7-19 WIRE EACH SIDE; TAILS 15' 7/16" DI DACRON.	Ø CLEATS	2	4"	SWAGE	SIDE SHACKLE WITH SLIDE	
FLAG HALYARD	1	100' 3/16" BRAIDED DACRON OR NYLON	6" CLEAT	1	2"	SWAG	CHECK	NO
SPINN HALYARDS	2	40' 3/4" BRAIDED COTTON OR NYLON		2	2"	SWAG	SIDE SHACKLE	NO
JIB SHEETS	1	80' 3/8" 6-7-19 WIRE EACH SIDE; TAILS 15' 7/16" DI DACRON.	Ø CLEATS	2	4"	SWAG	SIDE SHACKLE WITH SLIDE	
JIB HALYARD	1	36' 1/4" DI 7-19 WIRE; 35' 3/8" DI MANILA TAIL.	SNAP SHACKLE	1	4"	SWAG	UPSET FRONT SHCK	NO
MAIN SHEETS	1	11' 1/4" DI 7-19 WIRE EACH SIDE; TAILS 16' 1/2" DI DACRON.	SNAP SHACKLE					SEE STARTING SHEETS
CENTER SHEET	1	6' CLEATS	SNAP SHACKLE					
REEFING PENNANT	1	200' 1/2" NYLON						
REEF HOOKS	2							
REEF PENNANT	1	275' 3/4" NYLON						
BOWSPRIT CHAIN	1	275' 3/8" CHAIN						
RUNNER TRACKERS	2	9" CLEAT	WINCH	1	6"	SWAG	SIDE SHACKLE	NO
		WIRE 1 TAIL 3/4" DI 7-19 DACRON		1	6"	SWAG	SHACKLE EYE PLATE	
SPINNAKER LIFTS	2	40' 3/8" DI MANILA	6" CLEAT	2	7"	SWAG	UPSET SHACKLE SHACKLE	
SPINNAKER SHEETS	2	40' 1/2" DI NYLON	SNAP SHACKLE					
		40' 3/8" DI NYLON	WINCH 6" CLEAT					
SPINNAKER POLE	1	10' 1/16" DI 7-19 WIRE; 9 3/8" MANILA TAIL.	6" CLEAT	1	7"	SWAG	SLIDE SHEAVE	
				1	7"	SWAG	CHECK PAR WIRE	
				1	7"	SWAG	SLIDE SHEAVE	
				1	7"	SWAG	SHACKLE EYE PLATE	NO
				2	7"	SWAG	SWAGE EYE PLATE	NO
				1	7"	SWAG	SHACKLE	
				1	7"	SWAG	SWIVEL	
				1	7"	SWAG	SWIVEL	YES

TENTATIVE - TO BE REVISED BY MASTER & SPINNAKER

SAIL	AREA	LUFF	LEECH	FOOT	CUT	AMID (dia.)	
MAINSAIL	422	46'2"	40'4"	18'4"	CROSS		6
TRYSAIL	100	20'0"	23'4"	10'1"	MIRROR IMAGE		11
NO 1 GENOA	578	41'3"	45'7"	26'0"	CROSS MITRE		4
NO 2 GENOA	467	39'0"	38'4"	25'4"	"	"	5
NO 3 GENOA	350	30'0"	31'5"	24'10"	"	"	6
WINDSEE JIB	325	41'3"	39'10"	19'0"	"	"	5
GENOA SPINNAKER	176	68'0"	27'4"	21'0"	"	"	4
STORM JIB	84	21'0"	14'6"	12'0"	MITRE & WITH LEECH		6
NO 2 SPINNAKER	488	32'9"	25'0"	14'3"	"	"	5
NO 1 SPINNAKER	1100	49'9"	48'9"	31'6"	"	"	3
NO 3 SPINNAKER	309	26'0"	32'0"	20'0"	"	"	5

PHILIP C. BECKER
ENG. LANGHORNE
PENNSYLVANIA

DESIGN B 1966
SCALE 1/4" = 1'0"

PHILIP C. BECKER, DESIGNER
880 LANGHORNE STREET
GLOUCESTER, MASSACHUSETTS
01930

SHEET 1/4

ORDERED BY FEET, INCHES, & EIGHTHS,
TO DIVIDE OF PLANES
HALF, BENDING, & HEIGHTS ABOVE BASE LINE.

BASE LINE

MALF - BENDINGS

ELEVATION

PLAN

SECTION

SIDE ELEVATION

SIDE ELEVATION

END ELEVATION

END ELEVATION

90°0' LENGTH DIAGONAL (PHASE ZERO CHECK)
30'0" LENGTH ON DIAGONAL CENTERLINE
10'6" CENTRAL SPAN
6'9" DIAGONAL SPANS
7.69 TONS OF 25000 LBS. REINFORCEMENT
4.05 TONS OF 9,070 LBS. BRILLANT STEEL
15.29 TONS THEORETIC LOADS

DESIGN # 258
PHILIP C. BOLGER
NAVAL ARCHITECT
ENGINEERING MANAGEMENT
Re-Issued 1982 (Corrected Fig.
"INCHWORM"
47'-3"O"-10"&-6"9"

SCALE 3/4" = 1'0"

SHEET 3/4

SECTION @ STA. 30

SECTION @ STA. 27

SECTION @ STATION 19
LOOKING AFT

SECTION @ STA. 12
LOOKING FOR'D

SECTION @ STA. 6

TYPICAL SECTION
AT SHEER, 1/2 SIZE

STAINLESS STEEL
FRESH WATER
TANKS; TAKE
TEMPLATES
FROM HULL.

SCALE 3/4" = 1'0"

DESIGN # 186
"HESPERUS"
45'0" - 30'0" - 10'6" - 6'9"
Ex Ramsey Wang Gaffrigger Pilot

PHILIP C. BOLGER

crewing in Bob Steele's Star, every serious competitor had at least one spare rig all ready to step.

Not that the rig here is my idea of the way to go. It was meant to be strong and stiff to stand driving, and to have as much redundancy as deference to the rules allowed, but it's still vulnerable to the failure of a hundred-odd small, highly stressed components, terminals and turnbuckle pins and such.

It is probably also not well balanced, the keel being too far forward. It's natural to think of a giant finger poking at the center of sail area, but of course that's not how a boat is driven. If you look for the point where the thrust of the sails is being transmitted to the hull, you find that she's being pushed by the thrust of the boom against the mast, and, more important in rigs like this, dragged along by the pull of her jib sheets. The angles of those forces account for considerable weather helm without considering heeled hull shape. As far as I know, nobody has tried to resolve all the forces derived from sails on the halyards, luff slides and hanks, sheets and outhauls, and so on, to see what the final vector looks like. Until somebody does that, we're left with empirical methods and say, in effect, that the giant finger should push against the sail plan at a certain point relative to the keel according to experience with the type we're working with. The kind of rigs I usually use, with small or no jibs and sprit booms, have less tendency to swing the bow into the wind than the type that *Hesperus* has. I've had many more cases of trouble with lee helm than weather helm in my designs; lee helm is more harmful to performance than weather helm, so I tend to underestimate the weather-helm potential of rigs like this one.

One reason the balance of sailboats hasn't been examined in a more orderly fashion is that it is complicated by water forces acting on the hull, and by the stability of the hull relative to the rig. For instance, if a close-hauled boat heels sharply, the sheet of a boomed sail (which was pulling up vertically when she was upright) now pulls out to leeward. Hence the weathercocking of an overpowered catboat. On the other hand, when a hull that is very heavy for its beam heels, something or other happens that makes her head off, in spite of the pull of her sheets. I was going to say why I think this happens, but my theory sounds too feeble to bother passing on.

Overhangs like this don't make much sense, but like a good many people, I have a perverse liking for their looks. Logically, the waterline should be extended in long, sharp points under the overhangs. There would be more displacement in the ends without

much increase in the weight of the boat, so she would be shallower in the middle. Then the cabin sole would have to be higher, with an increase in freeboard to keep the same headroom. The result would be a faster, abler, and roomier boat than this one for about the same investment.

I'm not clear whether the attraction of long, delicate overhangs is innate or due to my having grown up in a time when racing boats had them.

The design got a prize because of her cabin, which was a good many years ahead of its time. All the other entries had normal cruising accommodations. After ocean races, I had seen such cabins looking like pigpens, if not slaughterhouses. *Hesperus'* cabin was designed with the idea that somebody could go in with a high-pressure hose and blast away the gurry. The galley and chart table come out as units, and there's nothing else but eight pipe berths. I'd been across the Pacific and back sleeping in an unpadded pipe berth, and I've slept worse. The berths in the forecastle are for in-port use. At sea, the watches would sleep amidships, close to the pitch axis, on the warm-berth principle. This cabin is cheap and light as well as sanitary.

The judges commented that I must have been to sea. They referred to the rail in the galley bay and the overhead grab rails. Nothing was said about the toilet arrangement, with a stanchion to hook your elbow around, a grab to hold yourself down, back braces, and the storm anchor lashed down to jam your toes under, but I still think these amenities got me the prize. They happen to have been arrived at in troopships, not ocean racers, but the waves were the same.

37

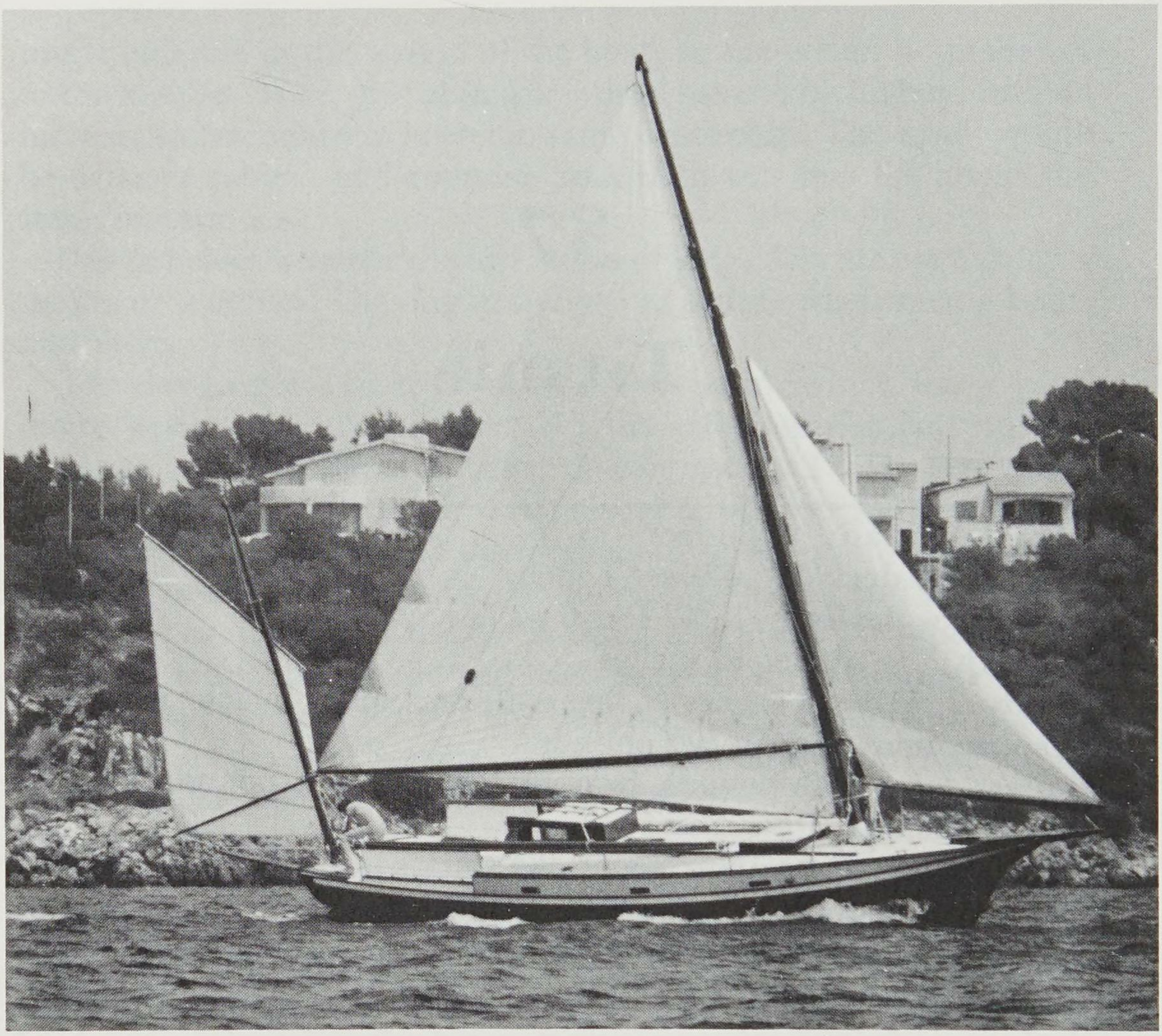
Titania

Length overall	50 feet
Length on deck	47 feet 1 inch
Length, waterline	42 feet 6 inches
Breadth	10 feet 10 inches
Draft	2 feet 6 inches (7 feet with maximum bilgeboards)
Displacement	21,700 pounds
Ballast	4,580 pounds iron on keel, 1,000 pounds lead in bilgeboards
Sail area	964 square feet (1,364 square feet with main staysail)
Owner	Howard A. Bauer
Builder	Adams Boatbuilding Company, Lake Park, Florida

Howard Bauer was much taken with the looks of some designs of Francis Herreshoff. He deluged me with photos of their sterns in particular — preaching to the saved, in fact. However, he wanted a much shallower and lighter boat, preferably also cheaper, and he wanted a simplified rig with unstayed masts.

I warned him that although I was all for rigs like that, I hadn't had much luck trying to make them sail into the eye of the wind like an IOR boat. He said I should do the best I could. If she went as well as Stanley Woodward's *Moccasin* (see photo), he'd be satisfied. He would sail her free and let her foot.

The design is for a much smaller boat than it seems at first glance. She's narrow for her length, shallow for her breadth, and lightly ballasted. To carry sail with light displacement and light ballasting, she's flat floored and hard bilged, "got her feet wide apart," and gets her reserve stability from high freeboard. It's something of a trick to get the "*Ticonderoga* look" in a boat this high sided. I accomplished it to my own satisfaction by keeping the clip-



Moccasin *proving that boats shaped and rigged like* Titania *aren't necessarily slugs on the wind. (Stanley Woodward photograph)*

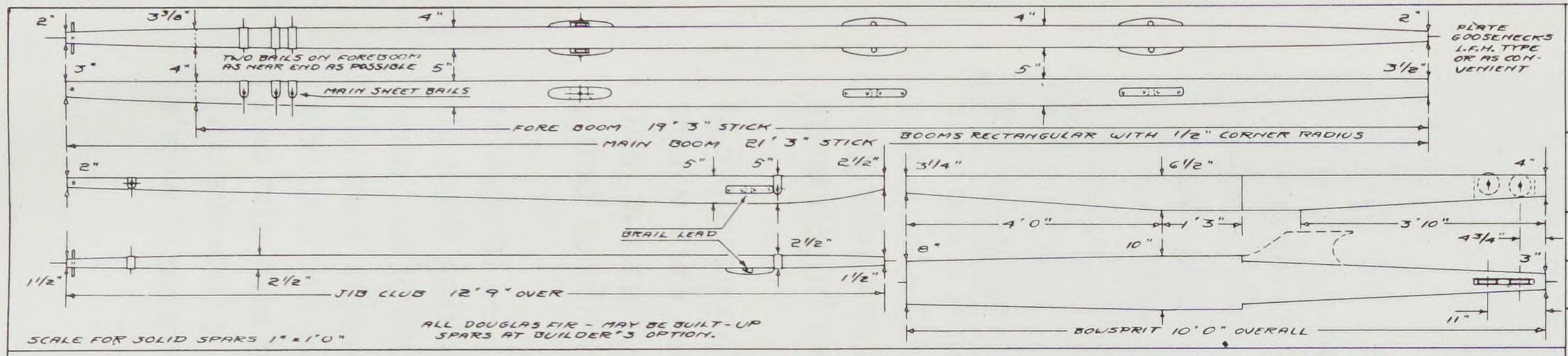
per headwork and the elliptical transom high and small. The effect is something like a coasting schooner sailing light, without cargo, when they always looked well to me. I expect the resulting buoyancy to benefit her seakeeping ability as well as her looks.

A hull like this is prone to pounding in a certain length of head sea. I thought it would help to hog the rabbet down in the ends, to spread out the displacement and get sharper and deeper sections for encountering waves. If she were dropped in the middle correspondingly to keep the rabbet straight, she would need more ballast and sail and would have to be deeper to get the same effective lateral plane. The hog looks odd on the construction plan but doesn't seem to hurt the fineness of her lines. She's meant to be a windward boat — I think the comparatively full lines aft will help her there. As for running off, it's pretty hard to stop a hull as floaty as this, and she's too buoyant aft to get pooped.

The bilgeboards give her 7-foot draft when she's got urgent business to windward; actually, 8 feet or more depending on angle of heel. I'd just as soon she didn't hit anything solid with the boards at that depth. For cruising they're supposed to be carried at 4-foot 9-inch draft, which brings the tops of the boards up to deck level for better support against impacts and less chance of a jam. Again, there's the advantage of drawing more water heeled than upright. It can be handy to be able to float off an accidental grounding by letting the sheets fly. Fully hoisted, the boards come up to 2-foot 6-inch draft and will make good legs to stand her upright if she ever ventures to parts where there's a useful range of tide. The long iron casting on her main keel is for coral bottom as well as general rigidity. She can sail to windward, after a fashion, with her bilgeboards all the way up.

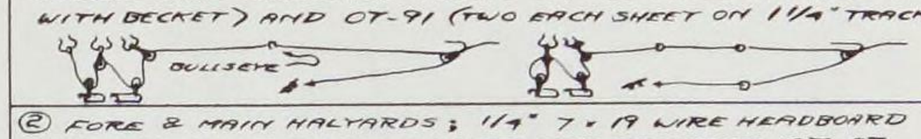
The cabin was kept austere to save money. Here's an example of how nice a deck can be had by insisting on headroom only where it's really useful. The view forward from the helm is dramatic, and two or more small boats can be carried on board without being much in the way.

The rig is designed on the assumption mentioned — to aim at footing fast rather than pointing high and settle for tacking through eight points. It's interesting to see how low the centers of sail area are with this rig, compared with IOR boats of much less nominal area. The weight and windage of the tops of her masts are also less than theirs, since they aren't in compression. In light airs, she can carry a very large area for her displacement. When it breezes up, the big main topmast staysail has to be taken in, because it won't



RUNNING RIGGING (NO STANDING RIGGING)

1. FORE & MAIN 1/2" DACRON; STANDING END BOOM BAIL ON MAIN, BLOCK BECKET ON FORE; SEE DECK PLAN FOR FALLS; BLOCKS LIKE SCHAEFER MARINE OT-03 ON BOOM BAILS (ONE WITH BECKET) AND OT-91 (TWO EACH SHEET ON 1 1/4" TRACKS.



2. FORE & MAIN HALYARDS; 1/4" 7 × 19 WIRE HEADBOARD THROUGH 31-16 BLOCKS ON MASTHEAD TANGS, TO OT-03 BLOCK WITH BECKET; TAIL 1/2" DACRON. CLEAT STARB'D SIDES OF MASTS.

3. TOPPING LIFTS 1/2" DACRON; MAST TANGS TO EYES AROUND 3" THIMBLES P. & S; LOWER LEGS THROUGH CHEEK BLOCKS TO CLEATS NEAR GOOSENECKS EACH SIDE OF BOOM.

4. LAZYJACKS 1/4" DACRON; PENDANTS SPLICED TO LIFT THIMBLES; ENDLESS LOOPS THROUGH PENDANT EYES AND UNDER BOOM.

5. MAIN TOPMAST STAYSAIL HALYARD 1/2" DACRON; HEAD OF SAIL THROUGH OT-03 BLOCK ON MAST; BRING FALL AFT ON WEATHER SIDE TO RAIL CLEAT TO FUNCTION AS BACKSTAY.

6. MAIN TOPMAST STAYSAIL TACK PENDANT 1/2" DACRON WITH SNAP SHACKLE TO DECK EYE ON WEATHER SIDE (SEE DECK PLAN).

7. JIB SHEET 3/8" DACRON; STAND END ON PAD EYE (SEE DECK PLAN); THROUGH OS-03 (2" SHEAVE) BLOCK ON CLUB BAIL; THROUGH 35-62 SWIVEL BLOCK ON DECK PLATE; AFT VIA FAIRLEAD.

8. JIB CLUB DOWNHAUL 1/2" DACRON; STANDING END ON CLUB BAIL; OVER 4" BOWSPRIT SHEAVE TO OT-03 BLOCK ON STEM TANG; OVER SECOND BOWSPRIT SHEAVE TO CLEAT NEAR HEEL OF BOWSPRIT.

9. JIB HALYARD 1/2" DACRON; SNAP SHACKLE TO HEAD OF SAIL; THROUGH OT-03 BLOCK ON MAST TANG; DOWN TO CLEAT PORT SIDE OF MAST.

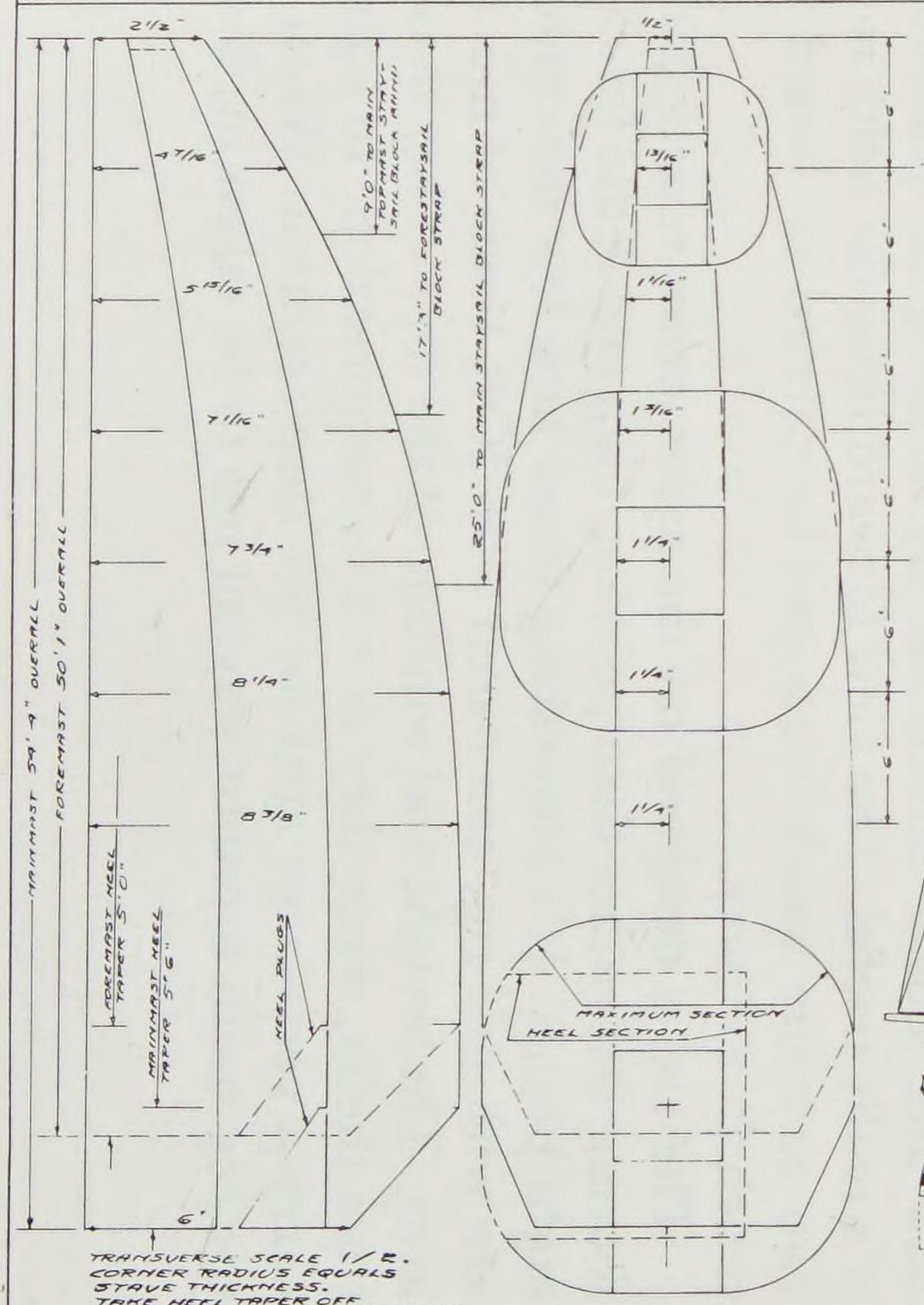
10. JIB BRAIL 3/8" DACRON; HEAD OF SAIL THROUGH THREE CRINGLES ON SAIL & DUMB SHEAVE ON CLUB; BRING AFT ON LEE SIDE AND USE TO SMOTHER SAIL IN LEE OF FORESAIL WHEN DOWNHAUL (#9) IS SLACKED.

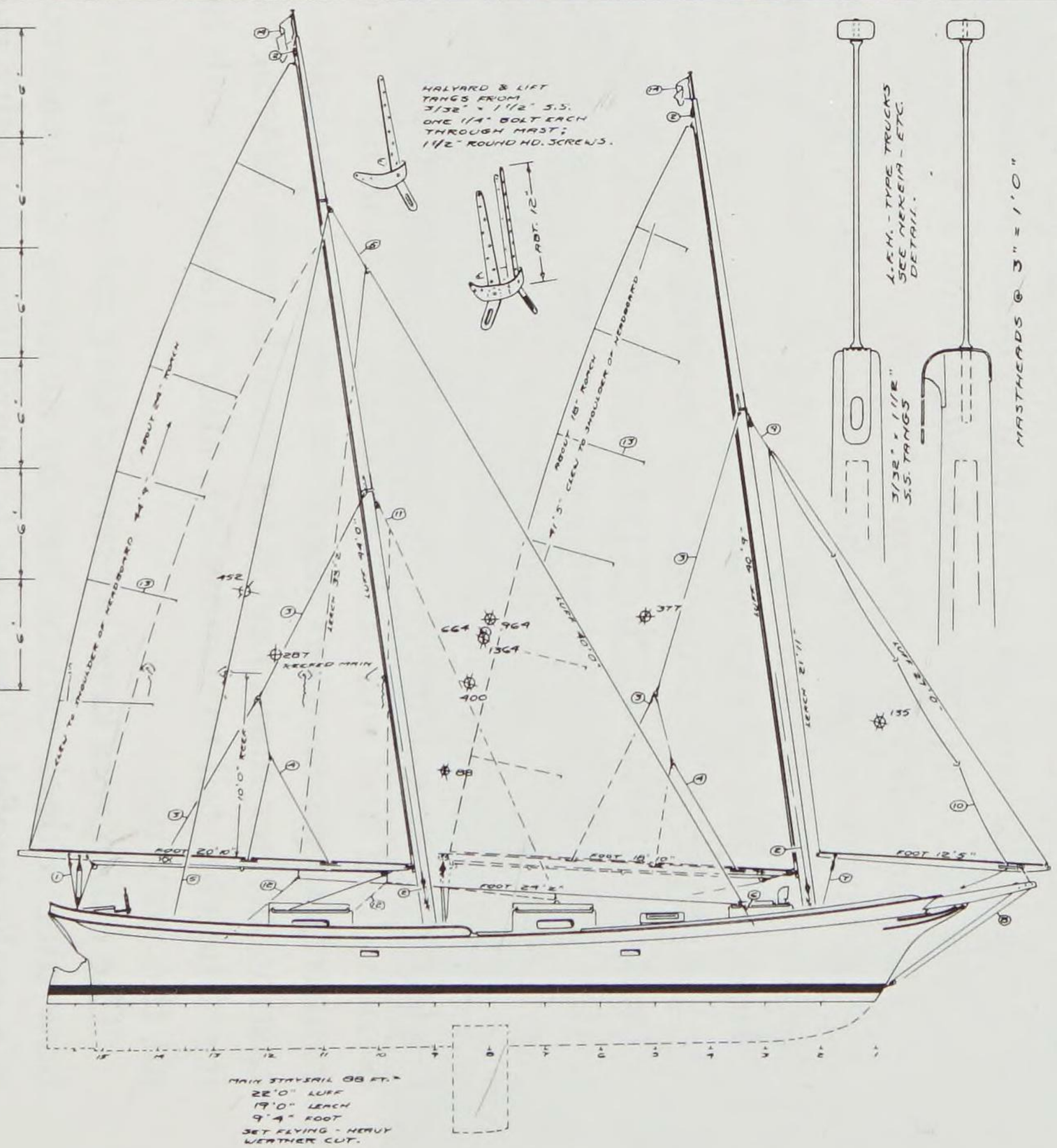
11. MAIN STAYSAIL HALYARD SIMILAR TO JIB HALYARD.

12. SHEETS OF MAIN STAYSAILS (ONE PER SAIL) 1/2" NYLON; LEAD TO SWIVEL BLOCKS OT-62 AS SHOWN ON DECK PLAN.

13. PLASTIC OR ASH BATTENS TO SAILMAKER'S ADVICE; NEED NOT CONFORM TO I.O.R. OR OTHER RULE RESTRICTIONS.

14. FLAG HALYARDS 1/4" DACRON; TWO SETS EACH MAST.





SCALE 1/4" = 1'0" AND AS MARKED

DESIGN #402
AB'0" × 10'10" × 2'6"
For Howard A. Bauer

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

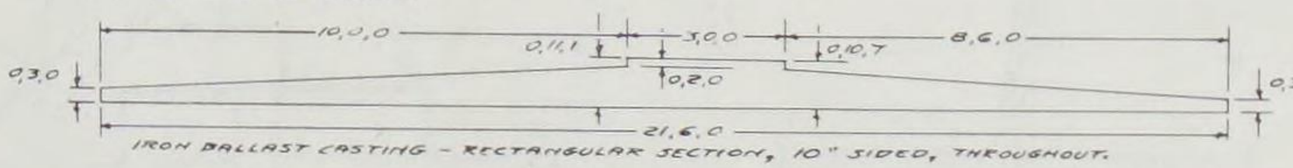
HEIGHTS FROM BASE LINE

	16	15½	15	14½	14	13½	13	12	11	10	9	8	7	6	5	4	3	2	1	
DECK @ UNDERSIDE OF RAIL CAP	(6,8,6)	6,7,7	6,7,1	6,6,5	6,6,0	6,5,9	6,5,0	6,4,1	6,3,5	6,3,2	6,3,2	6,3,5	6,4,0	6,4,6	6,6,0	6,7,4	6,7,1	6,11,1	7,1,3	DECK @
	7,1,4	6,11,4	6,9,2	6,7,2	6,5,4	6,4,0	6,3,0	6,1,2	6,0,2	6,0,0	6,0,0	6,0,6	6,0,0	6,3,4	6,5,4	6,8,1	6,11,0	7,3,0	7,7,3	RAIL
TRIM LINE		6,11,5	6,9,7	6,8,5	6,0,9	5,11,0	5,9,6	5,8,0	5,6,4	5,6,2	5,6,2	5,6,6	5,7,5	5,7,0	5,8,6	6,1,0	6,3,6	6,7,2	6,11,1	TRIM LINE
BUT. 48"				5,5,0	4,5,4	3,9,7	3,3,2	2,4,4	1,9,7	1,6,1	1,7,6	1,3,0	1,6,7	1,11,4	2,1,2	4,3,6	6,1,5			48" BUT.
42"		6,9,0	5,5,1	4,8,0	3,11,5	3,4,3	2,9,4	1,11,1	1,6,0	1,3,6										42"
36"	6,7,2	5,10,4	5,1,5	4,4,7	3,8,0	3,0,0	2,5,0	1,7,6	1,3,4	1,2,0	1,1,0	1,2,0	1,2,6	1,5,0	1,10,2	2,8,7	4,6,0	6,3,4		36"
30"	6,5,5	5,8,3	4,11,0	4,2,0	3,7,6	2,8,2	2,1,0	1,5,3	1,2,2											30"
24"	6,4,5	5,6,7	4,9,1	3,11,3	3,1,4	2,4,2	1,9,4	1,3,3	1,1,2	1,1,0	1,1,0	1,1,0	1,1,0	1,1,6	1,9,0	1,10,1	3,0,5	5,0,5	7,2,7	24"
18"	6,4,2	5,5,6	4,7,3	3,8,0	2,8,2	1,11,1	1,5,6	1,1,3												18"
12"	6,4,1	5,5,0	4,5,4	3,3,0	2,1,0	1,5,4	1,1,7	0,11,1	0,11,2	1,0,4	1,1,0	1,1,0	1,0,4	0,11,6	1,9,0	1,1,1	1,8,0	3,2,1	5,10,2	12"
6"	6,4,0	5,4,5	4,3,0	2,2,6	1,5,0	1,0,4	0,10,0	0,9,2												6"
RABBET	6,4,0	5,4,3	3,1,4	1,5,2	1,1,0	0,10,1	0,8,5	0,8,6	0,10,4	1,0,0	1,0,7	1,1,0	1,0,4	0,10,7	0,9,2	0,8,0	0,8,0	1,3,4	3,9,3	RABBET
KEEL	6,4,0	5,4,3	0,0,0	0,0,0	0,0,0	0,0,0	0,0,0	0,0,4	0,0,7	0,1,2	0,1,5	0,2,0	0,2,4	0,3,0	0,3,3	0,4,0	0,4,5	0,7,1	2,1,6	KEEL

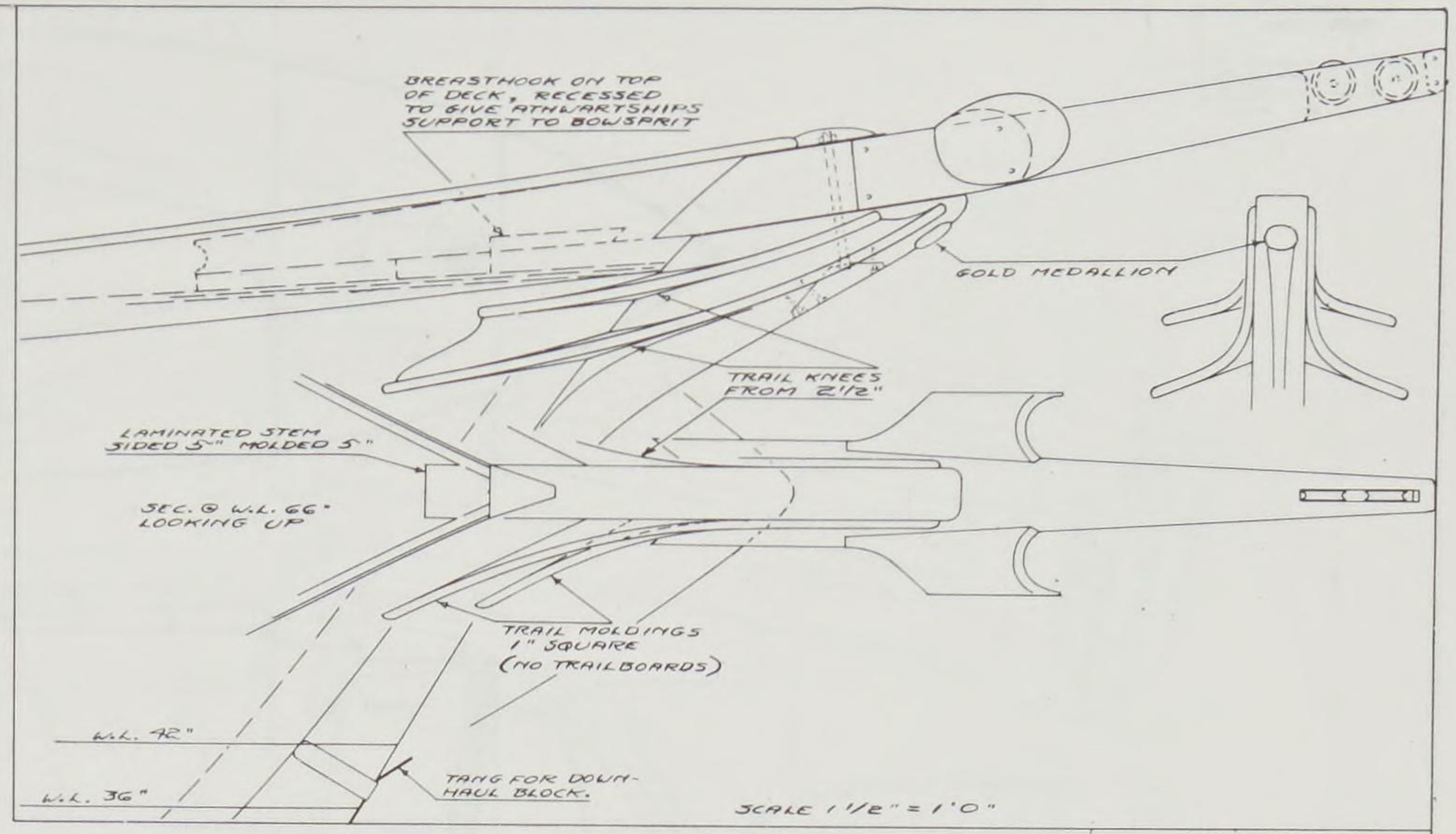
HALF-BREADTHS

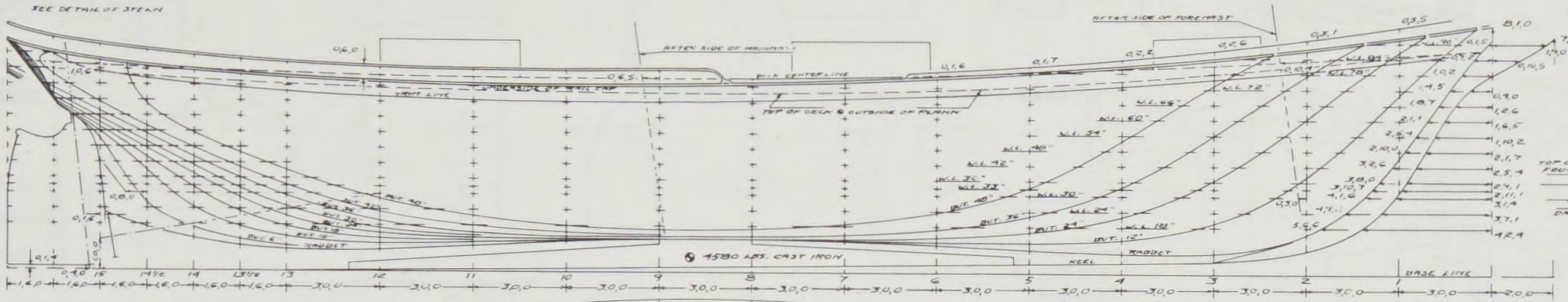
RAIL	0,0,0	3,6,0	3,9,5	4,0,6	4,3,6	4,6,0	4,8,2	4,11,4	5,2,0	5,3,5	5,4,4	5,4,6	5,4,5	5,3,5	5,2,0	4,10,6	4,5,1	3,8,0	2,3,2	RAIL
W.L. 90"																			2,3,4	90" W.L.
84"	3,3,0																	3,3,4	1,1,6	84"
78"	2,8,0	3,6,7	3,10,0	4,0,6												4,10,0	4,2,4	3,0,3	1,1,6	78"
72"		3,2,5	3,7,4	4,0,2	4,3,6	4,6,0	4,8,2	4,11,4	5,2,0	5,3,5	5,4,4	5,4,6	5,4,5	5,3,5	5,1,3	4,8,4	3,11,0	2,7,6	1,1,0	72"
66"		1,7,2	3,6,6	4,0,4	4,3,6	4,6,0	4,8,2	4,11,4	5,2,0	5,3,5	5,4,4	5,4,6	5,4,5	5,3,4	5,0,4	4,6,2	3,7,4	2,3,4	0,9,6	66"
60"			2,8,0	3,4,6	4,3,0	4,3,7	4,8,1	4,11,4	5,2,0	5,3,5	5,4,4	5,4,6	5,4,5	5,3,2	4,11,2	4,4,0	3,4,0	1,11,4	0,7,3	60"
54"			1,6,1	3,2,4	4,0,2	4,5,0	4,7,6	4,11,3	5,2,0	5,3,5	5,4,4	5,4,6	5,4,4	5,2,6	4,9,6	4,1,2	3,0,0	1,8,3	0,3,2	54"
48"			6,3,7	2,1,5	3,6,6	4,2,0	4,6,0	4,10,6	5,1,5	5,3,4	5,4,3	5,4,5	5,3,7	5,1,6	4,7,6	3,10,0	2,8,0	1,4,6	0,3,4	48"
42"			0,2,4	1,3,1	2,8,2	3,8,1	4,2,4	4,7,0	5,0,6	5,3,0	5,3,6	5,3,7	5,2,7	5,0,0	4,5,2	3,6,4	2,3,7	1,1,5		42"
36"				0,10,3	1,10,0	3,0,0	3,7,0	4,6,4	4,11,1	5,2,1	5,3,0	5,3,0	5,1,5	4,9,4	4,1,7	3,1,5	1,11,4	0,11,0		36"
33"				0,9,0	1,6,7	2,7,1	3,5,3	4,4,3	4,9,7	5,1,2	5,2,3	5,2,3	5,0,4	4,8,1	4,0,0	2,11,3	1,9,5	0,9,6		33"
30"				0,7,2	1,4,0	2,2,4	3,1,2	4,1,6	4,7,7	5,0,0	5,1,3	5,1,4	4,11,0	4,6,0	3,9,3	2,8,4	1,7,3	0,8,3		30"
24"				0,5,0	0,11,3	1,7,2	2,4,1	3,2,2	4,2,7	4,8,0	4,10,1	4,9,7	4,6,7	4,0,5	3,2,6	2,2,0	1,2,6	0,6,0		24"
18"				0,2,7	0,7,0	1,0,4	1,6,5	2,1,4	3,6,0	3,11,3	4,2,5	4,2,4	3,10,4	3,2,4	2,4,5	1,6,6	0,10,6	0,3,7		18"
KEEL			0,2,4	0,2,4	0,3,0	0,3,5	0,4,2	0,4,7	0,5,0	0,5,0	0,5,0	0,5,0	0,5,0	0,5,0	0,5,0	0,4,5	0,3,3	0,2,4		KEEL

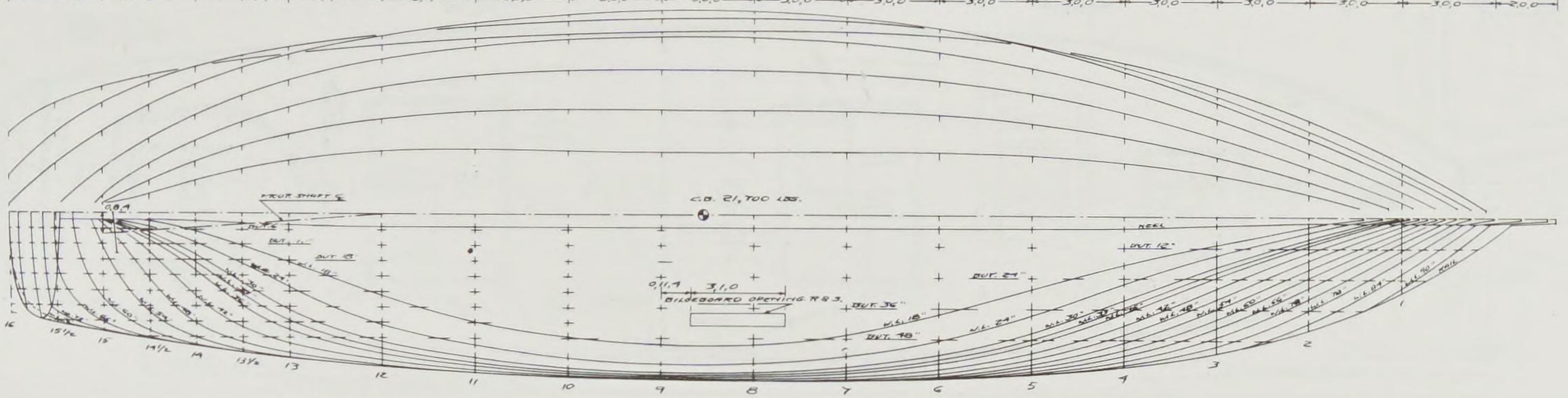
OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK.

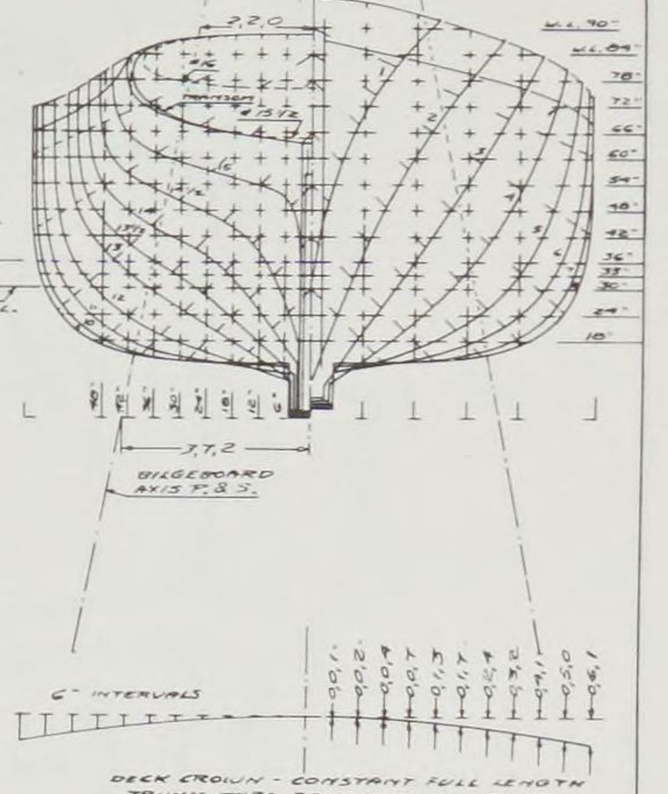


IRON BALLAST CASTING - RECTANGULAR SECTION, 10" SIDED, THROUGHOUT.









DECK CROWN - CONSTANT FULL LENGTH
TRUNK TOPS SAME CROWN, AS IS
TRANSOM ARC NORMAL TO KEEL.
DIMENSIONS CORRESPOND TO 30'0" RADIUS

SCALE 1/2" = 1'0"

DESIGN # 402
40'0" · 10'10" · 2'6"
for HOWARD A. BAUER

PHILIP L. RHODES
DESIGNER
GLOUCESTER, MASSACHUSETTS

ADAMS BOATBUILDING CO. INC.
LAKE PARK, FLORIDA

MAIN TOPMAST STAYSAIL SHEET SHATTEN BLOCK M&S.

MAIN STAYSAIL SHEET BLOCK M&S.

MAIN TOPMAST STAYSAIL TACK EYE M&S.

J/8 SHEET STANDING END PORT; TURNING BLOCK STARBOARD

3-L #555 HAND WINDLASS FOR 3/8" CHAIN

6" CLEAT M&S.

FORESAIL SHEET TRAVELLER TRACK

FAIRLEAD M&S.

FORESAIL SHEET

5" COWL VENT M&S. WATER TRAP UNDER

10" CLEAT

VENT OUTLET INSIDE WHEEL BOX

SEAT BACK M&S.

MAIN SHEET TRAVELLER TRACK

SCUPPERS

6" COMPASS

ENGINE CONTROL

HATCH

HATCH SLIDING

MAIN SHEET

TWO SPEED SELF-TAILING WINCH

'TORTOISE' PUMP

5:1 CAPSTAN TO HOIST BILGE BOARDS

MAIN STAYSAIL TACK PLATE

HATCH

HATCH SURROUND

SKYLIGHT

'TORTOISE' PUMP

HINTON DOME LIGHT

J/8 SHEET

MAIN TOPMAST STAYSAIL HALYARD CLEAT M&S.

SEC. @ #15½

SEC. @ #13½ LOOKING AFT

SEC. @ #11 LOOKING AFT

SEC. @ #9 LOOKING FOR'D

SEC. @ #7 LOOKING FOR'D

SEC. @ #5 LOOKING FOR'D

SEC. @ #3 LOOKING FOR'D

EDSON SIMPLEX #372-1 WORM STEERER - 28" DIAM. #60F TEAK WHEEL

EXHAUST

DRAIN

CHAIN

BALLAST KEEL BOLTS IN PAIRS

6½"

3/4"

8½"

1'3½"

4"

1'0"

4"

FUEL TANK

SAIL BIN

TRANSOM BERTH

FRESH WATER TANK

THREE-BURNER ALCOHOL STOVE

DRESSER

TRANSOM BERTH

SHELVES & LOCKERS

LADDER

W.C.

SINK

W.C.

BRONZE SHAFT LOG

FLEX-NECK STUFFING BOX

BATTERY TESTER

CHART TABLE

TRANSOM BERTH

STORAGE BIN

DRY FOOD LOCKERS

REFRIG-ERATOR

TRANSOM BERTH

CABIN

3'8" 6'6" 3'9½" 5'1" 6'6" 5'4"

POATHFINDER 50 DIESEL
2-1 T.T.I. REDUCTION GEAR
1" DIAM. MONEL SHAFT
K" DIAM. x 10" PITCH TWO-BLADE
FOLDING PROPELLER.

SCALE 1/2" = 1'0"

DESIGN #402
48'0" - 10'0" - 2'6"
for HOWARD P. BAUER

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

BILGEBOARD TRUNK HEADBLOCKS 3/8" - 3"

PERMANENT LANYARD TO DECK EYE TO HOLD BOARD IN TRUNK IF PENDANT PARTS.

WEDGES HERE TO HOLD BILGEBOARDS PARALLEL ON TO ANGLE ALLOWED BOARD TO BE RAISED.

WILEY WINDOW

FID

TRUNK TOPS 1 1/4" SQUARE GLUED & EDGE-NAILED STRIPS

TRUNK SIDES 1 1/8" MAHOGANY WITH CORNERS MORTICED

DECK DOUBLE 3/8" BRUYNZEEL OR EQUIVALENT PLYWOOD

RAIL CAPS 1 1/8" - 3" TEAK.

DECK STRINGERS 1 1/8" - 2 1/8" FIR ON 12" CENTERS.

SECTION @ #8 LOOKING FORWARD

CLAMP FROM 2 1/2" SQUARE FIR

BILGEBOARD TRUNK WALLS DOUBLE DIAGONAL TO FINISH 13/16"

L.L. 30"

OUTER PLANK DOUBLE DIAGONAL TO FINISH 1/4" L.E.S.T.

INNER PLANKING 1" SQUARE GLUED & EDGE-NAILED CEDAR

FLOOR TIMBERS ON BULKHEADS SIDED 3 1/2", RABBETTED FOR BULKHEADS

OTHER FLOOR TIMBERS 2 1/2" E 1 1/2" (SEE INBOARD PROFILE.)

BULKHEADS DOUBLE DIAGONAL TO FINISH 3/4" THICK.

CAST IRON BALLAST SEE LINES SHEET.

BILGEBOARD FULLY HOISTED (8'6" DRAFT)

MAXIMUM BILGEBOARD EXTENSION (7'0" DRAFT)

NORMAL CRUISING DEPTH OF BILGEBOARDS (4'9" DRAFT)

BILGEBOARDS 4'0" OVERALL - TWO IDENTICAL

3'0"

PINRAIL EYE

WELDED FID HOOKS

WALLS 1/8"

1/4" WEBS

ABOUT 300 LBS. LEAD RUN INTO EACH BOARD. (TOTAL WEIGHT OF EACH BOARD ABOUT 600 LBS.)

2"

1/4" - 4"

2 7/16" 3 7/16" 3 1/16"

3/4" D. ROUND BAR

3/8" 0 1/2" 0 1/16" 7 1/16" 0 1/8"

3'0"

SCALE 1 1/2" = 1'0"

DESIGN #402
40'0" - 10'10" - 2'6"
for Howard A. Baker

PHILIP L. RHODES
NAVAL ARCHITECT
GLOUCESTER, MASSACHUSETTS

TRANSOM ARC SAME AS DECK CROWN - SHOWN FROM STOCK.

TRANSOM EXPANDED OUTSIDE EVERYTHING

PLANK REDUCTION AMOUNTS ARE APPROXIMATE

REMOVABLE FILLER BLOCK

STEMPOST TONGUED INTO KEEL

11/4" - 1/2" END PLATE

15 14 1/2 14 13 1/2

MAXIMUM DEPTH OF RECESS

SECTION IN PLANE OF PROP SHAFT

SECTION @ #13 LOOKING AFT

BASE LINE

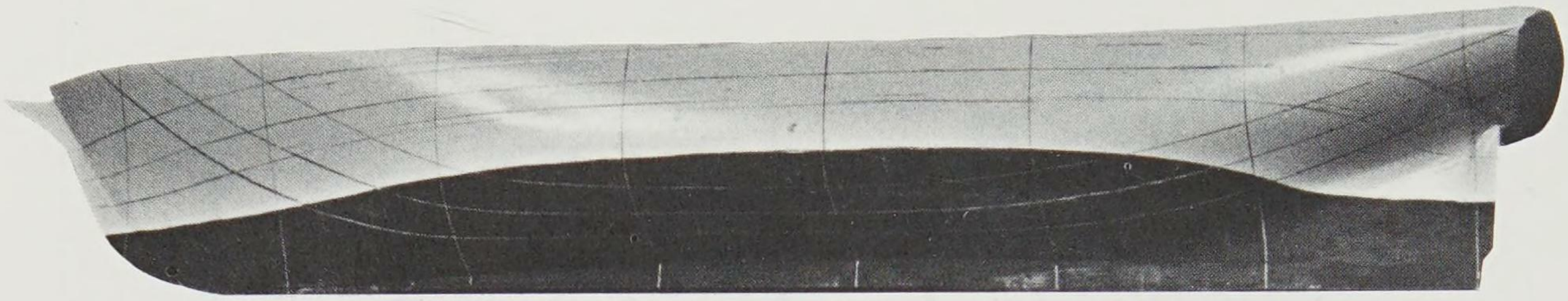
L.L. 30"

ALTERNATE TRANSOM SHAPE - MEASURE AT DASH MARKS FOR GIVEN STATION # 1/2, 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6

SCALE 1 1/2" = 1'0"

DESIGN #402
40'0" - 10'10" - 2'6"
for Howard A. Baker

PHILIP L. RHODES
NAVAL ARCHITECT
GLOUCESTER, MASSACHUSETTS



Model of Titania; *the hogged rabbet isn't very obtrusive, even out of water.*

stand well due to bending the mast, even if it isn't heeling her too much. That leaves 964 feet on the same balance point within a few inches. When she starts to stagger again, the jib is taken in and a deep reef is pulled down in the main, leaving her with a snug 664 square feet, still on the same balance point, with good sheeting leverage and both sails self-trimming. Perhaps she ought to have more reefs in the mainsail and one or more in the foresail, but I've shown no more, as I'd guess that by the time she couldn't lug full fore and reefed main, it'd be time to heave her to with the little storm main staysail aback. Incidentally, I would favor carrying that sail any time that plenty of manpower is available, because a small, low staysail like that can do wonders for the efficiency of the sail abaft it by smoothing out the flow where the twist in the sail and the turbulence from the mast is causing a stall.

Adams Boatbuilding started to lay her down. The cold-molded sheathing over a strip inner skin was their choice of construction. Work on her stopped almost before it started, however, since her financing fell victim to 20 percent interest rates and other consequences of social and political miscalculations. I trust they'll presently be able to resume work, as apart from patriotic considerations, I think she'd be an aesthetic amenity.

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Tonweya

Length overall	50 feet
Length, waterline	46 feet 9 inches
Breadth	13 feet
Draft	2 feet 9 inches
Designed displacement	31,600 pounds
Ballast	8,350 pounds lead
Sail area	1,258 square feet
Owner	Dr. Robert W. Greenwood
Builder	George Luzier, Sarasota, Florida

When Dr. and Mrs. Greenwood were discussing this design with me for the first time, I plainly heard one of them say, "We don't care what it costs." When you say that and mean it, you have a right to be demanding, and they were. Amiable, but hard to satisfy. I would perform prodigies of ingenuity in cartoon form and submit it proudly. Back it would come with "that's nice but . . . ." Two or three times I nearly gave up on it. I wish I'd kept some of those studies, because the final design doesn't look labored to me, and I have trouble understanding why it seemed so laborious while we were beating it out among us.

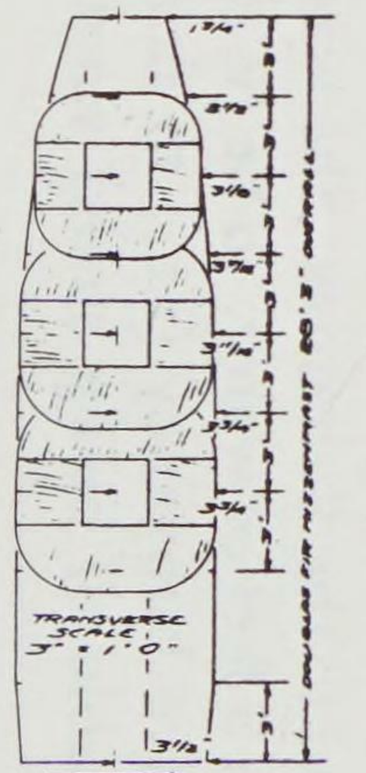
Tonweya (the warrior hero in the awe-inspiring novel *Hanta-Yo*) was designed for cruising the west coast of Florida with occasional passages around to the Bahamas. She was specified to be able to sail to windward in 3 feet of water, to be fit to keep the sea in a gale, to have full positive buoyancy (i.e., to float regardless of flooding), and to be capable of being sailed singlehanded by either of the Greenwoods.

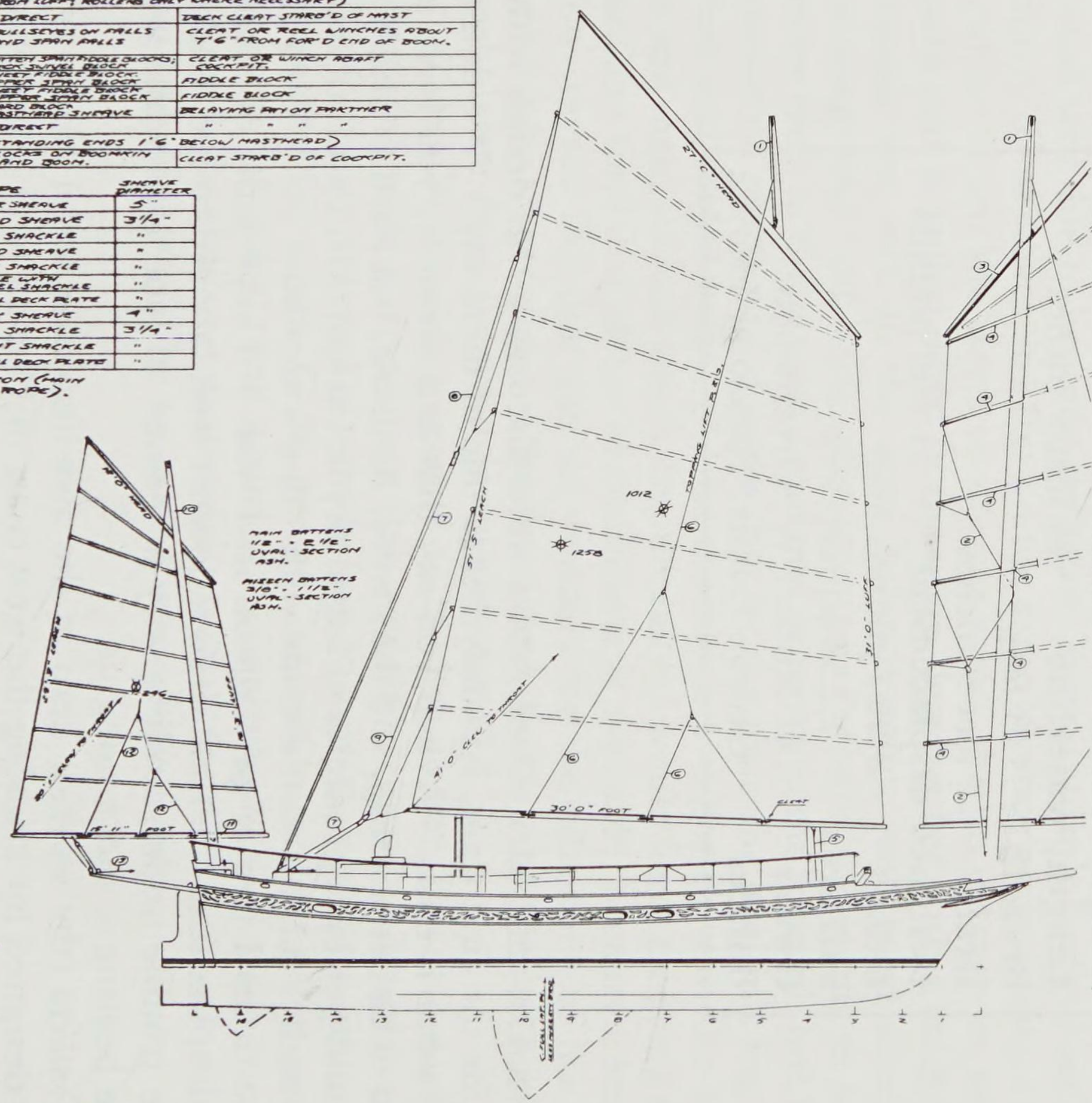
PART	STANDING END	VIA	FALL
① MAIN HALYARD	SHACKLE TO YARD EYE	MASTHEAD SHEAVE DECK SHEAVE	TURNS ON POWER WINDLASS
② " DOWNHAUL	UPPER BATTEN SPAN	AROUND MAST THROUGH LOWER SPAN, DECK SHEAVE	CLEAT AHEAD OF COCKPIT
③ " YARD PARREL	YARD 6'6" FROM HEEL	ROLLERS AROUND MAST	HEEL OF YARD; TAUT WITH HALYARD EYE IN LINE WITH AFTER FACE OF MAST.
④ " BATTEN PARRELS	(FAST TO BATTENS 5'6" FROM LUFF; ROLLERS ONLY WHERE NECESSARY)		
⑤ " BOOM DOWNHAUL	EYE 1'0" FROM FOR'D END OF BOOM	DIRECT	DECK CLEAT STARB'D OF MAST
⑥ " TOPPING LIFTS (2)	4' BELOW MASTHEAD; 7'8" AND 11'3" FROM END OF BOOM	BULLSEYES ON FALLS AND SPAN FALLS	CLEAT OR REEL WINCHES ABOUT 7'6" FROM FOR'D END OF BOOM.
⑦ " SHEET	DECK PAD EYE	BATTEN SPAN DOUBLE BLOCKS; DECK SWIVEL BLOCK	CLEAT OR WINCH ABAFT COCKPIT.
⑧ " UPPER SHEET SPAN	LOWER BATTEN SPAN	SHEET TRIPLE BLOCK; UPPER SPAN BLOCK	FIDDLE BLOCK
⑨ " LOWER " SPAN	BOOM-LOWER BATTEN SPAN	SHEET FIDDLE BLOCK; UPPER SPAN BLOCK	FIDDLE BLOCK
⑩ MIZZEN HALYARD	UPPER MASTHEAD SHEAVE	YARD BLOCK MASTHEAD SHEAVE	BELAYING PIN ON PARTNER
⑪ " BOOM DOWNHAUL	EYE 3'6" FROM FOR'D END OF BOOM	DIRECT	" " " "
⑫ " TOPPING LIFTS (TWO)	(SAME AS MAIN WITH STANDING ENDS 1'6" BELOW MASTHEAD)		
⑬ " SHEET	BAIL 3'3" FROM OUTBOARD END OF BOOM	BLOCKS ON BOOMKIN AND BOOM.	CLEAT STARB'D OF COCKPIT.

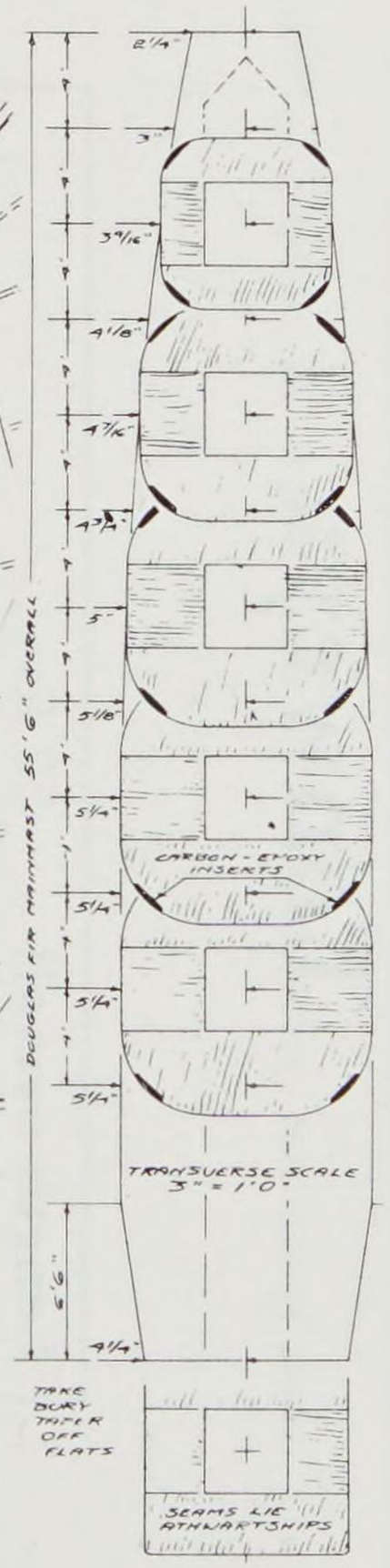
BLOCKS

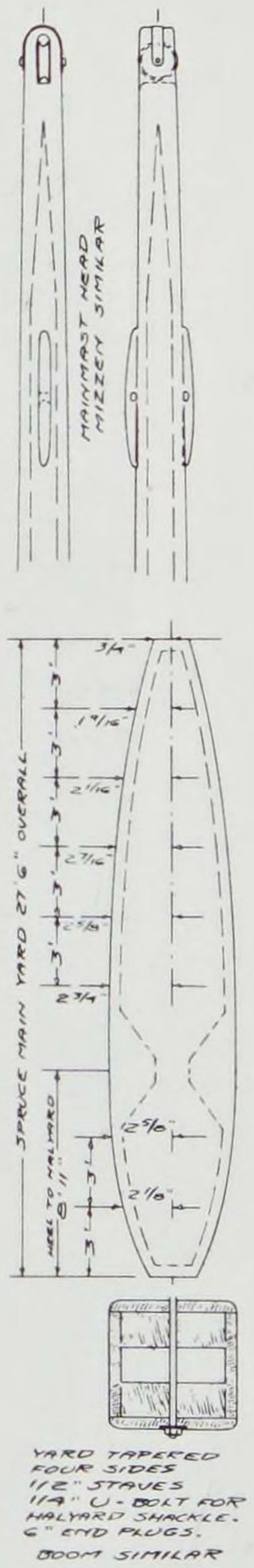
PART	NO.	LOCATION	TYPE	SHEAVE DIAMETER
MAIN HALYARD	1	MASTHEAD	SPAR SHEAVE	5"
"	1	DECK	FIXED SHEAVE	3 1/4"
" DOWNHAUL	1	LOWER BATTEN SPAN	SIDE SHACKLE	"
"	1	DECK	FIXED SHEAVE	"
" SHEET	2	BATTEN SPANS	SIDE SHACKLE	"
" "	2	SHEET SPANS	FIDDLE WITH SWIVEL SHACKLE	"
" "	2	TRUNK TOP	SWIVEL DECK PLATE	"
MIZZEN HALYARD	1	MASTHEAD	SPAR SHEAVE	4"
" "	1	YARD EYE	SIDE SHACKLE	3 1/4"
" SHEET	1	BOOM BAIL	FRONT SHACKLE	"
" "	2	BOOMKIN PLATES	SWIVEL DECK PLATE	"

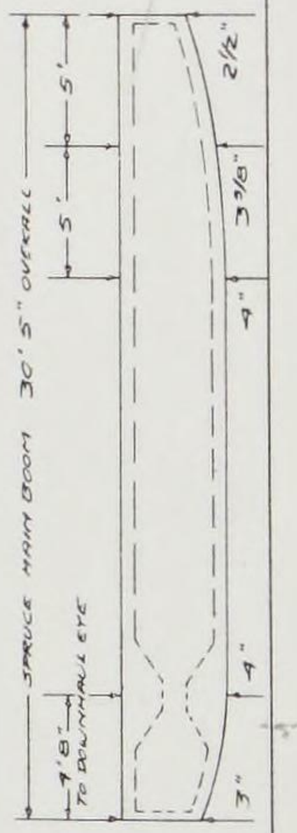
ALL RUNNING RIGGING 1/2" D. DACRON (MAIN HALYARD MAY BE WIRE TAILED OUT WITH ROPE).

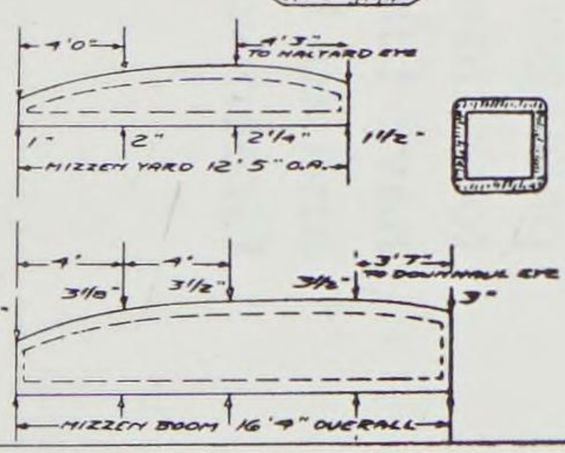












SCALE 1/4" = 1'0"

DESIGN #380
30'0" x 13'0" x 2'9"
for R. W. Greenwood

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

	T	16	15	M	13	12	11	10	9	8	7	6	5	4	3	2	1
TOP OF CAP	8,2,0	8,8,9	8,9,0	8,0,9	7,10,0	7,8,2	7,7,2	7,6,7	7,6,7	7,7,3	7,8,2	7,7,6	7,11,6	8,2,2	8,3,3 / 8,2,6	8,2,6	8,5,0
TOP OF MOLDING 1	8,2,4	7,7,7	7,5,5	7,2,2	6,11,9	6,9,6	6,8,3	6,8,2	6,8,5	6,9,3	6,10,9	7,0,0	7,1,7	7,1,2	7,1,1	7,0,6	8,2,3
BOTTOM OF MOLDING 2	7,0,0	6,7,4	6,3,4	6,0,3	5,10,2	5,8,6	5,8,0	5,7,7	5,8,1	5,8,7	5,10,0	5,11,6	6,1,6	6,1,2	6,1,1	6,0,7	7,1,9
BUTTOCK 5'				4,3,2	3,0,6	2,4,9	1,1,6	1,0,9	1,0,5	1,1,0,6	2,3,0	2,11,0	4,1,0	6,2,9			
4'		6,2,6	4,1,9	3,1,9	2,3,6	1,10,1	1,6,7	1,5,9	1,5,9	1,6,0	1,8,5	2,1,9	2,10,5	4,3,9	6,6,9		
3'	6,3,9	4,1,7	3,6,0	2,6,0	1,10,7	1,6,7	1,4,6	1,3,7	1,3,6	1,4,2	1,5,9	1,8,6	2,2,7	3,2,0	4,10,9	7,6,9	
2'	5,3,0	4,1,0	2,9,6	2,0,2	1,7,4	1,3,0	1,3,5	1,3,0	1,3,0	1,3,4	1,4,2	1,6,0	1,9,6	2,4,6	3,7,0	5,9,6	8,5,0
1'	4,2,2	3,2,1	2,1,4	1,7,4	1,4,6	1,3,5	1,3,1	1,3,0	1,3,0	1,3,0	1,3,4	1,4,2	1,5,4	1,9,0	2,3,0	4,0,4	6,8,0
RABBET	3,0,0	2,4,4	1,7,4	1,4,0	1,3,1	1,3,0	1,3,0	1,3,0	1,3,0	1,3,0	1,3,0	1,3,0	1,3,2	1,3,7	1,6,3	2,3,7	4,3,7
KEEL		0,5,4	0,4,6	0,4,0	0,3,1	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,4,2	0,6,4	0,9,2	1,3,2	3,6,5

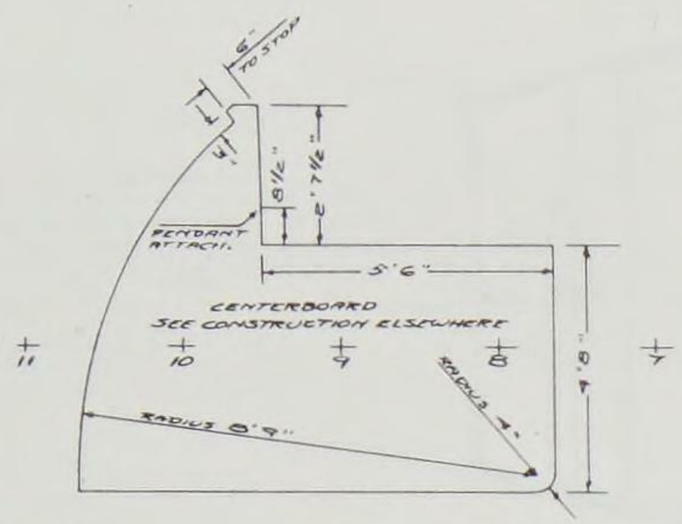
HEIGHTS FROM BASE LINE

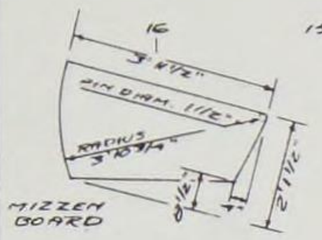
	T	16	15	M	13	12	11	10	9	8	7	6	5	4	3	2	1
CAP	3,4,3	4,2,0	4,0,3	3,5,1	3,10,0	6,1,4	6,4,0	6,5,2	6,5,6	6,5,3	6,4,4	6,3,0	6,0,1	3,7,3	4,3,3 / 3,3,0	3,3,0	2,0,0
MOLDING 1	3,6,5	4,3,2	4,1,0	3,5,1	3,10,0	6,1,4	6,4,0	6,5,2	6,5,6	6,5,3	6,4,4	6,2,4	5,10,6	3,4,4	4,6,0	3,2,4	1,10,4
W.L. 84"	3,4,0	4,3,0	4,1,0	3,5,1	3,10,0	6,1,4	6,4,0	6,5,2	6,5,6	6,5,3	6,4,4	6,2,4	5,10,4	3,3,2	4,2,6	2,8,2	1,1,7
72"	2,8,1	3,0,3	3,10,1	3,5,1	3,10,0	6,1,4	6,4,0	6,5,2	6,5,6	6,5,3	6,4,2	6,1,4	5,8,5	3,11,0	3,8,6	2,1,4	0,8,5
60"	1,7,2	3,0,4	2,5,2	3,3,2	3,7,3	6,1,4	6,4,0	6,5,2	6,5,6	6,5,0	6,3,1	5,11,2	5,5,0	4,5,4	3,1,0	1,6,4	0,4,2
48"	0,10,1	1,11,0	3,7,2	3,10,1	3,6,7	6,0,1	6,3,1	6,4,3	6,4,5	6,3,4	6,1,0	5,7,6	4,11,4	3,7,5	2,4,1	0,11,7	0,1,5
42"	0,5,6	1,4,4	3,0,0	3,5,3	3,4,0	5,10,1	6,2,0	6,3,3	6,3,4	6,2,2	5,11,0	5,4,6	4,7,2	3,4,3	1,11,2	0,8,7	
36"	0,4,1	1,0,7	2,7,5	4,2,1	3,2,0	5,8,7	6,1,1	6,2,4	6,2,5	6,1,2	5,9,6	5,3,0	4,4,6	3,1,4	1,8,5	0,7,4	
30"	0,3,0	0,10,0	2,3,2	3,10,0	4,11,3	5,7,1	5,11,4	6,1,4	6,1,4	6,0,0	5,8,1	5,0,6	4,1,6	2,9,4	1,6,1	0,6,1	
30"		0,4,3	1,6,5	3,0,0	4,3,7	5,2,0	5,7,2	5,10,0	5,10,0	5,8,0	5,3,4	4,6,7	3,5,6	2,2,0	1,1,0	0,3,6	
24"			0,9,6	1,11,4	3,3,4	4,5,0	5,0,5	5,4,0	5,4,1	5,2,0	4,7,4	3,8,6	2,6,1	1,5,0	0,7,7	0,2,0	
KEEL	0,3,0	0,3,0	0,3,0	0,3,4	0,4,3	0,5,2	0,5,2	0,5,2	0,5,2	0,5,2	0,5,2	0,5,2	0,4,4	0,3,4	0,3,0	0,3,0	0,3,0
	T	16	15	M	13	12	11	10	9	8	7	6	5	4	3	2	1

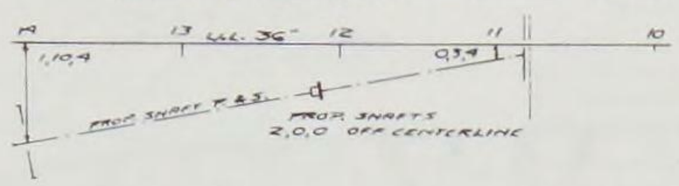
HALF BREADTHS

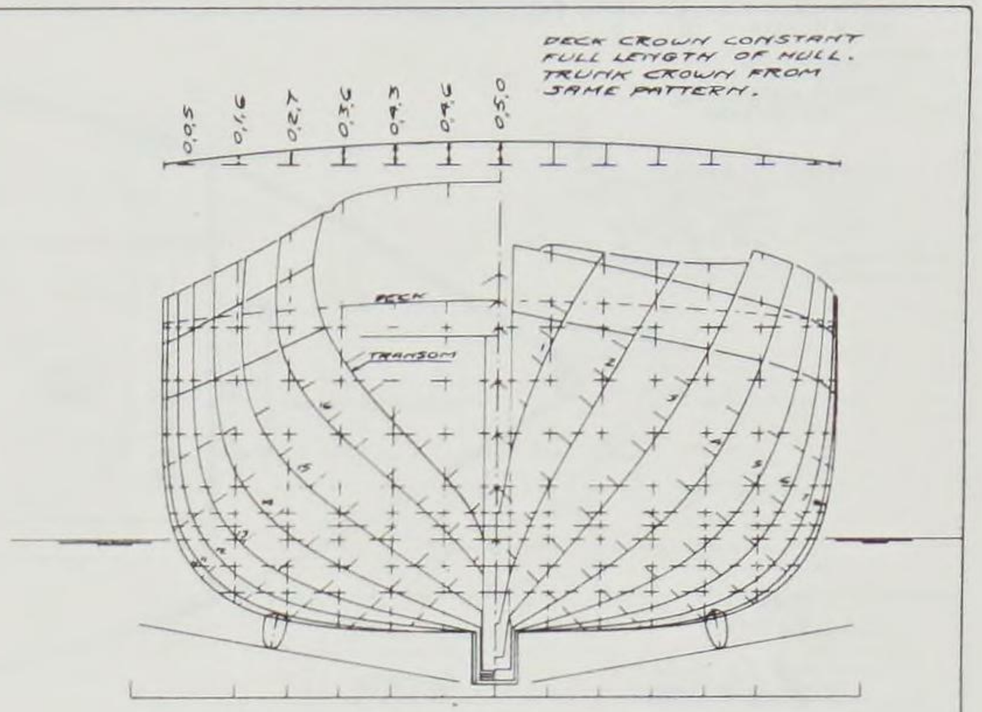
OFFSETS IN FEET, INCHES, & EIGHTHS TO OUTSIDE OF PLANK.

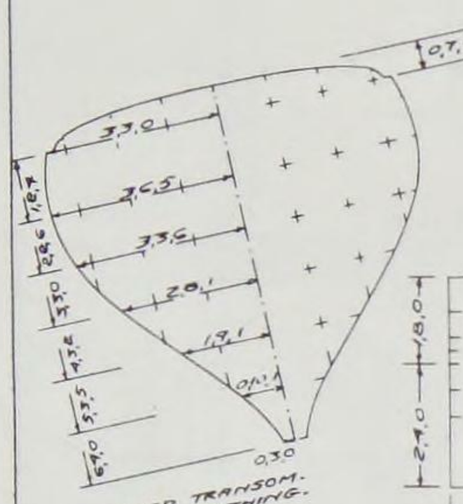
NOTE THAT TRANSOM HEIGHTS ARE IN VERTICAL PLANE, NOT IN PLANE OF TRANSOM.

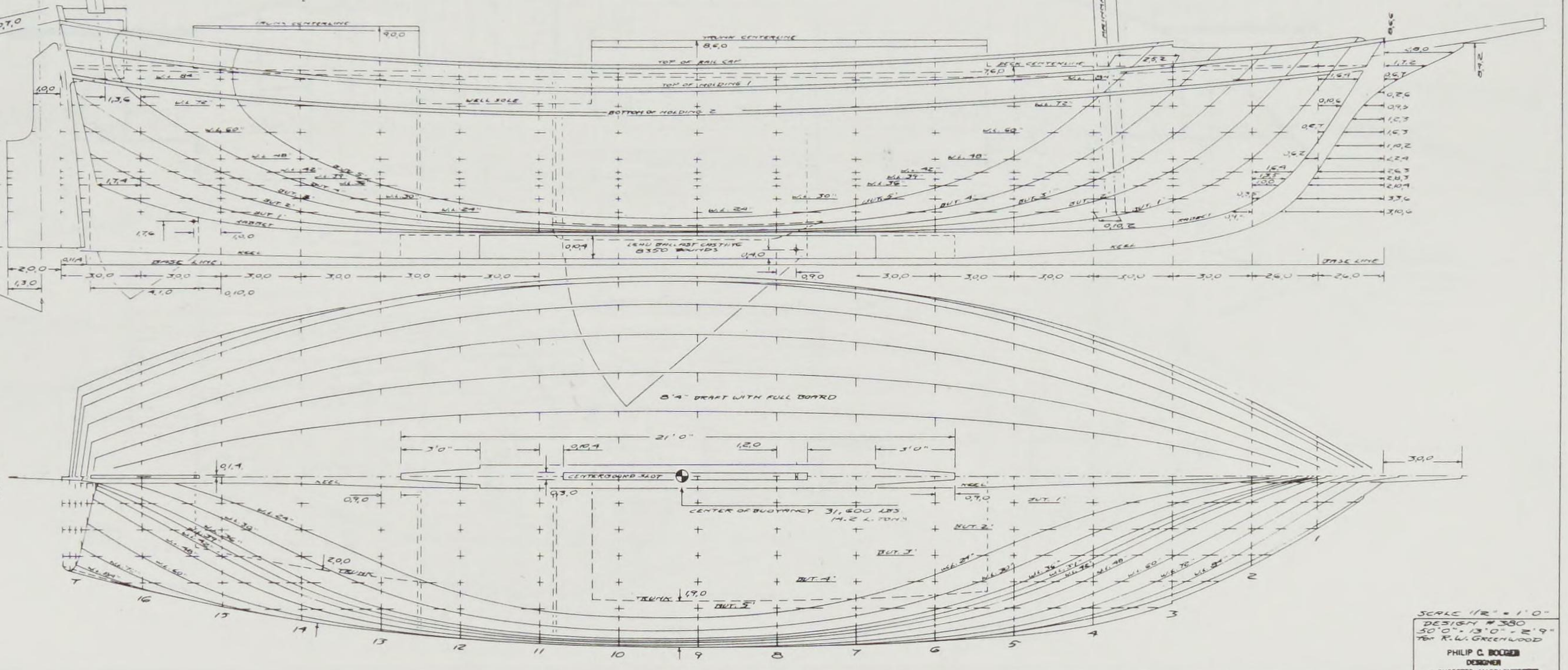












MAIN VENT M.S.

DAVIT DIAGONAL

MAIN HALYARD

MAIN SHEET

TRAVIS PARFAIT HATCH

COAMING SHROUDED FLUSH WITH HATCH

SKYLIGHT

COAMING

DECK SHEAVES

TRAVIS PARFAIT HATCH

BOOM GOOSE NECK & CLEAT

SLIDING HATCH

SEAT

MIRROR PANEL TO ENGINE

SLIDING HATCH

RUNNING STARBOARD M.S.

12'0" x 3'6" SAILING DINGHY

DAVIT

FUEL FILL M.S.

BOOMKIN 9'-1" OVERALL 3" SQUARE AFT, TAPERED TO 2" SQUARE

CHAIN SHUTES

DAVIT STAND'D

TRAIL RAKES FROM BELOW

LOUVERS

SKYLIGHT

REMOVABLE CRADLE

ORIGINAL WATER TANK 1'6" x 2'0" x 3'9" = 93 GALL. APPROX.

BAT ROLLER & BUTTOCK

6350 POUNDS LEAD BALLAST

T. HOWE SHAFTS SPECIAL BRONZE STRUTS

17" DIAM. x 18" PITCH TWO-BLADE FEATHERING PROPS

CONSULT EDSON CO. FOR STEERING COMPONENTS

FOAM BUOYANCY

SEAT

SHELF

DOUBLE BERTH 6'6" x 4'0"

30" QUAD. PANEL

65 GALLONS DIESEL FUEL

3KW GEN-SET

LISTERDIESEL 40 w/ 2:1 LUBRON GEAR

660 AMP HOUR BATTERY BANK

LISTERDIESEL 40 w/ 2:1 LUBRON GEAR

65 GALLONS DIESEL FUEL

THREE BUNKS RAISE TO DOUBLE

DRESSER

HANGING LOCKER

BERTH

TRANSOM

ALCOVE

DRESSER

MIDSHIPS

50" x 76" REMOVABLE TABLE

TRANSOM

CHART TABLE

BERTH

ALCOVE

FOAM BUOYANCY

SHELVES

WORK BENCH

FOAM BUOYANCY

FOAM BUOYANCY

DOUBLE BERTH 1/2 UP

FRESH WATER TANK APPROX. 97 GALS. EACH

SEC. @ F.C.

POSITIVE BUOYANCY

FOR'D OF M.S. - 5700 LBS.
AFT SIDES OF ENGINE ROOM - 2600
IN STERN - 3700
WOOD STRUCTURE - 2000
TOTAL 14,000

SCALE 1/2" = 1'0"

DESIGN #350
30'0" x 13'0" x 6'4"
AFT KELP GREENLINER

PHILIP C. WOLTER
DESIGNER
GLOUCESTER, MASSACHUSETTS

DECK PLAN
INBOARD ARRANGEMENT

FOAM BUOYANCY - KEEP AIR CIRCULATION CLEAR AS SHOWN

SEC. @ #15 LOOKING AFT

SEC. @ #19 LOOKING FOR'D

ENLARGED FUEL TANK 87 GALLONS

SEC. @ #12 LOOKING FOR'D

SEC. @ #9 LOOKING AFT

SEC. @ #5 LOOKING FOR'D

SEE AFTERBODY SECTIONS SHEET

BEARING BATTENS

STOP BLOCK

1 1/2" DIAMETER

COAT COLLAR 1 1/2" I.S. DIAM. (ALLOW ABOUT 1/8" CLEARANCE FOR MAST; NO WEDGES)

PARTNER BEAM 1 1/2" x 7 1/2"

SEC. @ #9

CENTERBOARD (SEE FOREBODY SECTIONS)

BOARD SEPARATES INTO THREE SECTIONS FOR REMOVAL FROM CASE.

CHANNEL DRAINS TO C.B. TRUNK

DECK FRAME

HULL FRAME

STRONG FLOOR 3 DEEP 5 1/2"

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

FRAME LOCATION APPROXIMATE

SEE CONSTRUCTION SECTIONS

ARRANGEMENT SECTIONS MAIN FRAME

SCALE 1/2" = 1'0"

DESIGN # 350
50'0" x 13'0" x 2'9"
for R.W. GREENWOOD

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

PHILIP L. BOLGER
DESIGNER
CONCORD, MASSACHUSETTS

DESIGN # 380
20' L.W.L. x 8'9"
Yar Ft. w/ CENTERBOARD

SCALE 1/2" = 1'-0"

OUTBOARD BOLTS FROM BULK-HEADS TO FLOOR TIMBERS BORED OVERSIZE TO ALLOW BOLTHEAD TO SWELL & SHRINK IN UNISON WITH PLANKING.

ENGINE BEDS SCARFED FROM 3 1/2" x 5 1/2"

10'1/2" AFT
1'4" FOR'D
2'0"

MONEL FUEL TANK P. & S. 3'0" FORE & AFT

2'1" FOR'D
1'7 1/2" AFT

3" I.D. EXHAUST P & S.

WET EXHAUST EXPANSION CHAMBER

BUOYANCY BLOCK P. & S. ABOUT 22 CUBIC FEET EACH - 2600 LBS. TOTAL BUOYANCY.

2'2"

LAMINATED GALLOWS
AWNING - SPRAY HOOD STOWS ON TOP.

AFTERBODY CONSTRUCTION SECTIONS

SECTION @ #11
LOOKING FORWARD

SEE FOREBODY SECTIONS FOR GENERAL SCANTLINGS

SECTION @ #13
LOOKING AFT

SECTION @ #1C
LOOKING AFT

HEEL PINTLE

RUDDER SECTIONS
A-A
END PLATE 1/4" BRONZE

1/8" CHEEK PLATES
SOFTWOOD BLADE

STCP
B-B

1 1/2" DIAM. STOCK
C-C

MIZZEN CENTERBOARD 3/8" BRONZE PLATE 1 PATHONT BROUGHT UP OUTSIDE TRANSOM.

SHEATHING IN ACCOMODATION AREAS ONLY

BUOYANCY FOAM LIES ON BENT FRAMES AND OUGHT NOT TO TOUCH PLANKING OR DECK ANYWHERE.

TOP MAIN BRACKET

MIZZEN PART NEW ROOM 3/4" x 3" x 2'7" 3/8" BOLTS
PARTNER WEB WELDED TO FIN 15" 1/2"

CENTERBOARD SECTIONS

3" SEC. B-B

1/4" BRONZE PLATE

1 1/8" WOOD SHEATHING

CENTERBOARD COMES APART IN THREE SECTIONS TO REMOVE THROUGH TOP OF CASE.

SEC. A-A

JOINT IN BRONZE CORE PLATE

SEE MAIN FRAME SHEET FOR GENERAL LAYOUT.

1/16" x 2" BRONZE STRAPS WITH SPECIAL FLAT-HEAD THROUGH TAP BOLTS.

2 1/2"

DRAIN AT CORNERS

SKYLIGHT

SCUPPER P. & S.

SECTION A-A

2" O.D. PIPE

CHAIN CHUTE SHEATHED WITH STAINLESS STEEL

6"

BOWSPRIT 11'4" OVERALL

CATHEAD ABOUT 4'

DECORATIVE CAP DESIGN TO CARVER'S IDEA

IDEAL ELECTRIC CAPSTAN 1000-LB. CAPACITY; DECK BOX SHROUDS MOTOR.

TRANSPARENT HATCHES, SKYLIGHT, & TOPSIDE WINDOWS 3/8" LEXAN

1'9"

WINDOWS 3/8" LEXAN

MAINTAIN CLEAR AIR FLOW BEHIND SHEATHING

RANGE IN GIMBALS

SOLE 3/4" PLYWOOD

AIR OPENING

BILGE SKIDS FROM 5" x ABOUT 9" x 10'3" SECURE WITH STAGGERED LAGS FROM INSIDE.

WEB AT FOR'D END OF CENTERBOARD TRUNK

HEADBLOCKS 3" x 6"

CAP 1 1/2" x 9"

CENTERBOARD TRUNK 1 3/4" x 13/4" STRIPS GLUED & EDGE-NAILED

BATTENS 1 1/2" x 1 1/2"

BRONZE FLANGE ANGLES 1/4" x 5" x 5" x 5"

LOGS 5" x 5 3/4"

FLOOR TIMBERS SIDED 3 1/2" - SEE FRAME PLAN FOR APPROXIMATE SPACING.

TRUNK TOPS SAME AS MAIN DECK

STRINGERS OF DECK & TRUNK TOPS 1 1/4" x 2"

TRUNK SHEATHING 1/4"

REMOVABLE PANELS OVER EVERY BAY OFFSET PORT OR STARB'D AS CONVENIENT

TRANSOM & CUSHION RAISED TO FORM DOUBLE BERTH P. & S.

1/4" BOLTS - BORE OVERSIZE HOLES IN FLOOR TIMBERS TO ALLOW BOLTS TO MOVE WITH PLANKING.

TWENTY-SIX 3/4" BRONZE BALLAST KEEL BOLTS ONE IN EACH FLOOR TIMBER OVER END SCARVES. TWO EACH AS SHOWN THROUGH SQUARE CENTER.

ABOUT 2" EDGE RADIUS SIDES & ENDS

INTERNAL ANGLES COVED OUT

TRUNK SIDES 1 1/2" SPLINED OR GLUED STRIP

CARLINES 1 1/2" x 2 1/2"

MAINMAST PARTNERS FROM 11/2" x 7 1/2" (TO FINISH 1'3") x 3'6 1/2"

DECK DOUBLE 3/8" PLYWOOD FIBERGLASS SHEATHED.

10" x 10" SQ. DECK DUCT P. & S.

OPENING TO CABIN 8" x 29"

VENT WATER TRAP

SQUARE COWL VENT CAN FACE FOUR WAYS

BACKING TIMBER 1 1/2" x 5 1/2" FOR CATHEAD BOLTS

5 1/2" SQUARE CATHEAD P. & S.

RAIL CAP 1 1/2" x 2 1/2"

DRIP MOLDINGS 3/4" x 1 1/2"

CLAMP TO FINISH 1 3/4" x 3 1/2"

CEILING 3/8" CEDAR FASTEN WITH COPPER NAILS

BENT FRAMES 7/8" x 1 1/8" STAGGERED IN ABOUT FOUR-FOOT LENGTHS; AVERAGE SPACING ABOUT 12" (SEE FRAME PLAN)

BULKHEADS VERTICAL-LAY 1 1/2" x 1 1/2" GLUED & EDGE-NAILED STRIPS

SHELL 1 3/4" x 1 3/4" STRIPS, GLUED & EDGE-NAILED WITH 4" GALVANIZED NAILS STAGGERED ON ABOUT 9" CENTERS.

VENT TRAP & DRAIN

MAST HEEL COLLAR 2 1/2" SEE FRAME PLAN FOR SHAPE, & LOCATION OF 3/4" BOLTS.

SEE OFFSETS FOR KEEL SIDING; FRAMING PROFILE FOR GENERAL LAYOUT

SECTION @ #10 LOOKING FORWARD

SECTION @ #7 LOOKING FORWARD

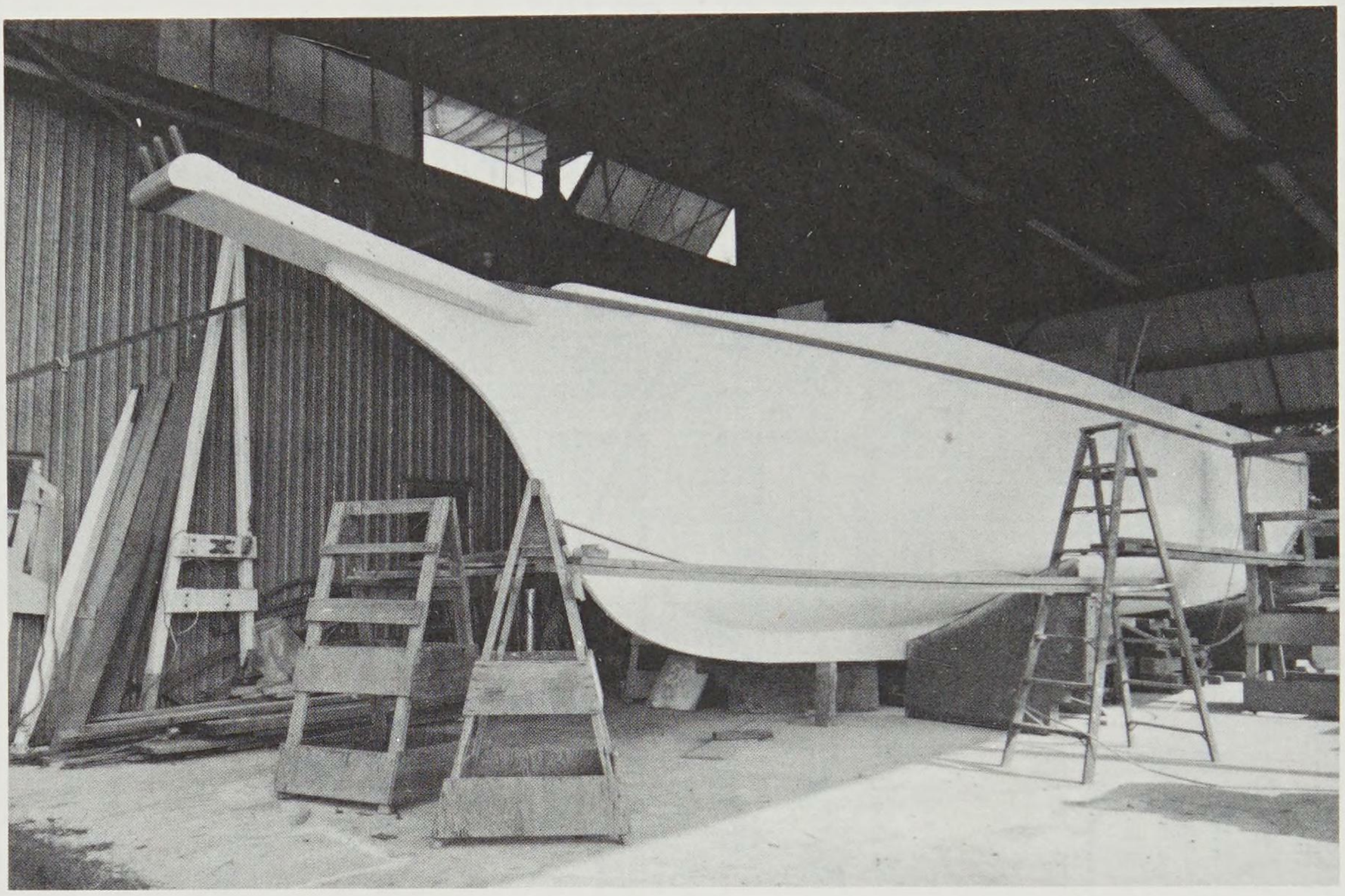
SECTION @ #3 LOOKING FORWARD

FOREBODY CONSTRUCTION SECTIONS

SCALE 1 1/2" = 1'0"

DESIGN #380
30'0" x 13'0" x 2'9"
for P. W. GREENLAND

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



Tonweya *waiting patiently while infinite pains are taken below decks. (Edward Siebert photograph)*

An immense amount of trouble was taken with her layout below and on deck. The cabin is said to be a wonderful display of work in rare woods collected by the owner over many years. The yacht was under construction for more than two years. The basic theme was openness in the main cabin and privacy aft. She is not air-conditioned, so sleeping on deck was an important consideration, one reason for the high bulwarks and rails.

The hull is like several others I've done, although they requested that it be less harsh than most of them, with easy bilges and gentle curves all along. The bilge skids were deleted, since there were no plans to go anywhere with much range of tide. The deep blade on the rudder was also eliminated after other boats of the type proved that the shallow rudder with end plate was adequate in a hull that doesn't raise her stern as she heels due to slack quarters and powerful forebody.

The deck is dead straight along the centerline and constant crown for convenience in construction and layout. The resulting profile of the deck edge isn't very handsome, so it's ignored by the

sheerlines. People either like the looks of these high sterns or they don't, but there's no harm in them, and in this case the owner wanted to be able to clean fish in a sheltered place that would be easier to clean up than the cockpit.

She has twin screws with small propellers far in under the hull — in reaction to my *Resolution*'s bad habit of pitching air into her far-aft, centerline prop at the least excuse.

The builder balked at the hull framing scheme shown and did it differently. I don't usually give an experienced professional much argument in such matters. The rule is: if it leaks, it's the builder's fault, no matter what the plans show; if it doesn't float right, it's the designer's fault, no matter what the builder did. The light staggered framing shown was supposed to give the 1¾-inch juniper strip planking more freedom to come and go than continuous frames allow. The stress can be huge. I've heard of bent frames broken in *tension* by it, and in a motorsailer I once designed with 2-inch mahogany strip planking, you could stick your hand between her rigid web frames and the planking along the turn of the bilge when she was a few years old. The juniper is probably more forgiving, and for that matter, the mahogany boat didn't open up or show any bad consequences of her change of shape.

I'm not overly fond of the Chinese rig, perhaps because I haven't sailed with it and don't like relying on hearsay, but to make a genuine singlehander out of a vessel on the scale of this one, it really seemed the only proven way to go. With a big, powerful winch so the halyard can be single-part, this 14-tonner is handier and less exhausting to sail than plenty of 25-footers. Since the 1,100-square-foot mainsail can be adjusted infinitely in height and area without stopping the boat, I see no reason to cut it up, as is usually done for some reason in Chinese luggers. Two sails would double the number of controlling lines, and two masts would be almost twice as heavy as one, since it's unsafe to assume that the stresses will be distributed evenly between them. Once you go to powered winches, the advantages seem all in favor of reducing the number of lines to be dealt with by a singlehander's one pair of hands and one set of teeth. Granted that single-part lines led to high-powered winches have been known to eat fingers and worse, there are also hazards in boats out of control because the crew couldn't do everything at once in a crisis, or pick up the right piece of gear in the dark.

Chinese lugs aren't usually at all close-winded, I suppose because the sail stands too flat in light airs and develops the wrong kind of draft in a breeze, but the large area that can be controlled

by a weak crew is some compensation. I don't think *Tonweya* is a slug by any means, even disregarding the potential of her propeller location for unobtrusive and effective cheating.

39

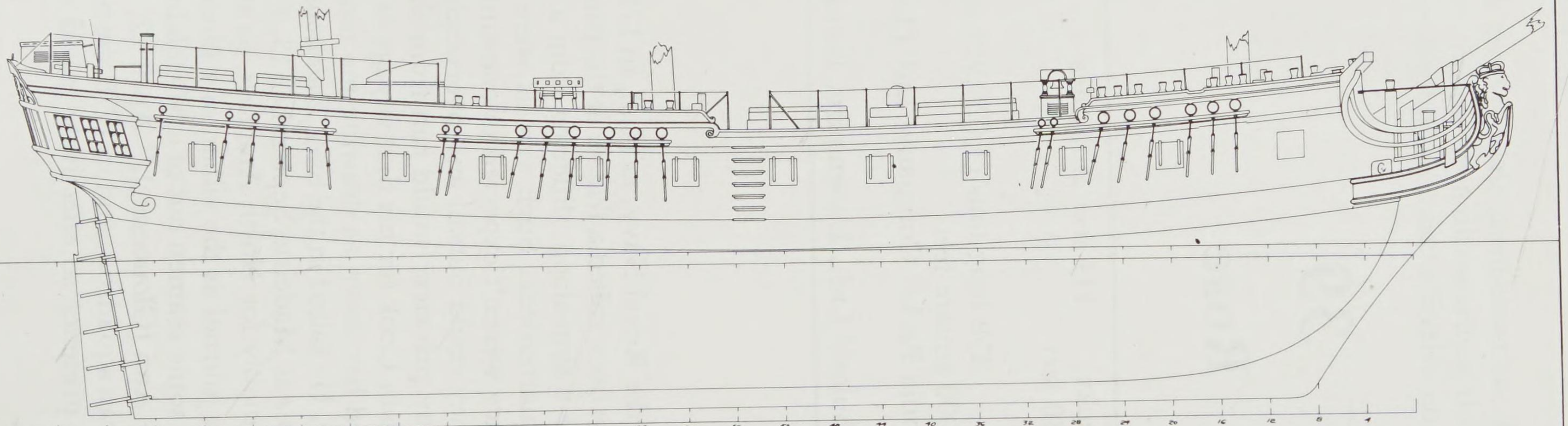
Rose

Length over weather decks 114 feet 10 inches
Breadth (extreme) 30 feet
Draft 12 feet
Designed displacement 458 long tons (1,025,920 pounds)
Sail area (total) 13,000 square feet
Owners The West India Packet Company, Ltd. (John Millar and Associates)
Builders Smith & Rhuland Ltd., Lunenburg, Nova Scotia

H.M.S. *Rose* was built for the Royal Navy, at Hull, in 1751, one of a large class. She may have been called a frigate at the time, but by later nomenclature she was a ship-sloop, differing from a frigate in having no guns on her quarterdeck. Such vessels were used for patrol and escort where they weren't expected to encounter heavy warships of an enemy. They could outsail and overwhelm almost any merchant ship, and any privateer would run from them.

She was offered to Captain Cook for his first voyage of exploration in 1768, but he turned her down as drawing too much water and needing too big a crew. He sailed in the bark *Endeavour,* and his journal records meeting *Rose* at Madeira, September 13, 1768. The next day she sailed, presumably for North America, as she's next heard of in Ashley Bowen's journal as the villain of a bloody brawl as she tried to press (draft) some seamen out of a Marblehead brig, "five leagues SSE of Cape Ann [Gloucester]," April 22, 1769.

She stayed in the American squadron, and in 1776 she turned up in Narragansett Bay. Her presence so effectively ended the ship-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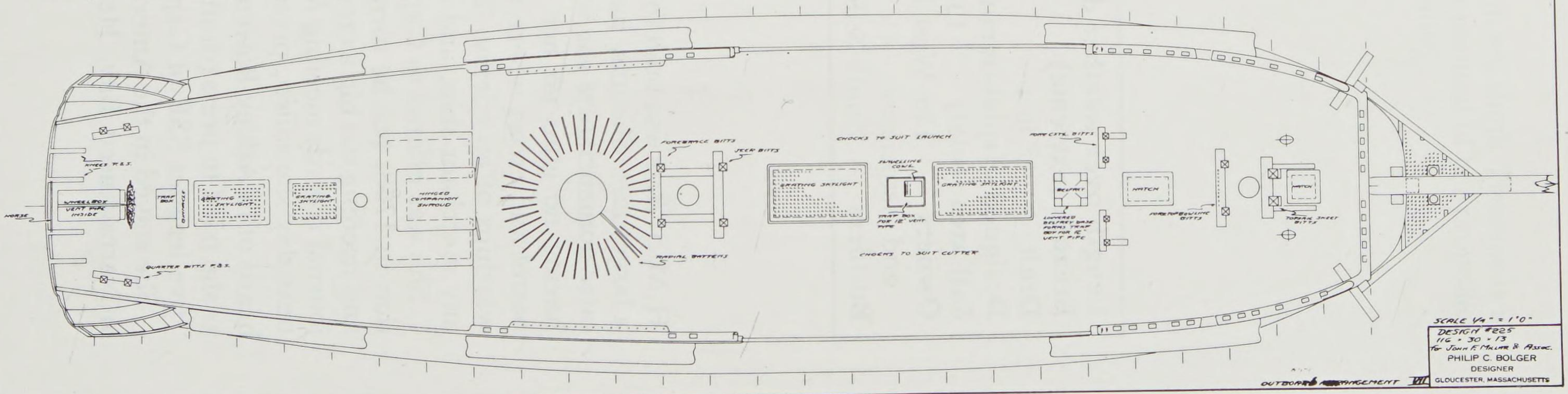
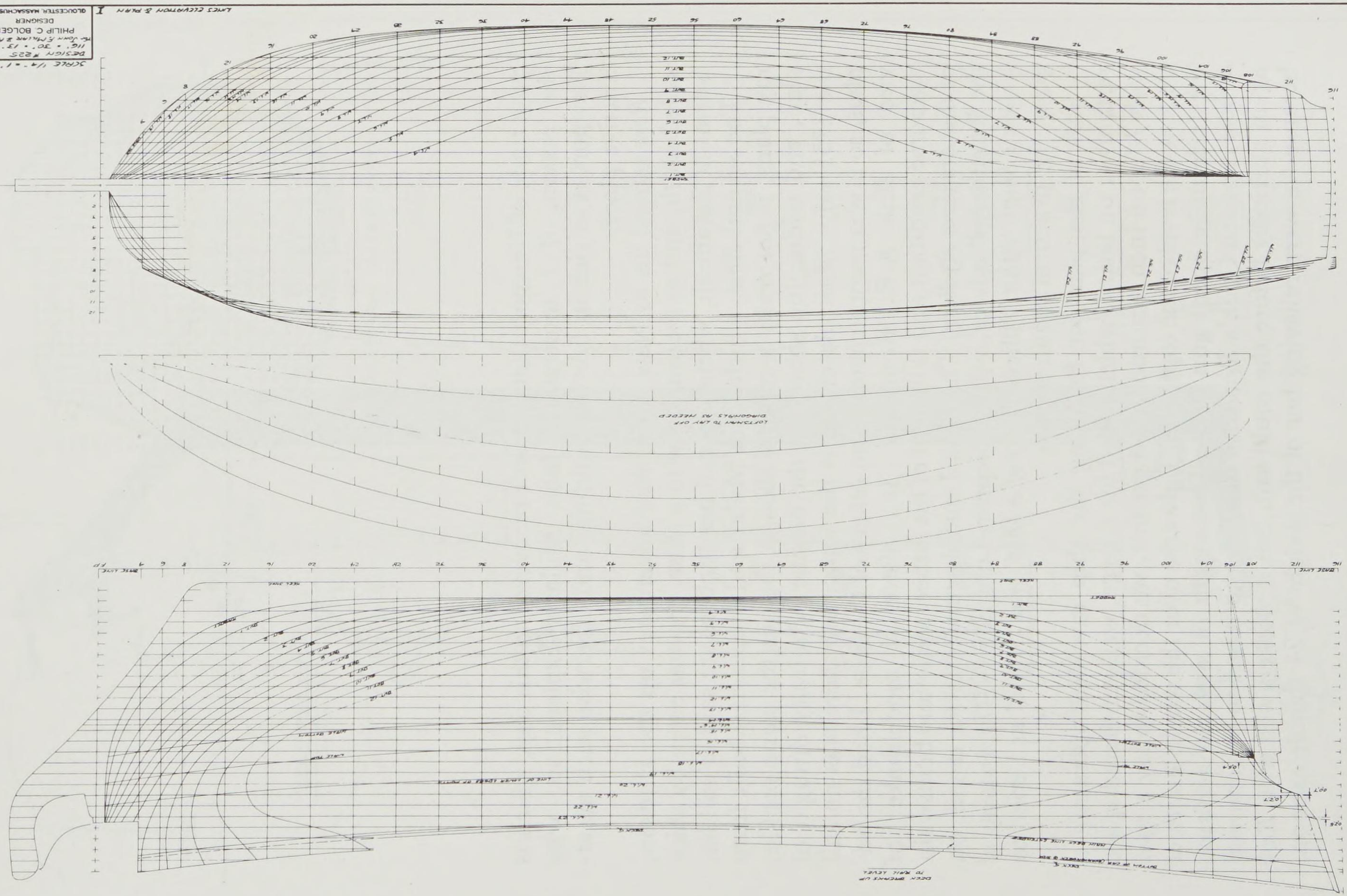

KNEES P.&S.
WHEELBOX
VENT PIPE INSIDE
HORSE
TRAP BOX
SKYLIGHT
GRATING SKYLIGHT
GRATING SKYLIGHT
HINGED COMPANION HATCH
QUARTER BITTS P.&S.
FOREMAST BITTS
JEER BITTS
RADIAL BATTENS
CHOCKS TO SUIT LAUNCH
SKYLLINE COWL
TRAP BOX FOR 12" VENT PIPE
GRATING SKYLIGHT
CHOCKS TO SUIT CUTTER
BOOM CLEAT BITTS
BELFRY
LOWERED BELFREY BASE FORMS TRAP DOOR FOR 6" VENT PIPE
HATCH
FORE TOPGALLANT BITTS
HATCH
TOPMAST JAUNT BITTS
SCALE 1/4" = 1'-0"
DESIGN #225
116 x 30 x 13
for John F. Muller & Assoc.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS
OUTBOARD ARRANGEMENT
VII

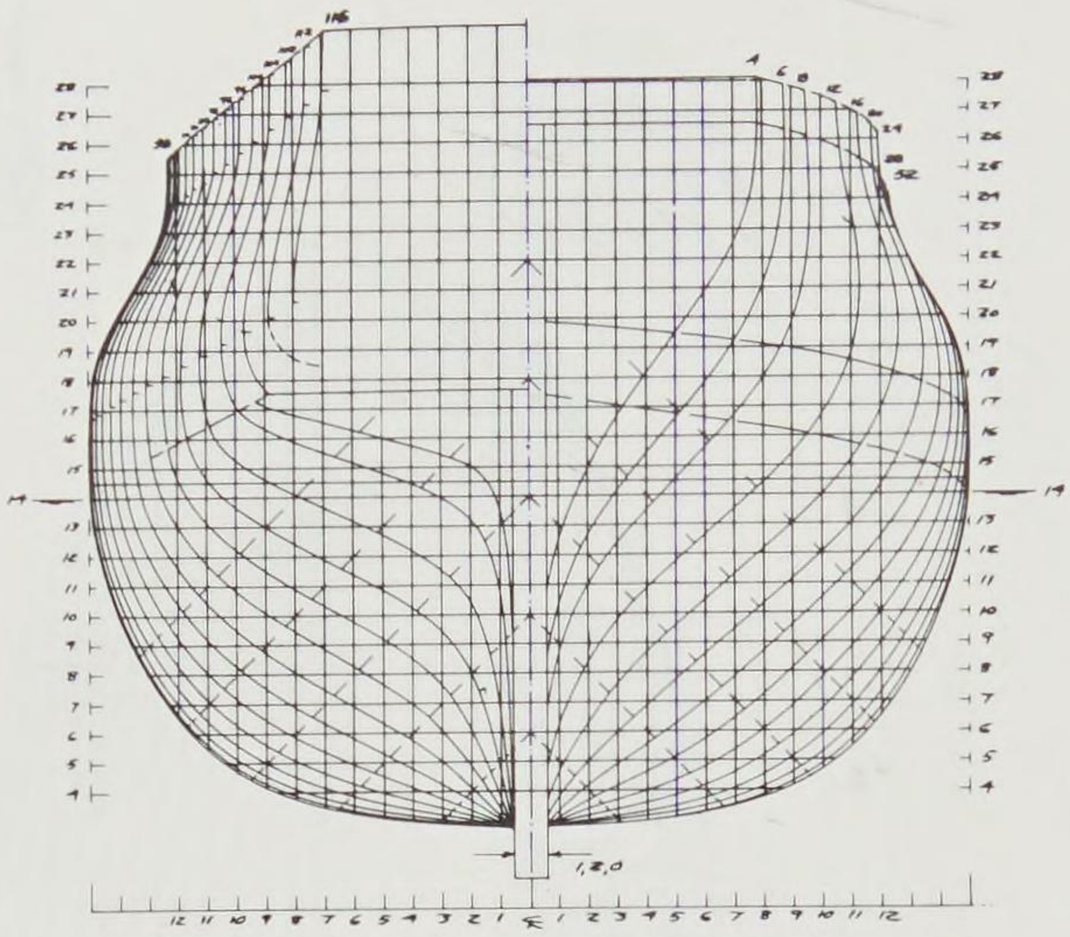
DESIGN #225
LOA. 30'. 13'.
Re. Down Finisher & Rigging.

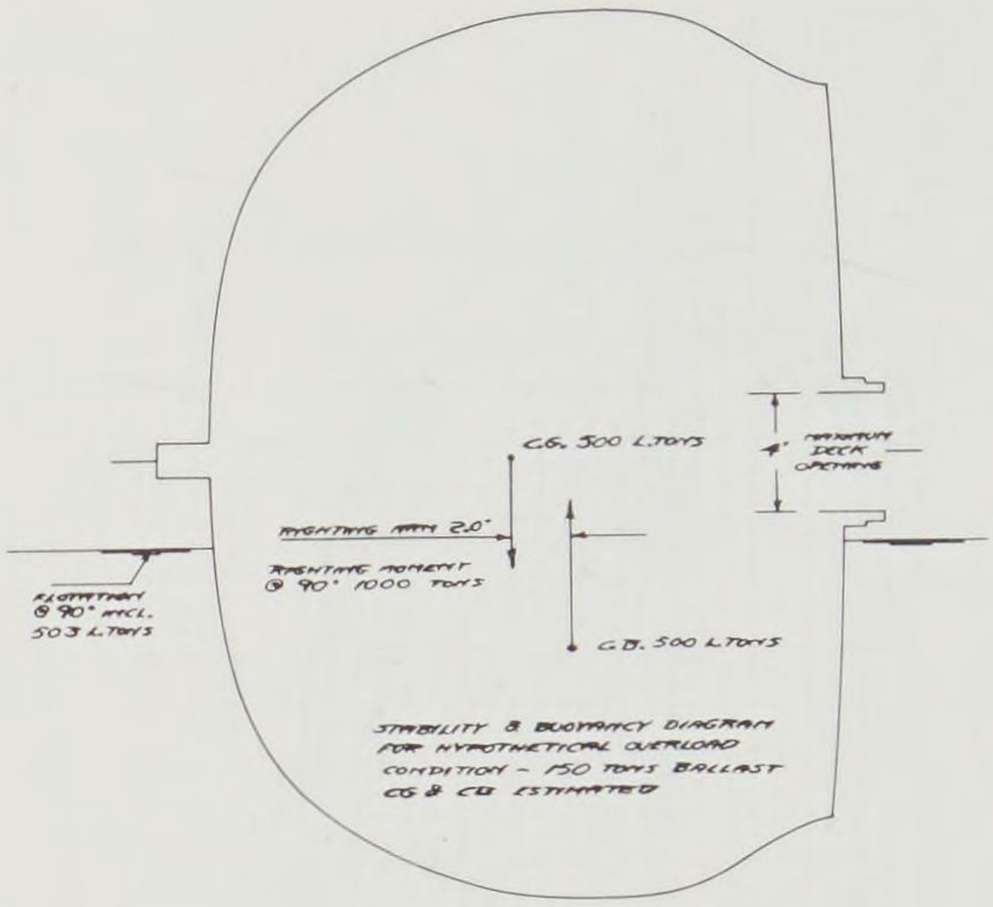
PHILIP C BOLGER
DESIGNER

GLOUCESTER MASSACHUSETTS

SCALE 1/4" = 1'0"







ping trade of Newport that it hasn't recovered to this day, which is the reason, if I understood John Millar's explanation, why Newport is so rich in fine old buildings and otherwise such an attractive place.

Rose moved on to New York, had adventures up the Hudson, sailed south, and as the war drew to a close, she was eaten by shipworms at Savannah, where some of her timbers are said to still lie.

The second *Rose,* which John Millar and others had built from my plans, is not really a replica, though she has the same profile, plan, and midsection shown on the outline Admiralty draught of the 1751 ship. Mast placement is the same, but there was no sail plan, so it was reconstructed from others of the time. I had the advice of Erik A.R. Ronnberg, Jr., historical modelmaker of awesome erudition and skill, and of his father, sometime boatswain of the *Abraham Rydberg.* The book I mainly turned to for detail, on the Ronnbergs' advice, was C. Nepean Longridge's *The Anatomy of Nelson's Ships.* Alan Villiers' *Way of a Ship* was helpful as I tried to grasp the practical requirements.

Part of the plan for financing the ship involved operating a restaurant on board, which called for a large, well-ventilated space with 7-foot 6-inch headroom. To get this, we decided to lay a spar deck at the level of the tops of the bulwarks over the whole length of the (originally open) gun deck. The weight of such an addition almost capsized Cook's *Resolution* in 1772 and it had to be removed again hurriedly before she could sail, but it worked well with *Rose* because we were relieving her of the weight of 24 sizable cannon,

W.L. 19
W.L. 13

W.L. 19'
W.L. 13'

SEATS P & S.

SLIDE DOOR

GALLEY

RUDDER BOX

GRATING

GRATING

CAPSTAN

GRATING

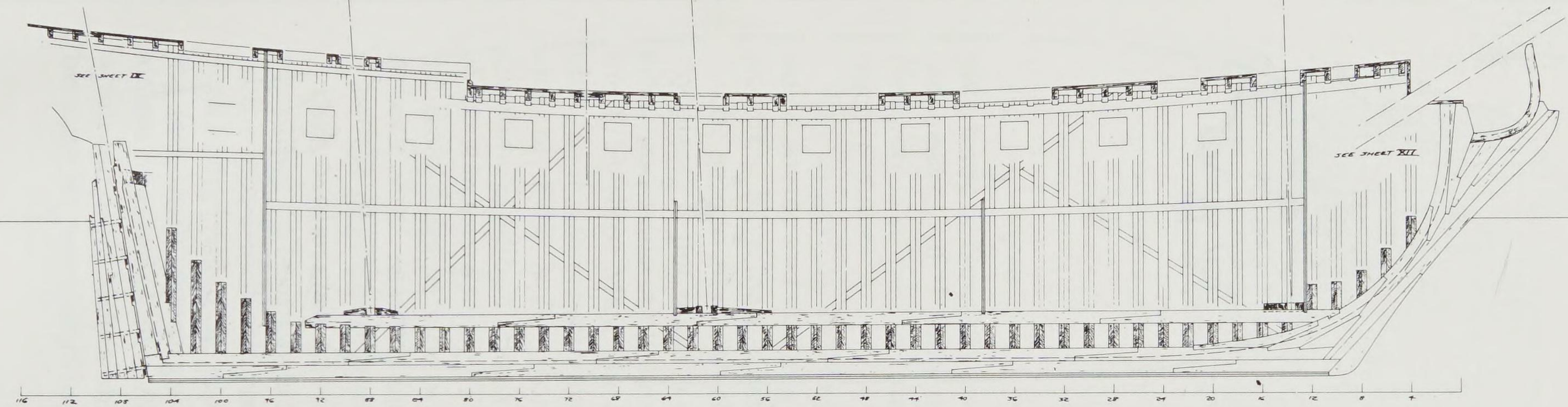
GRATING

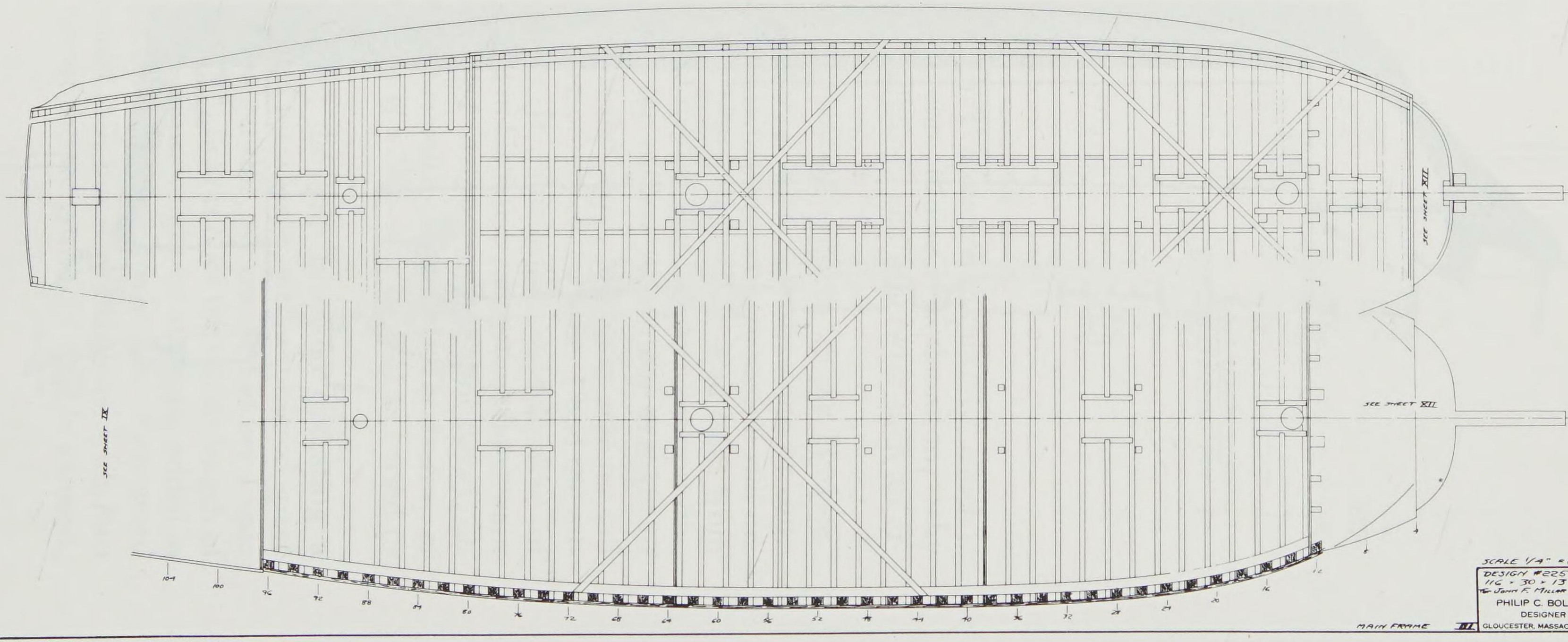
SCALE 1/4" = 1'-0"

DESIGN #825
HG - 30 - 13
for JOHN F. MALONE & ASSOC.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

VI

HYBOARD ARRANGEMENT

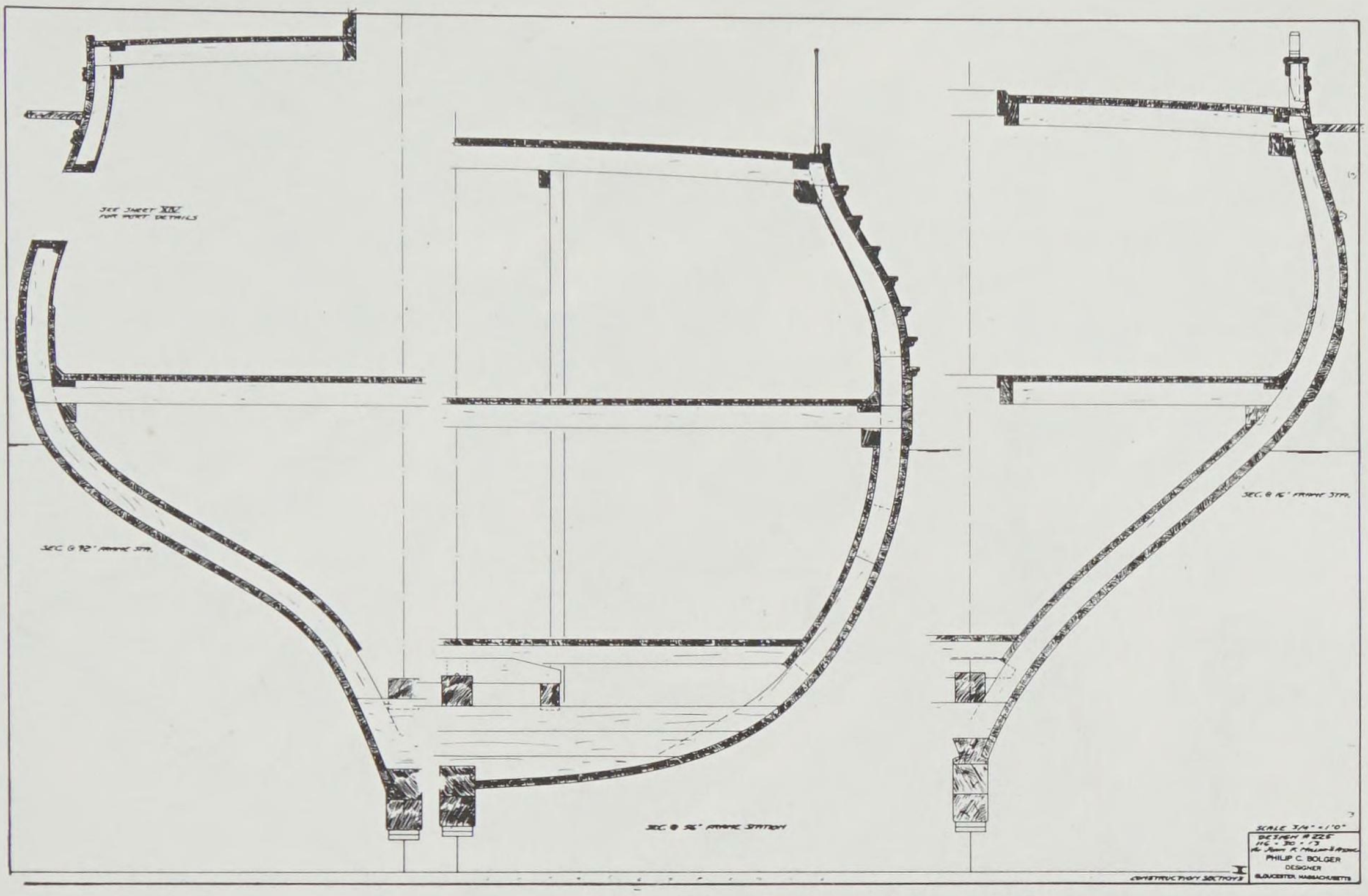




SCALE 1/4" = 1'0"

DESIGN #225
116 × 30 × 13
for JOHN F. MILLER & ASSOC.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS



which, plus large weights of supplies, plus the benefit of somewhat lighter construction, was replaced by about 110 tons of steel and concrete cast into her bilge. With that ballast and the new high deck, her range of stability came well into the modern yacht class, as long as the gunports were closed and the quarter gallery windows didn't cave in. The concrete also reassured us that she wouldn't readily hog or sag, and it is a good preventive of rot.

Since we had to make so many changes and were really building a stage set rather than anything of historical significance in a technical sense, I suggested mounting the 18th-century upperworks on a much shallower underbody, one that would be more flexible in berthing and less trouble to maintain. This was turned down, but it was probably a good idea that would have saved some grief later.

I was allowed to design the underbody with a shorter run and longer entrance than the original ship, as the difference wasn't obvious to a casual eye. I argued that she would sail better, especially on the wind. I don't agree with those who think the stern of a vessel should go faster than the bow; I think it's better to have the bow the faster end. However that may be, *Rose* sails and handles well, benefited by not having to drag any propellers. Her balance seems to be good under normal sail combinations, and the little rudder is

Rose *displays most of her fine suit of Hood sails. (Edwin Hills photograph)*

adequate, although it has always been stiff, having too many gudgeons to ever expect to get them all perfectly aligned. When I'm not constrained by historical realism, I try to keep the number of rudder bearings to a minimum, preferably just one at each end.

The Lunenburgers made a fine job of her, in my judgment. All of the plans were on only 25 sheets (six months' work for me), so the builders had to fill in a lot from their experience. She was the last major vessel built there, and as far as I know, the last vessel of her size built anywhere by traditional wooden construction methods. Her frame is of Nova Scotia maple; the fore and main lower masts are steel tubes (26 inches in diameter); all else is Douglas fir from British Columbia. She's treenail-fastened. The

side strapping shown on the framing profile was eliminated to save the expense of having to dub all the frames before starting to plank her. She seems to have enough rigidity without it.

I had my leg pulled a good deal because on *Rose*'s first public appearance, she lost her main topgallant mast very publicly as she was beating into Boston in a fresh breeze. It happened because the new rigging stretched faster than her scratch crew could set it up, but the incident illustrates the fail-safe quality of this rig, something that hasn't had as much attention as it deserves lately. I kept track, reading Captain Cook's journal of his three-year world cruise in *Resolution,* and he lost seven topgallant masts in that time. Two lines appeared in the log for each — one when it broke, and one, usually the next day, when they sent the new one aloft. Quite a contrast with what happens when a terminal lets go in a modern rig and everything above the deck disintegrates.

The standing rigging is slightly simplified from the original. It's wire instead of hemp (I find it wryly amusing that raising marijuana, *Cannabis sativa,* hemp, used to be government-subsidized as a defense industry), and we didn't need redundancy for battle damage. The geometry remains the same: if the diagram can be made out on the standing rigging sheet, you can see how each shroud and stay is plotted in the plane of each yard to check that all the yards can be braced to the same angle without fouling the rigging.

The running rigging of square-riggers always tended to be changed around with every change of masters. There's a wide choice of unsatisfactory leads, some worse than others. To the best of my knowledge, there's no good way of doing it. There are too many leads to the mizzen topmast head here. The main topsail and topgallant braces were soon shifted to the foremast and fore topmast caps, respectively. But it all worked after a fashion. Deliver me from being responsible for it in bad weather!

When I showed the plans to Howard Chapelle, he was scornful and called her "another non-replica." He was in an evil temper at the time, being embroiled in the dispute about the *Constellation* restoration — or vandalism, depending on how you feel about it. For what my opinion is worth, I agree with Chap. From his standpoint as a scholar, he was, of course, right about the *Rose.* I don't see how any case can be made for something like this except as entertainment. But that's quite an exception.

KEY TO STANDING RIGGING

Lower rigging all one-inch-diameter galvanized 6 x 7 wire.

1. Bowsprit shrouds (two): loop around bowsprit end; heart and eye shackle to hull side fittings. (80')

2. Forestay: hearts, one open, one closed, to bowsprit collar; seized loop over foremasthead; doubled full length. (92')

3. Mainstay: eye and shackle to foremast band; seized loop over mainmasthead; doubled full length. (136')

4. Mizzenstay: eye and shackle to mainmast band; seized eye over mizzenmasthead. (55')

5. Forelower shrouds (12): in pairs with both ends on same side of hull; 10-inch (at builder's option, 8'') deadeyes at channels; up, loop round masthead, seize, and down to next deadeye; alternate loops port and starboard; average length each pair of shrouds about 108'. (650')

6. Main lower shrouds: same arrangement as fore. (670')

Total 1'' wire, say, 1,700'; all lengths approximate.

7. Bobstays (two): one-inch (heavier if readily available) galvanized chain; about 40' required. See Sheet XX for sketch of stem fitting and bowsprit tangs; fit stem straps with bowsprit in place and weighted for gammoning for permanent adjustment of tension; shackle both ends; no lanyards or turnbuckles.

8. Martingale: jibboom end under dolphin striker; heart and eye to bowsprit collar; lanyards pass each side of outer bobstay and are seized to the bobstay when set up. (⅝'' x 33')

9. Jibboom guys (two): jibboom end over spritsail yardarms to hearts and eyes, or deadeyes, on headrails. (⅝'' or ½'' x 140')

10. Foretopmast stay: heart and eye on bowsprit collar to foretopmasthead. (¾'' x 80')

11. Foretopgallant stay: heart and eye on jibboom end to foretopgallant masthead. (⅝'' x 94')

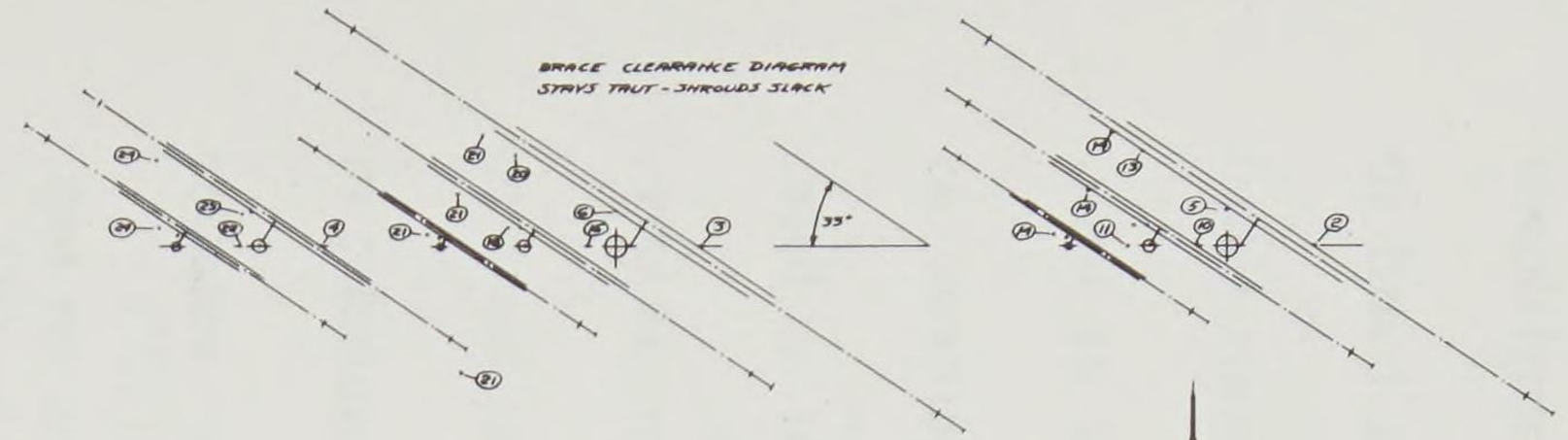
12. Foretopmast shrouds (four): about 6'' deadeyes on top, up, loop round topmasthead, seize, and down same side. (¾'' x 160')

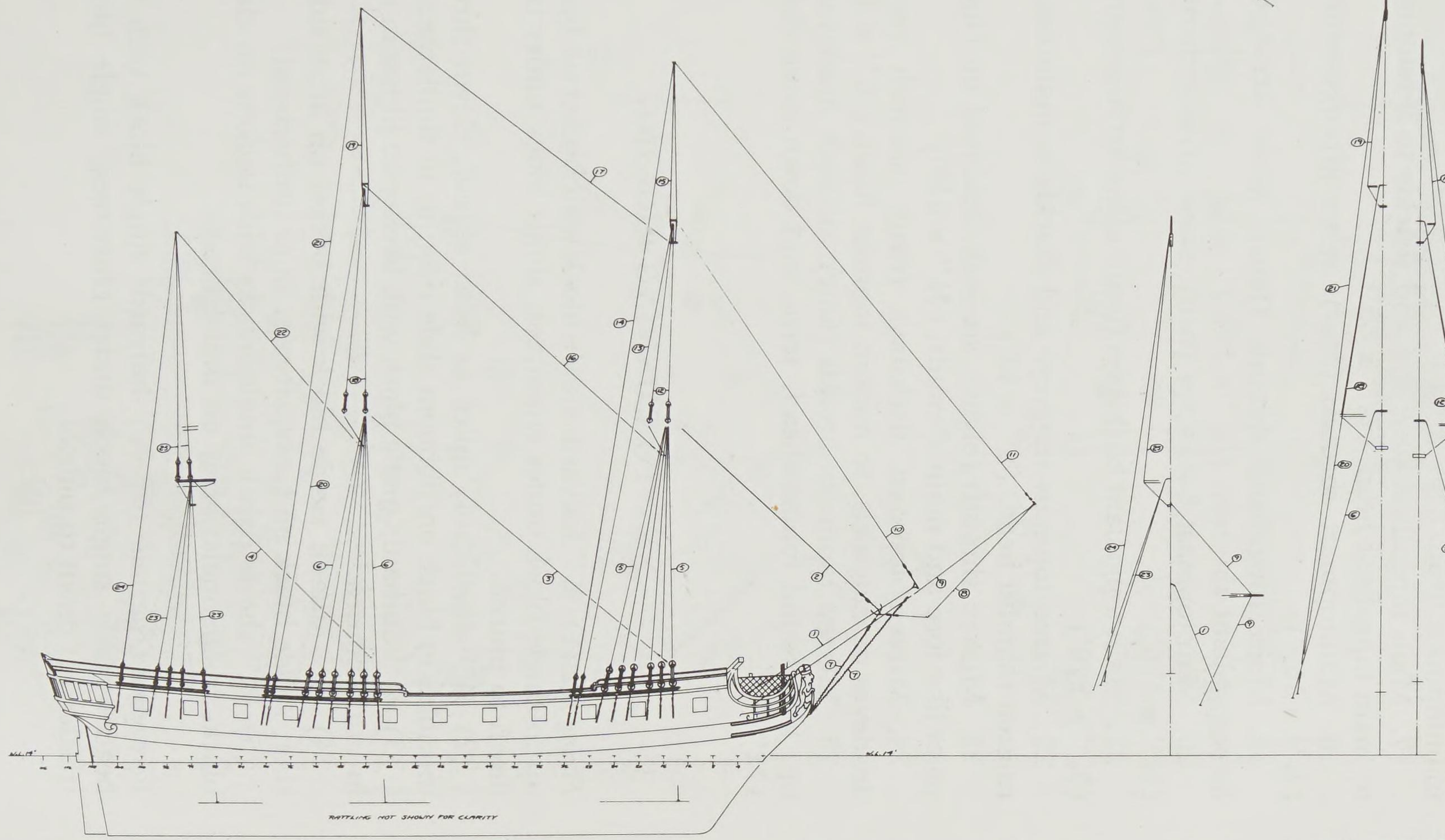
13. Foretopmast backstays (two): about 6'' deadeyes on channels to loops over topmasthead. (⅝'' x 160')

14. Foretopgallant backstays (two): about 6'' deadeyes on channels to loops over topgallant masthead. (⅝'' x 208')

15. Foretopgallant shrouds (four): six-inch (or smaller) deadeyes

BRACE CLEARANCE DIAGRAM
STAYS TAUT - SHROUDS SLACK





SCALE 1/8" = 1'0"

DESIGN #E25
116 - 30 - 13
For John F. Millar & Assoc.

PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

STANDING RIGGING XXI

on crosstrees, up, loop round topgallant masthead, seize, and down same side. (½'' x 128')

16. Maintopmast stay: eye and shackle on foremast band to maintopmast head. (¾'' x 68')

17. Main topgallant stay: eye and shackle to foretopmast band to main topgallant head. (¾'' x 65')

18. Maintopmast shrouds (four): same arrangement as fore. (¾'' x 160')

19. Main topgallant shrouds (four): same arrangement as foretopgallant shrouds. (½'' x 136')

20. Maintopmast backstays (two): same arrangement as fore. (¾'' x 176')

21. Main topgallant backstays (two): same arrangement as fore. (¾'' x 228')

22. Mizzen topmast stay: eye and shackle to mainmast band to mizzen topmast head. (⅝'' x 48')

23. Mizzen shrouds (eight): six-inch deadeyes on channels; in pairs like fore and main shrouds. (¾'' x 640')

24. Mizzen topmast backstays (two): six-inch (or smaller deadeyes on channels, to mizzen topmast head. (¾'' x 152')

25. Mizzen topmast shrouds (four): six-inch deadeyes on top, up, loop round topmasthead, seize, and down same side. (⅝'' x 172')

KEY TO RUNNING RIGGING

Flying jib: (1) ¾'' halyard: single block with becket on head of sail; up to single block under crosstrees; single block under trestletree; down to pinrail.

(2) ½'' downhaul: splice to head of sail, down through two thimbles to block on jibboom slide ring; in to timberhead.

(3) ¾'' outhaul: single block with becket on jibboom slide ring; in to timberhead.

(4) ¾'' inhaul: single block with becket on after side of slide ring; single block on bowsprit cap; in to timberhead.

(5) ¾'' sheets (two): single blocks with beckets on clew; single blocks in channels; belay on timberheads.

Foretopmast staysail: (6) ¾'' halyard: single block with becket on head of sail; single block under crosstrees; single block under trestletree; down to pinrail.

MIZZEN TOPSAIL SHEETS ETC. OMITTED

YARDS PROJECTED BRACED 33°

MAINMAST LOOKING AFT

JACKSTAYS OMITTED

FOREMAST LOOKING FORWARD

SCALE 1/8" = 1'0"

DESIGN #225
116 - 30 - 13
FOR JOHN F. MALEAR & ASSOC.
PHILIP C. BOLGER
DESIGNER
GLOUCESTER, MASSACHUSETTS

RUNNING RIGGING XXII

(7) ½'' downhaul: splice to head of sail; down through one thimble to block on bowsprit; in to timberhead.

Tack: lash to heart.

(8) ¾'' sheets (two): single blocks with beckets on clew; single blocks on deck port and starboard; belay on timberheads.

Forestaysail: (9) ¾'' halyard: single block with becket on head of sail; single block under foretop; another single block under foretop; down to pinrail.

(10) ½'' downhaul: splice to head of sail; down through thimble to block on bowsprit; in to timberhead.

Tack: lash to heart.

(11) ¾'' sheets (two): single blocks with beckets on clew; single deck block port and starboard; belay to timberhead.

Mainstaysail: (12) ¾'' halyard: single block with becket on head of sail; single block for purchase under main top; single block for fall under main top; down to pinrail.

(13) ½'' downhaul: splice to head of sail; down through two thimbles to foretopbowline bitts pinrail.

Tack: lash to mast band.

(14) ¾'' sheets (two): single blocks with beckets on clew; single deck block port and starboard; belay to cleat on deck.

Main topmast staysail: (15) ¾'' halyard: single block with becket on head of sail; two single blocks, one each side under crosstrees, down to main shrouds pinrail.

(16) ½'' downhaul: splice to head of sail; down through two thimbles to block on foremast band; down to foretopbowline bitts rail.

(17) ½'' tack line: belay on foretopbowline bitts rail

(18) ¾'' sheets (two): single blocks with beckets on clew; single blocks on forward end of main channels, each side; belay on rail.

Main topgallant staysail: (19) ¾'' halyard: single block with becket on head of sail; single block slung from main topgallant masthead; cheek block alongside main topgallant masthead; down to forebrace bitts.

(20) ½'' downhaul: splice to head of sail; down through two thimbles to block on topmast band; down to pinrail.

(21) ½'' tack line: belay in foretop.

(22) ¾'' sheets (two): single blocks with beckets on clew; single blocks on main channels, each side; belay on rail.

Mizzen staysail: (23) ¾'' halyard: single part, over single block under mizzen top and down to cleat on mizzen channel.

(24) ½'' downhaul: head of sail through thimble; belay on mast band.

Tack: lash to band.

(25) ¾'' sheets (two): single blocks with beckets on clew; single deck block port and starboard; belay to cleats on deck.

Mizzen topmast staysail: (26) ¾'' halyard: single block with becket on head of sail; single block slung on mizzen topmasthead; cheek block alongside topmasthead; down to cleat on channel.

(27) ½'' downhaul: head of sail through thimble to block on mainmast band; down and belay on lower band or forebrace bitts.

(28) ½'' tack line: belays on forebrace bitts.

(29) ¾'' sheets (two): single blocks with beckets on clew; single blocks on outboard after ends of mizzen channels; belay to cleat on rail.

Spanker: (30) ¾'' peak halyard: splice to peak band; single block on mizzen cap; single block on gaff strop; single block under cap; down and belay on spencer mast step.

(31) ¾'' throat halyard: single block with becket on gaff jaws; double block under mizzen top; down and belay on spencer mast step.

(32) ½'' nylon vangs (two): splice to peak band; down to single block on channel each side; belay to cleat near rail.

(33) ¾'' topping lifts (two): splice to eye on mizzen cap; single block with becket, purchase to single block on boom strop 7'6'' inboard of boom end; down through cheek block and in through one or two fairleads to belay on pin through jaws.

(34) ½'' brails (three): splice to gaff; out through leech holes; back to cheek blocks on gaff; inner cheek block, on gaff jaw, to be triple; down and belay on spencer mast step.

Tack: lash to jaws.

(35) ¾'' outhaul: double block on clew; standing end on boom band; single block on strop over boom end; cheek block at boom end; in to pin through jaws.

(36) ¾'' sheet: single block with becket to slide on horse; double block on boom bridle; single deck block port side; single block on

separate boom bridle; deck block starboard side; belay to cleat on deck.

(37) ¾'' boom vangs (two): for each, single block with becket on boom end; single block outboard on taffrail; belay to cleat well outboard, near taffrail.

Forecourse: (38) 1'' braces (two): single blocks with beckets on yardarms; single blocks at forward ends of main channels; belay to timberheads abreast mainmast.

(39) ¾'' lifts (two): yardarm bands to single blocks on cap; down to pinrails.

(40) 1'' sheets (two): double blocks on clews; single blocks with beckets on channels; belay to timberheads.

(41) 1'' tack lines (two): double blocks on clews; single snapshackle blocks with beckets; belay on timberheads.

(42) ¾'' clew garnets (two): clews to single blocks on yardarms; in to single blocks under top; down to pinrails.

(43) ½'' buntlines (four): similar to main (see below).

Main course: (44) 1'' braces (two): single blocks with beckets on yardarms; single blocks at after outboard corners of galleries; belay to cleats on deck, near rail.

(45) ¾'' lifts (two): yardarm bands to single blocks on cap; down to pinrail.

(46) 1'' sheets (two): double blocks on clews; single blocks with beckets on main channels; belay on timberheads.

(47) 1'' tack lines (two): double blocks on clews; single blocks with beckets on fore channels; belay on timberheads.

(48) ¾'' clew garnets (two): clews to single blocks on yardarms; single blocks under top; down to pinrails.

(49) ½'' buntlines (four): grommets in foot of sail; up through two thimbles on forward side of sail to cheek blocks on yards; in to blocks under top; down to pinrails.

Foretopsail: (50) ¾'' braces (two): single blocks on yardarms; standing ends on maintopmast crosstrees; single blocks under crosstrees; down to pinrails.

(51) ¾'' lifts (two): yardarm bands to single blocks on cap; down to pinrails.

(52) 1'' sheets (two): clew to single blocks on forecourse yardarm bands; in to single blocks on foreyard band; double blocks on falls; single blocks with beckets on lower foremast band; belay on maintopbowline bitts.

(53) ¾'' clew garnets (two): clew to single blocks on yardarms; single blocks under crosstrees; down and belay on foretopbowline bitts.

(54) ½'' buntlines (four): grommets in foot of sail; up through two thimbles on forward side of sail to cheek blocks on yard; in to single blocks under crosstrees; down through fairleads in foretop to pinrail.

(55) 1'' halyard: ½'' wire over sheave in topmasthead; triple block on end of wire; double block with becket on foremasthead just above top; fall to snatch block under foretopbowline bitts.

(56) ¾'' reef tackles (two): single blocks on leech cringles; standing ends on yardarms; single blocks on yardarm bands; in to single blocks on topmast band; down through fairleads in top to pinrail.

Main topsail: (57) ¾'' braces (two): single blocks on yardarms; standing ends on mizzen topmast head; single blocks slung from mizzen topmast head; down through fairleads in mizzen top to pins in spencer mast step.

(58) ¾'' lifts (two): yardarm bands to single blocks on cap; down through fairleads in top to pinrails.

(59) 1'' sheets (two): clews to single blocks on main yardarm bands; in to single blocks on main yard band; double blocks on falls; single blocks with beckets on lower mainmast band; belay on forebrace bitts.

(60) ¾'' clew garnets (two): clews to single blocks on yardarms; single blocks under crosstrees; through fairleads in top down to pinrails.

(61) ½'' buntlines (four): holes in foot of sail; up through two thimbles on forward side of sail to cheek blocks on yard; in to single blocks under crosstrees; down through fairleads in top to pinrails.

(62) 1'' halyard: ½'' wire over sheave in topmasthead; triple block on end of wire; double block with becket on mainmasthead just above top; fall to snatch block under forebrace bitts.

(63) ¾'' reef tackles (two): single blocks on leech cringles; standing ends on yardarms; single blocks on yardarm bands; in to single blocks on topmast band; down through fairleads in top to pinrails.

Mizzen topsail: (64) ¾'' braces (two): yardarm bands to single blocks on mainmast cap; down through fairleads in main top to pinrails.

(65) ¾'' lifts (two): yardarm bands to single blocks on topmasthead; down through fairleads in top to cleats on mizzen channels.

(66) ¾'' sheets (two): clews to single blocks on crossjack yardarm bands; in to single blocks on mizzenmast band; double blocks on falls; single blocks with beckets on channels; fall belays on spencer mast step. (not shown)

(67) ¾'' clew garnets (two): clews to single blocks on yardarms; single blocks on topmasthead; down through fairleads in top to spencer mast step. (not shown)

(68) ½'' buntlines (four): grommets in foot of sail; up through two thimbles on forward side of sail to cheek blocks on yard; in to single blocks on topmasthead; down through fairleads to cleats on mizzen lower shrouds. (not shown)

(69) ¾'' halyard: ⅜'' wire over sheave in topmasthead; double block on end of wire; single block with becket on mizzen masthead just above top; fall to spencer mast step.

Crossjack yard: (70) ¾'' braces (two): single blocks on yardarm bands; single blocks at top of transom at side; belay to deck cleat.

(71) 1'' halyard: ½'' wire over sheave in mizzenmast head; triple block on end of wire; double block with becket on spencer mast step; fall to snatch block under step.

(72) ¾'' lifts (two): yardarm bands to single blocks on mizzen cap; down through fairleads in top to cleats on mizzen channels.

Fore topgallant: (73) ½'' braces (two): yardarm bands to single blocks on main topgallant head; down through fairleads in main top to pinrail.

(74) ½'' sheets (two): clews through single blocks on topsail yardarms; in to blocks under crosstrees; down through fairleads in foretop to pinrails.

(75) ½'' lifts (two): yardarm bands to blocks on masthead; down through fairleads in top to pinrails.

(76) ½'' clew garnets (two): clews up to blocks on yardarms; in to cheek blocks or sheaves in parrel blocking; down through fairleads in crosstrees and top to pinrail.

(77) ¾'' halyard: from sling up through sheave in masthead; down to foretopbowline bitts.

(78) ⅜'' buntlines (four): grommets in foot of sail; up through two thimbles to cheek blocks on yard; in to blocks or sheaves in parrel blocking; down through fairleads to pinrails.

Main topgallant: (79) ½'' braces (two): yardarm bands to single blocks on mizzen topmast head; over to sheaves in main top; down to forebrace bitts.

(80) ½'' sheets (two): clews through blocks on topsail yardarm bands; in to blocks under crosstrees; down through fairleads in main top to pinrails.

(81) ½'' lifts (two): yardarm bands to blocks on topgallant masthead; down through fairleads in main top to pinrails.

(82) ½'' clew garnets (two): clews up to blocks on topgallant yardarms; in to blocks or sheaves in parrel blocking; down through fairleads to pinrails.

(83) ¾'' halyard: from sling up over sheave in topgallant masthead; down to forebrace bitts.

(84) ⅜'' buntlines (four): grommets in foot of sail; up through two thimbles to cheek blocks on yard; in to blocks or sheaves on parrel blocking; down through fairleads to pinrails.

All lines Dacron or Terylene except spanker vangs. Wire halyards of fore and main topsails stainless steel 7 x 19 strand.

Blocks all wood shell
(dimensions minimum; larger sheaves beneficial in all cases)

for rope size	shell length	sheave diameter
1''	10''	6¼''
¾''	6''	3½''
½''	4''	2¼''
⅜''	3''	1¾''

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Jacket photograph of *Fancy* by William J. Book

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